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INDIRECT FIRE MODEL COMPUTER PROGRAM - USER MANUAL

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SYSTEMS ANALYSIS DIRECTORATE

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Indirect Fire Model Computer Program computes effort and effectiveness measures of artillery systems in a war game situation. Effort is measured in terms of cost and weight of ammunition expended against a list of area targets. Effectiveness is measured in the amount of personnel and materiel damage inflicted. Each target is described by location, time of acquisition, estimated target duration time, number of tactical elements (personnel, tanks, trucks, and Armored Personnel Carriers), and other estimated and actual data.

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cont from 20.

This User Manual contains:

(1) A detailed description of the input variables to the program, how the variables are placed on the input cards, how the cards are generally arranged, and how the total deck is assembled to insure proper execution.

(2) A description of the output.

(3) A listing of the data deck for a sample case.

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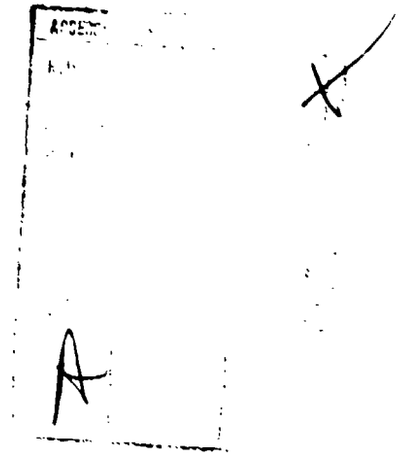

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SECTION I

INTRODUCTION

The Indirect Fire Model Computer program is a version of the model that was originally used to conduct the "Legal Mix IV" studies. The original model has been extensively modified by ARMCOM personnel in order to conduct trade-off analyses and to assess the benefits of hypothetical changes to weapons and munitions. The model computes effort and effectiveness measures of a friendly artillery force in an open, one-party war game situation. Figure 1-1 provides a generalized description of the Indirect Fire Model.

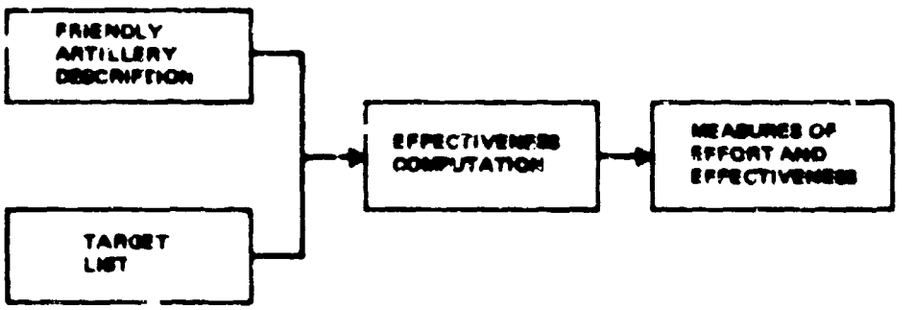

Figure 1-1. Generalized Description of Indirect Fire Model

The principal measures of effort are the cost and weight of ammunition expended against a list of various area targets. Effectiveness is evaluated by computing the amount of personnel and material damage inflicted, and by summarizing military worth points scored. The game is played in a time-orderd sequence of 15-minute intervals.

The sole intent of this document is to provide a user manual for those using the Indirect Fire Model to evaluate artillery systems; a detailed discussion of the methods employed by this model will not be given. The rationale, assumptions, and methodologies employed in this program are described in References 1 and 2. A brief explanation of some of the important terms and methods employed in the model is provided in the following paragraphs.

TARGET LIST

The target list, derived from a war game and subsequent target acquisition analysis, represents the threat and demands on the friendly artillery force. The result of the derivation is a time-ordered list of both acquired target missions and preplanned support missions such as illumination, smoke,

and harrassment fires. Each target on the list is described by a number of data elements, including location, time of acquisition, estimated target duration time, number of tactical elements [personnel, tanks, trucks, and Armored Personnel Carriers (APC's)], and other estimated and actual data.

Target Frequency

The program allows four levels of battle intensity: low, mid, base, and high. The target list itself represents base intensity where each listed target acquisition signifies a single (frequency = 1) demand on the artillery force. For other intensities, however, the target frequency may be increased (or eliminated) as a demand on the force. Therefore, based on an analysis of the war game which generated the target list, each target acquisition is assigned a frequency for each of the allowed intensities.

Military Worth

Based upon questionnaires administered to a group of field grade officers representing various combat arms, a scale of relative military worth values has been developed for the various type tactical elements on the target list (References 2 and 3). This military worth value is used for various purposes in the program. First, it provides for a priority ordering of targets for attack, whereby the acquisitions with highest military worth are attacked first in each game time increment. Secondly, it allows for a segmenting of targets into categories which control the level of attack and allowable ammunition weight expenditure against a target. Finally, military worth provides for a measure of force performance by summing up the military worth points of damaged target elements.

Target Posture Mix

Past efforts have identified typical postures for the elements (personnel, tanks, trucks, and APC's) which make up each target (Reference 1). These postures indicate the percentage of personnel standing, prone, and crouching (in foxholes) as well as the status of materiel elements (static or moving) and proximity to the Forward Edge of the Battle Area (FEBA) for both warned and unwarned conditions. There are 12 "posture mixes" accounting for various combinations of these postures.

EFFECTIVENESS COMPUTATION

The model employs the same basic effectiveness computation routine as outlined in Reference 4. This routine determines the number of rounds and fire units required to reach specified attack levels against estimated data for each target, and calculates the amount of target damage inflicted in terms of fractional survivors. The program examines each target in priority order and identifies the possible attack solutions available at the time the target is presented for consideration.

ALLOCATION PROCESS

The allocation process in the model controls the massing of fire units and the tactical method of attack in determining the optimum solution against a target. Two attack methods are examined:

(1) One-volley method. Fire units are added as necessary to reach the specified attack levels when constrained to fire only one volley per unit.

(2) Multi-volley method. Fire units firing all available (within specified constraints) ammunition are added in turn in order of effectiveness.

The order in which units at the various tactical echelons are examined and massed depends on the echelon which acquired the target, as determined in the war game. The order of massing fire units is shown in Table 1-1.

TABLE 1-1. FIRE UNIT MASSING ORDER

Attempted Solution	Acquiring Echelon		
	Direct Support (DS)	General Support (GS)	Corps
1st	Closest DS alone	GS alone	Corps alone
2nd	GS alone	GS & DS	Corps & GS
3rd	GS & DS	Corps Alone	All
4th	Corps alone	Corps & GS	
5th	Corps & GS	All	
6th	All		

COMPUTATIONAL SCHEME

Figure 1-2 illustrates the conceptual flow of the program. The numbered hexagons correspond to the following steps:

Step 1

The program initially provides for the reading of preliminary data and weapon system, round, and fire unit data from input cards. The game "mix" of systems, rounds, and fire units is then input and various counters, arrays, and clocks are initialized. For each 15-minute game interval, the program reads in from tape the target data for all targets arriving during the 15-minute interval. As each target is input, it is placed on the target array in priority order.

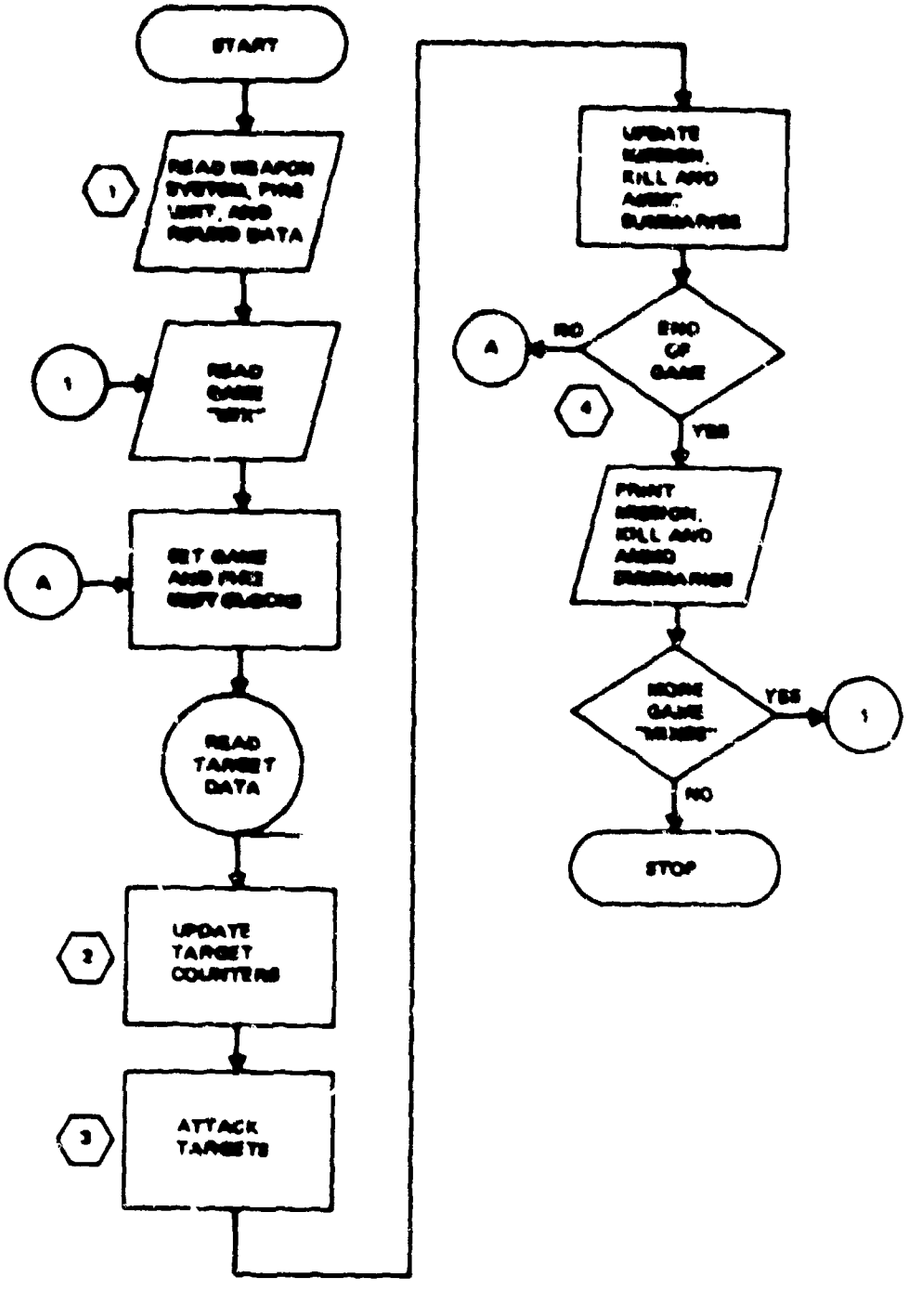

Figure 1-2. Conceptual Flow of the Indirect Fire Model

Step 2

Each target is added the appropriate number of times (according to game intensity), and counters for target acquisitions, target types, and target composition (personnel, tanks, trucks, and APC's) are increased. When all targets for a given 15-minute interval have been input, the program attempts to attack each target on the priority-ordered target array. If a given target has been previously defeated, it is removed from the target list; and if a target has been previously attacked but not defeated, previous damage inflicted is charged to the target.

Step 3

Either Direct Support, General Support, or Corps subroutines are called to attempt engagement, depending upon the echelon (DS, GS, or Corps) which acquired the target.

If a regular target is attacked, it is removed from the target array and the attacked-target counter is increased. For special missions [i.e., a smoke, illumination, or harrassment and interdiction (H&I) mission], the target is removed whether fired or not, with appropriate counter(s) being increased.

After all targets on the list for a given 15-minute game increment have been considered, appropriate game and fire unit (FU) clocks are increased by 15 minutes, and FU ammo counters are incremented. The program then begins the next 15-minute game interval by reading in the targets for that interval.

Step 4

The program continues this cycle until the game clock exceeds the input maximum game time, at which point detailed data for analysis are printed (see Model Output). The target tape is rewound and the system-round-fire unit mix for the next play of the game is read. If no additional mixes are to be played, the program stops.

MODEL OUTPUT

The initial prints include game time, game "mix" identifier, and the cumulative number of acquisitions, personnel, tanks, APC's, trucks, and military worth points acquired. The program credits 4 personnel per tank killed and 15 personnel per APC killed to the total of personnel killed. (Calculations made during the course of the computer game assume these personnel are inside vehicles, and are therefore not included in personnel damage assessments.) For each weapon system the program prints the total cost and weight of ammunition expended and the number of personnel, tanks, trucks, and APC's defeated, along with a grand total of all systems. Additionally, the percent of "queued" missions (missions not fired and dropped from the target list) and the sum of military worth points scored are printed.

Then a table is printed showing round expenditures by 1-kilometer range increments (up to 30 kilometers) for each round type, along with a cumulative total for each round type.

Next a table is printed showing number of acquisitions, targets, queued missions, queued missions plus missions still on the target list, missions fired, missions defeated, and missions fired but not defeated (lost). This listing is broken down by "other" missions, regular targets, and a sum of both.

Finally, a queued mission breakdown is printed, along with target list, reacquired mission, and combined target totals.

COMPUTER REQUIREMENTS

The Indirect Fire Model is written in FORTRAN IV, Level H, and is currently running on an IBM 360 computer with 300K bytes of core. Running time for a typical case is on the order of 6 to 7 minutes.

The remainder of this document contains:

(1) A detailed description of the input variables to the program, how the variables are placed on the input cards, how the cards are generally arranged, and how the total deck is assembled to insure proper execution (Section II).

(2) A description of the output (Section III).

(3) A list of the data deck for a sample case (Section IV).

SECTION II

INPUT

A complete description of the input parameters required to run one case is illustrated on the following pages. Execution of the program requires 10 input/output devices. These units are utilized in the following manner:

Logical Unit 5	Card input.
Logical Unit 6	Printing of card input (see Section III), error messages, and intermediate output.
Logical Unit 7	Formated tape/disk output. Can be used to record round identification numbers and number of rounds fired for each round type.
Logical Unit 8	Target tape input.
Logical Unit 9	Card input.
Logical Unit 10	Card input.
Logical Unit 11	Card input.
Logical Unit 12	Printing of card input (see Section III).
Logical Unit 13	Formated tape/disk output. Can be used to record firing-by-firing results.
Logical Unit 14	Printing of card input (see Section III), final results of the program and error messages.

Table 2-1 gives the logical unit numbers to which each card type is assigned. Figure 2-1 illustrates the data deck setup for a single case and Figure 2-2 illustrates the data deck setup for a run (consisting of one or more cases).

TABLE 2-1. INPUT LOGICAL UNIT ASSIGNMENTS

Logical Unit No.	Card Types
5	10, 10-1 through 10-10, 11, 11-1 through 11-4, and 12
9	1 through 9-1
10	13 through 21
11	22, 22-1, and 22-2

Note: Cards 22, 22-1 and 22-2 are required only if HOPT on Card 21 is equal to zero.

