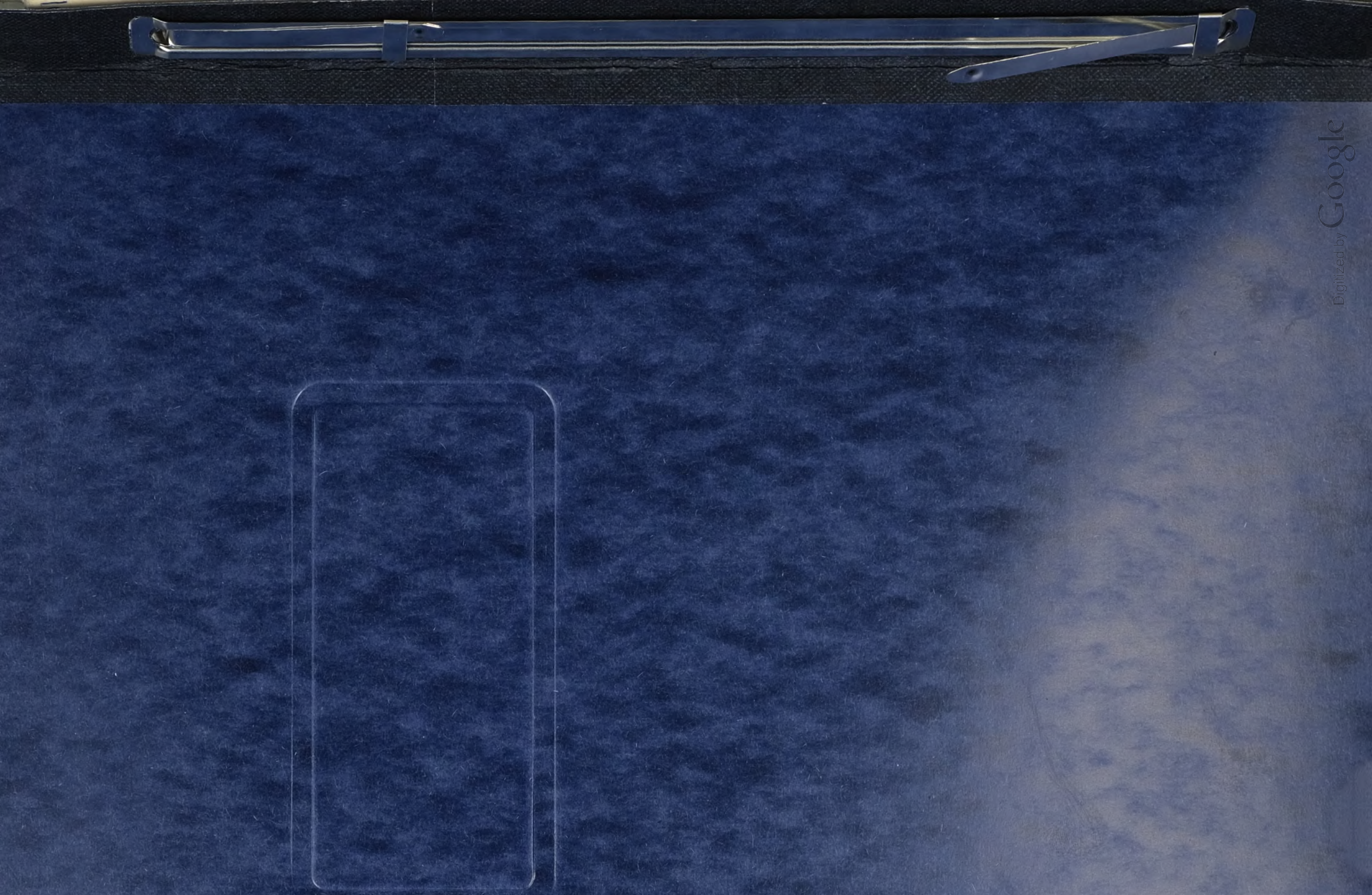
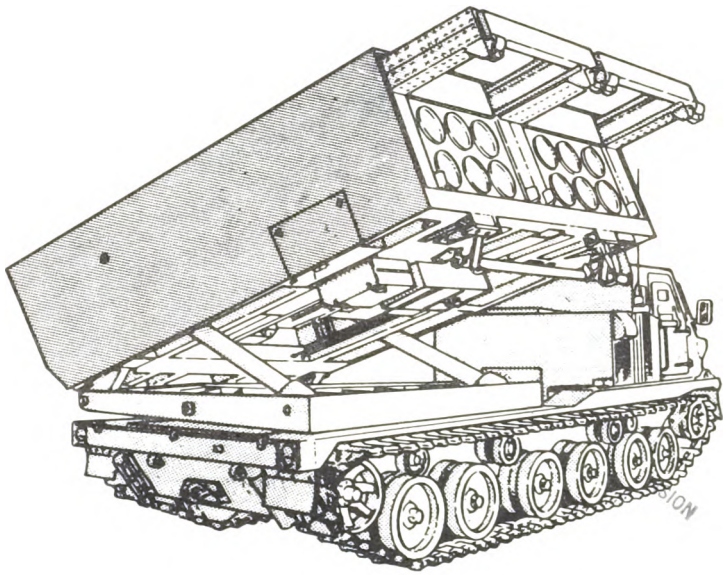


TECHNICAL MANUAL

OPERATOR'S MANUAL

LAUNCHER, ROCKET, ARMORED VEHICLE MOUNTED: M270

(1055-01-092-0596)



MULTIPLE LAUNCH ROCKET SYSTEM

DEPARTMENT OF THE ARMY

JUNE 1984

WARNING SUMMARY

WARNING

Rocket exhaust gases are poisonous. Prolonged breathing of rocket exhaust gas can cause severe injury or death. Be sure to keep your NBC mask ready for immediate use during firing. Make sure all doors, hatches, and louvers are closed and that SPLL cab ventilation system is set to FIRING before firing rockets.

WARNING

Hangfire rocket can ignite unexpectedly and kill someone. Hangfire is indicated by a slow flashing HANGFIRE indicator light on the fire control panel. If a hangfire occurs, hangfire procedures in paragraph 2-38 should be started immediately.

WARNING

Always keep a shorting plug connected to a loaded LP/C. Remove shorting plug only when you are going to connect a tested umbilical cable to the LP/C. Stray voltage could cause rocket to fire and kill someone.

WARNING

Never connect umbilical cable to LP/C unless cable has passed SNVT test, as the last step before connecting umbilical cable. Stray voltage may cause rocket to fire and kill someone.

WARNING

Beware of rotating equipment. LLM control is automatic in firing and reload positioning operation. Use care and keep away from rotating equipment to avoid injury.

WARNING SUMMARY – Continued

WARNING

Do not attempt to unload or load two loaded LP/Cs at the same time from side loading positions (paragraph 1-9, d). This may off balance the SPLL. The SPLL may turn over, injure someone, and damage equipment.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands or vertical lines in outer margin of page. Extensively changed illustrations are indicated by a miniature pointing hand symbol pointing to the words MAJOR CHANGE.

Dates of issue for original and changed pages are:

Original 0 . . . . . 20 June 1984

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 497 CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	0
a	0
b	0
A	0
B Blank	0
i thru iii	0
iv Blank	0
v	0
1-0 thru 1-31	0
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3-36 Blank	0
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B-1 thru B-4	0
C-1	0
C-2 Blank	0
D-1	0
D-2	0
E-1 thru E-4	0
Index-1 thru Index-9	0
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*Zero in this column indicates an original page.

ARMY

TECHNICAL MANUAL)
)
No. TM 9-1425-646-10)

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *20 June 1984*

OPERATOR'S MANUAL
LAUNCHER, ROCKET, ARMORED
VEHICLE MOUNTED:
M270 (1055-01-092-0596)

TABLE OF CONTENTS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Missile Command; Attn: DRSMI-SNPM, Redstone Arsenal, AL 35898. A reply will be furnished to you.

TABLE OF CONTENTS – Continued

LIST OF ILLUSTRATIONS

LIST OF TABLES

HOW TO USE THIS MANUAL

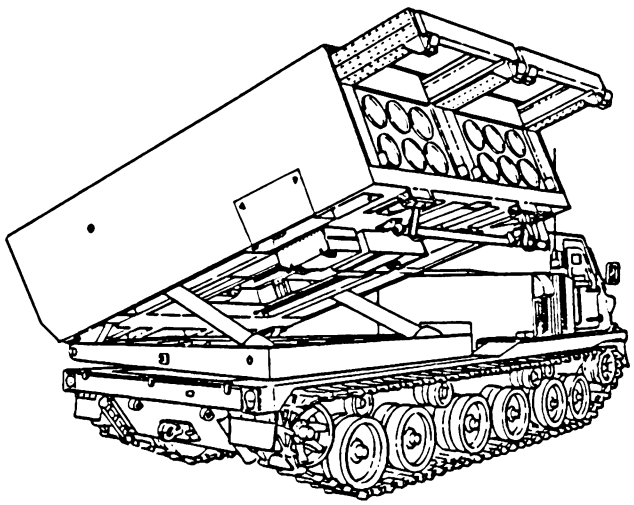
This manual is for the Armored Vehicle Mounted Rocket Launcher M270 crewmembers. It describes the system and tells you how it works. This manual also has sample procedures on how to use the Armored Vehicle Mounted Rocket Launcher M270.

To locate information in this manual, use the front cover index, the Table of Contents, the Chapter Contents, or the Alphabetical Index. The front cover index lists the major subjects contained in the manual and the page on which each subject is located. Black tabs on manual pages correspond to front cover index major subject tabs and to boxed heads in the Table of Contents. These black tabs may be used to locate each of the major subjects in the manual. The Table of Contents is in the front of the manual and lists general subjects by chapter and section. The Chapter Contents, in the front of each chapter, lists each subject by section and paragraph number. The Alphabetical Index, in the back of the manual, lists all subjects in the manual. Most subjects are listed two or three different ways. If you want to find a certain section, such as troubleshooting, use the Table of Contents. If you want to find a subject that is in the manual but not listed as a section title, use the Chapter Contents or the Alphabetical Index.

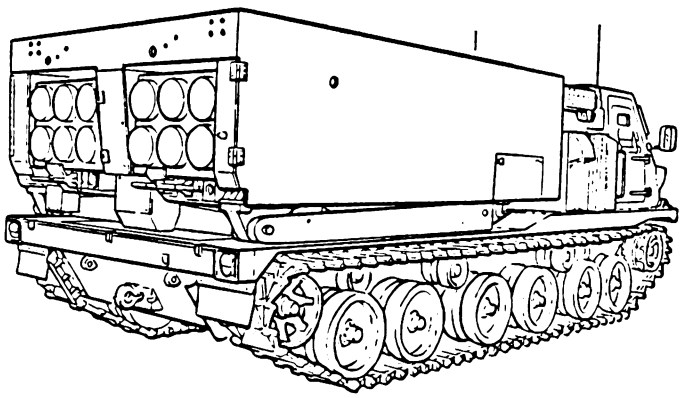
This manual is for both the new and experienced operator. Illustrated instructions guide you quickly through the procedures. Flow diagrams at the end of the longer procedures lets the experienced operator skim over the procedures.

Very few figure and table numbers are used. The figures and tables are placed as close to the written text as possible. You need not skip around as you follow the instructions. The instructions are given in step-by-step order. Picture type illustrations show exactly how things look when doing each step. In the reloading instructions, each crewmember is assigned a specific task. The tasks are crew oriented. Each crewmember is assigned a task by title (driver, gunner, section chief).

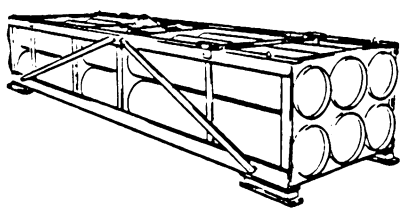
To properly operate the system, pay particular attention to the principles of operation in Chapter 1. Use the controls and indicators section and the general operating information section to help you understand the system. When operating the fire control system, the system's control panel will display written instructions. They will guide you through each operating procedure. Examples of operating procedures are provided in the operation under usual conditions section. Also, you must pay attention to the safety instructions in Chapter 4, and all warnings and cautions throughout this manual.



M270 ROCKET LAUNCHER
(FIRING MODE)



M270 ROCKET LAUNCHER
(TRANSPORT MODE)



M26 ROCKET POD

Figure 1-1. M270 Rocket Launcher with M26 Rocket Pod

CHAPTER 1
INTRODUCTION

CHAPTER CONTENTS

Section I. GENERAL INFORMATION

-1. SCOPE. This manual is for use in operation and support of the Rocket Launcher, Armored Vehicle lounted M270 (figure 1-1). The launcher is a mobile self-loading rocket firing platform on a tracked carrier ehicle. The rocket launcher is commonly called the Self-Propelled Launcher Loader (SPLL). The SPLL is the ocket firing unit in the Multiple Rocket Launch System (MLRS). The SPLL fires rockets housed in the 298 illimeter Rocket Pod M26. The rocket pod is commonly called a Launch Pod/Container (LP/C). The SPLL olds two LP/Cs and there are six rockets in each LP/C. The SPLL is made up of rocket launcher M269 mmonly called the Launcher Loader Module (LLM) and the carrier vehicle. This manual describes the LLM d its components and gives you the information you need to operate and take care of the SPLL. The formation does not include the carrier vehicle. Operating instructions for the carrier vehicle are in TM 1450-646-10.

2. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for uipment maintenance will be those prescribed by DA Pamphlet 738-750, The Army Maintenance anagement System (TAMMS). A list of forms, regulations, and technical manuals referenced in this anual are listed in Appendix A.

3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your SPLL needs provement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like out your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 uality Deficiency Report). Mail it to us at: Commander, U.S. Army Missile Command, Attn: DRSMI-EM, Redstone Arsenal, AL 35898. We'll send you a reply.

1-4. NOMENCLATURE CROSS-REFERENCE LIST. Table 1-1 lists and explains the common names and abbreviations used throughout this manual when speaking of equipment with official nomenclature.

Table 1-1. Nomenclature Cross-Reference List

COMMON NAME	OFFICIAL NOMENCLATURE
Abney Level	Level, Surveying: M1
Launcher Loader Module, (LLM)	Launcher, Rocket: M269
Launch Pod/Container, Loaded (LP/C)	Rocket Pod 298 Millimeter: M26
Self-Propelled Launcher Loader, (SPLL)	Launcher, Rocket, Armored Vehicle Mounted: M270

1-5. LIST OF ABBREVIATIONS. Table 1-2 lists abbreviations used in this manual and their explanations. Table 1-3 lists some of the less common terms and their explanations.

Table 1-2. List of Abbreviations

ABBREVIATION	OFFICIAL NAME
ACC	Acceptable
ACK	Acknowledge
ACTL	Actual
ACR	Ammunition Condition Report
ALM ACK	Alarm Acknowledge
AMC	At My Command
ATMOS	Atmosphere
AZ	Azimuth
BC	Boom Controller
BCU	Battery Computer Unit
BCS	Battery Computer System
BIT	Built-in-Test
BITE	Built-in-Test Equipment
BOOM CONT	Boom Controller

Table 1-2. List of Abbreviations – Continued

ABBREVIATION	OFFICIAL NAME
BRT	Bright
BTRY	Battery
C/E	Clear Entry
CBR	Chemical-Biological-Radiological
CFF	Call For Fire
CHK	Check
CHKF	Checkfire
CMD	Command
CMP	Communications Processor
CNTDN	Countdown
COMM or COM	Communications
COMMSEC	Communications Security
CONT	Control
CVC	Combat Vehicle Communication
DN	Down
DOT	Department of Transportation
DR INTLK	Door Interlock
DSPL	Display
DTI	Date, Time, Interval
EIR	Equipment Improvement Recommendation
EMI	Electromagnetic Interference
EMP	Electromagnetic Pulse
ENBL	Enable
EOD	Explosive Ordinance Disposal
EU	Electronics Unit
EXEC	Execute
FCP	Fire Control Panel
FCS	Fire Control System

Table 1-2. List of Abbreviations – Continued

ABBREVIATION	OFFICIAL NAME
FCU	Fire Control Unit
FDC	Fire Direction Center
FLD	Field
FSK	Frequency Shift Keying
FWD	Forward
FWR	Fire When Ready
HDG	Heading
HEMAT	Heavy Equipment Mobility Ammunition Trailer
HEMTT	Heavy Equipment Mobility Tactical Truck
HGT	Height
INIT	Initiate
LCHR	Launcher
LDS	Launcher Drive System
LLM	Launcher Loader Module
LOST	Location/Status
LP/C	Launch Pod/Container
LRU	Line Replaceable Unit
MAX	Maximum
MEM	Memory
MET	Meteorological
MF	Mission Fired
MIN	Minimum
MIS	Missile Interim Specification
MLRS	Multiple Launch Rocket System
MSG	Message
MSN	Mission
MST	Mission Status
NAC	Not Acceptable

Table 1-2. List of Abbreviations – Continued

ABBREVIATION	OFFICIAL NAME
NAK	Not Acknowledged
NBC	Nuclear, Biological, Chemical
NV	Nonvolatile
P/O	Part Of
PDB	Power Distribution Box
PDS	Position Determining System
PLT/TP	Platoon Leader/Troop
PMCS	Preventive Maintenance Checks and Services
PNL	Panel
PPS	Primary Power Supply
PRS	Pressure
psi	Pounds Per Square Inch
PWR	Power
QE	Quadrant Elevation
R/T	Receiver-Transmitter
RDY	Ready
REQ	Request
RKT	Rocket
RSF	Resettable Fuse
RST	Resupply Trailer
RSV	Resupply Vehicle
S/C	Section Chief
SEC	Second
SNVT	Short No-Voltage Tester
SOP	Standing Operating Procedure
SPLL	Self-Propelled Launcher Loader
SRP	Stabilization Reference Package
STD	Standard

Table 1-2. List of Abbreviations – Continued

ABBREVIATION	OFFICIAL NAME
SYS	System
TAMMS	The Army Maintenance Management System
TEMP	Temperature
TMP	Temperature (MET table only)
TOT	Time-On-Target
TTF	Time-To-Fire
VDC	Volts Direct Current
VOL	Volume
WDR	Wind Direction
WHD	Warhead
WSP	Wind Speed
XMIT	Transmit

Table 1-3. Glossary

TERM	EXPLANATION
Address	the location of something
Amber	yellow
Audible	a sound you can hear
Automatic	machine operated
Azimuth	to rotate on a flat plane
Bulge	to swell outward
Clockwise (cw)	to turn to the right
Compose	to put together
Counterclockwise (ccw)	to turn to the left
Crack	a narrow break in a material. A partial break, but the material is not completely divided.
Crewmember	Driver, Gunner, or Section Chief

Table 1-3. Glossary – Continued

TERM	EXPLANATION
Cursor	a lighted square on the fire control panel which tells where you can add data
Data	the factual information used as the basis for figuring mission coordinates
Data Link	the electronic equipment which can transmit information in digital form
Decameter	10 meters
Default Value	a fixed input value (number) for a operating routine input into the FCS. Input is always the same unless changed by the operator.
Dent	a slight depression. A small rounded hollow in the surface of a material.
Disengage	remove from or turn off
Dud	a rocket with a fuze that did not pass the rocket fuze test
Element	part of a larger item
Elevate	raise
Enable	to turn on
Engage	connect to
Erase	to remove the writing on the FCP display screen
Erosion	the process of wearing away by degrees, or eroding
Erratic	does not work the same at all times
Extinguish	to cause to die out
Fault Message	a short message telling you something is wrong in the equipment
Field	a group of words on the display panel
Firing Site	a location fixed in advance for firing rockets
Firing Site Coordinates	a map location
Fuze time	the time it will take before the fuze will fire
Garbled	all mixed up
Gouge	a scooped out area in a material due to cutting or tearing as in a scraping
Hangfire	a malfunction of the rocket motor igniter
Heading	a direction

Table 1-3. Glossary – Continued

TERM	EXPLANATION
Illegal	an error has been made, something has been done wrong
Initialize	to startup
Initiate	to start
Inoperative	does not work
Interconnect	to connect with one another
Interface	the system or components that are linked together by common components or function
Keyway	a groove or slot into which an opposite shaped piece fits
Kink	an abrupt or sudden bend
Latch	a catch which holds something in place
Leak, Class I	a seepage of fluid, not enough to form drops
Leak, Class II	a leakage of fluid, enough to form drops but not enough to cause drops to fall from item being tested or inspected
Leak, Class III	a leakage of fluid enough to form drops that fall from the item being tested or inspected
Malfunction	failure to operate properly
Manual	hand operated
Mechanized	powered by machine
Menu	a list of the choices on a display, from which you will make a selection
Meteorological	having to do with weather
Misfire	failure to fire due to faulty equipment (no current flow to rocket igniter)
Mode	a method of operation
Nomenclature	the official name
Overtemperature	too hot
Parameter	a constant value, a limit
Penetrate	to make a hole into or through a material

Table 1-3. Glossary – Continued

TERM	EXPLANATION
Penetration	to pass into or through
Pinion	a gear with a small number of teeth which is designed to mesh with a larger gear wheel
Platform	a flat level surface
Preamble Time	the time it takes to send coded information that is at the front part of a radio message
Premature	too early
Reloading	loading and unloading
Resolver	a device that detects the position of the LLM
Rockets Exhausted	all rockets that can fire have been fired
Rocket Fuse Time	the time it will take before the fuse will fire
Routine	a sequence of messages or procedures
Scrape	a slight scratch
Scratch	a narrow, shallow displacement of a material from a surface
Seepage	a small quantity of fluid that has passed through small opening in hydraulic lines or couplings
Sequence	a series of actions that follow in order
Shattered	to break apart, or to break into pieces
Spheroid	an area in the shape of a ball
Splined	having fixed key which fit into a key way of connecting part
Status	the condition of
Symptoms	a sign that tells you what could be causing a problem
Telescope	to slide or pass one part inside another like the tube sections of a hand-held telescope
Toxic	poisonous

Section II. EQUIPMENT DESCRIPTION

1-6. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. The SPLL is a mobile, self-propelled, self-loading, multiple launch rocket firing unit. It is used to increase standard artillery fire power. The SPLL firing unit is operated by a three-member crew. The unit is designed to operate using a shoot and scoot mode. The SPLL can quickly move from a hide position to a firing position, launch rockets, then move to a new firing position. The operation can be repeated until the rocket load is exhausted. When the rocket load is exhausted, the unit can quickly move to a reload position. Using the self-loading capability, it can reload in minutes and proceed to a new firing position or hide area. The rockets for the SPLL are housed in LP/Cs. Each LP/C holds six unguided free flight rockets. The rockets are factory assembled, tested, and stored in fiberglass containers mounted in the LP/C frame work. The container serves as both storage container and rocket launch tube. A detailed description of the LP/Cs is provided in Chapter 4.

b. The SPLL is made up of two major units and an electronic fire control system (FCS). The two major units are the carrier vehicle and LLM.

(1) The carrier is a full tracked vehicle, capable of off-the-road, cross-country operations, and gives the firing unit mobility. The capabilities and features of the carrier vehicle are described in detail in TM 9-1450-646-10.

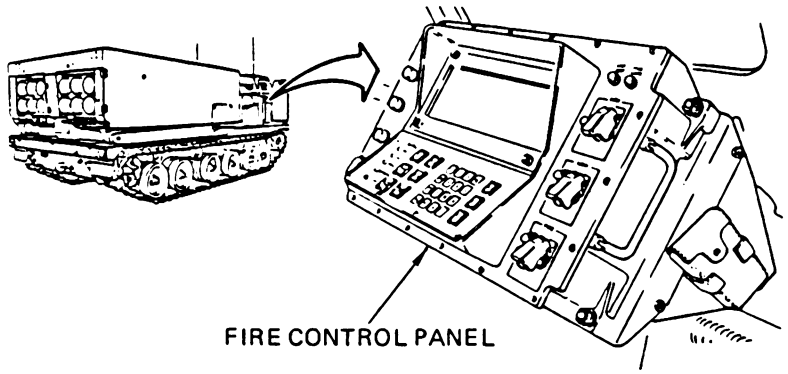
(2) The LLM is a box-like unit. It is made up of two major subassemblies, the cage assembly, and the base and turret assembly. The LLM is mounted on the carrier vehicle bed and serves as the rocket launching platform. When the SPLL is loaded, the LP/Cs are housed inside the LLM cage assembly. During a fire mission, the rockets are aimed at the target, by pointing the front of the LLM cage assembly at the target. LLM cage assembly movement is controlled by a hydraulic drive system called the launcher drive system (LDS), mounted in the base and turret assembly. The LDS, in turn, is electronically controlled by the FCS.

(3) The FCS is a computer control system, that has a built-in computer and memory system. The system uses permanently stored data and current input data to compute the ballistics for single and multiple aimpoint fire missions. Mission input information to the FCS can be both automatic and manual. Automatic inputs are by digital coded audiotone radio messages received over the SPLL radio. Manual inputs can be voice instructions received over the radio or written information. A stabilization reference package/position determining system (SRP/PDS) provides the FCS with LLM aiming stabilization, determines azimuth references to true north, and elevation from a horizontal plane. The SRP/PDS also maintains a carrier vehicle heading reference and determines SPLL present location. The radio system is equipped with a communications processor unit (comms processor or CMP). The comms processor electronically controls the data between the FCS computer and the radio system.

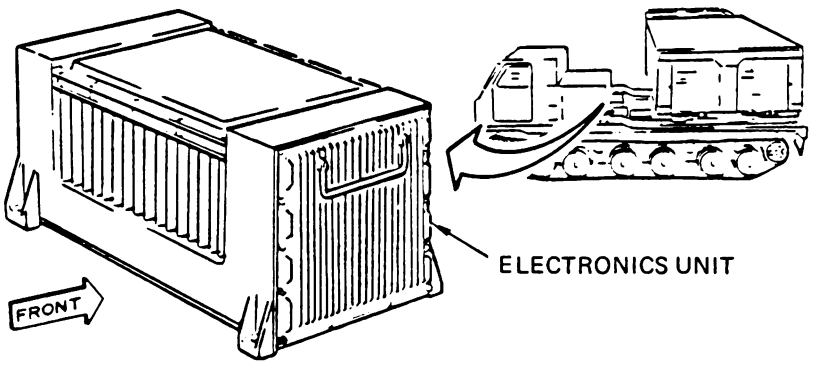
1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. The location and description of major components of the SPLL are in the following paragraphs. This does not include the carrier vehicle. Locations and descriptions of major components from the carrier are in TM 9-1450-646-10. The locations and descriptions provided in this paragraph are the major operating components of the FCS and the LLM.

a. Fire Control System.

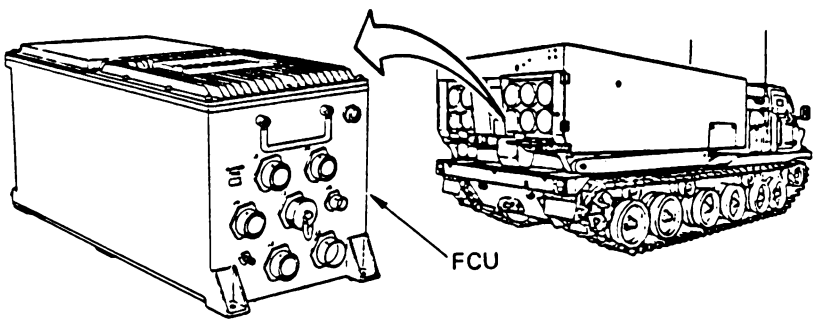
(1) Fire Control Panel. The fire control panel (FCP) is the controlling unit for the FCS. The FCP has a keyboard and display panel for sending and receiving operating instructions, and for manually entering data (information) into the FCS. The FCP also has indicator lights to show equipment conditions. The FCP has switches to turn on the FCS, and to arm and fire rockets. The FCP is located in the carrier crew cab.



(2) Electronics Unit. The electronics unit (EU) contains the electronic computer circuits for the FCS. The unit is located on the carrier bed.

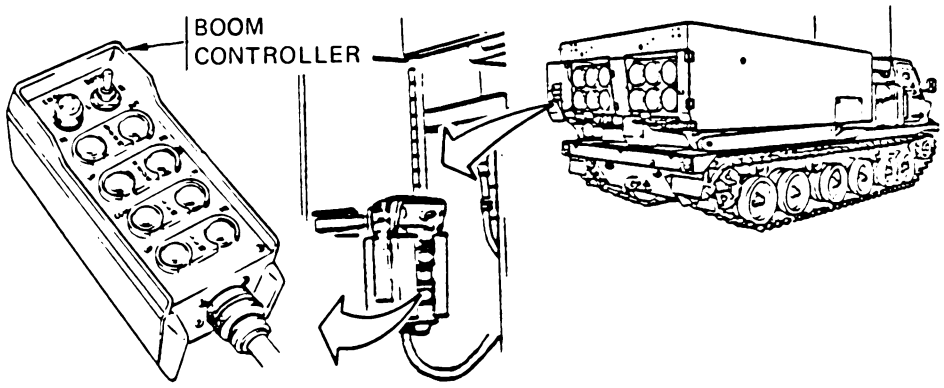


(3) Fire Control Unit. The fire control unit (FCU) contains the electronic circuits that change the EU outputs into control signals to other SPLL systems. It also takes inputs from the other systems and changes them into signals the EU can use. The FCU is located at the rear of the LLM.

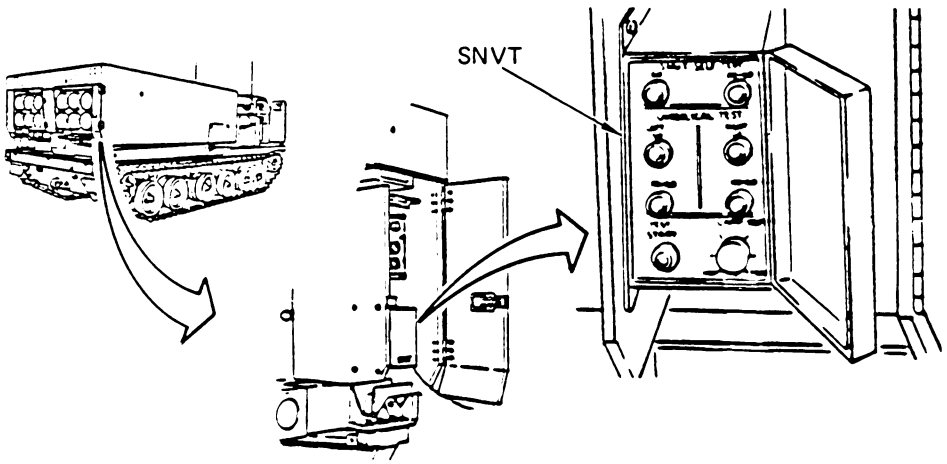


1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

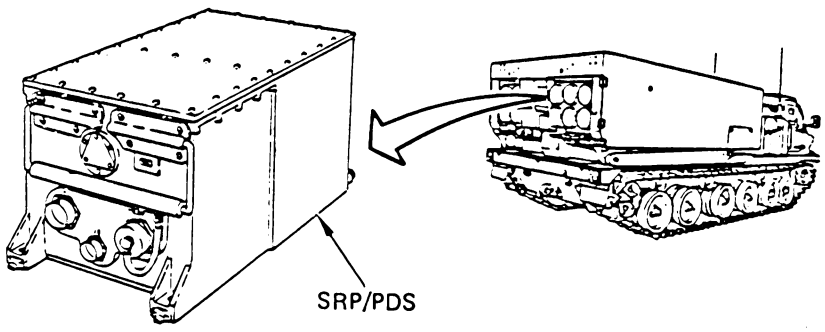
(4) Boom Controller. The boom controller (BC) is a hand-held switch control unit used to position the LLM, booms, and hoist hooks during reloading. The BC is connected to the LLM by a 9 meter cable. The BC and cable are stored in a special compartment at the rear of the LLM.



(5) Short/No-Voltage Tester. The short/no-voltage tester (SNVT) is a built-in tester used during loading operations. It is used to test the FCS umbilical cables to the LP/Cs. The test insures the cables are safe to connect to loaded LP/Cs. The SNVT is mounted in a storage compartment at the rear of the LLM. It is protected by a cover that swings open to one side.

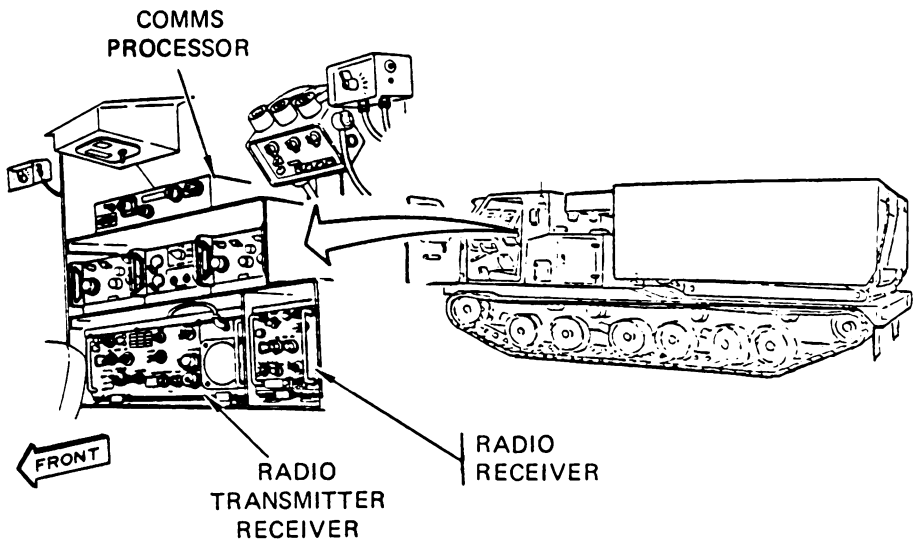


(6) Stabilization Reference Package/Position Determining System. The stabilization reference package/position determining system (SRP/PDS) is not a physical component of the FCS. However, operationally it is a very important part of the FCS. It provides the FCS with stabilizing (gyro) inputs. The SRP/PDS sets up the systems azimuth references to true north and elevation references from a horizontal plane. The PDS part of the SRP/PDS provides the FCS with current SPLL location data. The system is located in the rear of the LLM.



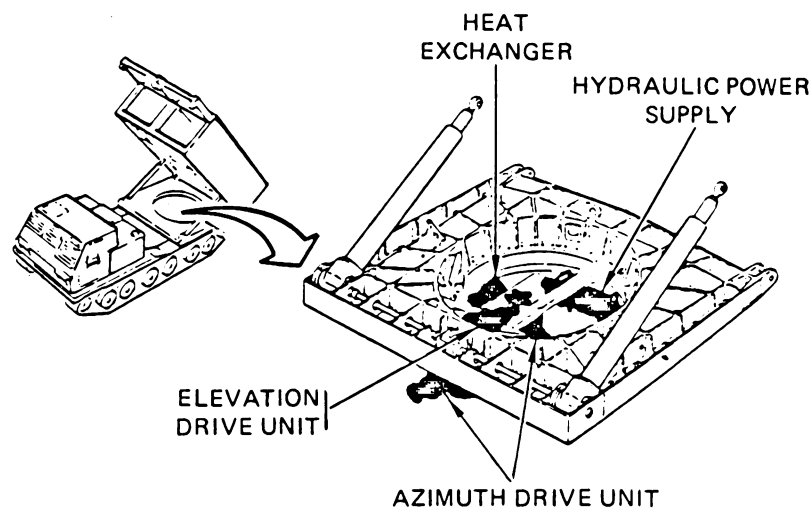
1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

(7) Comms Processor. The comms processor is an electronic unit that controls the flow of the digital coded, audiotone, radio messages sent and received by the SPLL. It is set up to automatically reject any messages not addressed to your SPLL, or that have weak or garbled signals. The unit is located inside the carrier cab.



b. Launcher Drive System.

The launcher drive system (LDS) is the hydraulic drive system that turns, raises, and lowers the LLM. The LDS is controlled electronically through the FCS. Major components of the LDS are a hydraulic power supply, a heat exchanger, and azimuth and elevation drive units. The LDS components are mounted inside the base and turret.



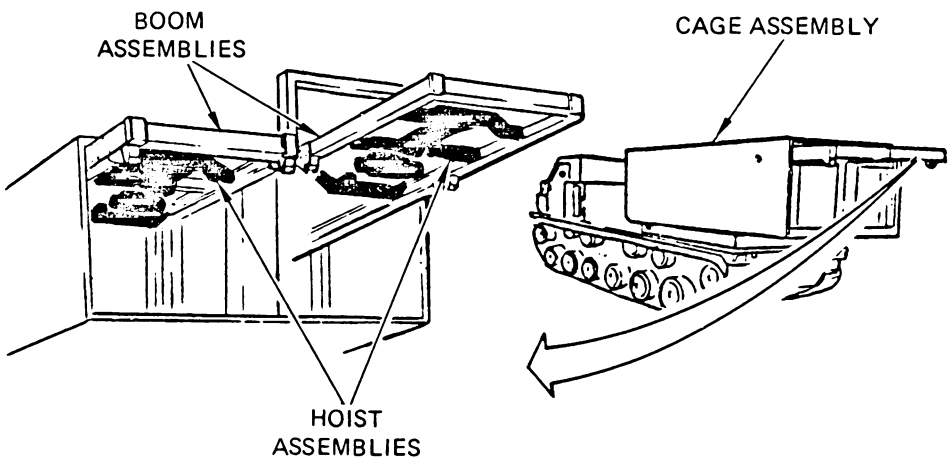
1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

c. Launcher Loader Module.

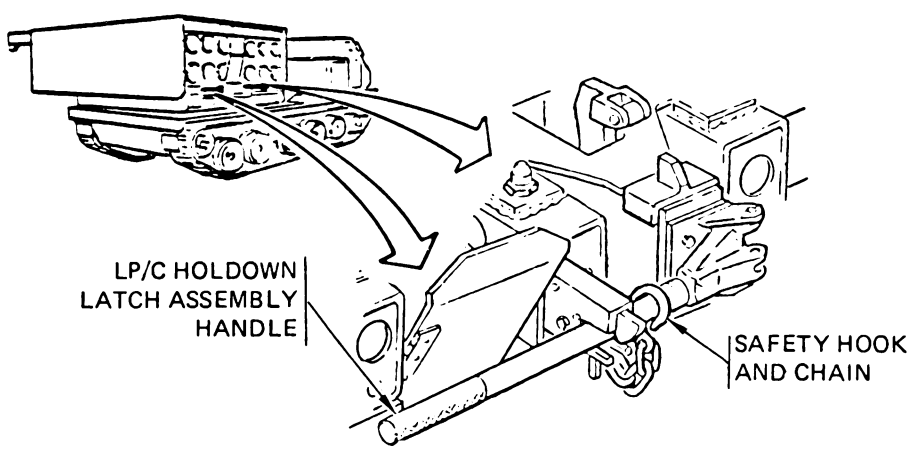
(1) Cage Assembly. The cage assembly is an armor plated unit. It consists of two bays that hold, align, and protect the LP/Cs. The cage assembly also has two built-in boom and hoist assemblies and two LP/C holddown devices. The cage assembly is mounted on the carrier bed.

(a) Hoist Assemblies. The hoist assemblies are electric motor-driven hook and cable assemblies that pick up and lower the LP/Cs during loading operations. Movement of the hoist hooks is controlled by the BC.

(b) Boom Assemblies. The boom assemblies are two sliding beam assemblies that hold the hoist assemblies. The booms move the hoist assemblies in and out of the cage. Movement of the booms is controlled by the BC.

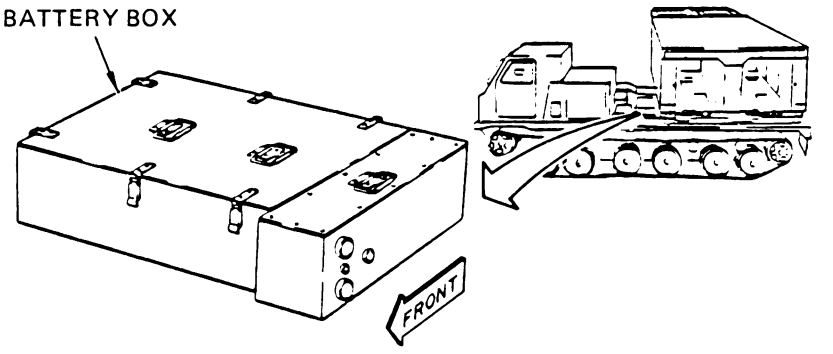


(c) LP/C Holddown Latch. The holddown devices are two hand-operated latching assemblies that hold the LP/Cs in place inside the LLM cage. The LP/C holddown latches are operated from the rear of the LLM by separate handles. Each handle is safety equipped with a hook and chain safety restraint. The safety hook fits over the latch handle and is chained to the LLM. Locking the LP/Cs in the LLM puts the latching assembly under pressure. The pressure causes the latch handle to swing open with force when unlatched. The hook, when placed over the handle, limits the handle movement, avoiding possible injury to the operator.



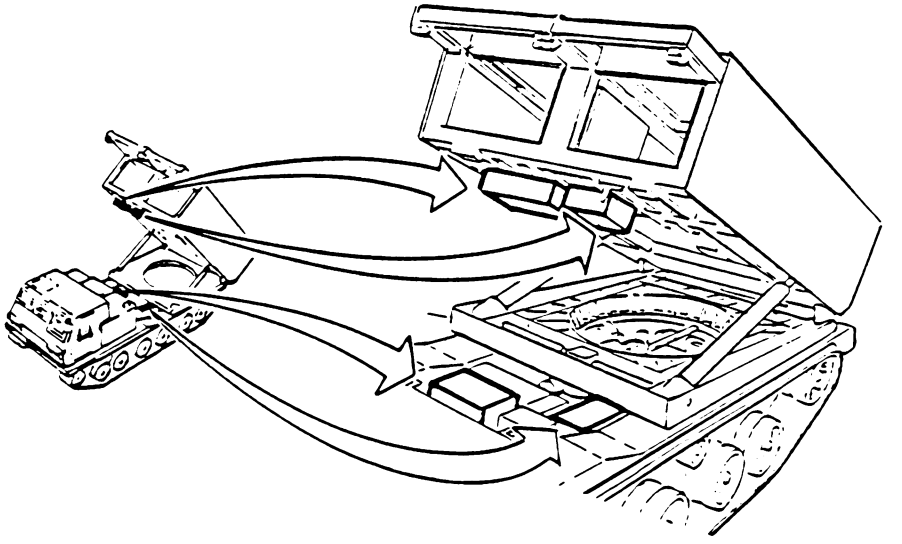
1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

(2) Battery Box. The battery box holds six 12-volt batteries that supply electrical power to the SPLL. The batteries can be connected to the carrier electrical system through a launcher interconnect switch in the carrier cab.



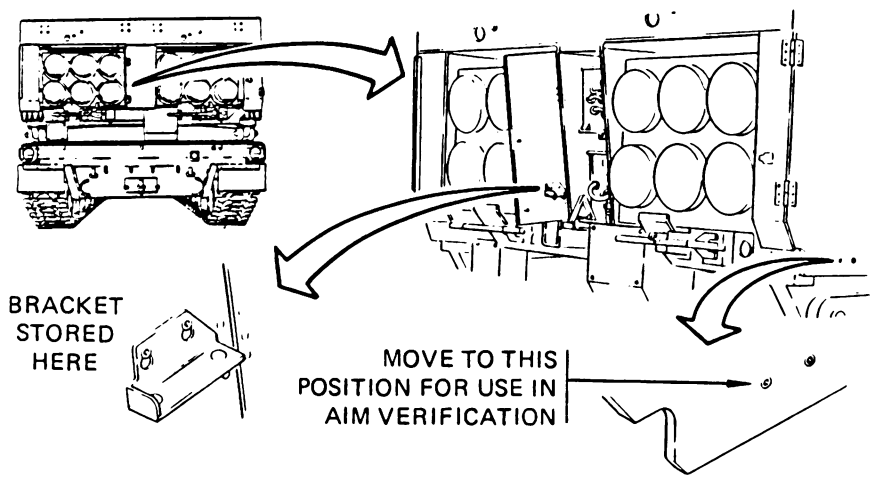
When the switch is on and the engine is running, the batteries can be charged from the carrier alternator. Four of the six batteries can be used to help start the vehicle engine if the carrier batteries have a low charge. The battery box is mounted on the carrier bed behind the engine compartment.

(3) Crew Equipment Storage Containers. Containers for storing the crew's personal equipment are located in the carrier bed and under the LLM cage. These containers are for storing such personal equipment as sleeping bags and duffel bags, or other equipment as directed by organizational operating procedures. The storage container doors are accessible with the LLM in any of the side or rear reloading positions.



1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

(4) Aim Verification Bracket. This bracket is not normally used by the operating crew. It is used by the Range Safety Officer to verify the LLMs aim position. It is also used by maintenance to align and adjust some of the systems operating limit switches. The bracket is stored on the FCU and SRP/PDS storage compartment door. When used, it is removed from the door and installed on mounting screws on the LLMs right rear side.



1-8. DIFFERENCES BETWEEN MODELS. There are no differences between SPLLs.

1-9. EQUIPMENT DATA. To fully understand the operation of the SPLL you must know its physical and performance limits.

a. Equipment Specifications.

Table 1-4 lists the SPLL general specifications. It contains information you will need for operation and maintenance of the SPLL and its major components. Performance data for the carrier vehicle is contained in TM 9-1450-646-10.

Table 1-4. Equipment Specifications

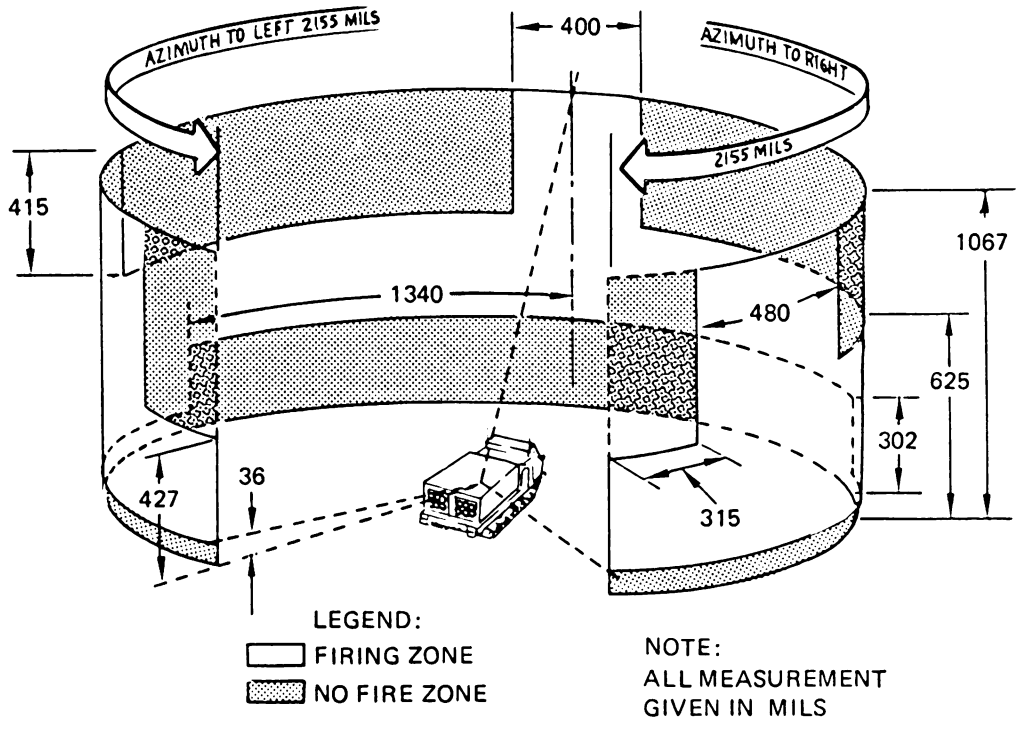
General	
Crew	Three members (driver, gunner, and section chief)
Firepower	12 rockets (6 in each LP/C)
SPLL Size	
Length:	
Overall	6832mm (22 ft 6 in.)
LLM	3963mm (13 ft)
Width:	
Overall	2972mm (9 ft 9 in.)
LLM	2616mm (8 ft 9 in.)
Height:	
Top of launcher (stowed)	2597mm (8 ft 6 in.)
Top of launcher (fully elevated)	5920mm (19 ft 4 in.)
Ground clearance LLM	1372mm (4 ft 6 in.)
Ground clearance booms	2591mm (8 ft 6 in.)
SPLL Weight	
SPLL empty (air transport)	19 573 kg (43,104 lb)
SPLL loaded (two LP/Cs)	24 756 kg (54,578 lb)
SPLL Performance	
Operation slope limits	0 to 89 mils slope (0 to 5 degrees)
Firing elevation limits	157.5 to 945 mils (9 to 54 degrees)
LLM Rotation:	
Rate	90 mils/sec (5 degrees/sec)
Limit (left or right from stowed position)	3450 mils (194 degrees)
LLM Elevation:	
Rate	15 mils/sec
Limit	1067 mils maximum
LLM Duty Cycles:	
Launcher drive system	210 sec on, 30 sec off
Travel lock	3 cycles on, 6 min off, 3 cycles on, at normal load
Operating temperature range	−32°C to +60°C (−25°F to +140°F)

Table 1-4. Equipment Specifications – Continued

Booms (2):	
Extend/retract rate	152 mm/sec (5.98 in./sec)
Extend/retract stroke	4662mm (15 ft 4 in.)
Duty cycle	30 sec on to extend, 120 sec off, 30 sec on to retract, 120 sec off; 12 cycles per hour
Hoists (2):	
Up/down rate	76 mm/sec (2.99 in./sec)
Up/down travel	2540mm (8 ft 4 in.)
Duty cycle	30 sec on to lower, 30 sec on to raise, 120 sec off; 18 cycles per hour
SPLL Electrical System	
SPLL (less carrier) batteries (6)	12-volt, 100 ampere-hour (connected series-parallel for 24-volt power supply)
SPLL Hydraulic System (LDS)	
Operating pressure	20 684 kPa (3000 psi)
Hydraulic fluid type	MIL-H-46170, Type 1

b. SPLL Firing Limits.

The carrier cab, engine housing, and rocket blast limit firing angles of the LLM. The FCS computes safe firing angles within these limits. Firing angles for the LLM make up a zone through which rockets can be safely fired. Fire and no fire zones for the LLM are as illustrated. Firing into a no fire zone is prevented by a safety feature in the FCS.

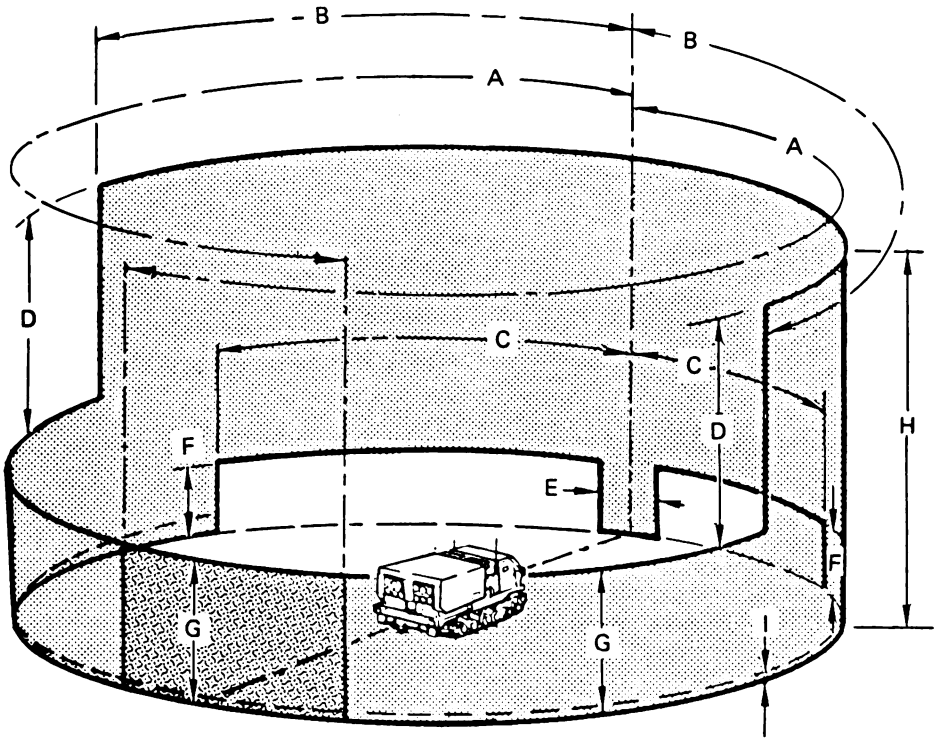


1-9. EQUIPMENT DATA (CONT)

c. LLM Travel Limits.

The carrier bed, engine housing, and interconnecting cables, limit safe LLM movement. The FCS has programmed limits to control the LLM movement. In addition, the system has mechanical limit switches to shutoff the LDS if the FCS limits fail.

The BC can be used to move the LLM within the FCS limits, except for area E. Within this area, the BC can elevate the LLM but cannot lower it below 302 mils. When using the BC, if an FCS limit is reached, reversing the control will move the LLM out of the limit. However, if a mechanical limit is reached, the LLM must be manually moved out of the limit.



