THESIS

COMPUTERIZED INTEGRATED INVENTORY CONTROL FOR AN AIR FORCE BASE-LEVEL SUPPLY SYSTEM.

by

Angelo Concepcion/Molato

June 1980

Thesis Advisor: N.F. Schneidewind

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# Computerized Integrated Inventory Control for an Air Force Base-Level Supply System

## Abstract

This study deals with the design and implementation of a computerized Air Base-Level Supply System. It determines the different components of the organization directly benefited by the system and identifies their respective responsibilities in the conversion from manual to a computerized system. The study further incorporates the use of an existing computer system with hardware upgrade in implementing the system to harness its full potential.
Computerized Integrated Inventory
Control for an Air Force Base-Level
Supply System

by

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I. INTRODUCTION

A. PROBLEM DEFINITION

The growing complexity of organizations and their inherent operations has created a need for management to grasp instantaneously information relevant to their decision-making processes. Technological advancements have created a phase, which over the past decade, has put upon the shoulder of managers the burden of searching through piles of information for the kernel to cope with these dynamic changes. This phenomena has rendered the manual system both inefficient and inadequate. As a consequence, organizations are turning to computerization of their basic management information systems to help deal with problems whose immediate attention is of utmost necessity. They are harnessing the very potential of computer systems—mass storage, efficient data recovery and fast information processing.

The Armed Forces, the Air Force specifically, is not an exception to the increasing demand for timely, accurate and relevant information. It has its share of requirements along this area. This study explores the feasibility of computerizing a Base-Level Supply System for better management of its inventory. Although the study is specifically tailored towards a certain organization, the steps involved in the design and implementation of a computerized information system is highlighted to provide as a guideline for similar undertakings.
B. MAJOR OBJECTIVE

The main objective of this study is to outline the different steps a system designer has to undertake in developing a computerized information system. It uses as a vehicle a typical Air Force Base-Level Supply System as a means of conveying concepts in the development process.

The study further illustrates how an existing environment (organization) could be affected by computerization. Since information systems cuts through organizational lines, the different end-users must be taken into consideration to ascertain their respective responsibilities towards the attainment of a common goal.

Lastly, the study exemplifies the concept of effective utilization of critical resources. By upgrading an existing computer system to its full complement, the study shows that the benefits to be derived outweigh heavily the incremental cost of hardware upgrade.

C. SCOPE AND LIMITATIONS

In absence of real data, this study made certain assumptions to facilitate computations. Since the major objective is for illustration purposes (as indicated in Section B above), it is presumed that those factors left out could easily be added-on in the event that an actual system development is made. Due to the wide latitude of end-user requirements and
different organizational constraints, the study specifically refrained from discussing such areas as they fall beyond the scope intended.
II. PRESENT ORGANIZATION

Discussed hereunder are the different potential users of the Inventory Control System. Being integrated in nature, different facets of the organization will be directly involved in its implementation. Organizations are presented in their skeletal form only to illustrate the relationship of the different system users involved.

A. COMMAND LEVEL

Figure 1 illustrates a typical command level of organization. Assisting the commander on matters pertaining to material requirements is Supply and Logistics, a function primarily responsible for strategic planning along this area. Under its functional supervision is the Procurement Office which is involved directly in the actual purchase and acquisition of needed supplies.

The Comptroller is the other potential user of the system at strategic level. Budget and financial planning is the main concern of the Comptroller, whose timely and accurate reports are a must in his line of work. The Accounting Department is under functional supervision of the Comptroller whose main task is the handling of all financial records of the organization. It is foreseen that the proposed system is to assist these potential users in their planning and operational needs.
B. DEPOT

The Depot has the primary mission of ensuring continuous flow of supplies in the command and undertaking major repairs on aircraft of the different operating units. The specific functions of the Depot are distributed over three directorates as shown in Figure 2.

The Directorate of Supply Management is directly concerned with inventory control of the two squadrons under it. The Depot Supply Squadron is charged with the base-level material support and services.

C. DEPOT SUPPLY SQUADRON

The hub of the system is to be implemented in this unit. The unit is organized as shown in Figure 3. A detailed discussion follows on the functions of the different branches under the squadron to pinpoint what areas are to be greatly affected.

1. Administrative Branch
   a. Provides administrative support for the Squadron like planning and administering functions relating to receipt and transmission of the unit's correspondence to include maintenance of files and control of classified materials.
   b. Responsible in the maintenance of 201 files for officers, airmen and civilian employees to include computation of furlough and leaves.
2. Plans and Management Branch

Maintains policy and procedural control for the Squadron, by initiating, formulating, coordinating, disseminating and/or implementing methods, policies and procedures relative to the internal operation of the squadron.

a. Management Section

Exercises centralized control of management methods and procedures to effect maximum utilization of supply facilities, personnel and material in the most economical manner for the Squadron. Initiates, coordinates and disseminates supply operating methods, policies and procedures.

(1) Management Analysis. Evaluates and analyzes managerial data to determine the operating efficiency of the Squadron. Prepares graphs, charts and brochures, containing statistical figures in order to accomplish the assigned mission.

(2) Supply Management. Evaluates Supply effectiveness and efficiency based on methods surveys; inspects regularly and frequently supply work areas; determines manpower requirements by analysis of workload data and conducts such operational studies as may be directed by higher headquarters.

b. Plans Section

Provides control agency service for the receipt and dissemination of planning data; evaluates plans and converts these into personnel and facilities requirement. Conducts continuous research of problem areas in the development of long
range plans. This includes services testing of Squadron and/or higher headquarters supply policies and procedures.

1. **Plans and Program**. Accomplishes projected planning and service testing of new policies and procedures received from higher headquarters. Responsible for gathering data from the entire Squadron divisions/offices for computing and analyzing efficiency of all operations. Maintains supply data in the form of statistics, charts, and graphs for effective display and management control. Operates drafting facilities for preparation of visual presentation.

2. **Training**. Responsible for the indoctrination of newly assigned personnel; conducts training courses for depot supply; conducts and maintains on-the-job training programs. Monitors all aspects of training for military and civilian personnel; requests designated supply personnel to pursue appropriate training courses.

3. **Quality Control Branch**

   Insures the fulfillment of the supply Quality Control Program for the Squadron. Develops plans and procedures of the Quality Control program of the Squadron in order to establish an effective and efficient system of quality control for material and equipment received, stored and issued by the Depot.

   a. **Quality Inspection Section**

   Performs inspection to determine compliance with prescribed quality control procedures; insures identification
of all property received, stored and issued by the Depot; sees to it that tags, labels and markings are affixed to property to reflect identity, status and condition. Inspects also property in storage to insure proper identification, condition and status, and maintains technical surveillance over property to insure technical order compliance, packing and preservation application.

b. Inventory Section

Responsible for all operations related to the scheduling and accomplishment of cycle and/or special inventory of all items stored in warehouses. Responsible for the accomplishment of inventory count and research necessary in the establishment of an accurate inventory of the Depot assets.

c. Analysis, Reports and Record Section

Establishes detailed quality control analysis; sampling procedures and quality control methods for the Squadron. Determines causes of deficiencies and recommends corrective actions. Monitors reports and maintains quality control reports for the Division.

(1) Quality Analysis. Complies quality control analysis data; maintains quality control data in the form of statistical charts and graphs for effective management control.

(2) Reports and Record. Responsible for the preparation of discrepancy or damage reports, reports of surveys,
inventory adjustment reports and other reports pertaining to material quality; and the maintenance of records and files of same.

d. Technical Publication Section

Responsible for maintaining a centralized, limited and accurate file of technical orders, Technical and Supply Manuals and other related technical publications. Takes charge of the Unit's Technical Library.

4. Statistical Services Branch

Assists the Squadron Commander on all matters pertaining to statistical functions; responsible for the timely submission of accurate statistical reports required by headquarters; performs support mission relative to requisitioning procedures and reporting system; and assumes other responsibilities regarding special projects required to accomplish the overall supply mission.

a. Statistical Analysis Section

Plans, develops, administers and analyzes statistical reports and statistical data gathered from different activities.

(1) Data Service Analysis. Provides centralized control in the processing and compilation of statistical data necessary as a guide or management tool of the Squadron or higher headquarters in command operation and programs. Prepares graphs, charts and brochures showing statistical trends of
various projects to insure that reports initiated and/or required of the Division are accurately done and submitted on time.

(2) Reports Control. Responsible for the preparation of reports and summaries relating to statistical data as may be required by the Squadron Commander or higher headquarters. Maintains a complete file of all current directives, policies and/or SOPs governing each report.

b. Centralized Accounting Section

Establishes and develops a system of receiving receipts and issues supplies and equipment to include updating and maintenance of files and requisition document control of units based on established programs, projects and monetary accounting.

5. Material Facilities Branch

Plans, administers and supervises the operation of the storage warehouses and outside storage area; responsible for the receipt and/or pick-up of supplies and equipment intended for the Depot other than those procured directly by the different Units; performs such functions relating to the receipt, storage and issue of supplies and equipment assigned to the supply Depot, to include the application of corrosion control, packaging, packing and preservation methods to material requiring such action.

a. Receiving Section

Provides centralized receiving, classification and inspection functions pertaining to purchased items. Responsible for the operation of all cargo traffic.
(1) **LP Property Receiving.** Responsible for the processing and receipt of locally purchased items prior to direct issue or transfer to the appropriate storage warehouse. Also responsible for accomplishment of pertinent papers or auditorial requirements to support payment of such receipts.

(2) **Logistics Center.** Responsible for the processing and receipt of supplies procurable through the Logistic Center. Performs such other functions as submission and follow-up of requisitions with Logistic Center.

(3) **Turn-In Property Receiving.** Responsible for the processing and receipt of all serviceable and/or unserviceable turn-in from using units.

b. **Shipping Section**

   Responsible for maintaining technical surveillance on shipping activities of the Squadron. Determine mode of transportation to be utilized in effecting cargo movements. Maintains records of cargo shipped and furnishes statistical workload data reflecting operational accomplishments.

c. **Facilities Service Section**

   Responsible for general utilities operations, including labor and equipment service. Responsible for the operation, maintenance and dispatching of vehicles assigned to the Squadron. Conducts such inspections and repairs required in the maintenance of special purpose vehicles in use and Squadron buildings to include grounds.

(1) **Material Handling Equipment.** Responsible for the maintenance, repair and control of all motor vehicles and material handling equipment assigned to the Squadron.

(2) **Service.** Responsible for furnishing labor force (civilian) within the Material Facilities Division.
d. Storage Section "A"

Responsible for the proper storage, issue and maintenance of locator cards for all items falling under the following commodity classes:

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<thead>
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<th>Commodity Class</th>
<th>Locator Card Numbers</th>
<th>1005-1305</th>
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e. Storage Section "B"

Responsible for the proper storage issue and maintenance of locator cards for all items falling under the following commodity classes:

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f. Storage Section "C"

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<td>3010-3040</td>
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<tr>
<td>3720-2750</td>
<td>5110-5180</td>
<td>9620-9650</td>
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<tr>
<td>3805-3030</td>
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</tr>
</tbody>
</table>
g. Storage Section "D"

Responsible for the storage, issue and maintenance of locator cards for all unserviceable generations of the depot and turn-ins from the different units.

h. Packing and Preservation Section

Provides packaging and crating service, corrosion control and preservation responsibilities for all supplies and equipment stored, issued or processed for shipment as required.