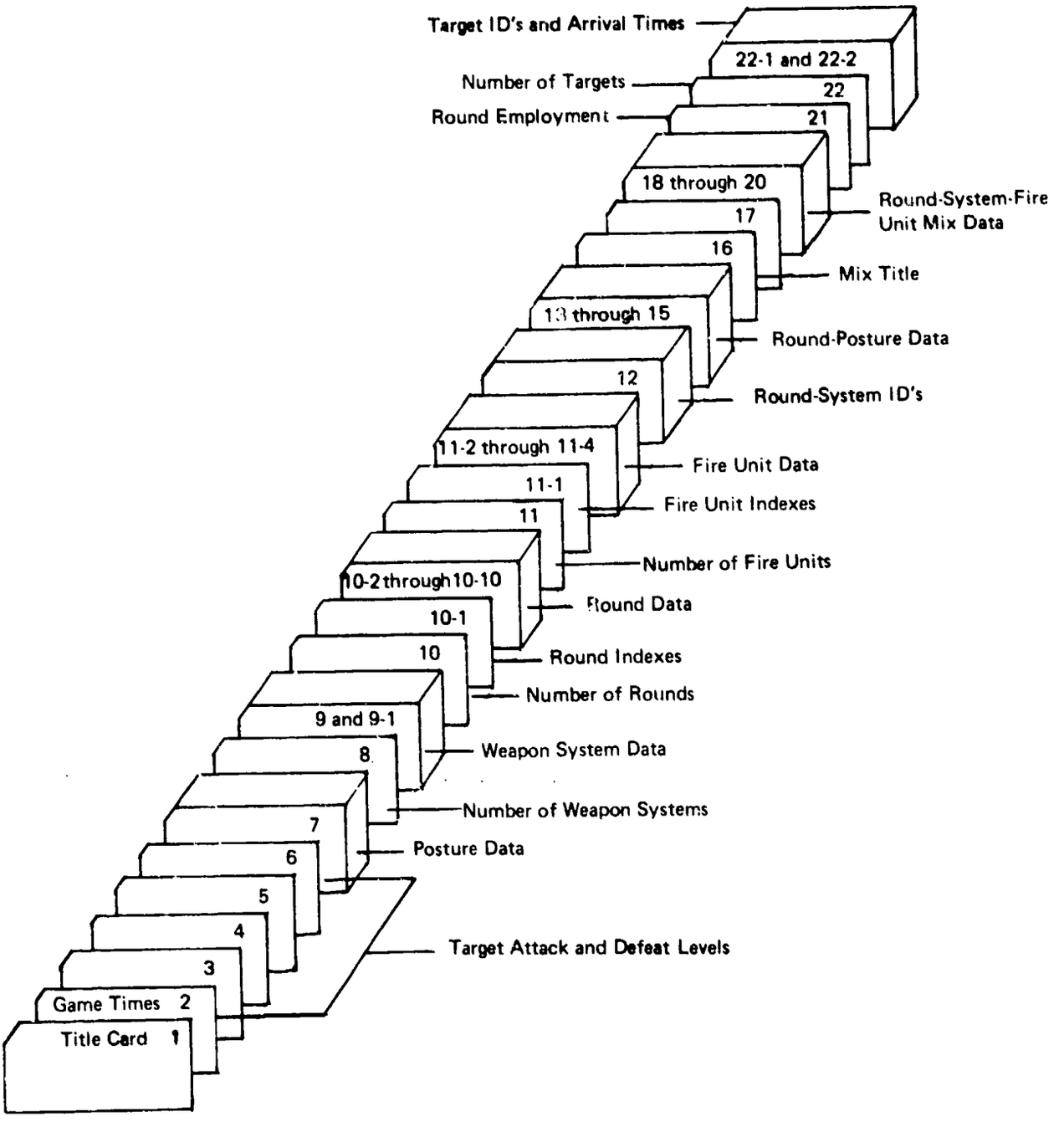

Figure 2-1. Single Case Card Setup

Note: All totals are zeroed and Logical Units 8 and 11 are rewound before the beginning of each case. Program terminates by reading the EOF as a data card on Logical Unit 10.

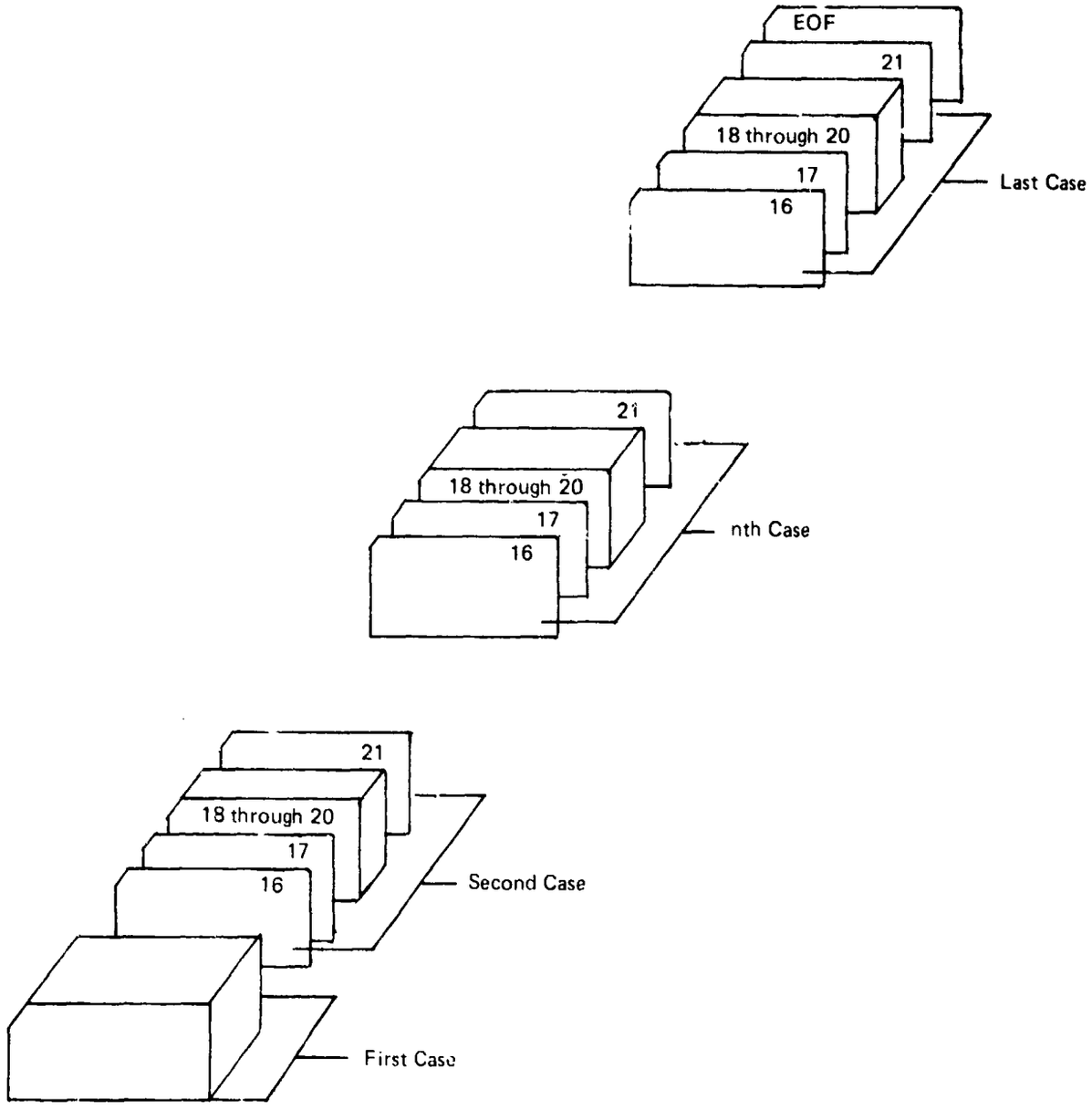

Figure 2-2. Multiple Case Card Setup

Following is a cross reference of the data card types and the corresponding input parameters described in this section.

DATA CARD TYPE AND INPUT PARAMETER CROSS REFERENCE

Card Type	Input Parameter Description
1	Title card
2	Game times
3	Target attack levels
4	Target attack levels
5	Minimum target attack level
6	Target defeat levels
7	Posture description
8	Number of weapon systems
9 and 9-1	Weapon system description
10	Number of rounds
10-1	Round indexes
10-2 and 10-3	Round description
10-4	Range values
10-5	CEP, round-to-round
10-6	Standard deviation of total error in ranges
10-7	Standard deviation of total error in deflection
10-8	Lethal areas for HE rounds
10-9 and 10-10	ICM input
11	Number of fire units
11-1	Fire unit indexes
11-2	Number of sites for each fire unit

Card Type	Input Parameter Description
11-3	Fire unit ID
11-4	Fire unit times and positions
12	Round-system ID's
13,14,15	Round-posture Data
16	Mix title
18	Weapon system mix
19	Round mix
20	Fire unit mix
21	Critical employment of rounds
22	Number of targets
22-1	Target ID's
22-2	Target arrival times
23,24,25	Target tape input

Title Card					CARD: 1
	A				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CXID	---*	16A4	1-64	Alphameric title of data deck

CARD: 1

*Nondimensional

Game Times

CARD: 2

A B C D

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	TZRO	hours	F7.4	1-7	Game start time
B	TMX	hours	F7.4	8-14	Game end time
C	FACT	---*	F7.4	15-21	Game intensity level = 1: Low = 2: Mid = 3: Base = 4: High
D	CONT	metric tons	F7.4	22-28	Maximum weight of ammunition allowed versus targets having a military worth of 10 or less

CARD: 2

*Nondimensional

Target Attack Levels — CARD: 3

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HWMA(1)	---*	F6.4	1-6	Target attack level for the first posture at zero target range
B	HWMA(2)	---	F6.4	7-12	Target attack level for the second posture at zero target range
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
L	HWMA(12)	---	F6.4	67-12	Target attack level for the 12th posture at zero target range

CARD: 3

*Nondimensional

Target Attack Levels

CARD: 4

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HWMC(1)	km	F6.4	1-6	Slope at target attack level versus target range plot for first posture
B	HWMC(2)	km	F6.4	7-12	Slope of target attack level versus target range plot for second posture
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
L	HWMC(12)	km	F6.4	67-72	Slope of target attack level versus target range plot for 12th posture

CARD: 4

Minimum Target Attack Level

CARD: 5

ID	FARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HWMD(1)	---*	F6.4	1-6	Minimum target attack level for first posture
B	HWMD(2)	---	F6.4	7-12	Minimum target attack level for second posture
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
L	HWMD(12)	---	F6.4	67-72	Minimum target attack level for 12th posture

CARD: 5

*Nondimensional

Target Defeat Levels

CARD: 6

	A	B	C	D	E	F	G	H	I	J	K	L

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HWMB(1)	---*	F6.4	1-6	Target defeat level for first posture
B	HWMB(2)	---	F6.4	7-12	Target defeat level for second posture
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
L	HWMB(12)	---	F6.4	67-72	Target defeat level for 12th posture

CARD: 6

*Nondimensional

Posture Description						CARD: 7
	A	B	C	D	E	DESCRIPTION
ID	PARA	UNITS	FORMAT	COLUMNS		
A	POST (I,1)	---*	F6.4	1-6		Posture ID number for *ith* posture ($0 \leq$ POST (I,1) ≤ 11)
B	POST (I,2)	---	F6.4	7-12		Percent of unwarned personnel standing for *ith* posture
C	POST (I,3)	---	F6.4	13-18		Percent of unwarned personnel prone for *ith* posture
D	POST (I,4)	---	F6.4	19-24		Percent of unwarned personnel in foxholes for *ith* posture
E	POST (I,5)	---	F6.4	25-30		Flag for unwarned tanks for *ith* posture = 0: no unwarned tanks = 1: there are unwarned tanks
F	POST (I,6)	---	F6.4	31-36		Flag for unwarned APC's for *ith* posture = 0: no unwarned APC's = 1: there are unwarned APC's
G	POST (I,7)	---	F6.4	37-42		Percent of warned personnel standing for *ith* posture
H	POST (I,8)	---	F6.4	43-48		Percent of warned personnel prone for *ith* posture
I	POST (I,9)	---	F6.4	49-54		Percent of warned personnel in foxholes for *ith* posture
J	POST (I,10)	---	F6.4	55-60		Flag for warned tanks for *ith* posture: = 0: no warned tanks = 1: there are warned tanks
K	POST (I,11)	---	F6.4	61-66		Flag for warned APC's for *ith* posture = 0: no warned APC's = 1: there are warned APC's

CARD: 7

*Nondimensional

Posture Description (continued)						CARD: 7 (cont)
	A	B	C	D	E	F	G	H	I	J	K	L	M

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
L	POST (I,12)	---	F6.4	67-72	Flag for unwarned trucks for *ith* posture = 0: no unwarned trucks = 1: there are unwarned trucks
M	POST (I,13)	---	F6.4	73-78	Flag for warned trucks for *ith* posture: = 0: no warned trucks = 1: there are warned trucks Note: There are 12 cards of this type, one for each allowable posture. (Table 2-2 lists the posture numbers corresponding to the type of target main element.)

CARD: 7 (cont)

TABLE 2-2. POSTURE NUMBERS

Posture ID Number	Target Main Element
0 through 4	Personnel
5, 6	APC
7 through 10	Tank
11	Truck

Number of Weapon Systems					CARD: 8
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NSYS	---*	I5	1-5	Number of weapon systems in force (NSYS $\leq$ 30)

CARD: 8

*Nondimensional

Weapon System Description					CARD: 9
	A B C D E F G H I J				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	SYSID(I)	---*	F7.1	1-7	System ID number for *ith* weapon system
B	FRWM(I)	---	F7.1	8-14	Fraction of *ith* weapon system fire units remaining in place during fire unit moves
C	TPFU(I)	---	F7.1	15-21	Number of tubes for launchers per fire unit for *ith* weapon system
D	SROF(I)	rd/min/ tube	F7.1	22-28	Maximum rate of fire versus static targets in *ith* weapon system
E	DROF(I)	rd/min/ tube	F7.1	29-35	Maximum rate of fire versus moving targets in *ith* weapon system
F	TBM(I)	minutes	F7.1	36-42	Time to set up and fire first volley for *ith* weapon system
G	BLD(I)	rounds	F7.1	43-49	Basic ammunition load for fire units of *ith* weapon system
H	RSPY(I)	rd/hour	F7.1	50-56	Ammunition resupply rate for fire units of *ith* weapon system
I	SNMX(I)	rd/tube/ mission	F7.1	57-63	Maximum number of rounds allowed per mission versus static targets for *ith* weapon system fire units
J	DNMX(I)	rd/tube/ mission	F7.1	64-70	Maximum number of rounds allowed per mission versus moving targets for *ith* weapon system fire units

CARD: 9

*Nondimensional

Weapon System Description (continued)					CARD: 9-1
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HNMX(I)	rd/tube/hr	F7.1	1-7	Maximum number of rounds allowed in 1 hour versus all targets for *ith* weapon system fire units
B	STYP(I)	---*	F7.1	8-14	System type: = 1: cannon = 2: missile Note: Cards 9 and 9-1 are required for each weapon system. Hence, there are NSYS groups of Cards 9 and 9-1.

CARD: 9-1

*Nondimensional

Number of Rounds					CARD: 10
	A				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NRDS	---*	I5	1-5	Number of different rounds in force (NRDS $\leq$ 90)

CARD: 10

*Nondimensional

Round Indexes					CARD: 10-1
	A B . . .				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NRD(1)	---*	I2	1-2	Index in the range and sigma arrays for the first round (See card 10-4)
B	NRD(2)	---	I2	3-4	Index in the range and sigma arrays for the second round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
	NRD(35)	---	I2	69-70	Index in the range and sigma arrays for the 35th round
					Note: There are $\frac{NRDS-1}{35}$ +1 cards of this type.
					CARD: 10-1

*Nondimensional

Round Description						CARD: 10-2
	A	B	C	D	E	F G H I
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION	
A	RNDID(I)	---*	F7.4	1-7	Round ID number for i^{th} round	
B	WGT(I)	metric tons	F7.4	8-14	Crated weight of i^{th} round	
C	CST(I)	$\frac{\text{dollars}}{10^3}$	F7.4	15-21	Cost of i^{th} round in thousands of dollars	
D	RMX(I)	km	F7.4	22-28	Maximum range of i^{th} round	
E	REL(I)	---	F7.4	29-35	In-flight reliability of the i^{th} round at zero target range	
F	DEP(I)	---	F7.4	36-42	Slope of the in-flight reliability versus target range plot of the i^{th} round	
G	RTY(I)	---	F7.4	43-49	Round type: = 1: ICM = 2: HE	
H	WARN(I)	---	F7.4	50-56	Not used	
I	RMIN(I)	km	F7.4	57-63	Minimum range of i^{th} round	

CARD: 10-2

Round Description | CARD: 10-3

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	RNG1(I)	meters	F7.4	1-7	Maximum weapon aimpoint in range for the i^{th} round
B	DEF1(I)	meters	F7.4	8-14	Maximum weapon aimpoint in deflection for the i^{th} round

CARD: 10-3

Range Values

CARD: 10-4

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	RNG(J,1)	km	F7.4	1-7	First range value in CEP and sigma arrays for the *jth* different round wnere j = NRD(I)** (See Card 10-1)
B	RNG(J,2)	km	F7.4	8-14	Second range value in CEP and sigma arrays for the *jth* different round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	RNG(J,10)	km	F7.4	64-70	Tenth range value in CEP and sigma arrays for the *jth* different round

**Note: If NRD(I) = NRD(I-1) for any value of i, then this card and the remaining cards 10-5 through 10-10 are read once for NRD(I-1).