TRAVEL LIMIT	MECHANICAL LIMIT	FCS LIMIT
A	3,484	3,450
B	1,891	1,860
C	1,304	1,340
D	622	623
E	20	10
F	268	302
G	480	444
H	1,102	1,067
I	NONE	36

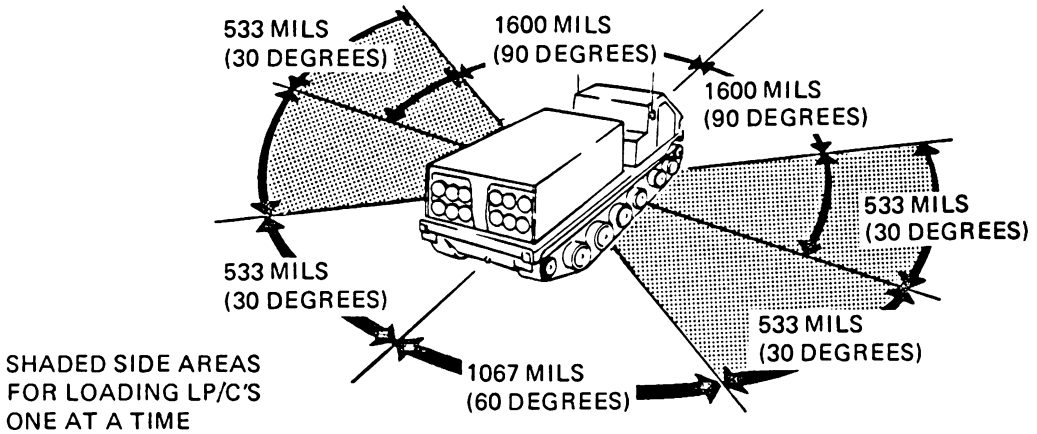
▨ INDICATES TRAVEL OVERLAP TIME

NOTE:
ALL MEASUREMENTS ARE IN MILS

1-9. EQUIPMENT DATA (CONT)

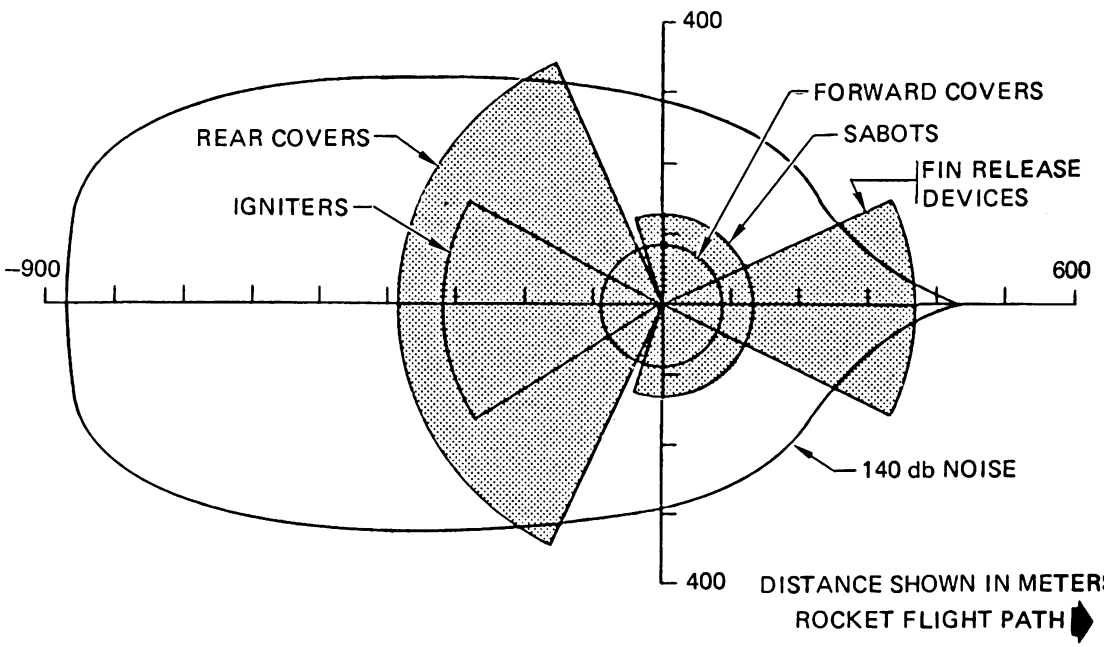
d. SPLL Reloading Danger Areas.

When loading or unloading full LP/Cs, SPLL balance is very important. There are some LLM positions where the full LP/Cs must be loaded or unloaded one at a time. The shaded areas illustrate these positions.



e. SPLL Firing Danger Areas.

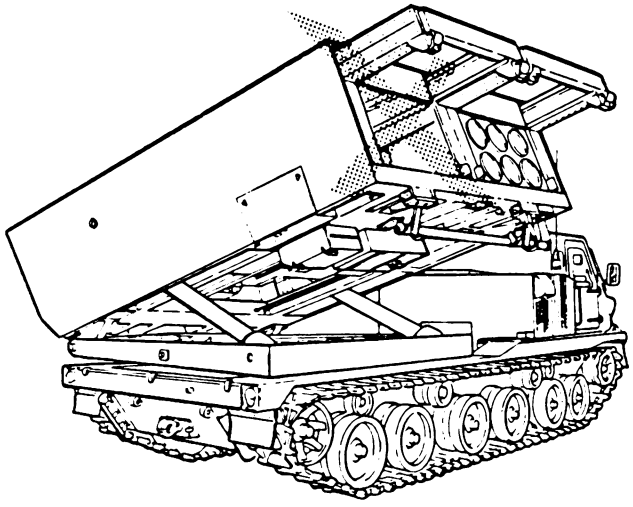
There are danger areas near the SPLL where the effects of rocket firing could cause injury to unprotected personnel. The dangerous effects of rocket firing are flying debris, noise, and toxic gases from rocket propellant. Personnel in these areas must be aware of the dangers. The location of toxic propellant gas is determined by conditions at the firing site. Generally, unprotected personnel should be upwind from the SPLL. If downwind, personnel must wear NBC masks for maximum protection from toxic gases.



1-9. EQUIPMENT DATA (CONT)

f. SPLL Firing Configuration.

The normal SPLL firing configuration is with two LP/Cs loaded in the LLM. The front of the LLM is designed so that the LP/C helps to keep rocket blast out of the LLM. Always fire rockets with two LP/Cs loaded into the LLM. If only one LP/C with live rounds is to be loaded and fired, a second empty LP/C must be loaded in the opposite bay.



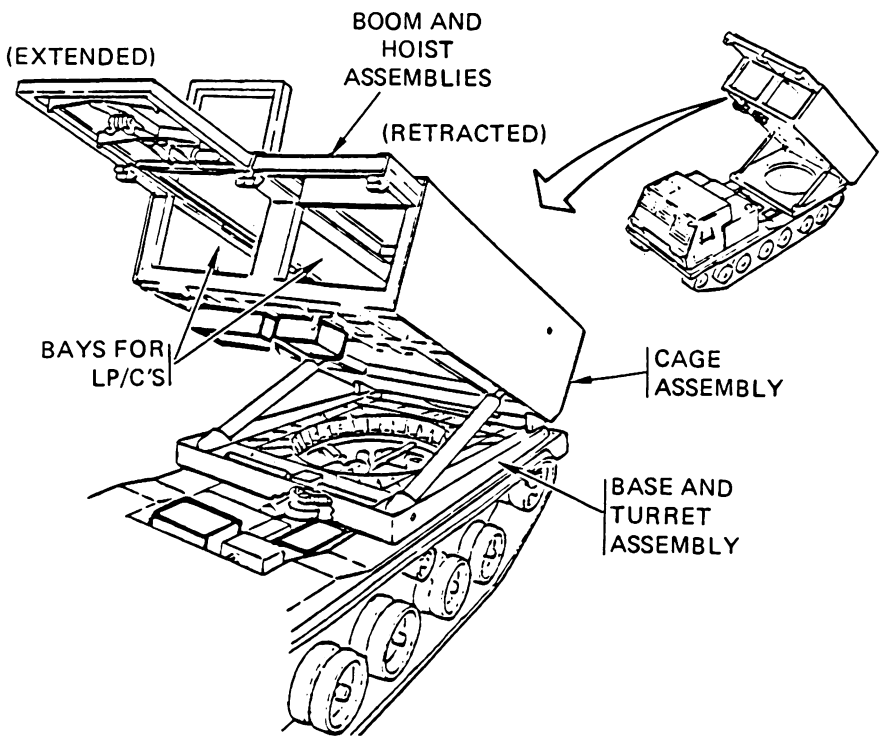
Section III. TECHNICAL PRINCIPLES OF OPERATION

1-10. GENERAL. The SPLL is the mobile rocket firing platform for the firing unit. The SPLL is made up of two major units and a fire control system (FCS). The two major units are the carrier and the LLM. The carrier gives the SPLL mobility. The LLM is the actual firing platform. To help understand how the SPLL operates, explanations of the equipment are divided into functions. The explanations will not include the carrier. Technical principles of operation for the carrier are in TM 9-1450-646-10.

1-11. PRINCIPLES OF OPERATION.

a. Launcher Loader Module.

The LLM is a box-like structure mounted on the carrier bed. It holds the LP/Cs loaded with rockets. The LLM is made up of two major subassemblies, the cage assembly, and the base and turret assembly. The base is mounted directly on the carrier bed. The turret is attached to the top of the base, and can be turned in either direction. The cage assembly is mounted on top of the turret. When the turret is turned the cage turns with it. Movement of the LLM is controlled by the LDS, which in turn, is controlled by the FCS.



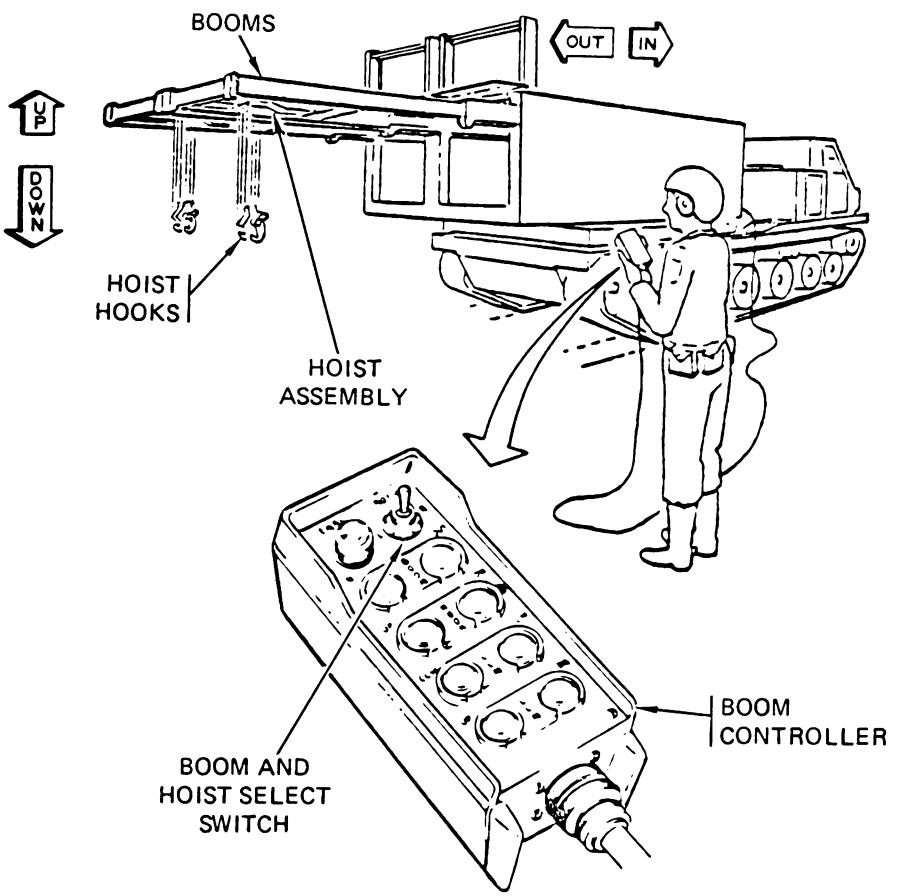
(1) Cage Assembly. The cage assembly is the box-like structure that holds the LP/Cs. The LP/Cs fit into two bays inside the cage assembly. Each bay has a built-in boom and hoist system. It is used to load and unload LP/Cs. The boom and hoist system is electric powered. The booms and hoists are controlled through the FCS by a hand-held switch unit called a BC. Pressing and holding switches on the BC sends electric signals to the FCS. The FCS, then, electronically controls the power to the booms and hoists.

1-11. PRINCIPLES OF OPERATION (CONT)

WARNING

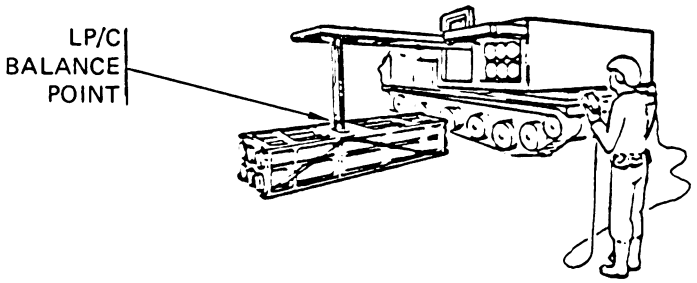
Do not unload or load two loaded LP/Cs at the same time from the side loading positions (paragraph 1-9, d). This may unbalance the SPLL. The SPLL may turn over and injure someone or damage equipment.

A select switch on the BC lets you control each boom and hoist separately, or both booms and hoists together.

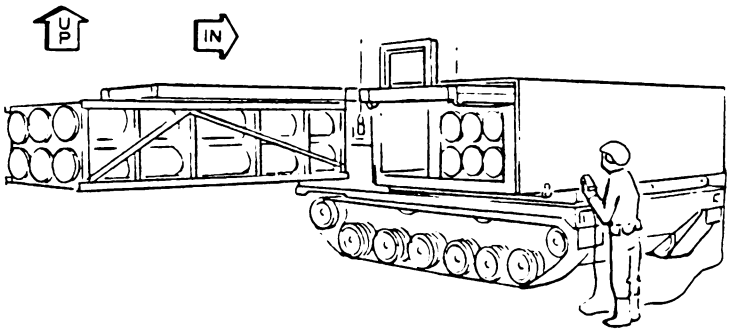


1-11. PRINCIPLES OF OPERATION (CONT)

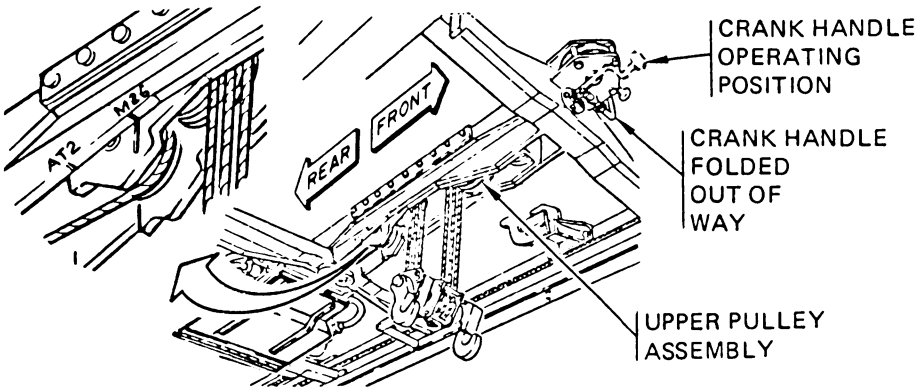
The LP/Cs are loaded by attaching the hoist hooks to the LP/C hoisting rod which is located at the LP/C balance point (center of gravity).



The LP/C is then lifted up into a fixed position flat against the boom. The boom and the LP/C are both retracted into the LLM cage. The LP/C is then lowered 25 to 50 millimeters onto positioning pins.



Rockets with different types of warheads will cause the LP/Cs to have different balance points. This means the lifting point on the LP/C will change. The LP/C must still be lifted into the same position, flat against the boom. The hoist's upper pulley assembly must be moved to allow for the lifting point change. To move the upper pulley assembly, a hand-operated screw and crank mechanism is provided. The crank can be folded back out of the way when it is not in use.

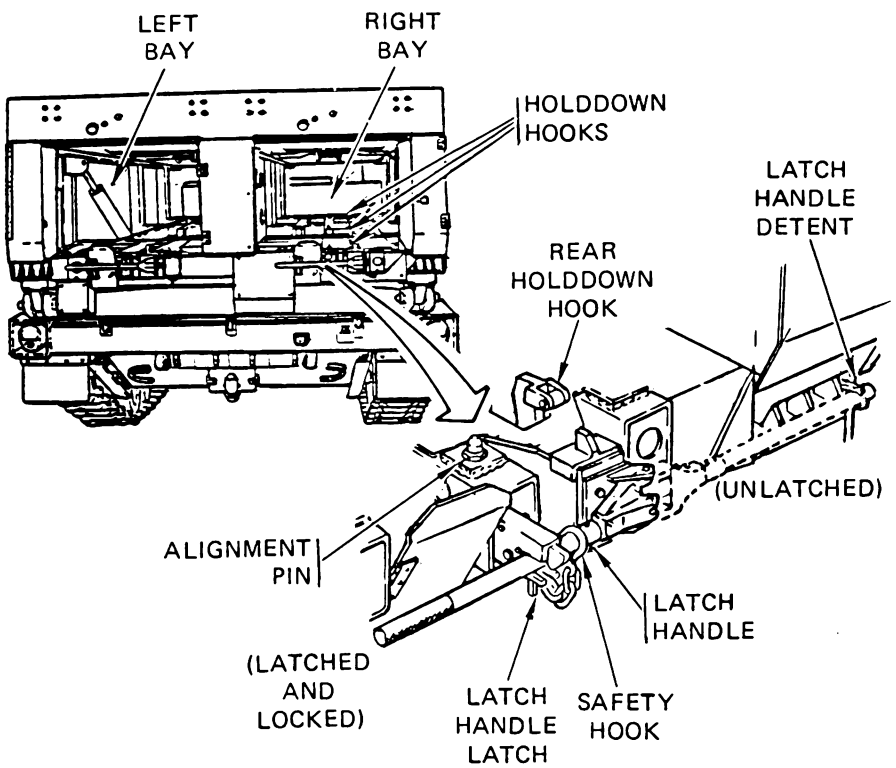


1-11. PRINCIPLES OF OPERATION (CONT)

Each bay has a mechanical latching assembly to hold the LP/Cs in position. The latch assembly is hand-operated. Handles for the latch assembly are located at the rear of the LLM below each bay. When the handle is in the latched position, three hooks raise up and hook on to the bottom of the LP/C. The hooks pull the LP/C down against the cage frame, holding the LP/C firmly in position. Releasing the latch lowers the hooks into the cage structure and frees the LP/C.

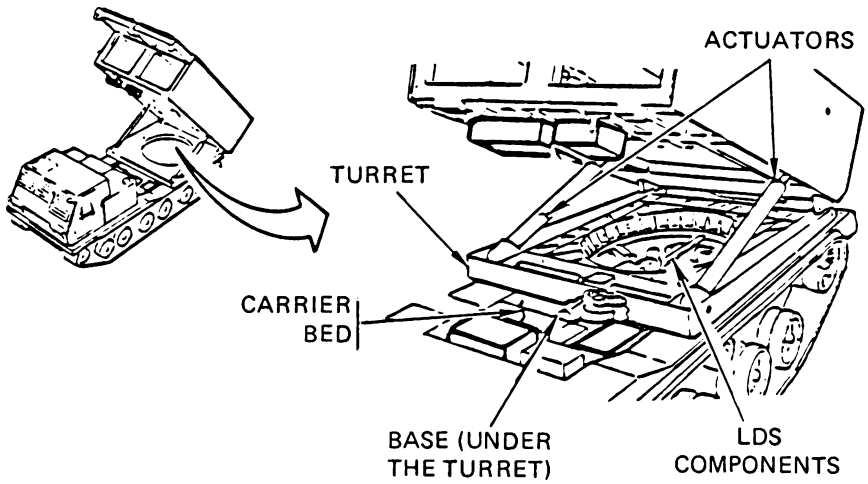
Each latch handle is equipped with a hook and chain safety restraint. The safety hook fits over the handle in the latched position. Locking the LP/Cs in the LLM cage puts the latching assembly under pressure. The pressure causes the latch handle to swing with force when it is unlatched. The hook, when placed over the latch handle, limits the handle movement when it is unlatched, avoiding possible injury to the operator.

When a loaded LP/C is latched and the umbilical cable is connected, the hoist up control is disabled. The LP/C cannot be lifted. However, if the umbilical cable is not connected to the LP/C, the hoist up control will operate. Always check that the LP/C is unlatched before trying to lift it. Lifting a latched LP/C can damage the bottom of the LP/C and/or the latching mechanism.



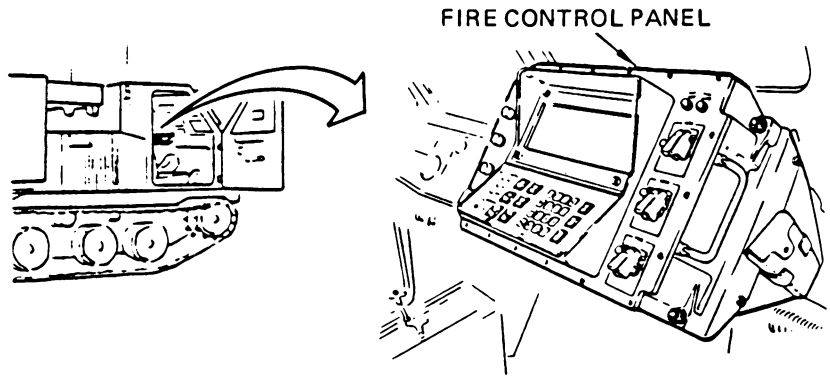
1-11. PRINCIPLES OF OPERATION (CONT)

(2) Base and Turret Assembly and LDS. The cage assembly mounts on the base and turret assembly. The base is the stationary part of the assembly and is fastened directly to the bed of the carrier. The turret is attached to the base and is the moving part of the assembly. The cage assembly is attached to the turret. The LDS hydraulic components are mounted inside the base and turret. The LDS has two hydraulic motors. One that turns the turret on the base, to turn the LLM. The second motor drives two actuators that raise and lower the front of the cage assembly. The LDS is controlled electronically through the FCS. It is controlled automatically during a firing mission, and by pushbutton switches on the BC when loading or unloading LP/Cs.



b. Fire Control System.

The FCS controls the LLM. The FCS is operated using switches, a keyboard, and a display panel on the fire control panel (FCP). The FCP is located in the carrier crew cab.



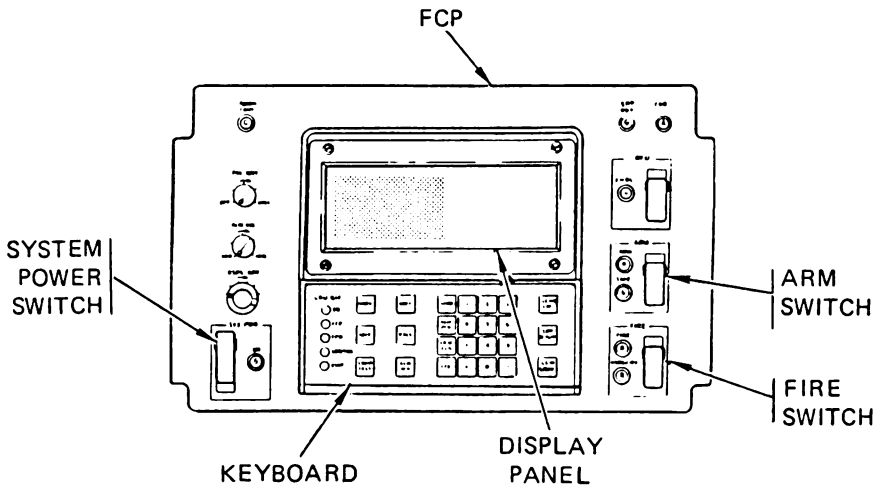
1-11. PRINCIPLES OF OPERATION (CONT)

All system power is controlled by a system power switch on the front of the FCP. There are no power switches for any other unit. Power is applied to the other units when the system power is turned on, or automatically turned on when an operating procedure, using the unit, is selected for use. Indicator lights on the FCP come on when system power is turned on or when power is applied to the other units, such as the BC.

Rocket firing is controlled by ARM and FIRE switches on the FCP.

The FCP display panel is where instructions and information is electronically written to help guide you through an operation. The keyboard is used to manually enter information (data) into the FCS.

The FCS (figure 1-2) operates from either manual input or digital input data. Using digital input data is the preferred method. The digital data is automatically received in a radio message and entered into the FCS.



Communications between the SPLL and the controlling battery (BTRY), fire direction center (FDC), and/or platoon leader (PLT/TP), using digital coded messages, is almost all automatic. Messages are made up by entering data into fixed message formats. (Very much like filling in the blanks.) After you make up the message, pushing a key on the FCP keyboard will send the message. Incoming messages are received automatically and stored in the FCS, or displayed on the FCP for you to see. All message traffic is electronically controlled by a comms processor unit.

Data entered into the FCS is stored in a built-in computer that is part of the FCS. The stored data is used to provide all the operating instructions necessary to successfully complete operating assignments. Such operations include tactical fire missions, resupply, and movement instructions.

c. Startup.

When first turned on, the FCS needs to be given location data and the correct time. The SRP/PDS must be turned on, given time to align, and the correct time entered. If the SPLL is to use digital data radio message inputs, identification codes must be entered. These codes must tell the FCS the identifying numbers assigned to the controlling BTRY and the PLT/TP. Message identification serial numbers are also needed. Proper operation of the SRP part of the SRP/PDS, requires the SRP be given time to align. The SRP must also be realigned at intervals during operation, depending on how much the SPLL and/or the LLM moves. The FCS has internal clocks that keep track of the SRP movement during operation. When realignment is necessary, a warning is given to the operator. The system automatically indicates the minimum time necessary for an alignment or realignment. However, if allowed to stabilize for 3 to 4 minutes longer, the time required between realignments will be extended three to four times as long. Operation of the PDS part of the SRP/PDS, requires the SPLL be driven to accurately surveyed locations called survey control points (SCPs). The SCP location must be entered into the FCS while the SPLL is at the SCP. A position update is required at various times while the SPLL is in operation, depending on how often the SPLL moves and local operating conditions.

The FCS is equipped with a data memory system called a nonvolatile (NV) memory. The NV memory keeps certain types of input operating data, in the FCS, from erasing when the FCS is turned off for short periods of time. The maximum length of time is about 10 hours. The exact time will vary slightly with operating conditions. The FCS will display a warning when it is turned on, if the NV memory is not usable. When the NV memory is usable, the system startup procedures can be shortened. Most of the required information will have been retained and does not have to be entered again. Although, you may want to edit the data for possible updating.

1-11. PRINCIPLES OF OPERATION (CONT)

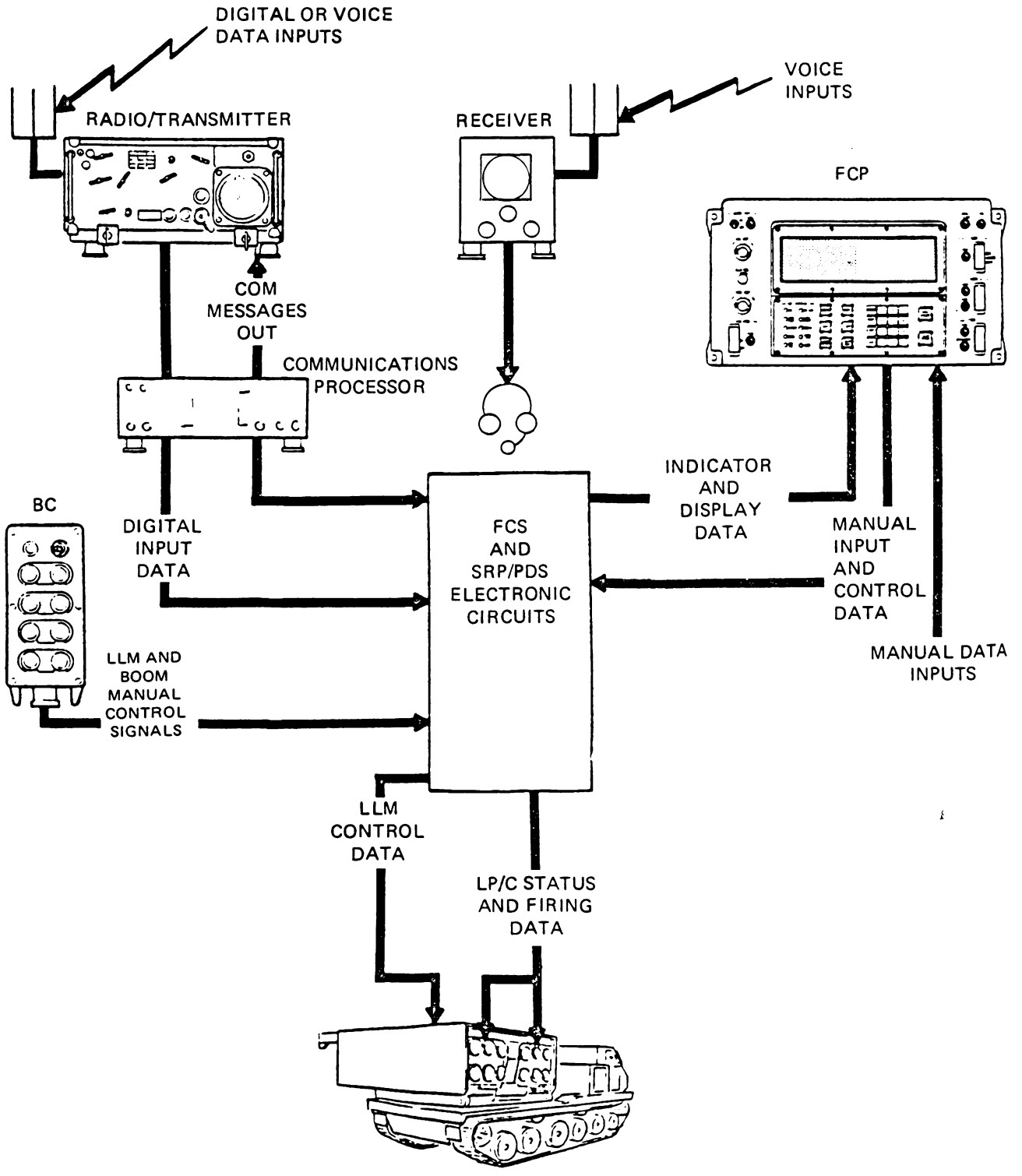


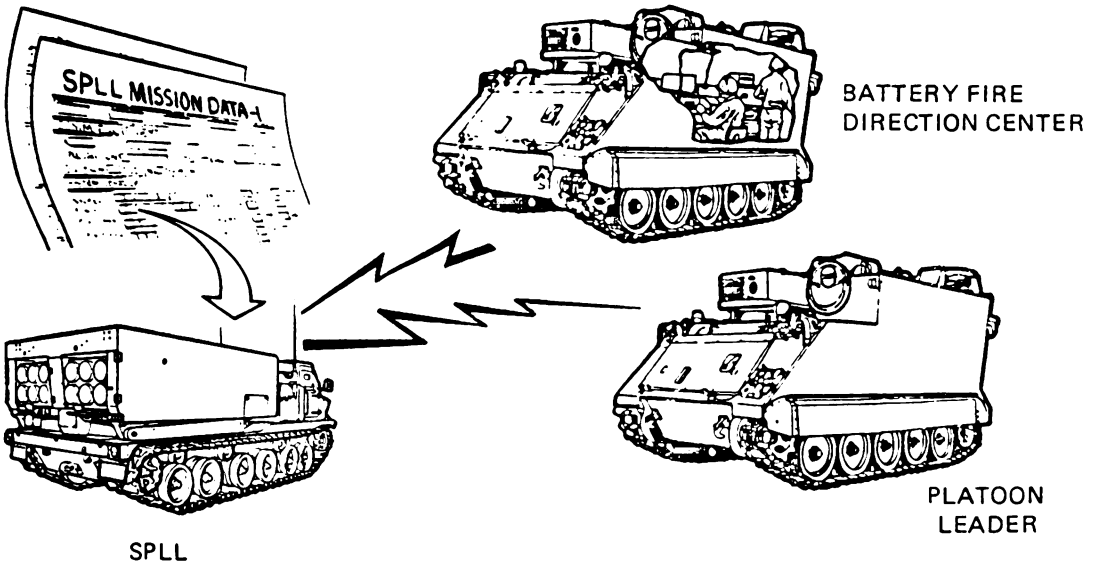
Figure 1-2. Fire Control System

1-11. PRINCIPLES OF OPERATION (CONT)

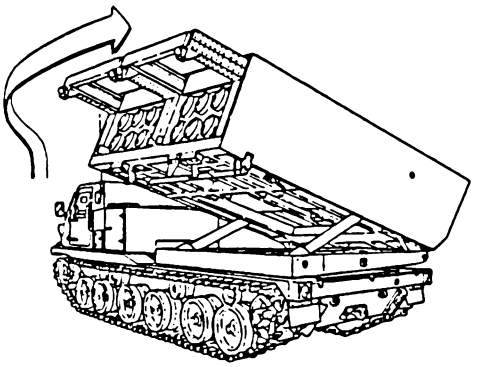
d. Fire Mission.

On a typical fire mission, after startup, fire position, target data, meteorological data, and movement information is entered into the FCS, either manually or automatically.

Target and SPLL firing position is usually received in a call for fire (CFF) message. When the message is received or the data manually entered, the FCS will display instructions on the FCP.



The FCS displays firing position location coordinates. Prompts instruct the driver to park the SPLL in a direction (heading) that will allow the LLM to aim at all assigned aimpoints for the target. When properly parked in the firing position, press keys on the FCP and the FCS automatically aims the LLM at the first aimpoint for the target assigned.



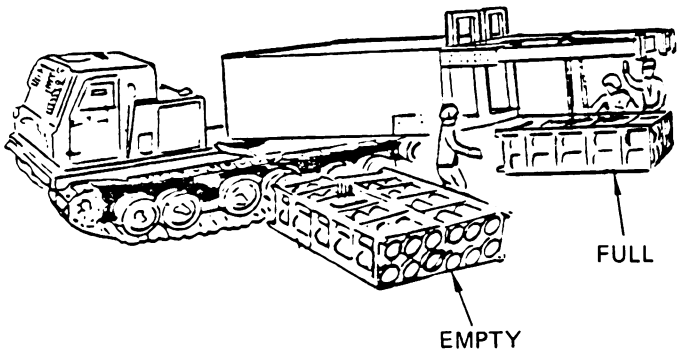
When the LLM is aimed, the FCS prompts you to arm the rockets using the ARM switch on the FCP. The FCS sets the fuze times and checks firing circuits. On command, using the FIRE switch on the FCP, fire the rockets. The FIRE switch has to be pressed only once. All rockets assigned to the mission will be fired. If more than one aimpoint is assigned to a target, the FCS will aim the LLM at each aimpoint in turn, and automatically fire the rockets assigned to each aimpoint. A checkfire can be entered automatically over the radio or manually. At a checkfire command, set the arm switch to safe. To resume firing after the rockets are safed, the ARM and FIRE switches must be pressed again.

When firing is completed, press the LLM STOW key, and the LLM is quickly stowed. The SPLL can then leave the firing position. If you are operating with BTRY, pressing the transmit (XMIT) key will automatically send a message, telling BTRY the mission is completed. The message also contains the SPLL status, such as how many rockets were fired, at what target, and how many rockets are remaining.

1-11. PRINCIPLES OF OPERATION (CONT)

e. Reloading.

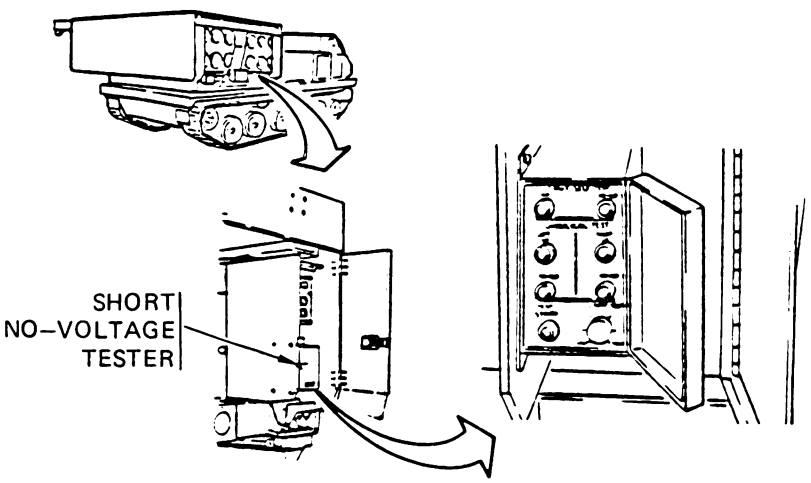
Reloading LP/Cs is a task usually using all crewmembers. The BC is used to turn and elevate the LLM, move the booms in and out, and lift and lower the LP/Cs. During a reload mission, the SPLL is parked near LP/Cs that have been delivered to a reload area. The SPLL parks close enough to the LP/Cs to be able to reach them with the LLM booms extended, usually to one side of the SPLL. The LLM is turned to the opposite side or rear, and using the BC to control the LLM position, the empty LP/Cs are unloaded.



Using the BC again, the LLM cage is turned to the loaded LP/Cs. The LP/Cs are picked up, one or two at a time, and loaded into the LLM cage assembly. The SPLL is ready again for a fire mission.

f. Short/No-Voltage Tester.

A SNVT is mounted in a storage compartment at the rear of the LLM. When loading, the umbilical cables that connect the FCS to the LP/Cs are tested to make sure they are safe to connect to the LP/Cs.

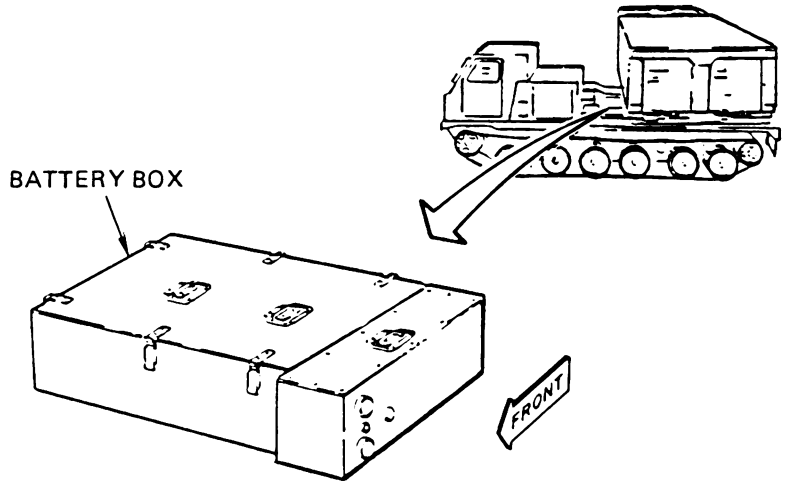


To use the SNVT, connect the umbilical cables and press the TEST START switch. The testing is automatic. Green GO lights come on when testing is completed and the cables are safe. Red NO-GO lights come on when the cables are unsafe. A red SNVT SELF TEST NO-GO light comes on when the SNVT has a malfunction. The front of the SNVT is protected by a cover when it is not in use.

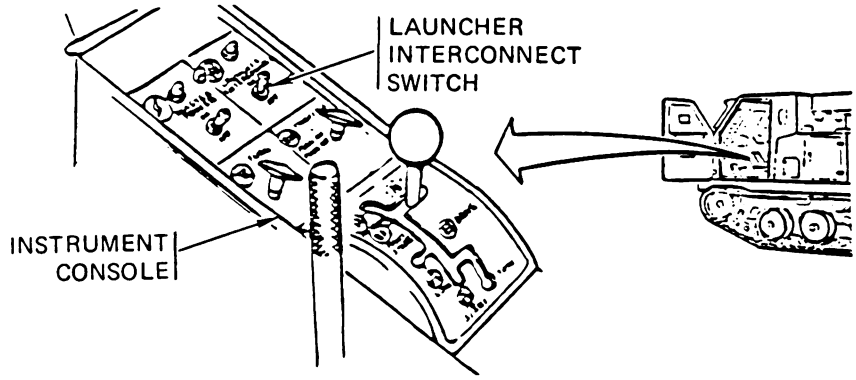
1-11. PRINCIPLES OF OPERATION (CONT)

g. Primary Power.

The LLM and the FCS operate using 24 V dc electrical power. The power is supplied by six batteries in a battery box. The box is mounted on the carrier bed behind the engine compartment.



The system is connected to the carrier battery supply and generator through a launcher interconnect switch on the carrier instrument console. When this switch is on and the carrier engine is running, the batteries are charged from the carrier generator.



CHAPTER 2
OPERATING INSTRUCTIONS

CHAPTER CONTENTS

CHAPTER CONTENTS – Continued

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. GENERAL. Information in this section describes the controls and indicators used to operate the self-propelled launcher loader's (SPLLs), fire control system (FCS), and the launcher loader module (LLM). The descriptions do not include controls and indicators for the carrier vehicle, or the communications and intercom equipment. Carrier vehicle controls and indicators are in TM 9-1450-646-10. Basic radio and intercom controls and indicators are in TM 11-5820-401-12 and TM 11-5830-340-12.

Figure 2-1 shows the general location of most of the controls and indicators on the SPLL. Each control and indicator is also illustrated separately, with the description of each control or indicator linked to the illustration by an index number.

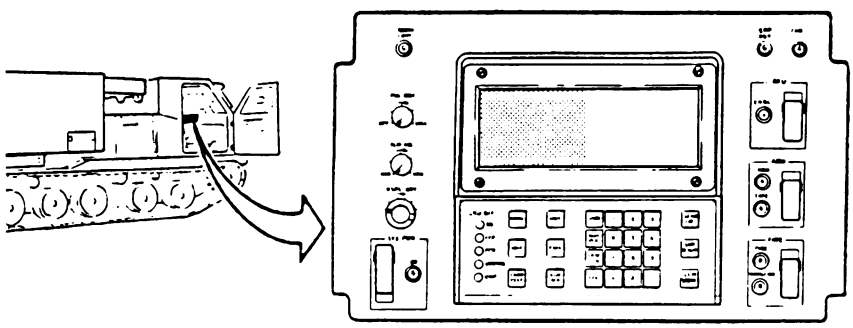


Figure 2-1. SPLL Controls and Indicators General Locations (Sheet 1 of 2)

2-1. GENERAL (CONT)

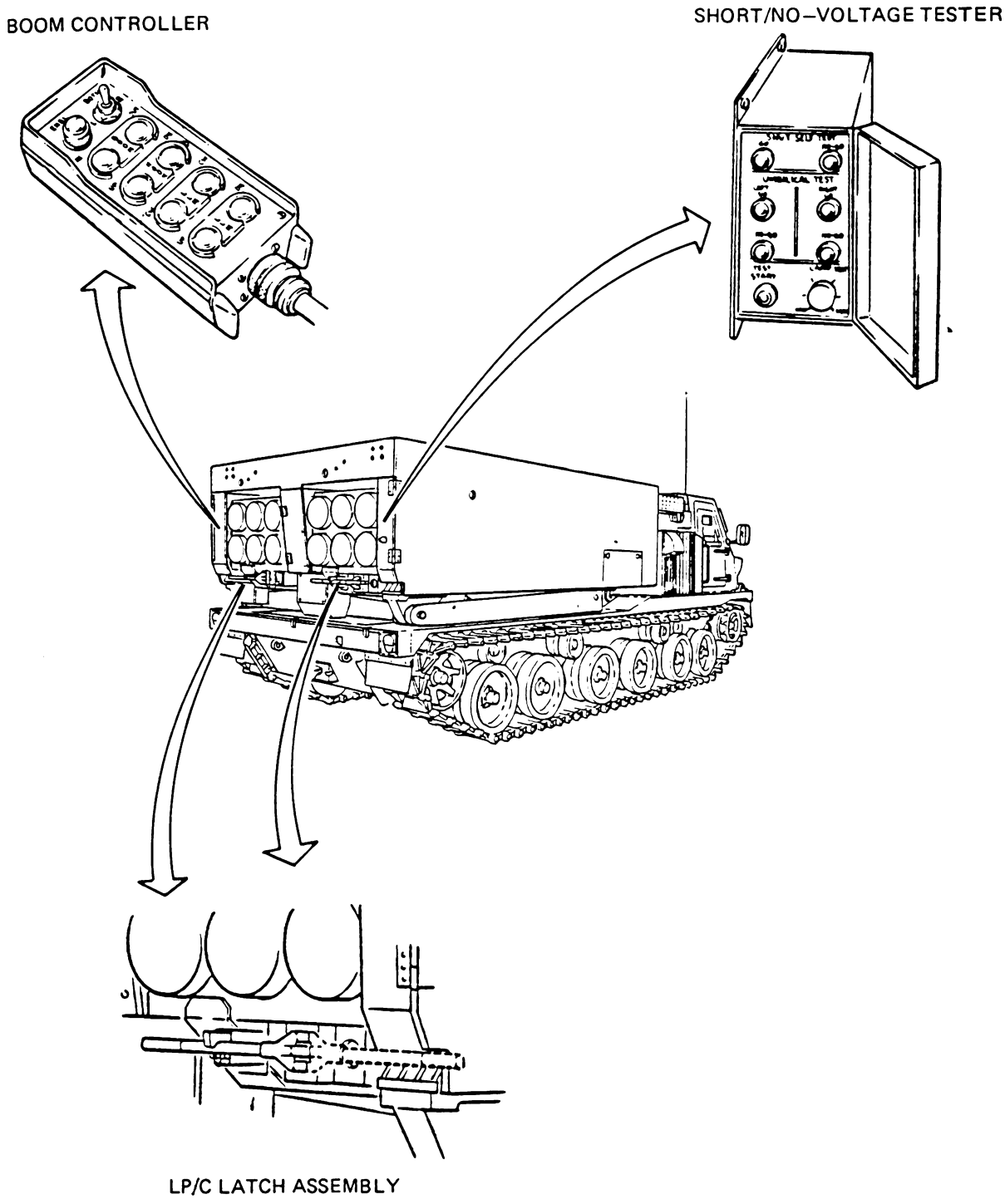
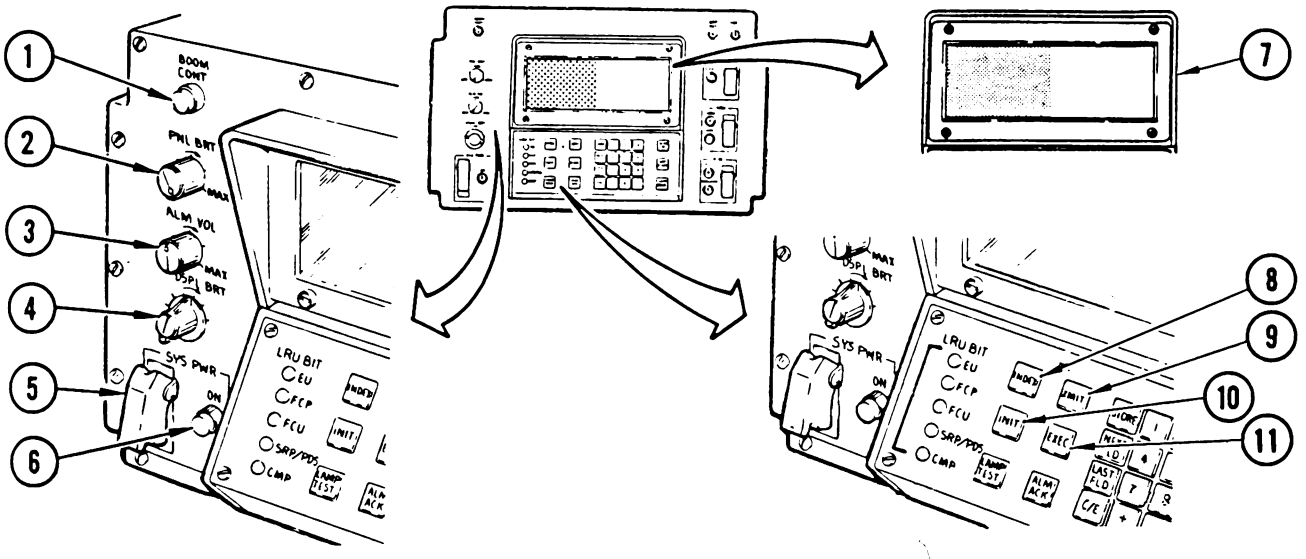


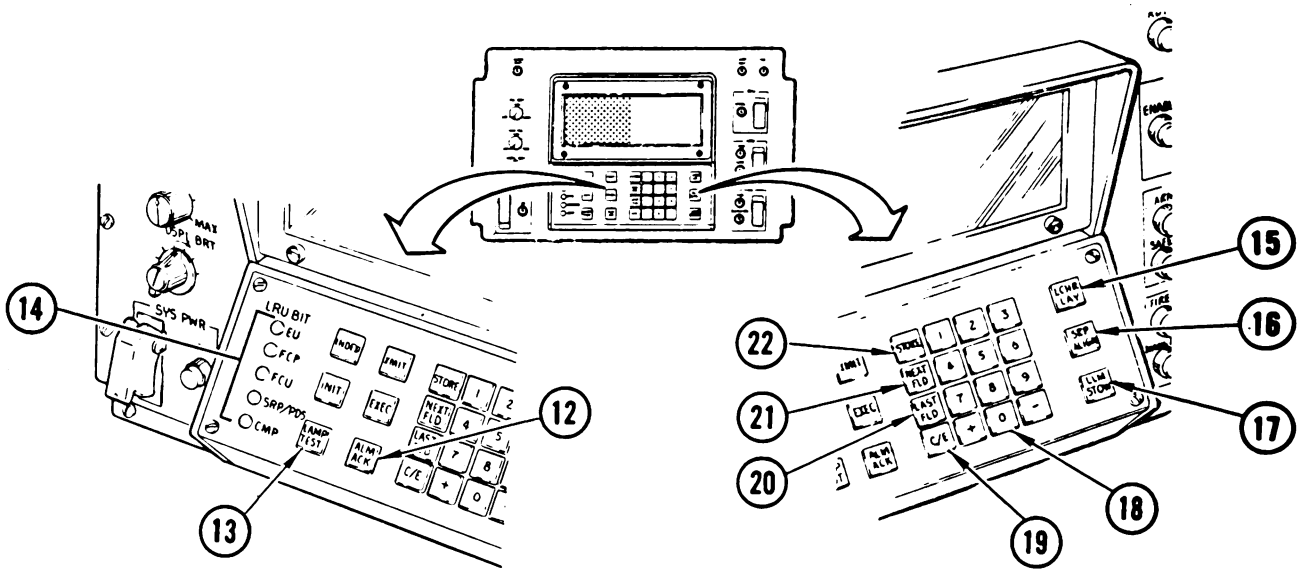
Figure 2-1. SPLL Controls and Indicators General Locations (Sheet 2 of 2)

2-2. FIRE CONTROL PANEL (FCP) CONTROLS AND INDICATORS.



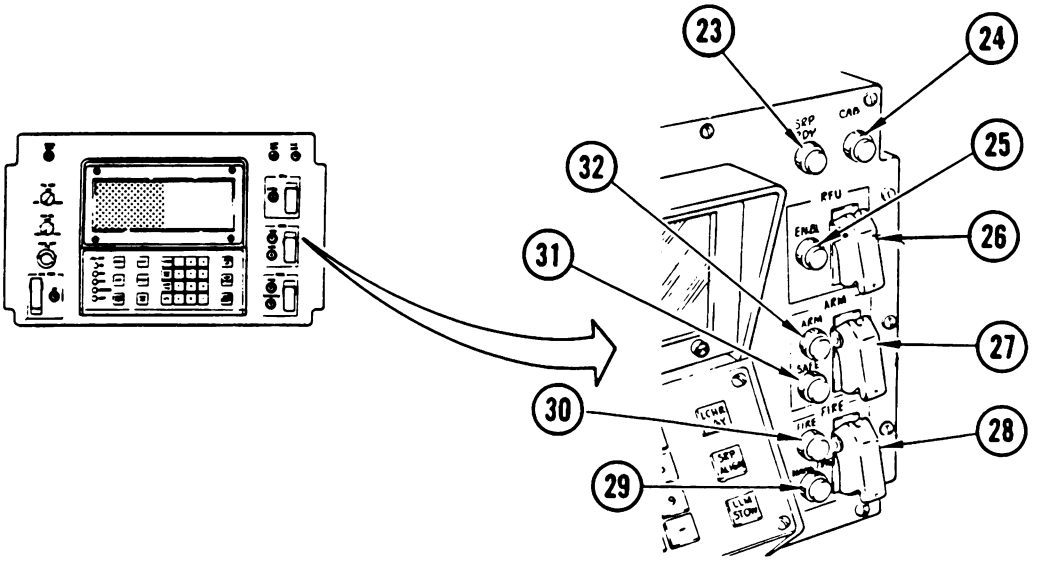
INDEX	CONTROL OR INDICATOR	FUNCTION
1	BOOM CONT indicator light	A green light that comes on after boom controller (BC) operation is selected and BC is ready for use.
2	PNL BRT knob	Controls the brightness of all the indicator lights on the FCP.
3	ALM VOL knob	Controls the volume of incoming message and cab alarm signal.
4	DSPL BRT switch	Controls brightness of the lighted message on the FCP display and the LRU BIT indicator lights.
5	SYS PWR switch	Applies electrical power to the FCS and other LLM units.
6	SYS PWR indicator light	A green light that comes on when electrical power is applied to the FCS. This light will not come on if the input voltage is too low or too high.
7	FCP display	A screen that the FCS data and prompts appear on. (Shaded area indicates the part of the screen where data and prompts will appear.)
8	INDEX key	Causes a list (menu) of operating routines to appear on the FCP display.
9	XMIT key	Causes a radio message to be transmitted to the battery and/or the platoon leader.
10	INIT key	Causes launcher lay instructions to appear on the FCP display, and enables the LCHR LAY key.
11	EXEC key	Causes the FCS to start using the data or command input by the operator.