(1) Carpenter. Designs and manufactures or repairs crates, boxes or other containers for the shipment or storage of supplies in accordance with approved methods. Performs repair work of DSS buildings.

(2) Packing and Crating. Performs packaging servicing for the Wing, packs packaged or crated materials for shipment or storage in accordance with established packing and crating methods.

(3) Corrosion Control. Responsible for the implementation of the corrosion control and preservation program of this Squadron.

6. Property Disposal Branch

Responsible for promoting and insuring maximum utilization and conservation of all property received for disposal. This includes the proper administration.

23
a. Receiving and Inspection Section

Responsible for the receipt, inspection and storage functions of items transferred or turned in to the Disposal.

b. Redistribution, Accounting and Reporting Section

Responsible for maintaining records and reporting of excess or condemned property received, utilized, sold, transferred, redistributed, donated, reclaimed or destroyed.

c. Marketing Section

Responsible for screening and preparing lists of items authorized for bidding or sale and the keeping of records of such for sale.

7. Stock Control Branch

Responsible for maintaining and administering inventory management control over all materials received, stored and issued by the activity; computes requirements, controls levels, initiates material procurement action, and maintains such records affecting the supply system.

a. Processing Section

Responsible for the establishment, management, and control of all supply documents reflecting and supporting the receipt, issue, transfer and adjustment of the depot stock inventory.

(1) Document Receiving and Distribution. Responsible for the receipts and screening of all supply documents and for their proper routing distribution to the different stock
record sections or storage warehouses. Insures that such documents are properly registered, authenticated and validated prior to distribution or filing.

(2) **Voucher File.** Responsible for the quality editing of all supply documents to insure correctness and validity before filing permanently.

b. **Requirement Section**

Responsible for the dissemination of supply action on items of general support nature and logistics support to all activities and agencies within the command and other activities as pertains to Program and Requirements. Initiate procurement action of Depot support of Group and Class items assigned. Maintains control and supervises overall property transaction for assigned classes. Exercises supervision and control over all critical items. Determines repair support requirements.

(1) **Priority Requirement.** Responsible for the expeditious processing and monitorship of all priority requests to include editing and close monitorship and control over such requests while these are being processed through the supply system. Prepares reports to reflect daily, weekly or monthly workloads. Responsible for obtaining and/or furnishing supply information and data concerning the requirements of customer units.

(2) **Repair Progress Requirement.** Develops the annual Repair Requirement Listings.
(3) **Logistics Center Property Requirement.** Responsible for the submission of requisitions to Logistics Center for items required by customer units.

(4) **Excess Priority.** Responsible for processing, reporting or turn-in of redistributable and disposable excess property.

(5) **Special Project Requirement.** Responsible for the monitorship, planning and administration of special projects, to include processing or supply documents, selection, identification and segregated storage of material required to accomplish such projects. Insures rendition of progress and status on outstanding projects as directed.

c. **Stock Record Section**

Maintains and establishes property accounting records, supply Depot assets, and performs such related functions as initiating procurement and research necessary in updating property accounting records.

(1) **Back Order Release.** Responsible for the preparation and typing of back order releases for items intended for customer units previously requested but not available for issuance at the time of requisition.
III. PRESENT SYSTEM

The present system of inventory control is basically manual in nature. Stock levels are recorded on stock cards (Figure 4) and all managerial and statistical reports to higher levels of command are done manually. Sheer volume alone of the inventory at hand precipitates various problems which will be discussed later.

Aside from Consuming Units, there are certain Supply Points that draw supply from the Depot as illustrated in Figure 5. These Supply Points are to maintain their respective stock levels but with close monitoring from the Depot. Critical items have to be ascertained as to their specific location in the Supply Points for the Depot to be flexible in moving these items in case the need arises.

There are generally two types of items received by the Squadron. First type are receipts which are items procured through vendors or requisitioned from the Logistics Center. Second type are Turn-ins received from using units which are either excesses or unusable items.

A. REQUISITIONING PROCEDURE

The basic request for supplies and materials emmanates from the using unit. The unit concerned accomplishes a Requisition Issue voucher (RIV) (Figure 6) in six copies. This
requisition is received at the Depot Supply Squadron. The document first goes through the administrative portion commonly known as demand processing where pertinent papers are checked for validity and accurateness. The RIV then goes to Stock Control where the item requested is checked against balances on hand. If the item is available, the RIV goes to Vouchering, then the Warehouse where the item is issued. If an item is not in stock, a Single Line Item Requisition is prepared to get the item from Logistics Center. Otherwise, a local purchase is made (Figure 7 outlines in detail these steps).

B. PRIMARY DOCUMENTS

1. **Stock Control Record**
   A series of three cards containing all data in reference to a single item. It is commonly known as the memory of the whole supply system (Figure 4).

2. **Single Line Item Requisition (SLIRIT)**
   This document is used on requests for all types of supplies requisitioned at Logistics Center (Figure 8).

3. **Requisition and Issue Voucher (RIV)**
   These documents are primarily used by units in requesting for supplies. The frequency of input daily is more or less 200, 1400 weekly and 5,000 monthly. The maximum volume received is 200, the minimum zero with 100 as average (Figure 6).

4. **Property Turn-in Slip (PTIS)**
   This document is used to turn-in to the supply installation of the next higher level all excess and unserviceable supply (Figure 9).
5. **Memorandum Receipt (MR)**

This is a separate document maintained for equipment received from a supply officer and equipment issued to individual person of the unit (Figure 10).

6. **Property Issue Slip (PIS)**

Issued together with the MR from a supply accountable officer to a responsible supply officer (Figure 11).

C. **PROBLEMS WITH THE PRESENT SYSTEM**

1. **Difficulty in Locating Parts**

There are at present five supply points located at various locations. Supply levels at these points are supposed to be closely monitored at Depot level to avoid disparity of supply allocation and at the same time to keep tab of where critical items are located. Requisitions made by Consuming Units to the Supply Points are likewise monitored by the Depot. These transactions are supposed to be reported but due to the manual nature of the system, this procedure is at times neglected. The overall supply situation picture does become distorted from the Depot's point of view.

When critical items run out at a particular Supply Point, the Depot is incapable of determining where these items are or if every other Supply Points or Consuming Units still have them in inventory. During that time, equipment are rendered inoperational and crucial man-hours wasted in waiting for needed spare parts.
2. **Inaccurate Stock Cards**

The Depot at present handles about 120,000 line items. This means that, at least 120,000 stock cards are updated and maintained by the Stock Control Branch. These cards are kept in steel drawers and updating is done as requisitions or receipts are made. During the past wall-to-wall inventory made by the Depot, the balance as reflected in the stock cards did not correspond to the balance in the warehouse. The inconsistencies noted could have had a dozen reasons behind them. One reason could be that documents are not routed properly. Some requisitions might have gone through the process without passing the Stock Control Branch. Another reason could be pure neglect due to the volume of transactions handled by the Branch making updating both cumbersome and confusing.

3. **Unrealistic Reports**

Since the very data used to come out with management information is erroneous, it follows that reports based on these are as erroneous. This has an effect of a chain reaction in nature. If what higher headquarters gets is an unrealistic report, their decision making processes will be adversely affected. Hence, benefits to be derived from these decisions are not harnessed properly.

4. **Difficulty in Preparation of Reports**

Reports prepared by the Stock Control Branch are both tedious and time consuming. The annual report on inventory alone could consume a sizeable number of man-hours in its
preparation. All of these reports are manually prepared. This is one problem that the computer could very well eliminate due to the nature of its processing.

5. **Inaccurate Determination of Requirements**

The present method of determining requirements is one that is based on uncertainty. Many of the fast-moving items are frequently out of stock.

6. **Dormant Stocks**

Of the 120,000 line items carried by the Depot, 50-60 percent are considered dormant. Those are the items that had no transactions for at least one year. Records show that some of the items had been dormant for the past five to eight years.

D. **PRESENT COMPUTER SYSTEM**

The Inventory Control System is designed within specification of the present computer system used by the command for various administrative application areas. It is operated by the computer center under the direct supervision of the Comptroller. Utilizing the present configuration as the basic main frame with the needed upgrading would lessen the total implementation cost. Discussed hereunder are the major characteristics of the present computer system.

1. **Memory Unit**

   Present Size - 98,304 bytes
   Max size - 262,144 bytes
   Cycle Time - 0.6 microseconds
   Bytes Fetched per Cycle - 2
2. **I/O Channels**

   No. of Selector Channels - 2
   Max Selector Channel Data Rate - 333,000 bytes/sec
   No. of Multiplexer Channels - 1
   Max Multiplexer Channel Data Rate - 85,000 bytes/sec

3. **I/O Units**

   a. Disc
      Rotational Delay - 12.5 millisec
      Seek Time - 60 millisec
      Transfer Rate (max) - 312 millisec
      Max Capacity - 29 M bytes
      Format - Variable length physical record of any size. Each inter-record gap in the equivalent of 30 bytes.

   b. Tapes
      Tape Speed - 42.7 ips
      Recording Density - 800 bits per inch
      Peak Speed - 34,160 char per sec
      Inter-Rec Gap - 0.6 inch
      14.1 M sec
      960 bytes

   c. Card Reader
      Reading Speed - 80 col cards @ 1000 cpm
      Input Hopper Capacity - 24,000 cards
      2 Output Hopper Capacity - 2000 cards
      Connects to multiplexer channel
d. Line Printer

Print Speed - 900 lpm @ 62-char set
Print Positions - 132
Connects to multiplexer channel

e. Terminal

Buffer Size - 1,920 char
Max I/O Supported - 31
Auxiliary Units = Printer, Mag Tape
Screen Size - 1,920 char
Line Facility - voicegrade; leased, switchboard, or private

Line Speed - 300 - 900 bits per sec
Line Mode - HOX
Line Code - ASCII
Synchronization - Async; Sync

4. I/O Control Units

a. Disc Controller

Max No. - 8 Controllers/Selector Channel
Max No. Drives - 8 Disc Drives/Controller

b. Tape Subsystem

Max No. of Drives - 16 per subsystem
Each "master" tape unit can control up to three "slave" tape units.

Max No. of Sybsystem Per Selector - 8

c. Terminal Multiplexor

Max No. Avail - 4
Max Terminal per Multiplexor - 8
5. **Modems**
   Modem Speed - 4800 bps
   Type - FOX, HW/DU/L

6. **Central Processing Unit**
   Address per instruction - 2
   Instruction (word) size - 32
   Add time - 6.0 micro sec (32 bit binary fields)
   Add time - 22.2 micro sec (5 digit decimal fields)

7. **Operating System**
   Resident storage required - 90 K bytes

8. **Other**
   Average machine instruction to Source Statement - 10

9. **System Configuration Diagram**
   See Figure 12.
IV. THE PROPOSED SYSTEM

The system proposed is one that is geared towards on-line processing. It will need the facilities of a computer system with remote data communications capabilities. Remote terminals will be used as focal points of inquiries into the data base that supports the system.

A. SYSTEM OBJECTIVES

1. Minimize Inventory Investment
   With the accurate recording of all transactions, more realistic unit requirements are purchased, thereby lessening tied-up capital to inventory.

2. Minimize Inventory Carrying Cost
   With lead-time properly calculated, stocks will not be stored over an extended period of time.

3. Minimize Ordering Cost
   The procurement pipe-line time will be properly identified with the system. Items which are traditionally needed will have an established supplier thereby lessening the problems of procurement.

