NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

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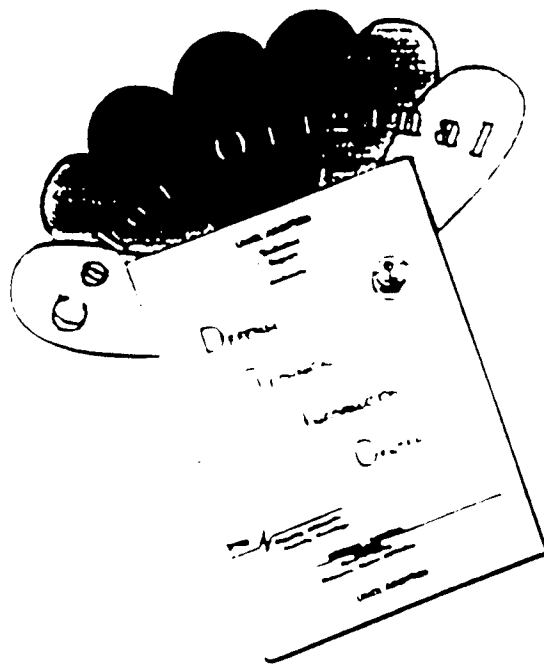| DESIGN AND IMPLEMENTATION OF A PROTOTYPE MONITOR ASSIGNMENT SUPPORT SYSTEM (MASS) |
| --- |
| by |
| Rory Joseph Walsh and Ira Maurice Cheatham |
| September, 1994 |
| Principal Advisor: Magdi N. Kamel |

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Design and Implementation of a Prototype Monitor Assignment Support System (MASS)
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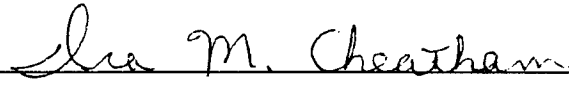MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

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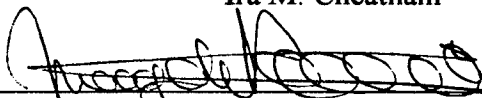
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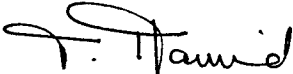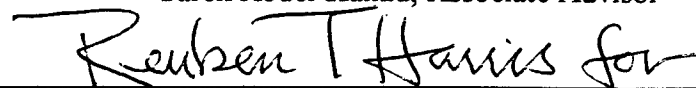| Accesion For		
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ABSTRACT

A primary mission for the Manpower Management Officer Assignment (MMOA) Branch of Headquarters, United States Marine Corps (HQMC) is the placement of trained and qualified officers into authorized billets both internal and external to the Marine Corps. In accomplishing their mission, the monitors and their support staff rely on a variety of information sources to assist them in their decision making. Access to this information, however, is neither quick nor easy and too much reliance is placed on paper reports and microfiche, which are often outdated.

To remedy this situation, this thesis develops a prototype PC-based Monitor Assignment Support System (MASS) to assist monitors in their day to day activities. The focus of this thesis is on the development of the assignment process model and its implementation into a database application. The prototype downloads updated personal and performance information about an officer which is used by a Marine monitor to make assignment decisions. MASS was developed using Microsoft Access database management system which proved to be a powerful and easy to use tool for developing this prototype.

TABLE OF CONTENTS

I. INTRODUCTION

A. BACKGROUND

A primary mission for the Manpower Management Officer Assignment (MMOA) Branch of Headquarters, United States Marine Corps (HQMC) is the placement of trained and qualified officers into authorized billets both internal and external to the Marine Corps. In accomplishing this mission, the monitors and their support staff rely on a variety of information sources to assist them in their decision making. These information sources include:

1. An extract from the Table of Manpower Requirements (TMR) system for billet related information.

2. Sections A and B of officer fitness reports accessed via the Automated Fitness Report System.

3. Training information from the By Name Assignment (BNA) System.

4. Specialized billet and officer information from both the Joint Duty Assignment Management Information System (JDAMIS) and the Acquisition Work Force Systems of Management (AWSOM).

5. The Officer Slate File (OSF), consisting of monitor entered Headquarters Master File (HMF).

Each of these systems, except JDAMIS, reside on a mainframe computer at Quantico and the monitors use, to varying degrees, the Natural programming language to obtain reports via ad hoc or canned routines. JDAMIS is a Department of Defense systems located at the Defense Manpower Data Center, Arlington, Virginia.

Additional sources of information may include: a foreign language proficiency file, Authorized Strength Report (ASR) file, Grade Adjusted Recapitulation (GAR) file, Officer Staffing Goal Model (OSGM), Exceptional Family Member file, Command English, Address information file and various selection/screening boards in separate files.

These files reside on the Quantico mainframe, but the monitors rarely, if ever, access these files. The systems shop for MMOA combines the data from these files with other files found in Natural/Adabase environment via mainframe application software (SAS) programming language to produce a variety of paper reports for the rest of MMOA on both scheduled and on-call basis. These reports represent data on the HMF while others are more statistical in nature and include officer planned information.

Finally, monitors obtain information from microfiche to assist them in their assignment decisions. In this category, they use the Officer Master Personnel File (OMPF) and the Table of Organization (T/O) checklist.

Besides using the information from a variety of automated systems, a small portion of monitor-entered data serves as an input to some automated systems external to MMOA. These include the BNA system, the Automatic Orders Writing Process (AOWP), JDAMIS, AWSOM, and on-line diaries as part of the JUMPS/MMS system.

As new Automatic Information Systems (AIS's) are developed to support various manpower functions, there appears to be no "force" attempting to orchestrate the integration of these systems to ensure affected manpower users can quickly and easily extract the necessary information needed to perform their mission. There is no question the information required by the users in MMOA is available in some automated systems, hard copy report or microfiche; however, access to this information is neither quick nor easy and too much reliance is sometimes placed on paper reports and microfiche. As soon as paper reports are printed, the information is dated and microfiche cannot be easily accessed on-line or effectively cross referenced with other data to assist in decision making.

B. OBJECTIVE

The objective of this thesis is to develop a PC-based Monitor Assignment Support System (MASS) to assist monitors in placing trained and qualified officers into authorized billets. The focus of this thesis is on the development of the assignment process model and its implementation into a database application. A related thesis develops and implements the data model of MASS.

C. RESEARCH QUESTIONS

The research questions that this thesis addresses are:

1. What are the main processes that a monitor employs to accomplish his/her job?

2. Can the assignment process be improved through the use of a microcomputer based database system?

D. SCOPE OF THESIS

This thesis will accomplish the following tasks:

1. Development of MASS Process Model using Data Flow Diagrams and a suitable Computer Aided Software Engineering (CASE) tool.

2. Design of Application programs (queries, forms, reports, etc.) for MASS using the developed Process Model.

3. Implementation of the above design using windows based Microsoft® Access database management system.

4. Development of a user manual for MASS.

E. METHODOLOGY

The methodologies and tools used to accomplish the above tasks are as follows:

1. The MASS process model will be specified using data flow diagrams. The Data Flow Diagrams will help clarify the process requirements of the users at MMOA to perform their mission. Specifically the list of related processes are:

a. Identifying units which are understaffed according to the latest staffing goal quantities.

b. Identifying officers who are potential movers to fill vacant billets.

c. Screening the personal and performance records of the officers who are considered as potential movers.

d. Creating a Brief Sheet. In this process, the monitor assembles the data consisting of the Marines who meet the criteria to fill a vacant billet. This information is compiled in a report and forwarded to the approving authority.

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e. Ad hoc query process; allows the monitor to query the database at their discretion.

f. Download process; allows the monitor to refresh the data stores from the mainframe located at Quantico, Virginia.

2. Provide a prototype system in a short period of time, utilizing in-house resources and off-the-shelf software to produce a prototype of the desired system with full involvement of the intended users. The prototype will include the monitor transactions, forms, queries and reports.

3. The software of choice for the thesis will be Microsoft Access for Windows and the Microsoft Access Developer's Kit. Previous experience has shown the software to be user friendly and suitable for the task. Additionally, the software allows the developer to create a "Run Time" version of the prototype system. This version allows the targeted user to test the system without the need for application program. Critical areas will be identified by the user and integrated into MASS. As the prototype is tested by actual users, additional areas will be added to the system or design will be changed (as time allows) to satisfy the needs of the users. Furthermore, this prototype will serve as a design changed specification for a follow on system under full-scale development.

4. The User Manual will be written in a "How To" style. The manual will include:

a. Minimal hardware and software requirements

b. Installation and setup

c. System navigation

F. BENEFITS OF STUDY

The adverse consequences of an officer misassignment cannot be over emphasized. With the reduced officer force, it is essential to use all methods to ensure the right officer is placed in the right billet. The MASS prototype will enable the monitor to more accurately identify billet shortages and assign the best qualified officers to fill those billets. Additionally, the monitor will have all the information required to perform his duties on a personal computing platform instead of interfacing with a mainframe computer. The immense cost of producing hundreds of reports each month will be significantly reduced. and the monitors will be working with more current information. Officers for billet assignments can be found and matched efficiently and effectively.

G. ORGANIZATION OF STUDY

This thesis is organized as follows:

Chapter II. Present Method of Personnel Assignment: This chapter describes the current method of how a monitor assigns Marine officers to vacant billets.

Chapter III. Process Requirements: This chapter presents the Logical Data Flow Diagrams of the system. The diagrams are used as the basis for designing the prototype.

Chapter IV. Application Design: This chapter presents the detailed design of each subsystem in the prototype. It includes the system menus, forms, reports, and the logic of the main modules.

Chapter V. Implementation: This chapter discusses the implementation of the prototype and an overview of the database management system used for its implementation.

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Chapter VI. Lessons Learned and Future Enhancements: This chapter provides a summary of our experiences, lessons learned and suggestions for future enhancements to the prototype.

Appendix A. User Manual: This appendix is a detailed "How To" manual for using MASS. The manual is written in a step by step manner accompanied by actual computer screen images to assist the user in understanding and operating the system.

Appendix B. Data Flow Diagrams: This appendix contains all the data flow diagrams described in Chapter III.

Appendix C. Tables: This appendix lists all the tables (reference files) used in MASS.

Appendix D. Queries: This appendix is a listing of the queries used in the prototype.

Appendix E. Forms: This appendix contains sample forms and a detailed description of the inputs for each.

Appendix F Reports: This appendix contains sample reports and a detailed description of the inputs for each and how to produce various types of output.

Appendix G. Modules: This appendix contains the Microsoft® Access Basic code used to develop MASS.

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II. PRESENT METHOD OF PERSONNEL ASSIGNMENT

A. BACKGROUND

This chapter is a description of the current process the Marine Corps monitors use to assign personnel. There are approximately 17,000 officers in the Marine Corps. The duty of the Marine Corps monitor is to ensure that the best possible qualified officers are assigned to correct matching billets. Since Marine Corps officers are transferred daily to billets around the world, their assignment is a continual process of moving one officer from one billet to another and filling the billet left vacant by that officer.

A monitor is assigned a portion of the officer corps by grade and Military Occupational Specialty (MOS). For example, a certain monitor would have the responsibility for the assignments of all officers with a grade of Captain and an MOS of Logistics (0402). Monitors use computers which are linked to the mainframe computer center located in Quantico, Virginia to access a variety of information. Although the mainframe provides the monitors with valuable information, the value of the information is dependent upon the mainframe staying on-line. If the mainframe goes down, the assignment process is virtually shut down.

Additionally, the monitors rely on computer reports which are produced on both a scheduled and demand basis. However, by the time the request for a report is processed, printed and delivered, the information is usually outdated and inaccurate.

Furthermore, not all of the information required by the monitor in determining "the right officer in the right billet" is available on the computer. Presently, some of the information is available on-line, some is located on paper printouts, and the rest is on microfiche. The current process is complicated and cumbersome. The process of assigning an officer to a billet is detailed below and graphically depicted in Figure 2-1.
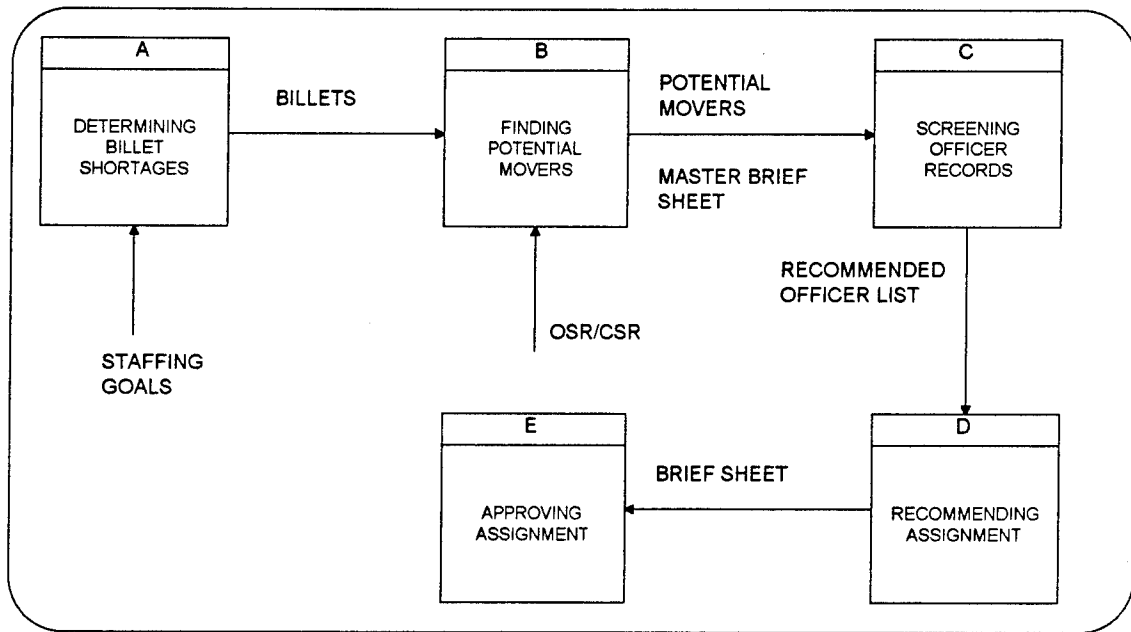
Figure 2-1 Monitor Processes

B. DETERMINING BILLET SHORTAGES

The monitor uses the Staffing Goal Number and the On Hand Number on the Staffing Goal Report as indicators of which units are short in the number of officers rated by the unit. The Staffing Goal Number indicates the number of officers by a certain grade and MOS which will be sent to a Marine Corps command. The monitor currently analyzes two reports called the Command Staffing Report (CSR) and the Occupational Staffing Report (OSR).

The CSR is a listing of all commands in the Marine Corps and is subdivided by type of unit. This report shows the number of officers on board by month. For example, for a given year, suppose the Staffing Goal for Captains with an MOS of 0402 for an infantry battalion is set at two. By looking at all the infantry battalions in the Marine Corps, the monitor can identify the month where certain infantry battalions will be understaffed. This means that the Staffing Goal Number will exceed the On Hand Number. When this occurs, the unit is short by one or more officers.

The OSR is similar to the CSR in the information it contains. This report is a listing of MOS's, and commands showing the grades and the names of the officers currently on board. The report also shows the number of officers on board by month and is used to determine which units will be understaffed during the coming year. An example of the CSR and the OSR is shown in Figure 2-2 and Figure 2-3.

Shortages in units are caused by a variety of reasons. Some examples are changes to the Staffing Goals which are revised annually. Another reason may be an unexpected transfer of an officer from one duty station to another without an immediate replacement available. In most cases, the monitor will attempt to remedy the situation as quickly as possible.

It is common practice for the monitors to plan ahead. The goal of the monitor is to schedule an officer for a billet at least six months before the incumbent officer leaves the billet. The monitor tries to plan an overlapping period where the outbound officer and the inbound officer have a chance for a turnover period. During this period, the outbound officer briefs the inbound officer on the details and particulars of the billet.

C. FINDING POTENTIAL MOVERS

The next step in the process is to find potential movers to fill the vacant billets. To accomplish this task, the monitors use both the CSR and the OSR to find those officers with the required MOS, along with other decision factors such as the minimum time on station or planned rotation date. A rule of thumb used by the monitor for determining minimum time on station is two years. The monitors also use another report called a "Losses Report". This report is a listing of all officers who are pending discharge from the Marine Corps and should not be considered as potential movers. The output of this process is an initial listing of officers who are potential movers.

D. SCREENING OFFICER RECORDS

Having compiled the list of "movers", the monitor must subjectively evaluate who is best suited for the billet. This process requires the monitor to review each officer's Master Brief Sheet (MBS), Fitness Reports and Officer Slate Form (OSF). Copies of the MBS and OSF are found in Figure 2-4 and Figure 2-5 respectively.

The MBS is a snapshot of an officer's career record. It is a chronological compilation of an officer's Fitness Reports detailing past assignments by type and location as well as the evaluation markings he has received throughout his career: The monitor uses this report to evaluate an officer's potential to fill a billet. The report is also used by the monitor to detect any unfavorable trends in an officer's performance which may be a cause for concern and may disqualify them for certain billets. For example, officers chosen for joint billet assignments are usually those who have consistently performed in an

outstanding manner. If the MBS indicates a questionable trend or repeated dips in performance, the monitor may refer to the officer's fitness reports for further evaluation.

The second main source of information used in this process is the officer's Fitness Reports. These reports allow the monitor to make a more detailed evaluation of an officer by reading the specific comments about an officer's performance which are not provided on the Master Briefsheet. The fitness reports contain a written paragraph called "Section C" which describes the officer's performance during a specific reporting period. The fitness reports also show how the officer compared with his peers during the various reporting periods in his career. For example, the monitor may need to know if an officer was consistently rated above his peers, below them, or was rated in the middle of the pack. This evaluation is critical for identifying and selecting a high performer for a joint duty billet.

The third main source of information used in this process is the OSF which lists the last known duty preference codes of the officers being screened. The monitor uses this information to narrow down the list of officers and to make a recommendation for each vacant billet.

Once the final list of officers and their recommended future assignments is completed, the monitor may make a series of phone calls. First, the monitor usually calls the officer and informs him of the planned assignment to the next duty station. This gives the officer a chance to express his opinion and advise the monitor if there are any special reasons he/she cannot or should not be considered for the billet. For example, the officer plans to retire or there is an "exceptional" family member who requires special medical

facilities not available at the next duty station. Next, the monitor calls the command to tell them about the planned inbound officer. This information gives the receiving command a chance to determine if the inbound officer is acceptable, particularly if they know the officer from previous duty stations. If the receiving command has no objections, the monitor makes a note on the list that the command has no objection to the inbound officer, and the officer has expressed a desire to fill the billet. The monitor notes are considered a critical part of this process. Since they are based on input, interaction, and any agreements made between the monitor and the officer in the field, they are used as one of the key decision factors in justifying an assignment.

E. RECOMMENDING ASSIGNMENT

At this point, the monitor has a list of the recommended officers to fill the billet vacancies. The next step is to prepare a Brief Sheet for each officer on the monitor's list. A copy of the Brief Sheet is shown in Figure 2-6. The Brief Sheet lists the name of the officer and the recommended duty station. Attached to the Brief Sheet is the officer's MBS. The Brief Sheet is then forwarded to the appropriate approval authority (e.g., Branch, Division, or Director of Manpower). At this point in the process, the monitor assumes the list will be approved without modifications. Presently, this process is done with "hard copies" of each Brief Sheet package. No electronic mail is being used to route the document package.

F. APPROVING ASSIGNMENT

Once approval has been received, the monitor makes a request for orders to be assigned to each officer. Once orders have been written for each officer, their individual

OSF records are marked with an "Orders" flag, indicating the officer will be in receipt of orders.

This completes one cycle of the assignment process. In the following chapter, we discuss our approach to designing the system through process modeling.

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  CAPTAINS                            1     1     1     1     1     1
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  LIEUTENANTS
  WARRANT OFF
MOS TOTAL          1

NAME              MID    GRD IZ PMOS 1MOS 2MOS DAUS S/O  RTD  FMCC MCC SPMCC  DCTB SEDO   EAS  SFMCC SEDA IMCC IEDA SGRD 8MOS

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IN BOUND  MOS 9967

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Figure 2-2 Command Staffing Report

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OCCUPATIONAL STAFFING REPORT (OSGM RUN - 16 DEC 93)
ALL OFFICERS
ASR AS OF   MID FISCAL YEAR 1994
INVENTORY AS OF   JANUARY 7, 1994
STAFFING GOAL TGT DATE OCTOBER 1, 1994
REPORT CREATION DATE   JANUARY 7, 1994

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ON BOARD MOS 0170	MAG 46 4THMAW EL TORO CA								OSR_MCC G17												
JACKSON WILLIAM D ●●●●●●●● H3	N 0170 0000 0000 9104								160	G17	G17	9201	950501	000000	ZY5	9506				● 03 0180

MCC G17	ASR	S.G.	JAN94	FEB94	MAR94	APR94	MAY94	JUN94	JUL94	AUG94	SEP94	OCT94	NOV94	DEC94	MAR95	JUN95	SEP95	DEC95	JUN96	DEC96
COLONELS																				
LT. COLS																				
MAJORS																				
CAPTAINS																				
LIEUTENANTS																				
WARRANT OFF		1	1	1	1	1	1	1	1	1	1	1	1	1	1				
MCC TOTAL		1	1	1	1	1	1	1	1	1	1	1	1	1	1				

BILLETS FOR THE ABOVE 0170 SG(S) ARE -
WARRANT OFF : CPT-0180   1

NAME	MID	GRD	IZ	PMOS	1MOS	2MOS	DAUS	S/O	RTD	FMCC	MCC	SPMCC	DCTB	SEDD	EAS	SFMCC	SEDA	IMCC	IEDA	BGRD	BMOS
ON BOARD MOS 0170	MACG 48 4THMAW GLENVIEW IL								OSR_MCC G18												
MCGUIRE MARK A ██████████	I 0170 0000 0000 8211								012	G18	G18	9008	950501	000000	ZY4	9505				● 03 0180

MCC G18	ASR	S.G.	JAN94	FEB94	MAR94	APR94	MAY94	JUN94	JUL94	AUG94	SEP94	OCT94	NOV94	DEC94	MAR95	JUN95	SEP95	DEC95	JUN96	DEC96
COLONELS																				
LT. COLS																				
MAJORS																				
CAPTAINS																				
LIEUTENANTS			1	1	1	1	1	1	1	1	1	1	1	1	1				
WARRANT OFF																			
MCC TOTAL			1	1	1	1	1	1	1	1	1	1	1	1	1				

NAME	MID	GRD	IZ	PMOS	1MOS	2MOS	DAUS	S/O	RTD	FMCC	MCC	SPMCC	DCTB	SEDD	EAS	SFMCC	SEDA	IMCC	IEDA	BGRD	BMOS
ON BOARD MOS 0170	MAG 49 4THMAW WILLOW GROVE PA								OSR_MCC G42												
BLAKE DIANA L ●●●●●●●● H3	N 0170 0000 0000 8906								009	G42	G42	9208	950701	000000	ZY5	9508				● 03 0180

OCCUPATIONAL STAFFING REPORT (OSGM RUN - 16 DEC 93)
ALL OFFICERS
ASR AS OF   MID FISCAL YEAR 1994
INVENTORY AS OF   JANUARY 7, 1994
STAFFING GOAL TGT DATE OCTOBER 1, 1994
REPORT CREATION DATE   JANUARY 7, 1994