Note: At present, there can be a maximum of 29 different sets of range values.

CARD: 10-4

CEP, Round-to-Round — CARD: 10-5

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CPR(J,1)	meters	F7.4	1-7	CEP, round-to-round, at first range value [given by RNG(J,1)] for the *jth* different round** (See Card 10-4)
B	CPR(J,2)	meters	F7.4	8-14	CEP, round-to-round, at second range value [given by RNG(J,2)] for the *jth* different round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	CPR(J,10)	meters	F7.4	64-70	CEP, round-to-round, at 10th range value [given by RNG(J,10)] for the *jth* different round

**See note on Card 10-4.

CARD: 10-5

Standard Deviation of Total Error in Range — CARD: 10-6

	A	B	C	D	E	F	G	H	I	J
	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								

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CPS(J,1)	meters	F7.4	1-7	Standard deviation of total error in range at first range value [given by RNG(J,1)] for the *j*th different round**
B	CPS(J,2)	meters	F7.4	8-14	Standard deviation of total error in range at second range value [given by RNG(J,2)] for the *j*th different round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	CPS(J,10)	meters	F7.4	64-70	Standard deviation of total error in range at 10th range value [given by RNG(J,10)] for the *j*th different round

**See note on Card 10-4.

CARD: 10-6

Standard Deviation of Total Error in Deflection

CARD: 10-7

A | B | C | D | E | F | G | H | I | J

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CPV(J,1)	meters	F7.4	1-7	Standard deviation of total error in deflection at first range value [given by RNG(J,1)] for the *j*th different round**
B	CPV(J,2)	meters	F7.4	8-14	Standard deviation of total error in deflection at second range value [given by RNG(J,2)] for the *j*th different round
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
J	CPV(J,10)	meters	F7.4	64-70	Standard deviation of total error in deflection at 10th range value [given by RNG(J,10)] for the *j*th different round

**See note on Card 10-4.

CARD: 10-7

HE Input [RTP(I) = 2] | CARD: 10-8

A B C D E F G H I J

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	AL(1)	square meters	F7.4	1-7	Round lethal area versus specified target for the first range value [given by RNG(J,1)] for the *j*th different round**
B	AL(2)	square meters	F7.4	8-14	Round lethal area versus specified target for the second range value [given by RNG(J,2)] for the *j*th different round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	AL(10)	square meters	F7.4	64-70	Round lethal area versus specified target for the 10th range value [given by RNG(J,10)] for the *j*th different round

Note: There are 12 specified targets as indicated in Table 2-3. Hence, there are 12 cards of this type.

**See note on Card 10-4.

CARD: 10-8

TABLE 2-3. TARGET INDEXES

Index	Target
1-10	Standing personnel in an open environment
11-20	Prone personnel in an open environment
21-30	Personnel in foxholes in an open environment
31-40	Tank in an open environment
41-50	APC in an open environment
51-60	Standing personnel in woods
61-70	Prone personnel in woods
71-80	Personnel in foxholes in woods
81-90	Tank in woods
91-100	APC in woods
101-110	Truck in an open environment
111-120	Truck in woods

ICM Input [RTP(I) = 1]					CARD: 10-9
	A	B	C	D	E
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	SRE	---*	F7.1	1-7	Slope of radius of effects versus target range plot for j^{th} different round**
B	REZ	meters	F7.1	8-14	Radius of effects for zero target range for j^{th} different round
C	SRO	---	F7.1	15-21	Submissile reliability in an open environment for j^{th} different round
D	SRW	---	F7.1	22-28	Submissile reliability in a wooded environment for j^{th} different round
E	EN	---	F7.1	29-35	Number of submissiles in j^{th} round
					**See note on Card 10-4.

CARD: 10-9

*Nondimensional

ICM Input [RTP(I) = 1]

CARD: 10-10

	A	B	C	D	E	F	G	H	I	J	K	L
	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

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	AL(1)	square meters	F6.4	1-6	Lethal area of one submissile versus standing personnel in an open environment for the j^{th} round
B	AL(2)	square meters	F6.4	7-12	Lethal area of one submissile versus prone personnel in an open environment for the j^{th} round
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
L	AL(12)	square meters	F6.4	67-72	Lethal area of one submissile versus a truck in a wooded environment for the j^{th} round

Note: AL(3) through AL(11) are lethal areas for the 3rd through 11th target types as defined in Table 2-1.

CARD: 10-10

Number of Fire Units					CARD: 11
	A				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NFU	---*	I5	1-5	Number of fire units in force (NFU $\leq$ 150)

CARD: 11

*Nondimensional

Fire Unit Indexes					CARD: 11-1
	A B				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NFU1(1)	---*	I2	1-2	Index in the arrival and departure times and coordinate arrays for the first fire unit (See Card 11-4)
B	NFU1(2)	---	I2	3-4	Index in the arrival and departure times and coordinate arrays for the second fire unit
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
	NFU1(35)	---	I2	69-70	Index in the arrival and departure times and coordinate arrays for the 35th fire unit
					Note: There are $\frac{NFU-1}{5}$ +1 cards of this type.

CARD: 11-1

*Nondimensional

Number of Sites

CARD: 11-2

A

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NSITE(J)	---*	I5	1-5	Number of sites the j^{th} different fire unit can occupy [NSITE(J) $\leq$ 8] Note: If NFU1(I-1) = NFU1(I) for J $\geq$ 2 then this card is read once for NFU1(I-1).

CARD: 11-2

*Nondimensional

Fire Unit ID					CARD: 11-3
	A				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	FSID(I)	---*	F8.1	1-8	ID number of weapon system to which the *ith* fire unit belongs (See SYSID on Card 9)

CARD: 11-3

*Nondimensional

Fire Unit Times and Coordinates					CARD: 11-4
	A	B	C	D	
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	TA(I,J)	hours, min	F8.1	1-8	Arrival time of *jth* fire unit at its *ith* site
B	TD(I,J)	hours, min	F8.1	9-16	Departure time of *jth* fire unit from its *ith* site
C	XS(I,J)	km	F8.1	17-24	x-coordinate of the *jth* fire unit's *ith* site
D	YS(I,J)	km	F8.1	25-32	y-coordinate of the *jth* fire unit's *ith* site
					Note 1: The positive X-axis points east, the positive Y-axis points north with (0,0) determined by the user.
					Note 2: There are NSITE(J) of these cards.
					Note 3: If NFU1(I) = NFU1(I+1), this card is read once for NFU1(I+1).
					CARD: 11-4

Round-System ID | CARD: 12

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	SYSRD(I,1)	---*	F7.1	1-7	System ID that has following rounds available
B	SYSRD(I,2)	---	F7.1	9-14	Round ID of first round allowed for i^{th} weapon system
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	SYSRD(I,10)	---	F7.1	64-70	Round ID at ninth round allowed for i^{th} weapon system

Note: There are three cards of this type for each weapon system. The second card contains the round ID's for the 10th through 19th allowable rounds and the third card contains the round ID's for the 20th through 29th allowable rounds. Hence, there are three NSYS cards of this type.

CARD: 12

*Nondimensional

Round-Posture Data					CARD: 13
	A B C				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	NP	---*	I5	1-5	*ith* posture number
B	NRO(I)	---	I5	6-10	Number of different rounds allowed versus the *ith* posture in an open environment [NRO(I) $\leq$ 40]
C	NRW(I)	---	I5	11-15	Number of different rounds allowed versus the *ith* posture in a wooded environment [NRW(I) $\leq$ 40]
					Note: A set of Cards 13, 14, and 15 is read for each of the 12 allowable postures.
					CARD: 13

*Nondimensional

Round-Posture Data | CARD: 14

	A	B	C	D	E	F	G	H	I	J
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION					
A	ORVP(I,1)	---*	F7.1	1-7	Round ID of first round allowed versus *ith* posture in an open environment					
B	ORVP(I,2)	---	F7.1	8-14	Round ID of second round allowed versus *ith* posture in an open environment					
.	.	.	.	.						
.	.	.	.	.						
.	.	.	.	.						
J	ORVP (I,10)	---	F7.1	64-70	Round ID of 10th round allowed versus *ith* posture in an open environment Note: There are $\frac{NRO(I)-1}{10}$ +1 cards of this type.					

CARD: 14

*Nondimensional

Round-Posture Data | CARD: 15

	A	B	C	D	E	F	G	H	I	J

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	WRVP(I,1)	---*	F7.1	1-7	Round ID of first round allowed versus *ith* posture in a wooded environment
B	WRVP(I,2)	---	F7.1	8-14	Round ID of second round allowed versus *ith* posture in a wooded environment
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	WRVP (I,10)	---	F7.1	64-70	Round ID of 10th round allowed versus *ith* posture in a wooded environment

Note: There are $\frac{NRW(I)-1}{10}+1$ cards of this type.

CARD: 15

*Nondimensional

Mix Title

CARD: 16

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	MIXID(1)	---*	I4	1-4	Mix identifier which is used to label data cards specifying weapon system round and fire unit mixes
B	MIXID(2)	---	I4	5-8	
C	MIXID(3)	---	A4	9-12	
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
P	MIXID(16)	---	A4	61-64	

CARD: 16

*Nondimensional

Dummy Card | CARD: 17

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CONFAC(1)	---*	F10.1	1-10	Total number of days of engagement at the FACT (on Card 2) game intensity/total number of days of engagement in a theater times the total number of tubes in the theater for each of the following weapons: (1) 60-mm mortar (2) 81-mm mortar (3) 4.2-inch mortar (4) 105-mm gun (5) 155-mm gun (6) 175-mm gun (7) 8-inch gun
B	CONFAC(2)	---	F10.1	11-20	
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
G	CONFAC(7)	---	F10.1	61-70	

CARD: 17

*Nondimensional

Weapon System Mix					CARD: 18
	A B . . .				
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	KSIG(1)	---*	I1	1	Flag used for first weapon system as defined by Card 9 = 1: weapon system is allowed in present mix of systems, rounds, and fire units = 0: weapon system is not allowed in present mix of systems, rounds, and fire units
B	KSIG(2) . . .	---	I1 . . .	2 . . .	Flag used for second weapon system as defined by Card 9 = 1: same as above = 0: same as above
	KSIG(30)	---	I1	30	Flag used for 30th weapon system as defined by Card 9 = 1: same as above = 0: same as above

CARD: 18

*Nondimensional

Round Mix | CARD: 19

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	KRIG(1)	---*	I1	1	Flag used for first round as defined by Card 10-2 = 1: round is allowed in present mix of systems, rounds, and fire units = 0: round is not allowed in present mix of systems, rounds, and fire units
B	KRIG(2)	---	I1	2	Flag used for second round as defined on Card 10-2 = 1: same as above = 0: same as above
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
	KRIG(80)	---	I1	80	Flag used for 80th round as defined by Card 10-2 = 1: same as above = 0: same as above Note: There are $\frac{NRDS-1}{80}$ +1 cards of this type.

CARD: 19

*Nondimensional

Fire Unit Mix

CARD: 20

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	KFIG(1)	---*	I1	1	Flag used for first fire unit = 0: fire unit not allowed in present mix of weapon systems, rounds, and fire units = 1: fire unit allowed in present mix but only at the direct support level = 2: fire unit allowed in present mix but only at the division support level = 3: fire unit allowed in present mix but only at the corps support level
B	KFIG(2)	---	I1	2	Same as above for second fire unit
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
	KFIG(80)	---	I1	80	Same as above for 80th fire unit

CARD: 20

*Nondimensional

Critical Employment of Rounds

CARD: 21

A B

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	CRTERA	---*	F7.4	1-7	Flag used in determining employment of rounds against a target = 1: cost is critical = 2: weight is critical
B	HOPT	---	F7.4	8-14	Target flag = 0: select targets to be considered > 0: do not select targets to be considered

CARD: 21

*Nondimensional

Number of Targets

CARD: 22

A

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	I114	---*	I5	1-5	Number of targets to consider (I114 $\leq$ 3000) Note: Cards 22, 22-1, and 22-2 are read only if HOPT = 0.

CARD: 22

*Nondimensional

Target ID Numbers — CARD: 22-1

	A	B	C	D	E	F	G	H	I	J
	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								

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HM113(1,1)	---*	F7.4	1-7	Target ID number of first target to consider
B	HM113(2,1)	---	F7.4	8-14	Target ID number of second target to consider
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	HM113(10,1)	---	F7.4	64-70	Target ID number of 10th target to consider

Note: There are $\frac{I114-1}{10}+1$ cards of this type.
This card is read only if HOPT = 0 (Card 21).

CARD: 22-1

*Nondimensional

Target Arrival Times

CARD: 22-2

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	HM113(1,2)	hours	F7.4	1-7	Estimated arrival time of first target to consider
B	HM113(2,2)	hours	F7.4	8-14	Estimated arrival time of second target to consider
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
J	HM113(10,2)	hours	F7.4	64-70	Estimated arrival time of 10th target to consider

Note: There $\frac{I114-1}{10}$ +1 cards of this type. This card is read only if HOPT = 0 (Card 21).

CARD: 22-2

Target Tape Input (Card 1 continued) — CARD: 23

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	TNI(1)	---*	F7.1	1-7	Target ID number
B	TNJ(2)	---	F7.2	8-14	Acquisition Key = 0: single acquisition = 1: first of several acquisitions = 2: intermediate acquisition = 3: last of several acquisitions
C	TNI(3)	---	F7.2	15-21	Number of this type of target at this site
D	TNI(4)	---	F7.2	22-28	Estimated posture number for target main element
E	TNI(5)	---	F7.2	29-35	Estimated fraction of target in a wooded environment
F	TNI(6)	---	F7.2	36-42	Estimated fraction of target in an open environment
G	TNI(7)	meters	F7.2	43-49	Estimated target radius
H	TNI(8)	hours	F7.2	50-56	Estimated target arrival time
I	TNI(9)	hours	F7.2	57-63	Estimated target departure time
J	TNI(10)	meters	F7.2	64-70	Target location error
K	TNI(11)	km	F7.2	71-77	Estimated target x-coordinate
L	TNI(12)	km	F7.2	78-84	Estimated target y-coordinate

CARD: 23

*Nondimensional

Target Tape Input (Card 1, continued)					CARD: 23 (cont)
	L	M	N	O	P	Q
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
M	TNI(13)	km	F7.2	85-91	Target distance from forward edge of the battle area
N	TNI(14)	---	F7.2	92-98	Estimated military worth of target
O	TNI(15)	---	F7.2	99-105	Echelon which acquired target = 1: direct support = 2: division = 3: corps
P	TNI(16)	---	F7.2	106-112	Target mission type identifier (See Table 2-4 for list of types)
Q	TNI(17)	---	F7.2	113-119	Target attack level Note 1: TNI(17) is computed by the program using HWMA, HWMC (Cards 3 and 4) and TNI(13). Note 2: Location of targets and fire units is assumed to be in the same coordinate system. Note 3: TNI(3) is determined by the program.

CARD: 23 (cont)

TABLE 2-4. TARGET MISSION INDEXES

Index	Target Mission Type
1	Artillery
2	Mortars
3	Antiair
4	Antitank
5	Missile/Rocket Launchers
6	APC
7	Tank
8	Command Post
9	Observation Post
10	Assembly Area
11	Engineer Units
12	Service Units
13	Aviation Units
20	H&I Mission
30	Illumination Mission
40	Preparation Fires
50	Counter-prep Fires
60	Smoke Mission
70	Final Protection Fires

Target Tape Input (Card 2) — CARD: 24

	A	B	C	D	E	F	G	H	I	J	K
	1 2 3 4 5 6	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									

ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	TNI(18)	---*	F7.2	1-7	Target attack level. Fractional value which determines whether target is defeated
B	TNI(19)	---	F7.2	8-14	Actual posture number for target main element
C	TNI(20)	---	F7.2	15-21	Actual fraction of target in a wooded environment
D	TNI(21)	---	F7.2	22-28	Actual fraction of target in an open environment
E	TNI(22)	meters	F7.2	29-35	Actual target radius
F	TNI(23)	hours	F7.2	36-42	Actual target arrival time
G	TNI(24)	hours	F7.2	43-49	Actual target departure time
H	TNI(25)	---	F7.2	50-56	Number of personnel in target
I	TNI(26)	---	F7.2	57-63	Number of tanks in target
J	TNI(27)	---	F7.2	64-70	Number of APC's in target
K	TNI(28)	---	F7.2	71-77	Initial fraction of personnel survivors
L	TNI(29)	---	F7.2	78-84	Initial fraction of tank survivors
M	TNI(30)	---	F7.2	85-91	Initial fraction of APC survivors
N	TNI(31)	---	F7.2	92-98	Target frequency at Low Intensity Game level
O	TNI(32)	---	F7.2	99-105	Target frequency at Mid Intensity Game level

CARD: 24

*Nondimensional

Target Tape Input (Card 2, continued)					CARD: 24 (cont)
	L	M	N	O	P	Q	R
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
P	TNI(33)	---*	F7.2	106-112	Target frequency at High Intensity Game level
Q	TNI(34)	---	F7.2	113-119	Number of trucks in target
R	TNI(35)	---	F7.2	120-126	Initial fraction of truck survivors
					Note 1: TNI(18) is computed by the program.
					Note 2: TNI(19) through TNI(24) is set equal to TNI(4) through TNI(9) by the program.
					Note 3: TNI(28) through TNI(30) are set to 1.