4. Maximize Customer Service
   Units requisitioning items from the Depot will have what they need in shorter periods of time. This is done through proper stocking of needed items and forecasting of critical supplies.
B. SALIENT POINTS

1. Automatic Replenishment Concept

The system will adopt the Automatic Replenishment Concept. This will eliminate the necessity of Consuming Units or Supply Points requisitioning requirements to the Depot. Requisitions and purchase orders are automatically triggered by the system when re-order points are reached. (Figure 13.)

2. Computer-Based System

The system is basically computer-based with all activities and record-keeping monitored through a computer. Management and statistical reports will be generated by the system as a by-product.

3. Full Accounting of Transactions Pertaining to Any Given Unit

With all the transactions recorded on the data base, needed information regarding a certain unit could easily be retrieved. All the requisitions of that particular unit could easily be printed by the computer as the need arises.

4. Better Customer Service

With the remote on-line terminal, balances of stocks-on-hand can easily be accessed. This will give the users an opportunity to inquire at no delay whether the item in requisition is at hand or not.

5. Monitoring of Activities

Management at any point in time can easily review current activities in the warehouse. This will give them up-to-date reports of inventory status.
6. **Accurate, Timely and Reliable Reports**

Periodic reports are printed out by the computer for use in management decision making. This is done at a fast phase due to the inherent capabilities of the computer system.

7. **Pin-Pointing of Dormant Stocks**

Since movement of items are properly recorded, items that are dormant could easily be determined. They could be re-channeled by management to other Line Units in need of such items.

C. **SOFTWARE FUNCTIONAL DESIGN**

The Functional Process Flowchart shown on Figure 14 outlines the sources of information and data (input) coming into the system and the different outputs generated. It gives an overview of the different users with their respective input and output documents. Figure 15 shows the Cycle Process Flowchart which divides the output into the different reporting periods.

1. **On-Line Software Modules**

The Inventory Control System is composed of six software modules for the on-line (interactive) portion. The general structure as is depicted on Figure 16. These modules will be programmed as subroutines enabling control to be passed on to a module where a particular processing is needed. Control returns to the calling program after the module performs its assigned functions.
a. Input Validation/Formatting Module

This module is the primary interface between the system and user terminals. After a message request is initiated by a user via the terminal, validation of the given password is made to ascertain only authorized users gain access to the data bases. It further formats the input message to specification for subsequent processing by other modules. When an error is detected, an invalid message is sent to the user with comments on what kind of error was made. If no error is detected, the type of processing needed is determined and control is passed on to that particular module.

b. On-Line Inquiry Module

Control is passed on to this module if user message request is for inquiry into the data base. Program flow is as shown on Figure 17. Main function of the module is to determine what particular display is needed, interact with the Data Retrieval Module, group them logically into the desired information, then pass control on the Output Message/Edit Module. CRT display format are shown on Appendix B.

c. On-Line Update Module

This module retrieves the needed file from the data base through the Data Base Maintenance Module, then updates all or part of it as called for by the user. Program flow is as shown on Figure 18. When all the fields needing updating have been written back on their respective files, the program sends
a message of its completion to the user through the Output Message/Edit Module. CRT display formats are shown on Appendix C. These formats will be made available to users in preprinted form as backup when communication lines are down.

d. Data Base Maintenance Module

This module retrieves the needed data during inquiry or updating. In the case of updating, the Module writes back the updated fields in their respective files in its rightful location. One important function performed by this module is the generation of backup files of all updating activities. This procedure insures a fallback routine in case of mechanical failure (head crash).

e. Message Output/Edit Module

Data or messages to be transmitted back to the user terminal are handled by this Module. The response is edited and formatted to specifications before transmission.

f. Module Size

Based on Figures 16-19, the following module sizes are estimated.

<table>
<thead>
<tr>
<th>Module Name</th>
<th>No. of Source Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Validation/Formatting Module</td>
<td>600</td>
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<tr>
<td>Inquiry Module</td>
<td>1500</td>
</tr>
<tr>
<td>Update Module</td>
<td>1000</td>
</tr>
<tr>
<td>Data Base Maintenance Module</td>
<td>300</td>
</tr>
<tr>
<td>Message Output Edit</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3500</td>
</tr>
</tbody>
</table>
2. **Report Generators**

Management and statistical reports will all be generated through batch processing. One program will generate one specific report. Appendix D is a compilation of the different printouts generated by the system.

3. **Backup Batch Update**

In cases where communication lines between the computer and terminal users are down, a backup batch update routine is used in order not to jeopardize data base maintenance. Figure 19 shows the steps taken to achieve continuity of operation in spite of non-use of terminals in updating the data base.

4. **Master File Creation**

The Inventory Control System like any other computerized system relies heavily on accuracy of data for its effectiveness. As such, particular attention must be given to the initial Master File Creation. To preclude an erroneous data base, all balance fields will be zeroed-out initially as shown on Figure 20. Next step is to prepare Inventory Tags and Control Listings using the initial Master File for a wall-to-wall inventory of the warehouse. Tags will help facilitate location and identification of the different line items in the physical count. Control Listings will be the audit trail for count accuracy. Figure 21 shows the flow in Step 2. After the inventory in Step 3 (Figure 22), the released tags with count are keypunched, then matched with the inventory tag file (in tag number sequence).
Matching part numbers are selected, and both the tag file and the part number master file are updated by quantity. An audit listing is printed for all part numbers with quantity out of pre-established ranges. A missing tag listing is prepared. Unmatched part numbers are listed for correction. Figure 23, Step 4, shows completion of inventory. A multi-bin location listing is prepared to allow gathering and restocking of like items into a common storage location. An inventory comparison listing is printed to show before and after inventory balances.

5. Inventory Analysis Processing

This part of the system is used to analyze and update historical activities to help management predict future trends in inventory movement. Figure 24 shows how the different files are processed to yield the desired outputs. Here is where planning and control is achieved through availability of relevant information.

D. DATA BASE FUNCTIONAL DESIGN

Figure 25 illustrates the file relationship of the different component files of the system. The Data Base Design approach is evident in this diagram to preclude redundancy and duplication of similar data fields. Data maintenance efficiency would be greatly enhanced in this approach since data fields are distinct from each other facilitating retrieval and updating. Appendix E contains the detailed design of the component files of the data base.
E. TECHNICAL FEASIBILITY STUDY

1. On-Line Storage Feasibility
   a. Master Stock Record File

Number of Records = 120,000
Size of Fixed Length Files = 125 bytes

Variable Length Files
   Average Number of Customers per Line Item = 50
   Average Number of Vendors per Line Item = 20
   Trailer Header = 4 bytes
   Average Length of Trailer = 70 x 5 bytes = 350 bytes

Average Record Size = 125 bytes + 350 bytes = 475 bytes
Size of File = 475 bytes x 120,000 = 57 M bytes
Allowance for Indices (10%) = 57 M x 1.1
= 62.7 M

Blocking Factor = 2
Size of Logical Record = 1045 bytes
Total Inter-Record Gap = \( \frac{62.7M}{1045} \) x 30 bytes/gap
= 1.8 M bytes
Total File Size = 62.7 M + 1.8 M = 64.5 M bytes

b. Customer Record File

Number of Customers = 100
Size of File = 100 rec x 58 bytes/rec = 5,800 bytes
Allowance for Indices (10%) = 5,800 x 1.1 = 6,380 bytes
Blocking Factor = 20
Size of Logical Record = 1160 bytes
Total Inter-Record Gap = \( \frac{6380}{1160} \times 30 \) bytes/gap = 165 bytes
Total File Size = 6,380 + 165 = 6545 bytes

c. Turn-In Record File
Number of Records = 10/day \times 5 \text{ days/week} \times 52 \text{ weeks/year} 
= 2,600 per year
Size of File = 2600 per year \times 50 \text{ bytes} = 130,000 \text{ bytes per year}
Allowance for Indices (10%) = 130,000 \times 1.1 = 143 \text{ K bytes}
Blocking Factor = 20
Size of Logical Record = 1000 bytes
Total Inter-Record Gap = \( \frac{143 \text{ K}}{1 \text{ K}} \times 30 \) bytes/gap = 4.29 \text{ K bytes}
Total File Size = 143 \text{ K} + 4.29 \text{ K} = 147.29 \text{ K bytes}

d. Daily Transaction File
Number of Transaction per year = 100 tran \times 100 \text{ cust} = 10 \text{ K}
Size of File = 66 \text{ bytes} \times 10 \text{ K} = 660 \text{ K bytes}
Allowance for Indices (10%) = 660 \text{ K} \times 1.1 = 626 \text{ K bytes}
Blocking Factor = 20
Size of Logical Record = 1320 bytes
Total Inter-Record Gap = \( \frac{726 \text{ K}}{1320} \times 30 \) bytes/gap = 16.5 \text{ K bytes}
Total File Size = 726 \text{ K} + 16.5 \text{ K} = 742.5 \text{ K bytes}

e. Vendor Data File
Number of Vendors = 200
Size of File = 200 \times 100 \text{ bytes} = 20 \text{ K bytes}
Allowance for Indices (10%) = 20 \text{ K} \times 1.1 = 22 \text{ K}
Blocking Factor = 10

43
Size of Logical Record = 1000 bytes
Total Inter-Record Gap = \( \frac{22 \text{ K}}{1000} \times 30 \text{ bytes/gap} \)
\[ = 0.660 \text{ K bytes} \]
Total File Size = \( 22 \text{ K} + 0.660 \text{ K} = 22.66 \text{ K bytes} \)
f. Due In/Out File
Number of Records = 100 per day \times 22 \text{ days/month} \times 12 \text{ months/year} \]
\[ = 26,400 \]
Size of File = \( 26.4 \text{ K} \times 35 \text{ bytes} = 924 \text{ K bytes} \)
Allowance for Indices (10%) = \( 924 \text{ K} \times 1.1 = 1,016.4 \text{ K bytes} \)
Blocking Factor - 20
Size of Logical Record = 700 bytes
Total Inter-Record Gap = \( \frac{1,016.4 \text{ K}}{700} \times 30 \text{ bytes/gap} = 43.56 \text{ K bytes} \)
Total File Size = \( 1,016.4 \text{ K} + 43.56 \text{ K} = 1,059.96 \text{ K bytes} \)
g. Total Storage Requirement

<table>
<thead>
<tr>
<th>File Name</th>
<th>Size (in Million Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Stock Record File</td>
<td>64.5</td>
</tr>
<tr>
<td>Customer Record File</td>
<td>.006545</td>
</tr>
<tr>
<td>Turn-In Record File</td>
<td>.14729</td>
</tr>
<tr>
<td>Daily Transaction File</td>
<td>.7425</td>
</tr>
<tr>
<td>Vendor Data File</td>
<td>.02266</td>
</tr>
<tr>
<td>Due In/Out File</td>
<td>1.05996</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>66.478955</strong></td>
</tr>
</tbody>
</table>

The system is projected to have 10 percent annual growth rate for a period of five years.

