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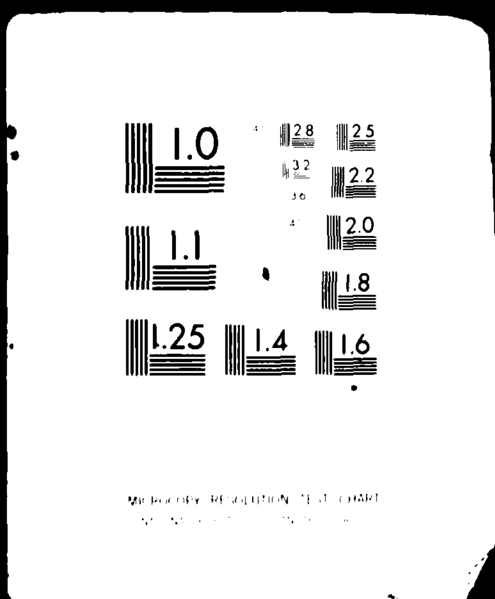

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Fort Leavenworth, Kansas 66027

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DIVWAG MODEL DOCUMENTATION
VOLUME II
PROGRAMMER/ANALYST MANUAL

ACN 21704

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ABSTRACT

This documentation provides a complete description of the Division War Game (DIVWAG) Model as it exists on 1 April 1976. The documentation is composed of an Executive Summary (Volume I), an Analyst/Programmer Manual (Volume II), and the Planner/User Manual (Volume III). Described within the volumes are the model design and development; application; capabilities; limitations; facility, equipment, and personnel requirements; data input requirements; mathematical and logical processes; program descriptions; output descriptions; user instructions; and diagnostic messages. This documentation was originally produced in April 1973 by Computer Sciences Corporation (CSC) under Contract DAAG 11-70-0875.

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SECTION I

DIVWAG SYSTEM GENERAL DESCRIPTION

CHAPTER 1

INTRODUCTION

1. PURPOSE. The purpose of this volume is to provide computer programmers and military operation research analysts with information necessary to understand the detailed operation of the DIVWAG system, the means by which the models represent the military activities simulated, and the means by which the constituent computer programs perform the necessary model functions. This volume also provides the instructions for preparing the DIVWAG data base.

2. SCOPE. This volume includes the following elements of the DIVWAG system documentation.

- Descriptions of the mathematical and logical processes
- Input data requirements
- Detailed program descriptions
- Output data descriptions
- Data storage techniques
- Diagnostic message handbook
- Computer system requirements.

3. ORGANIZATION. This volume is divided into eight sections. The introductory section provides a brief description of the DIVWAG system and its developmental history followed by the minimum computer system requirements and definitions of terms. The second through sixth sections describe the Constant Data Input, Orders Input, Period, Period Output, and Analysis Output Processors respectively. Each major element of a processor constitutes a chapter with its associated appendixes. The mathematical and logical processes are described in the chapter and the appendixes include the input requirements, detailed program descriptions, output descriptions, and references. Program source listings are available under separate cover. Section seven describes utility routines used by more than one processor. A handbook, listing and describing all diagnostic messages, is included in section eight.

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CHAPTER 2

MODEL DESIGN AND DEVELOPMENT

1. NEED FOR A DIVISION WAR GAME MODEL:

a. Within the Army Planning System,[1] there are two significant planning tasks that demand the use of a credible and acceptable division war game model: objective force and resource planning, and approved (constrained) force planning. Both planning tasks contribute to the primary objectives of the Army Planning System; namely, to:

- Provide timely, pertinent Army views for consideration by the Secretary of Defense.

- Contribute persuasively to the formulation and presentation of joint military strategy, force objectives, and other matters of the Joint Strategic Planning System.

- Provide timely guidance to Army staffs and commanders.

b. Annually, as part of the Department of Defense Planning, Programming, and Budgeting System (PPBS), the Military Department staffs submit to the Secretary of Defense plans for those Service forces and resources they feel are necessary to meet the national security objective. These plans are referred to as objectives or requirements plans. Imbedded in these plans are the results of detailed analyses, studies, and games that supply the rationale to justify the major Service forces planned or recommended. As an integral part of the preparation of Army objectives plans, detailed study and analysis is devoted to cost-versus-effectiveness trade-offs among alternative forces to achieve the desired objective of countering the enemy threat to the United States and its Allies. The most significant building block in advancing the Army's recommendations is the division or, more precisely, the division force equivalent (DFE). A division war game model, properly applied, will provide evaluation data to support Army objective force planning.

c. In the course of exercising the PPBS, the Secretary of Defense makes an annual decision on the apportionment of resources to each Military Department, and the results of the decision are embodied in the Five-Year Defense Program (FYDP). With this decision, the resources available to each Military Service are approved, as are the forces represented by the resources. The Army, as with the other Services, enters into a period of constrained force planning. An obvious objective of such an exercise is attaining the most combat effective force for the resources available. Again, cost effectiveness studies and analyses contribute to those approved force structures appearing in the Army Force Development Plan; and, as with objective force planning,

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the division or the division force equivalent becomes the basic building block. A division war game model is of immeasurable value in arriving at the design and structure of the Army in the field.

d. Aside from direct application of a division war game model to the formalized Army Planning System, there is a major requirement to assess the value of competing individual systems (firepower; mobility; command, control, and communications; combat service support; and intelligence) to the overall combat effectiveness of Army forces in the field. All aspects and capabilities of these individual competing systems are studied, analyzed, and tested; however, until the systems are aggregated into a combat organization and evaluated as part of a composite system, the contribution (value) of each system to overall combat effectiveness cannot be properly assessed. A division war game model simulates all functions of land combat at an organizational level that permits evaluation of component organizations and systems.

2. DIVISION WAR GAME MODEL DEVELOPMENT:

a. During the late 1960s a war game model, DIVTAG II (DIVision Through Army Group), was developed for U.S. Army Combat Developments Command (USACDC) and exercised under the sponsorship of the USACDC Institute of Combined Arms and Support (USACDCICAS). DIVTAG II was recognized as a major developmental effort incorporating several potentially significant features, including the DIVTAG Scenario Language (DSL), which allowed gamers to formulate their game period plans and orders in English-like commands for communication to the DIVTAG II computer submodels.

b. Experience in use of the DIVTAG II model to generate game data for analysis determined that the DIVTAG II system--including both human and computer elements--functioned far too slowly to be an effective tool for responding to USACDC force analysis requirements. In addition, several flaws were suspected in the application of DIVTAG II algorithms to the simulation of combat reality.

c. On 10 August 1970, the Combat Developments Research Office of Computer Sciences Corporation (CSC-CDRO) initiated Project 3-71, Improvement of the ICAS War Game Model (IMPWAG) under Contract DAAG11-70-C-0875. The overall tasks of this project were to identify deficiencies and problem areas in DIVTAG II through a review of the documentation; to establish a priority list for correction/resolution of the deficiencies and problem areas; to correct or improve DIVTAG II within project constraints; and to document corrective action, improvements, and resolutions, as well as recommended follow-on corrective action. This project was completed on 15 May 1971.

d. In February 1971, project tasking was issued to CSC-CDRO to design, develop, and validate:

(1) A computer-assisted war game model(s) which would permit determination of the impact on force effectiveness of changes in the mixes of major weapons and other systems at an appropriate level of resolution.

(2) An analytical methodology for analyzing the output of the model(s) developed and determining the effectiveness of a single force.

(3) An analytical methodology for comparing alternative forces.

The project described above is entitled "Development of a Division War Game Model (DIVWAG)" and was completed on 31 December 1971.

e. On 15 November 1971, CSC-CDRO initiated Project 2-72, Improvement of the War Gaming Capability (WAGCAP), the objectives of which were to:

- Incorporate selected improvements and additions into the DIVWAG Model
- Train a government team in the major aspects of the application of the model to include associated analytical methodologies.

The project was completed on 15 July 1972.

f. The DIVTAG II model and its successor, the DIVWAG model, were programmed to execute on the Control Data Corporation 3300 computer system at Fort Leavenworth, Kansas. They contained numerous machine-dependent programming features. In July 1972, tasking was initiated under Project 1-73 to reprogram the DIVWAG model to conform with newly established U.S. Army software development standards. The model would thus be readily adaptable to many computer systems available to the government, and fully operational on the Control Data Corporation 6500 computer system installed at Fort Leavenworth, Kansas, in November 1972. The project included fully documenting the DIVWAG model and performing benchmark validation.

g. The programming project was completed in April 1973 and the government accepted the model from CSC on 15 April 1973. Since then, it has been utilized to support six study efforts:

(1) Conceptual Armored Division (CONAR) Study (May 73 - Sep 73).

(2) Family of Scatterable Mines (FASCAM) Study (December 73 - August 74).

(3) TOW-DRAGON Antitank Mix Study (October 74 - December 74)

(4) Integration of Intelligence From All Sources (IIFAS) Study (May 75 - Sep 75).

(5) Antiarmor Systems Program Review (ASPR) (Jan 76 - Apr 76).

(6) Legal Mix V Study (Apr 76 - Aug 76).

h. In August 1974 a contract was awarded to Braddock-Dunn-McDonald (BDM) to improve the Engineer and Movement models. The $65,000 effort was completed in October 1975. Successful integration of the changes has not been made and the documentation does not reflect BDM's modifications.

NOTES

CHAPTER 3

SUMMARY DESCRIPTION

1. MODEL OBJECTIVE. The DIVWAG Model was developed as a computer-assisted war gaming system for use in simulating military interactions between opposing division-size forces and their major elements, with outputs permitting evaluation and comparison of the combat effectiveness of such division forces. The DIVWAG Model objective is to provide means for determining the impact on force effectiveness of changes in the mixes of major weapons and other systems. The DIVWAG Model permits two-sided simulations. The games using the DIVWAG Model can be open, semi-open, or closed. The games will be basically rigid, but the model can be operated with semi-rigid intelligence and special weapons assessment. Resolution is partially adjustable. Time resolution may be as small as a hundredth of a minute (0.01 minute), space resolution as small as one meter, and unit resolution as small as one individual; however, for practical gaming purposes, unit resolution is on the order of a battalion, depending on terrain scale and size forces being gamed.

2. MODEL CAPABILITIES. The model capabilities are discussed in terms of operational capabilities and operational scope.

a. Operational Capabilities. The DIVWAG Model has the following operational capabilities:

(1) Producing data for use in evaluating effectiveness of forces composed of maneuver units and their associated combat support and combat service support units.

(2) Producing detailed quantitative data for use in comparing the effectiveness of the alternative forces.

(3) Simulating high and mid-intensity conflict (nuclear and conventional war).

b. Operational Scope. The DIVWAG Model scope is defined in terms of command levels, military services, types of operations, geographical areas of operations, rate of operation, and combat functions.

(1) Command Levels. The DIVWAG Model has been designed to produce data to evaluate division forces; i.e., a division plus an appropriate slice of corps or field army troops. There is explicit representation of the task organization of the forces. Echelons of command are defined, and reports are prepared that reflect the status of each command echelon and include the aggregated status of all subordinate units. Communications are simulated between division, brigade/regiment, and battalion command units. A total of 1000 units can be played, divided among Red and Blue forces. These units must be structured into task organizations for each force.

(2) Military Services. The DIVWAG Model has been designed to accommodate and integrate all types of land forces (e.g., armored, mechanized, and airmobile) and supporting tactical air forces.

(3) Types of Operations. The DIVWAG Model provides for representation of the major types of military operations; i.e., offensive, defensive, retrograde (delay/withdrawal), covering force, and movement. In addition the model is capable of simulating high and mid-intensity conflict (nuclear and conventional war).

(4) Geographical Area of Operations. The DIVWAG Model can accommodate rectangular geographical areas as large as 8,000 kilometers on a side. The system is limited in its application to worldwide geography only by availability of appropriate input data.

(5) Rate of Operation. The rate of operation of the DIVWAG war game is not firmly established. It is estimated that the simulation model can produce game period turnaround data in a 2:1 ratio of computer time to combat time simulated for a relatively straightforward combat situation at a battalion level of resolution. Actual timing is a function of the level of resolution being gamed the number of units being gamed, the level of military activity portrayed, and the nature of other computer jobs on the system when the model is being used in a multiprogramming environment. Considering the time required for period turnaround, a real time to game time pace of approximately 5:1 is considered reasonably attainable for gaming at a sufficient level of complexity to provide useful results.

(6) Combat Functions. The DIVWAG Model can address the following functions and evaluate the contribution to force effectiveness of varying the mixes of related elements:

(a) Intelligence functions; surveillance and target acquisition.

(b) Command, control, and communications functions; decision and communications delay times.

(c) Firepower functions.

(d) Mobility functions; aerial, ground, and firepower mobility.

(e) Combat service support functions; supply and transportation; loss, expenditure, and consumption rates; personnel replacement.

3. FUNCTIONAL COMPONENTS AND CAPABILITIES. Functionally the DIVWAG Model is a dual system; it functions physically/electronically as a data processing system and, at the same time, it functions in simulation as a military combat system. To be complete, a description of the model must consider both aspects. The DIVWAG Model is described herein in terms of its data processing functional components and its military simulation functional capabilities.

a. Data Processing Functional Components. The DIVWAG software is divided functionally into five processors that communicate with each other through common files and records. Designations and functions of these processors are:

(1) Constant Data Input Processor. The Constant Data Input Processor receives data on cards, edits the data, and assembles the data onto tape and disk files.

(2) Orders Input Processor. The Orders Input Processor receives player operational orders in semi-military language and processes these orders into detailed instructions to the units simulated.

(3) Period Processor. The Period Processor receives translated player orders and simulates the military action.

(4) Period Output Processor. The Period Output Processor receives results from the Period Processor and compiles specific reports and gross summary reports.

(5) Analysis Output Processor. The Analysis Output Processor receives detailed data from the Period Processor as period history tapes; retrieves, arrays, and performs the statistical analysis of the data; and outputs the arrayed data in specified formats.

(6) Data Flow. The flow of data between processors and to the gaming staff and analysis team is displayed graphically in Figure I-3-1. The input and output of each processor are tabulated in Figure I-3-2.

b. Military Simulation Functional Capabilities. The Period Processor simulates an extremely broad and flexible spectrum of military activity through four categories of models (intelligence and control, firepower, mobility, and combat service support). The models are described individually in the following subparagraphs.

(1) Intelligence and Control (INC). This model provides the quantitative data necessary for evaluation of the contribution of sensor mixes to force effectiveness. It integrates the closely related functions of surveillance; target acquisition; combat intelligence; and command, control, and communications. Gamers are permitted to input intelligence from sources not simulated by model components. The information obtained from sensors and from gamer input is processed and used automatically by the Intelligence and Control Model to make requests for fire support on acquired targets. Fire missions are requested from available attack helicopters, Air Force close air support (CAS), or ground-based artillery by use of a set of decision rules, according to the situation. Sensor information is also converted into general intelligence by this model to produce a summary report at the end of each game period. The summary outlines the current status of what may be known at division level concerning the size, type, and location of the enemy forces in the battle area. This report is to aid the gamer in preparing orders for the next game period. The Intelligence and Control Model consists of three interrelated submodels: Collection, Processing, and Decision. The military functions simulated by the Intelligence and Control Model are summarized below and include:

(a) Sensing and Reporting. The capabilities of individual ground and aerial sensors are considered to simulate the detection and collection of information or intelligence on units of the opposing force and the summarizing

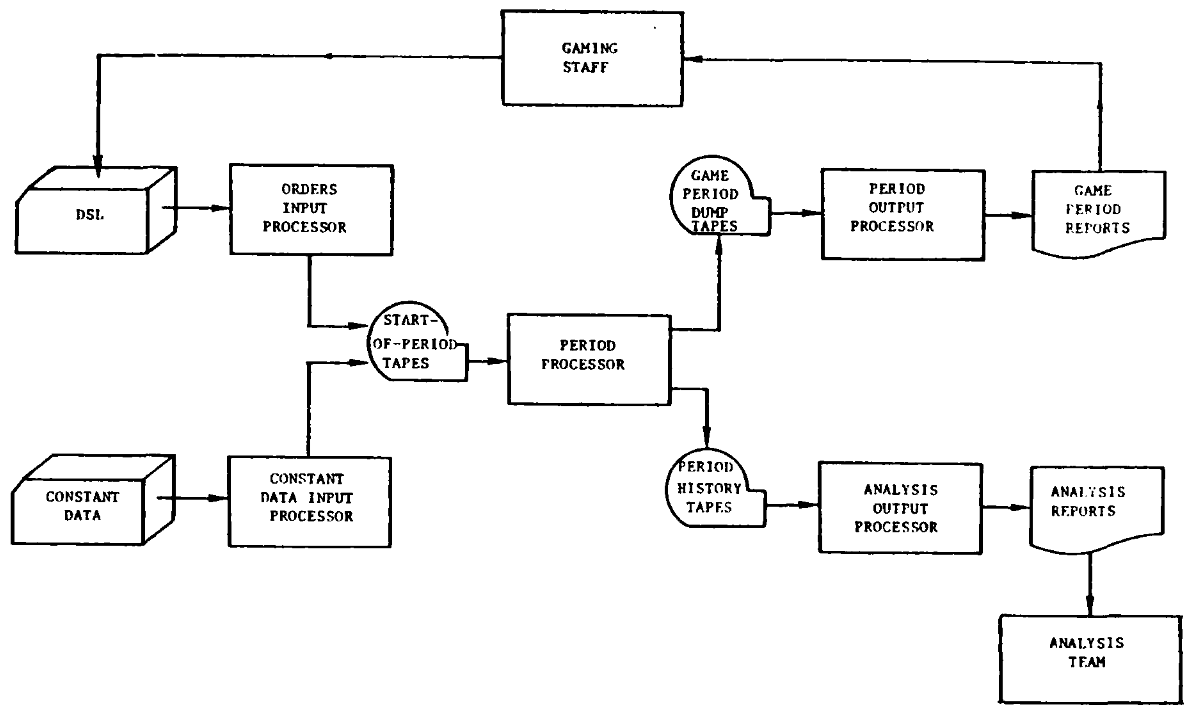

Figure I-3-1. DIVWAG System Data Flow

Processor	Input	Output
Constant Data Input Processor	Constant Data Cards	Formatted dumps of data files.
Orders Input Processor	DSL Order Cards	Unit and battle order tables.
Period Processor	Start-of-Period Tapes	Game Period History Tapes, Game Period Dump Tapes, printed output from the processor.
Period Output Processor	Game Period Dump Tapes	Game Period Status, Activity, Intelligence and Barrier Reports.
Analysis Output Processor	Period History Tapes	Analysis Reports

Figure I-3-2. Processor Input and Output of such information into sensing reports, which enter the intelligence chain. Both target and nontarget intelligence are simulated. Type sensors modeled include moving target indicator radar, unattended ground sensor fields, countermortar and counterbattery radar, air defense radar, visual observers in light observation helicopters and fixed wing reconnaissance aircraft, surveillance aircraft (Mohawk type) with moving target indicator radar capability, and high performance reconnaissance aircraft with visual and various photographic capabilities.

(b) Time Delays. The model introduces separate delays for time consumed in each of the principal steps: intelligence collection, intelligence analysis, routing, and use or the information in decisions.

(c) Development of Targets for Fire Missions. A separate channel for development of target intelligence is simulated by the model. This channel provides acquired targets for fire missions without the relatively long delays involved in general intelligence processing.

(d) Intelligence Analysis and File Maintenance. Comparison of a new report with information already in the intelligence files is simulated, and if reports relate to the same unit they are consolidated. The existence of new units or parent units can be deduced. Intelligence analysis centers are simulated for each unit at maneuver battalion, brigade or regiment, and division levels. Files are designed to stay within the limits of 10, 20, and 100 reports, respectively, for these three echelons.

(e) Decisions on Information/Intelligence Flow and Requests for Fire Support. The routing of information or intelligence among intelligence analysis centers and command elements at the three echelons is simulated with the use of a flow structure and set of routing criteria, according to the information in each report. A similar set of criteria is used to determine whether a target qualifies for fire support and what type of fire support (attack helicopter, TACAIR, ground-based artillery) will be requested.

(f) Contents of Intelligence Report. The end-of-period contents of the division intelligence file are used for this report. Each report that met criteria to reach this file and was not discarded from the file in favor of a more recent record or consolidated into a record of a parent unit is reflected in the Intelligence Report. Items of estimated information given in the report for each opposing unit in this intelligence file include size, activity, type, direction of last move, time last sensed, and number of sensings attributed to this unit.

(2) Firepower. The firepower models provide the quantitative data necessary for evaluation of force effectiveness as a function of changes in mixes and types of major weapon systems. The models integrate all aspects of mid or high intensity combat where interaction of opposing forces may occur and result in personnel or materiel losses. The firepower models coordinate and integrate the effectiveness of combined arms teams by modifying assessment routines for high attrition events to account for concurrent and parallel killing capabilities. For example, when units are engaged in combat, kills are

related to the number of fire elements on opposing sides. Should an attack helicopter fire team make an attack during a ground combat cycle, the ground combat cycle will be interrupted immediately prior to the helicopter attack, the status of the units in ground combat will be updated to that moment, the effects of the helicopter attack on the current ground combat unit's status will be assessed, and the ground combat cycle will be resumed. The same assessment technique is followed for other interfacing firepower activities. Five models simulate the firepower function: Ground Combat, Area Fire, TACFIRE, Nuclear Assessment, and Air Ground Engagement. Each of these models assesses damage inflicted and produces loss, expenditure rate, and consumption data for use in evaluating the supply and transportation systems.

(a) Ground Combat Model:

1. The Ground Combat Model represents the interaction between the direct fire weapons of opposing maneuver units engaged in ground combat.

2. The model represents the interaction and the effects of weapons of cross-reinforced units. Combat power may be enhanced by employing combined-arm forces against the enemy. The effectiveness of the maneuver unit is largely dependent on the combination and coordination of weapon systems within the unit. The distance of separation of weapon systems is limited so that mutual support is possible when weapon density permits.

3. The impact of the environment is represented by the model. All movement in ground combat is subject to the constraints imposed by the environment wherein ability to move forces by ground is degraded by the effects of adverse weather, terrain, and visibility. The application of firepower is largely controlled by the environment since effectiveness of each weapon system is limited by its associated target acquisition capabilities. Target acquisition cannot occur unless line of sight exists between the observer and target. Line of sight may be severely limited due to terrain roughness, vegetation, and forestation. A firer may lose line of sight on a moving target before firing a round. A moving target may drop out of line of sight during the time of flight of the round. Target acquisition is limited by visibility, whether due to adverse weather or night combat operations. Under conditions of reduced visibility, target acquisition is enhanced by the employment of night vision equipment.

4. The interaction of each maneuver unit with the enemy is considered by the model in terms of a maneuver unit's effectiveness and vulnerability. The maneuver unit's effectiveness is influenced by the level of activity. As the level of activity increases, more weapon systems can acquire targets. As individual moving weapon systems stop to fire, the signature (i.e., evidence of that weapon firing) increases with the level of activity. The maneuver unit's vulnerability is influenced by the level of activity. A firing weapon system may disclose its position and become a target for enemy fire.

5. The Ground Combat Model relies heavily on the existence of data to describe weapon/ammunition effectiveness against varying target

types in a combat situation. The model also requires adequate data to describe the target acquisition capabilities of all employed sensor types other than unaided vision.

(b) Area Fire and TACFIRE Models. The Area Fire and TACFIRE Models simulate the scheduling of nonnuclear munitions for area fires, and the delivery and assessment of results of nonnuclear fires. Area fire events are generated by two methods. First, gamers issue fire orders prior to the engagement period for fire with specific ammunition at specific coordinates. Second, during the engagement period target information is developed by the Intelligence and Control Model with a request for nonnuclear artillery fire, and the TACFIRE Model automatically schedules the required fire missions for the fire units. The automatic mode is referred to as the TACFIRE mode. Targets in this mode consist of targets of opportunity and are limited to those enemy units detected and processed by the Intelligence and Control Model. Fire units are battalion or battery size, and integral fire units are used in attacking area fire targets. The fire units are constrained by range limitations, volley firing times, number of tubes or rails per fire unit, and weapons/munitions availability. A target threat priority value ranging from 1 to 9 is assigned to each area fire target, and is based upon its estimated size, type, activity, range, and the tactical doctrine used in artillery employment for the particular game. Priority one is a higher priority than priority two, etc. If a backlog of targets exists, targets are engaged in highest priority order. The Area Fire and TACFIRE routines are separated into three functional classes: scheduling, delivery, and assessment. Most of the routines for the automatic TACFIRE mode are concerned with scheduling of fires. The delivery routines deliver the munitions on target and determine units whose presence in the impact area will require assessments. The assessment routines then calculate the effects of the fire events, based on number of rounds fired, lethal area of nonnuclear munitions, dimensions of the target, number and density of target elements, and target vulnerability. The assessment routine makes adjustments in target personnel and equipment to reflect losses and in the fire unit's munitions on hand to reflect expenditures.

(c) Air Ground Engagement Model. The Air Ground Engagement Model simulates for both opposing forces all air-to-ground and ground-to-air interactions falling within the definition of close air support (CAS) and otherwise directly related to ground combat operations. These operations include aircraft fires provided by other Services, and Army aircraft delivering direct aerial fires (DAF). The Air Ground Engagement Model determines all attrition and casualty results of such interactions. The Air Ground Engagement Model is sufficiently flexible that major changes in aircraft characteristics, quantity or mixes of the major weapon systems, or their modes of employment will be reflected in the measures of force effectiveness. Single or multiple aircraft flights are generated by the Intelligence and Control Model or are directed by gamer orders. Attrition of aircraft while in flight is based on the location of air defense capable units; i.e., units that contain air defense weapons. The Air Ground Engagement Model divides the flight path into the following segments as appropriate: air base to safe point, safe point to target, target to safe point, and safe point to air base. The Air Ground Engagement Model:

- Selects from available aircraft and munitions types those best suited for the mission, determines the time required for aircraft preparation and pilot briefing, and schedules the time for aircraft to be airborne.

- Maintains a current status record for aircraft assigned to a mission, to include munitions and fuel, aircraft losses caused by enemy activity, and effects of the aircraft on enemy targets.

- Moves the aircraft progressively along the mission segments, assessing aircraft status,[1] attrition, and accomplishments at the completion of each segment to determine if the mission should continue.

- Determines the results of attacks on targets in terms of aircraft losses and target losses.

- Upon completion of the mission and return to the airbase, aggregates total mission results (including total mission time), assesses aircraft damage, and determines delay times for subsequent mission availability of the aircraft.

(d) Suppression Model. The treatment of suppressive effects of area fires or aerial strikes upon a unit was introduced to the DIVWAG Model through the addition of a Suppression Model. This model represents suppressive effects by the interruption of selected activities (unit movement, delivery of area fires, delivery of air defense fires) in response to incoming fire. Length of interruption depends on the activity interrupted and nature of fire received, and the interruption is extended as fires continue to be received.

(e) Nuclear Assessment Model. The Nuclear Assessment Model simulates the delivery of and the assessment of results of tactical nuclear fires. All nuclear fires are conducted in response to gamer fire order, issued prior to the simulated engagement period. The gamer fire order specifies the unit to fire, weapon and munition to fire, yield, height of burst (if controllable), and designated ground zero. Thus, all planning of nuclear fires must be carried out by the gamer prior to an engagement period. In response to a nuclear fire order, the Nuclear Assessment Model simulates the actual firing, the nuclear detonation, and the assessment of effects against all units as well as on obstacles and facilities within the effects area of the round. The detonation and effects of atomic demolition munitions (ADM) are also simulated by the model. Simulated effects include those due to blast, prompt nuclear and thermal radiation, and delayed effects due to induced radiation. Fallout effects are not simulated.

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1. Includes effects of air defense activities, weather, and terrain.

(3) Movement Model. The Movement Model represents unit movement other than airmobile operations including the effects of those activities that serve to improve or impede movement. The Movement Model provides the quantitative data necessary for evaluation of force effectiveness as a function of ground movements, and the related effects of significant changes in the mixes and types of mobility means. The Movement Model considers the following aspects of force mobility:

(a) Air Movement. The Air Movement section of the model simulates moves by aircraft not in connection with airmobile operations. Air movements may be ordered externally by gamers or generated internally by the Air Ground Engagement Model. Aircraft availability, class IIIA supplies, and weather limitations are checked before the air movement is allowed. Air routes, altitudes, and speeds are specified by the gamer order or are determined by the model generating the movement internally. Once tha air movement is initiated, it will be completed unless terminated due to losses. At the end of each flight segment the unit will be updated to reflect losses of aircraft and personnel and the status of associated supplies.

(b) Ground Movement. The Ground Movement section of the model simulates moves by surface transportation. Ground movements of units not engaged in combat are ordered by gamers. Ground movements are affected by category of move, unit mission, formation type, vehicle mobility characteristics, terrain conditions, daylight or darkness, road nets, weather, natural obstacles, and enemy created conditions. The maximum movement rate for a unit is the rate of the slowest type vehicle in the unit. Some of the other characteristics of ground movement are indicated below.

1. Administrative/Supply Movements. Administrative routes are generated by gamer orders; supply routes, by the Combat Service Support Model. The road movement rate depends on road type, grade, weather conditions, and nighttime or daytime conditions. Administrative movements are executed in segments determined by terrain cell boundaries or en route obstacles. Units are halted by events scheduled for the moving unit and by encountering obstacles. After the delay, the unit is not able to make up this lost time but continues to move at its appropriate rate.

2. Tactical Movements. Tactical routes are generated by gamer orders and are executed in segments in the same manner as administrative movements. Starting times and normal tactical movement rates are specified for each unit type for attack, withdrawal, and reinforcing missions, as well as for day or night movements. Units are halted for obstacles or minefields. After such delay, tactical units attempt to make up the lost time, and move at the limiting mobility class rate for that purpose. The limiting mobility class rate depends on terrain roughness and vegetation, slope and soil trafficability, forestation, weather conditions, and nighttime or daytime conditions. Each equipment type is assigned to a mobility class, and only those mobility classes used during tactical movements are considered for determining the limiting mobility class.

3. Maneuver Movements. Maneuvering weapon systems execute their movements at maximum limiting mobility class rates. Since different weapon systems have different maximum rates, and since the movement rate of a maneuvering unit is limited by the rate of the slowest weapon system, faster weapon systems have periods of time when they are stationary. Maneuver movement is controlled entirely by the Ground Combat Model, which determines detection capabilities, vulnerability, and weapon system capabilities.

(c) Stay Activity. The model also simulates stationary activities for all gamed units not engaged in other specified activities; i.e., all units that are not performing another military activity such as firing, moving, or combat. Whether or not addressed by gamer orders, an inactive gamed unit will consume classes I and III or IIIA supplies and can be assessed as to losses and status; other units can gain information about the inactive unit. If a unit has completed all its orders before the end of a game period, the unit will automatically stay until the end of the period. Stay activity orders can be written to command ground units to remain in position for a specified length of time or until a specified game time arrives.

(d) Engineer. The Engineer Model simulates the scheduling and execution of engineer activities associated with the construction and destruction of obstacles and facilities. The model accepts engineer tasks, assigns task priorities, determines task feasibility, mobilizes mission units to execute the tasks, simulates the engineering activity in terms of time and materiel resources used, and demobilizes the mission units.

1. Obstacles and facilities are parts of an overall barrier plan developed for the game being conducted. Engineering activities can be initiated by gamer order to start work on a specified obstacle or facility or by request from the Movement Model when some engineering activity is necessary for the conduct of a directed movement. Where the engineer activity is requested by the Movement Model, the moving unit is unable to complete its move until the engineer activity is completed.

2. Engineer task priorities are based primarily upon the urgency of the activity in terms of its impact on the force's overall plan of maneuver. Task feasibility is determined in terms of task site (proximity to FEBA) and time and materiel availability.

3. The Engineer Model automatically allocates resources to each feasible task, constructs a mission unit to execute the task, moves the mission unit to the task site, simulates the initiation of work when sufficient resources are on site, periodically updates task status until completion of the task (or until a gamer order to stop the task is encountered), and returns the mission unit to its origin.

(4) Airmobile Model. The Airmobile Model permits simulation of a variety of airmobile operations. To maintain a high degree of flexibility in application of the model, the simulation depends upon the gaming staff for most of the general planning and decision making prior to execution of an airmobile operation. These plans are relayed to the model by a set of

DSL orders. Activities actually simulated within the model include allocation of transport and escort aircraft to conduct the operation, staging and loading of the airmobile force, the actual airmobile movement, attrition of the airmobile column while in flight to and from the objective area, suppression of air defenses by escort aircraft, deplaning at a landing zone, refueling and rearming of aircraft, and the release of aircraft from operational control of the airmobile force.

(5) Combat Service Support Model. This model simulates the resupply of manpower and materiel to units within the DIVWAG system. The model deals with personnel replacements, replacement of major items of equipment, and resupply of critical consumables such as food (class I), fuel (class III and IIIA), barrier materials (class IV), and ammunition (class V).

(a) Replacement of personnel and major items is accomplished once for each simulated day of combat. Availability of replacement personnel and major end items is on a daily basis, input by the gamer, with available assets accumulating over time; i.e., assets not used on previous days are available in addition to those available for the current time. Requirements are based on unit losses, represented by the authorized unit level of personnel and major items less the quantities on hand within the unit at the time of the replacement action. First priority for replacements and major end items is to front line maneuver units, second priority to reserve maneuver battalions and all artillery units, and third priority to all other units. If sufficient replacements or major end items are not available to fill the needs within a unit priority group, each unit receives a pro rata share of available resources based on amounts required by all units within the priority group. Replacement and major end items arrive at the receiving units after an appropriate travel delay.

(b) The treatment of resupply of consumables within the Combat Service Support Model is conceptually similar to treatment of replacement of personnel and major items. Implementation differs to account for the following:

1. No limitation is placed on quantities of consumables available to the force. In the case of consumables, the primary limiting factor is the availability of transportation to move the materiel from various supply points to the consumer. The model treats movement of consumables through a series of supply points from the nominal point of entry into the force to the using unit. The model uses either a unit distribution or a supply point distribution method on each leg of the supply chain, depending upon the supply class of the consumable and the nature of the receiving unit at each node.

2. To accomplish a more continual flow of consumables, resupply requirements are determined and actions initiated on a more frequent basis than with replacements. The model currently uses a 2-hour cycle for all consumables except class I, which is on a once-a-day cycle. (As experience is gained with the model, some appropriate cycle between the extremes of hourly and daily requirement determination should be established.)

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3. A request for resupply of consumables is generated if the quantity in the unit trains is less than a fixed percentage of the authorized amount in trains. That percentage is currently set at fifty percent.

NOTES

CHAPTER 4

COMPUTER SYSTEM REQUIREMENTS

The minimum computer system requirements for execution of the DIVWAG model are listed below.

Core storage capacity	124,000 words (octal)
Magnetic tape drives	2
Magnetic disk capacity	3,000,000 (decimal)
Printer	1
Card reader	1
Software features	FORTRAN compiler (ANSI)[1]
	Overlay loader (2 levels)
	Mass storage input/output

1. American National Standards Institute Incorporated, American National Standard FORTRAN, ANSI X 3.9; 1966.

NOTES

APPENDIX A

DEFINITIONS OF TERMS

The terms and abbreviations herein are defined as used within the DIVWAG system and may differ from terms defined in AR 320-5, Dictionary of Army Terms; however, AR 320-5 should be used in conjunction with this appendix for a more complete definition of terms.

AAFSS: advanced aerial fire support system.

actual ground zero: the geographical location of detonation of a nuclear weapon.

AD: air defense.

ADAFSS: Army direct aerial fire support system.

ADCU: see air defense capable unit.

ADM: atomic demolition munition.

ADP: automatic data processing.

AGZ: see actual ground zero.

airbase: a base of operations for fixed and/or rotary wing aircraft from which mission aircraft or air units may be dispatched.

air burst: a burst of a nuclear weapon the fireball of which does not touch the earth's surface.

air defense capable unit: any unit possessing defined air defense weapons.

A-kill: damage inflicted upon an aircraft by defending air defense units in which the aircraft is not recoverable for future use.

AM/HI: Airmobility in the Mid/High Intensity Environment; a USACDC study.

analysis of variance: the parametric technique for testing whether several samples have come from identical populations, thus determining the significance of variations in a group of samples.

Analysis Output Processor: an element of the DIVWAG system which produces and arrays data for analysis at the termination of a given set of gaming conditions.

analysis plan: a plan for the analysis of data produced from the application of a model or simulation.

AOP: see Analysis Output Processor.

APC: armored personnel carrier.

area reconnaissance: reconnaissance of a rectangular area defined by four sets of coordinates.

ASR: see available supply rate.

available supply rate: the rate of consumption of ammunition that can be allocated considering the supplies and facilities available, for a given period.

background conditions: the visual conditions surrounding a target which affect the capability of enemy weapons to acquire it as a target.

backorder: that portion of supplies requisitioned which is not immediately available for supply but which will be recorded as a commitment for future issue; in the DIVWAG system it is the amount of a commodity which a unit orders to allow it to maintain its authorized level assuming that the commodity is consumed at a mean usage rate.

band: one of a number of equally dimensioned subdivisions integral to a simulated military unit and paralleling the front of the unit.

barrier: any object--man made or natural--which restricts, delays, or stops the movement of a force or imposes losses of personnel or equipment on units crossing it.

barrier line: a continuous series of barrier segments.

barrier segment: a unique homogeneous element of a barrier defined by its two end points and a mnemonic identification.

Bartlett statistic: a sampling statistic for Bartlett's test of homogeneity of variances.

basic unit: the smallest unit described within the DIVWAG data base by a table of organization of which the total task organization is composed. A basic unit cannot be further subdivided.

battlefield orientation: model approximation to the axis of advance described by the slope in the X-Y plane of a line connecting the centers of mass of the two forces.

begin morning nautical twilight: the time at which the rising sun is 12 degrees below the horizon.

B-kill: damage inflicted upon an aircraft requiring a forced landing of the aircraft; if in enemy territory, the aircraft is not recoverable for future use.

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
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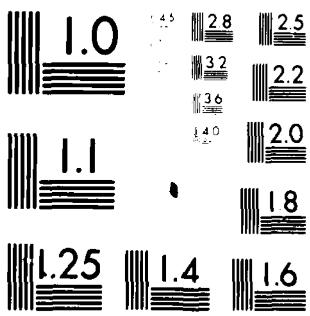

MICROCOPY RESOLUTION TEST CHART

blowdown: the effect of static overpressure or dynamic pressure from nuclear blast resulting in felled man made objects or trees.

BMNT: see begin morning nautical twilight.

CAS: see close air support.

CEP: see circular error probable.

CFS: see constant fire subsegment.

chi-square: a measure of the discrepency existing between observed and expected frequencies.

circular error probable: the radius of a circle within which half of the projectiles are expected to fall.

C-kill: damage inflicted upon an aircraft in which the aircraft is forced to discontinue its mission because of damage to the aircraft or because of a pilot or copilot casualty.

class of supply: the subdivision of commodities necessary to equip, maintain, and operate a military command, generally so divided for planning and administration of the supplies. For definitions of classes of supply see Chapter 9, FM 100-10.

close air support: air action against hostile ground targets that are in close proximity to friendly ground forces and that require detailed integration of each air mission with the fire and movement of those forces.

closed game: a game in which the control team and opposing player teams use separate rooms or areas, maintain separate maps and records, and in which a controlled amount of intelligence is given to each player team.

CM/CB: see countermortar/counterbattery.

collection system: an integrated system of individual sensor types or groups of sensor types.

combat service support: the assistance of providing administrative services, chaplain services, civil affairs, finance, legal service, maintenance, medical service, military police, replacements, supply, transportation, and other logistical services. Within the DIVWAG system, it includes personnel replacement, supply, and some transportation.

combat support: operational assistance furnished combat elements by other designated units.

complex unit: a unit comprised of two or more basic units.

conditional casualties: casualties which would be incurred if a weapon were firing alone and not receiving return fire.

Constant Data Input Processor: the element of the DIVWAG system which contains the group of special purpose data load programs that read source data from cards, convert the data to the form required by the Period Processor, and load the data onto DIVWAG data files.

constant fire subsegment: flight segment within which an air unit is expected to be subject to attrition by a unique and constant set of air defense weapons.

consumable: item that is normally expended and used up beyond recovery in the use for which it was designed or intended.

cookie cutter: a slang expression used to describe a circular radius of effects for indirect fire weapons, including nuclear weapons; contrasted with precise calculation of effects considering the influence of terrain and other factors.

countermortar/counterbattery: relating to the detection, suppression, or destruction of enemy indirect fire by mortars or artillery.

CSS: see combat service support.

cycle time: the duration of battle which is processed by a single pass through the Ground Combat Model.

DAF: see direct aerial fire.

damage radius: radius of an equivalent circular area damaged by a nuclear blast.

default rate: rate used when no rate is specified.

delayed casualties: casualties for which the manifestation of the cause is delayed over time; e.g., nuclear radiation.

delivery lead time: time required for a unit to obtain supplies after the order has been placed.

desired ground zero: the geographical location at which munition detonation is desired.

deterministic: not subject to random variation.

DGZ: see desired ground zero.

diagnostic message: a statement printed by a computer program indicating a possible or known erroneous condition detectable by the program.

direct aerial fire: close air support delivered by Army aircraft in close proximity to friendly forces.

direct support: a condition whereby a force is required to support another specific force and is authorized to answer directly the supported force's request for assistance.

division force: a military organization of division size and designation supported by appropriately assigned or attached combat, combat support, and combat service support forces; a modern and more definitive term similar to division slice.

DIVTAG II: a short title for Division Through Army Group Model (second iteration).

DIVWAG: Division War Game; a short title used in lieu of the term Division War Game Model.

DIVWAG Scenario Language: the special purpose English-like language used by the gaming group to direct simulated units within the DIVWAG system to carry out desired activities.

D-kill: damage inflicted upon an aircraft in which the aircraft is able to continue its mission.

DLT: see delivery lead time.

DMF: see dominant mask function.

dominant mask function: a function describing terrain masking in terms of distance to and height of terrain features masking the line of sight of a specific geographical location.

dose rate: the amount of radiation received by personnel per unit of time.

DPFO: data processing field office.

driver, driver routine: a routine within a computer program the principal function of which is to call other routines at the required times and perform related control functions.

DS: see direct support.

DSL: see DIVWAG Scenario Language.

DSL conditional: a statement included in a DSL order which describes the conditions under which the order is to be executed. Also, a DSL statement describing the conditions under which a battle is to be terminated.

DSL modifier: a qualifying statement included in a DSL order which specifies the precise activity desired.

DSL order: a complete DSL description of an activity to be performed by a designated unit including the type of activity and associated DSL modifiers.

ECM: see electronic countermeasures.

EENT: see end evening nautical twilight.

effectiveness indicator: selected quantitative elements of the large body of performance data available, chosen to highlight the most significant aspects of the performance data in light of the force evaluation objectives and the particular measures of effectiveness they support.

EIC: see equipment item code.

electronic countermeasures: those measures taken to eliminate or reduce the effectiveness of equipment or units relying upon electronic emanations for the performance of an assigned mission(s).

elevation grid: an arbitrary grid imposed upon a geographical area the points of which have elevations specified in the data base.

end evening nautical twilight: the time at which the setting sun is 12 degrees below the horizon.

EOH: see equipment on hand.

equipment item code: a numerical code (1 to 200) assigned to unique items of equipment and supplies, including munitions, simulated within the DIVWAG system.

equipment on hand: materiel physically in the possession of a designated military organization, installation, or activity and in a useable status and condition.

error analysis: the procedure of locating the cause of erroneous results produced by the model or associated computer programs.

error message: same as diagnostic message.

event sequence: the ordering of events in chronological sequence.

expendable: same as consumable.

facility: a physical entity on the battlefield which facilitates the movement of military forces; e.g., bridge, ferry, ford, bypass; a military installation at which specified activity takes place.

FARMWAG: Field Army Modernization War Game.

FARR: see forward area refuel and rearm.

FEBA: see forward edge of battle area.

fire cycle time: the time required by a weapon/ammunition type to acquire a target and to aim, fire, and deliver one round within the Ground Combat Model.

fire mission: specific assignment to a fire unit. In the DIVWAG system, this term refers to the specific set of data describing a single target communicated to the TACFIRE Model.

fire support coordination center: the location at which are centralized communications facilities and personnel incident to the coordination of all forms of fire support. In the DIVWAG system this term applies to that portion of the Intelligence and Control Model regulating supporting aerial fire and artillery.

flight corridor: a rectangular area centered along the flight path of an aircraft or group of aircraft.

flight leg: a segment of a flight path defined by two end points.

forest type index: an index between zero and three designating the extent of forest cover in a given terrain cell.

forward area refuel and rearm: relating to a highly mobile supply point in the forward area of the battlefield used to refuel and rearm attack, escort, or lift aircraft.

forward edge of battle area: foremost limits of a series of areas in which ground combat units are deployed excluding covering or screening forces. This edge is represented within the DIVWAG system by a straight line perpendicular to the battlefield orientation and equidistant from the forward maneuver elements of each force.

free game: a game conducted without benefit of a fixed set of rules.

Friedman test: nonparametric test based on ranks that can be used when matched subjects are obtained. Friedman's two-way analysis of variance by ranks provides a test of the null hypothesis that k related samples were drawn from k identically distributed populations.

FSCC: see fire support coordination center.

function of land combat: one of five recognized activities of land combat: firepower; mobility; intelligence; logistics; command, control, and communications.

game: simulation of a situation of competition or conflict in which the opposing players decide which courses of action to follow on the basis of their knowledge about their own situation and intentions and on their information about their opponent's courses of action.

game cycle: the procedures to be followed in the execution of a game period to maintain the gaming rate.

game period: an arbitrary time interval for the execution of game activities which is uninterrupted by game direction.

game period concept: a document prepared by the control group and approved by the game director stating the military and system considerations and guidelines governing activities of each game period.

game period turnaround: the process that occurs from the end of one set of game period computer runs until the beginning of the next set of game period computer runs.

game plan: the written concept by which the game manager plans to accomplish the game objectives.

gaming rate: the amount of simulated combat time that can be processed per unit of real time expended by the gaming staff.

GCM: Ground Combat Model.

general support: that support given to the supported forces as a whole and not to any particular subdivision thereof.

general support reinforcing: that support provided by an artillerv unit with the mission of supporting the forces as a whole and of providing reinforcing fires for another artillery unit.

glimpse rate: the number of discrete instances at which a sensor is active and able to acquire targets per unit of time.

ground sensor terminal: a ground-based facility with equipment for receiving directly and processing information acquired by airborne sensor systems.

ground zero: a point on the earth's surface at or immediately below the detonation of a weapon.

GS: see general support.

GST: see ground sensor terminal.

GZ: see ground zero.

height of burst: the height of a munition detonation measured from the earth's surface.

HOB: see height of burst.

homoscedactic: having equal variances.

hypothesis: an assumption or statement about the probability distributions of the population.

impact radius: the radius around an aim point within which indirect fire munitions may be expected to impact.

IMPWAG: Improvement of the ICAS War Game Model; a USACDC study.

INC: Intelligence and Control; a short title used to identify the Intelligence and Control Model.

induced radiation barrier: a barrier to movement created by induced radiation from a nuclear burst.

induced radiation hazard area: an area in which measurable induced radiation from a nuclear burst is present and in which the level of radiation is hazardous to personnel.

in-flight attrition: the destruction of aircraft while the aircraft is in aerial flight.

initial supply point: the origin for materiel and supplies within the combat zone.

intelligence processing: the activity which converts information of the enemy, weather, and terrain into finished intelligence for use by a commander in the decision-making process.

intercept segment: same as constant fire subsegment.

intermediate supply point: a point in the chain of supply between the initial supply point and either a division distributing point or a recipient unit.

IR: infrared.

IS: see intercept segment.

iteration, iteration time: the duration of unit-pair engagement which is processed by a single pass through the target acquisition, firepower distribution, and firepower effectiveness submodels of the Ground Combat Model.

Kolmogorov-Smirnov statistic: a statistic used to test the null hypothesis of normality of the sample distribution.

Kruskal-Wallis test: a nonparametric test based on ranks.

landing zone: the geographical point of debarkation of an airmobile force from its airlift transportation.

level of resolution: the degree to which an entity is broken into discrete, recognizable constituent parts or elements. High resolution implies many parts; low resolution implies few parts.

level of significance: for every null hypothesis H_0, there exists at least one alternative hypothesis H_1. An a priori procedure is to reject H_0 in favor of H_1 if a statistical test yields a value whose associated probability of occurrence under H_0 is equal to or less than some small probability symbolized as α. That small probability, α, is called the level of significance.

lift force: the military force which supplies ground or air transportation to another force or unit.

line of sight: unobstructed vision between two points.

LOH: light observation helicopter.

LOS: see line of sight.

major end items: a final combination of end products, component parts, and/or materiels that is ready for its intended use. Used primarily to describe vehicles, weapon systems, and sensor systems.

major engagement segment: same as possible engagement segment.

Mann-Whitney U-test: a method of employing the Mann-Whitney U-statistic to make orthogonal comparisons among the k treatment population or to determine which comparisons among the k treatment population are significant.

mean use rate: the usage rate determined by calculating a statistical average of usage rates since the start of the game.

measure of effectiveness: a quantitative value that indicates the degree to which a military unit or system performs its mission or achieves its goal.

MES: see major engagement segment.

mission unit: a unit created automatically within the model for performing a model generated mission and not under direct gamer control.

mobility category: a group of unit types having similar mobility characteristics.

mobility class: a group of equipment items having similar mobility characteristics.

MOE: see measure of effectiveness.

move segment: that portion of a movement path described by a straight line and entirely within a single terrain cell.

moving target indicator: a device that limits the display of radar information primarily to moving targets.

MTI: see moving target indicator.

NAM: Nuclear Assessment Model.

nap-of-the-earth: as close to the earth's surface as vegetation and obstacles will permit flight. The model assumes a height of 50 feet above the ground.

NATO: North Atlantic Treaty Organization.

nonparametric statistics: statistical procedures that do not depend on a knowledge of population distributions and associated parameters.

nonresolution unit: a constituent of a resolution unit or a higher echelon unit; a unit without specific location and which cannot accept orders for the execution of a function of land combat or cannot directly incur losses from enemy forces.

null hypothesis: the hypothesis that there is no difference between the procedures or populations.

open game: a military game in which opposing players have complete access to information pertaining to an opponent.

order and shipping time: the period of time represented by the combined activities of ordering and delivery of supplies or materiel.

Orders Input Processor: the element of the DIVWAG system which provides the communication link from the gaming group to the Period Processor by means of DSL orders and operating instructions.

period: an arbitrary time interval for the execution of game activities which is uninterrupted by game direction.

period history tape: a magnetic tape containing data that are a representation of all significant activities simulated by a computer-assisted war game model during a game period.

Period Output Processor: an element of the DIVWAG system that produces at the completion of a game period a set of post-period reports to be analyzed and used for play of subsequent periods of a game.

Period Processor: the central element of the DIVWAG system that contains the mathematical models, data maintenance routines, and event scheduling and execution logic required to simulate the military activities portrayed in the DIVWAG Model.

pick up zone: the geographical point of embarkation of an airmobile force.

pinpointing: detection of evidence that a potential target has fired.

possible engagement segment: that continuous portion of a flight leg in which an air unit is vulnerable to fire from a unique set of air defense capable units (ADCUs); the set including at least one ADCU.

primary equipment item: an item of equipment that is not a component of a larger equipment item.

prompt casualties: casualties incurred by a unit at the time of a nuclear blast.

$\bar{R}$: an empirical value used as an environment fitting parameter generally equated to mean range for line of sight in homogeneous terrain.

radiological barrier: a barrier resulting from radiation effects produced by a nuclear detonation.

reinforcing fires: fire delivered on call from the reinforced unit by a unit assigned to a reinforcing mission.

reorder cycle time: time interval between successive supply orders.

resolution unit: a military unit with a specific location which can be given specific orders for the execution of one or more functions of land combat and can incur losses from hostile fire.

rigid game: a war game conducted in strict conformance with a fixed set of rules.

roughness and vegetation index: a numerical index to a combination of terrain slope variation and nonforest vegetation.

route reconnaissance: aerial reconnaissance conducted along a designated route or line on the earth's surface.

routine: a discrete element of a computer program that performs a desired function or operation when called by another routine.

RV index: see roughness and vegetation index.

safe point: a point at which aerial vehicles are beyond the range of enemy air defense capable units; usually a point in friendly territory.

safety level: quantity of materiel, in addition to the operating level of supply, required to be on hand to permit continuous operation in the event of minor interruption of normal replenishment or unpredictable fluctuations in demand.

scenario: a narrative description of the setting in which the strategic military, political, economic, and social environment is established and the physical geography is set forth. A chronological listing of preplanned occurrences.

secondary equipment item: an item of equipment that is associated directly with, or a component of and is secondary to, a primary equipment item.

semiopen game: a military game in which opposing players have access to limited but corresponding type information of opposing forces.

sensor: a device capable of detecting the presence and/or location of possible military targets.

side analysis: analysis of factors not designated as the principal area of interest or concern.

side looking airborne radar: radar system directed perpendicular to the flight path of the transporting aircraft.

simulation: the representation of physical systems and phenomena by models or other logical or mathematical representation; a technique used to study and analyze the operation and behavior of man/machine systems in terms of the elements of which they are composed.

sky/ground ratio: ratio of the brightness of the horizon to the brightness of the target facing the target.

slant range: the distance between two points not at the same elevation.

SLAR: see side looking airborne radar.

slew rate: the rate of angular movement of a weapon or sensor in the horizontal and/or vertical plane.

sortie: the execution of an assigned mission by one aircraft.

staging area: the geographical area in which a military unit is assembled and prepared to execute an assigned operation; may be the area from which a military operation is initiated.

STANO: surveillance, target acquisition, and night observation.

stochastic: subject to random variations.

subordinate list: the listing of units that comprise and which are subordinate in command to a designated military unit.

supply point distribution: the method of distributing supplies in which the receiving unit is issued supplies at a supply point and moves the supplies to its own area using its own transportation.

surface burst: a burst of a nuclear weapon in which the fireball of the weapon touches the earth's surface.

table of organization and equipment: a table which prescribes the normal mission, organizational structure, and personnel and equipment authorization for a military unit.

TACAIR: high performance aircraft support of ground forces usually conducted by other Service or Allied air components.

TACFIRE: tactical fire direction.

target subunit: a subdivision of a potential target unit on an area basis which is considered individually for detection.

supply point: a military activity which receives, stores, and distributes supplies and equipment.

task organization: the organization of a military unit for the performance of a specific task.

terrain cell: an arbitrary geographical subdivision of the earth's surface for purposes of describing assumed homogeneous terrain characteristics.

terrain masking: the interposition of a terrain feature so as to prohibit line of sight between an observer and a candidate area or target.

TOE: see table of organization and equipment.

trafficability index: a numerical index that describes the capability of a portion of the earth's surface (soil) to sustain military operations.

transfer order: a DSL order directing a change to the task organization.

travel mode: a four-character alphabetic code describing the type of movement a unit is to perform.

UGS: see unattended ground sensor.

UID: see unit identification.

unattended ground sensor: a ground sensor which is unattended by human operators.

unit distribution: that method of distributing supplies in which all requested items are transported from the supply point to the requesting unit using vehicles provided by the supplying unit.

unit identification: an eight-character alphanumeric designation of a military unit, installation, or activity for identification purposes.

unit type: a categorization of units having identical tables of organization and equipment.

unit type designator: a four-character alphanumeric designation for a unit type.

update cycle: the interval between successive recalculations of battlefield geometry parameters.

UTD: see unit type designator.

volley: a fire mission consisting of one round fired by each weapon of a unit.

WAGCAP: Improvement of the War Game Capability; a USACDC study; a related follow-on study is designated WAGCAP II.

war game: a simulation, by whatever means, of a military operation involving two or more opposing forces, conducted using rules, data, and procedures designed to depict an actual or assumed real life situation.

weapon munition index: a four-character alphanumeric designator for a unique combination of weapon type and ammunition type.

weather zone: a rectangular area of game play over which weather conditions are considered uniform.

zero period: a short game period processed prior to initiation of the planned scenario for the purpose of model initialization.

NOTES

SECTION II

CONSTANT DATA INPUT PROCESSOR

CHAPTER 1

GENERAL DESCRIPTION OF THE CONSTANT DATA INPUT PROCESSOR

1. INTRODUCTION. The purpose of this section is to identify the constant data requirements of the DIVWAG system and provide instructions for entering the data into the constant data files. Constant input data is that information in the DIVWAG system that need not be changed throughout the conduct of the dynamic play of a war game.

2. SIGNIFICANCE OF THIS SECTION. The conduct of a war game using the DIVWAG system requires the utilization of a large data base containing many thousands of data items. These data must be derived or extracted from available sources, coded, and entered into storage devices. This section provides: (1) a description of the data required as input by DIVWAG prior to the actual conduct of a game to produce data for evaluation and detailed instructions for entering the data onto standardized card formats compatible with the programs that actually load the data from cards into the constant data files, (2) a complete program description including input and output variables to each routine, a logical flow, and a flow chart, (3) an output description identifying all printed output reports, and (4) a source listing of each load program.

3. ORGANIZATION OF THIS SECTION. Each of the subsequent 16 chapters of this section pertain to a specific data load process of the Constant Data Input Processor. The purpose of each is briefly described in the following subparagraphs.

a. Executive control. The Executive Control routine (PREDIV) provides the ability to execute any number of constant data input processors within one job request, thus providing an overall increase in efficiency to the DIVWAG system.

b. Tables of Organization and Equipment. The Tables of Organization and Equipment (TOE) are generally the first to be entered into the DIVWAG system constant data as common information for all models. The information needed to satisfy TOE data requirements includes the force structure, senior and subordinate units, and primary and secondary items of equipment. TOE sets the stage for all other data entries for the DIVWAG system.

c. Task Organization. The fourth chapter of this section deals with task organization input data. These data establish the identification and composition of units to be used in the game, the task force organization or organizational structure of the units within a force which will be used at the start of the game, the initial location of units, initial supporting roles of appropriate units, and the basic logistical network of the force.

d. Environment. Chapter 5 of this section deals with weather and terrain descriptions. This is common file information, used by several of the DIVWAG models. Preparation of this type data is time consuming and should be initiated as one of the first tasks of a war game effort.

e. Unit Geometry. Chapter 6 of this section deals with unit dimensions and item distribution data. This is data file 28 information and is used by several of the DIVWAG models.

f. Intelligence and Control. The seventh chapter is one of the most complex of the entire section. Data requirements are varied, and the complexity of preparation and entry exceeds that for the other models. For the most part the Intelligence and Control Model uses its own unique data. In the process of accessing its unique data bases, it provides an output that is used by virtually all other models.

g. Ground Combat. In Chapter 8 the direct fire weapons are addressed, and their constant data requirements are defined. The sensors for target detection and recognition are described with their performance data and the weapons to which they feed information. These weapons are matched with their ammunition, and target defeat is described in terms of hit probabilities and kill probabilities.

h. Area Fire Assessment. The entry of the constant data for accessing the loss and destruction created by conventional indirect fires is the type of data entered in this model. Chapter 9 discusses personnel protection against hostile fires through their posture on the battlefield, shielding by combat equipment (tanks), and areas of lethality.

i. TACFIRE. In the tenth chapter is decision type information that an artillery personnel will recognize as needed for division artillery and its firing batteries. Target priorities must be established, with the types of weapons and ammunition to be used; and the method of attack must be determined.

j. Air Ground Engagement. Chapter 14 is concerned with data to describe close air support provided by Army attack helicopters and Air Force aircraft. The data cover 40 type close air support missions and include various mission descriptors, in terms of numbers and types of aircraft required, and mission results. The data also include air defense and aircraft parameters required to treat aircraft attrition en route to and from the target area.

k. Suppression. Within the DIVWAG system suppression is treated as the interruption of an activity in response to incoming fires. Chatper 12 treats the data required, generally the duration of such interruptions.

l. Nuclear Assessment. The Nuclear Assessment Model deals with firing, detonation, and results of nuclear devices. Required data are prescribed in Chapter 13.

m. Movement. In virtually any application of the DIVWAG system, there must be extensive ground movement of military units. Chapter 14 treats the entry of constant data needed for this movement. Administrative aerial movement is also treated with this data input.

n. Engineer. The Engineer Model treats the construction and destruction of obstacles to and facilities for ground movement. The instructions for entering data required in this model are found in Chapter 15.

o. Airmobile. Chapter 16 deals with data unique to the Airmobile Model. This model, which treats the airmobile movement of units, also uses data associated with several other models, particularly Air Ground Engagement, Combat Service Support, and Movement.

p. Combat Service Support. The resupply of friendly troops either from supply points or through unit distribution is one of the major concerns of this model. Chapter 17 provides the instructions for constant data entry to satisfy model demands.

4. SEQUENCE OF LOAD PROGRAMS. Insofar as is possible, each set of data described in Chapters 3 through 17 is independent of other data to the extent that the sequence in which the data are loaded is not critical. Exceptions are listed below, with a suggested sequence of loading.

a. Data Areas Depending on Previous Loads:

(1) Task Organization. The task organization data (Chapter 4) cannot be loaded until after Organization and Equipment data (Chapter 3) and Combat Service Support Model data (Chapter 17) have been loaded. If either Organization and Equipment or Combat Service Support Model data are changed after the task organization has been loaded, then task organization must be reloaded with the new Organization and Equipment and/or Combat Service Support Model data.

(2) Movement. The Movement Model data (Chapter 14) cannot be loaded until after TOE data (Chapter 3) are loaded. If TOE data are changed after the Movement Model data have been loaded, then the Movement Model data must be reloaded.

(3) Suppression. Suppression Model data (Chapter 12) cannot be loaded until after Organization and Equipment data (Chapter 3) are loaded. Any change to Organization and Equipment data will necessitate reloading Suppression Model data.

(4) Nuclear Assessment. The data used by the Nuclear Assessment Model (Chapter 13) cannot be loaded until after conventional Area Fire Model data (Chapter 9) are loaded. Revisions to Area Fire Model data necessitate reloading Nuclear Assessment Model data.

b. Suggested Sequence of Loading. Organization and Equipment data must be loaded early in the data preparation cycle. This is reinforced by the fact that practically every data file is keyed in some sense to the Organization and Equipment data, either through equipment item codes or unit type designations. The following sequence of loading is suggested, based both upon the program requirements listed above and upon situations where knowledge of what has been loaded in one area is critical to the logical definition of data in other areas.

(1) Organization and Equipment data (Chapter 3) should be the first set of data loaded. Knowledge of these data is needed to prepare virtually all other data programs.

(2) Environment data collection (Chapter 5) should be initiated early because of the volume of data required.

(3) Intelligence and Control Model data input (Chapter 7), while not prerequisite to other data, is the most complex package and should be initiated early in the cycle.

(4) Combat Service Support Model data preparation (Chapter 17) is relatively straightforward but should be stabilized early because it is prerequisite to the task organization.

(5) Air Ground Engagement Model data requirements (Chapter 11) are voluminous, and preparation should be initiated early in the data development process. The individuals developing Air Ground Engagement Model data should ideally develop the Airmobile Model data (Chapter 16) thereafter because of a strong interrelation between data requirements of the two models. These individuals should be familiar with both models prior to working on either one, since heavy use of Air Ground Engagement Model data is made by the Airmobile Model.

(6) The Area Fire Model (Chapter 9), TACFIRE Model (Chapter 10), and Nuclear Assessment Model (Chapter 13) data requirements are strongly interrelated and should, if possible, be developed by the same individuals.

(7) Task organization data (Chapter 4) should be entered into the system at approximately this stage of development. Individuals preparing the task organization data should be those who developed the Organization and Equipment data and are familiar with its content.

(8) Engineer Model data (Chapter 15) may be prepared late in the data development cycle. Planning for this load, however, should be initiated early if extensive barrier plans are to be used.

(9) Ground Combat Model data requirements (Chapter 8), are voluminous but are relatively independent of other data areas.

(10) Movement Model (Chapter 14) and Suppression Model (Chapter 12) data may enter the system late in the cycle. Proper preparation of Movement Model data requires knowledge of the model's interface with barriers. The Suppression Model data requirements are simple and may be fulfilled last in the data preparation cycle.

CHAPTER 2

EXECUTIVE CONTROL DATA INPUT

The routine PREDIV reduces the number of cards and separate computer runs required to load the constant data and increases the overall efficiency of the DIVWAG system. This routine, by making all the load programs accessible on disk, allows the programs to be executable without a compile and allows as few as one or all constant data decks to be loaded with one job request. A softfall capability of PREDIV allows any data set to be skipped if the data are incorrect for loading and to continue to the next data set. If any data set is skipped, a message will be printed informing the programmer that a data set has not loaded.

NOTES

APPENDIX A

INPUT REQUIREMENTS FOR EXECUTIVE CONTROL DATA INPUT

The sample job control deck assembly is shown in Figure II-2-A-1, and a sample constant data input control deck is shown in Figure II-2-A-2. Each set of constant data is separated by a card identifying the data load program; i.e., GCMLD....PREP is the Ground Combat Model load program resident on disk. The last card behind all of the data decks is a STOP....PREP card. Only one stop card is required for one computer run. The cards required for each of the constant data decks are shown in Figure II-2-A-1. When preparing the cards, the program name begins in card column 1 and PREP must be entered in card columns 77-80 on each card. The appropriate constant data deck will follow the corresponding control deck card as shown in Figure II-2-A-2.

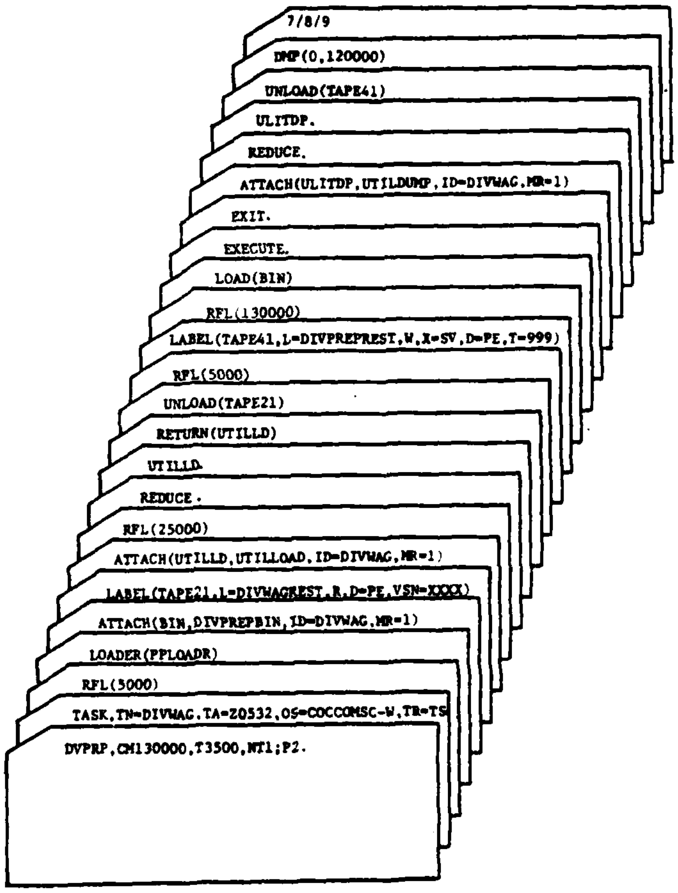

Figure II-2-A-1. Executive Job Control Deck Assembly

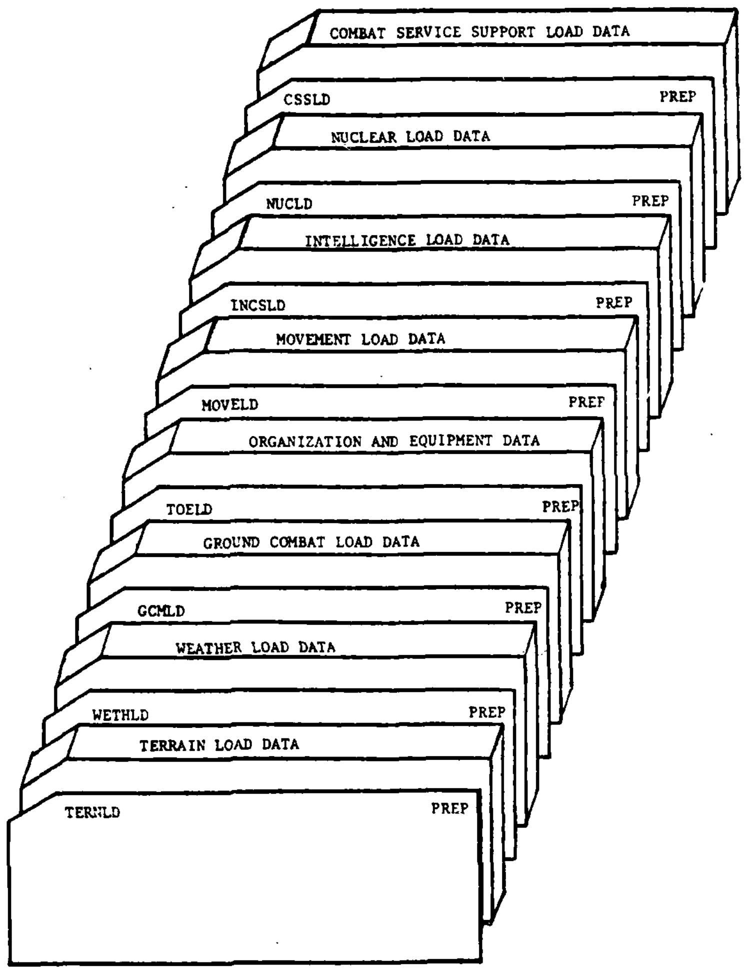

Figure II-2-A-2. Executive Control Constant Data Control Deck Assembly (Continued on Next Page)

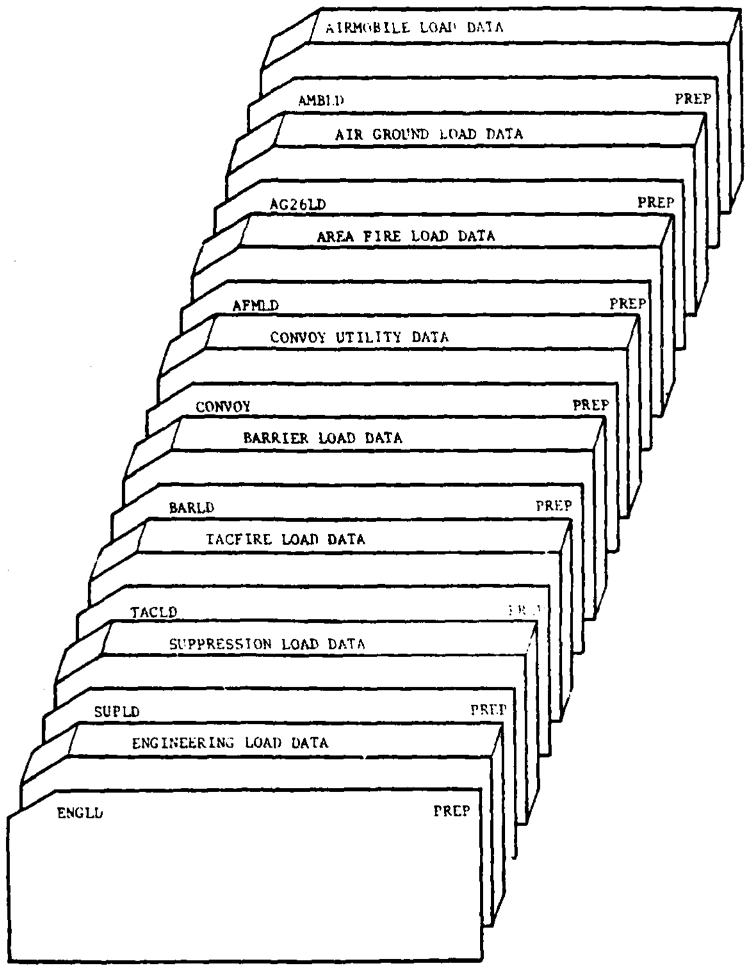

Figure II-2-A-2. Executive Control Constant Data Control Deck Assembly (Continued)

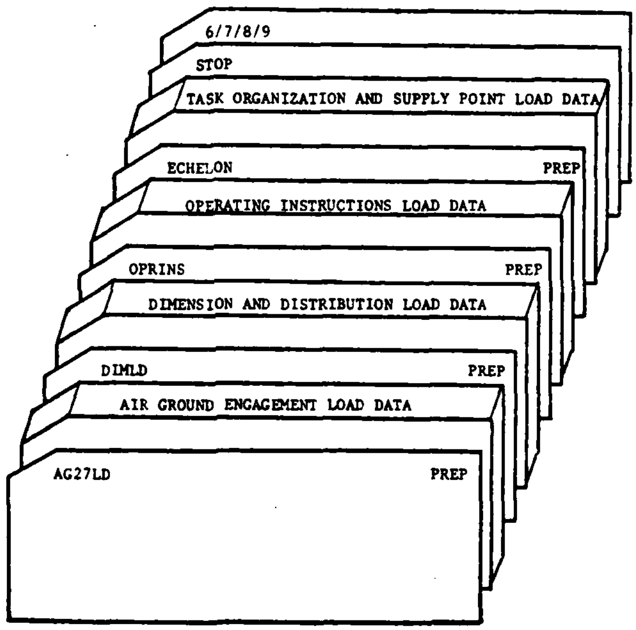

Figure II-2-A-2. Executive Control Constant Data Control Deck Assembly (Concluded)

NOTES

APPENDIX B

EXECUTIVE CONTROL DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. This appendix contains the program description of routine PREDIV, the primary executive control routine of the Constant Data Input Processor.

2. ROUTINE PREDIV:

a. Purpose. Routine PREDIV calls the proper overlays as needed.

b. Input Variables:

Name	Source	Contents
IFNT(56,3)	Disk	File name table.
LOADTP	Card	Variable that identifies the constant data input routine to call.

c. Output Variables: The file name table (IFNT) is printed initially and after each overlay call.

d. Logical Flow (Figure II-2-B-1):

(1) Blocks 1 and L10. A call is made to routine GETFLE to retrieve the file name table and the table is printed.

(2) Blocks L15 and 2. A data card is read. If the card format is incorrect, another card is read.

(3) Block 3. If the last card read was a stop card, transfer control to block L400.

(4) Block 4. If this is an Engineer (ENGLD), Suppression (SUPLD), TACFIRE (TACLD), or barrier (BARLD) load card, transfer control to block L70.

(5) Block 5. If the first character of the requested load is greater than M, transfer control to block L3.

(6) Block 6. If the first character of the requested load is greater than G, transfer control to block L2.

(7) Block 7. If the first character of the requested load is greater than C, transfer control to block L1.

(8) Blocks 8 and 9. If the requested load is a Combat Service Support load (LDCSS) set the overlay flag to six, and transfer control to block L200.

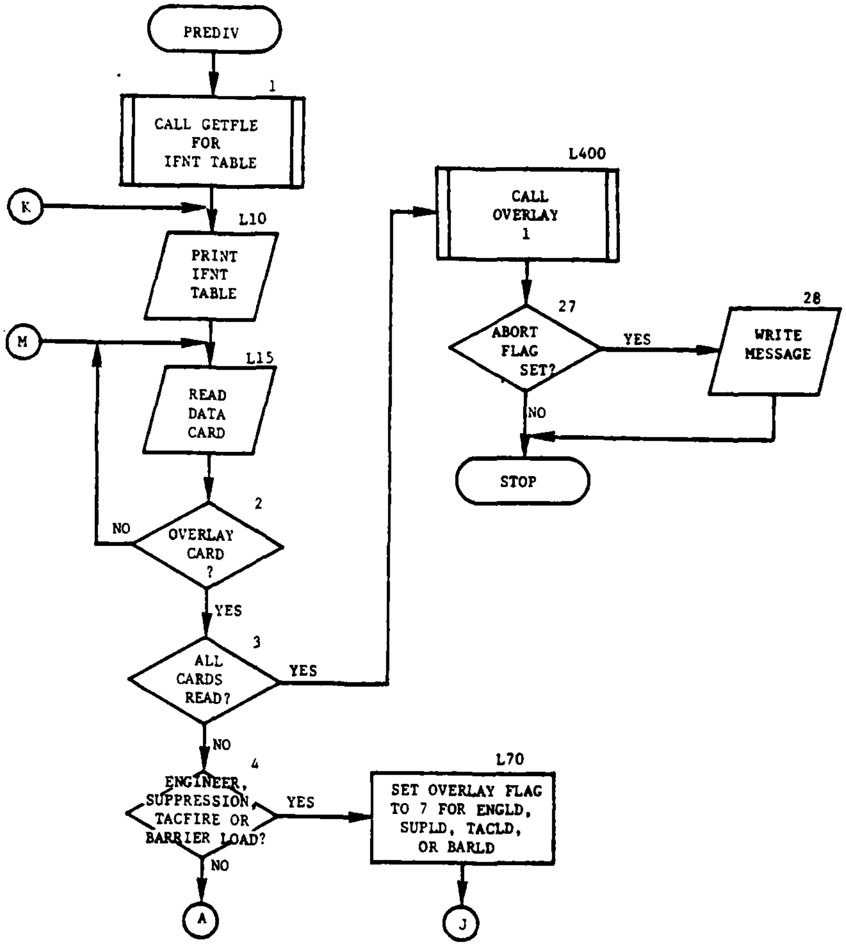

Figure II-2-B-1. Routine PREDIV (Continued on Next Page)

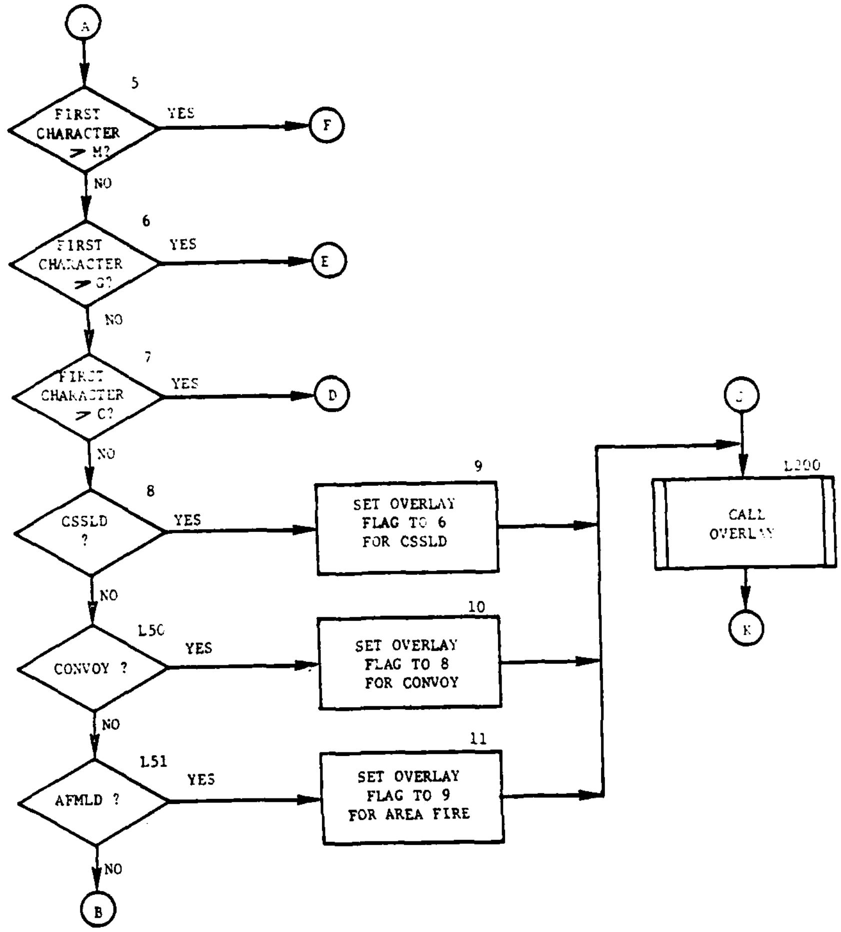

Figure II-2-B-1. Routine PREDIV (Continued)

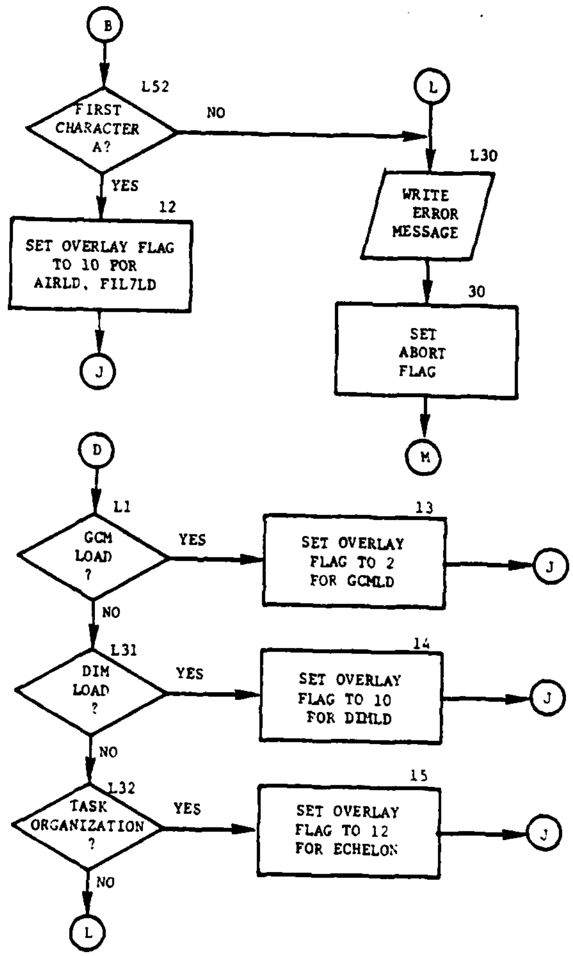

Figure II-2-B-1. Routine PREDIV (Continued)

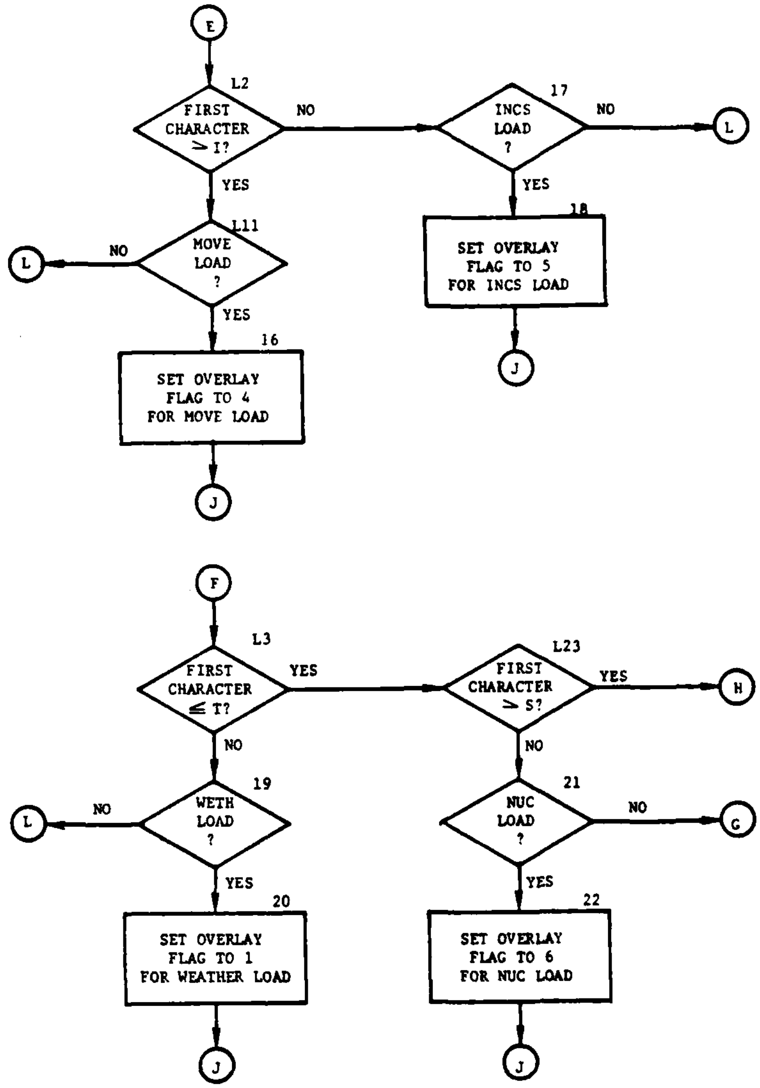

Figure II-2-B-1. Routine PREDIV (Continued)

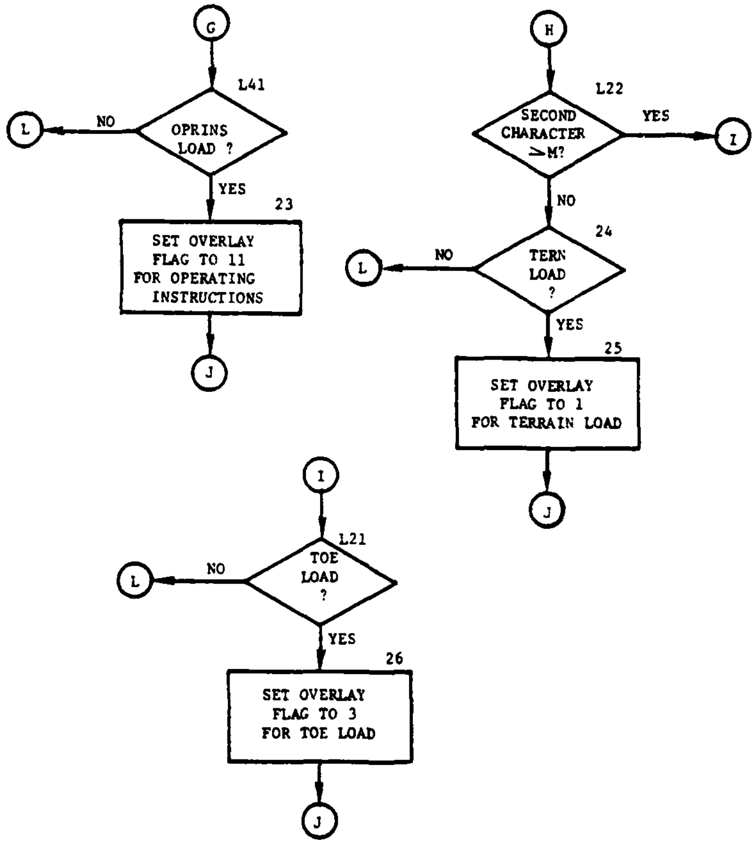

Figure II-2-B-1. Routine PREDIV (Concluded)

(9) Blocks L50 and 10. If the requested load is convoy (CONVOY), set the overlay flag to eight, and transfer control to block L200.

(10) Blocks L51 and 11. If the requested load is Area Fire (AFMLD), set the overlay flag to nine, and transfer control to block L200.

(11) Blocks L52 and 12. If the first character of the overlay type is A, set the overlay flag to 10, and transfer control to block L200; otherwise, transfer control to block L30.

(12) Block L70. Set the overlay flag to seven, and transfer control to to block L200.

(13) Blocks L1 and 13. If the requested load is Ground Combat (GCMLD), set the overlay flag to two, and transfer control to block L200.

(14) Blocks L31 and 14. If the requested load is unit dimensions (DIMLD), set the overlay flag to 10, and transfer control to block L200.

(15) Blocks L32 and 15. If the requested load is task organization (ECHLD), set the overlay flag to 12, and transfer control to block L200.

(16) Block L2. If the first character of the load type is less than or equal to I, transfer control to block 17.

(17) Blocks L11 and 16. If the requested load type is movement (MOVLD), set the overlay flag to four, and transfer control to block L200; otherwise, transfer control to block L30.

(18) Blocks 17 and 18. If the requested load is Intelligence and Control (INCLD) set the overlay flag to five, and transfer control to block L200; otherwise, transfer control to block L30.

(19) Block L3. If the first character of the load type is less than or equal to T, transfer control to block L23.

(20) Blocks 19 and 20. If the requested load is weather (WETLD), set the overlay flag to one, and transfer control to block L200; otherwise, transfer control to block L30.

(21) Block L23. If the first character of the load type is greater than S, transfer control to block L22.

(22) Blocks 21 and 22. If the requested load is Nuclear Assessment (NUCLD), set the overlay flag to six and transfer control to block L200.

(23) Blocks L41 and 23. If the requested job is operating instructions (OPRINS), set the overlay flag to 11, and transfer control to block L200; otherwise, transfer control to block L30.

(24) Block L22. If the second character of the load type is greater than M, transfer control to block L21.

(25) Blocks 24 and 25. If the requested load is terrain (TERLD), set the overlay flag to one, and transfer control to block L200; otherwise, transfer control to block L30.

(26) Blocks L21 and 26. If the requested load organization and equipment (TOELD), set the overlay flag to three; otherwise, transfer control to block L30.

(27) Block L200. Call the system overlay routine to load the requested overlay; then, transfer control to block L10.

(28) Block L400. Call the system overlay routine to overlay segment 1, This segment executes a dump.

(29) Blocks 27 and 28. If the abort flag is set, write an informative message and stop the program.

(30) Blocks L30 and 30. Write an error message, set the abort flag, and transfer control to block L15.

3. ROUTINE OVRLY7: Routine OVRLY7 determines which secondary overlay (ENGLD, SUPLD, TACLD, or BARLD) is requested and loads that segment.

4. ROUTINE OVLY10: Routine OVLY10 determines which secondary overlay (AIRLD, FIL7LD, or DIMLD) is requested and loads that segment.

APPENDIX C

OUTPUT DESCRIPTIONS FOR EXECUTIVE CONTROL DATA INPUT

The Constant Data Input Processor Executive Control routine will print the file name table (IFNT) before and after each requested constant data load program is executed.

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR EXECUTIVE CONTROL

(AVAILABLE UNDER SEPARATE COVER)

NOTES

APPENDIX A

ORGANIZATION AND EQUIPMENT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for organization and equipment are documented in Appendix A, Unit Representation Input Requirements, to Chapter 3 of the Period Processor (Section IV).

NOTES

APPENDIX B

ORGANIZATION AND EQUIPMENT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Loading of tables of organization and equipment (TOE) data is accomplished by routine LDTOE which, in turn, calls routine DMPTOE to provide a listing of the data. LDTOE is supported by utility routines SORT and SRCH.

2. ROUTINE LDTOE:

a. Purpose. This routine loads secondary equipment tables, data file 6; unit type designator (UTD) directory, data file 51; basic unit strength tables, data file 52; and UTD breakdown tables, data file 53.

b. Input Variables:

Name	Source	Contents
ICARD	Card	Data cards defining senior/subordinate units, TOE, secondary equipment list, and bulk-loaded expendable supplies.

c. Output Variables:

Name	Destination	Contents
IVEC6	DF6	Secondary equipment quantity pairs.
IVEC53	DF53	Breakdown of complex UTDs.
ITOE	DF52	Contains quantities for respective equipment items on hand and bulk in trains.
IVEC51	DF51	UTD directory. The first 250 entries contain ordinals for data file 52, the last 750 entries contain ordinals for data file 53.

d. Logical Flow (Figure II-3-B-1):

(1) Block 1. Call routine GETFLE to retrieve the file name table (IFNT) so that the Input/Output package may function.

(2) Block 2. If the dump flag is on, control goes to block L700.

(3) Block 3. Call routines REMOVE and CREATE for each of the files being created in this routine, which initializes these files on the DIVWAG data file.

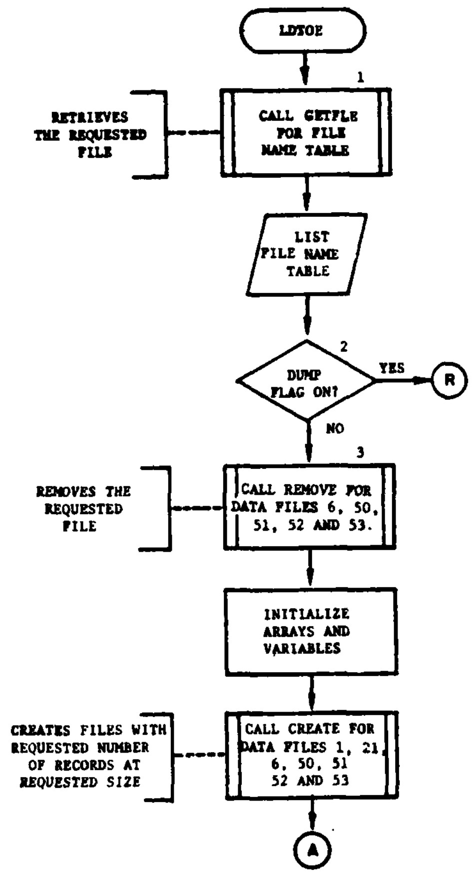

Figure II-3-B-1. Routine LDTOE. (Continued on Next Page)

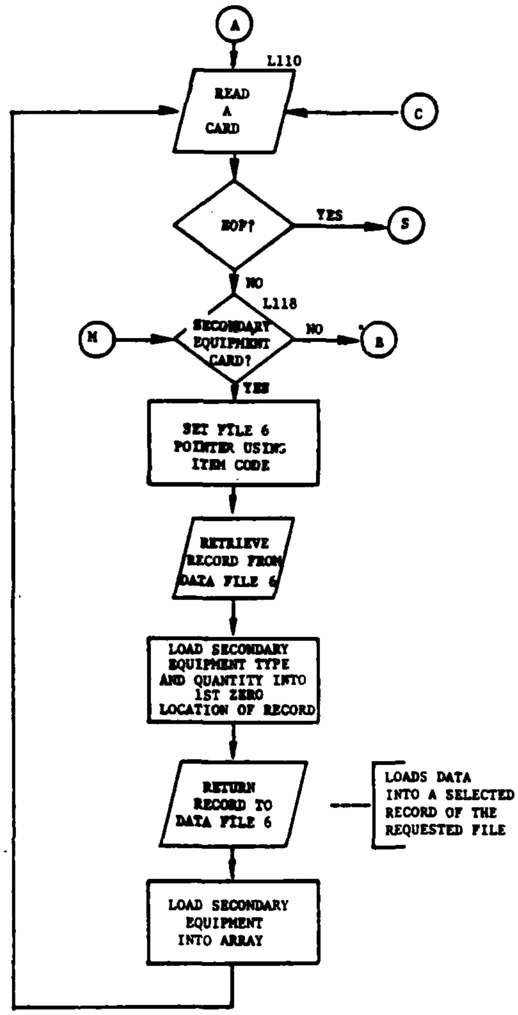

Figure II-3-B-1. Routine LDTOE. (Continued)

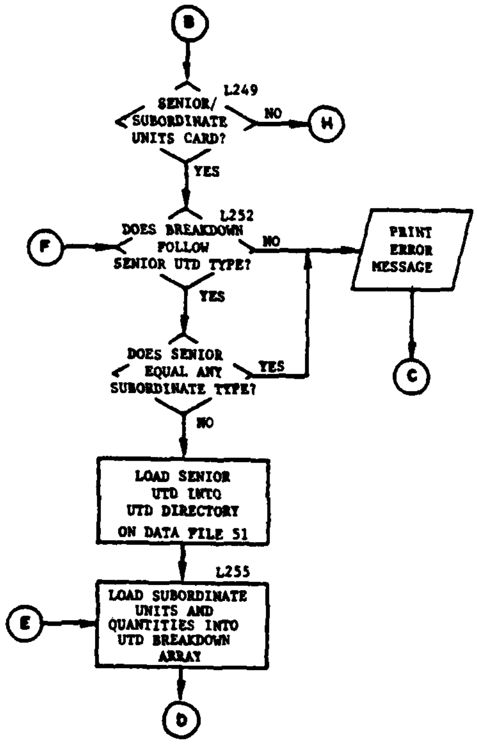

Figure II-3-B-1. Routine LDTOE. (Continued)

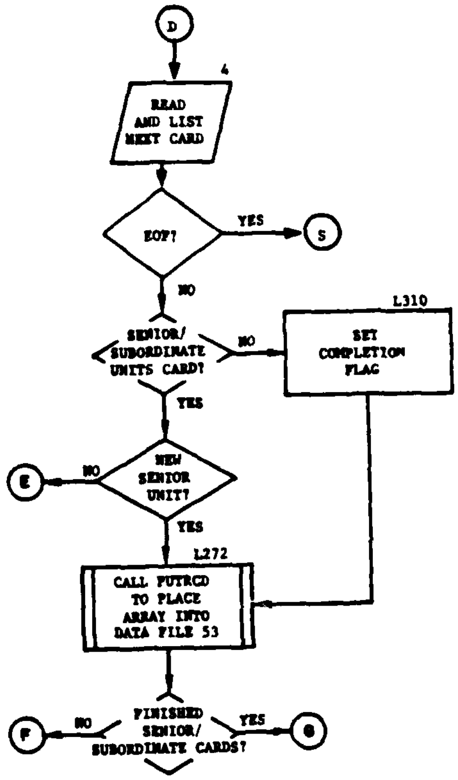

Figure II-B-3-1. Routine LDTOE. (Continued)

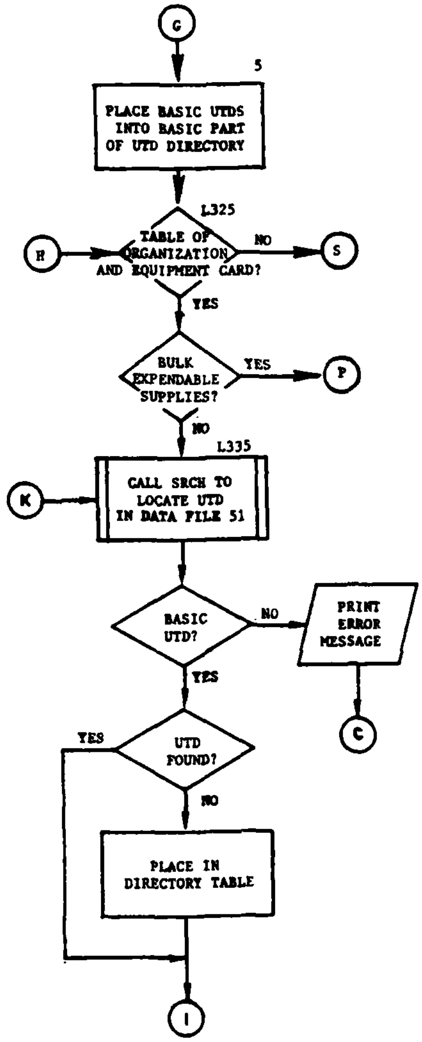

Figure II-3-B-1. Routine LDTOE. (Continued)

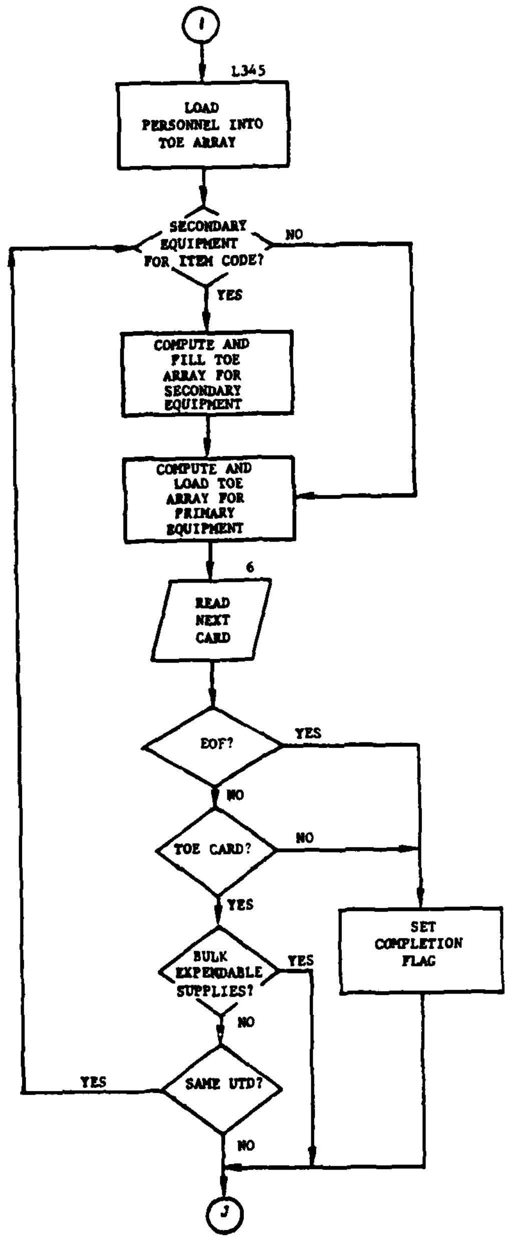

Figure II-3-B-1. Routine LDTOE. (Continued)

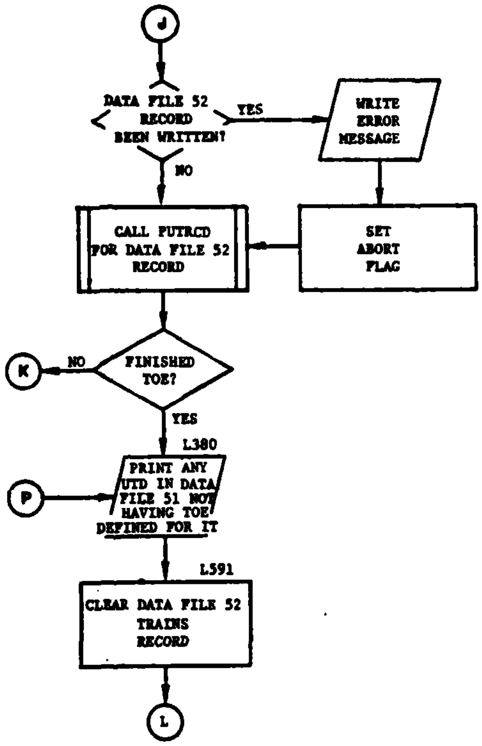

Figure II-3-B-1. Routine LDTOE. (Continued)

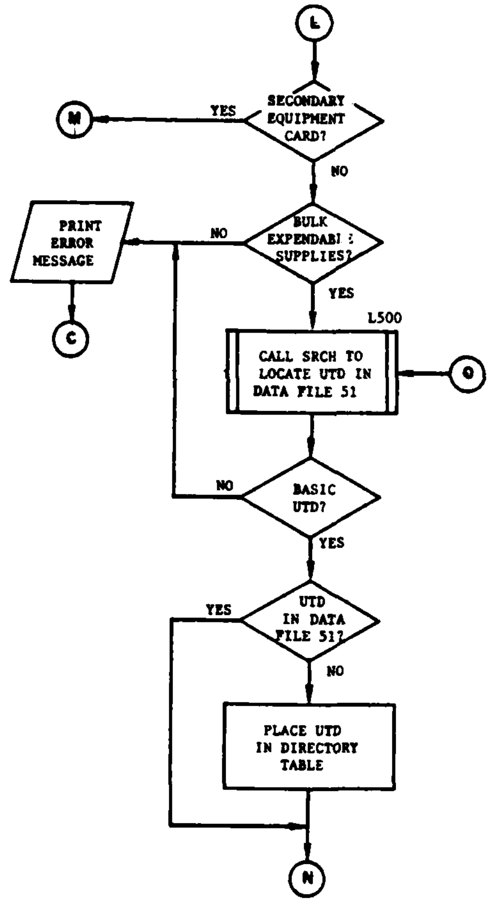

Figure II-3-B-1. Routine LDTOE. (Continued)

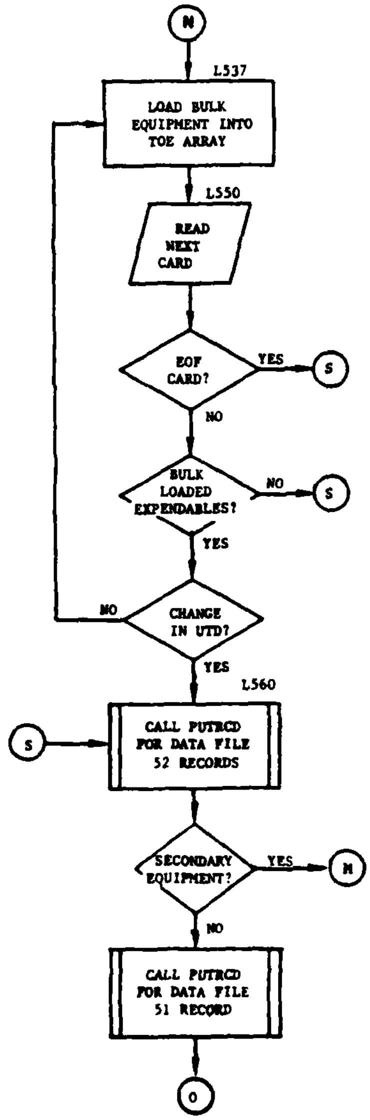

Figure II-3-B-1. Routine LDTOE. (Continued)

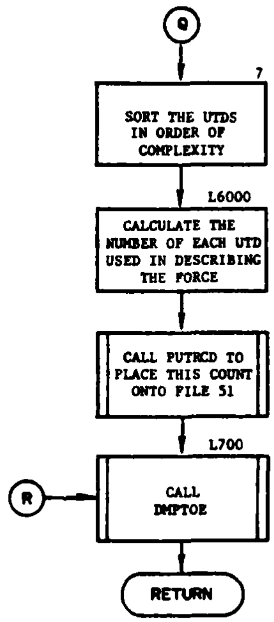

Figure II-3-B-1. Routine LDTOE. (Concluded)

(4) Block L110. A data card is read. If an end of file was sensed, control transfers to block L560. The card image is printed.

(5) Block L118. A check is made to determine if the card is a secondary equipment card. If not, control transfers to block L249; otherwise, routine GETRCD is called to retrieve the appropriate data file 6 record. The card data are loaded into this record starting at the first zero location, and routine PUTRCD is called to return the updated record to the file. The data file 6 record is then loaded into the secondary equipment array for later use, and control returns to block L110.

(6) Block L249. The card previously read is not of the secondary equipment type. If it is of TOE or bulk-loaded expendable supplies type control goes to block L325.

(7) Block L252. The card previously read is of the senior/subordinate type. The array for holding data file 53 records is initialized. A check is made to determine if the senior UTD was previously loaded into the complex portion of data file 51. If it was, an error message is printed and control returns to block L110; if it was not, it is loaded into the data file 51 array.

(8) Block L255. The subordinate UTDs and quantities are loaded into the data file 53 array.

(9) Block 4. The next data card is read, and if an end of file was sensed control transfers to block L560. If the card is not of the senior/subordinate UTD type control transfers to block L310; if the card is of senior/subordinate type and the senior UTD did not change, control returns to block L255.

(10) Block L272. The data file 53 record counter is incremented and routine PUTRCD is called to put the data file 53 array into data file 53. If all senior/subordinate cards have not been processed control returns to block L252.

(11) Block 5. Each data file 53 record is retrieved and each UTD of each record is examined. Each UTD, not of a complex type, is loaded into the basic portion of data file 51 until it is filled.

(12) Block L310. The completion flag is set and control transfers to block L272.

(13) Block L325. If the card is not of TOE or bulk-loaded expendable supplies type, control transfers to block L560. If it is bulk-loaded expendable supplies type control goes to block L380.

(14) Block L325. Routine SRCH is called to locate the unit type designator (UTD) in the UTD directory table. If it is a complex UTD, an error message is written and control returns to block L110. If it was not found, in the table, place it in the UTD directory table.

(15) Block L345. This block updates the TOE array for data file 52. For each equipment item code of the TOE, data file 6 is searched for secondary equipment. If none is found the TOE entry for that primary item is updated by the appropriate quantity. If secondary equipment is defined for a primary item code a nesting effect may occur, as each secondary equipment item may in turn have secondary equipment items. The products of these items are carried through into the TOE sums.

(16) Block 6. The next data card is read. If an end of file was sensed or the card is not TOE the completion flag is set. If the UTD does not change control returns to block L345. If the data file 52 record of this UTD has not previously been written, routine PUTRCD is called to place the TOE data on data file 52. If TOE data processing is not completed control returns to block L335.

(17) Block L380. Check to determine if all UTD entries in data file 52 have TOEs defined. If not, an informative message is written.

(18) Block L591. Initialize trains area of data file 52. If this is a secondary equipment type card control goes to block L118. If this is a bulk expendable supplies type card control goes to block L500; otherwise, an error message is printed and control returns to block L110.

(19) Block L500. Routine SRCH is called to locate the UTD in data file 51. If the UTD is of a complex type, an error message is printed and control returns to block L110. If the UTD was located control goes to block L537; otherwise, the data file 52 record counter is incremented and the UTD is placed in data file 51.

(20) Block L537. The bulk quantities are loaded in their appropriate equipment item code positions in the TOE array.

(21) Block L550. The next card is read. If it is an end of file card (9999), an end of file was sensed, or it is not a bulk-loaded expendables card; control goes to block L560. If the UTD did not change control returns to block L537.

(22) Block L560. Routine PUTRCD is called to place the bulk expendables records onto data file 52. If the last card is secondary equipment type control returns to block L118. The UTD directory is placed onto data file 51.

(23) Block 7. The list of complex UTDs for each force is arranged so that the components of each UTD are either basic or less complex UTDs. The resulting order is stored in the ORDER array. The first UTD associated with the Blue force must be AABB and the corresponding Red force UTD is AARR. By definition these UTDs are also the most complex UTDs associated with the respective force. They are placed last in the ORDER array. The ordering of the remaining UTDs is accomplished by attempting to match each component of the next UTD in the list with entries in the list of basic UTDs or with complex UTDs having components already resolved. If no match is found for a component of this UTD it is placed next to the last in the ORDER array,

the other UTDs are moved up one, and the next UTD is processed. If UTDs are discovered containing unresolved components, an error message is written and processing of this force's UTDs is terminated.

(23) Block L6000. This area calculates the total number of UTDs of each type that is used in describing the force. It is accomplished by working from the bottom of the ORDER array derived in block 7. The running total for each UTD is kept in the KNT51 array. There can be only one AABB or AARR UTD in each force, so a one is placed in that position in KNT51. The remaining UTDs are counted by considering each UTD in the order of complexity (from the bottom of the ORDER array). The product of the number of times it has been used and the amount of each component UTD it requires is added to the value associated with each component UTD in KNT51. KNT51 is then placed as the second record of data file 51.

(24) Block L700. Routine DMPTOE is called.

3. ROUTINE SRCH:

a. Purpose. This routine finds the ordinal number of the passed UTD in the UTD directory table.

b. Input Variables:

Name	Source	Contents
IREC	Call	UTD
IVEC51	Call	UTD directory table.

c. Output Variables:

Name	Destination	Contents
IREC	Call	Ordinal of UTD.

d. Logical Flow (Figure II-3-B-2):

(1) Block 1. If the passed UTD is blank, control transfers to block L15.

(2) Block 2. A search is made through the UTD directory table for a matching UTD. If one is found, control transfers to block L20.

(3) Block L15. The UTD passed was either blank or was not found in the UTD directory table. The ordinal is set to zero and control returns to LDTOE.

(4) Block L20. The ordinal is set to the location of the UTD in the UTD table and control returns to LDTOE.

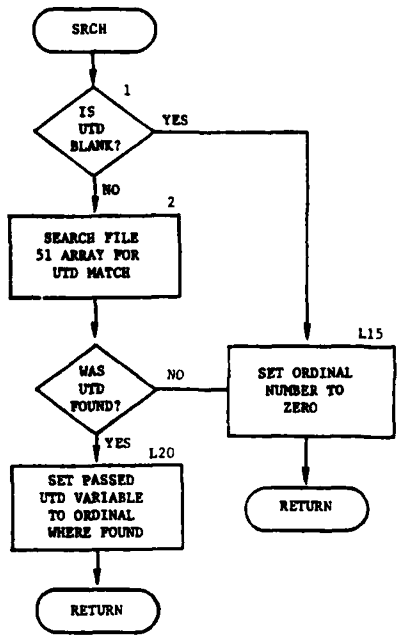

Figure II-3-B-2. Routine SRCH

4. ROUTINE DMPTOE

a. Purpose. The purpose of routine DMPTOE is to dump the UTD directory table, the UTD breakdown table, the basic unit TOE table, and the secondary equipment table.

b. Input Variables:

Name	Source	Contents
IUTD	DF51	List of UTDs.
KVEC6	DF6	Secondary equipment type and quantities for Red and Blue forces.
IVEC	DF53	UTD breakdown table. A breakdown of complex UTDs by type and amount.
KVEC	DF51	Maximum number of UTDs by type per force.
JVEC	DF52	Amount of equipment authorized on vehicles by type.
IXVEC	DF52	Amount of equipment authorized in trains by type.

c. Output Variables. A listing of the variables as noted under input variables.

d. Logical Flow (Figure II-3-B-3):

(1) Block 1. Routine GETRCD is called to retrieve the first record of data file 51. This is the UTD directory table of which the first 250 entries comprise basic UTDs, with ordinals pointing to data file 53 for UTD breakdown.

(2) Block 2. Routine GETFLE is called to retrieve data file 6, the secondary equipment file. There are 400 records, 10 words per record. The first 200 records are for the Blue force and the last 200 are for the Red force. Each record contains equipment type and amount for five items.

(3) Block 3. The secondary equipment types and amounts are listed for Blue and Red forces.

(4) Block L4. For each entry in the complex UTD table GETRCD is called to retrieve the corresponding data file 53 record. This provides a breakdown of the complex UTDs. This record is then listed.

(5) Block L20. Routine GETRCD is called to retrieve the second record of data file 51, which contains the maximum number of UTDs by type per force.

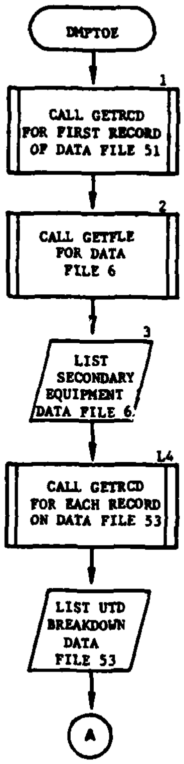

Figure II-3-B-3. Routine DMPTOE. (Continued on Next Page)

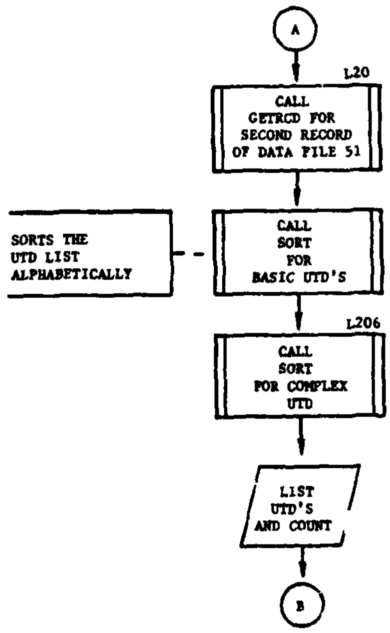

Figure II-3-B-3. Routine DMPTOE. (Continued)

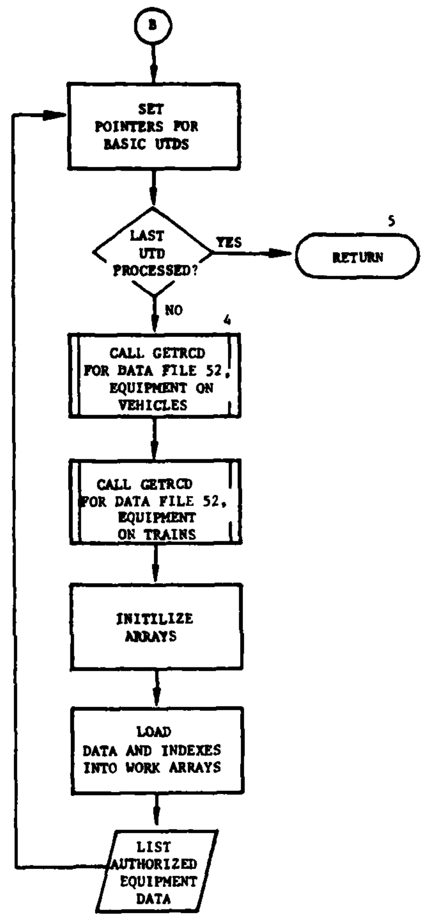

Figure II-3-B-3. Routine DMPTOE. (Concluded)

(6) Block L206. Routine SORT is called for the basic and complex units to sort the UTDs alphabetically. The UTDs are listed in sorted order.

(7) Block 4. For each basic UTD the corresponding equipment authorized in vehicles and on trains records are retrieved from data file 52. For each record, equipment types with the amounts are loaded into intermediate arrays and listed.

(8) Block 5. After data have been listed control returns to the calling routine.

5. ROUTINE SORT:

a. Purpose. The purpose of routine SORT is to sort the UTD table alphabetically and arrange the table index in the same order.

b. Input Variables:

Name	Source	Contents
N	Call	Number of entries in the UTD table.
IA	Call	UTD table.
IB	Call	Maximum number of UTD types allowable per force.
INDEX	Call	Ordinal of each UTD entry.

c. Output Variables. The above input variables in sorted order.

d. Logical Flow (Figure II-3-B-4):

(1) Block 1. The scan limit of the sort is set to one less than the number of UTD's to be sorted.

(2) Block 2. A do loop used to scan through the UTD array is established. The value of this do loop index is the ordinal of the left UTD to be compared.

(3) Block 3. The initial ordinal of the right UTD to be compared is established.

(4) Block L3. If the value of the ordinal of the right UTD is greater than the number of entries in the UTD array control goes to block L20.

(5) Block 4. The UTDs of the left and right ordinal are compared. If the left UTD is less than the right UTD control goes to block L15.

(6) Block L11. The left and right UTD's and their indexes are interchanged.

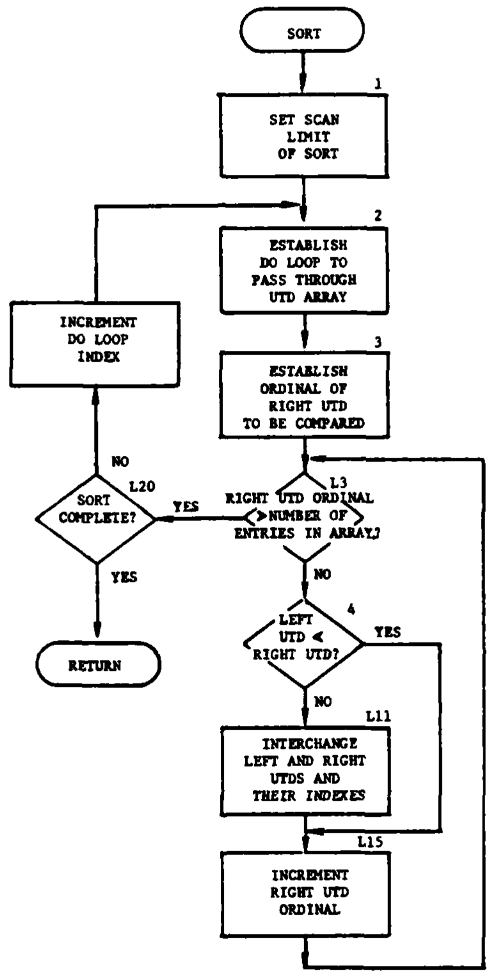

Figure II-3-B-4. Routine SORT

(7) Block L15. The ordinal of the right UTD is incremented and control returns to block L3.

(8) Block L20. If the sort is complete (the do loop ordinal would be greater than the scan limit established in block 1) transfer control to the calling routine; otherwise, the do loop index is incremented and control is returned to block 2.

APPENDIX C

ORGANIZATION AND EQUIPMENT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Five printouts are produced when the constant data input cards are read into the DIVWAG System. These five printouts are listed in Figure II-3-C-1, TOE Type Printouts. The printouts are used to validate the accuracy of the information entered as the constant data input. The format of each type printout is illustrated in the following pages together with a brief explanation of its contents.

Title of Printout	Source of Data
80-Column Card Image of Input Data	Cards in data deck
Secondary Equipment for Blue and Red	Data file 6, secondary weapons
Unit Type Designator Breakdown Table Red and Blue	Data file 53, UTD breakout
Unit Type Designator Di: ectory	Data file 51, UTD directory
Authorized Equipment Strengths	Data file 52, authorized strength type basic unit

Figure II-3-C-1. TOE Type Printouts

2. EIGHTY-COLUMN CARD IMAGE OF INPUT DATA. The source of this input printout form is the original cards that brought the data into the DIVWAG System. Figure II-3-C-2 illustrates the type printout. At the far right is listed the number 5201, which is the card identifier. On that same line at the far left is the number 2, which indicates that this is card type 2. Figure II-3-C-2 shows card image TOE for bulk-loaded-expendables data. The headings of the card columns from the card format defines the individual data items. For a complete description of the input card image, refer to Appendix A of Chapter 3, Unit Representation Input Requirements, of the Period Processor.

3. SECONDARY EQUIPMENT FOR BLUE AND RED. Figure II-3-C-3 Secondary Equipment for Blue, illustrates the format of this constant data input printout. This is the first of the printouts having columnar titles and formatted for easy reading. The data portrayed in the printout were entered in card format, processed, and entered into data file 6. The printout

```
28VCLH  2  12001  3  36001 90  10002                                             5201  26
28IBCH  3  12001  2  12001                                                       5201  27
28IBLH  2  12001                                                                 5201  28
28IBMH  2  24001  8   8402 90   2702 32    202  2    5001  7  50002              5201  29
28IHCC  2  12001  8   6302 70    122                                             5201  30
28IHMC  2  36001  8   2102 42   1802 43    902 30    1862 32    102              5201  31
2B      9   5002 70    122                                                       5201  32
28IAMH  3  48001  8  14702  2  12001 70    122                                   5201  33
28PWFH  7 900002 90   2702  3  18001                                             5201  34
28PSMH  3  18001                                                                 5201  35
28IHLC  2  12001  8  39902 70    122                                             5201  36
28JACH  2  12001  3  12001                                                       5201  37
28JASH  2  12001  3  36001                                                       5201  38
28JBSH  3  72001 90    602  2  12001  7  50002                                   5201  39
28JCSH  3  72001  2   6001                                                       5201  40
28VBLH  3  36001  2  12001 90    302                                             5201  41
28VFLH  3 100001  2   6001 90    602  7  20002                                   5201  42
28JACA  2  12001  3  12001  3  12001                                             5201  43
28IFCA 70    362  2  12001                                                       5201  44
28IFFA 53   4022 54   6002  2  12001  8   1002                                   5201  45
28IBFA 57   3762  2  12001  8   1002                                             5201  46
28IFLA  2  36001                                                                 5201  47
28IGCA  2   6001                                                                 5201  48
28IGFA 51   9001  2   5001 70    121                                             5201  49
28PACA  2   5001                                                                 5201  50
28PFFA 65   2741 66   4941  2   1001                                             5201 50A
28IGLA  2   6001                                                                 5201  51
28KCCA 70    362  2   5001                                                       5201  52
28KGFA 59   3042  2  12001                                                       5201  53
28KSLA  2  24001                                                                 5201  54
28KGCA 70    362  2  12001                                                       5201  55
28KHFA 57   3762  2  12001                                                       5201  56
28KALA  2  24001  8   1002                                                       5201  57
28KFCA 70    362  2  12001                                                       5201  58
28KCFA 53   4022 54   6002  2  12001                                             5201  59
28KCLA  2  36001  8   1002                                                       5201  60
28KACA  2  12001                                                                 5201  61
28KLFA 61     62                                                                 5201  62
28KLLA  2  36001                                                                 5201  63
28JHCD  2  12001                                                                 5201  64
28JAFD  2  24001  9 504002                                                       5201  65
28JBFD  2  24001 72    482                                                       5201  66
28JECF  2  48001142    602 10  10002                                             5201  67
28OBSE142    602  2   5001                                                       5201  68
28PESE  2  12001      5002 10   1002                                             5201  69
28OESE  2   5001 10    102  5   1002                                             5201  70
28ESCS  2  12001                                                                 5201  71
28JSCS  2  12001                                                                 5201  72
28PBCS  2   6001                                                                 5201  73
28IJCJ  2   6001                                                                 5201  74
28BMCC  2  12001  8   4202 70    602  8  20002                                   5201  75
28BTCC  2   1001                                                                 5201  76
28BRLC  2   1001                                                                 5201  77
28ICCT  2  12001  8   9302 70    602  3  12001                                   5201  78
28KCCT  2  12001  8   9302 70    602  3  12001                                   5201 78A
28JCLT  2   1001  3  50001                                                       5201  79
28IDCI  2  12001           70    602  3  12001                                   5201  80
28JOLI  2   1001  3  50001  8   1002                                             5201  81
28IACC  2  12001 70    242 70    602  2   5001                                   5201  82
28JALC  2 180001  3  50001  8   1002                                             5201  83
28JOCL  8  40002 70    602  2  36001                                             5201  84
28JLLL  2   5001                                                                 5201  85
28JTCL  2   5001  3  50001                                                       5201  86
28JSLL  2 240001  3  50001  5   1002  6   1002 27   1002 32   1002               5201  87
28     36   1002 44   1002 51   1002 65   1002 66   1002 70   1002               5201 87A
28PSLL  2    201                                                                 5201  88
```

Figure II-3-C-2. 80-Column Card Image

SECONDARY EQUIPMENT FOR BLUE

PRIMARY	SECONDARY									
EOH	EOH	AMT.	EOH	AMT.	EOH	AMT.	EOH	AMT.	EOH	AMT.
21	6	21	0	0	0	0	0	0	0	0
22	8	1000	0	0	0	0	0	0	0	0
25	2	137	27	114	20	1	8	525	0	0
26	27	80	0	0	0	0	0	0	0	0
29	2	137	30	63	20	1	8	2205	0	0
31	32	5	0	0	0	0	0	0	0	0
34	2	6	36	6	0	0	0	0	0	0
35	2	116	20	1	8	1995	36	10	0	0
37	2	375	38	15	39	48	20	1	8	840
41	2	158	20	1	8	1000	42	20	43	10
45	44	1	0	0	0	0	0	0	0	0
50	51	40	0	0	0	0	0	0	0	0
52	2	135	53	10	54	50	20	1	8	525
55	65	11	66	17	0	0	0	0	0	0
56	2	300	57	2	0	0	0	0	0	0
58	2	300	59	2	0	0	0	0	0	0
60	2	64	61	1	0	0	0	0	0	0
71	2	190	72	8	0	0	0	0	0	0
73	2	105	74	3	0	0	0	0	0	0
75	2	155	9	1800	0	0	0	0	0	0
85	3	59	0	0	0	0	0	0	0	0
86	3	224	0	0	0	0	0	0	0	0
87	3	1353	0	0	0	0	0	0	0	0
88	3	251	90	6	7	500	0	0	0	0
91	3	297	93	1	94	1	0	0	0	0
97	3	500	0	0	0	0	0	0	0	0
99	3	1100	100	1	0	0	0	0	0	0
135	2	52	0	0	0	0	0	0	0	0
136	2	190	0	0	0	0	0	0	0	0
138	2	166	0	0	0	0	0	0	0	0
140	2	375	0	0	0	0	0	0	0	0
141	2	375	20	1	8	735	142	30	0	0
160	2	18	0	0	0	0	0	0	0	0
161	2	64	0	0	0	0	0	0	0	0
162	2	1264	0	0	0	0	0	0	0	0
163	2	110	0	0	0	0	0	0	0	0
165	2	5300	0	0	0	0	0	0	0	0
166	2	1864	0	0	0	0	0	0	0	0
167	2	64	20	1	8	420	0	0	0	0
185	2	116	9	500	0	0	0	0	0	0
186	2	110	9	530	0	0	0	0	0	0
187	2	105	57	54	0	0	0	0	0	0
188	2	120	0	0	0	0	0	0	0	0
189	2	385	20	1	8	1470	0	0	0	0
190	2	105	53	33	54	15	0	0	0	0
191	2	105	59	36	0	0	0	0	0	0

Figure II-3-C-3. Secondary Equipment for Blue is a reflection of the data placed in data file 6. Across the top at far left is the title, PRIMARY EOH, and to the right is EOH, item code number, followed in the next column with AMT and so on. The first line states that the primary equipment item code number 21 has a secondary item in the quantity of 21. There are no other secondary items associated with item code 21. Formats of secondary equipment can be reviewed for validation. Should an error be found it may be traced directly to the 80-column card printout and corrected.

4. UNIT TYPE DESIGNATOR BREAKDOWN TABLE. The third type printout is that of unit type designator breakdown table for either Red or Blue forces illustrated in Figure II-3-C-4. This table is for the senior and subordinate unit relationship and reflects the data loaded onto data file 53. At the far left is the UTD for the senior unit. At the right of that column are the UTDs of the subordinate units assigned to that senior unit. Beneath each subordinate UTD is the number of these subordinate unit types that are assigned to the senior unit. Again, these may be used to check the accuracy of information entered in the data base. Apparent errors can be checked against the punch card 80-column printout and the errors on a specific card are detected.

5. UNIT TYPE DESIGNATOR (UTD) DIRECTORY. The fourth type printout for TOE constant data input is illustrated in Figure II-3-C-5. The purpose of this printout is to display the number of basic and complex units that are in the total force structure. This printout reflects the data entered onto data file 51. At the far left of the figure is the label index. To the right and along the top line is the number 142; this number has been assigned by the computer to the unit AALL. On the line labeled amount beneath AALL is the number 1; thus, in the entire force there is one AALL unit, and it has been assigned the index number of 142. Within this printout, the UTDs of all basic units are listed first--alphabetically sorted--followed by the complex units alphabetically sorted. The index numbers of the basic units provide a rapid reference to the printout of the TOE table.

6. AUTHORIZED PERSONNEL AND EQUIPMENT. The fifth type TOE data printout is illustrated in Figure II-3-C-6. For each basic UTD, the UTD index number and number of authorized personnel are shown at the left. Authorized equipment is shown in terms of the equipment item code, amount authorized to the unit, amount authorized on unit trains, and means of distribution (1 = unit, 2 = supply point distribution). The amount authorized to the unit and on trains is reflected on data file 50.