MCC G42	ASR	S.G.	JAN94	FEB94	MAR94	APR94	MAY94	JUN94	JUL94	AUG94	SEP94	OCT94	NOV94	DEC94	MAR95	JUN95	SEP95	DEC95	JUN96	DEC96
COLONELS																				
LT. COLS																				
MAJORS																				
CAPTAINS																				
LIEUTENANTS																				
WARRANT OFF		1	1	1	1	1	1	1	1	1	1	1	1	1	1				
MCC TOTAL		1	1	1	1	1	1	1	1	1	1	1	1	1	1				

BILLETS FOR THE ABOVE 0170 SG(S) ARE -
WARRANT OFF : CPT-0180   1

NAME	MID	GRD	IZ	PMOS	1MOS	2MOS	DAUS	S/O	RTD	FMCC	MCC	SPMCC	DCTB	SEDD	EAS	SFMCC	SEDA	IMCC	IEDA	BGRD	BMOS
ON BOARD MOS 0170	MATSG WHIDBEY ISLAND WA								OSR_MCC G68												
MARGIS JR CHARLES ●●●●●●●● H3	N 0170 1390 0000 8906								G70	G68	G68	9211	950901	000000	ZY5	9510				● MO 0170

MCC G68	ASR	S.G.	JAN94	FEB94	MAR94	APR94	MAY94	JUN94	JUL94	AUG94	SEP94	OCT94	NOV94	DEC94	MAR95	JUN95	SEP95	DEC95	JUN96	DEC96
COLONELS																				
LT. COLS																				
MAJORS																				
CAPTAINS																				
LIEUTENANTS																				
WARRANT OFF		1	1	1	1	1	1	1	1	1	1	1	1	1	1				
MCC TOTAL		1	1	1	1	1	1	1	1	1	1	1	1	1	1				

BILLETS FOR THE ABOVE 0170 SG(S) ARE -
WARRANT OFF : MO -0170   1

NAME	MID	GRD	IZ	PMOS	1MOS	2MOS	DAUS	S/O	RTD	FMCC	MCC	SPMCC	DCTB	SEDD	EAS	SFMCC	SEDA	IMCC	IEDA	BGRD	BMOS
ON BOARD MOS 0170	MATSG CECIL FIELD FL								OSR_MCC G69												
RIFFEL RANDALL R ●●●●●●●● H2	N 0170 0000 0000 9103								1F7	G69	G69	9301	951201	000000	ZY6	9601				● MO 0170

MCC G69	ASR	S.G.	JAN94	FEB94	MAR94	APR94	MAY94	JUN94	JUL94	AUG94	SEP94	OCT94	NOV94	DEC94	MAR95	JUN95	SEP95	DEC95	JUN96	DEC96
COLONELS																				
LT. COLS																				
MAJORS																				
CAPTAINS																				
LIEUTENANTS																				
WARRANT OFF		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MCC TOTAL		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

BILLETS FOR THE ABOVE 0170 SG(S) ARE -
WARRANT OFF : MO -0170   1

Figure 2-3 Occupational Staffing Report

Figure 2-4   Master Brief Sheet

Figure 2-5   Officer Slate Form

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Brief For Branch Head Approval

MAC FTG PFCS	NAME MO	PGRD SGRD SRCPTN	PMOS AMOS AMOS	OCTS QRO TCP	PRESENT COMMAND SPACE (CC)	FUTURE COMMAND SPACE (CA)	ADV MCC
4	DUNN, PAUL B.	08	0802		W 1 1STRAMON/ CAMP PENDLETON CA		2Y7
34	0913461928	04	0808	0190801 V11		012	
04		H	0800	38		04/07/82	

DAUSOH:

PCSDAT: 07/83/91

PREFERENCE OF DUTY: K46   FOREIGN AREA STUDIES PROGRAM

                      H97   NROTC UNI LEXINGTON VA

                      Y18   BARRACKS DUTY OVERSEAS

EXCEPTION: No expln

STAFFING GOAL STATUS

FAGRGD 04   FASMOS 0810   FTG: 7402   FTOUR: 0430

ASR: 37   SQ: 34

NOTES: RELIEF FOR MAJOR GRIGGS. FLUENT SPANISH (18 CREDITS IN COLLEGE). SMALL BOAT EXPERT (INVOLVED IN ACQUISITION OF RAG DURING LFTC TOUR). SOC BACKGROUND FROM 1ST MARINES (BOAT COMPANY, TOP OFFICER).

APPROVALS:

Section Head _____

Ground Colonel _____

Branch Head _____

Figure 2-6   Brief Sheet

III. MONITOR ASSIGNMENT PROCESS MODELING

A. INTRODUCTION

"Process models define the requirements for processing data into information." (Whitten, Bently, Barlow, 1989, pp. 275-281). A process model describes the flow of data through a system and the processing performed on that data. Process modeling helps users and system developers understand the inputs, outputs, processing, and the relationships between processes. Process models are also sometimes called data flow models or data flow diagrams. Logical process modeling defines the input, processing, and output requirements independent of their implementation.

In this chapter, we develop the process model for the Monitor Assignment Support System application. We discuss logical data flow diagrams, a tool for drawing pictures of the flow of data through a system and the processing that must be performed on that data. Data flow diagrams are normally easier to understand than technical and prose descriptions.

B. DATA FLOW DIAGRAM OVERVIEW

Data flow diagrams are hierarchical in nature. The first level depicts the entire system as a single process. The next level breaks the process into its component processes and their associated data flows. The third level further breaks the processes of the second level into subprocesses and so on. The purpose of this leveling is to provide a more detailed picture of the system by "exploding" each process into its smaller components.

The breakdown continues to the point where there are no more subprocesses for a particular process and the process is considered "primitive" or complete.

There are only four symbols that appear on a data flow diagram: the *external entity*, the *process*, the *data flow*, and the *data store*. The *external entity* is defined as people and organizations with which the system interacts. The *process* is defined as the work or actions that are performed on incoming data flows to produce outgoing data flows. The *data flow* is defined as the minimum, essential data needed by the process that receives the data flow. By ensuring that processes only receive as much data as required, we reduce the dependence between processes. The *data store* represents the objects, people and events about which we need to store data.

The following diagrams are developed for MASS in this chapter: Decomposition diagrams, context diagrams, system diagrams, middle level, lower level and primitive level data flow diagrams. They are explained briefly in the following sections.

1. Decomposition Diagram

The decomposition diagram shows the top-down functional decomposition or structure of a system. It also provides an outline for drawing the rest of the data flow diagrams. The decomposition diagram for the MASS is shown in Appendix B, Figure B-1 through Figure B-4, and explained in Section C-1.

2. Context Diagram

The context diagram defines the scope and boundary for the system and project. The context diagram is shown in Figure B-5 and explained in Section C-2.

3. Systems Diagram

The systems diagram shows the major subsystems or functions and how they interact with one another. This diagram is useful for depicting the system as a big picture. The system diagram is shown in Figure B-6 and explained in Section C-3.

4. Middle and Lower Level Diagrams

The middle level and lower level diagrams show greater detail about subsystems and subfunctions. The primitive levels show explicit data flows and processes for a small, manageable piece of the system. The middle and lower level diagrams are shown in Figure B-7 through Figure B-14 and explained in Section C-4.

C. DATA FLOW DIAGRAMS FOR MASS

1. MASS Decomposition Diagram

The decomposition diagram of MASS, shown in Figures B-1 through B-4, depicts the overall, top-down view of the system. This is a hierarchical chart that shows how the system is decomposed into processes and subprocesses. Figure B-1 shows MASS as a system with 3 main processes. These are the *Monitor Transactions, Data Store Maintenance* and *Queries and Reports*. These main processes are broken down further into subprocesses which in turn are broken into subprocesses and so on. The details for each process and subprocess gets greater as each level is analyzed in the following sections. The development of the decomposition diagram and the related data flow diagrams were accomplished through a series of interviews with the monitors and by working side by side with them in their day to day tasks of assigning Marine officers to vacant billets.

2. MASS Context Diagram

Figure B-5, defines the scope and boundary of the system by showing the main flows to and from the system. It consists of one process that represents the entire system which is labeled process zero.

3. MASS System Diagram

The systems diagram, shown in Figure B-6, depicts MASS' three main processes. These processes are labeled *Monitor Transactions, Data Store Maintenance,* and *Reports and Queries.* The processes are numbered 1, 2, and 3 respectively. The *Monitor Transactions* process is where the main day to day monitor transactions take place. The *Data Store Maintenance* is the process whereby the data stores of MASS are created and updated. The *Reports and Queries* process is the process that generates the predefined reports and queries of the system. These reports and queries are standard reports and queries that are commonly used by all monitors.

The following sections describe each subprocess of MASS.

a. Process 1.1: Find Billet Shortages and Movers

This process entails finding Marine Corps units with billet vacancies and officers who are eligible to fill them. The process is further subdivided into two subprocesses.

Process 1.1.1 *Find Movers to Fill Billets* allows the monitor to locate specific commands with billet vacancies. Process 1.1.2P *Find Potential Movers* locates officers who are eligible to be reassigned based on an officer's total time at specific duty station.

The *Find Movers to Fill Billets* process is broken into three primitive processes consisting of 1.1.1.1P *Find Matching Billets,* 1.1.1.2P *Find Matching Movers* and

1.1.1.3P *Sort Potential Mover List.* These processes consist of the monitor providing input consisting of the MOS and grade he is responsible for monitoring. The result of the *Find Matching Billets* process is a listing of billet vacancies which need to be filled. The information from this process is passed to the *Find Matching Movers* process which retrieves the names of officers who are potential candidates to fill these billets. The resultant output of officer names can be sorted according to the monitor's preference by the *Sort Potential Mover List* process.

b. Process 1.2: Screen Officer Records

The next process is *Screen Officer Records,* which is the set of processes whereby the monitor gathers and reviews data on the officers who have been determined as eligible for a billet vacancy. The process is further broken down into three sub-processes, 1.2.1P *View Master Briefsheet,* 1.2.2P *View Fitness Reports,* and 1.2.3P *View Officer Slate.*

Process 1.2.1P: *View Master Brief Sheet* allows the monitor to review an officer's career history in the Marine Corps. The Master Brief Sheet is a chronological listing of where the officer has served and the type of billets the officer has performed. The Master Brief Sheet lists the officer's performance markings, providing the monitor with a general background of the officer's career pattern. The monitor uses the report to identify any adverse or uncommon marking trends in an officer's performance record. This report also lists both the civilian and military schooling the officer has received as well as any language skills and personal awards worth noting.

Process 1.2.2P: *View Fitness Reports* allows the monitor to make an even more detailed evaluations on an officer by reading the specific comments about an officer's

performance which are not provided on the Master Brief Sheet. The fitness reports contain a written paragraph called "Section C" comments which describe the officer's performance during a specific reporting period. The fitness reports also show how the officer compared to his peers during his career. For example, the monitor may need to know if an officer was consistently rated above his peers, below them, or was rated as average. This evaluation is critical for identifying and selecting a consistently high performer for a joint duty billet.

Process 1.2.3P: *View Officer Slate* provides the monitor with additional information such as the last time an officer was deployed overseas, whether the officer has failed selection for the next higher grade, and any additional preferences of duty. A critical process related to viewing the officer slate is entering monitor notes. A Marine Corps monitor receives numerous notes and phone calls from officers around the world. These communications involve such matters as preferences and requests for duty station assignments, requests for a duty assignment near medical facilities for an exceptional family member who requires such facilities in an assignment area, or notification of impending retirement or resignation of an officer from the Marine Corps. Currently, the monitor makes notes of these calls or letters. Since the mainframe system limits the monitor to three lines of notes, lengthy notes are kept in a separate folder. Although a simple process, the monitor notes are considered a critical process as it is used as one of the key decision factors made in justifying an assignment based on input, interaction, and any agreements made between the monitor and the officer in the field.

c. Process 1.3P: Create Brief Sheet

The next sub-process is *Create Brief Sheet*. Having screened the number of eligible officers for the billet vacancies, the monitor makes his recommended officer choice for the billet, modifies the officer's slate record with an annotation of the next duty assignment, and enters a flag indicating the recommended assignment is awaiting approval. Next, the monitor creates a brief sheet which contains the officer's name and recommended assignment along with comments justifying the decision and a copy of the officer's Master Brief Sheet. The brief sheet is forwarded to the appropriate approval authority depending on the officer's grade and the type of billet assignment.

d. Process 1.4P: Approve Assignment

The next sub-process is *Approve Assignment*. If the appropriate approval authority concurs with the monitor's recommendation, the monitor makes an entry on the officer's slate record indicating the next assignment.

e. Process 2.1 Maintain Data Stores

The *Maintain Data Stores* process allows the system administrator to edit certain selected fields within the system's data stores. The process is further broken into subprocesses 2.1.1P *Maintain Member Store*, 2.1.2P *Maintain CSR/OSR*, and 2.1.3P *MCC Look Up*. The three processes allow the system administrator, upon request from the monitors, to modify selected fields of an officers' record field, a Marine Corps unit billet record field, or the name description field of a Marine Corps unit, respectively.

f. Process 2.2P: Download Data Stores

Process 2.2P involves downloading the reference files of the system from the mainframe computers located at Quantico, Virginia. The specific details of the process are contained in another thesis authored by Lt. Lourdes T. Neilan (USN) and will not be covered here.

g. Processes 3.1P through 3.6P: Reports and Queries

The third major process, labeled as number three, is *Reports and Queries*. The breakdown of the process is shown in Figure B-9. These primitive processes allow the monitors to generate the reports used on a daily basis. Currently, the reports shown in the diagram are printed upon a request to the mainframe computer center. By the time the report is printed and sent to the monitors, the information is usually outdated.

The *Master Brief Sheet*, as described previously, is reviewed and attached to all recommended officer assignments.

The *Billet Report* provides the monitor with a listing of officers within a unit by PGRD and PMOS.

The *Billet Shortage Report* provides the monitor with a tool to identify billet shortages in the format tailored to the monitor's specification.

The *Losses Report* provides the monitor with a listing of officers who should not be considered as a candidate for reassignment due to their imminent release from the Marine Corps. This includes those officers who have come to the end of their obligated service, have submitted requests for retirement, or have submitted their resignation.

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In conclusion, process modeling enabled us to understand and detail the inputs, outputs, processing and relationships between the processes of the monitors in finding the most qualified officer to fill a vacant billet. Understanding these procedures enabled us to design the system in a logical manner and provide the monitors with access to required information in the most expedient manner. In the next chapter, we will discuss the application design of MASS.

IV. MASS APPLICATION DESIGN

A. INTRODUCTION

When designing the application for MASS, several factors and considerations were taken into account. First, we attempted to design MASS in a manner that fulfills requirements and be friendly to its end-users. Second, we attempted to present clear and complete specifications to the programmer. This was accomplished by:

(1) Having the end-users intimately involved during every step of the application design.

(2) Ensuring that every effort was made to design each form and report so that it closely matches those used currently by the monitors.

(3) Ensuring that each component designed was approved by the monitors as to the correctness in procedure, logic and appearance.

(4) Use of a prototyping approach to validate the design of user interfaces such as screens and reports. A prototype is a working though abbreviated version of a system. This prototype performs the same functions and tasks that the enhanced future version will, but ignores such features as efficiency, security, and error handling. The prototype approach was particularly useful in soliciting monitors' input who could not explain what they wanted, but were "sure they would know when they saw it". In addition to clarifying requirements and reducing uncertainty, the prototyping approach fostered a more positive attitude on the part of the monitors. It gave the monitors the opportunity to comment, provide feedback, and indicate errors in our designs. The prototype also enabled the

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monitors to see and touch the "buttons" of this prototype which, along with the data flow diagrams, reinforced their understanding of how the system is being designed to meet their requirements. The next sections describe in detail the design of each menu, form and report seen by the monitor, along with a description of valid input and the output data, as applicable.

B. MENUS AND INPUT FORMS

1. System Menu

Figure 4-1 illustrates the system menu. It is the first menu the monitor sees upon activating the system The screen consists of the Marine Corps emblem and three buttons. The *About MASS* button provides a short background of how MASS was developed. The *Run MASS* button starts the system. The *Quit MASS* button exits the application. Monitors can make selections by pressing either the underlined letter indicated on each button or by clicking the appropriate button with the mouse.

2. Main Menu

Figure 4-2 illustrates the main menu. The main menu screen contains the three main processes of the system. These are the *Monitor Transactions, Data Store Maintenance,* and *Reports and Queries*. The *Monitor Transactions* process is where the main process of finding billet shortages and qualified officers to fill those billets. Using this option, the monitor is able to determine what units are understaffed with respect to the current staffing goals. The system provides the monitor the capability to query all the units under his cognizance by specifying the *PGRD* and *PMOS* of the officers desired. The monitor can also quickly find all potential movers by querying the system for all the officers who

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fall into a certain window time frame. These two options make the process of identifying both billet shortages and potential movers a simple one. The *Data Store Maintenance* button allows the system administrator to update the system files manually or through an automated download from the mainframe computers in Quantico, Virginia. The *Reports and Queries* option generates six formatted reports used daily by the monitors. Figures 4-3, 4-4, and 4-5 are germane.

Figure 4-6 illustrates what happens when the monitor selects the *Monitor Transaction* option. The system displays five additional options to choose from. They are: *Find Billet Shortages and Movers, Screen Officer Records, Create Brief Sheet, Approved Assignment* and *Exit*.

3. Billet Shortages and Movers Menu

When the *Find Billet Shortages and Movers* option is selected, the system displays two additional options for the monitor to choose from. As shown in Figure 4-7, these options are *Find Billet Shortages* and *Find Potential Movers*. The *Find Billet Shortages* option allows the monitor to list those units who are currently understaffed or will be understaffed based on the input of *PGRD, MOS,* and *MONTH* of the year. As shown in Figure 4-8, inputting values for *PGRD, PMOS* and *MONTH* is accomplished through list boxes. Clicking on the *PGRD* list box displays a listing of grades from WO to O7. The monitor may select one of the grades by highlighting it. Clicking the mouse on the *PMOS* list box displays a listing of MOS' in numeric order from 0101 to 7599. Clicking on the *MONTH* list box displays a listing of all months. The monitors have a choice of selecting the month that is equal to, less than, greater than, or between a specified date by using the

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operator list box. Once these parameters are entered, the system can run a query that returns a listing of those units where the number of officers on hand is less than the staffing goal. An example of the *Billet Shortage Report* is found in Appendix F. The *Find Billet Shortages* option also provides the monitor with the capability of listing the officers in any unit by *PGRD* and *PMOS.* This listing is called the *Billet Report.* An example of the *Billet Report* is shown in Appendix F.

The *Find Potential Movers for Billet* option allows the monitor to find all officers with a specified *PGRD* and *MOS* who are eligible to move during a specified time frame without regard to any unit. This time frame is usually based on the officer's rotation date. Selecting this option prompts the monitor for values of the following criteria: *MOS, PGRD, Slate Future MCC (SFMCC), Slate Estimated Departure Date (SEDD).* As shown in Figure 4-9, which is similar to the *Find Billet Shortages* option, a monitor inputs values for these parameters through a series of list boxes. Once values for these parameters are entered, the system can run a query that returns a listing of officers and their current location that satisfy the selection criteria, as shown in Figure 4-10.

4. Screen Officer Records

As shown in Figure 4-11, when the *Screen Officer Records* option is selected, the system displays five additional options for the monitor to choose from. These options are *View Master Brief Sheet, View Fitness Report, View Promotion Photo* and *View Slate Form.* The parameter for retrieving this information for any officer is by the *MID* of the officer.

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5. Create Brief Sheet

When the *Create Brief Sheet* option is selected, the system provides a dialogue box prompting the monitor for the officer's *MID*. The system will return the *Brief Sheet* with the complete header information as well as the staffing goal status of the unit where the officer is being assigned. A sample completed *Brief Sheet* is shown in Figure 4-12.

6. Approved Assignment

When the *Approved Assignment* option is selected, the system provides a dialogue box prompting the monitor for the officer's *MID*. The system returns the officer's slate form. The monitor updates this form by updating the *SCHG, SFMCC* and the *Orders* fields.

7. Maintain Member Store

As shown in Figure 4-13, when the *Maintain Member Store* option is selected, the system displays all the fields which may be updated or changed (e.g., Duty Preference Codes). In order to maintain data integrity, this option will be used only by the system administrator and masked from all other users.

8. Maintain ASR / Staffing Goals

As shown in Figure 4-14, when the *Maintain ASR / Staffing Goals* option is selected, the system displays all the fields which may be updated or changed (e.g., Staffing Goals). In order to maintain data integrity, this option will also be used only by the system administrator and masked from all other users.

9. MCC Look Up

As shown in Figure 4-15, when the *MCC Look Up* option is selected, the system displays all the fields which may be updated or changed (e.g., changing the long title of a unit, adding or deleting a unit). In order to maintain data integrity, this option will also be used only by the system administrator and masked from all other users.

C.   REPORTS AND QUERIES MENU

The Reports and Queries option of the main menu allows the monitor to produce the following reports.

1. Master Brief Sheet

When the *Master Brief Sheet* option is selected, the system prompts the monitor for an *MID*. The system produces an officer's complete *Master Brief Sheet*. A sample report is shown in Appendix F.

2. Billet Report

When the *Billet Report* option is selected, the system displays a list box prompting the monitor for values of the *PGRD* and *PMOS* input desired. The system produces the most current listing of officers by *PGRD* and *PMOS* within specified units.

3. Billet Shortage Report

When the *Billet Shortage Report* option is selected, the system displays a list box prompting the monitor for the *PGRD* and *PMOS* input desired. The system produces the most current listing of those units which are understaffed with respect to the staffing goals. A sample report is shown in Appendix F.

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4. Slate Form

When the *Slate Form* option is selected, the system provides a dialogue box prompting the monitor for the officer's MID. The system produces the officer's *Slate Form* which is shown in Appendix F.