Total Storage Requirement = \( 66.5 \times (1.1)^5 = 107.1 \)
h. Direct-Access Storage Devices

Based on the present system configuration (Figure 20) of 29 M bytes capacity per drive, total number of drives needed for the Data Base are as follows:
Number of Disc Drives = \( \frac{107.1}{29} \) = 3.69 = 4 drives

2. Off-Line Storage Feasibility

a. Backup Tape Files

Tape Real Length = 2400 ft x 12 in/ft = 28,800 inches
Recording Density = 800 bits per inch = 100 bytes per inch
Inter-Record Gap = 960 bytes

(1) Master Stock Record File

Size of File = 62.7 M bytes
Size of Logical Record = 1045 bytes
Total Inter-Record Gap = \( \frac{62.7 \text{ M}}{1045} \times 960 \text{ bytes/gap} \)

= 57.6 M bytes

Total File Size = 62.7 M + 57.6 M = 120.3 M

(2) Total Data Base Tape Requirement

Following the same calculations shown on Sec (1), other file sizes are as follows:

<table>
<thead>
<tr>
<th>File Name</th>
<th>Size (in Million Bytes)</th>
</tr>
</thead>
<tbody>
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<td>Master Stock Record File</td>
<td>120.3</td>
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<tr>
<td>Customer Record File</td>
<td>.01166</td>
</tr>
<tr>
<td>Turn-In Record File</td>
<td>.28028</td>
</tr>
<tr>
<td>Daily Transaction File</td>
<td>1.254</td>
</tr>
<tr>
<td>Vendor Data File</td>
<td>.043120</td>
</tr>
<tr>
<td>Due In/Out File</td>
<td>2.41032</td>
</tr>
<tr>
<td>TOTAL</td>
<td>124.299</td>
</tr>
</tbody>
</table>
A 10 percent annual growth rate for five years

Total Tape Requirement = 124.3 x (1.1)^5 = 200.18 M bytes

(3) Tape Reel Requirement

Number of Reels = 200.18 M bytes / 100 bytes per inch x 28,800 inc/reel
= 2.0018 M inches
= 69.5 = 70 tape reels

b. Inventory Analysis Processing

(1) Current Month History File (tape)

Record Layout

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Tran Code</th>
<th>Date</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>2</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Record Size = 30 bytes

File Size = 30 x 833 tran/month - 24,990 = 25 K bytes

Blocking Factor = 30

Logical Record Length = 900 bytes

Total Inter-Record Gap = \( \frac{25 K}{900} \times 960 \) bytes/gap

= 26.6 = 27 K

Total File Size = 25 K + 27 K = 52 K

(2) Demand Master File (Disk)

Record Layout

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Seasonal Level</th>
<th>Anticipated Requirement</th>
<th>Control Level</th>
<th>Reorder Point</th>
<th>Lead Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

EOQ

<table>
<thead>
<tr>
<th>Shelf Life</th>
<th>Pipe Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
Record Size = 46 bytes

File Size = 46 bytes x 120,000 items = 5,520 K bytes

Blocking Factor = 20

Logical Record Length = 920 bytes

Total Inter-Record Gap = \( \frac{5520 \text{ K}}{920} \) x 30 bytes/gap

= 180 K bytes

Total File Size = 5,520 K + 180 K = 5,700 K bytes

(3) Reorder History Master File (disk)

Record Layout

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Vendor No.</th>
<th>Date Req.</th>
<th>Date Del.</th>
<th>Qty</th>
<th>Unit Issue</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

Record Size = 54 bytes

File Size = 54 bytes x 120,000 items = 6,480 K bytes

Blocking Factor = 20

Logical Record Length = 1080 bytes

Total Inter-Record Gap = \( \frac{6480 \text{ K}}{1080} \) x 30 bytes/gap = 180 K bytes

Total File Size = 6480 K + 180 K = 6660 K bytes

(4) Peripheral Device Requirement. With reference to Figure 20, the following peripheral devices are required for this processing:

<table>
<thead>
<tr>
<th>File Name</th>
<th>No. of Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Month History File Input</td>
<td>1</td>
</tr>
<tr>
<td>Selected Item Input</td>
<td>1</td>
</tr>
<tr>
<td>Exception Report Output</td>
<td>1</td>
</tr>
<tr>
<td>Demand Output</td>
<td>1</td>
</tr>
<tr>
<td>Forecast</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5 Tape Drives</td>
</tr>
</tbody>
</table>
### File Name

<table>
<thead>
<tr>
<th>File Name</th>
<th>No. of Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory Demand Input</td>
<td>1</td>
</tr>
<tr>
<td>Inventory Demand Updated Output</td>
<td>1</td>
</tr>
<tr>
<td>Master File</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6 Disk Drives</strong></td>
</tr>
</tbody>
</table>

#### c. Backup Load Module Files

1. **On-Line Programs**
   
   Size = 3500 source statements x 10 inst/statement x 4 bytes/instruction
   
   = 140 K bytes

2. **Batch Programs**
   
   Report Generators Size = 25 programs x 300 source lines/program
   
   x 10 inst/statement x 4 bytes/inst
   
   = 300 K bytes

   Inventory Analysis Size = 3 programs x 500 source lines/program
   
   x 10 int/st x 4 bytes/int
   
   = 60 K bytes

3. **Tape Reel Requirement**
   
   Number of Reels = \( \frac{500 \text{ K} \times 2 \text{ (allowance for IRG)}}{100 \text{ bytes/inch} \times 28,800 \text{ inch/reel}} \)
   
   = 10 K/inch
   
   = 28,800 inch/reel
   
   = 1 reel

#### 3. Main Memory Feasibility

a. **On-Line Software Modules**
   
   With reference to Section C, the following are the breakdown of on-line software modules:
<table>
<thead>
<tr>
<th>Module</th>
<th>No. of Statement</th>
<th>Instruction/Statement</th>
<th>Bytes/Instruction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry</td>
<td>600</td>
<td>10</td>
<td>4</td>
<td>24 K</td>
</tr>
<tr>
<td>Update</td>
<td>1500</td>
<td>10</td>
<td>4</td>
<td>60 K</td>
</tr>
<tr>
<td>Data Base Maintenance</td>
<td>300</td>
<td>10</td>
<td>4</td>
<td>12 K</td>
</tr>
<tr>
<td>Message Output/Edit</td>
<td>100</td>
<td>10</td>
<td>4</td>
<td>4 K</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>140 K</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>bytes</td>
</tr>
<tr>
<td>B. Buffers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc Files</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>1.2 K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>1.2 K</td>
<td>2.4 K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer</td>
<td>2 (double) x</td>
<td>150</td>
<td>.0003 K</td>
<td></td>
</tr>
<tr>
<td>Tape</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>1.2 K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>1.2 K</td>
<td>2.4 K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Card Reader</td>
<td>2 (double) x</td>
<td>100</td>
<td>.0002 K</td>
<td></td>
</tr>
<tr>
<td>Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input 10 x 100</td>
<td></td>
<td>1.0 K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output 10 x 300</td>
<td></td>
<td>3.0 K</td>
<td></td>
<td>8.8005 K</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>8.8005 K</td>
</tr>
<tr>
<td>C. Memory Requirement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-Line Modules</td>
<td></td>
<td></td>
<td>140 K</td>
<td></td>
</tr>
<tr>
<td>Buffers</td>
<td></td>
<td></td>
<td>8.8005 K</td>
<td></td>
</tr>
<tr>
<td>Operating System</td>
<td></td>
<td></td>
<td>90 K</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>238.8005 K</td>
<td></td>
</tr>
</tbody>
</table>
4. **Terminal Response Time Feasibility**

To compute the terminal response time, all the Wait Times \((W)\) and Service Times \((S)\) will have to be taken into consideration as shown on Figure 26. The following are the data to be used:

- Number of Terminals = 10
- \(\bar{n} = \text{average number of queries per day} = 1000\) queries are assumed to be divided equally among terminals
- Queries handled in one 8-hour shift = 480 minutes
- \(\text{Tem} W = \text{Terminal Wait Time}\)
- \(\text{Com} S = \text{communication service time}\)

\[
\begin{align*}
\text{Com} S &= 100 \times 8 \times 10^3 = 166 \text{ MS (millisecond)} \\
\text{In Buf} W &= \text{Input Buffer Wait Time} \\
&= \text{Access Time} + \text{Wait Time} \\
\text{Access Time} &= \text{Disc Access} + \text{Rotational Delay} + \text{Transfer Rate} \\
&= Ta + Td + \text{Transfer} \\
&= 60 \text{ MS} + 12.5 \text{ MS} + \frac{100}{\sqrt{12}} = 72.8 \text{ MS} \\
p &= \bar{n} \cdot \text{Access Time} = \frac{1000}{(480 \times 60 \times 1000) \times 72.8} = .0025 \text{ MS} \\
\sigma_s &= \frac{(ta \text{ max})^2 + (td \text{ max})^2}{12} \\
&= \frac{(60)^2 + (12.5)^2}{12} = 313 \\
\sigma_s &= 17.7
\end{align*}
\]

50
\[
\text{Wait Time} = \frac{p \cdot \text{Access Time}}{2\left(1 - p\right)} \left[1 + \left(\sigma_{s}/\text{Access time}\right)^2\right]
\]

\[
= \frac{0.0025 - 72.8 \text{ MS}}{2\left(1 - 0.0025\right)} \left[1 + \left(17.7/72.8\right)^2\right]
\]

\[
= 0.0966 \text{ MS}
\]

In Buf \(W\) = Input Buffer Wait Time

\[
= 72.8 \text{ MS} + 0.0966 \text{ MS} = 72.8966 \text{ MS}
\]

Disc \(Q\) \(W\) = Disc Queue Wait Time

\[
= 2 \text{ Access (index and data)}
\]

\[
= 2 \times \text{Wait Time} = 2 \times 0.0966 \text{ MS} = 0.1932 \text{ MS}
\]

Disc \(S\) = Disc Service Time

\[
= 2 \text{ accesses (index and data)}
\]

\[
= 2 \times \text{Access Time} = 2 \times 72.8 \text{ MS} = 145.6 \text{ MS}
\]

CPU \(W\) = CPU Wait Time

\[
= \frac{p \cdot \text{CPU} S}{\left(1 - p\right)} \quad \text{(assume exponential distribution)}
\]

CPU time per statement = 10 terminals \(\times\) \(\frac{32}{8}\) \(\times\) 2 memory access

\[
\times 0.6 \text{ micro sec inst}
\]

\[
= 48 \text{ micro sec} = 0.048 \text{ MS}
\]

CPU \(S\) = 0.048 \(\times\) 1000 = 48 MS

\[
p = \frac{1000/(480 \times 60 \times 1000)}{48} = 0.00167 \text{ MS}
\]

CPU \(W\) = \(0.00167 \times 48\)

\[
= \frac{0.00167 \times 48}{\left(1 - 0.00167\right)} = 0.0803 \text{ MS}
\]

CPU \(S\) = CPU Service Time

\[
= 48 \text{ MS}
\]

Out Buf \(W\) = Output Buffer Wait Time

\[
= \frac{p \cdot ts}{2(1 - p)}
\]

\[
ts_s = \text{communication transfer time (out)}
\]

51
\[ p = \frac{1000}{(480 \times 60 \times 1000)} \times 500 \text{MS} = 0.148 \]

Out Buf W = \[ \frac{0.148 \times 500}{2(1 - 0.148)} \] x 43.43 MS

Com S = communication Service Time

\[ \tau_s = 625 \text{MS} \]

Dis S = Display Service Time

\[ \frac{300 \times 8}{1000} \times 10^3 = 2666 \text{MS} \]

Total Terminal Response Time =

\[ \text{Term W} + \text{Com S} + \text{In Buf W} + \text{Disc Q W} \]
\[ + \text{Disc S} + \text{CPU W} + \text{CPU S} + \text{Out Fuf W} \]
\[ + \text{Com S} + \text{Disc S} \]

\[ = 0 \text{ MS} + 166 \text{ MS} + 72.8966 \text{ MS} + 0.1932 \text{ MS} \]
\[ + 145.6 \text{ MS} + 0.0803 \text{ MS} + 48 \text{ MS} + 43.43 \text{ MS} \]
\[ + 625 \text{ MS} + 2666 \text{ MS} \]

\[ = 3767.2001 \text{MS} \]

5. **Hardware Configuration**

In view of the different feasibility factors discussed in Sections 1 - 4, Figure 27 illustrates the proposed hardware configuration after the present system is upgraded. This configuration conforms to all specifications and limitations embodied in the aforementioned sections.