CARD: 24 (cont)

*Nondimensional

Target Tape Input (Card 3)						CARD: 25
	A	B	C	D	E	F	G	H
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION			
A	AMSN(I,1)	---*	F8.2	1-8	Target ID of *ith* "other" mission			
B	AMSN(I,2)	---	F8.2	9-16	Number of rounds 105-mm system needs to fire *ith* mission			
C	AMSN(I,3)	---	F8.2	17-24	Number of rounds 155-mm system needs to fire *ith* mission			
D	AMSN(I,4)	---	F8.2	25-32	Number of rounds 175-mm system needs to fire *ith* mission			
E	AMSN(I,5)	---	F8.2	33-40	Number of rounds 203-mm system needs to fire *ith* mission			
F	AMSN(I,6)	---	F8.2	41-48	Number of rounds MARS system needs to fire *ith* mission			
G	AMSN(I,7)	---	F8.2	49-56	Number of rounds LANCE system needs to fire *ith* mission			
H	AMSN(I,8)	---	F8.2	57-64	Number of rounds HJ system needs to fire *ith* mission			
					Note: This card is read only if TNI(16) = 20, 30, or 60.			

CARD:25

*Nondimensional

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SECTION III

OUTPUT

The output of the Indirect Fire Model Program consists of two groups of data. The first group is a printing of card inputs which provides an input record for a given run (a run consists of one or more cases). The second group consists of intermediate and final results of the program for each case.

Figure 3-1 illustrates the output produced on Logical Unit 6. Part A is a listing of the contents of card types 16 and 18 through 21. The last line of Part A is the value of the flag HOPT (card type 21). Part B is a listing of the target identification numbers and arrival times of target reacquired after being defeated. This output is produced once per case.

Figure 3-2 illustrates the output produced on Logical Unit 7. The first two lines include the number of round types in the present case and the contents of card type 16. The next line is a listing of the values entered on card type 17. The remainder of the output is the round identification numbers followed by the total number of rounds fired for each round type. This output is produced once per case.

Figure 3-3 is an illustration of the output written onto Logical Unit 11. The number of targets, the target identification number, and target arrival time for each target are written. This output is produced once per case if HOPT (card type 21) is not equal to zero.

Figures 3-4, 3-5, and 3-6 illustrate the output produced on Logical Unit 12. This output is a listing of the contents of card types 2 through 7, 10-2 through 10-10, 11-1 through 11-4, and 15 through 15 as the cards are read by the program. The numbered hexagons correspond to the line numbers given in Tables 3-1, 3-2, and 3-3 respectively. This output is produced once per run.

Figure 3-7 is an illustration of the output produced on Logical Unit 13. Each line includes target identification number, target arrival time, range to target from given fire unit in kilometers, the round and system identification numbers; number of rounds fired; numbers of personnel, tanks, APC's, and trucks defeated; game time in hours; posture number of target main element; a flag indicating where in the program the line was written (See Table 3-4); and the number of target main elements in the target. This output is produced for each firing of each case.

Figures 3-8 and 3-9 illustrate the output produced on Logical Unit 14. Figure 3-8 is a listing of the contents of card types 1, 8, 9, 9-1, 10, and 11 as read by the program. Figure 3-9 is an illustration of the final results of the program which includes the game ending time; the contents of card type 16; the number of targets; the number of target acquisitions; the total number

of personnel, tanks, APC's, and trucks acquired; and the total military worth of all acquisitions. Also for each weapon system, the weapon system identification number; the cost and weight of the ammunition expended; and the number of personnel, tanks, APC's and trucks defeated are printed. For each round type the round identification number, the number of rounds fired for various target ranges, and the total number of rounds fired are printed. The variables PCTQ and MW are, respectively, the percentage of acquisitions which were not firings and the total military worth of the defeated targets.

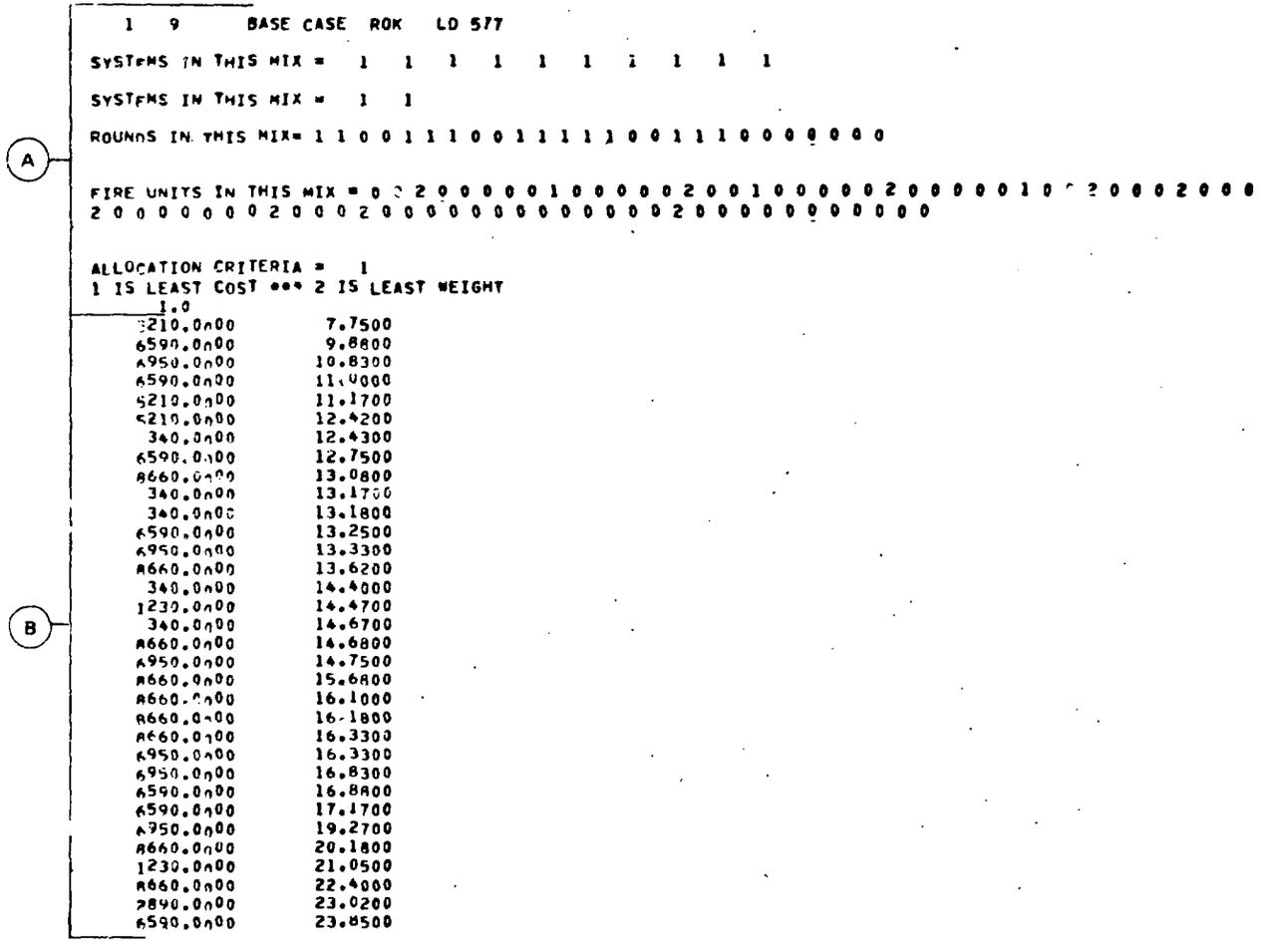

Figure 3-1. Logical Unit 6 Output

```
 13   1   9
     BASE CASE  ROK   LD 577
0.0          0.0          0.0          0.0035800 0.0053700 0.0          0.0241670
1101.0 1102.2 1153.2 1153.3 1201.0 1202.3 1253.2 1253.3 1231.0 1232.2
1401.1 1402.3 1401.0
  35.4   14.5  457.1     0.0     0.0     0.0 1118.9     0.0     0.0     0.0
   0.0    0.0    0.0
```

Figure 3-2. Round Results

```
  5n
8660.0 8660.0 5210.0900 2.090314.090584.090082.0 1840.0  220.0  350.0
6950.0 1230.0 2890.0    50.0 1760.0 2600.0 6590.0 8660.0 1760.0 2670.0
2670.090292.0  340.090 12.090095.090285.0  350.090202.0 1760.0 2670.0
2670.0 2670.0  450.090662.0 1760.0 5990.0 5780.0 2670.0 2670.0 2670.0
 350.0902e2.090512.0 2990.090502.090672.090462.0 6830.0 3694.0 7642.0
  0.02   0.53   0.53   5.75   5.75   5.75   6.17   7.48   7.25   7.42
  7.65   7.58   7.58   7.63   7.55   7.88   9.67  10.67  10.67  10.50
 10.83  11.00  11.67  11.75  11.75  11.75  11.83  12.25  12.33  12.33
 13.33  13.42  14.28  14.67  14.88  15.10  15.22  15.33  15.43  16.43
 16.67  18.00  18.25  18.68  20.00  20.17  21.00  23.10  23.67  23.83
```

Figure 3-3. Target ID's and Arrival Times

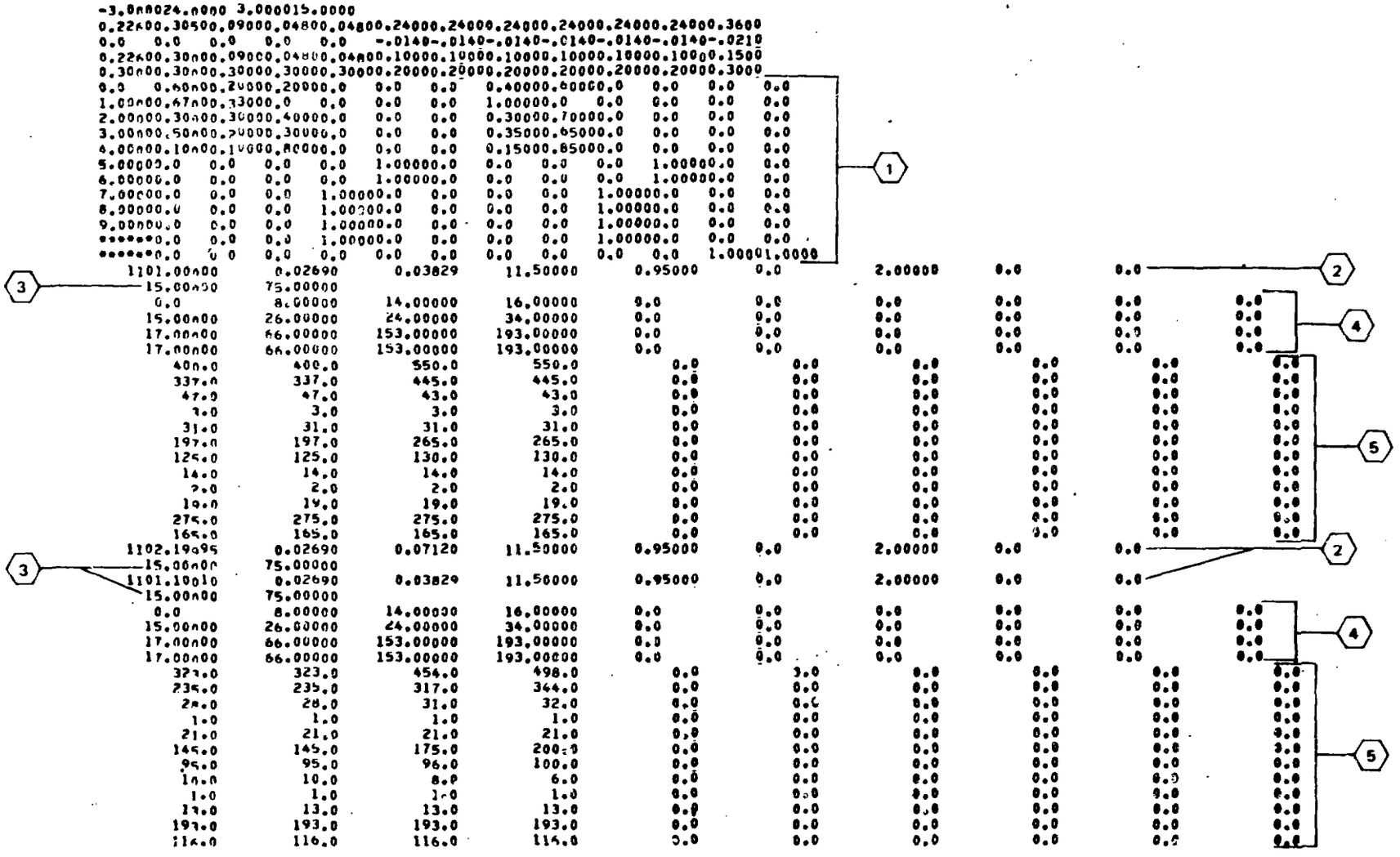

Figure 3-4. Round Data (Page 1 of 2)

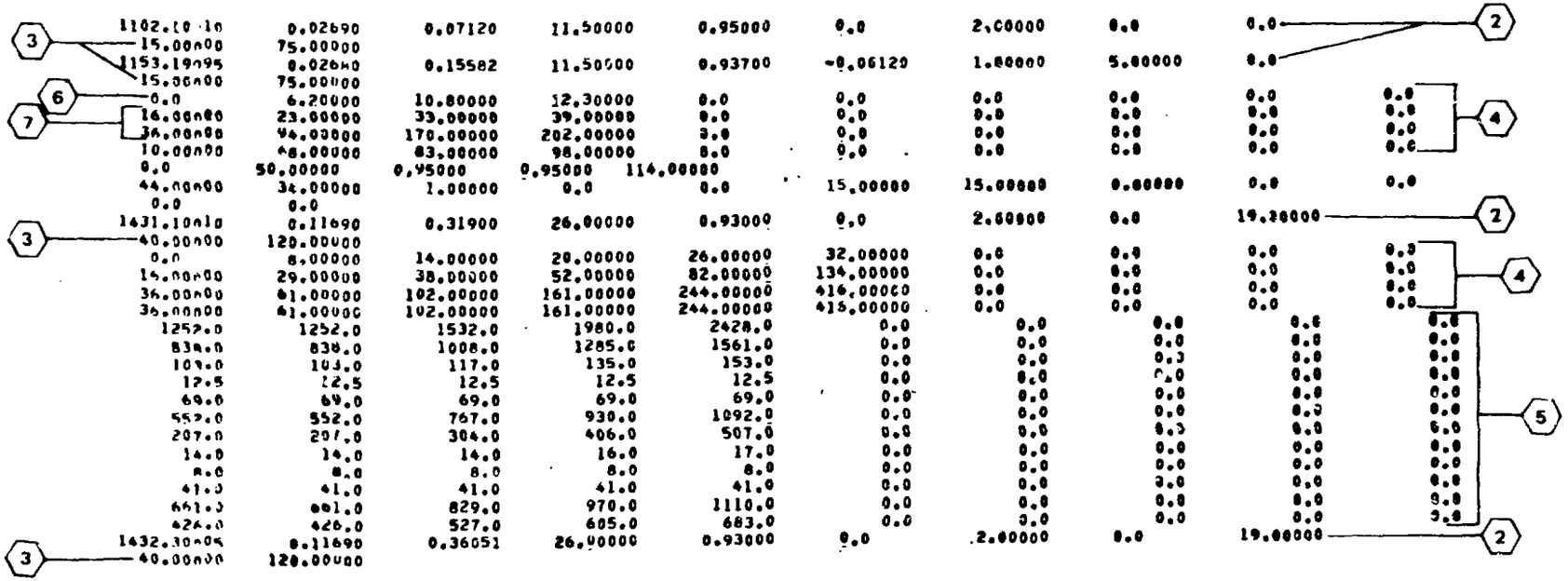

Figure 3-4. Round Data (Page 2 of 2)