5. Losses Report

When the *Losses Report* option is selected, the system prompts the monitor for their MAC and the type of report specified. A list box provides the following input options: "W95", "Z27", "Z29", "Z63" and "All". The system produces the most current listing of those Marine officers pending discharge, retirement, resignation, or legal action. A sample report is shown in Appendix F.
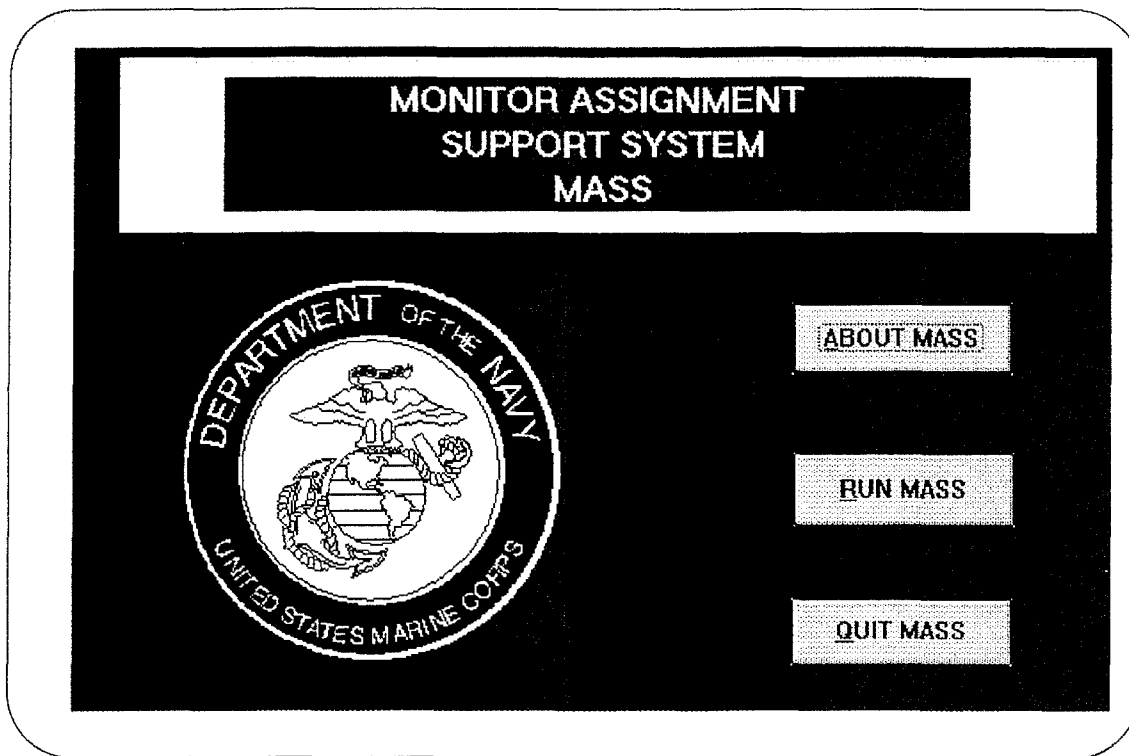
Figure 4-1 System Menu
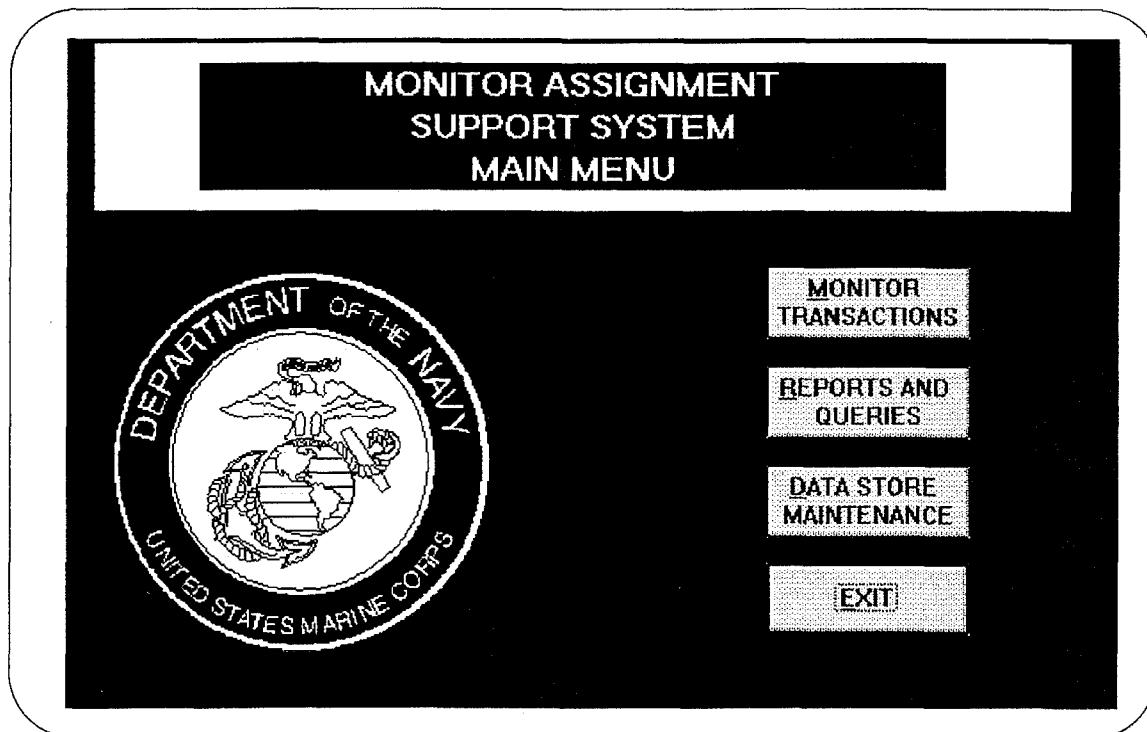
Figure 4-2 Main Menu
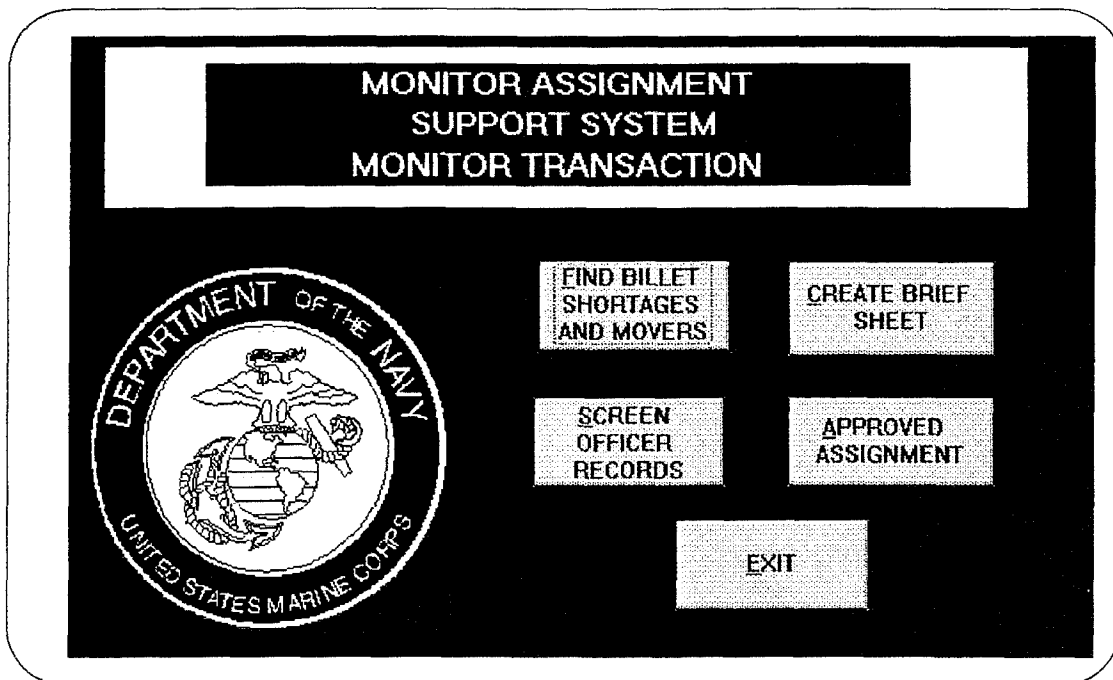
Figure 4-3 Monitor Transaction Menu

Figure 4-4 Data Store Maintenance Menu

Figure 4-5 Reports and Queries Menu

Figure 4-6 Monitor Transaction Menu

Figure 4-7 Billet Shortages And Movers Menu

Figure 4-8 Find Billet Shortage Input Form

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Figure 4-9 Find Potential Movers Input Form

Figure 4-10 Potential Movers Listing

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**MONITOR ASSIGNMENT
SUPPORT SYSTEM
SCREEN OFFICER RECORDS**

VIEW MASTER BRIEF SHEET

VIEW PROMOTION PHOTO

VIEW FITNESS REPORTS

VIEW OFFICER SLATE

EXIT
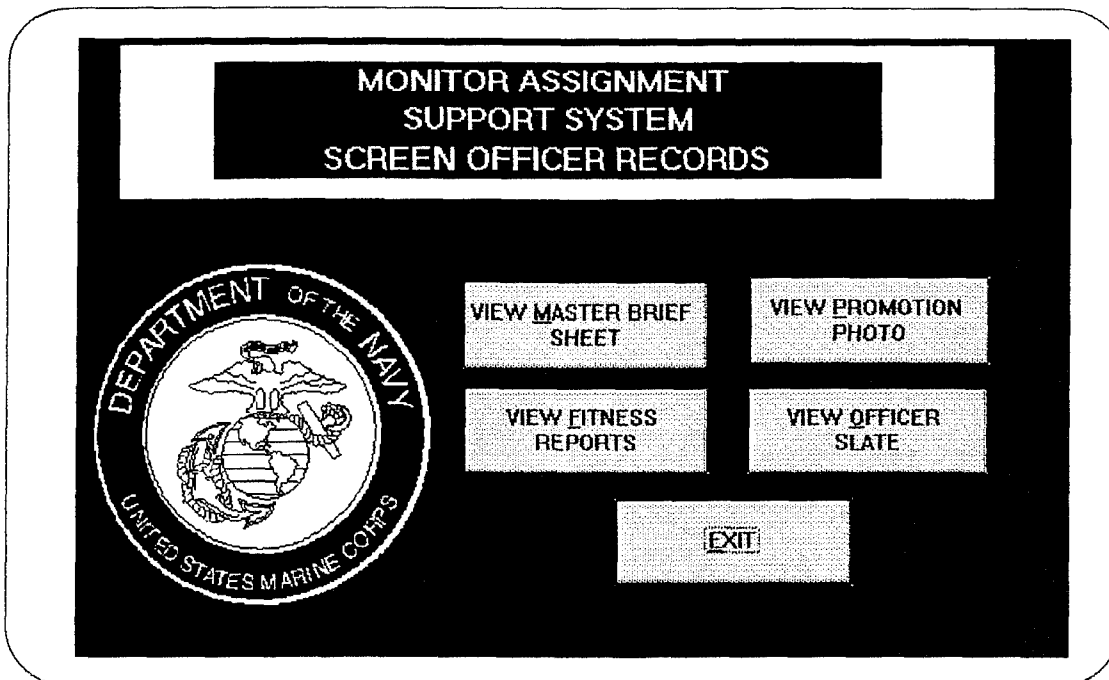
Figure 4-11 Screen Officer Records Menu

MAC FTCF FPCS	NAME MID	PGRD SGRD EXCPTN	PMOS AMOS AMOS	DCTB GEO EDD	PRESENT COMMAND SPMCC EDA
72	DOMINGUE, FRANCIS	03	0402		1ST MARDIV CAMP PENDLETON CA
12	0225521519	00	9957	92/01/01	121
OD			0000	36	95/01/01

FUTURE COMMAND: FORMAL SCHOOLS CAMP PENDLETON CA (PERMPEI)   ADV MCC: W95
SPMCC: KA1
EDA: 95/02/01

PREFERENCE OF DUTY: 151   2D FSSG CAMP LEJEUNE NC   DAUSDR:
                      142   2D MAW CHERRY POINT NC   PCSDAT: 88/12/12
                      122   2D MARDIV CAMP LEJEUNE NC

EXCEPTION:

Figure 4-12 Brief Sheet

MEMBER DATA STORE

LNAME: HARNER	FNAME: MICHAEL	MINIT: J	MID: 0201504219	MAC: 6

PG 1 OF 6

GRADE

- PGRD: 13
- SGRD: 04
- DOR:
- LNPRES: 47582000
- PASSED: 0
- CYIZ:
- SVCCODE:

MOS

- PMOS: 7204
- MOS1: 9658
- MOS2: 0000
- SIMOS:
- BMOS: 9658
- FUTMOS:

CONTRAC

- AFADBD:
- D1COMM:
- EASD:
- COMP: 11
- DULIM: 0
- JSODAT:

R/S/MAR

- RACE: C
- SEX: M
- MARST: M
- DEPLOC: 224
- SPOSVC: 0

FIND MEMBER BY: MID   LAST NAME   EXIT   PgDn   PgUp

Figure 4-13 Maintain Member Store Form

OSR AND CSR MAINTENANCE FORM

Demand MCC	Demand Grade	Demand MOS	ASR Quantity	PMOS Officer	PGRD Of
T	WO	0170	5	0170	WO
T	WO	0205	3	0205	WO
T	WO	0210	4	0210	WO
T	WO	0260	2	0260	WO
T	WO	0306	3	0306	WO
T	WO	1310	1	1310	WO
T	WO	2120	1	2120	WO
T	WO	2340	1	2340	WO
T	WO	2503	1	2503	WO
T	WO	2805	2	2805	WO

Figure 4-14 Maintain ASR/Staffing Goal Input Form

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MCC LOOK UP TABLE

MCC:	MCC_Long Name:
***	UNDISTRIBUTED EXCESS
N	NONCHARGEABLE
T	TRAINING
AAA	OFF SEL TM TUSCALOOSA AL
AAB	OFF SEL TM ROANOKE VA
AAC	OFF SEL TM ORANGE CA
AAD	OFF SEL TM SAN JOSE CA
AAF	OFF SEL TM JACKSONVILLE FL

FIND MCC BY:	CODE	LONG NAME	EXIT

Figure 4-15 Maintain MCC Lookup Input Form

V. IMPLEMENTATION OF MASS

A. MICROSOFT ACCESS OVERVIEW

Microsoft Access is a powerful and easy to use database management system designed to store and manage information. It was the database management system of choice to develop and implement the prototype. The following sections, and associated appendices, discuss the main components of MASS and how they were created using the facilities of Access.

1. Tables

Access is a relational database management system. A relational database system is one that is specifically designed to manage information that's organized into one or more tables. A table is simply a collection of information that's neatly organized into rows and columns with each row representing a record and each column as a field. A table contains all the information about a given subject, such as customers, products or in the case of this thesis, an officer. Access had the capabilities to create tables from scratch or import tables form other database management systems. A listing of the tables used in the MASS prototype is found in Appendix C.

2. Queries

A query is a means of asking questions about the data in the tables, looking for specific information, or isolating/sorting groups or categories of information. Access query facility allowed the developers to customize queries which are used in day to day

processes of the monitors. As the information in the tables are changed, the answers produced by the queries are also changed.

3. Forms

A form is much like a fill in the blank form, used for entering information into a table. Similar to a paper form, the user can enter and edit data directly on the on-screen form. Forms can also be used to display information to the user or a menu of options for the user to choose from. Access form facility allowed the developers to rapidly customize data input forms to meet the monitors' requirements.

4. Reports

A report is a printout or display of data, on paper or on the computer screen. The flexibility of Access report facility allowed the developers to design and produce reports which replicate the reports presently produced for the monitors by the mainframe computer center in Quantico, Virginia.

5. Modules

A module lets the programmer define custom procedures, either as functions or subroutines for use in the database application. Access Basic was the programming language we used to create procedures in the single module contained in the MASS prototype.

B. IMPLEMENTATION OF MASS

1. Tables

We used a total of 18 tables during the development of MASS. The five main tables are the ASR (Authorized Strength Report), Member, Fitrep, Staffing Goal, and CEF (Command English File). These tables are described in detail in Appendix C.

2. Queries

Using the Access query facility, we designed 14 major queries for MASS. These queries perform a variety of functions including providing input information to other forms and calling other forms. These queries are described in detail in Appendix D.

3. Forms

Using the Access forms facility, we designed 21 forms for MASS. These forms function as the system menus as well as input forms to the database. These forms are described in detail in Appendix E.

4. Reports

The Access report facility was used to replicate the following reports: Officer Slate Form, Master Brief Sheet, Billet Shortage Report, and the Losses Report. These reports closely resemble those currently created by the mainframe system in Quantico, Virginia. These reports are described in detail in Appendix F.

5. Modules

The MASS prototype has one module which contains the functions and subroutines. These functions and subroutines are described in Appendix G.

C. OTHER IMPLEMENTATION ISSUES

1. Test Plan

As program modules are implemented, they have to be tested to make sure that they perform exactly as required. The purpose of testing is not to prove that the system works as specified, but to identify all the ways in which it can fail. This subtle distinction focuses the testers attention on anticipating all possible problems. Testing is needed because the implementation process is very complex. It goes through many stages of translation from specification to program code, and each stage is subject to error. The implementation of a computer-based system also requires that test data be prepared and that the system and its elements be tested in a planned and structured manner.

For this prototype we used the top-down program development and testing approach. This development and testing method starts with a general description of the system and expands into successively greater levels of detail. The major advantages of top-down structured testing and development is that the architecture of the system is tested early to make sure that all components eventually fit together and the computer program continues to operate as required when stubs are removed and new modules are added. Additional tests conducted were validation, verification, clear and black box testing, unit, functional and system testing.

a. Validation

Validation ensures that the system solves the right problems. This was accomplished through user interaction during the design process. The Marine monitors were afforded the opportunity to help in the design of each module, form, and report of

the MASS prototype. This was a more effective approach than the traditional method of comparing the final functionality of the system with the set of requirements defined by the monitors at the beginning of the design. These requirements changed as the monitors became familiar with the system features and capabilities. Exposing the monitors to the system early helped on them to articulate their desired changes at an early phase of system development when changes are least costly and less difficult to implement.

b. Verification

Verification ensures that the prototype functions correctly. Verification is a process of rigorous error detection. In order to reduce the chances for input error by the monitors, we used list boxes with valid values for the monitor to choose from. We created parallel tests using known data and manual procedures and compared the results of these processes with the results of the MASS prototype. When errors were detected, the logic of the functions and test data were rechecked and corrected. The monitors were also afforded the opportunity to comment on the correctness of the prototype functions.

2. Testing Strategy

a. Clear Box Testing

In clear box testing, a module is tested by examining the code inside the module. Test methods are designed to verify that the code matches the monitors' requirements of the application. These methods are usually used before black box testing methods so that the black box reviews do not have to be repeated if problems are discovered. Specifically, we conducted a structured walk through in which we stepped through the logic of our design.

b. Black Box Testing

In this method of testing, we treated the coded module as a black box. The module was run with inputs that are likely to cause errors. Then the output was checked to see if any errors occurred.

c. Unit Testing

These tests ensure that data exchanged with external devices such as files, and printers are correct. As with interfaces, the number, type, size and order of data items were also checked. Also, table keys, attribute names, and table structures were checked.

d. Function Testing

Function tests make sure that the integrated system performs all the functions defined in the specifications. The same data used for module testing was used to ensure that the system functioned properly. All screens, files, processing options, and reports were tested. Documentation and user interfaces were tested by the monitors who were not familiar with the prototype system, thereby eliminating testing bias on our part.

e. System Testing

System testing determines whether the system can perform all of its functions in a realistic operating environment. It must be able to handle peak loads, store all required data, respond rapidly, and recover from mechanical failures.

(1) Peak Loads.   The testing computer platform we used was a 486/66 with 16 MB of RAM and a 450 MB hard disk storage capacity.   We were unable to simulate multiple operators using the system in a LAN environment during a peak load to see if the

prototype could withstand the additional load. We strongly recommend further testing in this area.

(2) Storage. Storage devices must be able to store the maximum number of records the system is expected to have. The monitors have envisioned a client-server environment whereby a server with a large storage capacity will run the database management system and each client (monitors) will run a copy of MASS, but have access to the database through the server. Additionally, we recommend a minimum of 32 MB of RAM for the server.

(3) Response Time. Currently, the system responds very rapidly with the few records used for testing. Further testing is required with a greater number of records to determine the response time.

(4) Recovery. Computers fail occasionally due to power shortages, lightning storms, hardware failure, or other incidents. Procedures must be in place to recover from failures. We recommend the system administrator establish both written policy and enforced procedures in using timed back ups and an off-site storage area back up files.

3. Training Users

Training plans are an important element of the implementation plan. Their purpose is to ensure that all the users associated with this system possess the necessary knowledge and skills to operate and use the system. All essential training must be completed prior to the installation of the system. Several training methods are discussed in the following sections.

a. Manuals

Manuals have the advantage of being cheap, portable, and accessible. They can be used at the office, home, or kept beside the monitor. We have provided the monitor with a user manual in Appendix A. It lists each feature or option and describes its operation. This manual is useful to both the novice and experienced users who know how to do most operations, but have to look up details occasionally. The drawback to manuals is that they are difficult and costly to update. As systems are updated and modified, the manuals need to be updated and promulgated as well. Another drawback to manuals is the fact that the user must be willing to look in the manual for information. In our experience, many users would prefer to ask other people for help rather than read the manual themselves.

b. Courses

Courses are useful when several people must be trained at the same time. Trainees can actually use the system during the course to reinforce what they learned. However, if a contracted instructor is used, the cost can be high. In addition, courses are impractical for training only a few users at one time. We recommend creating a cadre of trained monitors who, in turn, will be responsible for developing a series of classes and lesson plans for training other monitors.

c. Computer-Aided Tutorials

A well-designed tutorial can simultaneously instruct the user in how to use the system and illustrate how it operates. It is available at any time, so users can take it at their convenience or as a refresher course whenever they need it. New users can use it

immediately without waiting for scheduled courses. However, good tutorials are usually expensive, time consuming and hard to develop. Poor ones are useless. A tutorial is one of the recommended features for future versions of MASS.

4. Installation and Conversion

After the users have been trained and the system has been fully tested, it is ready for installation. Installation means replacing an existing system and converting old files, if any, to run on the new system. When transitioning or converting to a new system, it is important to consider human and psychological factors. People tend to resist change and need to be convinced that the new system is in everyone's best interests. When change in a procedure occurs, some people may fear they will suffer in productivity or will be unable to adapt to the new system. Others may resist the new system simply because it is new. Reactions such as these can lead to serious problems which may delay system implementation, hinder retraining programs, and increase costs. One way to avoid such problems is to involve all personnel in planning and assure them that the new system will improve their working environment.

There are four common approaches to conversion which we will discuss. These approaches include the plunge or immediate replacement, the pilot program, the phase-in, and the parallel operation.

a. The Plunge Or Immediate Replacement

This is the approach in which the old system is terminated and the new system is put on line simultaneously, often over a weekend. This method provides a clean transition

to the new system with no old system to fall back on. This approach, however, can lead to many problems if the new system is unstable and the old one no longer is available.

b. The Pilot

This method installs the system with representative users who test the system. All other users continue to use the old system. The group using the system has an opportunity to rigorously test the system and identify problems. When problems have been resolved, the new system is installed for all users.

c. The Phase-in

This method installs the system in stages. The stages may be in different parts of the system or they may be different groups or regions in the organization. This method is most useful if a lot of training and installation is involved. The same group can move from one office to another to perform the same tasks as the phase-in progresses. The old system disappears by gradual withdrawal. If problems are encountered, the new system can be delayed and the old one can continue to function until the problems have been resolved.

d. Parallel

The parallel method runs both the new and the old system for a period of time until the new system has been proven. It is the safest method because the old system still exists in case the new one fails. The drawback is usually that users are less motivated to learn a new system when they are comfortable with the old system. Additionally, the financial and personnel requirement of running two systems may be prohibitive.

Our recommendation is to use the pilot method or the phase-in method. These methods offer the monitor test group the chance to learn and evaluate the new system while the rest of the monitors continue to do business as usual with the old system. If the new system is adopted, the monitor test group can be used as a training cadre for the rest of the monitors during the implementation. We advise against the parallel method because of the cost of supporting two systems may be prohibitive, and if given a choice, users tend to stay with the older, more familiar system rather than taking the time to learn a new system.