UNIT TYPE DESIGNATOR BREAKDOWN TABLE

UTD		BREAKDOWN										
AABB	UTD	PAMC	AZST	AFFY	AHLI	APLL						
	NO.	1	1	1	1	1						
BAMC	UTD	BMCC	BRLC	CDCC	CAFA	CSCL	CCMT	CDMI	CAMC	BTCC	CMMI
	NO.	1	1	1	1	1	1	1	1	1	1
CMMI	UTD	FMMI	FMMT	KCCT							
	NO.	2	2	1							
FMMI	UTD	KMCI	ONFA	KAMI	KLSI						
	NO.	1	1	3	1						
FMMT	UTD	KTCT	ONFA	KTMT	KCST						
	NO.	1	1	3	1						
CAFA	UTD	JACA	EFFA	EGFA	FGFA	FHFA	FSFA	FMFA			
	NO.	1	1	1	1	3	3	1			
CCMT	UTD	ICCT	EAMT	EBMI	JCLT						
	NO.	1	2	1	1						
CDMI	UTD	IDCI	ECMI	EDMI	JDLI						
	NO.	1	2	1	1						
CAMC	UTD	IACC	EAMH	EBMH	JALC						
	NO.	1	1	1	1						

Figure II-3-C-4. Unit Type Designator Breakdown Table

U T D   D I R E C T O R Y

INDEX	142	141	1	2	145	3	4	5	173	179	184	194	149	145	152	175	181	173	87	191
TYPE	AALL	ABLL	APLL	APLL	ATTY	BMCC	BRLC	BTCC	DACE	DMCA	DMCD	DNCD	DRLT	DPPY	DSTJ	DTCA	DHCA	DYSE	FSCS	GFCE
AMOUNT	1	1	1	1	4	1	1	1	2	2	1	2	3	99	1	3	1	7	1	4
INDEX	183	163	162	155	176	150	165	171	178	166	172	159	153	185	143	195	151	177	18.	182
TYPE	GEFA	GEMI	GEMT	GFFA	GHFA	GIMC	GLLI	GPSE	GPFA	GRMT	GRSE	GTLT	GVTJ	HAFD	HATT	HBFD	HESE	HGFA	HMFA	HPFA
AMOUNT	1	9	27	3	12	3	3	2	3	3	2	9	1	3	2	6	2	3	6	2
INDEX	19	42	34	93	46	38	57	47	48	36	15	140	40	23	17	55	56	58	37	59
TYPE	IACC	IACH	IACI	IAPH	IBCH	IBCI	IBFA	IBLH	IBMH	IBMI	ICCT	ICIJ	ICMI	ICST	IDCI	IFCA	IFFA	IFLA	IFSI	IGCA
AMOUNT	1	1	2	1	1	1	1	1	3	6	1	1	3	2	1	1	3	1	2	1
INDEX	60	61	90	91	92	96	39	43	28	22	29	27	41	35	21	14	49	77	20	116
TYPE	IGFA	IGLA	IHCC	IHLC	IHMC	IJCJ	IJLI	IKMH	ILLI	ILLT	ILSI	IMCI	IMSI	ISLI	ITCT	JACA	JACH	JAFD	JALC	JALL
AMOUNT	3	1	1	1	2	1	1	3	1	2	1	1	1	2	2	1	1	2	1	1
INDEX	50	78	51	16	52	136	18	79	115	76	114	97	107	113	120	121	122	123	119	118
TYPE	JASH	JBFD	JBSH	JCLT	JCSH	JDCL	JDLI	JECE	JFLL	JHCD	JHLL	JIIJ	JLLL	JMCL	JMLL	JNCL	JNLL	JOLL	JPLL	JSCL
AMOUNT	1	2	3	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
INDEX	88	103	109	108	111	73	126	69	129	9	127	128	64	6	71	72	13	130	70	67
TYPE	JSCS	JSIJ	JSLL	JTCL	JTLL	KACA	KACH	KALA	KALH	KAMI	KASH	KBSH	KCCA	KCCT	KCFA	KGLA	KCST	KDLE	KFCA	KGCA
AMOUNT	1	1	1	1	2	1	1	3	1	6	3	1	1	1	9	3	2	1	3	3
INDEX	65	124	134	68	125	74	75	131	10	7	66	11	12	164	156	154	147	148	157	167
TYPE	KGFA	KHCD	KHCE	KHFA	KHFD	KLFA	KLLA	KLLE	KLSI	KMCI	KSLA	KTCT	KTMT	LBCI	LBCT	LECE	LFCT	LFIA	LIMC	MAFA
AMOUNT	3	1	2	9	3	2	1	1	2	2	1	2	6	3	9	3	3	3	12	3
INDEX	169	193	192	174	189	198	202	190	196	161	160	168	188	186	187	144	200	62	132	89
TYPE	MBFA	MCSE	MDSE	MOSE	NACO	NBSE	NBME	NDFD	NDSE	NEFD	NFFD	NGFD	NHCA	NLCA	NLFA	NRII	NTSE	PACA	PBBE	PBCS
AMOUNT	9	4	4	2	3	3	11	12	18	12	9	3	3	3	9	1	7	1	6	3
INDEX	85	81	82	63	33	32	26	24	25	30	117	110	95	112	31	94	133	86	83	84
TYPE	PBSE	PCSF	PESE	PFFA	PICI	PIMI	PMCT	PMFA	PMMT	PNFA	POLL	PSLL	PSMH	PTLL	PTSI	PWFH	QBBE	QBSE	QCSE	QESE
AMOUNT	2	6	2	1	3	9	6	2	18	1	1	3	1	3	2	1	2	1	6	2

Figure II-3-C-5. Unit Type Designator Directory

AUTHORIZED PERSONNEL AND EQUIPMENT TABLE

UTD INDEX	AUTH PERS STRENGTH		AUTH EQUIP STRENGTHS									
1	1	INDEX	2	0	0	0	0	0	0	0	0	0
		STR.	1200	0	0	0	0	0	0	0	0	0
AMLL		TRAINS	500	0	0	0	0	0	0	0	0	0
		ISTR.	1	0	0	0	0	0	0	0	0	0
		INDEX	0	0	0	0	0	0	0	0	0	0
		STR.	0	0	0	0	0	0	0	0	0	0
		TRAINS	0	0	0	0	0	0	0	0	0	0
		DISTB.	0	0	0	0	0	0	0	0	0	0
2	1	INDEX	2	161	165	0	0	0	0	0	0	0
		STR.	151920	30	30	0	0	0	0	0	0	0
APLL		TRAINS	0	0	0	0	0	0	0	0	0	0
		DISTB.	2	2	2	0	0	0	0	0	0	0
		INDEX	0	0	0	0	0	0	0	0	0	0
		STR.	0	0	0	0	0	0	0	0	0	0
		TRAINS	0	0	0	0	0	0	0	0	0	0
		DISTB.	0	0	0	0	0	0	0	0	0	0
3	114	INDEX	2	8	22	70	160	161	0	0	0	0
		STR.	982	2000	2	30	19	10	0	0	0	0
BMCC		TRAINS	1200	2000	0	60	0	0	0	0	0	0
		DISTB.	1	2	2	2	2	2	0	0	0	0
		INDEX	0	0	0	0	0	0	0	0	0	0
		STR.	0	0	0	0	0	0	0	0	0	0
		TRAINS	0	0	0	0	0	0	0	0	0	0
		DISTB.	0	0	0	0	0	0	0	0	0	0
4	20	INDEX	2	160	0	0	0	0	0	0	0	0
		STR.	108	6	0	0	0	0	0	0	0	0
BRLC		TRAINS	100	0	0	0	0	0	0	0	0	0
		DISTB.	1	2	0	0	0	0	0	0	0	0
		INDEX	0	0	0	0	0	0	0	0	0	0
		STR.	0	0	0	0	0	0	0	0	0	0
		TRAINS	0	0	0	0	0	0	0	0	0	0
		DISTB.	0	0	0	0	0	0	0	0	0	0

Figure II-3-C-6. Authorized Personnel and Equipment Printout

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR ORGANIZATION AND EQUIPMENT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 4

TASK ORGANIZATION DATA INPUT PROGRAMS

1. INTRODUCTION. The Task Organization data input programs create and load the unit status and supply status files and the authorized equipment file. The contents of these files are controlled by the Organization and Equipment data and the Task Organization data describing the unit resolution and command and support relationships among units.

2. ROUTINES. The Task Organization data input programs consist of the routines described below.

a. Routine ECHLON. The principal controlling routine is ECHLON. This routine creates and loads the unit status and authorized equipment files. It controls the reading and editing of appropriate data cards.

b. Routine RECOG1. The task organization data cards are read by routine RECOG1 and the data are returned in arrays stored in common.

c. Routine COMMCK. Routine COMMCK determines if a card read is a comment card. If not, it prints the card image. If a card is not terminated by a period, the next card is read.

d. Routine COMPRS. Blank spaces are compressed out of data card images by routine COMPRS.

e. Routine CFIND. Routine CFIND is a utility routine which searches a card image for a specified character and returns the location of a match if one is found.

f. Routine BLNKOT. A complete card image is filled with blanks by routine BLNKOT.

g. Routine CORDIN. Routine CORDIN searches a card image for a pair of X-Y coordinates and returns the coordinates in memory.

h. Routine SUPORT. Routine SUPORT reads support data and establishes the necessary support linkages. The support may be general support, direct support, reinforcing, or general support/reinforcing.

i. Routine SEQUEN. The routine that controls the creation of records for all units on the unit status file is SEQUEN. It calls routines TOEPUT, UPDATE, RELATR, and SUPPLY upon completion.

j. Routine TOEPUT. Routine TOEPUT fills the unit status record and authorized equipment record for a unit and places them on the data files.

k. Routine UPDATE. Updating of quantities of equipment and personnel on hand and authorized is performed by routine UPDATE for all units with subordinates. The quantities include the total of all quantities :sent in subordinate units.

l. Routine CRAT31. Supply status records are created by routine CRAT31 and placed on the supply status file.

m. Routine RELATR. Routine RELATR inserts properly coded indications of supporting roles into all unit status records of a force.

n. Routine SUPPLY. The supply source for each unit is placed in the supply status records by routine SUPPLY.

o. Routine TALLY. Routine TALLY verifies that all task organization requirements have been satisfied.

3. FILES. The following data files are created and loaded by the Task Organization data input programs:

- Unit status file - data file 1
- Supply status file - data file 31
- Authorized strength file - data file 50

APPENDIX A

TASK ORGANIZATION DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for task organization are documented in Appendix A, Unit Representation Input Requirements, to Chapter 3 of the Period Processor (Section IV).

NOTES

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APPENDIX B

TASK ORGANIZATION DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. The task organization input data are loaded by the group of routines described in this appendix that are controlled by the routine ECHLON. For the set of data describing the task organization of one force, processing is accomplished in three passes. First, the basic organization input cards are read, recognized, and placed in a common storage area by RECOG1 and supporting utility routines called from ECHLON. Second, ECHLON calls the routine SEQUEN that constructs unit status records (data file 1) and supply status records (data file 31) using the input data. Finally, routine SUPPLY reads the supply point data and sets appropriate entries on the supply status records. Variables are passed from RECOG1 to SEQUEN with a set of arrays in common. The three common areas for this set of loading routines are as follows:

a. Common ONE (Labeled Area):

Variable	Base Address	Contents
IFNT(56,3)	1	File name table.
UID(2,600)	169	Unit identifications in load order.
ICLASS(200)	1369	Equipment type classes.
IDUM(200)	1569	Not used.
NBLUE	1769	Total number of blue units.
NRED	1770	Total number of red units.

b. Common TWO (Labeled Area):

Variable	Base Address	Contents
EVTBLE(4000)	1	Records 1 and 2 of data file 51 unit type designator and number allowable.
UIDTAB(2,1000)		Unit identifications in IUID order.

c. Blank Common (Unlabeled Area):

Variable	Base Address	Contents
LIST	1	List flag: 1 = list, 0 = no list.
NU	2	Total number of units in table.

Variable	Base Address	Contents
LEV(600)	3	Level (echelon) of unit.
ITOE(600)	603	Unit type designator tables.
XLOC(600)	1203	X coordinates of units.
YLOC(600)	1803	Y coordinates of units.
USUP(2,600)	2403	Unit being supported.
NSUP(600)	3603	Types of support.
MAXLEV	4203	Highest level (echelon) of a unit.
KEND	4202	Total number of records on data file 31.
I23	4205	Data file 23 pointer.
IRATE	4206	Consumption rate of food supplies.

2. ROUTINE ECHLON:

a. Purpose. ECHLON is the controlling routine in the sequence of routines designed to build a task organization including unit status records, supply status records, and unit authorized strength records.

b. Input:

(1) Task organization data.

(2) TOE data.

(3) Supply data.

c. Output. ECHLON builds data file 1 (unit status), data file 31 (supply status), data file 50 (authorized strength), and data file 23 (unit composition).

d. Logical Flow (Figure II-4-B-1):

(1) Block 1. Call GETFLE to get the file name table from disk and place it in common.

(2) Block 2. Call REMOVE to remove data files 12, 23, and 31 from the file name table (IFNT) and remove the corresponding data from the disk storage area.

(3) Block 3. Call CREATE to create a new file in IFNT for data files 12, 23, and 31.

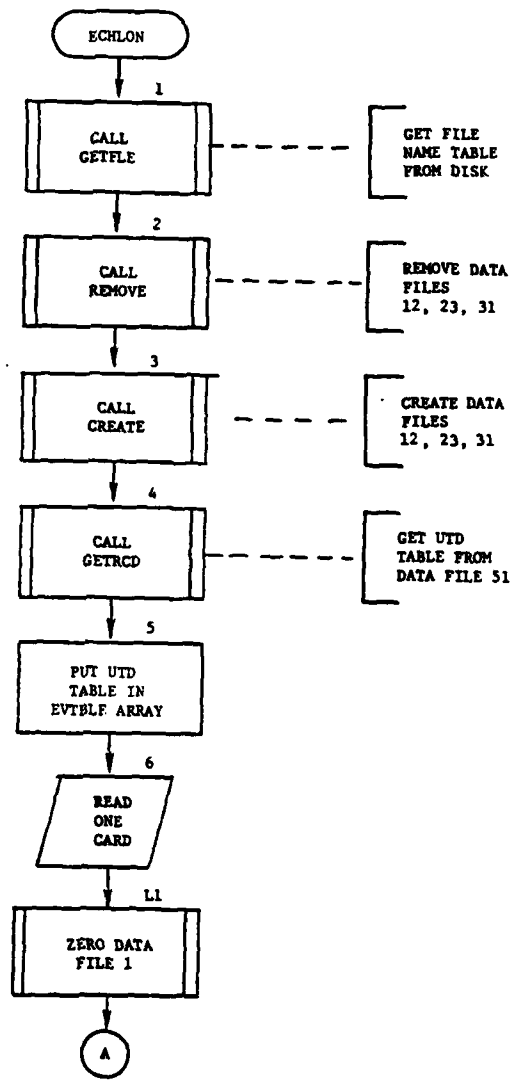

Figure II-4-B-1. Routine ECHLON (Continued on Next Page)

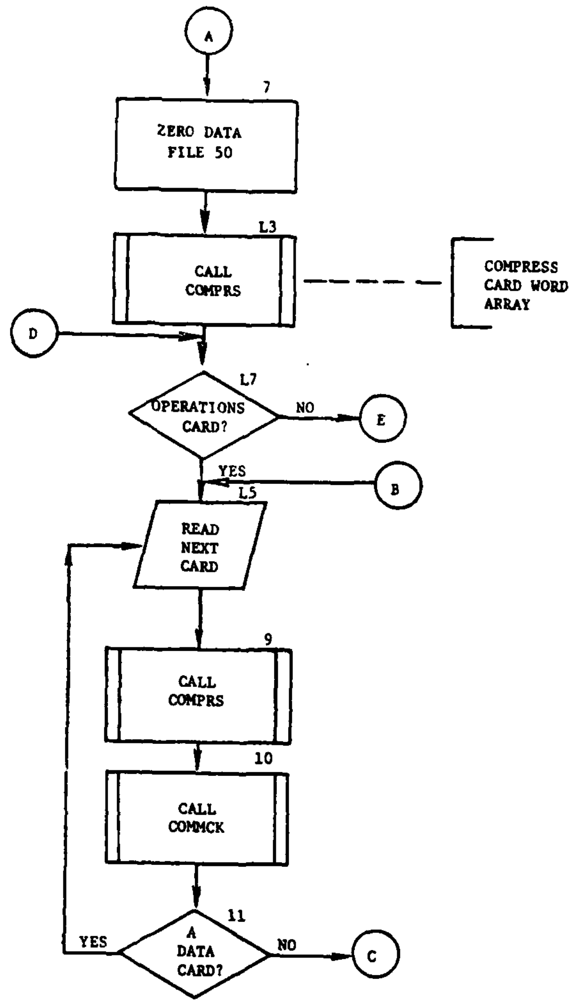

Figure II-4-B-1. Routine ECHLON (Continued)

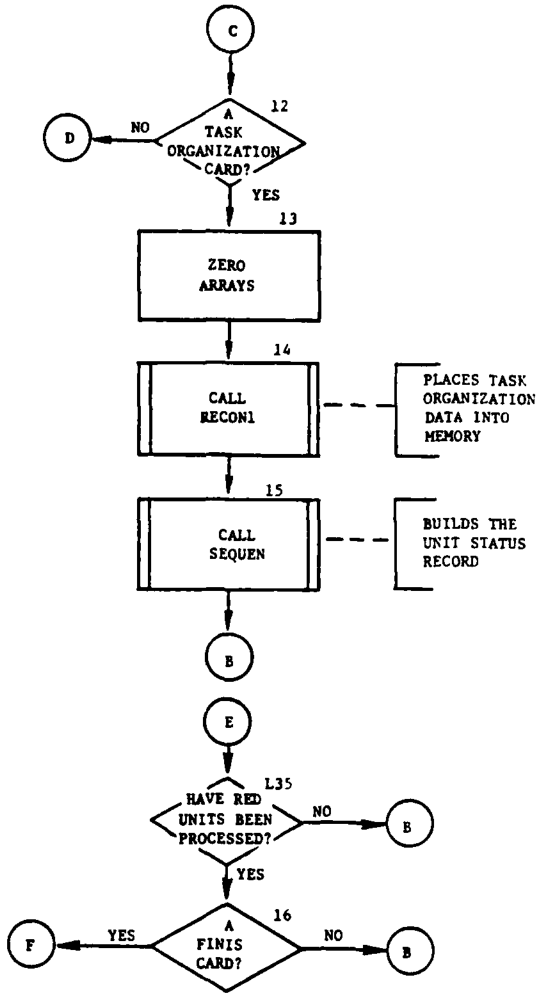

Figure II-4-B-1. Routine ECHLON (Continued)

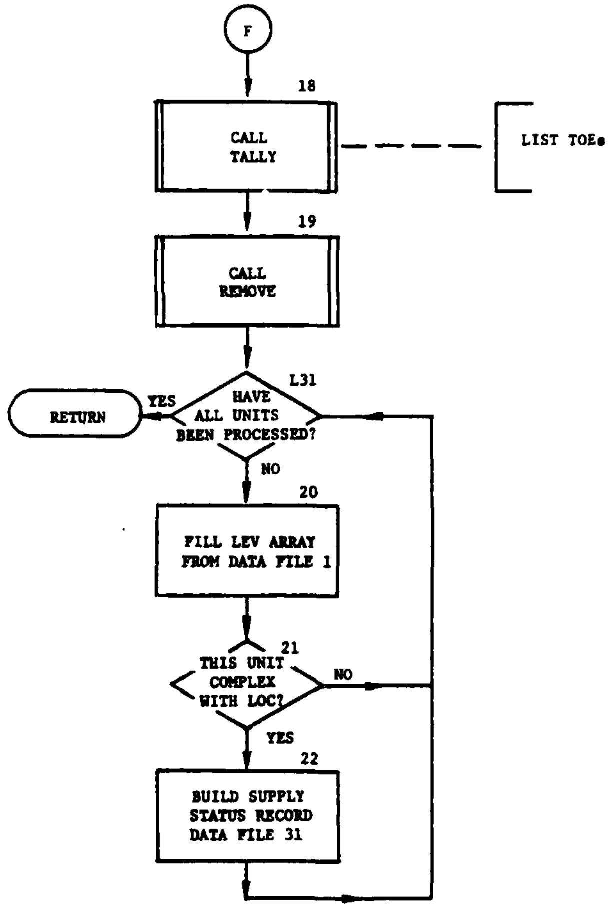

Figure II-4-B-1. Routine ECHLON (Concluded)

(4) Block 4. Call GETRCD to retrieve the unit type designator table from data file 51.

(5) Block 5. Put the unit type designator table into the EVTBLE array.

(6) Block 6. Read one card from task organization.

(7) Blocks L1 and 7. Zero the unit status file (data file 1) and the authorized strength file (data file 50).

(8) Block 13. Call COMPRS to put card image into a compressed form.

(9) Block L7. If this is not an operation card (first card), control goes to block L35.

(10) Blocks L5 and 9. Read the next card and call COMPRS to compress the characters.

(11) Blocks 10, 11, and 12. Call routine COMMCK to process this card if it is a comment card. If this is not a task card, control transfers to block L7.

(12) Block 13. Blank arrays UID, XLOC, YLOC, USUP, and ITOE. Zero arrays LEV, NSUP, MAXLEV, and NU.

(13) Block 14. Call RECOG1 to read the task organization data cards and place the input data into computer memory. If there were any errors in RECOG1 control transfers to block L5.

(14) Block 15. Call SEQUEN to build the unit status file. When control returns from this routine, control transfers to block L5.

(15) Block L35. Blue was processed with the first pass. If a second pass has not been made to process the Red units, return to block L5.

(16) Block 16. If the last card read was not a FINIS card, control goes to block L5.

(17) Block 18. Call TALLY which lists the units' TOEs.

(18) Block 19. REMOVE is called to remove data file 12 from IFNT. Data file 12 passes the data from routine TOEPUT to UPDATE.

(19) Block L31. If all units have been processed, control returns to the calling routine.

(20) Block 20. Fill the LEV (echelon level of a unit) array from data file 1.

(21) Block 21. If this unit does not have a location, control goes to block L31.

(22) Block 22. Build the supply status record for data file 31. Control goes to block L31.

3. ROUTINE RECOG1:

a. Purpose. RECOG1 reads task organization input data cards and places the input data into computer memory. Data are placed in a series of data arrays with the location within each array reflecting the sequence that data cards were read.

b. Input:

(1) Task organization data cards.

(2) Common blocks from routine ECHLON.

c. Output:

(1) RECOG1 lists all data cards as they are read.

(2) RECOG1 sets the following common variables: UID, ITOE, XLOC, YLOC, NSUP, UPSUP, LEV, MAXLEV, and NU.

d. Logical Flow (Figure II-4-B-2):

(1) Block L120, 1, and 2. A data card is read and routine COMPRS is called to compress any blanks out of the card image. Routine COMMCK is then called to determine if this is a comment card and to process it.

(2) Block 3 and L451. A check is made to determine if this is a support card. If it is, an error message is printed, the error flag is set, and control returns to the calling routine.

(3) Block 4. If there is not a period on the card, this unit's description is not complete, and control is transferred to block L120.

(4) Block 5. If this card is an end-of-unit card, control transfers to block L240.

(5) Block 6, 7, and 8. Set level indicator array for unit. If the new level is greater than the maximum level variable, reset the maximum level variable.

(6) Block 9. If this is a superior unit, transfer control to block L150.

(7) Block 10. If the level indicator of this basic unit equals one, transfer control to block 11.

(8) Block L150 and 13. If this is a superior unit, increment the level indicator.

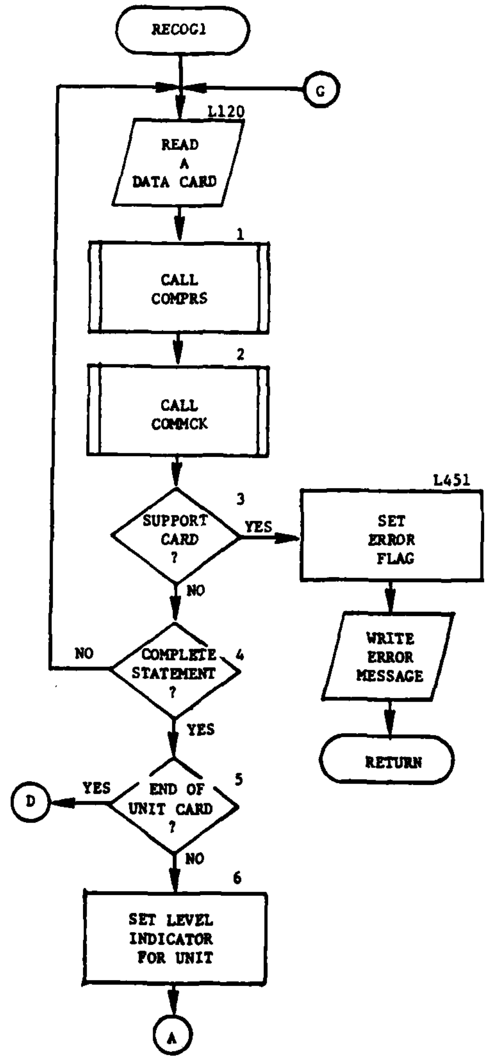

Figure II-4-B-2. Routine RECOG1 (Continued on Next Page)

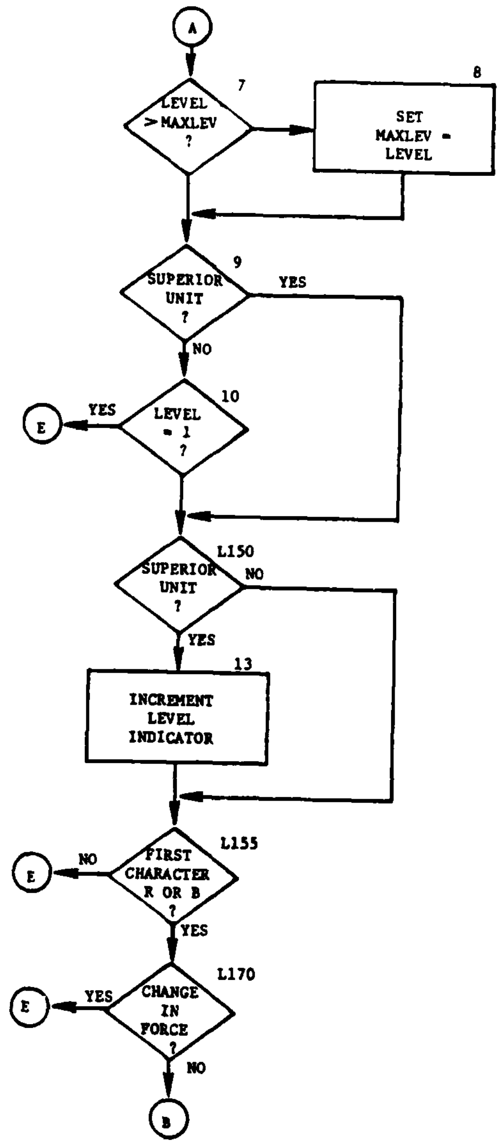

Figure II-4-B-2. Routine RECOG1 (Continued)

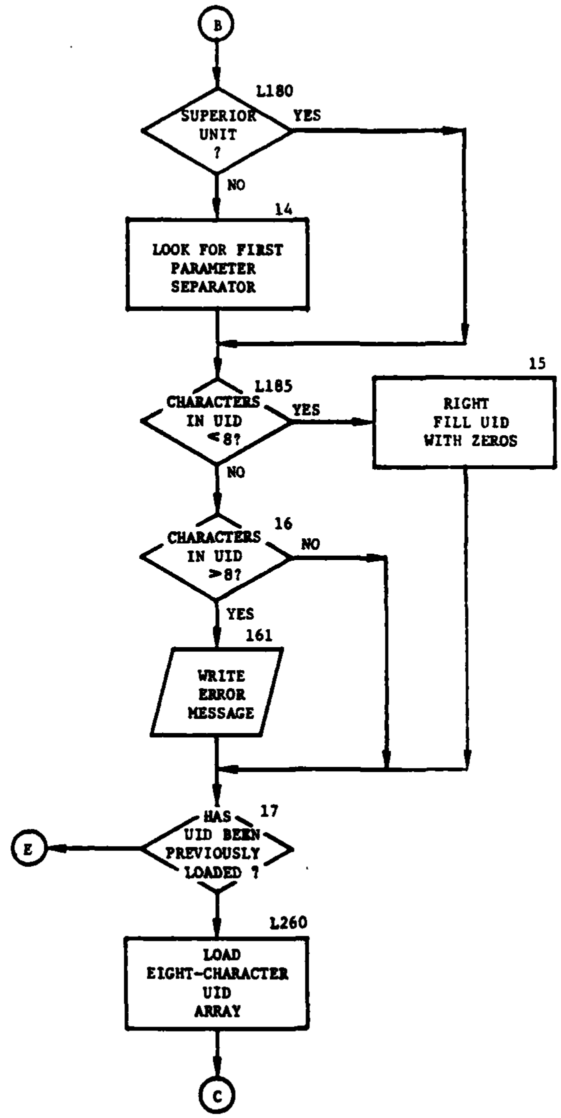

Figure II-4-B-2. Routine RECOG1 (Continued)

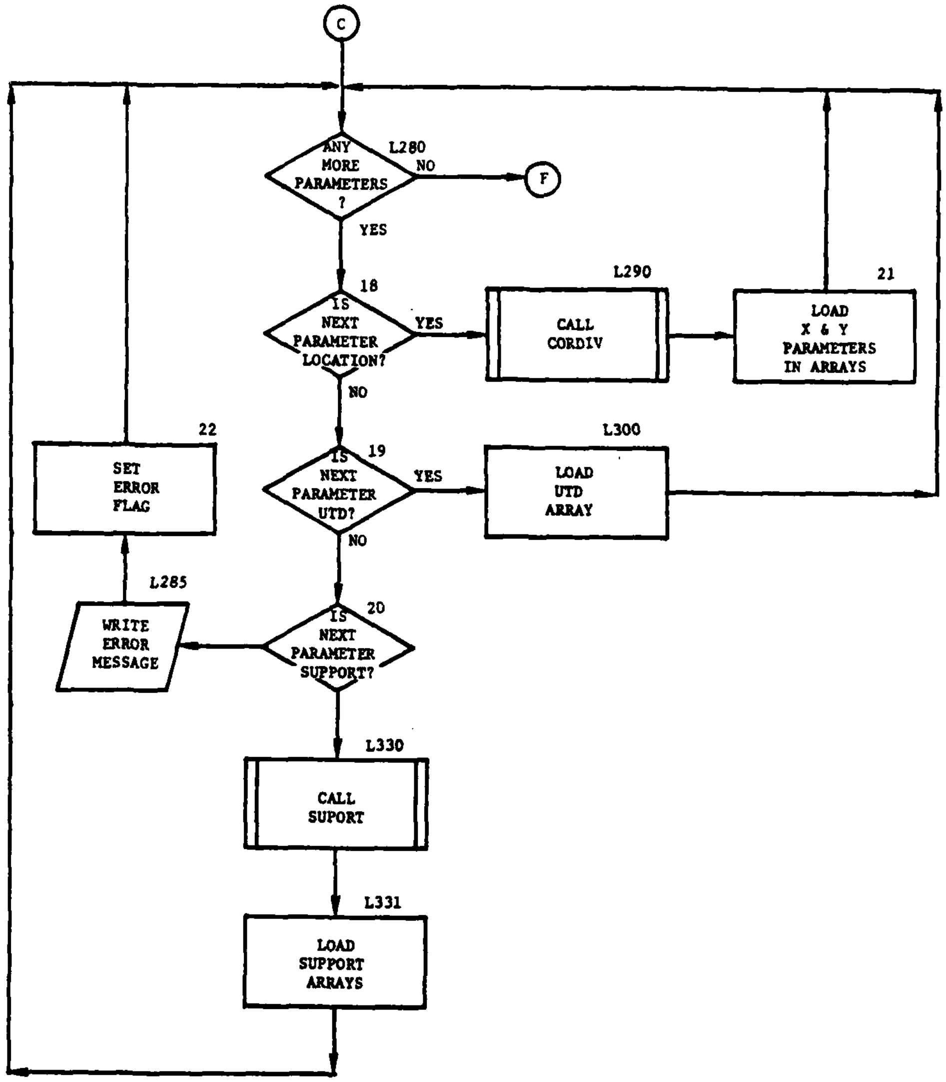

Figure II-4-B-2. Routine RECOG1 (Continued)

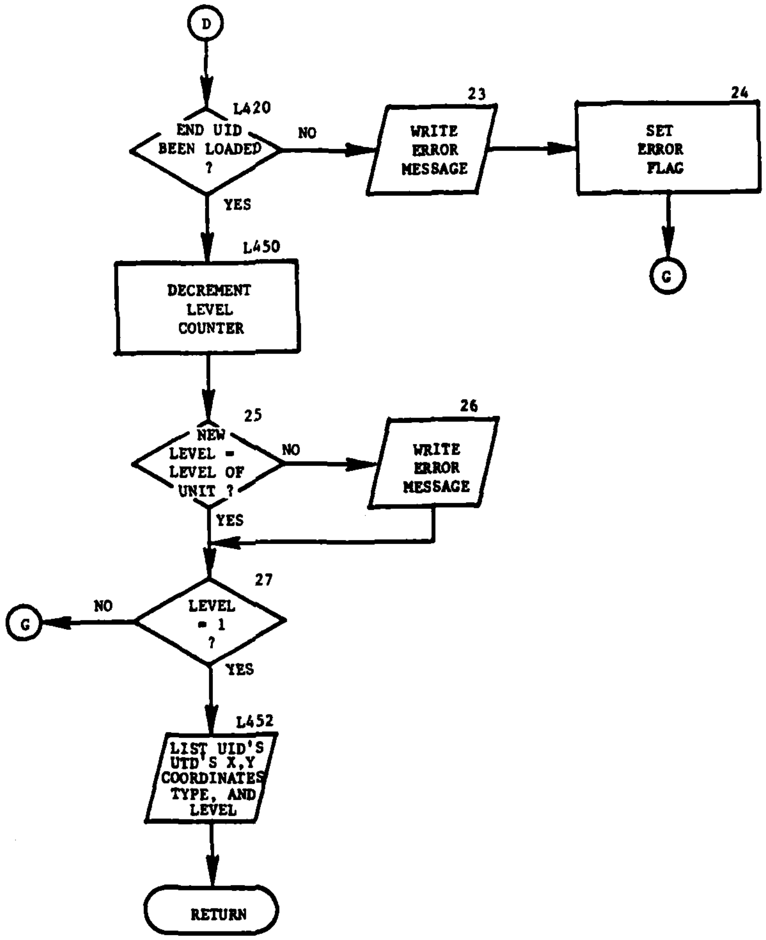

Figure II-4-B-2. Routine RECOG1 (Continued)

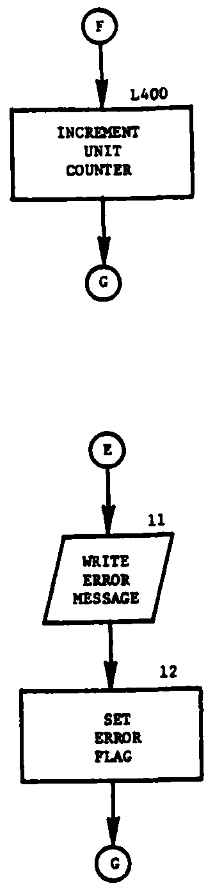

Figure II-4-B-2. Routine RECOG1 (Concluded)

(9) Block L155 and L70. If the first character of the unit identification (UID) is not B or R, or there has been a change in the force, transfer control to block 11.

(10) Block L180 and 14. If this is not a superior unit, locate first parameter separator in card.

(11) Block L185 and 15. If the number of characters in the UID is less than eight, write an informative message, right fill the UID with zeros, and transfer control to block 17.

(12) Block 16 and 161. If the number of characters in the UID is greater than eight, write an error message.

(13) Block 17. A check is made to determine if this UID has previously been loaded. If it has, transfer control to block 11.

(14) Block L260. Load the eight characters of UID into UID array.

(15) Block L280. A check is made to determine if there are any more parameters to process in the card image. If there are not, transfer control to block L400.

(16) Block 18, L290, and 21. If the next parameter is a location parameter, call routine CORDIN to extract the X and Y coordinates, load the coordinate arrays, and transfer control to block L280.

(17) Blocks 19 and L300. If the next parameter is a unit type designator parameter, load the parameter into the unit type designator array, and transfer control to block L280.

(18) Blocks 20, L285, and 22. If the next parameter is not a support parameter, write an error message, set the error flag, and transfer control to block L280.

(19) Blocks L330 and L331. Call routine SUPORT to extract the support data, load the data into the support arrays, and transfer control to block L280.

(20) Block L400. Increment the unit counter and transfer control to block L120.

(21) Block L420, 23, and 24. If the UID identified in the end-of-unit card has not been loaded write an error message, set the error flag and transfer control to block L120.

(22) Block L450. Decrement the level counter.

(23) Blocks 25 and 26. If the decremented level is not equal to the level of the unit in question, write an error message.

(24) Blocks 27 and L452. If the decremented level is not equal to one, transfer control to block L120; otherwise, list the UIDs, each associated

unit type designator, X and Y coordinates, support type, and level. Return control to the calling routine.

(25) Blocks 11 and 12. Write an error message, set the error flag, and transfer control to block L120.

4. ROUTINE COMMCK:

a. Purpose. COMMCK reads from the character word array and identifies comment cards.

b. Input Variables:

Name	Source	Contents
CCARD	Call	Compressed character array.
ICARD	Call	Word array.
JCHAR	Call	Last character column to search.
IGO	Call	Comment card flag.

c. Output. COMMCK compresses the card image and returns a flag if it is a comment card. If IGO equals 10, it is a comment card; if IGO equals 5, it is a data card.

d. Logical Flow (Figure II-4-B-3):

(1) Block 1. If the card is a comment card, set IGO equal to 10 and return control to the calling routine.

(2) Block L1. Print the card array on the printer in a 20A4 format.

(3) Block 2. If the last character of the card is a period, it is the end of data. Return control to the calling routine.

(4) Block 3. The end of data was not read; so, read another card image.

(5) Block 4. Call COMPRS to compress the next 80-column card image. Control goes to block L1.

5. ROUTINE COMPRS:

a. Purpose. COMPRS puts cards into compressed form for up to 80 compressed characters.

b. Input Variables:

Name	Source	Contents
ICARD	Call	Card image array (four characters per word).
CCARD	Call	Character array.
JCHAR	Call	Number of compressed characters.

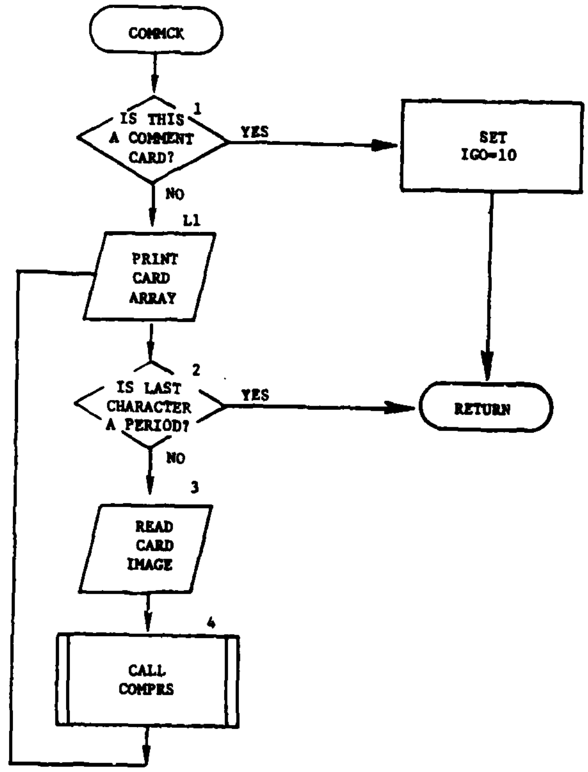

Figure II-4-B-3. Routine COMMCK

c. Output. Puts the nonblank characters into an array.

d. Logical Flow (Figure II-4-B-4):

(1) Block 1. The loop that passes through each word of the card is initialized or incremented.

(2) Block 2. The loop that passes through each character of the card word is initialized or incremented.

(3) Block 3. Call routine MVCHAR to extract the selected character of the word and place it left justified in a test variable.

(4) Block 4. If the test variable is blank, transfer control to block 7.

(5) Blocks 5 and L20. If the total number of characters in this statement exceeds 80, write an error message and return control to the calling routine.

(6) Block 6. Increment a character counter and move the character into the character array.

(7) Block 7. If this is not the last character of the word, transfer control to block 2.

(8) Block 8. If this is not the last word of the card, transfer control to block 1; otherwise, return control to the calling routine.

6. ROUTINE CFIND:

a. Purpose. CFIND searches for a character and returns the column number it is in. If the character is not found, it returns 100.

b. Input Variables:

Name	Source	Contents
CCARD	Call	Compressed character array to search.
KK	Call	Starting column for search.
LCHAR	Call	Last character column to search.
KCHAR	Call	Character to search for.

c. Output. CFIND sets LCHAR to the number of the column where the character is found. If the character is not found, set LCHAR to 100.

d. Logical Flow:

(1) Search the character array for the character requested.

(2) If the character is found, let LCHAR equal column number and return control to the calling routine.

(3) If the character is not found, let LCHAR equal 100, and return control to the calling routine.

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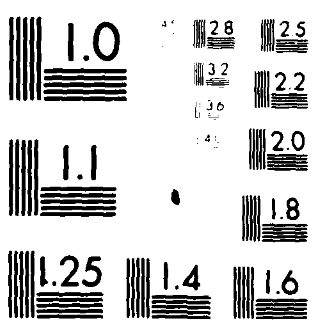


MICROCOPY RESOLUTION TEST CHART

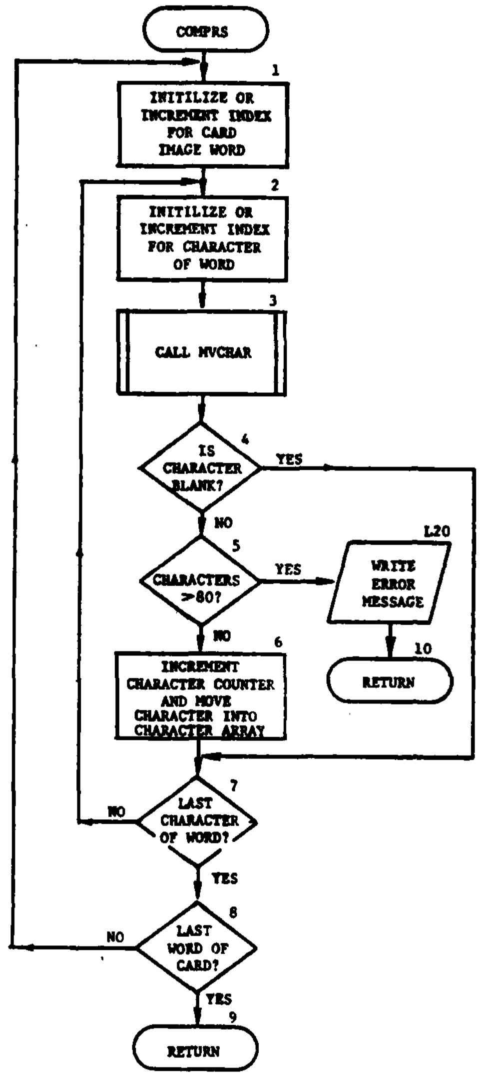


Figure II-4-B-4. Routine COMPRS.

7. ROUTINE BLNKOT:

a. Purpose. BLNKOT places blanks in a card image array.

b. Input Variables:

Name	Source	Contents
ICARD	Call	The card array to be blanked.

c. Output. Returns a blank 20-word array to the routine.

d. Logical Flow:

(1) Set ICARD(20) equal to blanks.

(2) Return control to calling routine.

8. ROUTINE CORDIN:

a. Purpose. CORDIN places the card image of X and Y coordinates into memory storage locations.

b. Input Variables:

Name	Source	Contents
CCARD	Call	Character array.
JCHAR	Call	Number of characters.
K	Call	Starting column for search.
X	Call	X coordinate.
Y	Call	Y coordinate.

INFT(56,3), NBLUE, and NRED, and BLANK from common ONE are also input.

c. Output. CORDIN places the X and Y coordinates from the CCARD array onto memory.

d. Logical Flow (Figure II-4-B-5):

(1) Blocks 1 and 2. Find the beginning of the X coordinate in the character array. Call CFIND to find the end of the X coordinate. This is done by checking for the dash (-) character.

(2) Block 3. Place the X coordinate in memory.

(3) Blocks 4 and 5. Call CFIND to search for the end of the Y coordinate. When an asterick (*) is found, the Y coordinate is placed onto memory and control returns to the calling routine.

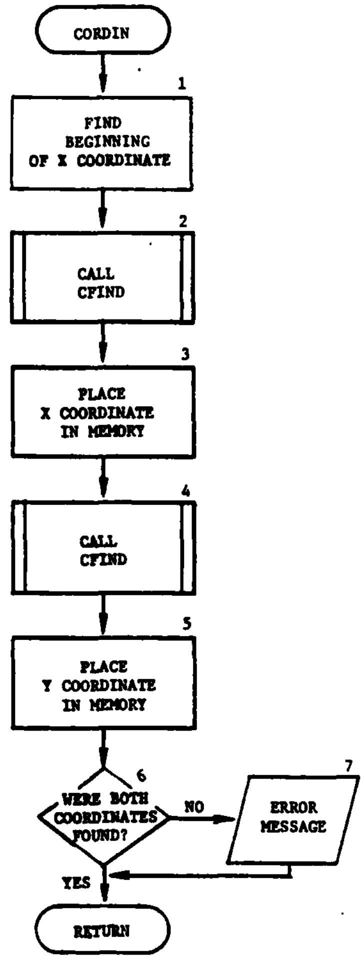


Figure II-4-B-5. Routine CORDIN

(4) Blocks 6 and 7. If no coordinates are found an error message is printed and control returns to the calling routine.

9. ROUTINE SUPORT:

a. Purpose. SUPORT decodes data to determine the unit receiving support and the type of support it is to receive.

b. Input Variables:

Name	Source	Contents
CCARD	Call	Compressed character array.
K	Call	Starting character column in compressed array.
JCHAR	Call	Number of compressed characters.

c. Output. SUPORT returns the type of support and the unit to receive it through the variable UNIT. The type of support is returned through K as follows:

- If K = 0, general support
- If K = 1, direct support
- If K = 2, reinforcing
- If K = 3, general support/reinforcing.

d. Logical Flow (Figure II-4-B-6):

(1) Block 1. If the support type is direct, transfer control to block L50.

(2) Block 2. If the support type is reinforcing, transfer control to block L70.

(3) Block 3. If the support type is general, transfer control to block L25.

(4) Blocks 4 and 5. If the support type is not general support/reinforcing or the supported unit is of the opposing force, transfer control to block 11.

(5) Blocks 6 and 7. Load the character representation of the supported unit into a temporary array, set the support type flag equal to three, and transfer control to block L90.

(6) Blocks L50 and 8. If there is a syntax error in the support unit or the supported unit is of the opposing force, transfer control to block 11.

(7) Blocks 9 and 10. Load the character representation of the supported unit into a temporary array, set the support type flag equal to one, and transfer control to block L90.

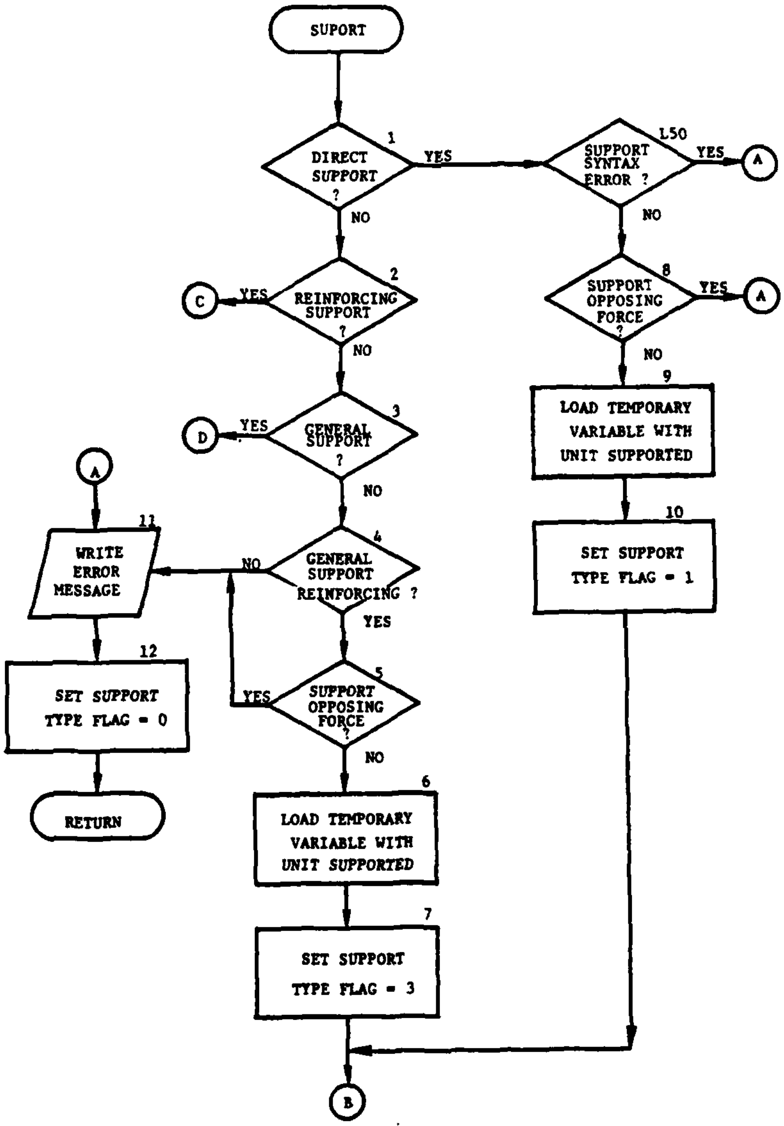


Figure II-4-B-6. Routine SUPORT (Continued on Next Page)

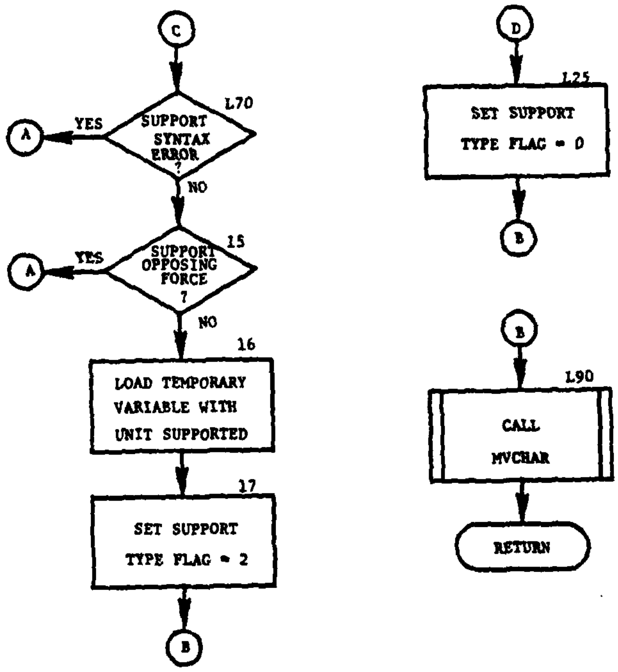


Figure II-4-B-6. Routine SUPORT (Concluded)

(8) Blocks 11 and 12. Write an error message, set the support type flag equal to zero, and return control to the calling routine.

(9) Blocks L70 and 15. If there is a support type syntax error or if the supported unit is of the opposing force, transfer control to block 11.

(10) Blocks 16 and 17. Load the character representation of the supported unit into a temporary array, set the support type flag equal to two, and transfer control to block L90.

(11) Block L25. Set the support type flag equal to zero.

(12) Block L90. Call routine MVCHAR to transfer the supported unit from the temporary array to the UNIT variable array, and return control to the calling routine.

10. ROUTINE SEQUEN:

a. Purpose. SEQUEN is the main routine that builds the unit status file.

b. Input Variables:

(1) Common ONE and blank common area from ECHLON.

(2) Supply class data from data file 11.

c. Output. SEQUEN places all units and subordinates on the unit status file.

c. Logical Flow (Figure II-4-B-7):

(1) Block 1. Set the number-of-units counter to zero. Initilize UID temporary storage variable with first UID of force.

(2) Block 2. Set the force flag to 428 for the Blue force or 429 for the Red force.

(3) Blocks 3 and L10. Call routine GETWRD twice: once, to retrieve the supply classes from data file 11; and once, to retrieve the consumption rates from data file 11.

(4) Block L105. Set the start point for the level search to one.

(5) Block 4. If the MAXLEV variable is equal to one, all units have been processed and control transfers to block L180.

(6) Blocks L1Q0 and 5. A search is made from the start point through the total number of units for a unit of which the level is equal to the MAXLEV variable. If one is not found, transfer control to block L165.

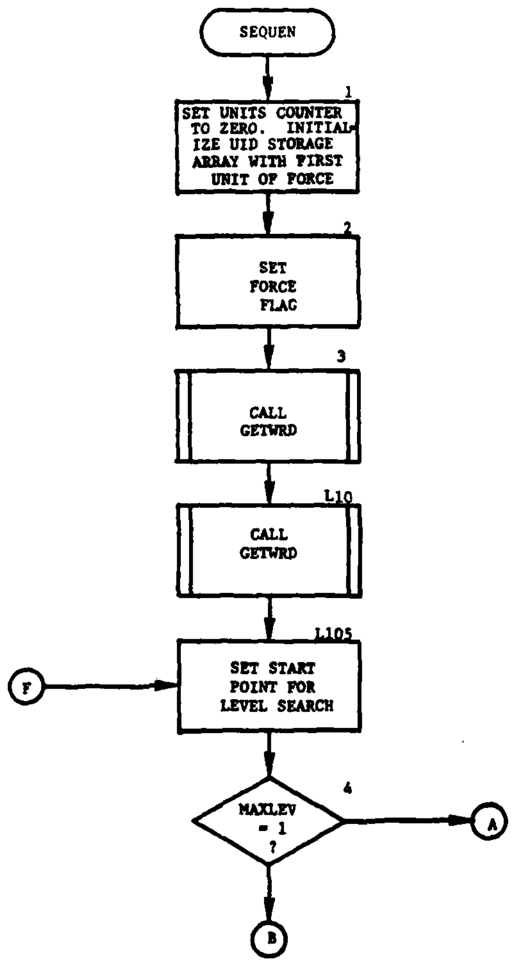


Figure II-4-B-7. Routine SEQUEN (Continued on Next Page)

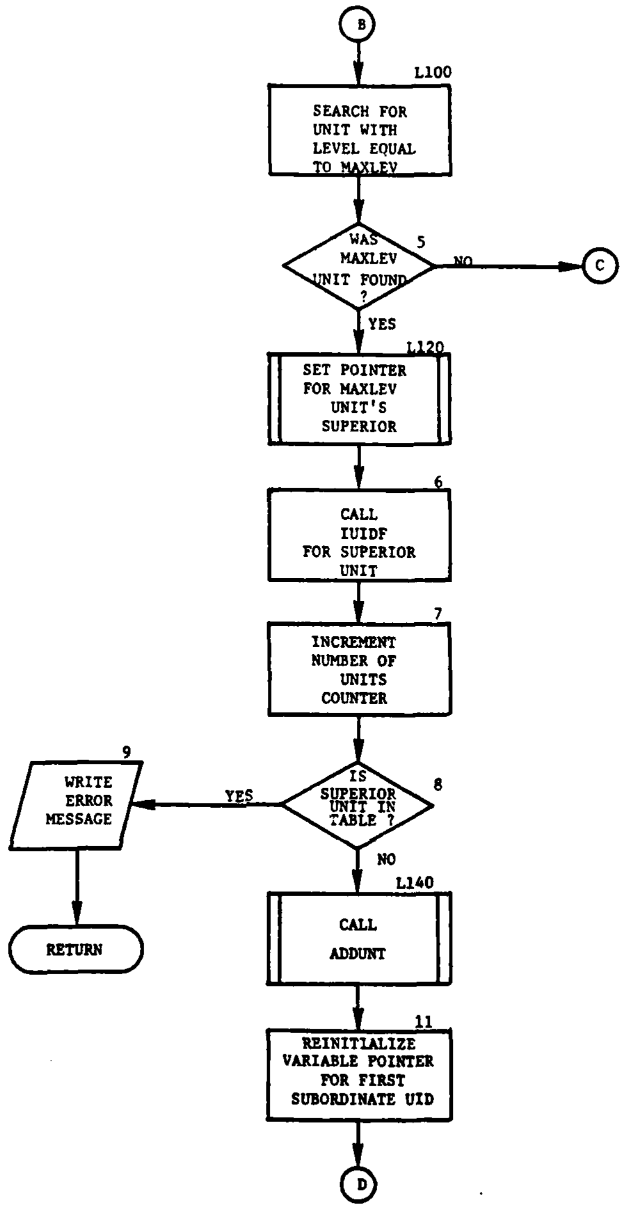


Figure II-4-B-7. Routine SEQUEN (Continued)

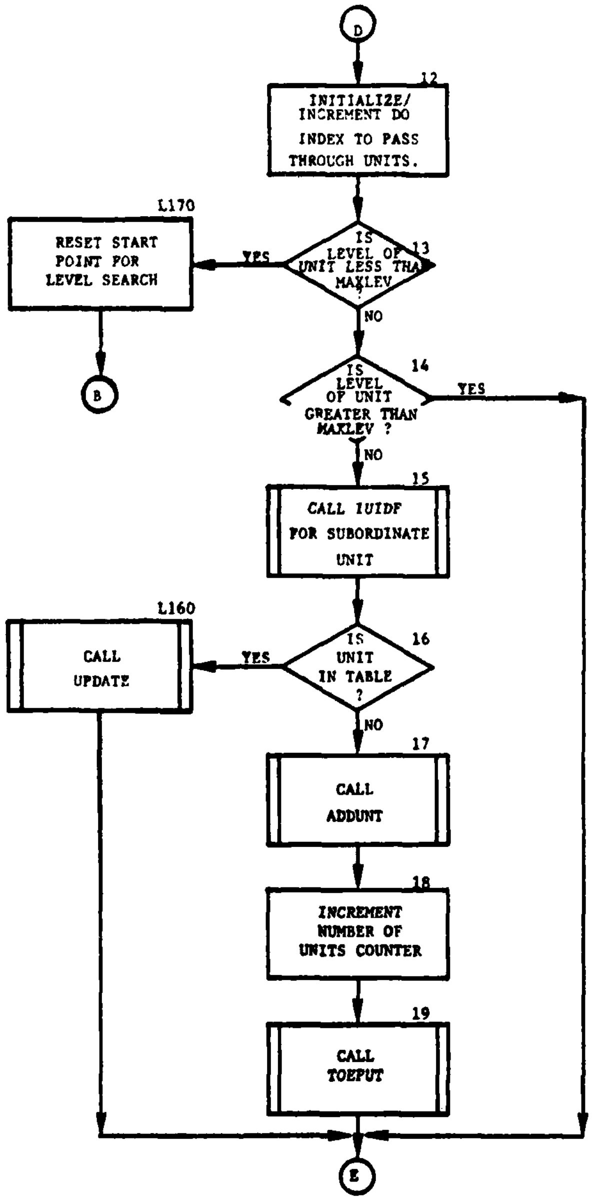


Figure II-4-B-7. Routine SEQUEN (Continued)

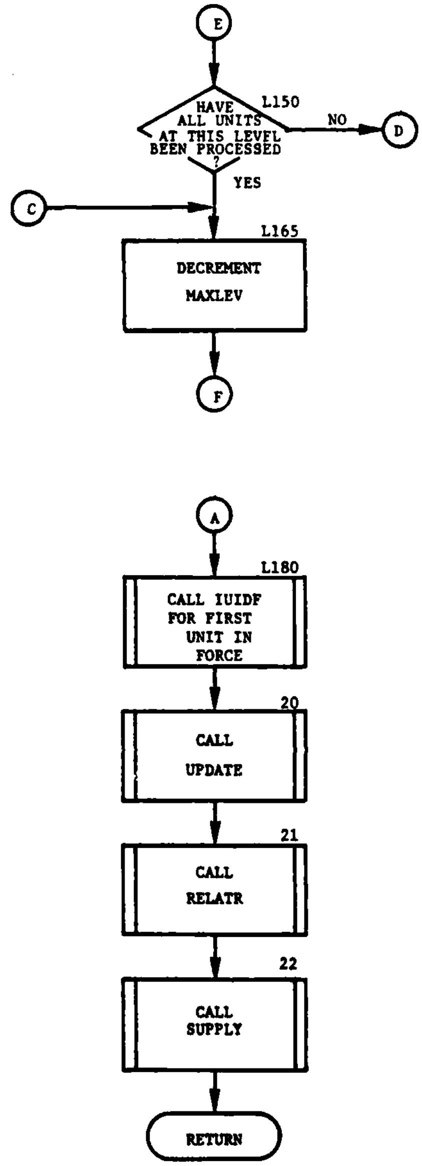


Figure II-4-B-7. Routine SEQUEN (Concluded)

(7) Blocks L120, 6, and 7. Set pointer for superior unit of maximum level unit found, call routine IUIDF to determine if the superior unit has previously been placed in the UID table, and increment the number-of-units counter.

(8) Blocks 8, 9, and 10. If the superior UID has previously been placed in the UID table, an error condition exists; there being two units with the same UID. An error message is written and control returns to the calling routine.

(9) Blocks L140 and 11. Routine ADDUNT is called to add the superior unit to the UID table, and the pointer for the subordinate UID with the maximum level is reinitialized.

(10) Block 12. Initialize or increment do index to pass through the force from the first maximum level unit to the end of the force.

(11) Blocks 13 and L170. If the level of the unit being examined is less than MAXLEV, reset the start point for the level search to that of the present unit, and transfer control to block L100.

(12) Block 14. If the level of the unit being examined is greater than the maximum level variable, transfer control to block L150.

(13) Blocks 15 and 16. Call routine IUIDF with the present subordinate UID as an argument to determine if it has previously been loaded in the UID tables. If it has, a call is made to routine UPDATE to update its superior unit's status record, and control is transferred to block L150.

(14) Blocks 17, 18, and 19. A call is made to routine ADDUNT to add the present subordinate unit UID to the UID tables, the units counter is incremented, and a call is made to TOEPUT to load unit status and authorized strength records for this unit.

(15) Blocks L150 and L165. If all the units of this level have been processed, decrement the MAXLEV variable and transfer control to block L105; otherwise, transfer control to block 12.

(16) Block L180. A call is made to routine IUIDF to retrieve the IUID of the first unit in the force.

(17) Blocks 20, 21, and 22. A call is made to routine UPDATE to load the first unit in the force's unit status record, a call is made to routine RELATR to update the supporting roles of the units in the unit status record; a call is made to routine SUPPLY to load the supply data into the unit status record; and, control returns to the calling routine.

11. ROUTINE ADDUNT:

a. Purpose. ADDUNT places the UID of a newly defined unit into a space available within the UID versus IUID cross reference table and returns the IUID allocated for the unit.

b. Input Variables:

Name	Source	Contents
UID	Call	Unit identification code.
IUID	Call	Integer unit identification.
BCOUNT	ONE	Number of Blue units in cross reference table.
RCOUNT	ONE	Number of Red units in cross reference table.

c. Output. ADDUNT returns the IUID allocated for the new unit to the calling routine.

d. Logical Flow. Set the appropriate IUID of the Red or Blue force unit to be allocated and place the UID in the cross reference table. Return control to the calling routine.

12. ROUTINE TOEPUT:

a. Purpose. TOEPUT fills the unit status and authorized equipment records for a basic unit.

b. Input Variables:

(1) Common ONE and blank common areas.

(2) Other Variables:

Name	Source	Contents
IA	Call	Location in common of data for unit to be treated.
NREC	Call	Record number within data file 1 allocated for unit's status record.
IKP2	Call	Record number within data file 1 allocated for the unit's superior.
EVTBLE	TWO	Unit type designator table.

c. Output. TOEPUT outputs the unit status record on data file 1 and the authorized strength record on data file 50 for the unit created.

d. Logical Flow (Figure II-4-B-8):

(1) Block 1. The UID, UTD, and X and Y coordinates of the unit are loaded into their appropriate places in the data file 1 record array.

(2) Blocks 2 and 3. The UTD index table of data file 51 has been loaded into the variable array EVTBLE. The part of this table that holds basic UTDs is searched for a corresponding UTD. The ordinal of this match will give an index to data file 52 to retrieve equipment on-hand and in trains data. If a corresponding UTD is found, transfer control to block L30.

(3) Blocks L261 and 4. If processing goes to this block, the UTD of the unit is complex, and the complex part of the UTD table is searched for a corresponding UTD. The ordinal of this corresponding UTD gives an index to data file 53 to retrieve a breakdown of the complex UTD. If a corresponding UTD is not found, transfer control to block L263.

(4) Blocks L270, 5, and L271. If the original UTD of the unit is being processed, that UTD and the numeral 1 are loaded into a UTD and count array (TALLY array) that contains all UTD types and amounts used to build a unit.

(5) Blocks 6, 7, 8, and 9. When a UTD must be separated into basic UTDs a data file 23 record is built for that unit. If the data file 23 record has not previously been built for this unit, the data file 23 record array is loaded and a call is made to routine PUTRCD to place the record onto data file 23. The pointer to that record is placed into the data file 1 record array.

(6) Blocks L272 and 10. A do loop is established to access the entries within the retrieved data file 53 record. The odd-numbered words of a data file 53 record are the authorized UTD types, the even-numbered words are the amounts authorized. If the present UTD entry is blank, all UTDs in the record have been accessed and control transfers to block L280.

(7) Blocks 11 and 12. A pointer for a UTD holding array and the corresponding array that contains the different UTD types is incremented. The UTD is loaded into that position in the array. The number of such UTDs is multiplied by a multiplication factor, derived from the number of units superior to the authorized unit, and is loaded into the count array.

(8) Blocks 13, L277, and 14. If the present UTD has been previously processed for this unit, the TALLY array count is updated for that unit; otherwise, the UTD is loaded into the UTD TALLY array and the count is loaded into the count TALLY array.

(9) Block L280. If processing of the current data file 53 record is not completed, transfer control to block L272.

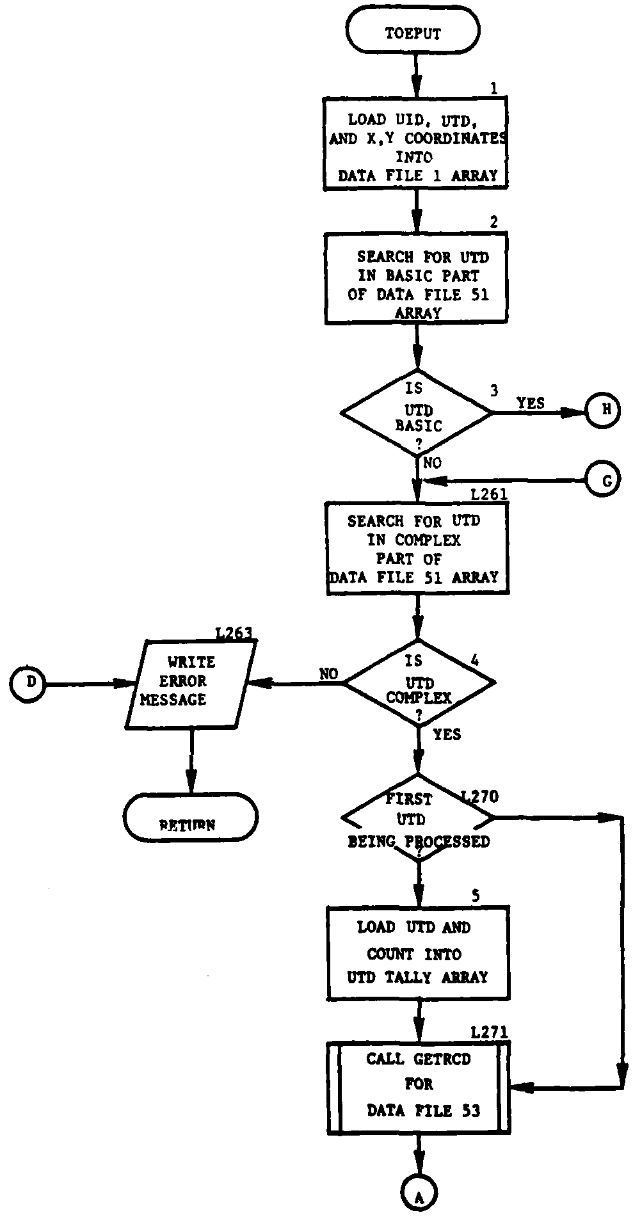


Figure II-4-B-8. Routine TOEPUT (Continued on Next Page)

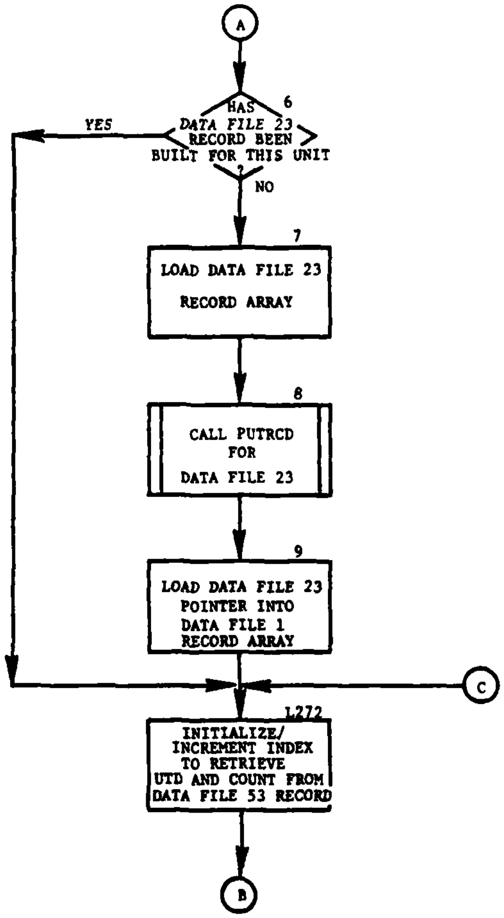


Figure II-4-B-8. Routine TOEPUT (Continued)

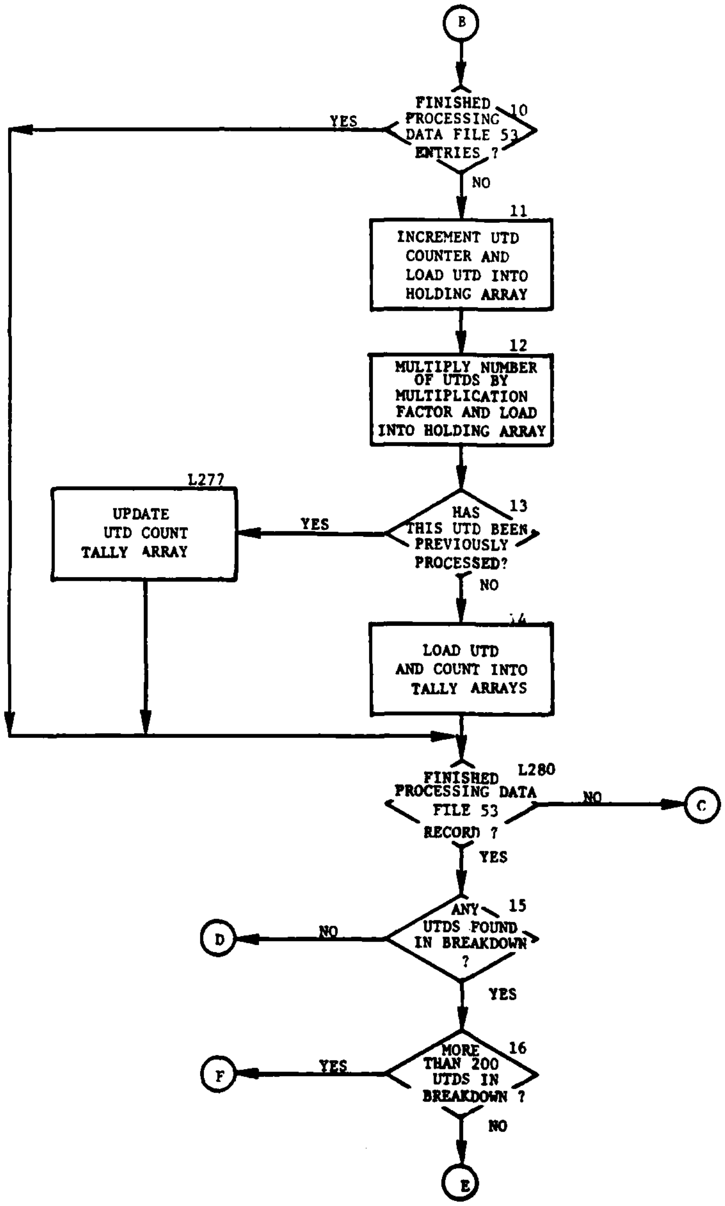


Figure II-4-B-8. Routine TOEPUT (Continued)

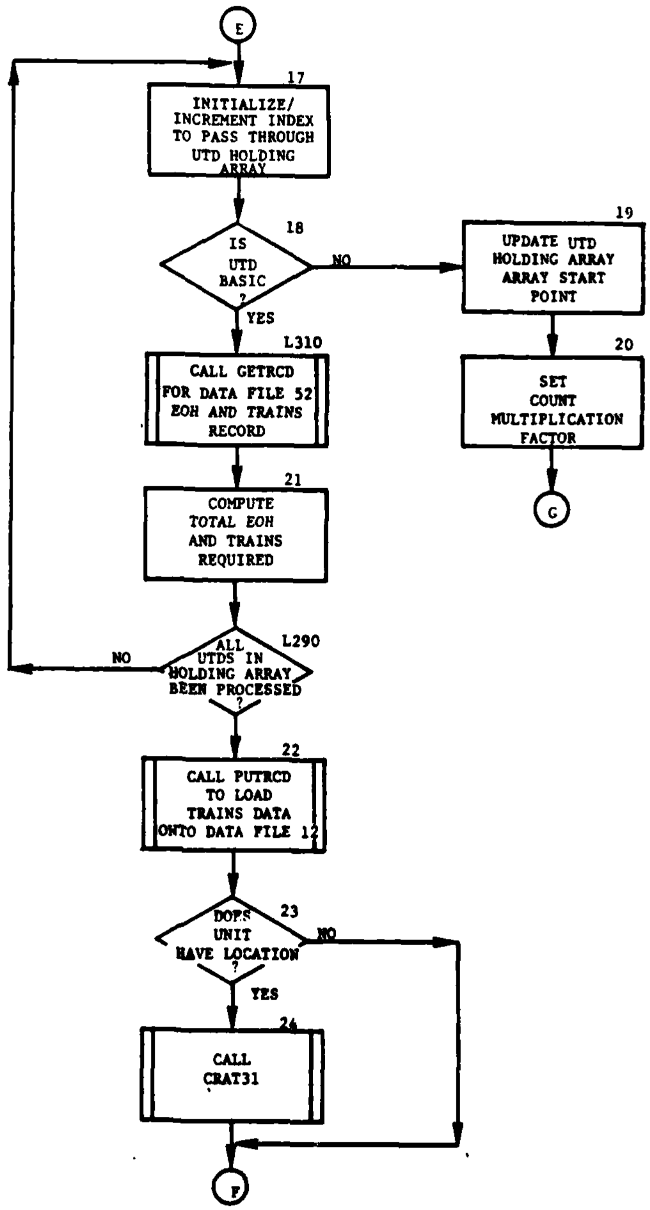


Figure II-4-B-8. Routine TOEPUT (Continued)

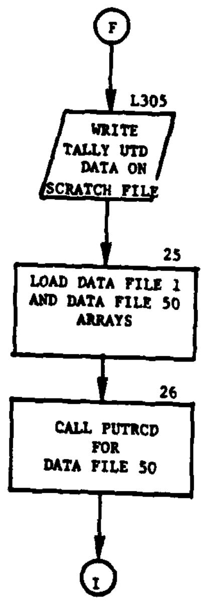


Figure II-4-B-8. Routine TOEPUT (Continued)

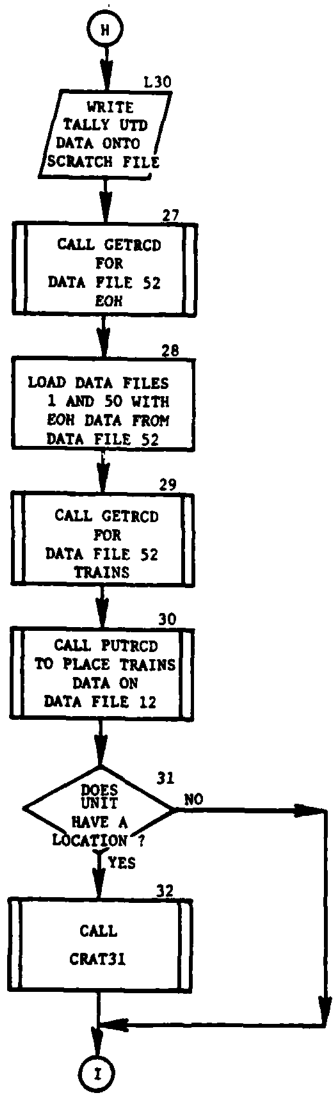


Figure II-4-B-8. Routine TOEPUT (Continued)

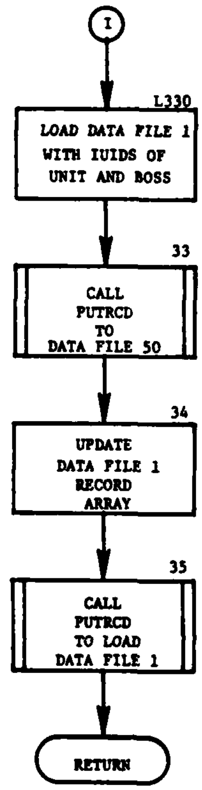


Figure II-4-B-8. Figure TOEPUT (Concluded)

(10) Blocks 15 and 16. If the complex UTD for this unit does not reduce to more basic units, transfer control to block L263. If the complex UID for this unit breakdown is to more than 200 basic units, transfer control to block L305.

(11) Block 17. At this point at least one record has been retrieved from data file 53 and placed in a holding array. This array indicates that the UTD is divided into more basic UTDs. A do index is initialized or incremented to pass through this array.

(12) Blocks 18, 19, and 20. If a UTD is found in the holding array that is not a basic UTD, the holding array start point is updated, the count multiplication factor is set, and control is transferred to block L261.

(13) Blocks L310 and 21. Call routine GETRCD to retrieve the data file 52 equipment-on-hand and in-trains data for this UTD and update total equipment-on-hand required and in trains.

(14) Block L290. If all UTDs in the holding array have not been processed, transfer control to block 17.

(15) Blocks 22, 23, and 24. A call is made to routine PUTRCD to load the trains data onto data file 12, and if the unit has a location, a call is made to routine CRAT31 to create data file 31 records for this unit.

(16) Blocks L305, 25, and 26. The TALLY data are written onto a scratch file. The appropriate data are loaded into the data file 1 and data file 50 record arrays, and a call is made to PUTRCD to output a data file 50 record. Control is then transferred to block L330.

(17) Blocks L30, 27, and 28. The TALLY unit type designator data are written onto the scratch file. A call is made to routine GETRCD to retrieve the appropriate data file 52 on-hand equipment record and that data are loaded into the data file 1 record array.

(18) Blocks 29 and 30. A call is made to routine GETRCD to retrieve the appropriate data file 52 trains data and then a call is made to routine PUTRCD to load that data into data file 12.

(19) Blocks 31 and 32. If the unit in question has a location, call routine CRAT31 to create the appropriate data file 31 records for that unit.

(20) Block L330. Load the data file 1 record array with the IUID of the unit and its superior unit.

(21) Blocks 33, 34, and 35. Call routine PUTRCD to load data file 50, update data file 1 record array, and call PUTRCD to load data file 1.

(22) Block L263. Write an error message and return control to the calling routine.

13. ROUTINE UPDATE:

a. Purpose. UPDATE fills the unit status record (data file 1) and the authorized equipment strength record (data file 50) of a unit that has subordinate units and adjusts unit status records of subordinate units if required.

b. Input Variables:

(1) Common ONE and blank common area.

(2) Other Variables:

Name	Source	Contents
IA	Call	Location in common of data for unit to be treated.
NREC	Call	Record number within data file 1 allocated for unit's status record.
IKP2	Call	Record number within data file 1 allocated for the unit's superior.
IFORCE	Call	Indicates Red or Blue unit.
NI	Call	Number of subordinates pointer.
EVTBLE	TWO	Unit type designator (UTD) tables.

c. Logical Flow. (Figure II-4-B-9):

(1) Blocks 1 and 2. Initialize all variables and arrays to be used in this routine. Set the level parameters of the unit to be updated and the unit's immediate subordinates.

(2) Block 3. Set up a loop that will pass from the first unit after the unit to be updated to the end of the force.

(3) Block 4. If the next unit has a level less than or equal to the level of the updating unit (BOSS) it is not subordinate to that unit, and control transfers to block L37.

(4) Block 5. If the next unit has a level which is greater than that of its immediate subordinates this is a new echelon, then transfer control to block L30.

(5) Blocks 6 and 7. Call routine IUIDF to retrieve the IUID of the subordinate unit, and call routine GETRCD to retrieve the unit status record of that unit.

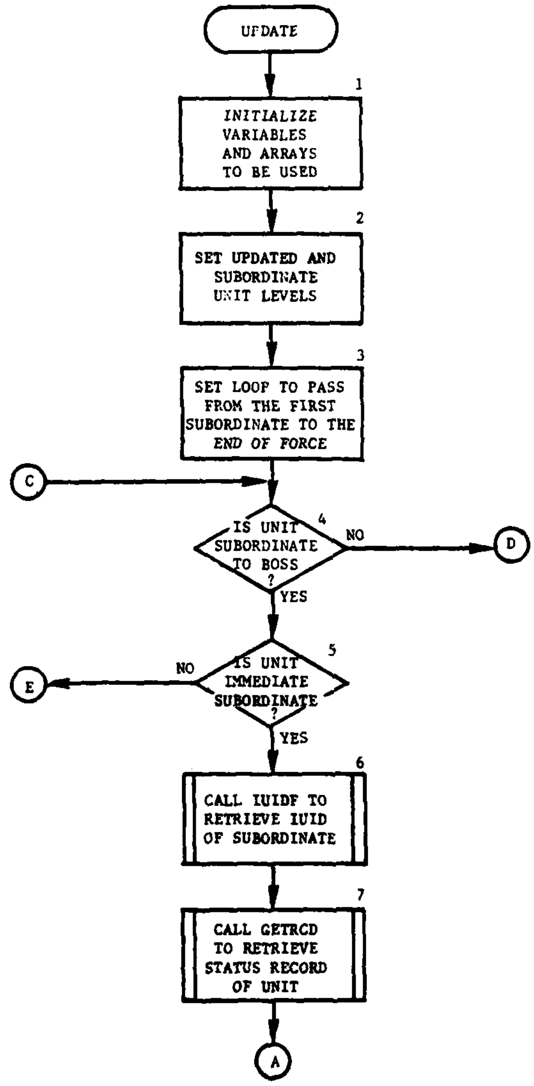


Figure II-4-B-9. Routine UPDATE (Continued on Next Page)

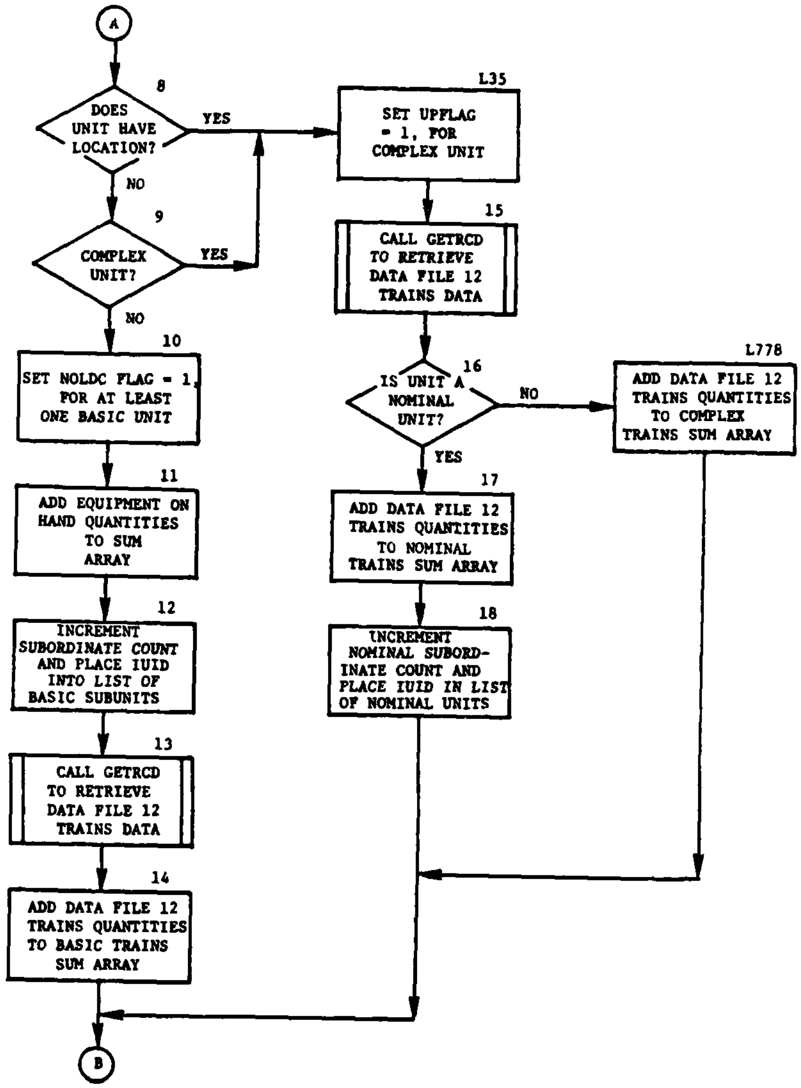


Figure II-4-B-9. Routine UPDATE (Continued)

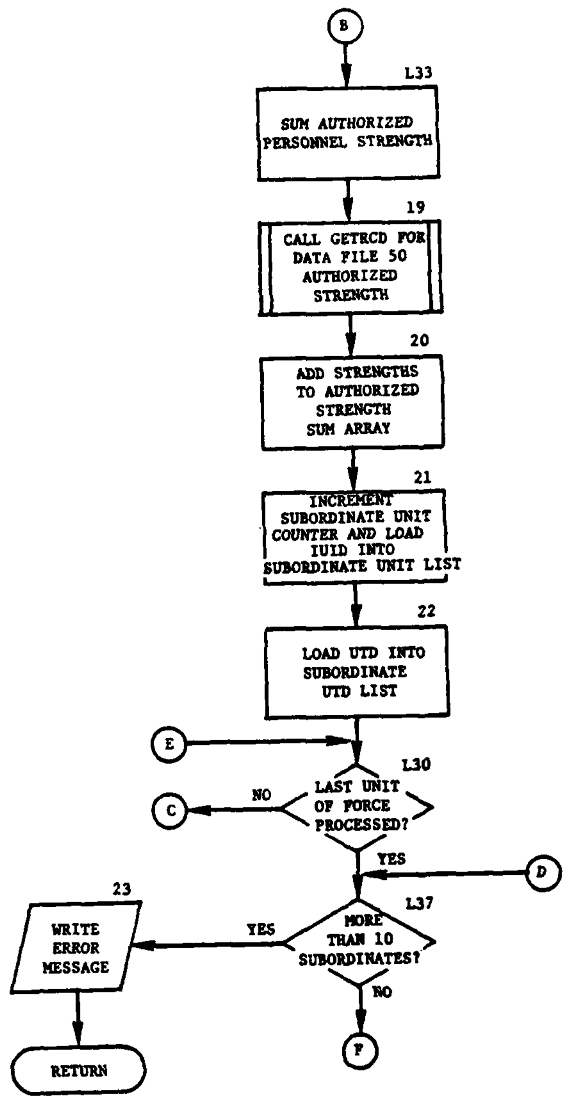


Figure II-4-B-9. Routine UPDATE (Continued)

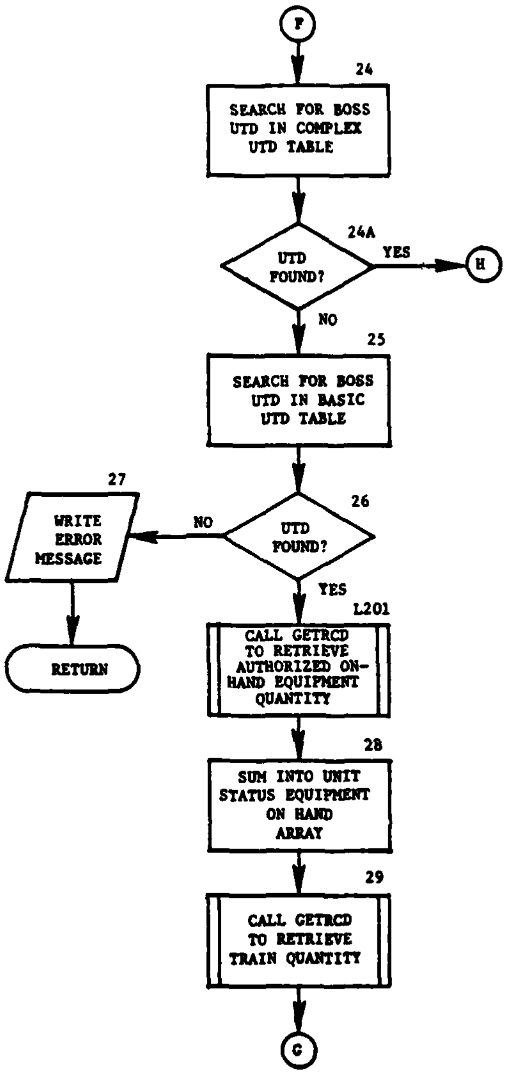


Figure II-4-B-9. Routine UPDATE (Continued)

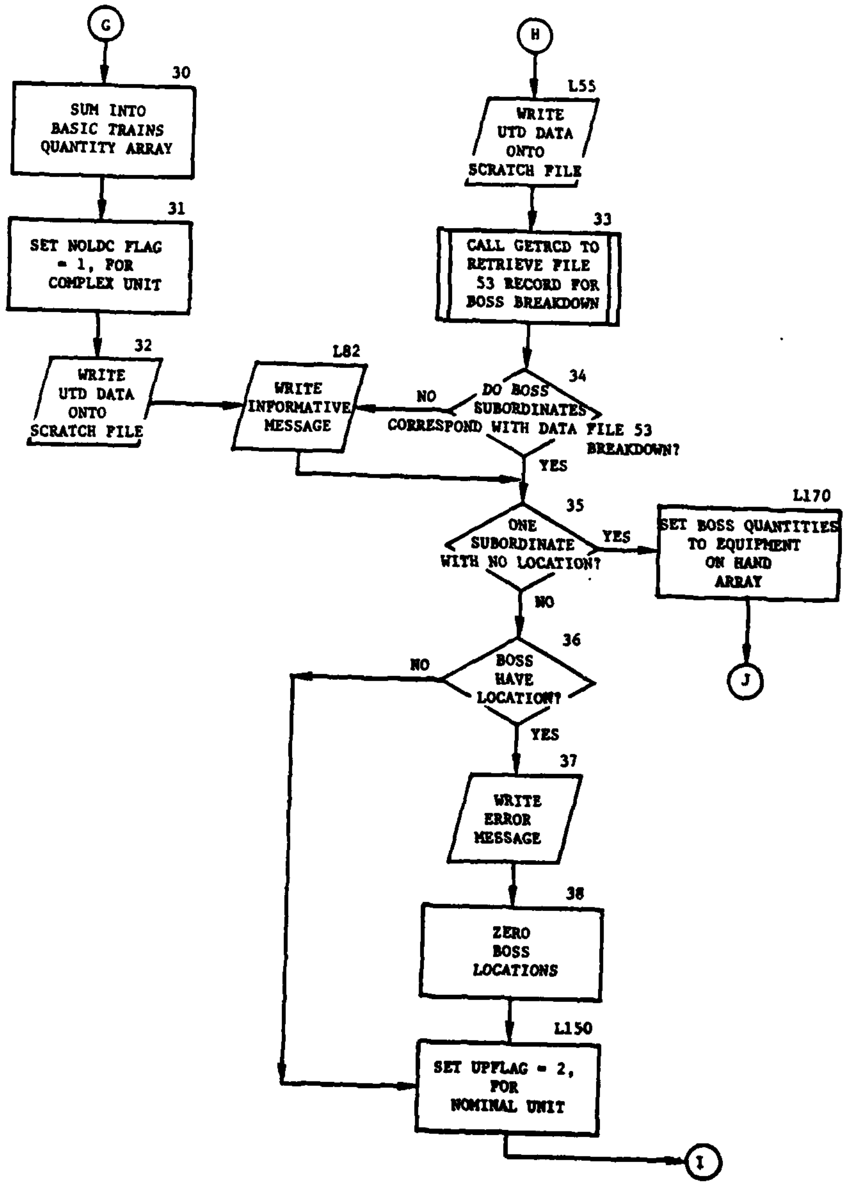


Figure II-4-B-9. Routine UPDATE (Continued)

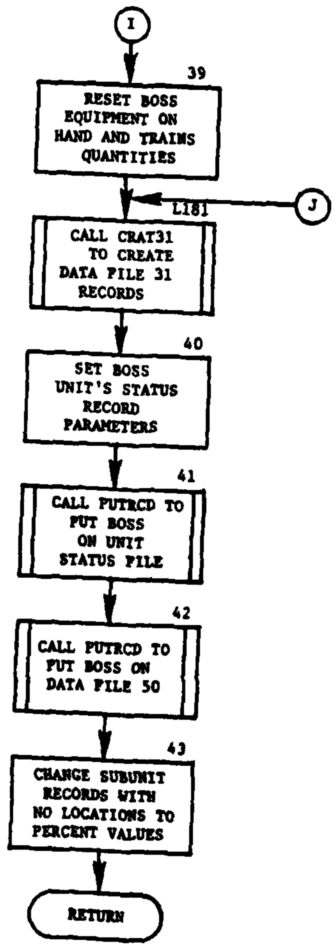


Figure II-4-B-9. Routine UPDATE (Concluded)

(6) Blocks 8 and 9. If the unit has a location or if the unit is a complex nominal unit, transfer control to block L35.

(7) Blocks 10 and 11. There is at least one subordinate unit with no location; set the NOLOC flag equal to one and sum the equipment on hand into a sums array.

(8) Block 12. Increment the no-location subordinate count and place the IUID of the subordination with no location into a list of basic subunits.

(9) Blocks 13 and 14. Call routine GETRCD to retrieve data file 12 trains data for this subordinate and sum into an array of train strengths for basic units. Transfer control to block L33.

(10) Blocks L35 and 15. Set the UPFLAG parameter equal to one for a complex unit, and call routine GETRCD to retrieve data file 12 trains data for this unit.

(11) Block 16. If this unit is not a nominal unit (i.e., basic with location), transfer control to block L778.

(12) Blocks 17 and 18. Sum data file 12 trains data into the nominal trains data array, increment the nominal unit's subordinate count, and place the IUID of the nominal unit into list of subordinate nominal units. Transfer control to block L33.

(13) Block L778. Sum data file 12 trains data into the complex unit trains data array.

(14) Block L33. Sum personnel strength.

(15) Blocks 19 and 20. Call routine GETRCD to retrieve data file 50 authorized personnel strength and add to authorized personnel strength array.

(16) Blocks 21 and 22. Increment subordinate unit counter and load subordinate IUID into subordinate unit list. Also load subordinate UTD into subordinate UTD list.

(17) Block L30. If there are more units in this force to be processed, transfer control to block 4.

(18) Blocks L37 and 23. If there were more than 10 subordinate units, write an error message and return control to the calling routine.

(19) Blocks 24 and 25. A search is made for the superior UTD in the complex UTD table. If it is found, transfer control to block L55.

(20) Blocks 25, 26, and 27. If the superior UTD was not found in the complex part of the UTD table, a search is made to determine if it is a basic UTD. If it is not complex or basic, an error message is printed, and control returns to the calling routine.

(21) Blocks L201 and 28. Call routine GETRCD to retrieve authorized on-hand equipment quantities and sum into unit status record equipment-on-hand array.

(22) Blocks 29 and 30. Call routine GETRCD to retrieve authorized train quantities and sum into basic trains quantity array.

(23) Blocks 31 and 32. Set the NOLOC flag equal to one, write the UTD data to the scratch file and transfer control to block L82.

(24) Blocks L55 and 33. Write the UTD data to the scratch file and call routine GETRCD to retrieve a data file 53 record to check the UTD breakdown of the superior UTD.

(25) Blocks 34 and L82. If the UTDs of the subordinate units do not correspond with those defined in the retrieved data file 53 record, write an informative message.

(26) Blocks 35 and L170. If there is one subordinate unit with no location, set superior unit equipment quantities to contents of equipment-on-hand array, and transfer control to block L181.

(27) Blocks 36, 37, 38, and L150. If the superior unit and all its subordinates have locations write an error message, and zero the superior unit locations. Set the UPFLAG parameter equal to two for a nominal unit.

(28) Block 39. Recompute the BOSS on-hand equipment and trains quantities.

(29) Block L181. Call routine CRAT31 to create data file 31 records for the superior unit.

(30) Blocks 40, 41, and 42. Set the superior unit's status record parameters, and call routine PUTRCD to load the superior unit's status record and data file 50 record.

(31) Block 43. The on-hand equipment quantities of any subordinate unit are changed to percent.

14. ROUTINE CRAT31:

a. Purpose. This routine builds the supply records for vehicles and trains and places them on data file 31.

b. Input Variables:

(1) Common ONE and blank common area.

(2) Other Variables:

Name	Source	Contents
IEOH	Call	Equipment quantities authorized on hand.
IEAUTH	Call	Equipment quantities authorized in trains.
KSTART	Call	Beginning record on data file 31.
ICOMSP	Call	Consumable supplies.
IPERS	Call	Number of personnel authorized.

c. Output. The supply status records are put on data file 31.

d. Logical Flow (Figure II-4-B-10):

(1) Block 1. Zero the working area.

(2) Block 2. Enter into the IVC31 array the quantities consumable supplies authorized on hand and in trains. Begin loop to process all equipment items.

(3) Blocks 3 and 4. If this item is a major item, place the quantity authorized on hand into array IVC31.

(4) Block 6. If this item is not a major item, enter the quantities authorized on hand and in trains into IVC31.

(5) Block 7. ADDRCD places array IVC31 on data file 31.

(6) Blocks 8 and 9. Zero array IVC31. If all equipment items have not been processed, control goes to block 3.

(7) Block 10. Put the number of personnel on data file 31. Return control to the calling routine.

15. ROUTINE RELATR:

a. Purpose. RELATR inserts properly coded indicators of supporting roles into unit status records of a force.

b. Input Variables. Common ONE and blank common area.

c. Output. RELATR outputs the unit status records with appropriate supporting role entries.

d. Logical Flow (Figure II-4-B-11):

(1) Block 1. A do loop is initialized or incremented to pass through all the units of a force.

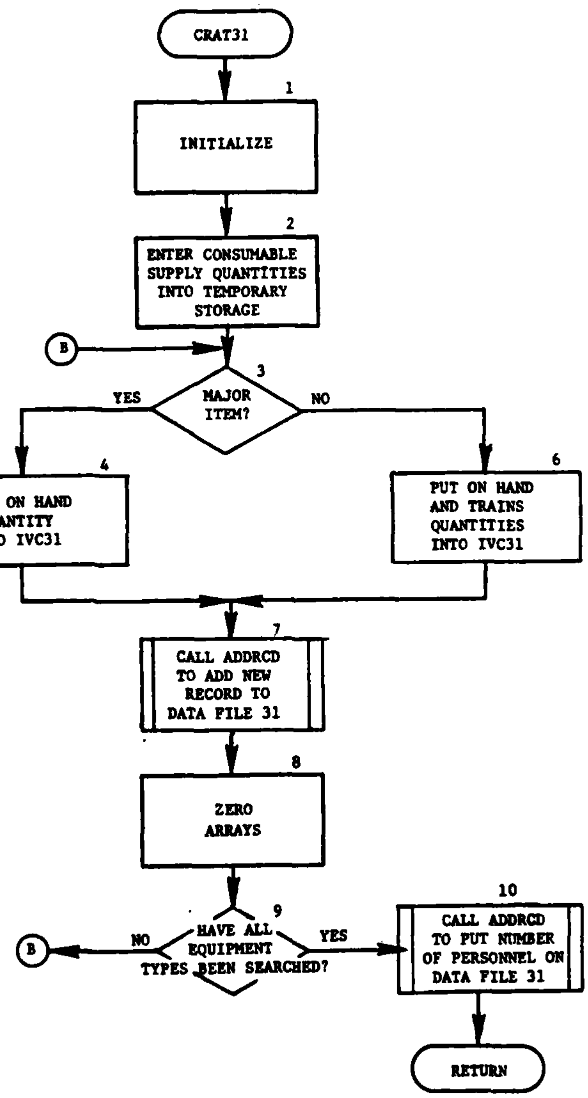


Figure II-4-B-10. Routine CRAT31

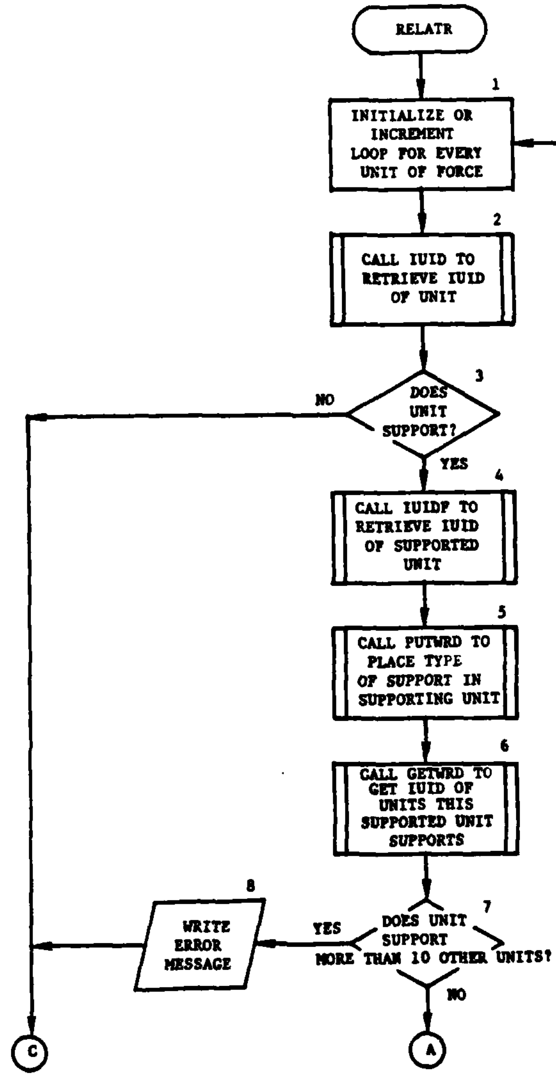


Figure II-4-B-11. Routine RELATR (Continued on Next Page)

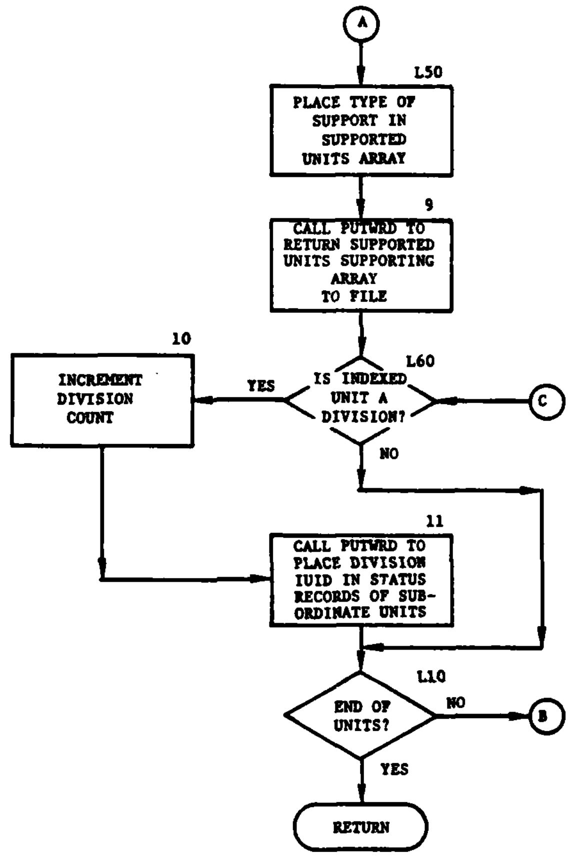


Figure II-4-11. Routine RELATR (Concluded)

(2) Blocks 2 and 3. IUIDF is called to retrieve the IUID of the indexed unit. If that unit is not a supporting unit, transfer control to block L60; otherwise, control proceeds to block 4.

(3) Block 4. IUIDF is called tc r. ·ieve the IUID of the supported unit.

(4) Block 5. The type of support is biased by 10000, the IUID of the supported unit is added to it, and a call is made to routine PUTWRD to place this variable in the unit status record of the supporting unit.

(5) Blocks 6, 7 and 8. A call is made to the routine GETWRD to retrieve the IUIDs of any unit that this supported unit in turn supports. If it supports more than 10 units, an error message is written, and control is transferred to block L60.

(6) Blocks L50 and 9. The type of support provided by the original supporting unit is biased by 10000, the IUID of this unit is added to it, and this value is placed in the first vacant location of the supported unit's supporting array. This array is placed in the unit status record of the supported unit.

(7) Blocks L60 and 10. The first and third character of the supporting unit's UTD are extracted. If they are B and M, this unit is a division and the division counter is incremented. If this is not a division, transfer control to block L10.

(8) Block 11. The IUID of the division is placed in the unit status record of every unit subordinate to it.

(9) Block L10. If all units have been processed, a return is made to the calling routine. If there are other units to be processed, transfer control to block 1.

16. ROUTINE SUPPLY:

a. Purpose. SUPPLY builds the supply source portion of a supply status record.

b. Input Variables:

(1) Common ONE. IFNT, NBLUE, and NRED.

(2) Other Variables:

Name	Source	Contents
ICARD	Card	Card word array.
UID	Card	Unit identification.
ICLASS	Card	Class of supplies (1-10)

Name	Source	Contents
JCARD	Card	Card word array.

c. Output. SUPPLY lists the supply points, units supplied, and classes of supplies. It also updates the appropriate records on data files 1, 31, and 50.

d. Logical Flow. (Figure II-4-B-12):

(1) Bloc'-s 1 and 2. The first supply data card is read. If it is not a "supply point" card, transfer control to block L900.

(2) Block L10. Call IUIDF with the UID of the supply point to retrieve the IUID of the supply point.

(3) Blocks L15, 3, and 4. Read the next supply data card. If it does not begin with "for units", transfer control to block L100. If it is a "for all units" card, transfer control to block L51.

(4) Blocks 5, 6, and 7. Call IUIDF with the UID of the unit being supplied to retrieve the IUID of that unit. With that IUID, call routine GETWRD to retrieve the status record class I consumption rate for that unit, and sum the consumption into a sum variable.

(5) Blocks 8, 9, and 10. Call routine GETWRD to retrieve the supplied units supplier IUIDs by class, load the new supplier IUID into the appropriate class location and call routine PUTWRD to place the new supply point IUID into the unit's status record.

(6) Block L40. If the last unit on the data card has been processed, transfer control to block L15; otherwise, transfer control to block 5.

(7) Block L100. If the supply point is to supply itself, transfer control to block L102.

(8) Blocks 11, 12, and 13. Call routine GETWRD to retrieve Class I consumption rates for the supply unit from the unit status record (data file 1) and data file 50; update these class I consumption rates by adding the summed class I consumptions. [see paragraph d(5) above]. Call routine PUTWRD to place the new class I consumption rates in the supply point unit's status record and data file 50 record.

(9) Blocks 14, 15, and 16. Call routine GETWRD to retrieve the supply point unit's data file 31 class I consumption record; update these records by adding the summed class I consumption rates [see paragraph d(5) above]. Call routine PUTWRD to place the new consumptions in the supply points data file 31 record.

(10) Block L102. If the last supply data card has been read, return control to the calling routine; otherwise, transfer control to block L15.

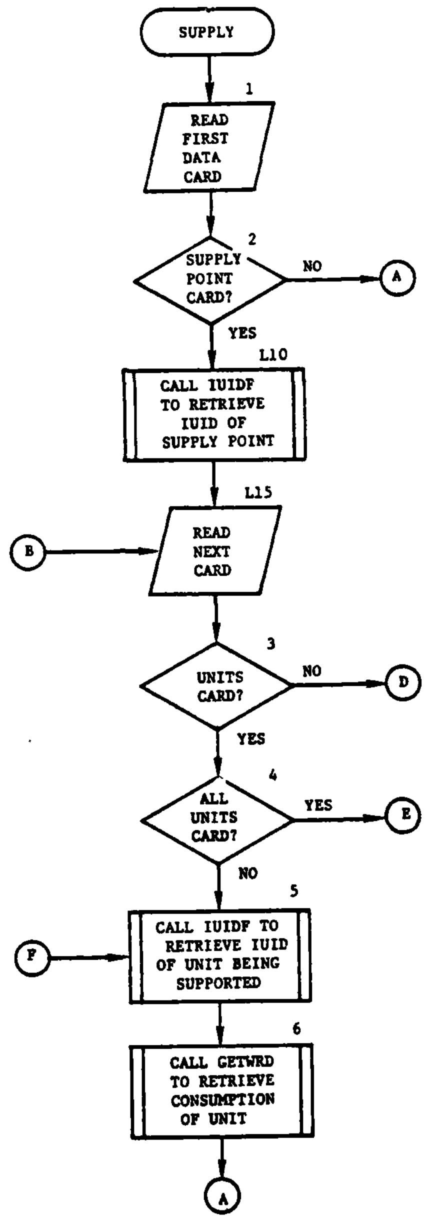


Figure II-4-B-12. Routine SUPPLY (Continued on Next Page)

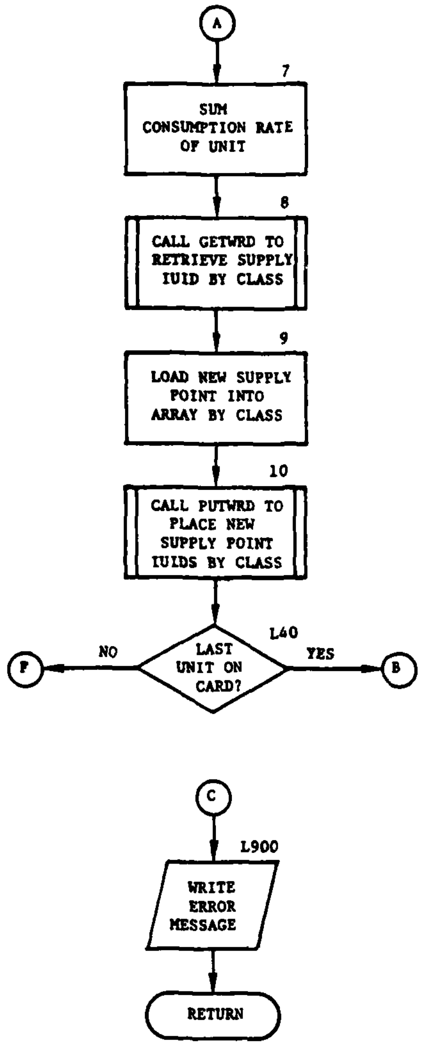


Figure II-4-B-12. Routine SUPPLY (Continued)

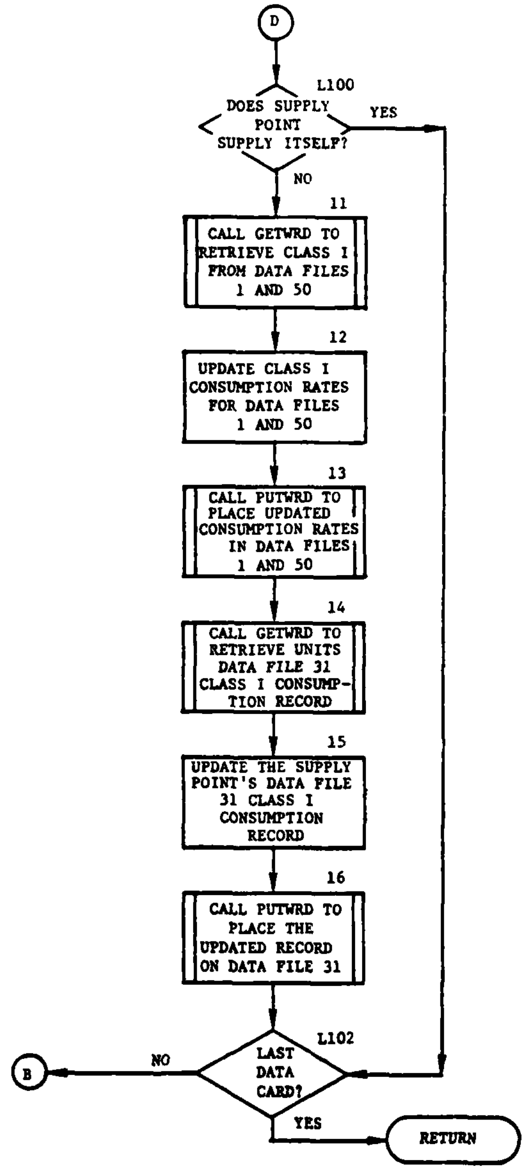


Figure II-4-B-12. Routine SUPPLY (Continued)

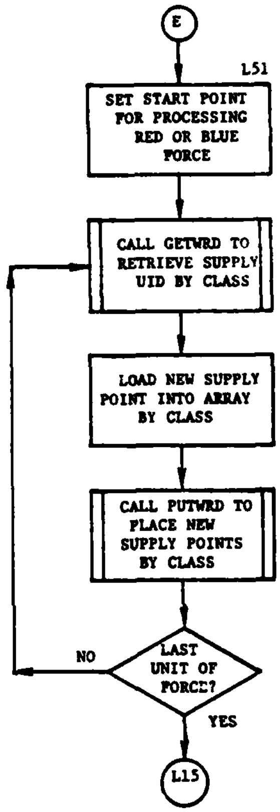


Figure II-4-B-12. Routine SUPPLY (Concluded)

17. ROUTINE TALLY:

a. Purpose. TALLY reads data saved on temporary scratch file (TAPE30), tabulates the UTDs, and checks the task organization requirements.

b. Input Variables:

Name	Source	Contents
IUTDCT	TAPE30	Number of UTDs.
UIDD	TAPE30	UID being processed.

c. Output. TALLY checks the task organization requirements and provides informative and destructive messages. It also lists the UTDs and the UIDs from which they were built.

d. Logical Flow (Figure II-4-B-13):

(1) Block L100. Read a UTD record from the scratch file.

(2) Block 1. When an end of file is read, control goes to block L400.

(3) Block 2. Print the UTDs as they are read.

(4) Block 3. Sum the UTDs and place the sum in temporary storage.

(5) Block L400. List the UTDs in sequence.

(6) Blocks 4, 5, and 6. Check the task organization UTD requirements. If a requirement is not met, an error message is printed.

(7) Block 7. Control goes to block 4 if all UTDs are not checked. If no UTDs remain, control returns to the calling routine.

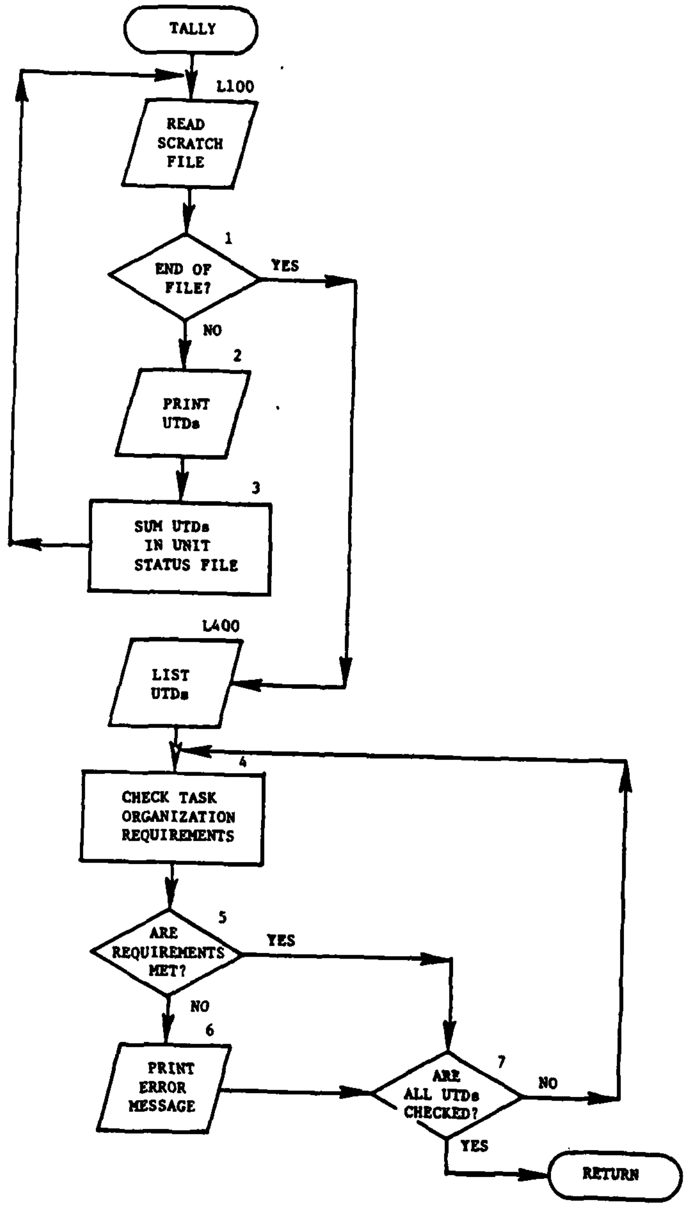


Figure II-4-B-13. Routine TALLY

NOTES

APPENDIX C

TASK ORGANIZATION DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Several types of printouts are provided when the ECHELON routine is executed. These printouts provide descriptions of the unit types available, the task organization, supply point data, unit type designator resolution and usage data, and a list of data file 31 (supply status) records created by the routine.

2. UNIT TYPE DESIGNATOR DIRECTORY. A list of unit type designators available for use within the task organization (see Figure II-4-C-1) is provided for cross reference.

3. CARD IMAGE. A printout of card images of the task organization is provided in Figure II-4-C-2. A description of this printout is contained in Appendix A to Chapter 3, Unit Representation, for the Period Processor.

4. RECOGNI TABLE. As the task organization cards are input, tables are built containing the unit type designators, the unit type designator, X and Y locations, type of support provided, unit being supported, and echelon level of each unit. Figure II-4-C-3 provides a printout of these tables.

5. MESSAGE. An informative message as to the number of divisions in the   force is printed as follows:

```
**MESSAGE** THERE WERE  1 DIVISIONS IN THE BLUE FORCE
```

6. SUPPLY STATUS TABLE. Supply point printout (Figure II-4-C-4) provides a comprehensive listing of the supply status of units within the task organization. The first column contains the unit identification of the supplying unit, the second column contains the unit identification of the unit being supplied, and the third column contains the unit identification record number of the unit being supplied. The next 10 columns contain the unit identification record number of the unit that supplies the corresponding class, as designated by the columnar headings.

7. UNIT RESOLUTION LIST. If a basic unit within the task organization is a complex type, it must be resolved into a basic type unit. In Figure II-4-C-5, lines one and two, states that unit B5502BEN was placed in the task organization as a basic unit, but was of a complex type. It was thus resolved into the basic structure of one type KCSE, three types RCSE, and one type RESE.

AMLL	APLL	BMCC	BPLC	BTCC	KCCT	KMCI	QNFA	KAMI	KLSI
KTCT	KTMT	KCST	JACA	ICCT	JCLT	IDCT	JDLI	IACC	JALC
ITCT	ILLT	ICST	PMFA	PMMT	PMCT	IMCT	ILLI	ILSI	PNFA
PTSI	PIMI	PICI	IACI	ISLI	IBMI	IFSI	IBCI	IJLI	ICMI
IMSI	IACH	IKMH	VALH	VCLH	IBCH	IBLH	IBMH	JACH	JASH
JBSH	JCSH	VELH	VBLH	IFCA	IFFA	IBFA	IFLA	IGCA	IGFA
IGLA	PACA	PFFA	KCCA	KGFA	KSLA	KSCA	KHFA	KALA	KFCA
KCFA	KCLA	KACA	KLFA	KLLA	JHCD	JAFD	JBFD	JECE	RASE
PCSE	PESE	QCSE	OESE	PBSE	QBSE	ESCS	JSCS	PBCS	IHCC
IMLC	IHMC	IAMH	PMFH	PSMH	IJCJ	JIIJ	UAIJ	UBIJ	UDIJ
UHIJ	UCIJ	JSIJ	UGIJ	USIJ	JDCL	JLLL	JTCL	JSLL	PSLL
JTLL	PTLL	JMCL	JHLL	JFLL	JALL	POLL	JSCL	JPLL	JMLL
JNCL	JNLL	JOLL	KHCD	KHFD	KACH	KASH	KBSH	KALH	KDLE
KLLE	PRBE	OGBE	KHCE	RCSE	RESE	VFIJ	VTTY	UFIJ	ICIJ
ABLL	AALL	HATT	NRII	DRRY	ATTY	LFCT	LFIA	DRLT	GIMC
HESE	DSTJ	GVTJ	LECE	GFFA	LBCT	LIMC	SCSE	STLT	NFFD
NEFD	GEMT	GEMI	LBCI	GLLI	GRMT	MAFA	NGFD	MBFA	DACF
GPSE	GRSE	DYSF	MOSE	DTCA	GHFA	HGFA	GRFA	DMCA	HMFA
DMCA	HPFA	GEFA	DMCD	HAFD	NLCA	NLFA	NHCA	NACD	NDFD
GECE	MDSF	MCSE	DNCD	HBFD	NDSE	SDSE	NBSE	SBSE	NTSF
SBXE	NBWE	SBWE							

Figure II-4-C-1. Unit Type Designator Directory, Task Organization

```
OPERATIONS BLUE UNIT.
TASK ORGANIZATION.
  B1000ZFC= *TOE AARB.
    B1000DIV=*TOE BAMC.
       B1AFDMBR *TOE AFFY *LOCATION 0070000-0044000.
       B1DTACCP *TOE BTCC *LOCATION 0090100-0098100.
       B1DIVZTP=*TOE CDCC.
          B1MAINCP *TOE BMCC *LOCATION 0090100-0098100.
          B10DRECP *TOE BRLC *LOCATION 0090100-0098100.
          B1000ZEN=*TOE EESE *LOCN  0091100-0095100.
            B101PREN *TOE JRSE.
            B101HOEN *TOE JECE.
            B10ADMEN *TOE RASE.
          END OF B1000ZEN.
          B10227AT=*TOE ECMI *LOCATION 0087300-0095500.
            B122HQAI=*TOE IACI.
              B140BNTI *TOE UBIJ.
            END OF B122HQAI.
            B1022AAI *TOE IBMI.
            B1022BAI *TOE IBMI.
            B1022CAI *TOE IBMI.
            B122CSAI *TOE IFSI.
          END OF B10227AI.
          B1000ZSC=*TOE ESSS.
            B101SCBN *TOE ESCS *LOCATION 0090100-0098100.
          END OF B1000ZSC.
          B1000ZAD=*TOE EASD.
            B10CHQAD *TOE JHCD *LOCATION 0089100-0094100.
          END OF B1000ZAD.
          B1000ZTI=*TOE EIIJ *LOCATION 0089600-0098300.
            B10CHQTI *TOF IJCJ.
            B10SSPTI=*TOE JIIJ.
              B13ABNTI *TOE JHIJ.
            END OF B10SSPTI.
            B10PTSTI *TOE JSIJ.
          END OF B1000ZTI.
       END OF B1DIVZTP.
```

Figure II-4-C-2. Card Image, Task Organization

**INPUT-IN-RECOGN1 TABLES

N	UIO	UTC	X	Y	NAUP	NSUP	LEV
1	B1000ZFC	AAHB			0		1
2	B10000IV	BAMC			0		2
3	B1AFBMSR	AFFY	0070000	0044000	0		3
4	B10TACCP	BTCC	0090100	0098100	0		3
5	B1DIVZTP	CDCC			0		3
6	B1MAINCP	BMCC	0090100	0098100	0		4
7	B10CPRCP	BRLC	0090100	0098100	0		4
8	B1000ZEN	EESE	0031100	0095100	0		4
9	B1013BEN	JBSE			0		5
10	B101HQEN	JECE			0		5
11	B10ADMEN	PASE			0		5
12	B1022ZAI	ECMI	0037300	0095500	0		4
13	B122HQAI	IACI			0		5
14	B140BNTI	UBIJ			0		6
15	B1022AAI	IBMI			0		5
16	B1022BAI	IBMI			0		5
17	B1022CAI	IBMI			0		5
18	B122CSAI	IFSI			0		5
19	B1000ZSC	ESSS			0		5
20	B101SCBN	ESCS	0090100	0098100	0		4
21	B1000ZAD	EASD			0		5
22	B10CHQAD	JHCD	0039100	0094100	0		4
23	B1000ZTI	EIIJ	0039600	0098800	0		5
24	B100HQTI	IJCJ			0		4
25	B1DSSPTI	JITJ			0		5
26	B10ABNTI	UHIJ			0		5
27	B1CPTSTI	JSIJ			0		5
28	B1SPTZMD	CSCL	0030100	0101300	0		5
29	B1HQDSCM	JDCL			0		3
30	B10ADMIN	JLLL			0		4
31	B101SCSP	JSCS			0		4
32	B1000ZMN	FMLL			0		4
33	B1HCLTMN	JMCL			0		4
34	B10HVYMN	JHLL			0		5
35	B100ACMN	JALL			0		5
36	B1000ZST	ESLL	0036000	0107000	0		5
37	B10CHQST	JTCL			0		4
38	B100SSST	JSLL	0036000	0107010	0		5
39	B10MTRST	JTLL			0		5
40	B1000ZMC	ENLL			0		5
41	B10CHQMC	JNCL			0		4
42	B1DIVZDA	CAFA			0		5
43	B100HQFA	JACA	0032200	0090800	0		3
44	B100FATI	UDIJ			0		4
45	B5015ZGS	FGFA	0108200	0087800	0		5
46	B515HQGS	KCCA			0		4
47	B5015AGS	KGFA			0		5
48	B5015BGS	KGFA			0		5
49	B5015CGS	KGFA			0		5

Figure II-4-C-3. RECOGN1 Table, Task Organization

SUPPLY POINT	UNIT SUPPLIED	IUIC	CLASS01	CLASS02	CLASS03	CLASS04	CLASS05	CLASS06	CLASS07	CLASS08	CLASS09	CLASS10
B100MZLL	B10CCZST	54	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5AIRSUR	286	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10CSSST	66	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5441ZAD	257	0	0	0	0	279	0	0	0	0	0
B100MZLL	B80A74GS	259	0	0	0	0	279	0	0	0	0	0
B100MZLL	BA0872GS	258	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVACO	176	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVBCO	177	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVCCO	178	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVDCO	179	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1ASSPTH	180	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVSPT	26	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1MAINCP	251	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10TACCP	283	0	0	0	0	279	0	0	0	0	0
B100MZLL	B100RRCP	252	0	0	0	0	279	0	0	0	0	0
B100MZLL	B101MOEN	46	0	0	0	0	279	0	0	0	0	0
B100MZLL	B101PREN	45	0	0	0	0	279	0	0	0	0	0
B100MZLL	B10AVNHQ	175	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1SPT1RR	28	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1SPT2RR	29	0	0	0	0	279	0	0	0	0	0
B100MZLL	B101SCEN	54	0	0	0	0	279	0	0	0	0	0
B10[illegible]L	B100HQAD	56	0	0	0	0	279	0	0	0	0	0
B100MZLL	B100COAD	17	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1010ZEN	44	0	0	0	0	279	0	0	0	0	0
B100MZLL	B100CZTI	57	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1SPTZMD	253	0	0	0	0	279	0	0	0	0	0
B100MZLL	B100HQFA	70	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5015ZGS	72	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5025ZGS	78	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5045ZGS	90	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5035ZGS	84	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5055ZGS	95	0	0	0	0	279	0	0	0	0	0
B100MZLL	B118DZTN	142	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1CAVZEN	174	0	0	0	0	279	0	0	0	0	0
B100MZLL	B128DZTN	181	0	0	0	0	279	0	0	0	0	0
B100MZLL	B13ACZTN	202	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5501ZEN	234	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5502ZEN	242	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5506DMP	249	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5507MAB	248	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5508MAB	241	0	0	0	0	279	0	0	0	0	0
B100MZLL	B5509LEQ	240	0	0	0	0	279	0	0	0	0	0
B100MZLL	B1000ZAD	55	0	0	0	0	279	0	0	0	0	0

Figure II-4-C-4. Supply Status Table, Task Organization

```
  UID B5532BFN WAS BUILT FROM THE FOLLOWING UIDS
KCSF  1  RCSF  3  PFSF  1
  UID B5532CFN WAS BUILT FROM THE FOLLOWING UIDS
KCSE  1  RCSF  3  FESE  1
  UID B5532DFN WAS BUILT FROM THE FOLLOWING UIDS
KCSF  1  RCSE  3  PESE  1
  UID B5537MAB WAS BUILT FROM THE FOLLOWING UIDS
KBSF  1  PBBF  3  OBBE  1
  UID B3D372GS WAS BUILT FROM THE FOLLOWING UIDS
FSFA  1  KFCA  1  KCFA  3  KCLA  1
  UID B3D374GS WAS BUILT FROM THE FOLLOWING UIDS
FHFA  1  KGCA  1  KHFA  3  KALA  1
  UID B1AFRMPR WAS BUILT FROM THE FOLLOWING UIDS
AFFY  1  VFIJ  6  VTTY  1
  UID B54IRSUR WAS BUILT FROM THE FOLLOWING UIDS
KCSH  1  UFIJ 12  TCIJ  1
  UID RA1X1AFN WAS BUILT FROM THE FOLLOWING UIDS
MASE  1  NDSF  1  SDSF  2
  UID RA1X1BFN WAS BUILT FROM THE FOLLOWING UIDS
MASE  1  NDSF  1  SDSE  2
  UID RA1X1CFN WAS BUILT FROM THE FOLLOWING UIDS
MASE  1  NDSE  1  SDSE  2
  UID RA1X2AFN WAS BUILT FROM THE FOLLOWING UIDS
MASF  1  NDSE  1  SDSF  2
  UID RA1X2BFN WAS BUILT FROM THE FOLLOWING UIDS
MASE  1  NDSF  1  SDSE  2
```

Figure II-4-C-5. Task Organization Unit Resolution List

8. UNIT TYPE DESIGNATOR SUMMARY. Figure II-4-C-6 shows a list summarizing all unit types and the number of times each was encountered within the task organization routine.