2-2. FIRE CONTROL PANEL (FCP) CONTROLS AND INDICATORS (CONT)



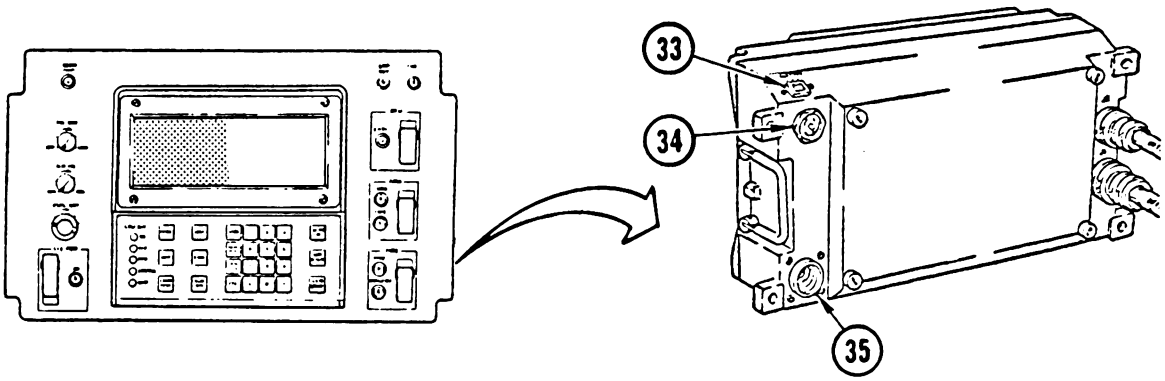
INDEX	CONTROL OR INDICATOR	FUNCTION
12	ALM ACK key	Turns off the audible alarm and causes the FCS to process the incoming message.
13	LAMP TEST key	Turns on all FCP indicator lights and the audible alarm for 5 seconds, as a test.
14	LRU BIT indicator lights	Red lights that come on to indicate a fault in a major unit of the FCS. If one of these indicator lights come on, refer to fault prompt and symptom index tables in Chapter 3, Section II.
15	LCHR LAY key	Starts the automatic fire control mission operation. Key is activated by INIT key.
16	SRP ALIGN key	Causes the SRP to go through a realign sequence.
17	LLM STOW key	Starts the LLM stow operation.
18	Numeric keyboard	A series of 12 keys, labeled 0 through 9, +, and − which are used to enter information into the FCS.
19	C/E key	Removes (erases) operator entries from the FCP display that have not been stored. It also erases FCS fault prompts.
20	LAST FLD key	Backs up the field on the FCP display to the field just before the one on the display.
21	NEXT FLD key	Advances the field on the FCP display to the next field.
22	STORE key	Stores data displayed on the FCP display in the FCS.

2-2. FIRE CONTROL PANEL (FCP) CONTROLS AND INDICATORS (CONT)



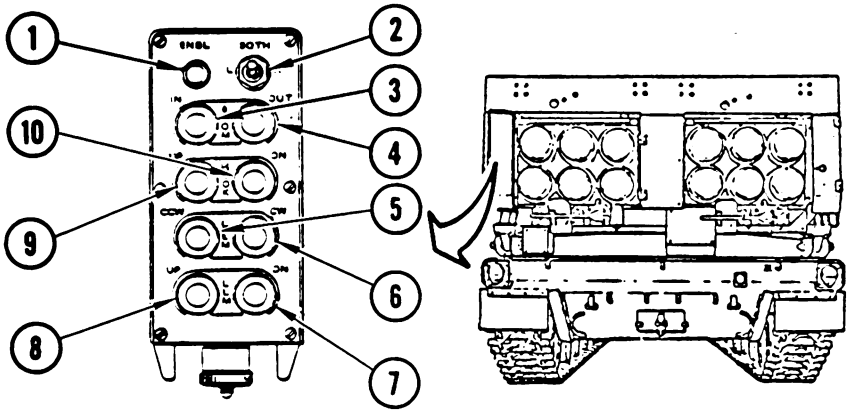
INDEX	CONTROL OR INDICATOR	FUNCTION
23	SRP RDY indicator light	A green light, when on, indicates the SRP is aligned and ready.
24	CAB indicator light	An amber light indicates that a door, or hatch is not closed or the ventilation system is not properly set during a fire mission. The audible alarm will sound when this light comes on.
25	RFU ENBL indicator light	Not used
26	RFU switch	Not used
27	ARM switch	Up applies electrical power that causes arming of rockets selected for firing. Down safes the system.
28	FIRE switch	Up (momentary) causes the FCS to start firing the rockets that were selected and armed. Firing will continue automatically after switch is released.
29	HANGFIRE indicator light	A flashing red light indicating that power has been applied to the rocket igniter squib, but firing did not occur.
30	FIRE indicator light	A red light that, when on, indicates the firing sequence has begun. It remains on until the firing sequence is completed.
31	SAFE indicator light	A green light that, when on, indicates the system is safed (not armed).
32	ARM indicator light	A red light that comes on when the system is armed.

2-2. FIRE CONTROL PANEL (FCP) CONTROLS AND INDICATORS (CONT)



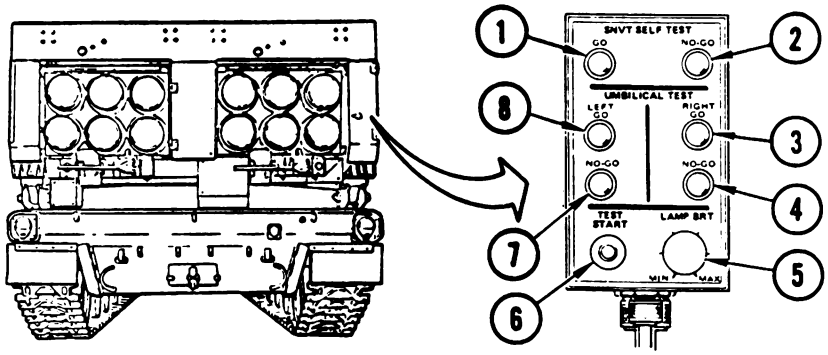
INDEX	CONTROL OR INDICATOR	FUNCTION
33	FCS elapsed time meter	Indicates the total FCS operating time. (Meter is on when FCP SYS PWR switch is set to ON.)
34	Pressure relief valve	Automatically equalizes air pressure inside FCP with outside air pressure.
35	Audible alarm	Alerts crew that a message from the battery or platoon leader has been received. It makes the FCP keyboard beep when a key is pressed. During a fire mission, it is used to warn the crew that a door, hatch, or the ventilation system is not properly closed.

2-3. BC CONTROLS AND INDICATORS.



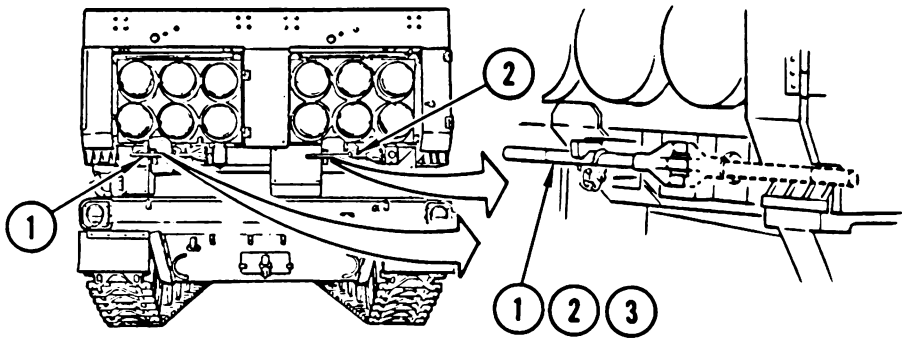
INDEX	CONTROL OR INDICATOR	FUNCTION
1	ENBL indicator light	A green light that comes on when the BC is turned on, and the LLM has moved to the unloading position selected.
2	L BOTH R switch	When in L (left) or R (right) position, the one boom or hoist selected is controlled by the boom controller. When the switch is in BOTH position, the two booms or hoists are controlled at the same time.
3	BOOM IN switch	When pressed and held, causes the selected boom(s) to retract into the LLM cage.
4	BOOM OUT switch	When pressed and held, causes the selected boom(s) to extend out of the LLM cage.
5	LLM CCW switch	When pressed and held, causes the front of the LLM to turn to the left (a counterclockwise direction).
6	LLM CW switch	When pressed and held, causes the front of the LLM to turn to the right (a clockwise direction).
7	LLM DN switch	When pressed and held, causes the front of the LLM to lower.
8	LLM UP switch	When pressed and held, causes the front of the LLM to elevate.
9	HOOK UP switch	When pressed and held, causes the selected boom hook(s) to raise.
10	HOOK DN switch	When pressed and held, causes the selected boom hook(s) to lower.

2-4. SHORT/NO-VOLTAGE TESTER (SNVT) CONTROLS AND INDICATORS.



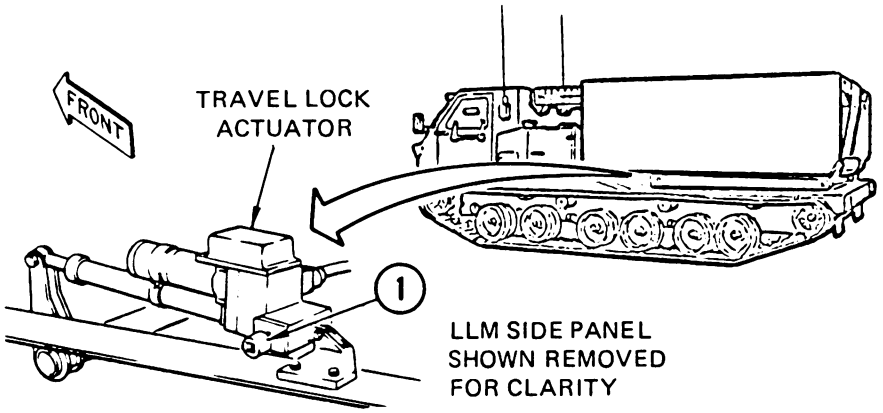
INDEX	CONTROL OR INDICATOR	FUNCTION
1	SELF TEST - GO indicator light	A green light that comes on when SNVT passes a self-test. The test is performed each time the TEST START switch is pressed, before the umbilical cable tests are performed. Indicates SNVT is working properly.
2	SELF TEST - NO GO indicator light	A red light that comes on when SNVT fails to pass self-test. Indicates SNVT has a fault and umbilical cable test cannot be performed.
3	UMBILICAL TEST - RIGHT GO indicator light	A green light that comes on when the umbilical cable, to a launcher pod/container (LP/C), in the LLM right bay passes the cable test. Passing the test means that it is safe to connect the cable to an LP/C.
4	UMBILICAL TEST - RIGHT NO-GO indicator light	A red light that comes on when the umbilical cable, to an LP/C, in the LLM right bay fails to pass the cable test. Failing the test means that it is not safe to connect the cable to an LP/C.
5	LAMP BRT knob	Controls brightness of all SNVT indicator lights. Turning to the right increases light brightness.
6	TEST START switch	Push-type switch that is used to start all SNVT tests.
7	UMBILICAL TEST - LEFT NO-GO indicator light	Same as index No. 4, except for an LP/C in the left bay.
8	UMBILICAL TEST - LEFT GO indicator light	Same as index No. 3, except for an LP/C in the left bay.

2-5. LP/C HOLDDOWN LATCH ASSEMBLY.



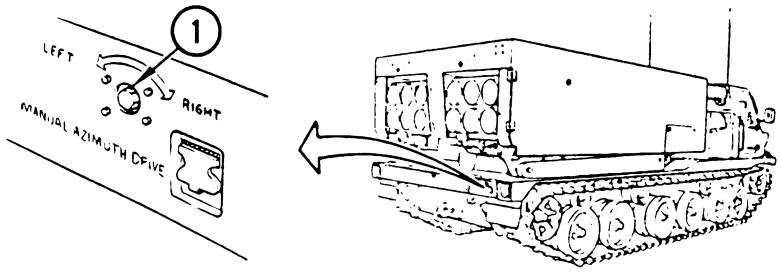
INDEX	CONTROL OR INDICATOR	FUNCTION
1 and 2	LP/C holddown latch handles	Latches the LP/Cs in the LLM. When swung from left to right, the handles unlatch the LP/Cs. Swinging handles back to left latches LP/Cs in place for travel and firing.
3	Hook and chain (handle safety restraint)	Placing hook over holddown latch handle limits the handle movement when it is unlatched.

2-6. TRAVEL LOCK MANUAL DRIVE.



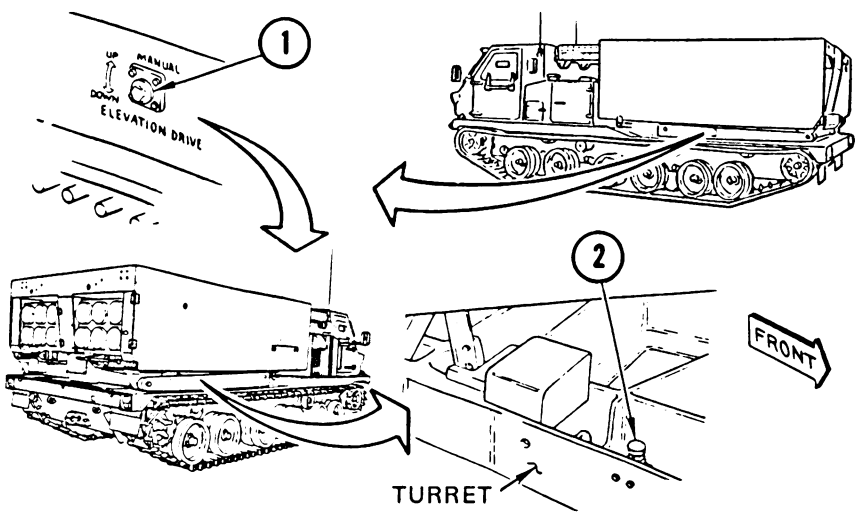
INDEX	CONTROL OR INDICATOR	FUNCTION
1	Travel lock manual drive socket	The socket is a 3/8-inch square drive socket attached to the travel lock actuator. Turning the drive to the right unlocks the transport locking system. Turning the drive to the left locks the transport locking system. Normally used to unlock travel lock during maintenance or in an emergency.

2-7. LLM AZIMUTH MANUAL DRIVE.



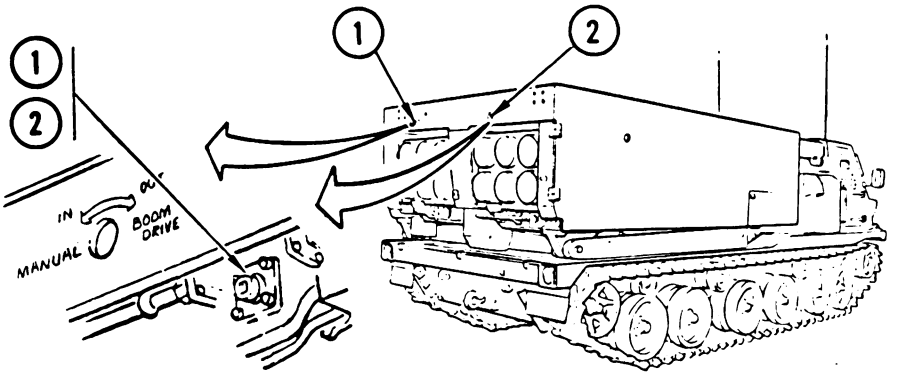
INDEX	CONTROL OR INDICATOR	FUNCTION
1	MANUAL AZIMUTH DRIVE	A 24mm hex-nut and flexible steel shaft assembly. The shaft, in turn, is connected to the azimuth drive unit. Turning the nut to the left causes the LLM to turn left. Turning the nut to the right causes the LLM to turn right.

2-8. LLM ELEVATION MANUAL DRIVE.



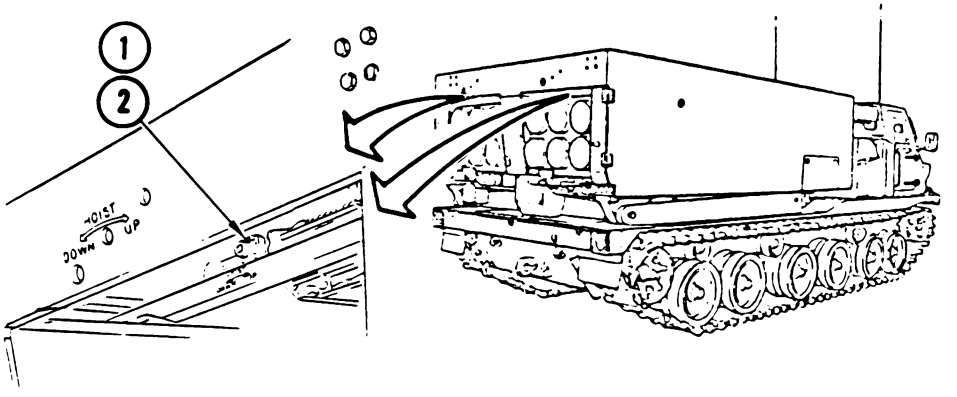
INDEX	CONTROL OR INDICATOR	FUNCTION
1	MANUAL ELEVATION DRIVE	A 24mm hex-nut and flexible steel shaft assembly. The shaft is connected to the elevation drive unit. Turning the nut to the left causes the LLM to lower. Turning the nut to the right causes the LLM to elevate.
2	Elevation brake pressure relief valve	A small valve used to reduce pressure on elevation drive system brake. Used when the LLM is to be manually elevated a few minutes after power stow operation. Turning the valve and holding it open for a few seconds reduces hydraulic pressure on brake, engaging brake.

2-9. LLM BOOM MANUAL DRIVE.



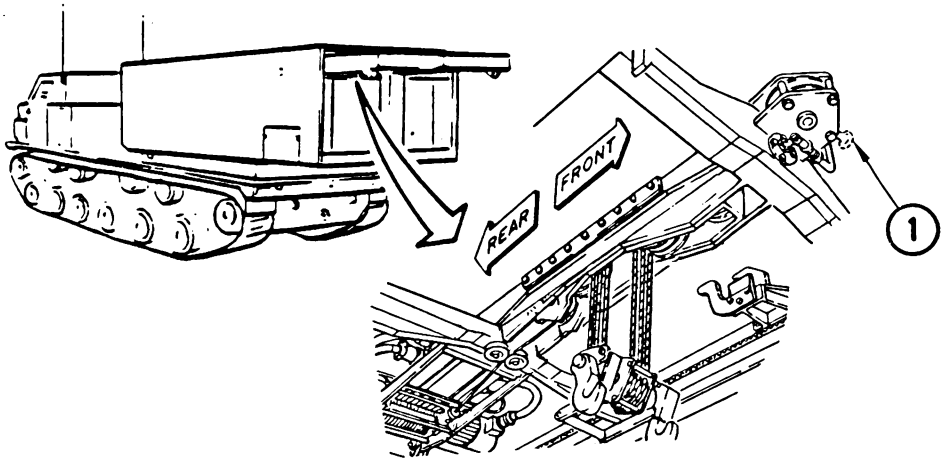
INDEX	CONTROL OR INDICATOR	FUNCTION
1 and 2	Left and right MANUAL BOOM DRIVE sockets	Each drive socket is a 1/2-inch square drive socket attached to the boom drive unit. Turning the drive socket to the left causes the boom to retract (go in). Turning the drive socket to the right causes the boom to extend (go out).

2-10. LLM HOIST MANUAL DRIVE.



INDEX	CONTROL OR INDICATOR	FUNCTION
1 and 2	Left and right hoist manual drive sockets	Each drive socket is a 3/8-inch square drive socket attached to the hoist drive unit. Turning the drive unit to the left causes the hoist hooks to lower. Turning the drive to the right causes the hoist hooks to raise.

2-11. LLM HOIST PULLEY MANUAL CRANK.



INDEX	CONTROL OR INDICATOR	FUNCTION
1	LLM hoist pulley manual crank	Used to change the position of the pulley assembly on the hoist carriage. Turned to the right will move pulley assembly forward. Turned to left will move pulley assembly to rear.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-12. GENERAL. Preventive maintenance checks and services (PMCS) are the regular inspection and care of the SPLL. Regular inspection and care will help you find and correct any faults before they become large enough to affect the SPLLs readiness status. PMCS are to be done at specified intervals as described.

a. Before (B) PMCS.

The before PMCS are done each day that the SPLL is to be used on operations. These tasks should be done just before starting up for the days operation.

b. During (D) PMCS.

Do your during PMCS while you are actually operating the SPLL. During means you are to monitor the SPLLs operation as you are operating it.

c. After (A) PMCS.

The after PMCS are done after each days operation.

d. Weekly (W) PMCS.

The weekly PMCS are done weekly.

e. Periods of Nonuse.

rform weekly PMCS as well as before and after PMCS if:

(1) You are the assigned operator and have not operated the SPLL since the last weekly PMCS.

(2) You are operating the SPLL for the first time.

f. Unusual Conditions.

ration under unusual conditions, such as blowing sand or dust, heavy rain storms, or very high or low peratures, may require PMCS more often than normally scheduled. You will be notified when you need to MCS more often than is normally scheduled.

3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

. The PMCS are listed in table 2-1. The checks are listed numerically in the item column. The item to be ected is combined with the procedure column, and contains a brief description of the item and procedures ired to perform the check. When a check has more than one step, the steps will be listed in alphabetical r. The equipment is not ready/available if column contains entries that identify conditions that make the not mission capable for readiness reporting purposes. An entry in this column, also, denies use of the ment until corrective maintenance has been performed. The terms ready/available and mission capable to the same status. The equipment is on hand and is able to perform its combat missions. (Refer to DA hlet 738-750.)

If you cannot complete a check or step, follow the instructions at the end of the check or step. When are no instructions, go to the fault prompt and symptom index in the troubleshooting section of Chapter index will guide you to a troubleshooting step. Each troubleshooting step has instructions telling you o do to correct the malfunction.

If a fault prompt should be displayed while you are doing the checks, pressing the C/E key on the FCP ase the prompt. If the prompt reappears immediately, or if the prompt reappears after the operation

2-13. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT)

causing the prompt to appear is repeated, then the malfunction indication is real. Corrective action must be taken. If the prompt does not reappear, normal operations can continue. To take corrective action, refer to the fault prompt index (table 3-1) and symptom index (table 3-2) in troubleshooting. The fault prompts are listed in alphabetical order, and will guide you to a troubleshooting step.

d. Any trouble that cannot be corrected must be reported to the next higher maintenance level, using DA Form 2404. Refer to DA Pamphlet 738-750, TAMMS, for complete instructions on how to fill out maintenance forms.

e. Some checks require the LLM and the booms and hoists be placed in a specified position. PMCS instructions using the BC assume that the vehicle will be started, throttle set for fast idle, and the vehicle launcher interconnect switch set to on, before FCS power is turned on and the BC is enabled. Starting the vehicle and setting the launcher interconnect switch to on will keep the LLM batteries from discharging as you do the PMCS. In addition, the before, after, and during checks assume that the SPLL is not loaded with LP/Cs.

f. As you do the PMCS, there are common items that need to be checked that are not listed in the table.

(1) Cleaning. Keep the SPLL clean. Clean as you work and as needed.

(a) Use soap and water to clean rubber or plastic material.

CAUTION

Do not use high pressure water or steam to clean interior and rear of LLM, or carrier vehicle bed. Water may penetrate electrical equipment and cause damage.

Do not flood the vehicle bed. When washing the LLM, refer to after fording paragraph in carrier operators manual, (TM 9-1450-646-10) and remove drain plugs.

(b) Use light spray of water at normal tap pressure, but not more than 350 kPa (about 50 psi) to clean interior and rear of LLM, carrier vehicle bed, and equipment mounted in it.

(c) Clean FCP display panel with a soft clean cloth dampened with water, and then wipe dry.

(2) Inspection.

(a) Nuts, bolts, screws, and cable clamps. Check them for looseness. If loose, notify the next higher maintenance level to tighten.

(b) Welds. Check for loose or chipped paint, corrosion, rust, and cracks. Notify next higher maintenance level for repair.

(c) Electrical cables and connectors. Check for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors. Notify next higher maintenance level for repair of wiring or connectors.

Table 2-1. Preventive Maintenance Checks and Services

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
1	●				**TRAVEL LOCK HOOKS** Visually check that both travel lock hooks are under rollers on carrier. If hooks are not under rollers, check to see if actuator is extended. Refer to manual operation (paragraph 2-43) and manually lock travel lock if actuator is not extended.	Travel lock hooks are not fully under rollers and actuator is extended.

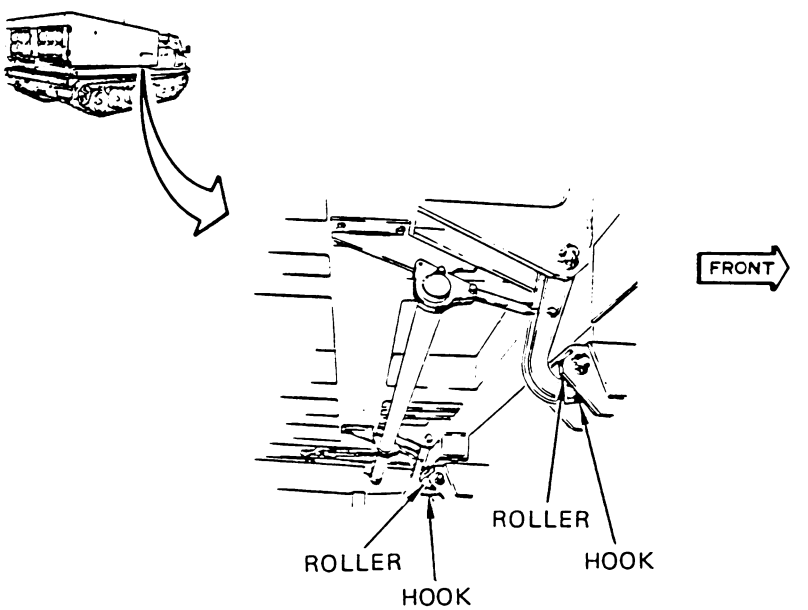


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

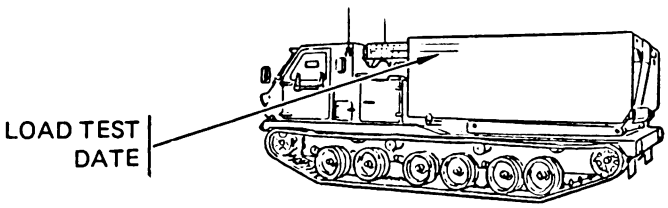
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
2	●				**LOAD TEST DATE** Visually check annual load test date for boom and hoist assemblies.  If annual load test date has expired, notify next higher maintenance level.	Annual load test date for LP/C boom and hoist assemblies has expired.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
3	●		●		**HYDRAULIC LINES AND LDS COMPONENTS**	

CAUTION

After climbing into LLM cage, do not step on LP/C holddown hooks and rollers that extend slightly above the cage floor. LP/C latch assembly can be damaged.

NOTE

Before climbing into LLM cage, make sure LP/C latch handles are in the unlatched position.

Some seepage of hydraulic fluid is expected in the LDS. Equipment operation is allowable with Class I or II leaks. (Refer to table 1-3 for definition of leaks.)

The hydraulic azimuth and elevation drive motors, and the hydraulic power supply will have Class III leaks at their seal drains into their scavenge reservoirs. No other Class III leak is permitted.

Visually check the following hydraulic lines and components for leaks.

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
3	❶		❶		HYDRAULIC LINES AND LDS COMPONENTS – Continued	

a. Heat exchanger

b. Hydraulic power supply

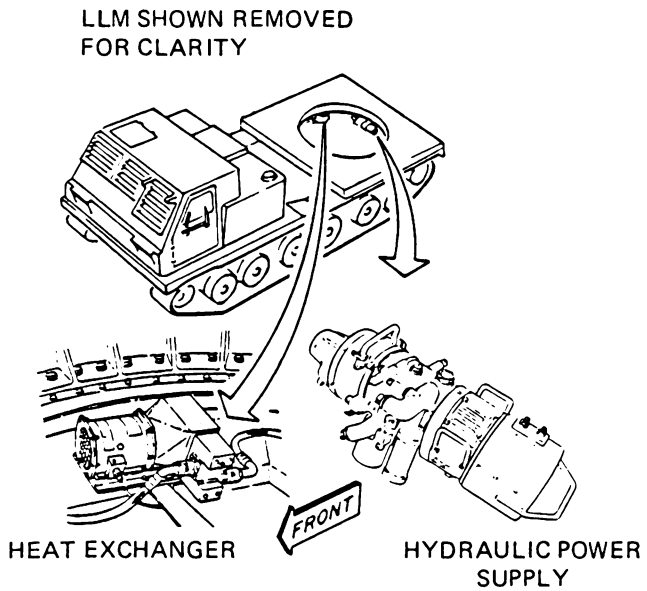
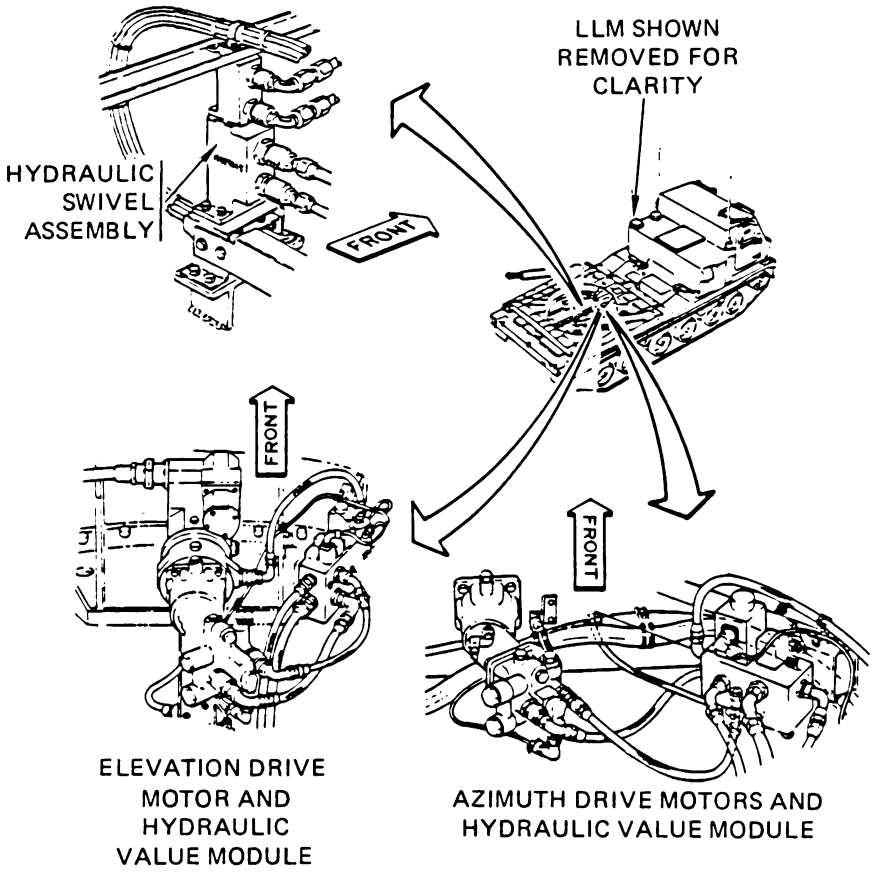


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
3	❶		❷		**HYDRAULIC LINES AND LDS COMPONENTS – Continued** c. Hydraulic swivel assembly d. Elevation and azimuth drive motors e. Elevation and azimuth hydraulic valve modules	



If any hydraulic component has Class III leak, notify next higher maintenance level.

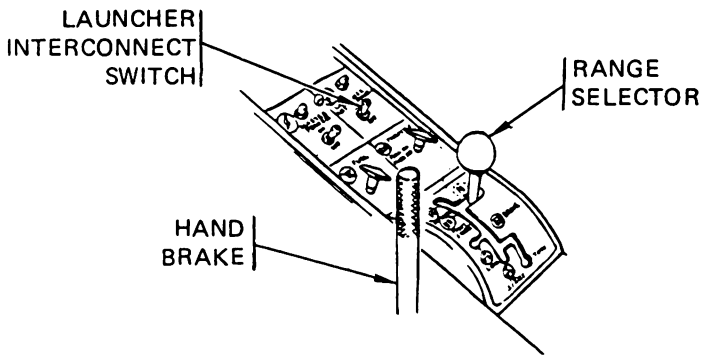
Any hydraulic line or component has Class III leak.

Table 2-1. Preventive Maintenance Checks and Services - Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
4		●			STARTUP	

a. Set handbrake, move RANGE SELECTOR to NEUTRAL. Start engine and set LAUNCHER INTERCONNECT switch to ON.



b. Turn on intercom, radio sets, and comsec units. Select operating frequencies and modes according to unit SOP.

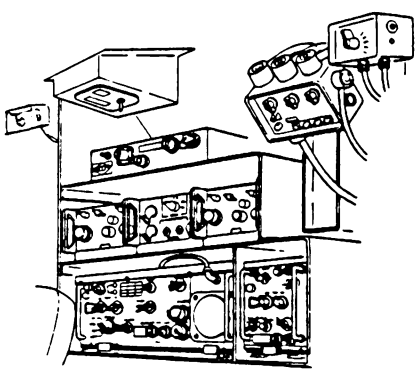


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

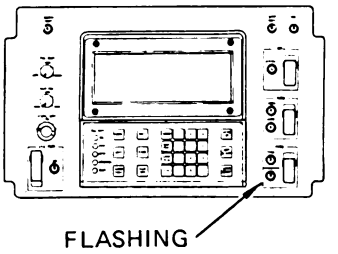
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
4		●			**STARTUP – Continued** **NOTE** Detailed startup procedures are provided in paragraphs 2-22, 2-23, and 2-24. The checks in this startup PMCS follow the procedures in those detailed startup paragraphs. c. Place SYS PWR switch in ON (up). All front panel indicator lights will come on, with HANGFIRE light flashing.  	SYS PWR indicator light does not come on. Any LRU BIT indicator light does not come on.

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
4		●			**STARTUP – Continued**	

Any fault prompt listed comes on at any time during normal operation.

BATTERY BOX FAILURE
COMMS CONTROLLER FAILURE
COMMS PROCESSOR FAILURE
EU CANNOT SEND MESSAGE TO CMP
FUZE SETTER MALFUNCTION
HARDWARE FAILURE-ILLEGAL KEYBOARD CODE
LDS MALFUNCTION
MINE SETTER MALFUNCTION
PDS DATA BAD
RESOLVERS NOT INITIALIZED WITHIN BOUNDS
SQUIB DRIVER MALFUNCTION
SRP/PDS MALFUNCTION
SRP/RESOLVER TEST BAD
STOW PRESSURE FAILURE

NOTE

The following list of prompts may not abort a fire mission in progress. Continued operation is at a lower operational capability and may cause equipment damage. Guidance should be requested from the organizational maintenance chief before continuing operations.

FILTER IS CLOGGED
FLUID OVER TEMPERATURE
FUZE SETTER 1 BAD
FUZE SETTER 2 BAD
LLM POSITION FAILURE
LOW FLUID LEVEL

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

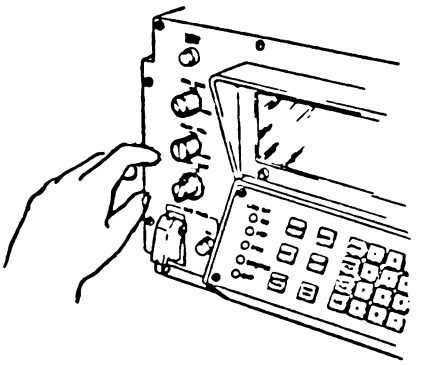
INTERVAL				ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
B	D	A	W		
	●			**STARTUP – Continued**	

LP/C 1 INTERFACE TEST BAD-REPLACE FCU. (Mission in progress will be aborted, but LP/C 2 can be used.)
LP/C 2 INTERFACE TEST BAD-REPLACE FCU. (Mission in progress will be aborted, but LP/C 1 can be used.)
MINE SETTER 1 BAD
MINE SETTER 2 BAD
MOTOR OVER TEMPERATURE
PUMP PRESSURE IS LOW
SQUIB DRIVER 1 BAD
SQUIB DRIVER 2 BAD
UNABLE TO STOW LLM

NOTE

When LAMP TEST key is pressed, alarm will sound and, if not on, all indicator lights will come on. Alarm and all lights except SYS PWR and SAFE will stay on for about 5 seconds then go off.

d. Press LAMP TEST key. Adjust front panel ALM VOL, PNL BRT, and DSPL BRT controls for normal volume and brightness.



Any LRU BIT indicator light comes on at any time during normal operation, except whenever LAMP TEST is pressed.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
4		●			**STARTUP – Continued** e. Perform SYSTEM startup. (1) Select US language prompting, option 3. Press EXEC key, startup INDEX MENU will be displayed. (2) Select START UP DATA, option 0. Press EXEC key. (3) The startup selection menu will be displayed. Select SYSTEM, option 0. Press STORE key. (4) Refer to paragraphs 2-22, f through 2-22, i, and enter system startup data. Enter: (a) EASTING (b) NORTHING (c) ALTITUDE (d) GRID ZONE (e) SPHEROID (f) DUD FUZE (g) MISFIRE (h) HANGFIRE (i) TIME OF DAY (j) TIME ZONE	

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA
1:BOOM CONT MENU
2:ROCKET STATUS
3:TEST MENU

SELECT NUMBER AND PRESS EXEC ;
```

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

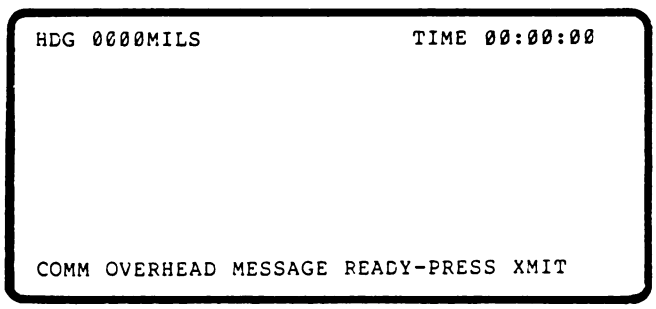
INTERVAL				ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
B	D	A	W		
	●			**STARTUP – Continued** **NOTE** SRP/PDS is turned on after altitude field is displayed and either STORE key or NEXT FLD key is pressed. f. Perform COMMS startup. (1) Refer to paragraph 2-23, and enter comms startup data. Enter: (a) ON THE AIR (b) CRYPTO STATUS (c) OWN ADDRESS 1 AND 2 (d) OWN BIT 1 AND 2 (e) BTRY ADDRESS 1 AND 2 (f) PLT/TP ADDRESS 1 AND 2 (g) PLT/TP BIT RATE (h) V24 BIT RATE (i) BIT RATE (j) ACCESS DELAY TIME (k) FSK PAIR (l) BLOCK MODE (m) CMP TO USE FIELD 18 AND 19 (n) TO BTRY SERIAL NUMBER 1 AND 2 (o) CMP TO USE FIELD 21 AND 22 (p) TO PLT/TP SERIAL NUMBER 1 AND 2 (q) CMP TO ACCEPT NEXT SERIAL NO. (r) PREAMBLE	Either SRP ALIGNING, TIME TO GO prompt, or START UP COMPLETE, SRP READY prompt is not displayed.

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
4		●			**STARTUP – Continued**	

(2) After PREAMBLE data entry, send comms overhead message to comms processor.



If INCONSISTENT COMMS DATA error prompt is displayed, recheck all comm startup entries. Correct any error(s) and retransmit overhead message. If all entries were correct and error prompt still appears, comms processor may have a fault. Notify next higher maintenance level.

EQUIPMENT IS NOT READY/ AVAILABLE IF:
Comms processor does not accept overhead message and INCONSISTENT COMMS DATA error prompt is displayed.

g. Perform PDS startup.

(1) Refer to paragraph 2-24, and enter PDS startup data.

Enter:

(a) ODOMETER SCALE FACTOR
(b) AZIMUTH CRAB ANGLE
(c) ELEVATION CRAB ANGLE

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
	●			**COMM CHECK** a. Request RESUPPLY assignment. Refer to using message menu (paragraph 2-19). (1) Display INDEX MENU, select MESSAGE MENU, option 6. (2) From message menu select REQUEST, option 4. (3) Select message destination according to unit SOP. (To BTRY or PLT/TP) (4) From request menu select LOAD/SUPPLY POINT, option 6, and send message. If COMMS PROCESSOR MESSAGE prompt is not received, recheck all comm startup data entries and send request message again. If still unable to send message, notify PLT for assistance in making sure comm startup data is correct.	
				Unable to send message. Comms processor sends COMM PROCESSOR MESSAGE back to FCS and causes NO RESPONSE or INVALID SERIAL NUMBER prompt to be displayed when system transmits message.	
				b. Receive resupply assignment. (1) Receive COMMAND message.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
5		●			**COMM CHECK – Continued**	

(2) Press ALM ACK to turn off alarm and display message.

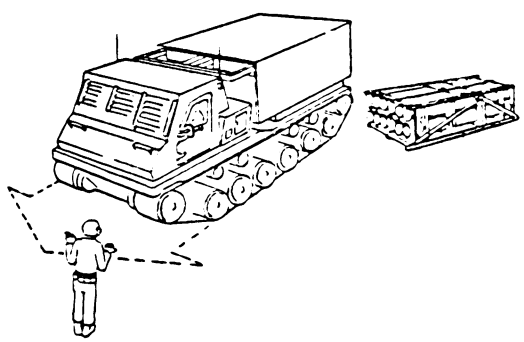
```
HDG 0000MILS                    TIME 00:00:00


SUPPLY AT GRID:0000 0000;M77 00 M77 00


WILL COMPLY MESSAGE READY-PRESS XMIT
```

(3) Send WILL COMPLY message in response to command message.

6		●			**LOADING**	

a. Load SPLL. (Use the LOAD/SUPPLY point location requested in item 5, a.)

(1) Drive SPLL to resupply point. Park SPLL in position to load LP/Cs.



(2) Engage suspension lockout and set carrier vehicle engine throttle to throttle stop

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			**LOADING – Continued** b. Load LP/Cs. (1) Display INDEX MENU and select BOOM CONT MENU, option 1. (2) LDS will come on and move LLM to loading position. Display will change to show azimuth and elevation resolver headings.	LDS does not come on and move LLM to loading position selected. Any fault prompt is displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC 1;
```

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

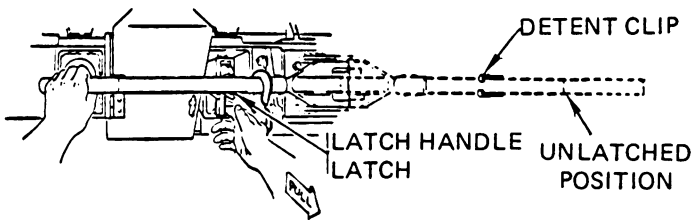
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		❶			LOADING – Continued	

(3) Before loading, perform the following checks.

WARNING

When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

(a) LP/C holddown latch is unlatched. Latch handle must be in unlatched position and secured by detent clip.



(b) Umbilical cables are connected to SNVT test cable connector and storage connector on LLM.

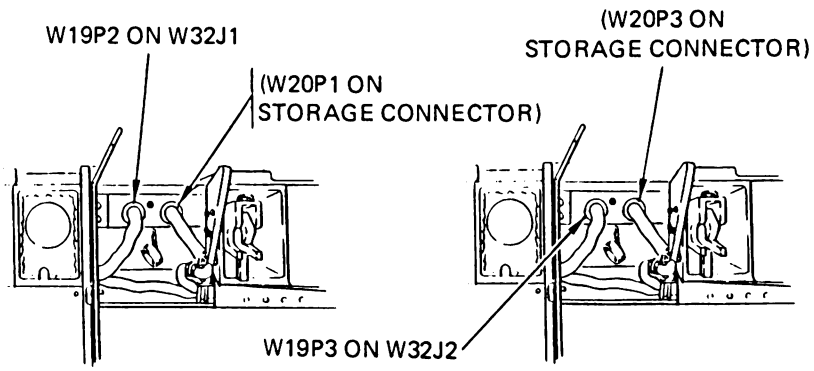
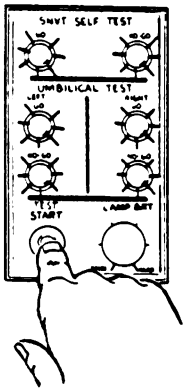


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			**LOADING – Continued** (c) Perform SNVT test on umbilical cables.	



SNVT SELF TEST NO-GO light or LEFT or RIGHT UMBILICAL TEST NO-GO light comes on.

(d) Remove BC from storage compartment. Inspect BC to make sure ENBL indicator light is on, and that cable does not have damaged outside covering or exposed wiring. If cable is damaged, but BC operates, notify next higher maintenance level at end of operations.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			**LOADING – Continued**	

CAUTION

Elevating LLM at some azimuths will cause open storage compartment doors to hit engine housing and be damaged.

(e) All storage compartment doors and umbilical cable access doors are closed.

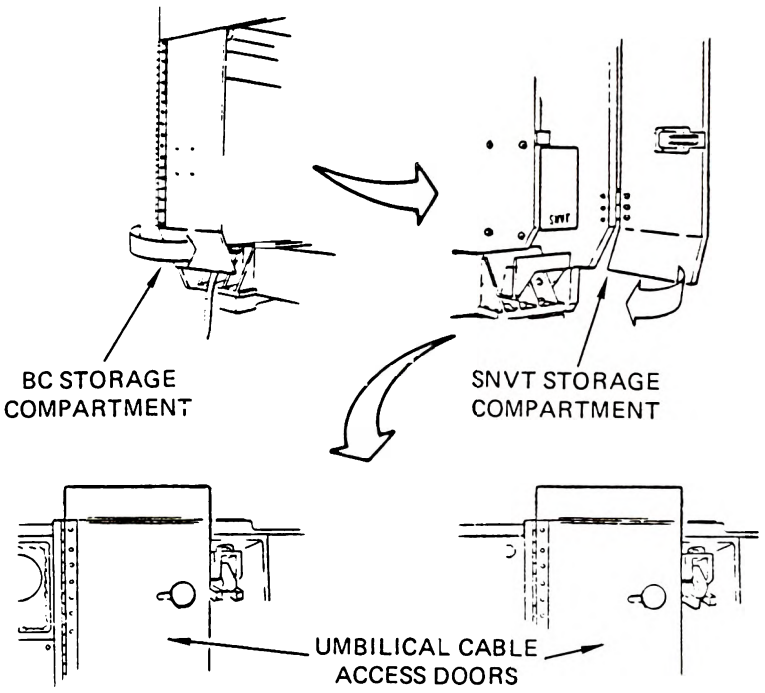


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

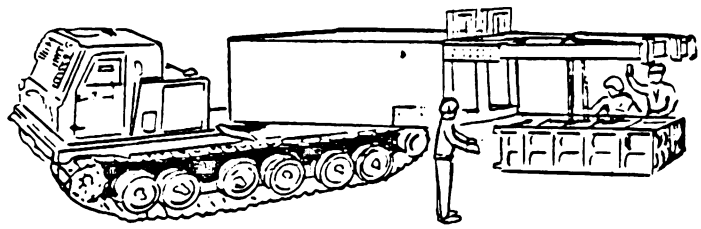
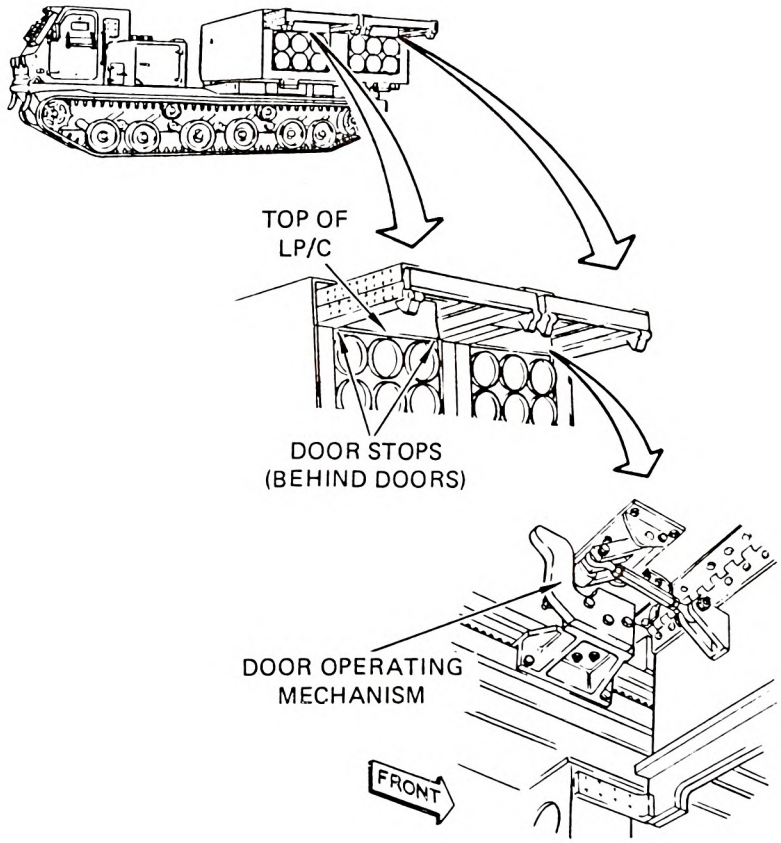
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			**LOADING – Continued** (4) Use BC as required, to position LLM and boom and hoist systems, and load LP/Cs.  As LP/Cs are loaded, visually check boom and hoist systems for the following: (a) Hoist cable for broken strand(s), bulge, or kink.	If a cable has broken strand(s), bulge, or kink.
					(b) Hoist upper pulley assembly is in correct position for loading LP/C with type of rocket warhead that is being loaded. If not in correct position, refer to manual operation (paragraph 2-43, e) and adjust as required. (c) Blast shield doors close properly to protect hoist carriage, cables, and mechanical components.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			LOADING – Continued	



Blast shield doors should not bind or stop against the operating mechanism. The doors must close easily. When closed, doors should contact one or both stops, or top of LP/C, or both stops and LP/C. If door hangs free and does not contact stops or LP/C, when pressure is applied from front side, it should move freely to contact the stops or LP/C. Rocket blast may cause door to bend. If door is bent, but closes properly, this is acceptable. If door binds or stops against operating mechanism, notify next higher maintenance level.

SPLL is not able to load or unload LP/Cs from either bay.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

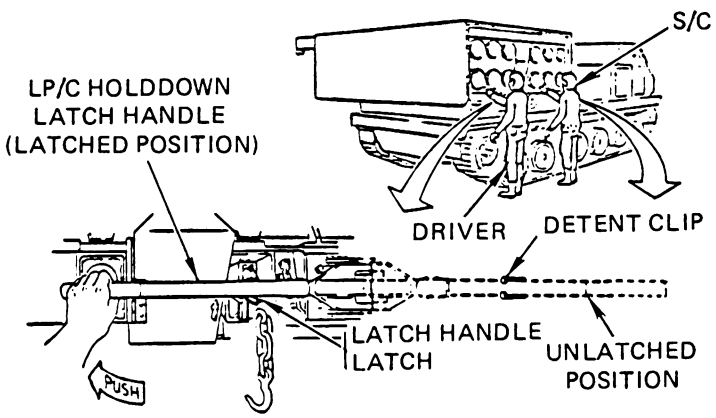
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
6		●			**LOADING – Continued** c. After LP/Cs are loaded, perform the following procedures. (1) Retest umbilical cables and connect them to LP/C.	SNVT SELF TEST NO-GO light or LEFT or RIGHT UMBILICAL TEST NO-GO light comes on.
					(2) Lock LP/Cs in place. Place safety restraint hooks over latch handles.  	LP/C in either bay cannot be latched in place.
					(3) Store BC, and stow LLM.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
7		●			PDS UPDATE	

a. Request survey control point location. (Refer to PDS update paragraph 2-26.)

(1) Press INDEX key and display INDEX MENU. Select MESSAGE menu, option 6.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC ;
```

(2) From MESSAGE MENU select REQUEST menu, option 4.

(3) From REQUEST menu select message destination according to unit SOP.

(4) After message destination, from request menu select SURVEY CONTROL POINT, option 4, and send message.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

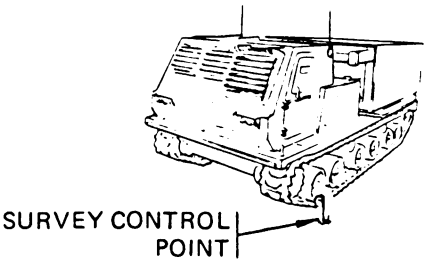
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
7		●			**PDS UPDATE – Continued** b. Receive COMMAND message with SURVEY CONTROL POINT (SCP) location. (1) When alarm sounds, press ALM ACK key to turn off alarm and display message. HDG 0000MILS TIME 00:00:00 SURVEY CONTROL POINT GRID:0000 0000; WILL COMPLY MESSAGE READY-PRESS XMIT (2) Press XMIT key and send WILL COMPLY MESSAGE back to sender. (3) Drive SPLL to SCP and park.  	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
7		●			**PDS UPDATE – Continued** c. Update PDS. (1) Display INDEX MENU and select UPDATE PDS, option 4.	Any SPLL LOCATION data (easting, northing, or altitude) is in error by more than 85 meters after traveling 6 to 8 kilometers with loaded LP/Cs.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION   :000000 00000000 +0000;
UPDATE LOCATION:000000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

If any SPLL LOCATION data is in error more than 85 meters after 6 to 8 kilometers of travel with loaded LP/Cs, refer to symptom index table (Chapter 3).

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
7		●			**PDS UPDATE – Continued**	

(2) Press STORE key to enter update location coordinates into PDS.

(3) UPDATE PDS selection field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS:[ ];
0=UPDATE    1=CALIBRATE    2=NO UPDATE



ENTER NUMBER AND PRESS STORE
```

(4) Select UPDATE, option 0.

PDS DATA BAD prompt is displayed while SRP/PDS is turned on.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

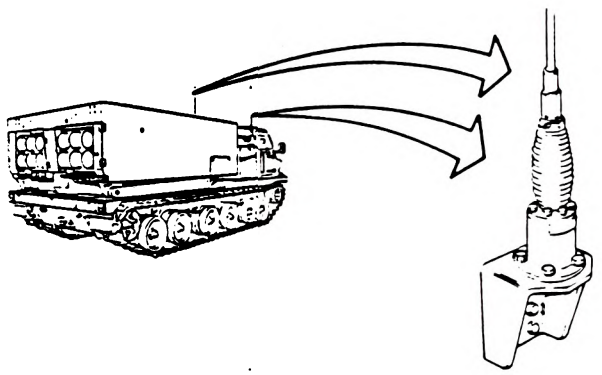
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
8			●		**RADIO ANTENNAS** Visually inspect radio antennas and antenna mounting base for physical damage and heavy rocket motor exhaust deposits. 	
						Antenna or antenna mounting base is damaged. ←
						Has heavy rocket motor exhaust deposits that stop or interfere with ability to send or receive messages. ←
					Turn LLM to right or left side.	