F. **ECONOMIC FEASIBILITY**

The present hardware configuration will be upgraded to support the Inventory Control System. Equipment cost will include memory upgrade, additional peripheral devices and
additional maintenance and operating costs. Benefits to be derived from the system will be based mainly in the reduction of inventory, carrying cost and improved efficiency in planning and forecasting of material requirements.

1. **Equipment Upgrade Outlay**

<table>
<thead>
<tr>
<th>Component</th>
<th>Purchase Cost</th>
<th>Maint Cost Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>($)</td>
<td>($), mo</td>
</tr>
</tbody>
</table>

**Main Storage**

1 - 32,768 bytes storage expansion

2 - 65,536 byte storage expansion

**Mass Storage Device**

2 - Two Disc Drives; 58 M bytes

**Tape Drives**

1 - Master Tape Unit; 9-track

1 - Slave Tape Unit; 9-track

**Remote Terminals**

7 - Display Terminal; 96 Char Gen

7 - Keyboards; A/N option

**Interface**

1 - Terminal Multiplexor

**Remote Peripherals**

7 - Remote Printer

**Modems**

6 - Modems; up to 2400 bps

<table>
<thead>
<tr>
<th>Total Purchase Cost</th>
<th>Total Maint Cost Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>244,654</td>
<td>244,654</td>
</tr>
<tr>
<td>939/mo</td>
<td>939/mo</td>
</tr>
<tr>
<td>11,268/yr</td>
<td>11,268/yr</td>
</tr>
</tbody>
</table>
2. Programming Element

Using programmer output of 160 source statement/man-month.

<table>
<thead>
<tr>
<th>Software Module</th>
<th>No. of Source Stat</th>
<th>Complexity</th>
<th>Man-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Vol/formatting</td>
<td>600</td>
<td>2</td>
<td>8.6</td>
</tr>
<tr>
<td>Inquiry Module</td>
<td>1500</td>
<td>3</td>
<td>28.2</td>
</tr>
<tr>
<td>Update Module</td>
<td>1000</td>
<td>3</td>
<td>19.3</td>
</tr>
<tr>
<td>Data Base Maint</td>
<td>300</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>Message Output Edit</td>
<td>100</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Report Generator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 @ 300</td>
<td>7500</td>
<td>1</td>
<td>46.9</td>
</tr>
<tr>
<td>Inventory Analysis</td>
<td>3 @ 500</td>
<td>2</td>
<td>18.8</td>
</tr>
<tr>
<td>Master File Creation</td>
<td>4 @ 400</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>131.9</strong></td>
</tr>
</tbody>
</table>

3. Testing Element

<table>
<thead>
<tr>
<th>Software Module</th>
<th>No.</th>
<th>Size Factor</th>
<th>Complexity</th>
<th>Man-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Module</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Inquiry</td>
<td>1</td>
<td>15</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td>Update</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Data Base Maintenance</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Message Output Edit</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Report Generator</td>
<td>25</td>
<td>3</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>Inventory Analysis</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Master File Creation</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>232</strong></td>
</tr>
</tbody>
</table>
4. Development Personnel Element

<table>
<thead>
<tr>
<th>Element</th>
<th>Man-Month</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Requirement Analysis</td>
<td>2</td>
<td>Interview &amp; Data Collection</td>
</tr>
<tr>
<td>Feasibility Study</td>
<td>1</td>
<td>Analyze Different Requirements</td>
</tr>
<tr>
<td>Evaluate Solutions</td>
<td>2 1</td>
<td>Evaluate Alternatives</td>
</tr>
<tr>
<td>Hardware and Software Evaluation</td>
<td>1 1</td>
<td>Performance Analysis</td>
</tr>
<tr>
<td>Prepare RFP</td>
<td>3</td>
<td>Functional Specification</td>
</tr>
<tr>
<td>Evaluate Proposals</td>
<td>4 2</td>
<td>Evaluate Vendor Proposal</td>
</tr>
<tr>
<td>Programming</td>
<td>132</td>
<td>Program design, code, deb</td>
</tr>
<tr>
<td>Testing</td>
<td>78 154</td>
<td>Unit, module &amp; system te</td>
</tr>
<tr>
<td>Documentation</td>
<td>26</td>
<td>Document system and prog</td>
</tr>
<tr>
<td>File Conversion</td>
<td>19 19</td>
<td>Convert to proposal system</td>
</tr>
<tr>
<td>Training</td>
<td>10</td>
<td>For user, programmer and operations personnel</td>
</tr>
<tr>
<td>Parallel Operation</td>
<td>6 6</td>
<td>Make final adjustments</td>
</tr>
<tr>
<td>Total</td>
<td>116 351</td>
<td></td>
</tr>
</tbody>
</table>

5. Development Personnel Cost

Aside from the programmer and analysts needed in the development process, console operators and clerks will be needed for parallel operations and three man-months total for general clerical work.
<table>
<thead>
<tr>
<th>Cost Element</th>
<th>Annual Salary ($1,000)</th>
<th>Man-Months</th>
<th>Total ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>25</td>
<td>116</td>
<td>241.67</td>
</tr>
<tr>
<td>Programmer</td>
<td>20</td>
<td>351</td>
<td>585.0</td>
</tr>
<tr>
<td>Operator</td>
<td>15</td>
<td>8</td>
<td>10.0</td>
</tr>
<tr>
<td>Clerk</td>
<td>10</td>
<td>3</td>
<td>2.49</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>839.16</strong></td>
</tr>
</tbody>
</table>

Fringe Benefits (30%) $1090.91

6. **Operations Personnel**

Maintenance Programming: 2 @ $20 K/yr = $40 K
Computer Operators : 2 @ $15 K/yr = $30 K
Tape Librarian : 1 @ $10 K/yr = $10 K

Fringe Benefits (30%) $104 K
Salary Increase = 5% per year

7. **Other Items**

While hardware and software development is going on, a wall-to-wall inventory of the warehouse will be undertaken. Additional clerks will be needed for this purpose. A one-time cost of $50 K will be needed for site preparation and to renovate the present computer center to accommodate the added hardware. Utilities will be treated as part of overhead cost.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Preparation</td>
<td>$ 50 K</td>
</tr>
<tr>
<td>Clerks (warehouse Inventory)</td>
<td>5 @ 833/month x 6 months</td>
</tr>
</tbody>
</table>
Item Cost

Supplies

Disc Paks: 50 @ $50 = $2.5 K
Tape Reels: 100 @ $30 = $3.0 K
Paper: = $10 K 15 K/year
Overhead 5 K/year

8. Cost Tabulation

<table>
<thead>
<tr>
<th>Cost Elements</th>
<th>Year (10% Growth Rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Equipment Outlay</td>
<td>244.7</td>
</tr>
<tr>
<td>Development Personnel</td>
<td>1090.91</td>
</tr>
<tr>
<td>Site Preparation</td>
<td>50.0</td>
</tr>
<tr>
<td>Warehouse Inventory</td>
<td>25.0</td>
</tr>
<tr>
<td>Operations Personnel</td>
<td>104</td>
</tr>
<tr>
<td>Supplies</td>
<td>15</td>
</tr>
<tr>
<td>Overhead</td>
<td>5</td>
</tr>
<tr>
<td>Hardware Maintenance</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>1410.6</td>
</tr>
</tbody>
</table>

Based on the computations above, the whole system when implemented over a five year period would cost $2,182.2 K.

9. Cost-Benefit Analysis

a. Benefits

The present level of inventory is estimated at $100 M. With the adoption of the Inventory Control System, a yearly reduction of 1 percent in inventory is anticipated.
Carrying cost based at 10 percent of total inventory will likewise have a corresponding reduction. Other intangible benefits such as customer service and increased procurement efficiency will not be included in the computations as quantifying them at this point is not feasible.

b. Cost Benefits Tabulation

<table>
<thead>
<tr>
<th>YEAR ($1000)</th>
<th>Cost</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Cost</td>
<td></td>
<td>1410.6</td>
<td>135.3</td>
<td>143.6</td>
<td>152.8</td>
<td>161.8</td>
<td>178.1</td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory Reduction</td>
<td>1000</td>
<td>990</td>
<td>980</td>
<td>970</td>
<td>960</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying Cost Reduction</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Benefits</td>
<td>1099</td>
<td>1099</td>
<td>1077</td>
<td>1066</td>
<td>1055</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits-Cost</td>
<td>-1410.6</td>
<td>963.7</td>
<td>944.4</td>
<td>924.2</td>
<td>904.2</td>
<td>876.9</td>
<td></td>
</tr>
<tr>
<td>Discounted @ 6%</td>
<td>-1410.6</td>
<td>905.8</td>
<td>834.5</td>
<td>767.6</td>
<td>705.9</td>
<td>643.5</td>
<td></td>
</tr>
<tr>
<td>Net Present Value</td>
<td>= $2446.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The system will break even after two years of operation. Even with a very conservative estimate of the benefits to be derived from the system, the Net Present Value is indicative of the advantage management will have with the implementation of the system.
V. CONCLUSIONS/RECOMMENDATION

This study as a whole illustrates the benefit an organization can derive out of an existing computer hardware by upgrading it to its full complement to suit increasing demand for processing capabilities. With careful planning and technical know-how, management information systems such as Inventory Control could lessen much of management's problems by providing timely, accurate and relevant information through the computer. Cost of additional processing requirements could be minimized by tailoring the system design to the capabilities of the existing main frame at hand. Only needed upgrade in terms of peripheral devices and main memory will be done to implement the system. This approach not only harnesses the full potential of the existing computer system but provides the organizational benefits that outweigh heavily the incremental cost to upgrade.
Figure 1

ORGANIZATIONAL CHART
COMMAND LEVEL

COMMANDER
VICE COMMANDER

PERSONNEL INTELLIGENCE OPERATIONS TRAINING SUPPLY & LOGISTICS PLAN COMPTROLLER

ADMINISTRATIVE STAFF PROCUREMENT OFFICE ACCOUNTING

MAJOR LINE UNITS
LINE DEPOT SUPPORT UNITS

--- Command Line
----- Functional Supervision
Figure 4
Stock Control Card

<table>
<thead>
<tr>
<th>STOCK CONTROL RECORD</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOCK NUMBER</td>
<td></td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td>STATUS</td>
</tr>
<tr>
<td>MAJOR ASSEMBLY</td>
<td>PRTY &amp; CLAUSE</td>
</tr>
<tr>
<td>APPLICABLE EQUIPMENT</td>
<td>STD PACKAGE</td>
</tr>
<tr>
<td>LOCATION</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REPAIR OR DISPO. CODE</th>
<th>REPAIR OR OVERHAUL DEPOT</th>
<th>SOURCE OF SUPPLY</th>
<th>REQUISITION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICEABLE PRICE</td>
<td>DATE</td>
<td>REPAIRABLE PRICE</td>
<td>DATE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE</th>
<th>SEASONAL LEVEL</th>
<th>STAND-BY LEVEL</th>
<th>ANTICIPATED REQUIREMENT</th>
<th>CONTROL LEVEL</th>
<th>REORDER POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DATE COMB.</td>
<td>DATE COMB.</td>
<td>DATE COMB.</td>
<td>DATE COMB.</td>
<td>DATE COMB.</td>
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</tr>
</tbody>
</table>

**INTERCHANGEABILITY DATA**

---

63
**Figure 6**

**SAMPLE FORMAT**

**REQUISITION AND ISSUE VOUCHER**

SIR: Please furnish the following supplies:

<table>
<thead>
<tr>
<th>No.</th>
<th>(Date)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>QTY</th>
<th>UNIT</th>
<th>Nomenclature</th>
<th>AS ISSUED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I CERTIFY the supplies required above are necessary and will be used solely for the purpose stated.