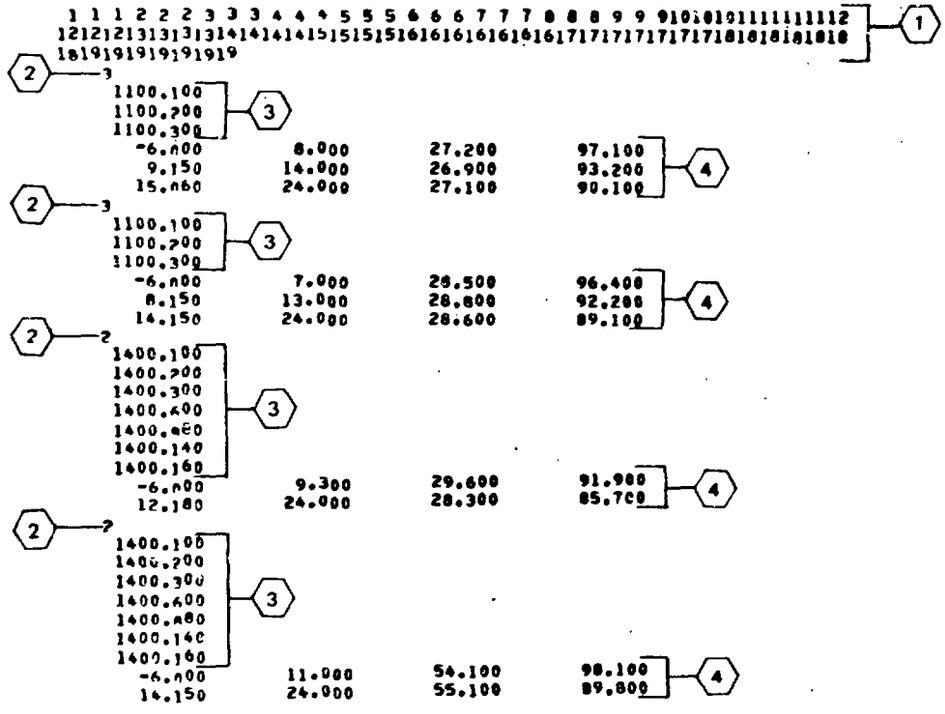

Figure 3-5, Fire Unit Data

TABLE 3-1. LINE NUMBERS FOR FIGURE 3-4.

Line Number	Contents
1	Card Type 7
2	Card Type 10-2
3	Card Type 10-3
4	Card Types 10-4 through 10-7
5	Card Type 10-8
6	Card Type 10-9
7	Card Type 10-10
Note: Lines 2 and 3 are printed for each round. Lines 4 through 7 are printed for each different round, with line 5 for HE rounds and lines 6 and 7 for ICM rounds.	

TABLE 3-2. LINE NUMBERS FOR FIGURE 3-5.

Line Number	Contents
1	Card Type 11-1
2	Card Type 11-2
3	Card Type 11-3
4	Card Type 11-4
Note: Lines 2 and 4 are printed for each different fire unit (see Section II). Line 3 is printed for each fire unit.	

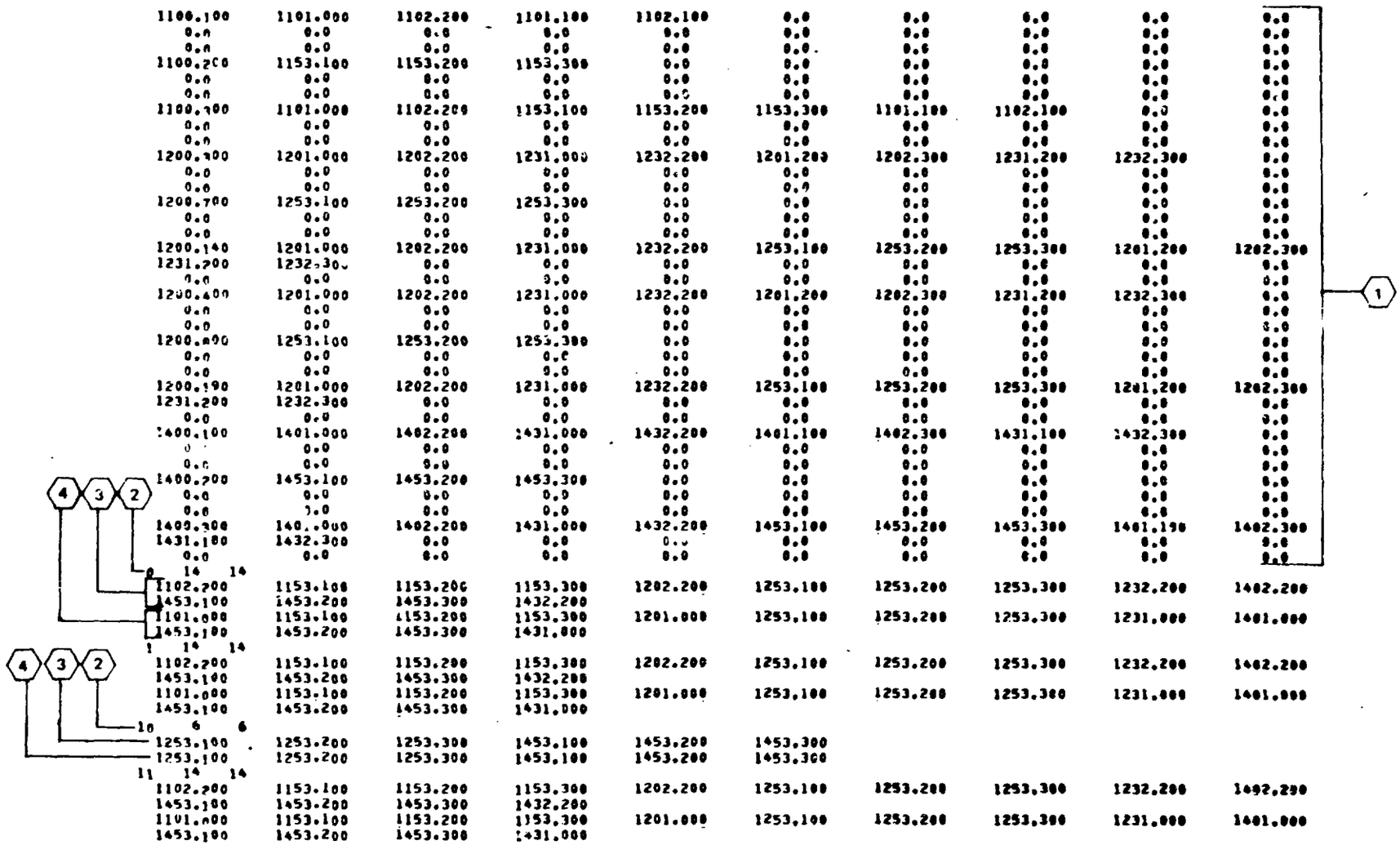

Figure 3-6. Round-System and Round-Posture Data

TN	ACQ TIME	RANGE	RND ID	SYS ID	NO. RDS	NO. PERS	NO. TANK	NO. APC	NO. TRUCKS	TIME	POSTURE	MSN NO.	ELMTS
8640.00	0.02	5.14	1153.20	1100.30	11.25	9.11	0.0	0.0	0.0	0.0	2.00	9.00	97.00
8640.00	6.53	4.97	1153.20	1100.30	11.25	7.75	0.0	0.0	0.0	0.50	2.00	9.00	97.00
5210.00	0.53	5.96	1153.20	1100.30	22.51	30.20	0.0	0.0	0.0	0.50	1.00	7.00	127.00
90092.00	5.75	5.32	1153.20	1100.30	11.66	0.0	0.0	0.0	0.0	5.75	4.00	1.00	0.0
90314.00	5.75	4.53	1253.20	1200.14	180.99	11.46	0.0	0.0	0.0	5.75	1.00	7.00	30.00
90584.00	5.75	7.50	1153.20	1100.30	13.50	4.72	0.0	0.0	0.0	5.75	4.00	9.00	97.00
90092.00	6.17	3.57	1153.20	1100.30	8.21	0.0	0.0	0.0	0.0	6.00	4.00	1.00	0.0
1840.00	7.48	5.75	1153.20	1100.30	4.94	5.04	0.0	0.0	0.0	7.25	3.00	1.00	105.00
220.00	7.25	7.84	1153.20	1100.30	3.67	3.74	0.0	0.0	0.0	7.25	3.00	1.00	78.00
350.00	7.42	5.32	1153.20	1100.30	6.43	1.25	0.0	0.0	0.0	7.25	4.00	1.00	26.00
6950.00	7.65	5.42	1253.20	1200.14	244.96	8.0	0.0	0.64	0.0	7.50	5.00	7.00	3.00
1230.00	7.50	11.20	1153.20	1100.30	18.00	20.56	0.0	0.0	0.0	7.50	1.00	8.00	191.00
1230.00	7.50	11.73	1253.20	1200.14	18.00	21.79	0.0	0.0	0.0	7.50	1.00	8.00	191.00
1230.00	7.50	12.88	1253.20	1200.19	15.75	15.84	0.0	0.0	0.0	7.50	1.00	9.00	191.00
2890.00	7.50	13.83	1253.20	1200.14	116.84	51.98	0.0	0.0	0.0	7.50	1.00	7.00	168.00
450.00	7.63	6.86	1153.20	1100.30	3.47	3.74	0.0	0.0	0.0	7.50	3.00	1.00	78.00
1740.00	7.58	6.28	1153.20	1100.30	17.26	0.77	0.0	0.0	0.0	7.50	4.00	1.00	16.00
2640.00	7.88	11.23	1153.20	1100.30	9.41	1.82	0.0	0.0	0.0	7.75	4.00	1.00	30.00
6590.00	9.67	9.15	1153.20	1100.30	11.55	0.0	0.0	0.0	0.0	9.50	4.00	1.00	26.00
8640.00	10.67	9.74	1153.20	1100.30	32.12	24.15	0.0	0.0	0.0	10.50	1.00	1.00	97.00
1740.00	10.67	9.78	1153.20	1100.30	21.42	0.74	0.0	0.0	0.0	10.50	4.00	1.00	16.00
2670.00	10.50	9.36	1153.20	1100.30	8.23	3.89	0.0	0.0	0.0	10.50	4.00	1.00	81.00
2670.00	10.83	9.77	1153.20	1100.30	7.50	3.87	0.0	0.0	0.0	10.75	4.00	9.00	81.00
90292.00	11.00	7.11	1153.20	1100.30	8.03	0.0	0.0	0.0	0.0	11.00	4.00	1.00	0.0
340.00	11.67	7.18	1253.20	1200.14	288.00	0.0	0.0	0.0	0.0	11.50	9.00	6.00	1.00
340.00	11.67	7.23	1253.20	1200.19	151.93	0.0	0.0	0.0	0.0	11.50	9.00	7.00	1.00
90612.00	11.75	7.66	1153.20	1100.30	6.77	0.0	0.0	0.0	0.0	11.75	4.00	1.00	0.0
90095.00	11.75	11.23	1253.20	1200.19	18.00	4.36	0.0	0.0	0.0	11.75	3.00	8.00	105.00
90095.00	11.75	11.96	1253.20	1200.14	2.25	0.75	0.0	0.0	0.0	11.75	3.00	9.00	105.00
90245.00	11.75	9.24	1153.20	1100.30	21.55	4.59	0.0	0.0	0.0	11.75	3.00	7.00	97.00
340.00	11.83	10.87	1153.20	1100.30	3.75	1.16	0.0	0.0	0.0	11.75	4.00	9.00	26.00
90202.00	12.25	6.06	1153.20	1100.30	8.08	0.0	0.0	0.0	0.0	12.25	4.00	1.00	0.0
1740.00	12.33	9.07	1153.20	1100.30	6.72	0.70	0.0	0.0	0.0	12.25	4.00	1.00	16.00
2670.00	12.33	9.09	1153.20	1100.30	10.65	3.52	0.0	0.0	0.0	12.25	4.00	1.00	81.00
2570.00	13.33	8.55	1153.20	1100.30	5.25	3.38	0.0	0.0	0.0	13.25	4.00	9.00	81.00
2670.00	13.42	9.13	1153.20	1100.30	11.55	3.18	0.0	0.0	0.0	13.25	4.00	1.00	81.00
450.00	14.28	11.05	1153.20	1100.30	1.88	3.74	0.0	0.0	0.0	14.25	3.00	9.00	78.00
90642.00	14.67	7.02	1153.20	1100.30	8.03	0.0	0.0	0.0	0.0	14.50	4.00	1.00	0.0
1740.00	14.88	9.76	1153.20	1100.30	5.63	0.70	0.0	0.0	0.0	14.75	4.00	9.00	16.00
5900.00	15.10	13.51	1253.20	1200.14	6.75	9.09	0.0	0.0	0.0	15.00	2.00	9.00	97.00
5740.00	15.22	7.76	1253.20	1200.14	75.43	0.0	0.0	0.65	0.0	15.00	6.00	7.00	3.00
2670.00	15.33	8.36	1153.20	1100.30	8.98	3.03	0.0	0.0	0.0	15.25	4.00	1.00	81.00
2670.00	15.43	7.88	1153.20	1100.30	9.00	3.01	0.0	0.0	0.0	15.25	4.00	9.00	81.00
2670.00	16.43	7.57	1153.20	1100.30	14.63	12.91	0.0	0.0	0.0	16.25	0.0	9.00	81.00
340.00	16.67	11.13	1153.20	1100.30	16.70	5.33	0.0	0.0	0.0	16.50	0.0	1.00	26.00
90252.00	18.00	5.95	1153.20	1100.30	8.09	0.0	0.0	0.0	0.0	18.00	4.00	1.00	0.0
90512.00	18.25	9.55	1153.20	1100.30	7.87	0.0	0.0	0.0	0.0	18.25	4.00	1.00	0.0
2980.00	18.68	8.50	1153.20	1100.30	13.50	0.0	0.0	0.0	0.0	18.50	4.00	9.00	151.00
90502.00	20.00	9.04	1153.20	1100.30	11.56	0.0	0.0	0.0	0.0	20.00	4.00	1.00	0.0
90672.00	20.17	5.63	1101.00	1100.30	35.39	0.0	0.0	0.0	0.0	20.00	4.00	1.00	0.0
90462.00	21.00	9.89	1153.20	1100.30	7.85	0.0	0.0	0.0	0.0	21.00	4.00	1.00	0.0
6810.00	23.18	8.26	1153.20	1100.30	19.68	23.02	0.0	0.0	0.0	23.00	1.00	1.00	78.00
3694.00	23.67	5.86	1153.20	1100.30	19.80	7.02	0.0	0.0	0.0	23.50	1.00	1.00	23.00
7642.00	23.83	9.55	1102.20	1100.30	14.50	2.16	0.0	0.0	0.0	23.75	3.00	1.00	45.00

Figure 3-7. Logical Unit 13 Output

TABLE 3-3. LINE NUMBERS FOR FIGURE 3-6.

Line Number	Contents
1	Card Type 12
2	Card Type 13
3	Card Type 14
4	Card Type 15
Note: Line 1 is printed for each weapon system. Line 2, 3, and 4 are printed for each posture number.	