9. UNITS CREATED. Figure II-4-C-7 shows a list of all the supply records (data file 31) created within the task organization routine and the associated units.

THE FOLLOWING IS A SUMMARY OF UTDS USED IN SEQUEN

UBIJ	8	UHIJ	3	JAFD	2	JBFD	2	UCIJ	1	IHLC	1	VBLH	1	VFLH	2	VCLH	1	VALH	3
IRLH	1	JSCL	1	JPLL	1	JMLL	1	JBSE	1	PBSE	2	CRSE	1	JECE	1	RASE	1	IACI	2
IBMI	6	IFSI	2	FSSS	1	JHCD	1	IJCJ	1	JIIJ	1	JSIJ	1	JMCL	1	JHLL	1	JALL	1
JTCL	1	JSLL	1	JTLL	2	JNCL	1	UDIJ	1	KCCA	1	KGFA	3	KSLA	1	KGCA	2	KHFA	6
KALA	2	KFCA	3	KCFA	9	KCLA	3	KACA	1	KLFA	2	KLLA	1	UAIJ	3	UGIJ	6	USIJ	6
PBCS	3	JCSF	2	PCSE	6	PESE	2	IFCA	1	IFFA	3	IBFA	1	IFLA	1	ITCT	2	IIMT	6
PMMT	18	PMCT	6	IAMI	3	PIMI	9	PICI	3	ICST	2	PMFA	2	IMCI	1	ILSI	1	PNFA	1
PTSI	2	IHCC	1	IHMC	2	IAMH	1	PSMH	1	PWFH	1	JNLL	2	PSLL	3	PTLL	3	JFLL	1
ILLT	2	ICSF	2	OCSE	6	QESE	2	IGCA	1	IGFA	3	ICFA	1	PACA	1	PFFA	1	IGLA	1
IRCI	1	ICMI	3	IMSI	1	JACH	1	JASH	1	JBSH	3	JCSH	2	JCLH	1	JOLL	1	POLL	1
ISLI	2	IACH	1	IKMH	3	IALH	1	IDCH	1	IRMH	3	FALL	1	KMCI	2	KAMI	6	KTMT	6
KLSI	2	ONFA	4	KTCT	2	KCST	2	KHCE	2	KCSE	8	RCSE	24	RESF	9	KLLF	1	K3SE	2
PBBE	6	QBEE	2	KOLE	1	BMCC	1	BRLC	1	FESE	1	ECMI	2	ESSS	1	EASD	1	EIIJ	1
JDCL	1	JLLL	1	JSCS	1	FMLL	1	ESLL	1	ENLL	1	JACA	1	FGFA	1	FMFA	2	FSFA	3
FMFA	1	ICCT	1	EFFA	1	EAMT	2	EDMI	1	ECMC	1	JCLT	1	IOCI	1	EGFA	1	EDMI	1
EDSH	1	JDLI	1	IACC	1	EAMH	1	EBMH	1	JALC	1	KCCT	1	FMMI	2	FMMT	2	FESE	2
KHCD	1	KHFD	3	KASH	3	K9SH	1	KACH	1	KALH	1	AFFY	1	VFIJ	5	VTTY	1	BTCC	1
CDCC	1	CSCL	1	CAFA	1	CCMT	1	CDMI	1	CAMC	1	CMMI	1	CZSF	1	FHFD	1	EASH	1
KCSH	1	UFIJ	12	ICIJ	1	AMLL	1	APLL	1	RAMC	1	AZST	1	AABB	1	GECE	4	MASE	18
NDSE	18	SDSF	57	MDSE	4	MCSE	4	NLCA	3	NLFA	9	NHCA	3	NACD	3	NDFD	12	LIMC	12
SCSE	9	NFFD	9	NEFD	12	MPFA	9	DTCA	3	GHFA	12	HGFA	3	GRFA	3	DMCA	2	HMFA	6
DNCD	2	HRFD	5	LFIA	3	GIMC	3	ORLT	3	HASE	4	LECE	3	MRSE	3	NBSF	3	S3SE	6
NTSE	7	NTSE	7	S9XE	7	MWSE	11	NBWE	11	SBWE	22	GFFA	3	GLFA	3	DGFA	3	D3FD	3
LBCT	9	GTLT	9	GEMT	27	GEMI	9	MAFA	3	HPFA	2	IBCI	3	NGFD	3	GLLI	3	GRMT	3
GFFA	1	DACE	2	GPSF	2	GRSE	2	DYSE	2	MOSE	2	DWCA	1	DMCD	1	HAFD	3	OSTJ	1
GVTJ	1	HATT	2	NRII	1	DLFA	3	DMFA	2	DNFD	2	LFCT	3	GASE	3	DDFA	3	DTMT	9
DTMI	3	ATTY	4	DESE	2	DVSE	2	HESE	2	DWFA	1	DMFD	1	DTTJ	1	BFFA	1	DRRY	6
DRMT	3	DESE	1	BAFA	1	ACCY	1	AALL	1	ABLL	1	AARR	1						

Figure II-4-C-6. Unit Type Designator Summary, Task Organization

[illegible] CREATED FOR [illegible] THEY FOLLOW BELOW.

UIDX B1SPT1RR

1	35	0	0	0	0	1	0	0	0
2	1328	600	600	0	0	1	0	0	0
3	10000	10000	10000	0	0	1	0	0	0
7	1000	2000	2000	0	0	2	0	0	0
90	140	60	60	0	0	2	0	0	0
96	6	0	0	0	0	7	0	0	0
97	10	0	0	0	0	7	0	0	0
162	1	0	0	0	0	7	0	0	0
167	1	0	0	0	0	7	0	0	0
201	5	0	0	0	0	0	0	0	0

UIDX B1SPT2RR

1	35	0	0	0	0	1	0	0	0
2	1328	600	600	0	0	1	0	0	0
3	10000	10000	10000	0	0	1	0	0	0
7	1000	2000	2000	0	0	2	0	0	0
90	140	60	60	0	0	2	0	0	0
96	6	0	0	0	0	7	0	0	0
97	10	0	0	0	0	7	0	0	0
162	1	0	0	0	0	7	0	0	0
167	1	0	0	0	0	7	0	0	0
201	5	0	0	0	0	0	0	0	0

UIDX B1ATK1RR

1	35	0	0	0	0	1	0	0	0
2	1328	600	600	0	0	1	0	0	0
3	10000	5000	5000	0	0	1	0	0	0
7	1000	2000	2000	0	0	2	0	0	0
90	140	60	60	0	0	2	0	0	0
96	3	0	0	0	0	7	0	0	0
97	10	0	0	0	0	7	0	0	0
162	1	0	0	0	0	7	0	0	0
167	1	0	0	0	0	7	0	0	0
201	5	0	0	0	0	0	0	0	0

UIDX B1ATK2RR

1	35	0	0	0	0	1	0	0	0
2	1328	600	600	0	0	1	0	0	0
3	10000	5000	5000	0	0	1	0	0	0
7	1000	2000	2000	0	0	2	0	0	0
90	140	60	60	0	0	2	0	0	0
96	3	0	0	0	0	7	0	0	0
97	10	0	0	0	0	7	0	0	0
162	1	0	0	0	0	7	0	0	0
167	1	0	0	0	0	7	0	0	0
201	5	0	0	0	0	0	0	0	0

UIDX B1ATK3RR

1	35	0	0	0	0	1	0	0	0
2	1328	600	600	0	0	1	0	0	0
3	10000	5000	5000	0	0	1	0	0	0
7	1000	2000	2000	0	0	2	0	0	0
90	140	60	60	0	0	2	0	0	0
96	3	0	0	0	0	7	0	0	0
97	10	0	0	0	0	7	0	0	0
162	1	0	0	0	0	7	0	0	0
167	1	0	0	0	0	7	0	0	0

Figure II-4-C-7. Task Organization Units Created

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR TASK ORGANIZATION

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 5

ENVIRONMENTAL DATA INPUT PROGRAMS

1. INTRODUCTION. The Environmental data input programs create and load the constant data files describing the environmental representation. Those data describe the terrain characteristics and elevation and the weather conditions.

2. ROUTINES:

a. General. The Environmental data input programs consist of three separate and independent programs as described below.

b. Elevation. Routine ELEVLD creates and loads the terrain elevation data file and produces a dump of the file contents. It requires a digitized terrain tape as input and determines and stores the elevation of each point on the elevation grid.

c. Terrain. Routine TERNLD reads the terrain characteristic data from the input cards and creates and loads the terrain characteristics file. Routine TERNDP produces a formatted dump of the file contents.

d. Weather. The weather data are read from cards and loaded into the weather data file by routine WETHLD. That routine also produces a formatted dump of the contents of the weather file.

3. FILES. The following data files are created and loaded.

- Terrain elevation file - data file 13
- Terrain characteristics file - data file 3
- Weather file - data file 4

NOTES

APPENDIX A

ENVIRONMENTAL DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for environment are documented in Appendix A, Environmental Representation Input Requirements, to Chapter 4 of the Period Processor (Section IV).

NOTES

APPENDIX B

ENVIRONMENTAL DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. The environmental representation data are loaded by three independently operated routines. Routine ELEVLD loads the terrain elevation data. This differs from all other DIVWAG load routines in that the input medium is magnetic tape rather than cards. The routine TERAIN assisted by TERNLD and TERNOP routines, loads the terrain characteristic data other than elevation, and the routine WETHLD loads the weather data. These routines are described in this appendix.

2. ROUTINE ELEVLD:

a. Purpose. Routine ELEVLD creates and loads the terrain elevation data (data file 13). It is designed to extract the elevation data from a digitized terrain tape. The tape used for all applications to date has been obtained from the TACOS Model data base.

b. Input Variables. The only source of input data for this routine is the digitized terrain tape. The tape is structured by 100,000-meter map squares with 24 logical records per square. The four squares used for recent studies are:

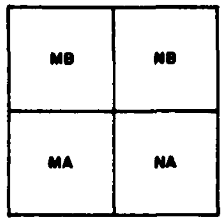
(1) MA : Records 122 through 145
(2) MB : Records 218 through 241
(3) NA : Records 146 through 169
(4) NB : Records 242 through 265

Each record contains the elevations of 1717 points spaced at 500-meter intervals (101 points in the easterly direction by 17 points in the northerly direction), except those describing the northern boundary of the squares that have only 14 points in the northerly direction. Each elevation point occupies 16 bits on the tape and is in binary integer notation in decameters. The layout of the records on the tape as they relate to the terrain areas is depicted in Figure II-5-B-1.

c. Output Variables. The output from the routine is data file 13. That data file contains one word for each elevation point. Each record contains the elevation in meters of all points on a given east-west row. There is a record for each row. For recent projects, the file was composed of 401 records of 401 words each to describe a terrain area 200,000 by 200,000 meters with 500-meter elevation grid intervals.

d. Logical Flow (Figure II-5-B-2):

(1) Blocks 1 and 1A. Bring in the file name table. If data file 13 has been created and is of the correct size, transfer control to block L100.



MB - 23 RECORD 240	MB - 24 RECORD 241	NB - 23 RECORD 264	NB - 24 RECORD 265
MB - 21 RECORD 238	MB - 22 RECORD 239	NB - 21 RECORD 262	NB - 22 RECORD 263

MB - 5 RECORD 222	MB - 6 RECORD 223	NB - 5 RECORD 246	NB - 6 RECORD 247
MB - 3 RECORD 220	MB - 4 RECORD 221	NB - 3 RECORD 244	NB - 4 RECORD 245
MB - 1 RECORD 218	MB - 2 RECORD 219	NB - 1 RECORD 242	NB - 2 RECORD 243
MA - 23 RECORD 144	MA - 24 RECORD 145	NA - 23 RECORD 168	NA - 24 RECORD 169
MA - 21 RECORD 142	MA - 22 RECORD 143	NA - 21 RECORD 166	NA - 22 RECORD 167

MA - 7 RECORD 128	MA - 8 RECORD 129	NA - 7 RECORD 152	NA - 8 RECORD 153
MA - 5 RECORD 126	MA - 6 RECORD 127	NA - 5 RECORD 150	NA - 6 RECORD 151
MA - 3 RECORD 124	MA - 4 RECORD 125	NA - 3 RECORD 148	NA - 4 RECORD 149
MA - 1 RECORD 122	MA - 2 RECORD 123	NA - 1 RECORD 146	NA - 2 RECORD 147

Figure II-5-B-1. Record Layout of Terrain Elevation Tape

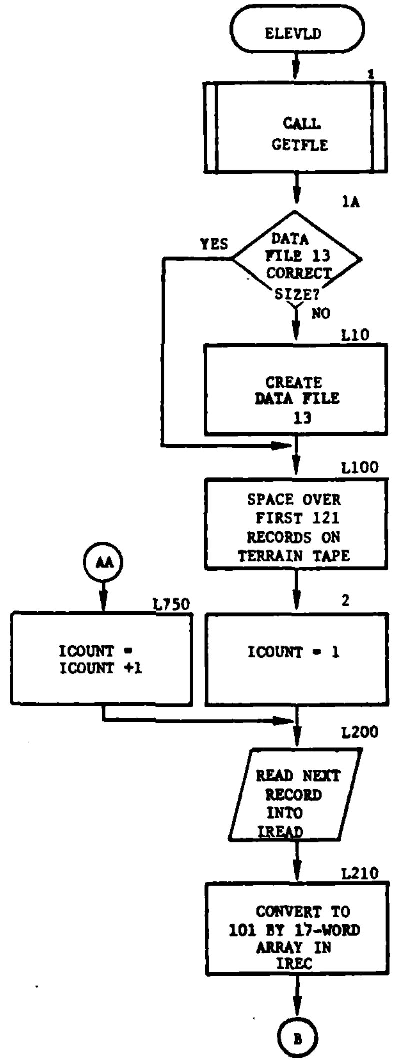


Figure II-5-B-2. Routine ELEVLD (Continued on Next Page)

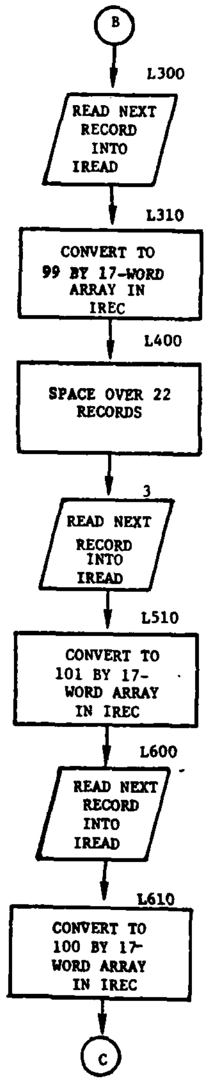


Figure II-5-B-2. Routine ELEVLD (Continued)

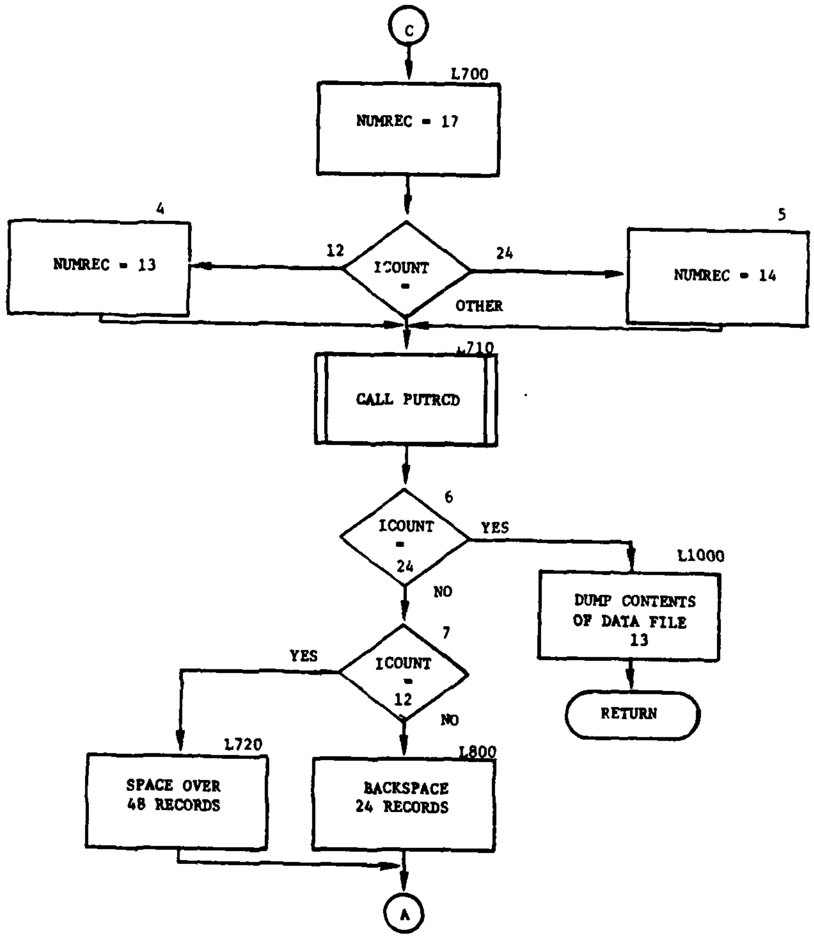


Figure II-5-B-2. Routine ELEVLD (Concluded)

(2) Block L10. If the file has been previously created, it is removed. The file is then created with the required dimensions.

(3) Block L100. The tape is positioned to record 122 to begin reading the elevation of square MA.

(4) Block 2. ICOUNT is initialized to one. It counts the number of four-record sets as they are read and processed.

(5) Block L200. A tape record is read into IREAD array. This contains the 1717 elevation points describing the westernmost of the four blocks.

(6) Block L210. Each 16-bit word is taken in sequence from IREAD, converted to an integer word, multiplied by 10, and stored in IREC. This process fills the first 101 columns in the IREC array.

(7) Block L300. The next tape record is read into IREAD. This contains the 1717 elevation points describing the next block to the east.

(8) Block L310. The process described in block L210 (paragraph d(6) above] is performed to fill columns 102 through 200 of the IREC array.

(9) Block L400. The tape is positioned to read the third record of this set by spacing over 22 records.

(10) Block 3. A tape record is read into IREAD. This contains the 1717 elevation points describing the next block to the east.

(11) Block L510. The process described in block L210 is performed to fill columns 201 through 301 of the IREC array.

(12) Block L600. The next record is read into IREAD. This contains the 1717 elevation points describing the easternmost block of the set.

(13) Block L610. The process described in block L210 is performed to fill columns 302 through 401 of the IREC array.

(14) Block L700. IREC is normally filled with 17 rows and 401 columns that correspond to 17 records on data file 13.

(15) Blocks 4 and 5. If this set of records pertains to the northernmost boundary of NA and MA, only 13 records are included. If it pertains to the northernmost boundary of NB and MB, only 14 records are included.

(16) Block L710. The correct number of records is put onto data file 13 from IREC.

(17) Block 6. If all 24 sets have been processed, transfer control to block L1000; otherwise, transfer control to block 7.

(18) Blocks 7 and L720. If ICOUNT is equal to 12, the tape is spaced forward 48 records to position it to read the first record of square MB, and control is transferred to block L750.

(19) Block L800. If ICOUNT is not equal to 12, the tape is backspaced 24 records to read the first record of the next set.

(20) Block L750. ICOUNT is incremented by one to begin processing the next set, and control is transferred to block L200.

(21) Block L1000. The contents of data file 13 are printed.

3. ROUTINE TERAIN. TERAIN is the controlling program for loading the terrain data deck. It calls the TERNLD routine to read the data cards and build the terrain file (data file 3). It also calls the TERNDP routine to print the newly created terrain file (data file 3).

4. ROUTINE TERNLD:

a. Purpose. The TERNLD routine reads the terrain data cards, performs minor editing, and writes the acceptable data onto the terrain file (data file 3).

b. Input Variables:

Name	Source	Contents
NX	Card	Number of cells in the X direction.
NY	Card	Number of cells in the Y direction.
NTERR	Card	Size of a terrain cell.
ISTORE	Card	RVSS codes.
IX	Card	X coordinate for ISTORE.
IY	Card	Y coordinate for ISTORE.

c. Output Variables:

Name	Destination	Contents
ITERR	DF3	100 terrain records.

d. Logical Flow (Figure II-5-B-3):

(1) Block L100. Read the first card; it is the parameter card specifying the number of X coordinates, Y coordinates, and size of the cell.

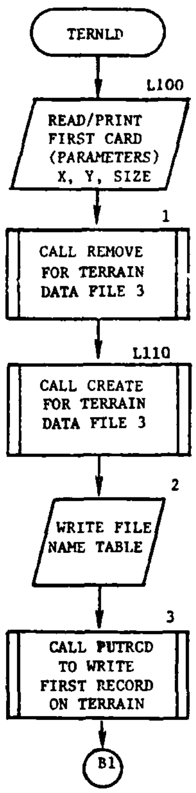


Figure II-5-B-3. Routine TERNLD (Continued on Next Page)

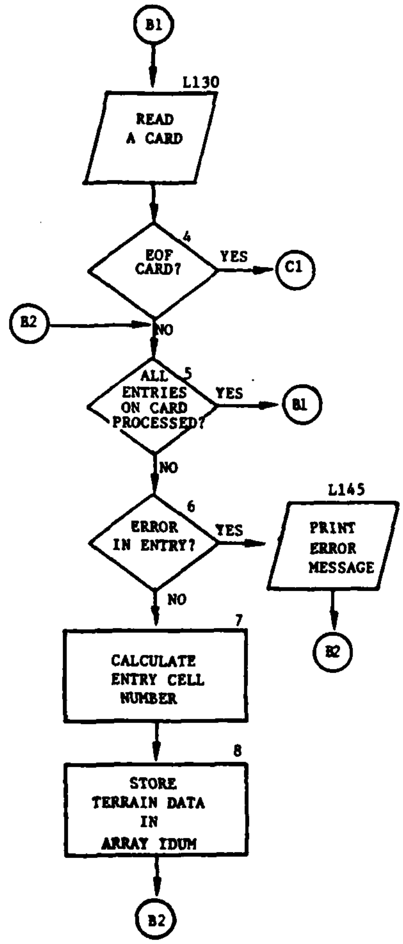
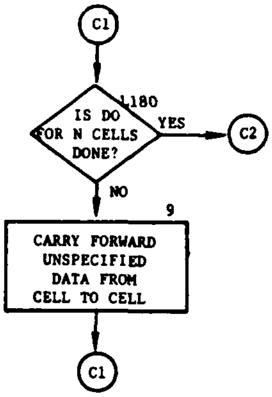


Figure II-5-B-3. Routine TERNLD (Continued)



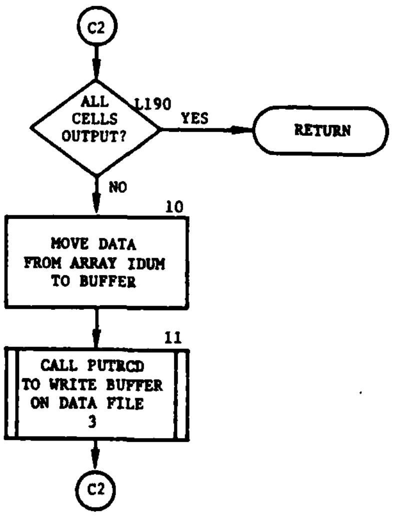


Figure II-5-B-3. Routine TERNLD (Concluded)

(2) Blocks 1, L110, and 2. Remove the previous data file 3, if one exists, and create a new data file 3 of the required size. Print the new file name table.

(3) Block 3. Build the first record for data file 3 from the parameter card and put it on data file 3 by calling PUTRCD.

(4) Block L130. Read the next data card.

(5) Block 4. If an end of file was detected, or if a data end of file card was read, control goes to block L180.

(6) Block 5. If all entries on the card have been stored in array IDUM, return to block L130. If not, increase entry pointer by one.

(7) Blocks 6 and L145. If the entry has an edit error, print an error message and return to block 5.

(8) Block 7. Calculate the entry cell number.

(9) Block 8. Store the terrain data in array IDUM.

(10) Blocks L180 and 9. Examine each cell's data in array IDUM, and set any unspecified data item equal to that data in the previous cell.

(11) Blocks L190, 10, and 11. Move the cell data from array IDUM, and build a buffer of 100 records. When the buffer is full or there are no more entries in IDUM, output the buffer to data file 3 by calling PUTRCD. When all records are output return control to the calling routine.

5. ROUTINE TERNDP:

a. Purpose. The TERNDP routine is called by the TERAIN routine, and lists the terrain file record-by-record.

b. Input Variables:

Name	Source	Contents
ITERR	DF3	Terrain record.
NX	DF3	Number of cells in the X direction.
NY	DF3	Number of cells in the Y direction.
NTERR	DF3	Size of terrain cell.

c. Output Variables. Refer to input variables.

6. ROUTINE WETHLD:

a. Purpose. WETHLD creates the weather data file, data file 4, and loads the file with the weather data read from punched cards.

b. Input Variables:

Name	Source	Contents
IDUMP	ONE	Flag indicating that only a dump is desired.
IDAY	Card	Total number of days to be loaded.
ISEC	Card	Total number of weather sectors to be loaded.
ISTOP	Card	End-of-deck indicator; 999 indicates end of data.
IAR(9)	Card	Weather record (nine words) in the following sequence: visibility index, cloud cover, temperature, precipitation index, temperature gradient, relative humidity, wind velocity, wind direction, and fog index.
MXWETH(9)	DF04	Weather record (see IAR).

c. Output Variables:

Name	Destination	Contents
IAR(9)	DF04	Weather record (see IAR, input variable).
MSEC	Print	Weather sector number.
MDAY	Print	Day.
MHRFRM	Print	End of last hour.
MHRTO	Print	End of this hour.
MXWETH(9)	Print	Weather record (see IAR, input variable).
IRECF	Print	File record number.

d. Logical Flow (Figure II-5-B-4):

(1) Block 1. The indicator IDUMP is located in common ONE and must be previously set by another routine to the value DUMP if a dump without loading is desired. If only a dump is desired, transfer control to block L700.

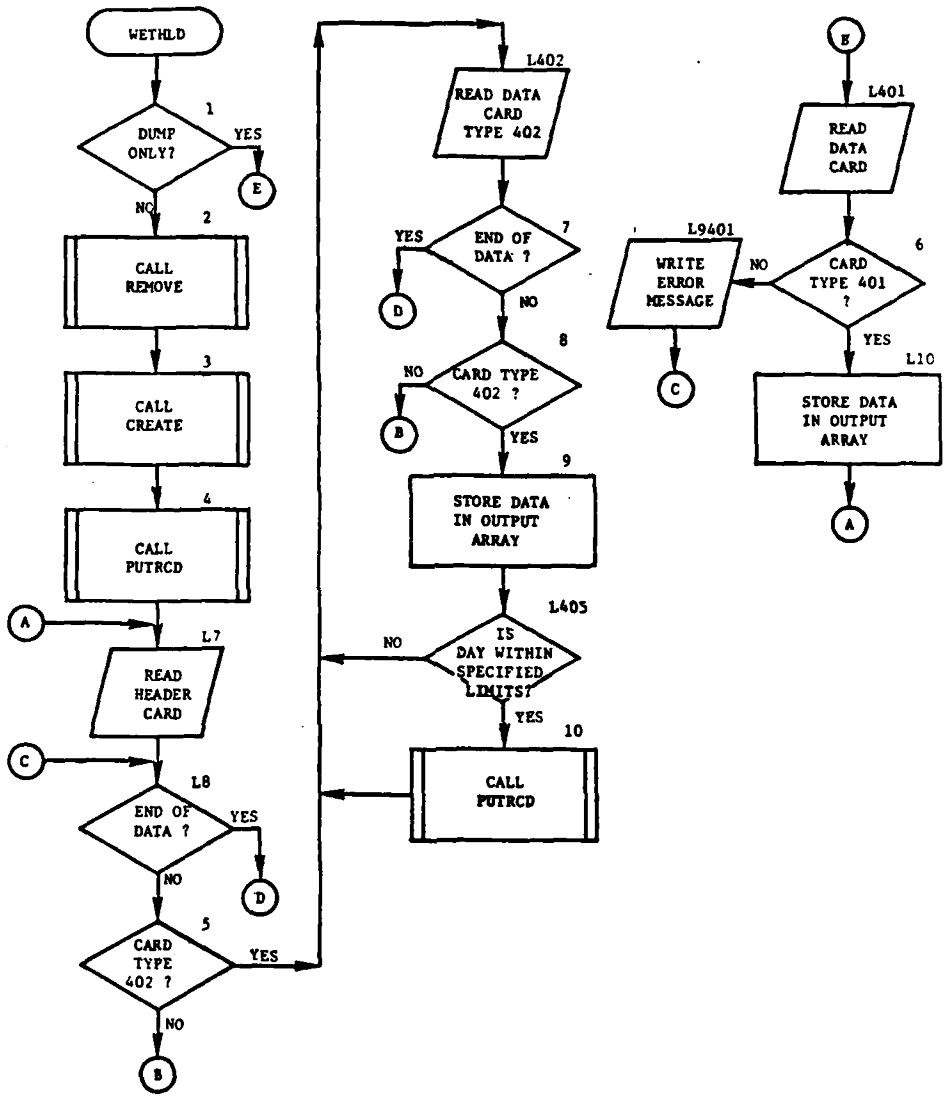


Figure II-5-B-4. Routine WETHLD (Continued on Next Page)

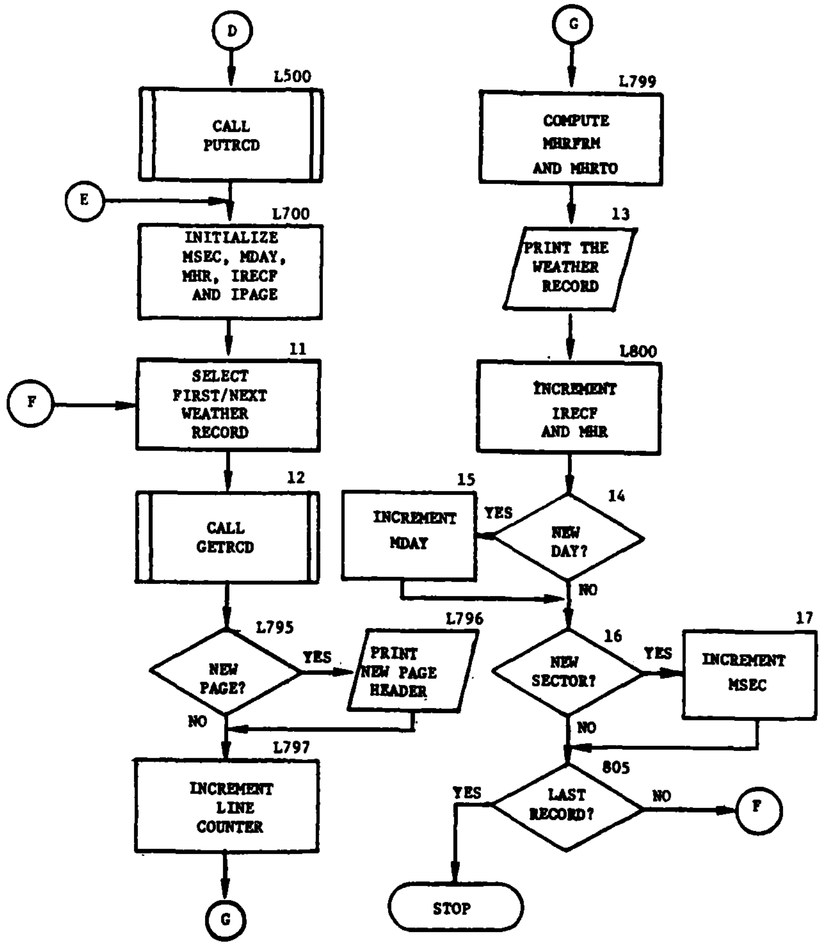


Figure II-5-B-4. Routine WETHLD (Concluded)

(2) Blocks 2, 3, and 4. The previous data file 4 is removed, if one exists, and a new data file 4 is created and zeroed.

(3) Block L7. A header card is read that indicates the card type to be read (401 or 402).

(4) Blocks L8 and 5. The card is checked for end-of-file indicator (9999 in columns 73-76) and then for card type 402. If an end of data was encountered, transfer control to block L500. If a card type 402 was encountered, transfer control to block L402.

(5) Blocks L401 and 6. A data card is read and checked for card type. If the card type is 401, transfer control to block L10.

(6) Block L9401. If the card type just read is not 401, an error message is written, and control returns to block L8.

(7) Block L10. The data from card type 401 are stored in the output array and control returns to block L7.

(8) Block L402. When a type 402 header card is read, control passes to block L402 and another data card is read.

(9) Blocks 7 and 8. The card is checked for end-of-file and for card type 402. If an end of data is encountered, transfer control to block L500. If card type 402 is not encountered, transfer control to block L401.

(10) Block 9. If the card type was 402, the data are stored in the output array.

(11) Blocks L405 and 10. If the day number is within the specified range, put the weather data on data file 4; then transfer control to block L402 to read the next card.

(12) Block L500. Put weather zone coordinates, sunrise and sunset times, and total number of days on data file 4.

(13) Block L700. The sector number (MSEC), day number (MDAY), hour number (MHR), and record number (IRECF) are initialized to one. The line counter (IPAGE) is set to zero.

(14) Block 11. This block is the top of the loop to bring in each weather record from data file 4 for printing.

(15) Block 12. The record at record number IRECF is brought into MXWETH from data file 4.

(16) Blocks L795 and L796. A new page header providing the title and column headings is printed if the line counter (IPAGE) equals zero.

(17) Block L797. The line counter (IPAGE) is incremented by one.

(18) Block L799. The hour numbers MHRFROM and MHRTO are computed from the cumulative hour number MHR.

(19) Block 13. The line for the weather recor. is printed from the following output variables: MSEC, MDAY, MHRFRM, MHRT , MXWETH(1-9), and IRECF.

(20) Block L800. IRECF and MHR are incremented to go to the next record which corresponds to the next hour.

(21) Blocks 14 and 15. If MHR exceeds 24, MHR is reset to one, and MDAY is incremented by one.

(22) Blocks 16 and 17. If MDAY exceeds 14, MDAY is reset to one, and MSEC is incremented by one.

(23) Block 805. If the last weather record has not been printed, transfer control to block 11; otherwise, control returns to the calling routine.

APPENDIX C

ENVIRONMENTAL DATA LOAD OUTPUT DESCRIPTIONS

The input loaded into the weather file produces a formatted printout as shown in Figure II-5-C-1. Each weather zone may contain a maximum of 14 days of weather data; therefore, regardless of the number of days of weather input for each zone, 14 pages of printout, i.e., one for each day; will be printed.

W E A T H E R   R E P O R T

RMNT = 720　　FCNT = 2175　　SUNRISE AT 434　　SUNSET AT 1921

LOWER LEFT (X,Y) = (0, 0)　　UPPER RIGHT (X,Y) = (300000, 200000)

ZONE	DAY	HOUR	VISIBILITY	CLOUD COVER	TEMPERATURE	PRECIPITATION	TEMPERATURE GRADIENT	RELATIVE HUMIDITY	WIND VELOCITY	WIND DIRECTION	FOG	REC.
1	1	0- 100	2	90	45	0	3	79	5	270	0	1
1	1	100- 200	2	90	43	0	3	79	5	270	0	2
1	1	200- 300	5	90	41	0	3	79	5	270	0	3
1	1	300- 400	5	90	37	0	3	79	5	270	0	4
1	1	400- 500	6	90	35	0	4	79	5	270	0	5
1	1	500- 600	6	90	39	0	4	79	5	270	0	6
1	1	600- 700	7	90	41	0	4	79	5	270	0	7
1	1	700- 800	7	90	43	0	4	79	5	270	0	8
1	1	800- 900	7	90	45	0	4	79	5	270	0	9
1	1	900-1000	8	70	49	0	4	79	5	270	0	10
1	1	1000-1100	8	70	51	0	4	79	5	270	0	11
1	1	1100-1200	8	70	53	0	4	79	5	270	0	12
1	1	1200-1300	8	70	55	0	4	79	5	270	0	13
1	1	1300-1400	8	70	58	0	4	79	5	270	0	14
1	1	1400-1500	8	70	59	0	4	79	5	270	0	15
1	1	1500-1600	8	70	60	0	4	79	8	315	0	16
1	1	1600-1700	8	70	60	0	4	79	8	315	0	17
1	1	1700-1800	8	90	59	0	4	79	8	315	0	18
1	1	1800-1900	6	90	57	0	3	79	8	315	0	19
1	1	1900-2000	5	100	56	1	3	79	8	315	0	20
1	1	2000-2100	4	100	52	1	3	79	8	315	0	21
1	1	2100-2200	3	90	50	0	3	79	8	315	0	22
1	1	2200-2300	3	90	49	0	3	79	5	315	0	23
1	1	2300-2400	2	90	45	0	3	79	5	315	0	24

Figure II-5-C-1. Weather File Printout

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR ENVIRONMENTAL REPRESENTATION

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 6

UNIT GEOMETRY DATA INPUT PROGRAMS

1. INTRODUCTION. The Unit Geometry data input programs create and load the constant data files describing unit dimensions and distributions for each type of unit performing seven activities. The data specify the width and depth of the unit, the number of bands in which the personnel and equipment are distributed, and the fractional distribution of personnel and equipment among the bands for each activity.

2. ROUTINES:

a. General. The Unit Geometry data input programs consist of the three routines described below.

b. Routine DIMLD. The controlling executive function is performed by routine DIMLD. This routine calls routine LOAD28 and routine DUMP28 in that order.

c. Routine LOAD28. The unit dimension and distribution data file is created and loaded by routine LOAD28. This routine also reads and edits the data cards.

d. Routine DUMP28. Routine DUMP28 produces a formatted dump of the contents of the unit dimension and distribution data file.

3. *FILES. The following data file is loaded by these routines.*

- Unit dimension and distribution - data file 28

NOTES

APPENDIX A

UNIT GEOMETRY DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for unit geometry are documented in Appendix A, Battlefield and Unit Geometry Input Requirements, to Chapter 5 of the Period Processor (Section IV).

NOTES

APPENDIX B

UNIT GEOMETRY DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Unit geometry data are loaded onto data file 28 by routines described in this appendix. Routine DIMLD is the controlling routine, LOAD28 reads the data cards and loads data file 28, and DUMP28 produces formatted tables displaying the data. Unit dimensions, number of bands, and distribution of personnel and equipment among the bands are principal data elements.

2. ROUTINE DIMLD:

a. Purpose. DIMLD controls loading of data file 28 with unit dimensions and item distribution data from cards. DIMLD calls LOAD28 to load the data and DUMP28 to print the data.

b. Input Variables: None.

c. Output Variables: None.

d. Processing Description. DIMLD performs three significant operations in sequence: calls LOAD28 to load the data, calls DUMP28 to print the data, and prints the file name table.

3. ROUTINE LOAD28:

a. Purpose. LOAD28 loads the unit dimensions and item distribution data onto data file 28 from cards.

b. Input Variables:

Name	Source	Contents
KARD(20)	Card	Data card image buffer.
IFILE	Card	File number (28).
IFORM	Card	Card format number (01-04).
ISIDE	Card	Force Designator (B or R).
IUSN	Card	Unit type designator (UTD) group assignment number (1-189).
UTDSET(12)	Card	List of one to twelve UTDs assigned to a UTD group.
NEOH	Card	Number of items with nonuniform distributions (1-20), number of entries in EOHLST.
EOHLST(20)	Card	List of item codes of items with nonuniform distribution.
UWIDTH(7)	Card	Unit width for seven activity indexes.

Name	Source	Contents
UDEPTH(7)	Card	Unit depth for seven activity indexes.
NBANDS(7)	Card	Number of bands for seven activity indexes.
K	Card	Scale factor for multiplying times UWIDTH and UDEPTH before loading on data file 28.
JEOH	Card	Leftmost character of the three-character equipment item code; used to recognize the entry "P" as indicating personnel.
IEOH	Card	Two rightmost characters of the three-character item code.
IACT(4)	Card	List of one to four activity indexes.
PCENTS(4,4)	Card	The percentage of the total amount on hand of the item for each of the four possible bands and the four activity indexes listed in IACT.

c. Output Variables:

Name	Destination	Contents
KARD(20)	Print	Data card image buffer.
UDDTBL(189)	DF28	Unit dimensions and item distribution tables for one UTD group, one data file 28 record.
NEOH		UDDTBL(1) Number of entries in EOHLST.
EOHLST(20)		UDDTBL(2). List of item codes of equipment items with nonuniform distributions.
UWIDTH(7)		UDDTBL(22). Unit width for seven activity indexes.
UDEPTH(7)		UDDTBL(29). Unit depth for seven activities.
NBANDS(7)		UDDTBL(36). Number of bands for seven activity indexes.
PERSD(7)		UDDTBL(43). Packed distribution words for seven activity indexes.
EOHD(7,20)		UDDTBL(50). Packed distribution words for seven activity indexes and up to 20 equipment items as listed in EOHLST.

d. Logical Flow (Figure II-6-B-1):

(1) Blocks L50, 1, 2, 3, and L63. The logic in these blocks reads each data card using a character format, assigns a sequence number to each card image, prints a card image for each card, and stores each card image on a temporary storage file for subsequent processing and loading onto data file 28.

(2) Block 4. Rewind the temporary storage file to begin load program logic.

(3) Blocks L100, 5, 6, and 7. The outdated data file 28 is removed, a new data file 28 is created, and directory and record buffer arrays are zeroed and initialized before loading the data.

(4) Block L120. This block is the beginning of the loop to read each card image and store the data on data file 28.

(5) Block L200. If the card file number is not equal to 28 control transfers to block 8.

(6) Block L205. The record buffer array, UDDTBL, is zeroed prior to entering data.

(7) Block L210. Logic of this block branches control to the correct set of logic to read the data with the proper format and to intrepret and store it accordingly. The format code is contained in columns 74 and 75 of each data card and is part of the card identification.

(8) Block L999. If an error is detected in the data card formats or in card sequencing, control branches to this block, an error message is produced, and the load program is terminated.

(9) Block 8. The file number is checked for an end of file entry of 99 which indicates normal termination of the load procedure. If the entry is not equal to 99, an error message is produced indicating an improper card file number, and control transfers to block L999.

(10) Block L350. Following normal load procedure, when the last data card image has been entered into data file 28, the file directory records are entered on data file 28.

(11) Block L120. Logic for loading data from card identification 2801 begins by reading the card image from the temporary storage file with a 2801 format. This is the unit dimension and distribution grouping data.

(12) Blocks 9, 14, 17, and 19. Logic in these blocks ensures that the format used to read the data corresponds to the format code on the data card. If not, control is transferred to block L200.

(13) Block 10. The force indicator data entry is checked to ensure that the entry is either R or B. If not, control is transferred to block L999.

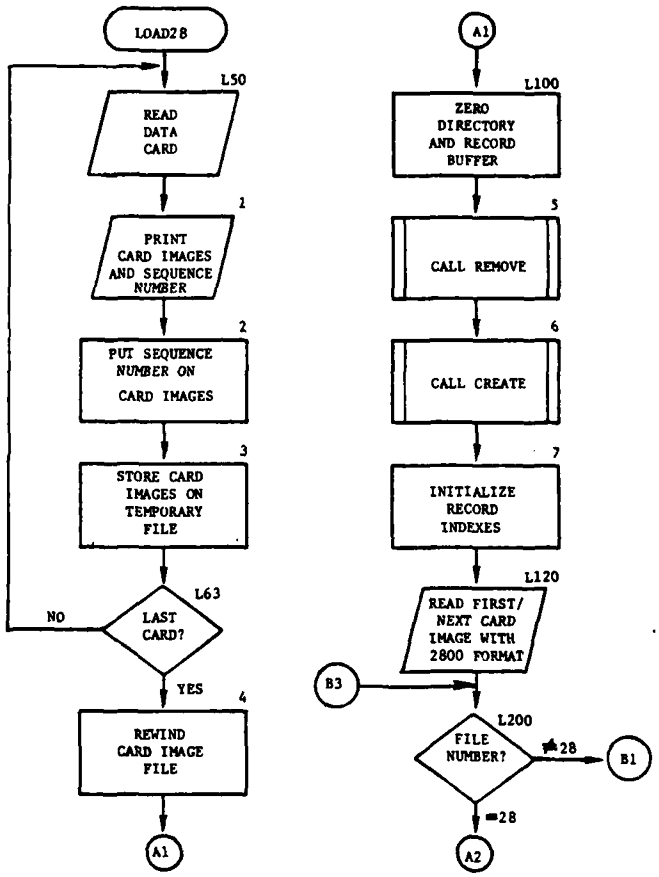


Figure II-6-B-1. Routine LOAD28 (Continued on Next Page)

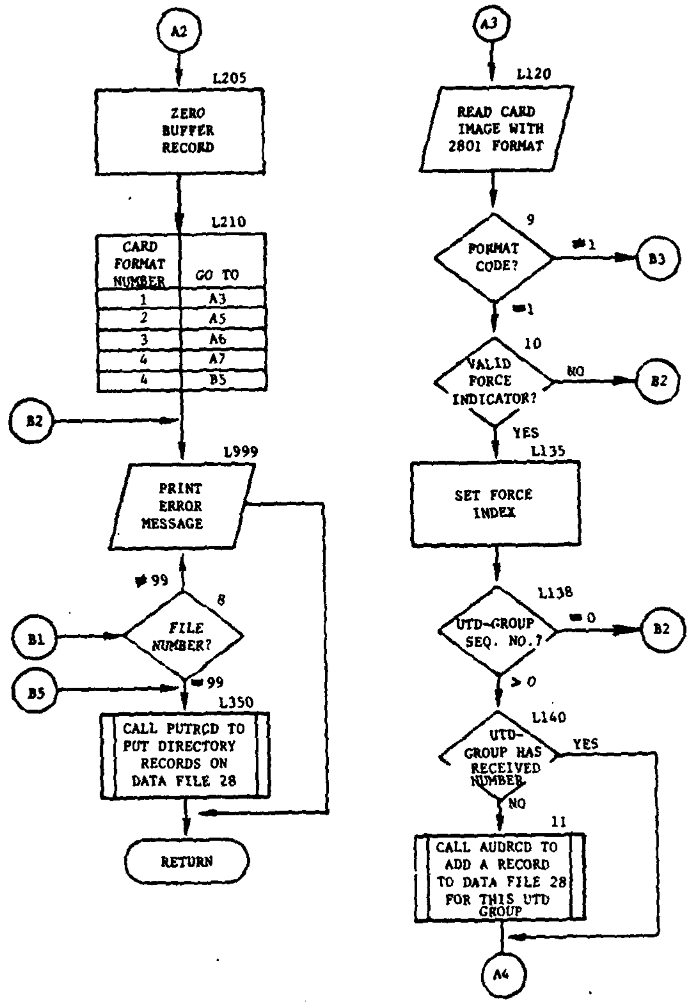


Figure II-6-B-1. Routine LOAD28 (Continued)

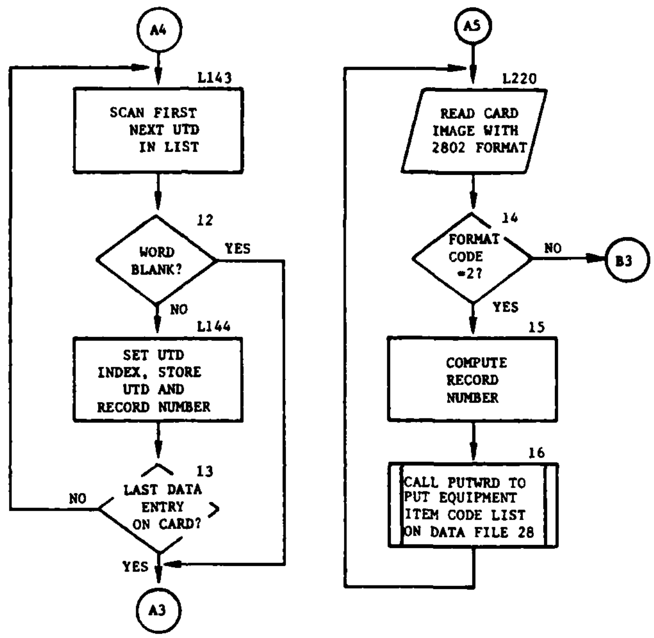


Figure II-6-B-1. Routine LOAD28 (Continued)

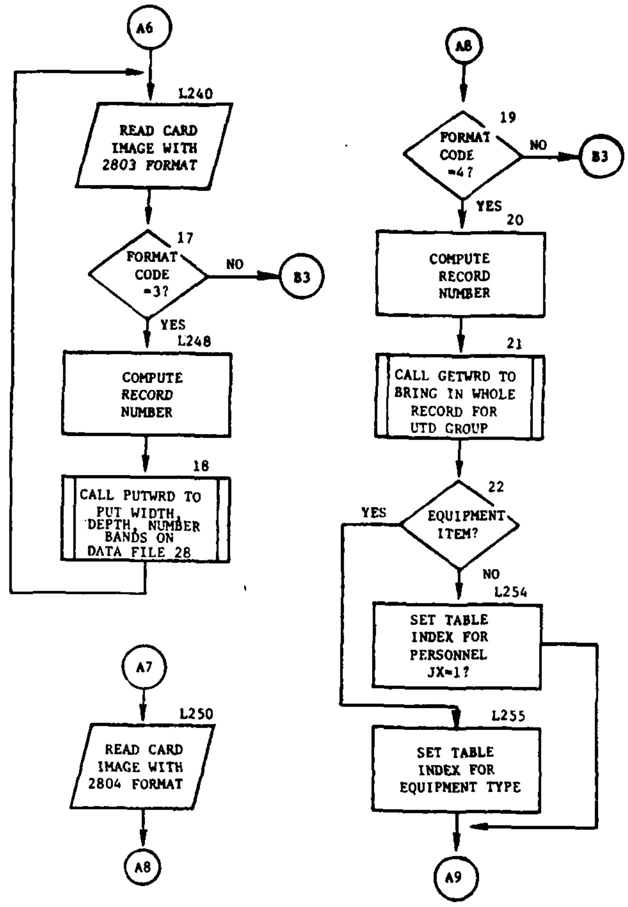


Figure II-6-B-1. Routine LOAD28 (Continued)

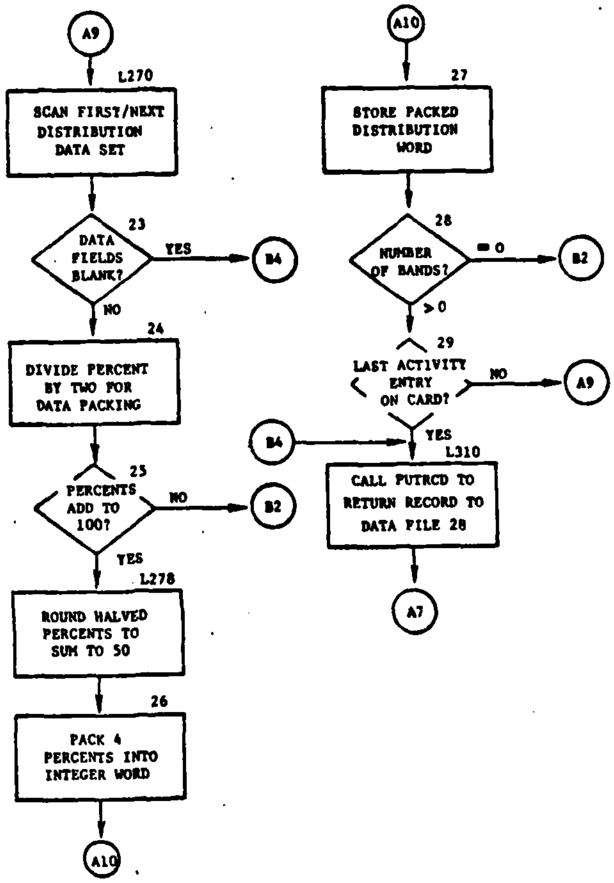


Figure II-6-B-1. Routine LOAD28 (Concluded)

(14) Block L135. The force indicator index, IFORCE, is set to 1 for Blue and to 2 for Red.

(15) Block L138. Each data card must contain the UTD group sequence number; otherwise, control is transferred to block L999.

(16) Blocks L140 and 11. As successive UTD groups identified on the data cards are loaded, each is assigned a record location on data file 28. The record index is stored in the directory array, IRECN.

(17) Blocks L143, 12, L144, and 13. Logic contained in these blocks reads each UTD in the data list, increments a UTD counter index, and stores the UTD with the record pointer index in the directory array, DRCTRY. The maximum number of UTDs allowed per force is 189.

(18) Block L220. Logic beginning with this block reads data entries on card identification 2802. Data contained therein are the list of equipment items that are to be nonuniformly distributed in the bands of units which have UTDs belonging to this UTD group. The data are stored in EOHLST(20) located at UDDTBL(2).

(19) Blocks 15 and 16. The record number on data file 28 is obtained by using the force index and UTD group sequence number as indexes to the array IRECN that was established previously. The data allow a maximum of 21 entries, the first of which is the number of items nonuniformly distributed, NEOH. Subsequent entries are the item codes of the items that are distributed, EOHLST. These entries are loaded onto data file 28.

(20) Block L240. Logic beginning with this block loads band and unit dimension data, NBANDS(7), UWIDTH(7), and UDEPTH(7), onto data file 28. The number of bands, NBANDS; width of unit, UWIDTH; and depth of unit, UDEPTH, are entered for each of seven activities. A scale factor, K, if entered in card columns 70-72, is applied to every width and depth entry for the UTD group sequence number.

(21) Blocks L248 and 18. The record index is obtained from IRECN, and the data arrays are loaded onto data file 28. Control then transfers to block L240.

(22) Block L250. This block begins the loop for loading the distribution data for personnel and equipment by bands. The data array filled is EOHD(7,20) and contains the packed distribution words for each of the equipment items in up to seven activities. The array is located at UDDTBL(50). Control is then transferred to block 19.

(23) Blocks 20 and 21. Once the record index has been established, the entire record is brought into the array, UDDTBL, and the distribution data are added to the array by subsequent logic.

(24) Blocks 22, L254, and L255. The first column of the equipment item code is read under a character format and the second two columns under an integer format. If the distribution is for personnel, the equipment item code entry has a character "P" in the first column or a zero in the third column. Data entries are loaded into UDDTBL(7,JX) where JX equals one for personnel and JX equals two through 20 for equipment items.

(25) Blocks L270 and 23. Each item is scanned beginning with this block until a blank entry for an activity code indicates the end of the data for this UTD group; then, control is transferred to block L310.

(26) Blocks 24, 25, L278, 26 and 27. The logic contained in these blocks performs two functions. The first is to check the data entries to ensure that the percentages sum to 100; if they do not, control transfers to block L999. The second is to pack the integer distribution percents into a single word for storage on data file 28. To store as a single word, each percent is first divided by two and rounded such that when unpacked, the sum will be 100. The percentages are each packed into six bits of a word. The packed record is stored in PCHAR(7) for each activity.

(27) Block 28. If the number of bands data entry is not greater than zero, control transfers to block L999.

(28) Block 29. If the last activity on the card has not been processed control returns to block L270.

(29) Block L310. After the last data entry on the card has been processed, the entire record array, UDDTBL, is replaced on data file 28 and control transfers to block L250.

4. ROUTINE DUMP28:

a. Purpose. DUMP28 produces a printed output listing of the contents of data file 28, unit dimensions and personnel and equipment distribution data.

b. Input Variables:

Name	Source	Contents
UDDTBL(189)	DF28	Unit dimension and distribution table.
NEOH		UDDTBL(1). Number of items with nonuniform distributions.
EOHLST(20)		UDDTBL(2). List of item codes of items with nonuniform distributions.
UWIDTH(7)		UDDTBL(22). Unit width for seven activity indexes.

Name	Source	Contents
UDEPTH(7)		UDDTBL(29). Unit depth for seven activity indexes.
NBANDS(7)		UDDTBL(36) Number of bands for seven activity indexes.
PERSD(7)		UDDTBL(43). Personnel distribution densities, packed, for seven activities.
EOH(7,20)		UDDTBL(50). Equipment item distribution densities, packed, for seven activities.
DTABL(756)		Data file 28 directory table.
DRCTRY(189,4)		DTABL(1). Data file 28 directory table.
UTDSB(189)		DTABL(1). Blue force UTD array.
UTDSR(189)		DTABL(379). Red force UTD array.
RECNB(189)		DTABL(190). Record pointer index for Blue data records corresponding to UTDs stored at same position in UTDSB.
RECNR(189)		DTABL(568). Record pointer index for Red data records corresponding to UTDs stored at same position in UTDSR.

c. Output Variables. Same as input variables.

d. Logical Flow (Figure II-9-B-2):

(1) Block 1. The data file 28 directory table, stored in the first four records on the file, is brought in and stored in DTABL.

(2) Block 2. The directory data stored in DTABL are printed for both forces.

(3) Block 3. This block initiates the loop on the two forces. The Blue force data are printed first, followed by the Red force data.

(4) Block L200. This block begins the loop to obtain data records from the file. Each record contains the data for one UTD group within the specified force being dumped.

(5) Block L400. Initial printout for each data record contains the record number, force identification, and list of UTDs characterized by the data in this UTD group record.

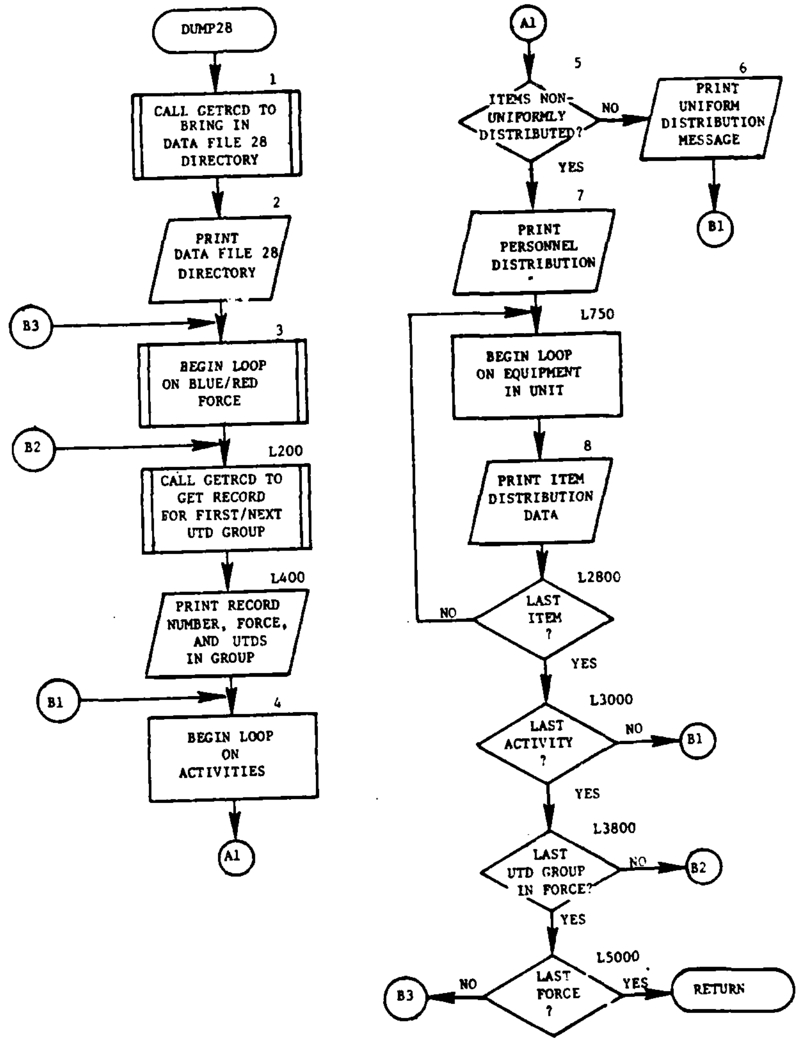


Figure II-6-B-2. Routine DUMP28

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
JUL 76

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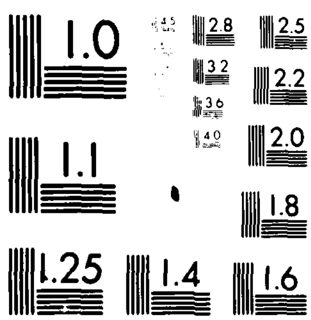

MICROCOPY RESOLUTION TEST CHART

(6) Block 4. The data in UDDTLB for the UTD group are printed for each activity. This block is the beginning of the loop on the activity index of the dimension and distribution data.

(7) Blocks 5, 6, and 7. Logic contained in these blocks screens the data for each activity and determines if nonuniform distributions for personnel or equipment items exist. If they do not, uniform distribution messages are printed; otherwise, the distribution data for personnel are printed and item distributions are computed in subsequent blocks. Personnel data are in array PERSD(7).

(8) Block L750. Scanning of equipment items nonuniformly distributed begins with this block.

(9) Block 8. The distribution data, including equipment item code and percent of equipment in each band, are printed for the equipment item being considered. Data are taken from array EOHD(7,20).

(10) Block L2800. This block completes the loop on equipment index in EOHD array.

(11) Block L3000. This block completes the loop on activity index in EOHD and PERDS arrays.

(12) Block L3800. This block completes the loop on UTD group (also data record) for the specified force.

(13) Block L5000. This block completes the loop on Blue and Red forces.

NOTES

APPENDIX C

UNIT GEOMETRY DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Three different printouts of constant data inputs are generated after the data have been read into the files. These printouts are as follows:

Printout Title	Data Source
80-Column Card Image Data File 28	Card data deck
Unit Type Designator Record Number Directory	Data file 28
Unit Descriptions	Data file 28

2. EIGHTY-COLUMN CARD IMAGE, DATA FILE 28. The format is illustrated in Figure II-6-C-1. At the far left, top line, of this figure are the characters B001, indicating that the data are for Blue forces and 001 is the index number assigned to that grouping of UTDs. In this case there is only one UTD in the group, PFLL as shown at the right of the B001. At the far right is card 1, indicating that the sequence number of the card is 1, and therefore is the first card in this identifier. The identifier of this card is in the second column from the right. The figures 2801 indicate that these are data for data file 28 in the 01 format.

3. UNIT TYPE DESIGNATOR RECORD NUMBER DIRECTORY. The second printout in the series lists the UTDs and the record number that contains the data for each UTD. This printout is shown in Figure II-6-C-2.

4. UNIT DESCRIPTIONS (Figure II-6-C-3). The data in this format are for only one force (in this case, the Blue force), and contain the description of the unit in terms of the dimensions and distribution of personnel and equipment as representative of stay, move, fire, and attack activities.

```
FILE-28 DATA CARD IMAGES

                                                                    2801 CARD     1
8001 PFLL                                                           2801 CARD     2
8002 JFLL PTLL PRCS                                                 2801 CARD     3
8003 ITCT IMCI                                                      2801 CARD     4
8004 KHLL                                                           2801 CARD     5
8005 JTCL                                                           2801 CARD     6
8006 KFLA TLLT JDCD IHMC JSCL IFLA JRLL JPLL ILLC IGCA              2801 CARD     7
8006 KDLF KPCA KCCA JFLT ILLT IGLA KVLA KSLA KALA JTLL              2801 CARD     8
8007 JRSF KMSF KPSF KFSF JCLC JALC JRLH                             2801 CARD     9
8008 JALL                                                           2801 CARD    10
8009 KHCD                                                           2801 CARD    11
8010 CSMH PWFH                                                      2801 CARD    12
8011 ICCC IACA IFCA                                                 2801 CARD    13
8012 OVLH                                                           2801 CARD    14
8013 KFLF JCCH JRCH                                                 2801 CARD    15
8014 KTLL KLLL JECF JACH IACC                                       2801 CARD    16
8015 RMCT JCMH                                                      2801 CARD    17
8016 KHFD                                                           2801 CARD    18
8017 JMFD                                                           2801 CARD    19
8018 KNFD                                                           2801 CARD    20
8019 AMLL                                                           2801 CARD    21
8020 APLL                                                           2801 CARD    22
8021 RTCT OTCL RPLT                                                 2801 CARD    23
8022 JTLT                                                           2801 CARD    24
8023 FSLL                                                           2801 CARD    25
8026 IFFA                                                           2801 CARD    26
8027 ICST ICSI                                                      2801 CARD    27
8028 JSCS JMLL JHLL KGCA KOCA KHCA KHCF JPLL KOCE JLC  KLLF         2801 CARD    28
8031 JRMH                                                           2801 CARD    29
8032 FDCS KNCD                                                      2801 CARD    30
8033 KFCA KMFA                                                      2801 CARD    31
8034 KGFA IGFA KTFA KHFA                                            2801 CARD    32
8035 KTTA                                                           2801 CARD    33
```

Figure II-6-C-1. Data File 28 80-Column Card Image

FILE-28 CONTAINS UNIT DIMENSION AND ITEM DISTRIBUTION DATA BY UNIT TYPE AND UNIT ACTIVITY

RECORDS 1 THRU 4 CONTAIN THE FILE-28 DIRECTORY FOR THE RECORD NUMBER OF EACH UTD GROUP

1	PFLL	JFLL	PTLL	PBCS	ITCT	IMCI	KHLL	JTCL	KDLA	ILLI	JDCD	IHMC	JSCL	IFLA	JALL	JPLL	ILLC	IGCA	KDLE	KRCA
	KCCA	JPLT	ILLT	IGLA	KVLA	KSLA	KALA	JTLL	JBSE	KMSE	KPSE	KFSE	JCLC	JALC	JALH	JALL	KHCD	PSMH	PWFH	ICCC
	IACA	IFCA	QVLH	KELF	JCCH	JBCH	KTLL	KLLL	JECF	JACH	IACC	PMCT	JCMH	KHFD	JAFD	KNFD	AMLL	APLL	BTCT	QTCL
	BBLT	JTLT	ESLL	IFFA	ICST	ICSI	JSCS	JMLL	JHLL	KGCA	KOCA	KHCA	KHCE	JRLL	KDCE	JLCL	KLLE	JBMH	EDCS	KNCD
	KBCA	KMFA	KGFA	IGFA	KTFA	KHFA	KTTA	PMFT	PMFI	ICCT	ITMT	ITMC	IMMI	KCSE	JCSE	KCLF	EAMT	EFFA	EGFA	FGFA
	FHFA	FIFA	FSFA	FMFA	FNFA	FBMI	JGFD	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000											
2	5	6	6	6	7	7	8	9	10	10	10	10	10	10	10	10	10	10	10	10
	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	12	13	14	14	15
	15	15	16	17	17	17	18	18	19	19	18	19	19	20	21	22	23	24	25	25
	25	26	27	29	29	29	30	30	30	30	30	30	30	30	30	30	30	31	32	32
	33	33	34	34	34	34	35	36	36	37	38	38	39	40	40	41	42	43	43	43
	43	43	43	43	43	44	45	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0											
3	BFCT	BACT	PDCA	LFIA	NBTJ	BRLT	RPLI	HASE	DRCT	GPMT	GIFD	GTLT	GIMC	GPMC	GFFA	GRFA	GMFA	HHFA	HJFA	HIFA
	DPCA	DHCA	DKCA	GHFA	GGFA	DACD	DDCD	DMCD	DTCA	DLCA	DNCA	DICA	GJFD	GIFD	GEFD	HAFD	GECE	HASE	MBSE	MESE
	MCSF	MDSE	MESE	DBCI	DMCA	GRMI	MAFI	MAFI	DBCJ	HBCJ	GLLI	DACA	GEFA	GKST	DACE	HATT	HESE	HGFA	HMFA	AALL
	ABLL	AACH	DAMT	EPMT	DFFA	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
	0000	0000	0000	0000	0000	0000	0000	0000	0000											
4	46	46	46	47	47	48	48	49	49	50	51	52	53	53	54	54	54	54	54	54
	55	56	56	57	57	58	58	58	58	58	58	58	59	59	59	59	60	60	60	60
	61	62	62	63	63	64	65	65	65	65	66	66	67	68	69	69	70	71	72	73
	74	74	75	76	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0											

Figure II-6-C-2. Unit Type Designator Record Number Directory

```
RECORD NUMBER   37 CONTAINS THE DESCRIPTION OF BLUE UNITS WITH THESE UTD*S :

                          ICCT

ACTIVITY INDEX  1 (STAY     )      WIDTH =   200 DEPTH =   200 NO. BANDS =  1

                                   PERSONNEL DISTRIBUTED UNIFORMLY AMONG BANDS
                                   EQUIPMENT DISTRIBUTED UNIFORMLY AMONG BANDS

ACTIVITY INDEX  2 (MOVE     )      WIDTH =    25 DEPTH =  1800 NO. BANDS =  1

                                   PERSONNEL DISTRIBUTED UNIFORMLY AMONG BANDS
                                   EQUIPMENT DISTRIBUTED UNIFORMLY AMONG BANDS

ACTIVITY INDEX  3 (FIRE     )      WIDTH =     0 DEPTH =     0 NO. BANDS =  0

                                   PERSONNEL DISTRIBUTED UNIFORMLY AMONG BANDS
                                   EQUIPMENT DISTRIBUTED UNIFORMLY AMONG BANDS

ACTIVITY INDEX  4 (ATTACK   )      WIDTH =   200 DEPTH =   400 NO. BANDS =  2

                                 PERSONNEL    DISTRIBUTION : 31310000 :   50 %   50 %
                                 ITEM CODE  8 DISTRIBUTION :   620000 :    0 %  100 %
                                 ITEM CODE 58 DISTRIBUTION :   620000 :    0 %  100 %
                                 ITEM CODE 63 DISTRIBUTION : 62000000 :  100 %    0 %
                                 ITEM CODE 65 DISTRIBUTION : 31310000 :   50 %   50 %
                                 ITEM CODE 66 DISTRIBUTION : 12500000 :   20 %   80 %
                                 ITEM CODE 67 DISTRIBUTION :   620000 :    0 %  100 %
                                 ITEM CODE 75 DISTRIBUTION :   620000 :    0 %  100 %

                                 ALL OTHER ITEMS DISTRIBUTED UNIFORMLY AMONG BANDS
```

Figure II-6-C-3. Unit Descriptions

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR UNIT GEOMETRY

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 7

INTELLIGENCE AND CONTROL DATA INPUT PROGRAMS

1. INTRODUCTION. The Intelligence and Control data input programs create and load the constant data files describing sensor characteristics and decision and communication tables. In addition, they create and initialize the dynamic unit intelligence files.

2. ROUTINES:

a. General. The Intelligence and Control data input programs consist of the four routines described below.

b. Routine INCSLD. Routine INCSLD reads the appropriate data from input cards and loads the decision and communication data tables. This routine also creates and initializes the dynamic unit intelligence files and the redundant report file. This routine calls routine SET20 to load the sensor data and routine DUMP36 to produce the formatted dump of the decision and communication tables.

c. Routine DUMP36. The decision and communication data are displayed in a formatted dump by routine DUMP36.

d. Routine SET20. The characteristics of all sensors to be included in the DIVWAG system are read from data cards and stored on the sensor data file by routine SET20. Routine DUMP20 is called at the completion of this process.

e. Routine DUMP20. A complete formatted dump of the contents of the sensor data file is produced by routine DUMP20.

3. FILES. The following data files are created and loaded by these routines:

- Sensor characteristics - data file 20
- Decision and communication tables - data file 36
- Unit intelligence files - data files 41, 42, and 43
- Redundant report file - data file 44

NOTES

APPENDIX A

INTELLIGENCE AND CONTROL DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for intelligence and control are documented in Appendix A, Intelligence and Control Model Input Requirements, to Chapter 6 of the Period Processor (Section IV).

NOTES

APPENDIX B

INTELLIGENCE AND CONTROL DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Routines INCSLD and SET20 are described in this appendix. Associated dump routines, DUMP36 and DUMP20, provide a formatted listing of data files 36 and 20 respectively.

2. ROUTINE INCSLD:

a. Purpose. INCSLD loads data file 36 with Intelligence and Control Model data and creates and zeroes data files 41, 42, 43, 44, and 45. The data loaded by this routine are the decision tables, delay times, unit size estimate and radius tables, and equipment type codes.

b. Input Variables:

Name	Source	Contents
C3601	Card	Card type 3601 containing delay times versus unit type designators (UTD), used to load UTDT (UTD table), PDT (processing delay time), and DDT (decision delay time).
C3602	Card	Card type 3602 consisting of equipment type code classification data.
C3603	Card	Card type 3603 containing data to load USET (unit size estimate table) and URT (unit radius table).
C3604	Card	Card type 3604 consisting of the threshold matrices for the dissemination of intelligence and associated information flow delay times.
ISA	DF41 DF42 DF43 DF44 DF45	An array filled with zeroes utilized to zero data files 41, 42, 43, 44, and 45.
FILE36	DF36	Data file 36 data loaded from cards by INCSLD routine.

d. Logical Flow (Figure II-7-B-1):

(1) Block 1. GETFLE is called to obtain the file name table (IFNT) to utilize the DIVWAG input/output package.

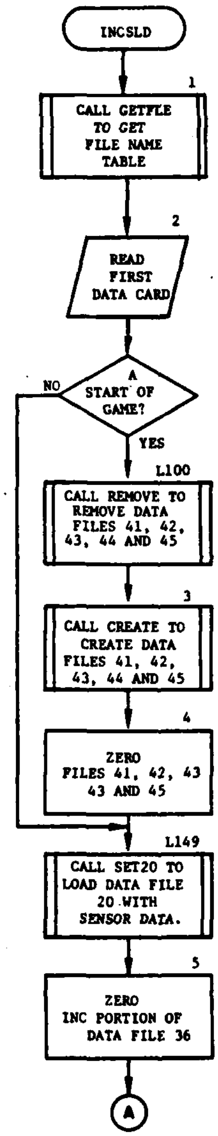

Figure II-7-B-1. Routine INCSLD (Continued on Next Page)

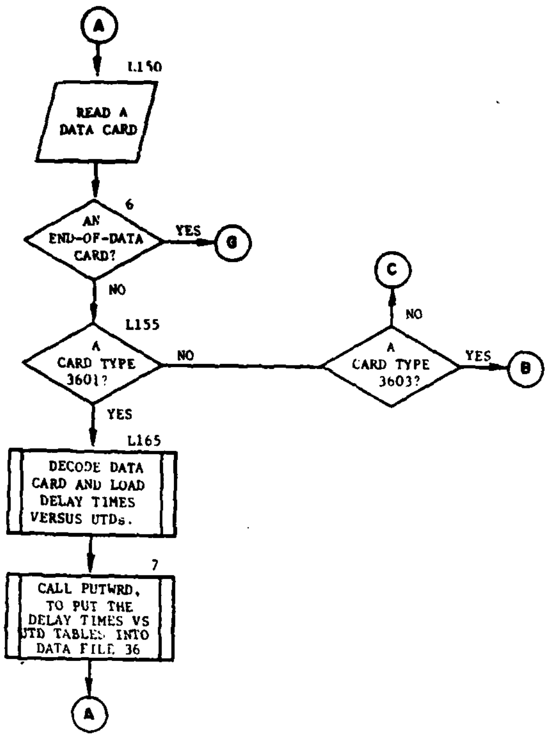

Figure II-7-B-1. Routine INCSLD (Continued)

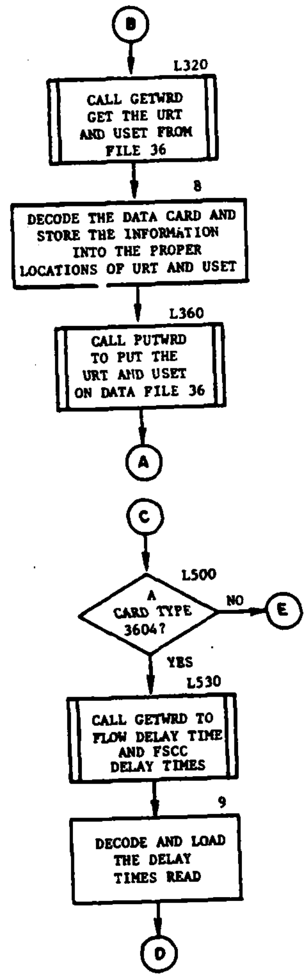

Figure II-7-B-1. Routine INCSLD (Continued)

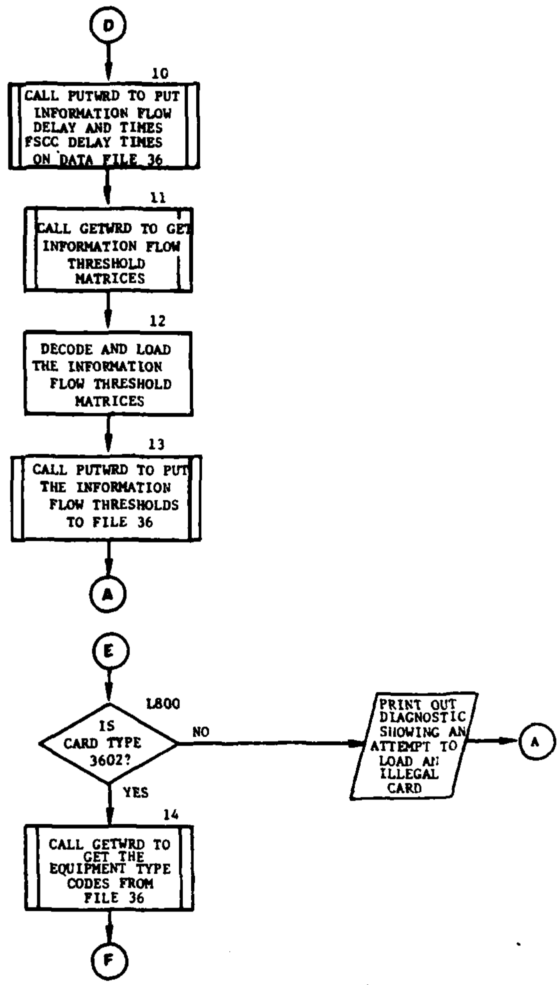

Figure II-7-B-1. Routine INCSLD (Continued)

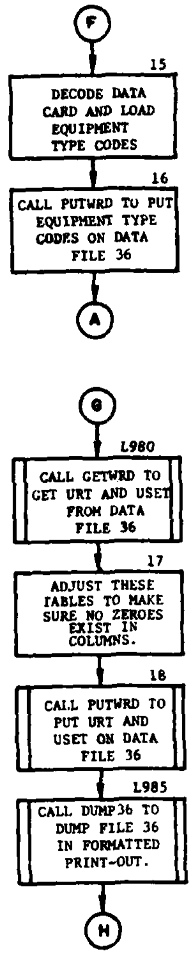

Figure II-7-B-1. Routine INCSLD (Continued)

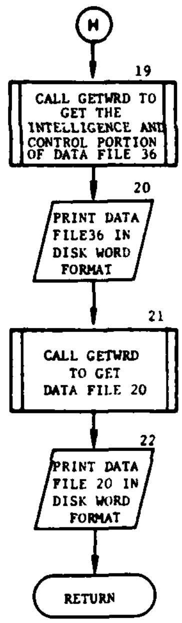

Figure II-7-B-1. Routine INCSLD (Concluded)

(2) Block 2. Read the first data card to determine if it is a game or period card. If it is a period card, control goes to block L149.

(3) Block L100. Routine REMOVE, is called to remove data files 41, 42, 43, 44, and 45 from the DIVWAG data system.

(4) Block 3. These same files are allocated the proper number of records and record size through a call to CREATE.

(5) Block 4. Data files 41, 42, 43, 44, and 45 are zeroed for proper utilization within the Intelligence and Control Model.

(6) Block L149. Through a call to the routine SET20 the sensor constant data are loaded into data file 20.

(7) Block 5. Zero the Intelligence and Control portion of data file 36 appropriately for a game or period load. (All data file 36 word locations are different for game or period loads.)

(8) Block L150. Read a data card under a (20A4) format.

(9) Block 6. If this is an end-of-data card (9999), control goes to block L980.

(10) Block L155. If this is not a card type 3601, control then goes to block L300.

(11) Block L165. Decode the data card into proper format to load the independent variable unit type designator table, IUTD, the decision delay time table, IDDT, and the processing delay time table, IPDT.

(12) Block 7. PUTWRD is called to place the delay times versus UTD arrays [IUTD(50), IDDT(50), IPDT(50)] to data file 36 and control returns to block L150.

(13) Block L300. If this is not a card type 3603, control goes to block L500.

(14) Block L320. The unit size estimate table USET(7,22), and the unit radius table, URT(7,11) are obtained from data file 36.

(15) Block 8. Decode the data card in the proper format and load the unit size estimate table and the unit radius table with the data from this card.

(16) Block L360. Replace the arrays USET and URT onto data file 36; control returns to block L150.

(17) Block L500. If this is not a card type 3604, control goes to block L800.

(18) Block L530. Obtain from data file 36 the information flow delay times (INFLO(5,5)), the attack helicopter and artillery range limits, and the request delay time for fire support (CAS, DAFS, or artillery).

(19) Block 9. Decode the data card in the correct format and load the delay times and range limits into their proper locations within the arrays.

(20) Block 10. Put the delay times and range limits back on data file 36.

(21) Block 11. Obtain from data file 36 the correct information flow threshold matrix according to the force and echelon in the card.

(22) Block 12. Decode and load into the threshold matrix the threshold values for communicating intelligence to a specific echelon.

(23) Block 13. Put the updated threshold matrix back on data file 36, and return control to block L150.

(24) Blocks L800 and L890. If this is not a card type 3602, print a diagnostic message showing an attempt to load an illegal card type and return control to block L150.

(25) Block 14. Otbain the equipment type code array, IEQPTY(50), from data file 36.

(26) Block 15. Decode and load the equipment type codes according to equipment item codes.

(27) Block 16. Replace the equipment type code array, IEQPTY(50), on data file 36; control returns to block L150.

(28) Block L980. Obtain the unit size estimate table and the unit radius table from data file 36.

(29) Block 17. Adjust these tables to ensure no zeroes are in their columns. (Nonzero tables are required by the Intelligence and Control Model.)

(30) Block 18. Replace the adjusted unit size estimate table and unit radius table on data file 36.

(31) Block L985. Call DUMP36 to print the contents of data file 36 in formatted printout.

(32) Block 19. Obtain the Intelligence and Control Model portion of data file 36.

(33) Block 20. Print the contents of data file 36 in a file word format for programmer use.

(34) Block 21. Obtain the sensor constant data loaded by SET20 from data file 20.

(35) Block 22. Print the contents of data file 20 in a file record format for programmer use.

3. ROUTINE SET20:

a. Purpose. Routine SET20 loads the sensor constant data of data file 20 (i.e., records 201 and above).

b. Input Variables:

Name	Source	Contents
C2001T1	Card	Card ID 2001, type 1, containing general radar constant data including maximum/minimum ranges, depth of scan, horizontal beam width, vertical beam width, scan rate, minimum radial velocity, distortion factor, detection error, range error, percent of equipment failure, percent of false alarm, power up and down times, and mean time to track.
C2001T2	Card	Card ID 2001, type 2, containing radar degradation factors. The factors are forestation factors, electronic countermeasure factors, and precipitation factors.
C2001T3	Card	Card ID 2001, type 3, consisting of the detection ranges and associated probabilities of detection and recognition of target types. For MTI radars, the following items are the target types: personnel, wheeled vehicles, tanks, armored personnel carriers, tube artillery, artillery missiles, air defense guns, and air defense missiles. For air defense radar, aircraft is the only target type.
C2001T4	Card	Card ID 2001, type 4, used to load constant data for unattended ground sensor fields. These data include target types and associated sensitive radii for three target types: personnel, wheeled vehicles, and tracked vehicles. Also loaded here is the percent of false alarms.

Name	Source	Contents
C2001T5	Card	Card ID 2001, type 5, consisting of the general radar data for countermortar/counterbattery radars which include tracking probability, low angle of fire and associated CEP, high angle of fire and associated CEP, low to high angle cutoff, horizontal beam coverage, vertical beam separaters, vertical beam thickness, percent equipment failure, maximum location error, power up and down times, operator performance time, and pick-up point wait time.
C2001T6	Card	Card ID 2001, type 6, containing the detection ranges of the countermortar/counterbattery radar against specific weapon/munition combinations.
C2001T7	Card	Card ID 2001, type 7, utilized to load the range brackets for movement of ground based sensors.
C2002T1	Card	Card ID 2002, type 1, utilized to load the sensor constant data for air reconnaissance type sensors.
C2002T2	Card	Card ID 2002, type 2, containing the reconnaissance sensor combinations.
C2002T3	Card	Card ID 2002, type 3, utilized to load the light observation helicopter decision table.
C2002T4	Card	Card ID 2002, type 4, containing the item code of the LOH or fixed wing reconnaissance aircraft, personnel on board, and delay time to prepare for subsequent reconnaissance missions.
C2002T5	Card	Card ID 2002, type 5, utilized to load the remaining equipment for a reconnaissance mission unit. Data consist of item codes and associated amounts.

c. Output Variables:

Name	Destination	Contents
FILE20	DF20	Records loaded into DIVWAG data file 20 from input cards described above.

d. Logical Flow (Figure II-7-B-2):

(1) Block 1. Read the first data card. If the load process is data update, control goes to block L99.

(2) Block 2. Call CREATE to ensure that data file 20 is allocated at the proper size.

(3) Block 3. Zero the 1000 records of data file 20, and control goes to block L10.

(4) Block L99. Otbain the 16 records containing the constant data information on UGS fields from data file 20. Control goes to block L10.

(5) Block L9. Put the four records of constant radar data into data file 20.

(6) Block L10. Read a data card under (20A4) format.

(7) Block 4. If this is an end-of-data card (9999), control goes to block L20.

(8) Block 5. If this is a 2001 card ID, control goes to block L90.

(9) Block 6. If this is a 2002 card ID, control goes to block L450.

(10) Block L20. Put the UGS field constant data (16 records) onto data file 20.

(11) Block 7. Put the sensor directory table onto data file 20.

(12) Block 8. Call routine DUMP20 to dump data file 20 in readable formats for user, and return control to the calling routine.

(13) Block L90. Print the card image previously read in format (20A4).

(14) Block 10. If this is a card type 4 (UGS field constant data), control goes to block L250.

(15) Block 11. Decode the first parameters on the data card which are used as the keyword to the sensor constant data and determine the proper record number on data file 20.

(16) Block 12. Get the designated record from data file 20.

(17) Block L115. If this is not card type 1 (general radar data for MTI or AD radar), control goes to block L200.

(18) Block L120. Decode the type 1 data card and store the information for general data for MTI or AD radar; control then goes to block L9.

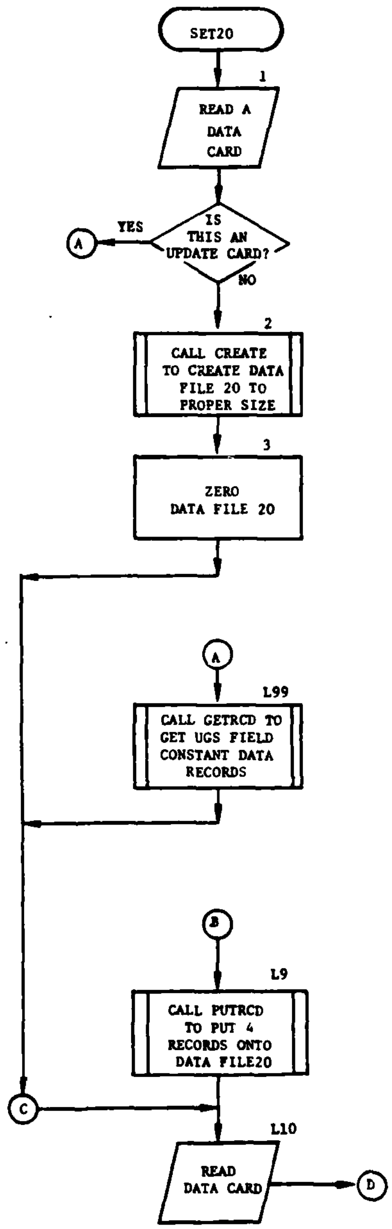

Figure II-7-B-2. Routine SET20 (Continued on Next Page)

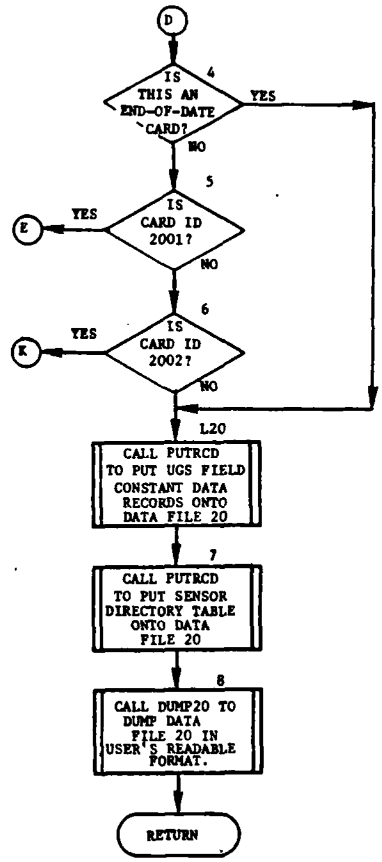

Figure II-7-B-2. Routine SET20 (Continued)

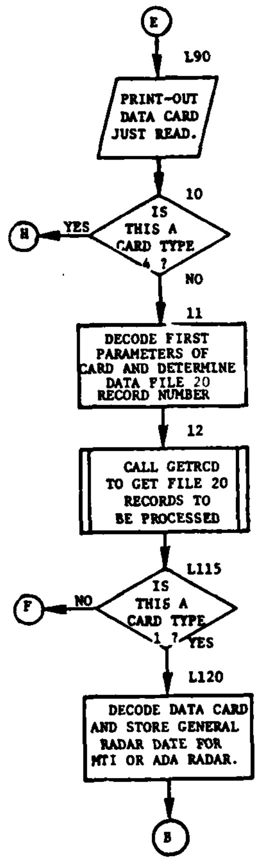

Figure II-7-B-2. Routine SET20 (Continued)

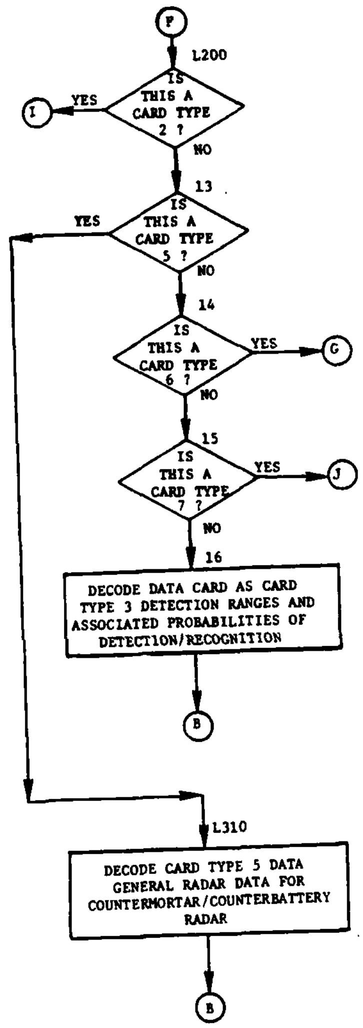

Figure II-7-B-2. Routine SET20 (Continued)

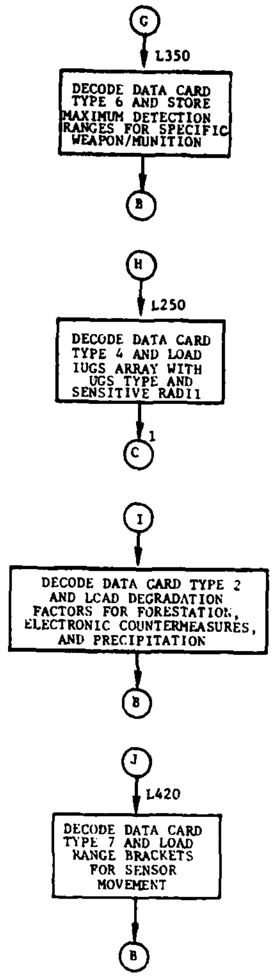

Figure II-7-B-2. Routine SET20 (Continued)

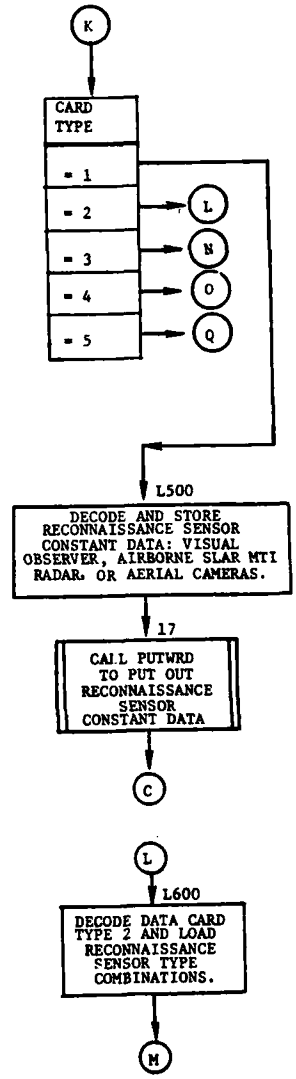

Figure II-7-B-2. Routine SET20 (Continued)

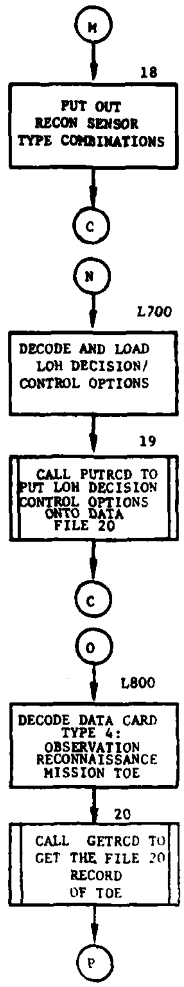

Figure II-7-B-2. Routine SET20 (Continued)

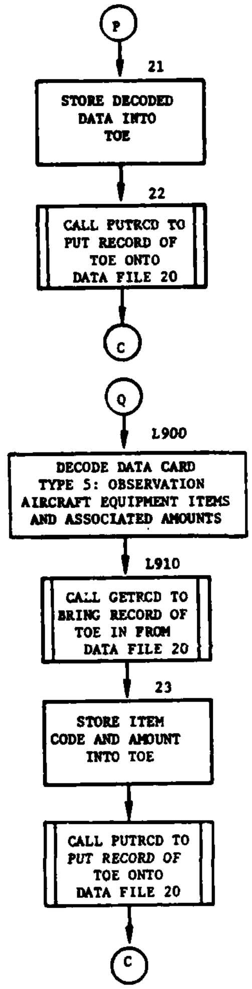

Figure II-7-B-2. Routine SET20 (Concluded)

(19) Block L200. If this is card type 2 (degradation factors), control goes to block L400.

(20) Block 13. If this is card type 5 (general radar data for countermortar/counterbattery radars), control then goes to block L310.

(21) Block 14. If this is card type 6 (maximum detection range for weapon/munition combination), control then goes to block L350.

(22) Block 15. If this is card type 7 (range brackets for sensor movement), control then goes to block L420.

(23) Block 16. Decode data card type 3 (detection ranges and associated probability of detection and recognition) and load these data for storage onto data file 20; control goes to block L9.

(24) Block L310. Decode data card type 5 and set up general countermortar/counterbattery radar data for storage onto data file 20; control goes to block L9.

(25) Block L350. Decode data card type 6 and load maximum detection ranges for specific weapon/munition combinations; control goes to block L9.

(26) Block L250. Decode data card type 4 and load IUGS array with UGS types and associated sensitive radii and percent of false alarms; control goes to block L10.

(27) Block L400. Decode data card type 2 and set up degradation factors for forestation, electronic countermeasures, and precipitation; then, control goes to block L9.

(28) Block L420. Decode data card type 7 and set up the range brackets for sensor movement; and, control goes to block L9.

(29) Block L450. If the card ID 2002 is type 1, control goes to block L500. If the card type is 2, control goes to block L600. If the card type is 3, control goes to block L700. If the card type is 4, control goes to block L800. If the card type is 5, control goes to block L900.

(30) Block L500. Decode and store reconnaissance sensor constant data (e.g., visual observer, airborne SLARMTI radar or aerial cameras).

(31) Block 17. Put the words containing the reconnaissance sensor constant data onto data file 20; control goes to block L10.

(32) Block L600. Decode data card type 2 and set up the reconnaissance sensor type combinations.

(33) Block 18. Put the reconnaissance sensor type combination arrays onto data file 20; and, control goes to block L10.

(34) Block L700. Decode data card type 3 and set up the LOH decision/control option array.

(35) Block 19. Put the LOH decision/control option array onto data file 20; control returns to block L10.

(36) Block L800. Decode data card type 4 and set up aircraft item code, number of personnel aboard, and delay time to prepare for subsequent reconnaissance missions.

(37) Block 20. Get the appropriate mission unit TOE from data file 20.

(38) Block 21. Store aircraft item code, number of personnel, and delay time into TOE array.

(39) Block 22. Put the TOE array back onto data file 20, and control goes to block L10.

(40) Block L900. Decode data card type 5 and set up remaining equipment item codes and associated quantities.

(41) Block L910. Bring the appropriate TOE array from data file 20.

(42) Block 23. Store the item codes and their associated quantities into the TOE array.

(43) Block 24. Put the TOE array back onto data file 20. Control goes to block L10.

APPENDIX C

INTELLIGENCE AND CONTROL DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. After the Red and Blue forces constant data input have been entered, a printout of these data is generated. The data in the printouts will be in three classes. The first is an 80-column image of the cards read in the data deck for INC. The second series is the file data, which has been formatted with columnar headings for easy reading. The third set of printouts is the dump of data files 20 and 36. The 80-column card image printout is designed to identify a card when updating is in order and facilitate the correction process. The file data in formatted form is suggested for use in verifying and validating data in the files. The third series of printouts is for programmer use in program check outs and is not discussed here. The list of constant data input printouts is shown in Figure II-7-C-1.

Printout Title	Data Source
80 Column Card Image	Data deck, INC
Constant Data on Sensors	Data file 20
Unattended Ground Sensors	Data file 20
Equipment Item Code for Target Category	Data file 36
SOP for Reporting Hostile Forces	Data file 36
Flow Delay Times	Data file 36
Processing and Decision Delay Times	Data file 36
Unit Size Based on Equipment and Personnel Counts	Data file 36
Target Inferences	Data file 36

Figure II-7-C-1. Printouts of Intelligence and Control Constant Data Input

2. EIGHTY-COLUMN CARD IMAGE. This printout is shown in Figure II-7-C-2. The top line at the far left has the characters 1B indicating that this is card type 1 for Blue forces. At the far right is the number 20[illegible] which is data file 20 with format 01. This card is general radar data, and the numbers entered on the top line would be interpret as follows: equipment item code 84, type of sensor is ground moving; maximum range was 18,280 meters, and so on.

3. CONSTANT DATA ON SENSORS. Figure II-7-C-3 illustrates this printout. The equipment item code of 84 is assigned this sensor with reference number of 201. The minimum and maximum ranges are shown, as was discussed for the card images. The card image data have been formatted and columnar headings applied so that it will be more readily understandable and can be used for validation checks. The follow on card labeled as general radar data continued also has its data displayed in this format. Errors or omissions detected here can then be traced to the appropriate card in the printout illustrated in Figure II-7-C-2 for remedial action.

4. UNATTENDED GROUND SENSORS. The illustration in Figure II-7-C-4 is for the Blue force. Data here can be traced to the card image in Figure II-7-C-2 to take remedial actions if needed. Headings for the various columns are similar to that for the card input format.

5. EQUIPMENT ITEM CODE FOR TARGET CATEGORY. Figure II-7-C-5 illustrates the format of this printout. At the far left the EOH column is the equipment item code. The target category for Blue force is shown in the center column, and that for Red is in the right column.

6. STANDING OPERATING PROCEDURE FOR REPORTING HOSTILE FORCES. These data (Figure II-7-C-6), from data file 36 were originally read from card type 1, ID 3604.

7. FLOW DELAY TIMES. The information from data file 36 on flow delay times is printed in the printout illustrated in Figure II-7-C-7. The data were originally read into data file 36 from card type 1, ID 3601.

8. PROCESSING AND DECISION DELAY TIMES. Figure II-7-C-8 illustrates the printout of data file 36 information. The data were initially read from card type 1, ID 3601. The data from this card were divided between the printout on flow delay times and this printout.

9. UNIT SIZE BASED ON PERSONNEL AND EQUIPMENT COUNTS. The printout is illustrated in Figure II-7-C-9. At the far left of the printout are the abbreviations for the various sized units that may be detected by radar in INC. PLA is for platoon sized unit, PLP is for platoon plus unit, and so on. The minimum and maximum is indicated beneath each of the headings.

```
1R 844  18280   450   900  130       24  35  90   4   10  2  3  35 25144  2001
1R 822  10000    50   600   44 159   80  27  70   4    7  5  4  10  2120  2001
1R 898 120000  1000120000   32     2133      85           5  3  35 25  7  2001
1R 592  10000    50   600   44       80  27  70  10   20  5  4  10  2120  2001
1R 554  50000   200  1000   25       83  35  90  20   10  2  3  11  1240  2001
1R 318  16500   500 16500   34      990      90   3   20  5  3   1  1 24  2001
1R 288  35000  1000 35000   44     2100      90   2  180  5  3  90 60 25  2001
2R  844 100 90 85 50 100 60 25 100 90 40                                  2001
2R  822 100 80 60 40 100 70  3 100 85 55                                  2001
2R  898 100100100100 100 95 40 100 95 40                                  2001
2R  592 100 80 60 40 100 70  3 100 85 55                                  2001
2R  554 100 90 85 50 100 60 25 100 90 40                                  2001
2R  318 100 90 85 50 100 60 25 100 90 40                                  2001
2R  288 100 90 85 50 100 60 25 100 90 40                                  2001
3R 841 97  2500 60  4500      2 98 11000 65 16000  8                      2001
3R 843 98 12000 60 17000 10   4 98 11000 60 17000  8                      2001
3R 845 97  8000 60 10000  5   6 97 11000 60 16000  5                      2001
3R 847 97  8000 60 10000 10   8 97 11000 55 16000  5                      2001
3R 821 99  2500 97  5000      2 99  4500 65  8000  5                      2001
3R 823 99  4500 65  8500  5   4 99  4500 65  8500  5                      2001
3R 825 97  4000 60  7000  5   6 98  4000 65  7000  5                      2001
3R 827 97  4000 50  7000  3   8 98  4000 65  7000  5                      2001
3R 899 99 45000 98100000 80   2 99  4500 65  8000  5                      2001
3R 591 99  2500 97  5000      2 99  4500 65  8000  5                      2001
3R 551 99  2500 97  5000      2 98 11000 65 16000  8                      2001
3R 319 99  5000 98 16000 80                                               2001
3R 289 99 10000 98 35000 80                                               2001
3R 593 99  4500 65  8500  5   4 99  4500 65  8500  5                      2001
3R 553 98 12000 60 17000 10   4 98 11000 60 17000  8                      2001
3R 595 97  4000 60  7000  5   6 98  4000 65  7000  5                      2001
3R 555 97  8000 60 10000  5   6 97 11000 60 16000  5                      2001
3R 597 97  4000 50  7000  3   8 98  4000 65  7000  5                      2001
3R 557 97  8000 60 10000 10   8 97 11000 55 16000  5                      2001
4R   TEST 1 01  1  1002  2003  150   TEST 2  02  1   802   603   90       2001
4R  TEST 3  01  1  2002  3003  100   TEST 4  02  1   902  1103  150       2001
```

Figure II-7-C-2. INC 80-Column Card Image

SENSOR REFERENCE NUMBER 201 EQUIPMENT ITEM 84 SENSOR TYPE 4

SENSING RANGE LIMITS IN METERS --- MAXIMUM 18280 MINIMUM 450

ROTATION RATE IN REVS / MIN 0

SCAN RATE IN MILS / SEC 23

RADAR BEAM --- HORIZONTAL WIDTH IN MILS 179
DEPTH IN METERS 900

TIME NEEDED IN MINUTES -- POWER UP 23 POWER DOWN 35

MEDIAN TIME TO TRACK A TARGET AND GENERATE INFORMATION IN SECONDS 144

PERCENT DOWN TIME 2
DEFLECTION ERROR IN MILS 3
RANGE ERROR AT TARGET LOCATION IN METERS 10

	RANGES IN METERS		PROBABILITY OF COLLECTION AT GIVEN RANGES			
	KNEE	ANKLE	MIN	KNEE	ANKLE	MAX
PEOPLE	2500	4300	97	60	0	0
WHEELED VEHICLES	11000	16000	98	65	8	0
TANKS	12000	17000	98	60	10	0
APCS	11000	17000	98	60	8	0
ARTY TUBES	8000	10000	97	60	5	0
ARTY MISSLES	11000	16000	97	60	5	0
ADA GUNS	8000	10000	97	60	10	0
ADA MISSLES	11000	16000	97	55	5	0

PRECIPITATION FACTORS -- NONE 100 LIGHT 90 HEAVY 40
ECM FACTORS NONE 100 SOME 60 MORE 25
FORESTRATION FACTORS -- NONE 100 SPARSE 90 MODERATE 85 DENSE 50
FALSE ALARM PROBABILITY 3
RESULTS RELIABILITY FACTOR 90

Figure II-7-C-3. Constant Data on Sensors

UNATTENDED GROUND SENSORS FOR BLUE

SENSOR TYPE	TARGET	RANGE	TARGET	RANGE	TARGET	RANGE	FALSE ALARM PERCENT
1	1	100	2	200	3	150	0
2	1	80	2	60	3	90	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0

Figure II-7-C-4. Unattended Ground Sensors for Blue Force

CODE LETTER BY EOH

EOH	BLUE	RED
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	C	F
21	0	0
22	0	0
23	C	J
24	0	B
25	0	0
26	0	J
27	G	B
28	0	0
29	E	0
30	0	I
31	0	0
32	E	T
33	0	0
34	0	0
35	0	0
36	0	0
37	0	F
38	0	B
39	I	0
40	0	0
41	K	0
42	0	F
43	K	0
44	0	F

Figure II-7-C-5. Equipment Item Code for Target Category

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BATTALION

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	5	99999	99999	99919	21	19	10	6
BRIGADE	3	99999	99999	99999	4	4	5	2
BATTALION	3	99999	99999	99919	4	4	10	2
DIV ARTY	99999	99999	99999	99999	99999	99999	99999	99999
DIR SUPPT	3	99999	99999	99999	999	4	5	2

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	5	99999	99999	99999	35	10	12	19
BRIGADE	3	99999	99999	99999	10	6	4	10
BATTALION	3	99999	99999	99999	10	6	4	10
DIV ARTY	99999	99999	99999	99999	99999	99999	99999	99999
DIR SUPPT	3	99999	99999	99999	10	6	4	10

BRIGADE

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	5	99999	99999	99999	21	19	10	6
BRIGADE	6	99999	99999	99999	21	19	10	6
BATTALION	3	99999	99999	99999	4	4	5	2
DIV ARTY	5	99999	99999	99999	999	19	10	6
DIR SUPPT	3	99999	99999	99999	999	4	5	2

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	5	99999	99999	99999	35	10	13	19
BRIGADE	3	99999	99999	99999	10	6	4	10
BATTALION	3	99999	99999	99999	10	6	4	10
DIV ARTY	3	99999	99999	99999	10	6	4	10
DIR SUPPT	3	99999	99999	99999	10	6	4	10

DIVISION

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	99999	99999	99999	99999	99999	99999	99999	99999
BRIGADE	5	99999	99999	99999	21	19	10	6
BATTALION	99999	99999	99999	99999	99999	99999	99999	99999
DIV ARTY	5	99999	99999	99999	999	19	10	6
DIR SUPPT	99999	99999	99999	99999	99999	99999	99999	99999

	SIZE	TYPE	ACT	PERS	TANKS	APC	TUBES	WEAPONS
DIVISION	99999	99999	99999	99999	99999	99999	99999	99999
BRIGADE	3	99999	99999	99999	10	6	4	10
BATTALION	99999	99999	99999	99999	99999	99999	99999	99999
DIV ARTY	3	99999	99999	99999	10	6	4	10
DIR SUPPT	99999	99999	99999	99999	99999	99999	99999	99999

Figure II-7-C-6. Standing Operating Procedure for Reporting Hostile Forces

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FLOW DELAY TIMES

	DIVISION	BRIGADE	BATTALION	DIV-ARTY	DIR-SUPT
DIVISION	0	3100	2600	0	0
BRIGADE	730	960	2400	0	0
BATTALION	0	960	620	0	0
DIV-ARTY	730	960	0	0	200
DIR-SUPT	0	960	620	100	0

DELAY TIME - DAFS - CAS - ARTY BLUE
1000 2000 100

DELAY TIME - DAFS - CAS - ARTY RED
0 2000 100

	DIVISION	BRIGADE	BATTALION	DIV-ARTY	DIR-SUPT
DIVISION	0	3100	2600	0	0
BRIGADE	730	960	2400	0	0
BATTALION	0	960	620	0	0
DIV-ARTY	730	960	0	0	200
DIR-SUPT	0	960	620	100	0

Figure II-7-C-7. Flow Delay Times

UTD	PDT	DDT	BLUE
BAMT	0	3100	
CCMT	0	1400	
ECMC	0	500	
EAMT	0	500	
EBMI	0	500	
	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	
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0000	0	0	
0000	0	0	
0000	0	0	
0000	0	0	

Figure II-7-C-8. Processing and Decision Delay Times

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BLUE

	INFANTRY MIN	INFANTRY MAX	ARMOR MIN	ARMOR MAX	MECH MIN	MECH MAX	RTF TANK MIN	RTF TANK MAX	RTF APC MIN	RTF APC MAX	TUBES MIN	TUBES MAX	MSSL MIN	MSSL MAX	GUNS MIN	GUNS MAX	AJA MSSL MIN	AJA MSSL MAX	ACFT MIN	ACFT MAX	VEH MIN	VEH MAX
PLA	0	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
PLP	0	0	2	2	2	2	0	0	0	0	1	1	0	0	1	1	0	0	0	0	1	1
CO	0	0	3	9	3	9	0	0	0	0	1	6	0	1	1	2	0	1	1	4	1	10
COP	0	0	10	20	10	18	0	0	0	0	7	10	1	2	3	6	1	2	5	8	11	20
BNH	0	0	21	31	19	29	0	0	0	0	10	24	2	6	6	10	2	6	9	16	21	40
BNP	0	0	32	63	30	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BDE	0	0	64	95	59	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure II-7-C-9. Unit Size Based on Equipment and Personnel Counts

10. TARGET INFERENCES. The printout for target inferences is illustrated in Figure II-7-C-10. The Intelligence and Control logic first asks for the size of the unit based on count of personnel and equipment. When this has been obtained, then the unit size is further examined in terms of the normal interval between the senior and subordinate units. It is this normal interval that is expressed in meters here. The information from the file was initially read in from card types 1 and 2, ID 3603.

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BLUE

	INFANTRY	ARMOR	MECH	RTF TANK	RTF APC	TUBES	MSSL	GUNS	ADA MSSL	ACFT	VEH
PLA	0	0	0	0		0	0	0	0	0	0
PLP	0	0	0	0		0	0	0	0	0	0
CO	0	600	600	0		300	300	300	300	300	300
COP	0	1200	1200	0		500	700	700	700	500	500
BNH	0	2300	2300	0		800	1200	1200	1200	800	800
BNP	0	5000	5000	0		0	0	0	0	0	0
BDE	0	8000	8000	0		0	0	0	0	0	0

Figure II-7-C-10. Target Inferences

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR INTELLIGENCE AND CONTROL

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 8

GROUND COMBAT DATA INPUT PROGRAMS

1. INTRODUCTION. The Ground Combat data input programs create and load the data file used by the Ground Combat Model. The data include tables describing weapon characteristics, sensor distribution, and equipment and personnel losses for attackers and defenders in a ground combat situation.

2. ROUTINES:

a. General. The Ground Combat data input programs are composed of the routines described as follows.

b. Routine GCMLD. This routine has the responsibility of reading and editing the data cards, storing the data on the file, and calling the file dump routine DUMP39. It is supported by utility routines AROTE, LINEAR, SPP, and FLIP.

c. Routines AROTE, LINEAR, SPP, and FLIP. Routine AROTE determines the presented area of a double box combination after being rotated through a specific angle. LINEAR performs a linear least squares fit to a set of points, and determines the slope and Y intercept of the resulting line segment. SPP determines the coefficients a and b in the expression $f(r,t = 10) = ae^{-br}$ and FLIP initializes the second record of data file 39.

d. Routine DUMP39. This routine is used to provide a formatted dump of the data file.

3. FILES. The following data file is loaded by these routines.

- Ground combat data - data file 39

NOTES

APPENDIX A

GROUND COMBAT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for Ground Combat are documented in Appendix A, Ground Combat Model Input Requirements, to Chapter 7 of the Period Processor (Section IV).

NOTES

APPENDIX B

GROUND COMBAT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Data for the Ground Combat Model are loaded on data file 39. Loading is accomplished by routine GCMLD and supporting routines AROTE, LINEAR, SPP, FLIP, and DUMP39.

2. ROUTINE GCMLD:

a. Purpose. Routine GCMLD identifies errors in the constant data and prints a diagnostic message if an error is found. The routine branches to the proper logic for various data types, and stores each data item in the proper location after data manipulation, if required.

b. Input Variables:

(1) Data file 39 variables.

(2) Other variables:

Name	Source	Contents
ICARD(20)	Card	Data card image.

c. Output Variables:

Name	Destination	Contents
IDAT(6000)	DF39	Array containing data to be placed on data file 39.

d. Logical Flow (Figure II-8-B-1):

(1) Block 1 and 1A. Obtain the file name table; create data file 39 with two records containing 14,258 words each and data file 21 with 105 records containing 256 words each.

(2) Block 2. Sensor type 1, unaided visual detection, which is not defined by input, is designated as applicable to both day and night detection.

(3) Block L100. Each data card is read as alphanumeric characters.

(4) Block 3. Part of the printed output of GCMLD is a list of card images. Each card image is printed at this time.

(5) Block 4. If card identification does not equal 9999, control goes to block L102.

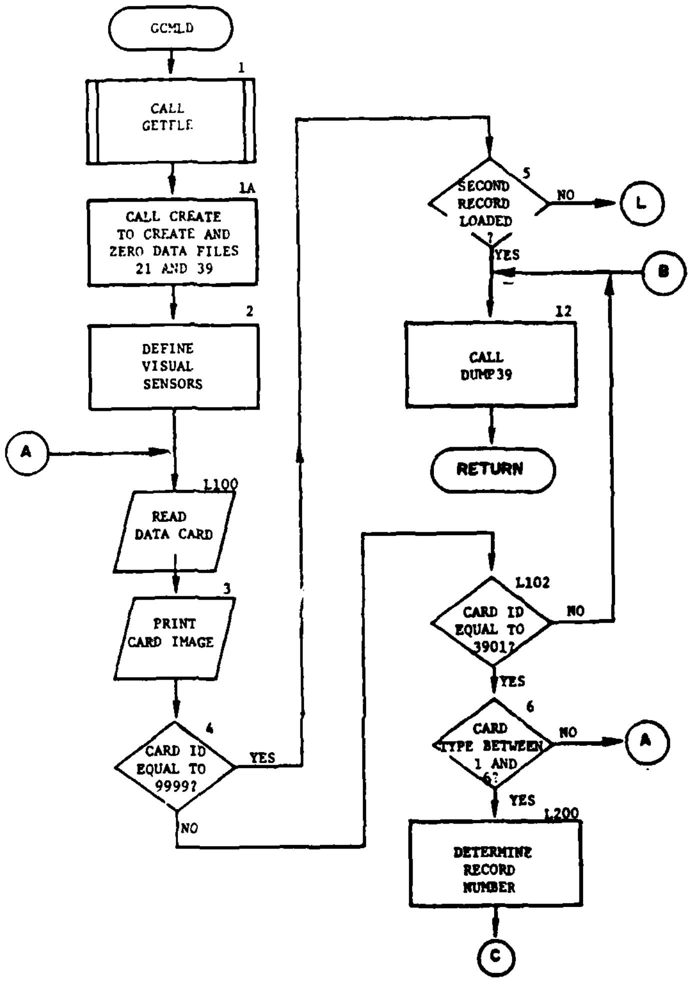

Figure II-8-B-1. Routine GCMLD (Continued on Next Page)

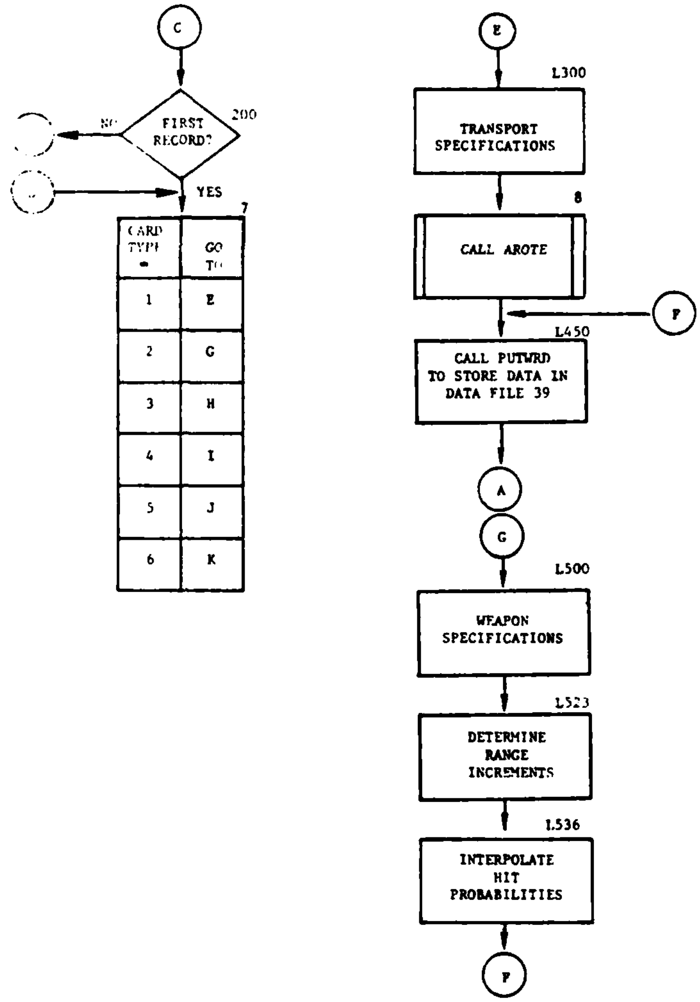

Figure II-8-B-1. Routine GCMLD (Continued)

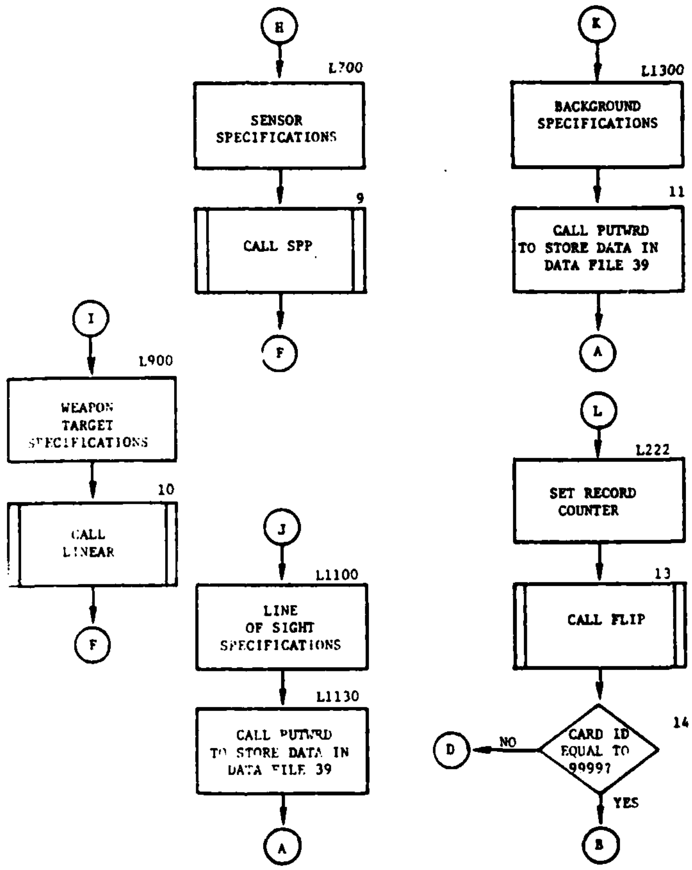

Figure II-8-B-1. Routine GCMLD (Concluded)

(6) Block 5. If the second record has not yet been loaded, control goes to block L222; otherwise, to block 12.

(7) Block 12. This block completes input. Complete the output by calling DUMP39; control returns to calling routine.

(8) Block L102. Any card identification other than 3901 will cause processing to be terminated.

(9) Block 6. If the card type is less than one or greater than six a diagnostic message is printed and another card is read.

(10) Block L200. If the data designate Blue as the defender or Red as the attacker (data for the second record), control goes to block L222; otherwise, it continues to block 7.

(11) Block 7. Control branches to the logic for the particular card type.

(12) Blocks L300, 8, and L450. Decode the data according to transport system format specification, compute the presented area following a 30-degree rotation by a call to AROTE, and store the data in the proper record of data file 39. Control then returns to block L100.

(13) Blocks L500, L523, and L536. Decode the data according to weapon system format specification. The range values in this set of data are scanned to determine the smallest (minimum range) and largest (maximum range). The resulting range interval is subdivided into five equal increments and a linear interpolation is performed on the hit probability data to determine the value corresponding to each range increment. Control is transferred to block L450.

(14) Blocks L700 and 9. Decode the data according to sensor format specification and determine the performance parameters required by the Ground Combat Model calling SPP. Control is transferred to block L450.

(15) Blocks L900 and 10. Decode the data according to weapon-target format specification. Using a least squares linear fit by calling LINEAR to determine the slope and Y intercept of the $P_{K/H}$ line segment. Control is then transferred to block L450.

(16) Blocks L1300 and L1130. Decode the data according to line of sight format specification and store it in both records of data file 39. Transfer control to block L100.

(17) Blocks L1300 and 11. Decode the data according to background format specification and store it in both records of data file 39. Transfer control to block L100.

(18) Blocks L222 and 13. The data for one record is complete. By calling FLIP, interchange all attacker and defender data to initialize the next record.

(19) Block 14. If the card ID is 9999, the second record is the reverse of the first. Store it and terminate; otherwise, some data in the second record require redefinition. Go to block 7.

3. ROUTINE AROTE:

a. Purpose. AROTE determines the presented area of a double box combination after being rotated through a specified angle.

b. Input Variables:

Name	Source	Contents
IDIM(6)	Call	Length, width, and height of two boxes.
IDEG	Call	Angle, in degrees, through which the box combination is to be rotated.

c. Output Variables:

Name	Destination	Contents
ANS	Call	Presented area, following rotation.

d. Processing Description. AROTE multiplies each horizontal dimension of each box by the appropriate sine or cosine of the angle, and takes the product of these resulting projected dimensions with the height. The presented area is determined by summing the area of each box.

4. ROUTINE LINEAR:

a. Purpose. LINEAR performs a linear least squares fit to a set of points, and determines the slope and Y intercept of the resulting line segment.

b. Input Variables:

Name	Source	Contents
N	Call	Number of coordinate sets in the array of input points.
XY(6,3)	Call	Array of input points.

c. Output Variables:

Name	Destination	Contents
A	Call	Y intercept.
B	Call	Slope.

d. Processing Description. LINEAR calculates the slope and Y intercept using the following equations:

$$\text{Slope} = \frac{\sum_{i=1}^{N} X_i Y_i - \frac{1}{N} \sum_{i=1}^{N} X_i \sum_{i=1}^{N} Y_i}{\sum_{i=1}^{N} (X_i)^2 - \frac{1}{N}\left(\sum_{i=1}^{N} X_i\right)^2} \qquad \text{II-8-B-1}$$

$$\text{Y intercept} = \frac{\sum_{i=1}^{N} Y_i - (\text{Slope}) \sum_{i=1}^{N} X_i}{N} \qquad \text{II-8-B-2}$$

5. ROUTINE SPP:

a. Purpose. SPP determines the coefficients a and b in the expression $f(r,t = 10) = ae^{-br}$ given the value of the function for two values of r at arbitrary t assuming the relation $f(r,t) = 1 - [1 - f(r,t = 10)]^{t/10}$.

b. Input Variables:

Name	Source	Contents
IHOLD(10)	Call	Two values of r with the value of the function evaluated at each r and the value of t.
NSENTD	Call	Pointer to the location in DSPP where output values are to be stored.

c. Output Variables:

Name	Destination	Contents
DSPP(10,4)	Call	Output array giving, for each value of NSENTD, the calculated values of a and b as well as the values of r for which the function ae^{-br} attains the values of 0.9999 and 0.0001.

d. Processing Description. SPP evaluates the expressions:

$$b = \frac{\ln\left\{1 - [1 - f(r_2,t)]^{10/t}\right\} - \ln\left\{1 - [1 - f(r_1,t)]^{10/t}\right\}}{r_1 - r_2} \qquad \text{II-8-B-3}$$

$$a = e^{br1} [1 - \{1 - f(r_1,t)\}^{10/t}]$$

6. ROUTINE FLIP:

a. Purpose. FLIP initializes the second record of data file 39.

b. Input Variables:

Name	Source	Contents
I(10)	Call	One of two arrays to be interchanged.
J(10)	Call	One of two arrays to be interchanged.
K	Call	Number of words in the pair of arrays to be interchanged.

c. Output Variables:

Name	Destination	Contents
I(10)	Call	Interchanged array.
J(10)	Call	Interchanged array.

d. Processing Description. FLIP interchanges the first K words of arrays I and J.

7. ROUTINE DUMP39:

a. Purpose. DUMP39 provides a formatted output capability to the loading program. It is designed to display the contents of both records of data file 39 in tabular form.

b. Input Variables:

Name	Source	Contents
FILE39(6000)	DF39	Ground Combat Model constant data.

c. Output Variables. Individual data file 39 variables.

d. Logical Flow (Figure II-8-B-2):

(1) Block 1. The record to be output is obtained from data file 39.

(2) Blocks 2 and L100. Environmental data are printed only in conjunction with the first record. The data are identical with that in the second record and are not repeated. Included are the line of sight parameter, background reflectance, and sky/ground ratio tables.

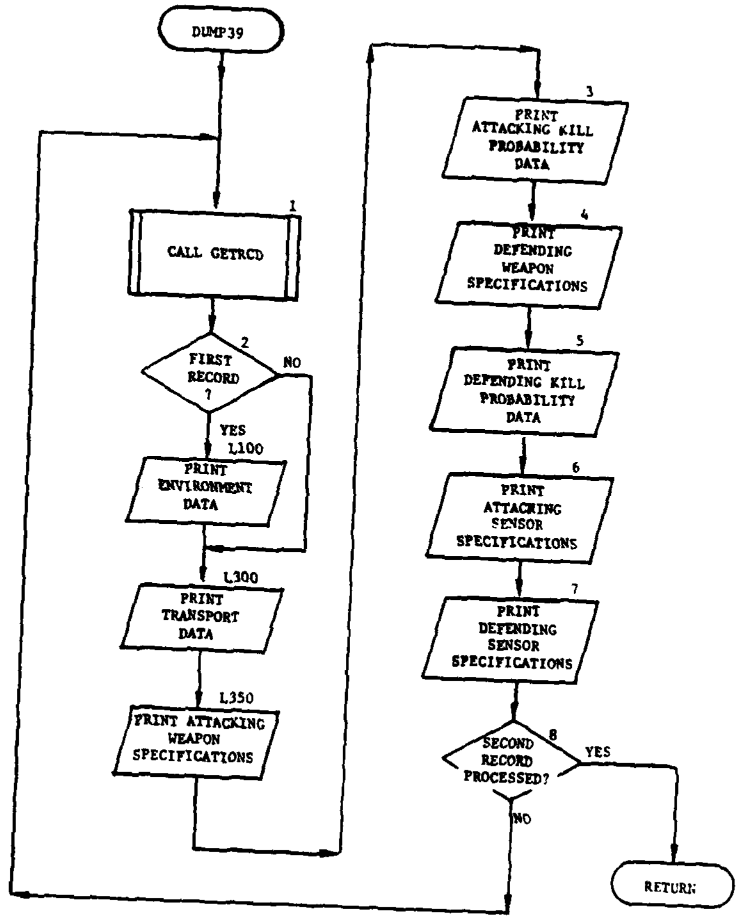

Figure II-8-B-2. Routine DUMP39

(3) Block L300. Print transport specifications for each force including transport area, type, reflectance, probability of being pinpointed, and the number of associated personnel.

(4) Block L350. Print attacking weapon specifications including range capabilities, delivery times, firing rates, NATO hit probabilities, and target priorities.

(5) Block 3. Print slopes and Y intercepts of kill probability line segments for attacking weapons against defending targets.

(6) Blocks 4 and 5. Print data for defending weapons specified in blocks L350 and 3.

(7) Blocks 6 and 7. Print sensor specifications for each force including sensor utilization and sensor performance parameters.

(8) Block 8. If both records have not been processed, transfer control to block 1 for the second record; otherwise, return control to calling routine.

APPENDIX C

GROUND COMBAT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. The input of Ground Combat constant data in the DIVWAG Model results in the generation of a series of output reports. Three types of output reports are printed: the 80-column card image, the formatted data from data file 39, and the data file 39 dump. The file printouts are listed in Figure II-8-C-1.

Printout Titles	Data Source File
80-Column Card Image	Ground Combat Data Deck
Line of Sight	Data file 39
Targets and Pinpoint Probabilities	Data file 39
Weapons and Specifications	Data file 39
Weapon/Target Intercept	Data file 39
Sensor Distribution and Performance	Data file 39

Figure II-8-C-1. Ground Combat Printouts for Constant Data Input

2. EIGHTY-COLUMN CARD IMAGE. This format is illustrated in Figure II-8-C-2. The top row, far left, has the characters 1BA. The 1 specifies the card type; The B specifies the data are for a Blue transport; and the A specifies the data pertain to an attacking Blue unit. At the far right of the figure the number 3901 appears, indicating that the data are for data file 39 and format 01. It also is a positive identifier for this specific card. The remaining information on this card is identifiable by tracing the headings on the card and relating the data entries to these topics.