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

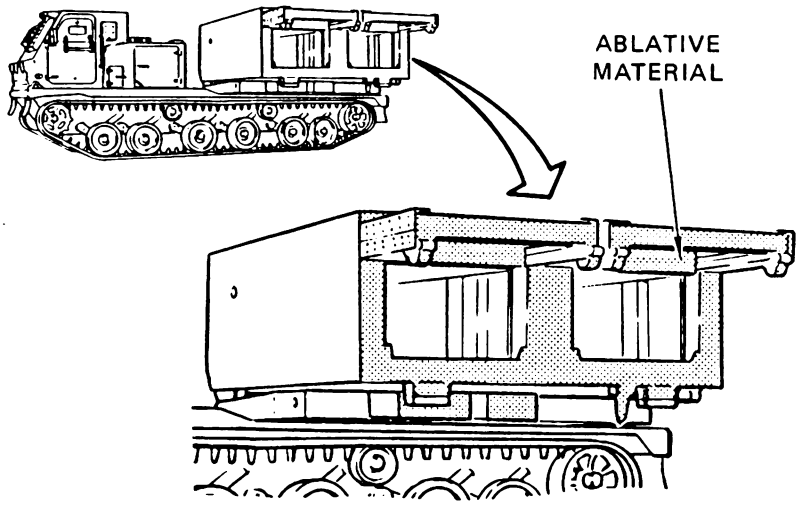
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
9			●		**ABLATIVE MATERIAL** Visually inspect ablative material on front parts of LLM.  Check material for the following: a. Erosion that has let metal show through. b. Missing, badly cracked, broken, or loose pieces. If ablative material is eroded, missing, cracked, broken, or loose, notify next higher maintenance level.	
10		●			**BOOM FORWARD ROLLERS** Inspect boom forward rollers. a. Check rollers for rocket exhaust deposits on polished metal surfaces.	

Table 2-1. Preventive Maintenance Checks and Services – Continued

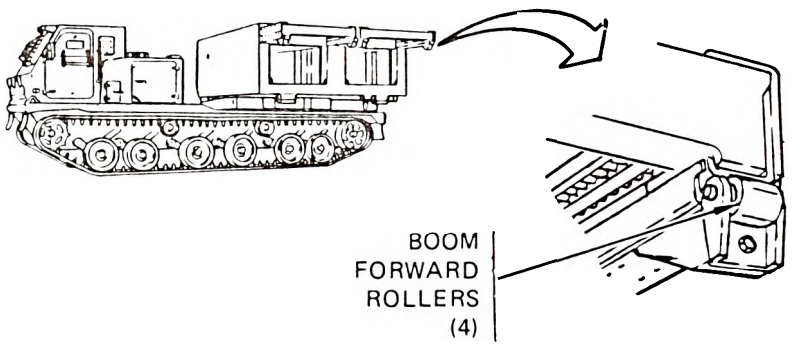
B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
10			●		BOOM FORWARD ROLLERS – Continued	

b. Fully extend booms and then retract them. Check that boom forward rollers turn as booms are extended and retracted. Rollers may not always be in contact with boom during entire length of boom travel. However, rollers must be in contact with boom when boom is fully extended.

NOTE

Some movement of roller assembly is normal when roller is not in contact with boom.



Clean rollers if rollers have rocket exhaust deposits, or do not turn freely. Refer to cleaning instructions (Chapter 3).

After cleaning rollers, fully extend and retract booms. If rollers do not turn freely when in contact with boom, or do not contact boom when fully extended, notify next higher maintenance level.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

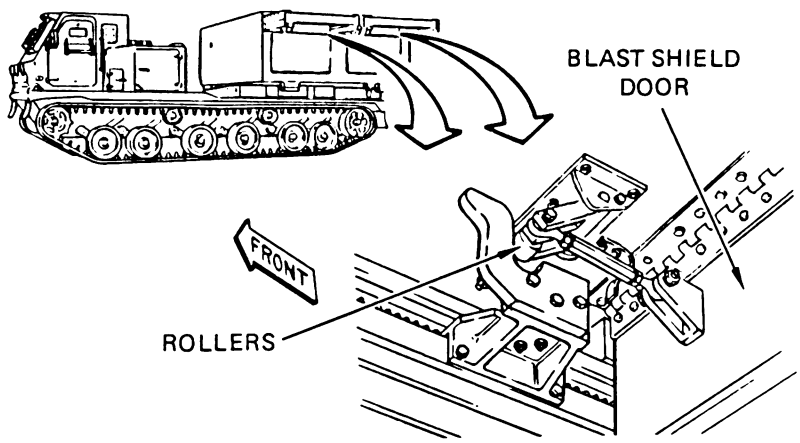
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
11			●		**BLAST SHIELD DOOR ROLLERS** a. Check blast shield door rollers and door closing mechanism for rocket exhaust deposits on polished metal surfaces. b. Check that mechanism is free of rocket exhaust deposits. Check that rollers turn freely.  Clean rollers if rollers do not turn. Clean door closing mechanism if it has heavy rocket exhaust deposits. Refer to cleaning instructions (Chapter 3).	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

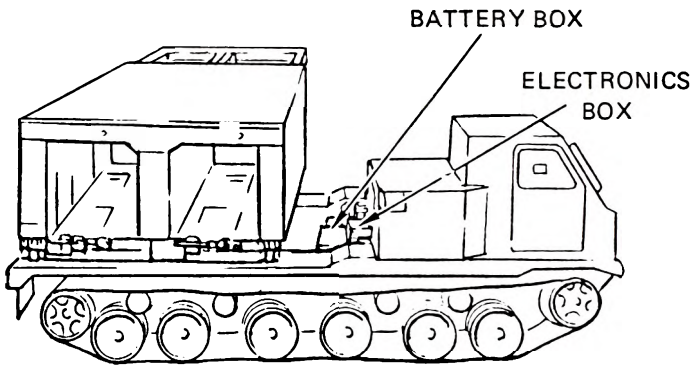
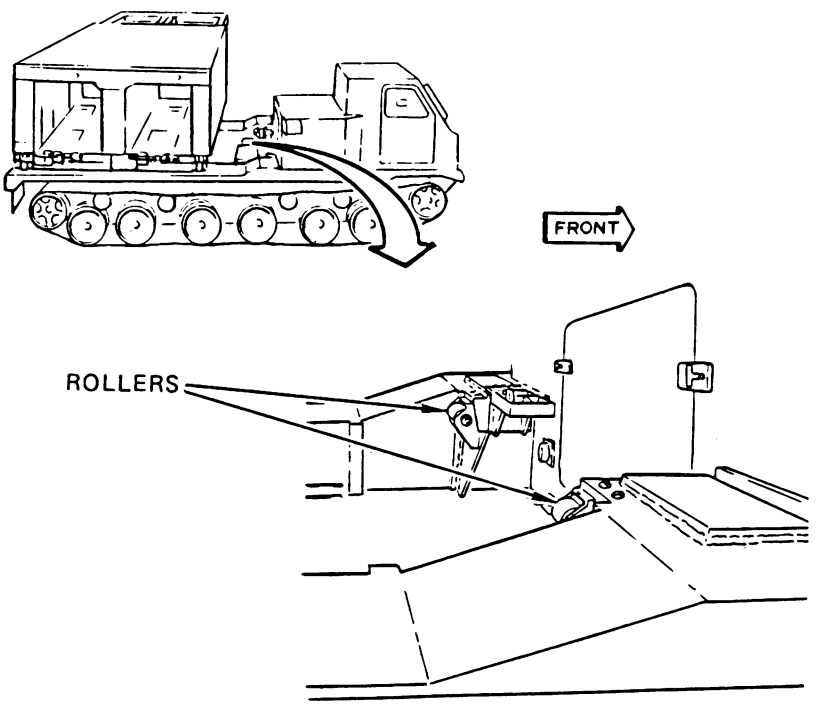
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
12			●		**EU AND BATTERY BOX** Inspect EU and battery box in SPLL cargo bed. Check electrical cables for damage to outside of cables or wiring.  Notify next higher maintenance level if electrical cables or wiring is damaged.	
13			●		**TRAVEL LOCK ROLLERS** Visually inspect travel lock rollers. a. Check rollers for rocket exhaust deposits on polished metal surfaces.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
13			●		**TRAVEL LOCK ROLLERS – Continued**	

b. Check that rollers are easy to turn.



Clean rollers if rollers have rocket exhaust deposits, or do not turn easy. Refer to cleaning instructions (Chapter 3).

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
14			●		LP/C HOLDDOWN LATCH ASSEMBLY	

WARNING

When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

a. Unlatch and latch each LP/C holddown latch assembly. As each assembly is operated, check for smooth operation. Look for possible bent or broken latch mechanism.

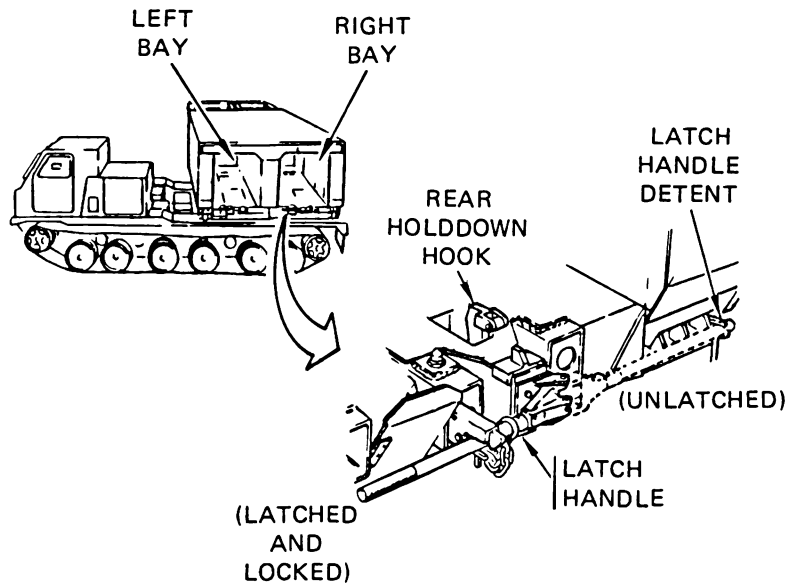


Table 2–1. Preventive Maintenance Checks and Services – Continued

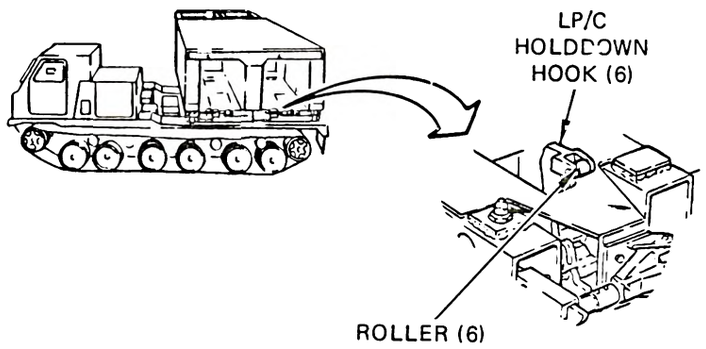
B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
14			●		**LP/C HOLDDOWN LATCH ASSEMBLY – Continued** Holddown hooks should appear to rise evenly to same height. When unlatched hooks should fold back out of the way so as not to interfere with loading.	Latch assembly is bent or broken, and holddown hooks are out of line to keep them from latching down on LP/C properly.

b. Visually inspect rollers on holddown latch hook assemblies.

(1) Check rollers for rocket exhaust deposits on polished metal surfaces.

(2) Check that rollers are easy to turn.

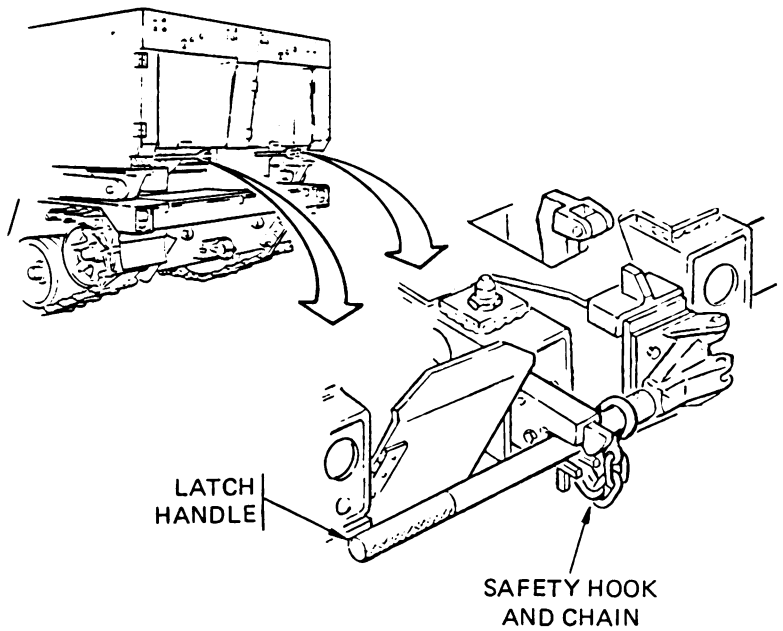


Clean rollers if rollers have rocket exhaust deposits, or do not turn easy. Refer to cleaning instructions (Chapter 3).

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
14			●		**LP/C HOLDDOWN LATCH ASSEMBLY – Continued** c. Visually inspect each latch handle safety hook and chain.	



Check each hook and chain for cracks and breaks. Check mounting bolts, nuts, and pins to make sure safety hook and chain is attached to LLM properly.

If hook or chain is cracked, broken, or not attached properly, notify next higher maintenance level.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

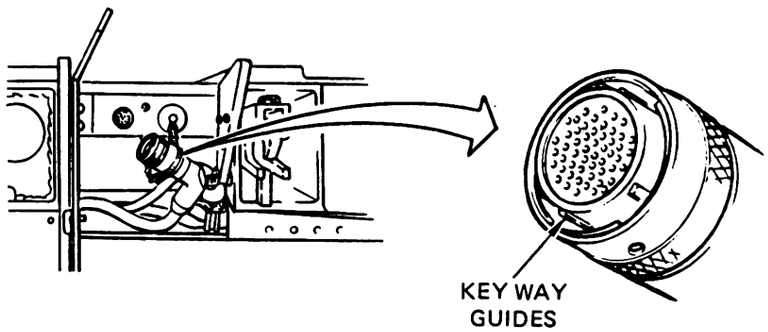
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
15			●		**UMBILICAL CABLES** Inspect umbilical cable W19. Look for damage to outer covering and/or exposed wiring. Check connector adapters for broken or damaged pins. Check key and guides for excessive wear that could keep connector from making proper connection to LP/C.  Notify next higher maintenance level if umbilical cable outer covering is damaged and wiring exposed.	Cable connector adapter has broken or damaged pins. Cable connector adapter key or guides are badly worn, and can keep cable from making proper connection.
16			●		**BOOM EXTENSION ACTUATOR CONTROL BOX** Visually inspect boom actuator control box cabling. Inspect electrical cables for damage to outside covering and/or exposed wiring. If electrical cable has damaged outside covering or exposed wiring, notify next higher maintenance level.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

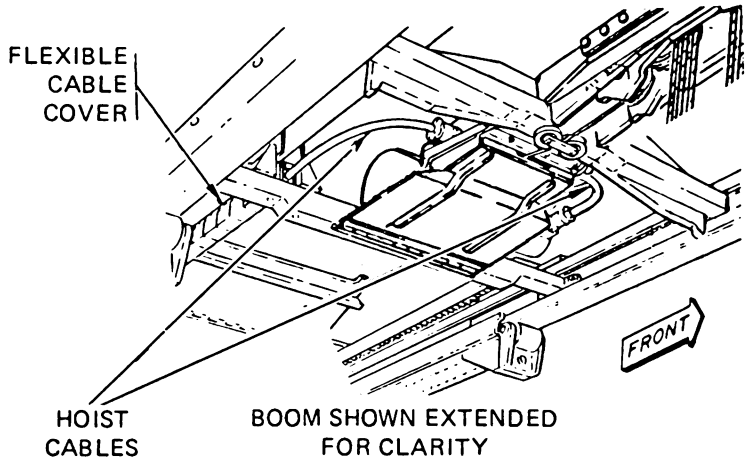
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
17			❶		HOIST ASSEMBLY a. Check hoist electrical cabling for damage to outside covering and exposed wiring.  Notify next higher maintenance level if cable outside covering is damaged, or wiring is exposed. b. Check hoist flexible cable cover for blast damage that will interfere with proper operation when booms are extended/retracted. If flexible cable cover appears damaged and interferes with proper movement of boom and hoist, notify next higher maintenance level.	Hoist assembly is not able to load or unload LP/Cs.

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

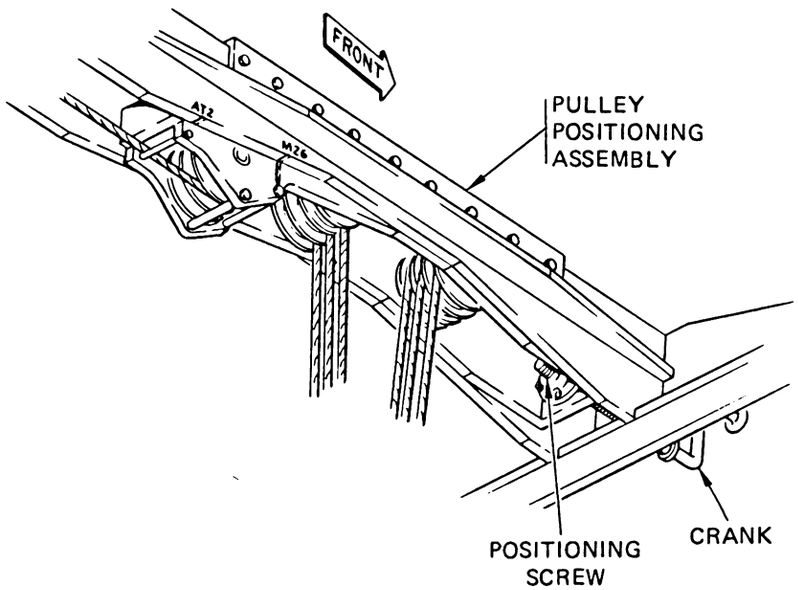
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
17			●		**HOIST ASSEMBLY – Continued** c. Extend booms fully and lower hoist hook 1/3 meter. Visually inspect hoist pulley positioning assembly screw and slide area. (1) Check for rocket exhaust deposits. (2) Refer to cleaning instructions (Chapter 3), and clean hoist pulley positioning assembly screw and slide area.  **CAUTION** Do not reposition assembly unless hoist hooks are lowered at least 1/3 meter. Do not reposition with a suspended load. Assembly screw and crank could be damaged. (3) Crank hoist pulley positioning assembly to M26 position after cleaning.	Hoist pulley assembly cannot be positioned to M26.

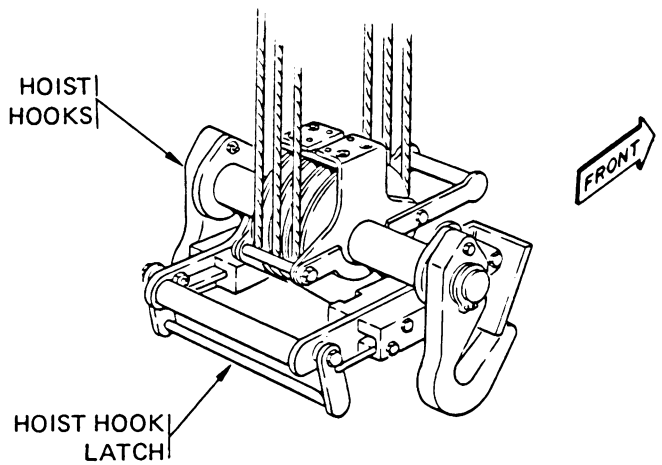
Table 2-1. Preventive Maintenance Checks and Services - Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
17			❹		**HOIST ASSEMBLY - Continued**	

d. Lower hoist hooks until hooks are about 1 meter off ground.

(1) Visually inspect hoist hook latching assembly.



(2) Check for rocket exhaust deposits and dirt. Make sure latching assembly operates freely without binding.

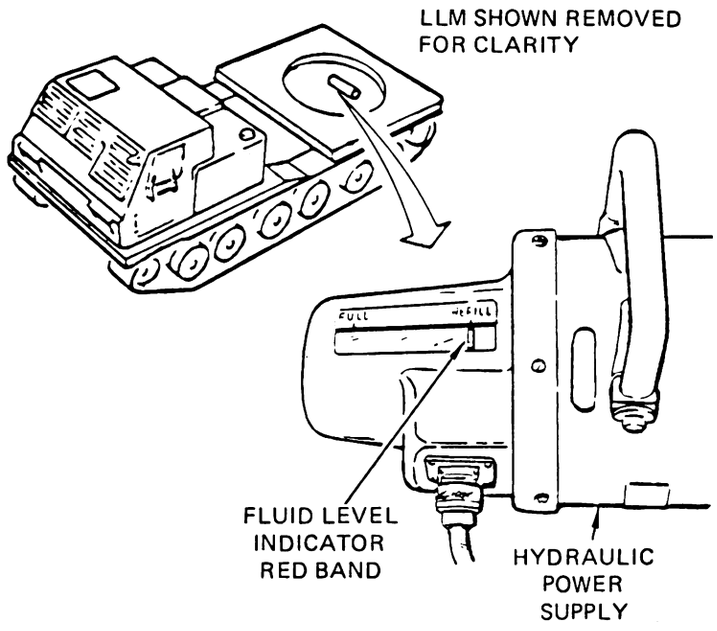
(3) Refer to cleaning instructions (Chapter 3), and clean latching assembly.

Notify next higher maintenance level if latching assembly will not operate freely, or if it binds after cleaning.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM NO.	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
8			●		**HYDRAULIC FLUID LEVEL** Visually check fluid level indicator on hydraulic power supply.	



Fluid level indicator red band is at or below the REFILL mark.

If fluid level is low, notify next higher maintenance level.

Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

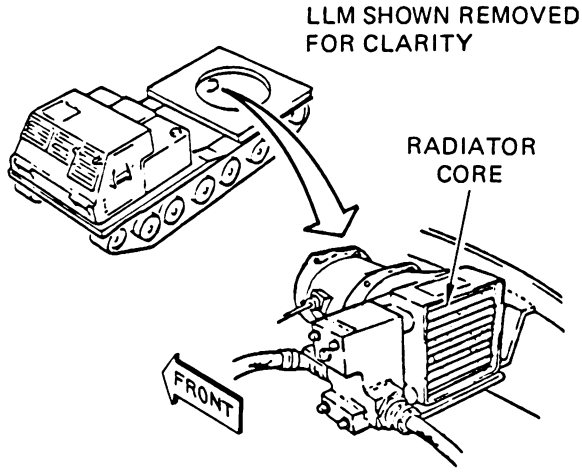
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
19			●		HEAT EXCHANGER Visually inspect heat exchanger radiator to make sure airflow is not stopped or interfered with.  Remove any objects that are stopping or interfering with airflow.	Object stopping or interfering with airflow cannot be removed.
					If heat exchanger has object stopping or interfering with airflow that can not be removed, notify next higher maintenance level.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

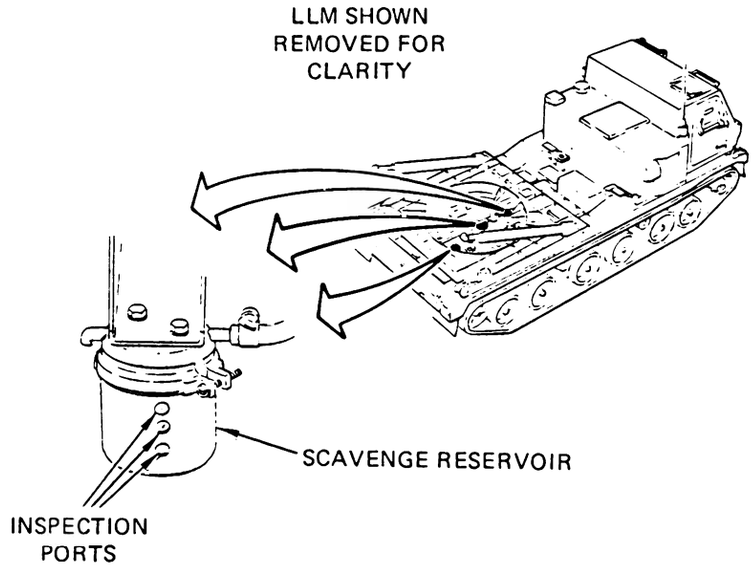
B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
20			●		**SCAVENGE RESERVOIRS**	

NOTE

There are three scavenge reservoirs. The azimuth reservoir is mounted on the base assembly to the left of the motor. The hydraulic power supply reservoir is mounted below the hydraulic power supply. The elevation servomotor reservoir is mounted on the driver assembly. The inspection and service tasks for the three reservoirs are the same.

Check fluid level of each scavenge reservoir.



Hydraulic fluid must be below middle inspection port. If fluid is at or above middle inspection port, empty reservoir. Refer to scavenge reservoir maintenance instructions (Chapter 3) for removing and emptying reservoir bowl.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

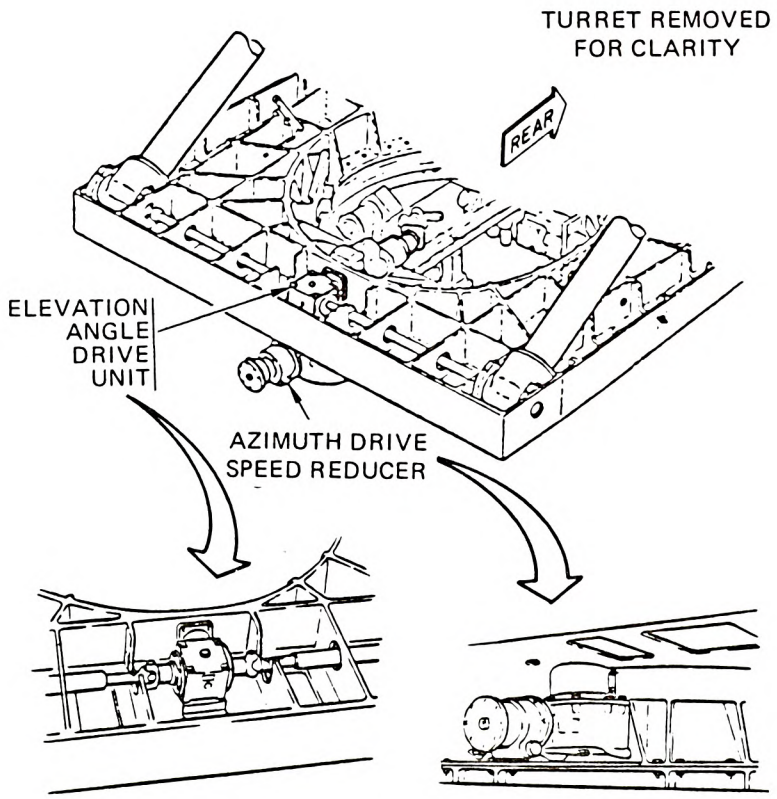
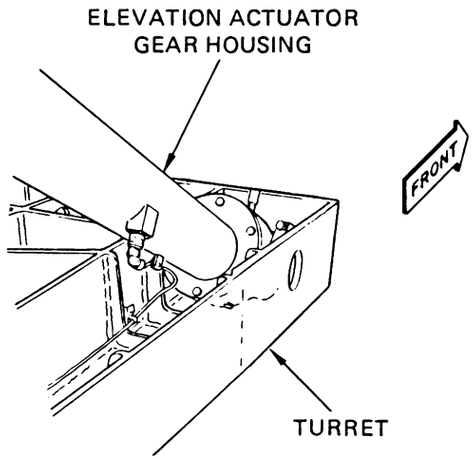
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
21			●		**AZIMUTH DRIVE AND ELEVATION ANGLE DRIVE** Visually inspect azimuth drive speed reducer, and elevation angle drive unit for oil leaks. **NOTE** Class I or II leakage is permitted from vent ports on bottom of azimuth drive speed reducer. 	Any component has Class III leak.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM NO.	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
22			●		**ELEVATION ACTUATOR GEAR HOUSING** a. Visually inspect elevation actuator gear housing for oil leaks.	

CAGE OMITTED FOR CLARITY



Class III leak is permitted if leak rate is NOT more than 3 drops per minute.

If actuator gear housing has Class III leak with leak rate more than 3 drops per minute.

If there is Class III leak with leak rate less than 3 drops per minute, have next higher maintenance level check actuator fluid level monthly. Add fluid as required.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

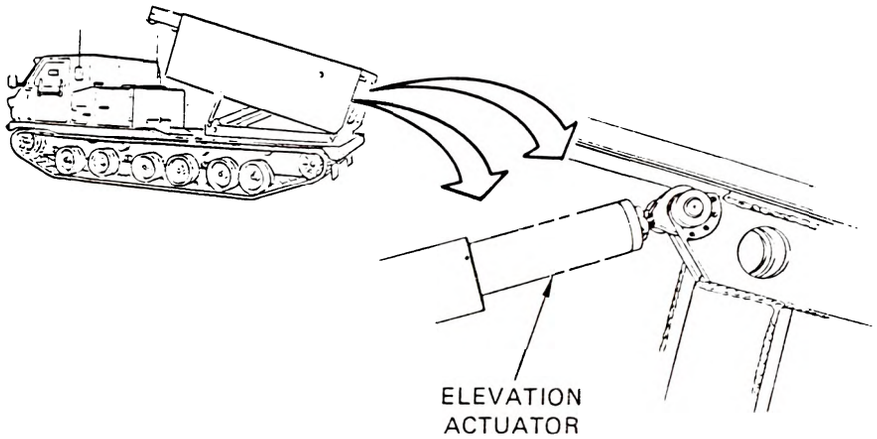
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
22			●		**ELEVATION ACTUATOR GEAR HOUSING – Continued** b. Clean both elevation actuators.  Refer to cleaning instructions (Chapter 3).	
23				●	**BATTERIES** **WARNING** Before working on or near the batteries, you should remove your rings and watch. If these things touch the battery terminals it could cause bad burns. Batteries can explode. Do not smoke, have open flames, or make sparks around the batteries. If battery acid contacts skin, flush immediately with water. If battery acid gets into your eyes, flush your eyes with water for at least 15 minutes. See a doctor immediately. a. Position LLM to LLM right rear to gain access to battery box. Shut down FCS and carrier vehicle when LLM position is reached.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITERVAL D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
		●	**BATTERIES – Continued**	

b. Remove battery box cover as follows:

(1) Pull up on bottom of latches.

(2) Release latch bar from bracket on battery box cover.

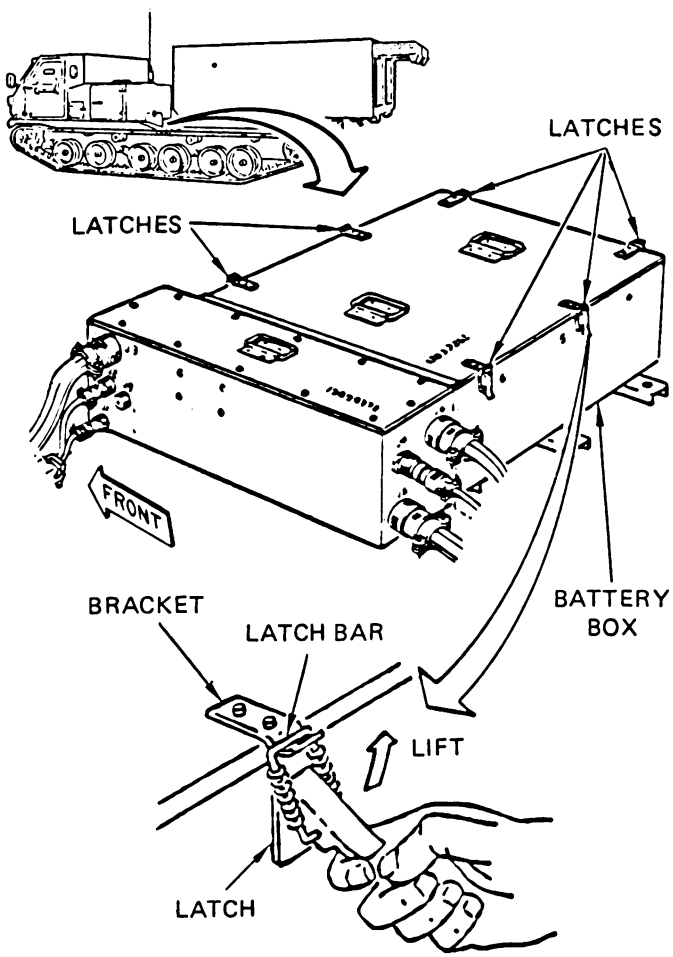
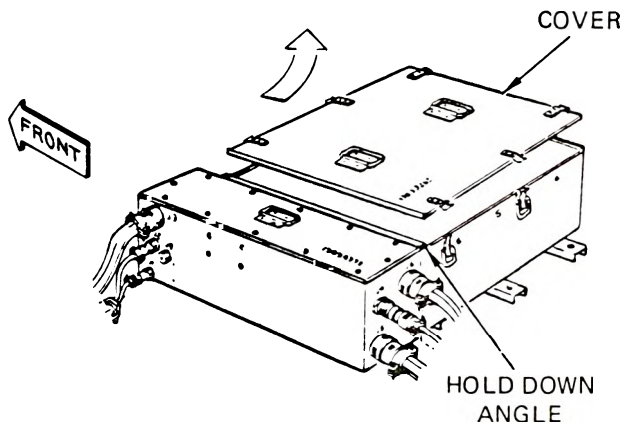


Table 2–1. Preventive Maintenance Checks and Services – Continued

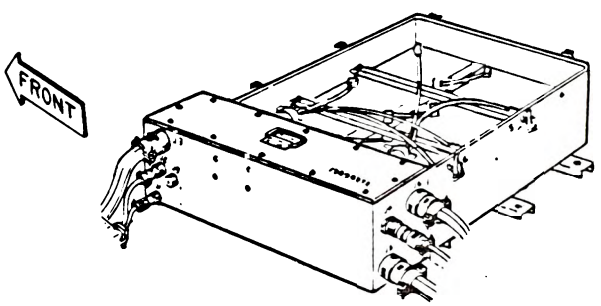
B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
23				●	**BATTERIES – Continued**	

(3) Remove cover by sliding it out from under holddown angle and then lift cover from battery box. Set cover out of the way.



c. Inspect inside and outside of battery box, cover, top of batteries, cables, and holddown retainers for dirt and corrosion.



Use wiping cloth to clean dirt and small amounts of corrosion.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

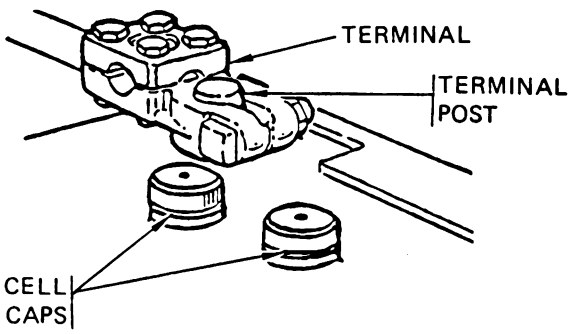
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
23				●	BATTERIES – Continued d. Inspect top of batteries. (1) Check connecting terminals and holddown retainers for tightness. (2) Check for cracks around terminal posts and/or broken cell caps.  Report loose terminals and holddown retainers, broken cell caps, or corrosion damage to battery box to next higher maintenance level.	Batteries are cracked or broken, or if terminals are loose.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

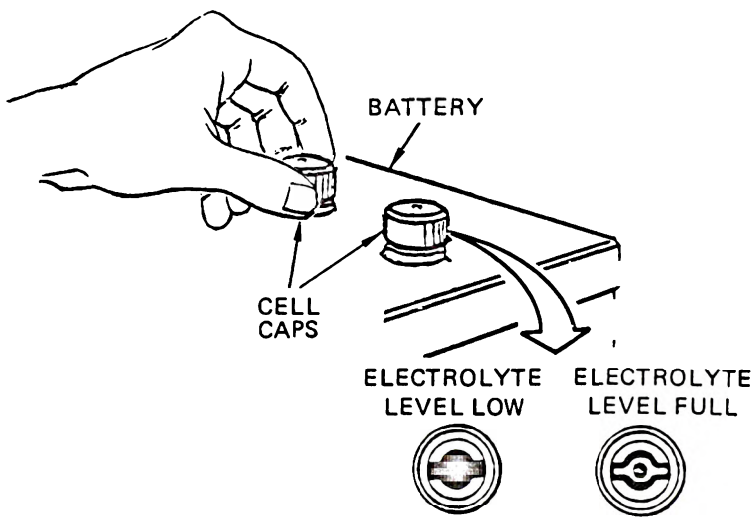
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
23				●	BATTERIES -- Continued	

WARNING

Do not get electrolyte on you. You can get burned badly. If you get electrolyte on your skin, rinse it off with clean water. If you get electrolyte in your eye, flush your eyes out with clean water for at least 15 minutes and go to a doctor immediately.

Use only a flashlight to check batteries. Open flame can cause an explosion.

e. Remove cell caps. Use flashlight to check level of electrolyte in each cell. Electrolyte should be up to bottom of split ring. Replace cell caps.



If battery electrolyte level is low, notify next higher maintenance level.

f. After inspecting batteries, replace cover. Slide edge of cover under holddown angle and fasten latches.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
24			●	●	NV MEMORY BATTERIES	

WARNING

Before working on or near the batteries, you should remove your rings and watch. If these things touch the battery terminals it could cause bad burns.

Batteries can explode. Do not smoke, have open flames, or make sparks around the batteries.

a. Using flat tip screw driver, loosen four captive screws securing battery cover to EU housing.

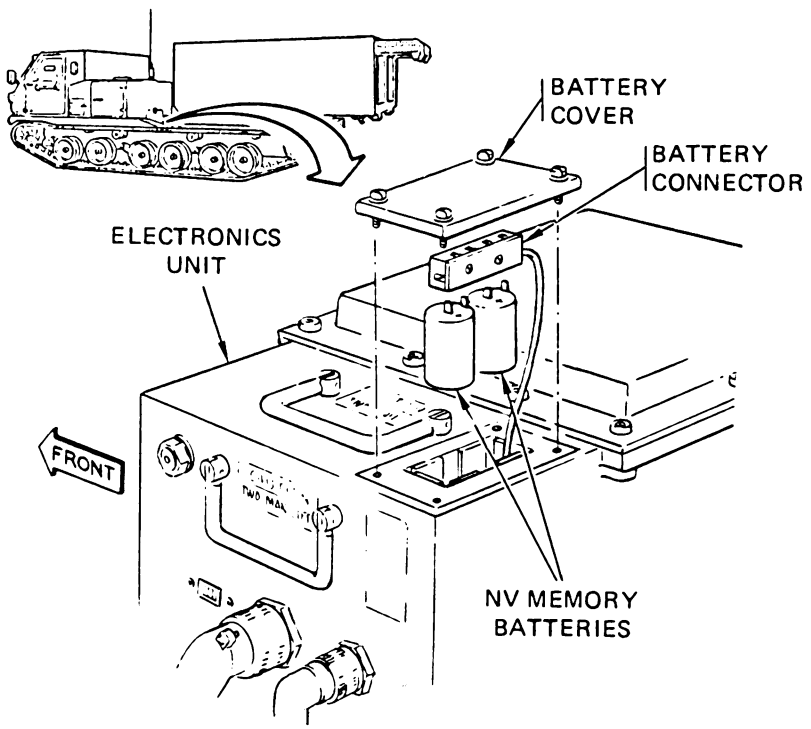


Table 2-1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
24			●	●	NV MEMORY BATTERIES – Continued	

CAUTION

Do not short across battery terminals while removing and installing batteries, or during inspection. Permanent damage to batteries will result. Place adhesive tape (electrical insulating) over battery terminals any time the batteries are disconnected.

b. Disconnect battery connectors from both batteries. Visually inspect battery connector terminals, and wires for corrosion or other signs of deterioration. Remove batteries, inspect batteries for leakage, bulging, corrosion, or any sign of deterioration. Check cover gasket for damage. Inspect battery compartment for corrosion or moisture.

If batteries are leaking, bulging, corroded, or show signs of deterioration, notify next higher maintenance level.

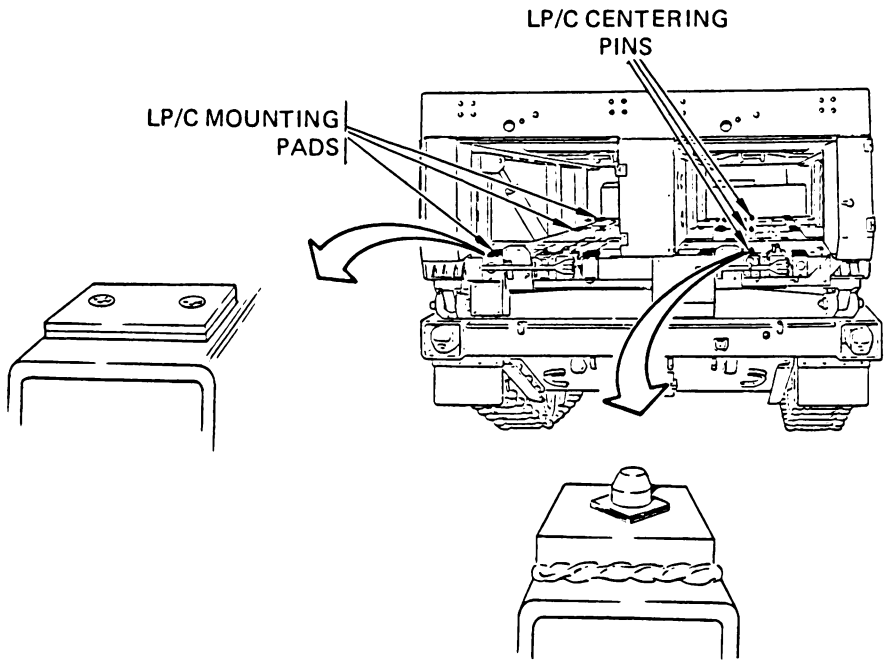
If battery compartment has corrosion or moisture, or if connector terminals or wiring is corroded or shows signs of deterioration, notify next higher maintenance level.

After inspecting battery compartment, replace batteries in battery compartment. Remove adhesive tape from battery terminals, and connect battery connector to batteries. Replace battery cover and tighten captive screws.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
25				●	LP/C MOUNTING PADS AND CENTERING PINS Visually inspect LP/C mounting pads and centering pins in each bay.	



Check for dents, gouges, and scrapes that cause pad or pin surface to be raised and rough. A minimum of 80 percent of centering pin surface should be free of gouges and scrapes.

Notify next higher maintenance level if mounting pads or centering pins are dented, gouged, or scraped and surface is rough.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

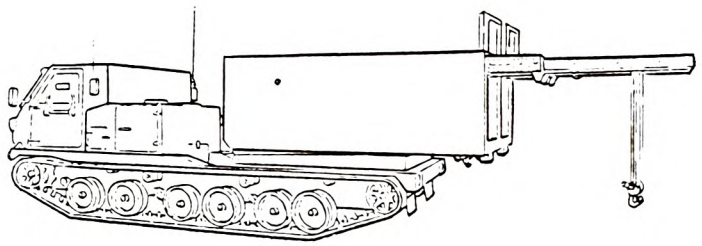
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
26				●	HOIST CABLES Perform hoist cable inspection on both left and right hoist cables. Refer to hoist cable inspection (Chapter 3).  Notify next higher maintenance level if cable has broken strand, bulge, or kink.	A cable has broken strand, bulge, or kink.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

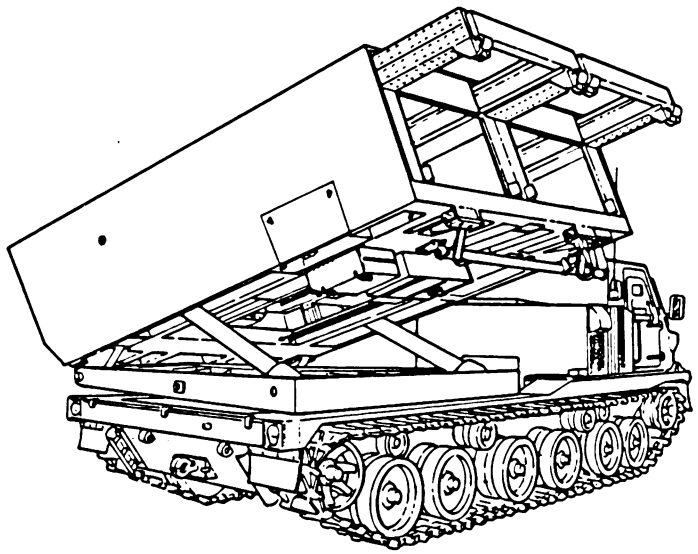
ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
27				●	**BOOMS** Using boom controller, position LLM 1600 mils to the right at about 200 mils elevation.  a. Refer to boom cleaning instructions (Chapter 3) and clean and service both booms.	

Table 2–1. Preventive Maintenance Checks and Services – Continued

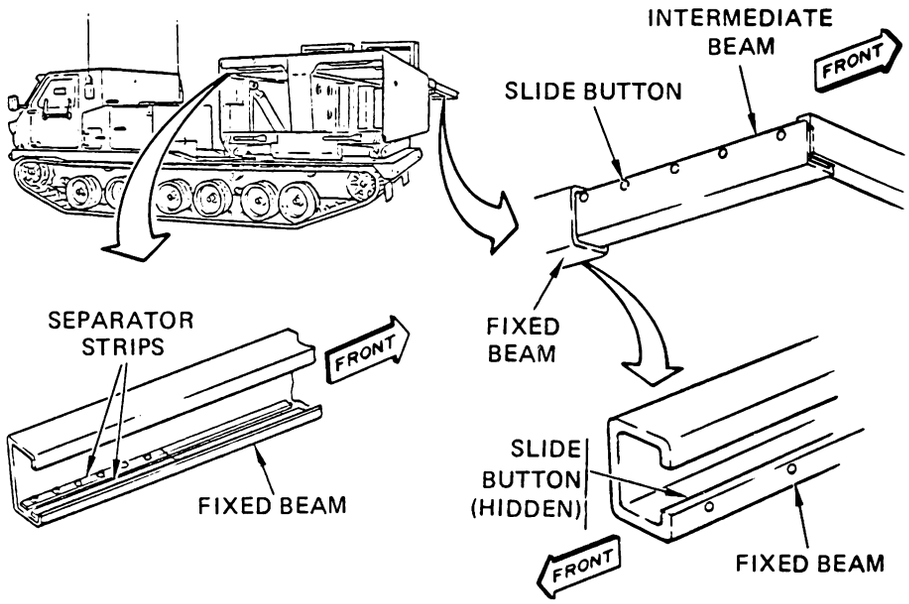
B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
27				●	**BOOMS – Continued**	

NOTE

Front separator strips are covered by intermediate beam. Wear on rear strips is evidence of wear on front strips also.

b. With booms fully extended, visually inspect exposed boom separator strips and slide buttons.



Check all exposed separator strips and slide buttons for evidence of wear, tears, and separation from beam. Check for evidence of metal to metal wear and missing slide buttons.

Notify next higher maintenance level if there is any visible damage, or if separator strips or slide buttons show evidence of excessive wear, or if more than three slide buttons in a row are missing.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
28				●	**LIMIT SWITCHES** Clean and lubricate all limit switches and plunger assemblies. Visually inspect each switch and plunger assembly.	

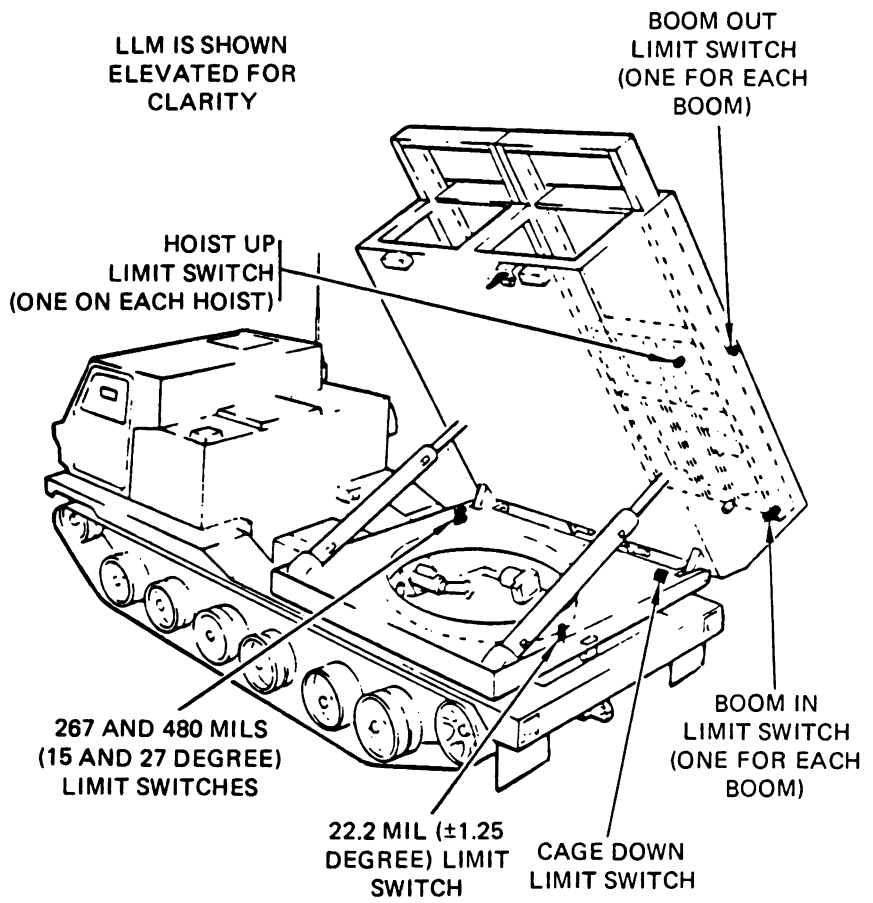
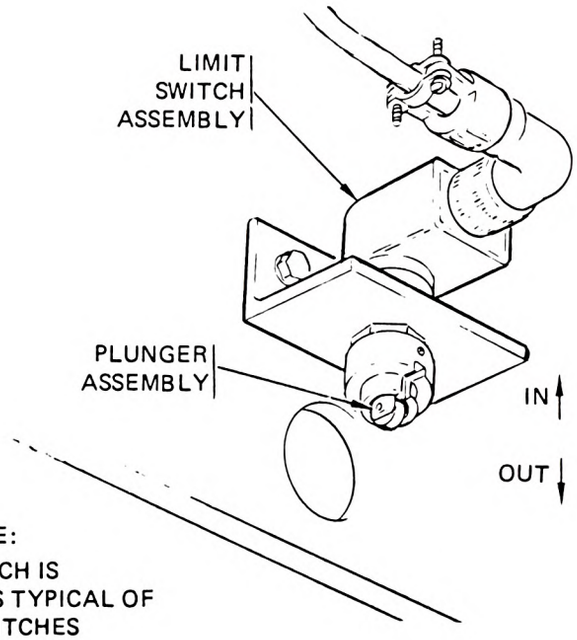


Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
28				●	LIMIT SWITCHES – Continued	

As switches and plungers are serviced, check plunger roller, roller guide, and jam nuts. If any defects are observed, such as missing safety wire, loose or worn roller, bent roller guide, mounting bracket or striker, notify next higher maintenance level.



NOTE:
BOOM IN SWITCH IS SHOWN AND IS TYPICAL OF ALL LIMIT SWITCHES

For limit switch cleaning and lubrication instructions, refer to cleaning instructions (Chapter 3).

	Limit switch on plunger has defect or does not operate properly.

Table 2–1. Preventive Maintenance Checks and Services – Continued

B = Before D = During A = After W = Weekly

ITEM	INTERVAL B	D	A	W	ITEM TO BE INSPECTED / PROCEDURE	EQUIPMENT IS NOT READY/ AVAILABLE IF:
29				●	STOW OPERATION	

Check stow operation for stowing under stress.

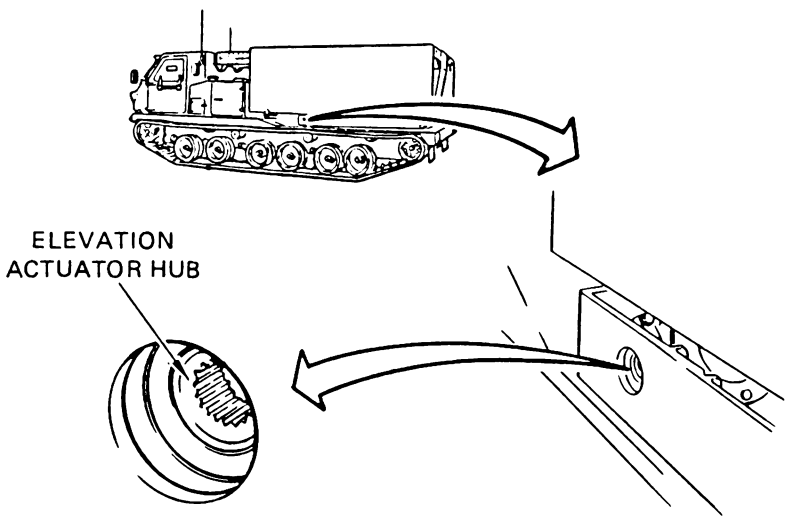
a. Stow LLM normally.

b. As LLM stows, observe the following:

(1) When LLM completes stow operation, bumpers will compress slightly.

(2) Travel lock hooks engage under rollers.

(3) As LDS turns off shaft hub of elevation actuator, as seen through hole in turret, appears to reverse direction of rotation. (The system unwinds or relaxes.)



If shaft hub does not unwind after stow, notify next higher maintenance level.

Refer to shutdown procedures (paragraph 2-36) and stow LLM and shut down SPLL.