TABLE 3-4. MISSION Numbers

Mission Number	Printed In Routine
1	DIRUSP
2, 3, 4, 5	DIVISN
6, 7	SHMUVL
8, 9	SHONUL
10, 11, 12, 13	CORPS

```
SRCEMA
  12
1100.1      0.7    18.0     9.0     7.0     2.0 3600.0   468.0    31.0    31.0
 180.0      1.0
1100.2      0.7    18.0     9.0     7.0     2.0 3600.0   468.0    31.0    31.0
 180.0      1.0
1100.3      0.7    16.0     9.0     7.0     2.0 3600.0   468.0    31.0    31.0
 180.0      1.0
1200.3      0.7    12.0     4.0     3.0     2.0 3468.0   168.0    16.0    16.0
  64.0      1.0
1200.4      0.7    12.0     4.0     3.0     2.0 3468.0   168.0    16.0    16.0
  64.0      1.0
1200.7      0.7    16.0     4.0     3.0     2.0 4624.0   224.0    16.0    16.0
  64.0      1.0
1200.8      0.7    16.0     4.0     3.0     2.0 4624.0   224.0    16.0    16.0
  64.0      1.0
1200.1      0.7    18.0     4.0     3.0     2.0 5202.0   252.0    16.0    16.0
  64.0      1.0
1200.2      0.7    18.0     4.0     3.0     2.0 5202.0   252.0    16.0    16.0
  64.0      1.0
1400.1      0.7     5.0     2.0     1.5     2.0  788.0    40.0    10.0    10.0
  64.0      1.0
1400.2      0.7    11.0     2.0     1.5     2.0 1734.0    88.0    10.0    10.0
  64.0      1.0
1400.3      0.7     6.0     2.0     1.5     2.0 1261.0    64.0    10.0    10.0
  64.0      1.0
  26
  78
```

Figure 3-8. Listing of Data Input (Logical Unit 14)

TIME= 24.0000 BASE CASE ROK LD 577

SE
ACQ= 196.00 PERS= 2889.0 TANK= 4.00 APC= 16.00 MIL WORTH= 454.12 TRUCKS= 0.0 0.

SYSTEM	COST	WEIGHT	PERSONNEL	TANKS	APCS	TRUCKS
1100.10	0.0	0.0	0.0	0.0	0.0	0.0
1100.20	0.0	0.0	0.0	0.0	0.0	0.0
1100.30	73.6143	13.5927	207.6730	0.0	0.0	0.0
1200.30	0.0	0.0	0.0	0.0	0.0	0.0
1200.40	0.0	0.0	0.0	0.0	0.0	0.0
1200.70	0.0	0.0	0.0	0.0	0.0	0.0
1200.80	0.0	0.0	0.0	0.0	0.0	0.0
1200.14	279.7405	55.8597	114.5022	0.0	1.2950	0.0
1200.19	55.6588	10.9558	28.1986	0.0	0.0	0.0
1400.10	0.0	0.0	0.0	0.0	0.0	0.0
1400.20	0.0	0.0	0.0	0.0	0.0	0.0
1400.30	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	409.0134	79.6074	342.3665	0.0	1.2950	0.0

PCT0 = 20.7547 [illegible] 50.86

RANGE IN KILOMETERS

ROUND ID	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
1101.30	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				39.3947																										
1102.20	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				14.5027																										
1153.20	0	0	0	0	48	79	19	76	100	82	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				457.1086																										
1153.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1201.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1202.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1253.20	0	0	0	0	244	0	439	75	180	0	18	20	15	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				1116.8933																										
1253.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1231.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1232.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1401.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1402.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										
1401.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RNDSUM =				0.0																										

	OTHER MISSIONS	REGULAR TARGETS	TOTALS
ACQUISITIONS=	0	106	106
NO. OF TARGETS=	0	43	43

Figure 3-9. Final Program Results (Page 1 of 2)

```
  NO. MSN/TGTS QUEUED=                0              22              22

  SUM QUEUED - STILL ON LIST=         0              23              23

  NO. MSN/TGTS FIRED=                 0              58              58

  NO. MSN/TGTS DEFEATED=              0              14              14

  TGT FIRED BUT LOST=                 0              36              36

  QUEUED MISSION TOTAL INCLUDES THOSE DROPPED DUE TO LOW PRIORITY(     0), THOSE DEPARTED BEFORE ATTEMPT TO
FIRE(    22), AND OTHER-TYPE MISSIONS TRIED BUT CANT DO(     0).

NO. OF TGTS STILL ON TGT LIST=    1.

NO. OF PREVIOUSLY DEFEATED TGTS WHICH ARE REACQUIRED=   33.

NO. OF TARGETS COMBINED (WITHIN 200 METERS)=    0.

TOTAL OF ALL REACQUISITIONS=   63.
```

Figure 3-9. Final Program Results (Page 2 of 2)

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SECTION IV

SAMPLE PROBLEM

All values of the variables required for the proper execution of the sample problem are illustrated in this section. Figure 4-1 is a listing of the input data on Logical Unit 5, Figure 4-2 is a listing of the input data on Logical Unit 9, Figure 4-3 is a listing of the input data for Logical Unit 10, and Figure 4-4 is a listing of the target tape (Logical Unit 8). The sample problem output is illustrated and described in Section III.

```
   24
0101020203040505060607080909101011111212131415151616
1101.0 .0249   .03829    11.5   .95      0.       2.       0.       0.
  15.    75.
    0.     8.     14.     16.
   15.    26.     24.     34.
   17.    46.    153.    193.
   17.    46.    153.    193.
  400.   400.    550.    550.
  337.   337.    445.    445.
   47.    47.     43.     43.
    3.     3.      3.      3.
   31.    31.     31.     31.
  197.   197.    265.    265.
  125.   125.    130.    130.
   14.    14.     14.     14.
    2.     2.      2.      2.
   19.    19.     19.     19.
  275.   275.    275.    275.
  165.   165.    165.    165.
1102.2 .0249   .07120    11.5   .95      0.       2.       0.       0.
  15.    75.
1101.1 .0249   .03829    11.5   .95      0.       2.       0.       0.
  15.    75.
    0.     8.     14.     16.
   15.    26.     24.     34.
   17.    46.    153.    193.
   17.    46.    153.    193.
  323.   323.    454.    498.
  235.   235.    317.    344.
   28.    28.     31.     32.
    1.     1.      1.      1.
   21.    21.     21.     21.
  145.   145.    175.    200.
   95.    95.     96.    100.
   10.    10.      8.      6.
    1.     1.      1.      1.
   13.    13.     13.     13.
  193.   193.    193.    193.
  116.   116.    116.    116.
1102.1 .0249   .07120    11.5   .95      0.       2.       0.       0.
  15.    75.
1153.2   .0249 .15542 11.5   .937   -.0012 1.       5.       0.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 1 of 10)

```
  15.     75.
   0.      6.2    10.8    12.3
  16.     23.     33.     39.
  36.     94.    170.    202.
  10.     48.     83.     98.
   0.     50.       .95     .95  114.
  44.     34.     1.      0.      0.    15.   15.        .8    0.     0.     0.     0.
1153.3     .0268 .15582 11.5     .937    -.0012 1.        5.       0.
  15.     75.
   0.      6.2    10.8    12.3
  16.     23.     33.     39.
  36.     94.    170.    202.
  10.     48.     83.     98.
   0      50.       .95     .95  114.
  37.3   30.A  1.                    12.7   12.7   .8
1201.0   .0561   .09073    14.6    .95      0.       2.       0.       0.
  25.     125.
   0.     6.5    11.3     16.2
  17.     36.     37.      62.
  34.     60.    113.     186.
  34.     60.    113.     186.
 770.    770.    945.    1380.
 596.    596.    725.    1025.
  87.     87.     90.      87.
  12.     12.     12.      12.
  64.     64.     64.      64.
 326.    326.    412.     562.
 220.    220.    222.     250.
  29.     29.     16.       7.
   7.      7.      7.       7.
  38.     38.     38.      38.
 540.    540.    540.     540.
 324.    324.    324.     324.
1202.2   .0561   .12256    14.6    .95      0.       2.       0.       0.
  25.     125.
1201.2   .0561   .09073    14.6    .95      0.       2.       0.       0.
  25.     125.
   0.     6.5    11.3     16.2
  17.     36.     37.      62.
  34.     60.    113.     186.
  34.     60.    113.     186.
 454.    454.    517.     647.
 307.    307.    344.     422.
  36.     36.     38.      41.
   9.      9.      9.       9.
  51.     51.     51.      51.
 276.    276.    311.     420.
 105.    105.    128.     173.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 2 of 10)

```
 1.      1.      2.      3.
 6.      6.      6.      6.
 30.     30.     30.     30.
 377.    377.    377.    377.
226.    226.    226.    226.
1202.3 .0561  .12256   14.6  .55      0.      2.      0.      0.
  25.     125.
1253.2  .0590 .29976   14.6  .973  -.0012 1.      5.      0.
  25.     125.
   0.     5.3    9.2    13.2   17.2
  24.     27.    31.    38.    58.
  46.     96.   145.   208.   280.
  21.     57.    81.   110.   157.
  2.6     21.     .97    .92   88.
 95.7  44.5  1.    1.7   2.13  50.3  26.5  .7    .85   1.07  4.8   2.4
1253.3   .0590 .29976   14.6  .973  -.0012 1.      5.      0.
  25.     125.
   0.     5.3    9.2    13.2   17.2
  24.     27.    31.    38.    58.
  46.     96.   145.   208.   280.
  21.     57     81.   110.   157.
  2.6     21.     .97    .92   88.
 81.7  39.9  1.    1.32  1.65  42.5  23.8  .7    .66   .83   4.8   2.4
1231.0  .0651 .21374   19.   .93      0.      2.      0.    13.
  25.     125.
   0.     5.     8.8    12.6   16.4    20.2
  16.     30.    39.     53.    83.   134.
  36.     62.   103.    163.   257.   416.
  36.     62.   103.    163.   257.   416.
1000.   1060.  1060.   1213.  1550.  1834.
820.    820.   880.    923.  1019.  1278.
117.    117.   120.    125.   136.   156.
12.     12.    12.     12.    12.    12.
46.     46.    46.     46.    46.    46.
440.    440.   475.    545.   700.   875.
275.    275.   275.    284.   305.   375.
40.     40.    35.     30.    20.    17.
7.      7.      7.      7.     7.     7.
28.     28.    28.     28.    28.    25.
725.    725.   725.    725.   725.   725.
435.    435.   435.    435.   435.   435.
1232.2  .0651 .24557   19.0  .93      0.      2.      0.    13.
  25.     125.
1231.2  .0651 .21374   19.   .93      0.      2.      0.    13.
  25.     125.
   0.     5.     8.8    12.6   16.4    20.2
  16.     30.    39.     53.    83.   134.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 3 of 10)

```
   36.    62.   103.    163.   257.   416.
   36.    62.   103.    163.   257.   416.
  567.   567.   601.    680.   878.  1039.
  464.   464.   499.    555.   577.   724.
   66.    66.    68.     76.    77.    88.
    9.     9.     9.      9.     9.     9.
   35.    35.    35.     35.    35.    35.
  249.   249.   269.    303.   397.   496.
  156.   156.   156.    159.   173.   213.
   23.    23.    20.     20.    11.    10.
    5.     5.     5.      5.     5.     5.
   21.    21.    21.     21.    21.    21.
  540.   540.   540.    540.   540.   540.
  326.   326.   326.    326.   326.   326.
 1232.3  .0851 .24557    19.0   .93     0.      2.      0.     13.
   25.    125.
 1401.1  .1169 .14952    20.5   .93     0.      2.      0.      0.
   40.    120.
    0.     8.    14.     20.    26.
   16.    29.    38.     52.    82.
   36.    61.   102.    161.   244.
   36.    61.   102.    161.   244.
 1109.  1109.  1333.   1708.  2083.
  726.   726.   852.   1064.  1275.
   85.    85.    91.     99.   107.
   17.    17.    17.     17.    17.
   89.    89.    89.     89.    89.
  531.   531.   666.    815.   964.
  205.   205.   272.    349.   426.
   57.    57.    57.     57.    57.
   12.    12.    12.     12.    12.
   53.    53.    53.     53.    53.
  724.   724.   901.   1104.  1306.
  453.   453.   559.    696.   771.
 1402.3  .1169 .18135    20.5   .93     0.      2.      0.      0.
   40.    120.
 1401.0  .1169 .14952    20.5   .93     0.      2.      0.      0.
   40.    120.
    0.     8.    14.     20.    26.
   16.    29.    38.     52.    82.
   36.    61.   102.    161.   244.
   36.    61.   102.    161.   244.
  862.   862.  1035.   1327.  1618.
  564.   564.   662.    827.   991.
   66.    66.    71.     77.    83.
   13.    13.    13.     13.    13.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 4 of 10)

```
 69.     69.     69.     69.     69.
 413.    413.    517.    633.    749.
 159.    159.    211.    271.    331.
 44.     44.     44.     44.     44.
 9.      9.      9.      9.      9.
 41.     41.     41.     41.     41.
 563.    563.    700.    858.    1015.
 352.    352.    434.    517.    599.
1402.2   .1169 .18135    20.5   .93      0.      2.      0.      0.
  40.      120.
1453.2   .1169 .50829    20.5   .973  -.0012 1.      5.      0.
  40.      120.
  0.      8.      14.     20.     26.
  18.     23.     26.     29.     33.
  50.     94.     134.    196.    300.
 30.     58.     83.    116.    162.
  3.3    32.      .97     .92 195.
 105.   47.    1.     1.7    2.13   54.6  29.    .7     .85    1.07   4.8    2.4
1453.3   .1169 .50829    20.5   .973  -.0012 1.      5.      0.
  40.      120.
  0.      8.      14.     20.     26.
  18.     23.     26.     29.     33.
  50.     94.     134.    196.    300.
 30.     58.     83.    116.    162.
  3.3    32.      .97     .92 195.
 89.    42.    1.     1.32   1.65   46.3  25.    .7     .66    .83    4.8    2.4
1431.0   .1169 .31900    26.0   .93      0.      2.      0.     19.
  40.      120.
    0.      8.      14.     20.     26.     32.
   18.     29.     38.     52.     82.    134.
   36.     61.    102.    161.    244.    416.
   36.     61.    102.    161.    244.    416.
  950.    959.    963.   1056.   1263.   2217.
  554.    654.    656.    706.    842.   1469.
   89.     89.     89.     92.    104.    150.
   10.     10.     10.     10.     10.     10.
   55.     55.     55.     55.     55.     55.
  434.    434.    434.    508.    600.    855.
  332.    332.    332.    331.    350.    491.
   11.     11.     11.     12.     13.     29.
      4.4     6.4     6.4     6.4     6.4     6.4
     33.     33.     33.     33.     33.     33.
    535.    535.    535.    558.    715.   1260.
    286.    286.    286.    299.    390.    585.
1432.2   .1169 .36051    26.0   .93      0.      2.      0.     19.
  40.      120.
1431.1   .1169 .31900    26.0   .93      0.      2.      0.     19.
  40.      120.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 5 of 10)

```
    2.      8.    14.      20.     26.     32.
   14.     29.    38.      52.     82.    134.
   36.     61.   102.     161.    244.    416.
   36.     61.   102.     161.    244.    416.
 1252.   1262.  1532.   1980.   2428.
  838.    838.  1008.   1285.   1561.
  103.    103.   117.    135.    153.
 12.5    12.5   12.5    12.5    12.5
  69.     69.    69.     69.     69.
  552.    552.   767.    930.   1092.
  207.    207.   304.    406.    507.
  14.     14.    14.     16.     17.
  8.      8.     8.      8.      8.
  41.     41.    41.     41.     41.
  661.    661.   829.    970.   1110.
  426.    426.   527.    605.    683.
1432.3  .1169 .36051   26.0   .93      0.      2.       0.     19.
  40.     120.
00079
0101010202020303030404040505050606060707070808080909091010101111111112
1212121313131314141414151515151616161616161616171717171717171818181818
1819191919191919
    3
1100.1
 1100.2
 1100.3
-6.       08.00   27.2    97.1
09.15     14.00   26.9    93.2
15.06     24.00   27.1    90.1
    3
1100.1
 1100.2
 1100.3
-6.       07.00   28.5    96.4
08.15     13.00   28.8    92.2
14.15     24.00   28.6    89.1
    3
1100.1
 1100.2
 1100.3
-6.       07.00   29.5    95.9
08.15     13.00   29.9    91.8
14.15     24.00   30.5    88.7
    3
1100.1
 1100.2
 1100.3
```

Figure 4-1. Input Data on Logical Unit 5 (Page 6 of 10)