3. LINE OF SIGHT. An illustration of this printout is shown in Figure II-8-C-3. Four tables are presented in this printout. The first, at the top, is line of sight parameters with no forest, and line of sight parameters for terrain with forest. The second is located in the center of the figure and entitled background reflectance. Headings of these columns are similar to those found on the card format. The third table is labeled sky-ground

```
1BA 31P  1  1  6  0  0  0100  1  0  8                                                      3901   1
1BA 34V 10  4  4  0  0  0120  4  0  8                                                      3901   2
1BA 35A 15  8  7  0  0  0100  4  0  8                                                      3901   3
1BA 37T 24 12  7  7  7  4120  4  0  8                                                      3901   4
1BA 41T 21 10  5  7  5  3120  4  0  8                                                      3901   5
1BA 45P  1  1  6  0  0  0100  1  0  8                                                      3901   6
1BA185A 15  8  7  0  0  0120 11  0  8                                                      3901   7
1BA186A 15  8  7  0  0  0120  3  0  8                                                      3901   8
2BA 31 32 31 70 30   7036 1  25036 3  50096 6 10009611                                     3901   1
2BA 34 36 34 70 30   6595 1  25095 1  50099 2 100098 4 200097 9 300097153901   2
2BA 35 36 35 99 30   6595 1  25095 1  50099 2 100098 4 200097 9 300097153901   3
2BA 37 38 37205 30  10099 1  25099 1  50098 1 100078 1 200031 2 300007 43901   4
2BA 37 39 37205 30  10099 1  25099 1  50098 1 100082 1 200041 2 300021 23901   5
2BA 37 40 37156 30  10096 1  25096 1  50075 1 100046 1                             3901   6
2BA 41 42 41165 30  10099 1  25098 1  50076 1 100015 2                             3901   7
2BA 41 43 41117 30  50098 3 100098 5 200097 9 30009715                            3901   8
2BA185   9185 50 90  25099 1  50099 2 100099 3                                    3901   9
2BA186   9186 50 90  25099 1  50099 2 100099 3                                    3901  10
2BA 45 44 45 70 30   5065 1  10070 1  20025 2                                     3901  11
3BA112N    5055 120050900185 10186 10 37 10 41 10 35 10                           3901   1
3BA113B    5055 300050900 35 10 37 10 41 10185 10186 40 34 10 31 10               3901   2
4BA 31 31 32 351    0   7044 100044                                               3901   1
4BA 31 31 32 362    0   7044 100044                                               3901   2
4BA 31 31 321613    0   7066 100066                                               3901  2A
4BA 31 31 321604    0   7066 100066                                               3901  2B
4BA 31 31 32 325    0   7066 100066                                               3901  2C
4BA 34 34 36 351    0  25048  50048 100048 150048 200048 300048                  3901   3
4BA 34 34 36 362    0  25095  50095 100095 150095 200095 300095                  3901   4
4BA 34 34 361613    0  25095  50095 100095 150095 200095 300095                  3901   6
4BA 34 34 361604    0  25095  50095 100095 150095 200095 300095                  3901   8
4BA 35 35 36 351    0  25048  50048 100048 150048 200048 300048                  3901   9
4BA 35 35 36 362    0  25095  50095 100095 150095 200095 300095                  3901  10
4BA 35 35 36 323    0  25095 300095                                               3901 10A
4BA 37 37 38 351    0  25046  50046 100046 150046 200046 300046                  3901  11
4BA 37 37 38 362    0  25095  50095 100095 150095 200095 300095                  3901  12
4BA 37 37 38 323    0  25095 300095                                               3901 12A
```

Figure II-8-C-2. Ground Combat 80-Column Card Image

9999

LINE OF SIGHT

TERRAIN	NO FOREST: POSTURE 1 PERSONNEL	NO FOREST: POSTURE 1 VEHICLES	NO FOREST: POSTURE 2 PERSONNEL	NO FOREST: POSTURE 2 VEHICLES	FOREST: POSTURE 1 PERSONNEL	FOREST: POSTURE 1 VEHICLES	FOREST: POSTURE 2 PERSONNEL	FOREST: POSTURE 2 VEHICLES
GOOD	900.	1000.	450.	500.	600.	650.	300.	325.
BAD	600.	700.	300.	350.	330.	350.	165.	175.

BACKGROUND REFLECTANCE

SEASON	BARREN	SPARSE	PLENTIFUL
SUMMER	.184	.184	.755
AUTUMN	.755	.755	.755
SNOW	.085	.135	.755

SKY-GROUND RATIO

TOWARD THE SUN	SUN OVERHEAD	AWAY FROM THE SUN
4.0	3.0	2.0

MINIMUM FRONT TO FRONT SEPERATION

50 METERS

Figure II-8-C-3. Line of Sight

ratio and contains the values for the three illumination conditions. The fourth is the minimum front-to-front separation of the opposing forces. The data shown in this printout, taken from data file 39, were originally read in by the cards recognized by card types 5 and 6, ID 3901.

4. TARGET AND PINPOINT PROBABILITIES. The third set of printout formats is that of target and pinpoint probabilities as illustrated in Figure II-8-C-4. There are three major divisions to this printout format, each of which has two tables. The upper third of the printout has the target data for both attacking and defending. In each table at the top there is the column (second from the left) labeled presented area. This is a computed figure from the information entered into card type 1, ID 3901, titled Transport Specifications. The information in the column headed presented area is the area in square feet of the target rotated through 30 degrees, and the 30-degree area is that presented as a target and computed for this column. The pinpoint probability and mobility class rate tables are also taken from card type 1, ID 3901.

5. WEAPON SYSTEM SPECIFICATIONS. The fourth set of printouts is weapon system specifications illustrated in Figure II-8-C-5. This format has three major tables. At the top, labeled link table, is a list of the ammunition (by item code) carried by each transport (by item code). In the center is the table with weapon performance data with each weapon's range limitations; maximum rate of fire in rounds per minute; the average time in seconds to aim, fire, and deliver a round to the midpoint of its effective range; and hit probabilities against a standard NATO target at six range values. At the bottom of the figure is the third table, labeled priority (ammo to drop) weapon to target. At the far left of this table is the equipment item code of the weapon. Across the top is the equipment item code for each of the hostile targets (transports). Beneath that listing is the priority given that target for the specific weapon. In parentheses following the target priority is the percentage of on-board basic load of ammunition which, when reached, will cause that target to be dropped from the priority list. Once dropped from the priority list, that target will not be fired on again by that weapon until the Combat Service Support Model is able to replenish the ammunition.

6. WEAPON TARGET KILL PROBABILITY. This printout is shown in Figure II-8-C-6. The data included in these tables are computed from the information originally entered in card type 2, weapon systems specifications, ID 3901. The far left, ammo EOH, is the equipment item code for the specific weapon. Target, in the center top of the figure, is the hostile force target (transport) item code. Beneath that equipment item code on the first line is the intercept (see second column from left). The intercept is the probability of a kill given a hit at zero range. The second line, labeled slope, is the tangent of the angle made by a straight line, defined by the intercept and the probability of a kill given a hit at the maximum range and the abscissa, representing the range from firer to target.

BLUE ATTACK -- RED DEFEND

ATTACKING TARGET					DEFENDING TARGET				
EOH	PRESENTED AREA	NUMBER OF PERSONNEL	REFLECTANCE	TYPE	EOH	PRESENTED AREA	NUMBER OF PERSONNEL	REFLECTANCE	TYPE
31	8.20	1.00	.100	PERS	35	117.89	4.0	.120	TANK
34	33.86	4.00	.120	VEH	36	156.52	3.0	.120	TANK
35	104.50	4.00	.120	APC	161	138.56	2.0	.120	APC
37	195.30	4.00	.120	TANK	160	109.54	5.0	.120	APC
41	121.39	4.00	.120	TANK	32	109.54	4.0	.120	APC
45	8.20	1.00	.100	PERS	23	8.20	1.0	.100	PERS
185	104.50	11.00	.120	APC	25	8.20	1.0	.100	PERS
186	101.30	3.00	.120	APC	27	16.79	3.0	.100	PERS

PINPOINT PROBABILITY

ATTACKING TARGET		DEFENDING TARGET	
EOH	PROBABILITY	EOH	PROBABILITY
31	0.000	35	0.000
34	0.000	36	0.000
35	0.000	161	0.000
37	0.000	160	0.000
41	0.000	32	0.000
45	0.000	23	0.000
185	0.000	25	0.000
186	0.000	27	0.000

MOBILITY CLASS RATE

ATTACKING TARGET		DEFENDING TARGET	
EOH	RATE	EOH	RATE
31	133.336	35	133.336
34	133.336	36	133.336
35	133.336	161	133.336
37	133.336	160	133.336
41	133.336	32	133.336
45	133.336	23	133.336
185	133.336	25	133.336
186	133.336	27	133.336

Figure II-8-C-4. Target and Pinpoint Probabilities

ATTACKING AMMUNITION

LINK TABLE

AMMUNITION CODE	32	36	36	38	39	40	42	43	9	9	44	0	0	0	0	0
TRANSPORT CODE	31	34	35	37	37	37	41	41	185	186	45	0	0	0	0	0

ATTACKING AMMUNITION SPECS

AMMO EOH	MIN RANGE	MAX RANGE	RATE	TIME	HIT PROBABILITIES					
32	70.000	1000.000	.500	13.292	.960	.960	.960	.960	.96	.960
36	65.000	3000.000	.500	13.662	.950	.987	.978	.972	.97	.970
36	65.000	3000.000	.500	16.562	.950	.987	.978	.972	.97	.970
38	100.000	3000.000	.500	22.050	.990	.908	.658	.385	.20	.070
39	100.000	3000.000	.500	22.050	.990	.922	.713	.476	.32	.210
40	100.000	1000.000	.500	16.600	.960	.935	.784	.669	.56	.460
42	100.000	1000.000	.500	17.640	.990	.954	.795	.589	.37	.150
43	530.000	3000.000	.500	19.700	.980	.980	.975	.970	.97	.970
9	250.000	1000.000	1.500	7.250	.990	.990	.990	.990	.99	.990
9	250.000	1000.000	1.500	7.250	.990	.990	.990	.990	.99	.990
44	50.000	230.000	.500	8.250	.850	.760	.655	.520	.38	.250
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000

ATTACKING AMMUNITION PRIORITIES

PRIORITY (AMMO TO DROP) WEAPON TO TARGET

AMMO EOH	TARGET EOH 35	36	161	160	32	23	25	27
32	1(0)	2(0)	3(0)	4(0)	5(0)	0(0)	0(0)	0(0)
36	1(0)	2(0)	3(0)	4(0)	0(0)	0(0)	0(0)	0(0)
36	1(0)	2(0)	0(0)	0(0)	3(0)	0(0)	0(0)	0(0)
38	1(0)	2(0)	4(0)	5(0)	3(0)	0(0)	0(0)	0(0)
39	1(0)	2(0)	4(0)	5(0)	3(0)	0(0)	0(0)	0(0)
40	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
42	1(0)	2(0)	3(0)	4(0)	0(0)	0(0)	0(0)	0(0)
43	1(0)	2(0)	3(0)	4(0)	0(0)	0(0)	0(0)	0(0)
9	0(0)	0(0)	2(0)	4(0)	1(0)	2(0)	3(0)	5(0)
9	0(0)	0(0)	2(0)	4(0)	1(0)	2(0)	3(0)	5(0)
44	1(0)	2(0)	3(0)	4(0)	5(0)	0(0)	0(0)	0(0)
0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
0	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

Figure II-8-C-5. Weapon System Specifications

ATTACKING AMMUNITION

AMMO EOH		TARGET 35	36	161	160	32	23	25	27
32	INTERCEPT	.440000	.440000	.660000	.660000	.660000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
36	INTERCEPT	.480000	.950000	.950000	.950000	0.000000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
36	INTERCEPT	.480000	.350000	0.000000	0.000000	.950000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
38	INTERCEPT	.460000	.950000	.950000	.950000	.950000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
39	INTERCEPT	.496427	.700000	.700000	.730000	.510000	0.000000	0.600000	0.000000
	SLOPE	.000614	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
40	INTERCEPT	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
42	INTERCEPT	.460000	.950000	.950000	.950000	0.000000	0.000000	0.000000	0.000000
	SLOPE	0.000000	.000000	.000000	.000000	0.000000	0.000000	0.000000	0.000000
43	INTERCEPT	.490000	.950000	.950000	.950000	0.000000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	INTERCEPT	0.000000	0.000000	1.160000	1.160000	1.160000	1.160000	1.160000	1.165000
	SLOPE	0.000000	0.000000	.000660	.000660	.000660	.000892	.000892	.000908
9	INTERCEPT	0.000000	0.000000	1.160000	1.160000	1.160000	1.160000	1.160000	1.165000
	SLOPE	0.000000	0.000000	.000660	.000660	.000660	.000892	.000892	.000908
44	INTERCEPT	.220000	.220000	.110000	.110000	.110000	0.000000	0.000000	0.000000
	SLOPE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Figure II-8-C-6. Weapon/Target Kill Probabilities

7. SENSOR DISTRIBUTION AND PERFORMANCE. This printout is shown in Figure II-8-C-7. This format has two major tables, one of which has the distribution of sensors among the various transports, stating the amount of time that they are used either while aboard that transport or while dismounted but supporting that transport. The sensor is identified at the far left under the column headed sensor EOH, which is the equipment item code. The transport is identified with its equipment item code listed across the first row of the top table. Beneath that figure is the listing of the times that the sensor is operated for that transport. The data are extracted from card type 3, sensor specifications, ID 3901. The sensor performance data are calculated from information provided by this card type and are used to calculate the probability of detection for each sensor.

ATTACKING SENSOR DISTRIBUTION

SENSOR	TRANSPORT							
EOH	31	34	35	37	41	45	185	186
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	10.000	10.000	10.000	0.000	10.000	10.000
113	10.000	10.000	10.000	10.000	10.000	0.000	10.000	40.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ATTACKING SENSOR PERFORMANCE

EOH	MIN	MAX	A	B
0	0.000	0.000	0.000000	0.000000
112	.816	75163.659	.008687	.000123
113	2.094	192811.125	.006854	.000048
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000
0	0.000	0.000	0.000000	0.000000

Figure II-8-C-7. Sensor Distribution and Performance

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR GROUND COMBAT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 9

AREA FIRE DATA INPUT PROGRAMS

1. INTRODUCTION. The Area Fire data input program creates and loads the files containing the munitions lethal areas and personnel protection data required by the Area Fire Model. It also loads certain weapons parameters on data file 25 where they are used by the TACFIRE Model.

2. ROUTINES:

a. General. The Area Fire data input programs consist of the routines described in the following paragraphs.

b. Routine AFMLD. This routine controls the loading of the two data files required by the Area Fire Model. It creates the data files, and then calls routines LOAD29, DUMP29, LOAD30 and DUMP30 in that sequence.

c. Routine LOAD29. This routine reads and edits the munition characteristics data and stores it in the correct position on the files.

d. Routine DUMP29. This routine gives a formatted dump of data file 29 and the portion of data file 25 loaded by the input routines.

e. Routine LOAD29. This routine is responsible for the reading and editing of the personnel protection data and for loading it correctly in the data file.

f. Routine DUMP30. Routine DUMP30 provides a tabular dump of the personnel protection data file.

3. FILES. The files loaded by the Area Fire data input programs are as follows.

- Munitions lethal areas - data file 29
- Personnel protection - data file 30

NOTES

APPENDIX A

AREA FIRE DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for area fire are documented in Appendix A, Area Fire Model Input Requirements, to Chapter 8 of the Period Processor (Section IV).

NOTES

APPENDIX B

AREA FIRE DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. The Area Fire Model's input data are loaded into data files 20 and 30, by the control routine AFMLD and associated routines LOAD29, LOAD30, DUMP29, and DUMP30. The unit dimension, geometry, and distribution data used by the Area Fire Model are loaded into data file 28 by the routines documented in Chapter 6, Appendix B, Unit Geometry Data Input Program Descriptions.

2. ROUTINE AFMLD:

a. Purpose. AFMLD controls loading of data files required by the Area Fire Model; (i.e., data file 29, which is the munitions lethal areas file, and data file 30, which is the personnel protection file. AFMLD also loads certain weapon parameters onto data file 25 to be used by the TACFIRE Model. Input data come from punched cards. AFMLD relies on two load routines to load the data, LOAD29 and LOAD30, and two dump routines to print the data, DUMP29 and DUMP30.

b. Input Variables: None.

c. Output Variables:

Name	Destination	Contents
IDUM(1200)	DF25, DF29 and DF30	Buffer for initializing to zero.

d. Logical Flow (Figure II-9-B-1):

(1) Block 1. The file name table (DIVWAG file directory) is brought in from the master data file by the standard call: CALL GETFLE (4HKEYS, IFNT, IER).

(2) Blocks 2, 3, and 4. Data files 25, 29, and 30 are created if they do not yet exist by use of the CREATE routine. Data file 25 consists of one record which is 27092 words in length, and portions are loaded by two different programs, LOAD29 and TACLD. Data file 29 consists of 72 records of 216 words per record and is loaded entirely by LOAD29. Data file 30 consists of 21 records of 2149 words per record. The first two are loaded by routine LOAD30 and the remainder are loaded by the Nuclear Model data loading routine.

(3) Blocks 5, L300, and L500. These portions of data files 25, 29, and 30 which are to be loaded (i.e., all of data files 29 and 30 and words 7605-8396 and 26877-27092 of data file 25) are initialized to zero.

(4) Blocks 6, 7, and 8. Routine LOAD29 is called to load the munition characteristics data onto data files 25 and 29. NERR is returned as the count of serious errors which were found in the data. Routine DUMP29 is called to print the data from data file 29 if no serious errors were located by LOAD29.

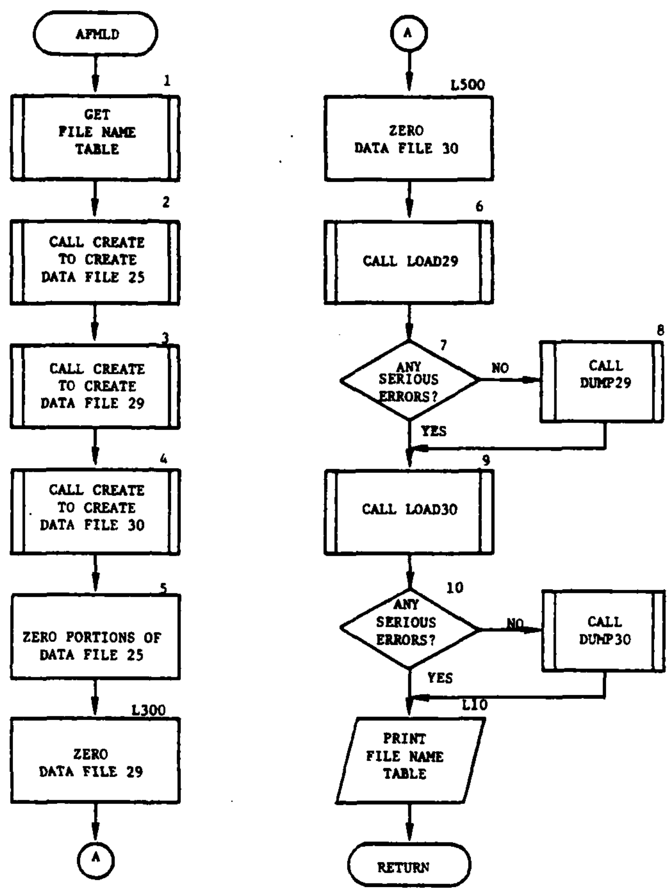

Figure II-9-B-1. Routine AFMLD

(5) Blocks 9, 10, and 11. Routine LOAD30 is called to load the personnel protection data onto data file 30. NERR is returned as the count of serious errors which were found in the data. Routine DUMP30 is called to print the data from data file 30 if no serious errors were located by LOAD30.

(6) Block L10. The file name table (IFNT) is printed to allow verification of the sizes of data files 25, 29, and 30.

3. ROUTINE LOAD29:

a. Purpose. LOAD29 reads the munition characteristics data required by the Area Fire and TACFIRE Models from cards and loads the data on data files 29 and 25.

b. Input Variables:

Name	Source	Contents
KARD(20)	Card	Data card image buffer.
IFILE	Card	File number (29).
IFORM	Card	Card format number (1-4).
ISEQ	Card	Card image sequence number.
ISIDE	Card	Force designator (B or R).
IWMUNX	Card	Weapon/munition combination index (1-36).
IWEOHX	Card	Weapon item code.
IMEOHX	Card	Munition item code.
LAPERS(3,2)	Card	Lethal areas to personnel in three postures (standing, prone, foxhole) and two environments (unforested and forested).
IEOH(7)	Card	List of seven equipment item codes.
LAREA(7)	Card	List of seven lethal areas for equipment items given by IEOH.
MAXRNG	Card	Maximum range of munition.
MINRANG	Card	Minimum range of munition.
ETYPE	Card	Error type code: S=Sigma, C=CEP.
SIGTAB(6)	Card	Table of round dispersion errors at six range points between MAXRNG and MINRNG.

Name	Source	Contents
DTV1	Card	Time to fire first volley.
DTVMR	Card	Time to fire each successive volley at maximum rate of fire.
DTVSR	Card	Time to fire each sucessive volley at sustained rate of fire.
NRNDMR	Card	Maximum number of rounds that can be fired at maximum rate of fire.
EFFRAD	Card	Effects radius.
IANGF	Card	Angle of fire of the weapon.
LENG	Card	Length of the projectile.
ICAL	Card	Caliber of the projectile.

c. Output Variables:

Name	Destination	Contents
NERR	Call	Number of serious data errors detected.
ISEQ	Print	Card image sequence number.
KARD(20)	Print	Data card image buffer.
MUNDAT(216)	DF29	Munition data, data file 29 record.
IWEOHX		MUNDAT(1). Weapon item code.
IMEOHX		MUNDAT(2). Munition item code.
LAPERS(3,2)		MUNDAT(3). Lethal areas for personnel in three postures (standing, prone, foxhole) and two environments (unforested and forested).
LAEOH(200)		MUNDAT(9). Lethal areas for 200 equipment items.
MAXRNG		MUNDAT(209). Maximum range of munition.
MINRNG		MUNDAT(210). Minimum range of munition.
SIGTAB(6)		MUNDAT(211). Round dispersion errors at six range points between maximum range and minimum range.

Name	Destination	Contents
WMPARM(36,11,2)	DF25	Weapon/munition combination parameter table for TACFIRE: 11 parameters for 36 weapon/munition combinations and two forces.
MUNDES(3,36,2)	DF25	Munition description table for countermortar/counterbattery: three parameters for 36 weapon/munition combinations and two forces.

d. Logical Flow (Figure II-9-B-2):

(1) Blocks L50, L61, 1, L63, 2, and 3. The data file 29 data cards are read and card images copied to a temporary disk file (logical unit 30). Each card is read with a 20A4 format, assigned a sequence number, and printed. The card image is written to the temporary file with the last four characters replaced by the new sequence number. The last data card is expected to have a card ID of 9999 in card columns 73-76. The card image file is positioned to card image number one after the last card is copied.

(2) Block 4. NERR is the count of serious detectable data errors which will be returned to AFMLD; it is set to zero before the editing process begins.

(3) Block 5. Each group of cards with the same card ID (i.e., 2901, 2902, 2903, or 2904) must be preceded by a header card which is blank except for the card ID. The first card image must be a header card and establishes the card ID of the first group.

(4) Blocks L100 and 6. The card ID consists of four numeric characters: the first two are the file number (29), the last two are the card format number (01-04, 99). If the file number is 29, control goes to block L110. If the card format number is 99, it goes to block L199.

(5) Blocks 7 and 8. If the card ID is not 2901, 2902, 2903, 2904 or 9999, an error has occurred. An appropriate error message is printed and the error counter (NERR) is incremented.

(6) Block L110. This block represents a computed GO TO statement that branches to the appropriate code for reading the next card image according to the card format number.

(7) Block L120. Using format 2901, the following variables are filled from the next card image: ISIDE, IWMUNX, IWEOHX, IMEOHX, LAPERS(1-6), IFILE, IFORM, and ISEQ.

(8) Block 9. If IFORM is not equal to one, it indicates that the header card of the next card group has been read. Control branches to block L100.

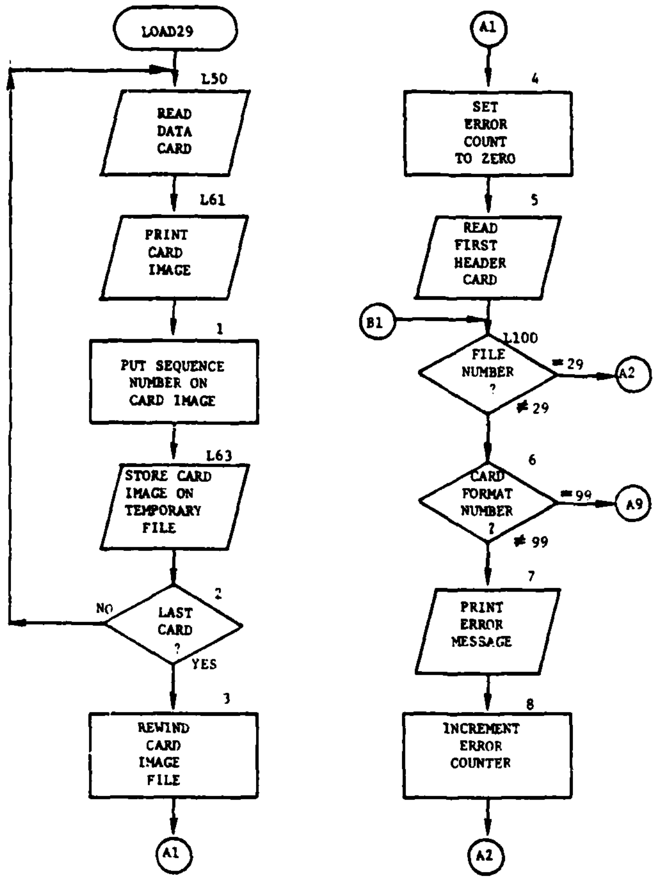

Figure II-9-B-2. Routine LOAD29 (Continued on Next Page)

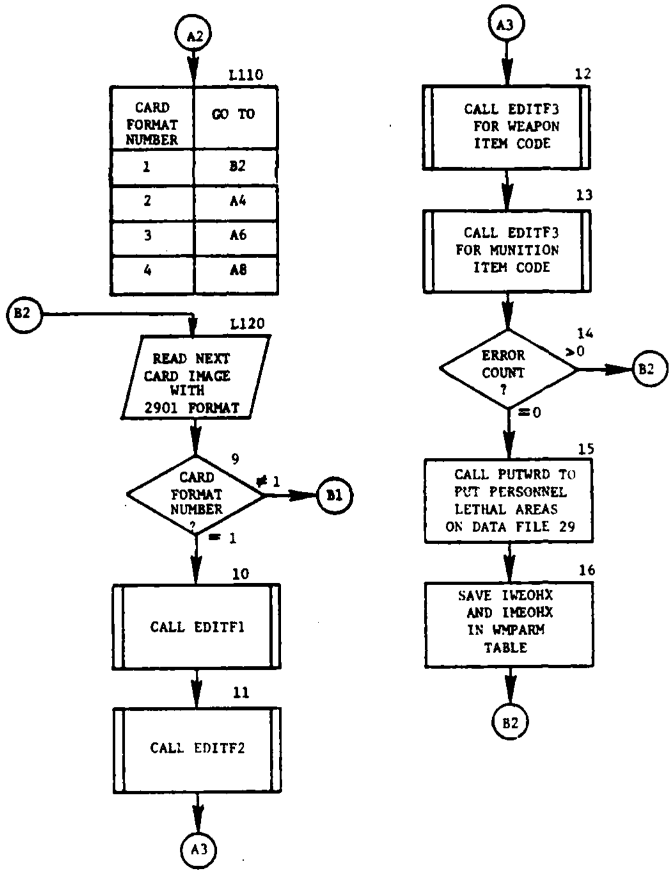

Figure II-9-B-2. Routine LOAD29 (Continued)

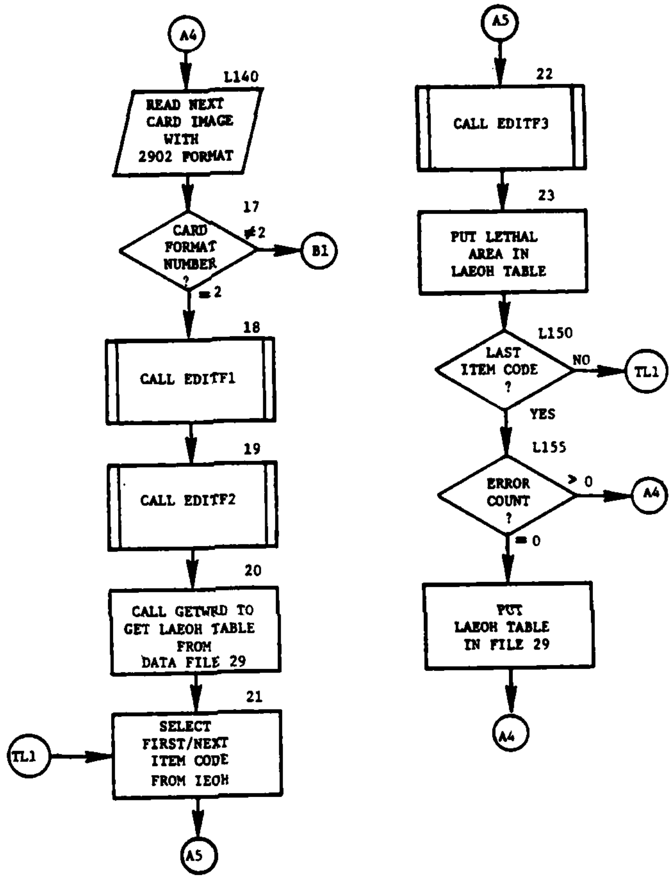

Figure II-9-B-2. Routine LOAD29 (Continued)

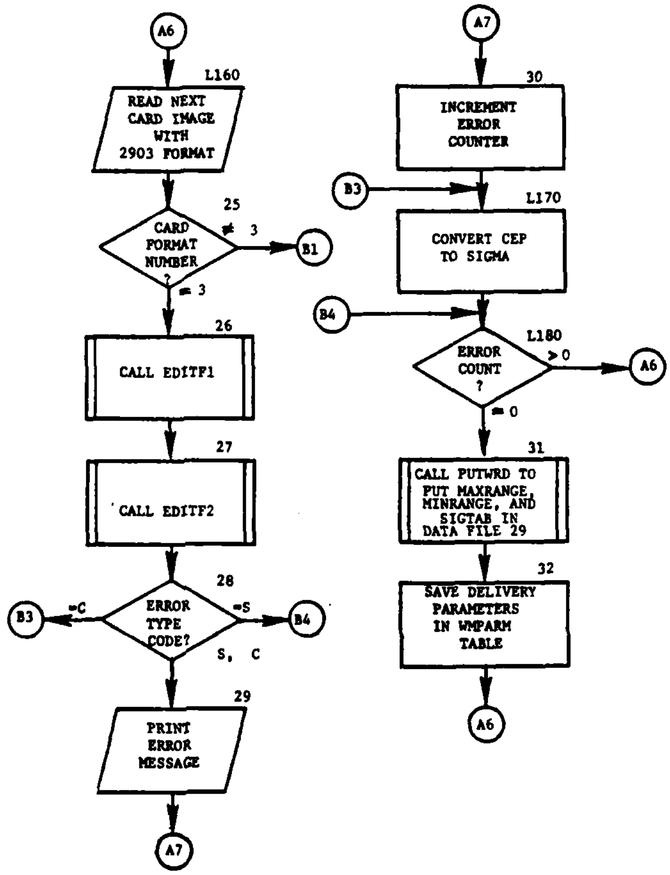

Figure II-9-B-2. Routine LOAD29 (Continued)

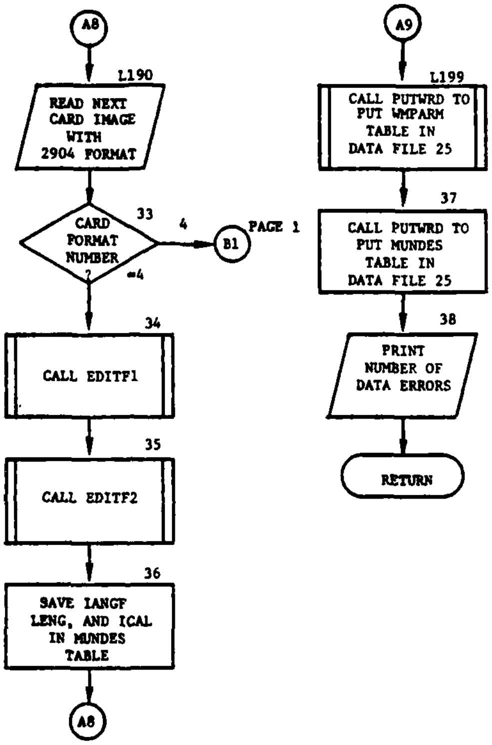

Figure II-9-B-2. Routine LOAD29 (Concluded)

(9) Blocks 10, 18, 26, and 34. Routine EDITF1 is called to edit the one-character force designator (ISIDE). If ISIDE is neither B nor R, then EDITF1 prints an error message and increments the error counter (NERR).

(10) Blocks 11, 19, 27, and 35. Routine EDITF2 is called to edit the weapon/munition combination index (IWMUNX). If IWMUNX is not between the values 1 and 36, EDITF2 prints an error message and increments the error counter.

(11) Blocks 12 and 13. EDITF3 is used to ensure that equipment item codes, in this case the weapon item code (IWEOHX) and the munition item code (IMEOHX), have values between 1 and 200. EDITF3 prints an error message and increments the error counter if the item code is not valid.

(12) Blocks 14, L155, and L180. If data errors have been found (NERR greater than zero), the loading of data file 29 is discontinued, although the card editing process continues.

(13) Block 15. IWEOHX, IMEOHX, and LAPERS(1-6) are loaded on data file 29 for this weapon/munition combination.

(14) Block 16. IWEOHX and IMEOHX are also placed in the weapon/munition parameter table (WMPARM) which is to be loaded on data file 25.

(15) Block L140. Using format 2902, the following variables are filled from the next card image: ISIDE, IWMUNX, IEOH(1-7), LAREA(1-7), IFILE, IFORM, and ISEQ.

(16) Block 17. If IFORM is not equal to two, it indicates that the header card of the next card group has been read and control goes to block L100.

(17) Blocks 20, 21, 22, 23, and L150. The table of lethal areas for equipment items (LAEOH) due to this weapon/munition combination is brought into core to have additional lethal areas filled. Seven item codes and lethal areas were read from the card image into IEOH and LAREA arrays. Each item code in IEOH is edited using the EDITF3 routine. The lethal areas in LAREA are put into the LAEOH array.

(18) Block 24. If no data errors have been found, the updated LAEOH array is returned to data file 29 and control returns to block L140 to read the next card image.

(19) Block L160. Using format 2903, the following variables are filled from the next card image: ISIDE, IWMUNX, MAXRNG, MINRNG, ETYPE, SIGTAB(1-6), DTV1, DTVMR, DTVSR, NRNDMR, EFFRAD, IFILE, IFROM, and ISEQ.

(20) Block 25. If IFORM is not equal to three, it indicates that the header card of the next card group has been read, and control goes to block L100.

(21) Blocks 28, 29, 30 and L170. The error type code (ETYPE) indicates whether the round dispersion errors (SIGTAB) are in the desired sigma form or the circular error probable (CEP) form; therefore, if ETYPE equals C, SIGTAB must be converted from CEPs to sigmas by multiplication of a conversion factor. Any other value of ETYPE is an error.

(22) Block 31. MAXRNG, MINRNG, and SIGTAB(1-6) are loaded onto data file 29 if no errors were detected.

(23) Block 32. DTV1, DTVMR, DTVSR, NRNDMR, MAXRNG, MINRNG, and EFFRAD are stored in the WMPARM table which will be loaded on data file 25 when completed.

(24) Block L190. Using format 2904, the following variables are filled from the next card image: ISIDE, IWMUNX, IANGF, LENG, ICAL, IFILE, IFORM, and ISEQ.

(25) Block 33. If IFORM is not equal to four, it indicates that the header card of the next card group has been read.

(26) Block 36. IANGF, LENG, and ICAL are saved in the MUNDES table which will be loaded on data file 25 when completed.

(27) Blocks L199 and 37. All data file 29 cards have been read and processed; therefore, the completed WMPARM and MUNDES arrays must be loaded into the appropriate locations of data file 25.

(28) Block 38. The number of data errors detected (NERR) is printed for the user.

4. ROUTINE LOAD30:

a. Purpose. LOAD30 reads the personnel protection data required by the Area Fire Model and other models from cards and loads the data on DIVWAG data file 30.

b. Input Variables:

Name	Source	Contents
KARD(20)	Card	Data card image buffer.
IFILE	Card	File number (30).
IFORM	Card	Card format number (1-4).
ISEQ	Card	Card image sequence number
ISIDE	Card	Force designator (B or R)
IACT(3)	Card	List of three activity indexes.

Name	Source	Contents
OPEND(3,7)	Card	Seven data items about unprotected (open) personnel for each of the three activity indexes given by IACT. The seven items are: percent standing unwarned, percent prone unwarned, percent in foxhole unwarned, percent standing warned, percent prone warned, percent in foxholes warned, and time to revert from warned to unwarned posture.
IACTX	Card	Activity index (1-7).
IRANK(6)	Card	List of six protection priorities (orders of choice) between 1 and 100.
COVERD(6,3)	Card	Three data items about protected (covered) personnel for each of the six protection priorities. The three items are: the equipment item code, the number of personnel protected, and the number of casualties per item lost.

c. Output Variables:

Name	Destination	Contents
NERR	Call	Number of serious data errors detected.
ISEQ	Print	Card image sequence number.
KARD(20)	Print	Data card image buffer.
UNPRO(7,7)	DF30	Table of unprotected personnel data; i.e., seven data items for each of seven activity indexes. The seven items are: percent standing unwarned, percent prone unwarned, percent in foxholes unwarned, percent standing warned, percent prone warned, and percent in foxholes warned, and time to revert from warned to unwarned postures.
EOHPRO(3,100)	DF30	Three data items (equipment item code, number of personnel per item, and number of casualties per item lost) for 100 protection priorities.

d. Logical Flow (Figure II-9-B-3):

(1) Blocks L50, L61, 1, L63, 2, and 3. The data file 30 cards are read and copied to a temporary disk file (logical unit 30). Each card is read with a 20A4 format, assigned a sequence number, and printed. The card

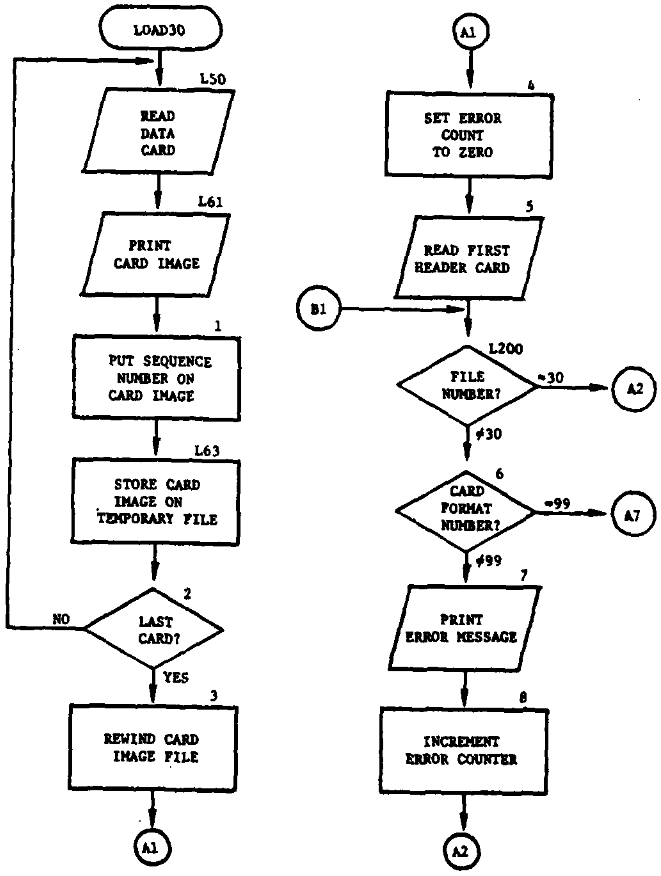

Figure II-9-B-3. Routine LOAD30 (Continued on Next Page)

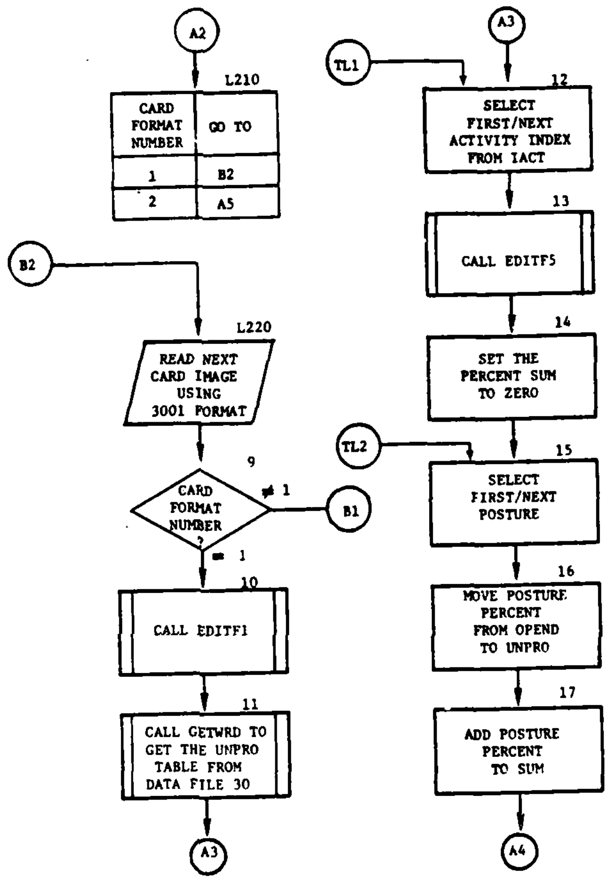

Figure II-9-B-3. Routine LOAD30 (Continued)

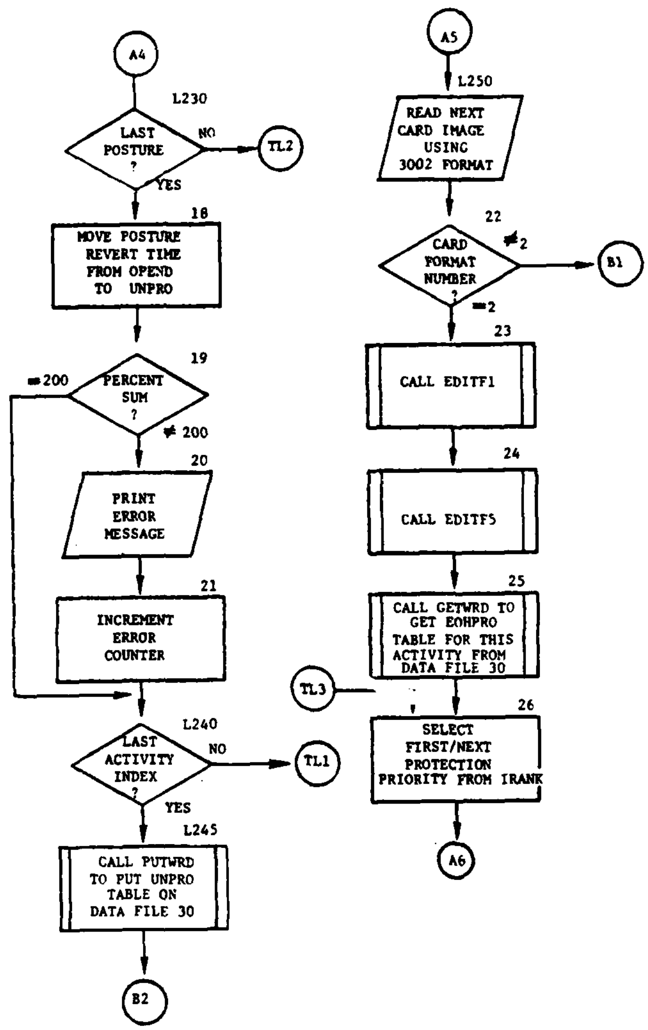

Figure II-9-B-3. Routine LOAD30 (Continued)

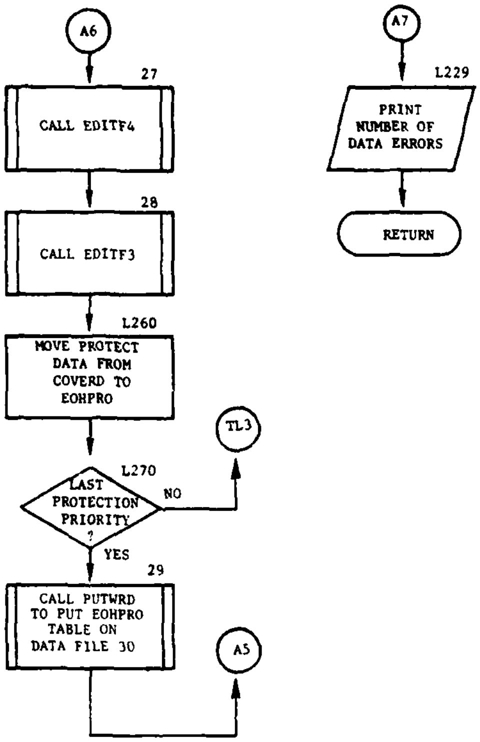

Figure II-9-B-3. Routine LOAD30 (Concluded)

image is written on the temporary file with the last four characters replaced by the new sequence number. The last data card has a card ID of 9999 in card columns 73-76. The card image file is positioned to the first card image after the last card is copied.

(2) Block 4. NERR is the number of serious detectable data errors which will be returned to AFMLD and it is set to zero before the editing process begins.

(3) Block 5. Each group of cards with the same card ID (i.e., 3001 or 3002) must be preceded by a header card which is blank except for the card ID.

(4) Block L200. The card ID consists of four numeric characters, the first two of which are the file number (30), the last two are the card format number (01, 02, 99). If the file number is 30, transfer control to block L210.

(5) Block 6. If the card format number is 99 transfer control to block L229.

(6) Blocks 7 and 8. If the card ID is not 3001, 3002, or 9999, an error has occurred. An appropriate error message is printed and the error counter (NERR) is incremented.

(7) Block L210. This block represents a computed GO TO statement which branches to appropriate code for reading the next card image according to the card format number. If the card format number is two, control is transferred to block L250. If the card format number is one, control goes to block L270.

(8) Block L220. Using format 3001, the following variables are filled from the next card image: ISIDE, IACT(7), OPEND(3,7), IFILE, IFORM, and ISEQ.

(9) Block 9. If IFORM is not equal to one, which indicates that the header card of the next card group has been read, control goes to block L200.

(10) Blocks 10 and 23. Routine EDITF1 is called to edit the one-character force designator (ISIDE). If ISIDE is neither B nor R, EDITF1 prints an error message and increments the error counter (NERR).

(11) Block 11. The UNPRO array is read from data file 30 to be updated with the new data.

(12) Block 12. The first/next activity index is selected from IACT(1-3).

(13) Block 13. The activity index from IACT is edited by routine EDITF5. If the index is not between one and seven, EDITF5 prints an error message and increments the error counter.

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
JUL 76

UNCLASSIFIED CACDA-TR-8-76-VOL-2-PT-1 NL

5 OF 9
AD
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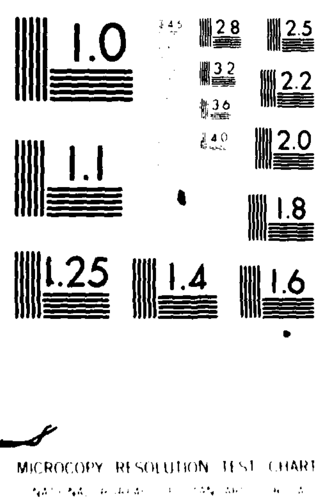
11265


1.0
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART

(14) Block 14. The percent sum (IPCSUM) is used to verify that each unwarned and warned posture sums to 100 percent.

(15) Block 15. The first/next of six postures is selected: standing unwarned, prone unwarned, foxhole unwarned, standing warned, prone warned, and foxhole warned.

(16) Blocks 16 and 17. The percent of personnel in this posture is given in OPEND and is stored in UNPRO which will be returned to data file 30. The percent is also added to IPCSUM.

(17) Block L230. If the last posture has not been processed, control returns to block 15.

(18) Block 18. The seventh data item about unprotected personnel is the time to revert from warned to unwarned posture. This is taken from OPEND and stored in UNPRO.

(19) Blocks 19, 20 and 21. The percentages in the three unwarned postures total 100 percent, as do the percentages in the three warned postures; therefore, the total percent sum (IPCSUM) is 200; if it is not, an error message is printed and the error counter incremented.

(20) Blocks L240 and L245. If last activity index has not been processed control returns to block 12; otherwise the UNPRO table is placed into data file 30.

(21) Block L250. Using format 3002, the following variables are filled from the next card image; ISIDE, IACTX, IRANK(6), COVERD(6,3), IFILE, IFORM, and ISEQ.

(22) Block 22. If IFORM is not equal to two, it indicates that the header card of the next card group has been read, and control is transferred to block L200.

(23) Block 24. The activity index (IACTX) is edited by routine EDITF5. If the index is not between one and seven, EDITF5 prints an error message and increments the error counter.

(24) Block 25. EOHPRO(3,100) is the table of personnel protection data for a single activity. In this case it is taken from data file 30 according to IACTX.

(25) Block 26. The first/next protection priority (order of choice) is selected from the IRANK table.

(26) Block 27. Routine EDITF4 is called to edit the order-of-choice index. If the index is not between 1 and 100, EDITF4 prints an error message and increments the error counter.

(27) Block 28. Routine EDITF3 is called to edit the item code of the equipment item which is specified to provide personnel protection. If the item code is not between 1 and 200, EDITF3 prints an error message and increments the error counter (NERR).

(28) Block L260. The three protection data items for this protection priority are copied from the COVERD array to the EOHPRO array. The column index is identical to the order-of-choice index.

(29) Blocks L270 and 29. If the last protection priority has not been processed, control transfers to block 26; otherwise the EOHPRO table is returned to data file 30 and control is transferred to block L250.

(30) Block L299. After the last card image has been read, the number of data errors detected (NERR) is printed for the user.

5. ROUTINE DUMP29:

a. Purpose. DUMP29 prints the data which LOAD29 loaded onto the DIVWAG data files: (i.e., the contents of data file 29 and two selected portions of data file 25).

b. Input Variables:

Name	Source	Contents
MUNDAT(216)	DF29	Munition data, data file 29 record.
IWEOHX	DF29	MUNDAT(1). Weapon item code.
IMEOHX	DF29	MUNDAT(2). Munition item code.
LAPERS(3,2)	DF29	MUNDAT(3). Lethal areas to personnel in three postures(standing, prone, foxhole) and two environments (unforested, forested).
LAEOH(200)	DF29	MUNDAT(9). Lethal areas for 200 equipment items.
MAXRNG	DF29	MUNDAT(209). Maximum range of munition.
MINRNG	DF29	MUNDAT(210). Minimum range of munition.
SIGTAB(6)	DF29	MUNDAT(211). Round dispersion errors at six range points between maximum range and minimum range.
WMPARM(36,11)	DF25	Weapon/munition combination parameter table for TACFIRE: eleven parameters for 36 weapon/munition combinations.

Name	Source	Contents
MUNDES(3,36)	DF25	Munition description table for countermortar/counterbattery: three data items for 36 weapon/munition combinations.

c. Output Variables. Same as input variables, destination being the printer.

d. Logical Flow (Figure II-9-B-4):

(1) Block 1. Each force is selected separately according to the force index (IFORCE); 1 for Blue, 2 for Red.

(2) Blocks 2 and 3. The weapon/munition combination parameter table (WMPARM) is taken from data file 25. It contains eleven words per weapon/munition combination, two of which are not used. This parameter table is printed.

(3) Blocks 4 and 5. The munition description table (MUNDES) is taken from data file 25. It contains three data items per weapon/munition combination. This table is printed.

(4) Block 6. Select the first/next of each of the 36 weapon/munition combinations by selecting the combination index (IMUN).

(5) Block 7. One record for each weapon/munition combination is brought into MUNDAT from data file 29.

(6) Block 8. The weapon/munition header consisting of the record number, the force name (RED or BLUE), the weapon/munition index (IMUN), the weapon item code (IWEOHX), and the munition item code (IMEOHX) are printed.

(7) Block 9. Six lethal areas against enemy personnel are listed for standing, prone, and foxhole postures, in both unforested and forested environments.

(8) Block L1000. An array (LAPRIN) is built containing nonzero lethal areas and the corresponding item codes so that only the nonzero lethal areas can be printed.

(9) Block L2000. The six round disper[illegible]ors (SIGTAB) are printed with the six corresponding range points. [illegible]irst range point is MAXRNG, the last is MINRNG, and the four intermediate [illegible]nges are calculated.

(10) Block L4000. If all of the weapon/munition combinations have not been processed, control is transferred to block 6.

(11) Block L5000. If Red force has not been processed, control transfers to block 1.

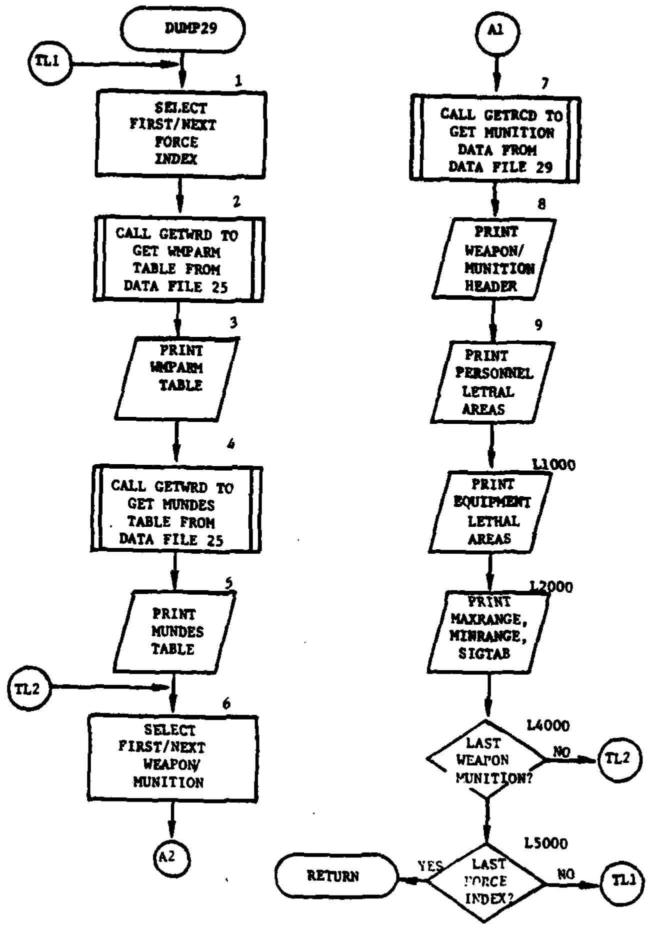


Figure II-9-B-4. Routine DUMP29

6. ROUTINE DUMP30:

a. Purpose. DUMP30 prints the data contained on data file 30, the personnel protection data.

b. Input Variables:

Name	Source	Contents
UNPRO(7,7)	DF30	Table of unprotected personnel data; i.e., seven data items for each of seven activity indexes. The seven items are: the percent of personnel in standing, prone, and foxhole postures, both unwarned and warned, and the time to revert from warned to unwarned postures.
EOHPRO(3,100)	DF30	Three data items (equipment item code, number of personnel per item, and casualties per item lost) for 100 protection priorities.

c. Output Variables. Same as input variables, destination being the printer.

d. Logical Flow (Figure II-9-B-5):

(1) Block 1. Select separately each of the two force indexes: 1 for Blue, 2 for Red.

(2) Block 2. The UNPRO table for the force is brought in from data file 30.

(3) Block 3. The first/next index of seven activity indexes is selected.

(4) Block 4. The activity header consisting of the record number, the force name (BLUE or RED), the activity index (IACTX), and the activity name taken from the IACT table are printed.

(5) Block 5. The personnel protection by equipment table (EOHPRO) is brought in from data file 30 for this activity index.

(6) Block 6. The percent of personnel in the three postures (standing, prone, foxhole) is printed from the UNPRO table for the two separate cases of unwarned and warned for this activity index.

(7) Block L2000. The order of choice, item code, number of personnel per item, and number of casualties per item lost are printed from the EOHPRO table for those items listed as protecting personnel.

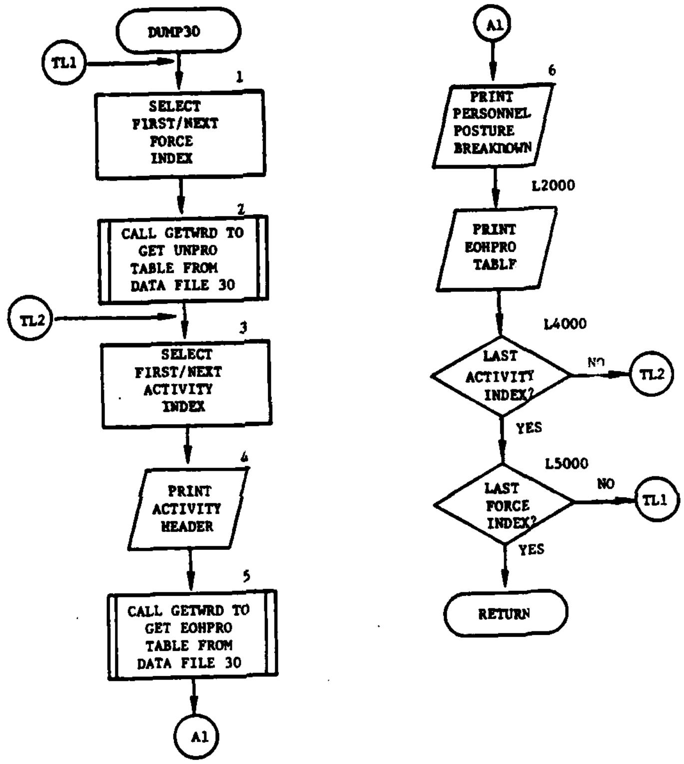


Figure II-9-B-5. Routine DUMP30

(8) Block L4000. If all of the activity indexes have not been processed, control is transferred to block 3.

(9) Block L5000. If the Red force has not been processed control transfers to block 1.

NOTES

APPENDIX C

AREA FIRE DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Nine different printouts of constant data inputs are generated after the data have been read into the files. (It is coincident that there are nine output reports and nine card types for input.) These printouts are listed in Figure II-9-C-1.

Printout Title	Data Source
Data File 29 80-Column Card Image	Card Data Deck
Weapons and Munitions Characteristics and Performance	Data file 29
Weapons and Munitions Delivery Parameters	Data file 25
Weapons and Munitions Description	Data file 25
80-Column Card Image for Personnel Data	Card Data Deck
Personnel Data	Data file 30

Figure II-9-C-1. Area Fire Constant Data Printouts

2. DATA FILE 29 80-COLUMN CARD IMAGE. In Figure II-9-C-2 is an illustration of this format. At the top line, far left, are the characters 1B, indicating that the data are for the Blue force and represent index 1 in combining UTDs with common dimensions and distribution of personnel and equipment. At the far left is the card number, preceded by ID 2901. The data between the far right and far left columns are actually entered into the file.

3. WEAPONS AND MUNITIONS CHARACTERISTICS AND PERFORMANCE. This format is illustrated in Figure II-9-C-3. The upper third of the figure shows data originally recorded in card ID 2901; i.e., lethal area against Red personnel, both forested and unforested. The center of the figure shows lethal areas for Red force equipment data initially transcribed on card ID 2902. The lower third of the figure shows deflection and range errors for six different range distances beginning with maximum at the left and proceeding to minimum at the right.

4. WEAPONS AND MUNITIONS DELIVERY PARAMETERS. This format is illustrated in Figure II-9-C-4. The weapon item code and the munition item code are read from card ID 2901 and the remaining data are read from card ID 2903. The columnar headings designate the following data. The data are stored in data file 25.

FILE-29 DATA CARD IMAGES

```
                                                                         2901            CARD  1
18   1   25   27     450    233      5    275    104      2              2901            CARD  2
18   2   26   27     450    233      5    275    104      2              2901            CARD  3
18   3   29   30     867    725    152    452    309     42              2901            CARD  4
18   4   50   51     867    725    152    452    309     42              2901            CARD  5
18   5   52   53    9911   7655    113   5058   3422     51              2901            CARD  6
18   6   52   54    6239   3129     85   3591   1873     57              2901            CARD  7
18   7   55   65    9401   7382    113   4949   3374     51              2901            CARD  8
18   8   55   66    6067   3093     85   3538   1859     57              2901            CARD  9
18   9   56   57   11268   6308    188   7130   3928    125              2901            CARD 10
18  10   58   59    1355   1008    124    577    248     35              2901            CARD 11
18  11   60   61  212224 117197   2375  92532  50195   1049              2901            CARD 12
                                                                         2902            CARD 13
18  01   21     2 22     9135    18137    181 38    18139    18140   18 2902  12        CARD 14
18  01  141    18142    18143   104144      9145    18146    18147    5 2902            CARD 15
18  01  148    63149    36150    18 70     18 72    18 71    18 73   36 2902            CARD 16
18  01   75    63 76    63 78   450110     63111   450112   450113  450 2902            CARD 17
18  01  114   450115   450116   450117    450118   450119   450120  450 2902            CARD 18
18  01  121   450122   450123    63124     36125    63126    63 85  104 2902            CARD 19
18  01   86   104 87   104 88    63 27    200 23   200 29     9 32  207 2902            CARD 20
18  01   33     9 50     9 52     9 54      9 56     9 60   104 62   63 2902            CARD 21
18  01   58     9 35     5 36     5185      9186    18187     5160    9 2902            CARD 22
18  01  161     5162     5163    18164     18165    18166    18167   18 2902            CARD 23
18  01  168   207169    18170    18171     18172    18173    18174  207 2902            CARD 24
18  01  175    18176        5                                           2902  35        CARD 25
18  02   21     2 22     9135    18137    181 38    18139    18140   18 2902  12        CARD 26
18  02  141    18142    18143   104144      9145    18145    18147    5 2902            CARD 27
18  02  148    63149    36150    18 70     18 72    18 71    18 73   36 2902            CARD 28
18  02   75    63 76    63 78   450110     63111   450112   450113  450 2902            CARD 29
18  02  114   450115   450116   450117    450118   450119   450120  450 2902            CARD 30
18  02  121   450122   450123    63124     36125    63125    63 85  104 2902            CARD 31
18  02   86   104 87   104 98    63 27    200 23   200 29     9 32  207 2902            CARD 32
18  02   33     9 50     9 52     9 54      9 56     9 60   104 62   63 2902            CARD 33
18  02   58     9 35     5 36     5185      9186    18187     5160    9 2902            CARD 34
18  02  161     5162     5163    18164     18165    18165    18167   18 2902            CARD 35
18  02  168   207169    18170    18171     18172    18173    18174  207 2902            CARD 36
18  02  175    18176        5                                           2902  35        CARD 37
18  03   78   867111   867112   867113    867114   867115   867116  867 2902   1        CARD 38
18  03  117   867118   867119   867120    867121   867122   867       2902   2        CARD 39
18  03   85   834 86   834 97   834168    834174   834 88   834 90  834 2902   3        CARD 40
18  03   91   834                                                       2902   4        CARD 41
18  03   75   780 76   780173   780 60    780 62   780 58   780         2902   5        CARD 42
18  03   21    42 70   725123   725124    725125   725126   725 27  725 2902   6        CARD 43
18  03   23   725 33   725                                              2902   7        CARD 44
```

Figure II-9-C-2. Data File 29 80-Column Card Image

RECORD NUMBER 1

BLUE WEAPON/MUNITION INDEX % 1 WEAPON ITEM CODE % 25 MUNITION ITEM CODE % 27

		STANDING	PRONE	FOXHOLE	
LETHAL AREA AGAINST RED PERSONNEL, NO FOREST %		450	200	5	(SQ. METERS)
LETHAL AREA AGAINST RED PERSONNEL, FOREST %		275	104	2	(SQ. METERS)

LETHAL AREAS AGAINST RED EQUIPMENT (SQ. METERS)

ITEM CODE	LETHAL AREA	ITEM CODE	LETHAL AREA	ITEM CODE	LETHAL AREA	ITEM CODE	LETHAL AREA
21	2	22	9	23	200	27	200
29	9	32	207	33	9	35	5
36	5	38	18	50	9	52	9
54	9	56	9	58	9	60	104
62	63	70	18	71	18	72	18
73	36	75	63	76	63	78	450
85	104	86	104	87	104	88	63
110	63	111	450	112	450	113	450
114	450	115	450	116	450	117	450
118	450	119	450	120	450	121	450
122	450	123	63	124	36	125	63
126	63	135	18	137	181	139	18
140	18	141	18	142	18	143	104
144	9	145	12	146	18	147	5
148	63	149	36	150	18	160	9
151	5	162	5	163	18	164	18
165	18	166	18	167	18	168	207
169	18	170	18	171	18	172	18
173	18	174	207	175	18	176	5
185	9	186	18	187	5		

DEFLECTION AND RANGE ERROR (SIGMA) AS FUNCTION OF RANGE

	MAXRANGE					MINRANGE
RANGE (METERS) %	4500	3610	2720	1830	940	50
SIGMA (METERS) %	18	16	14	12	11	9

Figure II-9-C-3. Weapons and Munitions Characteristics and Performance

BLUE WEAPON/MUNITION DELIVERY PARAMETERS (FILE-25)

WEAPON/MUNITION INDEX	WEAPON ITEM CODE	MUNITION ITEM CODE	SECONDS TO FIRE FIRST ROUND	SECONDS PER ROUND MAXIMUM RATE	SECONDS PER ROUND SUSTAINED RATE	ROUND LIMIT MAXIMUM RATE	MAXIMUM RANGE	MINIMUM RANGE	EFFECTS RADIUS
1	25	27	120	5	20	30	4500	50	150
2	26	27	120	5	20	30	4500	50	150
3	29	30	120	8	30	20	5500	840	175
4	50	51	120	6	20	30	11500	1000	175
5	52	53	120	15	60	12	18000	2500	360
6	52	54	120	15	60	12	18000	2500	360
7	55	65	120	15	60	12	14600	2000	360
8	55	66	120	15	60	12	14600	2000	360
9	56	57	120	45	120	6	22000	4200	470
10	58	59	120	45	120	4	32700	4200	518
11	60	61	1500	1200	1200	1	34000	5000	450
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0

Figure II-9-C-4. Weapons and Munitions Delivery Parameters

5. WEAPONS AND MUNITIONS DESCRIPTION. This format is illustrated in Figure II-9-C-5. The information is read from card ID 2904 and stored in data file 25. The mean angle of fire is printed in decidegrees and represents the angle between the horizontal and the direction of fire. The projectile length and caliber are printed in millimeters in the third and fourth columns, respectively.

6. EIGHTY-COLUMN CARD IMAGE, PERSONNEL DATA. This format is shown in Figure II-9-C-6. It lists the card image of data for loading data file 30 with personnel data.

7. PERSONNEL DATA. The personnel data, the postures that they may assume in combat, and the type of equipment available to afford protection are shown on this printout, Figure II-9-C-7. The table in the upper part of the figure has data originally transcribed in card ID 3001. The lower half of the figure has data in card ID 3002.

BLUEWEAPON/MUNITION DESCRIPTION(FILE-25)

WEAPON/MUNITION INDEX	MEAN ANGLE OF FIRE	LENGTH MM	CALIBER MM
1	590.	528	81
2	590.	528	81
3	590.	555	107
4	190.	831	105
5	180.	700	155
6	180.	700	155
7	290.	700	155
8	290.	700	155
9	270.	892	203
10	180.	1732	175
11	140.	13563	762
12	0.	0	0
13	0.	0	0
14	0.	0	0
15	0.	0	0
16	0.	0	0
17	0.	0	0
18	0.	0	0
19	0.	0	0
20	0.	0	0
21	0.	0	0
22	0.	0	0
23	0.	0	0
24	0.	0	0
25	0.	0	0
26	0.	0	0
27	0.	0	0
28	0.	0	0
29	0.	0	0
30	0.	0	0
31	0.	0	0
32	0.	0	0
33	0.	0	0
34	0.	0	0
35	0.	0	0
36	0.	0	0

Figure II-9-C-5. Weapons and Munitions Description

```
FILE-30 DATA CARD IMAGES

                                                                                  3001                CARD   1
18  1 30 63 10  3 80 17 5  2 90 10  0  3 94  3 3  3 85 10  5 30 30 40 2 3001   1                CARD   2
19  4 50 30 20 10 70 20 2  5  5 33 65  1 19 8010  6 90  9  1  3 94  3 3 3001   2                CARD   3
19  7 70 29  1 19 80  1 3                                                 3001   3                CARD   4
                                                                          3002                  CARD   5
19  1   1 37 4 4   2174 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002   1                CARD   6
18  1   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002   2                CARD   7
19  1  13189 2 2  14 521010  15 19 3 3                                    3002   3                CARD   8
18  2   1 37 4 4   2141 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002   4                CARD   9
19  2   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002   5                CARD  10
19  2  13189 2 2  14 521010                                               3002   6                CARD  11
19  3   1 37 4 4   2141 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002   7                CARD  12
18  3   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002   8                CARD  13
18  3  13189 2 2  14 521010                                               3002   9                CARD  14
19  4   1 37 4 4   2141 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002  10                CARD  15
19  4   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002  11                CARD  16
18  4  13189 2 2  14 521010                                               3002  12                CARD  17
19  5   1 37 4 4   2141 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002  13                CARD  18
19  5   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002  14                CARD  19
19  5  13189 2 2  14 521010  15 18 1 1                                    3002  15                CARD  20
19  6   1 37 4 4   2141 4 4   3140 2 2   4 41 4 4   51851111   6 29 5 5 3002  16                CARD  21
18  6   7 35 4 4   8 25 5 5   9186 3 3  10 71 5 5  11 75 4 4  12188 5 5 3002  17                CARD  22
19  6  13189 2 2  14 521010                                               3002  18                CARD  23
19  7   1 37 4 4   2141 4 4   3140       4 41 4 4   51851111   6 29 5 5 3002  19                CARD  24
19  7   7 35 4 4   8 25 5 5   9185      10 71 5 5  11 75 4 4  12188 5 5 3002  20                CARD  25
18  7  13189 2 2  14 521010                                               3002  21                CARD  25
                                                                          3001                  CARD  27
18  1 30 60 10  3 80 17 5  2 90 10  0  3 94  3 3  3 85 10  5 30 30 40 2 3001   1                CARD  28
18  4 50 30 20 10 70 70 2  5  5 33 65  1 19 8010  6 90  9  1  3 94  3 3 3001   2                CARD  29
18  7 70 29  1 19 80  1 3                                                 3001   3                CARD  30
                                                                          3002                  CARD  31
18  1   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002   1                CARD  32
18  1   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002   2                CARD  33
18  1  13176 1 1                                                          3002  2A                CARD  34
18  2   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002   3                CARD  35
18  2   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002   4                CARD  36
18  2  13176 1 1                                                          3002  4A                CARD  37
18  3   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6150 5 5 3002   5                CARD  38
18  3   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002   6                CARD  39
18  3  13176 1 1                                                          3002  6A                CARD  40
18  4   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002   7                CARD  41
18  4   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002   8                CARD  42
18  4  13176 1 1                                                          3002  8A                CARD  43
18  5   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002   9                CARD  44
18  5   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002  10                CARD  45
18  5  13176 1 1                                                          3002 10A                CARD  46
18  6   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002  11                CARD  47
18  6   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002  12                CARD  48
18  6  13176 1 1                                                          3002 12A                CARD  49
18  7   1 35 4 4   2 36 3 3   3147 4 4   4152 4 4   5187 3 3   6160 5 5 3002  13                CARD  50
18  7   7161 9 9   8185 6 6   9 32 4 4  10 71 4 4  11 73 6 6  12162 5 5 3002  14                CARD  51
18  7  13176 1 1                                                          3002 14A                CARD  52
                                                                          9999                  CARD  53
```

Figure II-9-C-6. Data File 30 80-Column Card Image

RECORD 1 BLUE PERSONNEL PROTECTION DATA

ACTIVITY INDEX 1 (STAY)

PERSONNEL NOT PROTECTED BY EQUIPMENT

	STANDING	PRONE	FOXHOLE
POSTURE BREAKDOWN, UNWARNED %	30	60	10
POSTURE BREAKDOWN, WARNED %	3	80	17

TIME TO RETURN TO UNWARNED POSTURE % 5 (MINUTES)

PROTECTION OF PERSONNEL BY EQUIPMENT

PROTECTION PRIORITY	ITEM CODE	PERSONNEL PER ITEM	CASUALTIES PER LOSS
1	37	4	4
2	174	4	4
3	140	2	2
4	41	4	4
5	185	11	11
6	29	5	5
7	35	4	4
8	25	5	5
9	186	3	3
10	71	5	5
11	75	4	4
12	188	5	5
13	189	2	2
14	52	10	10
15	18	3	3

Figure II-9-C-7. Personnel Data

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR AREA FIRE

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 10

TACFIRE DATA INPUT PROGRAMS

1. INTRODUCTION. The TACFIRE data input programs create and load the data file required by the TACFIRE Model. These data consist of target priority and method of attack tables.

2. ROUTINES:

a. General. The routines described in the following paragraphs comprise the TACFIRE data input programs.

b. Routine TACLD. This routine controls the other routines of the TACFIRE data input. It also creates and initializes the required data file. After that has been completed, it calls utility routines LOAD25 and DUMP25.

c. Routine LOAD25. This routine is responsible for the reading and editing of the data cards. It also stores the data extracted from the cards in the appropriate position on the file.

d. Routine OSORT. This routine is called by LOAD25 for the purpose of ranking a list of values in ascending order.

e. Routine DUMP25. This routine provides a listing of the file contents in tabular form.

3. FILES. Data file 25 is loaded by the TACFIRE data input programs.

NOTES

APPENDIX A

TACFIRE DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for tactical fire direction systems are documented in Appendix A, TACFIRE Model Input Requirements, to Chapter 9 of the Period Processor (Section IV).

NOTES

APPENDIX B

TACFIRE DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. The input data of the TACFIRE Model are loaded by the routines described in this appendix. TACLD initializes the data file and calls routine LOAD25 to read data cards and load the data, and routine DUMP25 to provide a formatted listing of the data. LOAD25 is supported by a utility sort routine, OSORT.

2. ROUTINE TACLD:

a. Purpose. Program TACLD is the driver for loading constant data target priority and method of attack tables required by the DIVWAG TACFIRE Model. These data are loaded onto data file 25.

b. Input Variables. Input variables consist of TACFIRE data entered on cards 2501, 2502, and 2503. (Refer to LOAD25 routine.)

c. Output Variables. TACFIRE data stored on data file 25. (Refer to DUMP25 routine.)

d. Logical Flow (Figure II-10-B-1):

(1) Block 1. A call is made to routine GETFLE to retrieve the file name table.

(2) Block 2. A call is made to the routine CREATE to create the TACFIRE record on data file 25 with one record of 27092 words.

(3) Block L90. Initialize priority area of data file 25.

(4) Block L100. Initialize method of attack area of data file 25.

(5) Block 3. Call routine LOAD25 to read the data cards and load data file 25.

(6) Block 4. If no errors were detected in LOAD25, a call is made to routine DUMP25 to list data file 25.

(7) Block 5. The file name table is listed and the routine is terminated.

3. ROUTINE LOAD25:

a. Purpose. Routine LOAD25 loads the TACFIRE Model's target priority and method of attack tables onto data file 25.

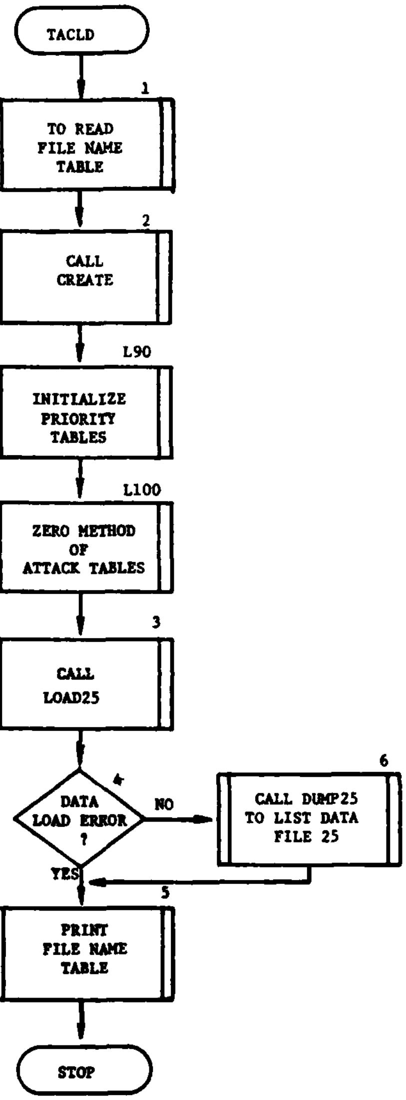


Figure II-10-B-1. Routine TACLD

b. Input Variables:

Name	Source	Contents
KARD(20)	Card	TACFIRE Model's data file 25 entries on card formats 2501, 2502, and 2503.
IRNGP(4,5,77)	Card	TACFIRE Model's target priority data for each of four possible target sizes and 77 activity-type combinations.
MTHATK(20,5,77)	Card	TACFIRE Model's method of attack table array. A table of 20 choices exists for each of the 77 possible activity-type target combinations.
NERR	Call	Error counter index.
KFORCE	Card	Force indicator on card being processed.
JFORCE	Card	Force indicator of previous card processed.

c. Output Variables:

Name	Destination	Contents
IRNGP(4,5,77)	DF25	Target priority tables.
MTHATK(20,5,77)	DF25	Method of attack tables.

d. Logical Flow (Figure II-10-B-2):

(1) Blocks L50, 1, 2, and 3. The logic of LOAD25 begins by reading each data load card, printing the card image, and storing the card image on a temporary scratch file.

(2) Block L70, 6, 7, 8, L76, and L80. The scratch file containing the TACFIRE card images is read and edited. Each card image is read. If the card image is a 2502 type all nonnumeric data are deleted. All card images are then rewritten to another scratch file.

(3) Block 4. Initialization of the data arrays in common is accomplished by setting the entries of the target priority table array, IRNGP, to 100. These values are used in the model to indicate that no priorities have been assigned to the target in the data load. Valid target combinations are given priorities in the load data with values 1-99. The method of attack array, MTHATK, is zeroed in the initialization process.

(4) Blocks 5 and 9. The first card in the deck is read and checked. If it is not a 2501 group card with no data entries, transfer control to block L210.

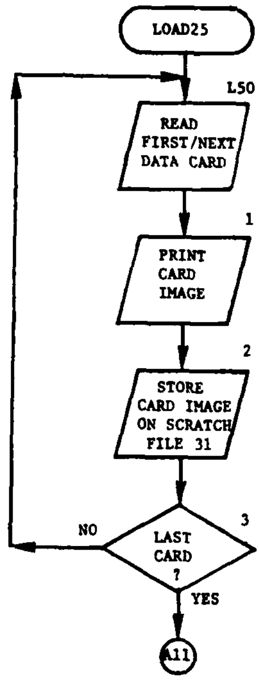


Figure II-10-B-2. Routine LOAD25 (Continued on Next Page)

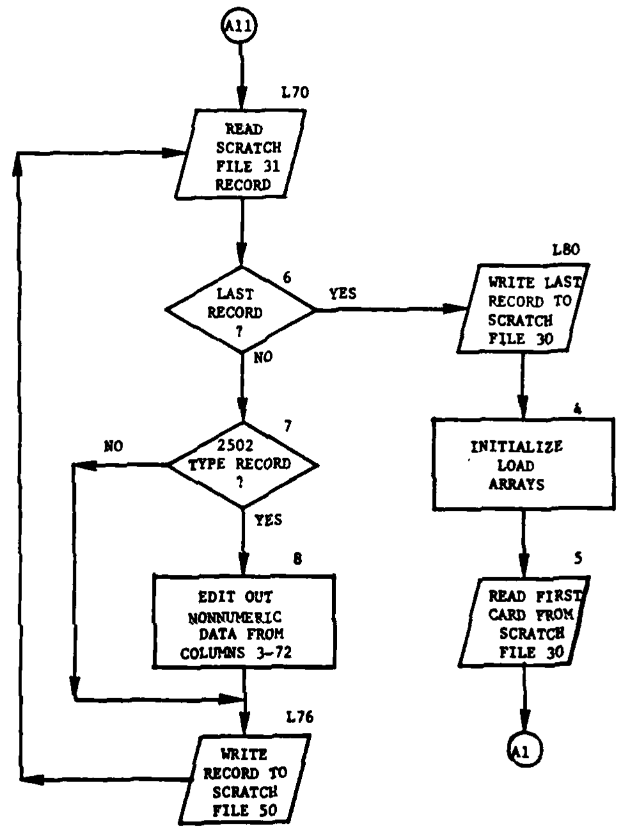


Figure II-10-B-2. Routine LOAD25 (Continued)

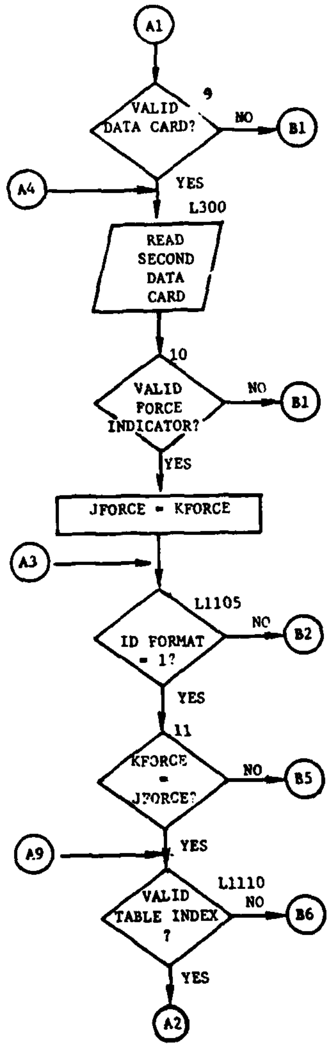


Figure II-10-B-2. Routine LOAD25 (Continued)

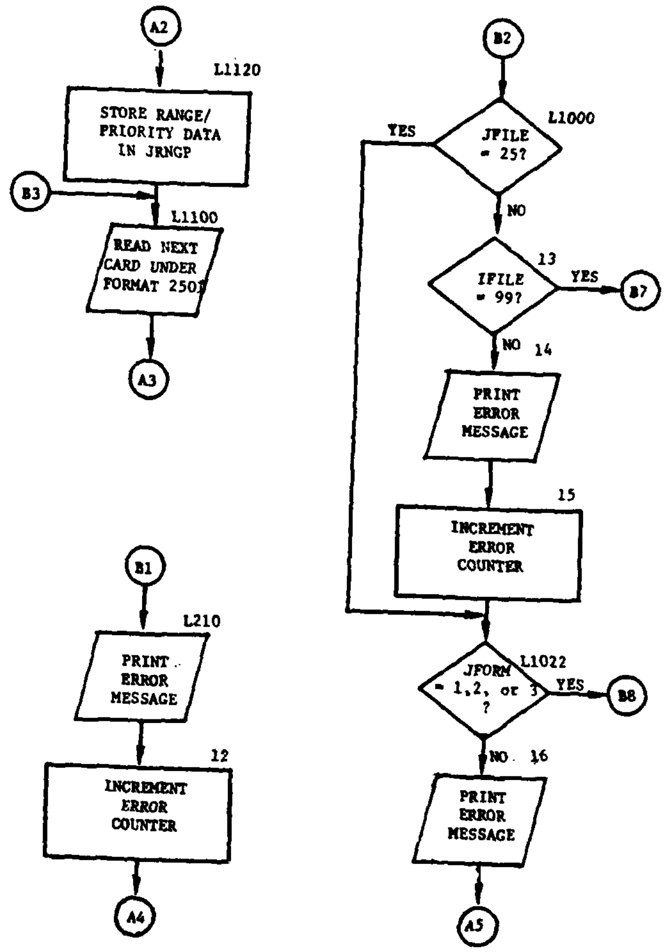


Figure II-10-B-2. Routine LOAD25 (Continued)

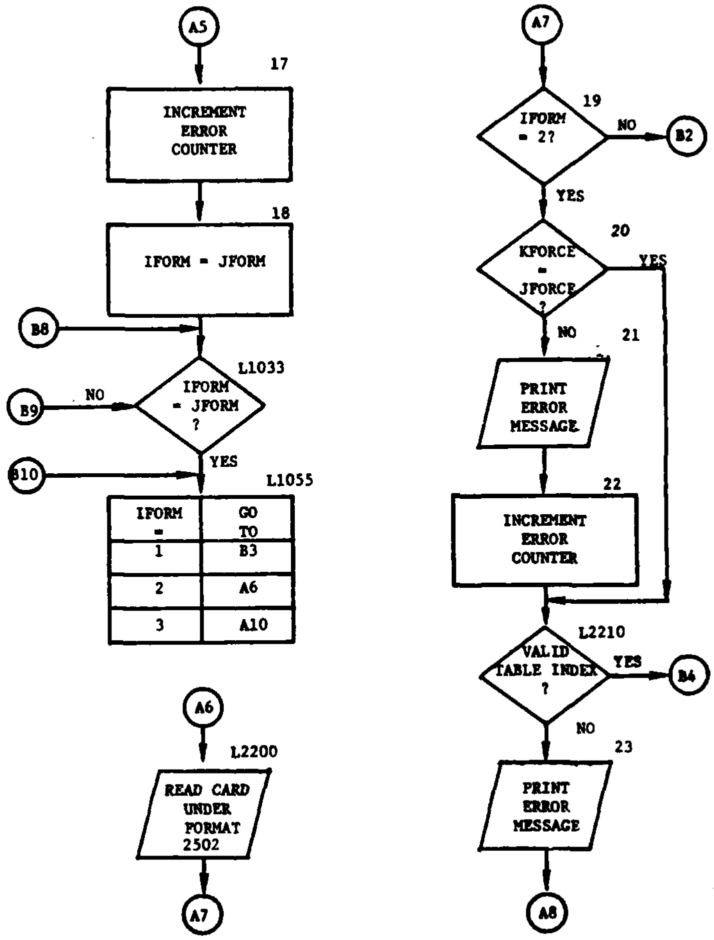


Figure II-10-B-2. Routine LOAD25 (Continued)

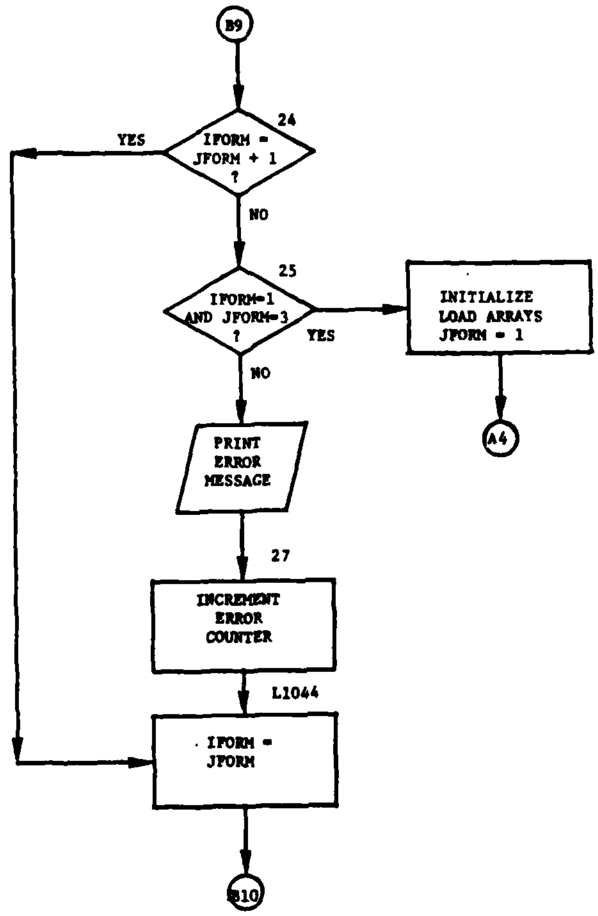


Figure II-10-B-2. Routine LOAD25 (Continued)

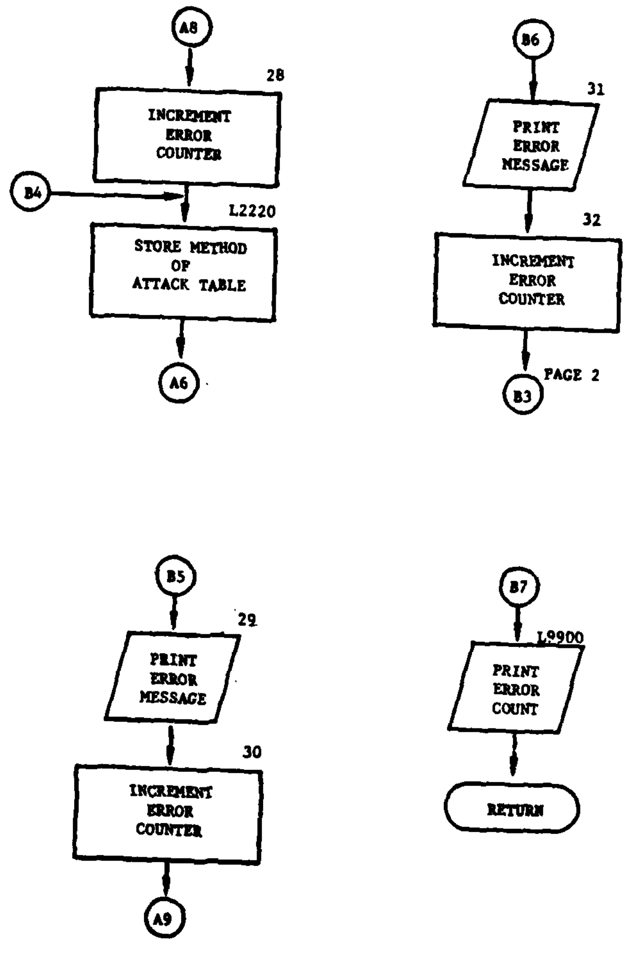


Figure II-10-B-2. Routine LOAD25 (Continued)

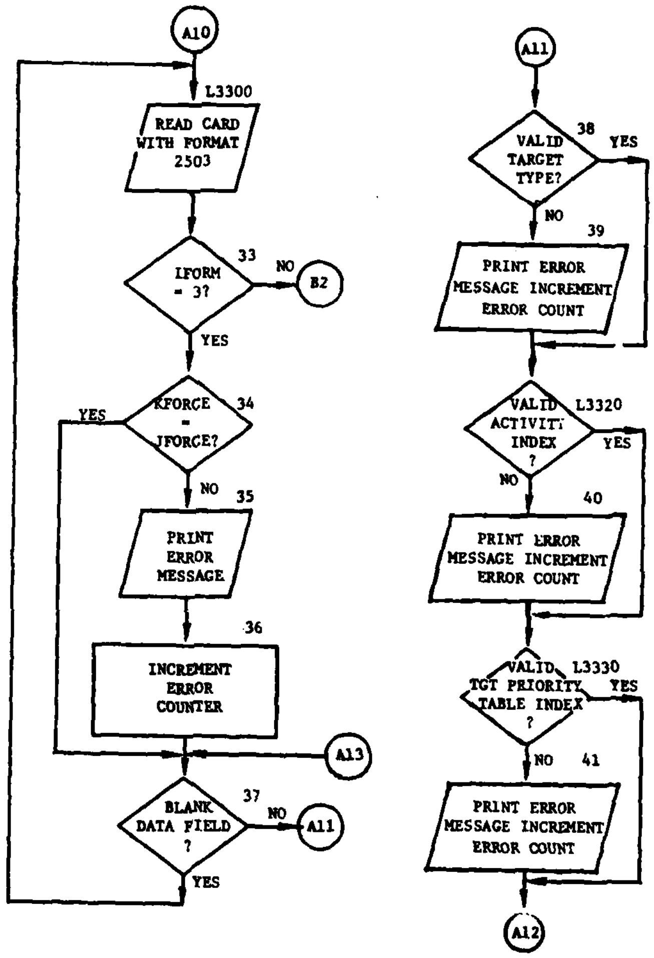


Figure II-10-B-2. Routine LOAD25 (Continued)

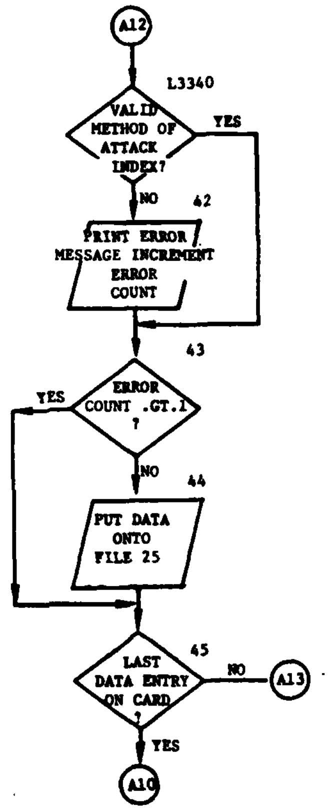


Figure II-10-B-2. Routine LOAD25 (Concluded)

(5) Blocks L300, 10, and L310. The second data card must have a valid force designator, R or B. If it does not, transfer control to block L210. The card contains the first set of target priority data.

(6) Blocks L1105, 11, and L1110. These blocks edit the card identification format, the force designator, and the target priority table index.

(7) Block L1120. The data on a single card, type 2501, contain two range cutoff values and three priority values (totaling five data entries) for each of four different target sizes. The data are stored in array IRNGP until all of the force's 2501 and 2502 card data have been processed. The data are then transferred to data file 25 using the indexing information contained on card format, identification 2503.

(8) Block L1100. The remainder of card format 2501 data for the force are read beginning with this block.

(9) Blocks L210, 12, 14, 15, 16, 17, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, L9900, 35, 36, 39, 40, 41, and 42. The logical process in each of these blocks prints an error message identifying the data error and increments an error counter index, NERR.

(10) Block L1033. Control transfers to the proper logic to process the card identification format. Card format identification groups 2501, 2502, and 2503 must be read in sequence for each respective force.

(11) Blocks 24 and 25. If the last card type read corresponds to the next sequence of the previously read card, control goes to block L1044. If the last card type read was a 2501 and the previous card was a 2503, control goes to block L1036; otherwise, control goes to block 26.

(12) Block L1036. Initialize load arrays and set JFORM equal to one. Control goes to block L300.

(13) Blocks L2200 through L2220. The method of attack table data for each weapon/munition combination listed are read into the MTHATK array for each method of attack table index. The data are stored in groups containing 10 data entries. Each card contains up to four groups.

(14) Blocks L3300 through 45. The logic represented in these blocks reads the data on the third format, 2503. Each set of data on this card format is required to associate a target combination with the correct target priority table and method of attack table. The data are transferred separately for each combination. If an error has been detected previously, none of the data are transferred to data file 25.

4. ROUTINE OSORT:

a. Purpose. Routine OSORT is used to rank a list of N values in ascending order. The values are input in array LIST(N) in any order and are output in ranked order.

b. Input Variables:

Name	Source	Contents
LIST	Call	Array used to store values that are to be arranged.
N	Call	Total number of values in LIST array.

c. Output Variables:

Name	Destination	Contents
LIST	Call	Array containing ranked packed priority values for each target combination.

d. Logical Flow (Figure II-10-B-3):

(1) Block 1. Set variable for the maximum number of passes to be made through array to be sorted.

(2) Block 2. Establish/increment outer do loop index. If all values have been sorted, return control to the calling routine.

(3) Blocks 3 and 4. Set inner loop scan limit and initialize MAX and INDEX.

(4) Block 5. Establish/increment inner do loop index. If inner do loop index is greater than the inner loop scan limit, control goes to block 6. Otherwise, control goes to block 8.

(5) Blocks 6 and 7. If the inner loop indexed value is less than MAX, control goes to block 5; otherwise, set MAX equal to that value and set INDEX equal to its index position.

(6) Block 8. If INDEX is equal to the inner loop scan limit, control goes to block 2.

(7) Block 9. Interchange the old and new maximum values. Control goes to block 2.

5. ROUTINE DUMP25

a. Purpose. Routine DUMP25 is called by routine TACLD to produce a printed output record of the data loaded onto data file 25 and a summarized listing of the TACFIRE Model's target priority tables for each force.

b. Input Variables: Input variables listed below are output variables in routine LOAD25.

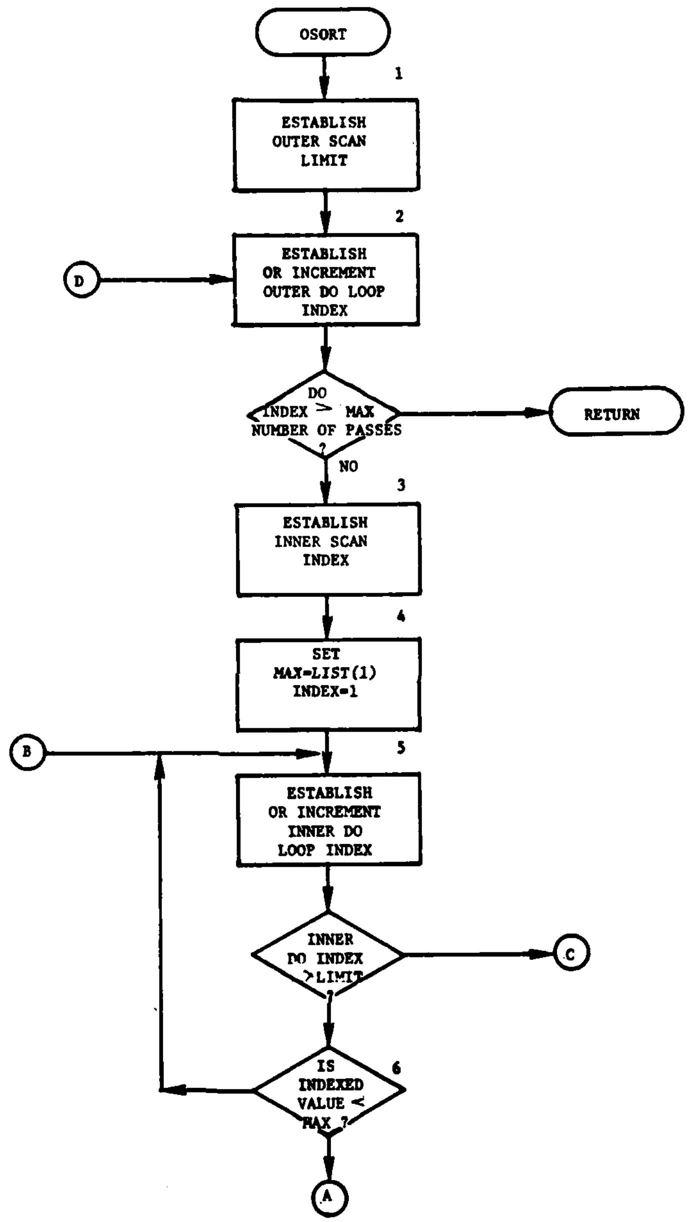


Figure II-10-B-3. Routine OSORT (Continued on Next Page)

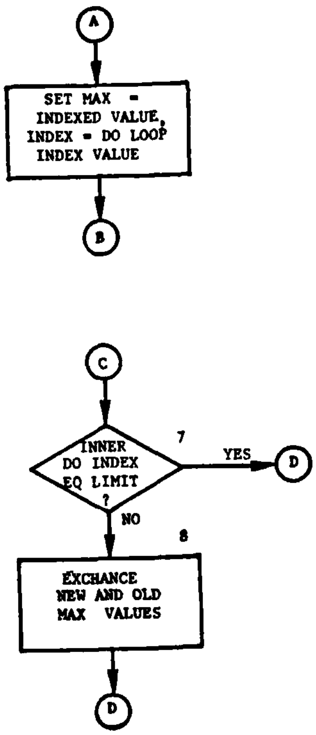


Figure II-10-B-3. Routine OSORT (Concluded)

Name	Source	Contents
IRNGP(4,5,77)	DF25	Target priority tables.
MTHATK(20,5,77)	DF25	Method of attack tables.

c. Output Variables: The variables used as input are the output variables to the printer.

d. Logical Flow (Figure II-10-B-4):

(1) Block 1. The labels used in each print header are initialized.

(2) Block 2. Routine DUMP25 processes and lists output for each force. This block initializes or increments a loop to process each force.

(3) Block L500. Routine GETWRD is called twice: once to retrieve the priority tables from data file 25 and once to retrieve the method of attack tables from data file 25.

(4) Blocks 3 and 4. The do loop indexes to extract data from the target type and method of attack tables are initialized or incremented.

(5) Blocks 5 and 6. The header and priority table are printed for this combination.

(6) Block 7. A summarized listing of target combinations in order of priority is produced after the TACFIRE priority and method of attack tables have been listed for the force. To rank the data according to the priority value, the packed priority value consisting of the priority, type, activity, table index, and range indexes is computed. The packed priority value is in array IRANK. The original target priority scale will always be retained.

(7) Block 8. A method of attack table is printed for the specific target type and target activity data being scanned.

(8) Block L3000. If there are more activity types to be scanned, transfer control to block 3.

(9) Block L4000. If there are more target types to be scanned, transfer control to block 4.

(10) Block 9. Routine OSORT is called to rank the entries in array IRANK in ascending order.

(11) Block 10. A summarized listing of target combinations, in order of decreasing priority, is printed as part of the TACLD output records.

(12) Block L5000. If there is another force to be processed, transfer control to block 2; otherwise, return control to the calling routine.

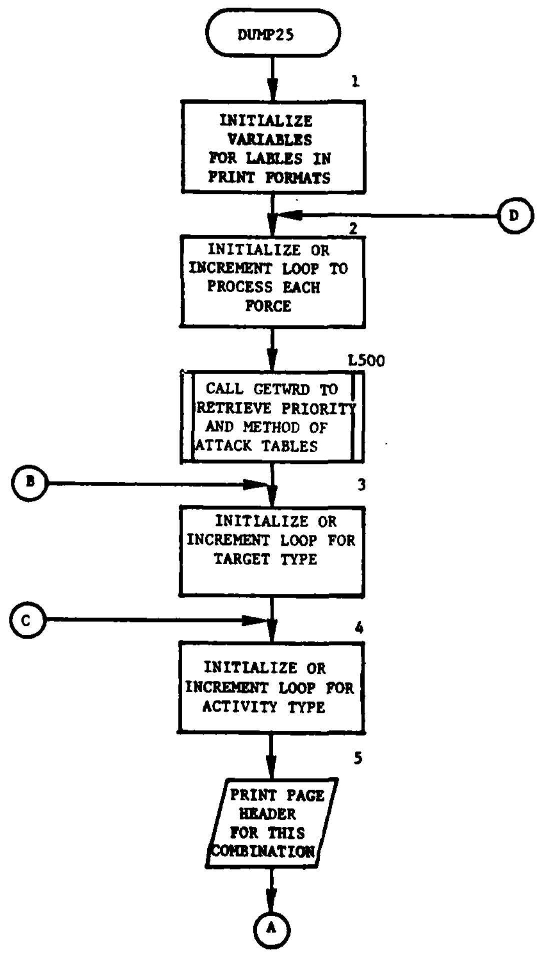


Figure II-10-B-4. Routine DUMP25 (Continued on Next Page)

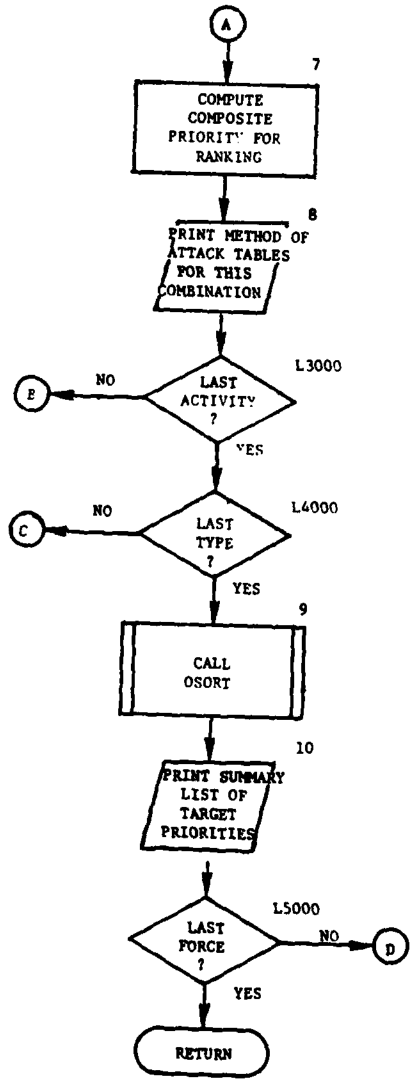


Figure II-10-B-4. Routine DUMP25 (Concluded)

NOTES

APPENDIX C

TACFIRE DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Three types of printout formats are generated each time data are entered into the TACFIRE constant data input files. These printouts are listed in Figure II-10-C-1. These printouts were designed to assist those preparing constant data input to validate the data in the files and make necessary revisions as may be required.

Printout Title	Data Source
Data File 25 Data Card Image	Card data deck
Priority and Method of Attack	Data file 25
Summary Report of Target Priorities	Data file 25

Figure II-10-C-1. TACFIRE Constant Data Printouts

2. DATA FILE 25 DATA CARD IMAGE. The 80-column card image data is illustrated in Figure II-10-C-2. At the top of the figure at the far left is the number 1 followed by the letter B indicating that the card type is 1 and the force is Blue. At the far right is the card number 1, the sequence of that card within this subdeck; that is, it is the second card in the deck illustrated in the figure. The third column from the right has the card ID 2501, indicating that this is range priority type data. By referring to the discussion of card type 1 and ID 2501, the reader may determine the meaning of the other entries on this line. For example, the 011 at the left on the top line refers to the weapon munition index. For a complete description of the input card images, refer to Appendix A to Chapter 9 of the Period Processor, TACFIRE Model Input Requirements.

3. PRIORITY AND METHOD OF ATTACK TABLES. The second TACFIRE constant data input printout is labeled Priority and Method of Attack Tables. It is illustrated in Figure II-10-C-3. The headings on the various tables are similar to those for the card formats. At the top of the figure is shown the table of priority by target size and range to that target. These data are taken from card ID 2501. The lower half of the figure has the method of attack table and is a composite of information taken from cards 2502 and 2503. The order of choice of weapons with the weapon/munition index are arrayed against the number of volleys to be fired on each of the target sizes listed.

4. SUMMARY REPORT OF TARGET PRIORITIES. The last format of the printout displays the summary data on target priorities. It is illustrated in Figure II-10-C-4. The data headings in this table are those used in the card formats in describing the data entries. This table permits a review of the logic of priority and range choice.

```
FILE-25 DATA CARD IMAGE

                                                                      2501          CARD   1
18 011   30002  400027 2  30001  500 12 3  30001 1000017 4  30001 1500 1N2501       CARD   2
18 021   30002  400025 2  30001  500 14 3  30001 1000013 4  30001 1500 2N2501       CARD   3
18 031   30002  400025 2  30001  500 14 3  30001 1000013 4  30001 1500 2N2501       CARD   4
18 041   30003  400034 2  30002  500035 3  30002 1000025 4  30002 15000 3N2501      CARD   5
18 051   30004  40005N 2  30003  500045 3  30003 1000045 4   100N    10 NN2501      CARD   6
18 061   30002  400023 2  30001  500012 3  30001 1000013 4  30001 1500 1N2501       CARD   7
18 071   30002  400025 2  30001  500024 3  30001 1000034 4  30003 150005N2501       CARD   8
18 081   30002  400025 2  30001  500014 3  30001 1000035 4   100N   100NN2501       CARD   9
18 091   30003  400045 2  30002  500034 3  30002 1000034 4   100N   100NN2501       CARD  10
18 101   30004  40005N 2  30003  500045 3  30003 1000045 4   100N   100NN2501       CARD  11
18 111   30002  400023 2  30001  500012 3  30001 1000013 4  30001 15000 2N2501      CARD  12
18 121   30002  400034 2  30001  500023 3  30002 1000034 4   100N   100NN2501       CARD  13
18 131   30002  400035 2  30002  500025 3  30002 1000025 4   100N   100NN2501       CARD  14
18 141   30003  40004N 2  30003  500035 3  30002 1000024 4   100N   100NN2501       CARD  15
18 151   30004  40005N 2  30003  500045 3  30003 1000045 4   100N   100NN2501       CARD  16
18 161   30002  400023 2  30001  500012 3  30001 1000012 4   100N   100NN2501       CARD  17
18 171   30002  400025 2  30001  500013 3  30001 1000024 4   100N   100NN2501       CARD  18
18 181   30002  400035 2  30001  500013 3  30001 1000012 4   100N   100NN2501       CARD  19
18 191   30003  400036 2  30002  500024 3  30002 1000023 4   100N   100NN2501       CARD  20
18 201   30003  400036 2  30003  500035 3  30002 1000024 4   100N   100NN2501       CARD  21
18 211 100002 3000034 2 100001 3000012 3 100001 3000012 4   100N   100NN2501       CARD  22
18 221 100002 3000034 2 100002 3000035 3 100002 3000036 4   100N   100NN2501       CARD  23
18 231 100003 3000034 2 100002 3000024 3 100001 3000024 4   100N   100NN2501       CARD  24
18 241   30001  500012 2  30001  800012 3   100N    100NN 4   100N   100NN2501       CARD  25
18 251   30001  500013 2  30001  800013 3  30002 1000024 4   100N   100NN2501       CARD  26
18 261   30002  500024 2  30002  800024 3  30001 1000013 4   100N   100NN2501       CARD  27
18 271    100N   100NN 2  30004  500048 3  50003 1000036 4 10000N 200003 52501      CARD  28
18 281    100N   100NN 2  30003  500048 3  50003 1000036 4 10000N 200003 52501      CARD  29
18 291    100N   100NN 2  30002  500024 3  50002 1000023 4 10000N 200002 32501      CARD  30
18 301    100N   100NN 2  30005  500057 3  50005 1000057 4 10000N 200005 62501      CARD  31
18 311    100N   100NN 2  30003  500034 3  50002 1000023 4 10000N 200002 32501      CARD  32
18 321   30003  500057 2  30001 1000037 3  50001 1000037 4   100N   100NN2501       CARD  33
18 331   30003  500057 2  30003 1000047 3  50003 1000057 4   100N   100NN2501       CARD  34
18 341   30003  500057 2  30004 1000069 3  50004 1000068 4   100N   100NN2501       CARD  35
18 351    100N   100NN 2  50004 1000068 3  50005 1000068 4   100N   100NN2501       CARD  36
18 361    100N   100NN 2  50006 1000078 3  50006 1000078 4   100N   100NN2501       CARD  37
18 371    100N   100NN 2  50007 1000089 3  50007 1000089 4   100N   100NN2501       CARD  38
18 381   50001 1000011 2 100001 3000011 3 100001 3000011 4   100N   100NN2501       CARD  39
18 391   50002 1000034 2 100002 3000034 3 100002 3000034 4   100N   100NN2501       CARD  40
18 401   50001 1000011 2 100001 3000011 3 100002 3000011 4   100N   100NN2501       CARD  41
18 411   30005  500067 2  50006 1000078 3 100007 2000069 4   100N   100NN2501       CARD  42
                                                                       2502         CARD  43
18 1   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 12502   1   CARD  44
18 1   5 51 12 33 34 N  6 71 12 33 34 N  7101 12 33 34 3                  2502   2   CARD  45
18 2   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 12502   3   CARD  46
18 2   5 51 12 33 34 N  6 71 12 33 34 N  7101 12 33 34 3                  2502   4   CARD  47
18 3   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 12502   5   CARD  48
1832   5 51 12 33 34 N  6 71 12 33 34 N  7101 12 33 34 3                  2502   6   CARD  49
18 4   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 12502   7   CARD  50
18 4   5 51 12 33 34 N  6 71 12 33 34 N  7101 12 33 34 3                  2502   8   CARD  51
18 5   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 12502   9   CARD  52
18 5   5 51 12 33 34 N  6 71 12 33 34 N  7101 12 33 34 3                  2502  10   CARD  53
18 6   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 N2502  11   CARD  54
18 6   5 51 12 33 34 N  6 71 12 33 34 3  7101 12 33 34 3  5 41 12 23 34 N2502  12   CARD  55
18 7   1 91 12 33 34 N  2 61 12 33 34 N  3 81 12 33 34 N  4111 N2 03 14 N2502  13   CARD  56
18 7   5 51 12 33 34 N  6 71 12 33 34 3  7101 12 33 34 3  8 41 12 23 34 N2502  14   CARD  57
```

Figure II-10-C-2. Data File 25 80-Column Card Image

BLUE PRIORITY AND METHOD OF ATTACK TABLES

FOR RED TAPGETS OF TYPE 1 (INFANTRY) IN ACTIVITY 1 (STAY)

PRIORITY BY TARGET SIZE AND RANGE TO TARGET

TARGET SIZE	PRIORITY (R<R1)	R1 (METERS)	PRIORITY (R1<R<R2)	R2 (METERS)	PRIORITY (R>R2)
1 (PLT)	3	3000	3	4000	6
2 (CO)	3	3000	3	5000	5
3 (BN)	2	3000	2	10000	4
4 (BDE)	100	100	100	100	100

METHOD OF ATTACK

ORDER OF CHOICE	WEAPON/MUNITION INDEX	VOLLIFS ON PLT	VOLLIES ON CO	VOLLIES ON BN	VOLLIFS ON BDE
1	5	0	2	3	0
2	7	0	2	3	0
3	4	1	2	3	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	6	0	2	3	0
8	8	0	2	3	0
9	9	0	2	3	0
10	11	0	0	1	0
11	10	0	0	3	0
12	0	0	0	0	0
13	0	0	0	0	0
14	0	0	0	0	0
15	0	0	0	0	0
16	0	0	0	0	0
17	0	0	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	0	0

Figure II-10-C-3. Priority and Method of Attack

SUMMARY REPORT OF TARGET PRIORITIES

BLUE FIRING ON RED

PRIORITY	TARGET TYPE	TARGET ACTIVITY	TARGET SIZE	RANGE TO TARGET
1	ARTY G/H	FIRE	BN	10000 -- 30000
1	ARTY MSL	STAY	PLT	0 -- 5000
1	ARTY MSL	STAY	PLT	5000 -- 10000
1	ARTY MSL	STAY	PLT	10000 -- 999999
1	ARTY MSL	STAY	CO	0 -- 10000
1	ARTY MSL	STAY	CO	10000 -- 30000
1	ARTY MSL	STAY	CO	30000 -- 999999
1	ARTY MSL	STAY	BN	10000 -- 30000
1	ARTY MSL	STAY	BN	30000 -- 999999
1	ARTY MSL	FIRE	PLT	0 -- 5000
1	ARTY MSL	FIRE	PLT	5000 -- 10000
1	ARTY MSL	FIRE	PLT	10000 -- 999999
1	ARTY MSL	FIRE	CO	0 -- 10000
1	ARTY MSL	FIRE	CO	10000 -- 30000
1	ARTY MSL	FIRE	CO	30000 -- 999999
1	ARTY MSL	FIRE	BN	0 -- 10000
1	ARTY MSL	FIRE	BN	10000 -- 30000
1	ARTY MSL	FIRE	BN	30000 -- 999999
1	ADA GUNS	STAY	BN	0 -- 3000
1	ADA GUNS	STAY	BN	3000 -- 10000
1	ADA GUNS	MOVE	PLT	0 -- 3000
1	ADA GUNS	MOVE	PLT	3000 -- 5000
1	ADA GUNS	MOVE	CO	0 -- 3000
1	ADA GUNS	MOVE	CO	3000 -- 8000
1	ADA GUNS	FIRE	PLT	0 -- 3000
1	ADA GUNS	FIRE	PLT	3000 -- 5000
1	ADA GUNS	FIRE	CO	0 -- 3000
1	ADA GUNS	FIRE	CO	3000 -- 8000
1	ENGINEER	ENGINEER	CO	0 -- 3000
1	ENGINEER	ENGINEER	BN	0 -- 5000
2	INFANTRY	STAY	BN	0 -- 3000
2	INFANTRY	STAY	BN	3000 -- 10000
2	INFANTRY	MOVE	CO	0 -- 3000
2	INFANTRY	MOVE	CO	3000 -- 5000
2	INFANTRY	MOVE	BN	0 -- 3000
2	INFANTRY	MOVE	BN	3000 -- 10000
2	INFANTRY	ATTACK	PLT	0 -- 3000
2	INFANTRY	ATTACK	PLT	3000 -- 4000
2	INFANTRY	ATTACK	CO	5000 -- 999999
2	INFANTRY	ATTACK	BN	10000 -- 999999
2	INFANTRY	DEFEND	PLT	0 -- 3000
2	INFANTRY	DEFEND	PLT	3000 -- 4000
2	INFANTRY	DEFEND	BN	3000 -- 10000
2	INFANTRY	WITHDRAW	PLT	0 -- 3000
2	INFANTRY	WITHDRAW	BN	10000 -- 999999
2	ARMOR	MOVE	CO	0 -- 3000
2	ARMOR	MOVE	BN	0 -- 3000
2	ARMOR	MOVE	BDE	0 -- 3000

Figure II-10-C-4. Summary of Target Priorities

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR TACFIRE

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 11

AIR GROUND ENGAGEMENT DATA INPUT PROGRAMS

1. INTRODUCTION. The Air Ground Engagement data input programs create and load the data files used to store the data required by the Air Ground Engagement Model. These data include tables of weapon descriptions and engagement results.

2. ROUTINES. The routine AIRLD comprises the Air Ground Engagement data input. It reads and edits the Air Ground Engagement data cards and loads the data on the appropriate file. After the load is complete, a formatted dump of each file is printed.

3. FILES. The following data files are used to store the Air Ground Engagement Model data:

- Air Ground Engagement data - data file 26
- Engagement results table - data file 27

NOTES

APPENDIX A

AIR GROUND ENGAGEMENT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for air ground engagements are documented in Appendix A, Air Ground Engagement Model Input Requirements, to Chapter 10 of the Period Processor (Section IV).

NOTES

APPENDIX B

AIR GROUND ENGAGEMENT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. This appendix provides the program description of routine AIRLD which loads the input data to the Air Ground Engagement Model. Routine SNATCH is a utility routine used to access the appropriate tables on data file 26. SNATCH is documented in Section VII.

2. ROUTINE AIRLD:

a. Purpose. The AIRLD routine loads and dumps DIVWAG data files 26 and 27.

b. Input Variables:

Name	Source	Contents
ITASK	Card	Task to be performed (load or dump).
MT	Card	Type of mission that applies to data on the card.
IPRIOR	Card	Aircraft/munition mix.
ESTACT	Card	Estimated activity of target.
IAD	Card	Air defense code.
IFC	Card	Position in table where data will be put.
AMNT	Card	Number to be put in the table.
IPENN	Card	Penetration code.
IAC	Card	Aircraft item code.
IACMN	Card	Minimum number of aircraft required.
IACMX	Card	Maximum number of aircraft required.
IABRT	Card	Minimum number of aircraft required to perform the mission.
IFLMN	Card	Minimum amount of fuel required.
IFLMX	Card	Maximum amount of fuel required.
IGAGE	Card	Engagement range.
MIX	Card	Aircraft/munition mix.

Name	Source	Contents
MUN	Card	Munition item code.
ROUNDS	Card	Number of rounds being carried by the aircraft designated by mix.
IPERSN	Card	Number of personnel required.
ISLANT	Card	Average slant range.
IACC	Card	Accuracy of the weapon.
MIC	Card	Munition item code.
DAYATK	Card	Percent effectiveness of weapon in daytime when enemy attacks.
DAYDEF	Card	Percent effectiveness of weapon in daytime when enemy is defending.
NITATK	Card	Percent effectiveness of weapon at night when enemy attacks.
NITDEF	Card	Percent effectiveness of weapon at night when enemy is defending.
ISPEED	Card	Percent effectiveness of weapon at various aircraft speeds.
IALT	Card	Altitude code.
IRSPAR	Card	Percent effectiveness of weapon in rough terrain, sparse forest.
IRMED	Card	Percent effectiveness of weapon in rough terrain, medium forest.
IRDENG	Card	Percent effectiveness of weapon in rough terrain, dense forest, good intelligence.
IRDENP	Card	Percent effectiveness of weapon in rough terrain, dense forest, poor intelligence.
IGSPAR	Card	Percent effectiveness of weapon in good terrain, sparse forest.
IGMED	Card	Percent effectiveness of weapon in good terrain, medium forest.

Name	Source	Contents
IGDENG	Card	Percent effectiveness of weapon in good terrain, dense forest, good intelligence.
IGDENP	Card	Percent effectiveness of weapon in g . terrain, dense forest, poor intelligence.
ITYPEA	Card	Average vulnerable area of aircraft to type A kill.
ITYPEB	Card	Average vulnerable area of aircraft to type B kill.
ITYPEC	Card	Average vulnerable area of aircraft to type C kill.
ITYPED	Card	Average vulnerable area of aircraft to type D kill.

c. Output Variables:

Name	Destination	Contents
ACAVL	DF26	List of aircraft, munition, and weapon types.
TABLE	DF26	Data contained in Air Ground Engagement data file 26.
TABLE2	DF26	Data contained in Air Ground Engagement data file 26.
DATA	DF27	Engagement results table data for data file 27.

d. Logical Flow (Figure II-11-B-1):

(1) Blocks 1 and 2. A call is made to routine GETFLE to retrieve the file name table and the first card is read.

(2) Block 3. If the first card was a DUMP card control goes to block L479. If it was a LOAD card, processing continues.

(3) Blocks 4 and 5. Data file 26 is created and initialized.

(4) Block 6 and 7. Data file 27 is created and initialized.

(5) Blocks 8, 9, and 10. Read the data cards and print card images and write card images onto a scratch file. When an end of data card is encountered rewind the scratch file.

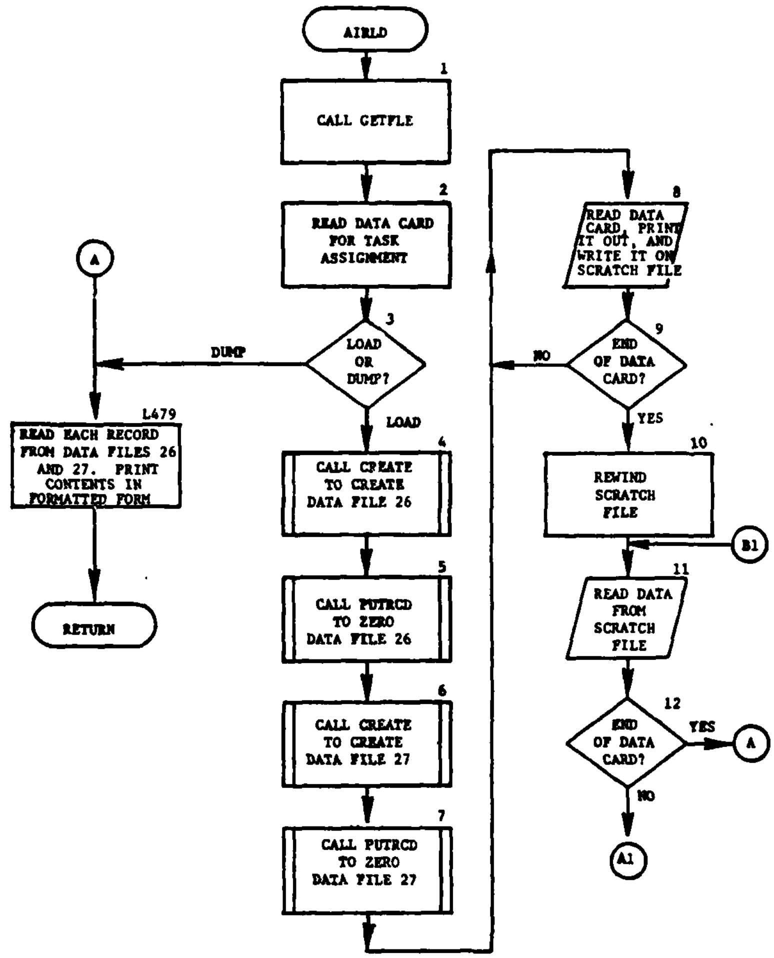


Figure II-11-B-1. Routine AIRLD (Continued on Next Page)

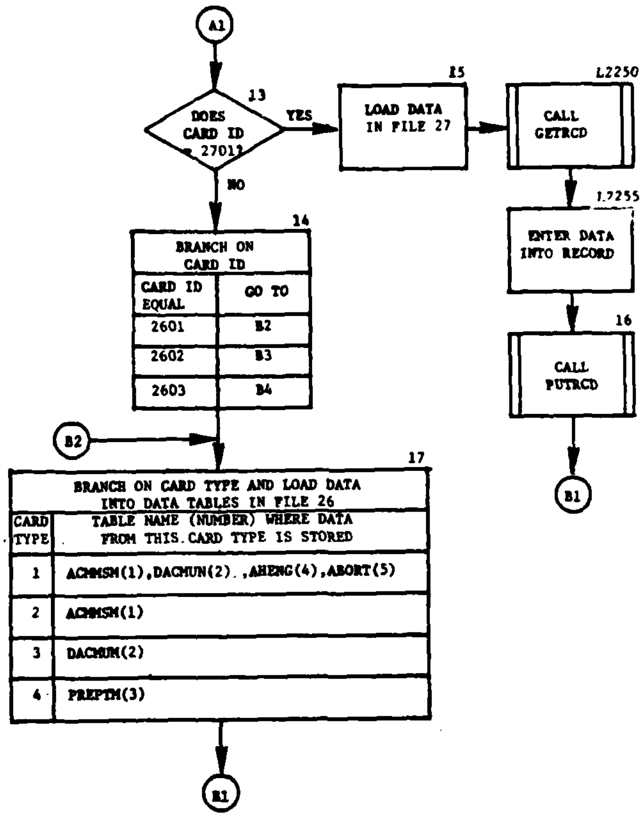


Figure II-11-B-1. Routine AIRLD (Continued)

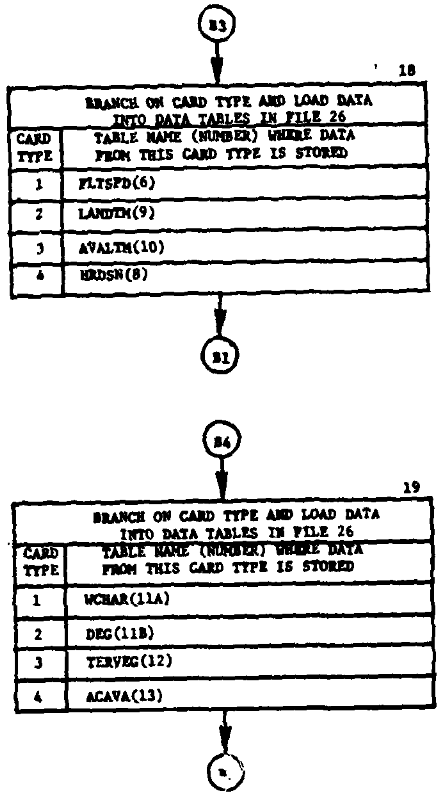


Figure II-11-B-1. Routine AIRLD (Concluded)

(6) Blocks 11 and 12. Read a card image from the scratch file. If an end of file was sensed control transfers to block L479.

(7) Block 13. If the data card ID is 2701 control goes to block 15; Otherwise, control goes to block 14.

(8) Block 14. Control transfers to block 17, 18, or 19 if the card ID is 2601, 2602, or 2603 respectively.

(9) Block 15. Determine the number of the data file 27 record to be loaded.

(10) Block L2250, L2255 and 16. Retrieve the record from data file 27, place the card data into the record, and replace the record onto data file 27. Control returns to block 11.

(11) Block 17. Place aircraft data in appropriate area of data file 26. Control transfers to block 11.

(12) Block 15. Place munition data in appropriate area of data file 26. Control returns to block 11.

(13) Block 19. Place air defense weapon data in appropriate area of data file 26. Control transfers to block 11.

(14) Block L479. Each record of data files 26 and 27 is retrieved and printed in formatted form. Control returns to the calling routine.

NOTES

APPENDIX C

AIR GROUND ENGAGEMENT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. The 15 different printout formats listed in Figure II-11-C-1 are generated each time the constant data files of the Air Ground Engagement Model are recreated. These printouts are generated in the order in which they are listed. These printouts list all the data entered in the files and were designed for assistance to review and validate the data, and take remedial action if needed. In the figure are the titles of the printouts and the source from which these data were extracted. In most cases the data were taken from data file 26, but engagement results of air strikes were extracted from data file 27. The second column from the right lists the data card ID from which the information was initially read, and the last column on the right further identifies the individual card from which the basic data were extracted. Each of the printouts can thus be related to a specific file and, further, to the card that initially input the data.

2. DATA FILE 26 80-COLUMN CARD IMAGE. The first printout, Figure II-11-C-2, is a card image of the data that was read into data file 26. This printout consists of data that was punched into cards ID 2601, 2602, and 2603 in card types 1 through 4 in all three cases. Many of these card formats were produced in multiple copies to acquire and load all the pertinent data. The type of data entered into each of the card images that are pictured on these printouts may be interpreted from the columnar headings of the card format and by reference to Appendix A to Chapter 10, Air Ground Engagement Model Input Requirements, of the Period Processor.

3. AIRCRAFT AND MUNITIONS MINIMUM AND MAXIMUM REQUIREMENTS. The format of this printout is shown in Figure II-11-C-3. The aircraft and munition item codes and the minimum and maximum requirements of each are listed for the various mission types to be flown. There is also a listing for penetration missions for the Blue force and a similar set of listings for the Red force.

4. AIRCRAFT PREPARATION DELAY TIMES. The format of this printout is shown in Figure II-11-C-4. The time required to prepare an aircraft to fly a mission depends upon the number of aircraft flying the mission. The time is, therefore given in minutes for groups of five or less, for groups of five to ten, and for groups of more than 10 for all combinations of aircraft and mission types to be flown.