D.   POST-IMPLEMENTATION EVALUATION

An important method of learning is evaluation. A post-implementation evaluation can provide useful suggestions for future improvement. After the system has been in operation for at least several months, we recommend conducting a comprehensive evaluation of the completeness and quality of the prototype system. The completeness of the system is evaluated by comparing the user requirements stated during the requirements collection with the functions actually delivered by the prototype to the monitors. Measuring the quality of a system is difficult. Usually, a user survey can provide a surrogate for a quality measure. A system that is liked by the users and used heavily is likely to be of high quality. Heavy use is a measure quality only when the users have a choice of using it. In this case, a satisfaction survey may be more appropriate. Evaluation results can be used in making more realistic estimates or assessments of future project costs and benefits. They can also influence the acceptance of future projects. Therefore,

the evaluations should be performed by an impartial group that is not suspected of any

bias.

VI. FUTURE ENHANCEMENTS AND RECOMMENDATIONS

This chapter discusses our recommended enhancements to the prototype and provides some conclusions.

A.   FUTURE ENHANCEMENTS

The following sections are recommended enhancements to the prototype.

1. Fitness Report Retrieval

Future editions of MASS should include the option of retrieving a Marine officer's entire fitness report. The current version of the prototype retrieves the header information and the performance markings of a fitness report, since the Marine Corps does not retain the Section C comments digitally. Until these comments are captured electronically, the monitors will have to continue to rely on paper or microfiche copies of an officer's fitness report.

2. Promotion Photo

Although we were able to successfully retrieve an officer's promotion photo and associate it with his personal records, the option was not included in this prototype. The amount of disk space required to store these pictures makes implementing this option impractical. However, we realize the importance of an officer's appearance in evaluating them for certain billets. In those cases, the officer's promotion photo is crucial to the decision making process, and consideration should be given to implementing this option whenever technology makes it practical.

3. Automated Billet Matching

With the continuing improvement of expert systems software, we envision MASS having expert knowledge capability to identify and match officers for vacant billets based on a set of heuristics developed by a consensus of the monitors. This enhancement would give the monitors the option to accept or modify the system's recommendation of assignments, thus reducing the time required to manually examine and evaluate the list of potential movers.

4. Request Orders

Another enhancement we envision for the system is the capability to send an electronic request for PCS orders once the approval for a recommended assignment has been received by the monitor. Upon screening briefing approved packages, the monitor would flag the orders field, generate a request for PCS orders, and send the pertinent information on the officer to the orders branch. This enhancement would significantly reduce the administrative burden of hand carrying paper work from one office to another.

5. Multiple Processing

We also envision the system having multiple windows of information opened simultaneously. This feature would allow the monitor to look at several officers at the same time and to switch from one officer's record to another. Navigating through the system or switching options will be done by point and click.

6. Sensitive Information Retrieval

We also envision the system being able to store and retrieve sensitive personal information. This type of information pertains to special, usually adverse, personal

information on an officer. Examples of this type of information include previous arrests by the civilian authorities, sexual harassment convictions, or spouse/child abuse convictions. This information would be kept in an access restricted portion of the network, and safeguards provided to prevent unauthorized access to this information.

7. MASS Tutorial

Training plans are an important element of the implementation plan. Their purpose is to ensure that all the users associated with this system possess the necessary knowledge and skills to operate and use the system. A well-designed computer-based tutorial can simultaneously instruct the user in how to use the system and illustrate how it operates. Since a tutorial can be taken at any time, users can take it at their convenience as first time users or as a refresher course whenever they need it. Additionally, first time users can take the tutorial immediately without having to wait for scheduled courses. Good tutorials are usually expensive, time consuming and hard to develop. A tutorial is one of the recommended features for future versions of MASS.

8. Hot Keys

We also recommend the use of preprogrammed function keys or "hot keys" which allow direct access to a form or menu without having to navigate through the menu system. An example of a hot key is a function key, such as F2, which would print a report or save the current workfile.

9. Cascading Menus

We also recommend implementing a pull-down cascading menu. In this version of the system, menus are implemented on forms that overlay each other. Unfortunately, the

user may sometimes not know how far down into the system they have traversed unless they are proficient with the system. A pull-down cascading menu would act as map to the user showing them the previous menus and allowing them to navigate more easily.

10. Tool/Option Bar

We also recommend the implementation of a toolbar. In this version of the system, due to time constrants, we chose to implement the system using menus instead of a tool bar or option bar similar to some Windows programs. The tool bar gives the user a quick method of choosing a function as opposed to a menu selection where the user has to traverse through the system to get to a desired function. The tool bar can also serve to support the hot key functions previously mentioned above. If the user chooses to print a report, the user has the option of clicking the tool bar command to print and then being offered a choice of printing a form, report or screen.

B. CONCLUSIONS

Developing MASS using a rapid prototyping approach was beneficial in encouraging active user participation and, through its iterative nature, was helpful in identifying the users' actual requirements. Rapid prototyping usually results in a development system such as this which costs much less and takes less time to build as opposed to formal development methodology. Prototyping helped identify monitor needs that the monitors themselves were not previously cognizant of. In general, users feel more confident approving a system under development in which they can try out the system options or a prototype rather than paper. Finally, users have a more positive attitude toward any system that they have helped to create. We recommend the rapid

prototyping methodology to anyone attempting to develop a prototype application using a

database management system.

APPENDIX A. USER MANUAL

A. SYSTEM REQUIREMENTS

This section describes the hardware, system software, memory, and hard disk space required for using MASS on a stand-alone computer or on a network.

1. Hardware

MASS requires the following hardware:

a. An 80386 or higher computer certified for use with Microsoft® Windows Version 3.X. However, we recommend that the system be installed on an 80486/66 computer.

b. An EGA, VGA, super VGA, or Hercules® graphics card compatible with Microsoft Windows Version 3.X.

c. A Microsoft Windows-compatible mouse.

d. One 1.44 MB 3.5 " disk drive.

2. System Software

You must have Microsoft Windows Version 3.X or higher and DOS Version 6.X installed on the computer to use MASS.

3. Memory

MASS requires a minimum of 4 MB of RAM. However, we recommend a minimum of 8 MB of RAM for better system performance.

4. Disk Space

We recommend a minimum of 100 MB of hard disk space.

B.   INSTALLING MASS

These instructions assume that you are starting the Install program from Drive A.
If you start from another drive, substitute the letter of that drive. To install the system on
a network, login as the network supervisor before you begin.

    1. Insert Install Disk 1 in Drive A.

    2. Start Windows and open the Program Manager.

    3. Choose File/Run.

    4. Type A: INSTALL and click OK.

C.   STARTING MASS

    1. Open the Program Manager window.

    2. Double click the MASS icon.

D.   NAVIGATING THROUGH THE SYSTEM

This portion of the user manual is designed to walk the user through the system
menu and options. We recommend you read and follow the instructions contained below
if you are operating MASS for the first time.   After practicing with the system for a
while, you should have the skills and understanding necessary to operate the system.

The first screen to appear when you enter the system is the MASS logo screen and
main menu. The screen has the title of the system and picture of the Marine Corps
emblem. As illustrated in Figure A-1, the screen contains 3 options to choose from.
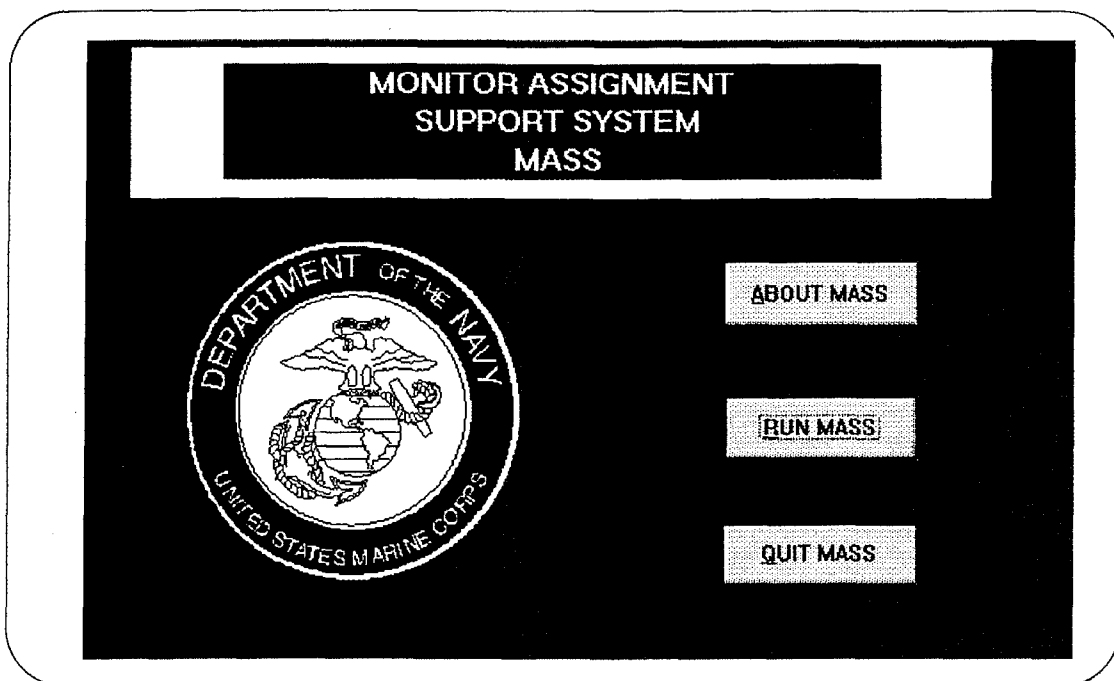
Figure A-1 MASS Main Menu

You "Press" or "Select" an option in one of two ways. If you are using a mouse, move the cursor arrow over the button you want and click the left mouse button. If you are using the keyboard, you can use the arrow keys (left, right, up, down) or the Tab key to toggle between the buttons. Then, once you have selected the appropriate button, hit the return key. Note that there is a status bar at the bottom of the screen which describes the function of each option selected. In what follows, the terms "Press" and "Select" are synonymous and used interchangeably.

Press the first button *About MASS*. The next screen is an abstract on the background and development of the system. To return to the main menu, select the *Exit* button. You'll see the *Exit* form appear. See Figure A-2.
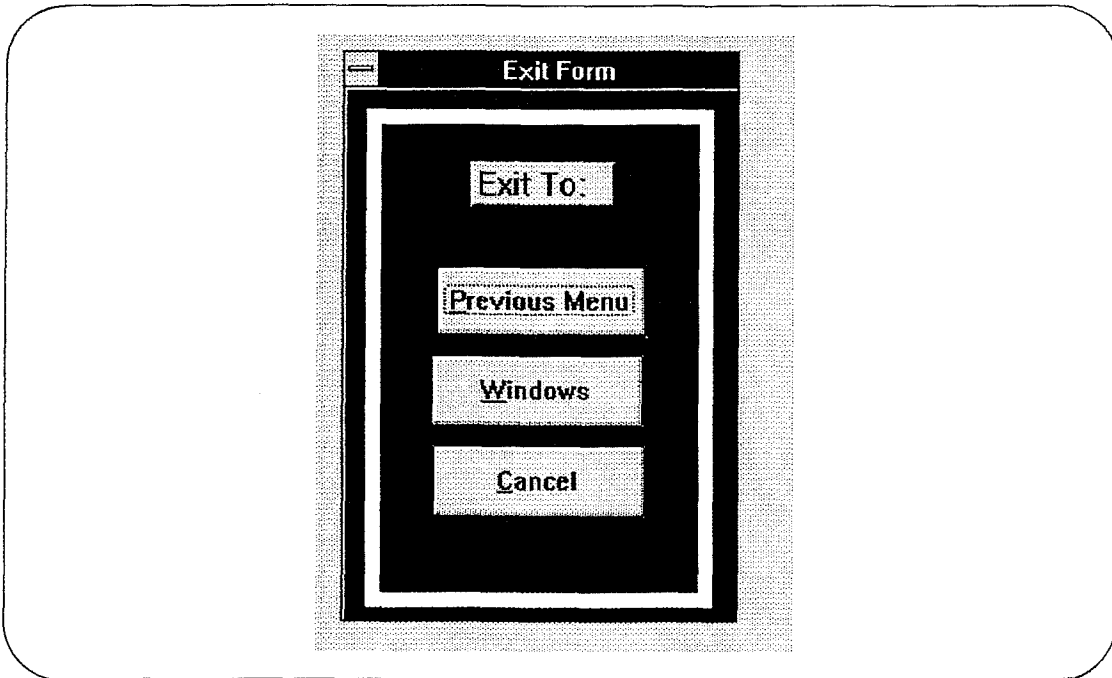
Figure A-2 Exit Screen

If you choose the *Previous Menu* option and you will be returned to the main menu. If you choose the *Windows* option, you will be given the opportunity to exit the MASS. The *Cancel* button removes the *Exit* form and returns you to the abstract form. Press the *Previous Menu* button. The system returns you to the main menu.

Press the *RUN MASS* button. The next screen displayed are the four main process options labeled *Monitor Transactions, Data Store Maintenance, Reports and Queries* and *Exit.* See Figure A-3.
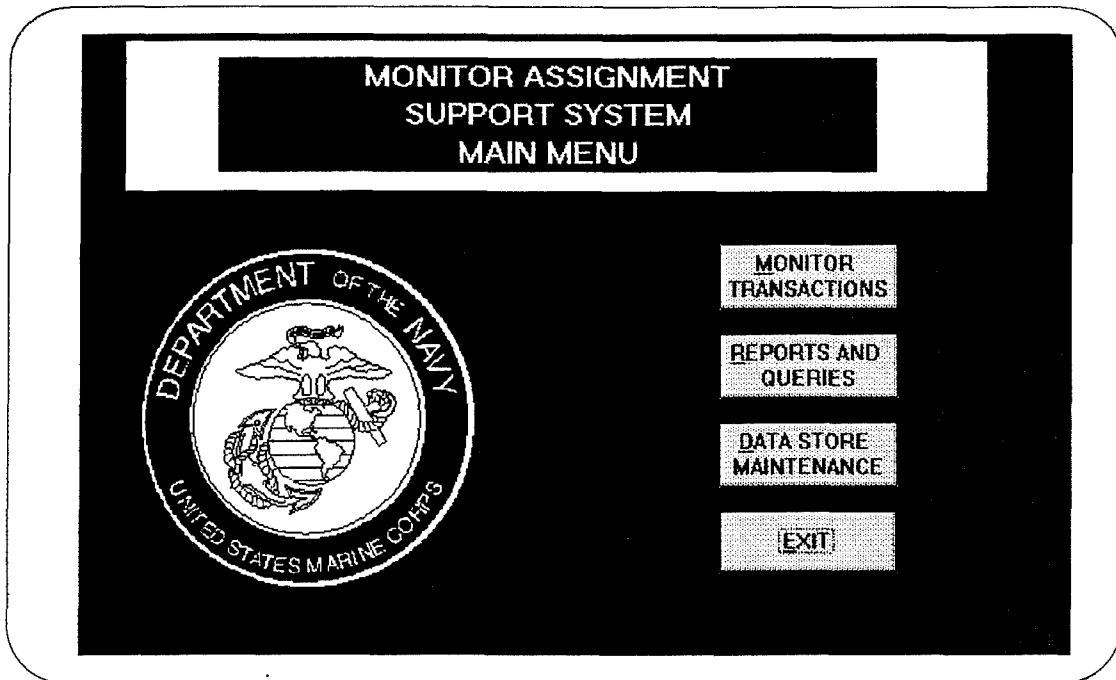
Figure A-3 Monitor Transaction Menu

The *Monitor Transactions* process is where the bulk of the work takes place in finding billet shortages and the appropriate officers to fill those billets. The monitor is able to determine what units are undermanned with regard to the current staffing goals. The system provides the monitor the capability to query all the units under his cognizance with respect to the grade and MOS of the officers specified. The monitor can also quickly find all potential movers by requesting the system to find all the officers who fall into a certain window with respect to their estimated rotation date. These two options make the process of identifying both billet shortages and potential movers virtually error free.

Press the *Monitor Transactions* button. The system displays the next set of options. They include *Find Billet Shortages and Movers, Screen Officer Records, Create Brief Sheet,* and *Approved Assignment.* See Figure A-4.
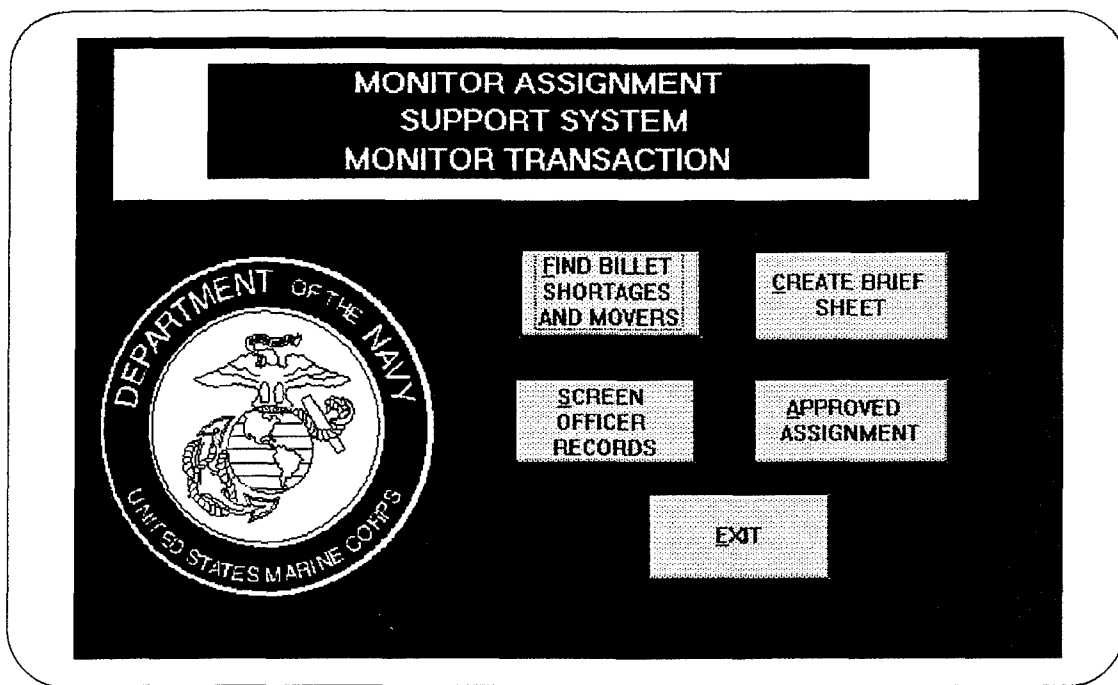
Figure A-4 Monitor Transaction Menu

Next, press the *Find Billet Shortages and Movers* button. The system displays the

next set of options for the monitor. These two options are *Find Billet Shortages* and

Find Potential Movers. See Figure A-5.
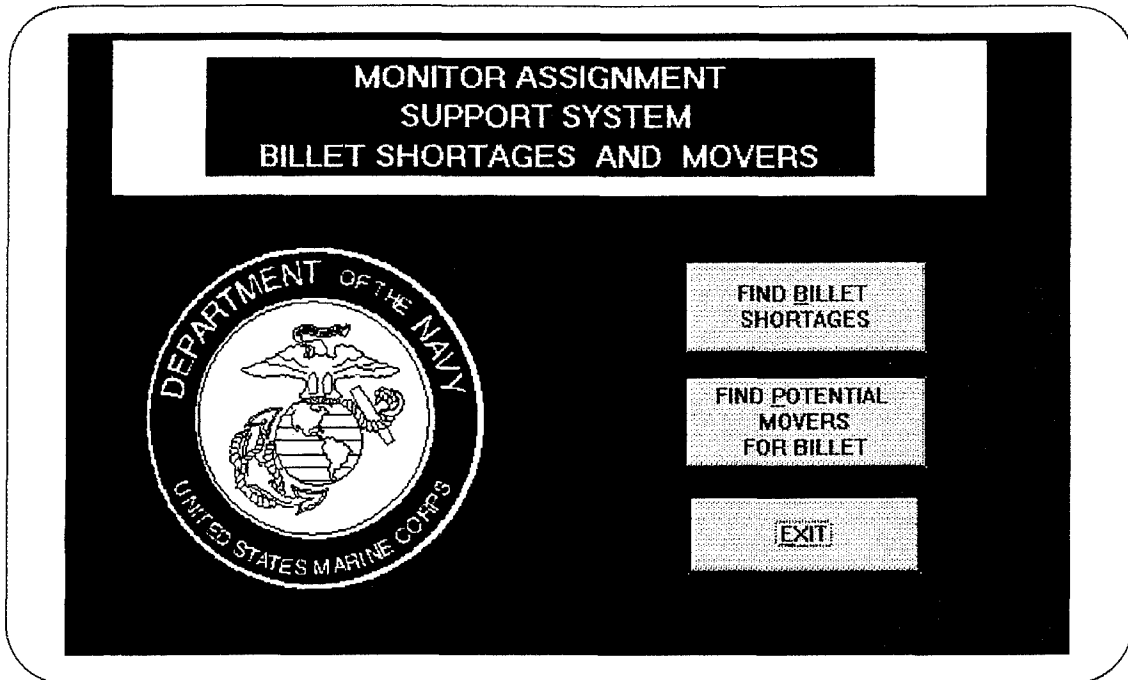
Figure A-5 Billet Shortages and Movers Menu

Press the *Find Billet Shortages* option. The system displays three additional

options: *Billet Report, Find Billet Shortages,* and *Find Potential Movers For Billet.* The

Billet Report option lists units and the officers currently on board as specified by the

input parameters of *PGRD, MOS,* and *MONTH* of the year. The input form is shown

below in Figure A-6.

Figure A-6 Billet Report Input Form

The *Billet Shortage Report* option lists those units who are currently understaffed or will be understaffed based on the input of *PGRD, MOS,* and *MONTH* of the year. The monitor can enter the *PGRD, PMOS* and *MONTH* of the desired billet using the list box illustrated in Figure A-7.

Figure A-7 Find Billet Shortage Input Screen

Click the mouse on the *PGRD* list box. The system displays a listing of grades from WO to O7. You select one of the grades by highlighting the one you want. Click the mouse on the *PMOS* box. You will see a listing of MOS' in numeric order from 0101 to 7599. You select one of the *MONTH* by highlighting the one you want. Click the mouse on the *OPERATOR* box. You will see a listing of operators. The operators give you a choice of choosing the month that are equal to, less than, greater than, or between a specified date. You select one of the operators by highlighting the one you want. Once these parameters have been entered, the system is ready to run the query. The system will return an answer showing those units where the number of officers on hand is less than the staffing goal. Press *Exit* and return to the previous menu.

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Press the *Find Potential Movers For Billet* button. The system prompts you for the following criteria: *PMOS*, *PGRD*, Slate Future MCC (*SFMCC*), and Slate Estimated Departure Date (*SEDD*) as illustrated in Figure A-8.

ENTER THE PGRD, PMOS, AND SEDD OF THE MOVERS YOU WANT.