```
-6.       10.00    40.8     95.2
11.33     18.00    38.8     90.7
19.33     24.00    38.6     85.6
     2
1100.1
 1100.2
 1100.3
-6.       07.00    41.9     95.8
08.24     14.00    41.6     91.5
15.51     24.00    42.3     85.5
     3
1100.1
 1100.2
 1100.3
-6.       07.00    42.3     96.1
08.15     14.00    42.8     91.8
16.00     24.00    43.3     84.7
     3
1100.1
 1100.2
 1100.3
-6.       08.00    49.8    100.2
10.00     18.00    50.9     95.7
19.15     24.00    50.2     91.2
     2
1100.1
 1100.2
 1100.3
-6.       09.30    51.4     99.8
14.39     24.00    55.3     93.8
     2
1100.1
1100.2
1100.3
-6.       10.30    51.6     99.0
15.30     24.00    56.7     93.8
     2
1100.1
1100.2
1100.3
-6.       07.30    52.1    100.8
12.57     24.00    57.3     95.3
     2
1200.3
1200.7
1200.14
1200.15
```

Figure 4-1. Input Data on Logical Unit 5 (Page 7 of 10)

```
-6.       00.00    26.9     95.0
10.24     24.00    27.3     90.2
    3
1200.3
1200.7
1200.14
1200.15
-6.       00.00    41.3     94.8
10.51     18.00    41.4     88.8
19.24     24.00    43.7     84.7
    3
1200.3
1200.7
1200.14
1200.15
-6.       10.00    51.3     99.2
11.24     18.00    50.4     94.3
19.51     24.00    49.7     87.6
    3
1200.4
1200.8
1200.19
1200.99
-6.       07.30    32.1     94.9
10.15     21.00    32.9     89.8
22.24     24.00    31.9     86.8
    3
1200.4
1200.8
1200.19
1200.99
-6.       10.00    47.7     97.4
11.15     18.00    48.5     93.7
19.51     24.00    47.2     86.3
    2
 1400.1
1400.2
1400.3
1400.5
1400.88
1400.14
1400.16
-6.       10.30    39.7     92.0
12.15     24.00    36.8     86.5
    2
 1400.1
1400.2
1400.3
```

Figure 4-1. Input Data on Logical Unit 5 (Page 8 of 10)

```
1400.6
1400.88
1400.14
1400.16
-6.       12.00    49.4     95.6
15.15     24.00    49.1     88.5
    2
 1400.1
1400.2
1400.3
1400.6
1400.88
1400.14
1400.16
-6.       00.30    29.6     91.9
12.18     24.00    28.3     85.7
    2
 1400.1
1400.2
1400.3
1400.6
1400.88
1400.14
1400.16
-6.       11.00    54.1     98.1
14.15     24.00    55.1     89.8
1100.1 1101.0 1102.2 1101.1 1102.1
  0.
  0.
1100.2 1153.1 1153.2 1153.3
  0.
  0.
1100.3 1101.0 1102.2 1153.1 1153.2 1153.3 1101.1 1102.1
  0.
  0.
1200.3 1201.0 1202.2 1231.0 1232.2 1201.2 1202.3 1231.2 1232.3
  0.
  0.
1200.7 1253.1 1253.2 1253.3
  0.
  0.
1200.141201.0 1202.2 1231.0 1232.2 1253.1 1253.2 1253.3 1201.2 1202.3 12
1231.2 1232.3
  0.
1200.4 1201.0 1202.2 1231.0 1232.2 1201.2 1202.3 1231.2 1232.3
  0.
  0.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 9 of 10)

```
1200.3 1253.1 1253.2 1253.3
  0.
  0.
1200.1 1201.0 1202.2 1231.0 1232.2 1253.1 1253.2 1253.3 1201.2 1202.3 12
1231.2 1232.3
  0.
1400.1 1401.0 1402.2 1431.0 1432.2 1401.1 1402.3 1431.1 1432.3
  0.
  0.
1400.2 1453.1 1453.2 1453.3
  0.
  0.
1400.3 1401.0 1402.2 1431.0 1432.2 1453.1 1453.2 1453.3 1401.1 1402.3
1431.1 1432.3
  0.
```

Figure 4-1. Input Data on Logical Unit 5 (Page 10 of 10)

```
SHCEMA
-3.      24.   3.    15.
.226   .305  .09   .048  .048  .24    .24    .24    .24    .24    .24    .36
                               -.014  -.014  -.014  -.014  -.014  -.014  -.021
.226   .3    .09   .048  .048  .1     .1     .1     .1     .1     .1     .15
.3     .3    .3    .3    .3    .2     .2     .2     .2     .2     .2     .3
0.     .6    .2    .2                        .4     .6
1.     .67   .33                            1.
2.     .3    .3    .4                        .3     .7
3.     .5    .2    .3                        .35    .65
4.     .1    .1    .8                        .15    .85
 5.    0.    0.    0.    0.    1.    0.     0.     0.    0.    1.0   0.    0.
 6.    0.    0.    0.    0.    1.     0.     0.     0.    0.    1.    0.    0.
 7.   0.     0.    0.    1.    0.     0.     0.     0.   1.     0.    0.    0.
 8.    0.    0.    0.    1.    0.     0.     0.     0.    1.    0.     0.    0.
  9.   0.     0.    0.    1.   0.     0.     0.     0.    1.    0.     0.    0.
 10.   0.     0.    0.    1.   0.     0.     0.     0.    1.    0.     0.    0.
 11.   0.    0.     0.   0.  0.      0.     0.     0.   0.    0.    1.     1.
  12
1100.1   .667   18.    9.    7.    2.    3600.  468.   31.   31.
 180.    1.
1100.2   .667   18.    9.    7.    2.    3600.  468.   31.   31.
 180.    1.
1100.3   .667   18.    9.    7.    2.    3600.  468.   31.   31.
 180.    1.
1200.3   .667   12.    4.    3.    2.    3468.  168.   16.   16.
 64.     1.
1200.4   .667   12.    4.    3.    2.    3468.  168.   16.   16.
 64.     1.
1200.7   .667   16.    4.    3.    2.    4624.  224.   16.   16.
 64.     1.
1200.8   .667   16.    4.    3.    2.    4624.  224.   16.   16.
 64.     1.
1200.14 .667    18.    4.    3.    2.    5202.  252.   16.   16.
64.    1.
1200.19 .667    18.    4.    3.    2.    5202.  252.   16.   16.
 64.     1.
1400.1   .667    5.    2.    1.5   2.    788.   40.    10.   10.
 64.     1.
1400.2   .667   11.    2.    1.5   2.    1734.  88.    10.   10.
 64.     1.
1400.3   .667    8.    2.    1.5   2.    1261.  64.    10.   10.
 64.     1.
```

Figure 4-2. Input Data on Logical Unit 9

```
    0   14   14
1102.2 1152.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1152.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
    1   14   14
1102.2 1152.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1152.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
    2   14   14
1102.2 1152.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1152.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
    3   14   14
1102.2 1152.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1152.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
    4   14   14
1102.2 1152.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1152.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
    5    6    6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
    6    6    6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
    7    6    6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
    8    6    6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
```

Figure 4-3. Input Data on Logical Unit 10 (Page 1 of 2)

```
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
    9     6     6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
   10     6     6
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
1253.1 1253.2 1253.3 1453.1 1453.2 1453.3
   11    14    14
1102.2 1153.1 1153.2 1153.3 1202.2 1253.1 1253.2 1253.3 1232.2 1402.2
1453.1 1453.2 1453.3 1432.2
1101.0 1153.1 1153.2 1153.3 1201.0 1253.1 1253.2 1253.3 1231.0 1401.0
1453.1 1453.2 1453.3 1431.0
   1    9       BASE CASE  ROK    LD 577
 .0        .0          .0         .003580    .005370    .0        .024167
111111111111
11  111  11111  111
 2       1     2  1     2     1  2   2   2      2   2           2
1.       1.
```

Figure 4-3. Input Data on Logical Unit 10 (Page 2 of 2)

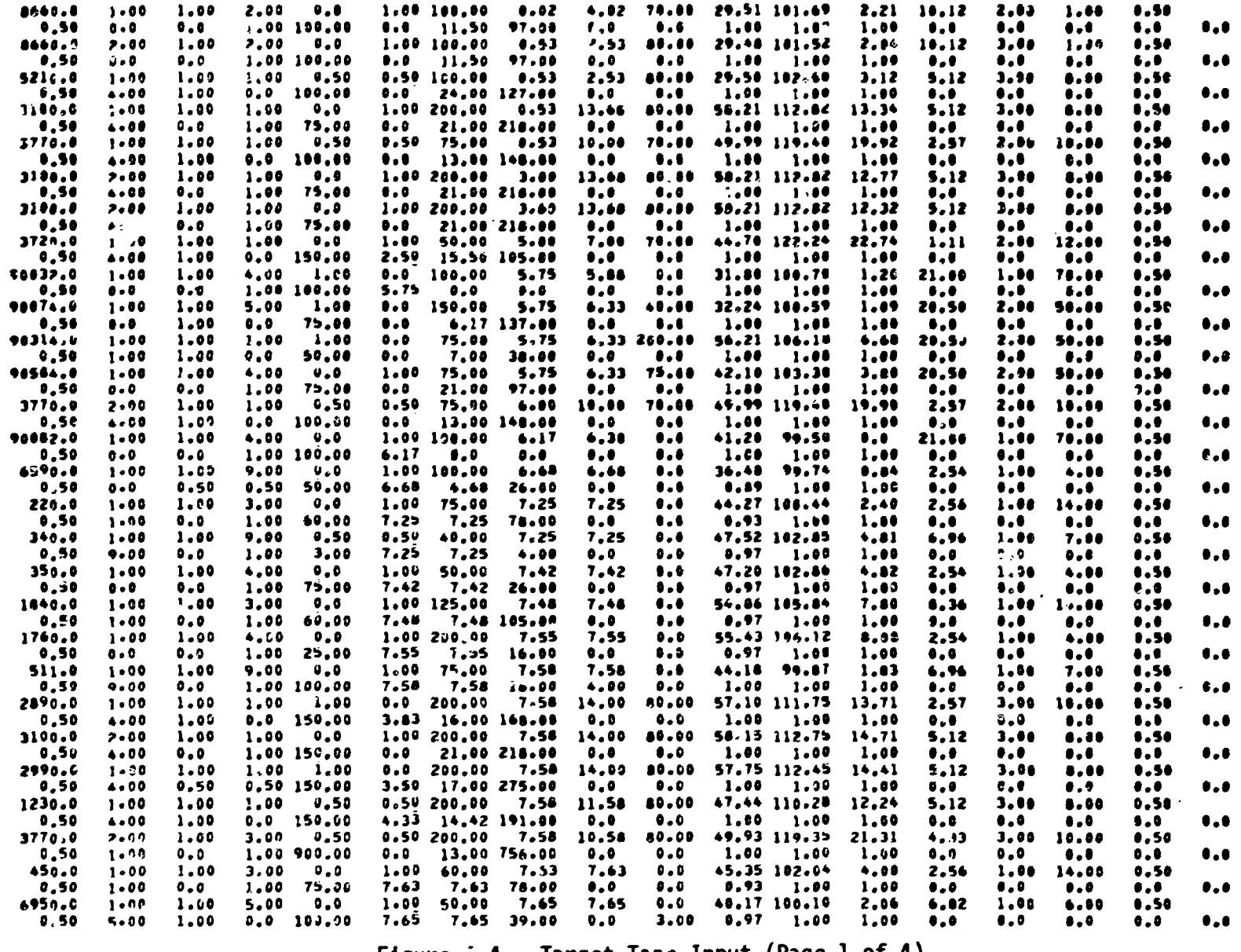

Figure 4-4. Target Tape Input (Page 1 of 4)

```
3100.0   2.00   1.00   1.00    0.0    1.00  200.00    7.68   13.68   25.00   58.21  112.82   14.78    5.12   2.00   8.00   0.50
   0.50   4.00    0.0   1.00  75.00     0.0   21.00  218.00     0.0     0.0    1.00    1.00    1.0     0.0    0.0    0.0    0.0    0.0
5210.0   2.00   1.00   2.00    0.0    1.00  200.00    7.75   11.75   80.00   29.55  102.55    4.51   10.12   3.00   1.00   0.50
   0.50   4.00   1.00    0.0  100.00     0.0   24.00  127.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
2600.0   1.00   1.00   4.00    0.0    1.00  150.00    7.88    7.88    0.0   52.01  105.21    7.17    1.75   1.00  11.00   0.50
   0.50   1.00   1.00    0.0   30.00    7.88    7.88   38.00     0.0     0.0    0.97    1.00    1.00    0.0    0.0    0.0    0.0
6590.0   2.00   1.00  11.00    1.00     0.0  100.00    8.17    8.17  105.00   36.21   99.12    1.08    2.54   1.00   4.00   0.50
   0.50  11.00   0.50    0.5   50.00    8.17    8.17   26.00     0.0     0.0    0.83    1.00    1.00    0.0    0.0    0.0    0.0
2990.0   2.00   1.00   1.00    0.5    0.50  400.00    8.42   14.00   80.00   58.40  112.60   14.56    5.12   3.00   8.00   0.50
   0.50    0.0   1.00    0.0  150.00    3.50   17.00  275.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
3100.0   2.00   1.00   1.00    0.5    0.50  400.00    8.42   14.00   80.00   58.40  112.60   14.56    5.12   3.00   8.00   0.50
   0.50   4.00    0.0   1.00  150.00     0.0   21.00  218.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
8410.0   1.00   1.00   1.00    0.0    1.00  200.00    8.42   16.00   80.00   32.62  123.10   25.06    1.11   3.00  12.00   0.50
   0.50   4.00   0.50    0.5   20.00     0.0   15.00   20.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
6590.0   2.00   1.00   4.00    1.00     0.0  100.00    9.67    9.67  105.00   36.12   98.51    0.47    2.54   1.00   4.00   0.50
   0.50    0.0   0.50    0.5   50.00    9.67    9.67   26.00     0.0     0.0    0.80    1.00    1.00    0.0    0.0    0.0    0.0
6590.0   2.00   1.00   3.00    1.00     0.0  100.00    9.88    9.88   25.00   36.02   98.92    0.88    6.96   2.00   7.00   0.50
   0.50   9.00   0.50    0.5   50.00    9.88    9.88   26.00     0.0     0.0    0.80    1.00    1.00    0.0    0.0    0.0    0.0
2670.0   1.00   1.00   4.00    0.50     0.5  100.00   10.50   10.50  105.00   51.90  102.95    5.06    2.54   1.00   4.00   0.50
   0.50    0.0   1.00    0.0   50.00   10.5   10.50   81.00     0.0     0.0    0.74    1.00    1.00    0.0    0.0    0.0    0.0
8660.0   2.00   1.00   1.00    0.0    1.00   75.00   10.67   13.00  112.00   29.60  101.54    3.65    6.71   1.00   2.00   0.50
   0.50    0.0    0.0   1.00   75.00     0.0   11.50   97.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
1760.0   2.00   1.00   4.00    0.0    1.00  100.00   10.67   12.67  101.00   55.05  104.82    6.93    6.55   1.00   4.00   0.50
   0.50    0.0    0.0   1.00   38.00    6.17   13.83   16.00     0.0     0.0    0.65    1.00    1.00    0.0    0.0    0.0    0.0
2670.0   2.00   1.00   4.00    0.50     0.5  100.00   10.83   10.83   25.00   51.86  102.94    5.05    2.54   2.00   4.00   0.50
   0.50    0.0   1.00    0.0   50.00   10.83   10.83   81.00     0.0     0.0    0.74    1.00    1.00    0.0    0.0    0.0    0.0
6590.0   2.00   1.00   6.00    0.50     0.5   50.00   10.83   13.83   25.00   38.12  100.61    2.72    5.65   2.00   6.00   0.50
   0.50   6.00   1.00    0.0  100.00    7.50   18.92   39.00     0.0    3.00    1.00    1.00    1.00    0.0    0.0    0.0    0.0
6590.0   2.00   1.00   4.00    1.00     0.0  100.00   11.00   11.00  105.00   35.86   98.06    0.62    2.54   1.00   4.00   0.50
   0.50    0.0   0.50    0.5   50.00   11.00   11.00   26.00     0.0     0.0    0.54    1.00    1.00    0.0    0.0    0.0    0.0
90292.0   1.00   1.00    .00    0.0    1.00  100.00   11.00   11.13    0.0   33.00   98.20    0.76   21.00   1.00  70.00   0.50
   0.50    0.0    0.0   1.00  100.00   11.00    0.0     0.0     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
340.0   2.00   1.00   9.00    0.0    1.00   50.00   11.17   11.17  100.00   47.47  101.05    3.61    6.96   1.00   7.00   0.50
   0.50   9.00    0.0   1.00    3.00   11.17   11.17    4.00    1.00     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
5210.0   2.00   1.00   3.00    1.00     0.0  100.00   11.17   15.17  112.00   29.40  102.63    5.19    5.12   1.00   8.00   0.50
   0.50   4.00   1.00    0.0  100.00     0.0   24.00  127.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
340.0   2.00   1.00   9.00    0.0    1.00  150.00   11.67   11.67  100.00   47.45  100.85    3.85   10.65   1.00   7.00   0.50
   0.50   9.00    0.0   1.00    3.00   11.67   11.67    4.00    1.00     0.0    1.00    0.01    1.00    0.0    0.0    0.0    0.0
90612.0   1.00   1.00   4.00    0.0    1.00  100.00   11.75   11.88    0.0   54.20  102.30    6.60   21.00   1.00  70.00   0.50
   0.50    0.0    0.0   1.00  100.00   11.75    0.0     0.0     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
90095.0   1.00   1.00   3.00    0.0    1.00   75.00   11.75   12.33  200.00   42.20  103.00    7.30   19.85   2.00  40.00   0.50
   0.50   4.00    0.0   1.00  100.00     0.0   24.00  105.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
90285.0   1.00   1.00   3.00    0.0    1.00   75.00   11.75   12.33  200.00   29.40  102.10    6.40   19.85   2.00  40.00   0.50
   0.50    0.0   0.50    0.5   75.00     0.0   24.00   95.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
350.0   2.00   1.00   4.00    0.0    1.00   50.00   11.83   11.83   25.00   47.27  101.12    5.42    2.54   2.00   4.00   0.50
   0.50    0.0    0.0   1.00   75.00   11.83   11.83   26.00     0.0     0.0    0.66    1.00    1.00    0.0    0.0    0.0    0.0
90202.0   1.00   1.00   4.00    0.0    1.00  100.00   12.25   12.38    0.0   31.30   97.70    2.00   21.00   1.00  70.00   0.50
   0.50    0.0    0.0   1.00  100.00   12.25    0.0     0.0     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
1750.0   2.00   1.00   4.00    0.0    1.00  100.00   12.33   12.33  101.00   54.90  104.05    8.35    2.54   1.00   4.00   0.50
   0.50    0.0    0.0   1.00   38.00   12.33   12.33   16.00     0.0     0.0    0.51    1.00    1.00    0.0    0.0    0.0    0.0
2670.0   2.00   1.00   4.00    1.00     0.0  100.00   12.33   12.33  105.00   51.58  102.37    6.67    2.54   1.00   4.00   0.50
   0.50    0.0   1.00    0.0   50.00   12.33   12.33   81.00     0.0     0.0    0.56    1.00    1.00    0.0    0.0    0.0    0.0
5210.0   2.00   1.00   3.00    1.00     0.0  100.00   12.42   14.42  112.00   29.51  102.61    6.91    5.12   1.00   8.00   0.50
   0.50   4.00   1.00    0.0  100.00     0.0   24.00  127.00     0.0     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
340.0   2.00   1.00   9.00    0.0    1.00   25.00   12.43   12.43   25.00   47.41  100.78    5.00    6.96   2.00   7.00   0.50
   0.50   9.00    0.0   1.00    3.00   12.43   12.43    4.00    1.00     0.0    1.00    1.00    1.00    0.0    0.0    0.0    0.0
```