Section III. GENERAL OPERATING INFORMATION

2-14. GENERAL.

a. Normal operation of the SPLL always uses the FCS. The FCS is the SPLLs control system. The FCS is a computer controlled system that uses permanent stored data and changeable input data. The FCS uses a display screen to show operating information and instructions. It controls the LLM movement during firing and reloading. Operated correctly, it will do most of your operating tasks.

b. The FCS is controlled by the operator using switches and keys on the FCP. The switches and keys are used to manually input new or change data into the FCS. The FCP also has a display screen used to show you operating instructions and other data. When turned on, the FCS is always testing itself. It makes sure all operations are done correctly and that no equipment failures have occurred. If you set a switch wrong, or press the wrong key, the FCS will tell you. If a failure happens, it will tell you about that, also.

c. To operate the FCS correctly, you must know how to operate the FCP. You must also know and understand the operating procedures programmed into the FCS. Some of the things you must learn to do are:

(1) Startup (turn on) FCS.

(2) Manually enter data into FCS.

(3) Change data already entered.

(4) Use FCS to send and receive radio messages.

(5) Know about and correct operating errors.

(6) Understand fault instructions.

(7) Turn on and use boom controller (BC).

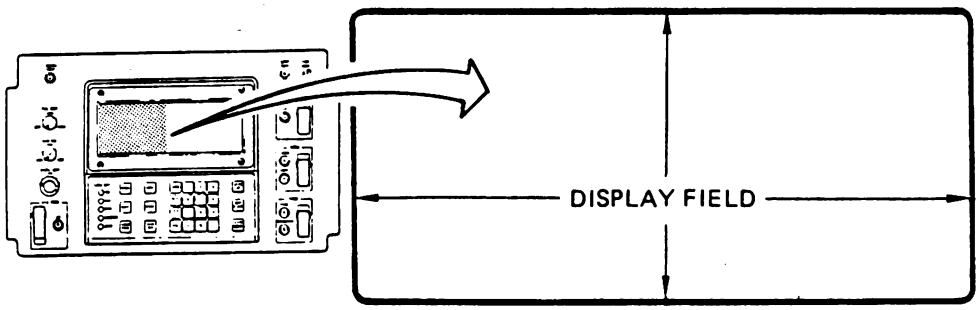
d. This section contains general operating information and instructions for using the FCP and BC. This information will help you learn to operate the FCS. It explains the general use of the procedures programmed into the FCS and how to select them. Also included are general instructions for using the BC. The instructions describe how to use the BC to turn and elevate the LLM, extend and retract the booms, and lower and raise the hoist hooks.

e. Except for the fault prompt table, all information in this section assumes the SPLL is operating normally. Each explanation assumes that all necessary startup entries have been made. If a fault should occur during operation, or a LRU BIT light comes on, refer to troubleshooting procedures (Chapter 3).

f. The following instructions and procedures do not include instructions for operating the communications security (comsec) units, radio set, intercommunications system (intercom), or carrier vehicle. When required, general reminders to turn the equipment on or off or to set a control to a position will be given. Operating instructions for the radio set are in TM 11-5820-401-12 and TM 11-5830-430-12 for the intercom. Operator instructions for the carrier vehicle are in TM 9-1450-646-10.

2-15. FCS OPERATION. All operating data for the FCS is shown to you on the FCP display.

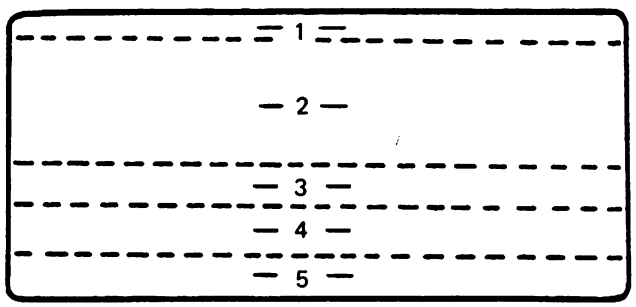
The FCP display is a screen on the FCP that is used for writing electronically. Not all of the screen is used to write on. Only the left half is used, and is designated by the gray area in most FCP illustrations. The area written on is called the display field (the field). The field will contain words to make up complete statements, instructions, or lists of operating selections. When a word or group of words in a field change, we say the field has changed, and that we have a different field.



A field or a group of fields that instruct and guide you through an operating procedure is called a routine.

There are several types of routines in the FCS. For example, there is a routine that is used to start up the FCS. There are routines for sending different types of radio messages to your platoon leader (PLT/TP) and the battery (BTRY). There is also a routine for manually entering firing data into the FCS should it become necessary.

The display field is divided into five areas in which the different types of information and instructions are written.



Area 1 is a single line across the top of the field. It is called the heading and time line. It is used to display the SPLL heading and the time of day.

Area 2 is a space of six lines across the field just below area 1. This is the biggest area and takes up almost all of the top half of the field. It is used to display operating data.

Area 3 is two lines below area 2. It is used to display instructions, called prompts. Any entry in this area usually requires some action by the operator.

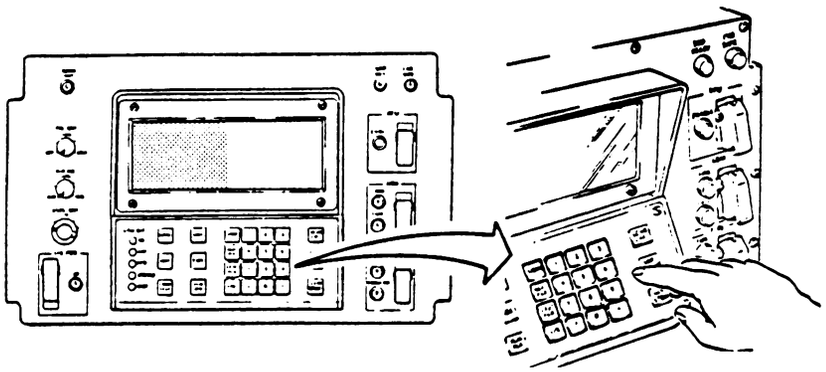
Area 4 is the next two lines below area 3. This area is used to display communication prompts. An entry in this area also requires some action by the operator.

Area 5 is the bottom line in the field. This area is for error and fault prompts. This area is usually blank except when a malfunction occurs or there is an operating error.

2-15. FCS OPERATION (CONT)

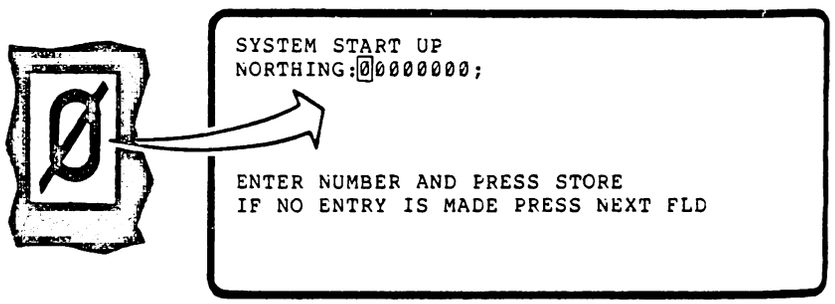
a. Entering Data.

(1) Data is entered into the FCS as a series of numbers. The data is entered by pressing keys on a keyboard. Spaces in the display field where data can be entered are shown in the manual as zeros (0). However, the actual display on the FCP may not show zeros if data is not entered.



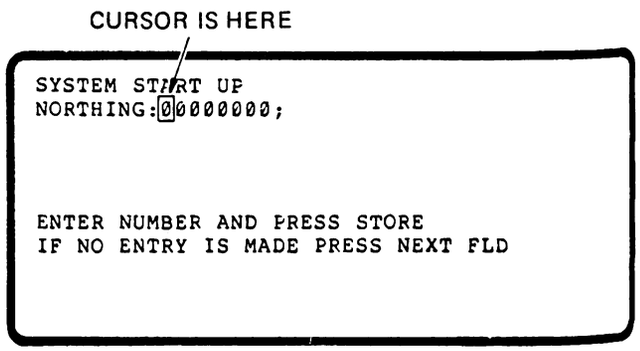
(2) On each field, a cursor (bright rectangle) will appear in the first space where you have to enter data. If data has been entered in the space where the cursor is located, the number entered in the space will be inside the cursor.

(3) The example shown is the field for entering NORTHING into the FCS during system startup. In fields like this example, when more than one number must be entered, the cursor will automatically advance to the next space to the right as each number is entered.



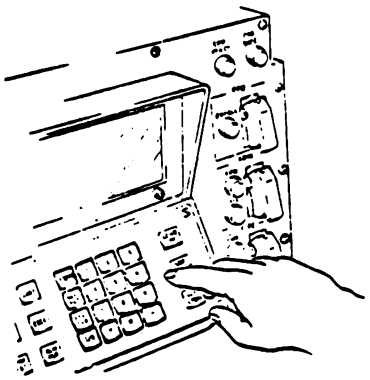
Example:

(1) The NORTHING number to be entered is 03590000.

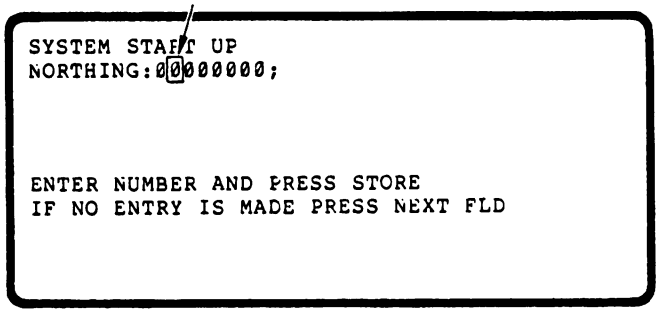


2-15. FCS OPERATION (CONT)

(2) Press 0 key to enter zero.

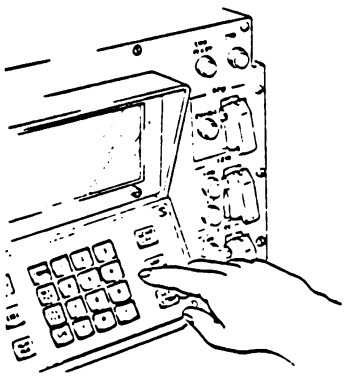


CURSOR IS HERE NOW



(3) Cursor moves right to second space.

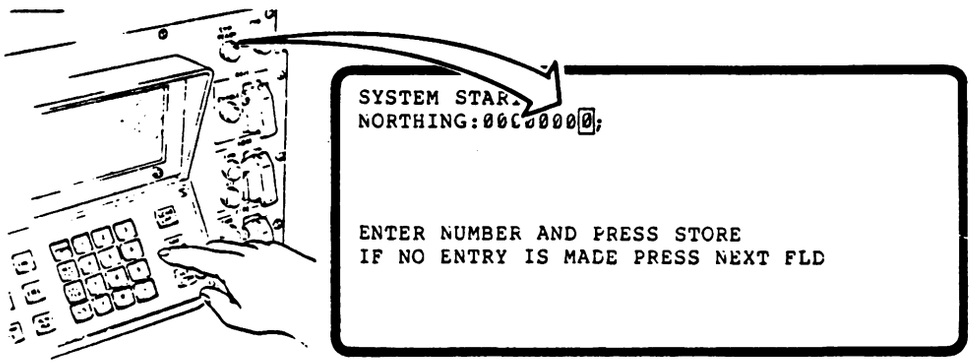
(4) Press 3 key. The number 3 will be entered and the cursor will advance right to the next space to the right.



(5) The cursor will automatically advance so that each number can be entered. The FCS knows how many spaces are needed for each data entry. The cursor will not move past the last space where you must enter a number. When you enter the last number, the cursor will stay in that space.

2-15. FCS OPERATION (CONT)

(6) The NORTHING number is now displayed in the field. To store the number in the FCS you must press the STORE key.



Pressing the STORE key puts the data into the FCS and automatically displays the next field in the routine.

b. Changing Fields - Next Field.

To change the FCP display to the next field in a routine without entering any data, press the NEXT FLD (next field) key.

Example:

(1) You are checking the startup data. The northing number is correct. No change is needed.

```
SYSTEM START UP
NORTHING:00000000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(2) Press NEXT FLD key.

(3) FCP display changes to the ALTITUDE field which is the next field in the routine. The cursor appears in the space for next data entry.

CURSOR IS HERE

```
SYSTEM START UP
ALTITUDE:+0000000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-15. FCS OPERATION (CONT)

c. Changing Fields - Last Field.

You can also change the fields by making the fields in a routine back up. To look at the fields in a routine just in front of the one you are displaying, press LAST FLD (last field) key.

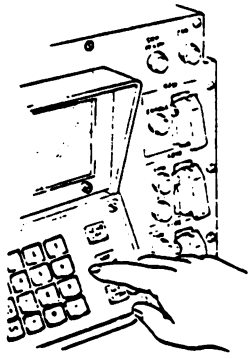
Example:

(1) NORTHING field is displayed and you want to see the easting field. (The easting field is the field just before the northing field.)

```
SYSTEM START UP
NORTHING:[0]0000000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(2) Press LAST FLD key.

(3) FCP display backs up to the field in the routine just before the one you were displaying.



```
SYSTEM START UP
EASTING:[0]00000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

d. Correcting an Entry Error.

To change an entry that you have not stored, press C/E (clear entry) key.

Example:

(1) You are entering the NORTHING number during startup procedure. Number is supposed to be 03570000.

As you enter the number, you see that you made an error and entered 03590000.

CURSOR IS HERE

```
SYSTEM START UP
NORTHING:0359000[0];


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-15. FCS OPERATION (CONT)

CURSOR MOVES BACK TO HERE

```
SYSTEM START UP
NORTHING:[0]0000000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(2) Press the C/E key.

(3) Cursor will move back to first space. The number will change to the number that was entered before you entered 03590000.

(4) Enter the correct number, 03570000.

```
SYSTEM START UP
NORTHING:0357000[0];


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

e. *Changing Stored Data.*

To change data that is stored, enter the new data and press STORE key.

Example:

CURSOR IS HERE NOW

```
SYSTEM START UP
NORTHING:[0]3570000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(1) You are starting up and the NORTHING entry is 03570000. Before you finish the startup procedure, you get instructions to change NORTHING to 03560000.

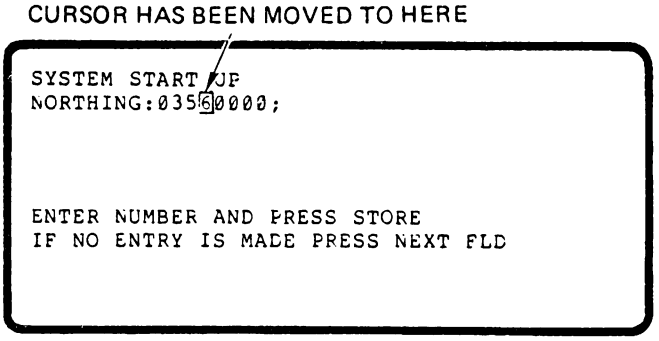
(2) Press the LAST FLD key until the NORTHING field is displayed.

2-15. FCS OPERATION (CONT)

(3) Enter the new numbers 03560000. Enter each number even if some numbers do not need changing. Entering each number again will move the cursor from space to space.

When the cursor gets to the space where the number changes from 7 to 6, enter the new number (6 over 7).

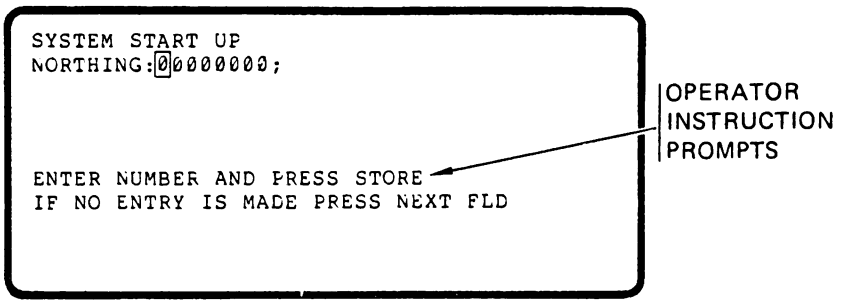
(4) After you enter the numbers, press STORE key. The new number will be entered in the FCS.



f. Operator Instruction Prompts.

Operator instruction prompts are instructions that are displayed to help remind you of what you are supposed to do. There are about 20 of these prompts and they will appear in almost every field displayed.

Some of the prompts are instructions that apply to only one operating procedure. Others are more general and are used in several different operating procedures.



The operating instruction prompts are listed and briefly explained in table 2-2. More detailed use instructions for the prompts are included in the procedures where they are used.

Table 2-2. Operator Instruction Prompts

PROMPT	USE
ARM ROCKETS	Used only during fire missions to tell operator when to arm rockets before firing.
CHECKFIRE AT 00:00:00Z – SAFE ROCKETS	Appears during fire mission if checkfire command is received. If firing, safing rockets causes firing to cease.
CONNECT CABLE AND PRESS INDEX THEN SELECT ROCKET STATUS	After loading LP/Cs, if umbilical cables to LP/Cs are not connected properly, this prompt will tell you to connect them correctly and then to perform rocket status check.
ENTER NUMBER AND PRESS STORE	This prompt appears in display field when operator can make change in data displayed, or make new data entry. If change or new entry is made, data must be stored in FCS before it can be used.
FIRE ROCKETS	Used only during fire mission to tell operator when to fire rockets.
HANGFIRE OCCURRED!!!	This prompt appears at end of fire mission, when operator safes rockets, if one of the rockets was hangfire.
HANGFIRE OCCURRED – PRESS INIT TO OVERRIDE	Used at the end of fire mission if hangfire rocket is present. Tells operator that LLM can be stowed with hangfire rocket, only if INIT key is pressed before LLM STOW key is pressed.
HANGFIRE – SAFE AND ARM TO CONTINUE	Used during fire mission to instruct operator on how to continue firing sequence after hangfire.
IF NO ENTRY IS MADE PRESS NEXT FLD	Used in display field when operator can make change in data, or make complete new entry. It tells operator that if no new entry or change needs to be made, pressing NEXT FLD key will advance display to next field without data change.
MALFUNCTION – SAFE ROCKETS	Appears when two rockets misfire in a row. Indicates probable equipment malfunction.
MISFIRE – SAFE AND ARM TO CONTINUE	Used during fire mission to instruct operator on how to continue firing sequence after misfire.
PRESS LLM STOW OR PRESS INDEX	Tells operator to stow LLM, or if LLM is stowed, to press INDEX key to continue operation. Usually used at beginning of startup if LLM is not stowed and at end of fire mission.
PRESS NEXT FLD	This prompt used in display field when no change or new entry is allowed. It tells operator how to advance display field.
PRESS NEXT FLD FOR SECOND FREE TEXT MSG	Appears after displaying free text message, if second message is stored in FCS.
PRESS NEXT FLD TO REVIEW ENTRY	Used at end of fire mission data entry procedure. Permits operator to review data after all entries are made and before firing problem is computed by FCS.
PRESS SRP ALIGN	Tells operator to realign SRP.

Table 2-2. Operator Instruction Prompts – Continued

PROMPT	USE
SAFE ROCKETS END OF MISSION	Used at end of fire mission to tell operator that mission is ended, and to set ARM switch to safe.
SELECT NUMBER AND PRESS EXEC	This prompt is used in display fields when operator must make selection from menu or choose between two or more possible entries.
SRP ALIGN WARNING	Used as warning to tell operator to realign SRP as soon as possible.
TOO LATE ON TARGET – END OF MISSION	Used during TOT or TTF type of fire mission. Appears when mission fire command is at specified time. FCS computes that there is not enough time to complete mission.
TOO LATE TO ARM – END OF MISSION	Used during TOT or TTF type of fire mission. Appears when mission fire command is at specified time. Mission is started but rockets were not armed in time.
TO CONTINUE MISSION PRESS LCHR LAY	Appears at beginning of fire mission after INIT key is pressed. Tells operator how to continue mission.
WHEN EDITING COMPLETE PRESS EXEC	This prompt appears in display fields that are part of multiple field operating routine. It tells operator how to end that procedure without going through whole routine.
WHEN OPERATION COMPLETE PRESS LLM STOW	Used during boom controller operation. Instructs operator on how to end operation and stow LLM.
WHEN PARKED PRESS INIT	Appears at beginning of fire mission. Tells operator how to continue mission after parking at firing location.

g. Correcting Operating Errors.

Once in a while an operating error will be made. Some errors may be caused by an operator, others may be caused by incorrect data. When an error is made, you will automatically get an error prompt on the FCP display.

In the field shown, the INDEX key was pressed while the rocket test was in progress. No entries are accepted during a rocket fuze test. The FCS displayed the ILLEGAL KEY PRESSED operating error prompt. An error prompt will always be displayed at the bottom of the display. It will appear whenever the error happens regardless of what other field may be on the display. The prompt will be displayed for about 10 seconds and then automatically disappear.

```
HDG 0000MILS                    TIME 00:00:00

ROCKET FUZE TEST IN PROGRESS


AZIMUTH RESOLVER :+0000.0;
ELEVATION RESOLVER:0000.0;



ILLEGAL KEY PRESSED
```

There are several possible error prompts that can be displayed.

The operating error prompt (table 2-3) lists possible errors and how to correct them. If the corrective action listed does not correct the error, notify the next higher maintenance level.

Table 2-3. Operating Error Prompts

PROMPT	ERROR	CORRECTIVE ACTION
ARM COMMAND ILLEGAL – SET ARM SWITCH TO SAFE	ARM switch set to arm position (up) before FCP displays arm command.	Set ARM switch to safe position (down).
ARM COMMAND STOW ILLEGAL	LLM STOW key pressed when ARM switch is still in arm position.	Set ARM switch to safe position, then press LLM STOW.
BOOMS EXTENDED STOW ILLEGAL	LLM STOW key pressed with one or both booms extended.	Retract booms, then press LLM STOW. If necessary, this prompt can be overridden by pressing INIT key.
CFF MESSAGE BEING PROCESSED	Fire mission routine selected from auxiliary index menu before FCS can process a call for fire message received by radio.	Wait a few minutes until message has time to be validated by FCS.
FIRE CIRCUIT ENABLED – STOW ILLEGAL	LLM STOW key pressed when firing rockets.	Fire circuit still active. When firing complete, safe rockets and press LLM STOW. If necessary, this prompt can be overridden by pressing INIT key.
FIRE COMMAND ILLEGAL	FIRE switch activated (set to up) before FCP displays command to fire.	Release FIRE switch. Wait for command. Prompt will erase automatically in about 5 seconds.
ILLEGAL COMMAND	RFU switch enabled (set to up) with FCP ARM switch set to arm.	Set RFU switch down or set FCP ARM switch to safe.
ILLEGAL KEY PRESSED	Operator presses key at wrong time. FCS will not accept command.	Message will usually disappear when correct key is pressed, or erase automatically in about 10 seconds. If prompt is displayed when INIT key is pressed to start fire mission, refer to symptom index (Chapter 3).
ILLEGAL SOURCE ADDRESS COUNT TOO HIGH	Number of messages received with illegal source code is too high over 10 minute period.	Edit comms startup data and correct any incorrect input data for BTRY and/or PLT/TP.
INCONSISTENT COMMS DATA	Overhead message data to comms processor incorrect.	Edit comms startup data and correct entries.
INCORRECT HEADING MOVE VEHICLE	SPLL is not properly parked when INIT key is pressed to start fire mission.	Repark SPLL and press INIT key to start fire mission.
INVALID ENTRY	Number entered in field is too large or to small. (Out of FCS range).	Cursor will return to first entry in field. Enter correct number.

Table 2-3. Operating Error Prompts – Continued

PROMPT	ERROR	CORRECTIVE ACTION
INVALID FIRE MISSION – INCONSISTENT FIELDS	Each entry acceptable. Total mission is not acceptable, because entries are not acceptable when compared to mission as a whole.	Edit data and correct as required or enter new mission.
INVALID FIRE MISSION – INSUFFICIENT ROCKETS	Error made in number of rockets selected for firing.	Check entry. Number of rockets must be equal to or less than number of rockets available.
MESSAGE CANNOT BE REVIEWED	Mission fired message option selected from message menu during fire mission, or ready to fire message option selected at wrong time.	Message will erase in about 10 seconds. Continue normal operation.
MET DATA IN USE	MET data routine selected from auxiliary menu, while FCS was processing MET message.	Wait a few minutes until MET message is processed.
MISSION CANCELLED MANUALLY	LLM STOW key pressed during fire mission while rockets are safed.	Start new mission.
NO SOLUTION ERROR	FCS cannot compute answer to fire problem with data provided. Mission cancelled.	Enter new and correct data. Start new fire mission.
NV MEMORY DATA BAD	SPLL shut down long enough for memory data to be erased.	Perform complete system, comms, and PDS startup.
OUTSIDE FIRE ZONE – MISSION CANCELLED	During fire mission, SPLL was reparked but still cannot aim at any aimpoints assigned.	Start new fire mission.
OUTSIDE FIRE ZONE – PRESS INIT TO CONTINUE	During fire mission, SPLL was reparked but not all aimpoints can be assigned.	Continue mission and fire on aimpoints available or cancel mission.
PDS NOT UPDATED	Calibrate option selected during PDS UPDATE routine before PDS has been updated.	Use INDEX key, select UPDATE PDS option to reenter routine. Make correct selection.
ROCKETS EXHAUSTED	Last available rocket was fired before fire mission is completed.	Mission is ended. Reload SPLL for new mission.
SET FRONT PANEL SWITCHES	All switches not set to off when system power is turned on.	Set all switches to off position.
SEQUENCE ERROR	An operational event occurred out of order during fire mission.	Enter new and correct data. Double check all entries. Start new mission.
SLOPE TOO GREAT MOVE VEHICLE	SPLL is parked on slope greater than 15 degrees when INIT key is pressed.	Park SPLL on flatter terrain.

Table 2-3. Operating Error Prompts – Continued

PROMPT	ERROR	CORRECTIVE ACTION
STOW COMMAND ILLEGAL	LLM STOW key pressed at time when FCS cannot accept command.	If hangfire indicator light is on, hangfire must be cleared. To override, press INIT and then press LLM STOW. If LLM is already stowed, no action required. Prompt will erase in about 10 seconds.
UMBILICAL CABLE NOT PROPERLY CONNECTED	If unloading, umbilical cables not connected to SNVT and cover.	Connect cable to SNVT and cover so that booms and hoist can be operated.
	If connected to LP/C during loading, umbilical cables not connected to LP/C and cover properly.	Connect cables properly after LLM is stowed. To override, press INIT and then press LLM STOW.

h. FCS Fault Prompts.

When the FCS is turned on, it is always self-testing the system for faults. If a fault occurs, a fault prompt will automatically appear at the bottom of the FCP display.

In the example shown, the firing data is displayed and an SRP/PDS MALFUNCTION occurred.

Like an error prompt, the fault prompt will always be displayed at the bottom of the display. It will also appear whenever the fault happens to occur regardless of what other fields may be on the display.

```
HDG 0000MILS                    TIME 00:00:00
TARGET NUMBER:AA0000;  ROCKETS    :   00;
AZIMUTH       :0000.0;  AIM POINTS:   00;
QUADRANT      :0000.0;  FUZE TIME :000.0;
TIME BETWEEN ROUNDS      :00.0;
TARGET NUMBER 2:       ;
TARGET NUMBER 3:       ;



SRP/PDS MALFUNCTION
```

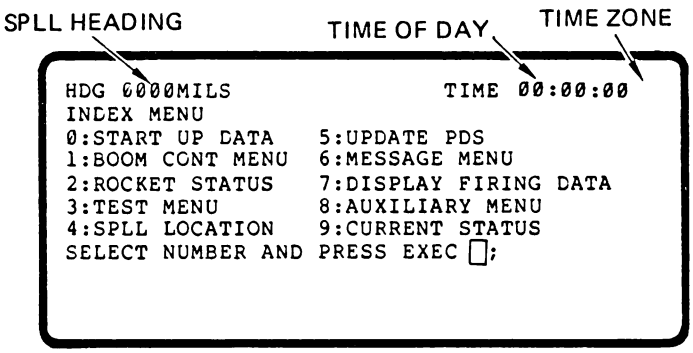
A fault prompt is a short prompt that tells you what has happened. Some fault prompts are caused by serious equipment malfunctions. If the SPLL should be on a fire mission and a serious malfunction occur, the FCS will stop the mission. Some malfunctions are not as serious and do not stop the mission. It may be possible to complete the mission before correcting the malfunction. If the malfunction stops the mission, instructions to safe the rockets and that the mission is ended are displayed automatically.

Fault prompts caused by equipment malfunctions are listed in the fault prompt and symptom indexes in the troubleshooting section of Chapter 3. The faults are also explained in the same table. If a fault prompt should be displayed, notify your section chief at once. Refer to the troubleshooting section of Chapter 3 for corrective action.

Remember, fault prompts appear only if a fault occurs. It is possible that you may never see some of them.

2-15. FCS OPERATION (CONT)

i. Heading and Time Line.



Some of the fields, used as an example in this section, have had what is called a heading and time line at the top of the field.

The heading and time line has two parts.

(1) SPLL Heading. (HDG 0000 MILS) This is the direction that the front of the SPLL is pointed. It is referenced to true north.

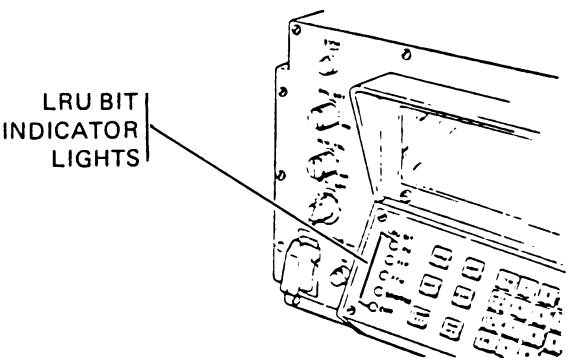
(2) Time of Day. (TIME 00:00:00 Z) This is the actual time of day. The correct time is entered into the FCS when the FCS is started up. The time zone is represented by the alphabetical letter in the upper right corner. The time zone is also entered during startup. Detailed instructions for entering the correct time and time zone are in the system startup procedures (paragraph 2-22).

The heading and time line does not always appear. There are some operating routines that do not display this message. For example, it does not appear during startup. Also, the heading will not be displayed unless the SRP/PDS is operating. The clock will not keep time until the correct time is entered, and the clock started. The time must be entered accurately if the FCS is to keep time accurately.

j. LRU BIT Indicator Lights.

When a malfunction occurs in one of the major subsystems or components of the FCS, an indicator light will come on. These indicator lights are called LRU BIT (line replaceable unit, built-in-test) indicator lights. They are mounted on the front of the FCP.

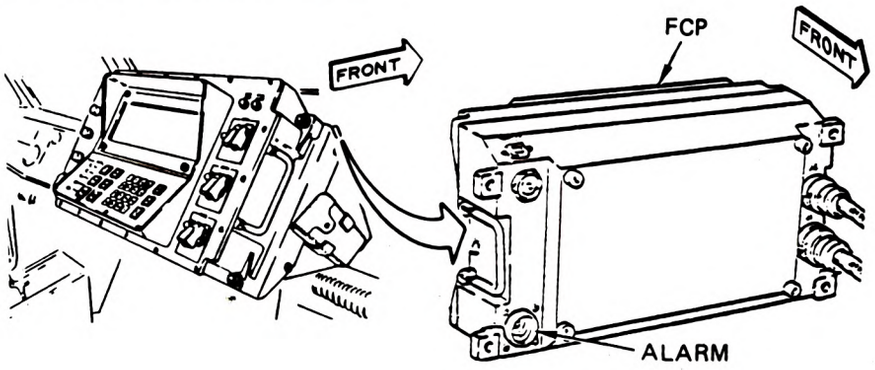
When one of these indicator lights comes on, it means a subsystem or component of the FCS has failed. Procedures for corrective action are given in troubleshooting section of Chapter 3.



2-15. FCS OPERATION (CONT)

k. Audible Alarm.

An audible alarm is built into the back of the FCP.

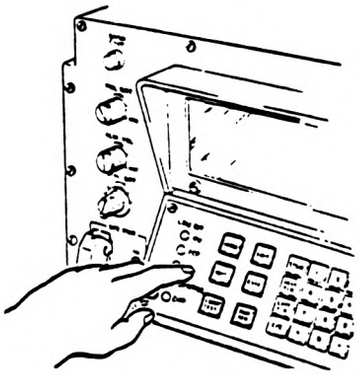


When turned on, the alarm can be heard in the carrier cab with or without the intercom on. (If the intercom is on, you will hear the alarm through your headset.)

The alarm is a warning used to alert the crew to two different conditions.

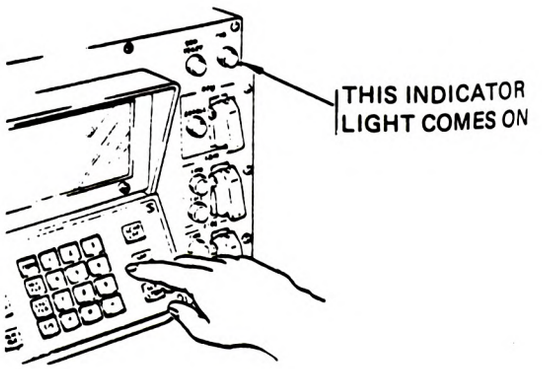
(1) When you have received a message, you must answer.

Pressing the ALM ACK key on the FCP will turn off the alarm and automatically tell BTRY that you have received the message.



(2) During a fire mission, if you have an open door, hatch, or ventilator, the alarm will come on. A CAB indicator light on the FCP will also come on.

Closing the open door, hatch, or ventilator will turn off the alarm and cause the indicator light to go off.



2-15. FCS OPERATION (CONT)

l. Selecting Operating Routines.

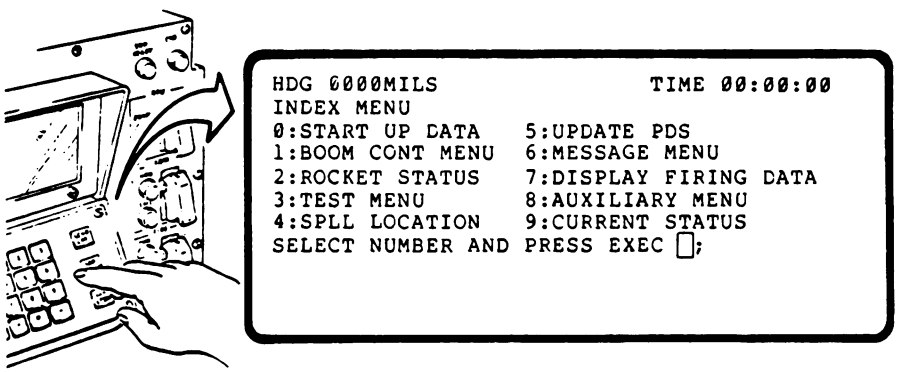
The operation of the FCS is controlled by use of several operating routines. The most often used operating routines are listed in a field called the index menu.

Routines that can be selected from the index menu are:

(1) START UP DATA
(2) BOOM CONT MENU
(3) ROCKET STATUS
(4) TEST MENU
(5) SPLL LOCATION
(6) UPDATE PDS
(7) MESSAGE MENU
(8) DISPLAY FIRING DATA
(9) AUXILIARY MENU
(10) CURRENT STATUS

Some of the operating routines listed are menus. When selected, they will in turn, list more operating routines.

To select a routine, press the INDEX key and display the INDEX MENU.



When the index menu appears, select the routine you want. Enter the number listed for the routine, then press EXEC key.

2-15. FCS OPERATION (CONT)

Example:

(1) You are on a fire mission. Before you move to the firing position, you want to check your present location.

(2) Press the INDEX key and display the INDEX MENU.

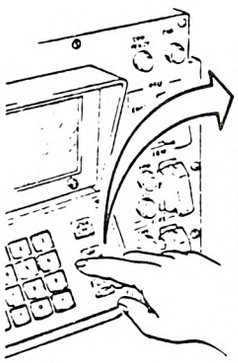
```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(3) The SPLL LOCATION routine is the number 4 routine. Press the 4 key on the keyboard.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 4;
```

NUMBER SELECTED APPEARS HERE

(4) Press EXEC key. The SPLL LOCATION GRID routine is displayed.



```
HDG 0000MILS                    TIME 00:00:00

SPLL LOCATION GRID :0000 0000;
```

2-15. FCS OPERATION (CONT)

In addition to the 10 routines shown on the index menu, there are nine additional routines listed in the auxiliary menu. The AUXILIARY MENU is listed as number 8 in the index menu.

To display the auxiliary menu press the INDEX key and display the INDEX MENU. Select number 8 on the keyboard, then press EXEC key. The AUXILIARY MENU is displayed.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC ;
```

There are some operating conditions when the index menu cannot be displayed.

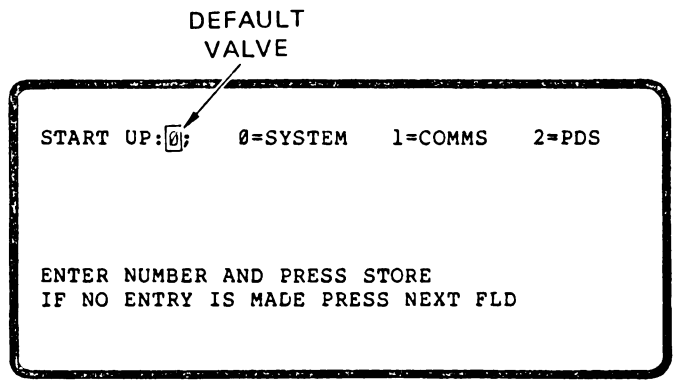
(1) If you are on a fire mission and have pressed the LCHR LAY key and started a firing routine.

(2) If you are working a routine that you have selected from the index or auxiliary menu.

m. Default Values.

Sometimes you must make a selection and enter it to advance and continue the routine. Usually, the most often selected option will be automatically selected for you. The number automatically selected will be shown under the cursor when the field is displayed.

This number is called the default value. To enter it into the FCS, press the NEXT FLD key. The default value is automatically entered as the selection. The routine automatically advances to the next field.



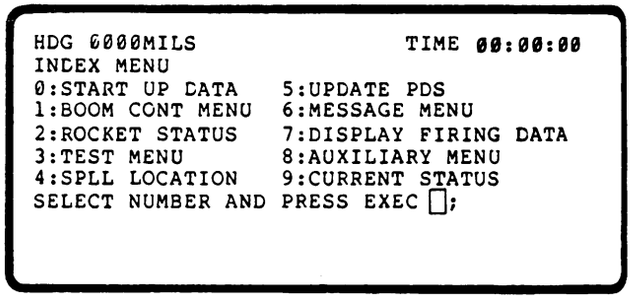
The field shown is an example of the startup selection field in the startup data routine. A 0 is automatically displayed. Pressing NEXT FLD key will select the system startup routine and advance the display field. (The startup data routines are described in detail in Section IV.)

However, you can always change selections. Just select the new number. The default value will be erased and the new selection displayed. Press STORE key and the new selection is entered. The routine will advance to the next field.

2-16. USING INDEX MENU. Each operating routine listed in the index menu has a separate use. The uses are described in the following paragraphs.

a. Start Up Data.

This routine is used to enter turn-on (starting) data into the FCS for normal operation. The data is information that must be entered when the FCS is turned on after a shutdown. Typical data entered is easting, northing, time of day, and radio communications identification codes. This routine is also used to turn on the SRP/PDS.

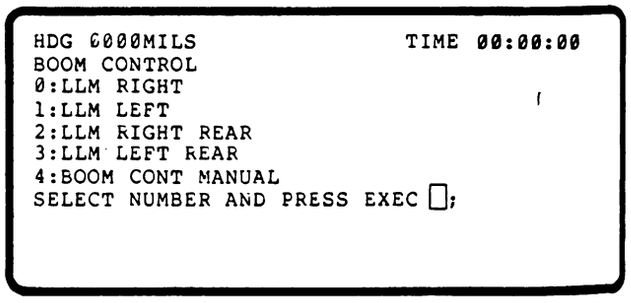


Detailed instructions on using this routine to start up the FCS are given in paragraph 2-22.

b. Boom Control Menu.

This routine is used to select the BC operation. When selected, another menu is displayed immediately.

This menu lists a selection of LLM positions for reloading the SPLL. Detailed explanations of each selection and step-by-step instructions for operating the BC are given in paragraph 2-20. A typical reloading procedure is described in paragraph 2-32.

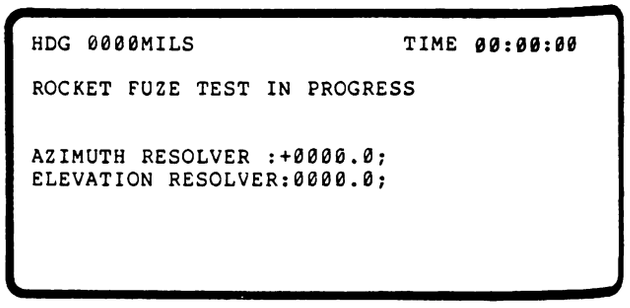


c. Rocket Status.

This operating routine is a two-field routine. It lets you check the rockets in the LP/C and displays their status.

Select option number 2 from the index menu. Press the EXEC key. The rocket fuzes will be tested automatically. A field telling you the test is in progress will be displayed.

Resolver readouts may also be displayed. They are used during BC operations to let you know the position of the front of the LLM when stowing the LLM. Refer to BC operation (paragraph 2-20) and test menu (paragraph d) for more explanations on the azimuth and elevation resolver readouts.



2-16. USING INDEX MENU (CONT)

BRIGHT RECTANGLE

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77    LP/C 2  M77
ROCKETS   6 5 4 3 2 1    1 2 3 4 5 6
STATUS    □□D□□□  □□□□□□
SELECTED
AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
```

The rocket fuze test in progress field will be displayed for a few seconds. When the test is completed, the ROCKETS STATUS field is displayed.

This field shows which rockets are in the LP/Cs and their condition.

A bright rectangle (like the cursor) will appear on the STATUS line under the rocket number if that rocket is in the LP/C and it tests good.

If the rocket does not test good, the bright rectangle will be replaced with a letter telling you the rockets status.

If the rocket is a dud, the letter D will appear in place of the rectangle.

Rocket status field is also displayed during a fire mission. If a rocket misfires, the letter M will appear in place of the rectangle.

If a rocket hangfires (you will be following emergency procedures), the letter H will appear in place of the rectangle.

If the space under the rocket number is blank, this indicates that there is no rocket in the LP/C in that space.

The selected line of the display is used, during the fire missions, to identify which rockets have been selected for firing.

2-16. USING INDEX MENU (CONT)

d. Test Menu.

```
HDG 0000MILS                    TIME 00:00:00
TEST MENU              VERSION ID:MIS-30030-101
0:FCU TEST MENU          4:NV MEMORY BATTERY
1:V24 INTERFACE          5:RESOLVER READOUT
2:DISPLAY                6:ROCKET SELECTION
3:KEYBOARD               7:TECHNICAL FIRE MSN

SELECT NUMBER AND PRESS EXEC [];
```

Selecting this routine from the index menu causes a special TEST MENU to be displayed.

The menu actually lists more than test routines. Selections numbered 0 through 4 are tests used by maintenance personnel to assist in location of FCS malfunctions.

```
HDG 0000MILS                    TIME 00:00:00


AZIMUTH RESOLVER :+0000.0;
ELEVATION RESOLVER:0000.0;
```

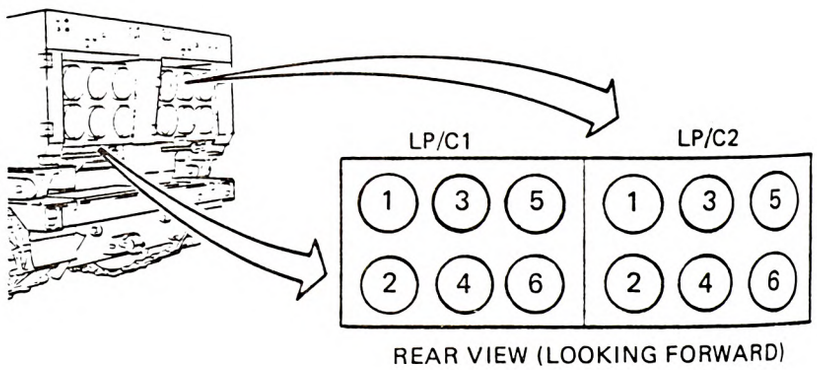
The resolver readout selection, number 5 option, is a nontest routine. It is used to check the position of the front of the LLM.

Resolver readouts are in mils. Positive azimuth readouts indicate the LLM is turned to the right of the front of the SPLL. Negative azimuth readouts indicate LLM is turned to the left.

Once selected, the field will remain displayed until, INDEX, SRP ALIGN, or ALM ACK is pressed. The readout is also displayed when LLM STOW is pressed. It will remain on the display until the LLM is stowed, then automatically erase.

Technical fire mission, number 7 option, is a nontest routine and is selected when you need to enter technical fire mission data. Normal fire mission data is entered as tactical data and the FCS computer computes the solution to the fire problem. This routine is intended for use only on special orders.

The rocket selection, number 6 option, is also a nontest routine. Normally the rocket firing sequence from each LP/C is selected automatically in the order shown.



REAR VIEW (LOOKING FORWARD)

2-16. USING INDEX MENU (CONT)

Rkt Flt No.	LP/C	Tube
1	1	6
2	1	5
3	1	4
4	1	3
5	1	2
6	1	1
7	2	1
8	2	2
9	2	3
10	2	4
11	2	5
12	2	6

This routine allows you to change the rockets to be fired. Firing will be in the sequence shown but rockets not selected will be skipped. This routine is normally not used. It is intended for use only on special orders. The following example describes how this routine is used.

Example:

(1) The SPLL is going out on the test firing range to fire special practice rounds. You wish to fire the rockets in the number 6, 4, and 1 positions of LP/C 1 and rockets number 2, 3 and 5 of LP/C 2.

(2) At the firing location you press the INDEX key and display the INDEX MENU.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 3;
```

(3) From the index menu, following the prompt, select the TEST MENU, number 3 option, and press the EXEC key. The TEST MENU is displayed.

```
HDG 0000MILS                    TIME 00:00:00
TEST MENU              VERSION ID:MIS-30030-101
0:FCU TEST MENU          4:NV MEMORY BATTERY
1:V24 INTERFACE          5:RESOLVER READOUT
2:DISPLAY                6:ROCKET SELECTION
3:KEYBOARD               7:TECHNICAL FIRE MSN

SELECT NUMBER AND PRESS EXEC ;
```

2-16. USING INDEX MENU (CONT)

(4) Following the prompt, you select the ROCKET SELECTION routine, number 6 option, and press the EXEC key again. The first field of the rocket selection routine is displayed.

The field allows the selection of rockets from LP/C 1. You want to select rockets 6, 4 and 1 for firing from LP/C 1.

```
HDG 0000MILS                    TIME 00:00:00
ROCKET NUMBER:_;
SELECT LP/C 1 ROCKETS: 6 5 4 3 2 1



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(5) Enter number 6 as the first rocket selection. The number will appear where the cursor was by the ROCKET NUMBER entry.

Press STORE key.

```
HDG 0000MILS                    TIME 00:00:00
ROCKET NUMBER:6;
SELECT LP/C 1 ROCKETS: 6 5 4 3 2 1



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(6) The number 6 will be erased and a cursor will appear below the 6 on the SELECT LP/C 1 ROCKETS line.

```
HDG 0000MILS                    TIME 00:00:00
ROCKET NUMBER:_;
SELECT LP/C 1 ROCKETS: 6 5 4 3 2 1
                       _


ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(7) Next, enter number 4 as the second selection, then press STORE key.

As each number is selected and stored, a cursor will appear below the number for the rocket.

INDICATES ROCKETS SELECTED

```
HDG 0000MILS                    TIME 00:00:00
ROCKET NUMBER:_;
SELECT LP/C 1 ROCKETS: 6 5 4 3 2 1
                       _ _


ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

2-16. USING INDEX MENU (CONT)

(8) When the last rocket from LP/C 1 is selected, press EXEC key. The LP/C 2 selection field is displayed.

```
HDG 0000MILS                    TIME 00:00:00
ROCKET NUMBER:□;
SELECT LP/C 2 ROCKETS: 1 2 3 4 5 6



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(9) From LP/C 2, you select rockets 3 and 5 to be fired and then press EXEC key.

NOTE

You must press EXEC key to change fields even if you did not select any rockets.

(10) Pressing EXEC key after selecting the rockets from LP/C 2 causes the ROCKETS STATUS field to be displayed.

```
HDG 0000MILS                          TIME 00:00:00
            LP/C 1  M77    LP/C 2  M77
ROCKETS     6 5 4 3 2 1    1 2 3 4 5 6
STATUS      □ □    □       □ □
SELECTED
```

The rocket status display shows you the rockets you selected for firing from both LP/Cs. The field disappears when you press INDEX key to continue operation.

Selecting rocket status, number 2 option, from the index menu will erase rocket selections using this routine.

e. SPLL Location.

SPLL LOCATION is the number 4 option listed in the index menu. This is a one field routine. It shows you the easting and the northing of your present location.

```
HDG 0000MILS                    TIME 00:00:00

SPLL LOCATION GRID :0000 0000;
```

2-16. USING INDEX MENU (CONT)

Notice that only four digits are used to show easting and northing coordinates for the SPLLs location. The four digits are given to simplify locating the coordinates on a map. The four digits are part of the full coordinate number as shown by the underlines below.

EASTING – 123456

NORTHING – 09876543

The four digits will locate the coordinate position to approximately 10 meters. This is normally close enough to locate a position.

The four digit coordinates are only used to show you a position. When you are entering a coordinate into the FCS as a data input, the full coordinate number will be used.

f. Update PDS.

The update PDS routine is the number 5 option on the index menu. It is used to both update and calibrate the PDS. Updating the PDS allows the operator to compare the PDS output in easting, northing and altitude coordinates with the coordinates of a fixed survey control point (SCP). When the PDS is updated, the SPLL is accurately positioned at a SCP and the PDS output coordinates are checked for accuracy. Any difference in PDS output is then changed so that the SPLL location coordinates agree with the SCP coordinates.

Calibration is very much like updating. However, two separate SCPs are used. The PDS is updated at the first SCP. Standard values are entered as PDS correction data. The SPLL is driven to the second SCP and the PDS is calibrated. The calibration computes correction data. The data is recorded and the PDS is updated. Standard values are entered again as PDS correction data. The SPLL is driven back to the first SCP and calibrated again. The computed correction data is compared with the data recorded at the second SCP. The results are recorded for use until the next calibration.

A detailed explanation of PDS updating is provided in paragraph 2-26.

A detailed explanation of PDS calibration is provided in paragraph 2-27.

g. Message Menu.

This routine is the number 6 option. It is used to select messages that can be sent to your PLT/TP or the BTRY. Typical messages that can be sent from the SPLL are location/status reports, mission status, mission fired, and request messages.

Detailed instructions on using the message routines are given in paragraph 2-19.

h. Display Firing Data.

This routine is one field. It allows you to see the firing data for the next target assigned to your SPLL. The data includes target azimuth, elevation, fuze time, aimpoints, number of rockets for the target, and time between rocket rounds. This routine will also display the target numbers for two more targets that can be stored in the FCS. If no targets are assigned, the target number entry spaces will be blank. As each fire mission is completed, the target numbers will move up in position (i.e., target number three becomes number two). Target number two moves up to become target number one.

2-16. USING INDEX MENU (CONT)

To display the firing data routine, select number 7 from the index menu and press EXEC key.

Pressing INDEX key will cause the field to erase and the index menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
TARGET NUMBER:AA0000;  ROCKETS   :   00;
AZIMUTH      :0000.0;  AIM POINTS:   00;
QUADRANT     :0000.0;  FUZE TIME :000.0;
TIME BETWEEN ROUNDS     :00.0;
TARGET NUMBER 2:       ;
TARGET NUMBER 3:       ;
```

i. Auxiliary Menu.

Selecting this routine, number 8 option, will display the AUXILIARY MENU. The auxiliary menu is a continuation of the index menu.

An explanation on the use of auxiliary menu routines is provided in paragraph 2-17.

To select the auxiliary menu, select number 8 from the index menu and press EXEC key.

j. Current Status.

Selecting this routine will cause the SPLLs latest assignment to be displayed. The assignment could be to move to a firing position, to a load/unload position, to a hide position, or to end the mission.

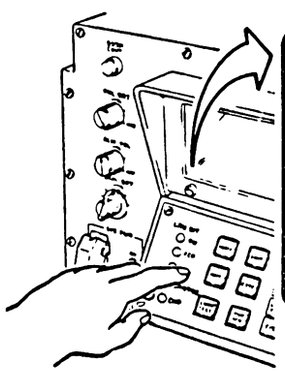
Example:

(1) You are on a fire mission. The FIRING POINT GRID and SPLL heading (HDG) at the site are displayed on the FCP.

This field is displayed.

```
HDG 0000MILS                    TIME 00:00:00
FIRING POINT GRID:0000 0000;
COMPUTING FIRING DATA
AT END OF MISSION MOVE TO GRID:0000 0000;
METHOD OF FIRE CONTROL:AT MY COMMAND

PARKING HEADING:0000MILS OR 3200MILS
WHEN PARKED PRESS INIT
```

(2) As you move to the firing point, you want to check your target assignment. You press the INDEX key and display the INDEX MENU. When the index menu is displayed you press the number 7 key to select the DISPLAY FIRING DATA routine.



```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 7;
```

NUMBER 7 HERE

2-16. USING INDEX MENU (CONT)

(3) Next, you press the EXEC key and display the firing data field that shows your target assignment.

You see your target assignment, which is shown as TARGET NUMBER AA0012. You also see that a second target, number AA0013, is stored in the FCS. Now you want to display the fire mission field that was on the display and continue the mission.

```
HDG 0000MILS                    TIME 00:00:00
TARGET NUMBER:AA0012;  ROCKETS    :   00;
AZIMUTH       :0000.0;  AIM POINTS:   00;
QUADRANT      :0000.0;  FUZE TIME :000.0;
TIME BETWEEN ROUNDS      :00.0;
TARGET NUMBER 2:AA0013;
TARGET NUMBER 3:       ;
```

(4) Press the INDEX key. The INDEX MENU is displayed. Next you select the CURRENT STATUS routine, option number 9.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 9;
```

NUMBER 9 HERE

(5) When the selection is made you press the EXEC key. The field showing your FIRING POINT GRID and PARKING HEADING, which is your current assignment, is displayed again.

```
HDG 0000MILS                    TIME 00:00:00
FIRING POINT GRID:0000 0000;
COMPUTING FIRING DATA
AT END OF MISSION MOVE TO GRID:0000 0000;
METHOD OF FIRE CONTROL:AT MY COMMAND

PARKING HEADING:0000MILS OR 3200MILS
WHEN PARKED PRESS INIT
```

2-17. USING AUXILIARY MENU. The AUXILIARY MENU lists additional operating routines for normal SPLL operation.