PGRD: PMOS: SFMCC:

N/A   N/A

OPERATOR   DATE1:MM/DD/YY   DATE2:MM/DD/YY:

FIND MOVERS WITH A SEDD THAT IS: GREATER THAN   9/19/94

Generate Report

EXIT

Figure A-8 Find Potential Movers Input Form

Click the mouse on the *PGRD* box. The system displays a listing of grades from WO to O7. You select one of the grades by highlighting the one you want. Click the mouse on the *PMOS* box. The system displays a listing of MOS' in numeric order from 0101 to 7599. You select one of the MOS' by highlighting the one you want. Click the mouse on the *SFMCC* box. Enter the desired *SFMCC* (for example, if you wanted to find all officers who are scheduled for PCS orders in FY-95, you would enter ZY5). Click the mouse on the *OPERATOR* box. The system displays a listing of operators. The operators provides a choice of entering the slate estimated departure dates that are equal to, less than, greater than, or between a specified date. You select one of the operators by highlighting the one you want. Once these parameters have been entered,

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The operators provides a choice of entering the slate estimated departure dates that are equal to, less than, greater than, or between a specified date. You select one of the operators by highlighting the one you want. Once these parameters have been entered, the system is ready to run the query. If the user selects the *Generate Report* button, the system will retrieve and display the answer based on the most current data in the system. The system will return an answer showing the listing of officers by name and their current location. The *Find Potential Movers for Billet* option allows the monitor to find all officers with a specified *PGRD* and *PMOS*, who are eligible to move during a specified time frame. This time frame is usually based on the officer's rotation date. Press *Exit* and return to the previous menu.

The next option is the *Screen Officer Records*. This option allows the monitor to perform a detailed evaluation of all the officers who were listed on the potential movers list or, the monitor can simply look at any officer's records at his discretion. Press the *Screen Officer Records* button. The next screen displays the following options: *View Master Brief Sheet*, *View Fitness Reports*, *View Promotion Photo*, and *View Officer Slate*. See Figure A-9.
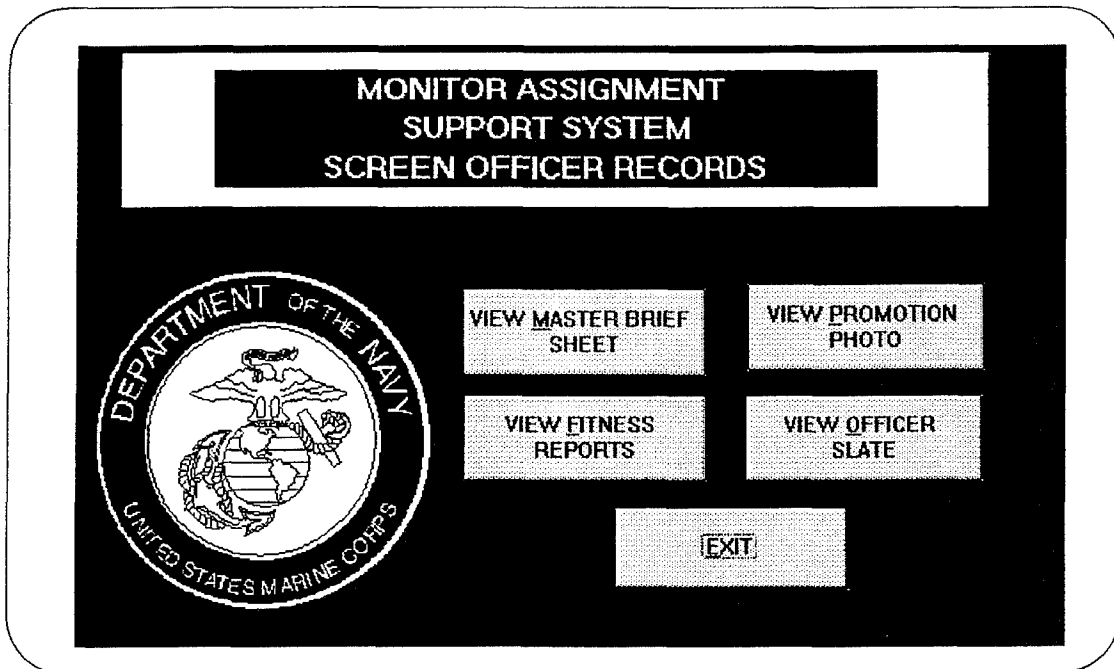
Figure A-9 Screen Officer Records Menu

Press the *View Master Brief Sheet* option. The system provides a dialogue box which prompts the monitor for the officer's *MID*. The system will return a complete Master Brief Sheet on the officer if the entries are valid. Press *Exit* and return to the previous menu.

View Fitness Reports. Not fully implemented in this version. This option will be included in a future edition. Because the section C comments are not currently stored in the mainframe files, this option has been modified to show the fitness report header data and the distribution of performance marks.

View Promotion Photo. Not implemented in this version. This option will be included in a future edition. When the system is fully implemented, the officer's promotion will be linked to his *MID*.

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View Officer Slate. This option allows the monitor to view an officer's slate. Press the *View Officer Slate* button. The system will prompt the monitor for the officer's *MID*. The system will return the officers slate form to the computer screen. See Figure A-10.

Figure A-10 Officer Slate Form

The *View Officer Slate* process is a "workbench" for the monitor. In this process, the monitor has multiple tools to choose from. Once the monitor has selected an officer by entering the officer's *MID*, the monitor can access the full realm of information on the officer through a set of buttons at the bottom of the form.

Press the *MBS* button, the system retrieves the officer's Master Brief Sheet. Press *Exit* and return to the previous menu.

Press the *OMPF* button, the system retrieves the officer's fitness reports. Press *Exit* and return to the previous menu.

Once the monitor has determined a future duty station for an officer by entering the appropriate *SFMCC*, a Brief Sheet can is created by pressing the *BRIEF* button. Press the *BRIEF* button. The system displays the officer's brief sheet showing the recommended future billet assignment. Press *Exit* and return to the previous menu.

The next option is *Create Brief Sheet*. Once the monitor has scrubbed the list of movers and made an initial list of recommended assignments, the monitor creates a brief sheet for each of the officers. Press the *Create Brief Sheet* option. A dialogue box appears on the screen The monitor enters the officer's *MID* and the system retrieves the rest of the header data and duty preferences from the officer slate and staffing goal table. The remaining data such as additional comments are entered by the monitor. Any changes made to the form will carry back to the member record. Once the form has been completed to the monitors satisfaction, a paper copy is created by pressing the *Print* button. Press the *Print* button. The system displays a preview of the paper copy of the brief sheet. The system also gives the monitor the option of producing multiple copies of the brief sheet. Press *Exit* and return to the previous menu.

The next option is *Approved Assignment*. When the monitor has received approval for the recommended assignments, this option allows the monitor to modify the officer's slate and enter the new appropriate *SCHG* (slate change) and enter a request for orders. Press the *Approved Assignment* button. The system prompts the user for the *MID* of the officer. Next, the system displays the slate form of the officer. The cursor is placed in the *SCHG*. Press *Exit* and return to the previous menu.

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The next main option is the *Reports and Queries Transactions*. This option allows the monitor to retrieve and print commonly used reports. These report options were requested by the monitors and are displayed in Figure A-11. An example of each report is displayed in Appendix F.
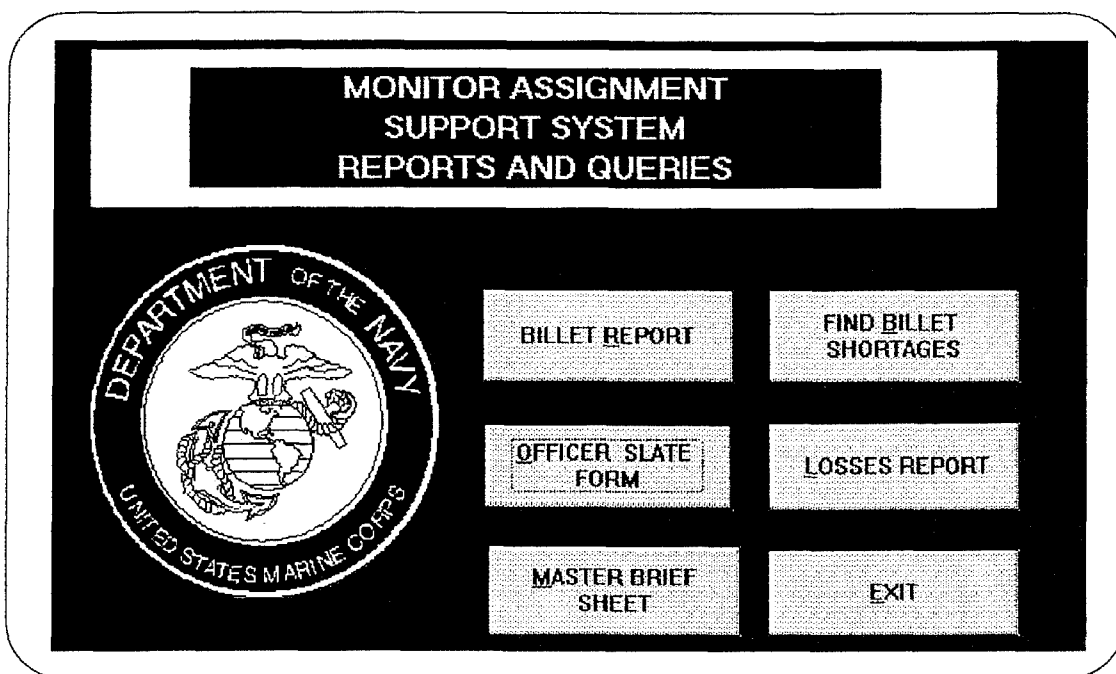
Figure A-11 Reports and Queries Menu

This prototype contains five reports: the *Billet Report, Billet Shortage Report*, the *Officer Slate Form*, the *Master Brief Sheet*, and the *Losses Report*.

Press the *Billet Report* button. The system prompts you for the *PGRD* and *PMOS* and *MONTH* as seen previously in Figure A-6. The system returns a listing of the officers meeting the input criteria showing all the units by MCC and listing the officers currently on board by MCC. Press *Exit* to return to the previous menu.

Press the *Billet Shortage Report* button. The system prompts you for the *PGRD* and *PMOS* and *MONTH* as seen previously in Figure A-7. Unlike the *Billet Report*

officers meeting the input criteria showing all the units by MCC and listing the officers currently on board by MCC. Press *Exit* to return to the previous menu.

Press the *Billet Shortage Report* button. The system prompts you for the *PGRD* and *PMOS* and *MONTH* as seen previously in Figure A-7. Unlike the *Billet Report* described above, the system produces a report listing of only those MCCs where the staffing goal exceeds the number of officers on board, thereby indicating a staffing shortage. Press *Exit* to return to the previous menu.

Press the *Officer Slate Form* button. The system prompts you for the MID for a specific officer. The system displays a copy of the officer slate form as seen previously in Figure A-10. The system provides the option to print another officer slate form by entering another officer's *MID*. Press *Exit* to return to the previous menu.

Press the *Master Brief Sheet* button. The system prompts you for the *MID* for a specific officer. The system produces a copy of the Master Brief Sheet form, an example of which, is shown in Appendix F. The system provides the option to print the entire report or selected pages of the report. Press *Exit* to return to the previous menu.

Press the *Losses Report* button. The system prompts you for your *MAC* and the type of report specified. The list box provides the following options: "W95", "Z27", "Z29", "Z63" and "All". See Figure A-12.

Figure A-12 Loss Report Input Form

The system provides the option of printing a single report, any combination of

three reports, or all the reports. The system will produce a listing of those officers who

will be leaving the Marine Corps and their *SPMCC* as seen in Figure A-13.

LOSSES BY W95, Z63, Z27, AND Z29

LNAME	FNAME	MINIT	PGRD	PMOS	SPMCC	SFMCC	MAC
MASON	DUANE	B	O3	2502	1F2	W95	4A
WELCH	ROBERT	L	O3	7204	1A5	Z63	6
MEDINA	JOHN	M	O3	3002	1F3	Z63	72
FERNANDEZ	FRANCIS	B	O3	1803	B22	Z63	73
GRIEVES	JOSEPH	H	O3	4402	TC6	W95	74
SPACE	JAMES	P	O3	0302	122	W95	75
TOOLAN	FRANCIS	E	O3	0302	V23	Z63	75
FLOWERS	JOHN	W	O3	7562	091	W95	8H
WELBORN	CARL	J	O3	7562	G78	W95	8H

EXIT

Figure A-13 Loss Report

Press *Exit* and then *Previous Menu* to return to the main menu.

You have successfully navigated through the MASS prototype. We recommend several "trial" runs in order to get comfortable with the prototype.

APPENDIX B DATA FLOW DIAGRAMS
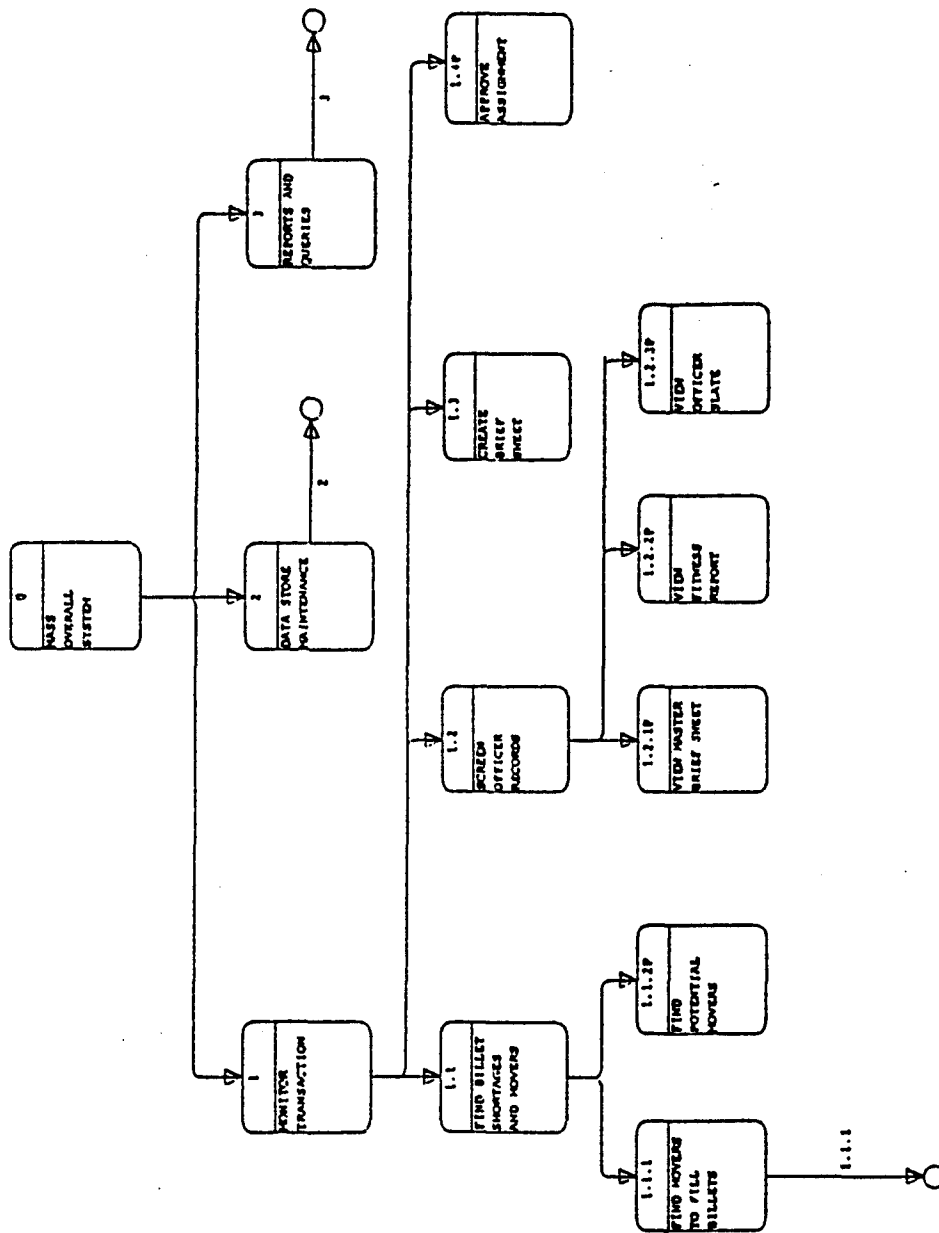
Figure B-1 MASS Decomposition Diagram

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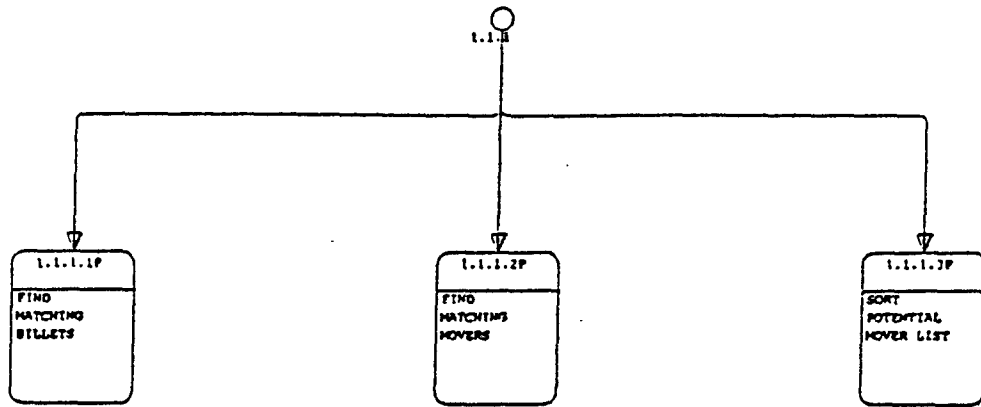
Figure B-2 MASS Decomposition Diagram
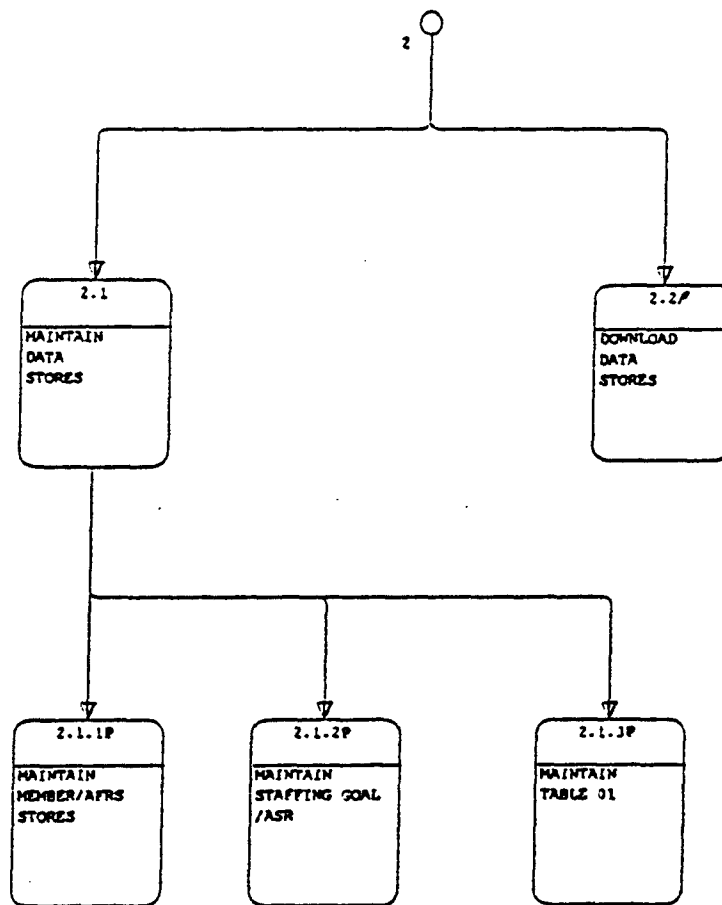
Figure B-3 MASS Decomposition Diagram
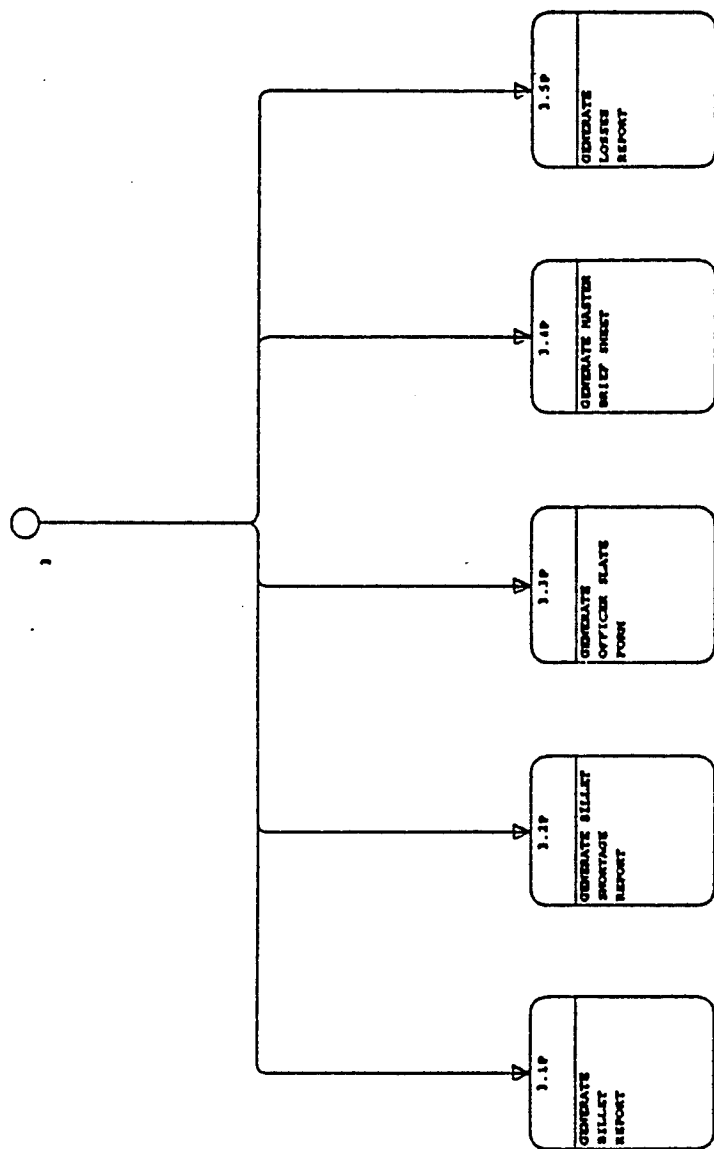
Figure B-4 MASS Decomposition Diagram

CONTEXT DIAGRAM

MONITORS

MONITOR REPORTS

MONITOR INPUT

MASS
OVERALL
SYSTEM

0

SOURCE FILES
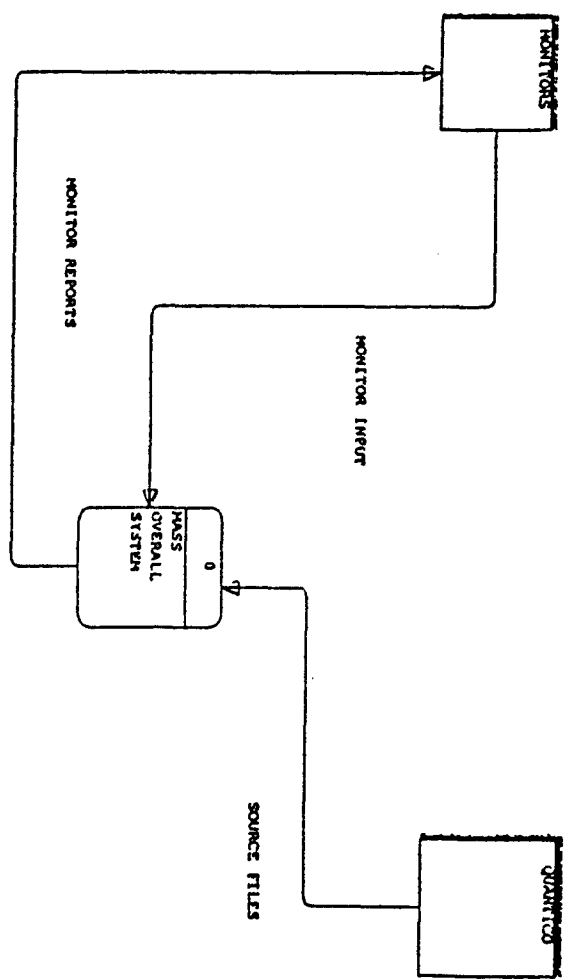
QUANTICO

NOTES

1.The Monitors are the
end users.