5. AIRCRAFT ENGAGEMENT PARAMETERS. The format of this printout is shown in Figure II-11-C-5. The aircraft engagement range is given in meters for each mission type that is to be flown by each of three classes of aircraft, two direct aerial fire support (DAFS) and one close air support (CAS).

6. AIRCRAFT MINIMUM ABORT DATA. The format of this printout is shown in Figure II-11-C-6. The number of aircraft required to successfully complete a mission is given for each class of aircraft that is to fly each mission. If fewer aircraft reach the target, the mission will be aborted.

Printout Titles	Data Source File	Card ID	Card Type
80-Column Card Image, Data File 26	Card data deck	All	All
Aircraft and Munitions Minimum and Maximum Requirements per Mission Type	Data file 26	2601	1
Aircraft Preparation Delay Times	Data file 26	2601	4
Aircraft Engagement Parameters	Data file 26	2601	1
Minimum Aircraft Abort Data	Data file 26	2601	1
Aircraft Landing Times	Data file 26	2602	2
Aircraft Flight Speeds	Data file 26	2602	1
Aircraft New Mission Availability Time	Data file 26	2602	3
Aircraft Degradation for Maintenance	Data file 26	2602	4
Aircraft Vulnerable Areas for Kills by Weapon Type	Data file 26	2603	4
Air Defense Weapon Characteristics	Data file 26	2603	1
Air Defense Weapons Effectiveness	Data file 26	2603	2
Air Defense Weapon Degradation from Terrain and Vegetation	Data file 26	2603	3
80-Column Card Images, Data File 27	Card data deck	All	All
Engagement Results of Air Strikes	Data file 27	2701	1

Figure II-11-C-1. Air Ground Engagement Constant Data Printouts

```
1B 13 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B 23 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B 53 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B 63 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B 93 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B103 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B133 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B143 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B173 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
1B183 88 2 4 1 162 2513000                                          98 4    1          1000  2601   1
2B01TK CO DAY GD VZ 1 90     4  7  250                                                     2 2601  2A
2B02TK CO DAY PR VZ 1 90     4  7  250                                                     2 2601  2B
2B05MEC IN DAY GD VZ1 90     4  7  250                                                     2 2601  2C
2B06MEC IN DAY PR VZ1 90     4  7  250                                                     2 2601  2D
2B09ARTBTR DAY GD VZ1 90     3  7  250                                                     2 2601  2E
2B10ARTBTR DAY PR VZ1 90     3  7  250                                                     2 2601  2F
2B13INF CO DAY GD VZ1  7  250 90     4                                                     2 2601  2G
2B14INF CO DAY GD VZ1  7  250 90     4                                                     2 2601  2H
2B17AFB DAY GD VZ   1 90     4  7  250                                                     2 2601  2I
2B18AFB DAY PR VZ   1 90     4  7  250                                                     2 2601  2J
3B01TK CO DAY GD VZ 1 90     6  7  500                                                     2 2601  3A
3B02TK CO DAY PR VZ 1 90     6  7  500                                                     2 2601  3B
3B05MEC IN DAY GD VZ1 90     6  7  500                                                     2 2601  3C
3B06MEC IN DAY PR VZ1 90     6  7  500                                                     2 2601  3D
3B09ARTBTR DAY GD VZ1 90     6  7  500                                                     2 2601  3F
3B10ARTBTR DAY PR VZ1 90     6  7  500                                                     2 2601  3F
3B13INF CO DAY GD VZ1  7  500 90     6                                                     2 2601  3G
3B14INF CO DAY PR VZ1  7  500 90     6                                                     2 2601  3H
3B17AFB DAY GD VZ   1 90     6  7  500                                                     2 2601  3I
3B18AFB DAY PR VZ   1 90     6  7  500                                                     2 2601  3J
4B01TK CO DAY GD VZ  88   50   50 200                                                        2601  4A
4B02TK CO DAY PR VZ  88   50   50 200                                                        2601  4B
4B05MEC IN DAY GD VZ 88   50   50 200                                                        2601  4C
4B06MEC IN DAY PP V7 88   50   50 200                                                        2601  4D
4B09ARTBTR DAY GD V7 88   50   50 200                                                        2601  4E
4B10ARTBTR DAY PR V7 98   50   50 200                                                        2601  4F
```

Figure II-11-C-2. Data file 26 80-Column Card Image

BLUE AIRCRAFT AND MUNITIONS MIN/MAX REQUIREMENTS

NON-PENETRATION MISSIONS

MIS. TYPE	A/C ITEM CODE	NO. A/C MIN	NO. A/C MAX	MUNITIONS BY ITEM CODES (ROUNDS) 90 MIN	90 MAX	7 MIN	7 MAX	0 MIN	0 MAX	0 MIN	0 MAX	0 MIN	0 MAX	PERSONNEL MIN	PERSONNEL MAX	FUEL (GALS) MIN	FUEL (GALS) MAX
1	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
1	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
2	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
5	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
6	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9	88	2.	4.	3.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
9	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
10	88	2.	4.	3.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
10	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
13	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
14	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
14	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
17	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
17	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
18	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
18	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PENETRATION MISSIONS

MIS. TYPE	A/C ITEM CODE	NO. A/C MIN	NO. A/C MAX	MUNITIONS BY ITEM CODES (ROUNDS) 90 MIN	90 MAX	7 MIN	7 MAX	0 MIN	0 MAX	0 MIN	0 MAX	0 MIN	0 MAX	PERSONNEL MIN	PERSONNEL MAX	FUEL (GALS) MIN	FUEL (GALS) MAX
1	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
1	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
2	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
5	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
6	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9	88	2.	4.	3.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
9	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
10	88	2.	4.	3.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
10	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.
13	98	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
14	88	2.	4.	4.	6.	250.	500.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	162.	251.

Figure II-11-C-3. Aircraft and Munitions Minimum/Maximum Requirements Mission Type

BLUE AIRCRAFT PREPARATION DELAY TIMES (MINUTES)

NON-PENETRATION MISSIONS

MIS. TYPE	A/C TYPE / ITEM CODE	1 / 88	2 / 98	3 / 85	4 / 86	5 / 87	6 / 91	7 / 99	8 / 0	9 / 0
1	NO. A/C									
	0 - 5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5 - 10	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10 +	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	NO. A/C									
	0 - 5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5 - 10	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10 +	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	NO. A/C									
	0 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10 +	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	NO. A/C									
	0 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10 +	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	NO. A/C									
	0 - 5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5 - 10	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10 +	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure II-11-C-4. Aircraft Preparation Delay Times

BLUE AIRCRAFT ENGAGEMENT PARAMETERS

NON-PENETRATION MISSIONS

	DAFS 1	DAFS 2	CAS
MISS. TYPE	RANGE (METERS)	RANGE (METERS)	RANGE (METERS)
1	3000.	0.	1000.
2	3000.	0.	1000.
3	0.	0.	0.
4	0.	0.	0.
5	3000.	0.	1000.
6	3000.	0.	1000.
7	0.	0.	0.
8	0.	0.	0.
9	3000.	0.	1000.
10	3000.	0.	1000.
11	0.	0.	0.
12	0.	0.	0.
13	3000.	0.	1000.
14	3000.	0.	1000.
15	0.	0.	0.
16	0.	0.	0.
17	3000.	0.	1000.
18	3000.	0.	1000.

Figure II-11-C-5. Aircraft Engagement Parameters

BLUE AIRCRAFT MINIMUM ABORT DATA

NON-PENETRATION MISSIONS

MIS. TYPE	DAFS 1	DAFS 2	CAS
1	1.	0.	1.
2	1.	0.	1.
3	0.	0.	0.
4	0.	0.	0.
5	1.	0.	1.
6	1.	0.	1.
7	0.	0.	0.
8	0.	0.	0.
9	1.	0.	1.
10	1.	0.	1.
11	0.	0.	0.
12	0.	0.	0.
13	1.	0.	1.
14	1.	0.	1.
15	0.	0.	0.
16	0.	0.	0.
17	1.	0.	1.
18	1.	0.	1.
19	0.	0.	0.
20	0.	0.	0.

PENETRATION MISSIONS

MIS. TYPE	DAFS 1	DAFS 2	CAS
1	1.	0.	1.
2	1.	0.	1.
3	0.	0.	0.
4	0.	0.	0.
5	1.	0.	1.
6	1.	0.	1.
7	0.	0.	0.
8	0.	0.	0.
9	1.	0.	1.
10	1.	0.	1.
11	0.	0.	0.
12	0.	0.	0.
13	1.	0.	1.
14	1.	0.	1.
15	0.	0.	0.
16	0.	0.	0.

Figure II-11-C-6. Minimum Aircraft Abort Data

7. AIRCRAFT LANDING TIME. The format of this printout is shown in Figure II-11-C-7. The time required for an aircraft to land after it has entered the traffic pattern is given in minutes for each aircraft type according to the number of aircraft in the formation and the visibility conditions.

8. AIRCRAFT FLIGHT SPEEDS. The format of this printout is shown in Figure II-11-C-8. The average flight speed is given for each aircraft under four visibility conditions at cruise speed and under other specified conditions which that aircraft type would fly. The speeds are printed in knots.

9. AIRCRAFT NEW MISSION AVAILABILITY TIME. The format of this printout is shown in Figure II-11-C-9. The time required to make an aircraft available for a new mission depends upon the amount of damage incurred in the previous mission, or, if no damage, it depends upon the amount of time the aircraft was flown. Figure II-11-C-9 shows the time required for repairs after B-, C-, and D-kills, and the time to prepare an aircraft after a flight of less than 60 minutes and a flight of more than 60 minutes for each aircraft type to be flown. The times are in minutes.

10. AIRCRAFT DEGRADATION FOR MAINTENANCE. The format of this printout is shown in Figure II-11-C-10. The number of aircraft available for a mission is expressed as a decimal fraction of those that were available on the first day (D-Day). A number is shown for each aircraft type for a 14-day period, with the first day being D-Day.

11. AIRCRAFT VULNERABLE AREAS. The format of this printout is shown in Figure II-11-C-11. The numbers in the left-most column are the weapon types and the three two-digit numbers going across the page are the aircraft types. The four decimal numbers under the headings A, A+B, A+B+C, and A+B+C+D are the average vulnerable areas in square meters for each of the four kill categories when the specified aircraft type is fired on by the specified weapon type.

12. AIR DEFENSE WEAPON CHARACTERISTICS. The format of this printout is shown in Figure II-11-C-12. The average number of rounds fired per engagement, maximum effective range, average slant range and the average error are given for each weapon type under four different visibility conditions. The distance each weapon type is employed behind the FEBA is given in the last column. The weapon types are listed in the first column on the left.

13. AIR DEFENSE WEAPONS EFFECTIVENESS. The format of this printout is shown in Figure II-11-C-13. The column on the left is the weapon types and the next four columns indicate the percent of each of these weapons that would engage the target under each of the combinations of time of day and whether the enemy is attacking or defending. The remaining columns give the percent effectiveness of each weapon type when firing at targets moving at different speeds. The various speeds are given by the top number heading each column.

14. AIR DEFENSE WEAPON DEGRADATION FROM TERRAIN AND VEGETATION. The format of this printout is shown in Figure II-11-C-14. The column on the left is the weapon types. The percent of these weapons that are unaffected by the different conditions of terrain roughness, amount of vegetation, intelligence, and target altitude is given for each weapon type.

BLUE AIRCRAFT LANDING TIMES IN MINUTES FROM
ENTRY INTO TRAFFIC PATTERN TO PARKED ON PAD

VISIBILITY%	DAY - GOOD			DAY - POOR			NIGHT - GOOD			NIGHT - POOR		
AIRCRAFT%	0-5	5-10	10 +	0-5	5-10	10 +	0-5	5-10	10 +	0-5	5-10	10 +
A/C ITEM CODE												
88	10.	15.	20.	15.	20.	25.	15.	20.	25.	0.	0.	0.
98	5.	7.	10.	10.	20.	25.	10.	20.	25.	10.	20.	25.
85	10.	15.	20.	15.	20.	25.	15.	20.	25.	0.	0.	0.
86	10.	15.	20.	15.	20.	25.	15.	20.	25.	0.	0.	0.
87	10.	15.	20.	15.	20.	25.	15.	20.	25.	0.	0.	0.
91	10.	15.	20.	10.	15.	20.	15.	20.	25.	10.	20.	25.
99	5.	7.	10.	10.	20.	25.	10.	20.	25.	10.	20.	25.

Figure II-11-C-7. Aircraft Landing Times

BLUE AIRCRAFT FLIGHT SPEEDS (KNOTS)

A/C ITEM CODE	VISX	CRUISE SPEED DAY GOOD	CRUISE SPEED DAY POOR	CRUISE SPEED NIGHT GOOD	CRUISE SPEED NIGHT POOR	HELICOPTERS ONLY ATTACKING TARGET DAY GOOD	HELICOPTERS ONLY ATTACKING TARGET DAY POOR	HELICOPTERS ONLY ATTACKING TARGET NIGHT GOOD	HELICOPTERS ONLY ATTACKING TARGET NIGHT POOR	RECON / SURV ONLY OVER TARGET DAY GOOD	RECON / SURV ONLY OVER TARGET DAY POOR	RECON / SURV ONLY OVER TARGET NIGHT GOOD	RECON / SURV ONLY OVER TARGET NIGHT POOR	CAS ONLY ATTACKING TARGET DAY GOOD	CAS ONLY ATTACKING TARGET DAY POOR	CAS ONLY ATTACKING TARGET NIGHT GOOD	CAS ONLY ATTACKING TARGET NIGHT POOR
38		130.	50.	50.	0.	110.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
98		440.	440.	440.	440.	0.	0.	0.	0.	1200.	1200.	1200.	1200.	440.	440.	440.	440.
85		119.	50.	50.	0.	110.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
86		92.	50.	50.	0.	110.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
87		155.	50.	50.	0.	110.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91		225.	225.	225.	225.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
99		440.	440.	440.	440.	0.	0.	0.	0.	1200.	1200.	1200.	1200.	0.	0.	0.	0.

Figure II-11-C-8. Aircraft Flight Speeds

TIME DELAY IN MINUTES BEFORE RETURNED BLUE AIRCRAFT ARE AVAILABLE FOR A NEW MISSION

A/C ITEM CODE	B - KILLS	C - KILLS	D - KILLS	UNDAMAGED A/C MISSION TIME (MIN) 0-60	60 +
88	555.	240.	120.	15.	15.
98	0.	0.	0.	0.	0.
85	555.	240.	120.	15.	15.
86	555.	240.	120.	20.	20.
87	555.	240.	120.	15.	15.
91	144.	720.	120.	20.	20.
99	0.	0.	8.	0.	0.

Figure II-11-C-9. Aircraft Availability Times for New Mission

DECIMAL FRACTION OF BLUE AIRCRAFT AVAILABLE
AFTER SUBTRACTING THOSE DOWN FOR MAINTENANCE

A/C ITEM CODE	D-DAY	D-DAY + 1	D-DAY + 2	D-DAY 3	D-DAY + 4	D-DAY + 5	D-DAY + 6	D-DAY + 7	D-DAY + 8	D-DAY + 9	D-DAY +10	D-DAY +11	D-DAY +12	D-DAY +13
88	1.000	.990	.950	.900	.800	.800	.800	.800	.750	.750	.700	.600	.500	.400
98	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
85	1.000	.990	.950	.900	.800	.800	.800	.800	.750	.750	.700	.600	.500	.400
86	1.000	.990	.950	.900	.800	.800	.800	.800	.750	.750	.700	.600	.500	.400
87	1.000	.990	.950	.900	.800	.800	.800	.800	.750	.750	.700	.600	.500	.400
91	1.000	.990	.950	.900	.800	.800	.800	.800	.750	.750	.700	.600	.500	.400
99	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Figure II-11-C-10. Aircraft Degradation for Maintenance

BLUE AIRCRAFT VULNERABLE AREAS FOR KILLS BY PFC WEAPON TYPES

(SQUARE METERS)

WEPN ITEM CODE	A/C ITEM CODE	A	A+B	A+B+C	A+B+C+D
22	98	.50	1.01	2.08	10.24
22	98	.04	.30	1.35	16.15
22	95	.50	1.01	2.08	13.24
22	96	.50	1.01	2.08	10.24
22	87	.50	1.01	2.08	10.24
22	91	.50	1.01	2.08	13.24
70	98	3.01	4.43	7.29	9.44
70	98	3.52	5.24	8.50	14.25
70	85	3.01	4.43	7.29	9.44
70	96	3.01	4.43	7.29	9.44
70	87	3.01	4.43	7.29	9.94
70	91	3.01	4.43	7.29	9.94

Figure II-11-C-11. Aircraft Vulnerable Areas for Kills by Weapon Type

RED AIR DEFENSE WEAPON CHARACTERISTICS

WEPN ITEM CODE	ROUNDS FIRED PER ENGAGEMENT DAY GOOD	DAY POOR	NIGHT GOOD	NIGHT POOR	MAXIMUM EFFECTIVE RANGE (METERS) DAY GOOD	DAY POOR	NIGHT GOOD	NIGHT POOR	AVERAGE SLANT RANGE (METERS) DAY GOOD	DAY POOR	NIGHT GOOD	NIGHT POOR	AVERAGE WEAPON ERROR (MILS) DAY GOOD	DAY POOR	NIGHT GOOD	NIGHT POOR	DISTANCE EMPLOYED BEHIND FEBA (METERS)
22	49.	49.	16.	16.	1400.	800.	1400.	800.	370.	370.	370.	370.	40.	40.	40.	40.	500.
70	273.	100.	73.	27.	2000.	800.	2000.	800.	1420.	450.	1420.	450.	10.	10.	10.	10.	1500.
71	784.	784.	784.	784.	3000.	3000.	3000.	3000.	1390.	1390.	1390.	1390.	10.	10.	10.	10.	3000.
72	26.	26.	26.	26.	4000.	800.	0.	0.	1600.	800.	0.	0.	10.	10.	10.	10.	4000.
73	52.	52.	52.	52.	6000.	6000.	6000.	6000.	1990.	1990.	1990.	1990.	10.	10.	10.	10.	4000.
74	1.	1.	1.	1.	45000.	45000.	45000.	45000.	5000.	5000.	5000.	5000.	1.	1.	1.	1.	25000.
76	1.	1.	1.	0.	45000.	45000.	45000.	0.	5000.	5000.	5000.	0.	1.	1.	1.	0.	25000.
78	1.	1.	0.	0.	2000.	800.	0.	0.	1060.	450.	0.	0.	1.	1.	0.	0.	600.
79	3.	3.	3.	3.	35000.	35000.	35000.	35000.	5000.	5000.	5000.	5000.	1.	1.	1.	1.	17000.

Figure II-11-C-12. Air Defense Characteristics

RED AIR DEFENSE WEAPONS EFFECTIVENESS DATA FACTORS

WEPN ITEM CODE	FRACTION DECIDING TO ENGAGE				FACTOR FOR MODIFYING ROUNDS FIRED PER ENGAGEMENT AIRCRAFT SPEED (KNOTS)													
	DAY		NIGHT															
	ATK	DEF	ATK	DEF	40	60	80	100	120	140	160	180	200	220	240	260	280	300+
22	50.0	50.0	3.0	3.0	99.9	99.9	95.0	93.0	90.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	25.0	25.0
70	50.0	50.0	4.0	4.0	99.9	99.9	95.0	93.0	90.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	25.0	25.0
71	50.0	50.0	50.0	50.0	99.9	99.9	95.0	93.0	90.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	25.0	25.0
72	50.0	50.0	4.0	4.0	99.9	99.9	95.0	93.0	90.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	25.0	25.0
73	50.0	50.0	50.0	50.0	99.9	99.9	95.0	93.0	90.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	25.0	25.0
74	50.0	50.0	50.0	50.0	0.0	0.0	0.0	0.0	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
76	50.0	50.0	50.0	50.0	0.0	0.0	0.0	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
78	50.0	50.0	0.0	0.0	99.9	99.9	99.9	99.9	99.9	95.0	95.0	90.0	90.0	85.0	85.0	75.0	75.0	50.0
79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure II-11-C-13. Air Defense Weapons Effectiveness

FACTORS FOR RED AIR DEFENSE WEAPON
EFFECTIVENESS VS. TERRAIN AND VEGETATION

WEPN ITEM CODE	ALT (FEET)	GOOD TERRAIN (FORESTATION) SPARSE	GOOD TERRAIN MED	GOOD TERRAIN DENSE GOOD INTEL	GOOD TERRAIN DENSE POOR INTEL	ROUGH TERRAIN (FORESTATION) SPARSE	ROUGH TERRAIN MED	ROUGH TERRAIN DENSE GOOD INTEL	ROUGH TERRAIN DENSE POOR INTEL
22	NOE	.900	.800	.600	.300	.950	.750	.500	.300
22	1500	1.000	.950	.750	.500	.950	.900	.750	.500
22	6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	NOE	.900	.800	.600	.300	.950	.750	.500	.300
70	1500	1.000	.950	.750	.500	.950	.900	.750	.500
70	6000	1.000	.950	.800	.600	.950	.900	.750	.500
71	NOE	.900	.800	.600	.300	.950	.750	.500	.300
71	1500	1.000	.950	.750	.500	.950	.900	.750	.500
71	6000	1.000	.950	.800	.600	.950	.900	.750	.500
72	NOE	.900	.800	.600	.300	.950	.750	.500	.300
72	1500	1.000	.950	.750	.500	.950	.900	.750	.500
72	6000	1.000	.950	.800	.600	.950	.900	.750	.500
73	NOE	.900	.800	.600	.300	.950	.750	.500	.300
73	1500	1.000	.950	.750	.500	.950	.900	.750	.500
73	6000	1.000	.950	.800	.600	.950	.900	.750	.500

Figure II-11-C-14. Air Defense Weapon Degradation from Terrain and Vegetation

15. ENGAGEMENT RESULTS. Two printouts deal with the results of air strikes, the 80-column card images of data file 27 and the engagement results of air strikes, which includes Blue aircraft striking Red targets and vice versa. The 80-column card image displays all data as originally entered in the card formats. For a description of the input cards, see Appendix A to Chapter 10, Air Ground Engagement Model Input Requirements, of the Period Processor. The engagement results of air strikes printout, Figure II-11-C-15, depicts the data entered into data file 27 and has been formatted with columnar headings and related information so that the data will be readily identifiable.

ENGAGEMENT RESULTS FOR BLUE AIRCRAFT

ATTACKING RED TARGET

TIME = DAY   VISIBILITY = GOOD   TARGET = TANK COMPANY

AIRCRAFT = DAFS1   ACTIVITY = ASSEMBLY AREA   AIR DEFENSE = NORMAL

TYPE OF KILL	WEAPON TYPE: SMALLER THAN 23MM	23MM	LARGER THAN 23MM	SAM
A-KILL	0.00000	.17847	0.00000	0.00000
B-KILL	0.00000	.01810	0.00000	0.00000
C-KILL	0.00000	.05590	0.00000	0.00000
D-KILL	0.00000	0.00000	0.00000	0.00000

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6
AERIAL MUNITION EXPENDED	0.00000	0.00000	0.00000	0.00000	0.00000	6.50000
AERIAL MUNITION LOST	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9
AIR DEFENSE WEAPONS KILLED	0.0000	0.0000	.6500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AIR DEFENSE MUNITION EXPENDED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

WEAPON	TANKS KILLED	APC KILLED	VEHICLES KILLED
GUIDED MISSILE	2.95000	.45000	0.00000
OTHER		0.00000	0.00000

PERSONNEL KILLED =14.10   NUMBER OF AIRCRAFT FLYING MISSION = 2.00   DURATION OF ENGAGEMENT IN MINUTES = 3.00

Figure II-11-C-15. Engagement Results of Air Strikes

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR AIR GROUND ENGAGEMENT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 12

SUPPRESSION DATA INPUT PROGRAMS

1. INTRODUCTION. The Suppression data input programs create and load the file containing the suppression group indexes and tables of suppression times used by the Suppression Model. These data are dependent upon data stored in data file 51 by the Organization and Equipment routines.

2. ROUTINES:

a. General. The Suppression data input programs consist of the following routines.

b. Routine SPRSLD. This routine creates the Suppression data file, reads and edits the data cards, and stores the data in the file. It also associates the suppression group index input on the data cards with the UTDs using the table stored on data file 51.

c. Routine SUPDMP. This routine gives a formatted dump of the Suppression data loaded which includes the suppression groups and tables of suppression times associated with each group. It also generates an unformatted record dump of the file.

3. FILES. Data file 8 is loaded by the Suppression input program.

NOTES

APPENDIX A

SUPPRESSION DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for suppression are documented in Appendix A, Suppression Model Input Requirements, to Chapter 11 of the Period Processor (Section IV).

NOTES

APPENDIX B

SUPPRESSION DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Suppression Model data are loaded by one routine, SPRSLD, which in turn calls routine SUPDMP to list the data. Since SPRSLD uses data file 51 as input, these data cannot be loaded until after an acceptable run of LDTOE.

2. ROUTINE SPRSLD:

a. Purpose. This routine is used to load the constant data required by the Suppression Model. The data are read from card forms 0801 and 0802 and are stored on data file 8.

b. Input Variables. Data cards 0801 and 0802 and data file 51.

c. Output Variables. Tables to data file 8.

d. Logical Flow. (Figure II-12-B-1):

(1) Blocks 1, 2, and 3. The file name table is brought in from disk and data file 8 is released by a call to REMOVE and allocated by a call to CREATE with one record of 3200 words.

(2) Block 4. The list of unit type designators (UTD) required by this routine is retrieved from data file 51. These data must be loaded after the UTD list is finalized.

(3) Blocks L1000, 5, and L1125. The suppression groups (card types 0801) are read and stored in the array IFIL8, starting with word 1 if they are Blue force groups and with word 1001 if they are Red force groups. The 1000 locations reserved for each force correspond to the 1000 possible UTDs. The word location within the data file 8 record of the beginning of the suppression time table for the UTD associated group, is stored in the corresponding location in IFIL8.

(4) Blocks L2000, L2010, and L2040. The suppression time tables are read from card types 0802 and stored in IFIL8 starting in location 2001 if they are associated with the Blue force and in location 2601 if they are associated with the Red force. There are 12 words of data per table with a maximum of 50 tables. Each card contains an entire table. The suppression times are read in seconds and converted to and stored in centiminutes.

(5) Blocks L7000, 6, and 7. The suppression data are put into data file 8, and routine SUPDMP is called to give a word dump of data file 8. The file name table is printed.

3. ROUTINE SUPDMP:

a. Purpose. This routine produces a dump of the contents of data file 8.

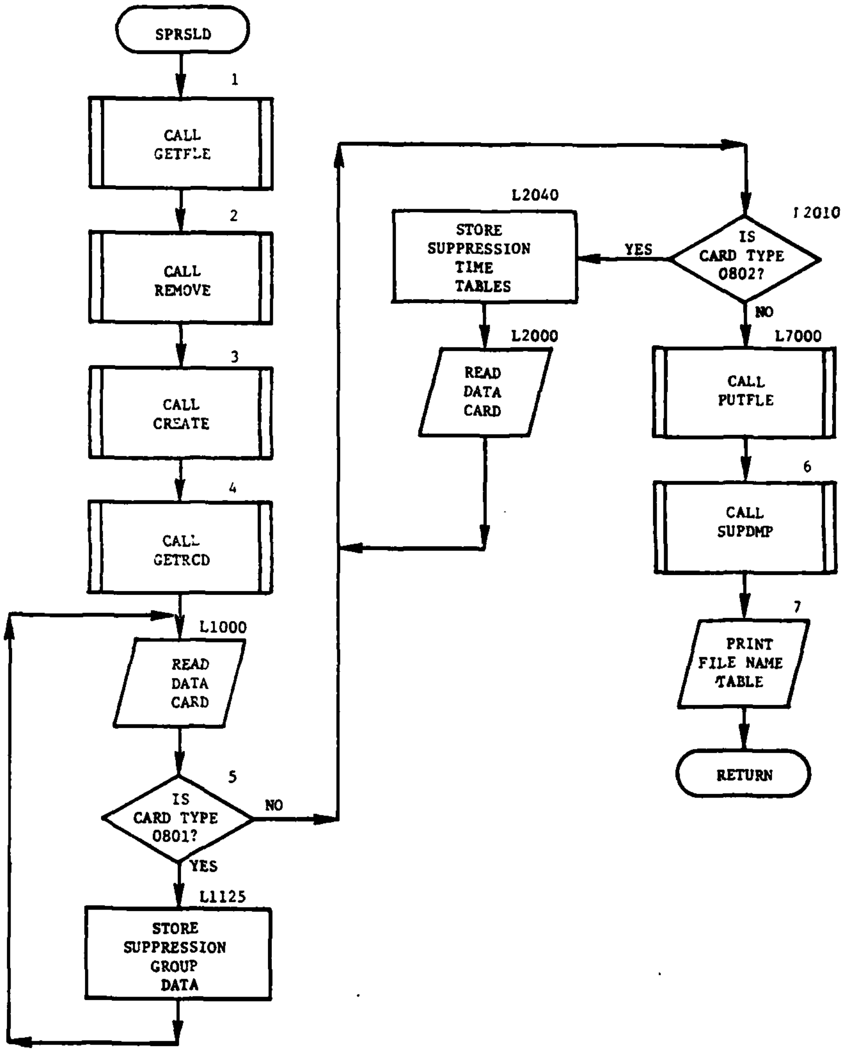


Figure II-12-B-1. Routine SPRSLD

b. Input Variables. Tables on data file 8.

c. Output Variables. Printed tables.

d. Processing Description. The data loaded on data file 8 are read and dumped in file sequence.

NOTES

APPENDIX C

SUPPRESSION DATA LOAD OUTPUT DESCRIPTIONS

An 80-column image of each card is printed immediately after it is read. A sample of the listing produced in this manner is shown in Figure II-12-C-1. This data load program also provides a word dump of the file. This word dump may be used to verify that the data file was loaded correctly.

```
-10  1  TAMT ITMT PMAT PMCT EPMI IAMI FSEA TANK + MECH MIX + 155 SP H   0801   1-
-10  1  KCEA EMMT KTMT                                                  0801   2-
-10  2  ECEA KGEA FHEA KHEA                175 G  203 HOW              0801   3-
-10  4  PTMT KAMT EMMT DNEA KLST KCST ICST MECH                        0801   5-
-10  4  PNEA IAMT ILST PNEA PTST PICT FCMC                             0801   6-
-10  4  IHMC                                                           0801   7-
-10  5  FASP JAFD JPED                     SP APA                      0801   8-
-10  6  TMEA KLTA                          HJ                          0801   9-
-10  7  CHED KHED                          HANK                        0801  10-
-10  8  BMCD BPLC BTCC KMCT KTCT JACA TCCT HQ SVC,TRAINS,MAINT,SPT ENGR,0801  11-
-10  8  JCLT ICCT JCLT IACC JALT ITCT ILLT SIG                          0801  12-
-10  8  TSCT TCMT TACT TCLT IPMI TEST PTST                             0801  13-
-10  8  TPCT THLT TCMT TMST PTST EAMH IACH                             0801  14-
-10  8  TALH IKMH VALH VCLH EPMH IBCH IBLH                             0801  15-
-10  8  TPMH FCTH JACH JASH JBSH JCSH JCLH                             0801  16-
-10  8  VELH VCLH TECA PESE PCSE KCSE KHCE                             0801  17-
-10  8  FESE KCCA KSLA KCCA KALA KECA KCLA PASE                        0801  18-
-10  8  KACA KLLA TCSE ECSS EITJ EDSH JHCD                             0801  19-
-10  8  JECE JPCE JCSE ICSE PCSE PESE OCSE                             0801  20-
-10  8  PEST PPSE JCSE ECCS JSCS PPCS THCC                             0801  21-
-10  8  THLC TAIH PMEH PCMH IJCJ JTIJ JOCL                             0801  22-
-10  8  JLLL FMLL ECLL FNLL FALL FASH JTLL                             0801  23-
-10  8  KACH KACH KPCH KALH KCLF KPSE PPSE                             0801  24-
-10  8  OPSE KLLE                                                      0801  25-
-10  3  EGEA IGEA ICEA ICEA IGLA                                       0801   4-
-10  1  GEMT GPMT GCSE                   ARMOR                         0801    -
-10  3  GHEA GFEA GLEA GPEA HGEA HPEA MAFATOWED ARTY                   0801    -
-10  3  MPEA NLEA                                                      0801    -
-10  4  LTMC STMC MASE NRSE SDSE MOSE HASEMECH, RCN, CRT ENGR           0801REPL-
-10  5  MLED MEED                        SP AD GUNS                    0801    -
-10  6  GEEA HMEA                        ARTY MSL                      0801    -
-10  7  HAED HPED                        AD MSL                        0801    -
-10  8  GASE GESE GCSE CCSE HESE MRSE MOSEADMIN, LOG, CSS, RADAR        0801    -
-10  8  JDSE ATSE MPSE MPIT GEMJ GLLI GTLT                             0801    -
-10  8  GVTJ HATT LETA LPCT LBCT LCCF LFCT                             0801    -
-10  8  MACP MPCA MLCA PMCD DPLT DSTJ DTMI                             0801    -
-10  3  JYSE PACE PMCA CMCA NEWE PBWE SBXE                             0801REPL-
```

Figure II-1 -1. Suppressi Model Data Car' 'isting

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR SUPPRESSION

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 13

NUCLEAR ASSESSMENT DATA INPUT PROGRAMS

1. INTRODUCTION. The Nuclear Assessment data input programs add the data required by the Nuclear Assessment Model to the data pertaining to the conventional Area Fire Model and already existing in data file 30. The controlling Nuclear load routine assures that the fire has been created. The data include tables describing the immediate time dependent effects of each nuclear detonation.

2. ROUTINES:

a. General. The routines comprising the Nuclear Assessment data input programs are described in the following paragraphs.

b. Routine NUCLD. This routine controls the other routines for Nuclear data input. Its first task is to assure that the conventional Area Fire data are preserved. Once this is accomplished, routines FLD30 and DMP30 are called in that sequence.

c. Routine FLD30. This routine reads and edits the Nuclear Assessment data cards and stores the data on the file.

d. Routine CKARY. This is a utility routine which determines if a given integer is present in a given array.

e. Routine DMP30. This routine prints the nuclear data portion of the file in tabular form.

3. FILES. This program loads the part of data file 30 containing the nuclear data.

NOTES

APPENDIX A

NUCLEAR ASSESSMENT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for nuclear assessment are documented in Appendix A, Nuclear Assessment Model Input Requirements, to Chapter 12 of the Period Processor (Section IV).

NOTES

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
JUL 76

UNCLASSIFIED CACDA-TR-8-76-VOL-2-PT-1 NL

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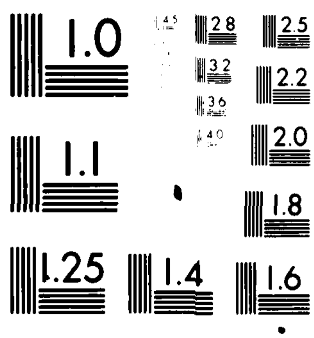

MICROCOPY RESOLUTION TEST CHART

APPENDIX B

NUCLEAR ASSESSMENT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Data for the Nuclear Assessment Model, when loaded, share data file 30 with data for the conventional Area Fire Model. The load programs are constructed in such a manner that the conventional Area Fire Model's data load routines must be executed prior to Nuclear Assessment Model data load routines. These routines include the controlling routine, NUCLD, that ensures proper allocation of data file 30 and maintenance of the conventional Area Fire Model data, FLD30, that reads the input data cards and stores data on data file 30, a utility routine, CKARY, and a dump routine, DMP30.

2. ROUTINE NUCLD:

a. Purpose. NUCLD is the driving routine for FLD30. It copies the two records on data file 30, recreates data file 30 with 21 records, and puts the first two records back on the new data file 30.

b. Input Variables. None.

c. Output Variables:

(1) Data file 30.

(2) Other variables:

Name	Destination	Contents
LUCR	ONE	Logical unit number of card reader.
LUPR	ONE	Logical unit number of printer.
LUIN	ONE	File number of intermediate file.

d. Logical Flow (Figure II-13-B-1):

(1) Block 1. Initialize the numbers of the devices to be used by FLD30 for input and output operations.

(2) Blocks 2 and 3. Bring in the file name table and print it.

(3) Blocks 4 and 5. Copy the first two records of data file 30 and call REMOVE to remove it.

(4) Blocks 6 and 7. Call CREATE to recreate data file 30 and copy the two records from the original data file 30 onto it.

(5) Block 8. Initialize the added records on data file 30 as either blank or zero.

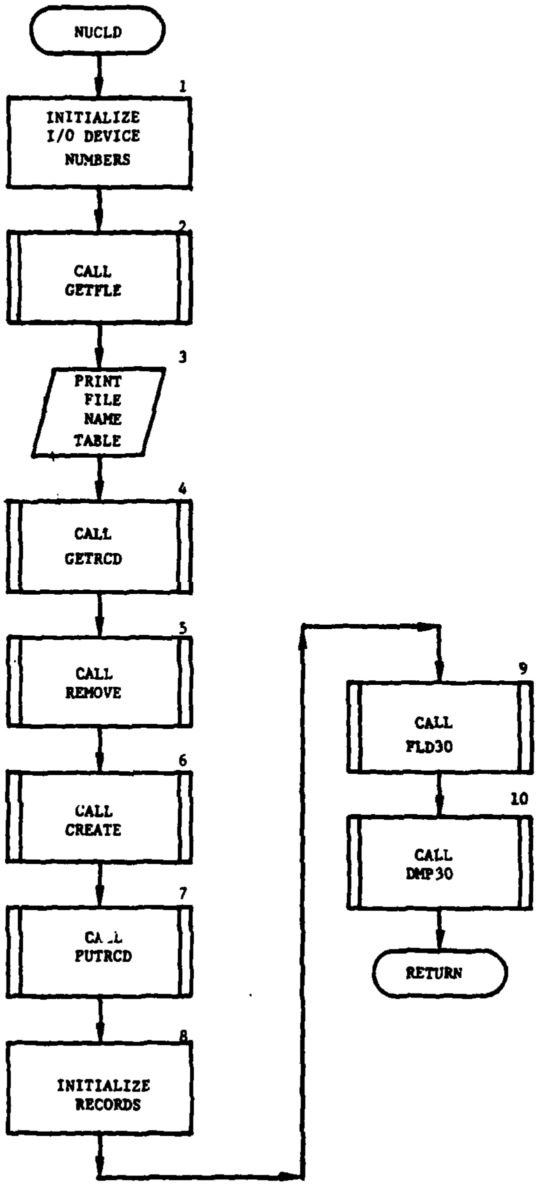

Figure II-13-B-1. Routine NUCLD

(6) Blocks 9 and 10. Call FLD30 to read and edit the input data and store it on data file 30. Call DMP30 to print the contents of data file 30.

3. ROUTINE FLD30:

a. Purpose. FLD30 reads and edits data for the Nuclear Assessment Model and stores it on data file 30.

b. Input Variables. Input variables are the output variables of NUCLD (paragraph 2c).

c. Output Variables:

Name	Destination	Contents
FAYT(7,1200)	DF30	Fuze data for nuclear weapons.
		FAYT(1,I). Code number for the weapon-fuze combination.
		FAYT(2,I). Impact detonation flag.
		FAYT(3,I). Airburst option flag.
		FAYT(4,I). Desired height of burst if the airburst flag is on.
		FAYT(5,I). Probable error in height of burst.
		FAYT(6,I). Minimum range for this weapon-fuze combination.
		FAYT(7,I). Maximum range for this weapon-fuze combination.
NOBFAC(30)	DF30	Character codes to link barriers to the array of pointers to damage radii.
NOBFPT(30)	DF30	Array of pointers linking barriers to damage radii.
RT(9)	DF30	Radiation modifiers and soil type indicator.
WWNAME(1200)	DF30	Array names assigned to nuclear weapon-warhead-fuze combinations.
		WWSTAT(9,100). Array of weapon-warhead statistics.
		WWSTAT(1,I). Code number for the weapon-warhead combination.

Name	Destination	Contents
		WWSTAT(2,I). Equipment item code for the weapon.
		WWSTAT(3,I). Equipment item code for the warhead.
		WWSTAT(4,I). Standard deviation in range for the weapon-warhead combination.
		WWSTAT(5,I). Standard deviation in deflection for the weapon-warhead combination.
		WWSTAT(6,I). Index number of the FAYT array of the first entry for this weapon-warhead combination.
		WWSTAT(7,I). Incoming angle of the round.
		WWSTAT(8,I). Velocity of the round (meters per minute).
		WWSTAT(9,I). Time required to deliver from state of readiness one.
YDRHOB(241,30)	DF30	Table associating, with each yield, four heig of burst and radii choices for each of the 30 possible damage radii.
EOHLEA(200)	DF30	Array of links from equipment item codes of items in the air to damage radii of enemy weapons.
EOHLFA(200)	DF30	Array of links from equipment item codes of items in the air to damage radii of friendly weapons.
PEPFLG(200)	DF30	Array of flags to show troop carrying items.
CCYD(30)	DF30	Codes of the yields in the YDRHOB table.
UNPRO(70)	DF30	Array of distributions of unprotected personnel.
		UNPRO(1,I). Personnel exposed (unwarned).
		UNPRO(2,I). Personnel in open foxholes (unwarned).
		UNPRO(3,I). Personnel in earth shelters (unwarned).

Name	Destination	Contents
		UNPRO(4,I). Personnel exposed (warned).
		UNPRO(5,I). Personnel in open foxholes (warned).
		UNPRO(6,I). Personnel in earth shelters (warned).
		UNPRO(7,I). Time to revert to unwarned status.
EOHLEG(200)	ONE	Array of links from equipment item codes of items on the ground to damage radii of enemy weapons.
EOHLFG(200)	ONE	Array of links from equipment item codes of items on the ground to damage radii of friendly weapons.
RSTRAN(200)	ONE	Array of residual transmission factors for each equipment item.

d. Logical Flow (Figure II-13-B-2):

(1) Blocks L700 and 1. Initialize the arrays to be used for storage of data before it is transferred to data file 30. If the input is for the Red force, transfer control to block 8.

(2) Block 2. Read the data cards and print each one on the printer.

(3) Blocks 3 and 4. As the cards are read, store card image on an intermediate file from which they will again be read for editing and storing into arrays.

(4) Blocks 5, 6, 7, and 8. Read the first data card image and store the radiation modifiers and soil type indicator in the output array. Read the next card image. Control branches on the appropriate card type.

(5) Blocks L10, 10, 11, 12, 13, and 14. Process the type one card images by reading them from the intermediate file and checking for redundant cards or values not within range. Print error messages.

(6) Block 15. Put the edited data on data file 30.

(7) Blocks L38, 16, 17, L30, 18, 19, L40, 20, 21, L50, 22, 23, L60, 24, and 25. Process other card types according to their associated formats, checking for redundant cards or values not within range.

(8) Block 26. Store the data from card types two through six on data file 30.

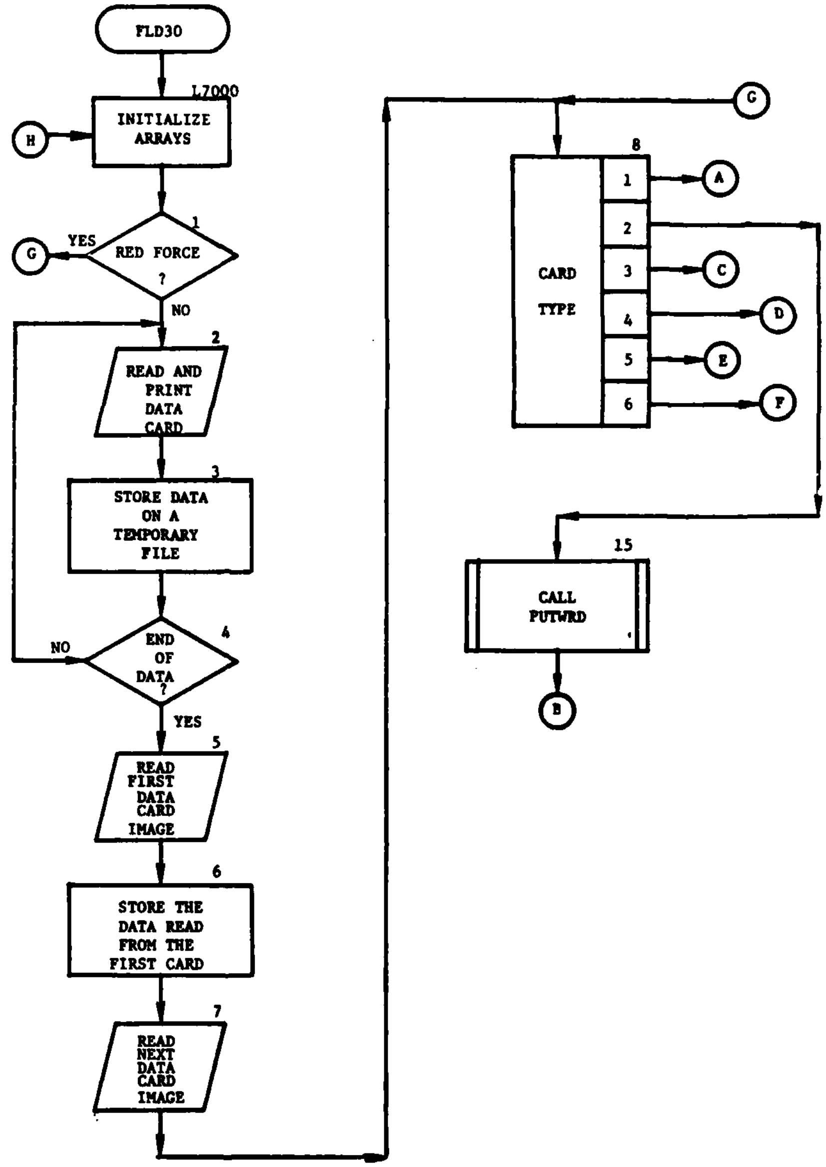

Figure II-13-B-2. Routine FLD30 (Continued on Next Page)

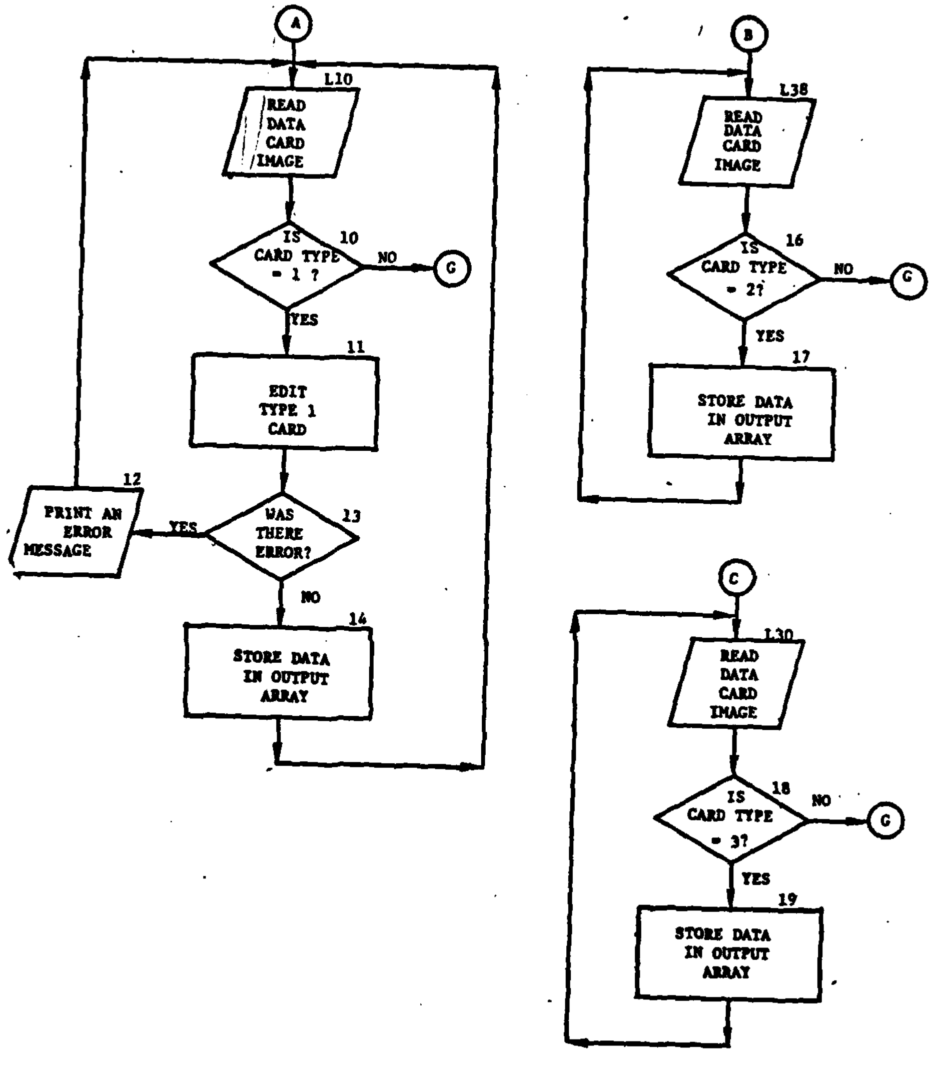

Figure II-13-B-2. Routine FLD30 (Continued)

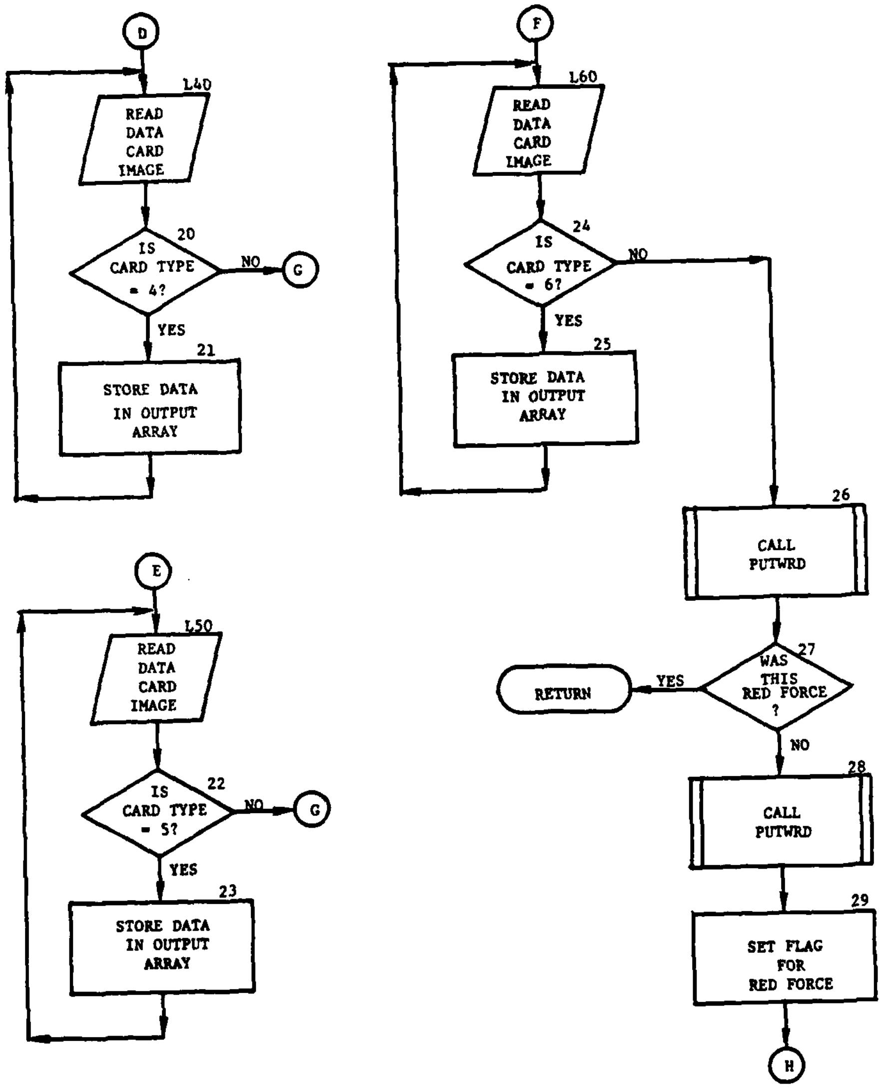

Figure II-13-B-2. Routine FLD30 (Concluded)

(9) Block 27. If data for both forces have been processed, return control to the calling routine.

(10) Blocks 28 and 29. Put data on data file 30 and set a flag to indicate that the Red force data is being entered. Control goes to block L700 to process the Red force data.

4. ROUTINE CKARY:

a. Purpose. CKARY searches an integer array for a special number. If the number is not found, a zero is returned; if the number is found, a one is returned.

b. Input Variables:

Name	Source	Contents
IARRY	Call	Array to be searched.
LOOK	Call	Number to find in IARRAY.
MAX	Call	Maximum number of elements to search in the array IARRY.

c. Output Variables:

Name	Destination	Contents
IANS	Call	Flag indicating whether the number was in the array.

d. Logical Flow (Figure II-13-B-3):

(1) Block 1. Initialize the flag to zero.

(2) Block 2. Loop through IARRY from one to MAX, searching for the number specified. If the number is not found, return control to the calling routine.

(3) Block L2. If the specified number was found, set the flag to one and return control to the calling routine.

5. ROUTINE DMP30.

a. Purpose. DMP30 prints the contents of data file 30 in formatted tabular form.

b. Input Variables. Contents of data file 30.

c. Output Variables. Formatted tables printed with contents of data file 30.

d. Processing Description. Each type of data is read from data file 30, reformatted into easily readable tables, and printed on the line printer.

NOTES

APPENDIX C

NUCLEAR ASSESSMENT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Ten different printouts are generated each time data are entered in the Nuclear Assessment constant data file. These printouts are listed in Figure II-13-C-1.

Printout Title	Date Source	Card ID
80-Column Card Image	Card Data Deck	All
Weapon Combination Names	Data file 30	3011
Weapon Statistics	Data file 30	3011
Fuze Table Entries	Data file 30	3011
Yield Table	Data file 30	3011
EOH Link to Damage Radii	Data file 30	3011
EOH Data	Data file 30	3011
Yield Codes and Barrier Data	Data file 30	3011
Unprotected Personnel Distribution	Data file 30	3011
Special Factors for Both Teams	Data file 30	3011

Figure II-13-C-1. Nuclear Assessment Model Constant Data Input Printouts

2. NUCLEAR ASSESSMENT 80-COLUMN CARD IMAGE. The 80-column card image is printed so that the data entries are in the same format as entered in the card type. The format for the 80-column card image is illustrated in Figure II-13-C-2. On the top line at the far left is the number 7, indicating card type 7 for both forces. In the third column from the right is the ID number 3011.

FILE 30-DATA CARD IMAGES.

```
7  140 360 610130010302151 12.0                                              3011   1      1
1                                                                                            2
1BNSAB 52 62    .5  2000 13000   7   7  150    0  340  300                   3011   1      3
1BNCAC 56 63   1.0  2000 20000   7   7  280    0  340  320                   3011   2      4
1BNCAB 56 63   2.0  2000 21000   7   7  280    0  340  320                   3011   3      5
1BNRAF 60 64   5.0  5000 40000  14  14 1400    0  530  400                   3011   4      6
1BNRAF 60 64  10.0  5000 40000  14  14 1400    0  530  400                   3011   5      7
1BNRAH 60 64  50.0  5000 40000  14  14 1400    0  530  400                   3011   6      8
1BNPIE 60 64   5.0  5000 40000  14  14    0    1  530  400                   3011   7      9
1BNRIF 60 64  10.0  5300 40000  14  14    0    1  530  400                   3011   8     10
1BNPIH 60 64  50.0  5300 40000  14  14    0    1  530  400                   3011   9     11
1BNLAG 67180  20.0 10000 50000   3   3  301  190  530  600                   3011  10     12
1BNLAG 67180  20.0 10000 50000   3   3  302  390  530  600                   3011  11     13
1BNLBG 67180  20.0 10000 50000   3   3  301  191  530  600                   3011  12     14
1BNLBG 67180  20.0 10000 50000   3   3  302  391  530  600                   3011  13     15
1BNLIG 67180  20.0 10000 50000   3   3    0    1  530  600                   3011  14     16
1BNMAI 68181100.0 50000150000    5   5  501  320 2050  700                   3011  15     17
1BNMAI 68181100.0 50000150000    5   5  502  660 2050  700                   3011  16     18
1BNMBI 68181100.0 50000150000    5   5  501  321 2050  700                   3011  17     19
1BNMBI 68181 100. 50000150000    5   5  502  661 2050  700                   3011  18     20
1BNMII 68181 100. 50000150000    5   5    0    1 2050  700                   3011  19     21
1BNMAJ 68182 200. 50000150000    5   5  501  500 2050  700                   3011  20     22
1BNMAJ 68182 200. 50000150000    5   5  502  790 2050  700                   3011  21     23
1BNMBJ 68182 200. 50000150000    5   5  501  501 2050  700                   3011  22     24
1BNMBJ 68182 200. 50000150000    5   5  502  791 2050  700                   3011  23     25
1BNMIJ 68182 200. 50000150000    5   5    0    1 2050  700                   3011  24     26
1BNHAK 69183 500. 50000300000    8   8 1001  800 2080  800                   3011  25     27
1BNHAK 69183 500. 50000300000    8   8 10021180 2080  800                    3011  26     28
1BNHBK 69183 500. 50000300000    8   8 1001  801 2080  800                   3011  27     29
1BNHBK 69183 500. 50000300000    8   8 10021181 2080  800                    3011  28     30
1BNHIK 69183 500. 50000300000    8   8    0    1 2080  800                   3011  29     31
1BNARG 99101  20.      0999999          501  261 1095  150                   3011  30     32
1BNARG 99101  20.      0999999          502  461 1095  150                   3011  31     33
```

Figure II-13-C-2. Nuclear Assessment 80-Column Card Image

3. WEAPON COMBINATION NAMES. The format for this report, described by its title, is illustrated in Figure II-13-C-3 for the Blue team. A similar report is produced for the Red team.

4. WEAPON STATISTICS. This report, Figure II-13-C-4, identifies the weapon statistics for each combination of weapon delivery system and weapon item code. Column one identifies each such combination. The next eight columns identify respectfully the weapon item code, warhead item code, the range dispersion, deflection dispersion, weapon system index, delivery angle, projectile velocity, and delay time associated with each weapon/delivery combination.

5. FUZE TABLE ENTRIES. This report, Figure II-13-C-5, identifies fuze characteristics for each type of fuze in column one. The next six columns identify respectfully the impact option indicator, height of burst option, preset height of burst, probable error in height of burst, and the minimum and maximum range of dispersion associated with each fuze type.

6. YIELD TABLE. This report, Figure II-13-C-6, reflects the height of burst and damage radius for each damage index of each weapon system.

7. EOH LINKS. This report, Figure II-13-C-7, associates equipment with the appropriate assessment radii of effect. This assessment is given for friendly and enemy munitions both airborne and on the ground.

8. EOH DATA. This report, Figure II-13-C-8, reflects the radiation transmission factor and the personnel protection flag for each equipment type.

9. YIELD CODES AND BARRIER DATA. This report, illustrated in Figure II-13-C-9, reflects barrier damage by yield code and damage radius index.

10. UNPROTECTED PERSONNEL DISTRIBUTION. This report, Figure II-13-C-10, reflects the percentage of personnel killed in three different postures, engaged in seven different activities, for both warned and unwarned. It also gives the time for personnel engaged in the seven activities to revert back to an unwarned condition.

11. SPECIAL FACTORS FOR BOTH TEAMS. The first two entries in this report, Figure II-13-C-11, give the slant range in yards corresponding to a radiation rate of 0.1 rads/hour/ton, the slant range in yards corresponding to a radiation rate of 0.005 rads/hour/ton. The next four entries give the same data for kiloton and megaton yields. The next entry is the soil type multiplier. The next entry is zero--and meaningless--and the last entry is minutes to resume unwarned posture for stay activity.

THE WEAPON COMBINATION NAMES FOR BLUE TEAM.

NSAB	NCAC	NCAD	NRAE	NRAF	NRAH	NRIE	NRIF	NRIH	NLAG	NLBG	NLIG	NMAI	NMBI	NMII
NMAJ	NMBJ	NMIJ	NHAK	NHBK	NHIK	NABG	NAIG	NABL	NAIL	NABN	NAIN	DDSA	DDSF	

Figure II-13-C-3. Weapon Combination Names

THE WEAPON STATISTICS FOR BLUE TEAM.

CODE	WEAP	WAPH	RANGE	DEFLECT.	INDEX	ANGLE	VELOCITY	TIME
NS	52	52	7	7	101	40	300	3
NC	56	63	7	7	202	40	320	3
NR	60	64	14	14	406	30	400	5
NL	67	130	3	3	1005	30	500	5
NM	68	181	5	5	1505	60	700	20
NM	68	182	5	5	2005	60	700	20
NH	69	183	8	8	2505	80	800	20
NA	98	101	-0	-0	3003	85	150	10
NA	98	102	-0	-0	3303	85	150	10
NA	98	103	-0	-0	3503	85	150	10
DD	143	143	-0	-0	3901	-0	-0	-0
DD	144	144	-0	-0	4001	-0	-0	-0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0

Figure II-13-C-4. Weapon Statistics

THE FUZE TABLE ENTRIES FOR BLUE TEAM.

CODE	IMPACT	HOB FLAG	HOB	PEH	MIN RANGE	MAX RANGE
A	0	0	-0	15	2000	10000
A	0	0	-0	28	2000	20000
A	0	0	-0	28	2000	20000
A	0	0	-0	140	5000	40000
A	0	0	-0	140	5000	40000
A	0	0	-0	140	5000	40000
I	1	0	-0	-0	5000	40000
I	1	0	-0	-0	5000	40000
I	1	0	-0	-0	5000	40000
A	0	1	19	30	10000	50000
A	0	2	39	30	10000	50000
B	1	1	19	30	10000	50000
B	1	2	39	30	10000	50000
I	1	0	-0	-0	10000	50000
A	0	1	32	50	50000	150000
A	0	2	66	50	50000	150000
B	1	1	32	50	50000	150000
B	1	2	66	50	50000	150000
I	1	0	-0	-0	50000	150000
A	0	1	50	50	50000	150000
A	0	2	79	50	50000	150000
B	1	1	50	50	50000	150000
B	1	2	79	50	50000	150000
I	1	0	-0	-0	50000	150000
A	0	1	80	100	50000	300000
A	0	2	118	100	50000	300000
B	1	1	80	100	50000	300000
B	1	2	118	100	50000	300000
I	1	0	-0	-0	50000	300000
B	1	1	26	50	0	999999
B	1	2	46	50	0	999999
I	1	0	-0	-0	0	999999
B	1	1	74	50	0	999999
B	1	2	123	50	0	999999
I	1	0	-0	-0	-0	-0
B	1	1	131	50	-0	-0
B	1	2	215	50	-0	-0
I	1	0	-0	-0	-0	-0
S	1	0	-0	-0	-0	-0
S	1	0	-0	-0	-0	-0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0

Figure II-13-C-5. Fuze Table Entries

THE YEILD TABLE FOR BLUE TEAM.

YEILD=		.10													
0	200	-0	-0	-0	-0	-0	-0	0	280	-0	-0	-0	-0	-0	-0
0	150	-0	-0	-0	-0	-0	-0	0	200	-0	-0	-0	-0	-0	-0
0	80	-0	-0	-0	-0	-0	-0	0	140	-0	-0	-0	-0	-0	-0
0	180	-0	-0	-0	-0	-0	-0	0	260	-0	-0	-0	-0	-0	-0
0	150	-0	-0	-0	-0	-0	-0	0	190	-0	-0	-0	-0	-0	-0
0	320	-0	-0	-0	-0	-0	-0	0	210	-0	-0	-0	-0	-0	-0
0	160	-0	-0	-0	-0	-0	-0	0	80	-0	-0	-0	-0	-0	-0
0	200	-0	-0	-0	-0	-0	-0	0	3150	-0	-0	-0	-0	-0	-0
0	500	-0	-0	-0	-0	-0	-0	0	1250	-0	-0	-0	-0	-0	-0
0	700	-0	-0	-0	-0	-0	-0	0	250	-0	-0	-0	-0	-0	-0
0	650	-0	-0	-0	-0	-0	-0	0	140	-0	-0	-0	-0	-0	-0
0	100	-0	-0	-0	-0	-0	-0	0	750	-0	-0	-0	-0	-0	-0
0	1400	-0	-0	-0	-0	-0	-0	0	600	-0	-0	-0	-0	-0	-0
0	550	-0	-0	-0	-0	-0	-0	0	500	-0	-0	-0	-0	-0	-0
0	350	-0	-0	-0	-0	-0	-0	0	900	-0	-0	-0	-0	-0	-0
YEILD=		.50													
20	470	140	490	280	420	420	230	20	560	140	580	280	640	420	550
20	330	140	340	230	240	420	0	20	490	140	520	280	450	420	330
20	180	140	150	280	0	420	0	20	300	140	310	280	190	420	0
20	430	140	440	230	370	420	190	20	610	140	640	280	590	420	500
20	330	140	330	280	230	420	0	20	480	140	510	280	450	420	320
20	720	140	720	280	720	420	720	20	480	140	480	280	480	420	480
20	360	140	360	230	360	420	360	20	180	140	180	280	180	420	180
20	90	140	0	230	0	420	0	20	740	140	930	280	1080	420	790
20	160	140	110	230	0	420	0	20	350	140	470	280	400	420	0
20	200	140	150	230	0	420	0	20	100	140	0	280	0	420	0
20	200	140	160	290	0	420	0	20	500	140	620	280	540	420	400
20	400	140	410	230	350	420	300	20	900	140	200	280	0	420	0
20	150	140	110	230	0	420	0	20	110	140	0	280	0	420	0
20	110	140	0	280	0	420	0	20	150	140	100	280	0	420	0
20	100	140	0	230	0	420	0	20	220	140	100	280	0	420	0
YEILD=		1.00													
50	600	200	570	300	530	450	400	50	810	200	790	300	760	450	680
50	450	200	410	300	340	450	60	50	640	200	610	300	560	450	450
50	270	200	190	300	0	450	0	50	420	200	370	300	290	450	0
50	550	200	570	300	470	450	330	50	760	200	740	300	700	450	620
50	440	200	400	300	320	450	0	50	530	200	600	300	550	450	440
50	1000	200	1000	350	1000	450	1000	50	600	200	600	300	600	450	600
50	500	200	500	300	500	450	500	50	250	200	250	300	250	450	250
50	130	200	0	300	0	450	0	50	1020	200	1250	300	1350	450	1160
50	230	200	130	300	0	450	0	50	520	200	570	300	710	450	0
50	290	200	200	300	0	450	0	50	160	200	0	300	0	450	0
50	330	200	240	310	0	450	0	50	700	200	660	300	600	450	450

Figure II-13-C-6. Yield Table

THE EOH LINKS TO DAMAGE RADII FOR BLUE TEAM.

ITEMS IN THE AIR		ITEMS ON THE GROUND	
ENEMY WEAPONS	FRIENDLY WEAPONS	ENEMY WEAPONS	FRIENDLY WEAPONS
0	0	15	15
0	0	15	16
0	0	16	16
0	0	15	15
0	0	16	16
0	0	16	16
0	0	15	15
0	0	15	15
0	0	16	16
0	0	16	16
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	20	20
0	0	20	20
0	0	20	20
0	0	0	0
0	0	20	20
0	0	20	20
0	0	20	20
0	0	15	15
0	0	20	20
0	0	20	20
0	0	15	15
0	0	20	20
0	0	16	16
0	0	20	20

Figure II-13-C-7. EOH Links to Damage Radii

EOH DATA FOR BLUE TEAM.

RESIDUAL TRANS. FACTOR	PERSONNEL PROTECTION FLAG
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
10.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0
10.0000	0
10.0000	0
10.0000	0
0.0000	0
10.0000	0
7.0000	2
10.0000	0
10.0000	0
10.0000	0
7.0000	2
10.0000	0
10.0000	0
10.0000	0
10.0000	0
7.0000	2
7.0000	2
10.0000	0
3.0000	1
10.0000	0
10.0000	0
10.0000	0
3.0000	1
10.0000	0
10.0000	0
10.0000	0
0.0000	0
0.0000	0
0.0000	0
0.0000	0

Figure II-13-C-8. EOH Data

THE YEILD CODES AND BARRIER DATA FOR BLUE TEAM.

YEILD CODE	BARRIER	DAMAGE RADIUS
A	ARH	15
B	ARL	15
C	BFL	27
D	BFR	27
E	BFT	27
F	BFX	26
G	FRD	21
H	FRJ	21
I	FRS	21
J	FRU	24
K	HUM	30
L	MNA	24
M	MNP	25
	MNT	24
	MUN	16
	PTH	15
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0

Figure II-13-C-9. Yield Codes and Barrier Data

UNPROTECTED PERSONNEL DISTRIBUTION FOR BLUE TEAM.

UNWARNED			WARNED			TIME TO REVERT
STANDING	FOXHOLES	EARTH SHELTERS	STANDING	FOXHOLES	EARTH SHELTERS	TO UNWARNED
30	5	5	5	85	15	60
70	15	15	5	50	45	360
60	20	20	0	40	60	720
0	0	0	0	0	0	0
100	0	0	20	75	5	5
70	15	15	5	50	45	10
100	0	0	60	40	0	2
30	40	30	10	40	50	2
90	5	5	5	85	10	5
100	0	0	50	40	10	4

Figure II-13-C-10. Unprotected Personnel Distribution

SPECIAL FACTORS FOR BOTH TEAMS

.67287
.01352
2244.62549
.01001
23807.53344
.00586
12.00000
0.00000
5.00000

Figure II-13-C-11. Special Factors

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR NUCLEAR ASSESSMENT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 14

MOVEMENT DATA INPUT PROGRAMS

1. INTRODUCTION. The Movement data input routines create and load the data files required to contain the data associated with the Movement Model. They require, as input, data file 51 created by the Organization and Equipment data input programs. The data stored include tables of mobility categories, mobility classes, movement rates, and fuel consumption rates.

2. ROUTINES:

a. General. The Movement input programs consist of the following routines.

b. Routine MOVELD. This routine creates the files required, reads and edits the data cards, and loads the data in the files. It also calls routine DPMOVE. It uses the unit type designator (UTD) directory table from data file 51 to associate UTDs with mobility categories.

c. Routine DPMOVE. This routine provides a formatted dump of the files created in tabular form. An unformatted record dump of each file is also given.

3. FILES. The files created by this program are:

- Mobility category tables - data file 9
- Exclusion and miscellaneous tables - data file 14
- Fuel consumption rate tables - data file 15
- Movement rate tables - data file 19

NOTES

APPENDIX A

MOVEMENT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for movement are documented in Appendix A, Movement Model Input Requirements, to Chapter 13 of the Period Processor (Section IV).

NOTES

APPENDIX B

MOVEMENT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Data used by the Movement Model are loaded by routine MOVELD, which in turn calls routine DPMOVE to provide a formatted listing of the data. Since data file 51 is used as input to MOVELD, these data cannot be loaded until after a satisfactory LDTOE run has been accomplished.

2. ROUTINE MOVELD:

a. Purpose. This routine loads the constant data required by the Movement Model. The data are read from cards with identifications 0901, 0902, 0903, 1401, 1402, 1403, 1404, 1405, 1501, 1901, and 1902 and stored on data files 9, 14, 15, and 19.

b. Input Variables. The only input required by this routine is the data cards and the list of unit type designators from data file 51.

c. Output Variables. The output of this routine consists of the four loaded data files.

d. Logical Flow (Figure II-14-B-1):

(1) Block 1. The file name table array (IFNT) is brought into core and data files 9, 14, 15, and 19 are released, if they exist. Data file 9 is then initialized. If a data file 9 of the correct size (5 records of 1000 words) exists, data read serves to update the file; otherwise, the file will be allocated and set to zero.

(2) Block 2. The data file 15 parameters in IFNT are checked to determine if a file of the right size (16 records of 400 words) exists. If it does, data read that are normally stored on that file will update it. If the file does not exist, it will be allocated and set to zero initially.

(3) Block 3. A check is made to determine if data file 14 exists. If it does not, it is allocated and set to zero, and the variables IFOOD, MODE, MCPT, MAXRAT, NMCAT, LR14, and LR19 are given initial values. If data file 14 does exist, data read pertaining to the file will update it and the variables listed above will be initialized from its contents.

(4) Block 4. If data file 19 exists and has the correct number of records (50) and words (120) per record, data read will update it; otherwise, it is allocated and set to zero.

(5) Block 5. Data defining the travel mode mnemonics, mobility categories, and their legitimate combinations are read from cards identified by 1401 and stored on data file 14. The four-character travel mode mnemonics are stored in records 2 and 23 for the Blue and Red forces, respectively. The one-character mobility category codes are stored in words 3-7 of record

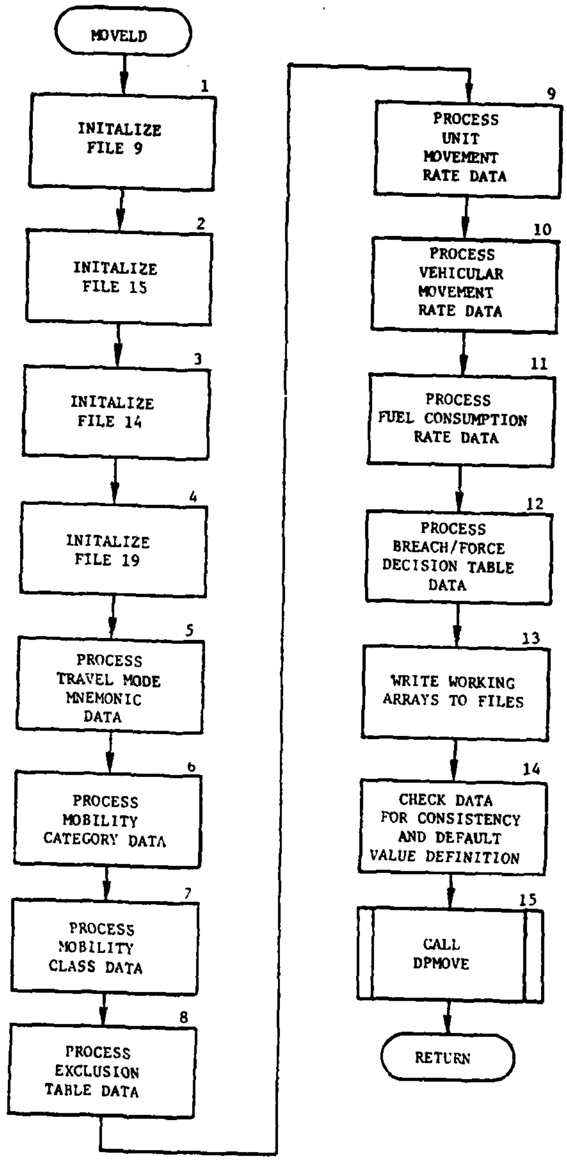

Figure II-14-B-1. Routine MOVELD

1 for the Blue force and words 8-12 for the Red force. The combination tables for the Blue force are stored in records 3-22 and those for the Red force are stored in 24-43. A maximum of 20 mobility categories and 20 travel mode mnemonics is allowed. As each mobility category is stored, the list is checked to assure that there are no duplicates. Each travel mode mnemonic is checked to assure it is legitimate.

(6) Block 6. The mobility category data are read from cards identified by 0901 and are stored on data file 9. The data are stored in the first record of data file 9 if they pertain to the Blue force and in the second record if they are Red force data. Each record is 1000 words long, allowing the mobility category associated with a particular UTD to be stored in the same location in the data file 9 record that the UTD appears in the 1000-word UTD list on data file 51. The card data associates a list of UTDs with a particular mobility category. An attempt is made to match each UTD with one in the list retrieved from data file 51. If a corresponding UTD is found, the data are stored as described above; otherwise, an error message is written.

(7) Block 7. The mobility class data are read from cards identified by 0902 and are also stored on data file 9. Words 211-410 and 411-610 of record 5 contain the Blue and Red mobility classes, respectively. The card data contain lists of item codes associated with a particular class. The item codes are used as pointers to store the class in the proper words of record 5. For example, if the Blue force card data indicated class 2 contained items 100 and 129, words 310 (210+100) and 339 (210+129) would be set to 2.

(8) Block 8. The mobility class exclusion table is read from card 1402 and is stored on data file 14 beginning in record 768. A pointer to the next available record in data file 14 is kept in data file 14 (record 1, word 17) and records may be added if they are needed. The exclusion tables contain a list of mobility classes that will be excluded from limiting the rate of movement of a type UTD unit moving by travel mode mnemonic TMDM. As each UTD is processed, it is assigned a record in data file 14 if one has not been assigned to it previously. This record number is stored in data file 9 (record 3, Blue; record 4, Red) in the word corresponding to the UTD's location in the UTD list. If the record is not newly assigned, it is searched for a word containing zero. The travel mode mnemonic and then the list of mobility classes to be excluded are stored in the record starting with that word. Each record is 20 words long. If the first 19 words cannot contain all of the mnemonics and classes, the next available record in data file 14 is assigned and its number is stored in word 20. One list of excluded classes with its associated UTD and TMDM is read per card.

(9) Block 9. The unit movement rate data are read from cards with the identifiers 1901 for road movement rate data and 1902 for cross-country movement rate data, and are stored in data file 19. Each record in data file 19 contains unit movement rates as a function of terrain, road, and movement type, and weather/light conditions. There is one record in data file 19 for each combination of unit formation and mobility category used. Two 3 by 20 word tables (information, category) containing pointers to records

in data file 19 are stored in data file 14 (records 44-49 for Blue force and 50-55 for Red force). The first of the two tables is associated with road movement rates and the second pertains to cross-country rates.

(10) Block 10. The cards identified by 1403 and 1404 contain vehicular movement rate data. The Blue force tables are stored on data file 14 in records 56-211, and the Red force tables are stored in records 212-367. The first 36 records of each group are associated with movement on roads and are functions of terrain type, road type, and weather/light conditions (2 by 3 by 6). The last 120 records contain cross-country movement rates as functions of terrain trafficability and weather/light conditions (20 by 6). The words of each record are associated with the mobility classes. Data contained on each card identify the mobility class and weather/light conditions that the movement rates are associated with.

(11) Block 11. Fuel consumption rate data (class III and class IIIA) are read from cards with identifiers 1501 and 1405. Data associated with vehicles moving on the ground (1501) are stored on data file 15. The 200 real words of each record correspond to the 200 possible items. The first eight records contain Blue force data and the last eight are used for Red force data. The consumption rates are functions of route type and activity. The aircraft consumption rate data (1405) are stored in data file 14 records 368-767, with the first 200 records of each group being used by the Blue force and the last 200 by the Red force. The 200 records per group correspond to the 200 equipment items. The first 16 words of each record are used to store the eight real values associated with aircraft fuel consumption. A table of item codes of aircraft for which fuel consumption data are loaded is kept in data file 9, record 5. Words 2-102 are reserved for Blue force data and words 104-204 for Red force. The first word of each group contains the number of item codes in the list.

(12) Block 12. The breach/force decision tables determine a unit's action if it encounters a barrier. They are read from cards identified by 0903 and are stored on data file 9, record 5. Words 663-831 are reserved for Blue force tables, and 832-1000 are used for Red. The first word of each group is set to the lowest of the movement priorities associated with the tables loaded for that force. The tables (a maximum of six is allowed) are stored in the remaining space. The tables contain four rows and seven columns. The first word of each row is the equipment loss cutoff value associated with that row. The other words contain decision indicators. Each data card contains a movement priority and the complete decision table associated with it. The priority determines the location at which the table is stored within the area assigned to the force.

(13) Block 13. The arrays used to accumulate data from cards are dumped to the appropriate files. Variables describing the files are written.

(14) Block 14. Checks are made to determine if items that the Movement Model will default to have been set. Checks are also made to assure that the various items of data are consistent.

(15) Block 15. Routine DPMOVE is called to print the data files just loaded.

3. ROUTINE DPMOVE:

a. Purpose. This routine dumps the constant data tables required by the Movement Model and loaded by MVELD from data files 9, 14, 15, and 19. The first part of the routine prints the data in tabular form with appropriate headers. The latter part gives a word dump of each file.

b. Input Variables. The only input to this routine is the data to be listed from data files 9, 14, 15, and 19, and the UTD list from data file 51.

c. Output Variables. The printed dumps described below are the output of this routine.

d. Processing Description. All Blue force data are listed, and then the Red force data are printed. The travel mode mnemonics, mobility category codes, and their combination tables are printed first for each force. Next are the mobility category codes and the UTDs associated with each code, followed by a list of the mobility classes and the item codes defining them. Next is a dump of the excluded mobility classes by UTD and travel mnemonic, followed by a listing of the unit road movement rate tables and the unit cross-country movement rate tables. Printed next are the vehicular road and cross-country movement rate tables, followed by tables of class III and class IIIA consumption rates. The tabular listings for the two forces are followed by a word dump of data file 14. Each record is dumped in integer format except records 368-767 which are dumped in real format. The records containing basic alphanumeric data are also dumped in alphanumeric format. Data file 9 is dumped next in integer format. The list of UTDs contained in data file 51 is also printed. Data file 15 containing class III consumption rate data is dumped in real format. Data file 19 is dumped in integer format and, finally a dump of the file name table is given.

NOTES

APPENDIX C

MOVEMENT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. Ten different printouts are generated each time data are entered in the constant data file for movement. These printouts are listed in Figure II-14-C-1.

Printout Title	Data Source	Card ID
80-Column Card Image	Data Deck	All
Travel Mnemonic Mobility Category Index	File 14	1401
Mobility Category	File 9	0901
Mobility Class and Exclusion Table	File 9	0902
Unit Road Movement Rates	File 19	1901
Unit Cross Country Movement Rates	File 19	1902
Equipment Road Movement Rates	File 14	1403
Equipment Cross Country Movement Rates	File 14	1404
Ground Movement Fuel Consumption Rates	File 15	1501
Air Movement Fuel Consumption Rates	File 14	1405

Figure II-14-C-1. Movement Model Constant Data Input Printouts

2. EIGHTY-COLUMN CARD IMAGE. The 80-Column Card Image is printed so that the data entries are in the same format as entered in the card type. The format for the 80-Column Card Image is illustrated in Figure II-14-C-2. On the top line at the far left are the characters 1B, indicating card type 1 for Blue force. At the far right is the ID number 1401. Also on the top line are the characters ARAM and F indicating the army dismounted infantry unit, and the index cross referencing it to the mode of travel and its mobility category

is shown. For a complete description of the input card images, refer to Appendix A to Chapter 13 of the Period Processor for MOVELD input requirements.

3. MOBILITY CATEGORY AND TRAVEL MODE. The format for this report is illustrated in Figure II-14-C-3. The data and the titles of the columns are similar to the card format; a complete description may be gained by reference to Appendix A to Chapter 13 of the Period Processor for MOVELD input requirements, cards ID 1401 and 901.

4. MOBILITY CLASS AND EXCLUSION TABLE. For both Red and Blue forces the mobility class and exclusion tables are printed in the illustrated format of Figure II-14-C-4. The titles of the columns in this format are similar to those used in the punch card format; for a complete description, refer to Appendix A to Chapter 13 of the Period Processor for MOVELD input requirements for card ID 902 and 1402.

5. UNIT ROAD AND CROSS COUNTRY MOVEMENT. The rates at which a composite unit or basic unit type will move cross country and over the various roads are printed in this format. The format is illustrated in Figure II-14-C-5. The data from which this format is printed were taken from data file 19 and were originally punched into cards ID 1901 and ID 1902. The headings in the columns of this printout are the same as for the card formats. The upper half of this figure shows Blue force data for road movement, and the lower half shows the cross country movement rates. A similar printout is prepared for the Red force.

6. EQUIPMENT CROSS COUNTRY AND ROAD MOVEMENT RATES. The rates at which individual vehicles, wheeled and track-laying types, will move cross country and over the various roads are printed in this format. The format illustrated in Figure II-14-C-6 shows data for Blue force. The lower half shows road movement rates, and the upper half shows cross country movement rates. The data are taken from data file 14 and were originally punched in cards ID 1403 and ID 1404.

7. GROUND AND AIR FUEL CONSUMPTION RATES. The last printout in the constant data input printout series is for ground and air fuel consumption rates and is illustrated in Figure II-14-C-7. The upper portion of the figure shows Blue force ground equipment consumption rates and the lower portion shows the fuel consumption for blue force aircraft. Similar tables are printed for Red force. The data shown in the illustration were taken from data files 14 and 15 and were initially inscribed in cards ID 1405 and 1501.

M O B I L I T Y   M O D E L   D A T A

```
-1P ADAM 1     F INF FOOT              11                                     1401   1-
-1P ADGM 2     T TANK MECH CAV      111111                                    1401   2-
-1P TCAM 3     L LOG ADMIN        11111 1                                     1401   3-
-1P TCGM 4     S CBT SPT           111111                                     1401   4-
-1P TCDM 5     S TIG HVY          11111 1                                     1401   5-
-1P TCCM 6                                                                    1401   6-
-1P TCCD 7                                                                    1401   7-
-1P TCCD 8                                                                    1401   8-
-1P T      FCMT IACI IPMI IFSI IBCI COMT ICMI IMSI                            0901   1-
-1P T      FAMT ITCT IIAT ICST PMEA PMMT PMCT FOMI IMCT IAMI ILSI PMEA        0901   2-
-1P T      PISI PIAT PICI IMMC                                                0901   3-
-1P T      KACT KAMI KLCI OMEA KTCI KIMT KCST                                 0901  3A-
-1P L      PMCC PLLC PTCC JACA ICCT JCLT IOCT JOLT IACC JALC ILLT ILLI        0901   4-
-1P L      ISLT IJLT IACH TALH VALH JACH VCLH IPCH IBLH EBMH EDSH             0901   5-
-1P L      JCSH JCLH VCLH VOLH IFCA IFLA IGCA IGLA KCCA KSLA KGCA KALA        0901   6-
-1P L      KFCA KCLA KACA KLLA JHCD JFCC IHCC IHLC FTIJ IJCJ JDCL JLLL        0901   7-
-1P L      FMLL FCLL HLLL FALL KHCD KACH KALH KOLE KLLE KHCF ICIJ             0901   8-
-1P L      PSLL PILL JELL CCCC JSLL JTLL                                      0901  8A-
-1P S      FFEA FCEA CCEA FHEA FSEA FNEA FAMH JASH IKMH                       0901   9-
-1P S      IPMH JCSH KHEA IFEA IPEA KGEA IGEA ICEA                              01  10-
-1P S      PESE KCEA PCCF KLEA FASD JAFD JBED FFSE JCSE ICSE                  0901  11-
-1P S      OCSE OCSE FSSS FSCS JSCS PDCC FCMC IAMH PWFH PSMH KCSH FHED        0901  12-
-1P S      KHED FASH KASH KPSH FFSE KCSF PCST PESE RASE                       0901  13-
-1P F      JPSE KPSE PPSE OPSE PBPE OBBE                                      0901  14-
-1P   1                                  FOOT MOVEMENT                        0902    -
-1P   2102 34                            LIGHT WHEEL VEH LESS THAN 2T         0902    -
-1P   3161162166167 61164165             MED WHEEL VEH                        0902    -
-1P   4163135138                         HVY WHEEL VEH                        0902    -
-1P   5185186188 25 29 75 35 41 71 73    LT TRACK VEH                         0902    -
-1P   6187193191 37 56  8 52189          MED TRACK VEH                        0902    -
-1P   7143141                            HVY TRACK VEH                        0902    -
-1P   8 85 86 87 88                      CH-47,UH1D                           0902    -
-1P FAMT TCCM  2  3  4                                                        1402   1-
-1P FAMT TCCD  2  3  4                                                        1402   2-
```

Figure II-14-C-2. Movement Model 80-Column Card Image

MOBILITY CATEGORY TABLE (UTD)

FORCE%BLUE

MOBILITY CATEGORY CODE	UNIT TYPE DESIGNATORS
F	0 AY
T	KMCI GNFA KAMI KLSI KTCT KTMT KCST ITCT ICST PMFA PMMT PMCT IMCT ILST PNFA PTST PIMI PICI IHMC EAMT ITMT EMMI IAMI
L	BMCC PPLC PTCC JACA ICCT JCLT IDCI JOLI IACC JALC ILLT ILLI ISLT IJLI IACH VALH VCLH IDCH IBLH JACH JCSH VFLH VBLH IFCA IFLA IGCA IGLA KCCA KSLA KGCA KALA KFCA KCLA KACA KLLA JHCD JECF IHCC IHLC IJCJ JDCL JLLI JSLL PSLL JTLL PTLL JFLL KHCD KACH KALH KOLE KLLE KHCE ICIJ IALH FBMH EDSH JCLH CDCC FIIJ FSLL FMLL FALL FNLL
S	IKMH IBMH JASH JDSH IFFA IBFA IGFA KGFA KHFA KCFA KLFA JAFD JBFD RASE RCSE PESE OCSE DESE ESCS JSCS PBCS IA4H EWEH PSMH KHFD KASH KBSH RCSE PESE EAMH EFFA ESFA ICFA FGFA FHFA FSFA FMFA EASD EFSE JCSF ICSE FSSS ECMC FHFD EASH FESE KCSE KCSH
F	PASE CESE PDBE ODBE JDSE KPSE
T	IACI IPMI IFSI IPCI ICMI IMST ECMI EDMI

TRAVEL MNEMONIC - MOBILITY CATEGORY INDEX TABLE

FORCE%BLUE

TRAVEL MNEMONIC		MOBILITY CATEGORY CODE		INDICES 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
ARAM	1	F	-	0	[illegible]	0	[illegible]	0	1	1	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	-
ARCM	2	T	-	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-
TRAM	3	L	-	1	1	1	1	1	0	1	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	-
TRCM	4	S	-	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TRRM	5	E	-	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TCCM	6	T	-	0	0	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TCCD	7	.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
TCC?	8	.	-	0	[illegible]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-

Figure II-14-C-3. Mobility Category and Travel Mode

MOBILITY CLASS TABLE (EQUIPMENT ITEM)

FORCEXBLUE

MOBILITY CLASS	EQUIPMENT ITEM CODES
2	34 160
3	60 161 162 164 165 166 167
4	135 138 163
5	25 29 35 41 71 73 75 185 186 188
6	37 52 56 58 187 189 190 191
7	140 141
8	85 86 87 88

MOBILITY CLASS EXCLUSION TABLE

FORCEXBLUE

UTD	TRAVEL MNEMONIC	MOBILITY CLASSES TO BE EXCLUDED		
ITCT	TCCM	2	3	4
ICST	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4
PMFA	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4
IMCT	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4
TLSI	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4
PNFA	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4
CTSI	TCCM	2	3	4
	TCCD	2	3	4
	TCCR	2	3	4

Figure II-14-C-4. Mobility Class and Exclusion Table

MOBILITY CATEGORY ROAD MOVEMENT RATE TABLES (KM/HR)

FORCEXPLUS

MOBILITY CATEGORY CODE	FORMATION	ROUTE TYPE - / TERRAIN TYPE -	ADMINISTRATIVE MOVE RA T1	RA T2	RG T1	RG T2	TACTICAL MOVE RA T1	RA T2	RG T1	RG T2	RD T1	RD T2
T	**	DAY - NO RAIN	0	0	0	0	32	30	32	30	24	20
		DAY - LIGHT RAIN	0	0	0	0	30	26	30	26	20	18
		DAY - HEAVY RAIN OR FOG	0	0	0	0	26	24	26	24	18	12
		NIGHT - NO RAIN	0	0	0	0	24	20	24	20	20	16
		NIGHT - LIGHT RAIN	0	0	0	0	20	18	20	16	16	12
		NIGHT - HEAVY RAIN OR FOG	0	0	0	0	16	14	16	14	12	8
L	**	DAY - NO RAIN	40	36	40	36	40	36	36	32	28	24
		DAY - LIGHT RAIN	40	36	40	36	36	32	32	28	24	20
		DAY - HEAVY RAIN OR FOG	32	28	32	28	32	28	28	24	20	16
		NIGHT - NO RAIN	36	32	36	32	36	32	32	28	20	16
		NIGHT - LIGHT RAIN	32	28	32	28	32	28	28	24	16	12
		NIGHT - HEAVY RAIN OR FOG	28	24	28	24	28	24	24	20	12	8

MOBILITY CATEGORY CROSS COUNTRY MOVEMENT RATE TABLES (KM/HR)

FORCEXPLUS

MOBILITY CATEGORY CODE	FORMATION	TRAFFICABILITY INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
F	**	DAY - NO RAIN	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
		DAY - LIGHT RAIN	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
		DAY - HEAVY RAIN OR FOG	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2
		NIGHT - NO RAIN	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1
		NIGHT - LIGHT RAIN	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
		NIGHT - HEAVY RAIN OR FOG	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T	**	DAY - NO RAIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		DAY - LIGHT RAIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		DAY - HEAVY RAIN OR FOG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NIGHT - NO RAIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NIGHT - LIGHT RAIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NIGHT - HEAVY RAIN OR FOG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure II-14-C-5. Unit Road and Cross Country Movement Rates [illegible] (KM/HR)

FORCEXFLUF

MOBILITY CLASS		TRAFFICABILITY INDEX 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	DAY - NO RAIN	3	3	[illegible]	[illegible]	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
	DAY - LIGHT RAIN	3	3	3	3	3	3	3	3	3	2	3	3	2	2	2	2	2	2	2	2
	DAY - HEAVY RAIN OR FOG	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2
	NIGHT - NO RAIN	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1
	NIGHT - LIGHT RAIN	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
	NIGHT - HEAVY RAIN OR FOG	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	DAY - NO RAIN	11	12	13	11	10	11	9	10	7	8	6	7	5	5	4	5	4	5	2	4
	DAY - LIGHT RAIN	13	11	13	11	9	12	9	10	7	6	5	8	4	3	2	4	2	4	1	2
	DAY - HEAVY RAIN OR FOG	9	10	9	10	5	9	7	9	5	7	4	7	2	4	1	2	1	2	1	1
	NIGHT - NO RAIN	7	9	7	8	6	7	6	7	5	6	4	5	3	4	2	3	2	3	2	2
	NIGHT - LIGHT RAIN	7	8	5	7	5	7	5	6	4	5	4	5	2	3	2	2	2	2	1	2
	NIGHT - HEAVY RAIN OR FOG	6	7	5	6	5	5	5	6	4	4	3	4	2	2	1	2	1	2	1	1

MOBILITY CLASS ROAD MOVEMENT RATE TABLES (KM/HR)

FORCEXFLUF

MOBILITY CLASS	TACTICAL MOVE — ROUTE TYPE - / TERRAIN TYPE -	RA T1	RA T2	RG T1	RG T2	RO T1	RO T2
1	DAY - NO RAIN	3	3	3	3	3	2
	DAY - LIGHT RAIN	3	3	3	3	3	2
	DAY - HEAVY RAIN OR FOG	3	3	3	2	2	1
	NIGHT - NO RAIN	3	3	3	3	3	2
	NIGHT - LIGHT RAIN	3	3	3	3	3	1
	NIGHT - HEAVY RAIN OR FOG	3	3	3	2	2	1
2	DAY - NO RAIN	40	36	40	36	35	32
	DAY - LIGHT RAIN	40	36	40	36	35	32
	DAY - HEAVY RAIN OR FOG	36	32	36	32	32	28
	NIGHT - NO RAIN	36	32	36	32	28	24
	NIGHT - LIGHT RAIN	32	28	32	28	24	20
	NIGHT - HEAVY RAIN OR FOG	28	24	28	24	[illegible]	15

Figure II-14-C-6. Equipment Road and Cross Country Movement Rates

FORCE=BLUE

CONSUMPTION RATES OF CLASS III SUPPLIES

EQUIPMENT ITEM CODE	UNITS-ACTIVITY-ROUTE TYPE-	GALS/HR MOVE GC	MOVE 1A	MOVE RG	MOVE RD	TEMPERATURE-	GALS/HR ENGINES LE 90/32	GALS/HR ENGINES GT 90/32	STAY LE 90/32	STAY LE 90/32
1		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2		0.00	0.00	0.00	0.00		0.00	0.00	0.00	[illegible]
3		0.00	0.00	0.00	0.00		0.10	0.00	[illegible]	[illegible]
4		0.00	0.00	0.00	0.00		[illegible]	[illegible]	[illegible]	[illegible]
5		0.00	0.00	0.00	0.00		[illegible]	[illegible]	[illegible]	[illegible]
6		0.00	0.00	0.00	[illegible]		[illegible]	[illegible]	0.00	0.00
7		0.00	[illegible]	[illegible]	[illegible]		0.00	0.00	0.00	0.00
8		0.00	[illegible]	[illegible]	[illegible]		0.00	0.00	0.00	0.00
9		[illegible]	[illegible]	[illegible]	0.00		0.00	0.00	0.00	0.00
13		[illegible]	0.00	[illegible]	0.00		0.00	0.00	0.00	0.00
[illegible]		[illegible]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
[illegible]		[illegible]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
[illegible]		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
25		.50	.24	.24	.24		0.00	0.00	0.00	0.00
26		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
27		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
28		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
29		4.10	1.64	1.64	1.64		0.00	0.00	0.00	0.00

FORCE=BLUE

CONSUMPTION RATES OF CLASS IIIA SUPPLIES (GALS/HR)

EQUIPMENT ITEM CODE	ALTITUDE CUT-OFF (FEET)	CRUISE SPEED CUT-OFF (KNOTS)	CONSUMPTION RATES LE SPEED LE ALT.	LE SPEED GT ALT.	GT SPEED LE ALT.	GT SPEED GT ALT.	ACTIVITY-TEMP.- STAY LE 90/32	STAY GT 90/32
85	0.0	0.0	0.00	0.00	0.00	22.00	1.00	0.00
86	0.0	0.0	0.00	0.00	0.00	85.00	1.00	0.00
87	0.0	0.0	0.00	0.00	0.00	467.00	7.00	0.00
88	0.0	0.0	0.00	0.00	0.00	83.60	1.00	0.00
91	0.0	0.0	0.00	0.00	0.00	170.00	3.00	0.00

Figure II-14-C-7. Ground and Air Fuel Consumption Rates

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR MOVEMENT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 15

ENGINEER DATA INPUT PROGRAMS

1. INTRODUCTION. The Engineer data input programs consist of two independently executed routines, ENGLD and BARLD. These routines create and load the files required by the Engineer Model and other models using barrier information. The data loaded define the time and resources required to accomplish each engineering task and describe the location and characteristics of the barriers.

2. ROUTINES:

a. General. The following routines comprise the Engineer data input programs.

b. Routine ENGLD. This routine reads and edits the data cards describing an engineering task and loads the information on the file. It also calls DUMP17.

c. Routine DUMP17. This routine provides a formatted dump of the Engineer data file.

d. Routines GET17, IFILE, IDENT, and ITYPCK. These four routines are efficiency routines used by ENGLD (GET17 is also used by DUMP17). GET17 is responsible for the input/output operation of bringing in the proper record from data file 17. IFILE edits the file number associated with each data card for the file, IDENT edits the card number, and ITYPCK edits the card type.

e. Routine BARLD. This routine reads and edits the input data describing the barriers and loads it on the file. It also creates the eight-digit quadrature code associated with each barrier. Finally, it provides a formatted dump of the data loaded.

3. FILES. The following files are used as indicated:

- Barrier description - data file 2
- Engineer task data - data file 17

NOTES

APPENDIX A

ENGINEER DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for engineer activities are documented in Appendix A, Engineer Model Input Requirements, to Chapter 14 of the Period Processor (Section IV).

NOTES

APPENDIX B

ENGINEER DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Engineer data are loaded by the routines described in this appendix. The routine ENGLD loads the constant data describing the various engineer tasks and, through a call to routine DUMP17, provides a listing of the data. Routine BARLD loads and lists data describing actual barriers. ENGLD and BARLD are run as independent jobs.

2. ROUTINES ENGLD AND DUMP17:

a. Purpose. Routine ENGLD is responsible for editing and loading the data for engineer tasks onto data file 17. DUMP17 prints the contents of data file 17 after it has been loaded. ENGLD reads a data card, prints its image, and examines this card for possible loading errors. Should an error occur, this routine identifies the type of error, prints the diagnostic message, places useable information onto the file, and reads the next card. Data file 17 contains data pertaining to actual engineering task information; and as such, six different card types are permissible, each providing different types of data for tasks. After reading the data, and placing it on data file 17, ENGLD calls routine DUMP17 to print those records containing data.

b. Input Variables:

Name	Source	Description
IDATA	DF17	Record number 157 for Red force.

c. Output Variables:

Name	Destination	Description
IDATA	DF17	Data to be loaded.
RDATA	DF17	Rate information, minimum and standard.

d. Logical Flow (Figure II-15-B-1):

(1) Block L1. Initialize variables and zero output array.

(2) Blocks 1, L10001, and 2. Bring in and print the file name table and create data file 17 on disk.

(3) Block 3. Zero data file 17.

(4) Block L10. Read next card.

(5) Blocks 4, L15, L20, L25, L30, 5, and L1100. Routines IFILE, IDENT, and ITPCHK edit the first data card for proper file, card, and card

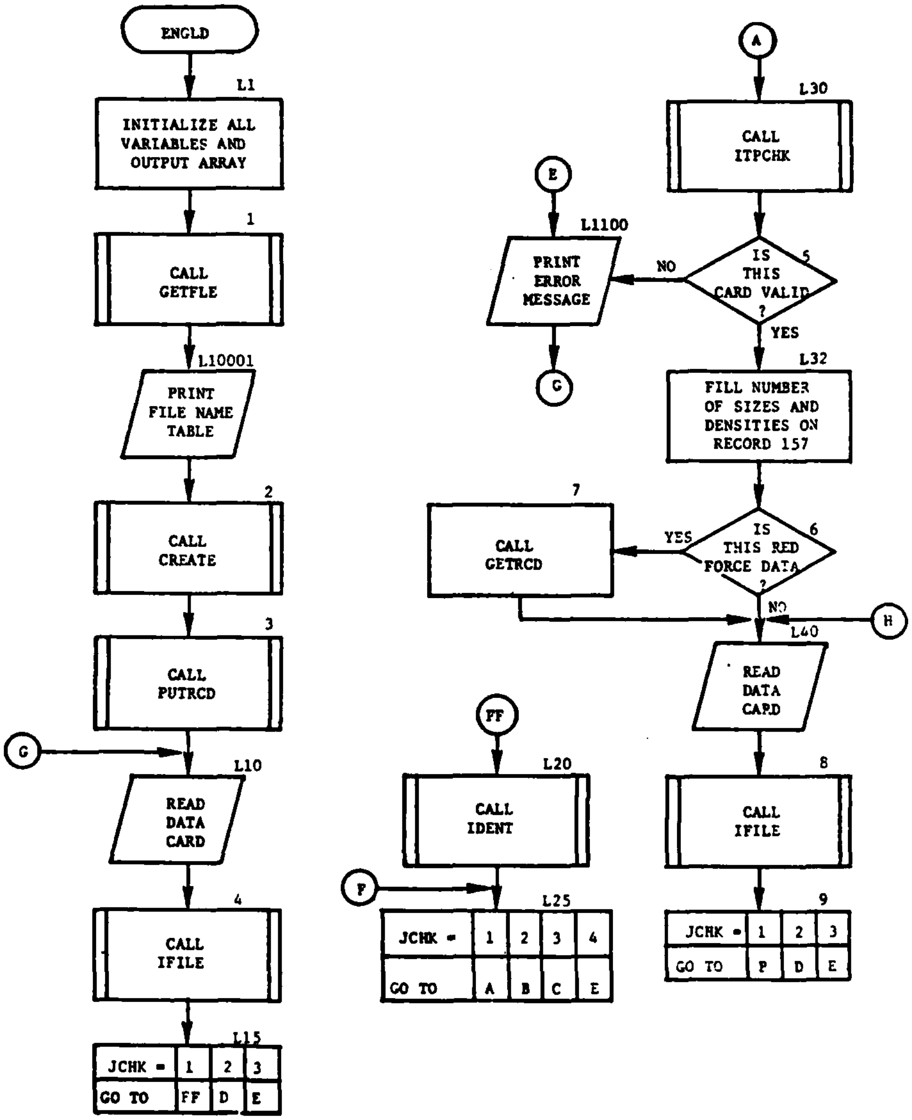

Figure II-15-B-1. Routine ENGLD (Continued on Next Page)

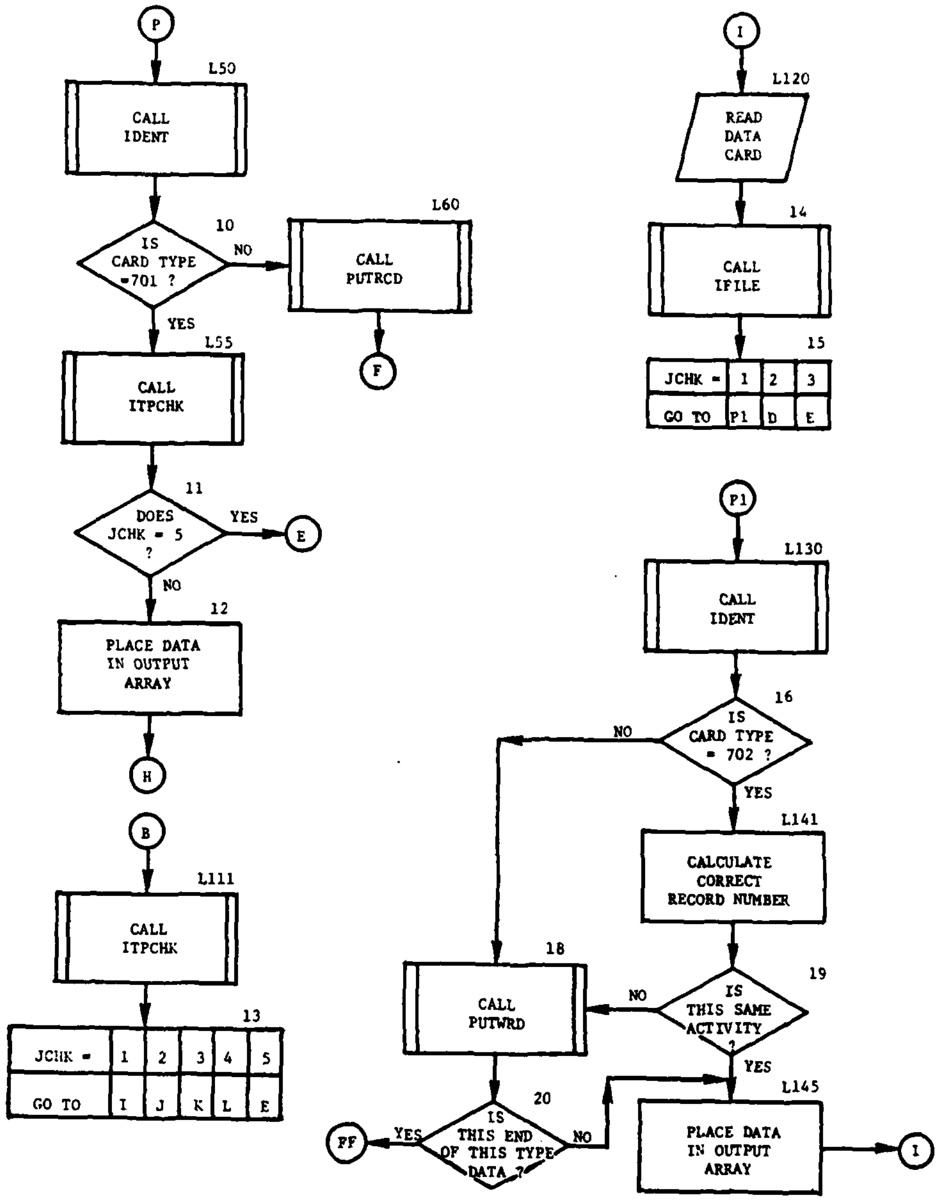

Figure II-15-B-1. Routine ENGLD (Continued)

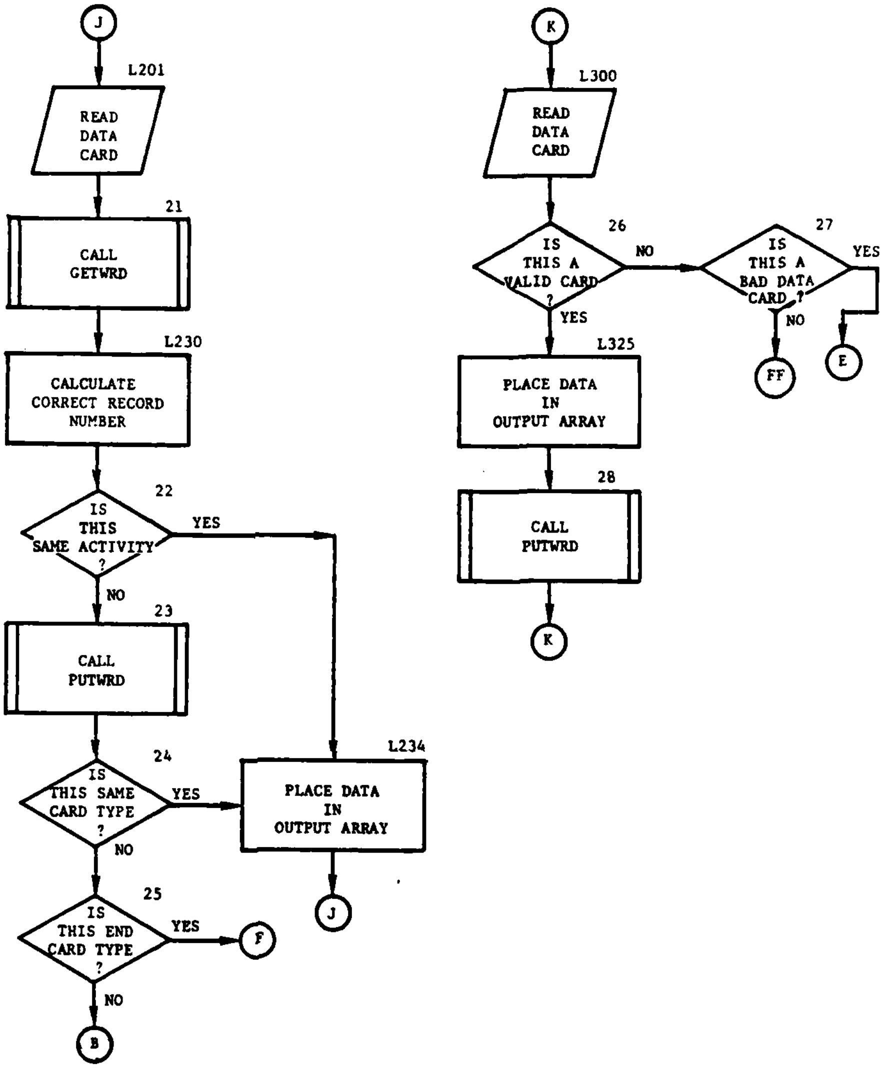

Figure II-15-B-1. Routine ENGLD (Continued)

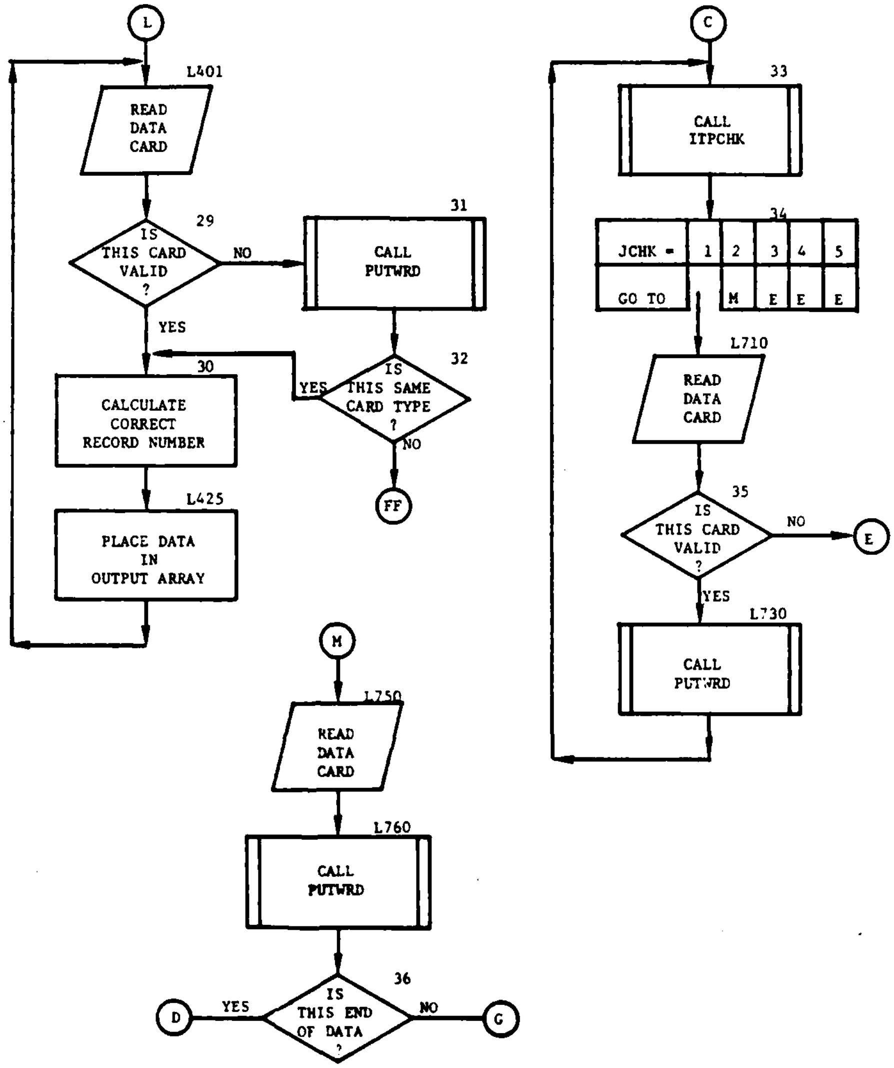

Figure II-15-B-1. Routine ENGLD (Continued)

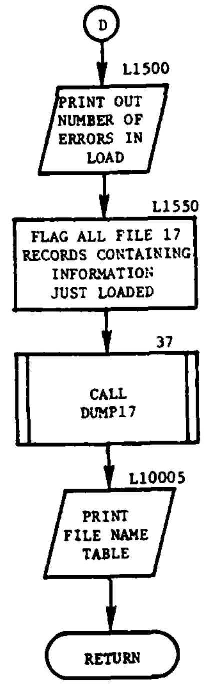

Figure II-15-B-1. Routine ENGLD (Concluded) type; control branches on card type or end of data. If this is not a valid card, the diagnostic message is printed and control goes to block L10 to read the next data card.

(6) Blocks L32, 6, and 7. Fill in possible number of sizes and densities by default for all task types. If this is a Red data card, bring in record 157.

(7) Blocks L40, 8, 9, L50, 10, L55, 11, 12, and L60. Read next card of first card type, containing task type, description, basic task size, number of sizes being played, and number of densities and restricted movement rate; all are placed on record 157. If this is not the end of the data, and there were no errors detected on this card, processing continues. If this is still the first card type, place the information just read into the output array. If this is a different card type, put record 157 onto the disk, and transfer control to block L25.

(8) Blocks L111 and 13. Card 1702 has four possible types; control branches on the proper type.

(9) Block L120. Read task type, activity, item code, minimum amount needed, standard amount required, proportionality factor, transportation item code, and modifiers affecting the task rates if less than the standard amount needed.

(10) Blocks 14, 15, L130, 16, L141, 18, 19, 20, and L145. If this is a valid card, and not the end of the data, processing continues. If this is the same card type, put the information just read into the output array. If this is a different card type, place the output array onto data file 17, and branch control to block L120.

(11) Blocks L201, 21, and L230. Read force pertaining to data, task type, size step, density, minimum troop level required for this size task, rate associated with this troop level, standard troop level, and standard rate. Bring in part of record 157 and calculate the record number where data are to be stored.

(12) Blocks 22, 23, 24, 25, and L234. If no errors are detected from this card, and this does not end the data, continue processing. If this is the same card type, put the data into the output array. If not, put the output array on the proper record of data file 17 and transfer control to block L201.

(13) Block L300. Read task type, activity, nighttime rate modifier, and terrain modifiers affecting the task rate on this type terrain.

(14) Blocks 26, 27, L325, and 28. If this is a valid card, and not the end of the data, processing continues. Put this data into output array and place it on data file 17; transfer control to block L300.

(15) Blocks L401, 29, 30, 31, 32, and L425. Read task type, activity, size step, density class, force rate, forcing code, and associated casualties.

If this is a valid card, and not the end of the data, processing continues. Put these data into the output array and place it on data file 17; transfer control to block L401.

(16) Blocks 33, 34, L710, 35, and L730. Read the item code and the contingency associated with it.

(17) Blocks L750, L760, and 36. Read contingency associated with each troop type, and place this onto data file 17, record 157. If this is not the end of the data, control goes to block L10.

(18) Blocks L1500, L1550, 37, and L10005. When the last data card has been read, print the total number of errors found. The last word on every record containing valid data is marked, and DUMP17 is called. The file name table is printed and control returns to the calling routine.

3. ROUTINES GET17, IFILE, IDENT, AND ITYPCK. These four routines are efficiency routines used by ENGLD (GET17 is also used by DUMP17). GET17 is responsible for the input/output operation of bringing in the proper record from data file 17. IFILE edits the file number associated with each data card for the file, and returns a three if an error is encountered. IDENT edits the card number returning a four if an error has occurred, and ITYPCK edits the card type and returns a five if an error occurs; otherwise, IDENT and ITYPCK return the values found for card number and card type. respectively.

4. ROUTINE BARLD:

a. Purpose. BARLD places the barriers to be played in any period or game onto data file 2 of the constant data base, by either loading a new barrier, updating an existing barrier, or removing a barrier. It also creates the eight-digit quadrature code associated with each barrier segment and places it onto data file 22. The routine prints the barrier segments line-by-line.

b. Input Variables:

(1) Barriers used in the actual barrier line segment are those common to the entire Engineer Model.

(2) Other Variables:

Name	Source	Contents
XMAX	DF37	Maximum X coordinate permissible.
YMAX	DF37	Maximum Y coordinate permissible.
XACTON	DF37	X coordinate approximating the center of action.

Name	Source	Contents
YACTON	DF37	Y coordinate approximating the center of action.

c. Output Variables:

Name	Destination	Contents
KDUM(1)	DF22	Link for this code to corresponding barrier record.
KDUM(2)	DF22	Eight-character quadrature code.

d. Logical Flow (Figure II-15-B-2):

(1) Block 1. Bring in the file name table and print it.

(2) Blocks 2 and L1000. Read geometry necessary for quadrature and print.

(3) Blocks 3 and 4. Read mnemonic of barrier line and card type; if card is not a load type, transfer control to block L2000.

(4) Blocks 5, 6, 7, 8, and 9. Remove, create, and zero data files 2, 18, 22, and 37. Place geometry information on data file 37.

(5) Block L10. Read mnemonic of next barrier line and card type.

(6) Blocks 10 and 11. Read barrier segment mnemonic; both barrier end points; Blue/Red task, size, troop types; and the segment's intelligence and physical status. Check for end of barrier line; if end of barrier line is found, transfer control to block L10.

(7) Blocks L11 and 12. Call routine BUIDRC to obtain the correct identifying record number for this barrier. Call routine CRTQD to create the eight-digit quadrature code based on the location of this barrier segment.

(8) Blocks 13, 14, and 15. If the card type is not UPDT, the record number of the present segment is put into the record for the preceeding segment, and the barrier information is put in data file 2. If the card type is UPDT, the record number is retained.

(9) Blocks L3001 and L3005. The barrier file and the intelligence and existence status of the barrier are printed.

(10) Blocks 16 and 17. If the card is a UPDT type, transfer control to block L10 to read the next header card. If not, the record number and quadrature code are put into data file 22.

(11) Block L100. This block is the end of the loop that reads barrier segment data. If end of barrier line, transfer control to block L10; otherwise, transfer control to block 10.

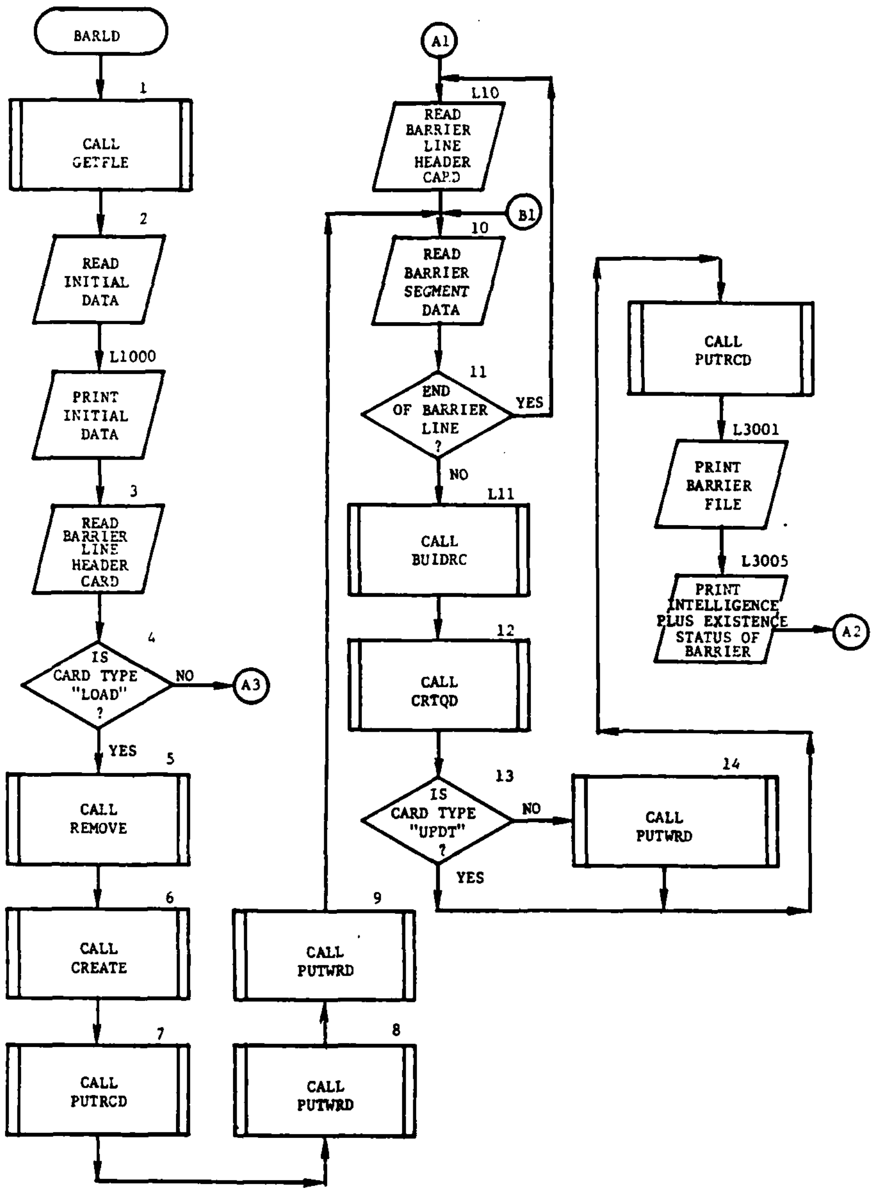

Figure II-15-B-2. Routine BARLD (Continued on Next Page)

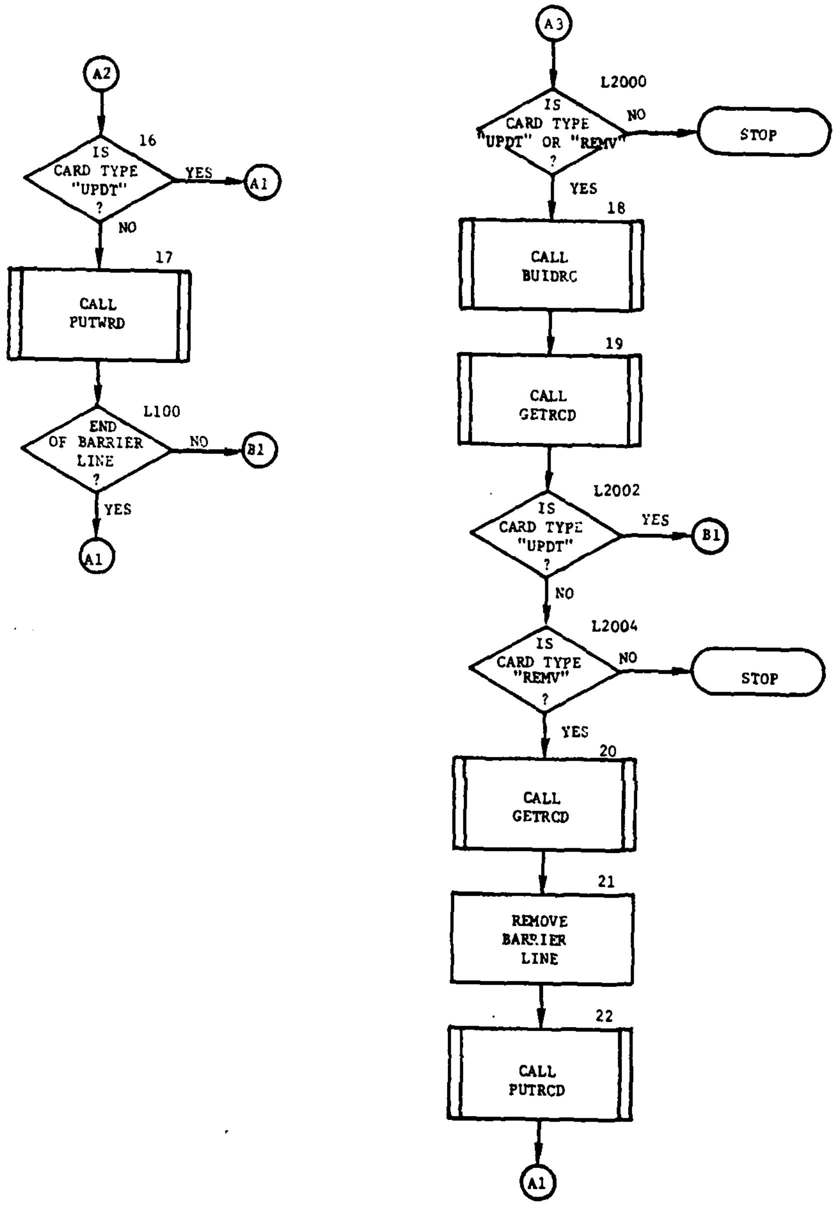

Figure II-15-B-2. Routine BARLD (Concluded)

(12) Blocks L2000, 18, and 19. If card type is not UPDT or REMV, stop the program; otherwise, determine the record number and bring it from data file 2.

(13) Blocks L2002 and 2004. If the card type is UPDT, transfer control to block 10 to read the next data card. If not, and if the card type is not REMV, stop the program.

(14) Blocks 20, 21, and 22. If the card type is REMV, remove the barrier line from data file 22, and transfer control to block L10.

APPENDIX C

ENGINEER DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. This appendix contains sample printouts of constant data input for Combat Service Support. The input of barrier and facility file data results in the generation of one type of output report and the input of engineer task file data results in the generation of five types of output reports.

2. BARRIER SEGMENT LOCATION AND STATUS. The format of this printout is illustrated in Figure II-15-C-1. The first line gives the coordinates from card ID 0200, type 1 (geographical area and battle area); this appears only once. The second line is the barrier record number and the quadrature number used for search purposes. The third line is the barrier line name from card ID 0201, type 1. The first two columns of the fifth line are provided to give record numbers of previous and following segments of the same barrier line; the remaining data are transferred directly from appropriate cards. More barrier segments follow in the same format.

3. ENGINEER 80-COLUMN CARD IMAGE. This format is illustrated in Figure II-15-C-2. The sources of this printout are the original cards that brought the data into the model. The number in the left column is the card type number and the number in columns 73-76 is the card ID.

4. ENGINEERING TASK PARAMETERS. This format, illustrated in Figure II-15-C-3, has three parts. The first part, task sizes, is a printout of data from card ID 1701, type 1; the second part, contingency levels of equipment, lists data from card ID 1703, type 1; and the third part, contingency levels of troops, lists data from card ID 1703, type 2.

5. ENVIRONMENTAL AND TROOP RATES AND RATE MODIFIERS. This format, illustrated in Figure II-15-C-4, has three parts. The first part, environmental rate modifiers, is a printout of data from card ID 1702, type 3; the second part, minimum number of troops and associated rates, and the third part, standard number of troops and associated rates, are printouts of data from card ID 1702, type 2.

6. EQUIPMENT REQUIREMENTS AND RATE MODIFIERS. This format, illustrated in Figure II-15-C-5, has two parts, both of which are printouts of data from card ID 1702, type 1. The upper part covers minimum and standard equipment requirements, and the lower part the associated rate modifiers.