Figure 4-4. Target Tape Input (Page 2 of 4)

6590.0	2.00	1.00	4.00	0.0	1.00	100.00	12.75	12.75	105.00	34.64	97.15	0.0	2.54	1.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	12.75	12.75	26.00	0.0	0.0	0.45	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	175.00	13.08	15.08	109.00	28.64	98.97	1.77	6.71	1.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	12.00	15.50	97.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
340.0	2.00	1.00	9.00	0.0	1.00	100.00	13.17	13.17	100.00	47.44	100.52	3.32	6.96	1.00	7.00	0.50	
0.50	0.00	0.0	1.00	3.00	13.17	13.17	4.00	1.00	0.0	1.00	0.01	1.00	0.0	0.0	0.0	0.0	0.0
340.0	2.00	1.00	0.0	0.0	1.00	25.00	13.18	13.18	25.00	47.35	100.42	3.22	6.96	2.00	7.00	0.50	
0.50	0.00	0.0	1.00	3.00	13.18	13.18	4.00	1.00	0.0	1.00	0.01	1.00	0.0	0.0	0.0	0.0	0.0
6590.0	2.00	1.00	4.00	1.00	0.0	100.00	13.25	13.25	105.00	35.47	97.08	0.91	2.54	1.00	[illegible]	0.50	
0.50	0.0	0.50	0.50	50.00	13.25	13.25	26.00	0.0	0.0	0.44	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2670.0	2.00	1.00	4.00	0.50	0.50	50.00	13.33	13.33	25.00	51.60	101.51	5.34	2.54	2.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	13.33	13.33	81.00	0.0	0.0	0.54	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6950.0	2.00	1.00	6.00	0.50	0.50	100.00	13.33	16.33	112.00	38.15	100.52	4.35	5.65	1.00	6.00	0.50	
0.50	4.00	1.00	0.0	100.00	7.50	18.92	39.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2670.0	2.00	1.00	4.00	1.00	0.0	100.00	13.42	13.42	105.00	51.52	192.37	6.20	2.54	1.00	4.00	0.50	
0.50	0.0	1.00	0.0	50.00	13.42	13.42	81.00	0.0	0.0	0.54	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	175.00	13.62	15.62	25.00	28.56	98.95	2.07	6.71	2.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	12.00	15.50	97.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
450.0	2.00	1.00	3.00	0.0	1.00	60.00	14.28	14.50	0.0	45.60	99.10	4.13	1.66	1.00	10.00	0.50	
0.50	1.00	1.00	0.0	75.00	13.00	24.00	78.00	0.0	0.0	0.64	1.00	1.00	0.0	0.0	0.0	0.0	0.0
340.0	2.00	1.00	0.0	0.0	1.00	50.00	14.40	14.40	0.0	47.35	100.12	5.15	6.96	1.00	7.00	0.50	
0.50	0.00	0.0	1.00	3.00	14.40	14.40	4.00	1.00	0.0	1.00	0.01	1.00	0.0	0.0	0.0	0.0	0.0
8370.0	1.00	1.00	5.00	0.0	1.00	250.00	14.45	14.45	90.00	30.75	113.02	18.05	5.11	3.00	6.00	0.50	
0.50	4.00	0.0	1.00	250.00	14.45	14.45	139.00	0.0	10.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
1230.0	2.00	1.00	1.00	0.50	0.50	300.00	14.47	18.00	80.00	47.60	110.20	15.23	3.32	3.00	10.00	0.50	
0.50	4.00	1.00	0.0	75.00	14.47	14.47	191.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
340.0	2.00	1.00	3.00	0.0	1.00	50.00	14.47	14.47	160.00	47.25	100.04	4.76	6.96	1.00	7.00	0.50	
0.50	0.00	0.0	1.00	3.00	14.47	14.47	4.00	1.00	0.0	1.00	0.01	1.00	0.0	0.0	0.0	0.0	0.0
90652.0	1.00	1.00	4.00	0.0	1.00	100.00	14.67	14.80	0.0	55.20	102.00	6.72	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	14.67	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	175.00	14.68	15.68	25.00	28.56	98.91	3.63	6.71	2.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	12.00	15.50	97.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6950.0	2.00	1.00	6.00	0.50	0.50	50.00	14.75	17.75	112.00	38.24	100.68	5.37	5.65	1.00	6.00	0.50	
0.50	4.00	1.00	0.0	100.00	7.50	18.92	39.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
1760.0	2.00	1.00	4.00	0.0	1.00	100.00	14.88	14.88	25.00	54.74	103.54	8.23	2.54	2.00	4.00	0.50	
0.50	0.0	0.0	1.00	38.00	14.88	14.88	16.00	0.0	0.0	0.47	1.00	1.00	0.0	0.0	0.0	0.0	0.0
511.0	2.00	1.00	9.00	0.0	1.00	100.00	14.88	14.88	0.0	48.15	97.10	1.79	4.96	1.00	7.00	0.50	
0.50	3.00	0.50	0.50	150.00	14.88	14.88	14.00	4.00	0.0	1.00	0.79	1.00	0.0	0.0	0.0	0.0	0.0
5990.0	1.00	1.00	2.00	0.0	1.00	75.00	15.10	15.60	0.0	28.04	103.69	8.28	10.12	1.00	1.00	0.50	
0.50	0.0	0.50	0.50	75.00	0.0	24.00	97.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
5780.0	1.00	1.00	6.00	0.0	1.00	50.00	15.22	15.50	0.0	31.01	97.01	1.66	5.65	1.00	6.00	0.50	
0.50	4.00	0.0	1.00	50.00	14.00	18.00	40.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2670.0	2.00	1.00	4.00	1.00	0.0	50.00	15.33	15.33	105.00	51.26	101.00	5.91	2.54	1.00	4.00	0.50	
0.50	0.0	0.0	1.00	75.00	15.33	15.33	81.00	0.0	0.0	0.52	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2670.0	2.00	1.00	4.00	1.00	0.0	75.00	15.43	15.43	25.00	51.33	100.61	5.44	2.54	2.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	15.43	15.43	81.00	0.0	0.0	0.52	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	75.00	15.68	15.68	25.00	28.52	98.88	3.22	2.61	2.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	15.68	15.68	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	100.00	16.10	20.10	60.00	27.86	98.77	3.19	6.71	1.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	16.00	24.00	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	11.00	0.0	1.00	100.00	16.18	16.18	0.0	27.81	98.75	3.17	2.61	1.00	2.00	0.50	
0.50	11.00	0.0	1.00	75.00	16.18	16.18	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	1.00	0.0	175.00	16.33	17.00	109.00	28.46	98.86	3.46	6.71	1.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	16.00	24.00	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6950.0	2.00	1.00	6.00	0.50	0.50	50.00	16.33	19.33	112.00	38.17	100.74	5.34	5.65	1.00	6.00	0.50	
0.50	4.00	1.00	0.0	100.00	7.50	18.92	39.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0

Figure 4-4. Target Tape Input (Page 3 of 4)

2670.0	2.00	1.00	0.0	0.0	1.00	100.00	16.43	16.43	25.00	51.08	100.09	4.69	2.54	2.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	16.43	16.43	81.00	0.0	0.0	0.50	1.00	1.00	0.0	0.0	0.0	0.0	0.0
350.0	2.00	1.00	0.0	0.0	1.00	100.00	16.67	16.67	109.00	47.39	100.36	5.20	2.54	1.00	4.00	0.50	
0.50	0.0	0.0	1.00	75.00	16.67	16.67	24.00	0.0	0.0	0.53	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6950.0	2.00	1.00	6.00	0.50	0.50	50.00	16.83	19.83	112.00	38.11	100.74	6.00	5.65	1.00	6.00	0.50	
0.50	4.00	1.00	0.0	100.00	7.50	18.92	39.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6590.0	2.00	1.00	4.00	1.00	0.0	100.00	16.88	16.84	25.00	35.38	95.72	0.98	2.54	2.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	16.88	16.88	24.00	0.0	0.0	0.41	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6590.0	2.00	1.00	4.00	1.00	0.0	100.00	17.17	17.17	105.00	35.49	95.49	0.75	2.54	1.00	4.00	0.50	
0.50	0.0	0.50	0.50	50.00	17.17	17.17	26.00	0.0	0.0	0.40	1.00	1.00	0.0	0.0	0.0	0.0	0.0
90252.0	1.00	1.00	4.00	0.0	1.00	100.00	18.00	18.13	0.0	32.50	94.30	0.0	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	18.00	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
90512.0	1.00	1.00	4.00	0.0	1.00	100.00	18.25	18.30	0.0	48.50	99.00	4.81	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	18.25	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
3100.0	2.00	1.00	1.00	0.0	1.00	150.00	18.50	19.50	70.00	58.19	112.78	22.97	5.12	2.00	8.00	0.50	
0.50	4.00	0.0	1.00	150.00	0.0	24.00	218.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2990.0	2.00	1.00	4.00	0.0	1.00	75.00	18.68	20.67	62.00	51.11	101.20	11.42	2.93	3.00	14.00	0.50	
0.50	0.0	1.00	0.0	150.00	18.50	24.00	151.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6950.0	2.00	1.00	6.00	0.0	1.00	50.00	19.17	19.27	0.0	38.67	94.44	4.66	6.82	1.00	6.00	9.56	
0.50	6.00	0.0	1.00	100.00	19.27	19.27	34.00	0.0	3.00	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
90502.0	1.00	1.00	4.00	1.00	0.0	100.00	20.00	20.13	0.0	48.70	98.10	4.23	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	20.00	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
90672.0	1.00	1.00	4.00	0.50	0.50	100.00	20.17	20.30	0.0	54.10	100.80	6.93	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	20.17	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	100.00	20.18	24.00	0.0	27.81	98.75	4.88	2.71	1.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	16.00	24.00	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
90462.0	1.00	1.00	4.00	0.0	1.00	100.00	21.00	21.13	0.0	47.50	96.60	3.17	21.00	1.00	70.00	0.50	
0.50	0.0	0.0	1.00	100.00	21.00	0.0	0.0	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
1230.0	2.00	1.00	1.00	0.0	1.00	200.00	21.05	24.00	80.00	47.52	110.22	16.80	2.57	3.00	10.30	0.50	
0.50	4.00	1.00	0.0	150.00	19.50	24.00	191.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8660.0	2.00	1.00	1.00	0.0	1.00	175.00	22.40	24.00	80.00	27.73	98.81	8.23	6.71	3.00	2.00	0.50	
0.50	0.0	0.0	1.00	75.00	16.00	24.00	97.00	0.0	0.0	0.66	1.00	1.00	0.0	0.0	0.0	0.0	0.0
2890.0	2.00	1.00	1.00	1.00	0.0	100.00	23.02	24.00	80.00	52.23	100.11	9.53	5.36	3.00	14.00	0.50	
0.50	1.00	0.50	0.50	150.00	20.50	24.00	168.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
6830.0	1.00	1.00	1.00	0.0	1.00	60.00	23.10	24.00	60.00	39.55	92.06	1.48	2.56	1.00	14.00	0.50	
0.50	1.00	0.0	1.00	75.00	23.00	24.00	78.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
7430.0	1.00	1.00	1.00	0.0	1.00	100.00	23.27	24.00	80.00	35.89	109.54	19.92	5.12	3.00	8.00	0.50	
0.50	4.00	0.0	1.00	100.00	0.0	24.00	137.00	0.0	0.0	1.00	1.00	0.0	0.0	0.0	0.0	0.0	0.0
3694.0	1.00	1.00	1.00	0.0	1.00	150.00	23.67	24.00	40.00	43.66	90.55	0.56	6.71	1.00	2.00	0.50	
0.50	0.0	0.0	1.00	50.00	23.50	24.00	23.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0
7642.0	1.00	1.00	3.00	0.0	1.00	50.00	23.83	24.00	40.00	27.35	97.72	7.73	2.56	1.00	14.00	0.50	
0.50	1.00	0.0	1.00	60.00	23.83	24.00	45.00	0.0	0.0	1.00	1.00	0.0	0.0	0.0	0.0	0.0	0.0
6590.0	2.00	1.00	1.00	1.00	0.0	100.00	23.85	24.00	60.00	35.21	92.94	2.95	2.61	1.00	4.00	0.50	
0.50	0.0	1.00	0.0	50.00	23.75	24.00	26.00	0.0	0.0	0.34	1.00	1.00	0.0	0.0	0.0	0.0	0.0
8321.0	1.00	1.00	4.00	0.0	1.00	50.00	25.00	24.00	0.0	29.17	95.88	95.88	2.61	1.00	4.00	0.50	
0.50	0.0	0.0	1.00	30.00	23.83	24.00	16.00	0.0	0.0	1.00	1.00	1.00	0.0	0.0	0.0	0.0	0.0

Figure 4-4. Target Tape Input (Page 4 of 4)

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