2.Quantico provides the files
from the mainframe

Figure B-5   MASS Context Diagram

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Fig B-6 Mass System Diagram
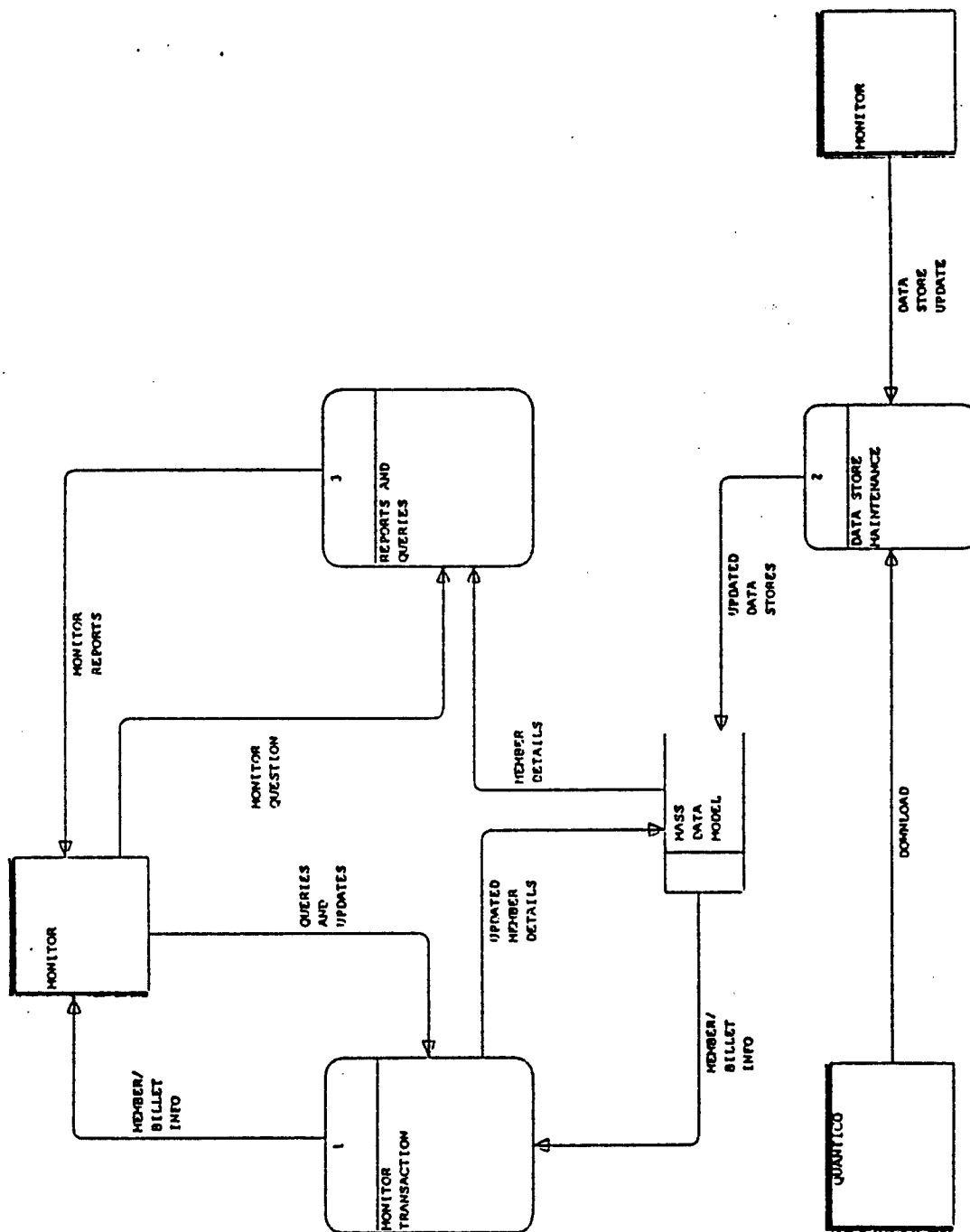
Figure B-6 MASS System Diagram

87
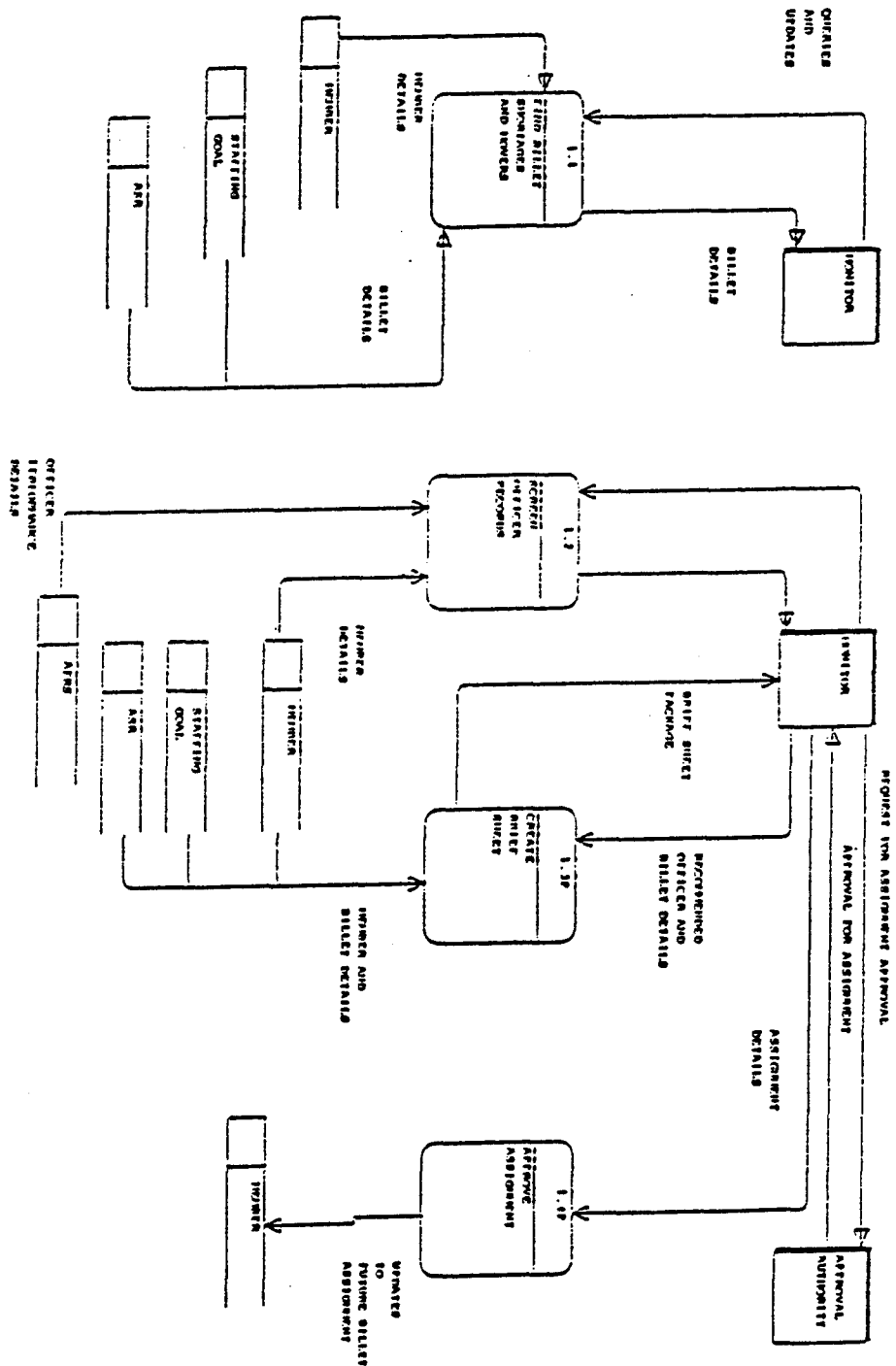
Figure B-7 Monitor Transactions
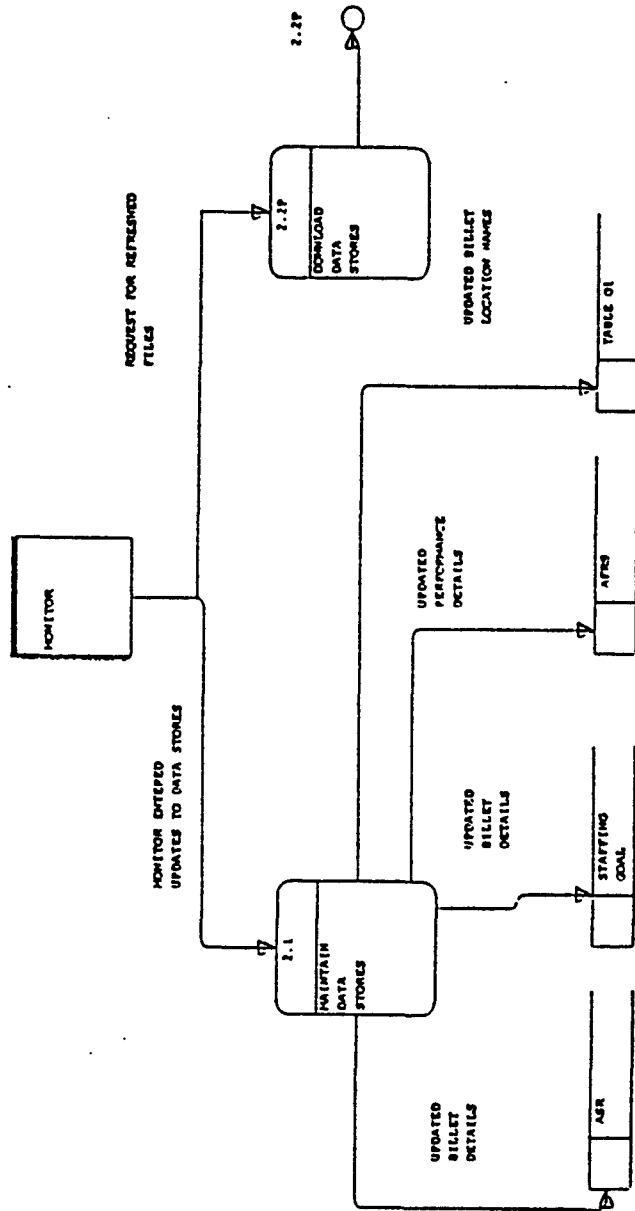
Figure B-8   Data Store Maintenance Subsystem

89
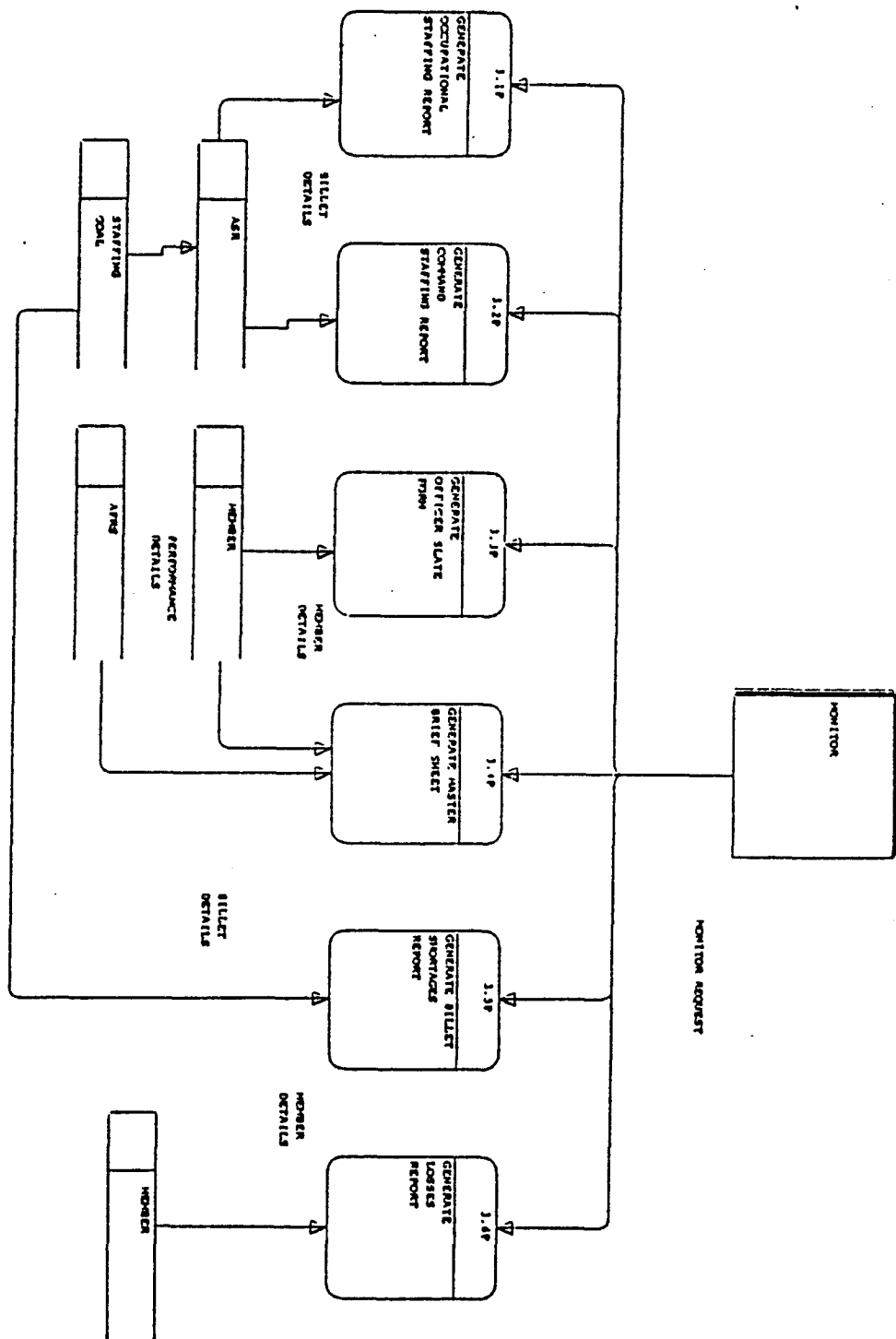
Figure B-9   Query And Report Subsystem

90
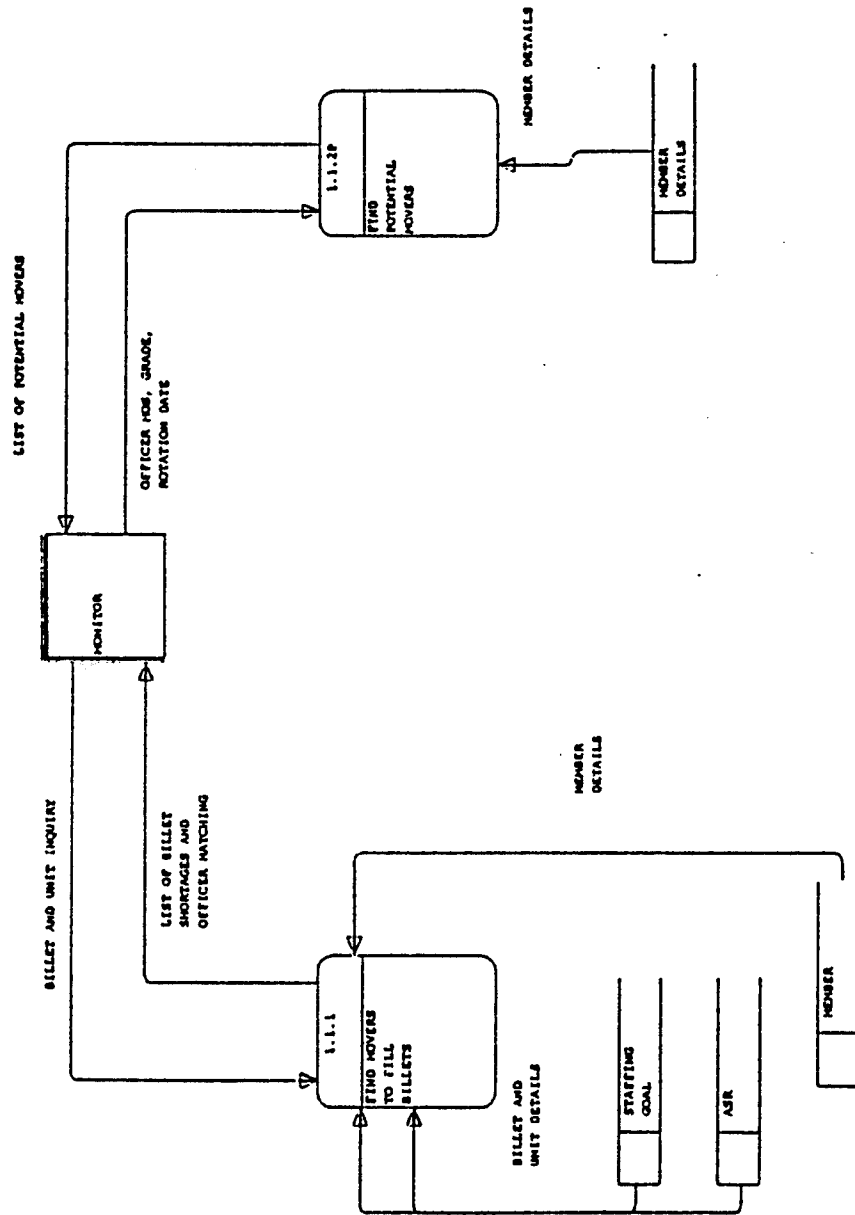
Figure B-10 Find Billet Shortages And Potential Movers Process

91
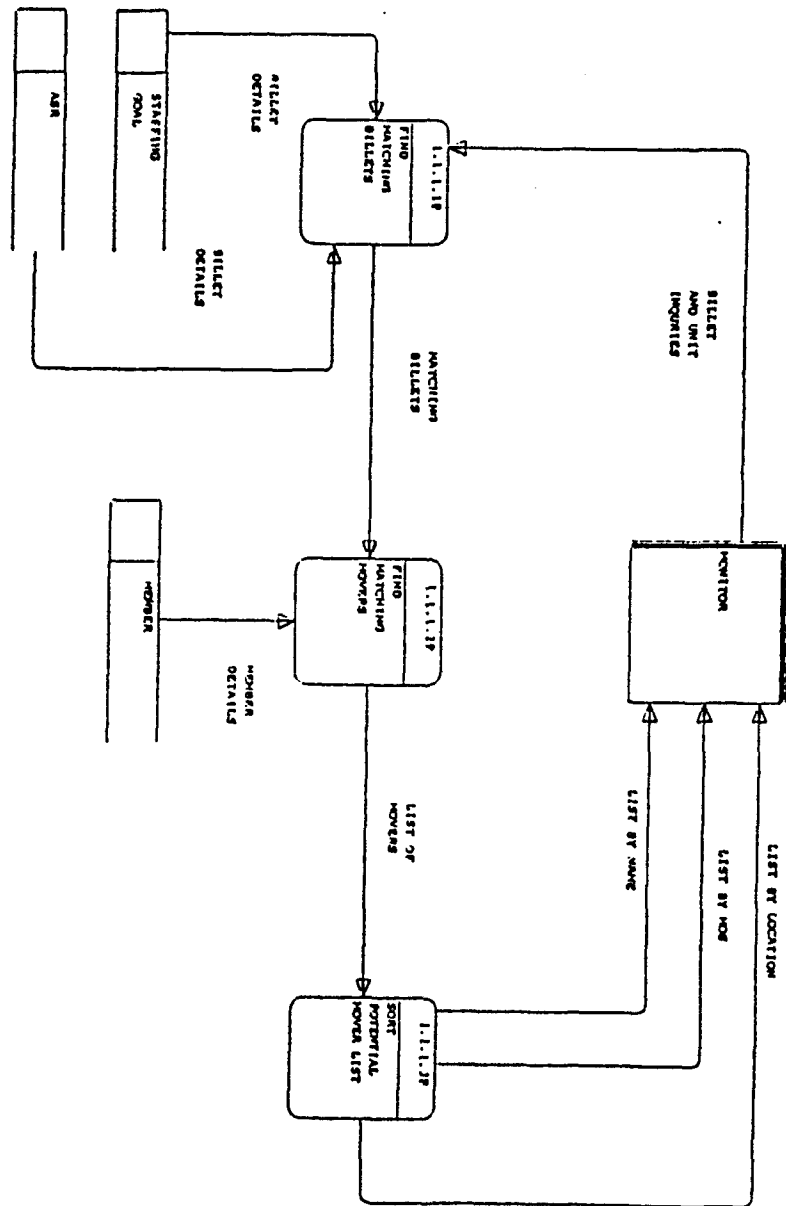
Figure B-11 Find Movers to Fill Billets Process
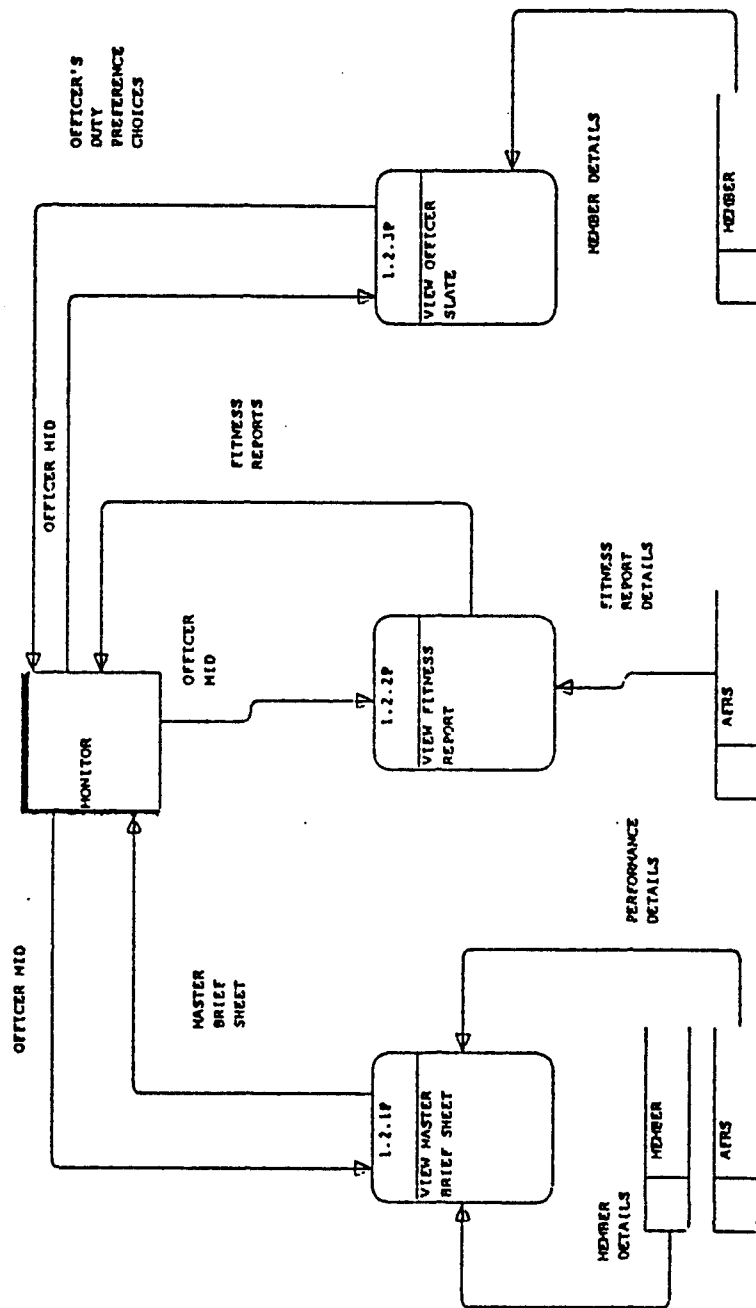
Figure B-12 Screen Officer Records Process