7. MINEFIELD FORCING CASUALTIES. This format, illustrated in Figure II-15-C-6, is a printout of equipment types and their losses when forcing a minefield. It is a printout of data from card ID 1702, type 1.

```
  215000   170000   160000   120000

ITOTAL = 3376ALLOC = 42370000
 BARRIER LINE ALPHA 01

PVNMCD FLNMCD    XCORD1      YCORD1      XCORD2      YCORD2      BUID        SIZEB    CHARIC      IDNTB   IDNTR   ISIZER

     0       0   148000.0    153000.0    148600.0    151000.0    RIV001          0    00000320    0000    0000        0
                   INTELLIGENCE STATUS    BOTH                  EXISTENCE STATUS    ALL

ITOTAL =  601ALLOC = 42333450
 BARRIER LINE ALPHA 01

PVNMCD FLNMCD    XCORD1      YCORD1      XCORD2      YCORD2      BUID        SIZEB    CHARIC      IDNTB   IDNTR   ISIZER

  3376       0   148600.0    151000.0    149000.0    159800.0    BFX001         60    00000320    0124    0124       20
                   INTELLIGENCE STATUS    BOTH                  EXISTENCE STATUS    ALL

ITOTAL = 3377ALLOC = 42333700
 BARRIER LINE ALPHA 01

PVNMCD FLNMCD    XCORD1      YCORD1      XCORD2      YCORD2      BUID        SIZEB    CHARIC      IDNTB   IDNTR   ISIZER

   601       0   149000.0    150800.0    150700.0    150600.0    RIV002          0    00000320    0000    0000        0
                   INTELLIGENCE STATUS    BOTH                  EXISTENCE STATUS    ALL

ITOTAL = 3378ALLOC = 73000000
 BARRIER LINE ALPHA 01

PVNMCD FLNMCD    XCORD1      YCORD1      XCORD2      YCORD2      BUID        SIZEB    CHARIC      IDNTB   IDNTR   ISIZER

  3377       0   150700.0    150600.0    150900.0    150000.0    RIV003          0    00000320    0000    0000        0
                   INTELLIGENCE STATUS    BOTH                  EXISTENCE STATUS    ALL
```

Figure II-15-C-1. Barrier Segment Location and Status

```
18 7 MINEFIELD AT-AP      30600 1      320                                               17 1    1
18 5 BRIDGE FLOATG MAR     3060 1      400                                               17 1    2
18 6 BRIDGE FLOATG M4T6    3060 1      400                                               17 1    3
18 7 BRIDGE FIXED AVLB     1860 1      400                                               17 1    4
18 8 RAFT/FERRY MAP        5060 1        5                                               17 1    5
1810 FORD                  5060 1      240                                               17 1    6
1811 BRIDGE LOCAL 1-LANE   5060 1      400                                               17 1    7
1812 BRIDGE LOCAL 2-LANE   5060 1      900                                               17 1    8
1813 BRIDGE LOCAL 3-LANE   5060 1     1200                                               17 1    9
1814 BRIDGE LOCAL 4-LANE   5060 1     1500                                               17 1   10
1815 CRATER ADM           10060 1       -0                                               17 1   11
1816 TREE BLOWDOWN         5060 1      320                                               17 1   12
18-0                       -0 -0-0      -0                                               17 2   -0
18 3   BUILD161     1     X130161    -0 -0    -0 -0    -0 -0     1 25     410017 2    1
18 3   BUILD 1015000      X 10161    -0 -0    -0 -0    -0 -0150001005000010017 2    2
18 3   BUILD -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0     -0 -0     -0 -017 2    3
18 3  BREACH  5   100     X  0160    -0 -0    -0 -0    -0 -0   100100   10010017 2    4
18 3  BREACH160     0     X250160    -0 -0    -0 -0    -0 -0     0100     110017 2   -0
18 3  BREACH -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2    5
18 3  REMOVE  5 1000      X 10161    -0 -0    -0 -0    -0 -0  1000100  20010017 2    6
18 3  REMOVE161     0     X250161    -0 -0    -0 -0    -0 -0     0100     110017 2   -0
18 3  REMOVE -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2    7
18 5   BUILD176    10     X130176    -0 -0    -0 -0    -0 -0    10100    1010017 2    8
18 5   BUILD -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2    9
18 6   BUILD137    16     X130161    -0 -0    -0 -0    -0 -0    16100    1610017 2   12
18 6   BUILD135     4     X250163    -0 -0    -0 -0    -0 -0     4100     410017 2   13
18 6   BUILD163     1     X250163    -0 -0    -0 -0    -0 -0     1100     210017 2   14
18 6   BUILD161    16     X250161    -0 -0    -0 -0    -0 -0    16100    1610017 2   15
18 6   BUILD -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2   16
18 6  BREACH  5   500     X  0160    -0 -0    -0 -0    -0 -0   500100   50010017 2   17
18 6  BREACH160     0     X250160    -0 -0    -0 -0    -0 -0     0100     110017 2   -0
18 6  BREACH -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2   18
18 6  REMOVE135     1     X130163    -0 -0    -0 -0    -0 -0     1 50     210017 2   19
18 6  REMOVE161    16     X250161    -0 -0    -0 -0    -0 -0    16100    1610017 2   20
18 6  REMOVE163     0     X250163    -0 -0    -0 -0    -0 -0     0100     110017 2   -0
18 6  REMOVE -0    -0     X -0 -0    -0 -0    -0 -0    -0 -0    -0 -0     -0 -017 2   21
```

Figure II-15-C-2. Engineer 80-Column Card Image

ENGINEERING TASK PARAMETERS

TASK TYPE	BASIC SIZE	NO. SIZES	NO. RECESS. INCR.	CONSTRICTIVE RATE
1	0	60	1	0
2	100	60	1	333
3	300	60	1	[illegible]
4	0	60	1	0
5	[illegible]	60	1	400
	0	60	1	0
25	0	60	1	0

BLUE FORCE

EQUIP	CONT. LEVEL
1	0
2	0
3	0
4	0
5	
199	0
200	0

UNIT	CONT. LEVEL
MNVR	0
ENGR	0
ADM	0
FLBR	0
MAB	0

RED FORCE

EQUIP	CONT. LEVEL
1	0
2	0
3	
	0
5	0
199	0
200	0

UNIT	CONT. LEVEL
MNVR	0
ENGR	0
ADM	0
FLBR	0
MAB	0

Figure II-15-C-3. Engineering Task Parameters

FORCE	TASK	ACTIVITY	LIGHT/DARKNESS	MODIFIERS TERRAIN A	B	C	D	F
BLUE	3	BUILD	50	-0	-0	-0	-0	-0

MINIMUM NUMBER OF TROOPS AND THE ASSOCIATED RATE

SIZE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE
1	1	50.000								
2	1	50.000								
3	1	50.000								
4	1	50.000								
5	1	50.000								
6	0	0								

STANDARD NUMBER OF TROOPS AND THE ASSOCIATED RATE

SIZE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE	TROOPS	RATE
1	1	50.000								
2	2	50.000								
3	3	50.000								
4	4	50.000								
5	5	50.000								
6	0	0								
7	0	0								
8	0	0								
9	0	0								
10	0	0								
11	0	0								

Figure II-15-C-4. Environmental and Troop Rates and Rate Modifiers

EQUIPMENT REQUIREMENTS

ITEM CODE	MINIMUM AMOUNT	STANDARD AMOUNT	PROPORTIONALITY	VEHICLE
161	1	4	20	161
10	15000	60000	10	161

EQUIPMENT RATE MODIFIERS

ITEM CODE	MIN.	MOD.	MIN.	MOD.	MIN.	MOD.	MIN.	MOD.	MIN.	MOD.
161	0	0	0	0	0	0	1	25	4	100
10	0	0	0	0	0	0	15000	100	60000	100

Figure II-15-C-5. Equipment Requirements and Rate Modifiers

M I N E   F I E L D   C A S U A A T I E S   P Y   E C H   T Y P E   F O R   T H E   P L U E   F O R C E

37	3	41	2	185	2	186	2	-0	-0	50
37	3	41	2	185	2	186	2	-0	-0	50
37	3	41	2	185	2	186	2	-0	-0	50
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0

Figure II-15-C-6. Minefield Forcing Casualties

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR ENGINEER

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 16

AIRMOBILE DATA INPUT PROGRAMS

1. INTRODUCTION. The Airmobile data input program creates the necessary file and loads all data used by the Airmobile Model including data required to define the composition of a mission and the weapons and aircraft characteristics necessary to simulate ground to air attrition.

2. ROUTINES. The Airmobile data input program is the routine FIL7LD. This routine is responsible for reading and editing the data cards containing the Airmobile data and loading the extracted data on the file. It also gives a partial formatted dump of the file and a complete unformatted record dump of the file.

3. FILES. Data file 7 is used to contain the airmobile data.

NOTES

APPENDIX A

AIRMOBILE DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for airmobile events are documented in Appendix A, Airmobile Model Input Requirements, to Chapter 15 of the Period Processor (Section IV).

NOTES

APPENDIX B

AIRMOBILE DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. The constant data stored on data file 7 for use by the Airmobile Model are loaded by the routine FIL7LD, described in this appendix.

2. ROUTINE FIL7LD:

a. Purpose. This routine loads the data contained on data file 7 that are used by the Airmobile Model.

b. Input Variables. Standard common area, IFNT.

c. Output Variables:

Name	Destination	Contents
EOH1(50)	DF7	Equipment item codes of all secondary priority items in the force; denoted by a one in the appropriate character location of this array. Four character codes are contained in each word.
JDATA(15)	DF7	Contents of the mission mix table for each escort/transport aircraft mix.
IFIL7(201-210)	DF7	Unit type designators of the forward rearm/refuel areas (FRRA).
IFIL7(211-220)	DF7	Number of rearm points at the above FRRAs.
IFIL7(221-224)	DF7	Equipment item codes of the refuel devices.
IFIL7(231-234)	DF7	Number of nozzles at each refuel device specified in words 221-224.
IFIL7(241)	DF7	Maneuver time for refueling.
IFIL7(242)	DF7	Maneuver time for rearming.
ITABLE	DF7	Array where data is stored until it is put onto data file 7.
MKILL	DF7	Probability of kill data for air defense weapons.

d. Logical Flow (Figure II-16-B-1):

(1) Blocks 1 and 2. Bring in the file name table and print it.

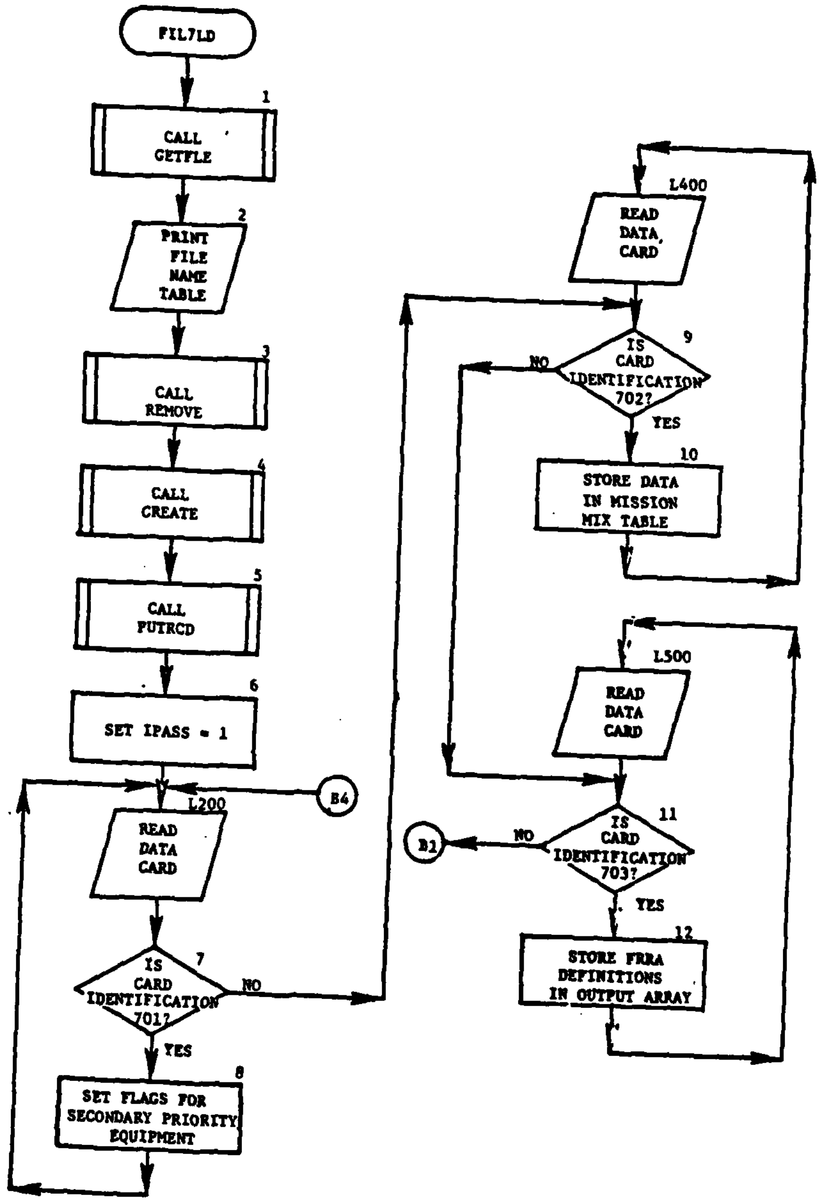

Figure II-16-B-1. Routine FIL7LD

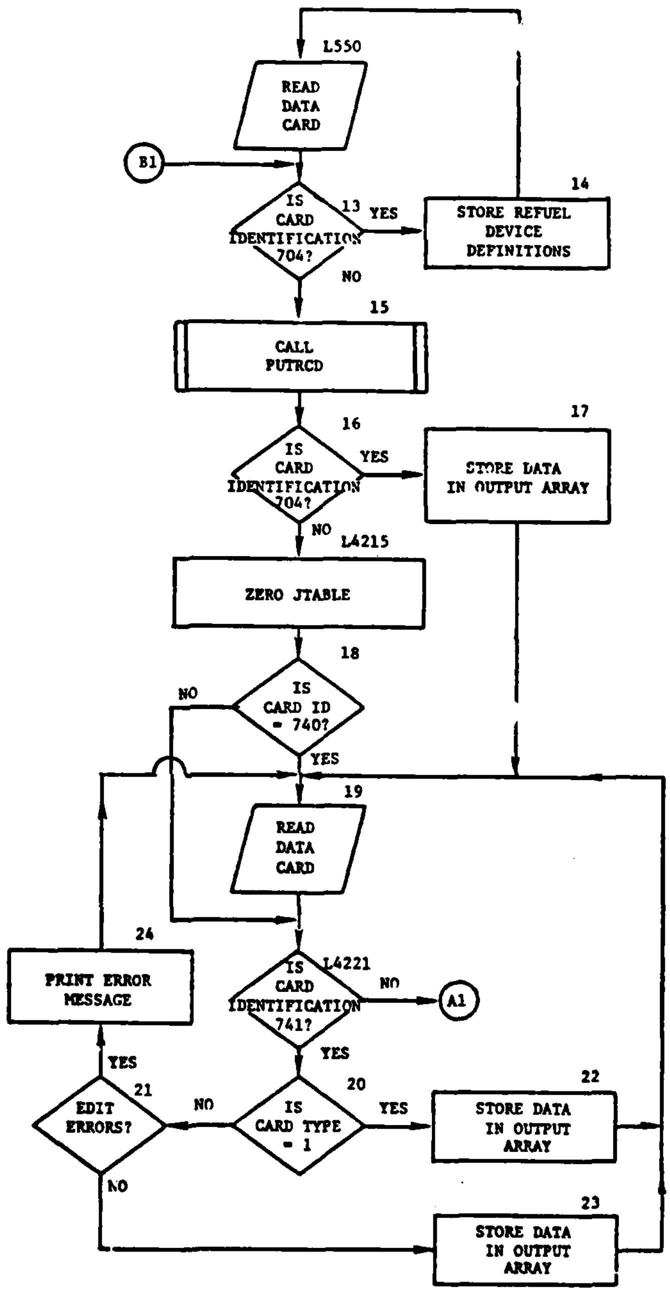

Figure II-16-B-1. Routine FIL7LD

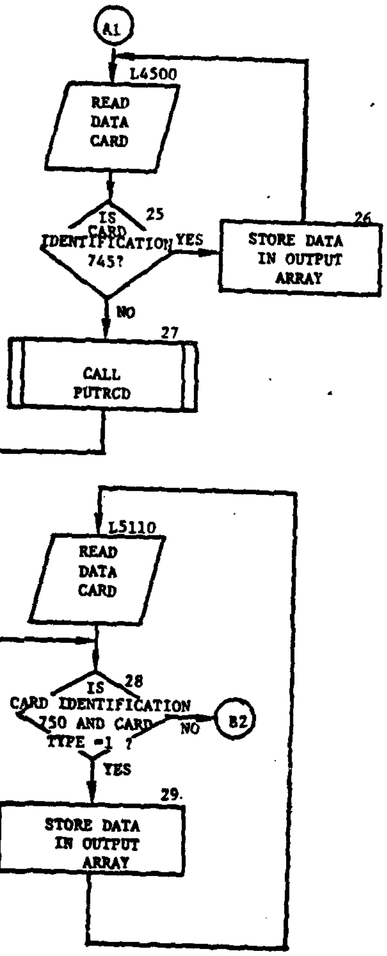

Figure II-16-B-1. Routine FIL7LD

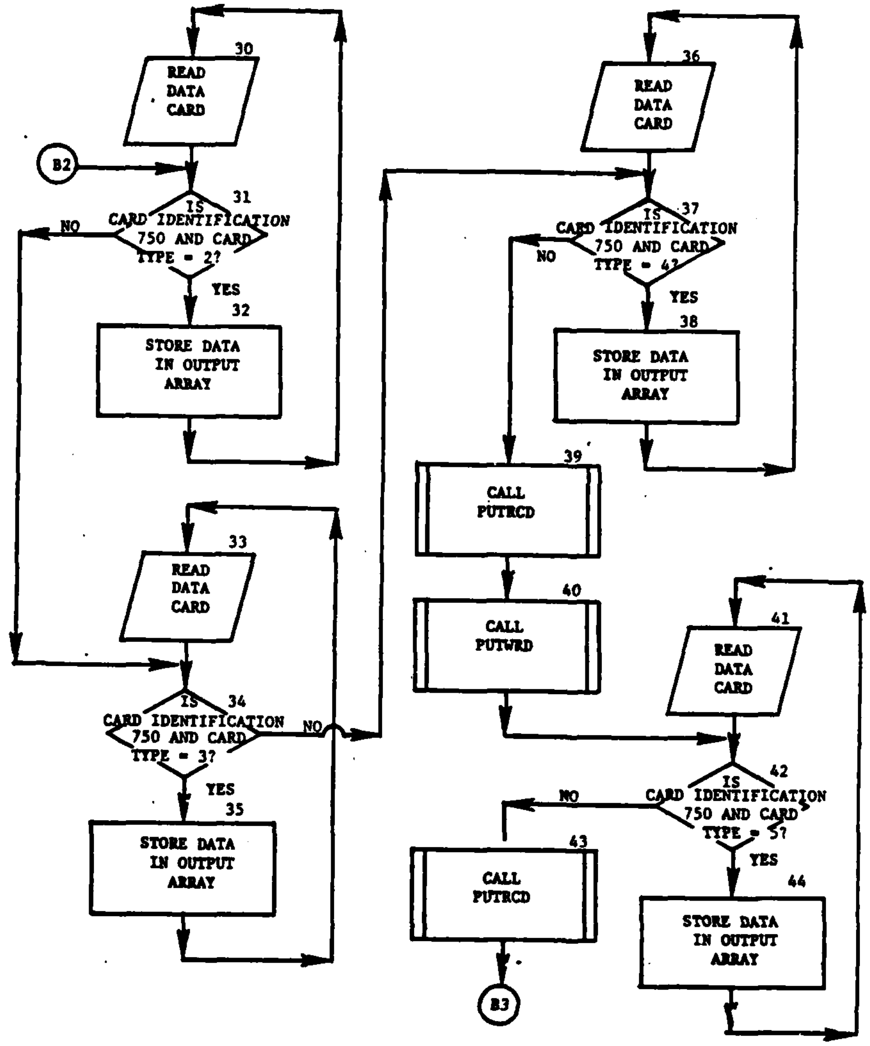

Figure II-16-B-1. Routine FIL7LD

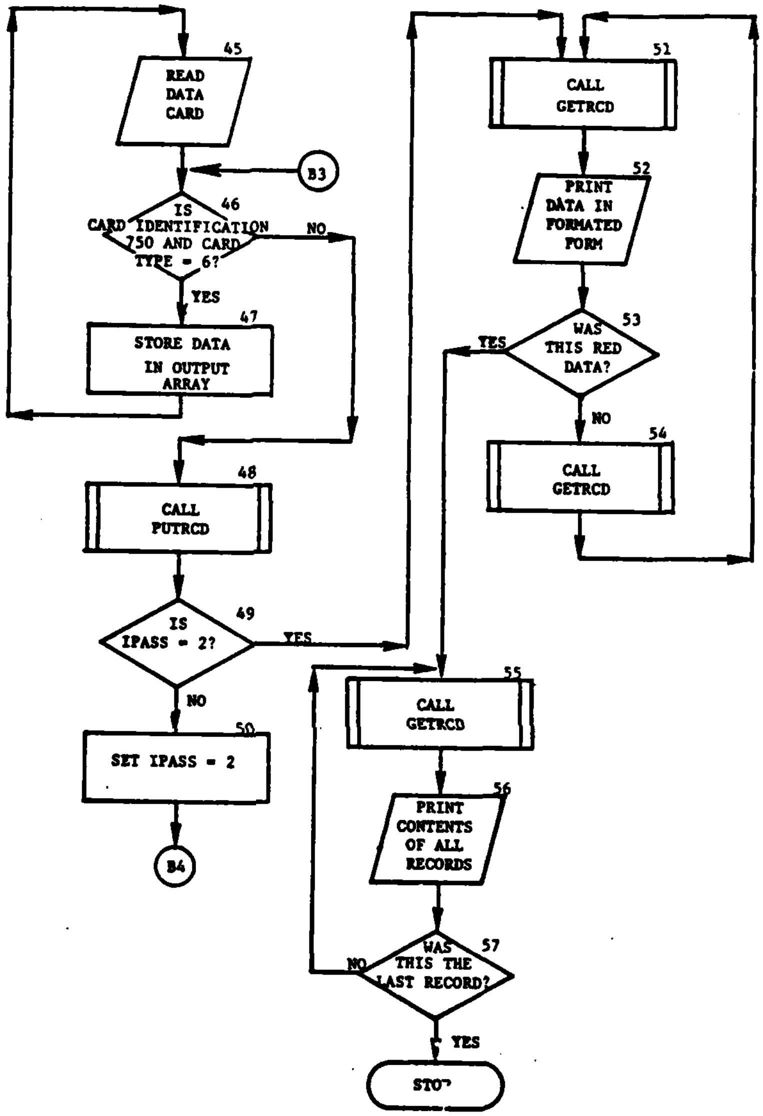

Figure II-16-B-1. Routine FIL7LD

(2) Blocks 3, 4, 5, and 6. Remove, create, and zero data files 7 and 24. Set IPASS equal to one to indicate that data for the Blue force are being processed.

(3) Blocks L200, 7, and 8. Read data cards. If the card identification is 701, set a flag in the output array for each secondary priority equipment type.

(4) Blocks L400, 9, and 10. The 702 cards are processed. They contain the mission mix data that are entered into the output array.

(5) Blocks L500, 11, and 12. After the 702 cards are processed, the 703 cards are read and the forward rearm and refuel area (FRRA) definitions that the cards contain are entered into the output array.

(6) Blocks L550, 13, 14, and 15. The 704 cards that contain the refuel device definitions are read and the data are stored in the output array. The data read from the four card types are put on the data file.

(7) Blocks 16, 17, L4215, 18, and 19. If the next card is a 740 card, the suppression mission data are read from it and stored in the output array. The JTABLE array is zeroed and, if the card was a 740 card, the next card is read in. If not control goes to block L4221.

(8) Blocks L4221, 20, 21, 22, 23, and 24. If the card read had data errors, a message is printed. If not, the acquisition data are stored in the appropriate place in the output array. When all 741 cards are processed, control passes to block L4500.

(9) Blocks L4500, 25, 26, and 27. If the card read is a 745 card, the aircraft data that it contains are stored in the output array. After all 745 cards are read the data from the 740, 741, and 745 cards are put on the data file.

(10) Blocks L5110, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, and 40. Card types 1 through 4 of card identification 750 are read. The air defense weapon data from each are stored in the output array. Each card is checked for identification and type. After all cards are read, the data are put on the data file.

(11) Blocks 41, 42, 43, and 44. The air defense weapon data for rotary wing aircraft are read from card type 5 of the identification 750 cards. The data are stored in the output array and, after all type 5 cards have been read, the data are put on the data file.

(12) Blocks 45, 46, 47, and 48. The air defense weapon data for fixed wing aircraft are read from card type 6 of the identification 750 cards. The data are stored in the output array and, after all type 6 cards have been read, the data are put on the data file.

(13) Blocks 49 and 50. If this was the second pass, control goes to the output portion of the program. If not, set IPASS equals two and read the data for the Red force, starting with the 701 cards.

(14) Blocks 51, 52, 53, 54, 55, 56, and 57. After the data have been loaded for both forces, print the contents of the first two records with descriptions of the contents. Then, print the contents of all data file 7 records.

APPENDIX C

OUTPUT DESCRIPTIONS FOR AIRMOBILE DATA INPUT

An 80-column image of each constant data input card is printed immediately after it is read. A sample of the listing produced in this manner is shown in Figure II-16-C-1. The listing of the data shown in Figure II-16-C-2 is generated by reading the first record and printing descriptive titles with the data. A similar listing for the Red force is generated from the second record. A word dump of all 52 records is also provided.

```
-1B113114160                                                                          07010001-
-1B01  88  2  251  1  40     6  7  500              07                               07020002-
-1B02                                                               96  2  224  107020003-
-1B03                                                               97  3 1131  407020004-
-1B04  88  2  251  1  90     6  7  500              07             86  2  224  107020005-
-1B05  88  2  251  1  90     6  7  500              07             87  3 1131  407020006-
-1B VALH  6 VFLH  6                                                                   07030007-
-1B  96   6                                                                    2   207040008-
-1B  5000 120   15   15   60   10   15                                                07400009-
-1B 1  2  5 10  1000  2000  3000  5000                                                0741    1-
-2B 1  2  80  11  63  15  63  22  30  25                                              0741    2-
-2B 1  5  93  10  80  13  63  15  45  25                                              0741    3-
-2B 1 10  99   8  93  11  80  13  63  15                                              0741    4-
-1B 2  2  5 10  1000  2000  3000  5000                                                0741    5-
-2B 2  2  10  11  90  15  60  22  10  25                                              0741    6-
-2B 2  5  10  10  90  13  70  15  20  25                                              0741    7-
-2B 2 10  10   8  90  11  80  13  30  15                                              0741    8-
-1B 3  2  5 10  2000  5000  8300 10000                                                0741    9-
-2B 3  2  85  38  85  38  85  38  85  38                                              0741   10-
-2B 3  5  85  25  85  25  85  25  85  25                                              0741   11-
-2B 3 10  85  25  85  25  85  25  85  25                                              0741   12-
-1B   85   7.5    8.2    2.8   .50    1                                               0745000?-
-1B   86  30.4   19.5    7.0   .50    1                                               0745000>-
-1B   87  68.5   29.8   11.76  .40    1                                               0745000 -
-1B   88  19.98  20.29   4.0   .50    1                                               0745000/-
-1B   91  25.0   20.0    2.00 2.00    2                                               0745000S-
-1B   98  23.9   17.2    1.09 4.00    2                                               0745000T-
-1B   99  23.9   17.2    1.09 4.00    2                                               0745000U-
-1B   70  11   4500   4500 1  1   9000  100  400   0 .      9  70          0750000V-
-1B   71  12   6000   6000 1  1   9837   50  600   0 .      9  72          0750000 -
-1B   73  13  32000  32000 1  1  54759   16 1620 100 .     19  74          0750000 -
-1B   75   3   2000   2000 1  1   4918    0  600   0 .167   5   9 1050     0750000Y-
-1B   76  14 100000 155000 1  1  99681 9840 2300   0 .     20  76          0750000 -
-2B   70  100 1000 2000  3000  4500  1  4  6   9  14  1   2  45   70   0750    1-
-2B   71  100 2000 3000  4000  6000  1  5  6   8  12  1   2  60   90   0750    2-
-2B   73 5000 8000 9999 20000 32000  8 10 18  30  60  1   2  60   90   0750    3-
-2B   75                                                     45   60   0750    4-
-2B   76 4000 8000 9999 75000 99999  3  7 10  99 130 12  19 9999 9999  0750    5-
-3B   70  3300  3100  2900 2900 2200 1800 1800            9    3  120  830750000L-
-3B   71  6900  6200  4800 3000 2200 2000 2000           12    4  300  900750010-
-3B   73                                                  6   18  900  9707500011-
-3B   75                                      60 3000     3 1100  420  9907500012-
-3B   76                                                 90    9  900  9707500013-
```

Figure II-16-C-1. Sample of 80-Column Card Image, Airmobile Model

FILE 7 DUMP -- BLUE --

MISSION MIXES

88	2	251	90	6	7	500	0	0	0	0	0	7	1	0
0	0	0	0	0	0	0	0	0	86	2	224	0	0	1
0	0	0	0	0	0	0	0	0	87	3	1131	0	0	4
88	2	251	90	6	7	500	0	0	86	2	224	7	1	1
88	2	251	90	6	7	500	0	0	87	3	1131	7	1	4
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

EXCLUDED EQUIP. ITEMS

113
118
160

FRRA DEFINITIONS (UTD,NO. OF REARM POINTS)

VALH, 6 VELH, 6 , 0 , 0 , 0 , 0 , 0 , 0

REFUEL DEVICE DEFINITIONS (EIC,NO. NOZZLES)

96, 6 0, 0 0, 0 0, 0

MANUEVER TIME FOR REFUELING 2
MANUEVER TIME FOR REARMING 2

Figure II-16-C-2. Sample Data Listing, Airmobile Model

NOTES

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR AIRMOBILE

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 17

COMBAT SERVICE SUPPORT DATA INPUT PROGRAMS

1. INTRODUCTION. The Combat Service Support data input programs create and load the data file required by the Combat Service Support Model. The data loaded include tables defining consumption rates of various items of equipment, the weight and volume constraints and the load and unload times of the transportation vehicles, and the supply classes of the equipment items.

2. ROUTINES:

a. General. The Combat Service Support data input programs consist of the following routines.

b. Routine CSSLD. This routine controls the other routines of the Combat Service Support data input. It creates the file used to store the data, then calls the data load and file dump routines.

c. Routine LOAD11. This routine is responsible for the reading and editing of the Combat Service Support data cards. It also loads the data in the correct position on the file.

d. Routines EDITF1 and EDITF2. These routines are called by LOAD11 to edit fields one and two of the data card respectively. Field one contains the force indicator and field two contains an equipment item code.

e. Routine DUMP11. This routine provides both a dump of the Combat Service Support data file in tabular format and an unformatted record dump.

3. FILES. Data file 11 is used to contain the Combat Service Support data.

NOTES

APPENDIX A

COMBAT SERVICE SUPPORT DATA LOAD INPUT REQUIREMENTS

Complete descriptions of the constant data load input requirements for combat service support are documented in Appendix A, Combat Service Support Model Input Requirements, to Chapter 16 of the Period Processor (Section IV).

NOTES

APPENDIX B

COMBAT SERVICE SUPPORT DATA INPUT PROGRAM DESCRIPTIONS

1. INTRODUCTION. Loading of the Combat Service Support Model data is controlled by the routine CSSLD which, in turn, calls routine LOAD11 to read the input data cards and place data upon data file 11 and DUMP11 to take data from the file and provide a formatted data listing. LOAD11 is supported by a pair of card editing routines, EDITF1 and EDITF2.

2. ROUTINE CSSLD:

a. Purpose. This routine controls the loading of Combat Service Support Model data on data file 11. Two routines are called; LOAD11 and DUMP11.

b. Input Variables. None.

c. Output Variables:

Name	Destination	Contents
NERR	Print	Number of data errors detected.

d. Logical Flow (Figure II-17-B-1):

(1) Blocks 1, 2, and 3. After the file name table has been obtained, routine REMOVE is called to remove outdated data from data file 11. Routine CREATE is called to create data file 11 as 249 records of 512 words each. This is an expandable file and can be expanded by the SERSUP routine of the Combat Service Support Model.

(2) Block 4. After the file has been created, records 11 through 18 are filled with words containing 99999. Records 1 through 10 and 19 through 239 are filled with zeros.

(3) Block 5. Routine LOAD11 is called to load data file 11 from cards.

(4) Block 6. If no errors have occurred in LOAD11, a dump of data file 11 is made by routine DUMP11. The file name table is printed and control returns to the calling routine.

3. ROUTINE LOAD11:

a. Purpose. This routine loads Combat Service Support Model data from cards onto data file 11.

b. Input Variables: Data card types 1101, 1102, 1103, and 1104.

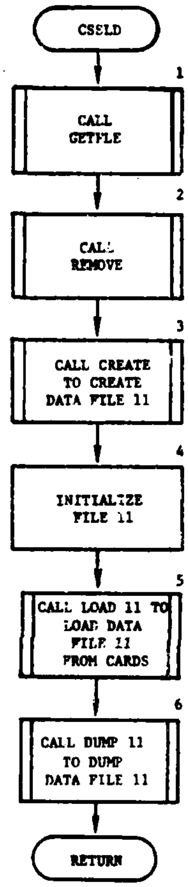

Figure II-17-B-1. Routine CSSLD

c. Output Variables:

Name	Destination	Contents
IREC19(425)	DF11	A value of zero, indicating no pending supply action entries, stored in record 29, word 425.
IREC19(426)	DF11	A value of one, indicating that this is the first 70-word block created on data file 11 for supply action entries, stored in record 29.
IREC19(427)	DF11	A value of 70, indicating this is first 70-word block created on data file 11 for supply action entries. When the second block is created, IREC19(425) and (426) are incremented by 70.
IREC19(428)	DF11	Blue force class I consumption rate, stored in record 29, word 428.
IREC19(429)	DF11	Red force class I consumption rate, stored in record 29, word 429.
ISUPB(11,201)	DF11	Weight, volume, and maximum of nine transport equipment item code preferences for each of 200 equipment items plus personnel for Blue force, stored in records 30 through 33 plus words 1 to 163 of record 34.
ISUPR(11,201)	DF11	Same as above--for Red force--stored in records 35 through 38 plus words 1 to 163 of record 39.
ICAPB(3,50)	DF11	Equipment item code, weight, volume, and capacities of up to 50 transport types for Blue force, stored in record 34, words 363 to 512.
ICAPR(3,50)	DF11	Same as above--for Red force--stored in words 363 to 512 of record 39.
IAVB(201,14)	DF11	Number of each item available for resupply for each day (14 days maximum) of battle for Blue force, stored in records 40 to 44 plus words 1 to 254 of record 45.
IAVR(201,14)	DF11	Same as above--for Red force--stored in records 46 through 50 plus words 1 to 254 of record 51.
ITIMEB(6)	DF11	Load and unload times for Blue force transports, stored in words 1 through 6 of record 29.
ITIMER(6)	DF11	Load and unload times for Red force transports, stored in words 207 to 212 of record 29.

Name	Destination	Contents
ISCB(200)	DF11	Supply class for each Blue force equipment item, stored in words 7 to 206 of record 29.
ISCR(200)	DF11	Supply class for each Red force equipment item, stored in words 213 to 412 of record 29.

d. Logical Flow (Figure II-17-B-2):

(1) Block 1. Cards in the CSSLD data deck are read; the 80-column card images are printed and stored on a scratch file. Cards continue to be read until 9999 is found in columns 73 through 76. The scratch file is then rewound.

(2) Block 2. A card image is read from the scratch file. The form number, which is in columns 75 through 76, is read into IFORM. For Combat Service Support data an 11 should appear in columns 73 and 74. Columns 73 and 74 are stored in IFILE. If IFILE equals 11, this card contains Combat Service Support data and control passes to block 3. If IFILE is not equal to 11, it is checked to determine if it contains 99. If it does, this is the end of the data to be loaded, and control goes to block 9; otherwise, an error message is printed and control goes bo block 3.

(3) Block 3. IFORM is checked to determine if it is valid; (i.e., greater than zero and less than or equal to four). If not, an error message is printed and control goes to block 2; otherwise, control goes to block 4.

(4) Block 4. If IFORM equals 4, control goes to block 8. If IFORM equals 3, control goes to block 7. If IFROM equals 2, control goes to block 6. If IFORM equals 1, control goes to block 5.

(5) Block 5. This is an 1101 card and contains transport load and unload times plus food consumption rates. Routine EDITF1 is called to ensure that the force designator code for this card is valid. If all transport times are zero or blank, a message is printed. If no consumption rates for class I are given, an error message is printed. If the force designator was invalid, an error message is printed. Blue class I consumption rate is stored in word 428 of record 429. Red class I consumption rate is stored in word 429 of record 429. The transport load and unload times are also stored in core in the ITIMEB or ITIMER arrays until all data are loaded. If no error occurs, it will be put on data file 11 in record 29. When IFORM changes, control returns to block 2.

(6) Block 6. This is an 1102 card and contains the equipment item codes (EIC) of the transports that will carry the consumable item for which the EIC is in columns 3 through 5. The weight and volume of the consumable item are also input in this card. The weight is in hundredths of pounds on the card, but is stored in tenths of pounds on data file 11. Routine EDITF1 is called to ensure that the card contains a valid force designator code. Routine EDITF2 is called to ensure that the consumable has a valid EIC. The supply class listed for the consumable is also edited to ensure that it is between one and ten. A check is made to ensure that if the consumable is

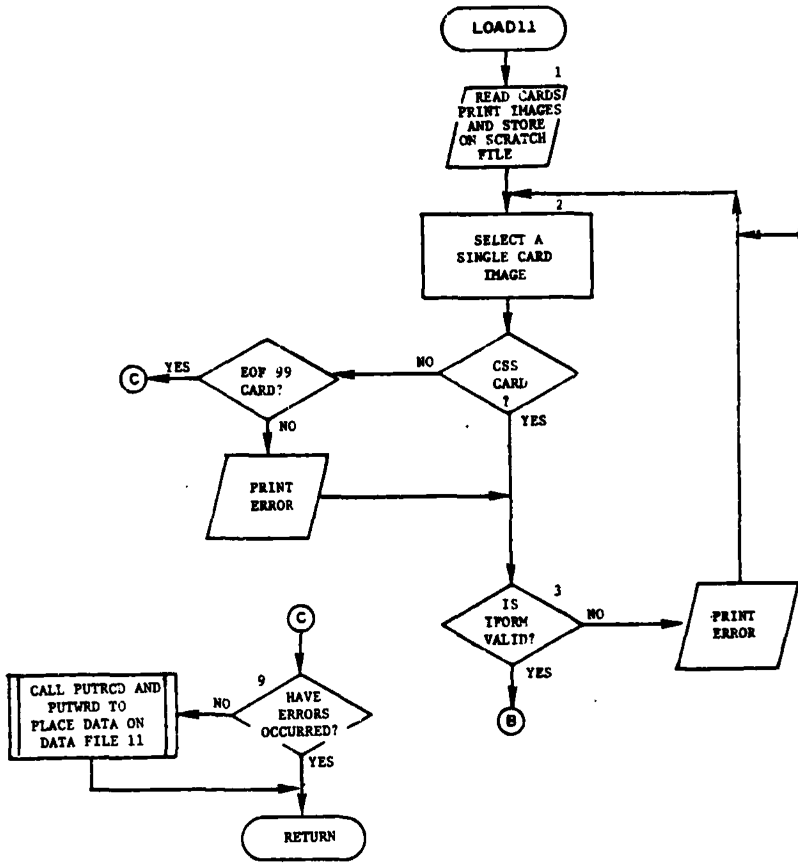

Figure II-17-B-2. Routine LOAD11 (Continued on Next Page)

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
JUL 76

UNCLASSIFIED CACDA-TR-8-76-VOL-2-PT-1 NL

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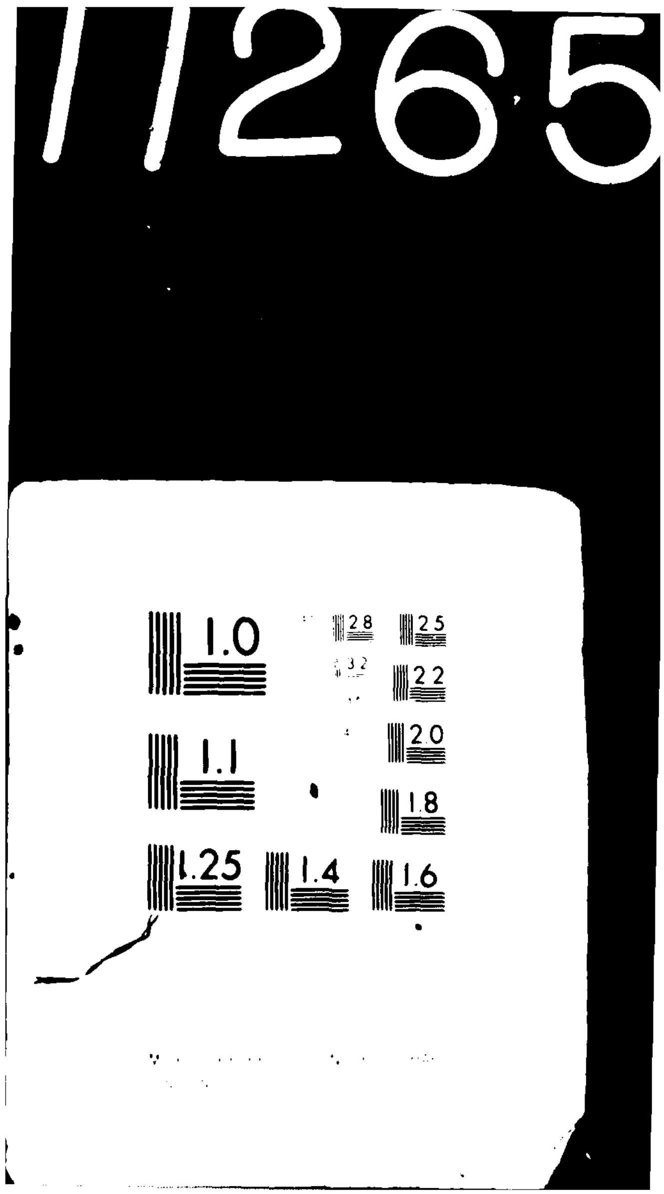

11265
1.0
2.8
2.5
3.2
2.2
2.0
1.1
1.8
1.25
1.4
1.6

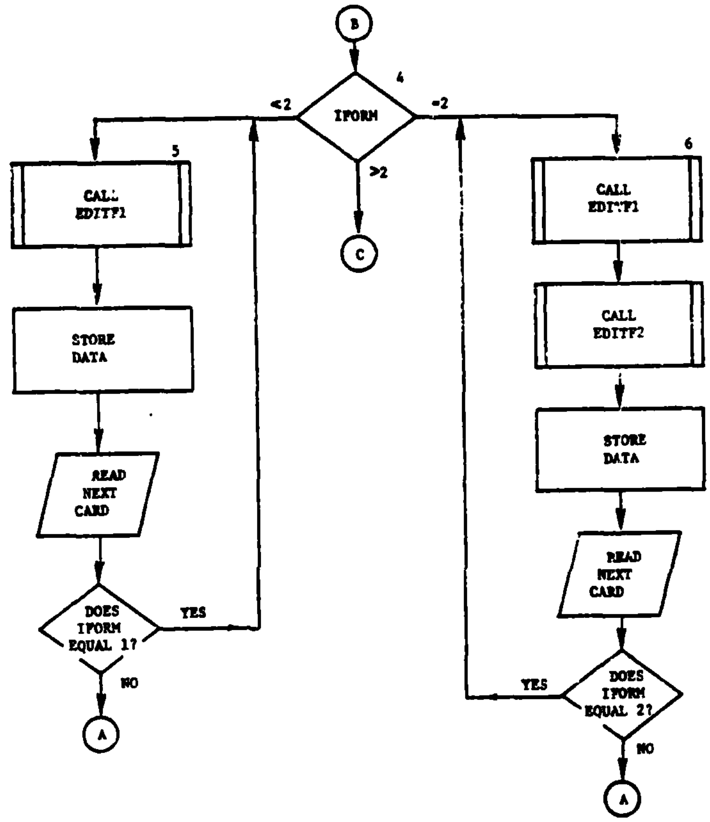


Figure II-17-B-2. Routine LOAD11 (Continued)

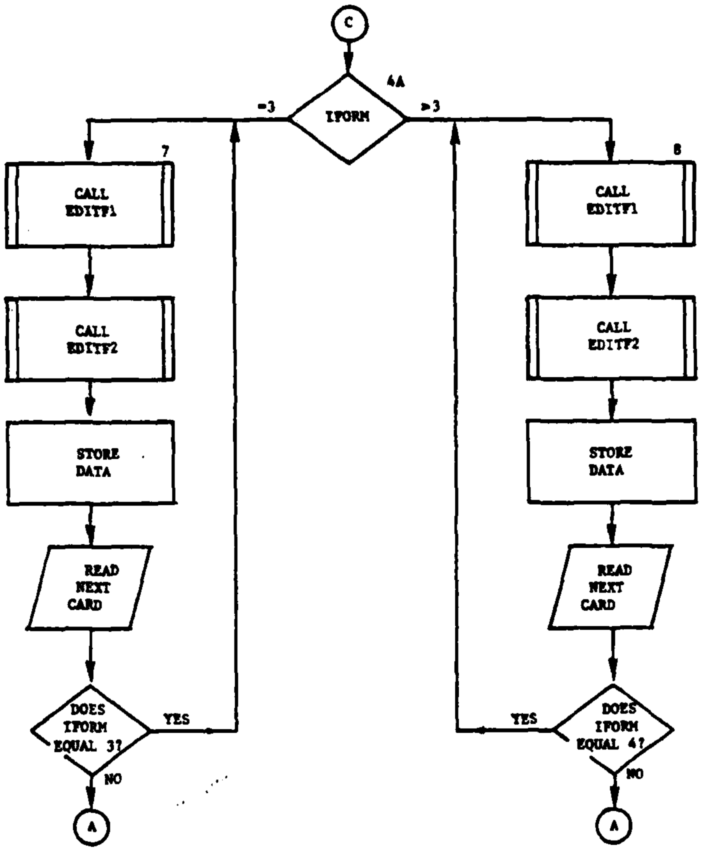


Figure II-17-B-2. Routine LOAD11 (Concluded)

class 7, a nonzero EIC is specified for the first transport choice under unit distribution. This EIC is used in determining how quickly personnel and major end items will travel to the receiving unit after they have been issued. All nine possible transport choices on this card are subjected to the EIC editing. Both the weight and volume of the consumable must be greater than zero. Messages are printed for all errors that are encountered. A count of the number of errors is also printed. All information is stored in core in the appropriate ISUPB or ISUPR arrays except the class of the consumable. The class is appropriately stored in ISCB or ISCR. When IFORM changes, control returns to block 2.

(7) Block 7. This is an 1103 card and contains the weight and volume capacities of the transports. A maximum of three transports can be entered on each card. Each transport is identified by its EIC. The weight capacities of the transports are read in hundredths of pounds but stored on data file 11 in tenths of pounds. Routine EDITF1 is called to check the validity of the force designator code. The EIC of each transport listed is checked for validity by routine EDITF2. If the volume capacity of a particular transport is input as 99999999.0 it is stored as the largest number that can be stored in a 24 bit integer word; (i.e., 8388607). The EIC, weight capacity, and volume capacity are stored in the appropriate ICAPB or ICAPR arrays. Messages are printed for all errors encountered. When IFORM changes, control returns to block 2.

(8) Block 8. This is an 1104 card and contains the number of major end items by type that are available to the division for resupply for each day of battle. The number of personnel available for replacement is also input on this card format. Routine EDITF1 is called to check the validity of the force designator code. Routine EDITF2 is called to verify the EIC for each card. The resources are stored in the appropriate IAVB or IAVR arrays. When IFORM changes, control returns to block 2.

(9) Block 9. At this point Combat Service Support data have been loaded in core. If no data load errors were encountered, the information is put on data file 11.

4. ROUTINE EDITF1:

a. Purpose. This routine edits the force designator located in the second column of every input card.

b. Input Variables:

Name	Source	Contents
NERR	Common	Number of errors that have occured in loading data.
IFD	Call	Force designator for card being read.

c. Output Variables:

Name	Destination	Contents
NERR	Common	Number of errors that have occurred in loading data.
IFORCE	Call	Number indicating whether card pertains to Red or Blue Force.

d. Processing Description. This routine examines the force designator in column two of every input card. If it contains a B, IFORCE is set equal to one. If it contains an R, IFORCE is set equal to two. If it contains anything else, an error message is printed, the error counter is incremented, and control returns to routine LOAD11.

5. ROUTINE EDITF2:

a. Purpose. This routine edits the equipment item codes. It is called by routine LOAD11.

b. Input Variables:

Name	Source	Contents
NERR	Common	Number of errors encountered in loading data file 11.
IEIC	Call	Equipment item code to be edited.
LIM	Call	The largest valid integer value IEIC may have.

c. Output Variables:

Name	Destination	Contents
NERR	Common	Number of errors encountered in loading data file 11.

d. Processing Description. This routine edits each equipment item code to ensure that it contains an integer value greater than zero but less than the value contained in LIM. If it contains a value outside of this range an error message is printed. NERR is incremented, and control returns to routine LOAD11.

6. ROUTINE DUMP11:

a. Purpose. This routine prints formatted tables displaying Combat Service Support Model data contained on data file 11 and then prints a dump of the file.

b. Input Variables: See output variables from routine LOAD11.

c. Output Variables: Printed data tables and dump of data file 11.

d. Logical Flow (Figure II-17-B-3):

(1) Block 1. In this block both Red and Blue force information is printed. This includes the class I consumption rates in pounds per man per day and the transport load and unload times for each distribution method.

(2) Block 2. Blocks 3 through 7 are performed first for the Blue force; then, for the Red force.

(3) Block 3. The supply class for each equipment item in the force is printed. If no supply class is given for a particular item, that item will not be resupplied. Supply classes are given numbers from 1 to 10.

(4) Block 4. The weight (pounds) and volume (cubic feet) of each consumable item to be resupplied is printed for this force. Each item is identified by its equipment item code.

(5) Block 5. The weight (pounds) and volume (cubic feet) capacities of each transport assigned to resupply consumables is printed for this force. Each transport is identified by its equipment item code. A maximum of 50 transports may appear.

(6) Block 6. The EICs of the transports assigned to deliver consumables for this force are printed. The first, second, and third preferences are displayed for each consumable under each of the three distribution methods.

(7) Block 7. This block prints the amounts of major end items and personnel that are available for resupply to the division during each day of battle.

(8) Block 8. If the Red force data were not printed, control returns to block 3 to process the Red force. Otherwise, a record-by-record dump of data file 11 is printed. Control then returns to routine CSSLD.

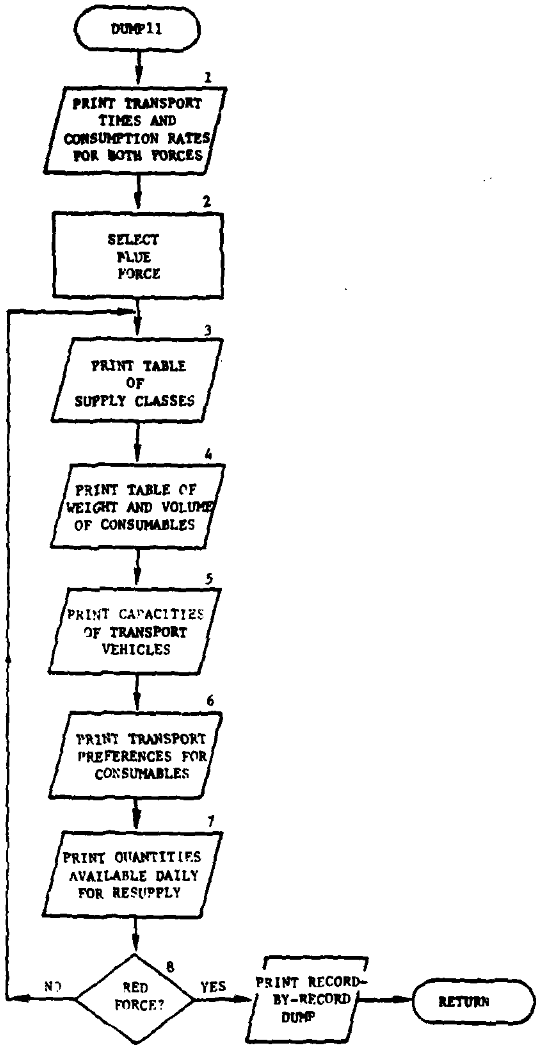


Figure II-17-B-3. Routine DUMP11

NOTES

APPENDIX C

COMBAT SERVICE SUPPORT DATA LOAD OUTPUT DESCRIPTIONS

1. INTRODUCTION. The constant data input printouts for Combat Service Support are listed in Figure II-17-C-1. The 80-column card image is the listing of all data entered in the files. The other printouts are used to check the values of data entered and to identify the originating card if necessary.

Printout Title	Data Source	Card ID	Card Type
80-Column Card Image	Card data deck	All	All
Elapsed Time to Handle Vehicles	Data file 11	1101	1
Consumption Rates	Data file 11	1101	1
Weights and Volumes of Consumables	Data file 11	1102	1
Weight and Volume Capacity of Transports	Data file 11	1103	1
Equipment Item vs Class of Supply	Data file 11	1102	1
Transport Preference for Hauling Consumables	Data file 11	1102	1
Consumables Available Daily for Resupply	Data file 11	1104	1
File Dump	Data file 11	All	All

Figure II-17-C-1. Combat Service Support Constant Data Printouts

2. EIGHTY-COLUMN CARD IMAGE. The 80-column card image printout is illustrated in Figure II-17-C-2. Across the top at the far left is the number 1, indicating card type 1. The letter B indicates Blue force data and the number 1101 is the card ID.

3. ELAPSED TIME TO HANDLE VEHICLES AND CLASS I CONSUMPTION RATE. The next printout in the constant data input printout series is illustrated by Figure II-17-C-3. At the upper half of the format is the elapsed time in minutes for handling the transports for both Blue and Red forces. The lower half of the figure has the subsistence consumption for both Red and Blue forces. The data for this printout are extracted from data file 11 and were originally enscribed on card ID 1101.

FILE-11 DATA CARD IMAGES

														1101		CARD NO.	1
18	60	1	30	60		7		5	1					1101	1	CARD NO.	2
19	50	1	30	50		4		5	1					1101	1	CARD NO.	3
														1102		CARD NO.	4
18	1	1	100	03	161	164	0	161	164	0	87	86	0	1102	1	CARD NO.	5
18	2	3	620	20	165	166	162	162	166	165	87	86	0	1102	2	CARD NO.	6
18	3	3	642	21	165	166	162	162	166	165	87	86	0	1102	3	CARD NO.	7
18	4	4	100	04	164	167	161	167	161	164	0	0	0	1102	4	CARD NO.	8
18	5	5	100	02	164	167	161	167	161	164	0	0	0	1102	5	CARD NO.	9
18	6	5	100	02	164	167	161	167	161	164	0	0	0	1102	6	CARD NO.	10
18	7	5	94	01	164	167	161	167	161	164	0	0	0	1102	7	CARD NO.	11
18	8	5	40	01	164	167	161	167	161	164	0	0	0	1102	8	CARD NO.	12
18	9	5	100	02	164	167	161	167	151	164	0	0	0	1102	9	CARD NO.	13
18	27	5	1732	133	164	167	161	167	161	164	87	86	0	1102	10	CARD NO.	14
18	30	5	4500	199	164	167	161	167	161	164	0	0	0	1102	11	CARD NO.	15
18	32	5	1440	100	164	167	161	167	151	154	87	86	0	1102	12	CARD NO.	16
18	36	5	11500	300	164	167	161	167	161	164	87	86	0	1102	13	CARD NO.	17
18	38	5	6849	175	164	167	161	167	161	164	0	0	0	1102	14	CARD NO.	18
18	39	5	6849	175	164	167	161	167	161	164	0	0	0	1102	15	CARD NO.	19
18	40	5	6849	175	164	167	161	167	161	164	0	0	0	1102	16	CARD NO.	20
18	42	5	6000	150	164	167	161	167	161	164	0	0	0	1102	17	CARD NO.	21
18	43	5	12000	332	164	167	161	167	151	164	0	0	0	1102	18	CARD NO.	22
18	51	5	6500	200	164	167	161	167	161	164	87	0	0	1102	19	CARD NO.	23
18	53	5	10704	301	164	163	167	167	161	164	0	0	0	1102	20	CARD NO.	24
18	54	5	10304	301	164	163	167	167	151	164	0	0	0	1102	21	CARD NO.	25
18	57	5	21100	500	164	163	167	167	151	164	0	0	0	1102	22	CARD NO.	26
18	59	5	15800	350	164	163	167	167	151	163	0	0	0	1102	23	CARD NO.	27
18	61	5	506000	40000	163	164	0	163	164	0	0	0	0	1102	24	CARD NO.	28
18	62	5	10304	300	164	163	167	167	151	164	87	86	0	1102	25	CARD NO.	29
18	63	5	21100	500	164	167	161	167	151	163	87	86	0	1102	26	CARD NO.	30
18	64	5	666000	40000	164	163	0	164	153	0	0	0	0	1102	27	CARD NO.	31
18	70	5	2930	100	157	161	163	157	161	163	87	36	0	1102	28	CARD NO.	32
18	72	5	18700	400	164	163	167	167	151	164	87	0	0	1102	29	CARD NO.	33
18	74	5	320000	15100	164	163	167	167	164	161	0	0	0	1102	30	CARD NO.	34
18	142	5	9240	200	164	163	167	167	153	161	0	0	0	1102	31	CARD NO.	35
18	65	5	10704	701	164	167	161	167	164	161	87	0	0	1102	32	CARD NO.	36
18	66	5	10304	300	164	167	161	167	164	161	87	0	0	1102	33	CARD NO.	37
18	22	7	19000	100	164	161	0	161	164	0	0	0	0	1102	34	CARD NO.	38
18	24	7	30800	2550	164	161	0	161	164	0	87	86	0	1102	35	CARD NO.	39
18	25	7	2064000	115470	25	0	0	25	0	0	0	0	0	1102	36	CARD NO.	40

Figure II-17-C-2. Combat Service Support 80-Column Card Image

ELAPSED TIME TO HANDLE TRANSPORTS (IN MINUTES)

	UNIT DISTRIBUTION		SUPPLY POINT DISTRIBUTION		AIRLIFT	
	LOAD TRANSPORTS	UNLOAD TRANSPORTS	START TRANSPORTS	LOAD TRANSPORTS	LOAD AIRCRAFT	UNLOAD AIRCRAFT
BLUE	60	1	30	60	5	1
RED	60	1	30	60	5	1

CLASS I CONSUMPTION RATES

BLUE FORCE	RED FORCE
7	4

Figure II-17-C-3. Elapsed Time to Handle Vehicles

4. WEIGHTS AND VOLUMES OF CONSUMABLES AND VEHICLES. Figure II-17-C-4 illustrates the format for this printout. One printout is for Red force and one for Blue. The titles of the columnar headings are identical with those of the card formats. At the bottom of that format is shown weight and volume capacity of vehicles. The data from the upper half of the illustration were taken from data file 11 and originated from card ID 1102. Data from the lower half of the illustration were also taken from data file 11 but were punched in card ID 1103.

5. CLASSES OF SUPPLY. Classes of supply printout format is shown in Figure II-17-C-5, Equipment Item vs Class of Supply. One printout is for Red force and the other for Blue force. The information for this printout was extracted from data file 11 and was punched in card ID 1102.

6. TRANSPORT PREFERENCE FOR HAULING CONSUMABLES. Figure II-17-C-6 depicts the format for this type of printout. One such table is printed for Blue and another for Red. This table lists the consumable at the far left and, for each consumable, preferred transports. Data for this printout were taken from data file 11 and were punched originally in card ID 1102.

7. MAJOR END ITEMS AND PERSONNEL AVAILABLE DAILY FOR RESUPPLY. This table, as illustrated in Figure II-17-C-7, provides the amounts of major end items and personnel available each day for resupply. These data were extracted from data file 11 and were input initially in card ID 1104.

WEIGHT AND VOLUME OF BLUE CONSUMABLES

ITEM CODE	WEIGHT (LBS.)	VOLUME (CU. FT.)
1	1.0	.03
2	6.2	.20
3	6.4	.20
4	1.0	.04
5	1.0	.02
6	1.0	.02
7	.6	.01
8	.4	.01
9	1.0	.02
22	100.0	1.00
24	308.0	25.50
25	20640.0	1154.79
26	308.0	25.50
27	17.7	1.00
28	640.0	20.40
29	19561.0	1044.80
30	40.0	1.00

WEIGHT AND VOLUME CAPACITY OF BLUE TRANSPORT VEHICLES

ITEM CODE	WEIGHT (LBS.)	VOLUME (CU. FT.)
97	23780.0	2016.10
161	16500.0	782.70
162	7140.0	240.00
163	24500.0	2304.00
164	24500.0	2314.00
165	71000.0	1000.00
166	11160.0	760.00
167	16550.0	782.30
86	4000.0	1000.00

Figure II-17-C-4. Weight and Volume of Consumables and Capacity of Vehicles

SUPPLY CLASSES OF BLUE EQUIPMENT ITEMS

ITEM CODE	SUPPLY CLASS	ITEM CODE	SUPPLY CLASS	ITEM CODE	SUPPLY CLASS
[illegible]	[illegible]	41	[illegible]	81	[illegible]
[illegible]	7	42	5	82	[illegible]
[illegible]	7	43	5	83	[illegible]
[illegible]	4	44	[illegible]	84	[illegible]
[illegible]	[illegible]	45	[illegible]	85	7
[illegible]	[illegible]	46	[illegible]	86	7
[illegible]	[illegible]	47	[illegible]	87	[illegible]
[illegible]	[illegible]	48	[illegible]	88	[illegible]
[illegible]	[illegible]	49	[illegible]	89	7
[illegible]	[illegible]	50	7	90	[illegible]
[illegible]	[illegible]	51	5	91	7
[illegible]	[illegible]	52	[illegible]	92	[illegible]
[illegible]	[illegible]	53	5	93	[illegible]
[illegible]	[illegible]	54	[illegible]	94	[illegible]
[illegible]	[illegible]	55	7	95	[illegible]
[illegible]	[illegible]	56	[illegible]	96	7
[illegible]	[illegible]	57	5	97	7
[illegible]	[illegible]	58	[illegible]	98	[illegible]
[illegible]	[illegible]	59	[illegible]	99	[illegible]
[illegible]	[illegible]	60	[illegible]	100	[illegible]
[illegible]	[illegible]	61	5	101	[illegible]
[illegible]	[illegible]	62	[illegible]	102	[illegible]
[illegible]	[illegible]	63	5	103	[illegible]
[illegible]	[illegible]	64	5	104	[illegible]
[illegible]	[illegible]	65	5	105	[illegible]
[illegible]	[illegible]	66	5	106	[illegible]
[illegible]	[illegible]	67	[illegible]	107	[illegible]
[illegible]	[illegible]	68	[illegible]	108	[illegible]
[illegible]	[illegible]	69	[illegible]	109	[illegible]
[illegible]	5	70	5	110	[illegible]
[illegible]	[illegible]	71	[illegible]	111	[illegible]
[illegible]	[illegible]	72	[illegible]	112	7
[illegible]	[illegible]	73	7	113	7
[illegible]	7	74	5	114	7
[illegible]	[illegible]	75	[illegible]	115	[illegible]
[illegible]	[illegible]	76	[illegible]	116	[illegible]
[illegible]	[illegible]	77	[illegible]	117	[illegible]
[illegible]	[illegible]	78	[illegible]	118	[illegible]
[illegible]	[illegible]	79	[illegible]	119	[illegible]
[illegible]	[illegible]	80	[illegible]	120	[illegible]

Figure II-17-C-5. Equipment Item versus Class of Supply

TRANSPORT PREFERENCES FOR BLUE CONSUMABLES

CONSUMABLE	---- UNIT DISTRIBUTION ----			SUPPLY POINT DISTRIBUTION			--------- AIRLIFT ---------		
	TRANSPORT VEHICLES								
ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE	ITEM CODE
1	151	164	0	161	164	0	87	86	0
2	165	166	152	162	166	165	87	86	0
3	165	166	152	162	166	165	87	86	0
4	164	167	161	167	161	164	0	0	0
5	154	167	161	167	161	164	0	0	0
6	154	167	161	167	161	164	0	0	0
7	154	167	161	167	161	164	0	0	0
8	164	167	161	167	161	164	0	0	0
9	154	167	161	167	161	154	0	0	0
22	154	151	0	161	164	0	0	0	0
24	154	161	0	161	164	0	87	86	0
25	25	0	0	25	0	0	0	0	0
26	154	161	0	161	154	0	87	86	0
27	154	167	161	167	161	164	87	86	0
28	164	161	0	161	164	0	0	0	0
29	29	0	0	29	0	0	0	0	0
30	154	167	161	167	161	164	0	0	0
31	164	161	0	161	164	0	87	86	0
32	164	167	161	167	161	154	87	86	0
33	164	161	0	151	164	0	87	86	0
34	154	161	0	161	164	0	87	86	0
35	35	0	0	35	0	0	0	0	0
36	154	167	161	167	161	154	87	86	0
37	37	0	0	37	0	0	0	0	0
38	164	167	161	167	161	164	0	0	0
39	154	167	161	167	161	164	0	0	0
40	154	167	161	167	161	164	0	0	0

Figure II-17-C-6. Transport Preference for Hauling Consumables

BLUE CONSUMABLES AVAILABLE DAILY FOR RESUPPLY

CONSUMABLE ITEM CODE	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14	TOTAL
	DAILY AMOUNTS														
31	0	1	0	1	0	1	0	0	0	0	0	0	0	0	3
34	0	1	0	1	0	1	1	0	0	0	0	0	0	0	4
37	2	2	1	1	1	1	1	0	0	0	0	0	0	0	9
87	0	0	1	0	1	0	1	0	0	0	0	0	0	0	3
88	2	2	1	1	1	1	1	0	0	0	0	0	0	0	9
186	2	2	2	1	1	1	1	0	0	0	0	0	0	0	10
PERS	20	220	220	220	120	120	120	0	0	0	0	0	0	0	1040

Figure II-17-C-7. Blue Major End Items and Personnel Available Daily for Resupply

APPENDIX D

SOURCE LISTINGS FOR CONSTANT DATA INPUT PROCESSOR COMBAT SERVICE SUPPORT

(AVAILABLE UNDER SEPARATE COVER)

NOTES

SECTION III

ORDERS INPUT PROCESSOR

CHAPTER 1

GENERAL DESCRIPTION OF THE ORDERS INPUT PROCESSOR

1. INTRODUCTION. In the conduct of a war game with the DIVWAG system, the Orders Input Processor is a primary point of interface between the war gaming staff and the Period Processor. It provides the means by which the gaming staff instructs simulated units to carry out desired activities. Although explicit unit portrayal and assessment of unit actions, together with limited decision making processes, are automated within the Period Processor, the gaming staff maintains its ultimate control of the course of the game through the Orders Input Processor.

2. INPUT PROCESSOR SUBSYSTEMS. The Orders Input Processor is composed of two independently run computer subsystems: the DIVWAG Scenario Language (DSL) Compiler and the Operating Instructions (OPERINS) Loader.

a. DSL Compiler. The DSL Compiler converts instructions written in a specialized source language into tables which, in turn, are used to drive the Period Processor. DSL orders are combined into unit scenarios, where each unit scenario contains the series of orders to be followed by one specified unit, or into battle paragraphs, which are used to control the Ground Combat Model of the Period Processor. DSL orders must be provided at the beginning of each period of simulated combat. The length of a period of simulated combat is under control of the gaming staff and is set by the gaming staff as part of the DSL input.

b. OPERINS Loader. The OPERINS Loader allows the gaming staff to interject, at the beginning of a period of simulated combat, certain data items for the control of ground-based sensors, for the control of fire support allocation, and for the introduction of intelligence from sources beyond the scope of sources internal to the Period Processor. Operating Instructions must be provided for the first period of simulated combat within a game. Their use thereafter is left to the discretion of the gaming staff.

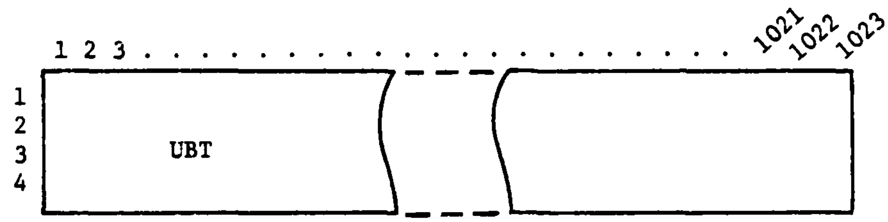
NOTES

CHAPTER 2

THE DIVWAG SCENARIO LANGUAGE COMPILER

1. GENERAL DESCRIPTION. The DIVWAG Scenario Language (DSL) compiler is designed to recognize statements composing a unit scenario or battle paragraph and translate them into tables which are easily used by the Period Processor. One table is generated for each unit scenario or battle paragraph, and is stored on the DSL data file. A unit battle table (UBT), which serves as a directory to the unit scenario and battle paragraph tables, is generated and is also stored on the file. The table is described in detail in Figure III-2-1. Each of the unit scenario and battle paragraph tables contains 21 columns and as many rows as necessary. The orders, modifiers, and conditionals are stored in the tables by use of numerical codes and implicit location within the table. The numerical codes of the orders (NORD) are listed in Figure III-2-2, and those associated with the conditionals (NCON) are shown in Figure III-2-3. Figures III-2-4, through III-2-7 list the meanings associated with each column as a function of NORD or NCON. In the unit scenario tables, rows beginning with NORDs and NCONs may appear in almost any order. In the battle paragraph tables the first five rows are reserved for the list of units participating in the battle. These are stored ten UIDs per row (using two columns per UID) leaving column 21 unused. The remainder of the table will have rows beginning with an NCON intermingled with rows of labels of unit scenario statements. These labels are associated with the unit scenario order the unit is to execute if the battle is terminated by the preceding conditional. They are stored one per column, again leaving column 21 unused.

2. DESCRIPTION OF PROCESSING. The limited vocabulary of orders, modifiers, and conditional clause elements and the rigid syntax of the language allow the decomposition of a statement to be accomplished using a small number of logical decisions. This process is depicted in Figure III-2-8. The first level of logic determines if the statement is a COMMENT, FINIS, unit scenario identification (ID), battle paragraph identification (BATTLE), unit order, or battle description statement. If the statement is one of the first four types listed, processing may be completed without further decision making. If the statement is a unit order, the second level of logic determines if it contains a conditional. If a conditional is present, a third level of logic is invoked to determine the conditional clause type. A different set of third-level logic is used to determine the type of order. If the order may have modifiers associated with it, a fourth level of logic determines which modifiers are present. If the statement is part of a battle description, another set of second level logic determines if it contains the list of units participating in the battle, or a conditional followed by a list of labels designating the next orders that the units are to execute if the battle is terminated by this conditional. If it contains the list of units, no other logic decisions are necessary. If not, the conditional will be processed by the third-level logic mentioned above. The final processing of any statement may consist of merely transferring execution to the appropriate place in the code (e.g., comment or FINIS statement), but usually requires the extraction and storage of data (e.g., UID, coordinates, munition type, labels).



. The unit battle table is a 4 x 1023 word array.

. Each of the 1023 columns may contain information about a unit scenario or battle paragraph.

. Unit scenario information is stored in column 1 to UNTPT.

. Battle paragraph information is stored in columns BATPT to 1023. with information from the first battle paragraph encountered being stored in column 1023, information from the second stored in column 1022, etc.

. Unit scenario information description:

- Row 1 contains the first four characters of the unit identification

- Row 2 contains the last four characters of the unit identification

- Row 3 contains the number of records (NR) required to contain the unit scenario and the pointer (PKNT) to the record containing the order currently being executed by the unit (value = NR + 1000 * PKNT)

- Row 4 contains the record number of the first record used to store the unit scenario.

. Battle paragraph information description:

- Row 1 contains the first four characters of the battle identification

- Row 2 contains the last four characters of the battle identification

- Row 3 contains the number of records (NR) required to store the battle paragraph and the number of units (NU) participating in the battle (value = NU + 1000 * NR)

- Row 4 contains the record number of the first record used to store the battle paragraph.

Figure III-2-1. Unit Battle Table Description

DSL Order	NORD
Accept Transport	20
Advance	6
Airmobile Assault	41
Assignment is	23
Assume control of	24
Breach	43
Build	42
Detach	26
Engage	15
Fire	9
Fire on targets of opportunity	10
Fly	7
Go to	-1
Join	25
Loiter	32
Mission is	39
Move	3
Prepare	2
Reconnoiter	8
Release transport	31
Remove	44
Retain	40
Stay	1
Stop task	45
Terminate	37
Withdraw	5

Figure III-2-2. Numerical Order Codes

Conditional Type	NCON
Assessed	-2
At location	-4
Class 3	-5
Class 5	-6
Cloud cover	-14
Equipment type	-7
Firing	-8
Fog index	-21
Halted at	-11
Moving	-9
Precipitation index	-16
Present strength	-12
Relative humidity	-18
Stopped	-10
Temperature	-15
Temperature gradient	-17
Time	-3
Visibility index	-13
Wind direction	-20
Wind speed	-19

Figure III-2-3. Conditional Type Codes

Column	Description
1	NORD
2	Time associated with the order
3	Air speed
4	Altitude
5,6	X and Y coordinates of designated ground zero
7	Number of rounds or number of volleys
8	Munition type
9	Impact radius
10	Height of burst
11,12	Unit identification of cooperating unit
13,14	Battle identification
15,16	X and Y coordinates of movement objective
17	Travel mode mnemonic, or reconnoiter by code
18	Movement priority
19	Unit width
20	Unit depth
21	Relative position in table of next order to be executed
See Figure III-2-5 for airmobile orders and Figure III-2-6 for engineer orders.	

Figure III-2-4. Standard Order Column Descriptions

Column	Description
1	NORD (= 20, 39, 40, or 41)
3	Game time associated with order
9	Number of aircraft < 0 Number of trips ≤ 0
10	Mix table code, or aircraft item code
12	Number of escorts, or target number
15,16	X and Y coordinates of the objective
21	Relative position in table of next order to be executed
	All other columns are unused.

Figure III-2-5. Airmobile Order Column Descriptions

Column	Description
1	NORD (= 42, 43, 44, or 45)
3	Barrier = 0 Bridge or facility = 1
4	First 3 characters of barrier code
5	Last 3 characters of barrier code
6	Priority code
7	Complete task by time = 0 Begin task by time = 1 (See column 9)
8	Completion of task is desired = 0 Completion is mandatory = 1
9	Game time associated with the task
21	Relative position in table of next order to be executed
	All other columns are unused.

Figure III-2-6. Engineer Order Column Descriptions

Column	Description
1	NCON (less than -1)
2,3	UID associated with the conditional
4	Time associated with the conditional
5,6	X and Y coordinates of the location associated with the conditional
7	Quantity data
8	Percentage data
9	True = negator appeared in conditional False = no negator
10	Less than = -1: equal = 0: greater than = +1
11	Item code of equipment in conditional
20	Relative location in table of next order to be executed if conditional is false
21	Relative location in table of next order to be executed if conditional is true
	All other columns are unused.

Figure III-2-7. Conditional Column Descriptions

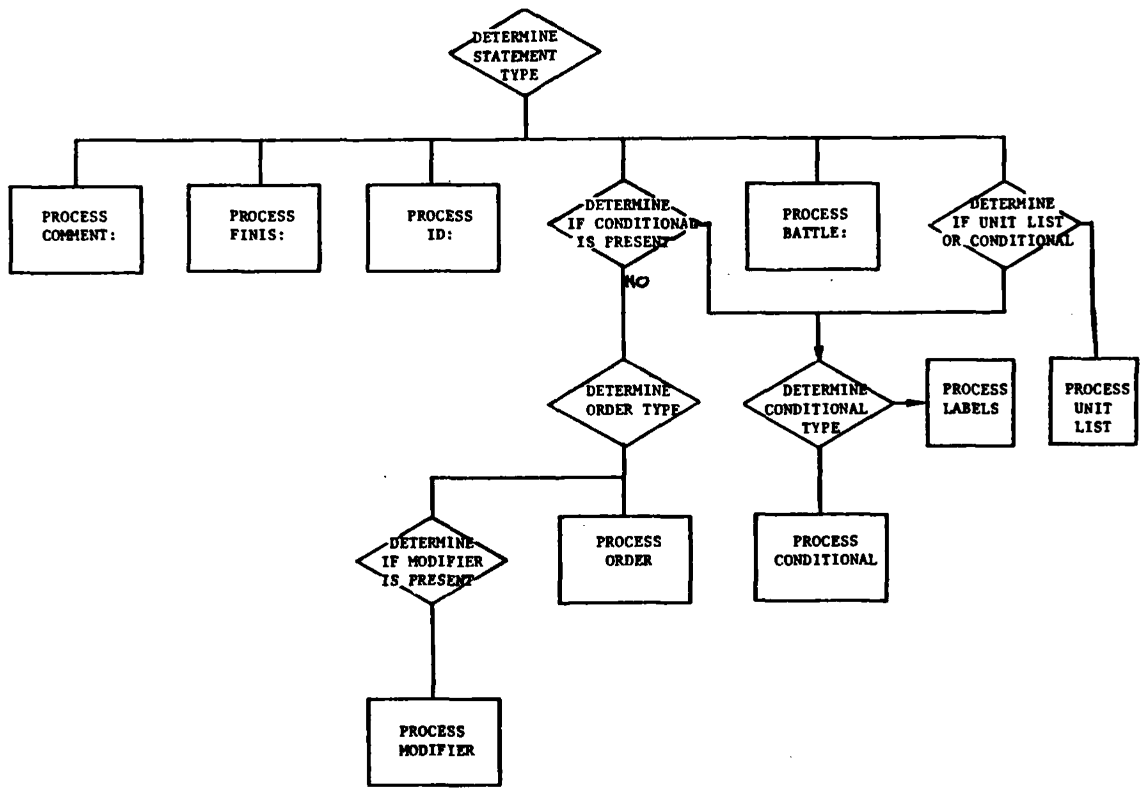


Figure III-2-8. DSL Compiler Logical Flow

3. DSL LOGICAL FLOW. The order in which the routines are invoked to process each DSL statement is depicted in Figure III-2-9. As indicated by this figure, DSLCMP serves as the controlling routine of the compiler. It first invokes DSLINT which initializes the dynamic arrays and variables and processes the DSL control statements. RDSTMT is used to read all DSL data cards. It is called by DSLINT for the processing of the first three DSL data cards and by DSLCMP for the processing of the remainder of the data deck. DSLCMP performs a preliminary examination of each statement read to determine if it is a a FINIS statement, a battle paragraph or unit scenario identification statement, or a battle paragraph or unit scenario descriptive statement. BATORD is called to further process battle paragraph descriptive statements, and UNTORD is invoked if the statement describes a unit scenario. Both BATORD and UNTORD call COND if a conditional is discovered in the statement. The decoding and storage of UIDs of units participating in a battle and the labels of the orders they are to execute immediately following a battle is accomplished by BATORD. After calling COND, if necessary, UNTORD determines the type of order contained in the statement and calls the appropriate routine. Each of the routines--AIRMOB, ENGR, FIRE, FLY, MOVE, STAY and TRANS--contains a list of the modifiers that may be used with the orders for which they are responsible. As each order is received, an array containing the modifiers that may be associated with it is set up and passed to KRAKMD. KRAKMD further decodes the statement by searching out the modifiers present and storing the associated data.

4. ROUTINE DESCRIPTIONS. A description of the routines comprising the DSL compiler follows. The purpose of each routine and the manner in which it accomplishes that purpose is included in the description.

a. Routine DSLCMP. This is the driving routine of the DSL compiler. Its first task is to call routine DSLINT which performs the initialization of the dynamic variables and processes the DSL control cards. Once that is accomplished, a loop involving the reading and decoding of the remaining statements is entered. RDSTMT reads each data card and performs initial processing. The statement is tested to determine if it is a comment. If it is, no further processing is necessary and the next statement is read. If the statement is the FINIS statement, the end of the DSL orders has been reached. PASS2 is called to complete processing of the tables. If debug print was requested, DUMPF is called to print the tables generated; otherwise, the statement is checked to determine if it is part of a unit scenario. If this is the case, UNTORD is called to process it. If the statement is part of a battle paragraph BATORD is invoked to decode it. If the statement is a battle paragraph or unit scenario identification statement, STOW is called to write the table associated with the battle paragraph or unit scenario just processed to the data file. If the statement cannot be recognized an error message is written and the next statement is processed.

b. Routines BLOCKD and DSLINT. These routines accomplish the initialization of the arrays and constants required by the DSL compiler. BLOCKD initializes the arrays of order names and codes, modifier names, array limits, and integer and special character constants. DSLINT sets the initial values of variables, such as the line counter, the error counters, and the file name table array. It calls RDSTMT to read the DSL control cards and stores the period time parameters input on those cards. It also initializes the unit

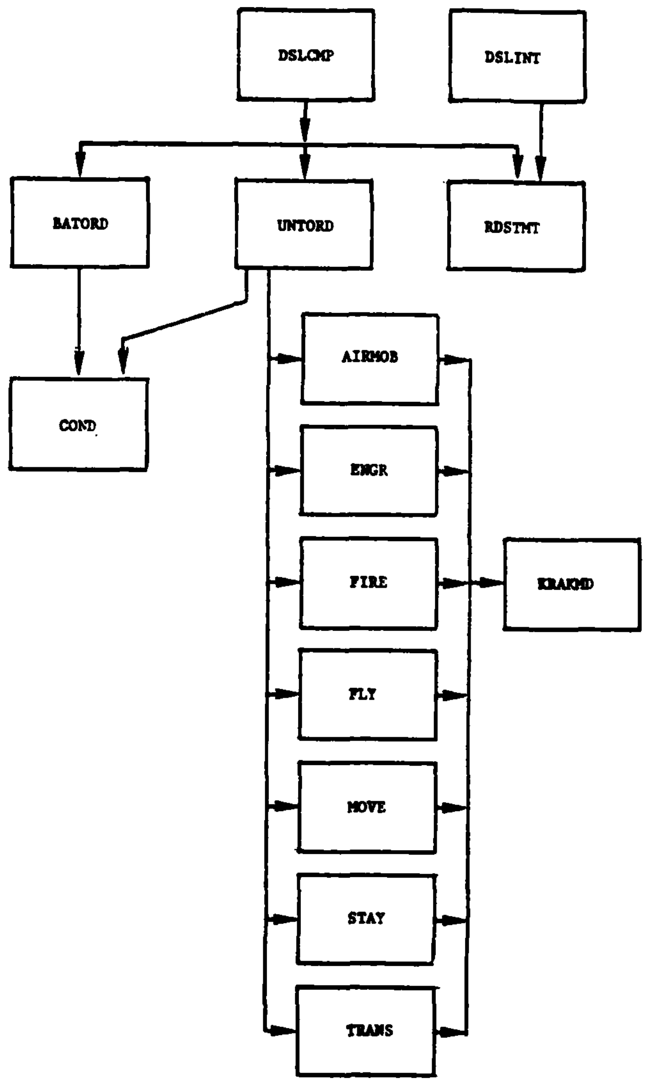


Figure III-2-9. DSL Logical Flow

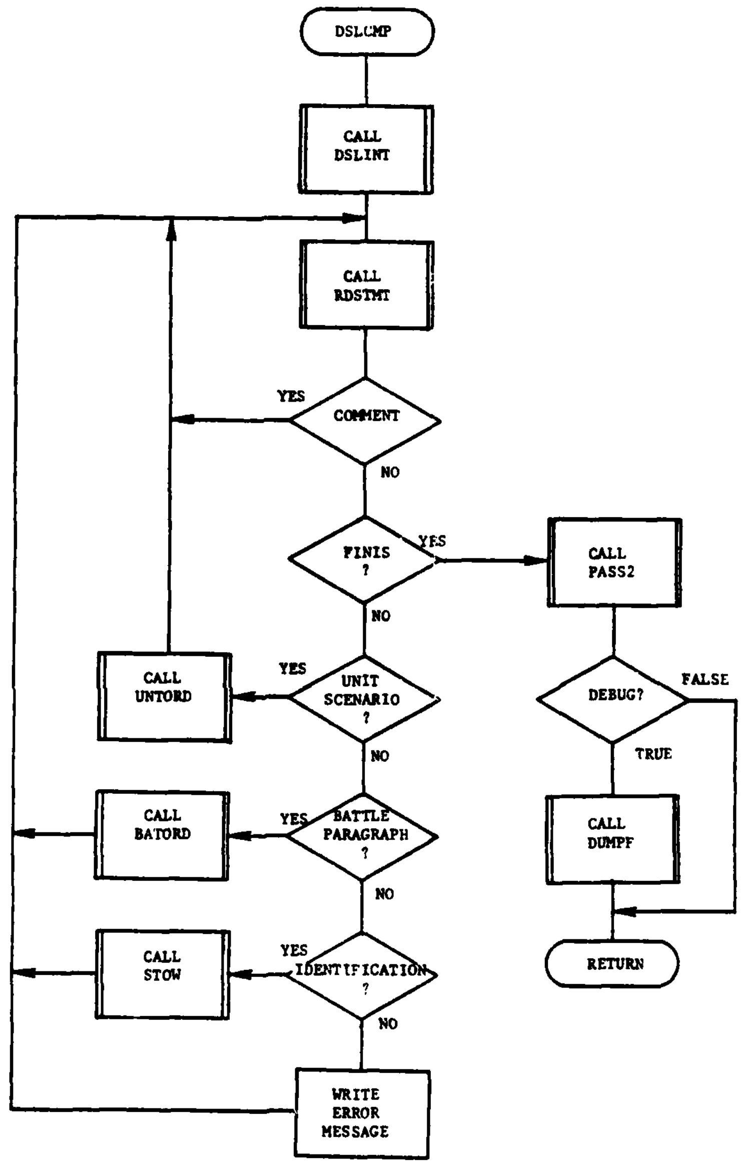


Figure III-2-10. Routine DSLCMP Logical Flow location and unit identification tables used by the compiler, and fills the unit-battle directory table with blanks and zeros.

c. Routine RDSTMT. RDSTMT is responsible for the reading and initial processing of all data cards input to the compiler. Blanks are ignored in the statements, so the nonblank characters are extracted from each card and stored in a compressed format as each card is read. Each nonblank character is also checked to determine if it is a period, colon, or comma. The locations of those characters, if encountered, are stored as they are useful in decomposing the statement. The contents of each card are also printed. To keep the listings of the Blue force and Red force unit scenarios and the battle paragraphs separate, each ID and BATTLE statement is checked and the printer skips to the top of the next page if the statement does not belong to the same group of the last listed statement.

d. Routine BATORD. This routine processes statements belonging to a battle paragraph. These statements must be one of two types. The first type contains the list of UIDs of units participating in the battle. The UIDs are extracted from the statement and stored in the order array, and the number of UIDs is stored in the unit battle table (UBT) in the area assigned to this battle paragraph. The second type of statement is a conditional followed by a list of labels. These labels correspond to labels in the unit scenarios of the units in the battle. When a battle is terminated by a conditional, the units execute the orders designated by the list of labels following the conditional. Routine COND is called to process the conditional portion of the statement, and BATORD extracts the labels from the statement and stores them in the order array.

e. Routine UNTORD. UNTORD is called to process unit scenario descriptive statements. These statements are orders to the unit and can be preceded by a label, a conditional, or both. If the statement contains a colon, the characters preceding the colon are stored as the label. If the statement contains a conditional, routine COND is called to process it. The remainder of the statement is an order that is chosen from the DSL vocabulary of orders and that order's modifiers. The general type of the order is determined (e.g., moving, firing) and the appropriate order processing routine is called (See Figure III-1).

f. Routine COND. The routine COND is responsible for the decomposition of and storage of data from the conditional portion of the statements. There are 14 conditional vocabulary elements including 10 clauses and 4 types of data. The syntax allows seven clause types to be formed from these elements. Clause types can be connected by AND or OR with the limitation that both AND and OR cannot be used in the same statement. Routine COND determines if AND or OR is present, and processes each clause type independently. A clause type is processed by first determining if the unit identification element is present. If it is, and the next element is a unit activity (e.g., MOVING, AT LOCATION), the processing is completed; otherwise, the clause type cannot be recognized. If the unit identification element is not present, a search is made for a unit possession element. If this element is found processing is completed. If a unit possession element is not present, a search is made for a weather conditional element. If this element is present it is processed; otherwise, the clause type cannot be recognized. If the unit identification element is not present, a time element is searched for; and if found, the time is stored; otherwise, a weather element is searched for indicating a weather conditional at a location if it is present and an unrecognizable clause type if it is not.

g. Routines AIRMOB, ENGR, FIRE, FLY, MOVE, STAY, and TRANS. These routines build an array of modifiers for the orders for which they are responsible and assure that the modifiers required by the orders are present in the statement. This is accomplished by building an array of modifiers that may be used with a particular order, passing this array to KRAKMD, and checking it when it is returned. If a required modifier or an exclusive modifier is missing, an error message is written.

h. Routine KRAKMD. This routine decomposes the modifier portion of the DSL statement and stores data associated with each modifier. Modifiers exclusively contain alpha characters. Most modifiers are followed by numerical data. Each modifier is processed independently by scanning the statement from the last character processed to the next numerical character or the end of the statement. If no modifier is found, an error message is written. If a modifier is present, the data associated with it (if any) is extracted and stored, and a search for another modifier begins. As each modifier is found, its position in the array of modifiers is set to zero, thereby disallowing more than one occurrence of the same modifier. Each coordinate pair, of orders having coordinate pairs (move, fly, advance, withdraw, reconnoiter, and airmobile assault), generates a separate order in the order table. After processing one of these order modifiers, the data stored in the first order generated are copied into the other orders. In the case of a reconnoiter or airmobile assault order, the last order generated is indicated.

i. Routine STOW. This routine is called by DSLCMP to write a unit scenario or battle paragraph to the data file. If a unit scenario is being stored, the labels associated with the scenario are written on the file in the five records immediately preceding the first record used to store the unit scenario. STOW also stores the number of statements (records on the file) in the appropriate location in the UBT and increments the order file record pointer.

j. Routine PASS2. PASS2 is the second pass of the DSL compiler. The labels used to identify orders in a unit scenario that are referenced later by the pseudo order GO TO or a battle paragraph statement are stored in character form. An array of labels is built as the unit scenario is processed. The position in the array corresponds to the order's position in the unit scenario. When a label is referenced by a GO TO or battle paragraph statement, it is stored in the appropriate position in the order array. PASS2 scans each unit scenario and battle paragraph for referenced order labels, matches labels found with a position in the unit scenario's array of labels, and substitutes the numerical position of the label for the characters in the order table.

k. Routine DUMPF. This routine is called by DSLCMP if the debug option on the DSL control cards is exercised. It provides a formatted dump of the tables built by the compiler by reading the contents of the order file and printing them under the appropriate format. Included in the dump is the period start time and period length, start of game/start of period flag, UBT pointers, resume of the formats used in printing unit scenarios, and an index of the unit scenarios listed. This is followed by a listing of the unit scenarios and battle paragraphs.

l. Routine TIME. The time input with a DSL order may be in either of two forms: a six-digit integer with the pairs of digits indicating days, hours, and minutes; or one to three integers followed by the appropriate day, hour, or minute indicator. Routine TIME converts the quantity input into an integer value, which is the number of centiminutes from the beginning of the period to the time indicated.

m. Routine CHCKID. This routine performs requested checks on unit and battle identifications. It can be requested to determine if a unit exists or is a resolution unit, whether the unit identification contains eight characters with the first one being B or R, or if the unit identification is a duplicate. A battle identification can be checked for duplication, for length (eight characters or less), or for existence in the list of battles.

n. Routine MVCHAR. This routine uses system mask and shift functions available to FORTRAN users to reposition characters.

o. Routines PAGE, IUIDF, MATCH, FINDN, EXPAND, IBCD, and RBCD. PAGE determines if the value of the line counter is greater than or equal to the number of lines allowed per page. If so, a header is written at the top of a new page and the line counter is reset. IUIDF is a function routine used to determine the position of a given UID in the Period Processor's list of UIDs. MATCH is used to determine if a given character string is a subset of a second character string (e.g., determines if a statement contains a particular order or modifier). If it is found to be a subset, the location is returned. FINDN will locate the next numerical character in a character string. EXPAND is used to move the four characters stored in one word to the first character in each of four words. Routines IBCD and RBCD are used to convert a string of numerical characters to its equivalent integer or floating point value.

NOTES

APPENDIX A

INPUT REQUIREMENTS FOR DIVWAG SCENARIO LANGUAGE COMPILER

1. INTRODUCTION. The essential components of the DIVWAG Scenario Language (DSL), as of any language, are a vocabulary; or set of symbols, words, or phrases with specified meanings; and a syntax, or set of rules for combining vocabulary elements. With DSL the vocabulary is limited to a small set of elements, and the syntax is relatively rigid; that is, few syntactic options exist. Within the DSL syntax, the highest level of composition is the Unit Scenario and the Battle Paragraph. This level parallels the paragraph of the English language, generally defined as being composed of one or more sentences and dealing with one point. A Unit Scenario contains the DSL commands for one unit within the DIVWAG system, and a Battle Paragraph contains the definition and instructions for one battle within the Ground Combat Model of the Period Processor. As the paragraph of the English language generally contains an introductory sentence followed by a number of elaborating sentences, so must a Unit Scenario or a Battle Paragraph contain an introductory section and an elaborating body. As a sentence of the English language generally expresses one thought and concludes with appropriate end punctuation, so must each piece of a Unit Scenario or a Battle Paragraph. As punctuation is critical to a proper understanding of written English, it is also critical to proper use of DSL. DSL differs from a language used for human communication in one highly significant aspect, semantic flexibility. In the English language a sentence could be interpreted as having several meanings, and a single thought could be expressed in a multitude of ways. In DSL, an order has only one meaning, and there is only one way to express an order.

2. DSL COMPOSITION:

a. General. The highest level of composition within the DSL syntax is the Unit Scenario or the Battle Paragraph. Each contains an introductory section and an elaborating body. Each statement of the introductory sections or of the elaborating body is similar to a sentence of the English language and must end with a period. Any other use of a period within DSL is illegal; thus, decimal points are not permitted and, although abbreviations are possible within the vocabulary, they are not denoted by the period. The building blocks for a statement are order clauses, conditional clauses, and labels. In the following paragraphs, an order clause is represented by the symbol O, a conditional clause by the symbol C, and a label by the symbol L. Where examples are given below, the prototype order clause STAY UNTIL 011200 will be used, the prototype conditional clause TIME LESS THAN 011830 will be used, and the prototype label ABC will be used. Statements may not exceed 400 characters in length.

b. Unit Scenarios. A Unit Scenario contains the set of DSL orders to be followed by one unit through the course of the game period for which the DSL is prepared. A Unit Scenario contains one troductory statement and at least one elaborating statement.

(1) Unit Identification. The unit identification is the first statement of each Unit Scenario. It contains the characters ID: followed by the eight-character unit identification (UID) of the unit to follow the orders contained in the scenario. For example:

```
ID:B1234ABC.
```

The colon and period must be present as in the example. The UID must be composed of exactly eight alphanumeric (letters of the alphabet or Arabic numerals) characters, the first of which must be B or R.

(2) Commands. Commands comprise the elaborating body of a Unit Scenario. Each unit identification statement must be followed by at least one command. There is no practical limit on the number of commands which may appear within one Unit Scenario. A command is composed of an optional label, one or more optional conditional clauses, and exactly one mandatory order clause.

(a) Command Syntax. A command may be written in one of the four following basic forms:

```
  O.
L:O.
  IF C, THEN O.
L:IF C, THEN O.
```

Using the prototypes introduced above, these forms are in actual DSL examples:

```
    STAY UNTIL 011200.
ABC:STAY UNTIL 011200.
    IF TIME LESS THAN 011830, THEN STAY UNTIL 011200.
ABC:IF TIME LESS THAN 011830, THEN STAY UNTIL 011200.
```

The following rules of syntax must be observed:

1. If a label is present, it must be the first element of the command.

2. If a label is present, it must be followed by a colon.

3. If a conditional clause is present, it must be stated before the mandatory order clause and after the label (if used).

4. If a conditional clause is present, it must be introduced by the keyword IF and it must be followed by a comma and the keyword THEN, in that order.

5. The order clause must be the final clause of a command.

6. The order clause must be followed by a period.

(b) Syntax for Conditional Expansion. The basic command forms containing conditionals may be expanded to contain more than one conditional in the following forms:

```
  IF C AND IF C AND IF C, THEN O.
L:IF C AND IF C AND IF C, THEN O.
  IF C OR IF C OR IF C, THEN O.
L:IF C OR IF C OR IF C, THEN O.
```

In using the conditional expansion feature, the following additional rules of syntax must be followed:

1. The logical keywords AND and OR may not both appear in one command.

2. The first conditional clause is introduced by the keyword IF; all following conditional clauses are introduced by the keywords AND IF or OR IF.

3. The last conditional clause is followed by a comma and the keyword THEN.

(c) Command Components:

1. The order clause within a command must be composed of one of the orders within the DSL vocabulary with any appropriate modifiers.

2. The conditional clauses within a command must be composed of conditionals contained within the DSL vocabulary with appropriate modifiers.

3. The label within a command must be composed of not more than three alphanumeric characters. Each label within one Unit Scenario must be unique. Labels are used to identify specific commands within a Unit Scenario. The use of labels is treated at length in paragraph 6. The keyword ID may not be used as a label since it is associated with unit identification.

(3) Unit Scenario Execution. A Unit Scenario contains all commands to be followed by the unit identified in the unit identification statement during the game period for which the scenario was written. A unit will follow commands only if it is a resolution unit and if it has a personnel strength of at least one man. (It is assumed that the reader is familiar with the concept of resolution units within the DIVWAG system.) Since a nonresolution unit is not actually active within the Period Processor, any Unit Scenario for a nonresolution unit will be ignored. The Unit Scenario for any resolution unit having less than one man is also ignored.

(a) Sequencing. The first command in a Unit Scenario is always acted upon first. When execution of one command is completed, execution of the succeeding command is initiated. This direct sequencing of commands can be overridden by the proper use of labels and the GO TO order, or the Battle Paragraph, as discussed in paragraph 6.

(b) Execution of One Command:

1. Conditionals. Upon receipt of a command which contains a conditional clause or clauses, the condition is checked prior to execution of the order clause. If the condition stated in the conditional clause does exist, the order clause is executed. If the condition stated in the conditional clause does not exist, the order clause is ignored and the next command is executed. Processing of a command wherein the expanded conditional feature is used is identical except that all conditional clauses are checked. If the logical AND keyword is used, the condition stated in each conditional clause must exist for execution of the order clause. If the logical OR keyword is used, the order clause is executed if the condition stated in any one (or more) of the conditional clauses exists. In either case, the next command is executed if the appropriate conditional criteria are not met.

2. Order Clause. In the absence of conditional clauses or the presence of appropriate conditional criteria, the order clause of a command is executed. Duration of the event initiated by an order clause depends on the nature of the clause. Generally, the Unit Scenario is not reentered until execution of the event initiated by the order clause has been completed. Exceptions are discussed in paragraph 6.

(4) Unit Scenario Preparation. Unit Scenarios are written on standard program coding sheets in free form; that is, the first character can be written in any column of the form, and spacing between characters or a group of characters can be used to improve readability. As many lines as needed may be used for one command, each line representing a punched card. Each command must begin with a new line (new card). The information on the form is then key punched on standard cards, and the cards are assembled in proper sequence to become unit scenarios within the source deck.

c. Battle Paragraphs. One Battle Paragraph serves to identify each battle grouping (battle) within the Ground Combat Model of the Period Processor, to identify the units involved in that battle, to establish the conditions for termination of the battle, and to identify the command within their respective Unit Scenarios that each involved unit is to follow upon termination of the battle. A Battle Paragraph contains two introductory statements and at least one elaborating statement.

(1) Battle Identification (BID). The battle identification is the first statement of each Battle Paragraph. It contains the characters BATTLE: followed by the name associated with the battle (BID). For example:

BATTLE:BULGE.

The colon and period must be present as in the example. The battle identification (BID) must be composed of not more than eight alphanumeric characters; and, within one game period, each BID must be unique.

(2) Battle Declaration. The battle declaration is the second statement of each Battle Paragraph. It contains the phrase SURFACE UNITS:, followed by a list of the UIDs of units which are to be actively engaged in the battle or are to respond to battle conditionals contained in the Battle Paragraph. For example:

SURFACE UNITS:B123ABCD,B111222B,RAB12345.

The colon must be present, the UIDs must be separated by commas, and the period must be present, as in the example. No more than 34 UIDs may be used, and no more than 17 UIDs on either side (Blue or Red) are permitted.

(3) Battle Conditionals. Battle conditionals comprise the elaborating body of a Battle Paragraph. Each battle declaration statement must be followed by at least one battle conditional. There is no practical limit on the number of battle conditionals in one Battle Paragraph. A battle conditional is composed of one conditional clause and a series of labels, where the number of labels must equal the number of units listed in the battle declaration statement.

(a) Battle Conditional Syntax. A battle conditional must be written in one of the following forms:

WHEN C, THEN L,L,L.

WHEN C, AND WHEN C, AND WHEN C, THEN L,L,L.

WHEN C, OR WHEN C, OR WHEN C, THEN L,L,L.

or, using the prototypes listed above form one becomes:

WHEN TIME LESS THAN 011830, THEN ABC,ABC,ABC.

The following rules of syntax must be observed:

1. The logical keywords AND or OR may not both appear in one command.

2. The first conditional clause is introduced by the keyword WHEN; all following conditional clauses are introduced by the keywords AND WHEN or OR WHEN.

3. The last conditional clause is followed by a comma and the keyword THEN.

4. The number of labels must agree with the number of units listed in the battle declaration statement.

5. Labels must be separated by commas.

6. The final label must be followed by a period.

7. Each unit in the battle declaration statement must have a Unit Scenario.

8. The nth listed unit in the battle declaration must have in its Unit Scenario a command which has the nth label listed in the battle conditional.

(b) Battle Conditional Execution:

1. Timing. The list of battle conditional statements within a Battle Paragraph is reviewed after each simulation increment of the named battle within the Period Processor.

2. Sequence. Battle conditionals within a Battle Paragraph are executed in the sequence in which they appear in the paragraph.

3. Condition Met. If, in the course of executing battle conditionals, the condition stated in a given conditional clause does exist, the battle is terminated (another battle increment is not scheduled in the Period Processor); and each unit listed in the battle declaration statement is immediately scheduled to execute the command within its own Unit Scenario which has a label matching the label of that battle conditional associated with that unit. Association of units in the battle declaration and labels in the battle conditional is by position; that is, the nth listed unit is associated with the nth listed label.

4. Condition Not Met. If at the time of execution, the condition listed in a battle conditional is not met, processing continues with the next battle conditional. When all conditionals in a Battle Paragraph have been processed, and none of the stated conditions exists, a new battle increment is scheduled in the DIVWAG Period Processor.

3. DSL ORDER CLAUSES:

a. General. The previous paragraph introduced the order clause and the the conditional clause as components of a DSL statement. This paragraph presents the elements of a DSL order clause, and paragraph 4 presents elements of a DSL conditional clause.

(1) Each order clause is composed of exactly one basic order, a variable number of order modifiers, and a variable number of data elements. In the following discussion, elements of DSL will always be written in upper case letters to differentiate from the accompanying narrative.

(2) The DSL Compiler does not recognize English words. It recognizes DSL elements. For example, the compiler recognizes the basic order FIRE as one DSL element. It also recognizes the basic order FIRE ON TARGETS OF OPPORTUNITY as one DSL element. The user must take care to provide the total DSL element when preparing DSL orders.

(3) Order modifiers may be mandatory, exclusive, or optional. A mandatory order modifier is one which must appear each time the basic order with which it is associated appears. A set of exclusive order modifiers is a group of modifiers, exactly one of which must appear each time the associated basic order appears. An optional order modifier is one which may appear with the associated basic order but is not required by the DSL Compiler.

(4) A data element may be associated with a basic order or with an order modifier. Data elements are never optional; that is, where a data element is associated with a basic order or an order modifier, the data element must be present.

(5) The first element of an order clause is always a basic order. If a data element is associated with a basic order, it is always the second element of an order clause. Order modifiers and associated data may be written after the basic order and its data element (if any) in any sequence, with the limitation that a data element associated with any modifier must immediately follow the modifier. Punctuation, or any entry not specifically identified as part of a DSL element, is not allowed.

b. DSL Basic Orders. Basic DSL orders are grouped within six generic categories: stay, move, engage, engineer, transfer, and pseudo orders. These categories contain basic orders for which the simulated activity is generally similar. In most cases, the various orders generate different secondary actions which are discussed with the appropriate basic order.

(1) Stay Activity Orders. Units with a stay activity are motionless. They will consume class I and class III or IIIA supplies. If on the ground, they may be assessed by area fires and by aerial attack and, if air defense units, may fire upon enemy aircraft. Other capabilities of units with stay activity orders depend upon the specific order.

(a) STAY. The STAY order requires one of the exclusive modifiers FOR (a specified period of time) or UNTIL (a specified time). For example:

STAY FOR 1 HOUR.
STAY UNTIL 010230.

If the unit is an artillery unit it will enter the TACFIRE Model of its division automatically and will fire upon targets if so directed by TACFIRE. This is also the default order. If a resolution unit has no Unit Scenario, or if all commands in its Unit Scenario are completed, the Period Processor will automatically generate a STAY UNTIL (end of the game period) for the unit.

(b) FIRE ON TARGETS OF OPPORTUNITY. This order should only be given to artillery units. It requires the same modifiers as the STAY order and, for an artillery unit, has the same effect as a STAY order. Examples:

FIRE ON TARGETS OF OPPORTUNITY FOR 30 MIN.
FIRE ON TARGETS OF OPPORTUNITY UNTIL 011230.

(c) PREPARE. The PREPARE order requires one of the exclusive modifiers FOR (a specified period of time) or UNTIL (a specified time) and allows the optional modifiers AT WIDTH (unit front in meters) -DEPTH (unit depth in meters). For example:

PREPARE UNTIL 031500.
PREPARE FOR 12 HOURS AT WIDTH 1500 - DEPTH 500.
PREPARE AT WIDTH 2000 - DEPTH 775 FOR 1 DAY.

The PREPARE order causes the unit to assume a defensive posture at its current location. If unit dimensions are specified, these are used. If unit dimensions are not specified, those loaded in the data base for a defensive posture are used. This is one of the three orders under which a unit may become involved in battle within the Ground Combat Model of the Period Processor. Rules for such engagement are discussed under the ENGAGE order. An artillery unit given the PREPARE order does not enter the TACFIRE Model.

(d) LOITER. The LOITER order requires the three modifiers: FOR (a specified period of time), AT ALTITUDE (a specified altitude in feet), and AT SPEED (a specified flight speed in knots). For example:

LOITER FOR 15 MIN AT ALTITUDE 3000 FT AT SPEED 30 KNOTS.

The LOITER order should be given to aircraft units only. The unit will remain at its current location and specified altitude for the specified period of time. Flight speed is used to determine fuel consumption. Since an aircraft unit under the LOITER order is not vulnerable to air defense, the order should only be used for units over friendly territory.

(2) Move Activity Orders. Move activity orders direct surface and air movement. The general requirement of these orders is specification of the route the unit is to follow. The unit is moved from its current location to each point specified within the order clause along a straight line. Class I and class III or IIIA are generally consumed, and ground units are generally vulnerable to area fire and aerial fire. Vulnerability of air units depends on the order. Other actions depend upon the specific order.

(a) MOVE. The MOVE order is the prototype order for ground movement. The modifier TO (series of X-Y coordinates) is mandatory, and the modifiers BY (travel mode mnemonic), PRIORITY (movement priority = 1,2,3, or 4), and AT WIDTH-DEPTH (unit width and depth in meters) are optional. For example

```
MOVE TO 0123000-0096500.
MOVE BY TCCM TO 0115000-0095750,
  0115000-0098500, 0117500-0100000
  Priority 3.
MOVE TO 0116000-0172500 BY TCCM AT WIDTH 3000-DEPTH 2000.
MOVE PRIORITY 1 to 0098000-0118800.
```

The MOVE order causes ground movement over the specified route. Movement mode used by the DIVWAG Movement Model is as specified or, if the BY modifier is not present, cross country deployed movement is assumed. The priority code, used by the DIVWAG Engineer Model in allocation of engineer resources should an obstacle be encountered on the move, is set to 4 if the PRIORITY modifier is not present. If not specified in the DSL order, the unit width and depth dimensions will be assigned according to the units activity as loaded in the pregame data base.

(b) WITHDRAW. The WITHDRAW order uses the same modifier structure as the MOVE order with one exception. For WITHDRAW and ADVANCE orders the modifier BY must specify a 4 digit integer movement rate (kilometers/hour) in place of 4 character movement mnemonic. For example:

```
WITHDRAW TO 0117000-0098000 AT WIDTH 2000-DEPTH 880.
WITHDRAW AT WIDTH 3000-DEPTH 500 BY TCCD
     TO 0088000-0115000,0098000-0117000,
               0102500-0118000 PRIORITY 1.
WITHDRAW TO 0124000-0100500 AT WIDTH 2000-DEPTH 1000 BY 0033.
```

The WITHDRAW order combines effects of the MOVE and PREPARE orders. It causes a unit to assume a withdrawal posture while accomplishing ground movements. This is one of the three orders under which a unit may become engaged in battle within the DIVWAG Ground Combat Model. Engagement procedures are discussed under the ENGAGE order.

(c) ADVANCE. Modifier requirements of the ADVANCE order are identical to those of the WITHDRAW order with the restriction that only one pair of coordinates may be speci ied. For example:

```
ADVANCE TO 0101500-0101888.
ADVANCE BY TCCR AT WIDTH 1200-DEPTH 1000 TO 0123400-0090500.
ADVANCE TO 0122000-0110000 BY 0066.
```

The ADVANCE order is the third order under which a unit may become engaged in ground combat. The unit assumes an attacking posture and proceeds toward the specified objective which, for proper ground combat engagement, should be to the rear of an opposing maneuver unit. Engagement procedures are discussed under the ENGAGE order.

(d) FLY. In using the FLY order, the three modifiers OVER (series of X-Y coordinates) AT SPEED (air speed in knots) AT ALTITUDE (altitude in feet) are mandatroy. For example:

```
FLY AT SPEED 125 AT ALTITUDE 2500
   OVER 0111000-0088000.
```

This order is issued to an air unit to cause it to move along a flight path from its present location to a specified coordinate point. A list of coordinates following the modifier OVER is used to describe end points of all legs of the flight path. The air unit will be located (land) at the last point listed. FLY orders should be reserved for administrative movement over nonhostile territory.

(e) AIRMOBILE ASSAULT. In writing this order the modifier TO (series of X-Y coordinates) is mandatory, and the modifier AT TIME (specified time) is optional. For example:

AIRMOBILE ASSAULT TO 0111000-0111000,0123000-
0111000.
AIRMOBILE ASSAULT AT TIME 030500 TO
009530-0088000.

This order causes the airmobile assault segment of the DIVWAG Airmobile Model to be activated. The airmobile task force conducts an airmobile movement along the specified flight path. Initiation of movement is scheduled such that leading elements of the airmobile task force arrive at the final coordinate if this is possible considering flight speeds, distance, and time the order is received. If the AT TIME modifier is not used, movement is initiated when the order is received. The airmobile task force is vulnerable to air defense weapons. To properly execute the order, the airmobile task force must have previously received an ACCEPT TRANSPORT order. Techniques for inclusion of this order in a Unit Scenario are discussed in paragraph 6.

(f) RECONNOITER. In writing the RECONNOITER order, the four modifiers BY (reconnaissance control code), OVER (series of no more than seven X-Y coordinates), AT SPEED (flight speed in knots) and AT ALTITUDE (altitude in feet) are all mandatory. For example:

RECONNOITER BY H322 OVER 0123000-0122000,
0123000-0117000, 0133000-0117000,
0133000-0122000 AT SPEED 50 AT
ALTITUDE 100.

Processing of the order varies depending upon the nature of the unit receiving the order and the reconnaissance control code.

1. If the first character of the reconnaissance control code is the letter A, the unit receiving the order must be an Air Force reconnaissance control flight. The entire unit conducts the mission flying at the specified altitude and speed over the specified route. The fourth character of the reconnaissance control code specifies the sensor load. Sensors are activated upon receipt of the order and remain active over the entire flight path.

2. If the first character of the reconnaissance control code is the letter M, the unit receiving the order must be an army surveillance aircraft (Mohawk type) flight. The entire unit conducts the flight as outlined in the previous paragraph. The fourth character of the reconnaissance control code identifies the sensor package (which must include the side looking airborne radar (SLAR) with a ground terminal), and the second and third characters control range, delay, and direction of the SLAR.

3. If the first character of the reconnaissance control code is the letter H or F, the unit receiving the order must be an army unit containing light observation helicopters (H) or light fixed wing scout aircraft (F). In response to the order, a mission unit is created to conduct the mission. The mission unit flies to the first coordinate, at which point target sensing may commence. Upon completion of the mission, the mission unit returns to the unit which received the order. The mission unit may conduct a route or an area reconnaissance, as determined by the control code and discussed in paragraph 6.

4. In all cases, the RECONNOITER order provides the ability to control airborne sensors. Aircraft responding to a RECONNOITER order are vulnerable to air defense weapons.

(3) Engagement Orders. The group of engagement orders permit the game staff to control application of firepower within the Period Processor. The FIRE order controls both the Area Fire and Nuclear Assessment Models; the ENGAGE order controls the Ground Combat Model; the MISSION IS order controls the Air Ground Engagement Model. It is axiomatic that these orders be given only to appropriate units. FIRE orders should be given only to units capable of delivering conventional or nuclear indirect fires. ENGAGE orders should be given only to maneuver units capable of engagement within the Ground Combat Model. MISSION IS orders should be given only to units capable of carrying out a close air support mission either with attack helicopters or tactical Air Force aircraft.

(a) FIRE. The FIRE order activates the Area Fire or Nuclear Assessment Model. It should, of course, appear within the Unit Scenario of a unit that is capable of carrying out the fire mission. The FIRE order structure depends upon whether a conventional or nuclear fire is required.

1. For conventional fires the FIRE order must contain the mandatory modifiers ON (coordinates of target) and MUNITION TYPE (Area Fire munition code beginning with A) and one of the exclusive modifiers, NUMBER OF ROUNDS (a number), NUMBER OF VOLLEYS (a number), or IMPACT RADIUS (a number). For example:

```
FIRE ON 0123000-0098500 NUMBER OF ROUNDS
   25 MUNITION TYPE A013 IMPACT
   RADIUS 100.
```

The unit receiving the order will fire the specified number of rounds or volleys of the type specified upon the specified location.

2. For nuclear fires, four modifiers should be viewed as mandatory. These are ON (desired ground zero), MUNITION TYPE (munition code starting with N or D), NUMBER OF ROUNDS 1, and HEIGHT OF BURST (preset height of burst option index). IMPACT RADIUS (desired height of burst if not preset) is required if HEIGHT OF BURST is not preset. The desired ground zero is specified in terms of one X-Y coordinate pair. The munition code is a four-character alphanumeric code wherein the first character must be N or D and the remaining characters relate to the Nuclear Assessment Model constant data base, allowing specification of a firing weapon, a munition, a fuzing option, and a yield. Specification of a height of burst depends upon whether the specified fuze allows free selection of height of burst or only preset height options. If preset options are used, the modifier HEIGHT OF BURST is followed by a height index (1, 2, 3, 4). If free selection of a height of burst is possible, the HEIGHT OF BURST is followed by the number zero; and IMPACT RADIUS, by desired height in meters. Examples:

```
FIRE ON 0127000-0115000 NUMBER OF ROUNDS 1
   MUNITION TYPE NA33 HEIGHT OF BURST 2
   IMPACT RADIUS 100.

FIRE ON 0127000-0115000 NUMBER OF ROUNDS 1
   MUNITION TYPE NXA2 HEIGHT OF BURST 1
   IMPACT RADIUS 500.
```

(b) ENGAGE. The ENGAGE order has one mandatory modifier, IN BATTLE (battle name), and is always used in conjunction with the ADVANCE order. For example:

```
ADVANCE TO 0123100-0125000.
ENGAGE IN BATTLE BRAVO.
```

The combination of an ADVANCE order followed by an ENGAGE order is used to initiate a battle within the DIVWAG Ground Combat Model. Each time an ADVANCE order is encountered within a Unit Scenario, the next command is checked for an ENGAGE order. If the ENGAGE order is not found, the ADVANCE is executed as a simple movement event. If an ENGAGE order is found, the following sequence of events takes place:

1. The list of units involved in the battle named in the ENGAGE order is obtained from the battle declaration statement of the appropriate Battle Paragraph.

2. From the list of all units involved in the battle, those units which are on the opposing side of the unit in whose scenario the ENGAGE order appears and whose current order is either PREPARE or WITHDRAW are selected. These units constitute potential opponents.

3. The list of potential opponents is checked for proximity to the advancing unit. If no potential opponents are within 3000 meters

(front-to-front) of the advancing unit, the battle is not initiated. (The process will be repeated as each Movement Model increment generated by the ADVANCE order is initiated.)

4. If a potential opponent is within 3000 meters of the advancing unit, the battle is initiated by scheduling the first Ground Combat Model increment. The increment is scheduled to take place after the standard Ground Combat Model increment length (15 minutes) has elapsed.

5. At the scheduled time, any unit listed in the Battle Paragraph which has an ADVANCE, PREPARE, or WITHDRAW order (a combat enabling order) will engage all units of the opposing force, also listed in the Battle Paragraph, and also having a combat enabling order and within 3000 meters.

6. The force to which the unit that had the initiating ENGAGE order belongs is treated as the attacking force within the Ground Combat Model.

(c) MISSION IS. The MISSION IS order is used to control the Air Ground Engagement Model. The order clause must contain the three mandatory modifiers TARGET NUMBER (a target intelligence index code from a DIVWAG intelligence report), NUMBER OF AIRCRAFT (a specified number), and AIRCRAFT TYPE (a specified equipment item code) and may contain the optional modifier AT TIME (a specified time). For example:

MISSION IS TARGET NUMBER 480001 AIRCRAFT TYPE 87
NUMBER OF AIRCRAFT 4 AT TIME 030720.

This order must be within the Unit Scenario of a unit that is capable of aerial attack of a target. Upon receipt of the order a mission unit is formed from the unit receiving the order, where composition of the mission unit is as specified in the order; and the Air Ground Engagement Model simulation of the mission unit strike against the specified target is scheduled. If a time is specified, and it is possible to strike the target at the specified time, the Air Ground Engagement Model events are scheduled accordingly. If a time is not specified or is specified but unattainable, scheduling of the first portion of the model takes place at once; and the strike will occur after appropriate delays within the model data base have passed. To function properly, the unit must have the specified number and type of aircraft available (except if an Air Force unit and the aircraft is an appropriate TACAIR item). This may be ensured by use of the RETAIN order, discussed in a subsequent paragraph.

(4) Engineer Activity Orders. The DIVWAG Engineer Model functions as a resource allocation filter, controlling the assignment of engineer resources to tasks that must be accomplished. In consonance with this approach, DSL orders controlling engineer activity are task oriented rather than unit oriented. For a given game period, all commands requesting engineer tasks are consolidated within one Unit Scenario for each force, and the scenarios

given the unit identification BLUEFORC or REDFORCE as appropriate. Three basic DSL orders are used to initiate engineer activity, and one DSL order stops activity on a given task.

1. Activity Initiation Syntax. The basic DSL orders to initiate engineer activity are BUILD, BREACH, and REMOVE. Order clauses are built around these basic orders identically. The order clause contains the basic order; one of the exclusive modifiers BARRIER or BRIDGE or FACILITY, followed by a barrier facility identification; one of the exclusive modifiers BEGIN BY or COMPLETE BY, followed by a specified time; optionally, the modifier PRIORITY followed by a priority indicator 1, 2, 3 or 4; optionally, one of the modifiers MANDATORY or DESIRED. Several examples follow:

```
BUILD BARRIER MNA007 BEGIN BY 010800.
REMOVE BARRIER MNA028 MANDATORY
     COMPLETE BY 020705.
BREACH MANDATORY PRIORITY 1 COMPLETE BY
       010715 BARRIER MNT001.
BUILD BRIDGE BRF011 BEGIN BY 022200
      DESIRED.
REMOVE FACILITY BFL003 BEGIN BY 041730
      PRIORITY 3.
```

2. Activity Initiation Response. The BUILD function is defined as construction of a new barrier or facility or repair and rebuilding of one that has been breached. The BREACH function is the disruption of the functional purpose of the obstacle or facility, while the REMOVE function is total destruction or dismantling and removal for use elsewhere. The modifiers BRIDGE and FACILITY are interchangeable. The Engineer Model operates upon a group of tasks, assigning resources to complete or initiate tasks as closely to the times requested as is possible. The user should be familiar with the priority algorithms used by the Engineer Model when assigning the optional modifiers. Briefly, all task orders having the modifier MANDATORY will have preference before task orders having the modifier DESIRED. If neither of the modifiers is used, the task order is treated as if the DESIRED modifier were present. The PRIORITY modifier and its data are used as a tie-breaker between task orders otherwise identical. If the modifier is not used, the task order is treated as though the modifier PRIORITY 4 had been present.

3. Relation to Automatic Task Requests. The DIVWAG Movement Model will generate automatic requests when a moving unit encounters an obstacle. The order will be to BREACH if the obstacle is breachable or to BUILD a facility if the obstacle is a natural obstacle. An automatic order will always be treated as having the modifier MANDATORY, the modifier BEGIN BY (time the obstacle is encountered), and PRIORITY (the priority associated with the movement event).

4. Task Cessation. Any engineer activity may be halted by the DSL order STOP TASK (barrier/facility identification). For example:

```
STOP TASK MNA013.
```

Work on the specified task halts at once, and any resources committed to the task are available for reassignment.

(5) Transfer Orders. The set of transfer activity orders provide a means for various administrative and organizational controls to be implemented within the model.

(a) JOIN. The JOIN order has one mandatory modifier UNIT (a UID). For example:

JOIN UNIT R1122333.

Receipt of this order causes the unit so ordered to integrate into another organization. The unit is completely absorbed by the receiving unit, its strength being reflected by the receiving unit in any subsequent actions. Once a unit joins another unit, it can accept no more orders until it has been detached. This order is used to change task organizations and, concurrently, results in the detail of resolution being reduced as several units join into one superior. If the receiving unit (unit being joined) had been a nonresolution unit prior to execution of the order it assumes the location of the joining unit and, if a Unit Scenario is provided, will immediately execute the first command of its Unit Scenario.

(b) DETACH. The DETACH order requires the mandatory modifier UNIT (a UID) and may have the optional modifier TYPE (a UTD). For example:

DETACH UNIT R1122BAR.
DETACH UNIT B113MECH TYPE GRMI.

The DETACH order causes the named subunit to be broken out of the superior unit receiving the order (e.g., one company out of a battalion). Without the optional modifier, TYPE, the detached unit is formed with its pro rata share of the superior unit's strength (personnel and equipment). When the optional modifier, TYPE, is used, the detached unit will be broken out at its full authorized strength, to the extent that the strength of the superior unit allows. The detached unit is initially given the same location as the unit from which it was detached and will immediately begin to follow any DSL orders provided for it within a Unit Scenario. The detaching, or superior, unit will maintain all residual strength, if any, and will continue to follow DSL orders as long as it has residual strength. Combined use of the DETACH and JOIN orders provides the ability to restructure organizations in any manner desired, limited only by the quantity and definition of units within the game. Used in isolation, the DETACH order results in an increase in the detail of unit resolution. Proper functioning of the order requires that the unit being detached is already defined to the game, insofar that it must have been defined as a subordinate of the unit from which detached either within the task organization at the start of the game or through a previous JOIN order. The DETACH order with optional TYPE modifier may also be used to introduce new units to the game if, within the original task organization, the unit receiving the DETACH order was defined as being of a nonbasic UTD and having no subordinates. In this case the UTD of the superior unit must be defined within TOE data as containing the UTD of the unit specified in the DETACH order.

(c) ASSUME CONTROL OF. This order, followed by the modifier, UNIT, causes the named unit to come under control of the unit receiving the order. Upon implementation of the order, status reports for the assuming unit will reflect strengths of the new subordinate. If the named unit is not already under control of the assuming unit and is not a resolution unit, it will be detached from its superior upon execution of the order. Example:

ASSUME CONTROL OF UNIT B1212123.

(d) ASSIGNMENT IS. This order, followed by an exclusive modifier, DIRECT SUPPORT OF UNIT, REINFORCING UNIT, GENERAL SUPPORT, or GENERAL SUPPORT-REINFORCING UNIT, causes the unit receiving the order to have the designated assignment for allocation of its supporting resources. Applications are within the TACFIRE Model, where fire support is allocated per assignment; within the Air Ground Engagement Model, where aerial fire support may be allocated by assignment; within the Airmobile Model, where allocation of lift and escort aircraft is per assignment; and in the Engineer Model, where allocation of engineer resources may be per assignment. Only the DIRECT SUPPORT assignment is actually acted upon within the Period Processor, the other assignments simply provide the user means of documenting organizational features of the force. In all cases, the GENERAL SUPPORT assignment serves to cancel previous assignments. Examples:

ASSIGNMENT IS GENERAL SUPPORT.
ASSIGNMENT IS DIRECT SUPPORT OF UNIT B1111111.
ASSIGNMENT IS REINFORCING UNIT B1234567.
ASSIGNMENT IS GENERAL SUPPORT-REINFORCING
UNIT B1212123.

(e) ACCEPT TRANSPORT. This order initiates the first segment of the Airmobile Model, which allocates aircraft and moves the aircraft to the location of the airmobile task force to be lifted. The ACCEPT TRANSPORT order must appear in the Unit Scenario of the unit being lifted and must precede the AIRMOBILE ASSAULT order for which aircraft are being allocated. The MIX modifier identifies the type lift and escort aircraft to be used and a standard lift to escort ratio. (This ratio is overridden by use of the NUMBER OF ESCORTS modifier.) The Airmobile Model allocates the specified number of lift aircraft, if the NUMBER OF AIRCRAFT modifier is used, or sufficient aircraft to move the entire unit in the specified number of trips, if the NUMBER OF TRIPS modifier is used. If the AT TIME modifier is used, aircraft are scheduled to arrive at the location of the unit to be lifted at the specified time. If such a time is not specified aircraft arrive as soon as possible after receipt of the order.

(f) RELEASE TRANSPORT. This order requires no modifiers or data. For example:

RELEASE TRANSPORT.

The RELEASE TRANSPORT order may appear in the Unit Scenario of an airmobile task force. If it appears it must not precede the AIRMOBILE ASSAULT order. In response to the RELEASE TRANSPORT order, all aircraft are returned to their home bases upon completion of the airmobile movement or upon receipt of the order, whichever occurs later. If the order is not used, aircraft remain with the airmobile task force.

(g) RETAIN. The RETAIN order has two mandatory modifiers: NUMBER OF AIRCRAFT (a specified number) and AIRCRAFT TYPE (an equipment item code). For example:

RETAIN AIRCRAFT TYPE 188 NUMBER OF AIRCRAFT 8.

This order should be reserved for use in the Unit Scenario of a unit which is capable of flying attack helicopter strikes within the Air Ground Engagement Model. When the order is used, the specified type and number of aircraft are exempt from automatic scheduling by the Air Ground Engagement Model. The order is intended to be used in conjunction with the MISSION IS order, to ensure availability of sufficient aircraft to conduct strikes ordered by the game staff. Aircraft are released for automatic scheduling as they return from a DSL ordered strike. Aircraft may also be released for automatic scheduling by a new RETAIN order, where the specified number is less than the number of aircraft currently retained. For example:

RETAIN AIRCRAFT TYPE 188 NUMBER OF AIRCRAFT 0.

(6) Pseudo Orders. Two DSL pseudo orders can be used in the construction of Unit Scenarios. The orders are so called because they differ from those described above with respect to their reasons for existence. They are not used to direct units to perform military activities but rather are inserted into Unit Scenarios to perform the functions described below.

(a) GO TO. The GO TO order is used to direct a unit to follow a set of orders in a particular sequence or with particular exceptions, depending on the order string structure and satisfaction of conditional statements. A GO TO order must be followed by a statement label. For example, the statement GO TO 6 may be inserted in an order string to direct the unit to start executing a statement labeled 6 immediately. Statement 6 may follow several others in the order string. If so, the orders between the statement GO TO 6 and statement 6 will be ignored by the unit.

(b) TERMINATE. This order, when encountered in any unit's scenario, will cause all simulation to halt and terminate the period. It is most useful in those cases where important or critical situations are expected to occur and for which contingency planning is not feasible or particularly desirable. The TERMINATE order should be used sparingly and with caution because it will halt all processing. To continue the war game a new game period, with complete DSL instructions for all units, must be prepared.

(7) Scatterable Mine Order. The emplacement of scatterable mines by indirect fire or aerial delivery means is directed by the EMPLACE order. This order is limited to field emplacement by indirect fire or aerial means. The emplacement of scatterable minefields by more conventional ground means is treated through the Engineer BUILD order described in paragraph 3b(4) above.

(a) System. The EMPLACE order must be followed by the mandatory modifiers FIELD (followed by a 6-character minefield identifier) and MUNITION TYPE (followed by a 4-character munition code). Additionally, one of the exclusive modifiers NUMBER OF ROUNDS, NUMBER OF VOLLEYS, or NUMBER OF TRIPS (followed by an integer number) must be used.

(b) Emplacement by Indirect Fire. Emplacement of minefields by indirect fire can be accomplished by, and the order may be given to, only artillery firing units. Such units are identified within the model as units which have the letters FA in the third and fourth characters of the Unit Type Designators. For example, units with the following UTD would accept the EMPLACE order for indirect fire minefield delivery: GFFA, MBFA, NSFA, etc.

1. The field to be emplaced is identified by the modifier FIELD (field identification where the field identification is a six-character mnemonic. The first three characters must be MVA, MNP, MNT, or MNS and the last three characters must be integers in a range depending on the first three:

MVA001 - MNA500

MNP001 - MNP150

MNT001 - MNT150

MNS001 - MNS500

2. The munition mnemonic must be of the form AOnn where nn ranges from 01 to 36; this should be the code of a weapons/munition mix loaded for minefield delivery within the Area Fire Model data load.

3. In response to the EMPLACE order, the ordered unit will fire the designated number of rounds or volleys of the designated type into the area of the specified minefield. Delivery is dependent on the field being within the range capabilities of the specific weapon/munition combination. Should the firing unit have fewer than the desired number of rounds, all munition available to the unit will be fired.

(c) Emplacement by Aerial Means. Aerial emplacement can only be accomplished by an aerial-type unit; that is, by a unit having a UTD which ends with the character H or Y. The same restrictions on the minefield name as were presented for indirect fire delivery apply.

1. For aerial emplacement, the MUNITION TYPE modifier must be followed by a 4-character aerial emplacement code.

a. First character of the aerial emplacement code must be A, C, or H, designating emplacement by high performance (A), fixed wing cargo type (C), or helicopter (H). If helicopter delivery, the UTD of the unit receiving the order must end with H; otherwise, the UTD of the ordered unit must end with Y.

b. Second character of the aerial emplacement code must be an inter 0, 1, or 2. This specifies mission abort criterion: 0=do not abort in any case; 1=abort if aircraft fired upon; 2=abort if aircraft losses are experienced.

c. Third character of the aerial emplacement code is an integer in the range 1-9. This specifies an index for mean height at the dispensing site, where the height values are loaded in constant data base.

d. Fourth character of the emplacement code is an integer 1-9. This specifies an aircraft mix table (type and number of mines and type of aircraft) to be used in emplacement. The mix tables are part of the model's constant data load.