Each routine has a separate use. These uses are explained in the following paragraphs.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC ;
```

a. Compute Firing Data.

This is the first routine, option 0, listed in the menu.

Selecting this routine causes firing data in the FCS to be recomputed. This routine lets you recompute the firing data whenever you think it may be necessary. Such as, after receiving new MET data before a firing mission.

```
HDG 0000MILS                    TIME 00:00:00

COMPUTING FIRING DATA
```

This field also appears automatically after manually entering fire mission data, or after receiving a call for fire (fire mission) message over the radio. The display is erased when the computation is completed.

b. Select Silent Watch.

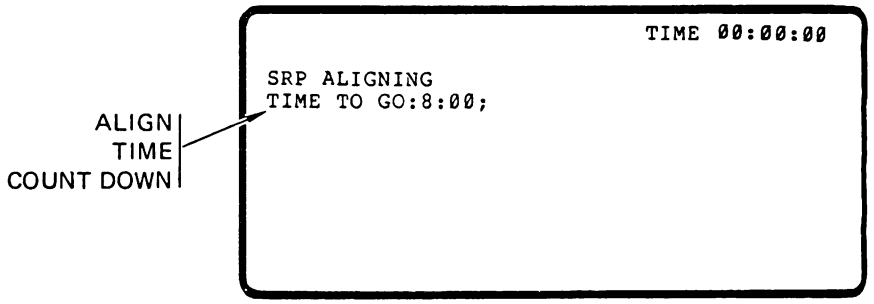
This routine is used after a normal startup to put the FCS in standby. It can be used during periods of waiting to receive or perform fire missions. When number 1 option is selected from the auxiliary menu, the SILENT WATCH selection field is displayed.

If START is selected the SRP/PDS is turned off. The FCS is held in a waiting mode.

```
HDG 0000MILS                    TIME 00:00:00

SILENT WATCH:0;    0=STOP    1=START


ENTER NUMBER AND PRESS STORE
```

2-17. USING AUXILIARY MENU (CONT)

If you are in the silent watch mode, selecting STOP will end the routine. The SRP/PDS will be turned back on, and it will start to align. An SRP ALIGNING field will be displayed.

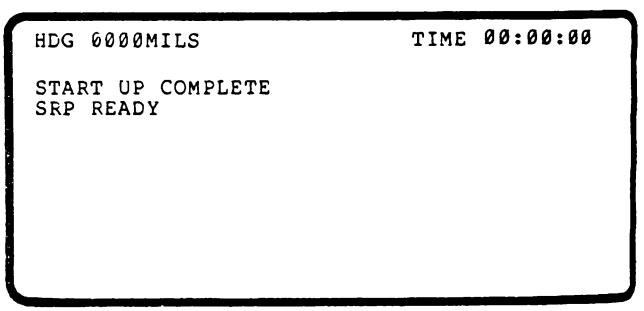


This field will also appear and the SRP/PDS is turned back on, if a call for fire message is received while in the silent watch mode. The call for fire message is explained in communications operation (paragraph 2-18).

This field is displayed when the SRP is aligning or realigning. A countdown time is displayed. The time indicates how long you must wait until the SRP alignment or realignment is completed. About 8 minutes is normal for alignment after turnoff, and 2 minutes, 30 seconds is normal for a realignment.

When the SRP alignment is complete a START UP COMPLETE field will be displayed.

Normal operation can begin again without going through a full startup routine.

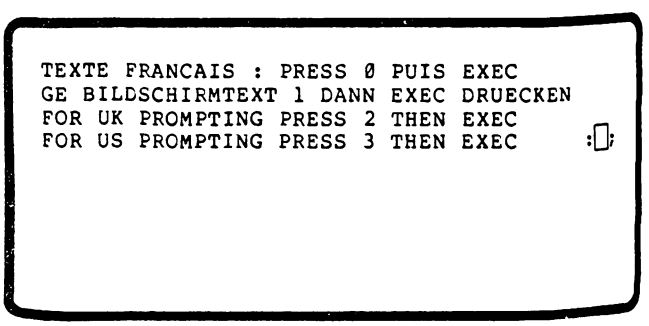


c. Select Prompting Mode.

From the description in Chapter 1, you know the FCS is programmed for French, German, United Kingdom, and United States language prompts. The selection is for the language used in the display field and the type prompt that is displayed in each field. Language selection is part of the normal startup procedure, and appears automatically at that time. This routine is intended to let you change languages after startup without shutting down.

Both UK and US selections use English. The instruction prompts and parts of some routines are different.

Selecting number 2 option from the auxiliary menu will display the LANGUAGE SELECTION menu.



2-17. USING AUXILIARY MENU (CONT)

d. Display Free Text Message.

Selecting number 3 option from the auxiliary menu will cause any free text message stored in the FCS to be displayed. Free text messages can be sent to the SPLL by both the PLT/TP and the BTRY. The use of this routine is explained in detail in the explanations of the message routines (paragraph 2-18, i).

e. Fire Mission.

This routine is used to edit (review) tactical fire mission data entered into the FCS over the radio as a digital coded message. The fire mission message is called a call for fire (CFF) message. This routine is also used to enter tactical fire missions manually. Detailed explanations with step-by-step procedures for this routine are given in paragraph 2-30. This routine is the number 4 option on the auxiliary menu.

f. MET Data.

The MET data routine is the number 5 option listed in the auxiliary menu. When selected, this routine is used to edit MET data entered into the FCS by digital coded radio message, and to enter MET data manually. Detailed explanations with step-by-step procedures for using this routine are provided in paragraph 2-33.

g. Recall Location.

This is the number 6 option on the auxiliary menu. When selected, a menu listing possible location data is displayed.

```
HDG 0000MILS                TIME 00:00:00
RECALL LOCATION
0:LAST SPLL LOCATION3:RENDEZVOUS GRID
1:SUPPLY GRID       4:MOVE TO GRID
2:NEXT FIRING POINT 5:SURVEY CONTROL POINT

SELECT NUMBER AND PRESS EXEC □;
```

From this menu you can select a location for which you want to see the coordinates. When the selection is made and EXEC key is pressed, the name of the position and the coordinates for the position will be displayed.

```
HDG 0000MILS                TIME 00:00:00



LAST SPLL LOCATION GRID:0000 0000;
```

2-17. USING AUXILIARY MENU (CONT)

The example shown is the LAST SPLL LOCATION GRID. The location data displayed will be the current SPLL location, which is the latest SRP/PDS output. Other recall locations listed that you can select are:

(1) SUPPLY AT GRID
(2) NEXT FIRING POINT
(3) RENDEZVOUS AT GRID
(4) MOVE TO GRID
(5) SURVEY CONTROL POINT

The location data displayed for these locations will be the latest data received in a location/status or command message.

h. Standard MET.

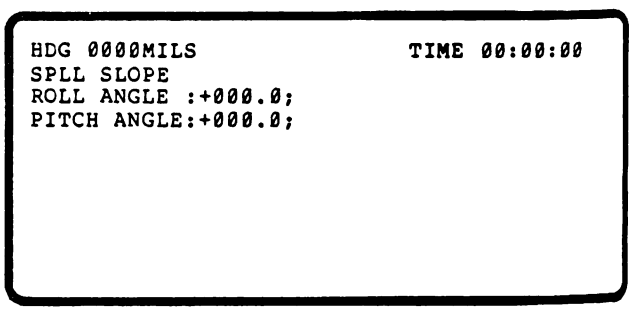
This routine causes standard MET data to be used by the FCS. When number 7 option is selected and executed, there is no response that the operator can see. All changes are inside the FCS. Standard values for all MET data are permanently stored in one section of the FCS.

Normally the MET data, used by the FCS, is updated data for local conditions entered by digital radio or manual input. However, if for some reason the updated data is not available, then standard data must be used. Selecting this routine takes the standard data and puts it into use in the FCS.

i. SPLL Slope.

This field appears when the number 8 option is selected. It displays the SPLLs pitch and roll angles.

The angles are referenced to the front of the SPLL and are in mils. A positive roll angle is the right side of the SPLL low. A negative roll angle is the right side of the SPLL high. A positive pitch angle is the front of the SPLL up. A negative pitch angle is the front of the SPLL down.



2-18. COMMUNICATIONS OPERATION. Voice and digital coded audiotone are two methods used to communicate by radio between the SPLL and the PLT/TP and/or the BTRY. The primary method is to use digital coded audiotone. Using this method, radio messages carrying necessary operational information (data) are received, accepted, and automatically entered into the FCS. This same data can also be sent by voice messages and manually entered into the FCS, but the digital coded messages are much faster.

a. Messages Received.

There are seven basic digital message types that the SPLL can receive. The message types are:

(1) Location/Status (LOST)
(2) Command (COM)
(3) Request (REQ)
(4) Meteorological (MET)
(5) Free Text (FT)
(6) Checkfire (CHKF)
(7) Call For Fire (CFF)

b. Messages Transmitted.

There are five basic digital messages the SPLL can transmit.The message types are:

(1) Location/Status (LOST)
(2) Masking Data
(3) Mission Fired (MF)
(4) Mission Status (MST)
(5) Request (REQ)

c. Message Exchanges.

The digital coded messages that the SPLL can receive or transmit are grouped into message exchanges. The message exchanges are set up to meet the SPLLs operating requirements. Table 2-4 shows these message exchanges and lists the message sequence and types in each exchange sequence. The table shows that five of the message sequences are in answer to a message received from the BTRY or PLT/TP. They are:

(1) Checkfire
(2) Call for Fire
(3) Command
(4) Meteorological
(5) Free Text

The location/status and request message sequences can originate (start) with the SPLL or the BTRY, and/or PLT/TP.

The mission fired message sequence is originated by the SPLL only. The mission status message can originate only at the SPLL or PLT/TP.

All of the message sequences have two or more messages exchanged to complete a sequence. A sequence must be completed before a new one is started. The exception is the checkfire message, which has priority over all other digital coded messages.

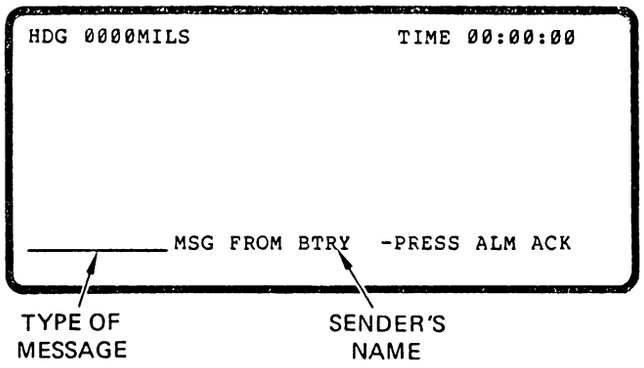
Table 2-4. Digital Coded Message Exchange Sequences

TYPE SEQUENCE	TYPE MESSAGE	MESSAGE TRANSMITTED BY	MESSAGE RECEIVED BY
Checkfire	CHKF	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
	MST	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Call for fire	CFF	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
	MST	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Command	COMM	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
	MST	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Free text	FT	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
Location/Status	LOST	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
	LOST	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Meteorological	MET COM	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP
Mission fired	MF	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Mission status	MST	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
Request	REQ	SPLL	BTRY or PLT/TP
	ACK/NAK	BTRY or PLT/TP	SPLL
	REQ	BTRY or PLT/TP	SPLL
	ACK/NAK	SPLL	BTRY or PLT/TP

2-18. COMMUNICATIONS OPERATION (CONT)

d. Receiving Digital Coded Messages.

All messages received cause a message received prompt to be displayed and an alarm to sound. The alarm alerts you to the incoming message. The prompt tells you the message type and who sent it.



The names of the message types that can be received are:

(1) Location/Status
(2) Command
(3) Request
(4) MET Data
(5) Free Text
(6) Checkfire
(7) Call for Fire

Messages from the battery fire direction center display BTRY as the sender. Messages from the platoon leader display PLT/TP as the sender.

After a message is received, pressing ALM ACK key will turn off the alarm and erase the prompt. MET and FT messages are stored. To display these messages, the index and auxiliary menus must be used to call up the routines for display. Other message types cause some type of data to be displayed immediately. An exception is the CFF message. The FCS can receive and store as many as three fire missions. The first mission received will display data immediately. A second or third CFF message will be stored. Each can be displayed in its turn, after the preceding messages are executed or cancelled.

Displaying message data immediately can cause part of another data field to be erased by writing over it. Also, if there are no CFF messages stored, care must be used when a CFF message is received. Pressing ALM ACK with other data displayed can cause the received message to be locked out. Refer to paragraph k for more explanations. When a message is received, be sure you are ready to display the data before pressing ALM ACK key.

Received messages usually require some followup action. The different messages contained in each message type and some possible uses are described in the following paragraphs.

e. Location/Status Message Received.

This type of message is received as an answer to a request message. The message can be received from BTRY or PLT/TP. It is usually for information only and any followup action will depend on local operating instructions.

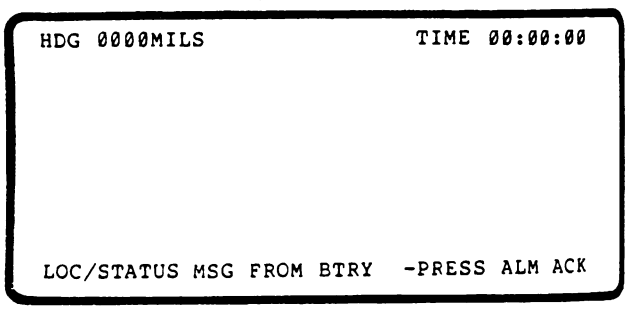
2-18. COMMUNICATIONS OPERATION (CONT)

There are six different messages that you can receive as location/status messages. They are:

(1) MOVE TO GRID
(2) RENDEZVOUS AT GRID
(3) SUPPLY AT GRID
(4) NEXT FIRING POINT GRID
(5) SURVEY CONTROL POINT GRID
(6) LAST SPLL LOCATION GRID

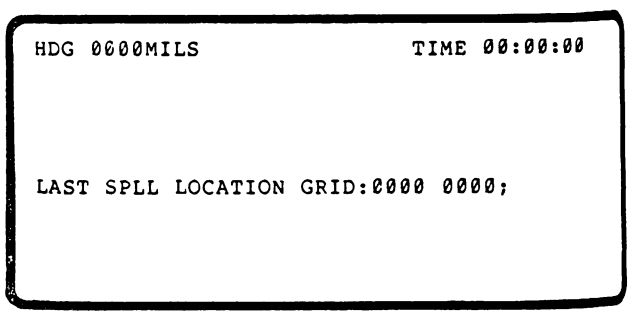
Some of the messages listed are also used as command messages. The message received prompt will tell you if the message is a location/status message. The command message received routine is explained in paragraph f.

When a location/status message is received, the audible alarm will sound and the message received prompt will be displayed.

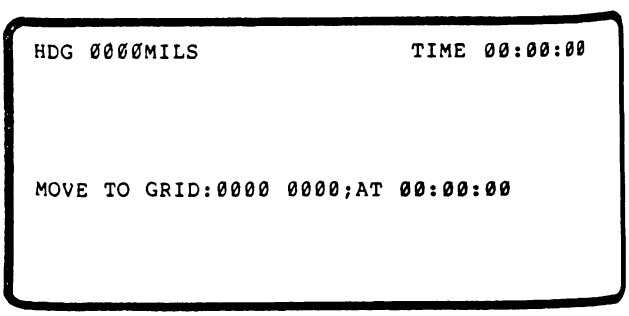


Pressing the ALM ACK key erases the message received prompt and displays the message. The messages that can be received are explained as follows:

(a) LAST SPLL LOCATION GRID. This message contains current SPLL location data from the SRP/PDS.



(b) MOVE TO GRID. This message contains coordinates of a new location and the time the move should begin.



2-18. COMMUNICATIONS OPERATION (CONT)

(c) RENDEZVOUS AT GRID. This message contains rendezvous coordinates and a time to be at the rendezvous point.

```
HDG 0000MILS                    TIME 00:00:00

RENDEZVOUS AT GRID:0000 0000;AT 00:00:00
```

(d) SUPPLY AT GRID. This message contains load/supply point coordinates, and the type of rockets to be loaded.

```
HDG 0000MILS                    TIME 00:00:00

SUPPLY AT GRID:0000 0000;M77 00 M77 00
```

(e) NEXT FIRING POINT GRID. This message contains the next firing point coordinates.

```
HDG 0000MILS                    TIME 00:00:00

NEXT FIRING POINT GRID:0000 0000;
```

(f) SURVEY CONTROL POINT GRID. This message contains coordinates of a survey control point.

```
HDG 0000MILS                    TIME 00:00:00

SURVEY CONTROL POINT GRID:0000 0000;
```

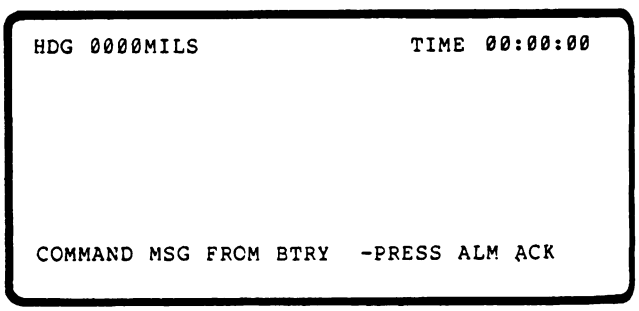
2-18. COMMUNICATIONS OPERATION (CONT)

f. Command Message Received.

This message is usually used to order the SPLL to start or stop an action. It is usually sent by the BTRY, but can also be sent by PLT/TP. There are several different command messages. Some of the location/status messages can also be received as command messages. They are:

(1) MOVE TO GRID
(2) RENDEZVOUS AT GRID
(3) SUPPLY AT GRID
(4) NEXT FIRING POINT GRID
(5) SURVEY CONTROL POINT GRID

The message received prompt tells you when the message is a command message.

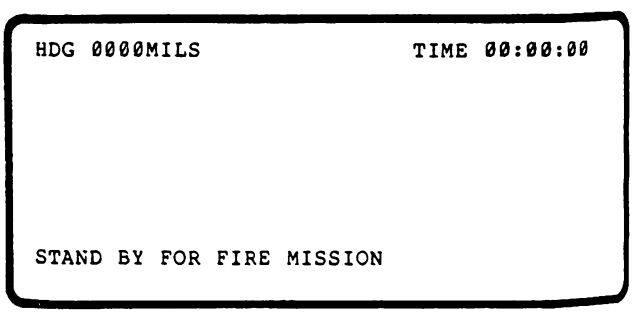


After the command message received prompt appears and the ALM ACK key is pressed, a mission status message will appear on the display. A mission status message must be transmitted back to the sender in answer to a command message. Mission status message tells the sender that you will or will not comply to a command. Refer to paragraph 2-19, e for an explanation on the use of the mission status message.

When the mission status message has been transmitted, the type of command message received prompt will appear on the display. In addition to the messages that are also listed as location/status messages, the several other types of command messages are possible. They are explained as follows.

(a) Warning Order. There are two general warning orders. One is a stand by for fire mission warning.

The message may be used with move orders, and the time the move should be executed. It is also used to warn that a fire mission is about to be sent to your SPLL.



2-18. COMMUNICATIONS OPERATION (CONT)

The other general type warning order is to remain in position.

```
HDG 0000MILS                    TIME 00:00:00


MAINTAIN SPLL LOCATION
```

(b) FIRE ROCKETS. This message is used during a fire mission as the fire command. When performing an AT MY COMMAND, or an ON CALL type fire mission, this command message is in response to a ready to fire message from the SPLL.

```
HDG 0000MILS                    TIME 00:00:00


FIRE ROCKETS
```

(c) CANCEL CHECKFIRE. Used as instructions to resume a fire mission halted by a checkfire message. The message may include a time to execute as shown.

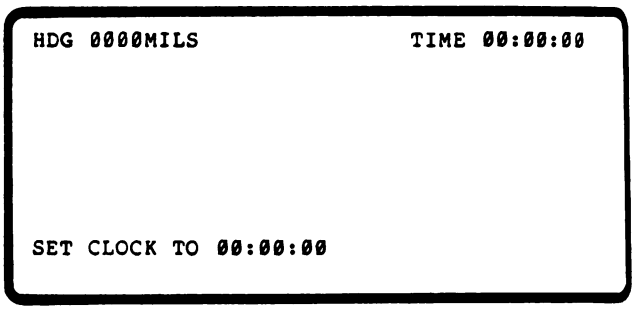
```
HDG 0000MILS                    TIME 00:00:00


CANCEL CHECKFIRE AT 00:00:00
```

(d) CANCEL TARGET. Used to remove (cancel) the target number displayed from the SPLLs active fire mission data.

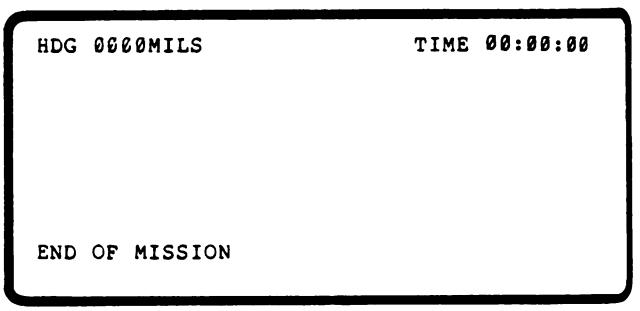
```
HDG 0000MILS                    TIME 00:00:00


CANCEL TARGET:AA0000;
```

2-18. COMMUNICATIONS OPERATION (CONT)

(e) SET CLOCK. Used as an instruction to set the FCS clock. Contains the command and the time to which the clock is to be set.

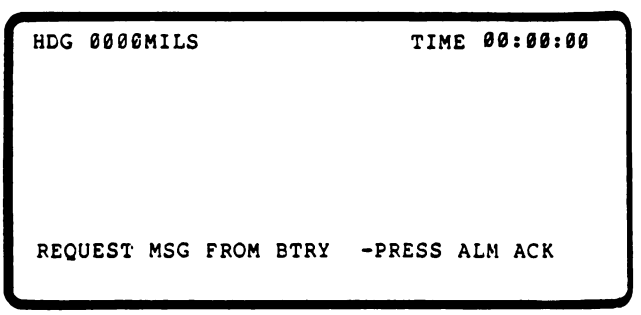


(f) END OF MISSION. Used as instructions to end an active fire mission. If rocket firing is in progress, you will have to set the ARM switch to SAFE to stop the firing.

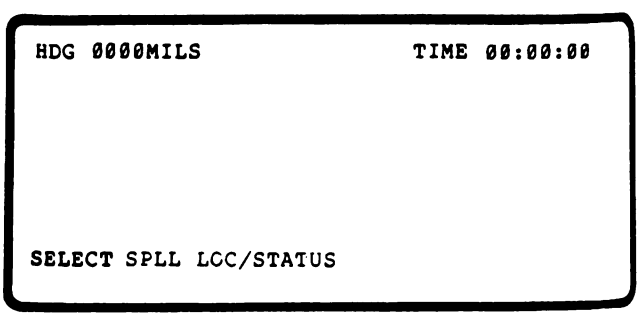


g. Request Message Received.

A request message received by the SPLL will always be for a SPLL location/status or masking data message. A request message usually requires an immediate answer.

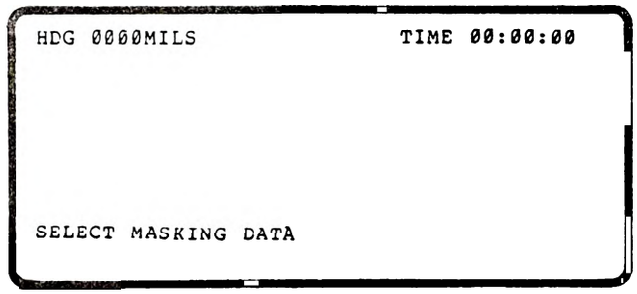


Pressing the ALM ACK key turns off the alarm and changes the prompt to tell you the type request received. If you must send a SPLL location and status type message in reply, the display will change to this prompt.



2-18. COMMUNICATIONS OPERATION (CONT)

If the reply you must send back is a masking data message, the display will change to this prompt.



To select the proper message routine you must use the index and message menus. To help you send back the proper message, the FCS automatically enters the proper selections into the menus and the location/status message routine. For an example of a request message received and the reply, refer to location/status message procedure (paragraph 2-28).

h. Met Data Message Received.

This message is used to automatically enter MET data from BTRY directly into the FCS. When this message is received and the alarm sounds. Pressing ALM ACK key shuts off the alarm and MET message received prompt disappears. The MET data is automatically processed and stored in the FCS. To edit the MET data you must use the index and auxiliary menus to select and display the MET data routine. A step-by-step procedure for editing the MET data routine is provided in paragraph 2-33.

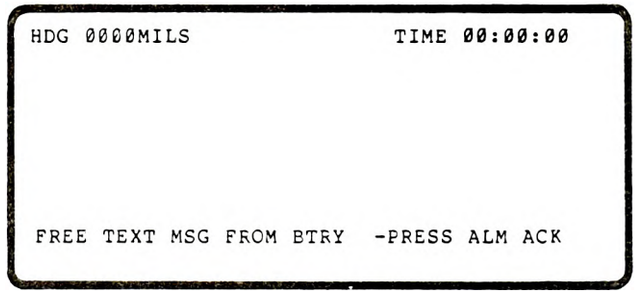
i. Free Text Messages Received.

This message routine is used by the BTRY or PLT/TP to send a plain language message to the SPLL. When a free text message is received, the alarm will sound in the same manner as for other messages. Pressing the ALM ACK key turns off the alarm and erases the display. The message is processed and stored in the FCS, but it is not displayed. If you are busy, this lets you continue with what you were doing without having to stop and answer a message right away. To display the message, select the display free text message option from the auxiliary menu.

Example:

(1) Your SPLL is out on operations and is in a hide area. The BTRY has sent you a free text message.

(2) Pressing the ALM ACK key turns off the alarm and stores the message in the FCS.



2-18. COMMUNICATIONS OPERATION (CONT)

(3) You decide that you want to see the free text message right away. Pressing the INDEX key displays the INDEX MENU.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC □;
```

(4) From the INDEX MENU you select the AUXILIARY MENU, option 8, and then press EXEC key. The AUXILIARY MENU is displayed.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC □;
```

(5) From the auxiliary menu you select the display free text message, option 3, then press EXEC key. The free text message is displayed.

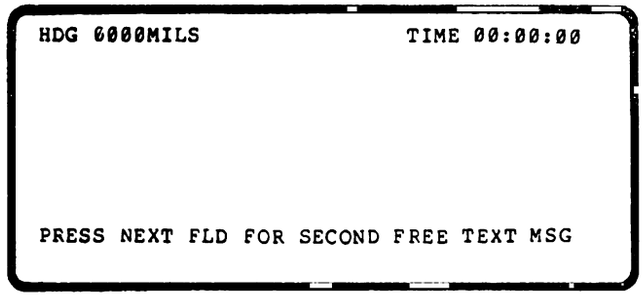
```
HDG 0000MILS                    TIME 00:00:00
A FREE TEXT MESSAGE WILL BE WRITTEN ON THE
 DISPLAY WITHOUT FORMATTING. THIS SAMPLE M
ESSAGE IS USED TO SHOW HOW MUCH OF THE DIS
PLAY IS USED FOR THE 243 CHARACTERS WHICH
A FREE TEXT MESSAGE MAY CONTAIN. THE PERIO
D IS THE LAST SPACE XXXXXXXXXXXX.
```

A free text message can be displayed only once. After it is displayed, the message will remain on the display until the INDEX, SRP ALIGN, or ALM ACK key is pressed. As soon as one of these keys is pressed, the message will be erased. It cannot be displayed again unless the sender repeats the message.

The FCS can store two free text messages at one time. If your SPLL has two messages stored, another message will not be accepted until one is displayed. You should display and read free text messages as soon as possible.

2-18. COMMUNICATIONS OPERATION (CONT)

If a second free text message is stored in the FCS and an INDEX, SRP ALIGN or ALM ACK key is pressed, a prompt telling you the second message is stored in the FCS will be displayed.



Pressing the NEXT FLD key will then display the second message. However, if you do not want to display the message (press NEXT FLD) the second message will not be erased. It can be displayed later by selecting the display free text message option again.

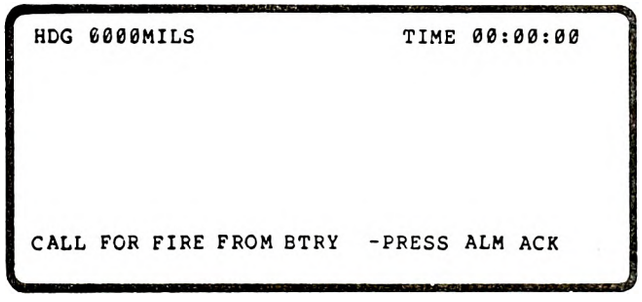
j. Checkfire Message Received.

This message is used to halt a fire mission. This message is given the highest priority and will be displayed before any other message. A typical example of how the checkfire message is used is contained in the fire mission procedures (paragraph 2-30).

k. Call For Fire Message Received.

This type message has the data for a fire mission. It contains tactical fire mission data used by the FCS to compute a firing problem. For an example of how to review CFF message data, refer to tactical fire mission (paragraph 2-29). A step-by-step procedure on how the data is used is described in fire mission (paragraph 2-30).

When a CFF message is received, the audible alarm will sound and the CFF message received prompt is displayed.



Pressing the ALM ACK key turns off the alarm and stores the message in the FCS. However, if you are performing an operation selected from the index menu, make sure you are ready to press the ALM ACK key. Pressing the ALM ACK key will cause a data overwrite on the display if there is not another CFF message stored. The FCS performs its operations in sequence. One operation has to be completed or properly ended before the next operation can begin. This is important when receiving CFF messages. The first field in a CFF message uses a large area of the display. It is easy to be distracted by it if you are in the middle of another routine. Therefore, before pressing ALM ACK, quickly complete the operation you were doing, then exit the routine. This will clear the FCS and displaying the CFF message will not cause a distraction. If you do not exit the routine before acknowledging a CFF message, pressing the INIT key to start a fire mission will display the ILLEGAL KEY PRESSED prompt. If this should happen, refer to the symptom index (Chapter 3) for troubleshooting procedures to help clear the error.

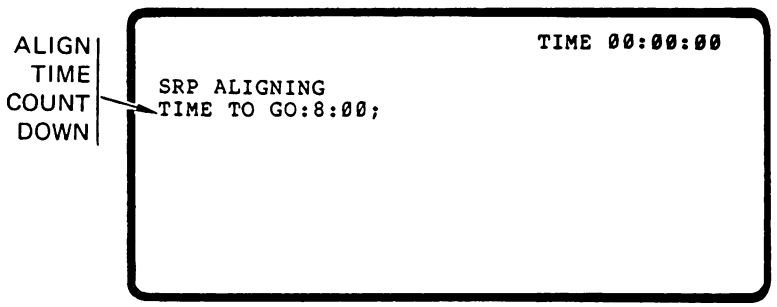
2-18. COMMUNICATIONS OPERATION (CONT)

The FCS can store three CFF messages. When the first message is received the FCS will automatically display the first field in the fire mission routine. If a second or third message is received, they are stored in the FCS. The second or third message cannot be reviewed or used until the first message is cancelled, or the mission is conducted.

If the FCS has three CFF messages stored, any other CFF message sent will be automatically rejected. When a CFF message is used (a fire mission completed), the FCS will accept another message. A mission status message (will, or will not comply message) must be sent to the sender each time a CFF message is received and stored.

If the SRP/PDS is aligning or realigning at the same time a CFF message is received, pressing ALM ACK key will display the SRP aligning field.

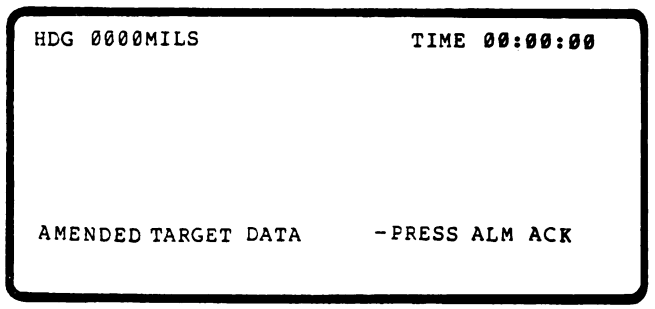
The time remaining until SRP alignment is complete will be displayed and counting down. (SRP alignment is explained in startup paragraph 2-22 and SRP realignment paragraph 2-34.)



l. Amended Target Data.

The CFF message is also used to amend or change target data. If the data received in a CFF message is amended data, when ALM ACK key is pressed, the prompt will change and tell you the data is AMENDED TARGET DATA.

Each target in a CFF message and each amended data CFF message has a serial number. The FCS uses the serial numbers to know which stored CFF message to amend.



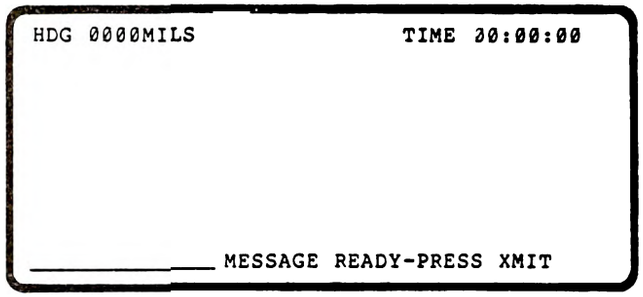
m. Transmitting Digital Coded Messages.

To reduce the time that an operator needs to send a message, all message types follow a fixed format. Each message that can be transmitted is composed (made up) by filling in the blank spaces in a message skeleton that has been permanently stored in the FCS.

The messages also must have proper addresses and serial numbers. Addresses and serial number sequence are put in the FCS at SPLL startup and automatically put into the message when it is selected. The rest of the message is filled in just before the message is transmitted. To transmit a digital coded message, the message must be selected from the message menu. The FCS uses message prompts to help in filling in the blanks of the coded message. Explanations of the message formats are included in the paragraphs on using the message menu (paragraph 2-19, a).

2-18. COMMUNICATIONS OPERATION (CONT)

When a message has been composed, the last prompt of each message routine is the MESSAGE READY prompt.



The MESSAGE READY prompt displayed is basically the same for all messages transmitted. The name of the message to be transmitted will appear in the area shown by the lined space. The names of messages that can appear are:

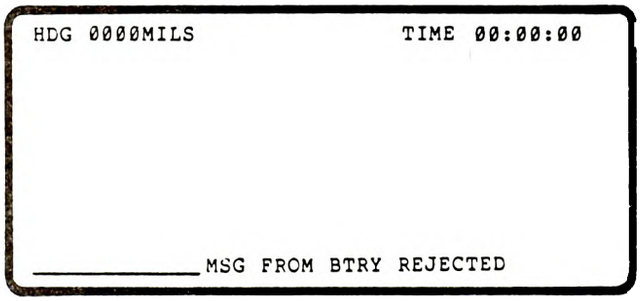
(1) LOCATION/STATUS
(2) MISSION FIRED
(3) CANNOT COMPLY
(4) WILL COMPLY
(5) READY TO FIRE
(6) REQUEST

The CANNOT COMPLY, WILL COMPLY, and READY TC FIRE messages are types of mission status messages.

n. Rejected Messages

Digital coded messages sent to the FCS are checked. If a message does not pass the checks, it is rejected.

Whenever a message is rejected by the FCS, a message rejected prompt is displayed.



The name of the type of message rejected will appear where the lined space is shown. Messages that can be rejected are:

(1) LOCATION/STATUS
(2) COMMAND
(3) REQUEST
(4) MET DATA
(5) FREE TEXT
(6) CHECKFIRE
(7) CALL FOR FIRE

2-18. COMMUNICATIONS OPERATION (CONT)

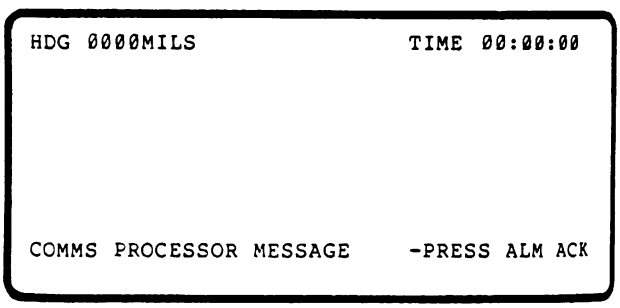
There are several reasons for rejecting in a message. One reason would be that the FCS has received and stored all the messages of one type that it can hold. For example, if three CFF messages are stored in the FCS, a fourth message will be rejected and a CFF message rejected prompt will be displayed.

When a message is rejected, you should notify your section chief immediately. Followup instructions may be necessary.

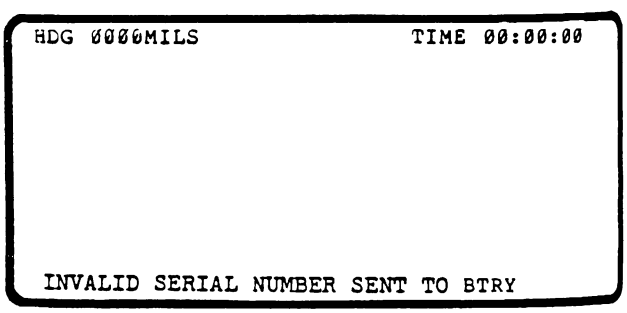
o. Comms Processor Messages.

Messages sent to or from the SPLL are controlled by a comms processor. The comms processor does what its name suggests. It processes all messages to insure they have the right header (beginning) information. After a message that is to be transmitted by the SPLL is checked by the FCS, it is sent to the comms processor. The comms processor adds the header and sends the message. When a message is received by the SPLL, the comms processor also checks the message and sends it to the FCS. If a message sent or received by the comms processor is not correct, it sends a message to the FCS. The FCS also sends messages to the comms processor (during comms startup).

The COMMS PROCESSOR MESSAGE to the FCS is displayed in the same way as other messages. When one is received by the FCS, a prompt is displayed and the alarm sounds.



Pressing the ALM ACK key, turns off the alarm and displays a prompt explaining the problem.



There are several messages that the comms processor can send to the FCS.

(1) NO RESPONSE TO MESSAGE SENT TO BTRY
(2) NO RESPONSE TO MESSAGE SENT TO PLT/TP
(3) INVALID SERIAL NUMBER SENT TO BTRY
(4) INVALID SERIAL NUMBER SENT TO PLT/TP
(5) INVALID OVERHEAD MESSAGE TRANSMITTED
(6) INVALID SERIAL NUMBER R'CVD FROM BTRY
(7) INVALID SERIAL NUMBER R'CVD FROM PLT/TP

2-18. COMMUNICATIONS OPERATION (CONT)

The messages explain the reason a message was not sent properly or received correctly. When a comms processor message is received, you should notify your section chief. Followup instructions will be necessary to correct the problem. Refer to SPLL troubleshooting in MLRS Communications System Manual, TM 9-7440-648-12 for corrective action required.

p. Ready to Fire Message.

This message is used as part of a fire mission. When a fire mission method of execution is AT MY COMMAND, the ready to fire message is automatically displayed as soon as the rockets are armed. Sending this message to BTRY and/or the PLT/TP lets them know your SPLL is armed and ready. An example of how this message is used is included in the fire mission procedures (paragraph 2-30).

2-19. USING MESSAGE MENU. Most message types that the SPLL can transmit are listed in the message menu. The MESSAGE MENU is displayed by pressing the INDEX key and selecting the number 6 routine.

The use of the message menu is explained in the following paragraphs.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC ;
```

a. Message Destination.

When any type of message is selected for transmission, the destination of the message must be selected.

After a message routine is selected from the message menu, pressing the EXEC key displays the MESSAGE DESTINATION field.

As shown, you have two choices. You can send the message to the BTRY, or to the PLT/TP. (Messages sent to BTRY are also sent to PLT/TP automatically.) This choice is probably controlled by your local operating instructions. However, this choice must be made each time you select a message for transmission.

TYPE OF MESSAGE

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
MESSAGE DESTINATION:0;    0=BTRY    1=PLT/TP


ENTER NUMBER AND PRESS STORE
```

The type of message to be sent is displayed above the message destination. The name of the type of message displayed will be the name of the type of message you selected from the message menu.

After you have selected the message destination and pressed STORE key, the first field in the message routine selected will be displayed.

b. Location/Status Message.

This message routine is the number 0 option. The location/status message is used to send the SPLLs present position coordinates and operational status to BTRY or PLT/TP. An example of this message with detailed step-by-step instructions on how the routine is used are provided in paragraph 2-28.

c. Masking Data Message.

This message routine is the number 1 option in the message menu. It is used to send data on terrain formations or other objects that mask the target at firing location. An example of this message with step-by-step instructions on how to use this routine are provided in paragraph 2-31.

2-19. USING MESSAGE MENU (CONT)

d. Mission Fired Message.

This routine is the number 2 option. This message is used to tell the BTRY and/or PLT/TP that a fire mission has been ended. It contains information about the target that was fired on, and tells them the status of your SPLL when the fire mission was completed. Step-by-step instructions showing how this routine is used are given in paragraph 2-35.

e. Mission Status Message.

This routine is the number 3 option. It is intended to be used by the SPLL to answer a command, call for fire, or checkfire message received. The message you send will be one of three possible messages.

(1) READY TO FIRE
(2) CANNOT COMPLY
(3) WILL COMPLY

The READY TO FIRE message is usually not a selected message. It is automatically set up for transmitting during a fire mission after the ARM switch is set, if the mission execution is AT MY COMMAND or ON CALL. However, a ready to fire message can be selected as an answering message, but all conditions for firing must be completed. The fire mission procedure (paragraph 2-30) is an example of how this message is usually used.

The CANNOT COMPLY and WILL COMPLY messages can be selected for transmitting. These messages are used to answer checkfire, command, and call for fire messages. Normally a will comply message is automatically set up for transmitting when they are needed. However, if it is recognized that for some reason the SPLL is unable to comply, a CANNOT COMPLY message must be set up for transmitting.

A WILL COMPLY or a CANNOT COMPLY message that is automatically set up for transmitting can be changed.

Example:

(1) You are on operations and just received a CFF and the FCS has automatically called up a WILL COMPLY message.

```
HDG 0000MILS                TIME 00:00:00




WILL COMPLY MESSAGE READY-PRESS XMIT
```

2-19. USING MESSAGE MENU (CONT)

(2) For some reason you recognize a problem with the SPLL that causes you not to be able to complete a fire mission, and you must send a cannot comply message.

(3) Press the INDEX key and display the INDEX MENU.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(4) Select MESSAGE MENU, number 6 option, from the index menu and press EXEC key. The MESSAGE MENU will be displayed.

(5) From the MESSAGE MENU, select the MISSION STATUS message, number 3 option. Press EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC ;
```

(6) The MESSAGE DESTINATION selection field will be displayed.

(7) Enter a 0 to send the message to BTRY. Enter 1 to send the message to PLT/TP. Press STORE key.

The MISSION STATUS menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
MESSAGE DESTINATION:0;    0=BTRY    1=PLT/TP



ENTER NUMBER AND PRESS STORE
```

(8) Select the CANNOT COMPLY, number 0 option. Press STORE key.

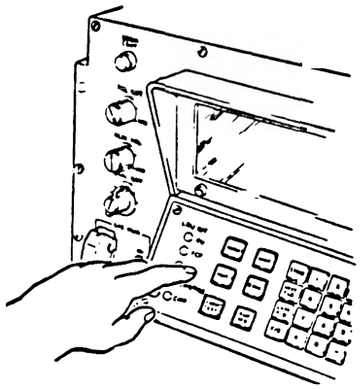
```
HDG 0000MILS                    TIME 00:00:00
MISSION STATUS
SPLL REPLY:1;
0=CANNOT COMPLY
1=WILL COMPLY
2=READY TO FIRE

ENTER NUMBER AND PRESS STORE
```

2-19. USING MESSAGE MENU (CONT)

(9) The CANNOT COMPLY MESSAGE READY prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00




CANNOT COMPLY MESSAGE READY-PRESS XMIT
```

(10) Press XMIT key and the cannot comply message is transmitted.



f. Request Message.

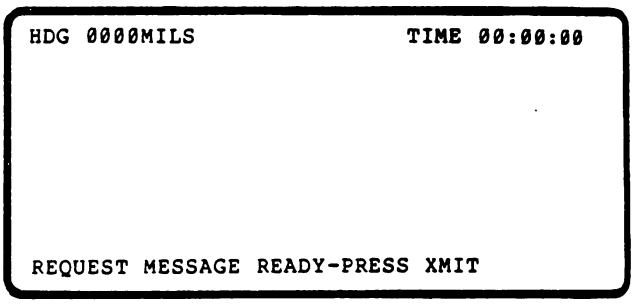
The REQUEST MESSAGE routine is the number 4 option. This message routine is used to request information from the BTRY or PLT/TP. Selecting the number 3 option from the message menu and pressing EXEC key will display a request message menu.

Select the number of the message for the information required and press STORE key. The REQUEST MESSAGE READY prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
REQUEST MENU
DATA REQUESTED:□;
0:CALL FOR FIRE       4:SURVEY CONTROL POINT
1:MET DATA            5:SPLL LOC/STATUS
2:RENDEZVOUS GRID     6:SUPPLY GRID
3:MOVE TO GRID        7:NEXT FIRING POINT
ENTER NUMBER AND PRESS STORE
```

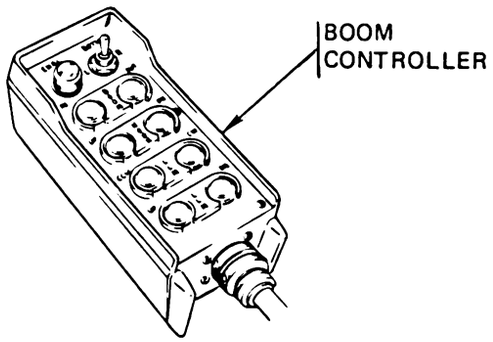
2-19. USING MESSAGE MENU (CONT)

Pressing the XMIT key will transmit the message.

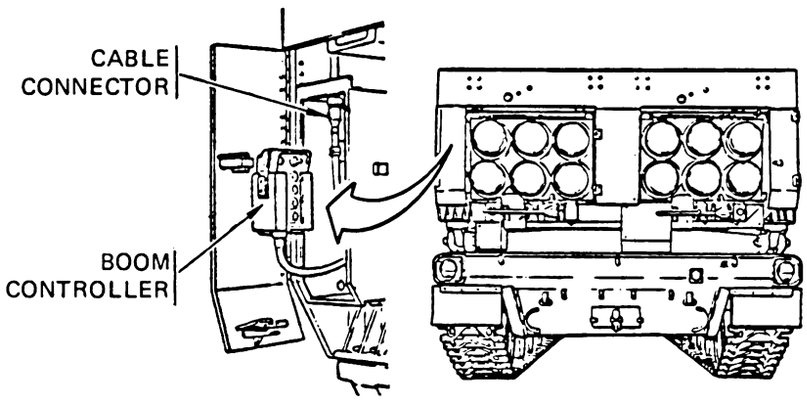


If for some reason you wish to change messages before transmitting (pressing XMIT key), pressing the C/E key will clear the message and the prompt will disappear. To send another request message, the message menu must be selected from the index and the selection procedure repeated.

2-20. BOOM CONTROLLER OPERATION. The boom controller (BC) is a hand-held unit used to control the position of the LLM and its boom and hoist system, during reloading operations.



Using the BC, the operator can elevate and lower the front of the LLM, and turn the LLM to the right and to the left. The operator can extend and retract the LLM booms, and raise and lower the boom hoist hooks.



The BC is connected to the FCS through an 8 meter interconnecting cable. The BC and the interconnecting cable are stored in a box at the left rear of the LLM. The BC cable is connected to the FCS through a connector that is located inside the storage box.

When the BC is not in use, it should always be stored in the storage box ready for immediate use.

a. LLM Reloading Positions.

The BC controls the movement of the LLM and the hoists and booms during reload operations. To help speed up the reloading operation, you can use the FCS to automatically move the LLM to selected reload positions.

The positions the LLM can be automatically moved to are listed in the BOOM CONTROL menu.

The BOOM CONTROL menu is the number 1 routine listed in the index and start up menu. (Start up menu is short index menu used only when FCS power is first turned on.)

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC
```

2-20. BOOM CONTROLLER OPERATION (CONT)

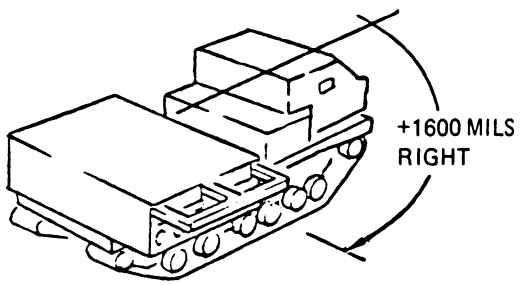
Selecting any of the routines causes the LLM travel lock to unlock. The LDS hydraulic system then turns on and the LLM is moved to the position selected.

The first four routines listed cause the LLM to elevate, turn to the position selected and lower to 36 mils elevation.

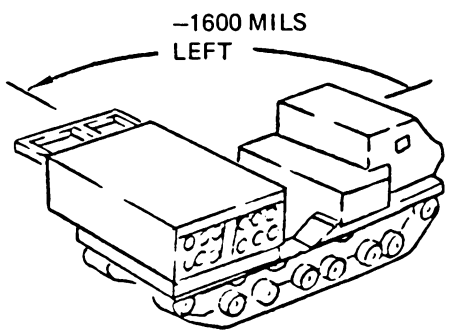
The fifth routine listed causes the LLM to unlock, but the LLM does not move.

Each routine, when selected, will position the LLM as follows.

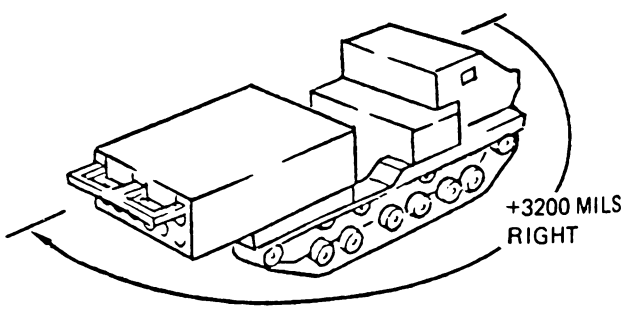
(1) 0:LLM RIGHT. This routine causes the front of the LLM to automatically be positioned 1600 mils to the right side of the SPLL, at 36 mils elevation.



(2) 1:LLM LEFT. This routine causes the front of the LLM to automatically be positioned 1600 mils to the left side of the SPLL, at 36 mils elevation.

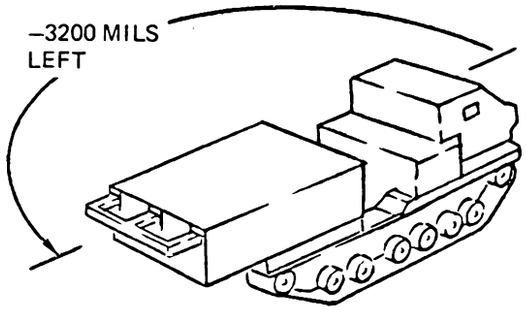


(3) 2:LLM RIGHT REAR. This routine causes the front of the LLM to be automatically positioned 3200 mils to the rear of the SPLL, at 36 mils elevation. The direction the LLM turns to get into position is to the right.

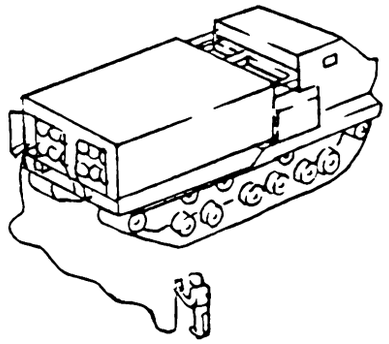


2-20. BOOM CONTROLLER OPERATION (CONT)

(4) 3:LLM LEFT REAR. This routine causes the front of the LLM to be automatically positioned 3200 mils to the rear of the SPLL, at 36 mils elevation. The direction the LLM turns to get into position is to the left.



(5) 4:BOOM CONT MANUAL. This routine turns on the hydraulic drive, unlocks the travel lock, and turns on the BC. The LLM does not move. The BC must be used to position the LLM.



b. Selecting an LLM Reloading Position.

The BC is automatically turned on (enabled) by the FCS when the LLM reaches the reloading position.

Example:

(1) You want to position the LLM to the left side of the SPLL and then use the BC.

(2) Press the INDEX key and display the INDEX MENU.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC □;
```

2-20. BOOM CONTROLLER OPERATION (CONT)

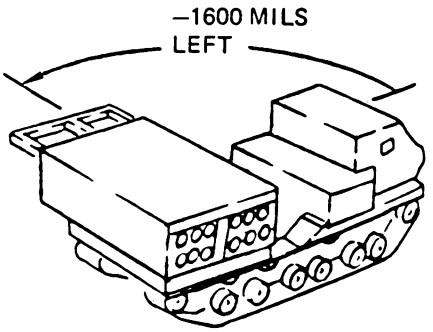
(3) The boom control menu is the number 1 option. Select number 1 and press the EXEC key. The BOOM CONTROL menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC ;
```

(4) The LLM LEFT routine is the number 1 option. Select number 1 and press EXEC key. The resolver headings showing the position of the front of the LLM will be displayed. Instructions on how to end the operation are also displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

(5) At the same time the LDS will turn on and the LLM will begin to move to the selected position.