93
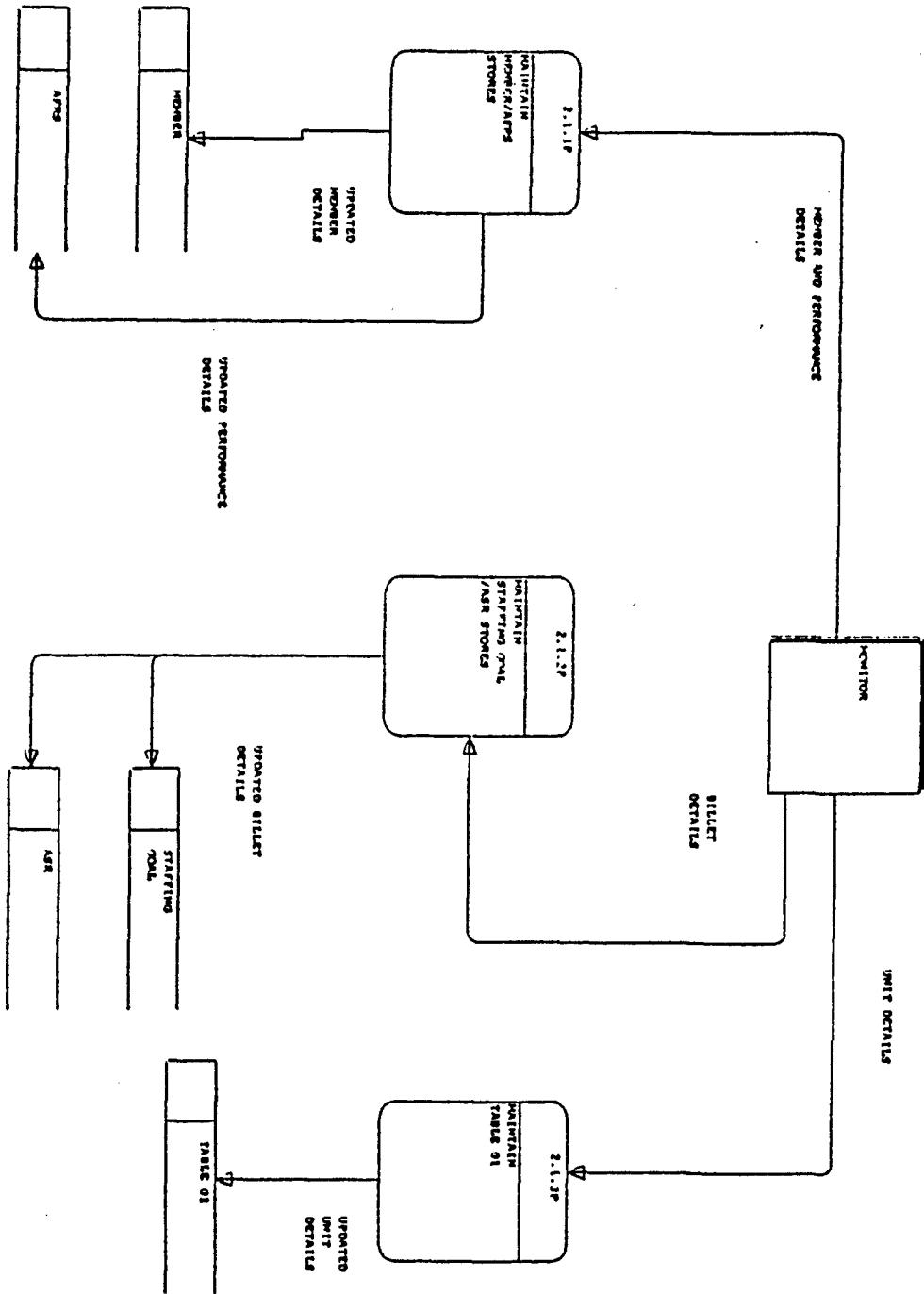
Figure B-13   Maintain Data Stores Process
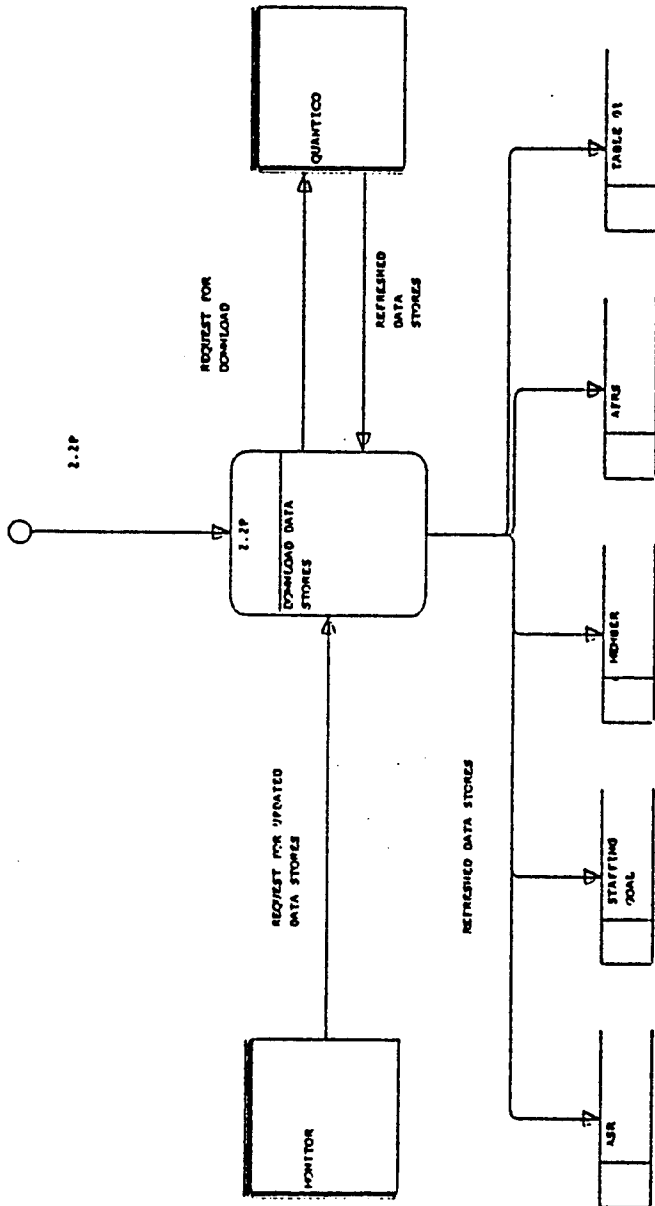
Figure B-14 Download Data Stores Process

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APPENDIX C. TABLES

This appendix lists the tables used by MASS, a short description of each table and its properties.

1. Tbl_ASR (Authorized Strength Report)

This table lists the MCC's and the total number of officers authorized for that command by grade and MOS. This information is used in determining the correct number of officers on hand for each Marine Corps unit.

2. Tbl_CEDL (Civilian Education Level)

This table lists the codes used to describe the officer's education.

3. Tbl_CEF (Command English File)

This table lists the MCC's and the plain English name title of the command.

4. Tbl_CLA (Contracted Legal Agreement)

This table lists the codes used to describe whether an officer is serving under a special contracted legal agreement such as a reserve officer serving for a set number of years instead of a regular commission.

5. Tbl_COMP (Component Code)

This table lists the officer's component branch of service.

6. Tbl_DEPN_REL (Dependent Relation)

This table lists the codes which describe the relation between an officer and his dependents.

7. Tbl_DSC (Deployment Status Code)

This table lists the codes which indicates the number of deployments in excess of 6 months the officer has successfully completed.

8. Tbl_DULIM (Limited Duty Status Code)

This table lists the codes which describe reasons for placing an officer under restricted assignments and duties.

9. Tbl_ETHNIC (Ethnic Code)

This table is a listing of codes used to describe the ethnic background of the officer.

10. Tbl_EXCEPTION (Slate Exception Code)

This table is a listing of codes which describes exceptional cases during an officers tour. For example, the officer is being transferred to another duty station even though he/she has less than the usual prescribed two years on station.

11. Tbl_FITREPDETAIL (Fitness Report Details)

This table lists all the information contained in an officers fitness report except for the section C comments.

12. Tbl_LANG (Language)

This table is a listing of language codes which indicates an officer's additional language skills.

13.Tbl_MARST (Marital Status Code)

This table is a listing of codes which describe an officer's marital status .

14.Tbl_MEMBER (Officer Slate Record)

This table contains all the fields which make up an officer's slate record. This information reflects the officer's personal administrative record used by the monitor.

15. Tbl_MOS (Military Occupational Specialty)

This table contains the MOS codes and the plain text description for each code.

16. Tbl_ORFLG (Orders Release Flag)

This table contains codes which indicate whether the officer is in receipt of orders.

17. Tbl_PCS (Permanent Change of Station)

This table contains the codes which describe the type of PCS orders being issued to the officer.

18. Tbl_PDU (Preference of Duty)

This table is a listing of duty station preferences listed by the officer on his/her previous fitness reports.

19. Tbl_STAFFING_GOAL

This table lists the MCC's and the staffing goal (the number of officers to be actually staffed versus the actual full-strength authorized number) by grade and MOS.

TBL_ASR

Name	Type	Length	IndexName
Demand MCC	Text	3	PrimaryKey
Demand Grade	Text	2	PrimaryKey
Demand MOS	Text	4	PrimaryKey
ASR Quantity	Double	8	

TBL_CEF

Name	Type	Length	IndexName
MCC	Text	3	PrimaryKey
MCC_Long Name	Text	54	

TBL_CLA

Name	Type	Length	IndexName
CLA	Text	1	PrimaryKey
CLA Meaning	Text	38	

TBL_DSC

Name	Type	Length	IndexName
DSC	Text	1	PrimaryKey
DSC Meaning	Text	39	

TBL_DULIM

Name	Type	Length	IndexName
DULIM	Text	1	PrimaryKey
DULIM Meaning	Text	39	

TBL_ETHNIC

Name	Type	Length	IndexName
ETHNIC	Text	1	PrimaryKey
ETHNIC Meaning	Text	36	

TBL_EXCEPTN

Name	Type	Length	IndexName
EXCPTN	Text	1	PrimaryKey
EXCPTN Meaning	Text	39	

TBL_FITREPDETAIL

Name	Type	Length	IndexName
MID	Text	10	PrimaryKey
ORG_TITLE	Text	30	
DUTY_TITLE	Text	20	
OCC_CODE	Text	2	PrimaryKey
DISP_FM_DATE	Text	8	PrimaryKey
DISP_TO_DATE	Text	8	PrimaryKey
NO_MONTHS	Text	2	
TO_TITLE	Text	30	
GRADE_DISP	Text	6	
TYPE_DUTY	Text	1	
DMOS	Text	4	
PERF	Text	14	
ITEM_13A	Text	1	
ITEM_13B	Text	1	
ITEM_13C	Text	1	
ITEM_13D	Text	1	
ITEM_13E	Text	1	
ITEM_13F	Text	1	
ITEM_13G	Text	1	
QUALITIES	Text	28	
ITEM_14A	Text	1	
ITEM_14B	Text	1	
ITEM_14C	Text	1	
ITEM_14D	Text	1	
ITEM_14E	Text	1	
ITEM_14F	Text	1	
ITEM_14G	Text	1	
ITEM_14H	Text	1	
ITEM_14I	Text	1	
ITEM_14J	Text	1	
ITEM_14K	Text	1	
ITEM_14L	Text	1	
ITEM_14M	Text	1	
ITEM_14N	Text	1	
VALUE_DISP	Text	22	
DES_DISP	Text	1	
ITEM_17	Text	3	
DISTRIB	Text	22	
ITEM_15B1	Text	1	
ITEM_15B2	Text	1	
ITEM_15B3	Text	1	
ITEM_15B4	Text	1	
ITEM_15B5	Text	1	
ITEM_15B6	Text	1	
ITEM_15B7	Text	1	
ITEM_15B8	Text	1	
ITEM_15B9	Text	1	
ITEM_15B10	Text	1	
ITEM_15B11	Text	1	
ITEM_18_19_21	Text	3	

TBL_MARST

Name	Type	Length	IndexName
MARST	Text	1	PrimaryKey
MARST Meaning	Text	17	

TBL_MEMBER

Name	Type	Length	IndexName
MAC	Text	2	
MID	Text	10	PrimaryKey
ODAUS	Date/Time	8	
PEAS	Date/Time	8	
SPMCC	Text	3	Reference
SEDD	Date/Time	8	
PGRD	Text	3	Reference
SGRD	Text	2	
PMOS	Text	4	Reference
MOS1	Text	4	
MOS2	Text	4	
PCSDAT	Date/Time	8	
FUTMOS	Text	4	
JTMOS	Text	4	
JSODAT	Date/Time	8	
APMOS	Text	4	
MOBEX	Text	5	
PABGRDF	Text	1	
FABGRDF	Text	1	
CYIZ	Text	1	
SCHLVL	Text	1	
JTBIL	Text	1	
ABMOS	Text	4	Reference
ABGRD	Text	2	Reference
LFMF	Text	2	
LSEP	Text	2	
TSEP	Text	1	
TON	Text	5	
TOLN	Text	5	
TOEDD	Date/Time	8	
FMMOS	Text	4	
SIMOS	Text	5	
SCHG	Text	1	
EXCPTN	Text	1	
FABMOS	Text	4	
FABGRD	Text	2	
SSEF	Text	1	
SSSF	Text	1	
FTO	Text	5	
FTOLN	Text	5	
FTOEDA	Date/Time	8	
SIMCC	Text	3	
SIEDA	Date/Time	8	
SFMCC	Text	3	
SEDA	Date/Time	8	
FDTYST	Text	1	
FTCF	Text	2	
FPCS	Text	2	
FRFT	Text	1	
ORUC	Text	5	
OTTC	Text	3	
ORFLG	Text	1	
PDS	Text	1	

Name	Type	Length	IndexName
SAMCC	Text	3	
SAEDA	Date/Time	8	
AGLC	Text	3	
AGLCEDA	Text	4	
DIFOP	Text	1	
AASAGNF	Text	1	
ACCOMP	Text	2	
MNOTES	Memo	0	
ROSTER	Text	7	
LNAME	Text	20	
FNAME	Text	10	
MINIT	Text	2	
INIT	Text	3	
PASSED	Double	8	
GEODAT	Date/Time	8	
MCC	Text	3	
RUC	Text	5	
EASD	Date/Time	8	
RACE	Text	1	
SEX	Text	1	
CLA	Text	2	
DULIM	Text	1	
MARST	Text	1	
ETH	Text	1	
FMCC	Text	3	
BMOS	Text	4	
COMP	Text	2	
FLAG	Text	1	
FMMCC	Text	3	
SCAT	Text	1	
RECSTAT	Text	1	
CEDL	Text	1	
SECINV	Text	1	
SEC	Text	1	
SPOSVC	Text	1	
OPGATE1	Text	1	
OPGATE2	Text	1	
RFTF	Text	1	
DSC	Text	1	
SSC1	Text	3	
SSC2	Text	3	
SSC3	Text	3	
SSC4	Text	3	
SSC5	Text	3	
SSC6	Text	3	
SSC7	Text	3	
SSC8	Text	3	
SSC9	Text	3	
SSC10	Text	3	
SSC11	Text	3	
SSC12	Text	3	
PDU1	Text	3	
PDU2	Text	3	

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Name	Type	Length	IndexName
PDU3	Text	3	
TCF	Text	2	
PCSC	Text	2	
GLCDCTB	Date/Time	8	
LANG1	Text	2	
LANG2	Text	2	
LANG3	Text	2	
LANG4	Text	2	
IMOS	Text	4	
LNPRES	Text	8	
DEPLOC	Text	3	
DCTB	Date/Time	8	
AFADBD	Text	6	
DOR	Text	6	
RTD	Text	6	
DAUSDR	Text	6	
SECDT	Text	6	
GCT	Text	3	
ORTRDT	Text	6	
ADT	Text	3	
DAUSDN	Text	6	
D1COMM	Text	6	
OSD	Text	6	
ASED	Text	6	
OPFLY	Text	5	
OPFLCD	Text	6	
OPBD	Text	6	
DRD	Text	6	
COMPONENT	Text	5	
GT	Text	3	
PERMGRD	Text	6	
PERMDORD	Date/Time	8	
DOBD	Date/Time	8	
ORIG_ENT_AFD	Date/Time	8	
PEBDD	Date/Time	8	
AC_NAV_BDD	Date/Time	8	
ACC_1ST_CMD	Date/Time	8	
DOR_1ST_LDOD	Date/Time	8	
DSG_PILOTD	Date/Time	8	
CUR_ACDU_BDD	Date/Time	8	
SD_CODE	Text	2	
OSCD	Date/Time	8	
CONTRACT_DISP	Text	10	
AWARD1NUM	Text	2	
AWARD1	Text	17	
AWARD2NUM	Text	2	
AWARD2	Text	17	
AWARD3NUM	Text	2	
AWARD3	Text	17	
AWARD4NUM	Text	2	
AWARD4	Text	17	
CIV_ED_YR	Text	26	
CIV_ED_LEVEL	Text	26	

Name	Type	Length	IndexName
CIV_ED_MAJOR	Text	26	
SCHOOL1	Text	18	
MIL_ED1_YR	Text	2	
SCHOOL2	Text	18	
MIL_ED2_YR	Text	2	
SCHOOL3	Text	18	
MIL_ED3_YR	Text	2	
SCHOOL4	Text	18	
MIL_ED4_YR	Text	2	
SCHOOL5	Text	18	
MIL_ED5_YR	Text	2	
SCHOOL6	Text	18	
MIL_ED6_YR	Text	2	
SCHOOL7	Text	18	
MIL_ED7_YR	Text	2	
SCHOOL8	Text	18	
MIL_ED8_YR	Text	2	
SCHOOL9	Text	18	
MIL_ED9_YR	Text	2	
SCHOOL10	Text	18	
MIL_ED10_YR	Text	2	
SCHOOL11	Text	18	
MIL_ED11_YR	Text	2	
SCHOOL12	Text	18	
MIL_ED12_YR	Text	2	

TBL_MOS

Name	Type	Length	IndexName
MOS	Text	4	PrimaryKey
MOS Meaning	Text	39	

TBL_ORFLG

Name	Type	Length	IndexName
ORFLG	Text	1	PrimaryKey
ORFLG Meaning	Text	30	

TBL_PCS

Name	Type	Length	IndexName
PCS	Text	2	PrimaryKey
PCS Meaning	Text	39	

TBL_PDU

Name	Type	Length	IndexName
PDU	Text	3	PrimaryKey
PDU Meaning	Text	39	

TBL_STAFFING_GOAL

Name	Type	Length	IndexName
Demand MCC	Text	3	PrimaryKey
Demand Grade	Text	2	PrimaryKey
Demand MOS	Text	4	PrimaryKey
PMOS Officer	Text	4	PrimaryKey
PGRD Officer	Text	2	PrimaryKey
SG Quantity	Double	8	

APPENDIX D. QUERIES

This appendix is a listing of all the queries used in MASS, the description of each query and the tables used to create the queries.

1. Qry_Billet _Shortages

The Billet Shortages Query provides the monitor with the ability to identify which units are understaffed with regards to a specific grade, MOS, and the current staffing goal for a unit. The query provides the monitor with a list box to specify a value for the MOS, PGRD, MAC, and the date of the month. The system returns a listing of units which are understaffed. The tables used to create the query are the ASR and the Staffing Goal tables.

2. Qry_Brief_Sheet

The Brief Sheet Query provides the monitor with the ability to generate a brief sheet for an officer. The query provides the monitor with a dialogue box to enter the officer's MID. The system returns a brief sheet with the header information provided. The tables used to create the query are the Member table and the ASR table.

3. Qry_Develop_OSR_w_ABMOS_ABGRD2 and

Qry_Develop_OSR_w_PMOS_PGRD2

These two queries are used to develop the Billet Report. The answer from this query shows the officers assigned to a unit and the billet they are currently performing. The tables used to create this query are tbl_Member, tbl_Staffing_Goal, and tbl_ASR.

4. Qry_Fitrep

The Fitrep Query provides the monitor the ability to retrieve specific information from the fields in an officer's fitness report with the exception of the section C comments. The tables used to create this query are tbl_Member and tbl_Fitrepdetail.

5. Qry_Frm_Pot_Mov_Btween

This query find potential movers based on the two date fields specified by the user. This query uses tbl_Member.

6. Qry_Losses

This query accepts the user input for a specified Monitored Activity Code (MAC) and a specified category of loss code and produces a listing of all officers leaving the Marine Corps. This query uses tbl_Member.

7. Qry_Losses_All

This query provides a listing of all officers who are scheduled to leave the Marine Corps in the coming year through retirements, resignations, discharges, or end of obligated service. This listing shows all of the officer losses without regard to PGRD, PMOS, or MAC. This query uses tbl_Member.

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8. Qry_Losses_Some_SFMCC

This query provides the monitor with the ability to find the officers within his MAC who are being discharged through either a single discharge code or a combination of discharge codes. This query uses tbl_Member.

9. Qry_Losses_SFMCC_All

This query is linked to the Losses Report input form. This query accepts the user input for all of the SFMCC service discharge codes and produces a listing of all officers leaving the Marine Corps. This query uses tbl_Member.

10.Qry_Losses_Some_Cat

This query is linked to the Losses Report input form. This query enables the monitor to pick a certain MAC and choose (including combinations) the SFMCC discharge codes for those officers leaving the Marine Corps. This query uses tbl_Member.

11. Qry_MAC_ALL_SFMCC_ALL

This query provides the monitor with a list of all officers, regardless of MAC and discharge code, who should not be considered for reassignment due to pending retirement, resignation or discharge from the Marine Corps. This query uses tbl_Member.

12. Qry_MAC_Lookup

The MAC lookup Query provides the monitor with a list box which shows all of the valid Monitor Assignment Codes. This query uses tbl_MAC.

13. Qry_Master_Brief_Sheet

This query joins the information contained in the Member and Fitrepdetail tables to create an officer's Master Brief Sheet.

14. Qry_OSR_CSR

This query is used to call the long line and short line tables (ASR and Staffing Goal). This query retrieves the tables for system maintenance functions in the Data Store Maintenance option.