2. In response to the order, the number of aircraft specified in NUMBER OF TRIPS of the type in the appropriate mix table will be given full loads, as specified in the mix table, and will be sent to emplace the named field as a single mission unit.

c. DSL Order Modifiers and Data Elements. Most of the DSL order modifiers and some basic DSL orders require data elements to complete an order clause. The required format of a data element depends on the order or order modifier with which it is associated. This paragraph discusses the order modifiers and all required data elements.

(1) There are two basic rules regulating the entry of data elements when required by an order or an order modifier:

(a) A data element must follow the order or order modifier with which it is associated. In the following examples data elements are underlined:

FLY AT SPEED 150 KNOTS AT ALTITUDE 3000 FEET
OVER 0112000-0098500, 0115000-0127500.

ADVANCE TO 0113000-0127000 BY TCCD
AT WIDTH 2000M-DEPTH 1500M PRIORITY 1.

(b) Units of measure may be used as parts of data elements to provide clarification; however, the system requires that each type of data be input in a specific unit of measure. For example, aircraft speed must be in knots, and aircraft altitude must be in feet. Only units of time measure are actually recognized as key words by the compiler. Periods must not be used to terminate abbreviations; they are used exclusively to terminate statements. If units of measure are used in DSL statements, they must be restricted to the following forms:

- DAY, DAYS, DA, or DAS
- HOUR, HOURS, HR, or HRS
- MINUTE, MINUTES, MIN, or MINS
- FEET or FT
- METER, METERS, or M
- KNOT or KNOTS.

(2) Format of data elements generally must follow a rigid pattern. An exception is the specification of a time or a period of time. Times may be expressed either by a six-digit data time group or in clear text. In either case interpretation of the data element as a specific time or as a period of time depends on the modifier with which it is used.

(a) The first form uses an integer number of six digits with the digits in three blocks of two digits each. The blocks are in fixed order. The leftmost block represents the number of days, the center block the number of hours, and the rightmost block the number of minutes. If fewer than six digits are used, a zero fill on the left is assumed. Examples:

112233 (denoting 11 days, 22 hours, and 33 minutes)

1122 (read as 001122 with zero fill on the left, denoting 11 hours and 22 minutes)

0800 (read as 000800, denoting 8 hours)

126 (read as 000126, denoting 1 hour and 26 minutes).

(b) The second form uses integer numbers of days, hours, and minutes, each of which must be followed by the word DAY, HOUR, or MINUTE (or abbreviations thereof as listed above). The words DAY, HOUR, and MINUTE (or abbreviations) are recognized by the compiler; therefore, the data may be written in any order and with any omissions. Examples:

1 DAY 12 HOURS 10 MINUTES

12 HOURS 10 MINUTES 1 DAY

12 HR 10 MIN

120 MIN

2 HRS

(3) For those orders and order modifiers that require data elements, specific data formats have been established. All order modifiers and those basic orders requiring data elements are presented below in alphabetical order.

(a) AIRCRAFT TYPE (equipment item code). The data element is an integer between 1 and 200 denoting the equipment item code of aircraft. Example:

AIRCRAFT TYPE 188

(b) AT ALTITUDE (height of aircraft in feet). The data element is an integer. Example:

AT ALTITUDE 6000 FT

(c) AT SPEED (velocity of aircraft in knots). The data element is an integer. Example:

AT SPEED 375

(d) AT TIME (a specified time). The data element is a time group as described above. Examples:

AT TIME 011230
AT TIME 1 DAY 12 HR 30 MIN

(e) AT WIDTH (unit frontage in meters). The data element is an integer value used in conjunction with-DEPTH. Example:

AT WIDTH 2000M -DEPTH 1200M

(f) BARRIER (barrier identification code). The data element is a six-character mnemonic, the first three characters being alphabetic and the last three characters numeric. Example:

BARRIER MNA013

(g) BEGIN BY (a specified time). The data element is a time group as described above. Examples:

BEGIN BY 010800
BEGIN BY 8 HOURS 1 DAY

(h) BRIDGE (facility identification code). The data element is a six-character mnemonic, the first three characters being alphabetic and the last three numeric. Example:

BRIDGE BFX103

(i) BY (code). Two cases exist:

1. BY (movement mode mnemonic). The data element consists of four alphabetic characters, comprising a movement mode mnemonic for the Movement Model. See Figure III-2-A-1. Example:

BY TCCD

2. BY (reconnaissance control code). The data element consists of four alphanumeric characters, the first of which is A, M, F or H, comprising a control code for the Reconnaissance Overlay. Example:

BY AXX3
BY MAL6
BY HR36
BY H425

Movement type -

A - Administrative. Movement of units by road nets. Uses the most efficient transportation systems available.

T - Tactical. Movement as part of an attack, withdrawal, or other tactical plan external to movement within Ground Combat engagements.

Route type -

CC - Cross country. Route is subject to natural terrain conditions.

RA - Paved roads. Route is such that road beds are asphalt or concrete with at least two lanes with good shoulders.

RG - Gravel roads. Route is gravel or similar surfaced road.

RD - Dirt roads. Route is dirt, road is narrow and/or marginally maintained.

Formation -

M - Column march. Unit is in a column formation.

R - Reconnaissance. Unit on a ground reconnaissance type mission.

D - Deployed. Unit is partially deployed in anticipation of imminent contact with the enemy.

Recognized movement combinations -

A:	RAD	RDD	RGD	
	RAM	RDM	RGM	
	RAR	RDR	RGR	
T:	RAD	RDD	RGD	CCD
	RAM	RDM	RGM	CCM
	RAR	RDR	RGR	CCR

Figure III-2-A-1. Travel Mode Mnemonic Description

(j) COMPLETE BY (a specified time). The data element is a time group as described above. Examples:

COMPLETE BY 031720
COMPLETE BY 3 DAYS 17 HR 20 MIN

(k) -DEPTH (unit depth in meters). The data element is an integer value used in conjunction with AT WIDTH. Example:

AT WIDTH 1250 -DEPTH 1525

(l) DESIRED. No data element.

(m) DIRECT SUPPORT OF UNIT (UID of supported unit). The data element is an eight-character alphanumeric unit identification beginning with B or R. Example:

DIRECT SUPPORT OF UNIT B1212AAR

(n) FACILITY (facility identification code). The data element is a six-character mnemonic, the first three characters being alphabetic and the last three numeric. Example:

FACILITY BFX103

(o) FOR (a specified period of time). The data element is a time group as defined above. The following examples are equivalent:

FOR 200
FOR 2 HOURS
FOR 120 MIN

(p) GENERAL SUPPORT. No data required.

(q) GENERAL SUPPORT-REINFORCING UNIT (UID of the reinforced unit). The data element is an eight-character alphanumeric unit identification beginning with B or R. Example:

GENERAL SUPPORT-REINFORCING UNIT R1234TKB

(r) GO TO (label of procedure statement). GO TO is a pseudo order used to direct the sequence of unit procedure statements applicable to a unit. The data element is an alphanumeric character string of one to three characters. In the following example, the labeled statement is also shown.

GO TO A12.
A12: STAY FOR 3 HRS.

(s) HEIGHT OF BURST (height index). The data element is an integer value 0, 1, 2, 3, 4. Zero is used for a nuclear fire event in which height of burst of the munition and fuze may be specified. Where munition and fuze permit only preset heights of burst, the integer 1, 2, 3, 4 is an index to the preset height option desired, as defined through Nuclear Assessment Model constant data. Example:

HEIGHT OF BURST 2

(t) IMPACT RADIUS (desired height of nuclear burst in meters). The data element is an integer. It is acted upon only in the case of a nuclear munition and fuze which allows specification of height of burst, in which case the data element is the desired height of burst in meters. Example:

IMPACT RADIUS 500M

(u) IN BATTLE (battle identification). The data element is composed of no more than eight alphanumeric characters. Examples:

IN BATTLE EIGHTCHR
IN BATTLE X
IN BATTLE 1PLUS2

(v) MANDATORY. No data required.

(w) MIX (an airmobile aircraft mix index). The data element is an integer. Example:

MIX 3

(x) MUNITION TYPE (weapon/munition code). The data element is a four-character code, the first character being A (conventional round), N (nuclear round), or D (atomic demolition munition). Examples:

A012
NKX3

(y) NUMBER OF AIRCRAFT (specified number of aircraft). The data element is an integer. Example:

NUMBER OF AIRCRAFT 4

(z) NUMBER OF ESCORTS (specified number of escort aircraft). The data element is an integer. Example:

NUMBER OF ESCORTS 6

(aa) NUMBER OF ROUNDS (specified number). The data element is an integer. Example:

NUMBER OF ROUNDS 187

(bb) NUMBER OF TRIPS (specified number of airmobile lift trips). The data element is an integer. Example:

NUMBER OF TRIPS 2

(cc) NUMBER OF VOLLEYS (specified number). The data element is an integer. Example:

NUMBER OF VOLLEYS 1

(dd) ON (location). The data element is a single rectangular map coordinate entry of the form integer - integer. Each integer can be one to seven digits in length. If fewer than seven digits are used, leading zeros are assumed by the compiler. Example:

ON 1163590 - 1246780

(ee) OVER (location or list of locations). A map coordinate pair or list of as many as eight pairs may be entered. Each pair has the form integer - integer, where each integer can be one to seven digits in length; leading zeros are assumed if fewer than seven digits are used. Each location is to the nearest meter. Examples:

OVER 163590 - 246780
OVER 163590 - 246780, 163600 - 246800

(ff) PRIORITY (movement or engineer priority). The data element is one of the integer values 1, 2, 3 or 4. Example:

PRIORITY 4

(gg) REINFORCING UNIT (UID of reinforced unit). The data element is composed of eight alphanumeric characters, the first of which must be B or R. Example:

REINFORCING UNIT B1212123

(hh) STOP TASK (barrier or facility identification). The data element consists of three alphabetic and three numeric characters. Example:

STOP TASK MNA017

(ii) TARGET NUMBER (target index from intelligence report). The data element is an integer. Example:

TARGET NUMBER 480003

(jj) TO (location or list of locations). A map coordinate pair or list of pairs may be entered. Each pair has the form integer - integer, where each integer can be one to seven digits in length; leading zeros are assumed if fewer than seven digits are used. Each location is to the nearest meter. Examples:

TO 163590 - 246780
TO 163590 - 246780, 163600 - 246800

(kk) TYPE (a unit type designator). The data element is composed of four alphabetic characters. Example:

TYPE BAMT

(ll) UNIT (a unit identification). The data element consists of eight alphanumeric characters, the first of which is B or R. Example:

UNIT B1212123

(mm) UNTIL (a specified time). The data element is a time group as described above. Examples:

UNTIL 021215
UNTIL 02 DAYS 12 HOURS 15 MINUTES

4. DSL CONDITIONAL CLAUSES:

a. General. Conditional clauses are used to specify the user's desired sequence of order execution when that sequence depends on conditions prevailing prior to execution of an order or during or upon termination of an order currently being executed. Conditional clauses can be used in Unit Scenarios and in Battle Paragraphs. As with order clauses, the construction of a conditional clause is governed by the allowed vocabulary and the DSL syntax.

b. Conditional Clause Vocabulary. A limited vocabulary is used in the construction of conditional clauses. This vocabulary, together with four possible types of data entries, constitutes the totality of symbols recognized by the DSL Compiler in processing conditional clauses. The vocabulary elements can be arranged within 14 distinct groups, of which groups 1, 12, 13, and 14 are data entries:

Group Number	Description	Legal Vocabulary
1	Unit identification	A UID consisting of eight alpha-numeric characters, the first of which is B or R.
2	Unit's possession	CLASS 3, CLASS 5, PRESENT STRENGTH
3	Unit's possession with data	EQUIPMENT TYPE XXX (an equipment item code)
4	Clock time	TIME
5	Logical operator	GREATER THAN, LESS THAN, EQUAL TO
6	Negator	NOT
7	Unit's activity	ASSESSED, FIRING, MOVING, STOPPED
8	Weather condition	CLOUD COVER, FOG INDEX, RELATIVE HUMIDITY, TEMPERATURE, TEMPERATURE GRADIENT, VISIBILITY INDEX, WIND DIRECTION, WIND SPEED, PRECIPITATION INDEX
9	Location of weather condition	AT LOCATION
10	Unit's activity with data	HALTED AT, AT LOCATION
11	Percent indicator	PERCENT
12	Location data	A pair of seven-digit map coordinates; e.g., 0122000-0095750.
13	Quantity data	An integer.
14	Time data	Formats as presented in subparagraph 3c(2).

c. Conditional Clause Syntax. Syntax established for the DSL Compiler allows seven conditional clause types, where a clause type is a set sequence of elements from the conditional clause vocabulary groups. The types are listed below with one example of each type. Parentheses indicate a group is optional.

Type	Pattern	Example
A	1 2 (6) 5 13 (11)	B1234567 PRESENT STRENGTH GREATER THAN 150
B	1 3 (6) 5 13	B1234567 EQUIPMENT TYPE 172 LESS THAN 34
C	1 8 (6) 5 13 (11)	B1234567 VISIBILITY INDEX NOT LESS THAN 5
D	8 9 12 (6) 5 13 (11)	CLOUD COVER AT LOCATION 0123500-0095000 NOT GREATER THAN 70 PERCENT
E	4 (6) 5 14	TIME GREATER THAN 011300
F	1 (6) 7	B1234567 NOT MOVING
G	1 (6) 10 12	B1234567 AT LOCATION 0123000-0095800

d. Description of Conditions being Tested:

(1) Conditional Type A. The unit for which the test is made may be any resolution unit defined within the system. The quantity against which a check is made is the quantity present in the specified unit of personnel (PRESENT STRENGTH); Class 3, or equipment item 2 (CLASS 3); ammunition associated with individual weapons, or equipment item 6 (CLASS 5). If PERCENT is used, the quantity against which a check is made is the ratio of the amount present in the unit to amount authorized. Examples:

B1234567 CLASS 3 NOT LESS THAN 2500
B1234567 CLASS 5 GREATER THAN 70 PERCENT
B1234567 PRESENT STRENGTH LESS THAN 150

(2) Conditional Type B. The unit for which the test is made may be any resolution unit defined within the system. The item on which the check is to be made is specified by an equipment item code between 1 and 200. The quantity against which a check is made is the quantity present in the unit or, if PERCENT is used, the ratio of quantity present to authorized quantity. Example:

B1234567 EQUIPMENT TYPE 32 LESS THAN 500
B1234567 EQUIPMENT TYPE 3 LESS THAN 50 PERCENT

(3) Conditional Type C. The value against which a check is made is the current weather condition at the location of the specified unit. Legal values of the data entry depend on the weather condition being checked. The values which are treated as percentages are so indicated.

(a) Cloud Cover. The data value can be an integer from 1 to 100. It is treated as a percentage. Example:

B1234567 CLOUD COVER LESS THAN 50 PERCENT

(b) Fog Index. The data value can be 0 (no fog) or 1 (fog). PERCENT is not allowed. Limitation to the logical operators EQUAL TO and NOT EQUAL TO is suggested. Example:

B1234567 FOG INDEX EQUAL TO 1

(c) Relative Humidity. The data value must be between 1 and 100. It is treated as a percentage. Example:

B1234567 RELATIVE HUMIDITY NOT LESS THAN 60 PERCENT

(d) Temperature. The data entry should be desired temperature in degrees Fahrenheit. Example:

B1234567 TEMPERATURE LESS THAN 32

(e) Temperature Gradient. The data value may be 1 (inversion), 2 (moderate inversion), 3 (neutral), or 4 (lapse). Example:

B1234567 TEMPERATURE GRADIENT LESS THAN 3

(f) Visibility Index. The data entry may range from 1 to 9 where 9 denotes best and 1 denotes poorest visibility. Example:

B1234567 VISIBILITY INDEX NOT LESS THAN 6

(g) Wind Direction. The data value, denoting azimuth in degrees, may range from 0 to 360. Example:

B1234567 WIND DIRECTION NOT LESS THAN 45

(h) Wind Speed. The data entry is wind speed in knots. Example:

B1234567 WIND SPEED NOT LESS THAN 12

(i) Precipitation Index. The data entry may have a value of 0 (no precipitation), 1 (light precipitation), or 2 (heavy precipitation). Example:

B1234567 PRECIPITATION INDEX EQUAL TO 0

(4) Conditional Type D. The value against which a check is made is the current weather condition at the specified location. Rules are identical to those for conditional type C.

(5) Conditional Type E. The value within the clause is any legal time format as described in subparagraph 3c(2). This is checked against current time. Example:

TIME GREATER THAN 011330

(6) Conditional Type F. The condition checked is the current status of the specified unit as follows:

(a) ASSESSED. A unit is sensed as ASSESSED if it has been attrited by the Area Fire or Air Ground Engagement Models within the past 15 minutes. Example:

B1234567 NOT ASSESSED

(b) FIRING. A unit is sensed as FIRING if it has received a DSL FIRE order or a TACFIRE fire mission and has not yet completed the ordered fire mission. Example:

B1234567 FIRING

(c) MOVING. A unit is sensed as MOVING if it has received one of the following orders and has not reached the final movement coordinates: MOVE, FLY, ADVANCE, WITHDRAW. If, however, the order is ADVANCE or WITHDRAW and the unit has actually engaged in ground combat, it is not sensed as moving. Example:

B1234567 MOVING

(d) STOPPED. The STOPPED condition is exactly equivalent to NOT MOVING, and MOVING is exactly equivalent to NOT STOPPED.

(7) Conditional Type G. The condition checked is whether the specified location is within the rectangular area defined by the specified unit's current location, orientation, width, and depth. The specified unit must be a resolution unit. Example:

B1234567 NOT AT LOCATION 0123000-0095000.

5. CONTROL CARDS AND DECK STRUCTURE. This paragraph presents control cards required by the DSL Compiler, structure of the DSL Compiler data deck, and structure of decks for submittal to the data processing facility.

a. Compiler Control Cards:

(1) The DSL Compiler call card must be the first card of the data deck. This card has one of the following forms:

DSL.

DSL, DEBUG.

Position on the punched card is not critical, as any blanks are ignored; however, the first entry must be DSL, and the designated comma and period must appear as indicated. Use of the DEBUG option causes the tables generated by the DSL compiler to be listed.

(2) The start of period card must be the second card of the data deck. This card has the form:

START OF PERIOD: XX DAY XX HOUR XX MINUTE.

where XX represents an appropriate numeric entry such as:

START OF PERIOD: 01 DAY 18 HOUR 30 MINUTE.

Presence of the colon and period as illustrated is crucial. To indicate the start of a game, the card must appear as follows:

START OF PERIOD: 01 DAY 00 HOUR 00 MINUTE.

This card indicates the game time at which the period for which DSL orders are being supplied is to start.

(3) The period length card must be the third card of the data deck. This card must be of the form:

PERIOD LENGTH: XXXX MINUTES.

where XXXX represents an appropriate numeric entry such as:

PERIOD LENGTH: 480 MINUTES.

The colon and period must appear as indicated. This card indicates the length of the period of combat to be simulated using the DSL orders.

(4) The final card of the DSL data deck must contain, in any position on the card, the notation:

FINIS.

This card indicates the end of the DSL data deck.

(5) Comments may be inserted at any position in the data deck following the third card. The comment is used to provide background elaboration of the operations being ordered for the information of any individual who should have access to the DSL data deck or a listing thereof. Comments have no meaning to the DSL Compiler or to any other processor of the DSL system and exist solely for user convenience. A comment must be introduced by one of the phrases COMMENT:, CONCEPT:, or CONCEPT OF OPERATION:, where the colon is an integral part of the phrase. A comment is ended with a period. The body of a comment, between the introductory phrase and closing period, may contain any symbol except a period. One comment may be of any length up to (and including) 400 nonblank characters. A DSL data deck may contain as many comments as desired. Example:

```
COMMENT: SECOND BRIGADE SHOULD NOW BE IN ATTACK
         POSTIONS; 1ST BN ON NORTH, 2ND BN ON
         SOUTH AND 3RD BN IN RESERVE (EAST) PD
         SUPPORTING ARTILLERY (1ST AND 3RD OF 307TH)
         HAVE FIRED PREPARATORY MISSIONS AND GONE
         TO TACFIRE MODE.
```

b. Data Deck Structure. The DSL data deck contains four segments as illustrated in Figure III-2-A-2.

(1) The first segment of a DSL data deck must comprise the compiler call card, start of period card, and period length card, in that sequence.

(2) Unit Scenarios comprise the second segment of a DSL data deck. The order in which individual Unit Scenarios appear is not critical, although review may be facilitated by keeping scenarios for units of the Red force and Blue force separate. A Unit Scenario is acted upon only if the specified unit is a resolution unit or has a personnel strength of at least one. Scenarios for nonresolution units are ignored, unless the unit should attain resolution status as the result of an appropriate transfer activity order (DETACH) within the scenario of another unit. In this case, execution of the scenario commences when resolution status is attained. The exception is a scenario with identification ID:REDFORCE. or ID:BLUEFORC. which contains all engineer activity orders for the appropriate force. Comments may appear within any Unit Scenario.

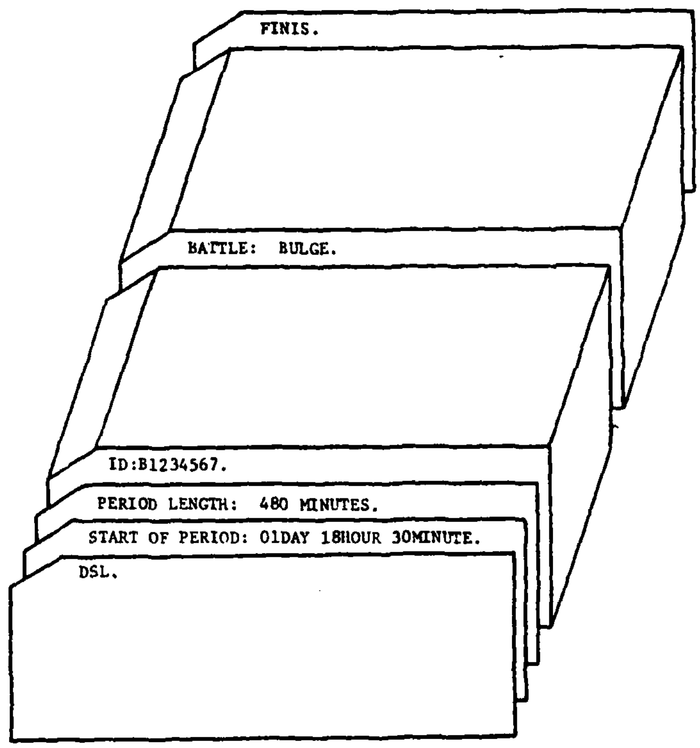


Figure III-2-A-2. DSL Data Deck Structure

(3) Battle Paragraphs comprise the third segment of a DSL data deck. All units listed in battle declaration cards of Battle Paragraphs must be provided Unit Scenarios which contain appropriately labeled commands keyed to the battle conditionals as discussed in subparagraph 2c. Situations may arise where a DSL data deck having no Battle Paragraphs is appropriate, which is allowed by the compiler.

(4) The final segment of a DSL data deck is the FINIS. card.

6. DSL RULES AND TECHNIQUES. The DIVWAG Scenario Language provides the gamer with a wide degree of latitude in controlling simulated units within the DIVWAG system. Proper use of DSL does, however, depend upon observation of the basic vocabulary and syntax rules of the language. Effective use also depends upon an appreciation of the model's response to the various orders. This paragraph restates some of the more critical basic DSL rules and provides selected guidelines toward effective DSL writing techniques. As with any language, an individual's facility with DSL strongly depends upon the extent of his exposure to and experience with the language. Thus, fluency with DSL cannot be expected simply by exposure to this manual. It is gained through practice.

a. Elementary Rules:

(1) Unit Scenarios:

(a) A Unit Scenario can be acted upon only if the unit is a resolution unit and has personnel. The DSL Compiler will accept Unit Scenarios for any unit, as long as the scenario is identified with a legal UID. The DIVWAG Period Processor, however, will ignore orders for units not defined within the game, for nonresolution units, and for resolution units having no personnel.

(b) A Unit Scenario may be provided for a nonresolution unit and that unit may gain a resolution status through appropriate use of the DETACH order given to another unit. When this happens, the Unit Scenario is acted upon at the time resolution status is gained.

(c) If a unit loses resolution status, through the JOIN order in its own Unit Scenario or through an order to DETACH its last subordinate; or should a unit lose all personnel; it will not execute any remaining orders in its Unit Scenario.

(d) A unit may have only one Unit Scenario. Presence of more than one Unit Scenario for a given unit causes the tables generated by the DSL Compiler to be invalidated.

(e) A Unit Scenario must contain at least one command.

(f) Liberal use of labels within a Unit Scenario is a key to efficient use of DSL. Labels must, however, be unique within a Unit Scenario. The sequence of orders cannot be followed as the user intends if more than one command has the same label in one Unit Scenario.

(2) Battle Paragraph/Unit Scenario Interface:

(a) Each unit listed in the battle declaration card must be provided a Unit Scenario.

(b) Within the Unit Scenario for each unit listed in the battle declaration card, properly labeled commands must appear.

b. Basic DSL Techniques:

(1) Timing. It is generally possible to control the time at which execution of an order begins by preceding the order with a STAY order or a PREPARE order. In the following example, the STAY order is used to time a FIRE order and a MOVE order.

```
ID:B1111111.
STAY UNTIL 010530.
FIRE MUNITION TYPE A003 ON 0123000-0123000
  NUMBER OF VOLLEYS 4 IMPACT RADIUS 100.
STAY UNTIL 010615.
MOVE TO 0118000-0127000.
```

(2) Repetitive Orders. It is generally possible to repeat a sequence of orders using the GO TO order with appropriate labels. In the following example, an artillery unit is ordered to fire upon a series of three targets repetitively. A time conditional is used to exit the loop when time exceeds 021800.

```
   ID:B11111FA.
   STAY UNTIL 021630.
A1:FIRE MUNITION TYPE A003 ON 0123000-0123000
        NUMBER OF VOLLEYS 3 IMPACT RADIUS 100.
   FIRE ON 0118000-0123000 MUNITION TYPE A003
        NUMBER OF VOLLEYS 3 IMPACT RADIUS 100.
   FIRE ON 0120000-0122525 NUMBER OF VOLLEYS 2
        MUNITION TYPE A003 IMPACT RADIUS 100.
   IF TIME NOT GREATER THAN 021800, THEN GO TO A1.
   STAY UNTIL 022000.
```

(3) Skipping Commands. Judicious use of conditionals with the GO TO order permits skipping a command or series of commands as the situation may dictate. In the example B123BN01 will engage in one of two battles depending upon the strength of B123BN02. The command with label ABC will be executed upon termination of either battle (Battle Paragraphs not shown here).

```
        ID:B123BN01.
        PREPARE UNTIL 020500.
        IF B123BN02 PRESENT STRENGTH LESS THAN 125, THEN
             GO TO AAA.
        ADVANCE TO 0125000-0113000.
        ENGAGE IN BATTLE BIGHORN.
    AAA:ADVANCE TO 0120000-0115500.
        ENGAGE IN BATTLE FIREFITE.
    ABC:PREPARE UNTIL 021200.
```

c. Techniques Related to Models:

(1) Ground Combat Model. Preparation of DSL commands for the Ground Combat Model is the most subtle phase of DSL preparation. Functioning of the model must be held in mind as orders are prepared.

(a) Battle is initiated in response to an ADVANCE order followed by an ENGAGE order. Initiation requires scheduling the first Ground Combat Model assessment cycle to take place 15 minutes from the time of initiation. Initiation takes place only if a unit on the other force is currently under a PREPARE or a WITHDRAW order and is within 3000 meters (front to front) of the unit receiving the ENGAGE order.

(b) Assessment of battle results takes place at the scheduled time. Assessment will cover all units under ADVANCE, PREPARE, or WITHDRAW orders at the time of assessment. Only units under an appropriate order and within 3000 meters of an opponent who is also under an appropriate order are treated. Specification of attacker and defender within the Ground Combat Model is determined by the one unit in whose scenario the ENGAGE order that caused initiation occurs. All units on the initiator's side are assessed as attackers and all units on the opposing side are assessed as defenders.

(c) Upon completion of the assessment cycle, all conditionals in the Battle Paragraph are checked to determine if the battle must be terminated. If none of the conditions are met, another assessment cycle is scheduled to take place in 15 minutes.

(d) A battle may be reinitiated at any time another ENGAGE order is encountered. Once initiated and terminated, a battle will generally terminate 15 minutes after reinitiated. This is because reinitiation will schedule a 15-minute cycle, and the conditional that terminated the battle the first time will generally continue to be true and will generally terminate the battle each time it is reinitiated.

(e) Upon battle termination, all units listed in the Battle Paragraph will progress to labeled commands as indicated by the battle conditional that is met. This occurs regardless of whether the units actually participated in the battle. The command under execution at the time of battle termination is not generally completed.

(f) Battle conditionals are checked in the order in which they appear in the Battle Paragraph. Once a condition is met, ·er conditionals are not checked. Thus, if several conditions are include. the condition expected to occur at the latest time should generally appear first in the Battle Paragraph.

(2) Reconnaissance Orders. The reconnaissance control code is of paramount importance in a RECONNOITER order. The code consists of four characters, $C_1C_2C_3C_4$, where the first character, C_1, identifies the mission type as light observation helicopter mission (C_1=H), light fixed wing aircraft mission (C_1=F), Mohawk OV-1D type aircraft mission (C_1=M), or Air Force reconnaissance mission (C_1=A). Meaning of successive characters of the code depends upon the first character.

(a) Control Code Determination:

1. LOH/Fixed Wing Observation Reconnaissance Mission. Code equals H $C_2C_3C_4$ or F $C_2C_3C_4$.

a. If the second character, C_2, is R, then the mission is a route reconnaissance mission; otherwise, it is an area reconnaissance mission. If it is an area reconnaissance mission, then C_2 has values 1-9, where the integer value specifies the time assigned to the search area in units of 15-minute intervals. For example, a code of H326 specifies an area reconnaissance mission lasting 45 minutes for an LOH.

b. The third character, C_3, has a range of 0-9 and specifies the route deviation limit in kilometers (corridor width) which the aircraft will not exceed during the flight. In the example, H326, the character 2 in the third position specifies that the LOH will reconnoiter along routes with a corrider width of 2 kilometers, and thus will never exceed the 1-kilometer deviation limit from the route interval. For an area reconnaissance mission, the third character is used in the same manner and effectively creates a density of reconnaissance coverage; i.e., successive passes over the assigned area will be separated by the corridor width.

c. The fourth character, C_4, ranges from 1-9 and is used for two purposes:

- C_4 is the sensor load combination code which identifies the list of sensor types carried on board the aircraft
- C_4 is also the combination code which identifies the correct LOH decision control matrix to use in this mission. Note that the same sensor load is required to use the same decision matrix; however, with up to 10 combinations available, it is possible to list the same sensor load with different decision matrices.

2. Mohawk Type Mission. Code equals M $C_2C_3C_4$.

a. This type reconnaissance mission is currently restricted to represent only the SLAR MTI with GST and camera sensor types on board. The fourth character, C_4, identifies the sensor load combination carried on board in the same manner as the LOH. The first sensor type in the combination is currently restricted to the SLAR MTI with GST.

b. The second character, C_2, is used to set the range and delay of the SLAR MTI sensor package during the RECONNOITER order flight path. The allowed values of C_2 and interpretations are shown in Figure III-2-A-3 where the values of DELAY, RANGE 1, RANGE 2, and RANGE 3 are set as part of the constant data base.

c. The third character, C_3, defines the direction(s) for which the SLAR is gated as being to the right, left, or to both sides of the aircraft flight direction as follows:

- C_3 = R, radar is gated on the right side only
- C_3 = L, radar is gated on the left side only
- C_3 = B, radar is gated on both sides

3. Air Force Aircraft Reconnaissance Mission. Code equals A X X C_4.

a. The second and third characters of the code are not currently used by the submodel and should contain X X.

b. The fourth character, C_4, is used to specify the sensor load combination on board as in previous mission types. (Sensor types are currently restricted to camera systems.)

(b) DSL Flight Pattern Data:

1. The DSL order also specifies the flight intervals or area over which the reconnaissance mission is to be flown. The coordinate endpoints listed on the DSL order form the actual flight path taken in Mohawk OV-1D and Air Force reconnaissance missions.

2. If the mission is an area reconnaissance mission, the coordinates specify the four corners of the area over which the reconnaissance mission is to be flown. The order of the points appearing in the DSL order is such that $P_1P_2P_3P_4$ are in counterclockwise order around the enclosed reconnaissance area. Also P_1P_2 is the rear boundary from which the reconnaissance aircraft will start the coverage of the area.

3. If the DSL order request is for an LOH type mission, the actual flight path does not follow the route intervals exactly but remains within the corridor limits defined in the DSL order control code.

Second Character of code	SLAR MTI Settings Delay Setting	Range Setting
C_2 = 0	0 x DELAY	RANGE1
C_2 = 1	1 x "	"
C_2 = 2	2 x "	"
C_2 = 3	3 x "	"
C_2 = 4	4 x "	"
C_2 = 5	5 x "	"
C_2 = 6	6 x "	"
C_2 = A	0 x DELAY	RANGE2
C_2 = B	1 x "	"
C_2 = C	2 x "	"
C_2 = D	3 x "	"
C_2 = E	4 x "	"
C_2 = F	5 x "	"
C_2 = Z	0 x DELAY	RANGE3

Figure III-2-A-3. Delay and Range Settings for Mohawk Type Mission

7. DIVWAG SCENARIO LANGUAGE VOCABULARY. Figure III-2-A-4 and Figure III-2-A-5 provide a compendium of the DSL order and modifier vocabulary in tabular form.

a. DSL Orders. Figure III-2-A-4 lists the DSL order, the appropriate modifiers--required, exclusive, and optional--for that order, and the code number.

b. DSL Order Modifiers. Figure III-2-A-5 lists the modifiers of DSL orders with the type and format of data. Various comments are included regarding the data format.

Orders	Required Modifiers	Exclusive Modifiers*	Optional Modifiers	Code Number
ACCEPT TRANSPORT	MIX	NUMBER OF TRIPS NUMBER OF AIRCRAFT	NUMBER OF ESCORTS AT TIME	20
ADVANCE	TO		BY PRIORITY AT WIDTH - DEPTH	6
AIRMOBILE ASSAULT	TO		AT TIME	41
ASSIGNMENT IS		DIRECT SUPPORT OF UNIT REINFORCING UNIT GENERAL SUPPORT GENERAL SUPPORT REINFORCING UNIT		23
ASSUME CONTROL OF	UNIT			24
BREACH		BARRIER, BRIDGE, FACILITY } one of BEGIN BY, COMPLETE BY } one of	PRIORITY MANDATORY, DESIRED } one of	43
BUILD		BARRIER, BRIDGE, FACILITY } one of BEGIN BY, COMPLETE BY } one of	PRIORITY MANDATORY, DESIRED } one of	42

Figure III-2-A-4. DSL Orders (Continued on Next Page)

Orders	Required Modifiers	Exclusive Modifiers*	Optional Modifiers	Code Number
DETACH	UNIT		TYPE	26
ENGAGE	IN BATTLE			15
FIRE (Conventional)	MUNITION TYPE ON	NUMBER OF ROUNDS NUMBER OF VOLLEYS	IMPACT RADIUS	9
FIRE (Nuclear)	IMPACT RADIUS MUNITION TYPE NUMBER OF ROUNDS 1 ON		HEIGHT OF BURST	9
FIRE ON TARGETS OF OPPORTUNITY		FOR UNTIL		10
FLY	AT ALTITUDE AT SPEED OVER			7
GO TO	(command label)			
JOIN	UNIT			25
LOITER	AT ALTITUDE AT SPEED FOR			32
MISSION IS	AIRCRAFT TYPE NUMBER OF AIRCRAFT TARGET NUMBER		AT TIME	39
MOVE	TO		BY PRIORITY	3

Figure III-2-A-4. DSL Orders (Continued)

Orders	Required Modifiers	Exclusive Modifiers*	Optional Modifiers	Code Number
PREPARE		FOR UNTIL	AT WIDTH - DEPTH	2
RECONNOITER	AT ALTITUDE AT SPEED BY OVER			8
RELEASE TRANSPORT				31
REMOVE		BARRIER BRIDGE FACILITY } one of BEGIN BY COMPLETE BY } one of	DESIRED MANDATORY } one of	44
RETAIN	AIRCRAFT TYPE NUMBER OF AIRCRAFT			40
STAY		FOR UNTIL		1
STOP TASK	(barrier/facility identifier)			45
TERMINATE				37
WITHDRAW	TO		BY AT WIDTH - DEPTH PRIORITY	5

* One and only one required.

Figure III-2-A-4. DSL Orders (Concluded)

Modifier	Data Type	Data Format	Comments
AIRCRAFT TYPE	Equipment item code	One to three digits	
AT ALTITUDE	Height (in feet)	Integer	Integer may be followed by FEET or FT.
AT SPEED	Speed (in knots)	Integer	Integer may be followed by KNOT or KNOTS.
AT TIME	Absolute time	ddhhmm	d = number of days (digit). h = number of hours (digit). m = number of minutes (digit). One to six digit integer. If less than six digit, zero fill on left is assumed.
		dDhHmM	d = number of days (integer). h = number of hours (integer). m = number of minutes (integer). D = DAYS, DAY, or DA H = HOURS, HOUR, or HR M = MINUTES, MINUTE, or MIN dD, hH, or mM (or any two of the three forms) may be omitted (e.g., dDhH is valid). dD, hH, and mM may be arranged in any order (e.g., hHdD is valid). Caution: 0800 HOURS = 800 hours, not eight hours.

Figure III-2-A-5. DSL Order Modifiers (Continued on Next Page)

Modifier	Data Type	Data Format	Comments
AT WIDTH	Unit front (meters)	Integer	
BARRIER	Barrier identification code	Alphanumeric string, six characters.	First three characters are alpha, last three numeric.
BEGIN 3Y	Absolute time	(See AT TIME modifier)	
BRIDGE	Facility identification code	Six alphanumeric characters.	First three characters are alpha, last three numeric.
BY	Transportation mode	Four alphabetic characters.	
BY	Reconnaissance control code.	Four alphanumeric characters.	Used only with RECONNOITER order. First character is A, F, L or M.
COMPLETE BY	Absolute time	(See AT TIME modifier)	
- DEPTH	Unit depth (meters)	Integer	
DESIRED	Not applicable.		
DIRECT SUPPORT OF UNIT	UID	Alphanumeric string	Eight characters beginning with B or R.
FACILITY	Facility identification code	Six alphanumeric characters.	First three characters are alpha, last three numeric.
FOR	Time length	(See AT TIME modifier)	
GENERAL SUPPORT	Not applicable		Used with ASSIGNMENT IS order.

Figur II-2-A-5. DSL der Modifiers (atinued)

Modifier	Data Type	Data Format	Comments
GENERAL SUPPORT-REINFORCING UNIT	UID	Alphanumeric string	Eight characters beginning with B or R.
GO TO	Label	Alphanumeric string	Three characters only. One of two orders (not modifiers) requiring data.
HEIGHT OF BURST	Preset HOB option code.	Integer, 0, 1, 2, 3, 4	Used with nuclear FIRE order to indicate which preset HOB when fuzing appropriate.
IMPACT RADIUS	Height of bust (meters)	Integer	Used with nuclear FIRE when *fuzing allows specification* of HOB. Mandatory for all other FIRE orders but data not used.
IN BATTLE	Battle name	Alphanumeric string	One to eight characters.
MANDATORY	Not applicable.		
MIX	Airmobile transport/escort mix code.	Integer 1-10	
MUNITION TYPE	Munition mnemonic	Alphanumeric string	Four characters.
NUMBER OF AIRCRAFT	Desired number	Integer	Used with RETAIN, MISSION IS, ACCEPT TRANSPORT orders.
NUMBER OF ESCORTS	Desired number	Integer	Used with ACCEPT TRANSPORT order.
NUMBER OF ROUNDS	Rounds	Integer	For nuclear FIRE, must be 1.
NUMBER OF TRIPS	Desired number	Integer	Used with ACCEPT TRANSPORT order.

Figure III-2-A-5. DSL Order Modifiers (Continued)

Modifier	Data Type	Data Format	Comments
NUMBER OF VOLLEYS	Volleys	Integer	
ON	Single coordinate pair	x-y, Integer	x and y are integers measured in meters.
OVER	Coordinate pairs	x_1-y_1, ..., x_n-y_n Integer	x_i and y_i are integers measured in meters. $n \leq 8$ except for area reconnaissance, in which case n must be 4.
PRIORITY	Movement or engineer task priority	1, 2, 3 or 4	
REINFORCING UNIT	UID	Character string	Eight characters beginning with B or R
STOP TASK	Barrier or facility identification code.	Six alphanumeric characters.	First three characters are alpha, last three numeric. One of two orders (not modifiers) requiring data.
TARGET NUMBER	Target index from intelligence report.	Five to seven digits.	
TO	Coordinate pairs	x_1-y_1, ..., x_n-y_n Integer	x_i and y_i are integers measured in meters. For AIRMOBILE ASSAULT order, $n \leq 4$. For ADVANCE order n=1. Otherwise $n \leq 8$.
TYPE	Unit type designator (UTD)	Alphanumeric string	Four characters.
UNIT	Unit identification	Alphanumeric string	Eight characters beginning with B or R.
UNTIL	Absolute time	(see modifier AT TIME)	

Figure III-2-A-5. DSL Order Modifiers (Concluded)

NOTES

APPENDIX B

DIVWAG SCENARIO LANGUAGE COMPILER PROGRAM DESCRIPTIONS

1. INTRODUCTION. This appendix contains detailed descriptions of the routines comprising the DIVWAG scenario language (DSL) compiler and the common area used by those routines.

2. COMMON DSLMN. This common area is used by most of the DSL compiler routines. The variable definitions listed below are consistent throughout the compiler.

Name	Description
NFERR	Total number of fatal errors found in input data.
NWERR	Total number of warning errors found in input data.
DBUG	Debug print switch.
ISTMT	Pointer to the first character in the array STMT that was processed.
MXSTMT	Maximum number of characters allowed in the STMT array.
STMT	Array containing the statement being processed.
LOCCM	Location of the first comma in the statement.
LOCCLN	Location of the colon in the statement.
LOCPER	Location of the period in the statement.
MXORD	Maximum number of orders allowed in array OARY.
ORDER	Array containing the first four characters of each order.
ORORN	Array containing the order number (NORD) associated with each order.
MXMDFR	Maximum number of modifiers in the MDFR array.
MDFR	Array containing the first four characters of each modifier.
MXNUM	Maximum number of unit scenarios plus battle paragraphs allowed.

Name	Description
UBT	Unit-battle directory table, containing the unit scenario information (loaded from the front) to UNTPT and the battle paragraph information (loaded from the back) to BATPT.
UNTPT	Pointer to the last position in unit battle table used to store unit scenario information.
BATPT	Pointer to the first position in unit battle table used to store battle paragraph information.
UBFLG	Unit scenario-battle paragraph indicator.
CONORD	Conditional-order indicator.
OARY	Order array built by the compiler.
MXOA	Maximum number of orders allowed in each unit scenario or battle paragraph.
JOA	Pointer to the last order placed in the ORDR array.
LABEL	Array containing the labels associated with the orders.
RECPT	Pointer to the last record used in the order file.
ORDFIL	DIVWAG data file identifying number of the order file.
IN	Logical number of input file.
OUT	Logical number of output file.
LNCNT	Total number of lines that have been written on the current page.
MXLN	Maximum number of lines per page.
PERBG	Beginning time of the period in centiminutes.
PERDAY	Day period begins.
PERHR	Hour period begins.
PERMIN	Minute period begins.
PERED	Day period ends.

Name	Description
PEREH	Hour period ends.
PEREM	Minute period ends.
XMAX	Maximum value of X coordinate.
YMAX	Maximum value of Y coordinate.

3. COMMON CONST. This common area is used by many of the DSL compiler routines. It contains the hollerith constants, listed below, that are stored in the first character of the word with the remaining word blank filled.

Name	Description
IPER	Period (.)
ICOM	Comma (,)
ICLN	Colon (:)
IBLNK	Blank ( )
IDASH	Dash or minus sign (-)
INTGR	A 10-word array containing the digits (0-9).
IALPH	A 26-word array containing the alphabet (A-Z).

4. COMMON ONE. This common area is used by routines calling any of the input/output routines.

Name	Description
IFNT	File name table.
IER	Error code.

5. ROUTINE BLOCKD:

a. *Purpose.* This routine initializes some of the variables for common DSLMN and common CONST.

b. Input Variables. None.

c. Output Variables:

Name	Initial Value	Name	Initial Value	Name	Initial Value
MXSTMT	400	MXNUM	1023	MXOA	100

Name	Initial Value	Name	Initial Value	Name	Initial Value
ORDFIL	55	IN	60	OUT	61
MXLN	55	MXORD	25	MXMDFR	32
ORDR(1)	4HFLYB	ORDR(2)	4HSTAY	ORDR(3)	4HGOTO
ORDR(4)	4HMOVE	ORDR(5)	4HFIRE	ORDR(6)	4HPREP
ORDR(7)	4HADVA	ORDR(8)	4HENGA	ORDR(9)	4HRECO
ORDR(10)	4HACCE	ORDR(11)	4HAIRM	ORDR(12)	4HASSI
ORDR(13)	4HASSU	ORDR(14)	4HBREA	ORDR(15)	4HBUIL
ORDR(16)	4HDETA	ORDR(17)	4HJOIN	ORDR(18)	4HLOIT
ORDR(19)	4HMISS	ORDR(20)	4HRELE	ORDR(21)	4HREMO
ORDR(22)	4HRETA	ORDR(23)	4HSTOP	ORDR(24)	4HTERM
ORDR(25)	4HWITH	ORDN(1)	7	ORDN(2)	1
ORDN(3)	-1	ORDN(4)	3	ORDN(5)	9
ORDN(6)	2	ORDN(7)	6	ORDN(8)	15
ORDN(9)	8	ORDN(10)	20	ORDN(11)	41
ORDN(12)	23	ORDN(13)	24	ORDN(14)	43
ORDN(15)	42	ORDN(16)	26	ORDN(17)	25
ORDN(18)	32	ORDN(19)	39	ORDN(20)	31
ORDN(21)	44	ORDN(22)	40	ORDN(23)	45
ORDN(24)	37	ORDN(25)	5	MDFR(1)	4HAIRC
MDFR(2)	4HATAL	MDFR(3)	4HATSP	MDFR(4)	4HATTI
MDFR(5)	4HATWI	MDFR(6)	4HBARR	MDFR(7)	4HBEGI
MDFR(8)	4HBRID	MDFR(9)	4BYbb	MDFR(10)	4HCOMP
MDFR(11)	4H-DEP	MDFR(12)	4HDESI	MDFR(13)	4HDIRE
MDFR(14)	4HFACI	MDFR(15)	4HFORb	MDFR(16)	4HGENE
MDFR(17)	4HHEIG	MDFR(18)	4HIMPA	MDFR(19)	4HINBA

Name	Initial Value	Name	Initial Value	Name	Initial Value
MDFR(20)	4HMAND	MDFR(21)	4HMIXb	MDFR(22)	4HMUNI
MDFR(23)	4HNUMB	MDFR(24)	4HONbb	MDFR(25)	4HOVER
MDFR(26)	4HPRIO	MDFR(27)	4HREIN	MDFR(28)	4HTARG
MDFR(29)	4HTObb	MDFR(30)	4HTYPE	MDFR(31)	4HUNIT
MDFR(32)	4HUNTI	IPER	1H.	ICOM	1H,
ICLN	1H:	IBLNK	1H	IDASH	1H-
INTGR(1)	1H1	INTGR(2)	1H2	INTGR(3)	1H3
INTGR(4)	1H4	INTGR(5)	1H5	INTGR(6)	1H6
INTGR(7)	1H7	INTGR(8)	1H8	INTGR(9)	1H9
INTGR(10)	1H0	IALPH(1)	1HA	IALPH(2)	1HB
IALPH(3)	1HC	IALPH(4)	1HD	IALPH(5)	1HE
IALPH(6)	1HF	IALPH(7)	1HG	IALPH(8)	1HH
IALPH(9)	1HI	IALPH(10)	1HJ	IALPH(11)	1HK
IALPH(12)	1HL	IALPH(13)	1HM	IALPH(14)	1HN
IALPH(15)	1HO	IALPH(16)	1HP	IALPH(17)	1HQ
IALPH(18)	1HR	IALPH(19)	1HS	IALPH(20)	1HT
IALPH(21)	1HU	IALPH(22)	1HV	IALPH(23)	1HW
IALPH(24)	1HX	IALPH(25)	1HY	IALPH(26)	1HZ

6. ROUTINE DSLCMP:

a. Purpose. This is the controlling routine of the DSL compiler. It makes the major decisions to store a unit scenario or battle paragraph and initialize the arrays so another may be built, to initiate the second pass of the compiler, to dump the data file if requested, and to abort the run if fatal errors are discovered.

b. Input Variables. DSL common, NFERR, DBUG, ISTMT, STMT, LOCCLN, UBT, UNTPT, BATPT, UBFLG, OARY, JOA, LABEL and OUT.

c. Output Variables. DSL common variables, NFERR, NWERR, ISTMT, UBT, UNTPT, BATPT, UBFLG, OARY, and LABEL.

d. Logical Flow (Figure III-2-B-1):

(1) Block 1. DSLINT is called to perform initialization of necessary variables.

(2) Block L2000. This block initializes the label array (LABEL), order array (OARY), JOA and UBFLG each time a unit scenario or battle paragraph is to be built.

(3) Block L3000. If the next statement is to be read from cards, control is transferred to block L3005; otherwise, control passes to block L3010.

(4) Block L3005. RDSTMT is called to read the next statement from cards.

(5) Block 2. If this statement is FINIS, control is passed to block 4.

(6) Block 3. If the statement begins with ID or BATTLE, it indicates the beginning of a new unit scenario or battle paragraph and control is transferred to block L2000.

(7) Block L3010. The type of statement is further determined and the appropriate action taken to process it. If it is a comment, no further action is necessary. If it is the end of a unit scenario or battle paragraph STOW is called to store it on the DSL data file. If it is an order, UBFLG is interrogated; UNTORD is called if it is one or BATORD is called if it is two.

(8) Block 4. PASS2 is called to complete the compilation.

(9) Blocks 5 and 6. If DEBUG was specified on the DSL card, DBUG will be true and DUMPF will be called to dump the DSL data file.

(10) Block 7. The total number of fatal errors and warning errors detected by the compiler are written.

(11) Blocks L8500 and 8. If fatal errors were detected by the compiler, the run will be aborted by generating a system error mode 1, the DSL data file will be invalidated, and an error message is printed.

7. ROUTINE DSLINT:

a. Purpose. This routine initializes the areas of common that are not initialized by the DSL block data routine. It reads the DSL, start of period, and start of game cards and initializes the variables obtained from them. It also loads the unit identification and unit location tables.

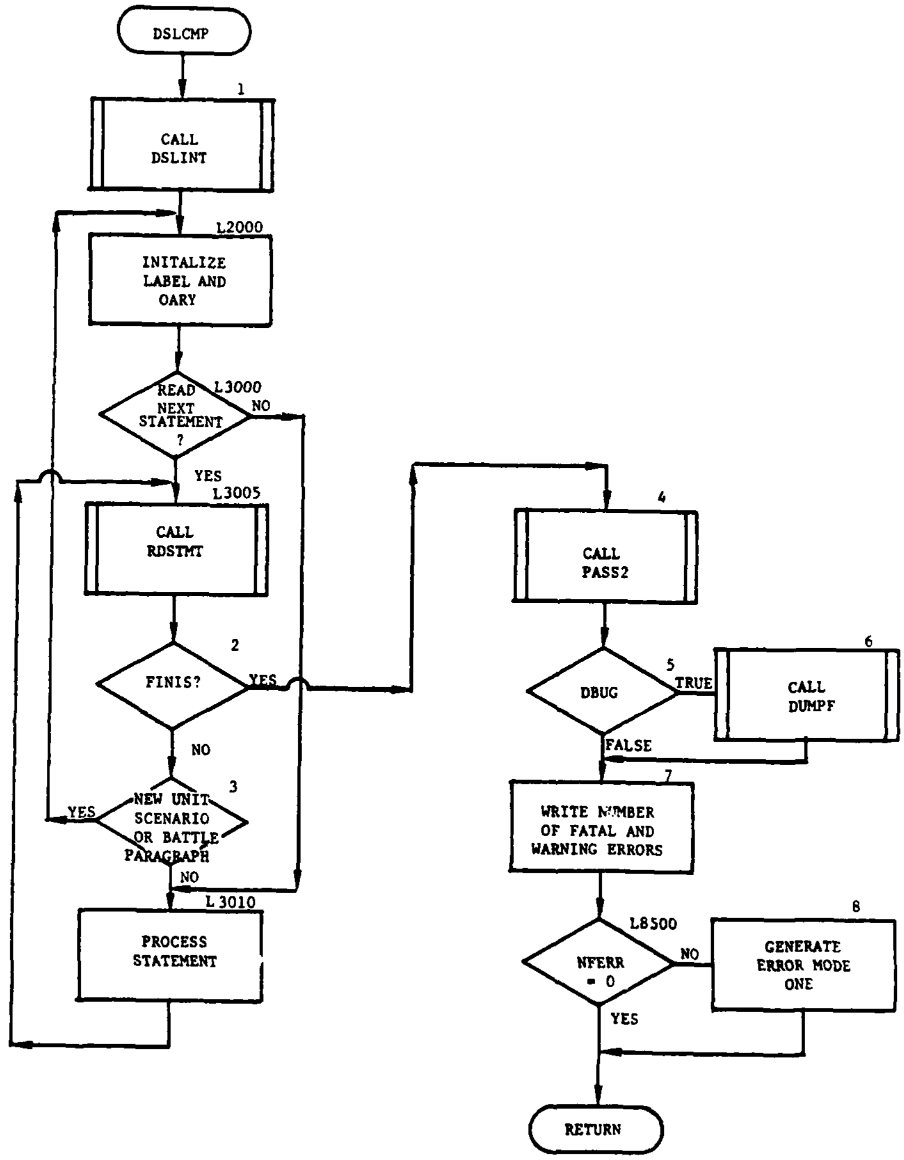


Figure III-2-B-1. Routine DSLCMP

Name	Source	Contents
PERDAY	Card	Beginning period day.
PERHR	Card	Beginning period hour.
PERMIN	Card	Beginning period minute.
IREC1(6)	Card	Start of period/start of game flag.
IREC1(4)	Card	Period length.
DEBUG	Card	DSL debug option.

c. Output Variables:

(1) DSL Common Block Variables. IFNT, IER, LNENT, PGNO, NFERR, NWERR, DBUG, PERED, PEREH, PEREM, PERDAY, PERHR, PERMIN, XMAX, YMAX, RECPT, UNTPT, BATPT, and UBT.

(2) Other Variables:

Name	Destination	Contents
IREC1(4)	Call	Period length.
IREC1(6)	Call	Start of period/start of game flag.
UIDTAB	TWO	Unit identification table.
UNTLOC	TWO	Unit location table.
BPOINT	TWO	Pointer to last Blue unit in UIDTAB.
RPOINT	TWO	Pointer to first Red unit in UIDTAB.

d. Logical Flow (Figure III-2-B-2):

(1) Blocks 1 and 2. The array IFNT is checked to determine if the order file has been created at a proper size. If it has not been created, it is created.

(2) Blocks L1002 and 3. The line count (LNCNT), page number (PGNO), number of fatal errors (NFERR), and number of warning errors (NWERR), are initialized and DSL COMPILATION and PAGE1 are written on the first line of a new page.

(3) Block 4. The first three cards of the DSL deck are read and the values of the beginning day, hour, and minute (PERDAY, PERHR, PERMIN), the period ending day, hour, and minute (PERED, PEREH, PEREM), and the period length (IREC1(4)) are initialized. If the DEBUG option is found on the first card, DEBUG is set to TRUE. It also sets the start of game/start of period flag (IREC1(6)) to three or one respectively.

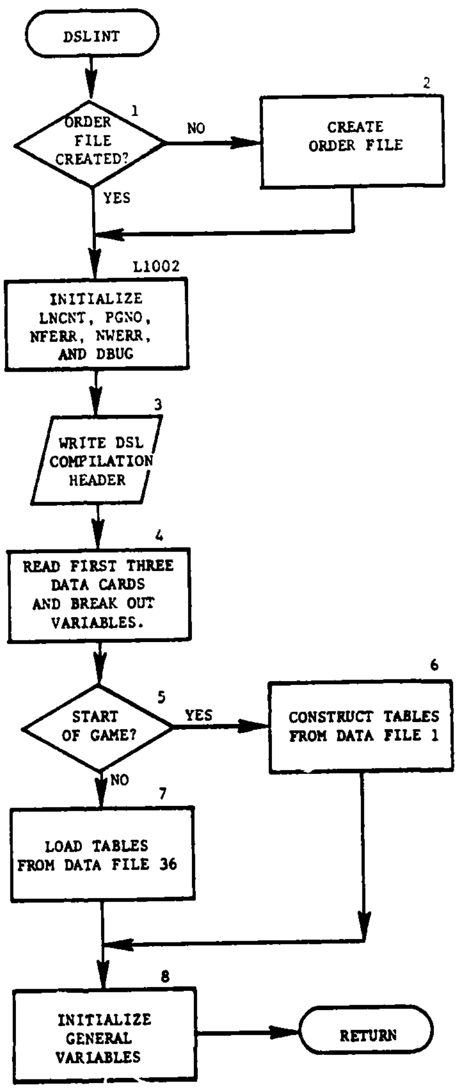


Figure III-2-B-2. Routine DSLINT

(4) Blocks 5, 6, and 7. IREC1(6) is checked to determine if it is equal to three. If it is, the UIDTAB and UNTLOC tables are constructed; otherwise, these tables are loaded from data file 36.

(5) Block 8. The maximum values of the X and Y coordinates (XMAX and YMAX), the pointer to the last record used in the order file (RECPT), the pointer to the last unit loaded (UNTPT), and the pointer to the last battle loaded (BATPT) are initialized. Also, the appropriate words of the unit and battle directory table (UBT) are set to blanks and zeros.

8. ROUTINE RDSTMT:

a. Purpose. This routine reads and prints DSL data cards. A card is read until a period is encountered or the STMT array is filled. If the STMT array is filled, a period is placed in it's last position and the routine reads until a period or colon is encountered. The routine also returns the position of the period, the position of a colon if one is found, and the position of the first comma if one is found.

b. Input Variables:

(1) DSL Common Block Variables.

(2) Other Variables:

Name	Source	Contents
ISAV	Call	Error indicator: 1 = period was left out in previous DSL statement and colon was found in next DSL statement, ICARD contains the previous card image. A new card is not read. 0 = normal entry. Read new DSL statement.
ICARD	Card	DSL order statement.

c. Output Variables:

(1) DSL Common Block Variables. LOCCM, LOCCLN, LOCPER, ISTMT, NFERR, INWERR, STMT, and LNCNT.

(2) Other Variables:

Name	Destination	Contents
ICARD	Print	DSL order statement.

d. Logical Flow (Figure III-2-B-3):

(1) Block L1000. Set the period, comma, color, and STMT location pointers and the number of characters counter are set to zero.

(2) Blocks 1 and L1010. If ISAV is less than or equal to zero, a new card is read.

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
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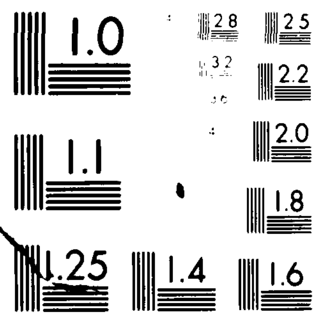

1.0
2.8
2.5
3.2
2.2
2.0
1.1
1.8
1.25
1.4
1.6

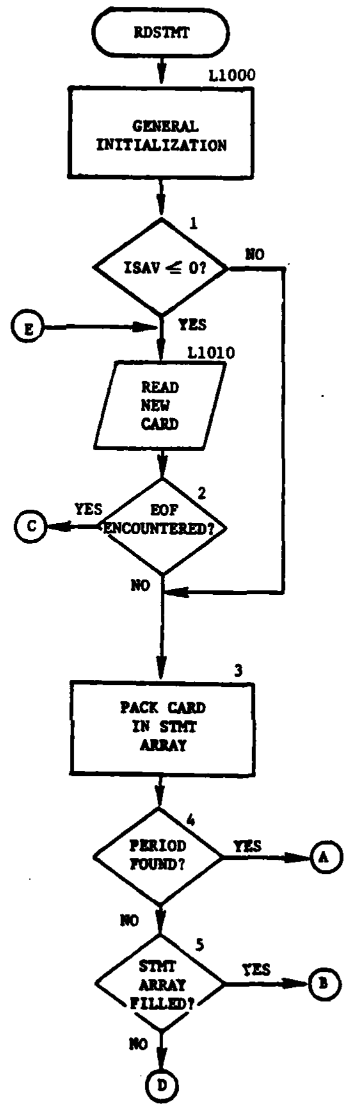


Figure III-2-B-3. Routine RDSTMT (Continued on Next Page)

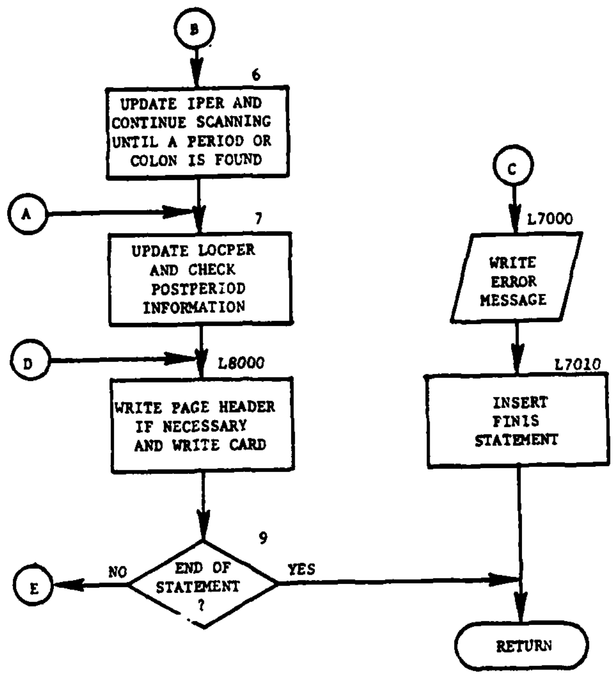


Figure III-2-B-3. Routine RDSTMT (Concluded)

(3) Block 2. Control transfers to block L7000 if an end of file is encountered.

(4) Block 3. As the contents of CARD are packed into START, each character is checked to determine if it is a comma, period or colon. If a colon is found, its location (in STMT) is stored in LOCCLN. If a comma is found, LOCCM is compared to zero to determine if it is the first comma in the statement; if it is first, its location is stored in LOCCM.

(5) Blocks 4 and 5. If a period is found, control transfers to block 7; otherwise, it is determined if the STMT array is full and control transfers to block 6 if it is.

(6) Block 6. A period is put in the last location of the STMT array, and reading is continued until a period or colon is found. If a colon is found, ICARD is saved and used as the first card the next time RDSTMT is called.

(7) Block 7. The period location pointer (LOCPER) is updated and checked for nonblank characters following the period. A warning message is printed if nonblank characters are found.

(8) Blocks L7000 and L7010. If an end of file was encountered while reading the DSL data cards, an error message is written and the six characters FINIS. are inserted in STMT.

(9) Block L8000. A new page header is written if the statement belongs to a different force or to a battle paragraph rather than a force.

(10) Block 9. If an end of statement has been detected, control is returned to the calling routine; otherwise, control is transferred to block L1010.

9. ROUTINE BATORD:

a. Purpose. This routine processes the battle paragraph statements by storing the participating unit list and the corresponding labels and calling COND to process the conditionals.

b. Input Variables. DSL common block variables LOCCLN, ISTMT, BATPT, LOCPER, NFERR, IBLNK, STMT, ICOM, and JOA.

c. Output Variables. DSL common bloc[illegible]bles OARY, NFERR, JOA and ISTMT

d. Logical Flow (Figure III-2-B-4):

(1) Block 1. This block decides whether the battle order is a conditional or unit list.

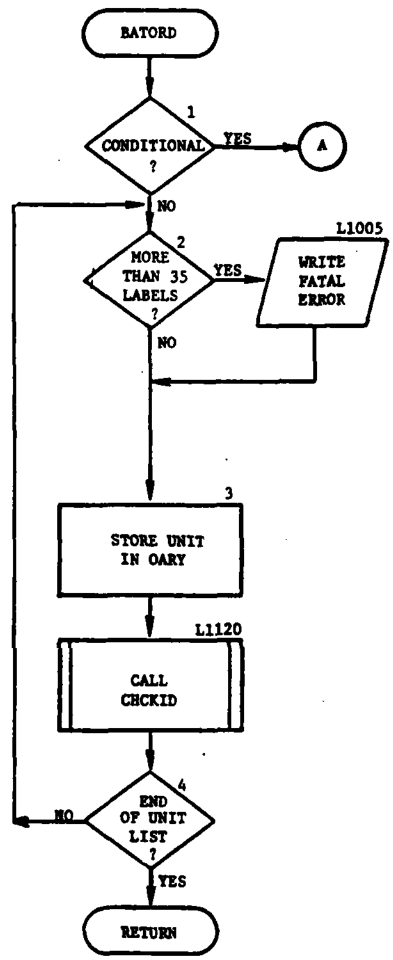


Figure III-2-B-4. Routine BATORD (Continued on Next Page)

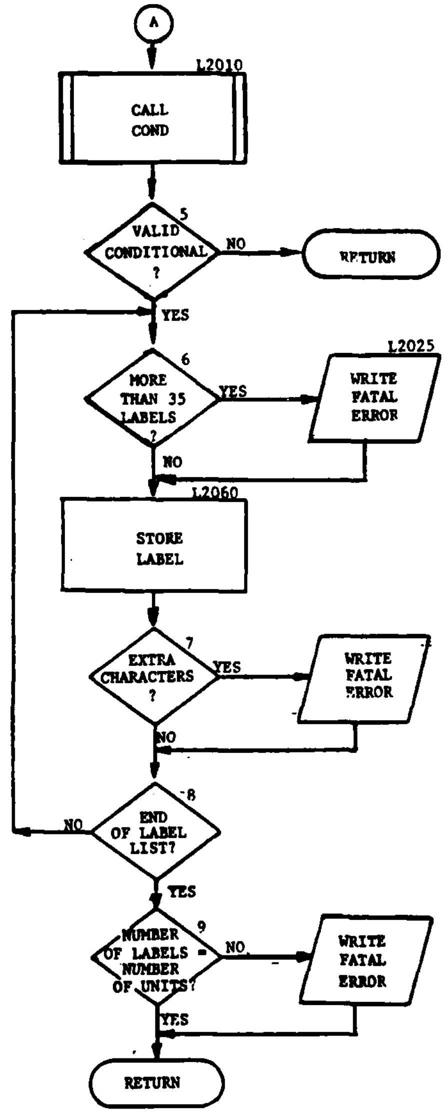


Figure III-2-B-4. Routine BATORD (Concluded)

(2) Block 2 and L1005. If there are more than 35 units in this battle, the number of fatal errors (NFERR) is incremented by one and an appropriate error message is written.

(3) Block 3. The unit list is stored in records one to four of OARY, 10 unit identifications per record.

(4) Block L1120. CHCKID is called to find errors in the unit identifications.

(5) Block 4. If the list of units is completed, control is returned to the calling routine; otherwise, another unit identification is processed.

(6) Blocks L2010 and 5. COND is called to return the value IAO. If IAO is less than zero, control is returned to the calling routine.

(7) Blocks 6 and L2025. If the number of labels is greater than 35, NFERR is incremented by one and an appropriate error message is written.

(8) Block L2060. The labels are stored OARY.

(9) Blocks 7 and L2115. If a label is followed by extra characters, NFERR is incremented by one and an appropriate error message is written.

(10) Block 8. If the label list is not completed, control returns to block 6.

(11) Blocks 9 and 10. If the number of labels equals the number of units, control is returned to the calling routine. If they are not equal, NFERR is incremented by one and a fatal error message is written.

10. ROUTINE UNTORD:

a. Purpose. This routine processes unit scenario orders and conditionals. It determines the type of order and calls the appropriate order routine, stores the statement label if there is one, and calls COND if necessary.

b. Input Variables. DSL common block variables LOCCLN, NFERR, STMT, LABEL, IALPH, OARY, IBLNK, ISTMT, ORDR, MXORD, JOA, and LOCPER.

c. Output Variables. DSL common block variables LABEL, NFERR, JOA, and OARY.

d. Logical Flow (Figure III-2-B-5):

(1) Block 1. If a colon is present in the statement, control transfers to block 2, or to block L2010 otherwise.

(2) Blocks 2 and 3. If the label is legal (less than four characters), processing continues. If it is not legal, an error message is written.

(3) Block L1020. The label is stored in the array LABEL.

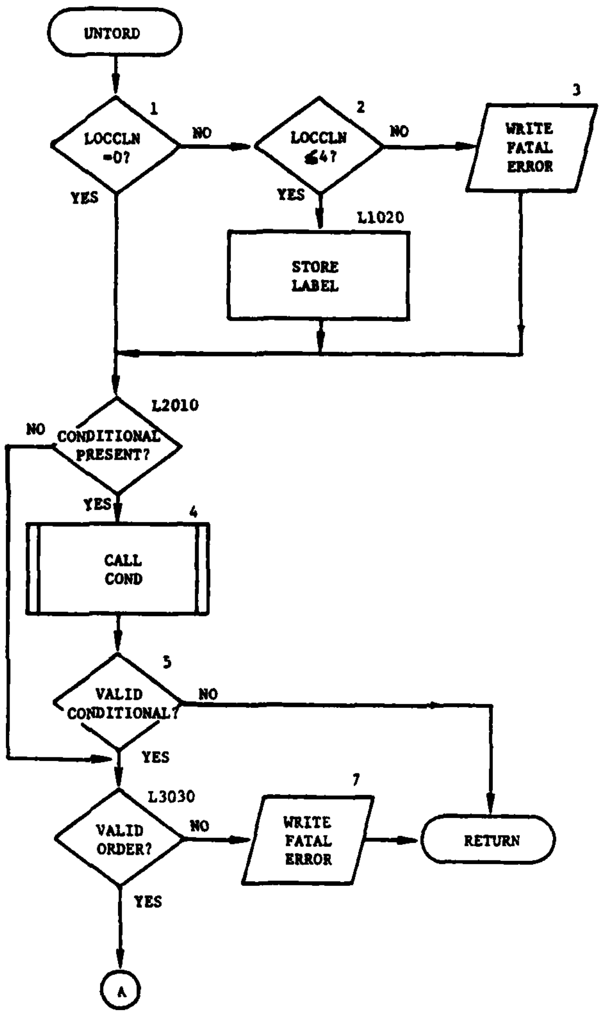


Figure III-2-B-5. Routine UNTORD (Continued on Next Page)

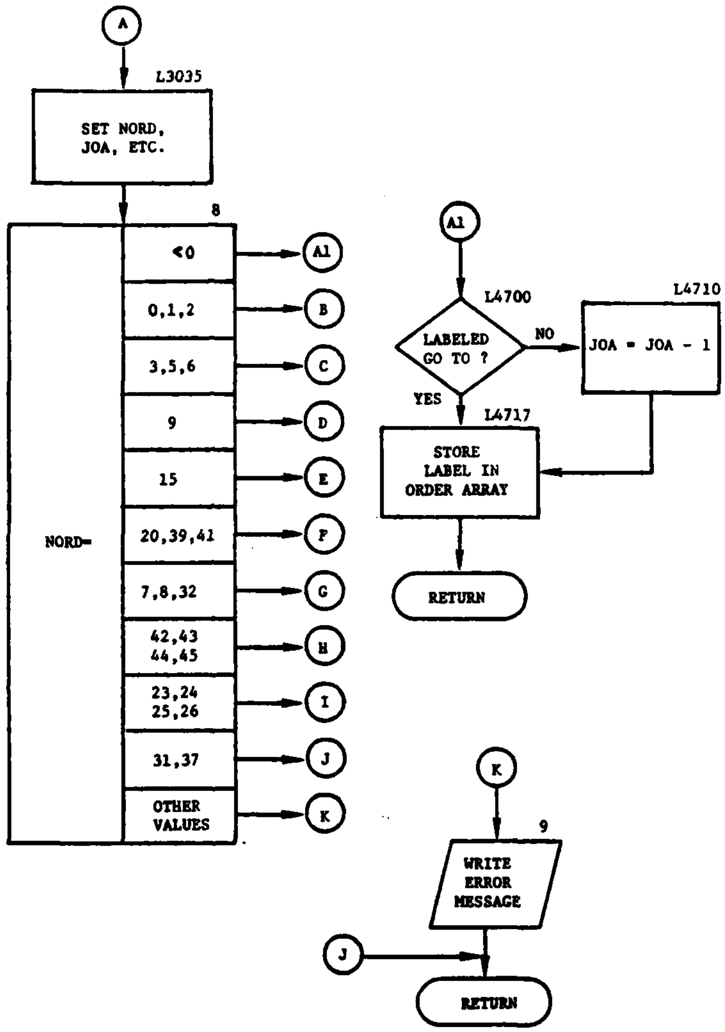


Figure III-2-B-5. Routine UNTORD (Continued)

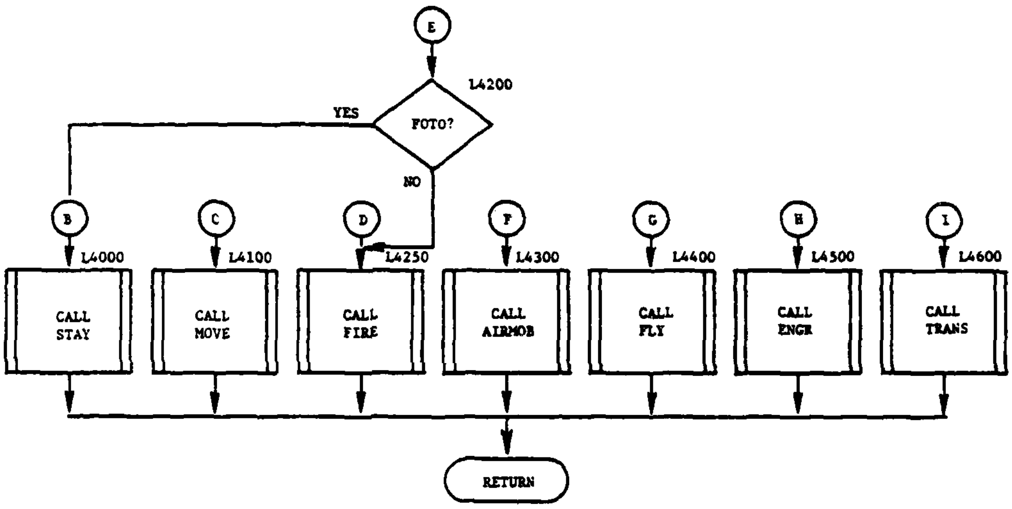


Figure III-2-B-5. Routine UNTORD (Concluded)

(4) Blocks L2010 and 4. If the statement contains a conditional, COND is called.

(5) Block 5. COND returns parameter IAO. If this parameter is less than zero, the conditional is not valid, and processing of the statement is aborted by returning control to the calling routine.

(6) Blocks L3030 and 7. If the order cannot be matched in array ORDR, an error message is written stating the order is invalid. If there is a match, the order type is determined by the value stored in the same position in ORDRN.

(7) Block L3035. NORD is set equal to the identifying number associated with this particular order.

(8) Block 8. NORD determines which order routine to call.

(9) Block 9. An error message is written if the value of NORD is invalid.

(10) Blocks L4700, L4710, and L4717. These blocks are for GOTO orders. If the order is labeled or contains a conditional, the GOTO order requires a separate statement. Otherwise, GOTO is put at the end of the previous order.

(11) Block L4200. This block checks for a fire on targets of opportunity (FOTO) order. If it is a FOTO order, routine STAY is called.

(12) Blocks L4000, L4100, L4250, L4300, L4400, L4500, and L4600. These blocks call the appropriate order routines.

11. ROUTINE COND:

a. Purpose. This routine decodes the conditional clauses of the unit scenario and battle paragraph orders. Each clause of a conditional is considered separately.

b. Input Variables. DSL common variables NFERR, NWERR, ISTMT, STMT, LOCCM, JOA, OUT and OARY.

c. Output Variables:

(1) DSL Common Variables. NFERR, NWERR, ISTMT, OARY, and JOA.

(2) Other Variables:

Name	Destination	Contents
IOA	Call	Conditional clause indicator: Less than zero = fatal error in processing conditional 1 = clauses are connected by AND 2 = clauses are connected by OR.

Name	Destination	Contents
KNTOA	Call	Number of clauses in statement.

d. Logical Flow (Figure III-2-B-6):

(1) Block L1000. Initialization in this block checks the conditional to be sure a comma is in the statement and writes an error message and aborts processing if it is missing. KNTOA and IOA are initialized and it is determined if each clause begins with if or when.

(2) Block L1021. If the clause separators--and/or--are present in the conditional, the locations are stored. A check is made to assure both "and and "or" do not appear in the same conditional.

(3) Blocks 1, 2, 3, and L1030. If the first character of the conditional is not a B or R, control is transferred to block L3000. If an R is found, another check must be made to determine if the relative humidity condition is being checked. If this is the case, control is transferred to block L2000; otherwise, the unit identification is stored and control passes to block L1045.

(4) Blocks L1045 and 4. The conditional is checked to determine if 'not' is present. If it is, the indicator is stored in OARY.

(5) Blocks L1200 and 5. The conditional is checked for 'HALTED AT' or 'AT LOCATION'. If one is found, the coordinate pair associated with it is stored in OARY and control passes to block L7000.

(6) Blocks L1300 and 6. If the unit's activities of movement, stopping, or firing or of being assessed are to be determined the indicator is stored and control is transferred to block L7000.

(7) Block L1500. If an equipment type conditional is found, the equipment type is stored and control is transferred to block L7000.

(8) Blocks L1600 and 8. If the condition of class III, class V or present strength is detected, the indicator is stored and control is passed to block L2000.

(9) Block L1700. If weather conditionals--cloud cover, fog index, relative humidity, temperature, visibility, wind speed or direction, and percipitation--are not found, control is transferred to block L1800; otherwise, control passes to block L2000.

(10) Block L1800. This clause could not be recognized as a conditional; so, an error message is written and control is transferred to block L7000.

(11) Blocks L2000 and 9. If 'not' is found in the conditional, its indicator is stored in OARY.

(12) Blocks L2200 and 10. If a 'greater than', 'equal to' or 'less than' appears in the conditional, the appropriate indicator is stored.

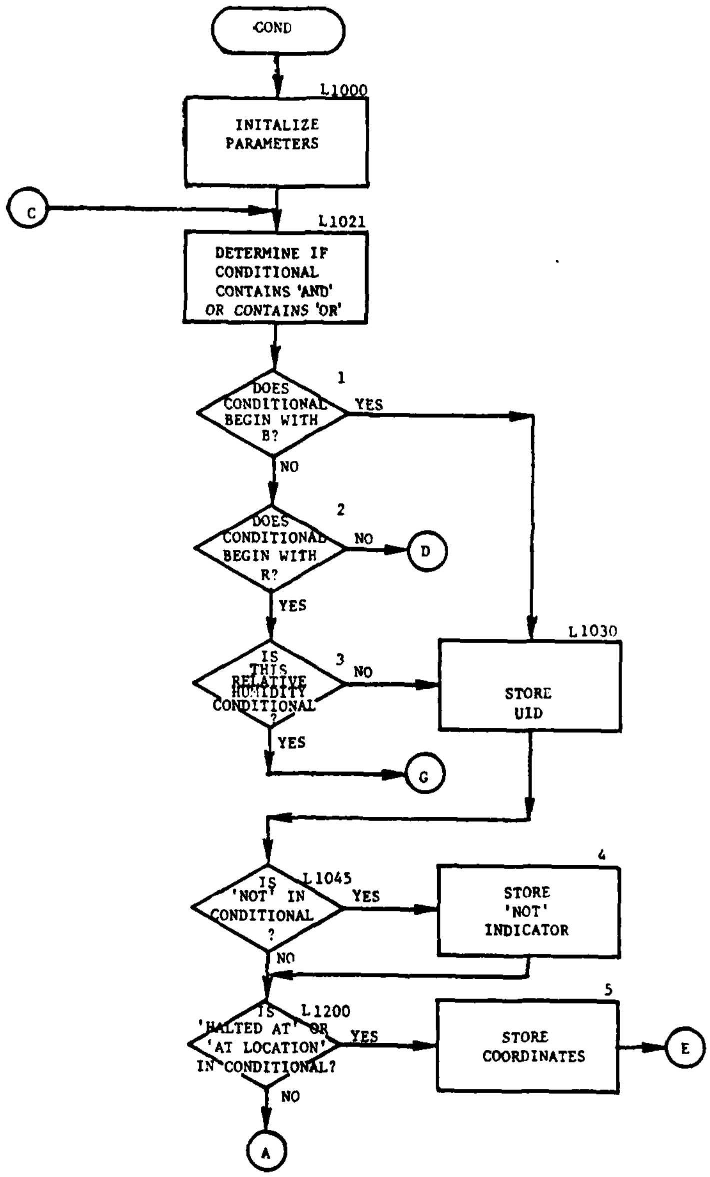


Figure III-2-B-6. Routine COND (Continued on Next Page)

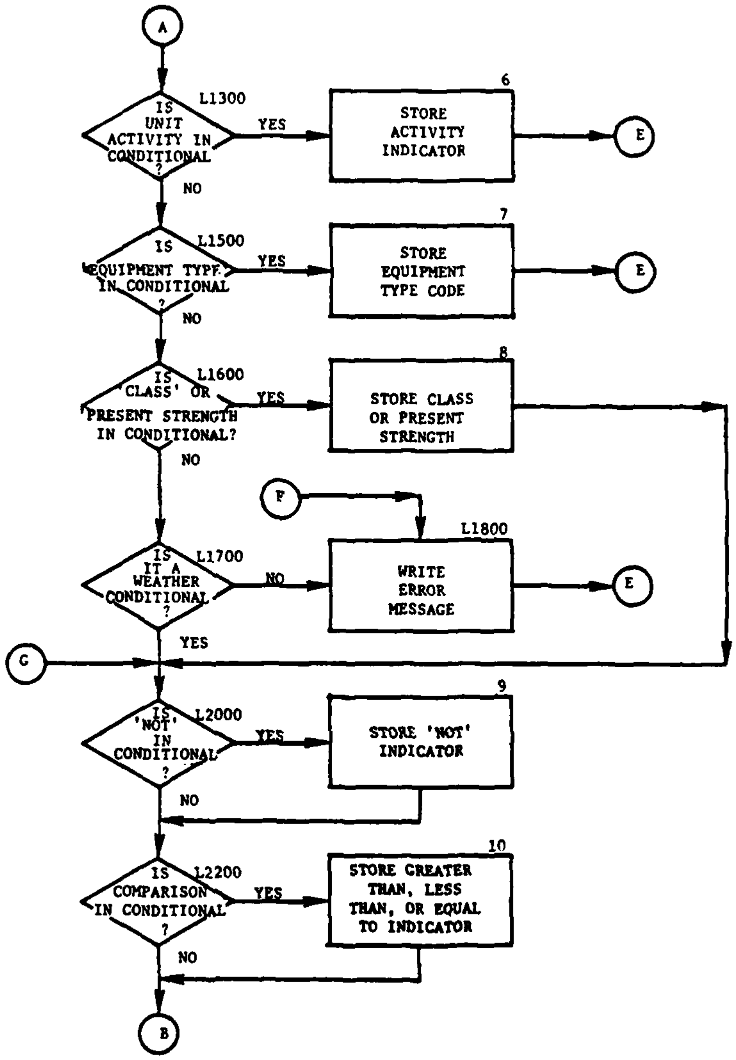


Figure III-2-B-6. Routine COND (Continued)

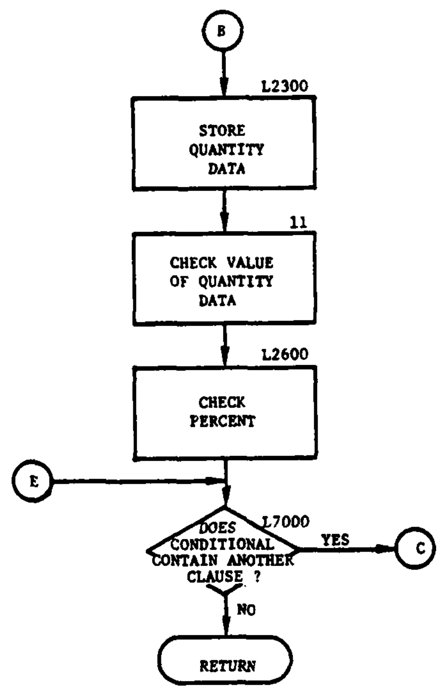


Figure III-2-B-6. Routine COND (Continued)

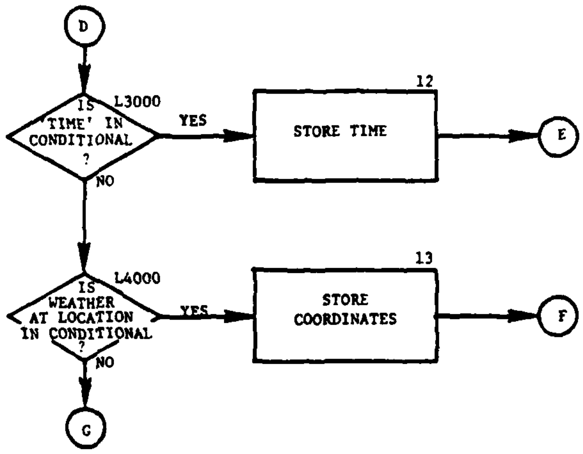


Figure III-2-B-6. Routine COND (Concluded)

(13) Block L2300. The numeric quantity data associated with the conditional is decoded and stored.

(14) Block 11. The value of the quantity data must fall in prescribed ranges. The allowed values are:

- visibility index, 1-9 inclusive
- cloud cover and relative humidity, 1-100
- precipitation index, 0-2
- temperature gradient, 1-4
- wind direction, 0-360
- fog index 0-1
- wind speed, positive.

If values are found that are not within these ranges an error message is written.

(15) Block L2600. Equipment type and present strength are compared to an absolute value or to a percentage of the amount authorized to the unit. If percent is found, it is stored.

(16) Block L7000. If the conditional contains another clause, control transfers to block L1021; otherwise, it returns to the calling routine.

(17) Blocks L3000 and 12. If the conditional contains a check against time, the time is decoded and stored, and control is transferred to block L7000.

(18) Blocks L4000 and 13. If the condition to be considered is weather at a particular location, the coordinates are stored, and control is passed to block L2000; otherwise, control goes to block L1800.

12. ROUTINE AIRMOB:

a. Purpose. This routine builds the list of modifiers for the orders accept transport, airmobile assult, mission is, and retain. If a required or exclusive modifier is missing in an order, an appropriate error message is written.

b. Input Variables. DSL common block variables OARY, NFERR, MDFR, and JOA.

c. Output Variables. DSL common block variable NFERR.

d. Logical Flow (Figure III-2-B-7):

(1) Block 1. Determine the order type (accept transport, airmobile assault, mission is, retain). Store the modifier indexes that correspond to the particular order in the array MDF.

(2) Block L1000. KRAKMD returns MDF with the value zero replacing the index of each modifier that was found in the order.

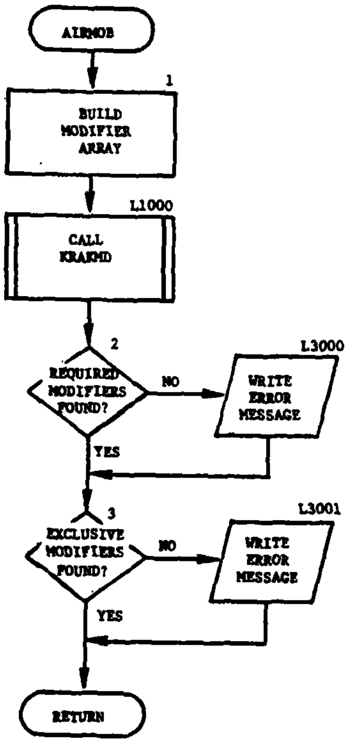


Figure III-2-B-7. Routine AIRMOB

(3) Block 2. MDF is checked to verify that all required modifiers were found in the order. If not, block L3000 is executed.

(4) Block 3. MDF is checked to verify that one of each exclusive modifier set was found in the order. Block L3001 is executed for each set that is missing.

(5) Block L3000. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each required modifier omitted in the order.

(6) Block L3001. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each exclusive modifier set omitted in the order.

13. ROUTINE ENGR:

a. Purpose. This routine builds the list of modifiers for the orders build, breach, and remove. If any exclusive modifiers are missing or there are too many modifiers input, an error message is printed.

b. Input Variables. DSL common block variables OARY, NFERR, MDFR, and JOA.

c. Output Variables. DSL common block variable NFERR.

d. Logical Flow (Figure III-2-B-8):

(1) Block 1. Determine the order type (build, breach, remove). Store the modifier indexes that are used with the particular order in the array MDF.

(2) Block L302. KRAKMD returns MDF with the value zero replacing the index of each modifier that was found in the order.

(3) Block 2. MDF is checked to verify that only one of each exclusive modifier set is in the order. If there are too many exclusive modifiers in the order, block L2000 is executed.

(4) Block 3. MDF is checked to verify that one of each exclusive modifier set was found. Block L2001 is executed for each set that is missing.

(5) Block L2000. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written.

(6) Block L2001. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each exclusive modifier set not found.

14. ROUTINE FIRE:

a. Purpose. This routine builds the list of modifiers for the orders fire (nuclear), fire (conventional), and engage. If any required or exclusive modifiers are missing, an error message is printed.

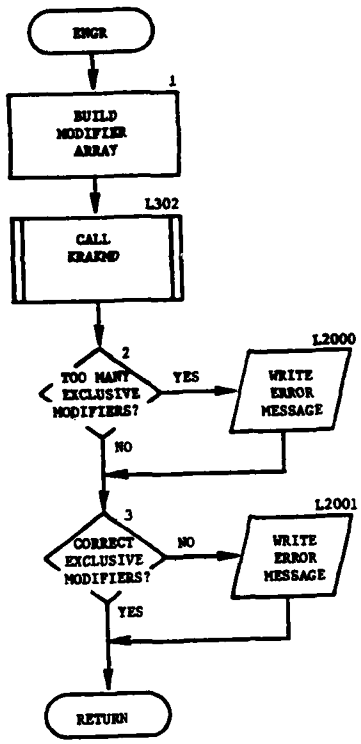


Figure III-2-B-8. Routine ENGR

b. Input Variables. DSL common block variables OARY, NFERR, MDFR, and JOA.

c. Output Variables. DSL common block variable NFERR.

d. Logical Flow (Figure III-2-B-9):

(1) Block 1. Determine the order type (fire, nuclear; fire, conventional; engage). Store the modifier indexes that correspond to the particular order in the array MDF.

(2) Block L1000. KRAKMD returns MDF with the value zero replacing the index of each modifier that was found in the order.

(3) Block 2. MDF is checked to verify that all required modifiers were found. Block L3000 is executed for each one that is missing.

(4) Block 3. MDF is checked to verify that exclusive modifiers of each set was found. Block L3010 is executed for each set that is missing.

(5) Block L3000. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each required modifier not found.

(6) Block L3010. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each exclusive modifier set not found.

15. ROUTINE FLY:

a. Purpose. The routine checks all of the required modifiers for the orders, fly, loiter, and reconnoiter. If any required modifiers are missing, an error message is printed for each required modifier not found in the order.

b. Input Variables. DSL common block variables OARY, NFERR, MDFR, and JOA.

c. Output Variables. DSL common block variable NFERR.

d. Logical Flow (Figure III-2-B-10):

(1) Block 1. Determine the order type (fly, loiter, or reconnaissance). Store the indexes of the modifiers that apply to the particular order in the array MDF.

(2) Block L1001. KRAKMD zeros the positions in MDF corresponding to each modifier found in the order.

(3) Block 2. MDF is checked to verify that all of the required modifiers were found. Block L2000 is executed for each modifier that is missing.

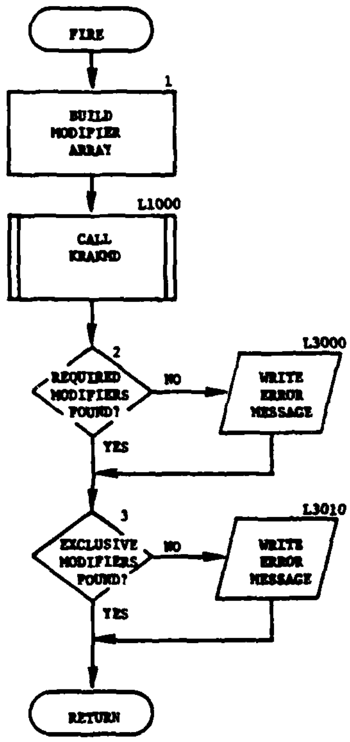


Figure III-2-B-9. Routine FIRE

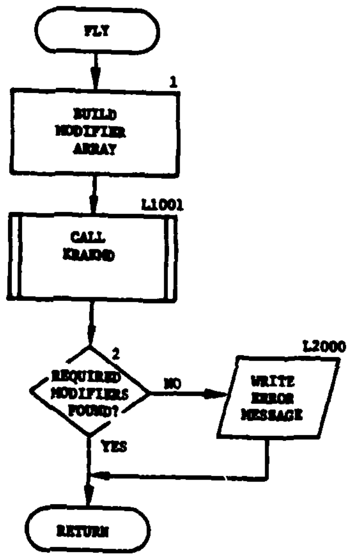


Figure III-2-B-10. Routine FLY

(4) Block L2000. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing the required modifiers not found.

16. ROUTINE MOVE:

a. Purpose. This routine builds the list of modifiers for the orders move, advance, and withdraw. If a required modifier is missing an error message is written. Also, if the order is advance or withdraw, the routine checks to determine if both width and depth modifiers were found if these optional modifiers were used.

b. Input Variables. DSL common block variables OARY, NFERR, NWERR, MDFR, and JOA.

c. Output Variables. DSL common block variables NFERR and NWERR.

d. Logical Flow (Figure III-2-B-11):

(1) Block 1. Determine the order type (move, advance, withdraw). Store the modifier indexes that correspond to the particular order in the array MDF.

(2) Block 2. KRAKMD returns MDF with the value zero replacing the index of each modifier that was found in the order.

(3) Block 3. MDF is checked to verify that all required modifiers were found in the order. If some were not found or incorrect modifiers were found, block 4 is executed.

(4) Block 4. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written.

(5) Block 5. MDF is checked to verify that both parts of the width-depth pair were found. If both were not found, block L2700 is executed.

(6) Block L2700. The number of warning errors (NWERR) is incremented by one, and a warning error message is written.

17. ROUTINE STAY:

a. Purpose. This routine builds the list of modifiers for the orders stay, prepare, and fire on targets of opportunity (FOTO). If any exclusive modifiers are missing or if more than one is input, an error message is written. Also, the width and depth are checked to determine if both were input if the width-depth optional modifiers are used.

b. Input Variables. DSL common block variables OARY, NFERR, NWERR, MDFR, and JOA.

c. Output Variables. DSL common block variables NFERR and NWERR.

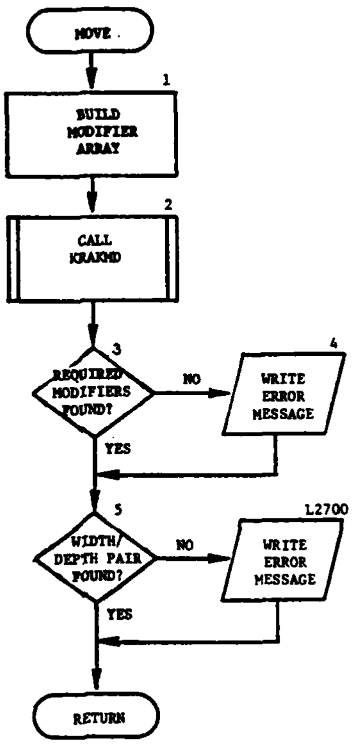


Figure III-2-B-11. Routine MOVE

d. Logical Flow (Figure III-2-B-12):

(1) Block 1. Determine the order type (stay, prepare, fire on targets of opportunity). Store the modifier indexes that correspond to the particular order in the array MDF.

(2) KRAKMD returns MDF with the value zero replacing the index of each modifier that was found in the order.

(3) Block 3. MDF is checked to determine if exclusive modifiers were found in the order. Block 4 is executed if none were found.

(4) Block 4. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written.

(5) Block 5. MDF is checked to determine if more than one exclusive modifier was found in the order. Block L2600 is executed if more than one was found.

(6) Block L2600. The number of warning errors (NWERR) is incremented by one, and a warning error message is written.

(7) Block 6. MDF is checked to see that both parts of the width-depth pair were found in the order. If both were not found, block L2700 is executed.

(8) Block L2700. The number of warning errors (NWERR) is incremented by one, and a warning error message is written.

18. ROUTINE TRANS:

a. Purpose. This routine builds the list of modifiers for the orders assignment is, assume control of, detach, and join. If a required or exclusive modifier is missing, an appropriate error message is written.

b. Input Variables. DSL common block variables OARY, NFERR, MDFR, and JOA.

c. Output Variables. DSL common block variable NFERR.

d. Logical Flow (Figure III-2-B-13):

(1) Block 1. Determine the order type (assignment is, assume control of, detach, or join). Store the modifier indexes that correspond to the particular order in the array MDF.

(2) Block L1000. KRAKMD returns MDF with the value zero replacing the index of each modifier in MDF that was found in the order.

(3) Block 32. MDF is checked to verify that all required modifiers were found in the order. Block L3000 is executed for each one that is missing.

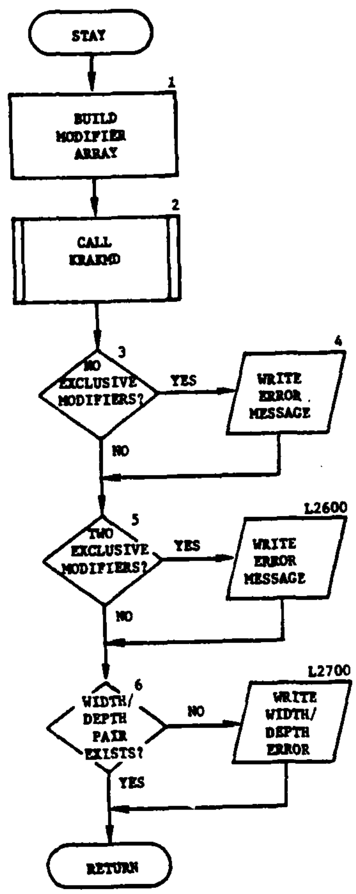


Figure III-2-B-12. Routine STAY

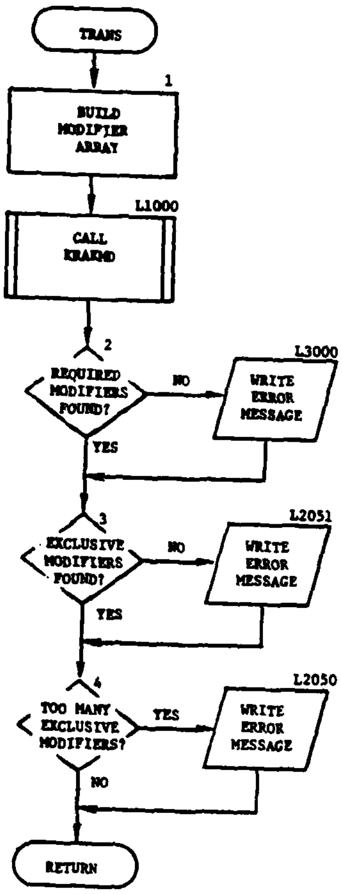


Figure III-2-B-13. Routine TRANS

(4) Block 3. MDF is checked to verify that one of each exclusive modifier set was found. Block L2051 is executed for each set that is missing.

(5) Block 4. MDF is checked to see that too many exclusive modifiers were not found. If too many were found, block L2050 is executed.

(6) Block L3000. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written listing each required modifier omitted in the order.

(7) Block L2051. The number of fatal errors (NFERR) is incremented by one, and an appropriate fatal error message is written.

(8) Block L2050. The number of fatal errors (NFERR) is incremented by one, and an appropriate error message is written.

19. ROUTINE KRAKMD:

a. Purpose. This routine decodes the modifiers associated with a particular DSL order. As each modifier is found, an appropriate entry is made in OARY. Error checking is also done where possible.

b. Input Variables:

(1) DSL Common Variables. NFERR, NWERR, ISTMT, STMT, LOOPER, OARY, JOA, OUT, MXMDFX, and PERBG.

(2) Other Variables:

Name	Source	Description
MDF	Call	Array containing pointers to the modifiers that may be applied to this order.
NM	Call	Number of modifiers in MDF.

c. Output Variables. DSL common variables NFERR, NWERR, ISTMT, JOA, and OARY.

d. Logical Flow (Figure III-2-B-14):

(1) Block L5010. The number of modifiers (NM) is compared to the maximum number of modifiers (MXMDFR) to assure there is room in the MDF array. If there isn't an error message is printed and NM is set equal to MXMDFR. The first four characters of the modifiers are extracted from the MDFR array and stored one-character-per-word in the MDFX array.

(2) Block L5100. The STMT array is scanned from ISTMT to LOOPER for a numeric character. If one is found, its location is stored in MXC and the numeric string is converted to an integer and stored in IVAL.

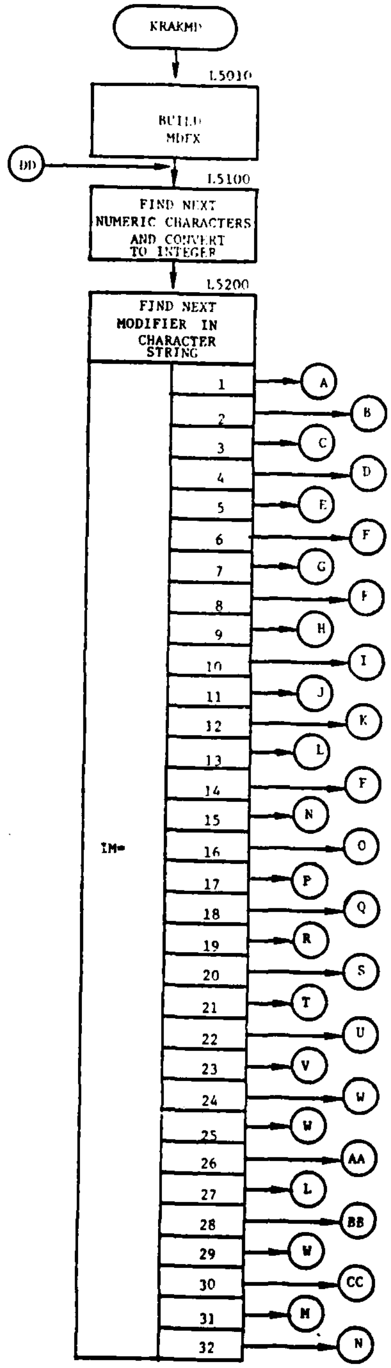


Figure III-2-B-14. Routine KRAKMD (Continued on Next Page)

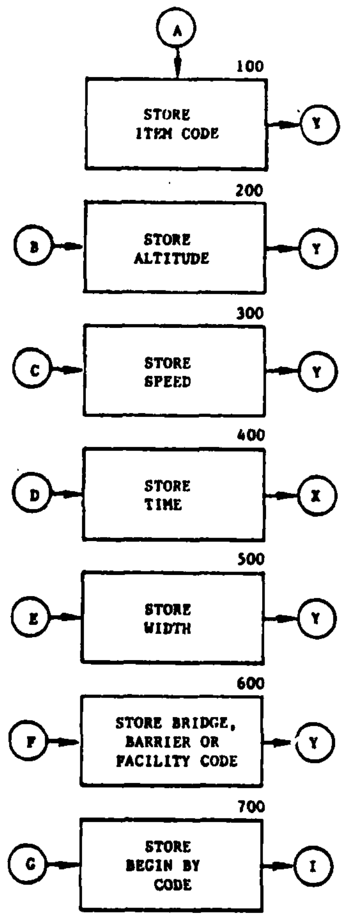


Figure III-2-B-14. Routine KRAKMD (Continued)

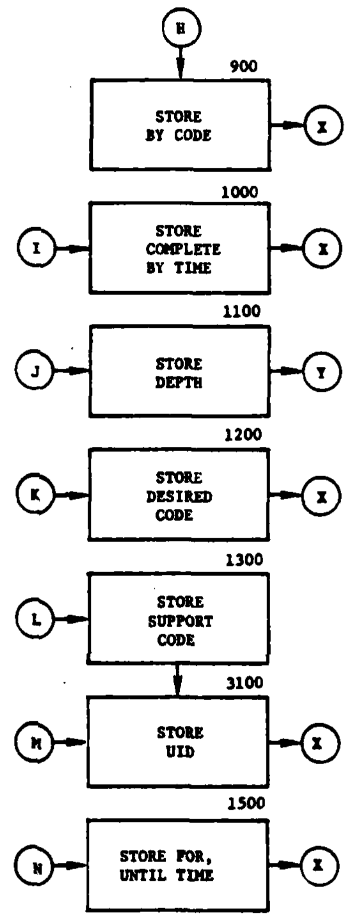


Figure III-2-B-14. Routine KRAKMD (Continued)

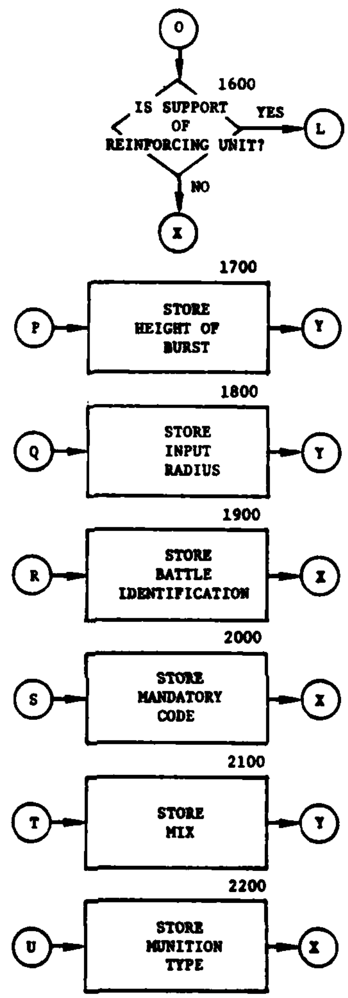


Figure III-2-B-14. Routine KRAKMD (Continued)

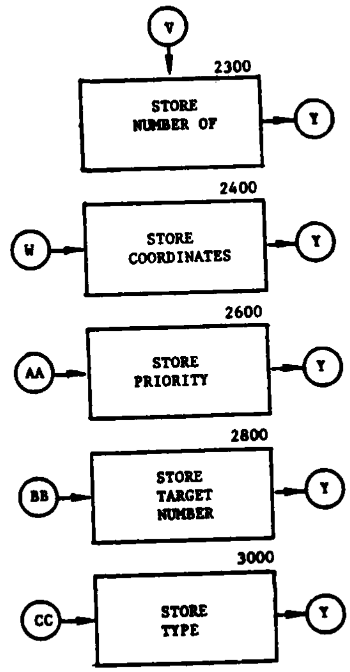


Figure III-2-B-14. Routine KRAKMD (Continued)

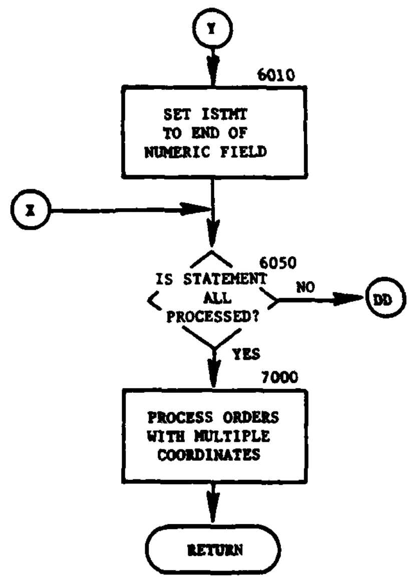


Figure III-2-B-14. Routine KRAKMD (Concluded)

(3) Block L5200. The STMT array is scanned from ISTMT to MXC to determine if a modifier is in that character string. If none is found, a message is printed and the remaining statement is processed. If a modifier is found, IM is set to its index and is used to determine the next block of code to be processed.

(4) Block L100. The aircraft item code is stored in the tenth position in the order array (OARY) and checked to determine if it is less than or equal to 200. An error message is printed if it is not. Control is transferred to block L6010.

(5) Block L200. The altitude is stored in position four in the order array (OARY) and control is passed to block L6010.

(6) Block L300. The speed is stored in the third position of OARY and control is transferred to block L6010.

(7) Block L400. Routine TIME is called to store the time in OARY(2) and control passes to block L6050.

(8) Block L500. The width is stored in OARY(19) and control passes to block L6010.

(9) Block L600. OARY(3) is set to one if a bridge or facility is the modifier and remains zero if a barrier is the modifier. The barrier code is stored in OARY(4) and OARY(5) and checked to determine if the last three characters are numeric. If they are not, an error message is written. Control passes to block L6010.

(10) Block L700. The begin-by code of one is stored in OARY(7) and control is transferred to block L1000.

(11) Block L900. The travel mode mnemonic or reconnaissance by code is stored in OARY(17). The mnemonic or code is checked to determine that it is legitimate and an error message is printed if it is not. Control passes to block L6050.

(12) Block L1000. Write an error message if the time data are missing; otherwise, call TIME to store the begin-by or complete-by time in OARY(9). Transfer control to block L6050.

(13) Block L100. Store depth in OARY(20) and pass control to block L6010.

(14) Block L1200. Store the value of zero in OARY(8) to indicate a desired engineer task and pass control to block L6050.

(15) Block L1300. Store, in OARY(8), a one if the modifier is direct support, two if modifier is reinforcing, or three if modifier is general support-reinforcing. Transfer control to block L3100.

(16) Block L3100. Store the unit identification in OARY(11) and OARY(12); call CHCKID to determine if it is legitmate, and transfer control to block L6050.

(17) Block L1500. Store the time in OARY(2) if the modifier is until; otherwise, add the beginning of the period time (PERBG) to the time and store the negative of the sum in OARY(2). Pass control to block L6050.

(18) Block L1600. If the modifier is general support-reinforcing unit, transfer control to block L1300; otherwise, control is transferred to block L6050.

(19) Block L1700. Store height of burst in OARY(10), write an error message if its value is greater than four, and transfer control to block L6010.

(20) Block L1800. Store impact radius in OARY(9), and pass control to block L6010.

(21) Block L1900. Store the battle identification in OARY([illegible]) and OATY(14), and pass control to block L6050.

(22) Block L2000. Store the value of one in OARY(8) to indicate a mandatory engineer task and transfer control to block L6050.

(23) Block L2100. Store mix in OARY(10), write an error message if its value is greater than 10, and transfer control to block L6010.

(24) Block L2200. Store the munition type in OARY(8), write an error message if its first character is not A, D, or N, and pass control to block L6050.

(25) Block L2300. Determine if the remainder of the number-of modifier is aircraft, escorts, rounds, volleys, or trips. Store number of aircraft in OARY(9), number of escorts in OARY(12), number of rounds or volleys in OARY(7) with number of rounds being stored as the negative value, and number of trips in OARY(9) as a negative value. Transfer control to block L6010.

(26) Block L2400. Store the X coordinate in OARY(5) and the Y coordinate in OARY(6) if it is an on modifier and in OARY(15) and OARY(16) otherwise. If the modifier is either over or to, scan the statement for other coordinate pairs. A check is made to assure that all coordinates are written in pairs, the location defined is in the defined game area, and the coordinates are composed of seven digits. An appropriate message is written if any condition is not met. Control passes to block L6010.

(27) Block L2600. The priority code is stored in OARY(6) if the order is an engineering order and in OARY(18) otherwise. Control passes to block L6010.

(28) Block L2800. The target number is stored in OARY(12) and control is passed to block L6010.

(29) Block L3000. The type is stored in OARY(8), an error message is written if it is not alphabetic, and control is transferred to block L6010.

(30) Block L6010. ISTMT is moved to point to the last numeric character in the data just processed.

(31) Block L6050. If any of the statement remains to be processed, control passes to block L5100.

(32) Block L7000. Orders that have multiple coordinate pairs input are expanded so that only one coordinate pair appears in each order in the final array. The other modifiers are copied into each of these orders. Reconnaissance orders are limited to seven pairs and airmobile assault orders are allowed only four pairs. A message is written if these limits are exceded. OARY(5) is set to one in the order containing the last coordinate pair for the reconnaissance order. OARY(2) is set to negative one for all airmobile assault orders except the last order.

20. ROUTINE STOW:

a. Purpose. This routine stores the unit scenario or battle paragraph orders in the DSL order file and the number of orders in the unit battle table (UBT) array.

b. Input Variables. DSL common variables UBFLG, UNTPT, BATPT, LABEL, OARY, JOA, NFERR, and ORDFIL.

c. Output Variables. DSL common variables. UBT, NFERR, and RECPT.

d. Logical Flow (Figure III-2-B-15):

(1) Block 1. The variable UPFLG is checked to determine if a unit scenario or battle paragraph is to be stored. If UPFLG is not equal to one indicating it is not a unit scenario, control is transferred to block L2000; otherwise, block 2 is executed.

(2) Block 2. If a unit scenario has been processed, the labels associated with the orders are stored on the DSL data file, and the number of orders in the scenario is stored in UBT.

(3) Block L2000. The number of orders associated with the battle is stored in the UBT array.

(4) Block L2100. The unit scenario or battle paragraph orders stored in OARY are put on to the DSL data file and the record pointer (RECPT) is updated.

21. ROUTINE PASS2:

a. Purpose. This routine processes the second pass necessary to complete the compilation. During this pass, the alphanumeric labels stored by the first pass of the compiler, are converted to the numeric position of the order associated with the label. Some error checks are also made by the routine.

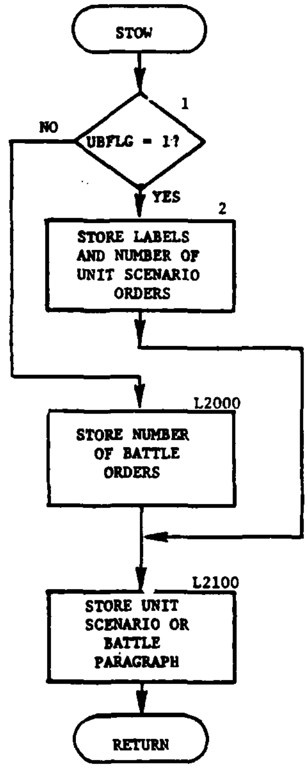


Figure III-2-B-15. Routine STOW

b. Input Variables. DSL common variables. NFERR, NWERR, UBT, UNTPT, BATPT, OARY, LABEL, ORDFIL, and OUT.

c. Output Variables. DSL common variables NFERR and NWERR.

Name	Destination	Contents
OARY	DFORDFIL	Unit scenario or battle paragraph orders.

d. Logical Flow (Figure III-2-B-16):

(1) Block 1. If UNTPT is less than one, no unit scenarios were processed and control is transferred to block L1450.

(2) Block 2. The next unit scenario and its labels are retrieved from the DSL data file. Each order is checked to determine if it contains a label. If it does, the label array is searched for a match. If a match is found, the alphanumeric value of the label in the order is replaced by its numeric position in the label array. If the label is not in the label array, an error message is printed.

(3) Block 3. The engage order is preceeded by an advance order. If another relationship occurs, an error message is printed.

(4) Block L1270. Each order is checked to determine if it contains a battle identification. If it does, CHCKID is called to determine if a battle paragraph was input for a battle of that name.

(5) Block L1300. The processed order array is restored in the DSL order file.

(6) Block L1400. If another unit scenario is to be processed, control is transferred to block 2; otherwise, block L1450 is executed.

(7) Block L1450. The battle paragraph of the next battle to be processed is read and the orders are scanned to determine those that contain conditionals or unit scenario labels. The locations of orders containing labels are stored in LABEL.

(8) Block L2100. The labels associated with each unit participating in the battle are retrieved from the DSL data file. The alphanumeric labels stored in the battle paragraph are matched with a label in the array; and, if a match is found, the location of the label is stored in the battle paragraph. An error message is written if the label cannot be matched.

(9) Block L2400. If another participating unit is to be processed, control is transferred to block L2100; otherwise, block L2500 is executed.

(10) Block L2500. If another battle is to be processed, execute block L1450; otherwise, return control to the calling routine.

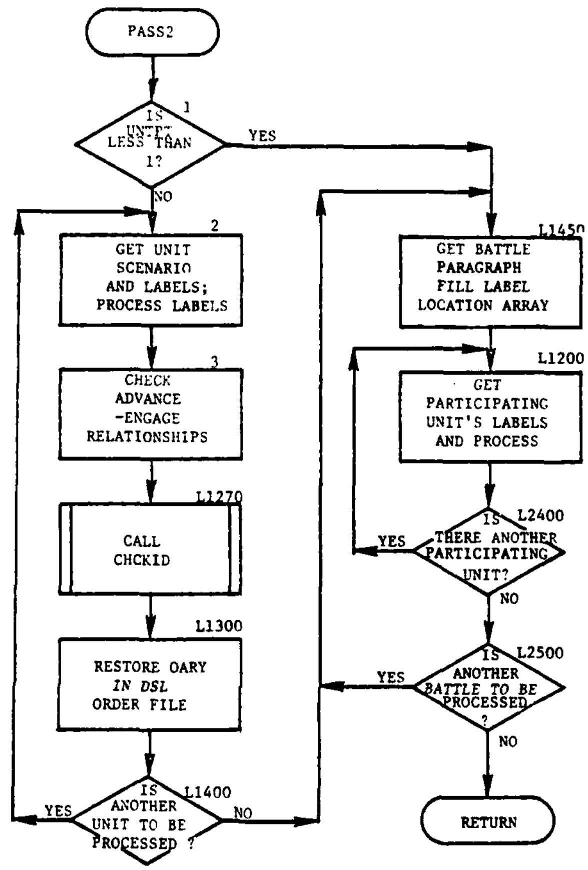


Figure III-2-B-16. Routine PASS2

22. ROUTINE DUMPF:

a. Purpose. This routine is designed to give a formatted dump of the DSL data file. This dump is optional at the time the data are compiled and is obtained by specifying the DEBUG option on the DSL card.

b. Input Variables:

(1) DSL Common Variables. ORDFIL and OUT.

(2) Data File Variables. PERDAY, PERHR, PERMIN, UBT, UNTPT, BATPT, OARY, JOA, LABEL, RECPT, and the length of period.

c. Output Variables. The input variables listed above are output to the line printer.

d. Processing Description:

(1) The first portion of the routine calls PAGE to eject the page and write the page title. PAGE writes the time the period begins, the length of period, start of game/start of period flag, UNTPT and BATPT. A description of the formats used to write the engineer orders, airmobile orders, conditionals, and other orders is written.

(2) The next portion of the routine reads each unit scenario and its labels, scans each order in the scenario, and prints the order and the appropriate label using a format described above.

(3) The last portion of the routine reads the orders for each battle paragraph, prints the list of participating units, and prints the conditional and labels list with appropriate formats.

23. ROUTINE PAGE:

a. Purpose. This routine writes a new DSL period page header and page number at the top of each new DSL compilation page.

b. Input Variables. DSL common block variables LNCNT, MXLN, PGNO, PERDAY, PERHR, PERMIN, PERED, PEREH, and PEREM.

c. Output Variables. DSL common block variables. PGNO and LNCNT.

d. Logocial Flow (Figure III-2-B-17):

(1) Block 1. If the line counter (LNCNT) is less than the maximum number of lines (MXLN), control returns to the calling routine, otherwise, block 2 is executed.

(2) Block 2. The page number (PGNO) is incremented by one and the line counter (LNCNT) is reset to zero.

(3) Block 3. The DSL compilation page header and page number is written.

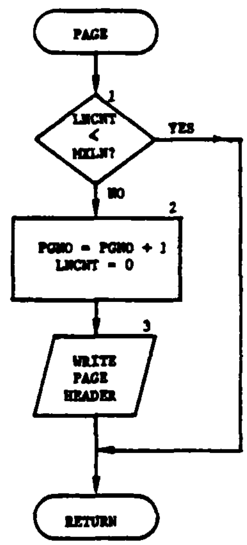


Figure III-2-B-17. Routine PAGE

24. ROUTINE TIME:

a. Purpose. This routine converts the character time expressed in days, hours, and minutes, or as six digits, to an integer time in centiminutes.

b. Input Variables:

(1) DSL Common Block Variables. ISTMT, STMT, IALPH, PERBG and NFERR.

(2) Other Variables:

Name	Source	Contents
LOC	Call	Pointer to the first character following the first numeric field.
IF	Call	Fatal error test indicator: IF = 0, do not check, less than PERBG IF = 1, check, less than PERBG.
IVAL	Call	Integer value of first numeric character.

c. Output Variables:

(1) DSL Common Block Variables. NFERR and ISTMT.

(2) Other Variables:

Name	Destination	Contents
LOC	Call	POINTER to second character following last numeric field.
ITIME	Call	Time in centiminutes.

d. Logical Flow (Figure III-2-B-18):

(1) Block L31. Determine if the characters following the first numeric value are DA, HO, HR, or MI. If they are, the corresponding value (ID, IH, or IM) is set equal to IVAL; otherwise, the time is assumed to be in the six-digit format and block L1 is executed.

(2) Block L1. IVAL is divided into day, hour, and minute values. The day, hour, and minute values are converted to centiminutes and summed.

(3) Block 2. FINDN is called and returns the location of the next numeric character.

(4) Block 3. IBCD is called and returns the integer value of the numeric characters found by FINDN.

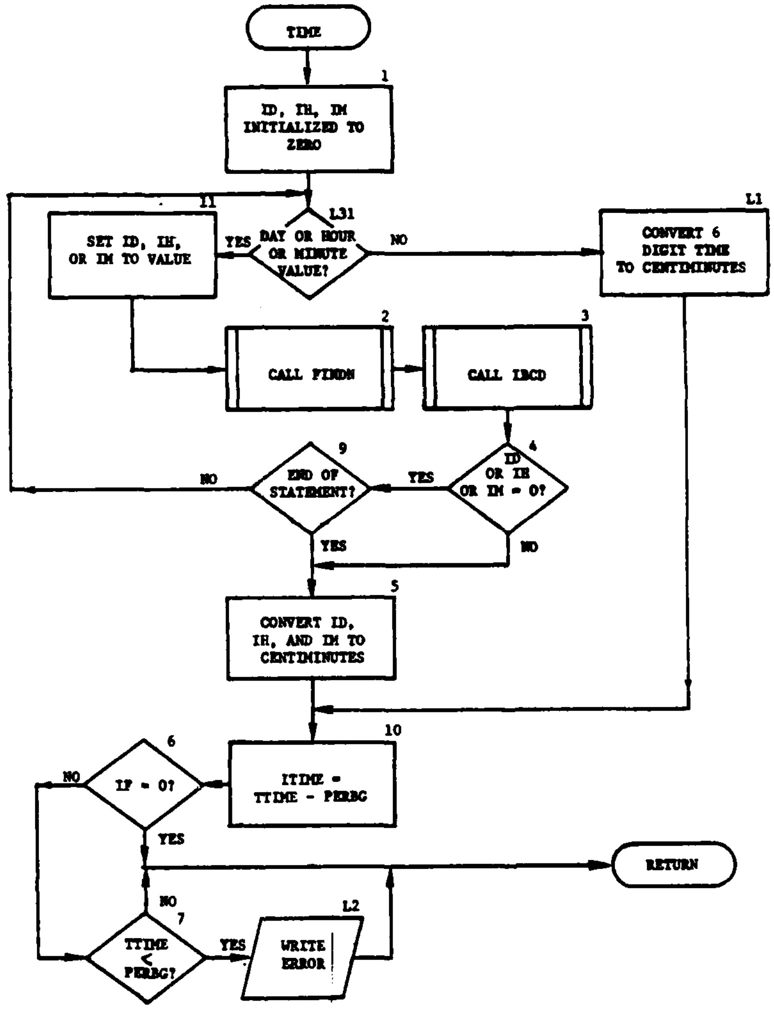


Figure III-2-B-18. Routine TIME

(5) Block 4. The values of ID, IH, and IM are checked. If any value is equal to zero, block 9 is executed; otherwise, control goes to block 5.

(6) Block 9. If the end of the statement has not been reached, execute block L31.

(7) Block 5. The day, hour, and minute values (ID, IH, and IM) are converted to centiminutes and summed.

(8) Block 10. The time the period began (in centiminutes) is subtracted from the time calculated and the result is stored in ITIME.

(9) Block 6. The value of IF is checked. If IF is nonzero, block 7 is executed; otherwise, control is returned to the calling routine.

(10) Block 7. If the time in centiminutes is less than PERBG, block L2 is executed; otherwise, control is returned to the calling routine.

(11) Block L2. The number of fatal errors (NFERR) is incremented by one, and an error message stating that the time is prior to the beginning of the period is written.

25. ROUTINE CHCKID:

a. Purpose. This routine checks the unit identification to determine if it begins with B or R and contains eight characters. It also checks to determine if the unit exists, is a resolution unit, and is not a duplicate unit. Battle identifications are checked to determine if any name contains more than eight characters and if the battle is duplicated.

b. Input Variables.

(1) DSL Common Block Variables. UNTPT, BATPT, IBLNK, UBT, UBFLG, UBID, NFERR, and NWERR.

(2) Common TWO Variable. UNTLOC.

(3) Other Variables:

Name	Source	Contents
IFLG	Call	Flag indicating type of checking requested on UB. 0 = UID - check for duplication check for eight characters check for B or R in first character check for resolution unit. BID - check for duplication.

Name	Source	Contents
		1 = check UID only for 8 characters and B or R in first character. 2 = check to see if BID is in UBT.
UB	Call	Containing unit or battle identification to be checked (double precision).

c. Output Variables.

(1) DSL Common Block Variables. NFERR, NWERR.

(2) Other Variables. None.

d. Logical Flow (Figure III-2-B-19):

(1) Block 1. The value of IFLG determines the type of check to be made. If IFLG is equal to zero, block L19 is executed. Block L2 is executed if IFLG is equal to one and block 2 is executed if IFLG is equal to two.

(2) Block L2. The unit identification is checked to verify that it contains eight characters. Block L8 is executed if the unit identification does not contain eight characters.

(3) Block L91. The first character of the unit identification is checked. Block L9 is executed if the first character is not B or R.

(4) Block 3. If IFLG is equal to one, control is returned to the calling routine. Block 4 is executed if IFLG is not equal to one.

(5) Block 4. Routine IUIDF returns the identification number of a unit. Block 5 is executed if the subscript is greater than one and block L15 is executed if the subscript is equal to zero.

(6) Block 5. If the unit's location is equal to zero, block L10 is executed. Control is returned to the calling routine otherwise.

(7) Block L19. Block L22 is executed if UBFLG is equal to one; otherwise, block L21 is executed.

(8) Block L22. UBID is checked to determine if the unit identification is a duplicate. Block L7 is executed if the unit is a duplicate; otherwise, block L2 is executed.

(9) Block L21. UBID is checked to determine if the battle identification is a duplicate. Block L4 is executed if it is a duplicate, or block 2 is executed if it is not.

(10) Block 2. If the ninth character of the battle identification is not a blank, the identification is greater than eight characters and block L14 is executed. If it is a blank, control is returned to the calling routine.

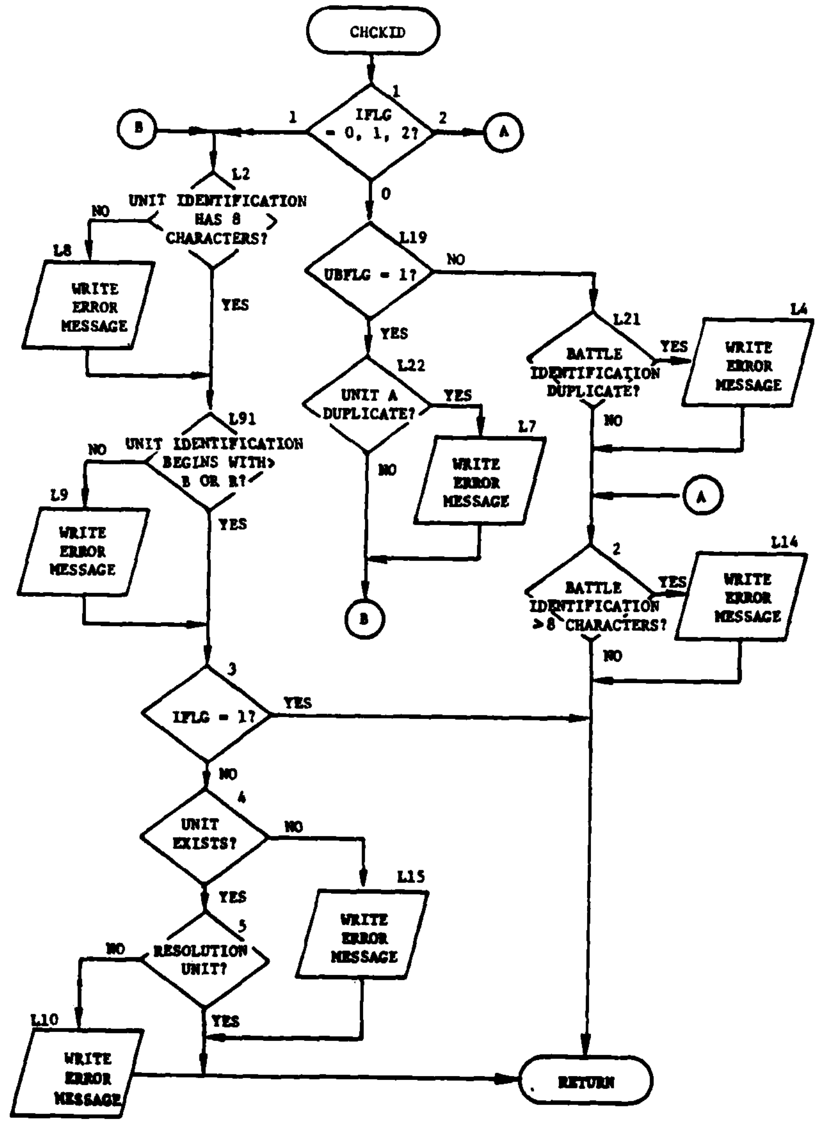


Figure III-2-B-19. Routine CHCKID

(11) Block L8. The number of fatal errors (NFERR) is incremented by one, and an error message is written stating the unit identification contains fewer than eight characters.