(Date)

Received the supplies shown above as issued.

(Signature of person receiving supplies)

(Requisitioning Officer)

APPROVED: (For Issuance)

(Signature) (Designation)

Filled by Rocked by

Shipped to Bill of Loading No. Date

NOTE: Requisitioner must initial cross out all spaces not used.

(Property Clerk)

19

65
Figure 8

SINGLE LINE ITEM REQUISITION (SLIRIT)

<table>
<thead>
<tr>
<th>TO</th>
<th>SHIP TO</th>
<th>DOCUMENT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STOCK NUMBER</th>
<th>NOMENCLATURE</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>END ITEM-NAME-MFGR</th>
<th>MODEL NO.</th>
<th>SERIAL NO.</th>
<th>TYPE REQUISITION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>E/T REPLENISHMENT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R/O</th>
<th>O/H</th>
<th>D/I</th>
<th>D/O</th>
<th>QTY</th>
<th>SIGNATURE OF REQUISITIONER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QTY APPROVED</th>
<th>REQUISITIONED APPROVED BY</th>
<th>ISSUE APPROVED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STORAGE</th>
<th>QUANTITY INDICATED HAS BEEN</th>
<th>CUSTOMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTY</td>
<td>SIGNATURE &amp; DATE</td>
<td>REQUISITIONED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>EXPENDABILITY</th>
<th>VOUCHER NO.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/NON-EXPENDABLE</td>
<td></td>
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<tr>
<td></td>
<td>/EXPENDABLE</td>
<td></td>
<td></td>
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<td></td>
<td>/RECOVERABLE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>□ COMPLETE</th>
<th>□ PARTIAL</th>
<th>□ DUE-OUT</th>
<th>□ LP AUTHORIZED</th>
</tr>
</thead>
</table>

67
Figure 9

Problem Turn-in Slip

<table>
<thead>
<tr>
<th>Item Stock Number</th>
<th>Organization</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Legend for Table:

du = due, return
ru = receive, return
so = supplied, return
suc = supplied, receive

Note:

1. Make sure all items are turned in before the end of the month.

2. Items not listed may be obtained from the Supply Section.

3. Items marked with an asterisk (*) are exempt from the normal processing requirements.

For the Commanding Officer:

(Date) Organization

Solicited Items:

For Station Supply Section:

68
SAMPLE FORMAT

MEMORANDUM RECEIPT FOR EQUIPMENT
SEMI-EXPENDABLE AND NON-EXPENDABLE PROPERTY

(Place of Transaction) _____________________________ (Date) __________

I acknowledge to have received from _____________________________
(Name of Responsible Officer)

the following property for which I am responsible to the provision of
the Accounting Law, and which will be used in the office of _____________________________

<table>
<thead>
<tr>
<th>QTY</th>
<th>UNIT</th>
<th>NAME AND DESCRIPTION</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

INSTRUCTIONS

THIS form shall be prepared in duplicate. Always draw a heavy horizontal line along item and a similar line diagonally from the horizontal line to the last blank line at the bottom of this form after both copies are properly signed by the receiving officer and the duplicate by the receiving or responsible officer.

(Name)

Every sheet must be duly signed.

(Designation)
**Figure 11**

PROPERTY ISSUE SLIP

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Stock No.</th>
<th>Nomenclature</th>
<th>Unit</th>
<th>Authorized Allowance</th>
<th>On Hand</th>
<th>Due In</th>
<th>Quantity Requested</th>
<th>Action</th>
</tr>
</thead>
</table>

Issuance of quantity shown in "Quantity Requested" column is authorized. Items marked "due out" will be ordered and when received organization will be notified.

For Station Supply Officer:

For the COMMANDING OFFICER:

Quantities shown in "Action" column have been received.

Date: Organization Supply Officer

Date: Authorized Officer

70
Figure 14

Functional Process Flow Chart

Supply Pts/
Linx Exit
Request
Issue Voucher
Shipment Receipt
Property Issue Slip
Shipment
Shipping Card/Receipts
Stock Control File Update
(Change)
Stock Control File Update
(Change)

DEPOT

ORDER

SHR& FIC

PROCUREMENT

SUPPLY &
DEPARTMENT

CONTROLLER

Purchase Order
Update Availability
Vendor Data File
Update (Check)
Order Input Change

FILE

INDB

SPEICHS

IN/OUT

ORDER
Figure 15

**CYCLE PROCESS FLOW CHART**

**INPUT**
- Requisition/Issue Voucher
- Memoandum Receipt
- Property Issue Slip
- SLRIT
- Receipt/Issue Card
- Master Stock Record Change
- Stock Control File Change
- Customer Record File Change
- Procurement Directive
- Purchase Order
- Purchase Order Change
- Vendor Record File Change
- Due In/Out Record Change
- Funding Availability

**OUTPUT**
- Automatic Reorder List
- Daily Back Order List
- Stock Disbursement Record
- Daily Receiver List
- Master Inventory Activity List
- Open Purchase Order Report
- Reorder Report

**OUTPUT**
- Reorder by Customer
- Inventory Shorts List
- Non-Responsive Vendor List
- Accounts Payable
- Purchase Order Follow-up

**OUTPUT**
- Stock Control Catalog
- Supply Catalog
- Purchase Order Register
- Item Traffic Density
- Master List of Items by Supply Pts
- Items with High Excess
- Issue VS Requisition
- Status of Turn-In
- Status of Items for Repair

**OUTPUT**
- Item Activity Report
- Replenishment Cycle
- Customer Account Report
- Item Demand
- Detailed Listing of Turned-In Items
- Status of Item
- Depot Efficiency Report
- Vendor Master List
Figure 16

ON-LINE PROGRAM STRUCTURE

MESSAGE INPUT

INPUT VALIDATION/FORMATTING MODULE

INVALID

VALID

TYPE OF PROC

INQUIRY MODULE

DATABASE

MESSAGE OUTPUT EDIT

TERMINAL RESPONSE

DAILY TRANSACTIONS

UPDATE MODULE

DATA BASES

DATA BASE MAINTENANCE MODULE
Figure 17
On-line Inquiry Module

FORMATTED MESSAGE

INVALID

USER ID CHK

VALID

FORMAT UNAUTHORIZE USER MSG

FORMAT DISPLAY "NO AVAIL DATA"

FORMAT DISPLAY

CALL DATA MAINTENANCE MODULE

DETERMINE ROUTINE, FILE NEEDED

DATA AVAIL

YES

CALL OUTPUT MSG MODULE

CALL PRINT ROUTINE

FORMAT END OF FILE MESSAGE

CALL OUTPUT MSG MOD

NO

HARD COPY

YES

PAGE ROLL?

NO

YES
Figure 18

On-line Update Module

- **FORMATTED MESSAGE**
- **INVALID USER ID CHK**
- **VALID USER ID CHK**
  - **DETERM, CALL ROUTN, FILE NEEDED**
  - **CALL DATA BASE MAINT MODULE**
    - **NEW OR CHG**
      - **NEW**
    - **CHG**
      - **FORMAT DISPLAY**
      - **FORMAT DISPLAY**
    - **FORMAT UNAUTHORIZED USER MSG**
  - **FORMAT DISPLAY**
  - **CALL OUTPUT MSG MODULE**
    - **FORMAT FLD TO BE UPDATED**
    - **CALL DATA BASE MAINT MODULE**
    - **SUCCESSFUL OPN MSG**

77
Figure 19

BACK-UP BATCH UPDATE

- INPUT DOCUMENTS
  - KEYPUNCH
    - DAILY TRANSACTION CARDS
      - EDIT
        - CORRECTED TRANSACTION CARDS
          - CARD-TO-TAPE ROUTINE
            - BACK-UP FILES
              - MASTER FILE
              - INDEX
            - DAILY TRANS
              - BATCH UPDATE PROG
                - UPDATED MASTER FILE
                - UPDATED INDEX
            - UPDATE FILE
Figure 20

Master File Creation
Step 1

Figure 20 diagram:

1. MASTER STOCK REC
2. CARD TO TAPE SORT
3. MASTER STOCK RECORD SORTED BY STOCK NO.
4. MASTER FILE CREATION
5. INITIAL MASTER FILE
Figure 21

Master File Creation
Step 2

INITIAL MASTER FILE

SORT BY BIN LOC SEQUENCE

INVENTORY TAG FILE

TAG FILE MINUS TAG NO.

SORT BY PART NO. SEQUENCE

TAG FILE MINUS PART NUMBER

INVENTORY TAG PROG

INVENTORY TAGS

INVENTORY CONTROL LISTING
Figure 22

Master File Creation
Step 3

INVENTORY TAGS
→ KEY TO TAPE
→ UNSORTED INVENTORY TAGS
→ SORT UTILITY

SORTED INVENTORY TAGS
→ INVENTORY TAG 1
→ MASTER FILE UPDATE PROG
→ AUDIT LISTING
→ MISSING TAG LISTING
→ ERRORS LISTING

INVENTORY TAG FILE
→ UPDATED MASTER FILE
→ INITIAL MASTER FILE
Figure 23

Master File Creation
Step 4

INVENTORY ERROR CORRECTIONS

KEY TO TAPE

UNSORTED INVENTORY CORRECTIONS

SORT UTILITY

SORTED INVENTORY CORRECTIONS

INVENTORY TAG MASTER FILE UPDATE PROGRAM

INVENTORY TAG MASTER FILE

UPDATED MASTER FILE

MULTI-BIN LOCATIONS

INVENTORY COMPARISON

UPDATED TAG FILE

COMPLETED MASTER FILE
Figure 24
Figure 25

FILE RELATIONSHIP
INVENTORY DATA BASE NETWORK

MASTER FILE

CUSTOMER FILE

DUE IN/OUT FILE

TURN IN FILE

DAILY TRANSACTION FILE

VENDOR FILE
Figure 26

TERMINAL RESPONSE TIME FACTORS

[Diagram showing the flow of data between CRT, terminals, buffer queues, and disk queues.]
### MASTER INVENTORY FILE ACTIVITY LIST

**XX/XX/XX**

<table>
<thead>
<tr>
<th>STOCK NO.</th>
<th>DESCRIPTION OF ITEM</th>
<th>TRANSACTION TYPE</th>
<th>QTY</th>
<th>UNIT</th>
<th>PURCH/ISSUE PRICE</th>
<th>TOTAL AMOUNT</th>
<th>STOCK BALANCE</th>
</tr>
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</tbody>
</table>
OPEN PURCHASE ORDER REPORT BY PURCHASE ORDER NUMBER
AS OF  XX/XX/XX