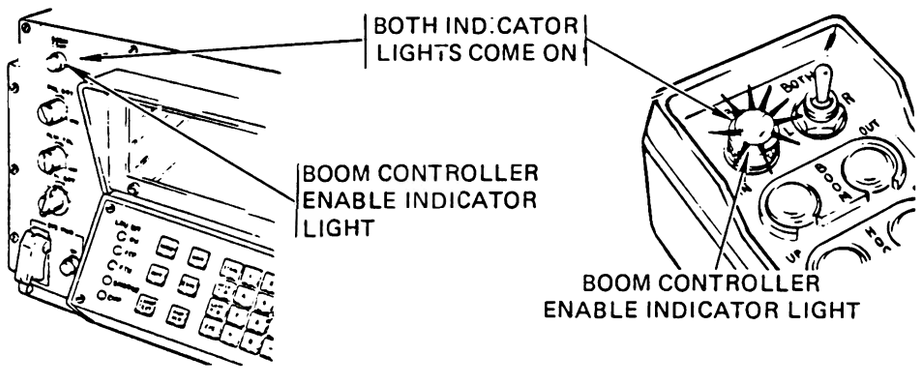


2-20. BOOM CONTROLLER OPERATION (CONT)

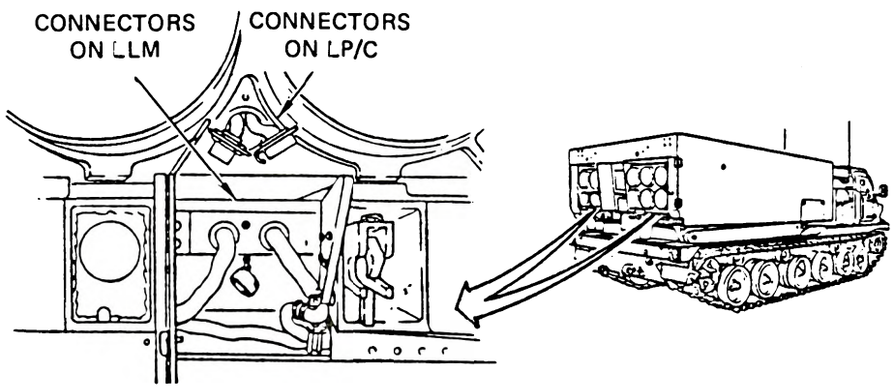
NOTE

The LDS will turn off automatically about 10 seconds after reaching the selected position. It will turn back on automatically when a BC switch that causes the LLM to move is pressed.

(6) When the LLM is in the selected position, the BC will be turned on. Indicator lights on the FCP and the BC will come on.



(7) The umbilical cables to the LP/C will be tested. The cables must be connected to SNVT test connectors on the LLM for the booms and hoists to operate.



2-20. BOOM CONTROLLER OPERATION (CONT)

(8) If the cables are not connected to the LLM properly, an error prompt will be displayed.

(9) The boom and hoist in the LLM bay that has the cables improperly connected will not operate. Connecting the cables properly will erase the error prompt, and the boom and hoist will operate.

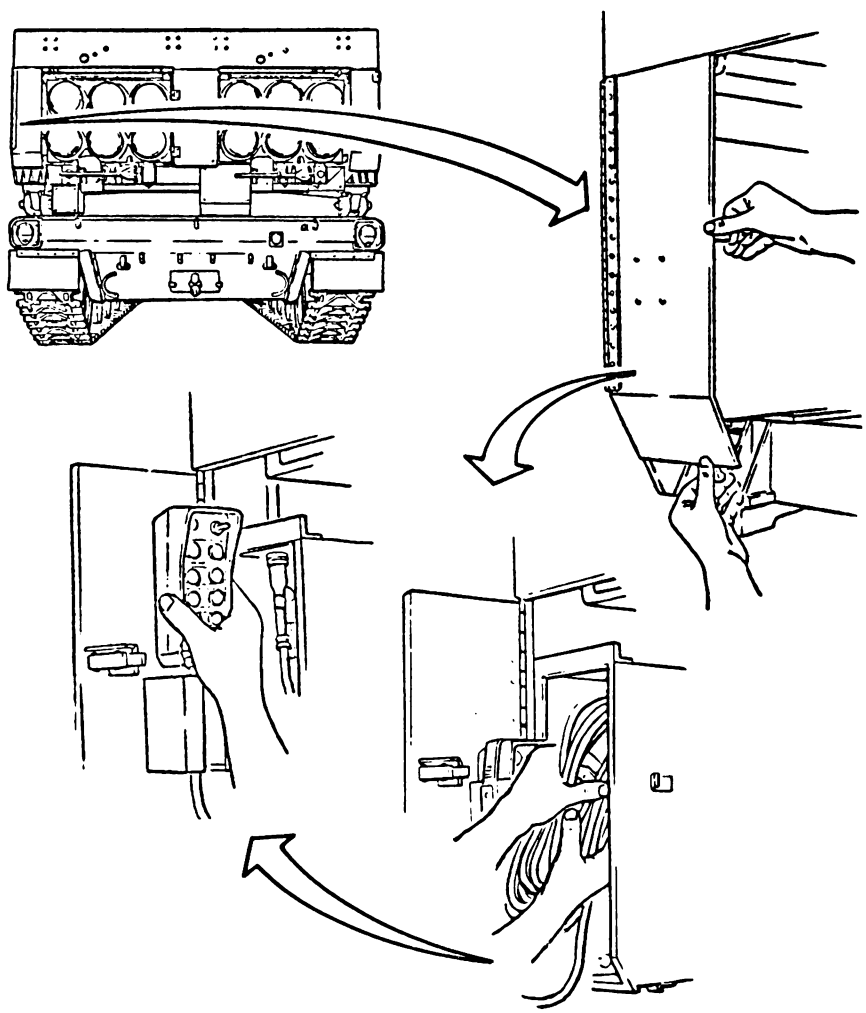
```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW


UMBILICAL CABLE NOT PROPERLY CONNECTED
```

c. Using the Boom Controller.

Remove the BC from the storage compartment. Use it as described in the following procedures.

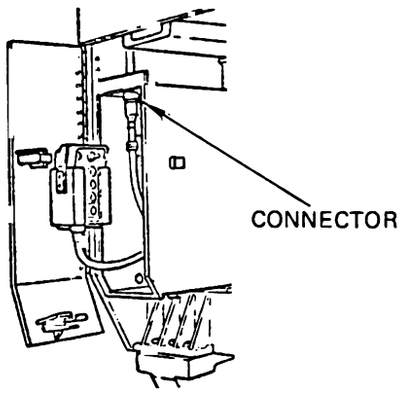
(1) Open the storage box door and remove the BC cable.

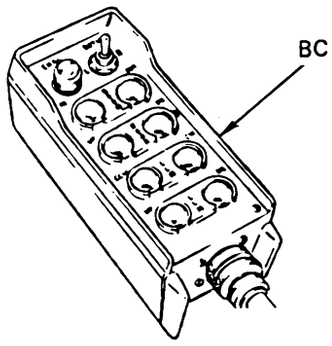
(2) Unfasten the strap and remove the BC.



2-20. BOOM CONTROLLER OPERATION (CONT)

(3) Make sure that the cable is connected to the BC and the storage box connector. Check that the BC ENBL indicator light is on.



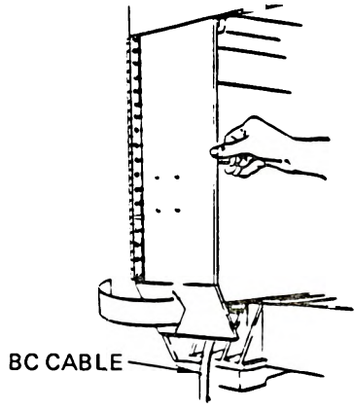


CAUTION

Keep BC storage compartment door closed. Elevating LLM at some azimuths will cause open BC storage compartment door to hit engine housing and be damaged.

(4) Make sure cable is laying in slot in bottom of storage compartment. Close and latch storage compartment door.

(5) Stretch out the cable and move to a position that will let you see the LLM movement, and the boom and hoist movement.



2-20. BOOM CONTROLLER OPERATION (CONT)

CAUTION

Do not cause LLM hydraulic power supply or the boom or hoist motors to overheat. Continuous uninterrupted operation of a drive motor will cause it to overheat and be damaged. Refer to table 1-4 for drive motor duty cycle limits.

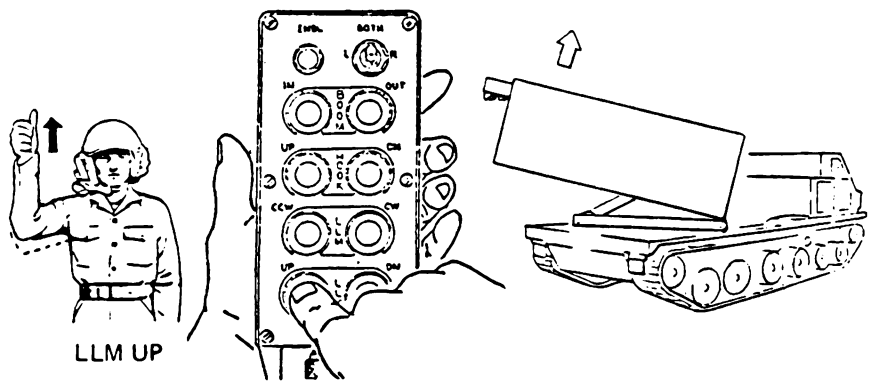
(6) Use the switches on the BC to position the LLM and control the boom and hoist movements as described in the following steps. Only one switch should be pressed at a time. If two switches are pressed at the same time, the BC will respond to the switch that was pressed first.

The BC can control LLM movement only within the FCS travel limits. These limits are shown and described in paragraph 1-9, c. If you try to move the LLM past a limit, the movement will stop. The LDS will continue to run until the control switch is released. You must use the opposite control to move the LLM away from the limit. Boom and hoist operation is not allowed when the front of the LLM is positioned within 1304 mils to the right or left of the front of the SPLL.

The LDS will turn on automatically when a switch controlling LLM movement is pressed. The LDS will turn off automatically about 10 seconds after controlling switch is released, unless another switch that causes the LLM to move is pressed.

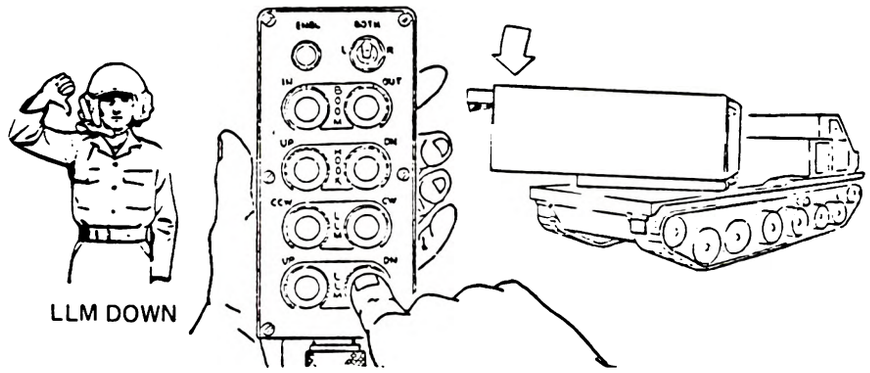
The hand signals shown are a suggested method of signaling the BC operator. During blackout operations at night, use a red baton (flashlight) for signaling. No light means stop.

(a) LLM UP. To elevate the front of the LLM, press and hold LLM UP switch. When LLM elevates to position you want, release the switch.

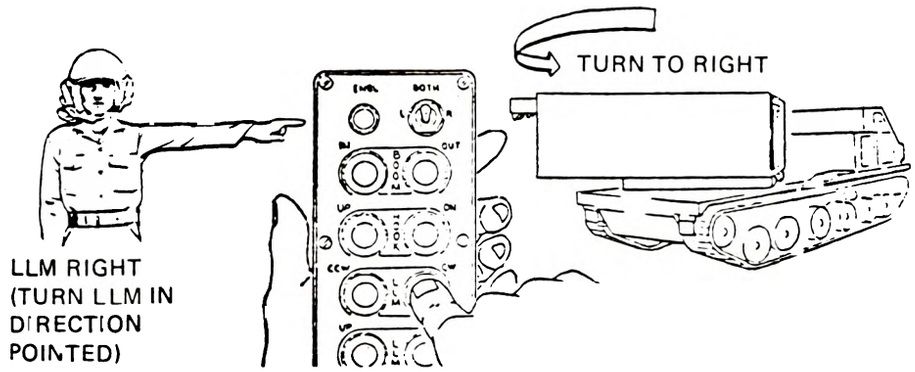


2-20. BOOM CONTROLLER OPERATION (CONT)

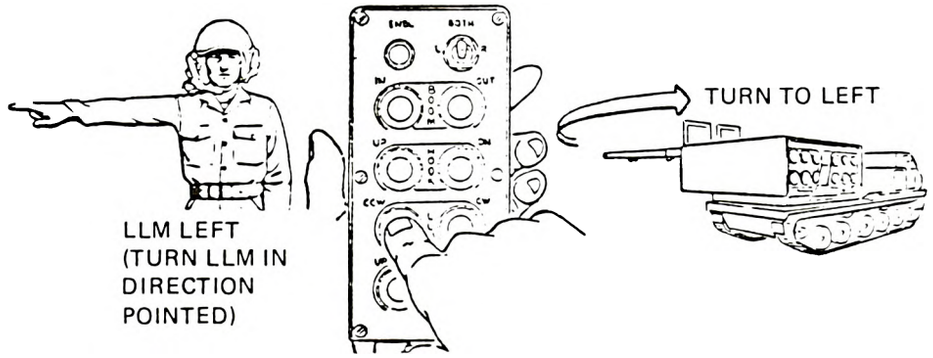
(b) LLM DN. To lower the front of the LLM, press and hold LLM DN switch. When LLM lowers to position you want, release the switch.



(c) LLM CW. To turn the LLM to right, press and hold LLM CW switch. When LLM has turned to right to the position you want, release the switch.



(d) LLM CCW. To turn the LLM to left, press and hold the LLM CCW switch. When LLM is turned left to the position you want, release the switch.

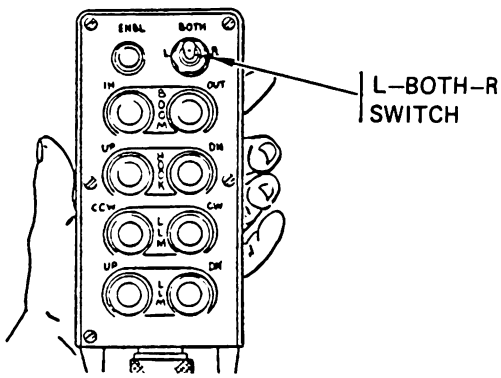


2-20. BOOM CONTROLLER OPERATION (CONT)

WARNING

Do not attempt to unload or load two loaded LP/Cs at the same time from side loading positions (paragraph 1-9, d). This may offbalance the SPLL and injure someone or damage equipment.

(e) L BOTH R. This switch selects which boom and hoist you want to control. Set the switch to L and you have control of the boom or hoist in the LLM left bay. Set the switch to R and you have control of the boom or hoist in the LLM right bay. Set the switch to BOTH and you have control of the booms or hoists in both bays at the same time.

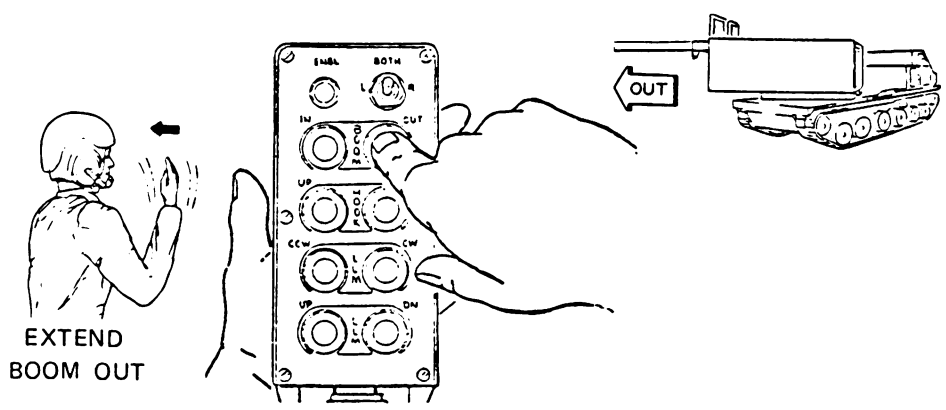


NOTE

The booms and hoists have limit switches. If the boom or hoist runs into a limit switch it will stop. You must use the opposite control and move the boom or hoist in the opposite direction, and away from limit switch to continue operations.

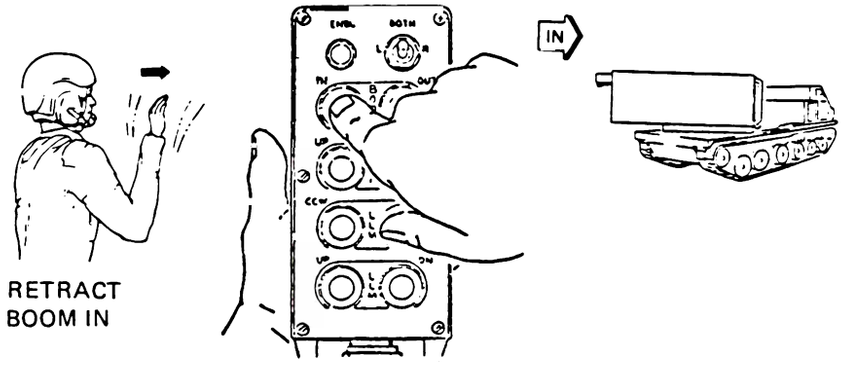
A boom cannot be extended or retracted unless the hoist hook up limit switch for that boom is engaged.

(f) BOOM OUT (extend). To extend the boom and hoist, press and hold BOOM OUT switch. When boom and hoist is fully extended, release the switch.

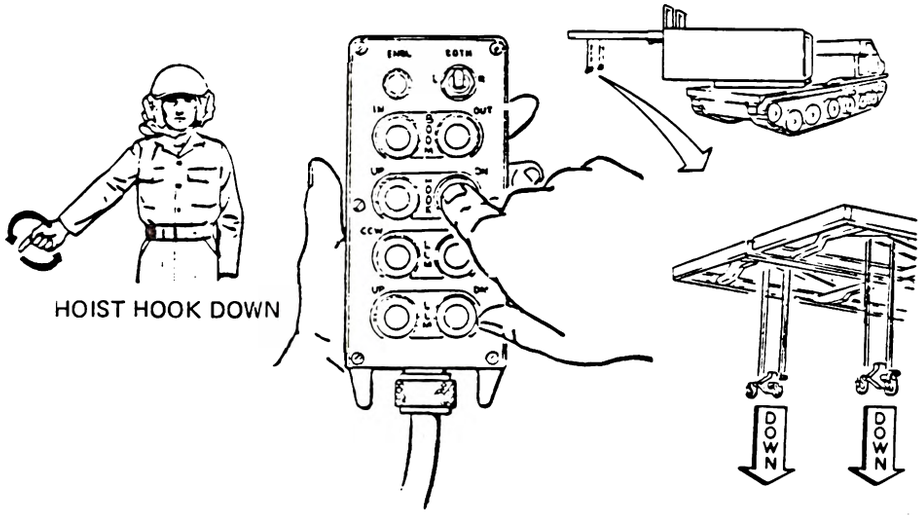


2-20. BOOM CONTROLLER OPERATION (CONT)

(g) BOOM IN (retract). To retract the boom and hoist, press and hold the BOOM IN switch. When the boom is fully retracted, release the switch.



(h) HOOK DN (lower). To lower the hoist hooks, press and hold the HOOK DN switch. When the hooks have lowered to where you want them, release the switch.

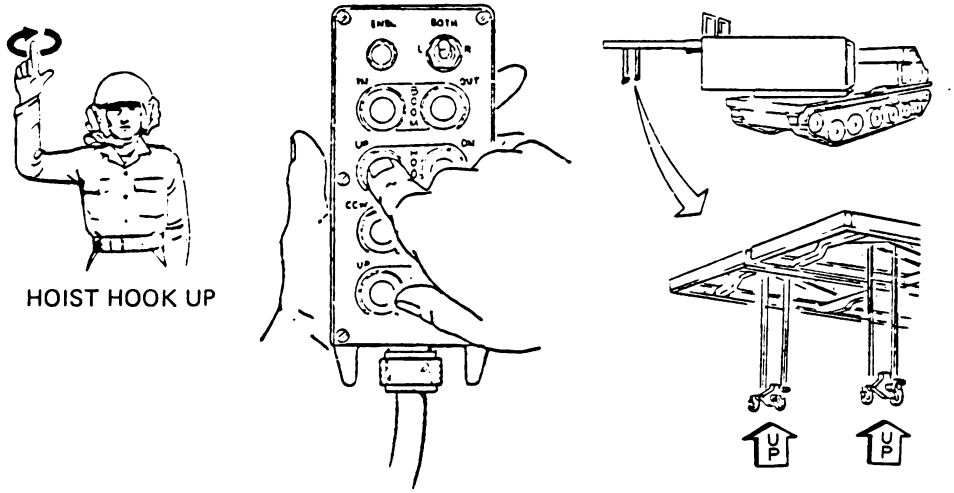


2-20. BOOM CONTROLLER OPERATION (CONT)

CAUTION

When raising hook assembly against boom carriage, make sure hooks seat properly against carriage. Misaligned hooks will not engage up limit switch and hook assembly will be damaged.

(i) HOOK UP (raise). To raise the hoist hooks, press and hold the HOOK UP switch until the hooks have raised to where you want them, release the switch.



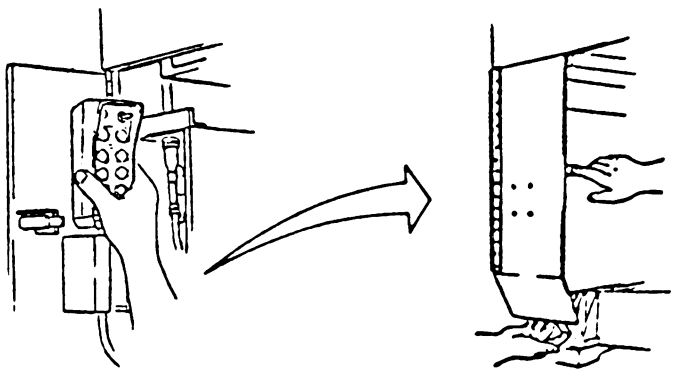
HOIST HOOK UP

(j) STOP. When you are operating the BC and using hand signals, the signal to release the control is a raised right fist.

STOP

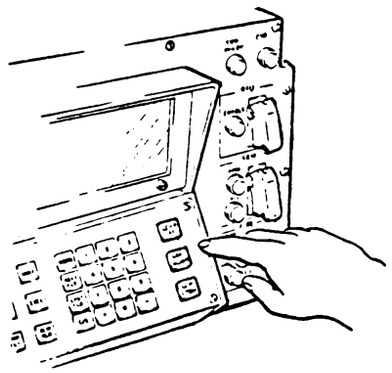
(7) When you have finished using the BC, coil up the cable and store the BC and cable in the storage compartment.

(8) Always make sure the door is closed and latched.



2-20. BOOM CONTROLLER OPERATION (CONT)

d. Turning Off BC and Stowing LLM.



The BC operation is ended and the BC is turned off by stowing the LLM. To stow the LLM, press the LLM STOW key on the FCP.

Before the LLM is stowed, the umbilical cables are automatically tested for proper connection.

If the umbilical cables are connected properly, the FCS will automatically test rocket fuzes. A prompt telling you the test is in progress will be displayed.

Resolver outputs showing the position of the front of the LLM as it stows, are also displayed.

```
HDG 0000MILS                    TIME 00:00:00

ROCKET FUZE TEST IN PROGRESS


AZIMUTH RESOLVER :+0000.0;
ELEVATION RESOLVER:0000.0;
```

NOTE

If there are no LP/Cs in the LLM, the spaces along the status line will be blank.

The fuze test prompt will stay on the display for a few seconds. Then, a rocket status field will be displayed. When the LLM is stowed, an LLM STOWED prompt will be displayed.

If you want to unstow the LLM immediately after stowing, wait for 30 seconds after LLM STOWED prompt is displayed before selecting BC operation again.

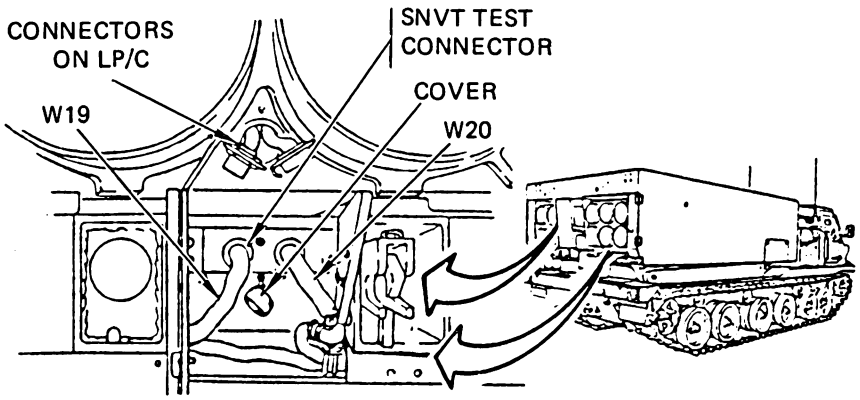
```
HDG 0000MILS                        TIME 00:00:00
          LP/C 1   M77    LP/C 2   AT2
ROCKETS   6 5 4 3 2 1    1 2 3 4 5 6
STATUS    □□D □□□  □□□□□□
SELECTED

LLM STOWED
```

2-20. BOOM CONTROLLER OPERATION (CONT)

e. Umbilical Cable Test Failure.

If the umbilical cables are always connected properly, you may never know they were checked. If for some reason the cables are not connected to the LP/C or SNVT properly, you will get an error prompt telling you to connect them properly.

When LLM STOW key is pressed, the connections are tested. To pass the test, the cables must be connected in the proper combinations shown.



CABLE CONNECTIONS	PROPER COMBINATIONS		
	1	2	3
W19 connected to SNVT	X		
W19 connected to M77-LP/C		X	
W19 connected to AT2-LP/C			X
W20 connected to cover	X	X	
W20 connected to AT2-LP/C			X

If the connection combination is not correct the LLM will stow, but an error prompt will be displayed. The rockets are not to be tested.

An instruction prompt telling you how to correct the error and start the rocket fuze test is also displayed.

```
HDG 0000MILS                    TIME 00:00:00


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
CONNECT CABLE AND PRESS INDEX THEN
SELECT ROCKET STATUS


UMBILICAL CABLE NOT PROPERLY CONNECTED
```

2-20. BOOM CONTROLLER OPERATION (CONT)

Reconnect the umbilical cables properly. After the cables have been reconnected, to test the rocket fuzes press the INDEX key and display the INDEX MENU.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC [];
```

Select the ROCKET STATUS, option number 2 and press EXEC key. The rocket fuzes will be tested and the results displayed.

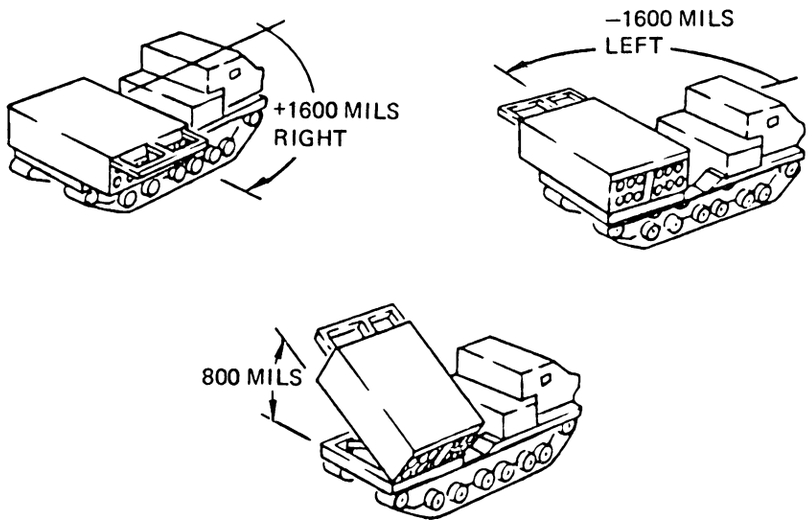
f. Azimuth and Elevation Resolver Readout.

The azimuth and elevation resolvers are instruments used to tell the FCS the position of the front of the LLM at all times. The readout from these resolvers is displayed when the BC is in operation.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
```

The outputs are referenced to the front of the SPLL. A plus (+) azimuth indication is displayed when the LLM position is on the right side of the SPLL. A minus (−) azimuth indication is used for the left side. The elevation resolver is referenced to the turret of the LLM, which is level with the carrier vehicle bed. Using the resolver outputs, you can tell position of the front of the LLM.

The resolver readout is automatically erased when the LLM is stowed.



g. Boom Controller Operation Flow Diagram.

A diagram showing a typical BC operation, from turning on the BC to stowing the LLM, is shown in figure 2-2. The diagrams assume that the SPLL carrier engine is running, the FCS is turned on, and startup data entered.

2-20. BOOM CONTROLLER OPERATION (CONT)

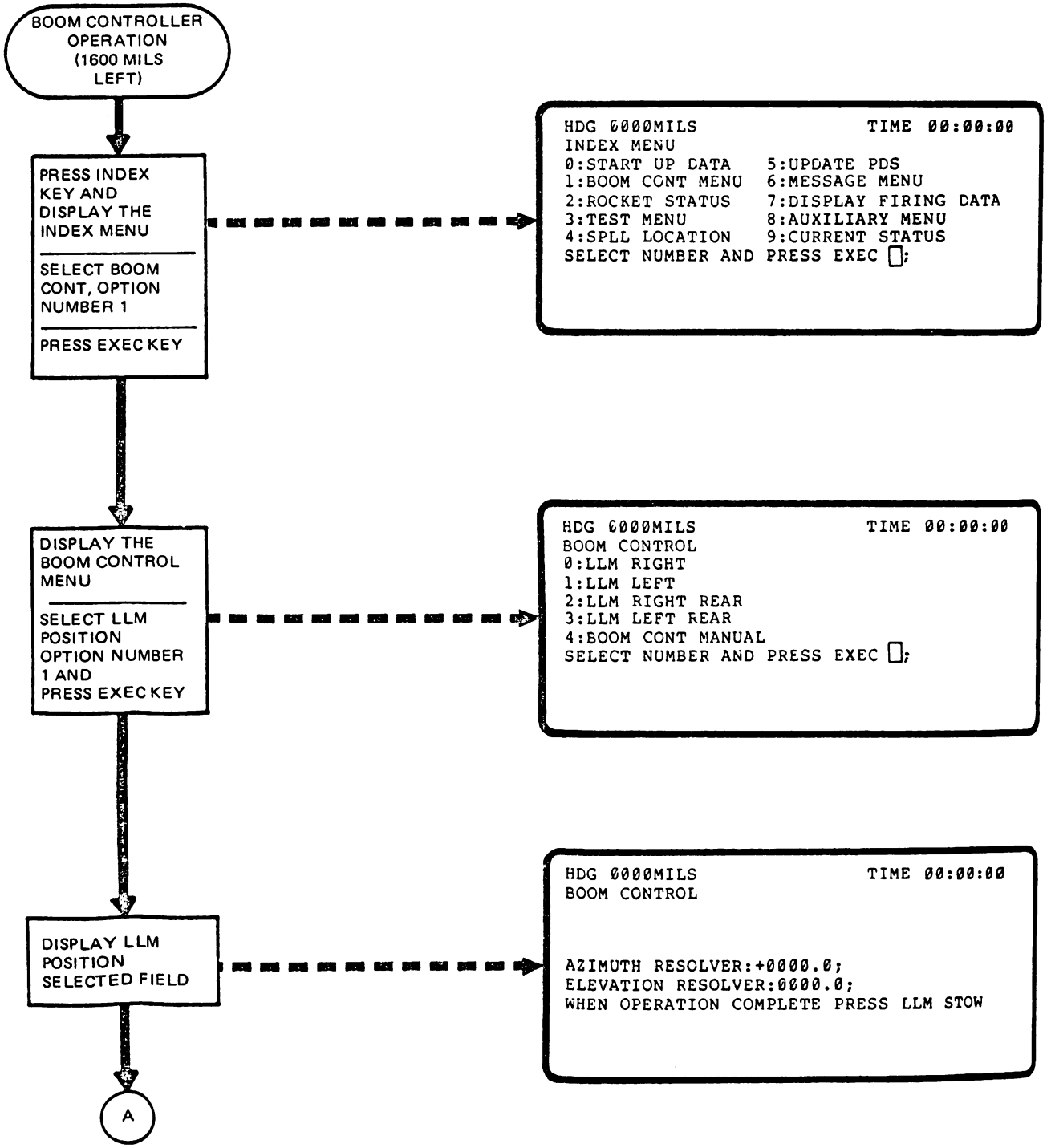


Figure 2-2. Boom Controller Operation Flow Diagram (Sheet 1 of 4)

2-20. BOOM CONTROLLER OPERATION (CONT)

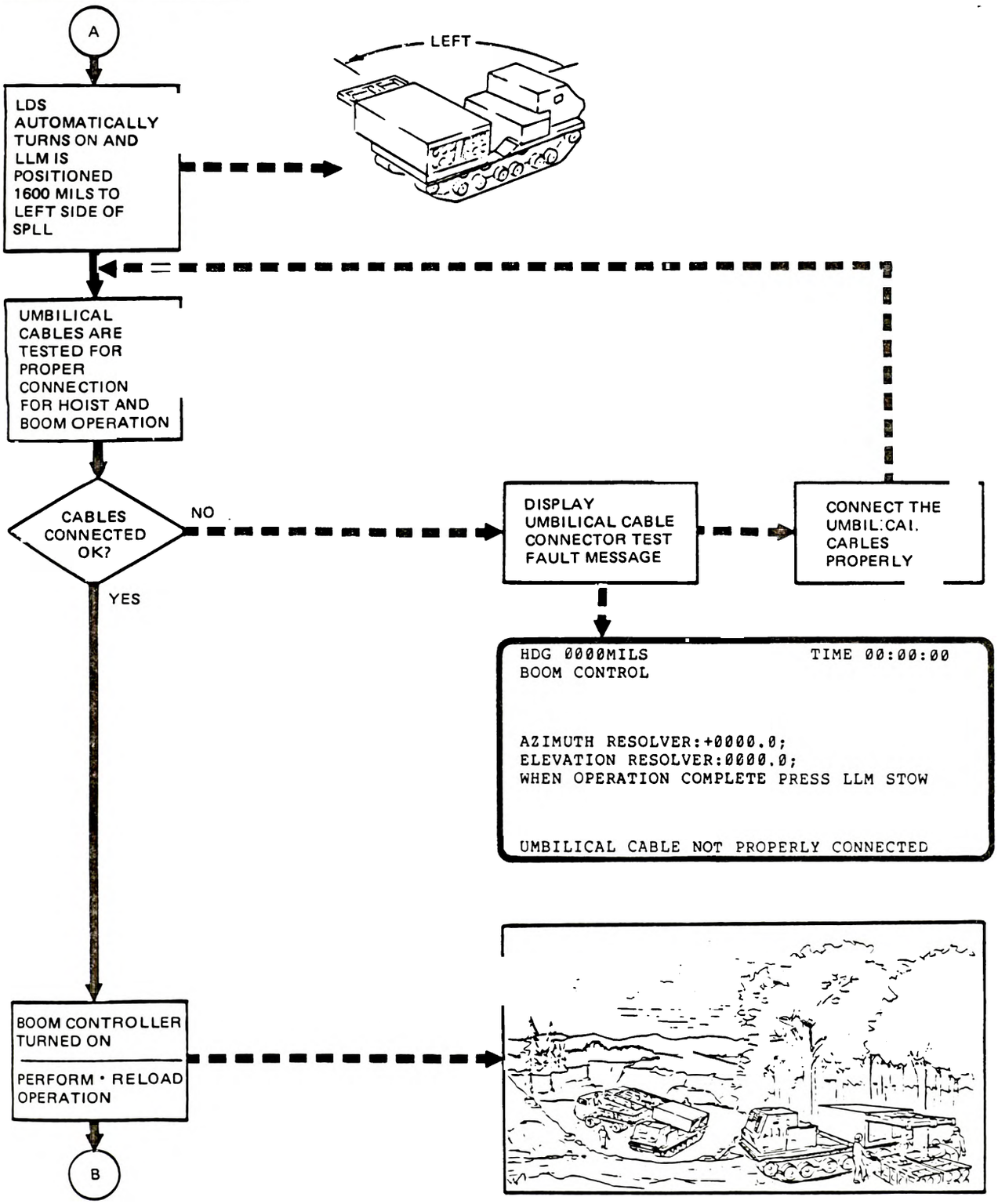


Figure 2-2. Boom Controller Operation Flow Diagram (Sheet 2 of 4)

2-20. BOOM CONTROLLER OPERATION (CONT)

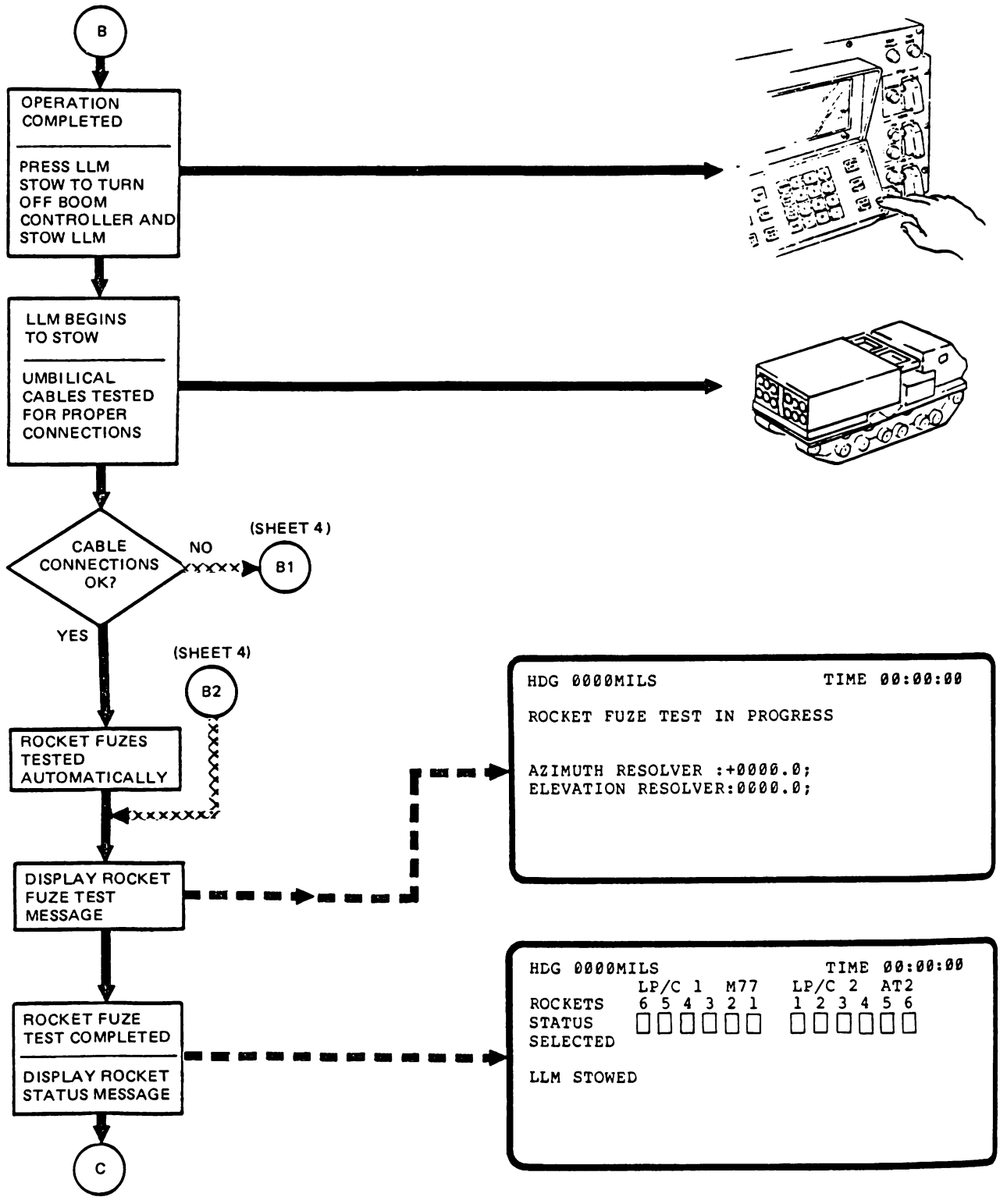


Figure 2-2. Boom Controller Operation Flow Diagram (Sheet 3 of 4)

2-20. BOOM CONTROLLER OPERATION (CONT)

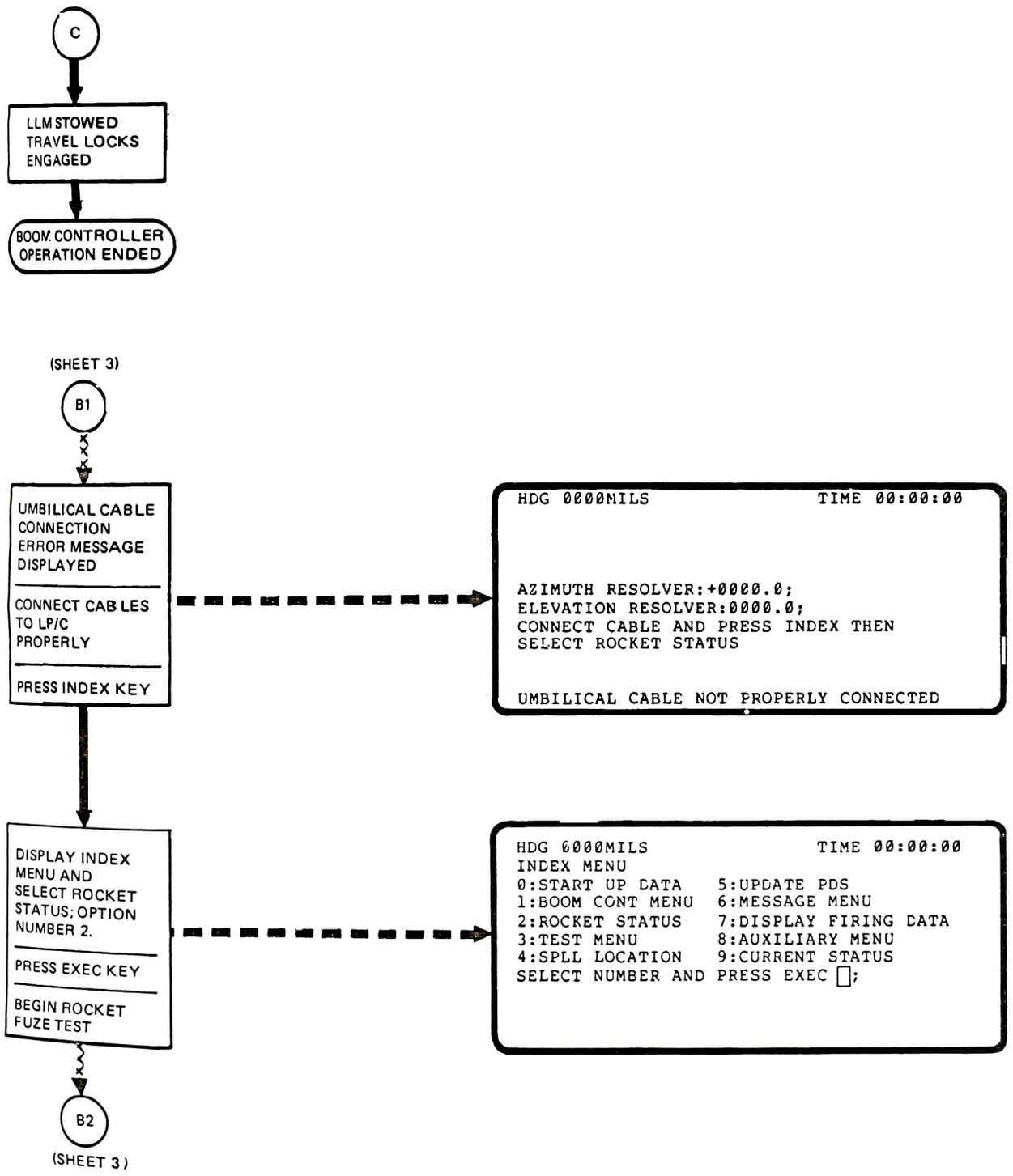


Figure 2-2. Boom Controller Operation Flow Diagram (Sheet 4 of 4)

Section IV. OPERATION UNDER USUAL CONDITIONS

2-21. GENERAL. This section provides detailed step-by-step operating procedures for the FCS. It contains procedures for system startup, executing fire missions, manually entering fire mission data, updating meteorological data, and stabilization reference package/position determining system (SRP/PDS) data. It also contains procedures for acknowledging and sending radio messages, reloading the SPLL, and SPLL shutdown.

The normal operating mode for the FCS is to use radio input data. The data is received as digital coded audiotone messages. Data received is automatically processed and entered into the FCS. However, you as an operator will need to edit the data entered. You will often need to change data already entered, and often enter new data. The operating procedures presented here are examples of how to perform the longer procedures.

Each procedure is presented separately and is not necessarily connected to another procedure. These procedures assume that all SPLL equipment is working and the carrier's engine is running. Except for the startup procedures, each procedure assumes all necessary startup entries have been made.

If a fault prompt should be displayed while you are operating the FCS, pressing the C/E key on the FCP will erase the prompt. If the prompt reappears immediately, or if the prompt reappears after the operation causing the prompt to appear is repeated, then the malfunction is real, and corrective action must be taken. If the fault prompt does not reappear, normal operations can continue. To take corrective action, refer to troubleshooting procedures in Chapter 3.

Some of the operating procedures require you to manually enter written data into the FCS. Although data may come from other sources, the startup and fire mission procedures in this section use data recorded in the SPLL startup data form (figure 2-3) and the SPLL mission data form (figure 2-4). MET data is recorded on DA Form 3677 (figure 2-5).

Startup procedures are used to enter basic operating data into the FCS. The system needs three types of basic input data for normal operation.

a. System Startup.

These inputs turn on the SRP/PDS and give it the SPLLs present position. Instructions on what to do in case of a dud fuze, misfire, and/or hangfire are entered. The time of day and your time zone are also entered.

b. Comms Startup.

These inputs give the comms processor and FCS the identification codes for the SPLL, BTRY, and PLT/TP. Starting serial numbers for messages to and from BTRY and the platoon leader must be entered. Other codes used for radio operation are also required and must be entered. If the SPLL is to be operated without using digital coded radio data inputs, the comms startup is not necessary.

c. PDS Startup.

PDS startup inputs to the FCS provide error correction data for the PDS outputs.

d. Nonvolatile Memory.

The three startup procedures contain a lot of information. However, the FCS is equipped with a nonvolatile (NV) memory. This means that when power is turned off, some input data is not erased. The NV memory will last up to 10 hours after shutdown. This makes it unnecessary to enter all the startup data every time you shut the system down. If the NV memory is not active, a NV MEMORY DATA BAD prompt will be displayed as soon as the FCS is turned on. When this prompt is displayed, a full startup using the system, comms, and PDS startup procedure is necessary. However, if the NV memory is active, the NV MEMORY DATA BAD prompt will not be displayed. A much shorter startup procedure can be used (paragraph 2-25). The minimum steps required are to turn on the SRP, enter the correct time, set up the comms for air operation, and check the PDS calibration values. If you are not going to use digital radio inputs, the COMMS entries are not needed.

2-21. GENERAL (CONT)

SPLL START UP DATA-1

1. SPLL NO. | 2. PLT/TP | 3. BTRY | 4. SECT | 5. DATE

COMMUNICATIONS EQUIPMENT

TR: CHANNEL FREQ. RCVR: CHANNEL FREQ.

SPLL VOICE CALL SIGN: PLT/TP VOICE CALL SIGN:

SQUELCH: OLD NEW

SYSTEM START UP

6. EASTING:
7. NORTHING:
8. ALTITUDE: +
9. GRID ZONE: +
10. SPHEROID:
11. DUD FUZE: SKIP FIRE
12. MISFIRE STOP CONTINUE
13. HANGFIRE: STOP CONTINUE
14. TIME ZONE:

COMMUNICATIONS START UP

15.	01 ON THE AIR:	0 = ON	1 = OFF		
16.	02 CRYPTO STATUS:	0 = IN USE	1 = NOT IN USE	2 = NOT IN USE, 0 COORD	
17.	03 OWN ADDRESS 1:	0 THRU 9			
18.	04 OWN ADDRESS 2:	0 THRU 9			
19.	05 OWN BIT 1:	0 OR 1			
20.	06 OWN BIT 2:	0 THRU 9			
21.	07 BTRY ADDRESS 1:	0 THRU 9			
22.	08 BTRY ADDRESS 2:	0 THRU 9			
23.	09 PLT/TP ADDRESS 1:	0 THRU 9			
24.	10 PLT/TP ADDRESS 2:	0THRU 9			
25.	11 PLT/TP BIT:	0 THRU 5			
26.	12 V24 BIT RATE:	0 = 600	1 = 1200	2 = 2400	3 = 4800
27.	13 BIT RATE:	0 = 600	1 = 1200		
28.	14 ACCESS DELAY	0 = 0.0	1 = 0.5	2 = 1.0	3 = 1.5
		4 = 2.0	5 = 2.5	6 = 3.0	7 = 3.5
		8 = 4.0	9 = 4.5		
29.	15 FSK PAIR:	0 = 1200/2400		1 = 1300/2100	
30.	16 BLOCK MODE:	0 = SINGLE		1 = DOUBLE	
31.	17 CMP USE FLDS 18 AND 19:	0 = DO NOT USE	1 THRU 9 = USE		
32.	18 TO BTRY SERIAL NO. 1:	0 THRU 9			
33.	19 TO BTRY SERIAL NO. 2:	0 THRU 9			
34.	20 CMP USE FLDS 21 AND 22	0 = DO NOT USE	1 THRU 9 = USE		
35.	21 TO PLT/TP SERIAL NO. 1:	0 THRU 9			
36.	22 TO PLT/TP SERIAL NO. 2:	0 THRU 9			

SAMPLE

FRONT = NO FCS ENTRY

Figure 2-3. SPLL Startup Data Form (Sheet 1 of 2)

2-21. GENERAL (CONT)

SPLL START UP DATA-2

COMMUNICATIONS START UP - continued

37. 23 CMP ACCEPT NEXT SERIAL NO ☐ ϕ THRU 7

38. 24 PREAMBLE ☐ ϕ = ϕ2 ☐ 1 = ϕ7 ☐ 2 = 1.4 ☐ 3 = 2.1

FIELDS 25–32 NOT USED ☐ 4 = 2.8 ☐ 5 · 4.0

PDS START UP

39. ODOMETER SCALE FACTOR: ☐☐☐☐☐ 18710 THRU 19222

40. AZIMUTH CRAB ANGLE: ☐☐☐☐☐ 65280 THRU 65535 AND 0 THRU 00256

41. ELEVATION CRAB ANGLE: ☐☐☐☐☐ 65024 THRU 65535 AND 0 THRU 00512

FREE TEXT MESSAGE DATA

NO. 1

NO. 2

NOTES

BACK

Figure 2-3. SPLL Startup Data Form (Sheet 2 of 2)

2-21. GENERAL (CONT)

SPLL MISSION DATA

1. SPLL NO. | 2. PLT/TP | 3. BTRY | 4. SECT | 5. DATE

MISSION DATA

6. TARGET NUMBER:
7. WARHEAD:
8. AT2 SELF DESTRUCT CODE:
9. NUMBER OF ROCKETS FOR TARGET
10. TIME BETWEEN ROUNDS:
11. METHOD OF FIRE CONTROL:
12. TIME ON TARGET
13. TIME TO FIRE
14. TIME ZONE

FIRING POINT DATA

15. EASTING:
16. NORTHING
17. ALTITUDE:
18. GRID ZONE:
19. SPHEROID

TARGET DATA - TACTICAL

20. EASTING:
21. NORTHING:
22. ALTITUDE:
23. GRID ZONE:
24. SPHEROID:
25. NUMBER OF AIM POINTS

26. AIM POINT SHIFTS

	01	02	03	04
EASTING:				
NORTHING:				
ALTITUDE:				
NO. OF ROCKETS:				

27 AIM POINT SHIFTS

	05	06	07	08
EASTING:				
NORTHING:				
ALTITUDE:				
NO. OF ROCKETS:				

28. AIM POINT SHIFTS

	09	10	11	12
EASTING:				
NORTHING:				
ALTITUDE:				
NO. OF ROCKETS:				

= NO FCS ENTRY

Figure 2-4. SPLL Mission Data Form

2-21. GENERAL (CONT)

COMPUTER MET MESSAGE

For use of this form, see FM 6-15; the proponent agency is United States Continental Army Command.

IDENTIFICATION	OCTANT	LOCATION		DATE	TIME (GMT)	DURATION (HOURS)	STATION HEIGHT (10's M)	MDP PRESSURE MB's
METCM	Q	$L_aL_aL_a$ or xxx	$L_oL_oL_o$ or xxx	YY	$G_oG_oG_o$	G	hhh	$P_dP_dP_d$
METCM								

ZONE HEIGHTS (METERS)	LINE NUMBER	ZONE VALUES			
		WIND DIRECTION (10's M)	WIND SPEED (KNOTS)	TEMPERATURE (1/10°K)	PRESSURE (MILLIBARS)
	ZZ	ddd	FFF	TTTT	PPPP
SURFACE	00				
200	01				
500	02				
1000	03				
1500	04				
2000	05				
2500	06				
3000	07				
3500	08				
4000	09				
4500	10				
5000	11				
6000	12				
7000	13				
8000	14				
9000	15				
10000	16				
11000	17				
12000	18				
13000	19				
14000	20				
15000	21				
16000	22				
17000	23				
18000	24				
19000	25				
20000	26				

FROM TO	DATE & TIME (GMT)	DATE & TIME (LST)
MESSAGE NUMBER	RECORDER	CHECKED

DA FORM 1 JAN 71 3677 REPLACES DA FORM 6-59, 1 MAR 62, WHICH IS OBSOLETE.