(12) Block L9. The number of fatal errors (NFERR) is incremented by one, and an error message is written stating the unit identification does not begin with B or R.

(13) Block L15. The number of warning errors (NWERR) is incremented by one, and an error message is written stating the unit does not exist.

(14) Block L10. The number of warning errors (NWERR) is incremented by one, and an error message is written stating the unit is not a resolution unit.

(15) Block L7. The number of fatal errors (NFERR) is incremented by one, and an error message is written stating the unit is a duplicate.

(16) Block L4. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written stating the battle is a duplicate.

(17) Block L14. The number of fatal errors (NFERR) is incremented by one, and a fatal error message is written stating the battle identification contains more than eight characters.

26. ROUTINE IUIDF:

a. Purpose. This routine scans the list of units (UIDTAB) and returns the location of the unit identification input to it.

b. Input Variables:

(1) Standard Common Block Variables. UIDTAB, BPOINT, and RPOINT.

(2) Other Variables.

Name	Source	Description
NUID	Call	Unit identification to be matched.

c. Output Variables:

Name	Destination	Description
IUIDF	Call	Location in UIDTAB of NUID.

d. Processing Description. The routine determines if the unit is Blue or Red force. Using this information it initiates a search loop from one to BPOINT or RPOINT to 1000. If the unit identification input is matched in the list of units (UIDTAB), its location is returned in IUIDF; otherwise, a zero is returned. If the unit identification input (NUID) has a first character that is neither B nor R, an error message is printed and a zero is returned

27. ROUTINE MATCH:

a. Purpose. This routine searches for a string of characters in STMT that matches a string of characters in MDFX.

b. Input Variables:

(1) DSL Common Block Variables. STMT, ISTMT, IBLNK, and IPER.

(2) Other Variables:

Name	Source	Contents
MDFX	Call	Array of character strings to be matched (one character per word, left justified, blank filled).
NM	Call	Number of character strings.
MXC	Call	Index of STMT where search will end.

c. Output Variables:

(1) DSL Common Block Variable. ISTM (pointing to the last character processed).

(2) Other Variables:

Name	Destination	Contents
IFND	Call	Pointer to the string matched: 0 = no match was found 1 = a period was encountered.

d. Logical Flow (Figure III-2-B-20):

(1) Block L1000. The statement pointer (ISTMT) is incremented by one so it points to the character being analyzed.

(2) Blocks 1 and L7000. A check determines if the character being analyzed is a period. If it is, block L7000 sets IFND equal to negative one.

(3) Blocks 2 and 3. It is determined whether the character being analyzed is equal to the first character of a string in MDFX. If it is not equal, the index of MDFX is incremented to the next string.

(4) Blocks 4, L2010, and 5. A check determines if the next three characters in STMT are equal to the next three characters of the string in MDFX. If they are equal, IFND is set equal to the pointer of the string matched in MDFX and ISTMT is set equal to the pointer to the last character processed.

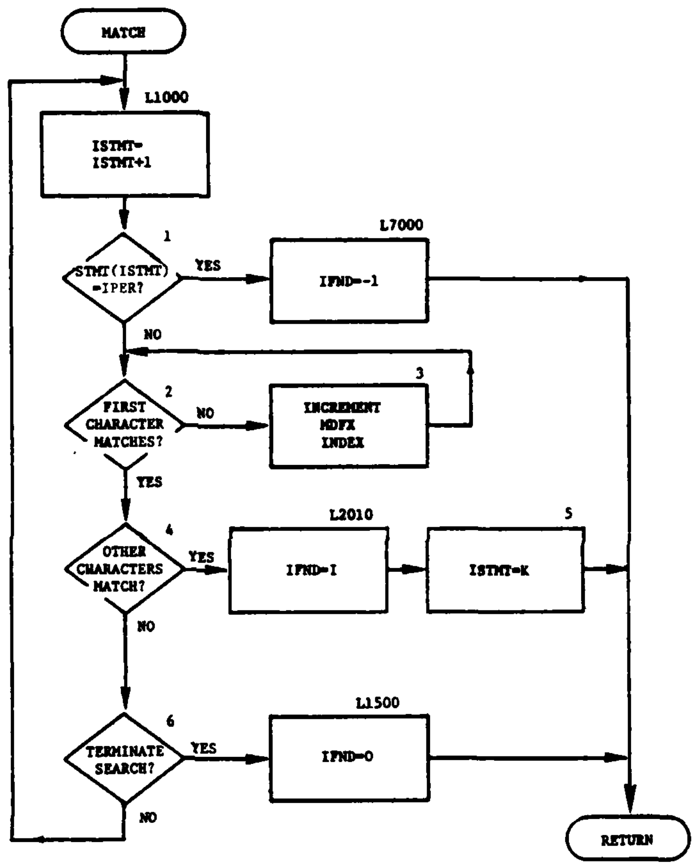


Figure III-2-B-20. Routine MATCH

(5) Blocks 6 and L1500. A check determines if the search is terminated (MXC -1 > ISTMT). If so, IFND is set equal to zero.

28. ROUTINE FINDN:

a. Purpose. This routine locates the next numeric character in a string of characters and returns a constant containing the number of nonnumeric characters encountered before a numeric was encountered.

b. Input Variables:

(1) DSL Common Block Variables. IPER and INGR.

(2) Other Variables:

Name	Source	Contents
S	Call	Array containing the character string.

c. Output Variables:

Name	Destination	Contents
N	Call	Number of nonnumeric characters encountered before a numeric was encountered.

d. Logical Flow (Figure III-2-B-21):

(1) Block 1. Character S(N) is checked to determine if it is a period. If S(N) is a period, block 3 is executed; if not, block 2 is executed.

(2) Block 2. If S(N) is numeric, block 4 is executed; if not, block 5 is executed.

(3) Block 3. The value of N is set to negative one.

(4) Block 4. One is subtracted from the value of N.

(5) Block 5. N is incremented by one.

29. ROUTINE EXPAND:

a. Purpose. This routine expands and unpacks the number of character strings that are stored in the array M to the array MX.

b. Input Variables.

Name	Source	Contents
M	Call	Array containing original character strings four characters per word, left justified, and blank filled.
N	Call	Number of character strings.

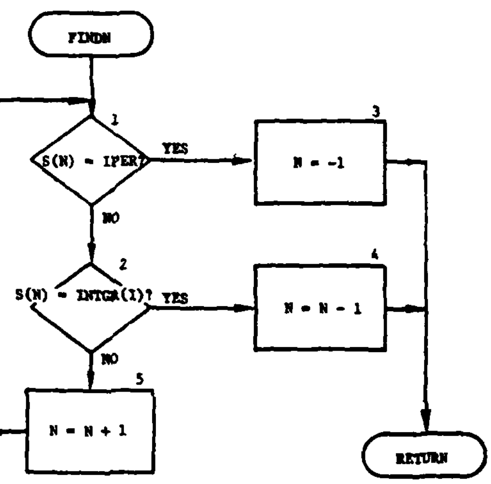


Figure III-2-B-21. Routine FINDN

c. Output Variables.

Name	Destination	Contents
MX	Call	Array containing character strings (one character per word).

d. Processing Description: EXPAND calls MVCHAR four times for each string and stores one character in one word of MX during each call.

30. ROUTINE IBCD:

a. Purpose. This routine converts numeric characters to an integer value and returns the integer value, the number of characters converted, and the statement pointer.

b. Input Variables:

(1) DSL Common Block Variables. STMT and INTGR.

(2) Other Variables:

Name	Source	Contents
ISTM	Call	Pointer to the first numeric character to be converted in STMT.

c. Output Variables:

Name	Destination	Contents
ISTM	Call	Pointer to first nonnumeric character encountered.
NC	Call	Number of numeric characters encountered.
IR	Call	Integer value of converted characters.

d. Processing Description. NC and IR are initialized to zero. Each numeric character encountered is converted by multiplying the previous value of IR by 10 and adding the value of the new character. Each time a numeric is encountered NC and ISTM are incremented by one.

31. ROUTINE RBCD:

a. Purpose. This routine converts numeric characters to real values and returns the real value, the number of characters converted, and the statement pointer.

b. Input Variables:

(1) DSL Common Block Variables. STMT and INTGR.

(2) Other Variables:

Name	Source	Contents
ISTM	Call	Pointer to the first numeric character to be converted in STMT.

c. Output Variables:

Name	Destination	Contents
ISTM	Call	Pointer to first nonnumeric character encountered.
NC	Call	Number of numeric characters encountered.
R	Call	Real value of converted characters.

d. Processing Description. NC and R are initialized to zero. Each numeric character encountered is converted by multiplying the previous value of R by 10 and adding the value of the new character. Each time a numeric is encountered NC and ISTM are incremented by one.

APPENDIX C

DIVWAG SCENARIO LANGUAGE COMPILER OUTPUT DESCRIPTIONS

1. INTRODUCTION. This appendix contains samples and detailed descriptions of printed output from routines within the DIVWAG Scenario Language (DSL) Compiler of the Orders Input Processor. A figure depicts the format of each routine's print statements. In the figure, an alphabetical character (descriptor) designates an appropriate line, group of lines, or column that is explained in the following paragraphs.

2. ROUTINE DSLINT. This printed output (Figure III-2-C-1) is a listing of the DIVWAG file name table. Column 1 lists the number of the file; column 2 contains the starting address of the file; column 3 contains the number of words per record; and column 4 contains the number of records in the file.

3. ROUTINE RDSTMT. Routine RDSTMT lists the input cards as they are read. Figure III-2-C-2 illustrates several different kinds of input cards:

Output Descriptor	Explanation
A	The DSL control cards are listed in this group. The first card contains the debug option; the second card indicates this period is to start at day 1, hour 5, and minute 0; and the third card sets the period length to 150 minutes.
B	This printout contains examples of unit scenarios. The Blue force unit, B1011ZAR, has two MOVE orders followed by a PREPARE order. The Red force unit, R1330ZTK, has a PREPARE order contingent upon a conditional, a pseudo order GOTO also contingent upon a conditional, an ADVANCE order, an ENGAGE order, and a second PREPARE order. Its scenario also contains a COMMENT and two labeled order.
C	The battle MECH3 will involve the units R2110ZTK, R2120ZTK, R2130ZTK, and B8001ZAR which will execute orders labeled M3, M3, M3, and M1 in their respective unit scenarios when game time exceeds day 1, hour 5, and 14 minutes.

4. ROUTINE PAGE. This routine positions the printer at the top of the next page and prints the header shown in Figure III-2-C-3.

5. ROUTINE PASS2. This routine prints the following message:

PASS2 DIAGNOSTICS

It is printed at the top of the page as an indication that the routine has been entered and to separate any diagnostic print from the listing of the data input cards.

		FNT	
1	27393	512	1000
2	2558442	35	4250
3	1213610	10	15001
4	893273	9	3333
5	0	0	0
6	566273	10	400
7	1930483	300	52
8	1363620	3200	1
9	1976383	1000	5
10	0	0	0
11	976222	512	249
12	2149842	35	3000
13	1366820	401	401
14	1984583	20	950
15	1981383	200	16
16	2129842	20000	1
17	1103710	700	157
18	2462442	6	1000
19	2003583	120	50
20	956222	20	1000
21	539393	256	105
22	2707192	752	20
23	2054376	25	200
24	1946083	1212	25
25	257	27092	1
26	1527621	72	616
27	1571973	112	1000
28	2009583	189	237
29	920570	215	72
30	2722232	2149	23
31	2059376	10	4195
32	0	0	0
33	0	0	0
34	0	0	0
35	0	0	0
36	936122	20100	1
37	2468442	60	1500
38	0	0	0
39	2101326	14253	2
40	0	0	0
41	1824043	340	84
42	1852603	680	21
43	1866883	3400	4
44	1880483	100	500
45	1683973	35	4002
46	0	0	0
47	0	0	0
48	2254842	1212	50
49	0	0	0
50	570273	202	1000
51	772273	1000	2
52	774273	202	500
53	875273	24	750
54	0	0	0
55	2315442	21	7000
56	0	0	30

Figure III-2-C-1. Routine DSLINT Printed Sample Output

```
(A)  DSL,DEBUG.
     START OF GAME% 01 DAY 05 HOUR  00 MIN.
     PERIOD LENGTH% 150 MIN.
```

```
(B)  ID%R1C117AR.
        MOVE TO 0099300-0099300,0100300-0099000,0102100-0098200,0104200-0097300,
        0106900-0095700,0108300-0096000,0109400-0095100,0111900-0095000 BY TRDM.
        MOVE TO 0114700-0095300,0116300-0096200,0118400-0095600,0120000-0094700,
        BY TRDM.
        PREPARE UNTIL 010731 AT WIDTH 2000-DEPTH 2000.

      ID%R1330ZTK.
     COMMENT% 30 TK BN 30 TKR 1ST TKD / MSN% ATTACK.
       M2%IF TIME GREATER THAN 010514, THEN PREPARE FOR 15 MINUTES
          AT WIDTH 2000-DEPTH 2100.
          IF R1330ZTK EQUIPMENT TYPE 35 LESS THAN 20,THEN GO TO PR.
          ADVANCE TO 0113000-0086000 BY TCCR.
          ENGAGE IN BATTLE MECH2.
       PR%PREPARE UNTIL 010731 AT WIDTH 2100-DEPTH 2100.
```

```
(C)  BATTLE%MECH3.
     SURFACE UNITS%R2110ZTK,R2120ZTK,R2130ZTK,B8001ZAR.
           WHEN TIME GREATER THAN 010514,THEN M3,M3,M3,M1.
```

Figure III-2-C-2. Routine RDSTMT Printed Sample Output

```
           D S L   C O M P I L A T I O N                                  PAGE     7
PERIOD STARTS    1 DAY    5 HOUR    0 MINUTES         ENDS    1 DAY    7 HOUR   30 MINUTES.
```

Figure III-2-C-3. Routine PAGE Printed Sample Output

6. ROUTINE DUMPF. This routine gives a formated dump (Figure III-2-C-4) of the tables generated by the DSL compiler if the DEBUG parameter is specified on the first DSL control card.

Output Descriptor	Explanation
A	The banner line is printed and the day, hour, and minute the period begins and the length of the period are listed.
B	The period type and an explanation of its meaning is listed on the first line. The following lines give the pointers to the last positions used in the unit battle table.
C	All order information is not stored in the same format. Descriptor C lists the various formats used to print the unit scenario orders shown in descriptors F and G. The first column printed by each format (JOA) is the counter indicating the relative record the order is placed in. Column two contains the label associated with the order. If the order was not labeled, that space will be blank. The third column contains the order number (referred to as NORD in the Period Processor), if the value is greater than zero. If the value is a -1 the pseudo order GOTO is indicated. If the value is less than -1 a conditional is stored in that record. A description of the remaining columns is tabulated below for each format type.

Engineer orders, NORD = 42, 43, 44, 45
- BARR-BRID-FAC CODE: code indicating type of engineering structure; 0 = barrier, 1 = bridge or facility
- BID(1): first half of barrier-facility name
- BID(2): second half of barrier-facility name
- PRIORITY: priority of task
- TIME FLAG: 0 = complete by, 1 = begin by
- DESIR/MAND: 0 = desired, 1 = mandatory
- ENG TIME: time in centiminutes

Airmobile orders, NORD = 20, 39, 40, 41
- AT TIME: time associated with order
- NO. OF A/C, NO. TRIPS: value greater than 0 indicates number of trips
- MIX: transport-escort mix code or aircraft item code
- NO. OF ESCORTS: number of aircraft or target number
- OBJX,OBJY: coordinates of mission destination

```
                                                ORDERFILE DUMP FROM ROUTINE DUMPF

    DAY PERIOD BEGINS    1

    HOUR PERIOD BEGINS    5
(A)
    MINUTE PERIOD BEGINS    0

    LENGTH OF PERIOD IN CENTIMINUTES          15000

    PERIOD TYPE    3   1= NORMAL PERIOD,     3= FIRST PERIOD OF GAME
(B) UNTPT=     40 POINTER TO THE LAST UNIT LOADED

    BATPT=  1019 POINTER TO THE LAST BATTLE LOADED


                          FORMAT FOR ENGINEER ORDERS WITH NORD=(42,43,44,45)

    JOA,LABEL,NORD,PARR-BRID-FAC CODE,BID(1),BID(2),PRIORITY,TIME FLAG, DESIR/MAND, ENG TIME

                          FORMAT FOR AIRMOBILE ORDERS WITH NORD=(20,39,40,41)

(C) JOA,LABEL,NORD,AT TIME,NO.A/C>0,NO.TRIPS(0,MIX, NO. OF ESCORTS,OBJX,OBJY

                         FORMAT FOR TRUTH FUNCTION ORDERS,NORD=-1

    JOA,LABEL,NORD,TFCD,TUID(1),TUID(2),CTIME,XLOC,YLOC,AVAL,PVAL,NOT,LOS,IFC
      POINTER-FALSE,POINTER-TRUE

                         FORMAT FOR NORMAL ORDERS NORD=ANYTHING NOT PREVIOUSLY SPECIFIED

    JOA,LABEL,NORD,NTIME,AIRSPD,ALT,DGZX,DGZY,NOR,MUNTPY,IR,HOB,COOPUID,RATIO,OBJX,OBJY,RPRCD,MOVPRTY,
      BLANK,BLANK,POINTER
```

Figure III-2-C-4. Routine DUMPF Printed Sample Output
(Continued on Next Page)

(D)

	UID	PCOUNTER AND NUMO	URECND
1	B80127MI	1	202
2	B80112MI	1	208
3	B80027AP	1	214
4	B80017AR	1	220
5	B10117AR	13	226
6	B10217AP	15	244
7	B10317MI	13	264
8	B10107CA	11	282
9	B1013CAC	1	298
10	B10237AH	2	304
11	B101AWPL	1	311
12	B10AV7BN	1	317
13	B10137AC	12	323
14	B1190FHO	4	340
15	B12RDFHO	4	349
16	B13ACPHO	5	359
17	B5AIRSUP	2	368
18	B1AIRFLT	6	375
19	B5AIRFLT	7	386
20	B1AFRMDP	2	393
21	B1AFRFCF	5	405
22	B2AFRFCF	5	415
23	RFDFORCE	1	425
24	R1010PCN	1	431
25	R13107TK	7	437
26	R13207TK	7	449
27	R13307TK	7	461
28	R14307MI	1	473
29	R14407TK	2	479
30	R2010RCN	1	486
31	R21107TK	7	492
32	R21207TK	7	504
33	R21307TK	7	516
34	R24407TK	1	528
35	R2410ZMI	1	534
36	R10000PS	8	540
37	R20000PS	8	553
38	P1AIRPCN	4	566
39	R2AIRPCN	5	575
40	PF4AIRFT	2	585

(E)

	BID	NUMO AND NUNT	BRECNO
1	LONG	7024	611
2	MECH3	6004	605
3	MECH2	6002	599
4	MECH1A	6002	593
5	MECH1	6002	587

Figure III-2-C-4. Routine DUMPF Printed Sample Output (Continued)

```
ORDERS FOR UNIT 91211ZAR  UNIT NO.    5

 1     3     0     0     0     0.     0.     0      0  0                  98300.     99300.  TRDM
                                                              0          0          0       0
 2     3     0     0     0     0.     0.     0      0  0                 100300.     99000.  TRDM
                                                              0          0          0       0
 3     3     0     0     0     0.     0.     0      0  0                 102100.     98200.  TRDM
                                                              0          0          0       0
 4     3     0     0     0     0.     0.     0      0  0                 104200.     97900.  TRDM
                                                              0          0          0       0
 5     3     0     0     0     0.     0.     0      0  0                 106900.     96700.  TRDM
                                                              0          0          0       0
 6     3     0     0     0     0.     0.     0      0  0                 108300.     96000.  TRDM
                                                              0          0          0       0
 7     3     0     0     0     0.     0.     0      0  0                 109400.     95100.  TRDM
                                                              0          0          0       0
 8     3     0     0     0     0.     0.     0      0  0                 111900.     95800.  TRDM
                                                              0          0          0       0
 9     3     0     0     0     0.     0.     0      0  0                 114700.     95300.  TRDM
                                                              0          0          0       0
10     3     0     0     0     0.     0.     0      0  0                 116300.     96200.  TRDM
                                                              0          0          0       0
11     3     0     0     0     0.     0.     0      0  0                 118400.     95600.  TRDM
                                                              0          0          0       0
12     3     0     0     0     0.     0.     0      0  0                 120000.     94700.  TRDM
                                                              0          0          0       0
13     2  15100    0     0     0.     0.     0      0  0                      0.          0.
                                                              0    2000       2000          0
```

(F)

Figure III-2-C-4. Routine DUMPF Printed Sample Output (Continued)

G

```
ORDERS FOR UNIT R1330ZTK  UNIT NO.    27

1 M2    -3          1400      0.      0.      0.      0. F    1     0           3   2
2        2   -1500     0     0     0.      0.      0          0   0                        0.        0.
                                                                                     0   2000     2100      0
3       -7   R13397TK  0     0.      0.      20.       -1. F   -1    35           5   4
4       -1             0     0.      0.       0.       0. F    0     0            0   7
5        6       0     0     0     0.      0.      0          0   0                    113000.   86000.  TCCR
                                                                                     0     0        0        0
6       15       0     0     0     0.      0.      0          0   0          MECH2         0.        0.
                                                                                     0     0        0        0
7 PR     2   15100     0     0     0.      0.      0          0   0                        0.        0.
                                                                                     0   2100     2100      0
```

H

```
BATTLE MECH3    BATTLE NO.    2
     R2110ZTK  R2120ZTK  R2130ZTK  B8001ZAK

5       -3          1400      0.      0.      0.      0. F    1     0           7   6
6    1   1   1   1     0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

Figure III-2-C-4. Routine DUMPF Printed Sample Output (Concluded)

Output Descriptor	Explanation

Conditionals, value of column 3 is less than zero
- TFCD: conditional code - printed in column 3
- TUID(1): first word of UID
- TUID(2): second word of UID
- CTIME: time associated with conditional
- XLOC,YLOC: X,Y coordinates associated with conditional
- AVAL: amount of equipment item associated with conditional
- PVAL: percent of equipment item associated with conditional
- NOT: value is true if negator appears in conditional
- LOG: logical variable indicator; 1 = less than, 0 = equal to, +1 = greater than
- IEC: equipment item code

Other orders
- NTIME: time in centiminutes, negative if data were from FOR modifier
- AIRSPD: air speed
- ALT: altitude
- DGZX,DGZY: designated ground zero X and Y coordinates
- NOR: number of rounds
- MUNTPY: munition type
- IR: impact radius
- HOB: height of burst
- COOPUID: UID of cooperating unit
- BATID: battle identification
- OBJX,OBJY: coordinates of destination
- RRRCD: travel mode mnemonic or reconnaissance by code
- MOVPRTY: priority of movement

The last two columns printed are reserved for pointers to other orders; they contain nonzero values for all conditionals, and the last column will be nonzero for the pseudo order GOTO.

D — Descriptor D lists the unit portion of the unit battle table. Column 1 numbers the units as they are listed and also serves as a page index to the following printout. Column 2 contains the unit identification; column 3 contains integers indicating the number of DSL data file records required to store the unit scenario; and the fourth column contains the number of the first record used to store the scenario.

E — The format of the battle portion of the unit battle table listed in group E is similar to that of the unit portion. Again, column 1 numbers the battles and serves as a page index to that portion of the following printout. Column 2 contains the identification of the battle. Column 3 contains

Output Descriptors	Explanation
	two variables packed in each word. The rightmost three digits indicate the number of units involved in the battle, and the remaining digits denote the number of records required to store the battle paragraph information. Column 4 contains the record number of the first record used to store that battle paragraph.
F	Group F is a formatted dump of the table generated from the orders contained in the unit scenario of unit B1011ZAR. It is unit number 5 in the directory table listed in descriptor D and it's unit scenario is listed in RDSTMT (descriptor group B, Figure III-2-C-2). As indicated by the last print format described in descriptor C, the first column is a counter of the records used to store the orders. The second column is blank. The third column gives the order number (NORD). The fourth column contains meaningful information only in the thirteenth record. The value listed is the number of centiminutes from the start of the period to the time input in the PREPARE order. The last three columns contain the X and Y coordinates and the travel mode mnemonic respectively. It should be noted that one record is generated for each coordinate pair in each MOVE order.
G	Group G lists the table generated from the unit scenario of R1330ZTK unit number 27 in the directory. Again, column 1 is the record counter. Column 2 contains the labels of the labeled orders. Column 3 contains order codes. The positive numbers are NORDs and the negative numbers indicate a conditional or a GOTO pseudo order. This column also serves as an index to the format descriptions listed in descriptor group C.
H	This group lists the information stored for battle MECH3. Its battle paragraph is listed in RDSTMT (descriptor C, Figure III-2-C-2). The second line contains a list of the units participating in the battle. The remaining lines list the conditionals and the associated labels. Note that the record count in column one begins with 5; the first four records are reserved for the list of participating units, and record number 5 is the time conditional. The last two columns listed for a conditional contain the record numbers to be transferred to (i.e., if the conditional is false or true respectively). Record 6 now contains the record numbers of the orders that the participating units are to execute if the battle is terminated by this conditional.

APPENDIX D

SOURCE LISTINGS FOR ORDERS INPUT PROCESSOR DIVWAG SCENARIO LANGUAGE COMPILER

(AVAILABLE UNDER SEPARATE COVER)

NOTES

CHAPTER 3

OPERATING INSTRUCTIONS

1. INTRODUCTION. The Operating Instructions (OPERINS) loader provides a means for the gaming staff to interject, at the beginning of a period of simulated combat, certain items for the control of ground-based sensors, for the introduction of intelligence from sources beyond the scope of the sensors simulated within the DIVWAG Period Processor, and for the control of fire support allocation. Operating Instructions input must be provided for the initial period of a game to initialize ground-based sensors and fire support allocation control and may be provided for any following game period.

2. GROUND-BASED SENSORS. The classes of ground-based sensors for which Operating Instructions are required include moving target indicator (MTI) radars, countermortar and counterbattery (CM/CB) radars, air defense (AD) radars and unattended ground sensor (UGS) fields. Basic hardware characteristics of these classes of sensors are loaded within the Intelligence and Control Model constant data base (Section IV, Chapter 6, Appendix A). Operating Instructions identify individual radars and unit ground sensor fields as to their locations, operational constraints that are expected to vary in the course of a game, and composition for UGS fields.

3. INTRODUCTION OF INTELLIGENCE. Collection of information concerning the enemy force is simulated within the DIVWAG system for selected ground-based and aerial sensors typically available to the committed forces. Explicit simulation of all potential sources of information is not attempted. Through the use of Operating Instructions, the gaming staff may introduce additional information concerning the opposing forces. Such information may be routed through the information processing areas of the Intelligence and Control Model and/or through fire support allocation areas of the model at the discretion of the gaming staff.

4. FIRE SUPPORT ALLOCATION CONTROL. Operating Instructions allow the gaming staff to set the most critical parameter used within the system to control the allocation of fire support and to define the number and type of tactical air sorties available to the respective forces.

NOTES

APPENDIX A

OPERATING INSTRUCTIONS DATA INPUT REQUIREMENTS

1. SENSOR CONTROL. The DIVWAG system will simulate up to 100 model sensors for each opposing force where a model sensor is an individual moving target indicator (MTI), countermortar/counterbattery (CM/CB), or air defense (AD) radar or an unattended ground sensor (UGS) field. Each such model sensor is defined to the DIVWAG system through the use of the OPERINS loader. A distinct card format is required for each type sensor as discussed below. Certain data items, including a sensor code, unit identification (UID) of first node, sensor index, sensor reference number, and sensor status code are common to all card formats.

a. Data Common to All Sensors:

(1) Sensor Code. Each generic type sensor is identified by a sensor code which appears on all sensor control data cards. Permissible values of this code and interpretations are:

02 = short range MTI radar
03 = medium range MTI radar
04 = long range MTI radar
05 = continuous tracking type CM/CB radar
06 = dual beam type CM/CB radar
07 = UGS field
08 = AD radar.

(b) UID of First Node. Each sensing report is passed, within the Intelligence and Control Model, through an intelligence communications network for decisions and processing. (See Section IV, Chapter 6 for a detailed discussion.) Nodes within this network are battalion, brigade, or division level command units. This entry identifies the unit that is nominally in control of the sensor being specified. Each sensor will use the unit so identified as the entry point into the network for all sensing reports generated by that sensor. The UID is the eight-character alphanumeric unit identifier of the unit to be specified. This unit must have a maneuver type unit type designator (UTD); that is, the third character of this unit's UTD must be M.

(c) Sensor Index. If a given unit (UID) is responsible for more than one MTI radar, more than one CM/CB radar, more than one AD radar, or more than one UGS field, the sensor index is used to determine to which radar or UGS field the OPERINS data applies. A sequence of sensor indexes, starting with 1, must be assigned to each group of model sensors that is composed of elements from one of the above categories and shares the same first node UID. For example, if a given unit controlled three MTI radars, one CM/CB radar, and six UGS fields; the sensor indexes applied to the MTI radar would be 1, 2, and 3; to the CM/CB radar 1; and to the UGS fields 1, 2, 3, 4, 5, and 6.

(d) Sensor Reference Number. Hardware characteristics of each type sensor are defined using the Intelligence and Control Model constant data load routines (see Section IV, Chapter 6, Appendix A). These routines assign a reference number to each type sensor. This reference number is used to specify within OPERINS data the piece of hardware desired. The reference number is obtained from the printed output of the Intelligence and Control load routines.

(e) Sensor Status Code. Allowed values of the sensor status code are:

1 = available
2 = tracking
3 = inoperative.

The status code is set dynamically to appropriate values by the Intelligence and Control Model. An entry of 1 using OPERINS data will permit full play of the sensor during the course of the period. An entry of 2 or 3 made by OPERINS is not reset by the Intelligence and Control Model and will effectively turn off the sensor through the course of the period.

b. MTI Radar. The essential hardware characteristics of this type radar are entered in the constant data input. These performance characteristics are not changed during the entire game. The operating instructions, which the gamer is expected to give, are those that deal with operating constraints and changes in the situation as the battle progresses. This card format must be prepared for each sensor played either to define the sensor initially or to change a previously defined sensor's location, status, and orientation. There are two segments in the input card format, illustrated in Figure III-3-A-1. The first segment, columns 1 through 18, identifies a specific radar and associates its operating unit with identification details. The second segment, columns 20 through 66, specifies the location and other operating parameters.

(1) Sensor Code (Columns 1-2). Each generic type sensor is identified by a sensor code. For MTI radar, enter the value 02 (short range), 03 (medium range), or 04 (long range).

(2) UID of Controlling Unit (Columns 4-11). Enter the eight-character UID of the unit that is to receive reports from this sensor. (This must be a unit having an M as the third character of its UTD.)

(3) Unique Sensor Index (Columns 13-14). When the controlling unit is responsible for more than one MTI radar, this index is used to discriminate among the radars. The index must be assigned serially, starting with 1 for the first MTI radar under this unit, 2 for the next MTI radar, etc. In relocating or reorienting a radar, this index is used to decide which radar to move, should a unit be responsible for more than one. The entry is right justified.

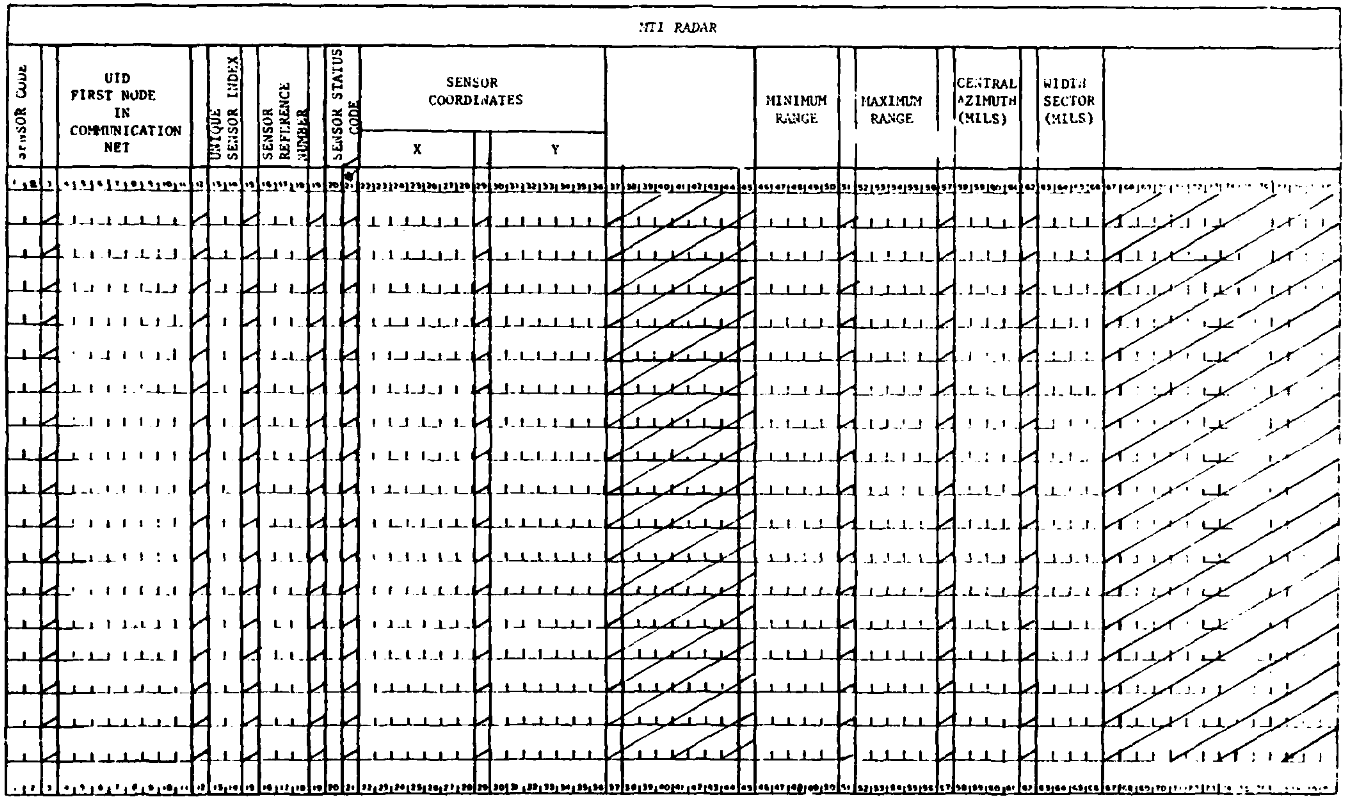


Figure III-3-A-1. Moving Target Indicator Radar Card Format

(4) Sensor Reference Number (Columns 16-18). Each specific type of sensor hardware is parametrically defined within the constant data input on the Intelligence and Control Model data file. In the process, a reference number is assigned by the data load program. Enter this number, obtained from the load program's printed output.

(5) Sensor Status Code (Column 20). The status of the radar at the beginning of the game or period is to be entered in this card column.

(6) Sensor Coordinates (Columns 22-36). Enter the seven-digit X and Y coordinates of the sensor right adjusted in appropriate columns. Leading zeros are not required.

(7) Assigned Area of Search (Columns 46-66). The area of search to be assigned to an MTI radar is specified by the entries on columns 46-66. Columns 46-50 and 52-56 contain the minimum and maximum ranges, respectively, of the assigned search area, in meters. Columns 58-61 contain the orientation, or central azimuth, of the assigned search sector, measured clockwise in mils from grid north. Columns 63-66 contain the width of the assigned search sector, in mils. These values must not exceed hardware characteristics as loaded in the Intelligence and Control Model constant data.

c. CM/CB Radar. The hardware characteristics of this type radar were entered in the constant data input. These characteristics are not changed during the entire game. The data on countermortar/counterbattery radar loaded as Operating Instruction are those that deal with operating constraints and changes in the situation as the battle progresses. A card in this format (Figure III-3-A-2) must be prepared for each sensor played either to define the sensor initially or to change a previously defined sensor's location status or orientation.

(1) Sensor Code (Column (1-2). Each generic type sensor is identified by a sensor code. For a single beam continuous tracking CM/CB radar, set the code to 5. For a dual beam CM/CB radar, set the code to 6. The entry must be right justified.

(2) UID of First Node in Communication Net (Columns 4-11). Enter the eight-character UID of the unit that will be the first node in a communication network from this specific radar site. This unit must be a maneuver unit (i.e., have the character M in the third character of the UTD).

(3) Unique Sensor Index (Columns 13-14). When this receiving node has more than one CM/CB radar reporting to it, this index is used to discriminate among the radars. The index must be assigned serially, starting with 1 for the first CM/CB radar reporting to this unit, 2 for the second, etc. In relocating or reorienting a radar, this index is used to decide which radar to move or reorient, should the unit have more then one reporting to it. The entry must be right justified.

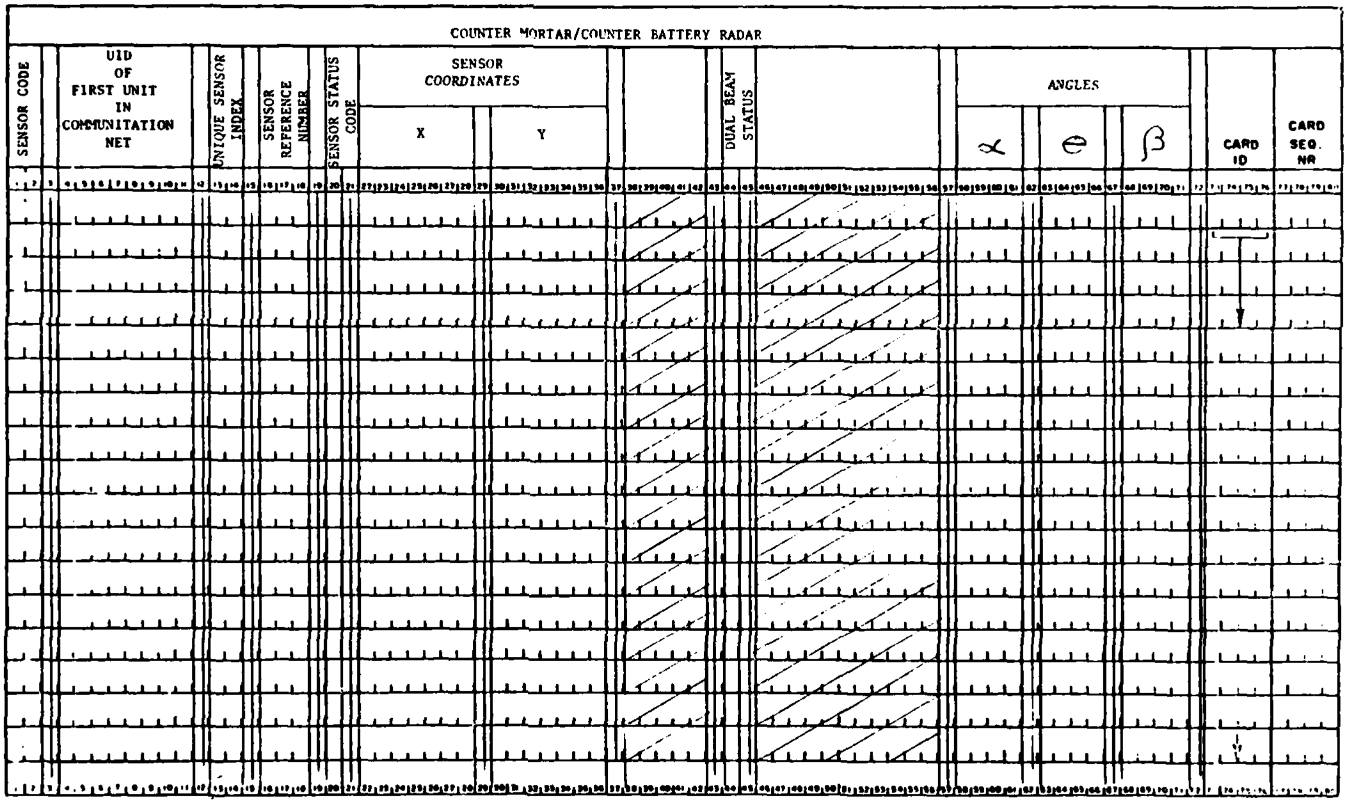


Figure III-3-A-2. Countermortar/Counterbattery Radar Card Format

(4) Sensor Reference Number (Columns 16-18). Each specific type of sensor hardware is parametrically defined within the constant data input on the Intelligence and Control Model data file. In the process, a reference number is assigned by the data load program, and it is this number that is required here to tie this particular radar to a set of hardware data.

(5) Sensor Status Code (Column 20). The status of the radar at the beginning of the game or period is to be entered in this card column. Entering a 2 or 3 will preclude the radar from detecting and recognizing targets during the course of the period. Entering a 1 will permit full play of the radar during the course of the period.

(6) Sensor Coordinates (Columns 22-36). Enter the seven-digit X and Y coordinates of the sensor. The entry must be right justified, and leading zeros are not required.

(7) Dual Beam Status (Column 44). This is a status code for dual beam CM/CB radars only (i.e., sensor code 6). This flag is used to indicate the desired operational status of the radar. Possible entries are:

0 = monitor low angle fire only
1 = monitor high angle fire only
2 = switch back and forth to monitoring
low and high angle fire.

The radar must have this capability.

(8) Center Azimuth, α (Columns 58-61). This the orientation or center azimuth of the search sector, measured in mils from grid north. Entry must be right justified.

(9) Search Sector, θ (Columns 63-66). This is the assigned search sector width, in mils. If this search sector is more than two times the sector coverage capability of the hardware (see beam description variables in Appendix A to Chapter 6 of the Period Processor, Section IV for Countermortar/Counterbattery Radars), there will be a coverage gap in the center of the assigned search sector. Entry must be right justified.

(10) Site Mask Angle, β (Columns 68-71). This is the site mask angle measured in mils, and it must be right justified in the field.

d. AD Radar. Hardware characteristics of the radars are entered in the Intelligence and Control Model constant data files (see Section IV, Chapter 6, Appendix A). These hardware characteristics are not to be exceeded by those in the Operating Instructions input. The operating instructions that the gamer is expected to provide on AD sensors are those that deal with operating constraints and changes in the situation as the battle progresses. This card format must be prepared for each AD radar to be played. Format of the input card is shown on Figure III-3-A-3.

(1) Sensor Code (Columns 1-2). Each generic type of sensor is identified by a sensor code. For AD radar, enter the value 08.

AIR DEFENSE RADAR													
SENSOR CODE	UID FIRST NODE IN COMMUNICATION NET	UNIQUE SENSOR CODE	SENSOR REFERENCE NUMBER	SENSOR STATUS CODE	X-COORDINATE	Y-COORDINATE	ELEVATION	MINIMUM RANGE	MAXIMUM RANGE	HORI-ZONTAL CENTRAL AZIMUTH (MILS)	HORI-ZONTAL WIDTH OF SECTOR (MILS)	VERTI-CAL CENTRAL AZIMUTH (MILS)	VERTI-CAL WIDTH OF SECTOR (MILS)

Figure III-3-A-3. Air Defense Radar Card Format

(2) UID of First Node in Communication Net (Columns 4-11). Enter the eight-character UID of the unit that will be the first node in a communication network from this specific radar site. This unit must be a maneuver unit (i.e., have the character M in the third character of the UID).

(3) Unique Sensor Index (Columns 13-14). When this receiving node has more than one AD radar reporting to it, this index is used to discriminate among the radars. The index must be assigned serially, starting with 1 for the first AD radar reporting to this unit, 2 for the second, etc. In relocating or reorienting a radar, this index is used to decide which radar to move or reorient, should the unit have more than one reporting to it. The entry must be right justified.

(4) Sensor Reference Number (Columns 16-18). Each specific type of sensor hardware is parametrically defined within the constant data input on the Intelligence and Control Model data file. In the process, a reference number is assigned by the data load program, and it is this number that is required here to tie this particular radar to a set of hardware data.

(5) Sensor Status Code (Column 20). The status of the radar at the beginning of the game or period is to be entered in this card column. Entering a 2 or 3 will preclude the radar from detecting and recognizing targets during the course of the period. Entering a 1 will permit full play of the radar during the course of the period.

(6) Sensor Coordinates and Height (Columns 22-44). Enter the seven-digit X, Y coordinates and height in meters of the sensor right adjusted in the appropriate columns. Leading zeros are not required.

(7) Assigned Area of Search (Columns 46-76). The area of search to be assigned to an AD radar is specified by the entries in columns 46-76. Columns 46-50 and 52-56 contain the minimum and maximum ranges, respectively, of the assigned search area, in meters. Columns 58-61 contain the orientation, or central azimuth, of the assigned search sector, measured in mils clockwise from grid north. Columns 63-66 contain the width of the assigned search sector, in mils. Columns 68-71 contain the vertical central azimuth of the search area, in mils. Columns 73-76 contain the width of the vertical search sector, in mils.

e. Unattended Ground Sensors. This section describes the card formats required to represent unattended ground sensor fields. Each UGS field requires three data cards. The first card contains data necessary to identify the UGS field, the second card specifies the composition of the UGS field, and the third card specifies the location of the field. The format of each of these cards is discussed below.

(1) UGS Identification (Figure III-3-A-4). This card specifies the sensor code, UID of the controlling unit, unique sensor index, sensor status, and the median time to track and report enemy units.

UGS IDENTIFICATION									
SENSOR CODE	BLANK	UID CONTROLLING UNIT	BLANK	UNIQUE SENSOR INDEX	BLANK	SENSOR STATUS CODE	BLANK	MEDIAN TIME (SECS) TO TRACK AND DETECT	BLANK
1-2	3	4-11	12	13-14	15-19	20	21-38	39-44	45-80

Figure III-3-A-4. Unattended Ground Sensor Identification Card Format

(a) Sensor Code (Columns 1-2). Each generic type of sensor is identified by a sensor code. For UGS fields, enter the value 07.

(b) UID of First Node in Communication Net (Columns 4-11). Enter the eight-character UID of the unit that will be the first node in a communication network from this specific UGS field. This unit must be a maneuver unit (i.e., have the character M in the third character of the UTD).

(c) Unique Sensor Index (Columns 13-14). When this receiving node has more than one UGS field reporting to it, this index is used to discriminate among the fields. The index must be assigned serially, starting with 1 for the first UGS field reporting to this unit, 2 for the second, etc.

(d) Sensor Status Code (Column 20). The status of the UGS field at the beginning of the game or period is to be entered in this card column. Entering a 2 or 3 will preclude the field from detecting and recognizing targets during the course of the period. Entering a 1 will permit full play of the field during the course of the period.

(e) Median Time to Track and Detect (Columns 39-44). Enter the median time in seconds, from activation of this UGS field to receipt of a sensing report at the first communication node.

(2) UGS Field Composition (Figure III-3-A-5). This card specifies the composition of the UGS field. Field composition is defined in terms of the number of each distinct type of UGS that is located within the field. Up to 10 different types of UGSs may be present in a given field. See Section IV. Appendix A to Chapter 6, for a discussion of UGS types.

(a) Sensor Type (Columns 2-3). The sensor type identifies the specific kind of UGS. This sensor type must agree with the definition given in the UGS constant data (Section 11, Chapter 6).

(b) Number (Columns 5-7). Enter the number of sensors, of the type specified above, to be placed in the UGS field.

(c) The remainder of the card has space for defining nine additional sensor types and their numbers.

(3) UGS Field Location (Figure III-3-A-6). This card specifies the battlefield locations of the UGS field by listing the four corner coordinates of the field. The shape of an UGS field is restricted to a convex quadrilateral. A geometric figure is said to be convex if it is possible to connect any two points in the figure by a straight line that lies entirely within the figure. The geometric figure shown as (a) below (Figure III-3-A-7) is convex; the figure shown as (b) is not. The order in which the corners are input is arbitrary.

UGS FIELD COMPOSITION

UNATTENDED GROUND SENSORS IN FIELD

BLANK	1ST TYPE	BLANK	NR OF 1ST TYPE	BLANK	2ND TYPE	BLANK	NR OF 2ND TYPE	BLANK	3RD TYPE	BLANK	NR OF 3RD TYPE	BLANK	4TH TYPE	BLANK	NR OF 4TH TYPE	BLANK	5TH TYPE	BLANK	NR OF 5TH TYPE	BLANK	6TH TYPE	BLANK	NR OF 6TH TYPE	BLANK	7TH TYPE	BLANK	NR OF 7TH TYPE	BLANK	8TH TYPE	BLANK	NR OF 8TH TYPE	BLANK	9TH TYPE	BLANK	NR OF 9TH TYPE	BLANK	10TH TYPE	BLANK	NR OF 10TH TYPE	BLANK
1	2 3	4	5 6 7	8	9 10	11	12 13 14	15	16 17	18	19 20 21	22	23 24	25	26 27 28	29	30 31	32	33 34 35	36	37 38	39	40 41 42	43	44 45	46	47 48 49	50	51 52	53	54 55 56	57	58 59	60	61 62 63	64	65 66	67	68 69 70	71 72 73 74 75 76 77 78 79 80

Figure III-3-A-5. Unattended Ground Sensor Field Composition Card Format

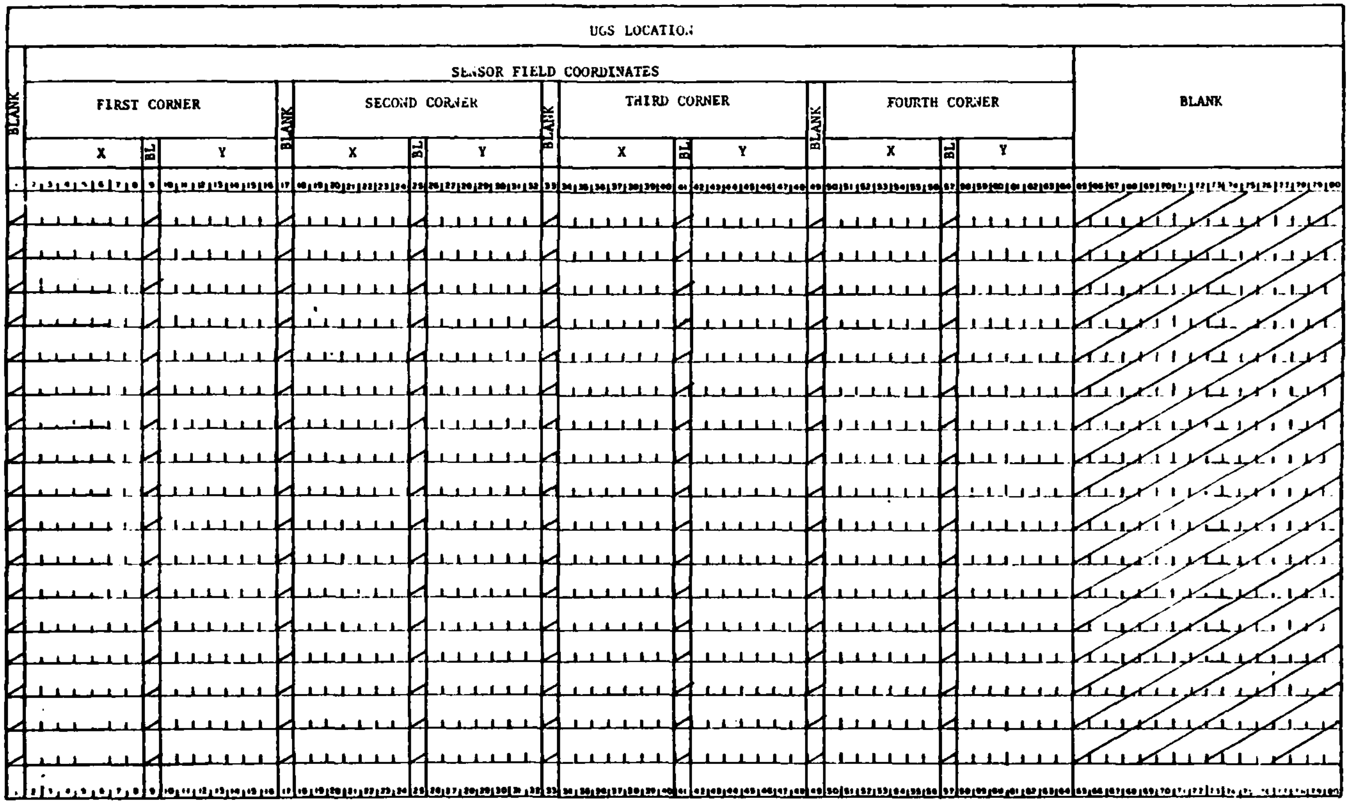
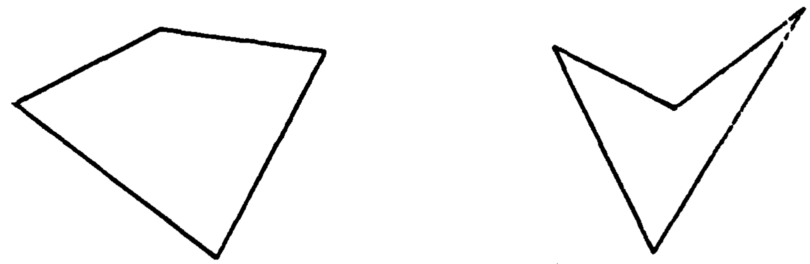


Figure III-3-A-6. Unattended Ground Sensor Location Card Format



(a) (b)

Figure III-3-A-7. Geometric Figures

(a) X coordinate (Columns 2-8). Enter the seven-digit X coordinate of the first corner of the field. Leading zeros are not required.

(b) Y coordinate (Columns 10-16). Enter the seven-digit Y coordinate of the first corner of the field.

(c) The remainder of the card contains the coordinates of the remaining three corners.

2. INTRODUCTION OF INTELLIGENCE. While the DIVWAG Period Processor simulates a range of ground-based and aerial sensors generally available to a division in the field, explicit simulation of all potential sources of battlefield intelligence is not attempted. The ability is available through the OPERINS loader to introduce additional intelligence to the model. This capability is intended to permit the control team to enrich the intelligence picture available to the opposing player teams in a closed or semi-closed game while maintaining the information within the format that is generally used for intelligence in the DIVWAG system. It also permits specification of targets for attack within the Air Ground Engagement Model or for automatic allocation of fire support, should this prove necessary. In all cases, use of this feature should be stringently controlled by the game's control team.

a. Approach. Intelligence introduced to the DIVWAG Period Processor through the OPERINS loader enters and is processed by the Intelligence and Control Model similarly to intelligence gathered by sources explicitly modeled. The data input by the OPERINS loader is formatted to produce a sensing report similar to those generated within the model. The input data format permits the user to control the time at which this sensing report enters the Intelligence and Control Model, the node in the intelligence communication network at which the sensing report enters the system, and whether the report passes through the intelligence processing portions of the model, the fire support allocation portions of the model, or both. Details of the Intelligence and Control Model communications network, processing, and fire support allocation logic are found in Section IV, Chapter 6.

b. Card Formats. Three card formats are prescribed for the introduction of intelligence with the OPERINS loader. The period card is prepared only once for each game period in which intelligence is introduced. For each sensing report to be introduced, one intelligence information card and one estimated equipment card are produced.

(1) Period Card. The period card, illustrated in Figure III-3-A-8, is the first data card of an intelligence data deck processed by the OPERINS loader. The information provided on this card is needed to correctly schedule time of entry of sensing reports into the Intelligence and Control Model. The symbols PERIOD, DAY, HOUR, MINUTE and a period are preprinted on the coding form at columns 1-6, 12-14, 19-22, 27-32, and 33 respectively and must be punched on the data card. Data to be provided are the starting time of the game period for which intelligence is to be introduced. Start of period in terms of day, hour, and minute are placed in columns 9-10, 16-17, and 24-25, respectively. Each entry is right justified.

(2) Intelligence Information. This card format, shown in Figure III-3-A-9, is the first of two cards required for each item of intelligence to be introduced into the system.

(a) Source Type Code (Columns 1-2). The source type code is a gamer or control group classification of the information source. Within the model, its function is simply one of mechanical bookkeeping; and processing of each sensing report is identical, regardless of the nature of the information source specified. Legal codes and their nominal source interpretation are:

31 = Prisoners of war
32 = Civilians
33 = Recovered military personnel
34 = Captured enemy documents
35 = Enemy materiel
36 = Stay-behind units
37 = Agencies for operation behind enemy lines
38 = Other sources.

(b) Where to Code (Columns 4-7). This code establishes the type of action to be taken upon the sensing report within the Intelligence and Control Model. Legal codes and indicated actions are:

. INTL - Enter report only in intelligence processing and communication net

. FSCC - Enter report only in the fire support allocation logic of the model

. BOTH - Enter report both in intelligence processing and communication net and in fire support allocation logic.

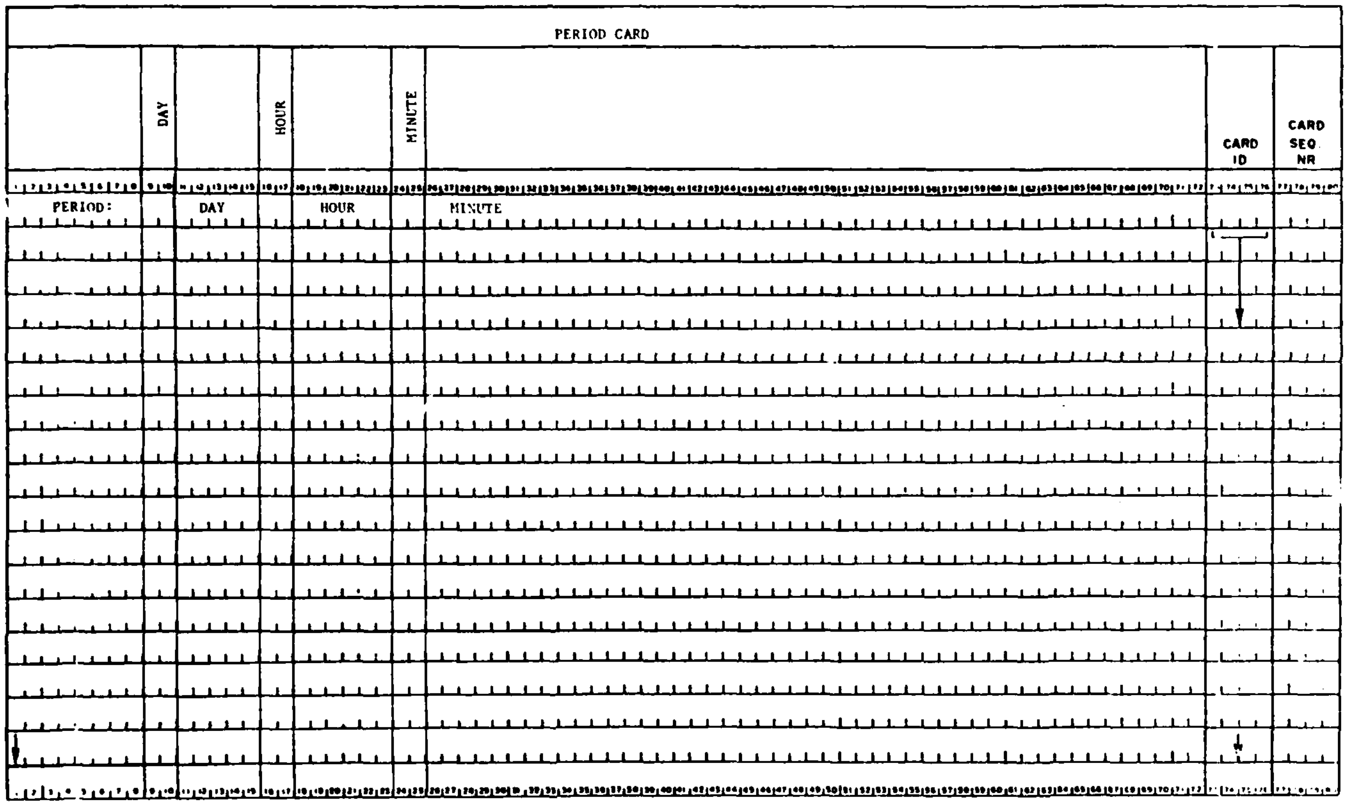


Figure III-3-A-8. Period Card Format

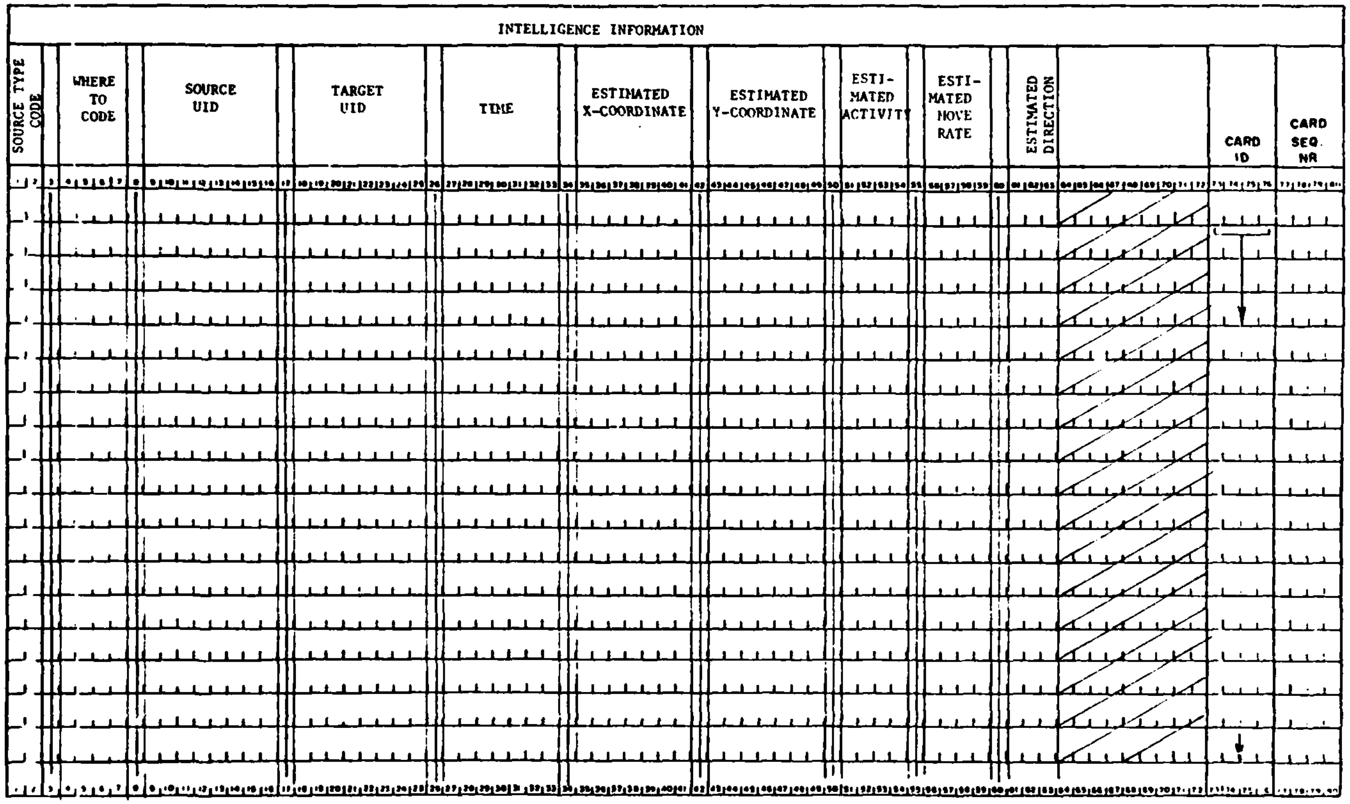


Figure III-3-A-9. Intelligence Information Card Format

(c) Source UID (Columns 9-16). Enter the eight-character alphanumeric UID of a unit to whom the information is first available. This unit will function as the first node in the communication network for the sensing report and must be a battalion, brigade, or division-level maneuver unit.

(d) Target UID (Columns 18-25). Enter the eight-character alphanumeric UID of the target unit; i.e., the unit described by this report.

(e) Time (Columns 27-33). Enter the time at which the information is to enter the Intelligence and Control Model. Upon entry the report is processed as any sensing report in the model, and the user must be aware of decision and processing delay times that will be applied. Enter the day in columns 27-28, the slash (/) in column 29, and the time (24-hour clock) in columns 30-33. For example, 02/0830 represents 0830 hours on the second day of simulated combat.

(f) Estimated Location (Columns 35-49). Enter the seven-digit X and Y coordinates of the estimated location of the target unit. Entries are right justified in columns 35-41 (X coordinate) and 43-49 (Y coordinate) and leading zeroes may be omitted.

(g) Estimated Activity (Columns 51-54). The estimated activity of the target unit at time of entry of the report into the system is required. Legal activity codes for the unit are:

MOVE = Unit moving
FIRT = Unit firing tube artillery
FIRM = Unit firing missile artillery
FIRA = Unit firing air defense weapons
ATCK = Unit in an attack posture
DEFN = Unit in a defensive posture
WTHD = Unit withdrawing
ENGR = Unit involved in engineering activitv
STAY = Unit stationary and not otherwise active.

(h) Estimated Move Rate (Columns 56-57). If the estimated activity is MOVE, ATCK, or WTHD, enter the estimated rate of unit movement in meters per minute; otherwise, leave the field blank.

(i) Estimated Direction (Columns 61-63). If the estimated activity is MOVE, ATCK, or WTHD, enter the estimated direction of movement; otherwise, leave the field blank. Directions are expressed as points of the sixteen-point compass, and entries are right justified within the field. Legal entries are:

N	E	S	W
NNE	ESE	SSW	WNW
NE	SE	SW	NW
ENE	SSE	WSW	NNW

(3) Estimated Equipment. This card format, illustrated in Figure III-3-A-10, is the second of two cards required for each item of intelligence to be introduced into the system. This information is used within the model to develop estimated type and size of the target unit.

(a) Personnel (Columns 1-4). Estimated number of personnel obtained from source.

(b) Vehicles (Columns 6-8). Estimated number of vehicles, other than those in categories described below, obtained from source.

(c) Tanks (Columns 10-12). Number of tanks estimated by source about the target.

(d) APCs (Columns 14-16). Estimated number of APCs in target obtained from source.

(e) Artillery Tubes (Columns 18-20). Number of artillery tubes estimated by information source.

(f) Artillery Missiles (Columns 22-24). Estimated number of artillery missiles in target.

(g) Air Defense Guns (Columns 26-28). Number of AD guns estimated by source to be in target unit.

(h) Air Defense Missiles (Columns 30-32). Estimated number of AD missiles in target unit.

(i) Aircraft (Columns 34-36). Estimated number of aircraft obtained from information source.

3. FIRE SUPPORT ALLOCATION CONTROL:

a. Helicopter and Artillery Penetration Limits. This card format, shown in Figure III-3-A-11, sets limiting ranges beyond which helicopter and artillery fire support missions will not be requested by the fire support allocation logic of the Intelligence and Control Model. Ranges are stated in terms of distance beyond the FEBA. The Period Processor actually calculates a rectilinear approximation of the trace of the FEBA to be used in reaching fire support allocation decisions. Since the model's approximation of the FEBA may not coincide with the FEBA on game maps plotted by the user, the calculation of the model FEBA, as described in Chapter 4 of Section IV, Battlefield and Unit Geometry, should be understood prior to assignment of these ranges. Ranges are initially set to zero within the model and should be set to desired values at the first game period.

(1) Blue Helicopters (Columns 2-7). Enter in meters the maximum range beyond the FEBA to which Blue attack helicopter missions may be automatically requested within the model.

ESTIMATED EQUIPMENT											
ESTIMATED PERSONNEL	ESTIMATED VEHICLES	ESTIMATED TANKS	ESTIMATED APCs	ESTIMATED ARTY TUBES	ESTIMATED ARTY MISSILES	ESTIMATED AD GUNS	ESTIMATED AD MISSILES	ESTIMATED AIRCRAFT		CARD ID	CARD SEQ. NR

Figure III-3-A-10. Estimated Equipment Card Format

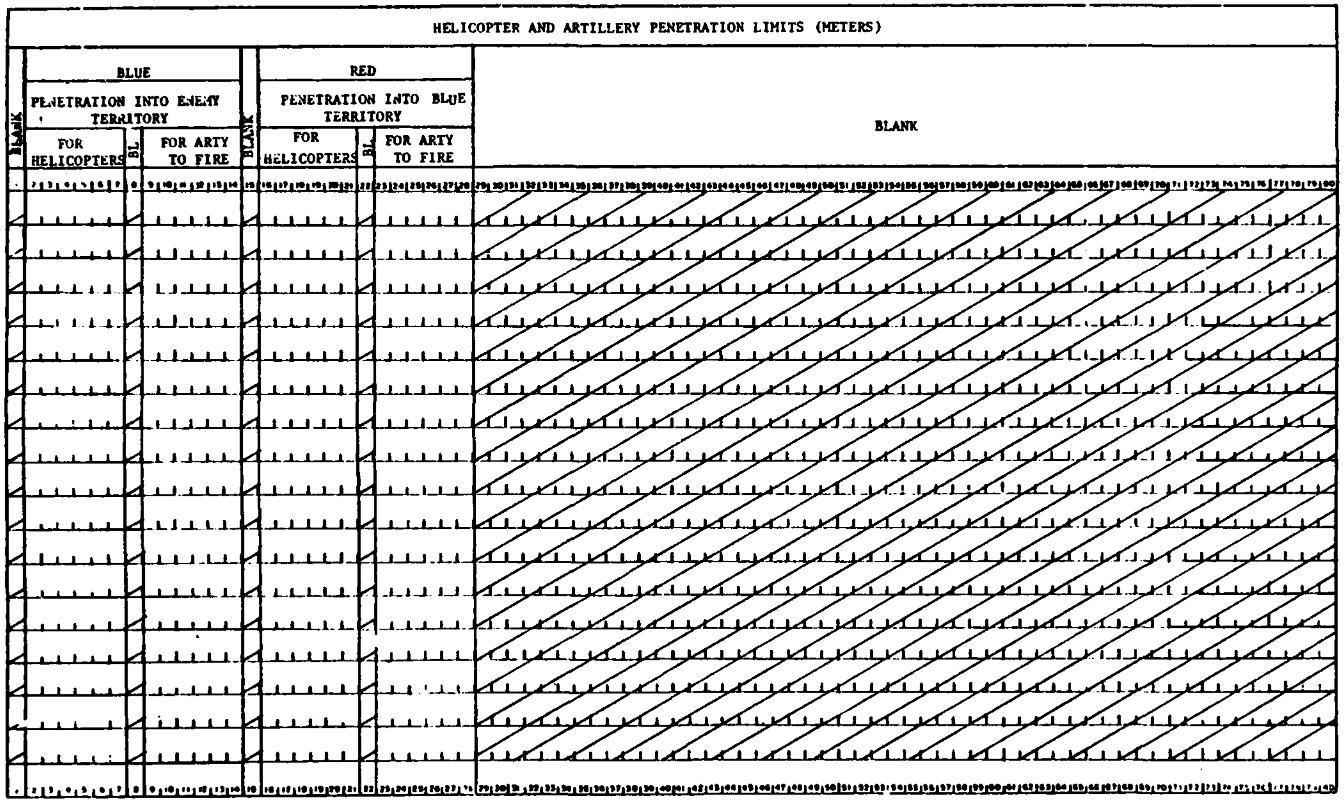


Figure III-3-A-11. Helicopter and Artillery Penetration Limits Card Format

(2) Blue Artillery (Columns 9-14). Enter in meters the maximum range beyond the FEBA to which Blue artillery fire missions may be automatically requested within the model.

(3) Red Helicopters (Columns 16-21) and Red Artillery (Columns 23-28). Same definition as columns 2-7 and 9-14 above.

b. Close Air Support Sorties. These card formats are used to set the number of TACAIR sorties available to the Blue and Red forces. They are initialized at zero and must be set by OPERINS data to obtain TACAIR simulation.

(1) Blue Sortie Constraints (Figure III-3-A-12). It is assumed that all Blue sorties will be conducted by all-weather-capable aircraft. Sorties are allocated in 6-hour blocks, starting at midnight; and unused sorties in one block are not carried over to later blocks. Entries are the maximum number of sorties available from 0001 to 0600 (columns 1-5); from 0601 to 1200 (columns 6-10); from 1201 to 1800 (columns 11-15); and from 1801 to 2400 (columns 16-20).

(2) Red Sortie Constraints (Figure III-3-A-13). Both all-weather-capable aircraft and aircraft limited to good visibility conditions are played for Red. The good visibility aircraft are flown first, conditions and sortie limits permitting; otherwise, allocation of sorties is as for Blue TACAIR. Enter maximum Red all-weather-capable sorties for the time blocks 0001 to 0600, 0601 to 1200, 1201 to 1800, and 1801 to 2400 in columns 1-5, 6-10, 11-15, and 16-20 respectively. Enter maximum Red sorties by aircraft limited to good visiblity for the time blocks 0001 to 0600, 0601 to 1200, 1201 to 1800, and 1801 to 2400 in columns 21-25, 26-30, 31-35, and 36-40 respectively.

4. OPERINS DATA DECK STRUCTURE. The data deck for the OPERINS loader is composed of up to four subdecks. Any or all of these decks can be provided for one operation of the loader. Each subdeck is introduced by a header card with the proper code punched in the first two columns. Legal header card codes and associated subdecks are:

01 = Sensor control subdeck
02 = Introduction of intelligence subdeck
03 = Helicopter and artillery penetration subdeck
04 = Close air support sorties subdeck.

a. Subdeck Structure:

(1) Sensor Control Subdeck. The first card of the sensor control subdeck is a header card with the symbols 01 punched in the first two card columns. Following the header card, sensor control data cards may be provided in any sequence with the requirement that the three cards required to establish an UGS field must be contiguous and in the order described in subparagraph 1e (UGS Identification, UGS Field Composition, UGS Field Location) for each UGS field. The user should bear in mind the limit of 100 model

BLUE SORTIES				
MAXIMUM NUMBER OF ALL WEATHER SORTIES FOR EACH 6 HOUR PERIOD STARTING AT MIDNIGHT				BLANK
PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4	

Figure III-3-A-12. Blue Sorties Card Format

RED SORTIES								
MAXIMUM NUMBER OF ALL WEATHER SORTIES FOR EACH 6 HOUR PERIOD STARTING AT MIDNIGHT				MAXIMUM NUMBER OF GOOD VISIBILITY SORTIES FOR EACH 6 HOUR PERIOD STARTING AT MIDNIGHT				BLANK
PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4	PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4	

Figure III-3-A-13. Red Sorties Card Format sensors (radars or UGS fields) per force. The size of this subdeck is not fixed; and the last card of the subdeck must be a blank card, used to signal the end of the subdeck to the loader.

(2) Introduction of Intelligence Subdeck. The first card of this subdeck must be the header card with the symbols 02 punched in the first two card columns. The second card of this subdeck must be the period card, described in subparagraph 2b(1). For each sensing report to be introduced into the system, the intelligence information card must be followed immediately by the estimated equipment card. There is no practical limit on the number of such card pairs to be processed. The size of this subdeck is not fixed; and the last card of the subdeck must be a blank card, used to signal the end of the subdeck to the loader.

(3) Helicopter and Artillery Penetration Subdeck. This subdeck consists of the header card, with 03 punched in the first two card columns, followed by one data card as discussed in subparagraph 3a.

(4) Close Air Support Sorties Subdeck. This subdeck is composed of a header card, with 04 punched in the first two card columns, followed by a Blue sortie card and a Red sortie card. All three cards must be present in the proper order.

b. Deck Structure. Only those subdecks required for the game period need be included in the data deck. The order of subdecks within the data deck is of no significance as long as each subdeck starts with the proper header card. An end of data deck card, with 99 punched in columns 1-2 of the card, must follow the last subdeck. A typical data deck for Operating Instructions is shown in Figure III-3-A-14.

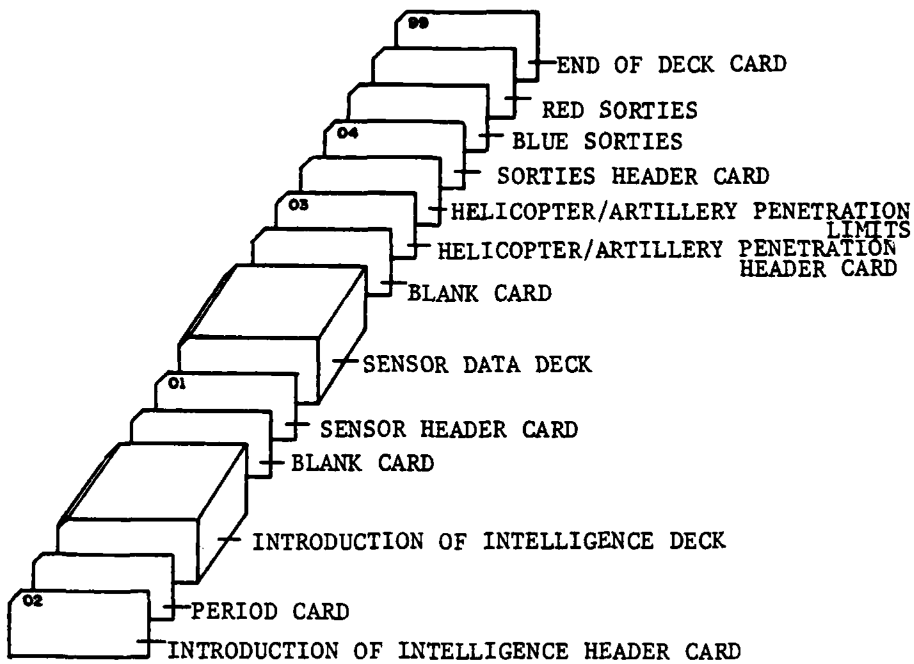


Figure III-3-A-14. Data Deck Arrangement for Operating Instructions

NOTES

APPENDIX B

OPERATING INSTRUCTIONS PROGRAM DESCRIPTIONS

1. INTRODUCTION. The routines described in this appendix make up the operating instructions loader and include a loader executive, DATAST, and a group of routines that read data cards and place the data directly into the DIVWAG data files. These routines are considered part of the Orders Input Processor because they may be used at the beginning of any game period.

2. ROUTINE DATAST:

a. Purpose. DATAST is the executive routine of the operating instructions loader.

b. Input Variables:

Name	Source	Contents
IFNT(56,3)	Disk	File name table.
UTDTAB(1000)	DF36	Unit type designator (UTD) for all units.
UIDTAB(2,1000)	DF36	Unit identification cross-reference table for all units.
IBLUE	DF36	IUID of last Blue unit.
IRED	DF36	IUID of first Red unit.
JHEAD	Card	Header card to indicate the type of load required.

c. Output Variables. None.

d. Logical Flow (Figure III-3-B-1):

(1) Block 1. Call routine GETFLE to load the file name table.

(2) Block 2. Call routine GETWRD to obtain from data file 36 the unit type designator cross-reference table, the unit identification cross-reference table, and the last used IUID for both Blue and Red forces.

(3) Block 4. Zero out the array of sequence numbers for sensing reports from all battlefield sources and call routine PUTRCD to place this array in data file 16.

(4) Block L1000. Read header card to indicate which set of data is to follow.

(5) Block 5. If the header card is an end-of-data card, terminate the program.

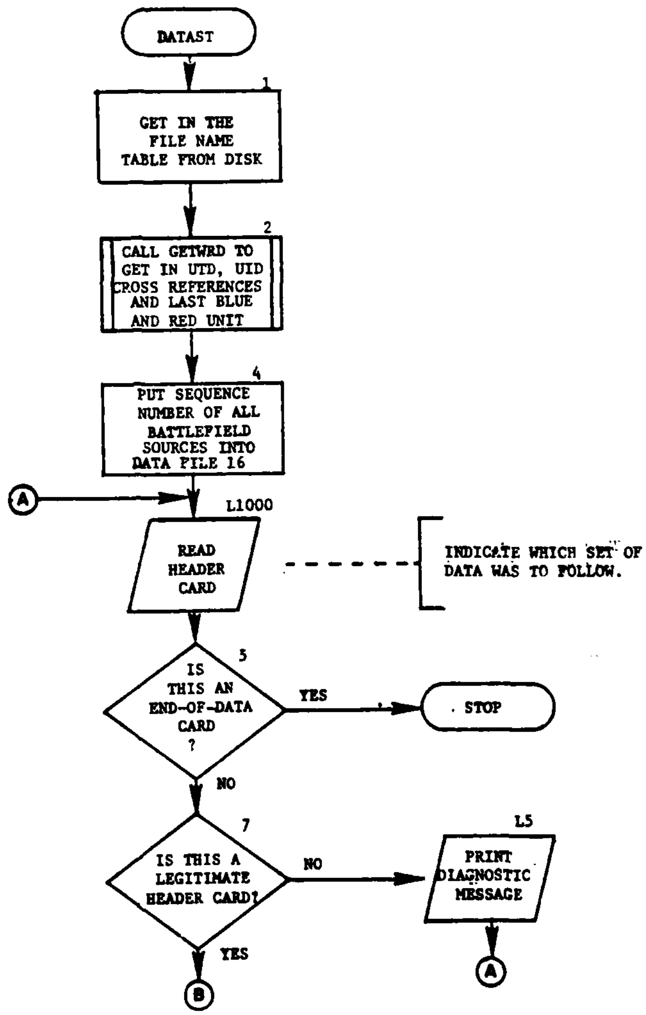


Figure III-3-B-1. Routine DATAST (Continued on Next Page)

AD-A112 658 ARMY COMBINED ARMS COMBAT DEVELOPMENTS ACTIVITY FORT--ETC F/G 15/7
DIVWAG MODEL DOCUMENTATION. VOLUME II. PROGRAMMER/ANALYST MANUA--ETC(U)
JUL 76

UNCLASSIFIED CACDA-TR-8-76-VOL-2-PT-1 NL

9 OF 9
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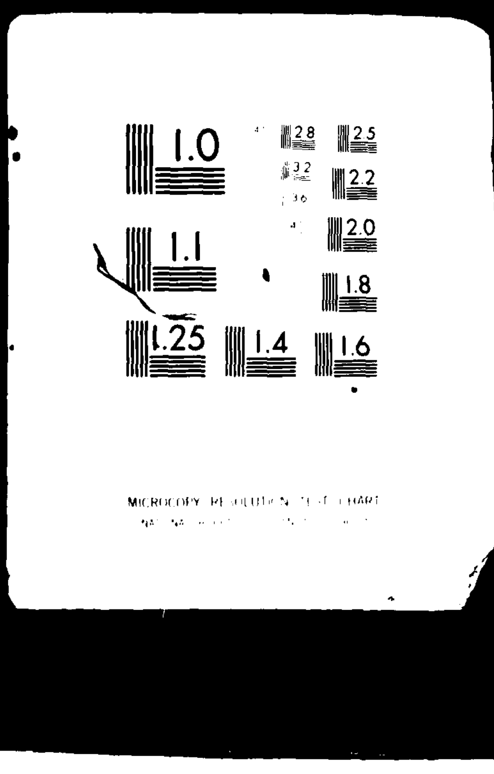
AD A112658



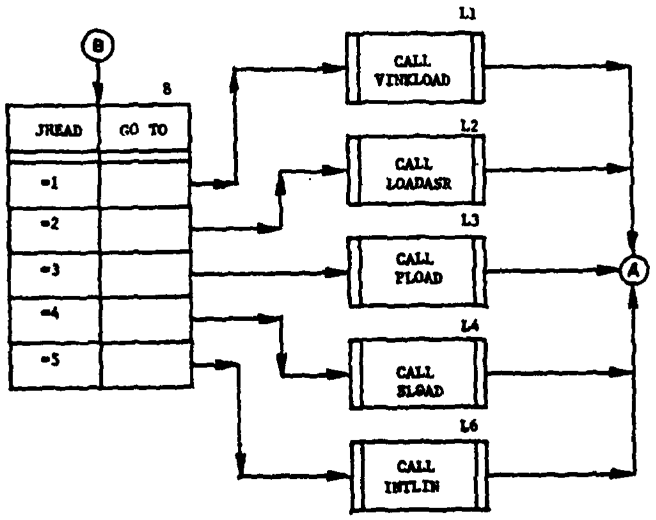


Figure III-3-B-1. Routine DATAST (Concluded)

(6) Blocks 7 and L5. If the header card is a legitimate header card (i.e., contains a value between one and five inclusive), control goes to block 8; otherwise, print a diagnostic message about the illegal header card and transfer control to block L1000 to read the next card.

(7) Block 8. Control branches according to value in header card. If JHEAD is equal to one, control goes to block L1. If JHEAD is equal to 2, control goes to block L6. If JHEAD is equal to three, control goes to block L3. If JHEAD is equal to four, control goes to block L4. If JHEAD is equal to five, control goes to block L2.

(8) Block L1. Call VINKLD to load data file 20 with the individual sensor data. Upon its return, control goes to block L1000.

(9) Block L2. Call LDASR to load a unit's available supply rates (ASR). Upon controls return, it goes to block L1000.

(10) Block L3. Call PLOAD to load the ranges from the FEBA for the decision process of the Intelligence and Control Model on the type of fire support to request. Upon its return, control goes to block L1000.

(11) Block L4. Call SLOAD to load the Blue and Red sorties for a period of time in 6-hour blocks. Upon its return, control goes to block L1000.

(12) Block L6. Call INTLIN to load intelligence information. Upon its return, control goes to block L1000.

3. ROUTINE VINKLD:

a. Purpose. VINKLD loads the individual sensor data desired for this game period onto data file 20.

b. Input Variables:

Name	Source	Contents
IDUM(320)	DF20	Constant unattended ground sensor (UGS) field data. First 160 words describe Blue UGS fields and last 160 words describe Red UGS fields.
INVEC(15)	Card	Sensor data for individual sensor read from cards.
UTDTAB(1000)	TWO	Unit type designator table for all units.
JREC(20)	DF20	Individual sensor data record from data file 20.

c. Output Variables:

Name	Destination	Contents
JREC(20)	DF20	New or updated individual sensor data record.

d. Logical Flow (Figure III-3-B-2):

(1) Block 1. Get from data file 20 the constant unattended ground sensor field data (loaded by INCLD).

(2) Block L1000. Read sensor data card.

(3) Block 2. If all the data have been read (sensed by blank card), control goes to block L6000.

(4) Block 3. Print the contents of the data card just read.

(5) Block 4. Utilizing the unit identification read as the first node in the communication network, determine the IUID and, using it, obtain the unit type designator of the first node from the unit type designator table.

(6) Block 5. If the first node is not a maneuver unit (last characters of unit type designator not MI, MT, or MC), control goes to block L5000.

(7) Block 6. Set the sensor record pointer for the Blue or Red force.

(8) Block 7. Loop through the individual sensor records to determine if this is a new set of data or an update to an existing record.

(9) Blocks 8 and 9. If this is a new set of data, transfer control to block L2. If this is an update set of data, transfer control to block L3.

(10) Block 10. Since the data are not an update to existing sensor data and there is no room on the existing sensor data record for new sensor data, a diagnostic message is written and control is returned to the calling routine.

(11) Block L2. Set the new data flag and load the keyword into the sensor record array.

(12) Block L3. Compute the next record counter.

(13) Block 11. If the new sensor data are not for an update, transfer control to block L7.

(14) Block 12. If the new set of data is for an unattended ground sensor field sensor, transfer control to block L300.

(15) Block L10. Set up sensor record with parameters that are common to the moving target indicator, air defense, and countermortar or counterbattery radars.

(16) Block 13. If this is a countermortar or counterbattery radar type sensor, transfer control to block L90.

(17) Block 14. Set those sensor values common to the moving target indicator and air defense radars.

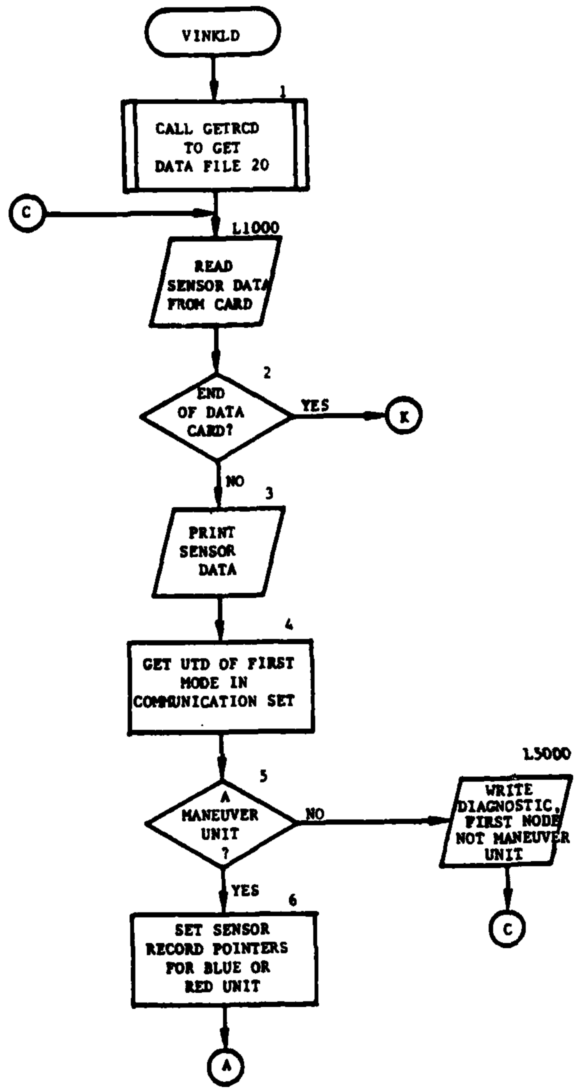


Figure III-3-B-2. Routine VINKLD (Continued on Next Page)

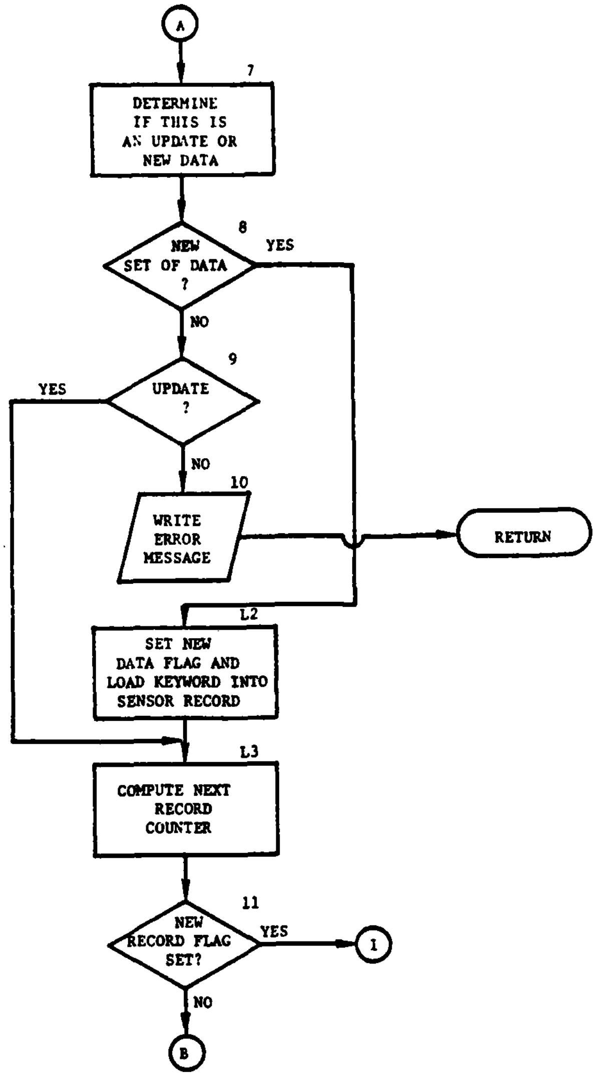


Figure III-3-B-2. Routine VINKLD (Continued)

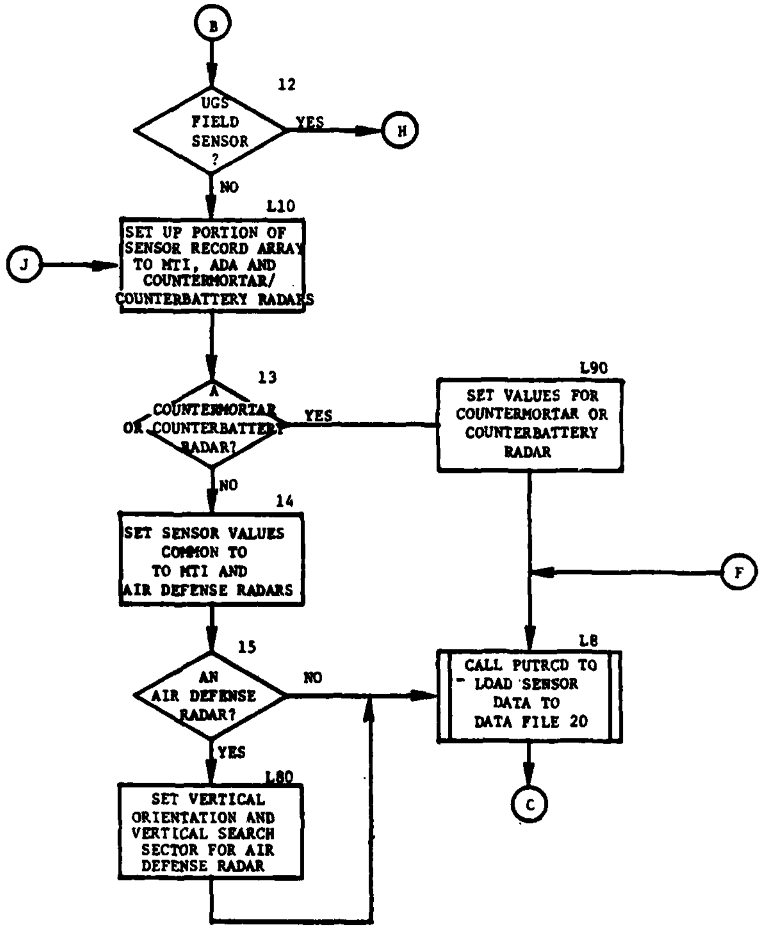


Figure III-3-B-2. Routine VINKLD (Continued)

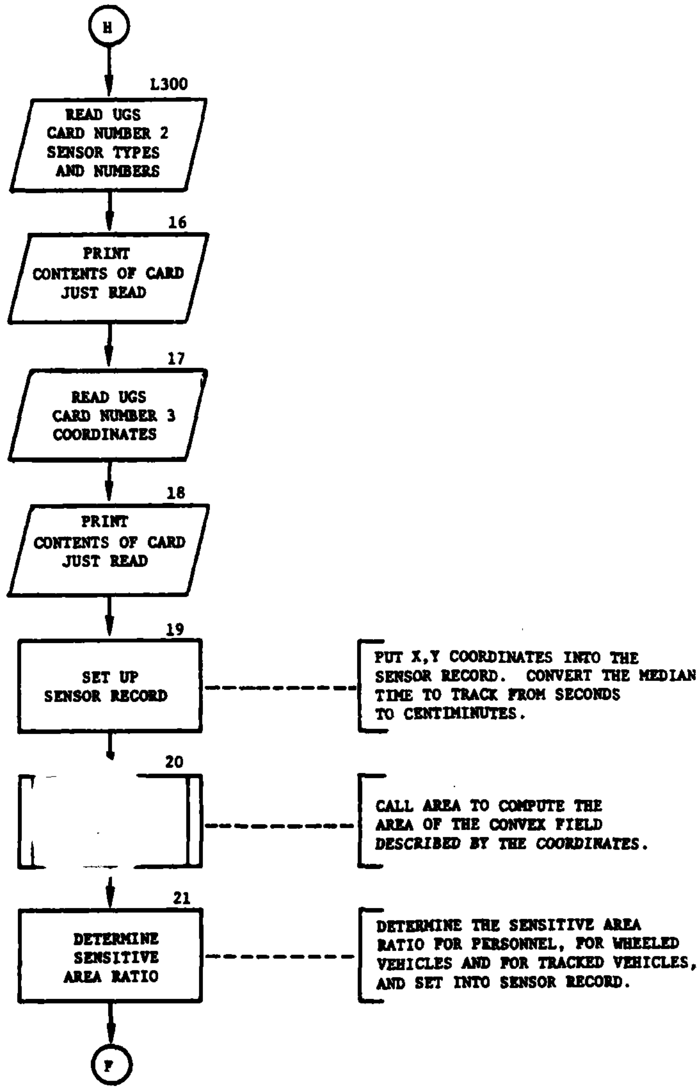


Figure III-3-B-2. Routine VINKLD (Continued)

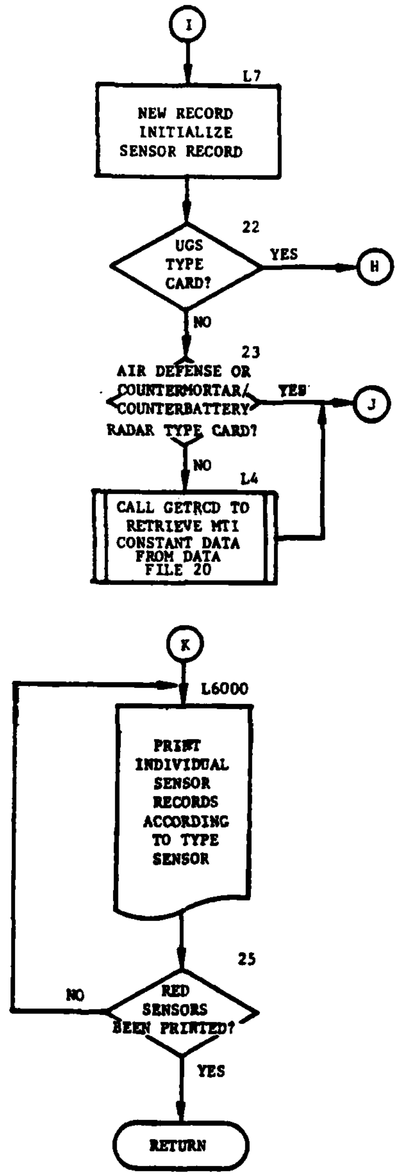


Figure III-3-B-2. Routine VINKLD (Concluded)

(18) Block 15. If this is not an air defense radar sensor type, transfer control to block L8.

(19) Block L80. Set the vertical orientation and vertical sector for air defense radar.

(20) Block L8. Put individual sensor record onto data file 20 and return control to block L1000.

(21) Block L90. Set the values of the countermortar/counterbattery radar, and transfer control to block L8.

(22) Blocks L300, 16, 17, and 18. Read cards 2 and 3 for unattended ground sensor fields and print their contents. Card 2 contains sensor types and numbers to make up an unattended ground sensor field. Card 3 contains the four X,Y coordinates that give the unattended ground sensor field its convex geometric shape.

(23) Block 19. Put the coordinates into the sensor record. Convert the median time to track from seconds to centiminutes and store into sensor record.

(24) Blocks 20 and 21. Call routine AREA to determine the area of the unattended ground sensor field described by the coordinates and determine the sensitive area ratios for personnel, for wheeled vehicles, and for tracked vehicles; place these into the sensor record, and transfer control to block L8.

(25) Block L7. Zero sensor record, and set up values common to all sensor types.

(26) Blocks 22 and 23. If this is an unattended ground sensor radar card type, transfer control to block L300. If this is an air defense or countermortar/counterbattery radar type card, transfer control to block L10.

(27) Block 24. Call routine GETRCD to retrieve the minimum radial velocity, azimuth auto scan rate, and range auto scan depth; then, transfer control to block L10.

(28) Block L5000. Print a diagnostic message that the first node in the communication network is not a maneuver unit; then transfer control to block L1000 to read the next card.

(29) Blocks L6000 and 25. Print each sensor record formatted according to sensor type; first, the Blue force sensors and then the Red force sensors are printed. Return control to the calling routine.

4. ROUTINE CNVRT:

a. Purpose. CNVRT is called by VINKLD to convert angles in mils measured clockwise from grid north to angles in radians measured counterclockwise from the positive X axis.

b. Input Variables:

Name	Source	Contents
ANG	Call	Angle in mils measured clockwise from grid north.

c. Output Variable:

Name	Destination	Contents
CNVRT	Call	Angle in radians measured counterclockwise from the positive X axis.

d. Processing Description. The angle is converted from mils to degrees from grid north, using the multiplicative factor 0.05625. This is converted to degrees from the X axis by a change in sign and addition of 45° (90° if the original angle was less than or equal to 90°). Finally, the result is converted to radians by the multiplicative factor 0.01745.

5. ROUTINE AREA:

a. Purpose. AREA is called by VINKLD to compute the area of a convex quadrilateral by summing the areas of the two triangles formed by bisecting the quadrilateral.

b. Input Variable:

Name	Source	Contents
X(4), Y(4)	ONE	Set of four (X,Y) coordinate locations of the corners of a convex figure describing the unattended ground sensor field.

c. Output Variable:

Name	Destination	Contents
ANS	Call	Area of the convex quadrilateral computed by this routine.

d. Processing Description. The lengths of each side of the quadrilateral are determined as A, B, C, and D and the length of a diagonal as E, all using the Pythagorean theorem. (The quadrilateral is bisected into triangles with sides A, B, E, and C, D, E.) The area of each triangle is calculated, and the two areas are summed.

6. ROUTINE LDASR:

a. Purpose. LDASR loads from cards the available supply rate for specific equipment types for a specified unit.

b. Input Variables:

Name	Source	Contents
UID	Card	Unit identifier code for unit receiving the available supply rate.
NI	Card	The number of entries on the data card.
INDEX(100)	Card	An array of equipment item codes.
ASR(100)	Card	An array of associated available supply rates.
UMAIN(500)	DF1	Unit status file of unit receiving the available supply rates.
LIST(10)		UMAIN(277). List of subordinate units.
PNT1, PNT2	ONE	UMAIN(317) and UMAIN(318). Beginning and ending supply status records.
EQUIP(1000)	DF31	Storage for up to 100 ten-word records from data file 31.

c. Output Variables:

Name	Destination	Contents
EQUIP(1000)	DF31	Updated available supply rate data in storage area for up to 100 ten-word records for data file 31.

d. Logical Flow (Figure III-3-B-3):

(1) Block L1000. Read the card containing the following information: UID, unit identification of unit to receive the new available supply rates; NI, number of new available supply rate entries; INDEX, an array of equipment item codes; and ASR, an array of associated available supply rates.

(2) Block 1. If this is an end-of-data card (i.e., blank card), then return control to the calling routine.

(3) Block 2. Print the contents of the card just read.

(4) Block L1001. Get from data file 1 the unit status record of the unit receiving the new available supply rates.

(5) Block 3. Utilizing the record pointers of this unit's data file 31 records, get this unit's supply status record from data file 31.

(6) Block 4. Search for a match between the item codes read from cards and those on the supply status array. When there is a match, the new available supply rate associated with the item code is stored into the proper location on the data file 31 storage array.

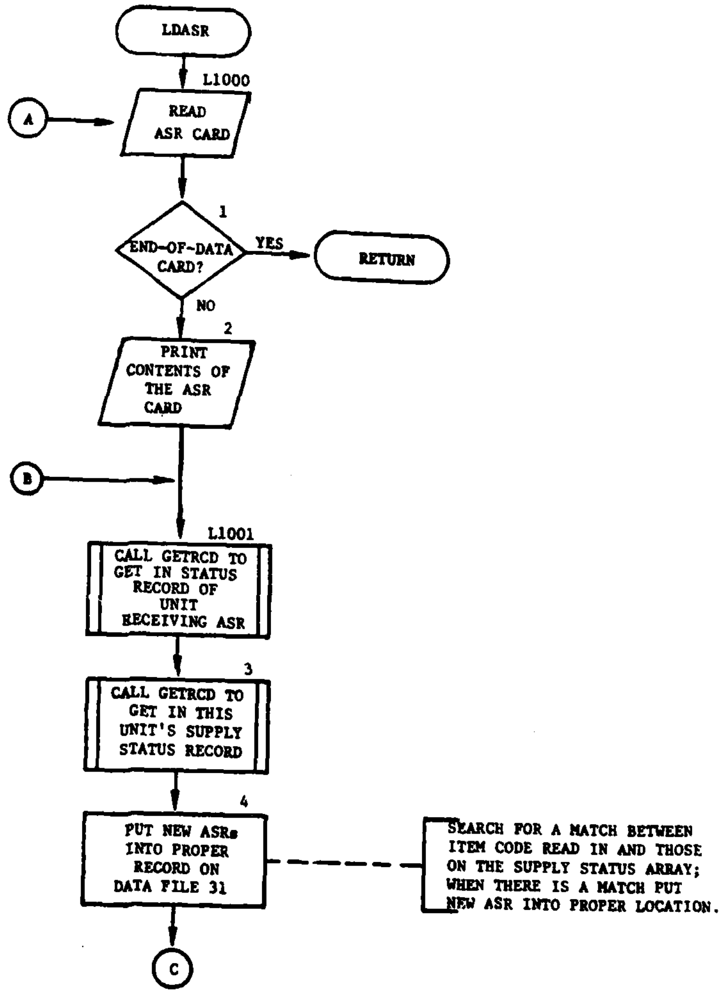


Figure III-3-B-3. Routine LDASR (Continued on Next Page)

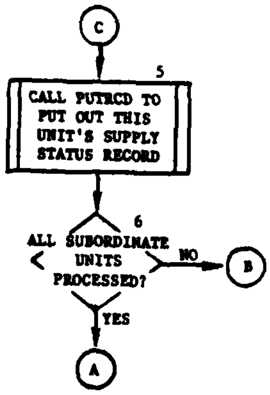


Figure III-3-B-3. Routine LDASR (Concluded)

(7) Block 5. Put this unit's updated supply status file on data file 31.

(8) Block 6. If this unit has subordinate units, then their supply status records must be updated to correspond with those of the superior; therefore, transfer control to block L1001. If all the subordinates have been processed or there are no subordinates, then transfer control to block L1000 for the next card.

7. ROUTINE PLOAD:

a. Purpose. PLOAD loads ranges from the forward edge of battle area used in the decision process as to what fire support to request.

b. Input Variables:

Name	Source	Contents
JBLU(2)	Card	Blue force attack helicopter range limit (JBLU(1)) and artillery range limit (JBLU(2)).
JRED(2)	Card	Red force attack helicopter range limit (JRED(1)) and artillery range limit (JRED(2)).

c. Output Variables:

Name	Destination	Contents
JBLUE(2)	DF16	Same as input variable description.
JRED(2)	DF16	Same as input variable description.

d. Processing Description. A data card is read, values on the card are listed and placed on data file 16, and control returns to the calling routine.

8. ROUTINE SLOAD:

a. Purpose. SLOAD reads the Blue and Red close air support (CAS) sortie constraints and stores them on data file 26.

b. Input Variables:

Name	Source	Contents
JSORTY(8)	Card	JSORTY (1 through 4) are good weather sorties for a 24-hour period, allocated in 6-hour segments. JSORTY (5 through 8) are all-weather sorties for a 24-hour period, allocated in four 6-hour blocks.

c. Output Variables:

Name	Destination	Contents
JSORTY(8)	DF26	Same as described for input variables.

d. Processing Description. A card is read and listed, and its contents placed on data file 26 as Blue sortie limits. A second card is read and listed, and its contents placed on data file 26 as Red sortie limits. Control then returns to the calling routine.

9. ROUTINE INTLIN:

a. Purpose. The Intelligence and Control Model utilizes simulation of enemy activity detecting devices to develop an intelligence picture. Although these provide valuable combat intelligence information, they are not the only source of intelligence. INTLIN allows introduction of intelligence information from other battlefield sources.

b. Input Variables:

Name	Source	Contents
ISENST	Card	The source type code is the classification of the information source.
IWHERE	Card	Code indicating where the information is to go within the Intelligence and Control Model.
SUID	Card	Identification of the unit to which the information will first be communicated (i.e., first node in the information network; hence, must be a maneuver type unit).
TUID	Card	Identification of the unit that is described in the information (i.e., the target UID).
IDAY and IHRMIN	Card	Time at which the information enters the Intelligence and Control Model. It is also the time that will appear on the intelligence report as the detection time.
ESTX	Card	Estimated X coordinate of the target (detected) unit in meters, (up to seven digits).
ESTY	Card	Estimated Y coordinate of the target unit in meters.
IACT	Card	The estimated activity code is a four-character code describing the target unit's estimated activity.

Name	Source	Contents
MOVRAT	Card	Estimated movement rate in meters/minute, if the estimated activity is movement or if the target unit is attacking.
IDIR	Card	Estimated direction of the movement, if the target is considered to be moving.
NOPERS	Card	Estimated number of personnel in target.
NOVEH	Card	Estimated number of wheeled vehicles in target.
NOTNKS	Card	Estimated number of tanks in target.
NOAPCS	Card	Estimated number of armored personnel carriers in target.
NOATBS	Card	Estimated number of artillery tubes in target.
NOAMIS	Card	Estimated number of artillery missiles in target.
NOADGN	Card	Estimated number of air defense guns in target.
NOADMS	Card	Estimated number of air defense missiles in target.
NOACFT	Card	Estimated number of aircraft in target.

c. Output Variables:

Name	Destination	Contents
FILE12(35)	DF12	Automatic event array containing intelligence information to be entered into the Intelligence and Control Model.
LUID		FILE12(1). Identification of the detecting unit.
INCOPR		FILE12(2). Intelligence and Control function to be performed.
RPTNO		FILE12(5). Sensing report number.
MUID		FILE12(6). Identification of the unit sensed.
ESTX		FILE12(7). Estimated X coordinate.
ESTY		FILE12(8). Estimated Y coordinate.
ESTSZE		FILE12(9). Estimated size of unit sensed.

Name	Destination	Contents
ESTYPE		FILE12(10). Estimated type of unit sensed.
ESTACT		FILE12(11). Estimated activity of unit sensed.
MOVRAT		FILE12(12). Average movement rate of detected unit.
ESTDIR		FILE12(13). Estimated direction of movement, if moving.
NOPERS		FILE12(14). Estimated number of personnel detected.
NOVEH		FILE12(15). Estimated number of vehicles detected.
NOTNKS		FILE12(16). Estimated number of tanks detected.
NOAPCS		FILE12(17). Estimated number of armored personnel carriers detected.
NOATBS		FILE12(18). Estimated number of artillery tubes detected.
NOAMIS		FILE12(19). Estimated number of artillery missiles detected.
NOADGN		FILE12(20). Estimated number of air defense guns detected.
NOADMS		FILE12(21). Estimated number of air defense missiles detected.
NOACFT		FILE12(22). Estimated number of aircraft detected.
TIMDET		FILE12(23). Time of detection.
ISENST		FILE12(26). Sensor type.

d. Logical Flow (Figure III-3-B-4):

(1) Block 1. Bring in contents of data file 36.

(2) Block 2. Get from data file 16 the sequence numbers for the sources of information to be used in the development of the sensing report numbers.

(3) Block L4. Read the first intelligence information card, which contains source and target units, time to enter Intelligence and Control Model,

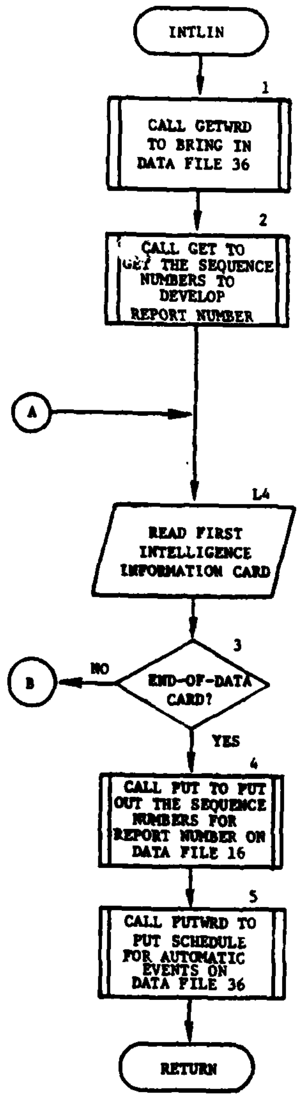


Figure III-3-B-4. Routine INTLIN (Continued on Next Page)

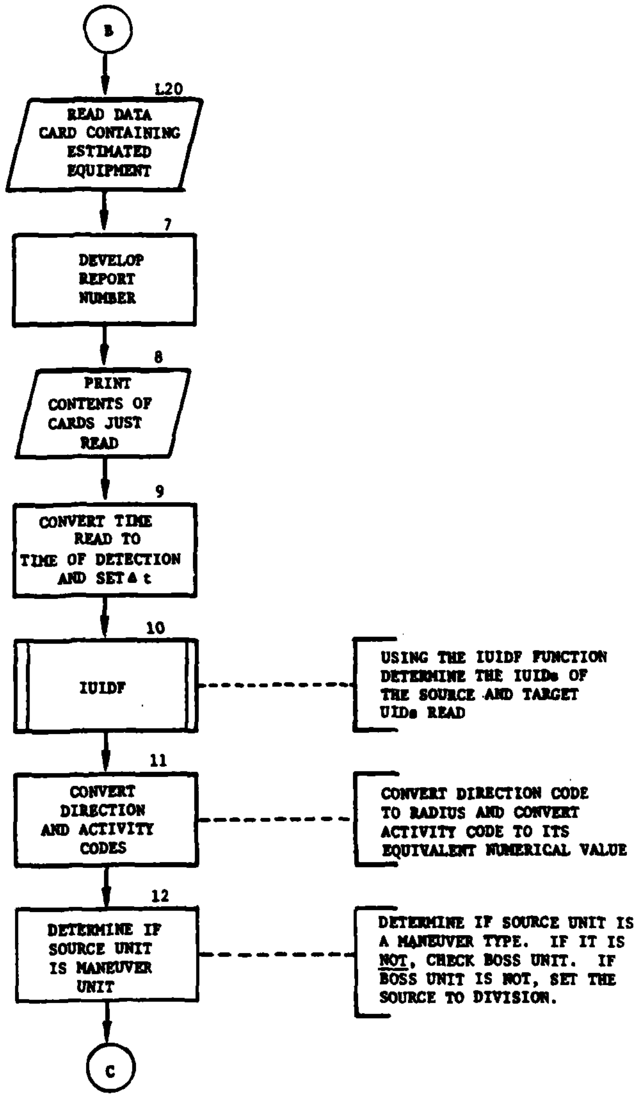


Figure III-3-B-4. Routine INTLIN (Continued)

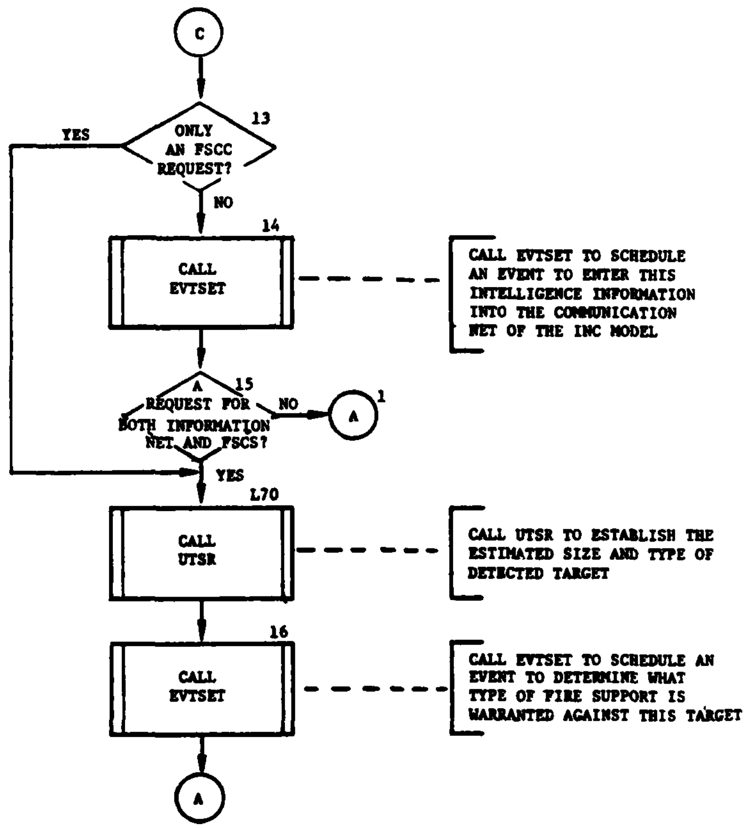


Figure III-3-B-4. Routine INTLIN (Concluded) and time of detection, source type, estimated location, estimated activity, and if activity is estimated to be movement, the estimated direction and rate of movement.

(4) Block 3. If this is not an end-of-data card (i.e., a blank card), control goes to block L20.

(5) Block 4. Since all data have been read, save source sequence numbers by putting them on data file 16.

(6) Block 5. Since some Intelligence and Control events have been scheduled by this routine, save the schedule for automatic events by putting it on data file 36. Return control to the calling routine.

(7) Block L20. Read the second card containing the estimated equipment items contained in the target unit.

(8) Block 7. Develop the report number for the sensing report, which will also be used on the printout.

(9) Block 8. Print the contents of the two intelligence information cards just read.

(10) Block 9. Convert the time read into time of detection (i.e., time in minutes from beginning of game). This time is also used as the time increment to schedule the entry of this information into the Intelligence and Control Model.

(11) Block 10. Utilizing the routine IUIDF, determine the identification numbers of the source and target units read on the first card of intelligence information.

(12) Block 11. Convert the direction code read into the proper radian equivalent. Convert the activity code read into its proper numerical equivalent. (See DATA statement in listing).

(13) Block 12. Determine if the specified source unit is a maneuver unit by checking its unit type designator. If it is not a maneuver unit, check the unit type designator of its superior unit. If neither unit is a maneuver unit, then set the specified source unit's division as the indicated source unit on the sensing report.

(14) Block 13. Check the code indicating where this intelligence information is to enter the Intelligence and Control Model; if it is a request for only fire support coordination processing, control goes to block L70.

(15) Block 14. Call EVTSET to schedule an event to enter this intelligence information into the communication network of the Intelligence and Control Model.

(16) Block 15. If this is not a request to enter this information into both the information communication network and fire support coordination center, control goes to block L4.

(17) Block L70. Call UTSR to establish the estimated size and type of the target unit entered in the data cards.

(18) Block 16. Call EVTSET to schedule an event to determine what type of fire support should be requested against this target; transfer control to block L4.

10. ROUTINES IUIDF, UTSR, EVTSET. These routines are described in Section IV.

APPENDIX C

OUTPUT DESCRIPTIONS FOR OPERATING INSTRUCTIONS

The operating instructions (OPRINS) process initially lists all unit identification codes in the Blue and Red forces. Figure III-3-C-1 depicts the format of the output produced by the operating instructions process. In the figure, an alphabetical character (descriptor) designates an appropriate group of lines explained below.

Output Descriptor	Explanation
A	This line reflects the unit identification code of the last unit in the Blue force (288), and the first unit in the Red force (655).
B	INTLAN DATA CARDS: There are two lines reflecting intelligence information loaded in routine INTLAN of the operating instructions. The report number (4800011) reflects the source of information (48) and a unique sequential report number (11). This unique report number is generated by adding 10 to a source type code, multiplying the result by 100,000 and adding a sequential report number. For a description of source type codes, see Appendix A to this chapter. BOTH: Both indicates that this report is entered both in the intelligence processing and communication network and in the fire support allocation logic. Other possible entries here are INTL to indicate that this report is entered in the intelligence processing and communication network only, or FSCC to indicate that this report is entered in the fire support allocation logic only. B82MEZBD and RZ130ZTK are unit identification codes of the first node of the communication network and the target unit respectively. The next two entries (1 500) are the day and hour/minute in which the information is to be entered into the Intelligence and Control Model. The next two entries are the estimated X and Y coordinates of the target unit. The next entry (DEFN) is the estimated activity of the target unit. See Appendix A of this chapter for all estimated activity mnemonics and their interpretations.

```
(A)—— 288    ESS

(B)—— INTLAN DATA CARDS  4800011 BOTH P1320ZTK 88C01ZAR  1  500  116677   89753 DEFN    0

     [ EVTSET          8       9
     [        836      2       0       0   4800011     220   116677   89753        0        0
(C)--[         41      0       0     450         0      10       29       0        0        0
     [          0      0     300       0         0      30        0       0        0        0
     [          0      0       0       0         0

(D)—— ENTERED UTSR

     [ 2 P11ARZ8D  1 213 1  122400   94100    450   500  5000 2400  800    0   0
     [ 2 P11ARZ8D  2 213 1  115800   85800    540  1000  6200 2400 1800    0   0
     [ 2 P11ARZ8D  3 213 1  120800   93300    600   500  6000 2200 1800    0   0
     [ 2 P11ARZ8D  4 213 1  117400   90500    630  2500  9400 2000 1600    0   0
     [ 2 P11ARZ8D  5 213 1  113800   87950    430  1200  5000 2000  200    0   0
     [ 2 P11ARZ8D  6 213 1  116100   89300    415  1500  4000  400  800    0   0
(E)--[ 2 P11ARZ8D  7 213 1  118100   83100    430  1000  3300  800  800    0   0
     [ 2 P11ARZ8D  8 213 1  123300   81900    396  1200  5000  800  800    0   0
     [ 5 P11ARZ8D  1 217 1  113300   88500    393  1000 15000 1500 1200    0   0
     [ 5 P11ARZ8D  1 225 1  125500   82100      0     0     0  200  800   25   0
     [ 5 P11ARZ8D  2 225 1  119700   93100      0     0     0 1400  800   25   0
     [ 5 P11ARZ8D  3 225 1  115300   91700      0     0     0 2400  800   25   0
     [ 7 P13BCZ8D  1   0 1       0       0     30     0     0    0    0    0   0
```

Figure III-3-C-1. Sample Printed Output by the Operating Instructions Process (Continued on Next Page)

```
(F)  1 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     138500   99000  139400   99700  138800   99700  138000   99000

(G)  RACUS=     150SUP=  22500.00AREA=  90000.00   4
     RACUS=     300SUP=  90000.00AREA=  90000.00   4
     RACUS=     300SUP=  90000.00AREA=  90000.00   4
     RACUS=     300SUP=      1.00AREA=  90000.00   4

                                                       B L U E   S E N S O R S
(H)   1  2  213  260     1 0  122400  94100     453   500   5000  5.50   .79  16  268  600   0   0   1
      2  2  213  260     1 0  115800  85800     540  1000   6200  5.50  1.57  16  268  600   0   0   2
      3  2  213  260     1 0  120800  93000     600   500   6000  5.69  1.57  16  268  600   0   0   3
      4  2  213  260     1 0  117400  90500     630  2500   8400  5.89  1.57  16  268  600   0   0   4
      5  2  213  260     1 0  113600  87990     430  1200   5000  5.89   .79  16  268  600   0   0   5
      6  2  213  260     1 0  116100  89000     415  1500   4000  1.18   .79  16  268  600   0   0   6
      7  2  213  260     1 0  118100  83100     430  1000   3000   .79   .79  16  268  600   0   0   7
      8  2  213  260     1 0  123300  81900     390  1300   5000   .79   .79  16  268  600   0   0   8
      9  5  217  260     1 0  113300  88600     390  1000  15000   .00  1.18  16   37  900   0   0   1
(I)  10  5  225  260     1 0  125500  82100   13741  7854    245  0.00  0.00   0    0    0   0   0   1
     11  5  225  260     1 0  119700  93100    1963  7954    245  0.00  0.00   0    0    0   0   0   2
     12  5  225  260     1 0  115300  91700   54967  5890    245  0.00  0.00   0    0    0   0   0   3
```

Figure III-3-C-1. Sample Printed Output by the Operating Instructions Process (Continued)

J	13	7	0	263	1	0	133100	98900	[illegible]	[illegible]	[illegible]	98700	132800	98400	100	100	100	0	0	50	1
	14	7	0	263	1	0	138500	99000	138400	99700	138800	99700	138000	99000	100	100	100	0	0	50	2
	15	7	0	263	1	0	131800	93200	132200	93000	131500	92500	131500	92900	100	100	100	0	0	50	3
	16	7	0	263	1	0	130800	97800	130000	97900	140200	97600	140000	97400	100	100	100	0	0	50	4
	17	7	0	263	1	0	139300	95400	139700	95400	135700	95500	135100	95000	100	100	100	0	0	50	5
	18	7	0	263	1	0	139600	94100	139100	94100	139000	93500	138500	93600	100	100	100	0	0	50	6
	19	7	0	263	1	0	137000	93900	137800	[illegible]	137700	90200	135900	93900	57	100	100	0	0	50	7
	20	7	0	263	1	0	134500	92500	134500	92500	134700	92000	134300	92000	100	100	100	0	0	50	8
	21	7	0	263	1	0	143400	90800	141000	91900	141100	90500	140400	90300	78	100	100	0	0	50	9

K — PLOAD 3000 15000 0 90000

L	BLUE SORTIES	0	50	50	0	0	0	0	0
	RED SORTIES	0	0	0	0	50	100.	50	21

Figure III-3-C-1. Sample Printed Output by the Operating Instructions Process (Concluded)

Output Descriptor	Explanation
	The last two entries of this line reflect the estimated rate of movement (in meters per minute) and the estimated direction of movement of the target unit.
	The second line of this report reflects the estimated number of personnel, vehicles, tanks, armored personnel carriers, artillery tubes, artillery missiles, air defense guns, air defense missiles, and aircraft of the target unit.
C	EVTSET, event report: The first line of this report gives the time that the event occurs within this period and the event number. The next four lines are an image of a 35-word record of data file 12. The first-line entries (per column) are:

- IUID of the division to which this data is sent
- The intelligence operation code
- Not used
- Not used
- Index number
- IUID of target number
- X coordinate of unit
- Y coordinate of unit
- Estimated type of target unit
- Estimated size of target unit

The second line gives:

- Estimated activity of target unit
- Estimated movement rate of target unit (meters per minute)
- Estimated movement direction of target unit (tenths of radians)
- Estimated personnel strength of target unit
- Estimated number of vehicles in target unit
- Estimated number of tanks in target unit
- Estimated number of armored personnel carriers in target unit
- Estimated number of artillery tubes in target unit
- Estimated number of artillery missiles in target unit
- Estimated number of air defense guns in target unit

The 10 words on the third line are:

- Estimated number of air defense missiles in target unit

Output Descriptor	Explanation
	Estimated number of aircraft in target unit Time of detection of target unit (since start of game Detector code
	The remaining nine words are not used.
D	This entry indicates that routine UTSR was called to estimate the size of the target unit.
E	Sensor data cards. A description of these cards appears in Appendix A to this chapter.
F	Unattended ground sensor (UGS) field composition and location cards. See Appendix A to this chapter for a description of these cards.
G	UGS data report. The first three lines of this report reflect UGS coverage for personnel, wheeled, and tracked vehicles. The first entry gives the sensitive radius of the sensor for the respective target; the second entry gives the cumulative sum of the square of the sensitivity radius of all sensors in the UGS field. The next entry gives the area of the UGS field, and the last entry is the number of sensors of the type reflected by this line. The last line of this report is the same as the third line with the exception of SUM. On this line, SUM reflects the ratio of the sums of the area of coverage of all UGS sensors in the UGS field to the area of the UGS field.
H	Moving target indicator (MTI) radar report. This printout is a report of data file 20 records of MTI radar sensor data. Each line has the following entries: Record number Sensor type code Key to sensor type parameter table. IUID of sensor's first node unit Last assigned report number Sensor status flag Sensor X coordinate Sensor Y coordinate

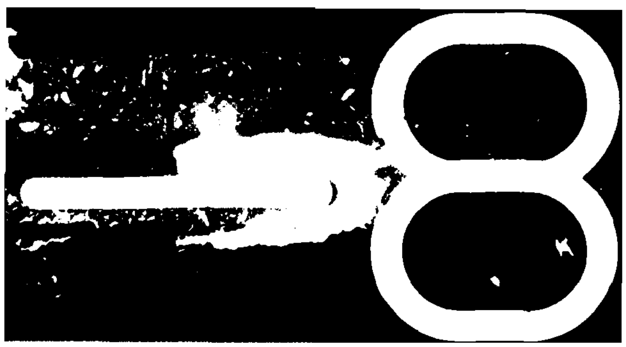
Output Descriptor	Explanation
	Sensor Z coordinate. Minimum range. Maximum range. Horizontal orientation (radius from X axis). Horizontal search sector (radians). Minimum radial target velocity. Azimuth autoscan rate (milliradians per centiminutes). Range autoscan depth (meters). The remaining fields are not used.
I	Counterbattery radar report. This printout is a report of data file 20 records of individual countermortar/counter-battery radar data. Each line has the following entries: Record number. Sensor type code. Key to sensor type parameter table. IUID of sensors first node unit. Last assigned report number. Sensor status flag. Sensor X coordinate. Sensor Y coordinate. Horizontal center azimuth (radians from X axis). Horizontal search sector (radians). Site mask angle (radians). Vertical beam separation (radians). The remaining fields are not used.
J	Unattended ground sensor (UGS) report. This printout is a report of data file 20 records of UGS data. Each line has the following entries: Record number. Sensor type code. Key to sensor type parameter table. IUID of sensor first node unit. Last assigned report number. Sensor status flag. X coordinate of first UGS field corner. Y coordinate of first UGS field corner. X coordinate of second UGS field corner. Y coordinate of second UGS field corner. X coordinate of third UGS field corner. Y coordinate of third UGS field corner. X coordinate of fourth UGS field corner. Y coordinate of fourth UGS field corner. The remaining fields are not used.

Output Descriptor	Explanation
K	PLOAD, penetration data report. This report reflects the maximum range in meters beyond the FEBA to which missions may be automatically requested within the model for Blue attack helicopter missions, Blue artillery fire missions, Red attack helicopter missions, and Red artillery fire missions.
L	Blue and Red sorties report. Line one reflects the maximum number of all weather sorties for each 6-hour period starting at midnight for the Blue force. Line two reflects that data for the Red force.

APPENDIX D

SOURCE LISTINGS FOR ORDERS INPUT PROCESSOR OPERATING INSTRUCTIONS

(AVAILABLE UNDER SEPARATE COVER)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