<table>
<thead>
<tr>
<th>PURCH ORD NO</th>
<th>CUST NO.</th>
<th>STOCK NO.</th>
<th>VDR/DESCRIP. ITEM</th>
<th>ORDER QTY</th>
<th>UNIT PRICE</th>
<th>ORDER DATE</th>
<th>PROMISED DEL. DATE</th>
<th>LAST ACT DATE</th>
<th>STATUS CODE</th>
<th>REQ NO.</th>
<th>REC'D QTY</th>
<th>DAYS OVERDUE</th>
</tr>
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</table>

PAGE 999
<table>
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<tr>
<th>STOCK NO.</th>
<th>UNIT</th>
<th>DESCRIPTION</th>
<th>BACK ORDER QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL COST</th>
<th>ORDER QTY</th>
<th>ORDER DATE</th>
<th>PO NO.</th>
<th>VOUCHER NO.</th>
</tr>
</thead>
</table>

**TOTAL VALUE STOCK BACK ORDERED:** $9999.99 
**NO. ENTRIES:** 99

**CLOSING VALUE ALL STOCK ON HAND:** $999,999.99 
**POSITIVE VAL:** $9.999.99 
**NEGATIVE VAL:** $9,999.99
DAILY REORDER WARNING POINT
99 xxxxxxxxxxxxxx 9999

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>QUANTITY IN STOCK</th>
<th>HIGH LIMIT</th>
<th>REORDER QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN</td>
<td>NOMENCLATURE</td>
<td>MODEL NO.</td>
<td>T S</td>
</tr>
</tbody>
</table>
APPENDIX C

MASTER FILE DELETION/SUSPENSION/STATUS REQUEST

DATE: ________________  REQUESTED BY: ________________

MASTER FILE STOCK NO: ____________________________

ACTION:

REPORT STATUS: ____________
DELETE FILE: ________________
SUSPEND STOCK: ____________  QUANTITY: ___  CODE: ___

Stock Suspension Codes:
  Remove from Suspension... = 1
  Suspend - Damaged Material = 2
  Suspend - Outdated Stock. = 3
  Suspend - Reserve Stock.. = 4
MASTER STOCK RECORD FILE CHANGE

FOR CHANGES: ENTER PERTINENT INFORMATION ONLY.

FOR ADDITIONS: COMPLETE ALL APPLICABLE ITEMS.

1 CHARACTER FOR EACH LETTER, NUMBER, MARK OF PUNCTUATION OR SPACE BETWEEN WORDS. LIST EXACTLY AS DESIRED AND DO NOT EXCEED MAXIMUM CHARACTERS SHOWN ( ).

1. Addition _______ Change _______ Delete _______
2. Stock No. (14) __________________________
3. Nomenclature (20) _______________________
4. Unit Issue (4) _____________________________
5. Major Assembly (10) _____________________
6. Group and Class (4) _______________________
7. Applicable Equipment (10) _______________
8. Standard Package (4) _________________

DATE: ___________________________ PREPARED BY: ___________________________
STOCK CONTROL FILE CHANGE

FOR CHANGES: ENTER PERTINENT INFORMATION ONLY.

FOR ADDITIONS: COMPLETE ALL APPLICABLE ITEMS.

1 CHARACTER FOR EACH LETTER, NUMBER, MARK OF PUNCTUATION
OR SPACE BETWEEN WORDS. LIST EXACTLY AS DESIRED AND DO
NOT EXCEED MAXIMUM CHARACTERS SHOWN ( ).

1. Addition _____ Change _____ Delete _____
2. Stock No. (14) ________________
3. Seasonal Level (4) ____________
4. Stand-by Level (4) ____________
5. Anticipated Req (6) ____________
6. Control Level (4) ____________
7. Reorder Point (6) ______________
8. Lead Time (4) ________________
9. Economic Order Qty (4) ________
10. Shelf Life (2) ________________
11. Pipe Time (2) ________________
12. Interchangeability (12) ________

DATE: __________________ PREPARED BY __________________
G. COMPUTERIZED INTEGRATED INVENTORY CONTROL FOR AN AIR FORCE BASE--ETC(U)

MOLATO

JUN 80 A C MOLATO
VENDOR DATA FILE CHANGE

FOR CHANGES: ENTER PERTINENT INFORMATION ONLY.

FOR ADDITIONS: COMPLETE ALL APPLICABLE ITEMS.

1 CHARACTER FOR EACH LETTER, NUMBER, MARK OF PUNCTUATION OR SPACE BETWEEN WORDS. LIST EXACTLY AS DESIRED AND DO NOT EXCEED MAXIMUM CHARACTERS SHOWN ( )

1. Addition ______ Change ______ Delete ______
2. Vendor No. (6) ________________
3. Name (20) ________________
4. Street (24) ________________
5. City (21) ________________
6. State/Prov (24) ________________
7. Zip Code (5) ________________

DATE: ________________ PREPARED BY: ________________
CUSTOMER RECORD FILE CHANGE

FOR CHANGES: ENTER PERTINENT INFORMATION ONLY.

FOR ADDITIONS: COMPLETE ALL APPLICABLE ITEMS.

1 CHARACTER FOR EACH LETTER, NUMBER, MARK OF PUNCTUATION OR SPACE BETWEEN WORDS. LIST EXACTLY AS DESIRED AND DO NOT EXCEED MAXIMUM CHARACTERS SHOWN ( ).

1. Addition _____ Change _____ Delete _____
2. Customer Code (6)  
3. Customer Name (20)  
4. Transaction Code (2)  
5. Date (8)  
6. CR/DB No. (6)  
7. Quantity (4)  

DATE: ____________________ PREPARED BY ____________________
DUE IN/OUT FILE CHANGE

FOR CHANGES: ENTER PERTINENT INFORMATION ONLY.
FOR ADDITIONS: COMPLETE ALL APPLICABLE ITEMS.
1 CHARACTER FOR EACH LETTER, NUMBER, MARK OF PUNCTUATION OR SPACE BETWEEN WORDS. LIST EXACTLY AS DESIRED AND DO NOT EXCEED MAXIMUM CHARACTERS SHOWN ( ).

1. Addition _____ Change _____ Delete _____
2. Stock No. (14) __________
3. Transaction Code (2) ______
4. Date Requested (8) ______
5. Req Customer (6) ______
6. Voucher No. (8) ______
7. Quantity (6) ______

DATE: ________________ PREPARED BY: ________________
<table>
<thead>
<tr>
<th>STOCK NUMBER</th>
<th>NOMENCLATURE</th>
<th>UNIT ISSUE</th>
<th>MAJOR ASSEMBLY</th>
<th>GROUP &amp; CLASS</th>
<th>APPLICABLE EQUIPMENT</th>
<th>STANDARD PACKAGE</th>
</tr>
</thead>
</table>

MASTER SUPPLY CATALOG
AS OF XX / XX / XX
<table>
<thead>
<tr>
<th>STOCK NUMBER</th>
<th>SEASONAL LEVEL</th>
<th>STAND-BY LEVEL</th>
<th>ANTICIPATED REQUIREMENT</th>
<th>CONTROL LEVEL</th>
<th>REORDER POINT</th>
<th>LEAD TIME</th>
<th>ECO ORDER QTY</th>
<th>SHELF LIFE</th>
<th>PIPE TIME</th>
<th>INTERCHANGEABILITY</th>
</tr>
</thead>
</table>
LIST OF VENDORS WHO HAVE NOT RESPONDED TO THE PURCHASE FOLLOW UP FORM AFTER THE THIRD NOTICE

PREPARE DATE XX/XX/XX

<table>
<thead>
<tr>
<th>VENDOR NO.</th>
<th>P.O. NO.</th>
<th>VENDOR NAME</th>
<th>STOCK NO.</th>
<th>PURCHASE DATE</th>
<th>3RD NOTICE DATE</th>
<th>QUANTITY LEFT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

103
<table>
<thead>
<tr>
<th>STOCK NO.</th>
<th>VENDOR NO.</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>MAX LEVEL</th>
<th>REORDER POINT</th>
<th>CURRENT LEVEL</th>
<th>QTY LOW</th>
<th>QTY ON ORDER</th>
<th>CUSTOMER BACK ORD.</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>CUST NO.</td>
<td>STOCK NO.</td>
<td>DESCRIPTION</td>
<td>ISSUE UNIT</td>
<td>BACK ORD. QTY</td>
<td>ISSUE PRICE</td>
<td>COST</td>
<td>TRANS DATE</td>
<td>ORDER PLACED</td>
<td>QTY ORDER</td>
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</tbody>
</table>
PURCHASE ORDER:  

DATE:  

CURRENT DATE:  

PLEASE INDICATE ON THIS FORM WHEN YOU EXPECT TO SHIP THE FOLLOWING ITEMS, SIGN, AND RETURN THIS FORM TO:

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY</th>
<th>UNIT</th>
<th>PRICE</th>
<th>STOCK NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>DEL DATE</th>
</tr>
</thead>
</table>

DATE:  

AUTHORIZED VENDOR SIGNATURE:  

107
# PURCHASING REQUIREMENTS LIST

**DATE OF REPORT:** XX/XX/XX

<table>
<thead>
<tr>
<th>STOCK NO.</th>
<th>DESCRIPTION</th>
<th>DUE IN</th>
<th>DUE OUT</th>
<th>REQ. QTY</th>
<th>CUM. ISS.</th>
<th>CUM. REC.</th>
<th>ISS. UNT</th>
<th>PUR. QTY</th>
<th>ORD QTY</th>
<th>PUR. PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
</table>

PAGE 999
<table>
<thead>
<tr>
<th>VENDOR NO.</th>
<th>VENDOR NAME</th>
<th>STREET ADDRESS</th>
<th>CITY AND STATE</th>
<th>ZIP CODE</th>
<th>REMARKS</th>
</tr>
</thead>
</table>
ITEM ACTIVITY REPORT
xxxxxx QUARTER 9999

<table>
<thead>
<tr>
<th>FSN</th>
<th>NOMENCLATURE</th>
<th>TS</th>
<th>END-ITEM APP.</th>
<th>MODEL NO.</th>
<th>NO. REQ</th>
<th>NO. ISS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
# REPLENISHMENT CYCLE REPORT
FOR THE XXXXX QUARTER 9999

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>F S N</th>
<th>NOMENCLATURE</th>
<th>MODEL NO.</th>
<th>UM</th>
<th>PO NO.</th>
<th>DATE OF PO</th>
<th>QTY</th>
<th>SUPPLIER</th>
<th>OR NO.</th>
<th>DATE DELIV</th>
<th>QTY</th>
<th>BAL.</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>ITEM NOMENCLATURE</th>
<th>MODEL NO.</th>
<th>SERIAL NO.</th>
<th>QUANTITY</th>
<th>RELEASES</th>
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</tbody>
</table>
MASTERLIST OF ITEMS BY SUPPLY POINT
For the Month of xxxxxxxx 9999

SUPPLY POINT: xxxxxxxxxxx

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN</td>
<td>NOMENCLATURE</td>
<td>END-ITEM APP</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
LIST OF ITEMS WITH QUANTITY IN EXCESS OF HIGH LIMIT
As of 99 xxxxxxxxxxx 9999

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>FS N</th>
<th>NOMENCLATURE</th>
<th>MODEL NO.</th>
<th>UM</th>
<th>O/H</th>
<th>HIGH LIMIT</th>
<th>SURPLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
ISSUE VS. REQUISITION
FOR THE MONTH OF xxxxxxxx 9999