15. Qry_Potential_Movers_1

The Potential Movers Query provides the monitor with the ability to retrieve a listing of all officers of a required PGRD, MOS, and rotation date to be considered for PCS orders. The system provides the monitor with a list box to choose the required PGRD, PMOS, and date parameters. The system returns a listing of officers by name, PGRD, PMOS and their current location. This query uses tbl_Member.

16. Qry_SFMCC

This query is used to produce the Losses Report. This query finds and lists all the SFMCC's in the Member Table. The SFMCC's are used to generate an officer's brief sheet for a recommended future assignment.

17. Qry_Some_MAC

This query is used to produce the Losses Report. In this query, the monitor specifies a single desired MAC with a choice of discharge SFMCC (Z27, or Z29, or Z63, or W95). This query uses tbl_Member.

APPENDIX E: FORMS

There are 21 forms used in the design of MASS which are described below.

1. Frm_Billet _Abstract

This display form contains a short background of the developmental efforts for the prototype. The abstract lists the developers and the sponsors of this thesis as well as the functional purpose of the prototype.

2. Frm_Billet_Report

This form creates a series of list boxes to input values of the selection criteria and generates a Billet Report.

3. Frm_ BSR

This form contains list boxes for the monitor to enter values for PGRD, PMOS, and a range of dates desired to determine what units will be understaffed.

4. Frm_Billet_Shortages_And_Movers

This is a menu form that contains two options for the monitor to choose from. They are Find Billet Shortages and Find Potential Movers. This form is linked to Frm_ Billet _Shortage_Request and Frm_Potential_Movers.

5. Frm_Brief_Sheet

This form is a replica of the Brief Sheet currently used by the monitors. This form is linked to Frm_Monitor_Transaction option to Create a Brief Sheet.

6. Frm_Data_Store_Maintenance

This is a menu form that contains two options for the MASS system administrator: Maintain Data Stores and Download Data Stores.

7. Frm_Data_Store_Update

This is a menu form that contains three options for the monitor to choose from: Maintain Data Stores, Maintain ASR/Staffing Goal, and MCC Lookup.

8. Frm_Exit

This is a menu form that contains three options for the monitor to choose from and can be involed from any menu. The Previous Menu option takes the monitor to the previous menu. The Windows option exits MASS to Windows. The Cancel option leaves the monitor in the current menu.

9. Frm_Fitrep

This form is a replica of an officer's fitness report. It is linked to the View Fitness Report option which is found in Frm_Screen_Candidates_Records.

10. Frm_Losses

This form accepts input data from the list boxes in the Losses Report option and creates a formatted report.

11. Frm_Losses_All

This form lists all the officers who should not be considered for orders due to their imminent discharge from the Marine Corps. This form is linked to the Generate Loss Report which is found in Frm_Reports_And_Queries.

12. Frm_Losses_Request

This form contains list boxes for the monitor to enter a type of discharge code and Monitor Access Code. This form is linked to the Loss Report which is found in Frm_Reports_And_Queries.

13. Frm_Losses_Some_Cat

This form contains list boxes for the monitor to enter more than one type of discharge code and Monitor Access Code. This form is linked to the Loss Report and Qry_Losses_Some_Cat which are found in Frm_Reports_And_Queries.

14. Frm_Losses_Some_MAC

This form contains list boxes for the monitor to enter one type of discharge code and multiple (up to three) Monitor Access Codes. This form is linked to the Loss Report and Qry_Losses_Some_MAC which are found in Frm_Reports_And_Queries.

15. Frm_Main_Menu

This is a menu form that contains three options for the monitor to choose from: Monitor Transaction, Reports and Queries, and Data Store Maintenance. This form is the gateway to all other options in the system

16. Frm_MASS

This form is the system menu. This is the first menu of MASS, and it contains three options: About MASS, Run MASS and Quit MASS.

17. Frm_Master_Brief_Sheet

This form accepts input data from the monitors to create a Master Brief Sheet. This form is linked to Qry_Master_Brief_Sheet which links the Member Table and the Fitrepdetail table.

18. Frm_MCC_Lookup

This is a menu form that provides the monitor with two options to look up a Monitored Command Code: By a three alphanumeric code or by the plain English title of the unit.

19. Frm_Member

This form is a replica of the officer slate form currently used by the monitors. This form is linked to the View Officer Slate option which is found in Frm_Screen_Officer_Records.

20. Frm_Member_Photo

This form allows the monitor to retrieve and display an officer's promotion photo by entering the officer's MID.

21.Frm_Monitor_Transactions

This form contains the main processes in assigning an officer to a vacant billet. These processes are Find Billet Shortages and Movers, Screen Officer Records, Create Brief Sheet, and Approved Assignment.

22. Frm_OSR/CSR

This form provides the MASS systems administrator with the capability of modifying the ASR and Staffing Goal Tables. This capability is restricted to the MASS system

administrator. The form is linked to the Maintain ASR/Staffing Goal option which is found in Frm_Data_Store_Update.

23. Frm_PMR

This form provides the monitor with list boxes to enter values for PGRD, PMOS, and a range of dates to determine the officers who are eligible for reassignment. This form is linked to Frm_Potential_Movers which is found in Frm_Billet_Shortages_And_Movers.

24. Frm_Potential_Movers

This form allows the monitor to input parameters for Frm_PMR. The form allows entries of PMOS, PGRD, SFMCC, and SEDD.

25. Frm_Potential_Movers2

This form allows the monitor to input parameters for the "Between" operator on the SEDD date list box in Frm_PMR.

26. Frm_Reports_And_Queries

This is a menu form that provides the monitor with four options to produce reports based on system queries. These reports are the Billet Shortage Report, the Officer Slate Form, the Master Brief Sheet, and the Losses Report.

27. Frm_Screen_Officer_Records

This is a menu form that provides the monitor with four options to evaluate an officer as a potential candidate to fill a vacant billet. These options are View Officer Slate, View Master Brief Sheet, View Fitness Reports, and View Promotion Photo.

28. Frm_Slate

This form is generated when the monitor chooses the View Officer Slate option. The form contains personal information about an officer.

APPENDIX F. REPORTS

This Appendix shows an example of each report generated by the Reports and Queries option. Examples of the standard reports created by MASS in the Reports and Queries Option are illustrated in Figure F-1 Billet Report, Figure F-2 Billet Shortage Report, Figure F-3 Officer Slate Form, Figure F-4 Master Brief Sheet, and Figure F-5 Losses Report.

1. Rpt_Billet_Report

This report takes its data from Frm_Billet_Report and produces the Billet Report. This report contains the information usually found in the Command Staffing Report (CSR) and Occupational Staffing Report (OSR). It lists the units and the officers currently on board. Unlike the OSR and CSR, the Billet Report provides the monitor with only the essential elements of information to determine when a unit will be understaffed and what units require staffing priority.

2. Rpt_Billet_Shortages

This report takes its data from Frm_Billet_Shortage _Request and produces the Billet Shortage Report. This report lists the units which are either understaffed or will be understaffed in the near future.

3. Rpt_Billet_Shortages1

This report is a listing of units which are either understaffed or will be understaffed between a given date range. This report is invoked when the user enters a value for the "between date_1 and date_2" operator in the Find Billet Shortages option.

4. Rpt_Brief_Sheet

This report is the officer brief sheet. The officer brief sheet contains the monitor's recommended duty assignment for an officer. It is prepared by the monitor and submitted to the appropriate approval authority. The officer brief sheet is discussed in detail in Chapter III and Chapter IV.

5. Rpt_Movers

This report is a listing of officers who are eligible for reassignment based on the PMOS, PGRD, and SEDD criteria specified on the input form.

6. Rpt_Slate

This report is the officer slate form. The officer slate form is a listing of personal and administrative information about an officer such as his/her present duty assignment, noted preference of duty station, and any notes made by the monitor about this officers capabilities.

BILLET REPORT

Demand MC	Demand MOS	SEDD	Demand Grade	MID	PGRD	PMOS	ASR Qty	SG Qty	OH Qty
121									
	3002								
		1/1/95	O3	0240564829	O3	3002			
							11	3	1
145									
	7210								
		1/1/96	O3	0298526509	O3	7210			
							6	6	1
169									
	4402								
		1/1/95	O3	0206566869	O3	4402			
		1/1/96	O3	0236564929	O3	4402			
							13	12	2
1A5									
	7204								
		1/1/95	O3	0212548019	O3	7204			
							2	2	1
1F2									
	2502								
		1/1/96	O4	0205568609	O3	2502			
							6	1	1
1FR									
	0402								
		1/1/95	O3	0225521519	O3	0402			
							1	1	1
B50									
	0302								
		1/1/95	O3	0248502979	O3	0302			
							1	1	1

Figure F-1 Billet Report

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BILLET SHORTAGES REPORT

Demand MC	Demand MOS	SEDD	Demand Grade	MID	PGRD	PMOS	ASR Qty	SG Qty	OH Qty
121									
	3002								
		1/1/95	O3	0240564829	O3	3002			
							11	3	1
145									
	7210								
		1/1/96	O3	0298526509	O3	7210			
							6	6	1
169									
	4402								
		1/1/95	O3	0206566069	O3	4402			
		1/1/96	O3	0236564929	O3	4402			
							13	12	2
1A5									
	7204								
		1/1/95	O3	0212548019	O3	7204			
							2	2	1
QAR									
	4402								
		1/1/96	O3	0216584779	O3	4402			
							6	5	1
V13									
	0302								
		1/1/95	O3	0211541249	O3	0302			
							6	6	1

Figure F-2 Billet Shortages Report

OFFICER ASSIGNMENT SLATE   DATE: Wednesday, August 31, 1994

| LNAME: DUNN, JOHN K. | FRAME: PAUL | MNTR: | MID: 0267567639 | MAC: 4 |

GRADE		MOS	CONTRACT	R/S/MAR	GCT/ED	LANGUAGE	SECURITY	DAUS/DEPL
PGRD: O3	PMOS: 0302	AFADBD:	RACE: C	GCT:	LANG1:	SEC: S	DAUSDR:
SGRD: O4	MOS1: 0000	D1COMA:	SEX: M	CEDL: K	LANG2:	SECINV: 4	DAUSDN:
DOR:	MOS2: 0000	EASD:	MARST: M	DOPMA:	LANG3:	SECDATE:	OOAUS:
LNPRES: 47727000	SIMOS:	COMP: 11	DEPLOC: 928	SSEF: 0	LANG4:		DSC: 3
PASSED: 0	BMOS: 0302	DULIM: 0	SPOSVC: 0	SSSF: 0			DRD:
CYTZ	FUTMOS:	JSODAT:					ADT:
SVCCODE:							

------PRESENT COMMAND------   ......FUTURE COMMAND......

MCC:	V11	1/1 1STMARDIV CAMP PENDLETON CA	SIMCC:		SIEDA:
SPMCC:	V11	1/1 1STMARDIV CAMP PENDLETON CA	SFMCC: 012	MCCDC QUANTICO VA	SEDA: 7/2/94

RUC: 11110	TON:	JTBIL:	SCHG: A	FTCF: 36		
DCTB:	TOLN:	ACCOMP:	EXCPTN: N	FPCS: OA	Field103:	
GLCDCTB: 5/1/91	ABMOS: 0302	ISEP1	FTO: 7402	FRFT: S	ORUC: 54813	PABGRDF: *
TCF: 36	ABGRD: O3	ISEP2	FTOLN: 0439	FABMOS: 9910	OTTC: 010	FABGRDF: &
SEDO: 6/1/94	PCSC: TA	LFMF: 00	FDTYST: 1	FABGRD: O4	ORFLG: M	MOBEX:
RTO:	ORTRDT:	FMMCC: J52	PDU1: K48 H57 Y18		ROSTER: D940414	

___ACIP___   ___ADVANCE COMMAND___   ___JSO___

DIFOP:	OPFLY:	OSD:	SAMCC: ZY7	SAEDA: /97	JTMOS:
OPSTART	OPGATE1:	ASED:	AGLC:	Field131:	JSODAT:
OPSTOP	OPGATE2: 0	OPBD:	Field128:	APMOS: 0000	

MNOTES: RELIEF FOR MAJOR GRIGGS. FLUENT SPANISH (18 CREDITS IN COLLEGE). SMALL BOAT EXPERT (INVOLVED IN ACQUISITION OF RAC DURING LFTC TOUR). SOC BACKGROUND FROM 1ST MARINES (BOAT COMPANY). TOP OFFICER.

Figure F-3 Officer Slate Form

MASTER BRIEF SHEET

NAME	MID	GRADE	RANK	DOR	COMP	LINEAL NO.	PMOS	AMOS	GCT	PER CR	PERM DOR
FERNANDEZ, FRANCIS B:	6723526409	03	CAPT		USMC	A0808009	1909	1302		CAPT	10/1/87

Figure F-4 Master Brief Sheet

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MASON	DUANE	B	O3	2502	1F2	W95	4A
WELCH	ROBERT	L	O3	7204	143	Z63	6
MEDINA	JOHN	M	O3	3002	122	Z63	72
FERNANDEZ	FRANCIS	B	O3	1803	B22	Z63	73
GRIEVES	JOSEPH	H	O3	4402	1C1	W95	74
SPACE	JAMES	P	O3	0302	122	W95	75
TOOLAN	FRANCIS	E	O3	0302	V23	Z63	75
FLOWERS	JOHN	W	O3	7210	142	W95	8H
WELBORN	CARL	J	O3	7562	143	W95	8H

Figure F-5 Losses Report

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APPENDIX G. MODULES

This Appendix contains the functions and procedures of the MASS prototype as shown below:

A. FUNCTION EXIT_SYSTEM

This function takes the user out of MASS.

```
Function Exit_sys ()
  userButton = MsgBox("Exit MASS Program?", 36, "MASS")
  If userButton = 6 Then
    DoCmd Quit
  End If
End Function
```

B. FUNCTION FORM_EXIT

This functions takes the monitor out of any particular menu. The function gives the user a choice of "Previous Menu", "Windows" and "Cancel".

```
Function Frm_Exit ()
  DoCmd OpenForm "Frm_Exit", 0, "", "", 2, 0
End Function
```

C. FUNCTION LOSSES

This function provides the monitor with list boxes to choose the type of loss report to be generated. Once these parameters have been entered, they are passed to a query to generate the loss report.

FUNCTION: losses

```
Function losses ()
  On Error GoTo losses_Err
  cat = ""
  mac = ""
  If Forms!frm_losses_request!CAT_1 = "ALL" Or
    Foms!frm_losses_request!CAT_2 = "ALL" Or
    Forms!frm_losses_request!CAT_3 = "ALL" Then
      cat = "True"
  End If
```

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```
If Forms!frm_losses_request!MAC_1="ALL"Or
    Forms!frm_losses_request!MAC_2 = "ALL" Or
    Forms!frm_losses_request!MAC_3 = "ALL" Then
        mac = "True"
End If
 If cat = "True" And mac = "True" Then
    DoCmd OpenForm "FRM_LOSSES_ALL"
 End If
 If cat = "True" And mac <> "True" Then
     DoCmd OpenForm "FRM_LOSSES_SOME_MAC"
 End If
 If cat <> "True" And mac = "True" Then
    DoCmd OpenForm "FRM_LOSSES_SOME_CAT"
  End If
 If cat <> "True" And mac <> "True" Then
    DoCmd OpenForm "frm_Losses", 0, "", "", 1, 0
  End If
 losses_Exit:
 Exit Function
    losses_Err:
 Resume losses_Exit
End Function
```

D.   FUNCTION: MEMBER_SEARCH

This function allows the monitor to search for an officer by Last Name or MID in
the Maintain Member Store option.

```
Function member_search (search As String)
   On Error GoTo member_search_Err
   Select Case search
     Case "btn_LAST_NAME"
        DoCmd OpenForm "frm_member", 0, "", "(([tbl_MEMBER].[LNAME] Like
           [LAST NAME]))", 1, 0
     Case "btn_MID"
        DoCmd OpenForm "frm_member", 0, "", "(([tbl_MEMBER].[MID] Like
           [MILITARY ID NUMBER]))", 1, 0
   End Select
   member_search_Exit:
   Exit Function
     member_search_Err:
        'MsgBox "Warning:" + Error$
        'MsgBox "WARNING: CANCELING REQUEST"
     Resume member_search_Exit
End Function
```

E. FUNCTION MENU_CHOICE (CHOICE AS STRING)

```
        On Error GoTo Menu_Choice_Err
        Select Case CHOICE
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
"          MENU CHOICES FOR THE FORM MASS                "
"                                                        "
"                    BEGINS HERE                         "
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

        Case "btn_RUN_MASS"
          DoCmd OpenForm "frm_MAIN_MENU", 0, "", "", 2, 0
        Case "btn_ABOUT_MASS"
          DoCmd OpenForm "frm_ABSTRACT", 0, "", "", 2, 0


"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
"          MENU CHOICES FOR THE MAIN MENU                "
"                                                        "
"                    BEGINS HERE                         "
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

        Case "btn_Monitor_transaction"
          DoCmd OpenForm "frm_Monitor_Transaction", 0, "", "", 2, 0
        Case "btn_Data_Store_Maintenance"
          DoCmd OpenForm "frm_Data_Store_Maintenance", 0, "", "", 2, 0
        Case "btn_Reports_And_Queries"
          DoCmd OpenForm "frm_Reports_And_Queries", 0, "", "", 2, 0


"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
"          MENU CHOICES FOR THE EXIT MENU                "
"                                                        "
"                    BEGINS HERE                         "
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

        Case "btnPrevious_Menu"
          SendKeys "%{f4}"
          SendKeys "^{f4}"
        Case "btnCancel"
          SendKeys "%{f4}"


"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
"  MENU CHOICES FOR THE MONITOR TRANSACTION MENU    "
"                                                        "
"                    BEGINS HERE                         "
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

        Case "btn_Billet_Shortages_Movers"
          DoCmd OpenForm "frm_Billet_Shortages_And_Movers", 0, "", "", 2, 0
        Case "btn_Screen_Candidates_Records"
          DoCmd OpenForm "frm_Screen_Candidates_Records", 0, "", "", 2, 0
```

```
Case "btn_Temp_Assign"
    DoCmd OpenForm "frm_Temp_Assign", 0, "", "", 2, 0
Case "btn_Create_Brief_Sheet"
```

```
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
'       MENU CHOICES FOR THE REPORTS AND QUERIES       .    '
'                                                            '
'                       BEGINS HERE                         '
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
```

```
    Case "btn_Maintain_Data_Stores"
        DoCmd OpenForm "frm_Data_Store_Update", 0, "", "", 2, 0
```

```
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
'       MENU CHOICES FOR THE DATA STORE MAINTENANCE     '
'                                                            '
'                       BEGINS HERE                         '
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
```

```
    Case "btn_Generate_W95_Report"
        DoCmd OpenForm "frm_Losses_Request", 0, "", "", 1, 0
```

```
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
'       MENU CHOICES FOR THE DATA STORE UPDATE          '
'                                                            '
'                       BEGINS HERE                         '
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
```

```
    Case "btn_Maintain_Member_Store"
        DoCmd OpenForm "frm_member", 0, "", "", 1, 0
    Case "btn_MCC_LOOK_UP"
        DoCmd OpenForm "frm_MCC_LOOKUP", 0, "", "", 1, 0
    Case "btn_CODE"
        DoCmd OpenForm "frm_MCC_LOOKUP", 0, "", "((([tbl_CEF].[MCC] Like
            [MCC CODE]))", 1, 0
    Case "btn_LONG_NAME"
        DoCmd OpenForm "frm_MCC_LOOKUP", 0, "",
            "((([tbl_CEF].[MCC_LONG NAME] Like
            [MCC ENGLISH NAME]))", 1, 0
```

```
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
'       MENU CHOICES FOR THE BILLET SHORTAGES AND MOVERS   '
'                       BEGINS HERE                          '
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
```

```
    Case "btn_Find_Potential_Movers_For_Billet"
        DoCmd OpenForm "frm_PMR", 0, "", "", 1, 0
    Case "btn_Find_Billet_Shortages"
        DoCmd OpenForm "frm_Billet_Shortage_Request", 0, "", "", 1, 0
```

```
''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
"          MENU CHOICES FOR BRIEF_SHEET FORMS          "
"                                                      "
"                     BEGINS HERE                      "
''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
      Case "btn_PGDN"
        SendKeys "{pgdn}"
      Case "btn_PGUP"
        SendKeys "{pgup}"
      Case "btn_MID"
        DoCmd OpenForm "frm_BRIEF_SHEET",0,"","(([tbl_MEMBER].[MID]Like
          [ENTER MID OF MARINE]))", 1, 0
      Case "btn_Print"
        DoCmd  OpenReport  "rpt_Brief_Sheet" ,2," ", "[MID]=
          Forms![frm_Brief_Sheet]![MID]"
      End Select
    Menu_Choice_Exit:
    Exit Function
      Menu_Choice_Err:
        'MsgBox "Warning:" + Error$
        Resume Menu_Choice_Exit
End Function
```

F.   FUNCTION POTENTIAL MOVERS

```
Function Potential_Movers ()
  On Error GoTo Potential_Movers_err
  If [FORMS]![FRM_PMR]![OPERATOR] = "EQUAL TO" Then
    DoCmd OpenForm"frm_Potential_Movers",0,"","(((tbl_MEMBER.[PGRD]like
      [FORMS]![FRM_PMR]![PGRD:]) AND (tbl_MEMBER.PMOS Like
      [FORMS]![FRM_PMR]![PMOS:]) AND (tbl_MEMBER.SEDD=
      [FORMS]![FRM_PMR]![DATE_1]) AND (tbl_MEMBER.PABGRDF Is
      Null))", 1, 0
  End If
  If [FORMS]![FRM_PMR]![OPERATOR] = "LESS THAN" Then
    DoCmd OpenForm"frm_Potential_Movers",0,"","(((tbl_MEMBER.[PGRD]Like
      [FORMS]![FRM_PMR]![PGRD:])AND(tbl_MEMBER.PMOS Like
      [FORMS]![FRM_PMR]![PMOS:]) AND (tbl_MEMBER.SEDD<
      [FORMS]![FRM_PMR]![DATE_1]) AND (tbl_MEMBER.PABGRDF Is
      Null))", 1, 0
  End If
  If [FORMS]![FRM_PMR]![OPERATOR] = "GREATER THAN" Then
    DoCmd OpenForm "frm_Potential_Movers", 0,"","(((tbl_MEMBER.[PGRD]Like
      [FORMS]![FRM_PMR]![PGRD:]) AND (tbl_MEMBER.PMOS Like
      [FORMS]![FRM_PMR]![PMOS:]) AND
```

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```
(tbl_MEMBER.SEDD>[FORMS]![FRM_PMR]![DATE_1]) AND
(tbl_MEMBER.PABGRDF Is Null))", 1, 0
        End If
        If [FORMS]![FRM_PMR]![OPERATOR] = "BETWEEN" Then
          DoCmd OpenForm "frm_Potential_Movers", 0,"","((tbl_MEMBER.[PGRD]Like
            [FORMS]![FRM_PMR]![PGRD:]) AND (tbl_MEMBER.PMOS Like
            [FORMS]![FRM_PMR]![PMOS:]) AND (tbl_MEMBER.SEDD Between
            [FORMS]![FRM_PMR]![DATE_1] AND
            [FORMS]![FRM_PMR]![DATE_2]) AND
          (tbl_MEMBER.PABGRDF Is Null))", 1, 0
        End If
    Potential_Movers_Exit:
      Exit Function
      Potential_Movers_err:
        Resume Potential_Movers_Exit
    End Function
```

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