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>ISSUE</th>
<th>REQUISITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSN</td>
<td>NOMENCLATURE</td>
<td>UM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITEMS REQUESTED</td>
<td>ITEMS FILLED</td>
<td>FILL RATE (%)</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>CURRENT (M-T-D)</td>
<td>PRIOR (IF MO-END)</td>
<td></td>
</tr>
</tbody>
</table>
### Status of Turn-Ias

For the period XXX 99 to XXX 99

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantities</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUT</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
</tr>
<tr>
<td>R/S</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
</tr>
<tr>
<td>S/C</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
</tr>
<tr>
<td>SER</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
</tr>
<tr>
<td>EXS</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
</tr>
<tr>
<td>MR</td>
<td>9,999,999.99</td>
<td>99,999,999,999.99</td>
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<tr>
<td><strong>Totals</strong></td>
<td><strong>9,999,999.99</strong></td>
<td><strong>99,999,999,999.99</strong></td>
</tr>
</tbody>
</table>
STATUS OF ITEMS FOR REPAIR
FOR THE PERIOD XXX 99 TO XXX 99

<table>
<thead>
<tr>
<th>QUANTITIES</th>
<th>COSTS</th>
<th>LATEST DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,999,999.99</td>
<td>FORWARDED TO DME 99,999,999.99</td>
<td>99-99-99</td>
</tr>
<tr>
<td>9,999,999.99</td>
<td>RECEIVED FROM DME 99,999,999.99</td>
<td>99-99-99</td>
</tr>
<tr>
<td>9,999,999.99</td>
<td>BALANCE 99,999,999.99</td>
<td></td>
</tr>
</tbody>
</table>
## STATUS OF ITEM
### As of XXX 99

<table>
<thead>
<tr>
<th>FSN = XXXX-XXXXX-XXXX</th>
<th>WHSE : LOCATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT OF ISSUE = XX</td>
<td>1. 99-999-99-9</td>
</tr>
<tr>
<td>UNIT PRICE = 9,999,999.99</td>
<td>2. 99-999-99-9</td>
</tr>
<tr>
<td></td>
<td>3. 99-999-99-9</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>QUANTITIES</th>
<th>COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BALANCE ON HAND</td>
<td>9,999,999.99</td>
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<tr>
<td>TOTAL RECEIPTS</td>
<td>9,999,999.99</td>
</tr>
<tr>
<td>TOTAL ISSUES</td>
<td>9,999,999.99</td>
</tr>
</tbody>
</table>

LATEST DATE OF RECEIPT: 99-99-99  
LATEST DATE OF ISSUE: 99-99-99
Record Format: Master Stock Record File

<table>
<thead>
<tr>
<th>STOCK NO.</th>
<th>B A L N C E S</th>
<th>WAREHOUSE LOCATION</th>
<th>DUE IN</th>
<th>DUE OUT</th>
<th>INTERCHANGEABILITY</th>
<th>NOMENCLATURE</th>
<th>UNIT ISSUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1314</td>
<td>2021</td>
<td>2728</td>
<td>3458</td>
<td>4243</td>
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<td>5453</td>
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<table>
<thead>
<tr>
<th>MAJOR ASSEMBLY</th>
<th>GROUP &amp; CLASS</th>
<th>STANDARD PACKAGE</th>
<th>SEASONAL LEVEL</th>
<th>ANTICIPATED REQUIREMENT</th>
<th>CONTROL LEVEL</th>
<th>REORDER POINT</th>
<th>LEAD TIME</th>
<th>EDQ</th>
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<td>93</td>
<td>102103</td>
<td>108109</td>
<td>112113</td>
<td>116117</td>
<td>122123</td>
<td>126127</td>
<td>132133</td>
<td>136137</td>
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<table>
<thead>
<tr>
<th>SHELF LIFE</th>
<th>PIPE TIME</th>
<th>NO. TRAILERS</th>
<th>VENDOR</th>
<th>. . . . . .</th>
<th>NO. TRAILERS</th>
<th>CUSTOMER CODE</th>
<th>. . . . . .</th>
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<tr>
<td>141</td>
<td>142143</td>
<td>144145</td>
<td>146147</td>
<td>2</td>
<td>5</td>
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<table>
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<tr>
<th>Item</th>
<th>Columns</th>
<th>Char</th>
<th>Description</th>
<th>Item</th>
<th>Columns</th>
<th>Char</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>0-13</td>
<td>14</td>
<td>Stock Number</td>
<td>13</td>
<td>109-112</td>
<td>4</td>
<td>Standard Package</td>
</tr>
<tr>
<td>2</td>
<td>14-20</td>
<td>7</td>
<td>Serviceable Balance</td>
<td>14</td>
<td>113-116</td>
<td>4</td>
<td>Seasonal Level</td>
</tr>
<tr>
<td>3</td>
<td>21-27</td>
<td>7</td>
<td>Reparable Balance</td>
<td>15</td>
<td>117-122</td>
<td>6</td>
<td>Anticipated Requirement</td>
</tr>
<tr>
<td>4</td>
<td>28-34</td>
<td>7</td>
<td>Reserve Balance</td>
<td>16</td>
<td>123-126</td>
<td>4</td>
<td>Control Level</td>
</tr>
<tr>
<td>5</td>
<td>35-42</td>
<td>8</td>
<td>Warehouse Location</td>
<td>17</td>
<td>127-132</td>
<td>6</td>
<td>Reorder Point</td>
</tr>
<tr>
<td>6</td>
<td>43-48</td>
<td>6</td>
<td>Due In</td>
<td>18</td>
<td>133-136</td>
<td>4</td>
<td>Lead Time</td>
</tr>
<tr>
<td>7</td>
<td>49-54</td>
<td>6</td>
<td>Due Out</td>
<td>19</td>
<td>137-140</td>
<td>4</td>
<td>Economic Order Quantity</td>
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<tr>
<td>8</td>
<td>55-68</td>
<td>14</td>
<td>Interchangeability</td>
<td>20</td>
<td>141-142</td>
<td>2</td>
<td>Shelf Life</td>
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<td>9</td>
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Record Format: Customer Record File

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Record Format: Daily Transaction File (Receipts/Issues)

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Total 66 characters (bytes) per rec
Record Format: Turn-In Record File

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<th>VOUCHER NO.</th>
<th>TURN-IN SLIP NO.</th>
<th>QUANTITY</th>
<th>STATUS</th>
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<td>2</td>
<td>14-19</td>
<td>6</td>
<td>Customer Code</td>
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<td>3</td>
<td>20-27</td>
<td>8</td>
<td>Date</td>
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<td>28-35</td>
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<td>36-43</td>
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<td>Turn-In Slip Number</td>
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<td>48-49</td>
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<td>Status of Item</td>
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Total 50 characters (bytes) per rec
Record Format: Due-In/Out File

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<th>No. of Trailers</th>
<th>Trans Code</th>
<th>Date Rqtd</th>
<th>Customer Code</th>
<th>Voucher No.</th>
<th>Quantity Due(In/Out)</th>
<th>Vendor Code</th>
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**Header Record**

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<td>Stock Number</td>
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**Trailer Records**

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<td>Transaction Code (Due In/Out)</td>
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<td>8</td>
<td>Date Requested</td>
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<td>10-15</td>
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<td>Requisitioning Customer (blank if ordinary replenishment)</td>
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<td>24-29</td>
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<td>Quantity Due (In/Out)</td>
</tr>
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<td>30-34</td>
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<td>Item</td>
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<td>Street</td>
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<td>95-99</td>
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Record Format: Vendor Data File
DEFINITIONS AND ABBREVIATIONS

Supplies - All kinds of properties, except real estate, needed in the transaction of official business or for public use, whether in the nature of furniture, stationeries, construction materials, livestocks and such other properties of similar nature, or equipment for issue to troops, units and installations.

Serviceable Property - Those properties in serviceable condition, which are in possession of a unit agency of the government. Serviceable properties include those properties authorized in the TO & E or in the TA, and excess properties.

Excess Properties - Those serviceable properties in the possession of any unit/agency or office which is in excess of the quantity required or authorized for retention, and cannot be utilized as a substitute property to satisfy existing shortages. This includes items of supplies in stocks which have no recorded demand.

Unserviceable Properties - Those properties whose conditions are such that they cannot be used or placed in service because they are worn out or obsolete.

Obsolete Properties - Those properties which are unserviceable and cannot be replaced in service because they are
no longer suited to the purpose intended. These include properties in stocks which have no recorded demand.

**Salvage Properties** - Those properties which are unserviceable and beyond economical repair. For the purpose of appraisal of values, salvage property is further classified into: high value salvage, whose value is higher than the value of its material content; and scrap, whose value is the value of its material content only.

**Disposable Properties** - Those properties falling under the following categories:

a. Excess properties remaining after redistribution;
b. Obsolete Properties; and
c. Salvage Properties.

**General Voucher** - This form shall be used to pick up the accountability of property acquired through purchase from appropriated or reimbursable funds.

**Invoice Receipt** - This form shall be used in the transfer of property accountability of non-expendable supplies from one supply officer to another. It shall serve as the evidence of issue of transfer. It may be used as a packing slip or a tally out.

**Requisition and Issue Voucher** - This form shall be used in requisitioning expendable supplies. It shall serve as the evidence of issue and transfer of accountability, as well as the packing slip, tally out, and shipping document.
SLIRIT - Single Line Item Requisition. This form shall be used for requisitioning non-expendable supplies for one item only.

Property Turn-In Slip - This form shall be used for turning-in to the supply installation of the next higher level all excess and unserviceable supplies. This form shall be used to debit or credit accountability.

Supplies Adjustment Sheet - This form shall be used to abstract and sum up all issues of expendable supplies (issued under "requisition and issue voucher") by Depot Accountable Officer.

Inventory Adjustment Report - This form shall be used to adjust discrepancies for properties noted between balances in the stock cards and actual balance of stock on hand of all supplies, when such discrepancies do not exceed a specified amount and the item quantity short is not in excess of 10 percent by line item of the recorded quantitative balance. Shortages in excess of said limits shall be taken up on a report of survey. However, in the use of this form for overages no limits are prescribed. Adjustment of records to tally with physical count is completed by the Accountable Officer and approved by his Commanding Officer. This form may also be used in adjusting records when component parts taken up separately in the records are issued in the form of
assemblies. Adjustment credit shall be established for the component parts and adjustment debit will be made for the assemblies formed by the component parts. In cases like this, adjustment shall be effected first before issue transactions.

**Report of Survey** - This form shall be used for obtaining relief from accountability and/or responsibility for lost, damaged, stolen, destroyed, or worn-out supplies and equipment.

**Technical Inspection Report** - This form when duly accomplished shall support the Inventory and Inspection Report; the Report of Survey of Statement of Charges, as the case may be.

**Report of Property Found in Station** - This form shall be used to pick up accountability of all supplies like found in station, captured enemy property, confiscated property to include donations and/or supplies not taken up in the record of the unit.

**Memorandum Receipt** - This form shall be used in issuing non-expendable property from a supply officer to user.

**Data** - A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation or processing by humans or automatic means.

**Data Flowchart** - A flowchart representing the path of data through a problem solution. It defines the major phases of the processing as well as the various data media used. Synonymous with data flow diagram.
On-Line - (1) Pertaining to equipment or devices under direct control of the central processing unit. (2) Pertaining to user's ability to interact with a computer.

Keypunch - A keypunch actuated device that punches holes in a card to represent data.
LIST OF REFERENCES


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