Figure 2-5. MET Data Form

2-22. SYSTEM STARTUP. These procedures assume the carrier engine is running, the LLM is stowed, and that the SPLL is to be operated in the normal operating mode.

a. ***Startup Conditions.***

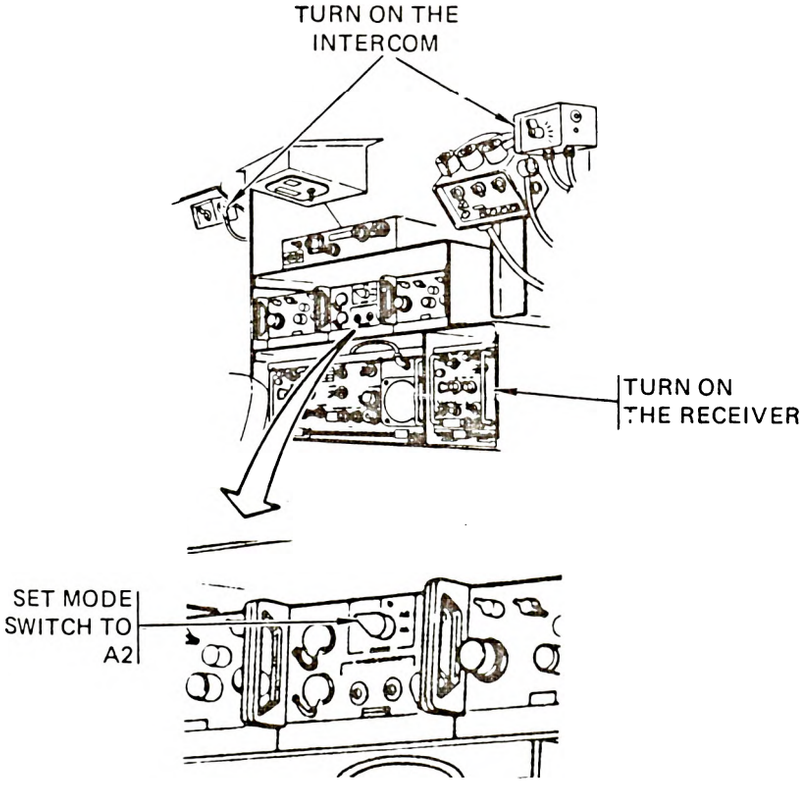
WARNING

Everyone who uses or rides in the SPLL must wear ear protection. Noise levels could cause permanent hearing damage.

(1) Wear your ear protection when you get into the SPLL. Put on your helmet, then turn on the intercom and communications equipment. Set up the radio set and comsec units according to local operating instructions.

(2) Make sure the comsec mode selector control MODE switch is set to A2.

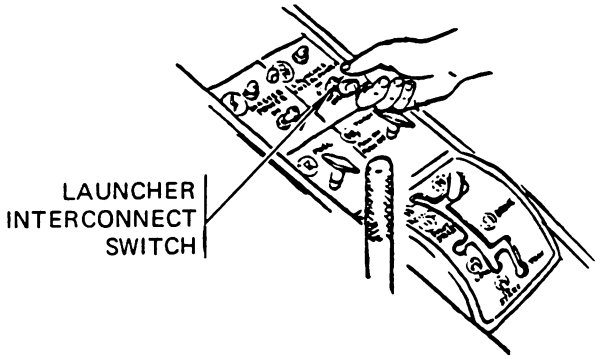
(3) Make sure the radio set volume controls are in the 12 o'clock position, and the squelch controls are set to the position given on the SPLL startup data form. (Detailed communications network startup instructions are provided in MLRS Communications System Manual, TM 9-7440-648-12.)



2-22. SYSTEM STARTUP (CONT)

(4) Set carrier LAUNCHER INTERCONNECT switch to ON.

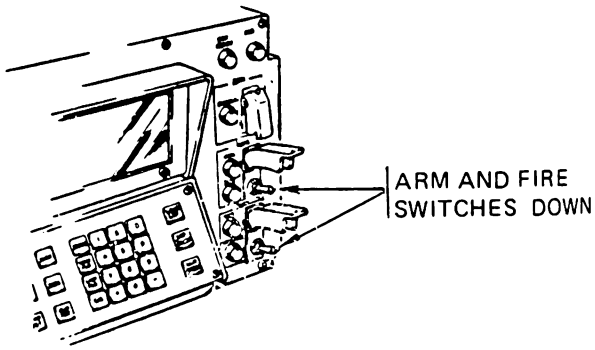
(5) Check the carrier voltmeter during normal SPLL operation. Voltmeter should indicate in upper half of the yellow zone or in the green zone. If voltmeter does not indicate correctly, refer to troubleshooting (Chapter 3).



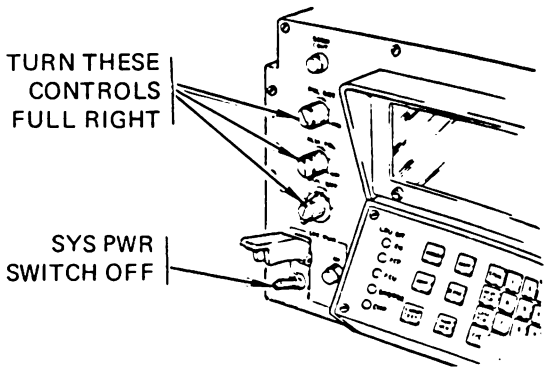
NOTE

If all of the FCP switches are not set to OFF, a prompt to TURN OFF FRONT PANEL SWITCHES will appear on the FCP as soon as the SYS PWR switch is set to ON. Prompt will remain displayed until all switches are set to off.

(6) Lift switchguards and make sure ARM and FIRE switches are down with switchguards down.

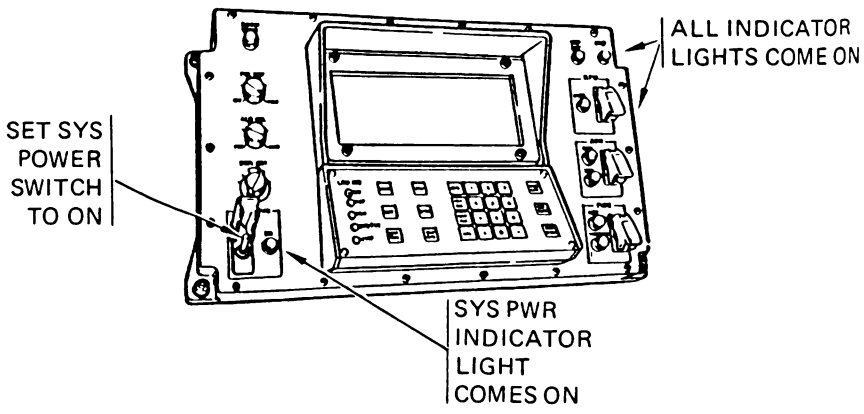


(7) Make sure the SYS PWR switch is set to OFF. Next, turn the PNL BRT, the ALM VOL, and the DSPL BRT controls all the way to the right.



b. Power On.

Set SYS PWR switch to ON, and observe that all other indicator lights come on.

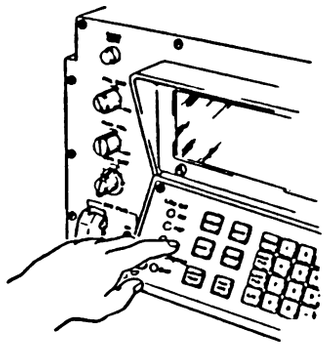


2-22. SYSTEM STARTUP (CONT)

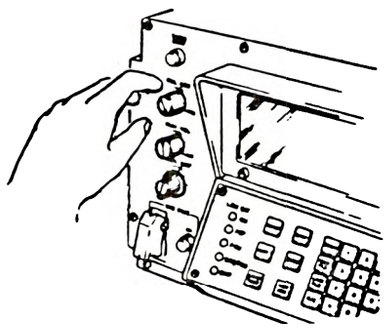
c. Lamp Test and Adjustment.

CAUTION

FCP indicator lights are not press to test type. Do not push on BIT lights. They can be damaged.



(1) Press the LAMP TEST switch. The alarm will come on for 5 seconds, then the alarm and the lights will go off. Check to make sure all the indicator lights came on. If all indicator lights did not come on, notify your section chief (S/C) and refer to fault prompts and symptom index tables (Chapter 3).

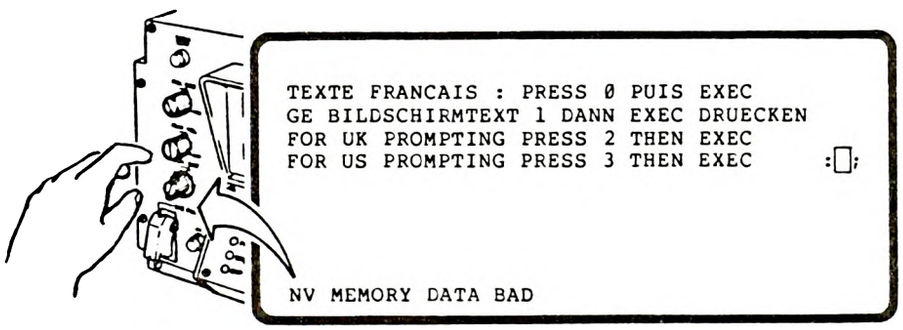


(2) Adjust the PNL BRT control until the indicator lights are as bright as you want them.

d. Alarm Volume and Display.

(1) Press the LAMP TEST switch again. This time adjust the ALM VOL control until the alarm is as loud as you want it.

(2) The language selection field will be on the display. Use it to adjust the DSPL BRT control until the display field is as bright as you want it.



2-22. SYSTEM STARTUP (CONT)

e. Language and Index Selections.

(1) The FCS can operate in several languages. The first step is to determine what language you want the prompts to be written in.

```
TEXTE FRANCAIS : PRESS 0 PUIS EXEC
GE BILDSCHIRMTEXT 1 DANN EXEC DRUECKEN
FOR UK PROMPTING PRESS 2 THEN EXEC
FOR US PROMPTING PRESS 3 THEN EXEC      :

NV MEMORY DATA BAD
```

NOTE

The prompt lines for each language are written in the language that will be displayed.

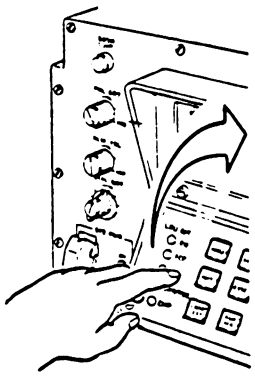
(2) For US language prompts, select option number 3.

(3) Press the EXEC key.

(4) If the LLM is stowed, the startup index menu will be displayed automatically.

NOTE

Heading and time line will be displayed. Heading will be 0000. Time will begin at 00:00 when power is turned on.



```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA
1:BOOM CONT MENU
2:ROCKET STATUS
3:TEST MENU

SELECT NUMBER AND PRESS EXEC
```

(5) However, if the LLM is not stowed, a PRESS LLM STOW OR PRESS INDEX prompt will be displayed.

(6) This prompt appears to let you know that the LLM is not stowed. It also lets you stow the LLM without having to use the BOOM CONT routine. Pressing LLM STOW will cause the LLM to stow and the prompt will be erased. If you want to display the startup index menu after pressing LLM STOW key, you will then have to press the INDEX key.

```
PRESS LLM STOW OR PRESS INDEX
```

(7) If the PRESS LLM STOW OR PRESS INDEX prompt is displayed and you do not want to stow the LLM, press the INDEX key. The startup index menu will be displayed.

2-22. SYSTEM STARTUP (CONT)

(8) Select the START UP DATA, option number 0, and press EXEC key. The startup data selection field will be displayed.

```
START UP:0;    0=SYSTEM    1=COMMS    2=PDS


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(9) The SYSTEM startup, option number 0, is the default value. Press NEXT FLD key to select system startup routine.

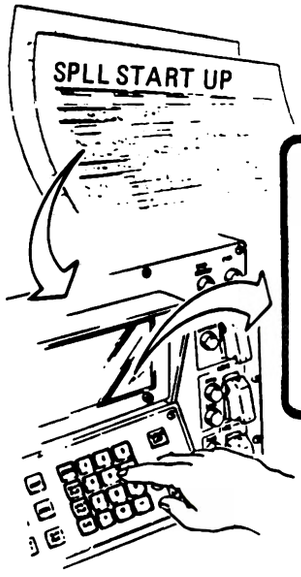
The first field in the system startup routine will be displayed.

f. Enter SPLL Present Location and Turn on SRP/PDS.

The location coordinates entered in system startup are the location of the SPLL at the time of startup. The first field in the SYSTEM START UP routine is the EASTING field.

(1) Enter the EASTING numbers, written in block 6 of your SPLL startup data form.

(2) Press STORE key. The NORTHING field will be displayed.

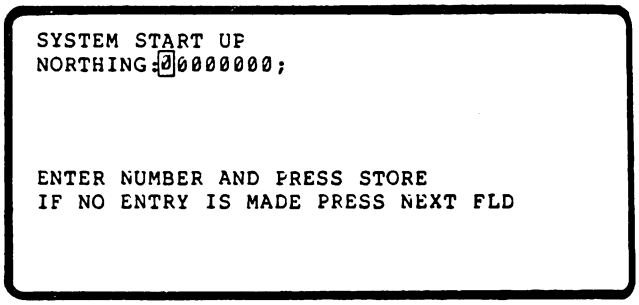



```
SYSTEM START UP
EASTING:0 00000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-22. SYSTEM STARTUP (CONT)

(3) Enter the NORTHING numbers, written in block 7 of your SPLL startup data form.

(4) Press STORE key. The ALTITUDE field will be displayed.



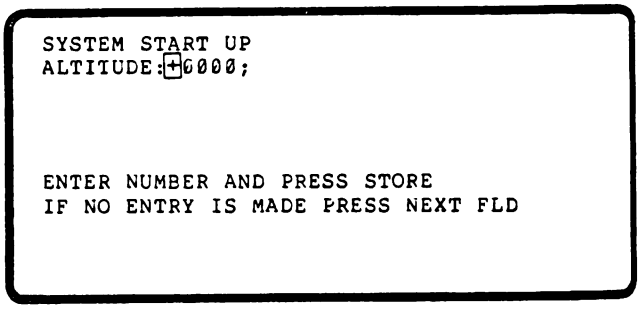
(5) Enter the ALTITUDE numbers, written in block 8 of your SPLL startup data form.

(6) Press STORE key.

NOTE

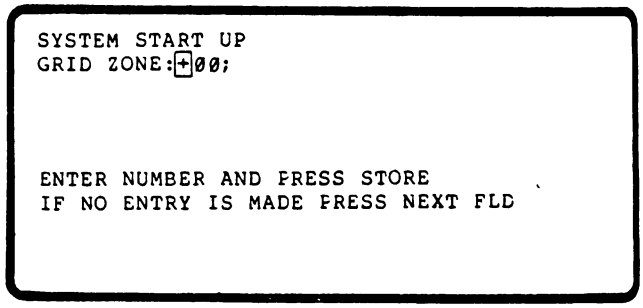
The SRP/PDS will be turned on automatically when either the STORE or the NEXT FLD key is pressed.

The SRP/PDS is turned on automatically and the GRID ZONE field will be displayed.



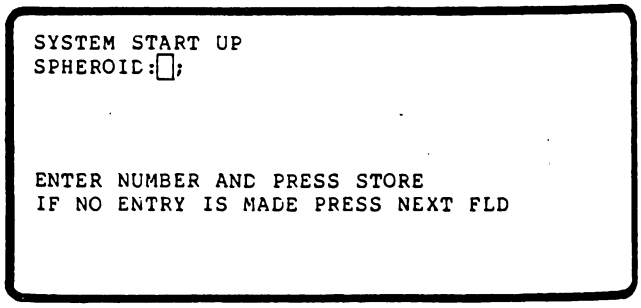
(7) Enter the GRID ZONE number, written in block 9 of your SPLL startup data form.

(8) Press STORE key. The SPHEROID field will be displayed.



(9) Enter the SPHEROID number, written in block 10 of your SPLL startup data form.

(10) Press STORE key. The SPLL present position is now entered. The first field of the rocket option selections will be displayed.



2-22. SYSTEM STARTUP (CONT)

g. Enter Rocket Options.

The first rocket option field is DUD FUZE.

If SKIP is selected, a rocket with a dud fuze will not be fired. Another rocket will be automatically selected and fired.

If FIRE is selected, a rocket with a dud fuze will be fired, but will not count as a rocket fired at the target. Another rocket will be automatically selected and fired.

```
SYSTEM START UP
DUD FUZE:0;    0=SKIP    1=FIRE



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(1) Enter the DUD FUZE option, written in block 11 of your SPLL startup data form.

(2) SKIP, option number 0, is the default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The MISFIRE option field will be displayed.

If STOP is selected and a rocket misfires during firing, the firing will stop. Refer to fire mission (paragraph 2-30) for instructions on misfired rockets when STOP option is selected.

If CONTINUE is selected and a rocket misfires during firing, the FCS will automatically select another good rocket to fire in its place.

```
SYSTEM START UP
MISFIRE:0;    0=STOP    1=CONTINUE



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(3) Enter the MISFIRE option, written in block 12 of your SPLL startup data form.

(4) STOP, option number 0, is the default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The HANGFIRE option field will be displayed.

If STOP is selected and a rocket hangfires during firing, the firing will stop. Refer to fire mission (paragraph 2-30) for instructions on hangfire rockets when STOP option is selected.

If CONTINUE is selected and a rocket hangfires during firing, the FCS will automatically select another rocket to fire.

```
SYSTEM START UP
HANGFIRE:0;    0=STOP    1=CONTINUE



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(5) Enter the HANGFIRE option, written in block 13 of your SPLL startup data form.

(6) STOP, option number 0, is the default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The rocket malfunction options have been entered. The TIME and TIME ZONE fields will be displayed next.

2-22. SYSTEM STARTUP (CONT)

h. Enter Time and Time Zone.

When entering the time of day, follow local operating procedures for synchronizing the time.

The FCS clock will reset when STORE key is pressed. The best way to start the clock at a specified time is to enter a time several seconds ahead of the actual time of day. When the time of day reaches the time entered, press STORE key to reset clock.

(1) Enter the time in hours, minutes, and seconds.

(2) Press STORE key. The clock will reset. The TIME ZONE entry field will be displayed.

```
                                    TIME 00:00:00
SYSTEM START UP



TIME IS IN HOURS:MINUTES:SECONDS
ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

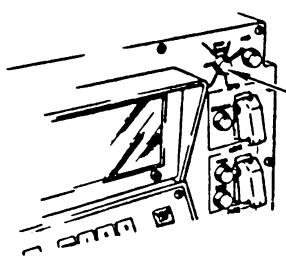
(3) Enter the TIME ZONE, written in block 14 of your SPLL startup data form.

(4) Press STORE key. The system startup entries are complete. The SRP/PDS must turn on and align for the system startup to be complete.

```
                                    TIME 00:00:00
SYSTEM START UP
TIME ZONE:24;
A=01  E=05  J=09  N=13  S=17  W=21
B=02  F=06  K=10  P=14  T=18  X=22
C=03  G=07  L=11  Q=15  U=19  Y=23
D=04  H=08  M=12  R=16  V=20  Z=24
ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

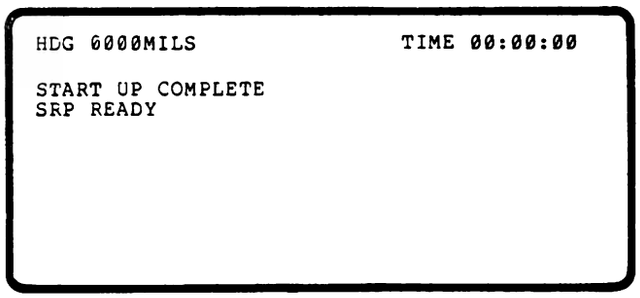
i. Startup Completion.

(1) When the SRP/PDS was turned on, the SRP automatically began an alignment procedure. The procedure takes about 8 minutes to complete. When the SRP alignment is completed, the SRP RDY indicator light will come on.



2-22. SYSTEM STARTUP (CONT)

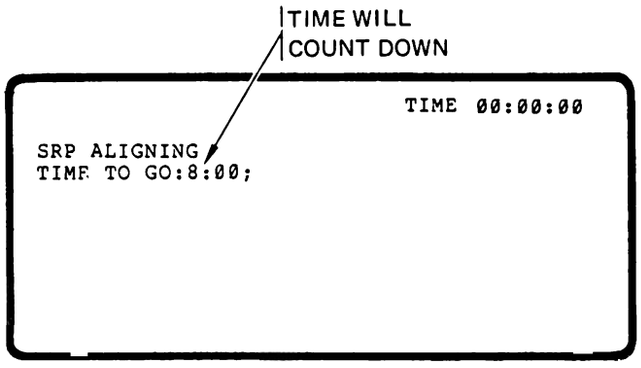
(2) If the SRP has completed alignment and the SRP RDY indicator light is on, a START UP COMPLETE prompt will be displayed.



The system startup is complete.

(3) If the SRP has not completed alignment when the time of day and time zone are entered, a SRP ALIGNING prompt will be displayed.

(4) The time remaining (TIME TO GO) before the alignment is completed will be displayed. You will be able to see the time counting down.



NOTE

Allowing the SRP to stabilize 3 to 4 minutes longer, after SRP READY is displayed, will increase time before realignment is required.

When the time reaches zero, the START UP COMPLETE and SRP READY prompts will be displayed automatically.

2-23. COMMS STARTUP. Comms startup procedure may be started as soon as the time zone is entered in the system startup routine. It is not necessary to wait for the SRP to complete alignment.

a. Index and Comms Startup Selection.

To display the comms startup routine, it must be selected from the startup index menu.

(1) Press INDEX key. The startup index menu will be displayed.

(2) Select START UP DATA, option number 0. Press the EXEC key. The startup data selection field will be displayed.

```
Ø:START UP DATA
1:BOOM CONT MENU
2:ROCKET STATUS
3:TEST MENU

SELECT NUMBER AND PRESS EXEC ;
```

(3) Select COMMS, option number 1, and press STORE key. The first field in the comms startup routine will be displayed.

```
START UP:Ø;    Ø=SYSTEM    1=COMMS    2=PDS



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

b. Enter On the Air, Crypto Status, and Own Address.

The first field in the COMMS START UP routine gets the comms processor, FCS, and the crypto equipment ready for use. It is also used to enter your SPLL address into the comm system.

NOTE

Some comm startup entries have default values. If the number you want to enter is already entered under the cursor, press NEXT FLD. The cursor will advance to the next entry, and the default value will be entered automatically.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
01 ON THE AIR                        :1;
02 CRYPTO STATUS                     :0;
03 OWN ADDRESS 1                     : ;
04 OWN ADDRESS 2                     : ;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

ON THE AIR options are 0 for ON and 1 for OFF. The default is 1. If it is selected, message ready prompt of each message routine will not be displayed. Message ready prompts are explained in paragraph 2-18.

(1) Enter the ON THE AIR selection number, written in block 15 of your SPLL startup data form.

2-23. COMMS STARTUP (CONT)

(2) Default value for ON THE AIR is 1. Press NEXT FLD if default value is used. Press STORE key if other number is entered. Cursor will advance to CRYPTO STATUS in entry.

(3) Enter the CRYPTO STATUS selection, written in block 16 of your SPLL startup data form.

(4) The default value is 0 for CRYPTO STATUS, in use. Press NEXT FLD if default value is used. Press STORE key if other number entered.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
01 ON THE AIR                        :1;
02 CRYPTO STATUS                     :0;
03 OWN ADDRESS 1                     : ;
04 OWN ADDRESS 2                     : ;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

NOTE

If CRYPTO STATUS, NOT IN USE (option 2 on SPLL startup form) is selected, SPLL position coordinates will be set to zero in all location/status and mission fired messages transmitted from the SPLL.

(5) When the CRYPTO STATUS option is entered, the cursor will advance to the OWN ADDRESS 1 entry.

(6) Enter the OWN ADDRESS 1 number, written in block 17 of your SPLL startup data form.

(7) Press STORE key. The cursor will advance to the OWN ADDRESS 2 entry.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
01 ON THE AIR                        :1;
02 CRYPTO STATUS                     :0;
03 OWN ADDRESS 1                     :;
04 OWN ADDRESS 2                     : ;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(8) Enter the OWN ADDRESS 2 number, written in block 18 of your SPLL startup data form.

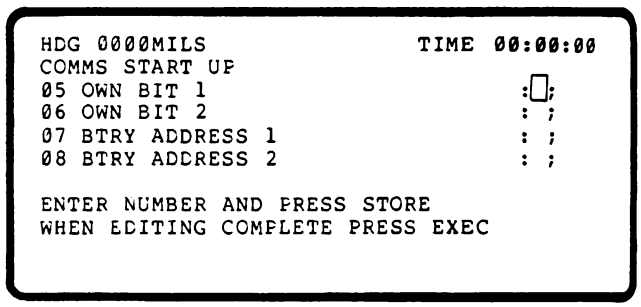
(9) Press STORE key. The next field of entries will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
01 ON THE AIR                        :1;
02 CRYPTO STATUS                     :0;
03 OWN ADDRESS 1                     :3;
04 OWN ADDRESS 2                     :;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

2-23. COMMS STARTUP (CONT)

c. Enter Own BIT and BTRY Address.

The next field of entries is for the SPLLs own BIT rate and the battery's (BTRY) address.



(1) Enter OWN BIT 1 number, written in block 19 of your SPLL startup data form. Press STORE key. The cursor will advance to the OWN BIT 2 entry.

NOTE

The cursor will advance to the next required entry each time STORE is pressed.

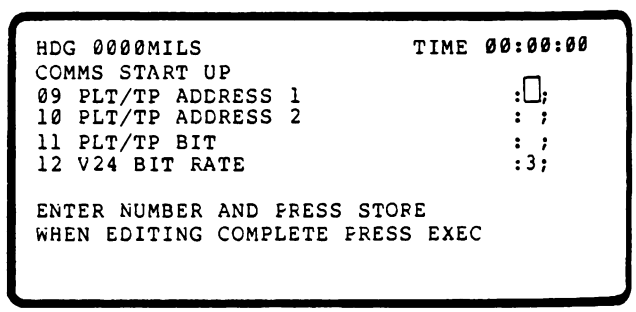
(2) Enter OWN BIT 2 number, written in block 20 of your SPLL startup data form. Press STORE key. The cursor will advance to the BTRY ADDRESS 1 entry.

(3) Enter BTRY ADDRESS 1 number, written in block 21 of your SPLL startup data form. Press STORE key. The cursor will advance to the BTRY ADDRESS 2 entry.

(4) Enter BTRY ADDRESS 2 number, written in block 22 of your SPLL startup data form. Press STORE key. The next field of entries will be displayed.

d. PLT/TP Address, PLT/TP BIT and V24 BIT Rate.

The next field of entries is for the platoon leaders (PLT/TP) address and BIT rate, and the V24 (international interface) BIT RATE.



(1) Enter PLT/TP ADDRESS 1 number, written in block 23 of your SPLL startup data form. Press STORE key. The cursor will advance to the PLT/TP ADDRESS 2 entry.

(2) Enter PLT/TP ADDRESS 2 number, written in block 24 of your SPLL startup data form. Press STORE key. The cursor will advance to the PLT/TP BIT entry.

(3) Enter PLT/TP BIT number, written in block 25 of your SPLL startup data form. Press STORE key. The cursor will advance to the V24 BIT RATE entry.

(4) Enter the V24 BIT RATE selection, written in block 26 of your SPLL startup data form.

(5) The default value for V24 BIT RATE is 3. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The next field of entries will be displayed.

2-23. COMMS STARTUP (CONT)

e. Enter BIT Rate, Access Delay Time, FSK Pair, and Block Mode.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
13 BIT RATE                          :1;
14 ACCESS DELAY TIME                 :3;
15 FSK PAIR                          :0;
16 BLOCK MODE                        :0;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

The next field of entries contain the BIT RATE, ACCESS DELAY TIME, FSK PAIR, and BLOCK MODE selection. Each entry has a default value.

(1) Enter the BIT RATE selection, written in block 27 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

(2) Enter ACCESS DELAY TIME selection, written in block 28 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

(3) Enter FSK PAIR selection, written in block 29 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

(4) Enter BLOCK MODE selection number, written in block 30 of your SPLL startup data form, or use default value. Press NEXT FLD if default value is used. Press STORE if other number is entered. The next field of entries will be displayed.

f. Enter Comm Processor Field Use and To BTRY Message Serial Numbers.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
17 CMP TO USE FIELD 18 AND 19        :0;
18 TO BTRY SERIAL NUMBER 1           :0;
19 TO BTRY SERIAL NUMBER 2           :0;
20 CMP TO USE FIELD 21 AND 22        :0;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

The next field of entries is for entering serial number selection for messages sent to BTRY.

(1) Enter CMP TO USE FIELD 18 AND 19 number, written in block 31 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The cursor will advance to the next entry.

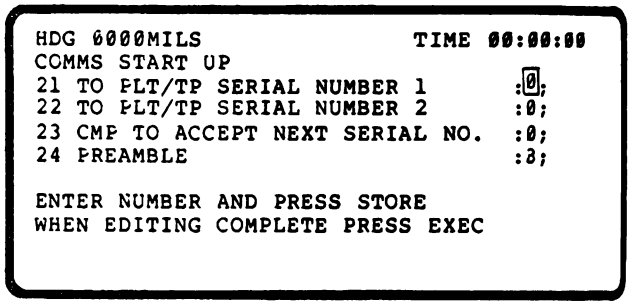
(2) Enter TO BTRY SERIAL NUMBER 1 number, written in block 32 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The cursor will advance to the next entry.

(3) Enter TO BTRY SERIAL NUMBER 2 number, written in block 33 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The cursor will advance to the next entry.

(4) Enter CMP TO USE FIELD 21 AND 22 number, written in block 34 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. The next field of entries will be displayed.

2-23. COMMS STARTUP (CONT)

g. Enter To PLT/TP Message Serial Number and Preamble.



The next field of entries is the serial number for messages to PLT/TP, and the preamble time.

(1) Enter TO PLT/TP SERIAL NUMBER 1 number, written in block 35 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

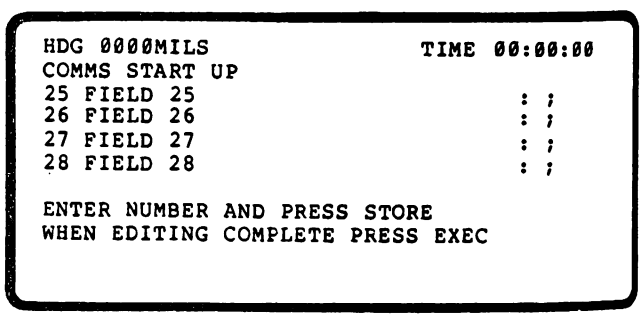
(2) Enter TO PLT/TP SERIAL NUMBER 2 number, written in block 36 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

(3) Enter CMP TO ACCEPT NEXT SERIAL NO. number, written in block 37 of your SPLL startup data form, or use default value. Press NEXT FLD key if default value is used. Press STORE key if other number is entered. Cursor will advance to next entry.

(4) Enter PREAMBLE time selection number, written in block 38 of your SPLL startup data form, or use default value.

The preamble entry completes the required entries for comms startup using the US prompts and comms processor. Additional entry fields are provided for use with French, German, and United Kingdom language prompts and their comms processing equipment. To display the additional fields, press STORE key and continue with the following paragraphs. To exit the routine and complete the comms startup, press EXEC key and go to comms overhead message (paragraph i).

h. Fields 25 Through 32.



(1) Entries in these fields are not required for comms startup. These fields are blank for US language prompts. If for some reason you want to edit these fields, press STORE key. Fields 25 through 28 will be displayed.

2-23. COMMS STARTUP (CONT)

(2) Press EXEC key to end the routine. Press STORE key to display fields 29 through 32.

(3) When editing is complete, press EXEC key to display comms overhead message prompt.

```
HDG 0000MILS                    TIME 00:00:00
COMMS START UP
29 FIELD 29                          : ;
30 FIELD 30                          : ;
31 FIELD 31                          : ;
32 FIELD 32                          : ;

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

i. Comms Overhead Message.

(1) The preamble entry completes the required entries for comms startup. Press EXEC key. The COMM OVERHEAD MESSAGE READY – PRESS XMIT prompt will be displayed.

(2) Press the XMIT key. This action sends all the data just entered into the FCS to the comms processor. The field will be erased.

```
HDG 0000MILS                    TIME 00:00:00




COMM OVERHEAD MESSAGE READY-PRESS XMIT
```

(3) If the SRP has not completed alignment by the time comms startup is completed, the SRP ALIGNING prompt will be displayed.

```
                                TIME 00:00:00

SRP ALIGNING
TIME TO GO:3:40;
```

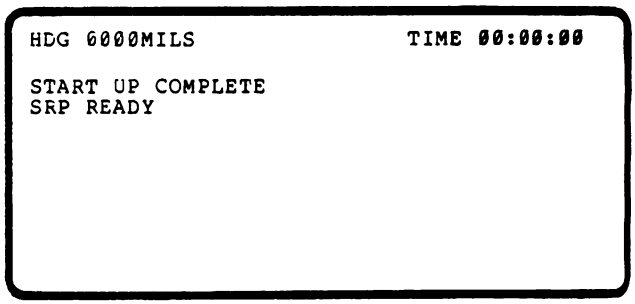
TIME TO GO

2-23. COMMS STARTUP (CONT)

NOTE

Allowing the SRP to stabilize 3 to 4 minutes longer, after SRP READY is displayed increases time before realignment is required.

(4) If the SRP has completed alignment, the display will show the startup complete, SRP READY prompt, and the SRP RDY indicator light will be on.



2-24. PDS STARTUP. The PDS startup routine can be started as soon as the comms routine is completed. Accurate PDS output data depends on accurate correction data. The PDS correction data is determined by periodic PDS calibration, and is referred to as PDS calibration values. PDS calibration values are entered into the FCS as odometer scale factor and azimuth and elevation crab angles. Calibration values will not change between calibrations. However, they must always be within specified limits and must be accurately entered at startup. The PDS calibration value limits are listed on the SPLL startup data form (figure 2-3) and are listed here for information.

Calibration Value	Limit
Odometer Scale Factor	18710 to 19222
Azimuth Crab Angle	65280 to 65535 and 0 to 00256
Elevation Crab Angle	65024 to 65535 and 0 to 00512

If, for some reason, calibration values should fall outside the limits specified, PDS calibration is required.

a. Index and PDS Startup Selection.

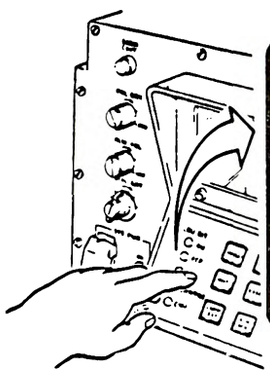
To display the PDS startup routine it must be selected from the startup index menu.

NOTE

Heading and time line will be displayed if SRP/PDS has completed alignment.

(1) Press INDEX key. The startup index menu will be displayed.

(2) Select the START UP DATA, option number 0. Press the EXEC key. The startup data selection field will be displayed.



```
0:START UP DATA
1:BOOM CONT MENU
2:ROCKET STATUS
3:TEST MENU

SELECT NUMBER AND PRESS EXEC ;
```

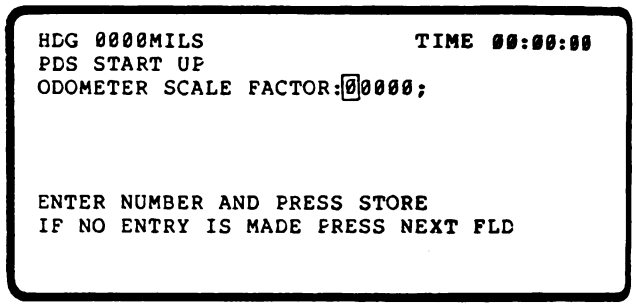
(3) Select PDS, option number 2, and press STORE key. The first field in the PDS startup routine will be displayed.

```
START UP:0;    0=SYSTEM    1=COMMS    2=PDS



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-24. PDS STARTUP (CONT)

b. Enter Odometer Scale Factor and Crab Angles.

The first field in the PDS startup routine is the ODOMETER SCALE FACTOR.

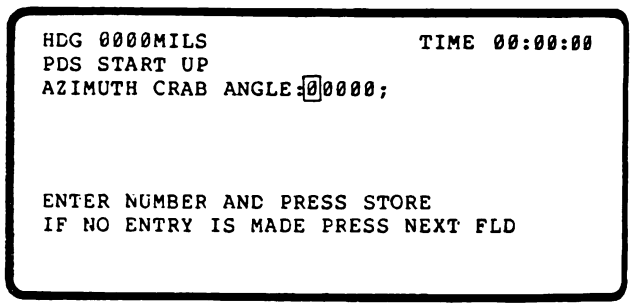


NOTE

This procedure assumes that the calibration values, recorded at the last calibration, will be recorded in the SPLL startup data form.

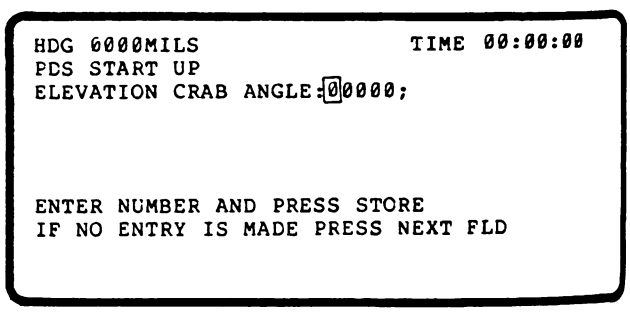
(1) Enter the ODOMETER SCALE FACTOR numbers, written in block 39 of your SPLL startup data form.

(2) Press STORE key. The AZIMUTH CRAB ANGLE entry field will be displayed.



(3) Enter the AZIMUTH CRAB ANGLE numbers, written in block 40 of your SPLL startup data form.

(4) Press STORE key. The ELEVATION CRAB ANGLE entry field will be displayed.

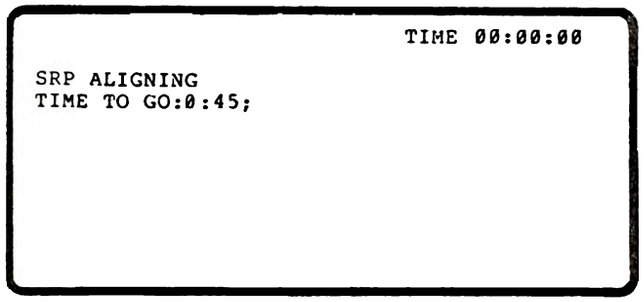


(5) Enter the ELEVATION CRAB ANGLE numbers, written in block 41 of your SPLL startup data form.

(6) Press STORE key.

2-24. PDS STARTUP (CONT)

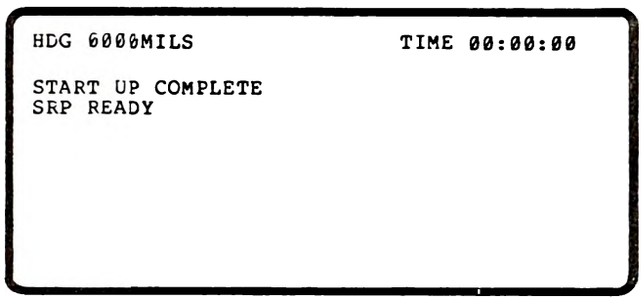
(7) This completes the required entries for PDS startup. When STORE key is pressed, if the SRP is still aligning, the SRP ALIGNING prompt will be displayed.



NOTE

Allowing the SRP to stabilize 3 to 4 minutes longer after SRP READY is displayed, increases time before realignment is required.

(8) If the SRP has completed alignment, the display will show the START UP COMPLETE, SRP READY prompt and the SRP RDY indicator light will be on.



2-25. NV MEMORY STARTUP. When the NV memory is active, the startup procedure is short and quick. Most of the basic operating data that was entered when the SPLL was shutdown has not been erased. The minimum steps required are to turn on the SRP, enter the correct time, set up the COMMS for air operation, and check the PDS calibration values. If you are not going to use digital radio input data, COMMS entries are not needed. You should edit all other entries and make changes if required.

a. Startup Conditions.

The startup conditions are the same as for a full startup. Perform paragraphs 2-22, a through 2-22, d.

b. Language and Index Selection.

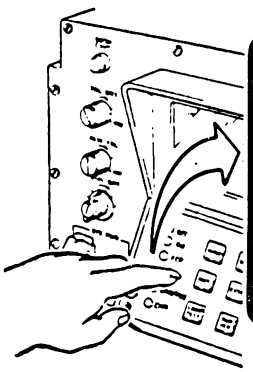
After the FCS is turned on and the indicator lights and display brightness is adjusted, the language selection must be made.

```
TEXTE FRANCAIS : PRESS 0 PUIS EXEC
GE BILDSCHIRMTEXT 1 DANN EXEC DRUECKEN
FOR UK PROMPTING PRESS 2 THEN EXEC
FOR US PROMPTING PRESS 3 THEN EXEC      :0;
```

(1) For US language prompts, select option number 3.

(2) Press the EXEC key. The startup index menu will be displayed.

(3) Select the START UP DATA, option number 0, and press EXEC key. The startup data selection field will be displayed.



```
0:START UP DATA
1:BOOM CONT MENU
2:ROCKET STATUS
3:TEST MENU

SELECT NUMBER AND PRESS EXEC 0;
```

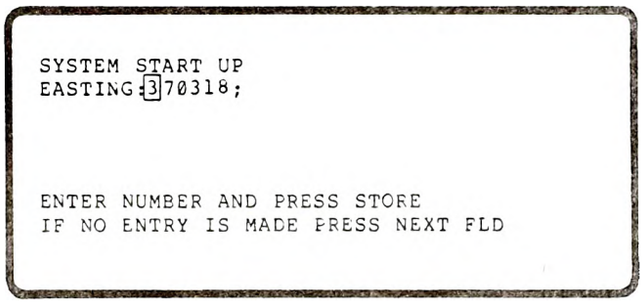
(4) Select SYSTEM startup, option number 0, and press STORE key. The first field in the system startup routine will be displayed.

```
START UP:0;    0=SYSTEM    1=COMMS    2=PDS


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-25. NV MEMORY STARTUP (CONT)

c. Turn on SRP/PDS.

The first field in the system startup routine is the EASTING field.

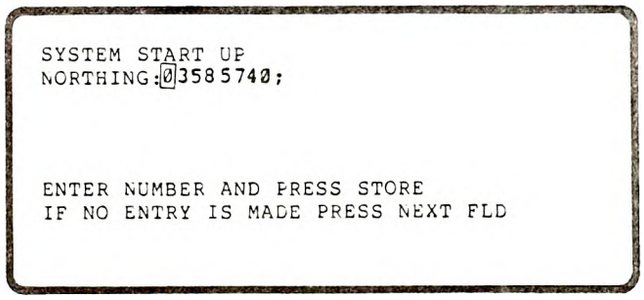


(1) The EASTING that was stored in the NV memory at shutdown will be displayed. No entry is required.

NOTE

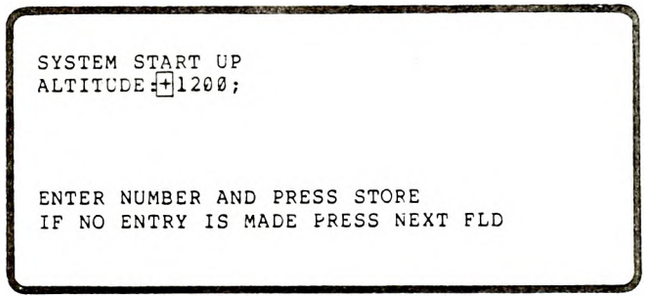
If a change to any stored entry is required, enter the change and press STORE key to advance to next display field.

(2) Press NEXT FLD key. The NORTHING field will be displayed.



(3) The NORTHING that was stored in the NV memory at shutdown will be displayed. No entry is required.

(4) Press NEXT FLD key. The ALTITUDE field will be displayed.



(5) The ALTITUDE that was stored in the NV memory at shutdown will be displayed. No entry is required.

(6) Press NEXT FLD key. The SRP/PDS will be turned on, and the GRID ZONE field will be displayed.

2-25. NV MEMORY STARTUP (CONT)

d. Enter Time and Time Zone.

After the SRP/PDS is turned on, the next required entries are time of day and time zone.

(1) After the SRP/PDS is turned on, the GRID ZONE field that was stored in NV memory of shutdown will be displayed. No entry is required. Press NEXT FLD key.

```
SYSTEM START UP
GRID ZONE:+13;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(2) The SPHEROID, DUD FUZE, MISFIRE, and HANGFIRE fields will each be displayed in turn. Each will display the entry that was stored in NV memory at shutdown. As each field is displayed, press the NEXT FLD key. The display will advance to each field in turn, until the time entry field is displayed.

```
                                TIME 00:00:00
SYSTEM START UP



TIME IS IN HOURS:MINUTES:SECONDS
ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

NOTE

When entering time of day, follow local operating procedures for synchronizing the time.

(3) Enter the time in hours, minutes, and seconds. Press STORE key to start the clock.

When STORE key is pressed, the clock starts and the TIME ZONE field is displayed.

(4) Enter the TIME ZONE for your operating area, or the one written in block 14 of your SPLL startup data form.

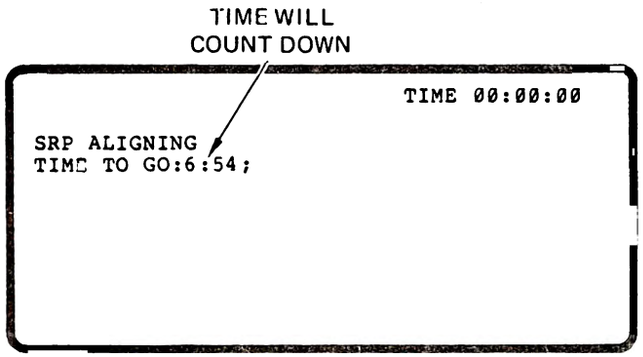
(5) Press STORE key. The system startup entries are complete. The SRP ALIGNING prompt will be displayed.

```
                                TIME 00:00:00
SYSTEM START UP
TIME ZONE:24;
A=01  E=05  J=09  N=13  S=17  W=21
B=02  F=06  K=10  P=14  T=18  X=22
C=03  G=07  L=11  Q=15  U=19  Y=23
D=04  H=08  M=12  R=16  V=20  Z=24
ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-25. NV MEMORY STARTUP (CONT)

You can see the time remaining (TIME TO GO) before alignment is complete.

However, it is not necessary to wait for the SRP/PDS to complete alignment before continuing.

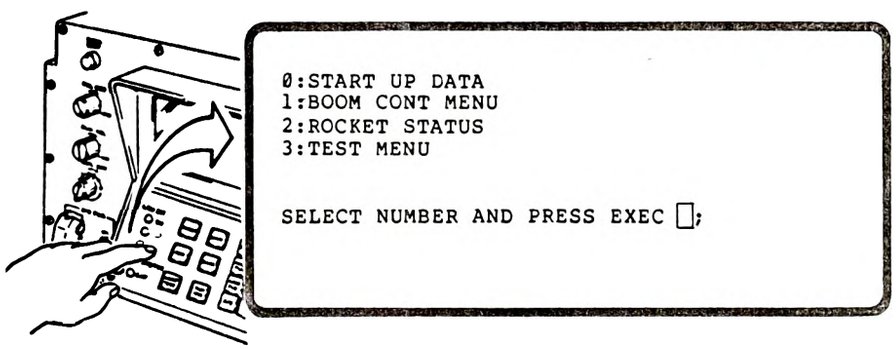


e. Comms Turn on.

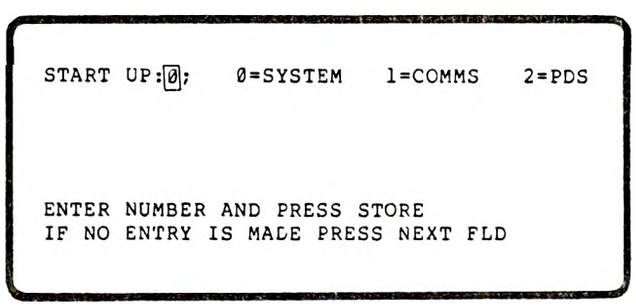
If you are going to operate using digital input data, received over the radio, you must display the comms startup routine and select ON THE AIR. If you are not going to use digital inputs received over the radio, you may skip this paragraph and go to to paragraph f.

(1) To turn on the comms, press INDEX key. The INDEX MENU will be displayed.

(2) Select START UP DATA, option number 0, and press EXEC key. The startup data selection field will be displayed.

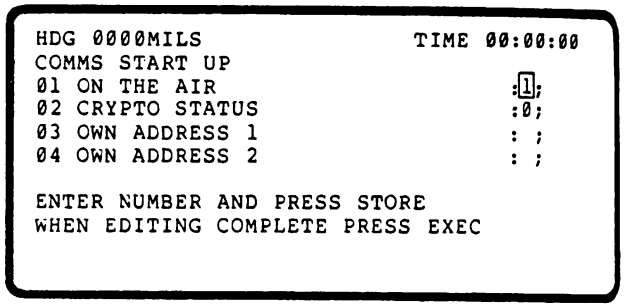


(3) Select COMMS, option number 1, and press STORE key. The first field in the COMMS START UP routine will be displayed.



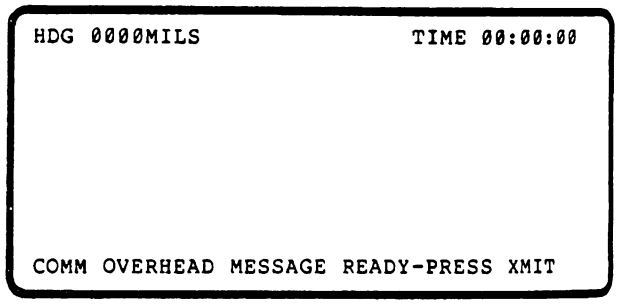
2-25. NV MEMORY STARTUP (CONT)

(4) The first entry in the display field is to tell the FCS if you are going to operate on the air. The default number is 1, which is the OFF THE AIR selection. To use the comms equipment with the FCS, you must change this to ON THE AIR, which is 0. Select 0.

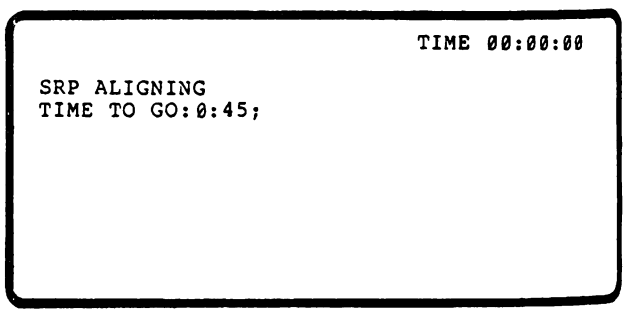


(5) Press STORE key and the ON THE AIR selection will be entered. You can continue to edit the other comms startup data. However, ON THE AIR is the only required selection for NV memory startup. If you want to exit the routine and continue operations, press EXEC key. The COMM OVERHEAD MESSAGE READY prompt will be displayed.

(6) Press the XMIT key. This action sends the comms data to the comms processor. The field will be erased.



(7) If the SRP has not completed alignment, the SRP ALIGNING prompt will be displayed.



2-25. NV MEMORY STARTUP (CONT)

r. Edit PDS Startup Data.

Edit PDS startup data to verify that PDS calibration values are within limits.

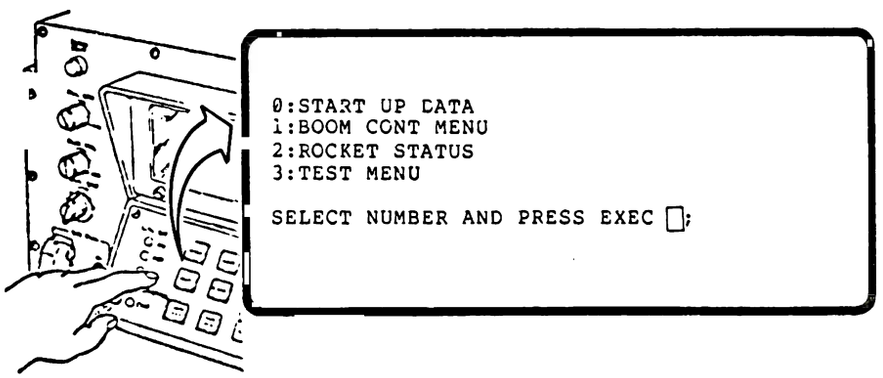
NOTE

PDS calibration values must be the same as the values recorded at last calibration.

(1) Press INDEX key and display the startup index.

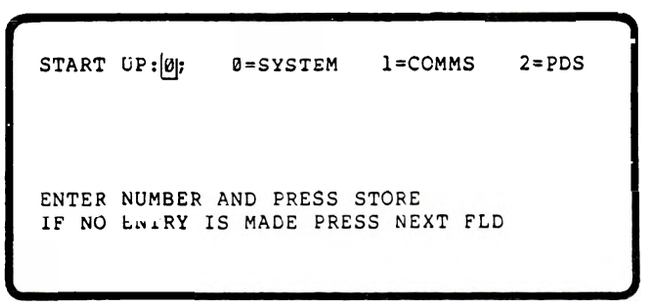
(2) Select the START UP DATA, option number 0, and press EXEC key.

The startup data selection field will be displayed.



(3) Select PDS startup, option number 2, and press STORE key.

ODOMETER SCALE FACTOR, the first field in the PDS startup routine, will be displayed.



2-25. NV MEMORY STARTUP (CONT)

(4) Edit the odometer scale factor and verify that it is the same as the ODOMETER SCALE FACTOR recorded at last calibration. Press NEXT FLD key. The AZIMUTH CRAB ANGLE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ODOMETER SCALE FACTOR:00000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(5) Edit the azimuth crab angle and verify that it is the same as the AZIMUTH CRAB ANGLE recorded at last calibration. Press NEXT FLD key. The ELEVATION CRAB ANGLE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
AZIMUTH CRAB ANGLE:00000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(6) Edit the elevation crab angle to verify that it is the same as the ELEVATION CRAB ANGLE recorded at last calibration. Editing PDS startup data is complete. Press NEXT FLD key. If the SRP is still aligning, the SRP ALIGNING prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ELEVATION CRAB ANGLE:00000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(7) No other entries are required. Other startup entries should be edited while waiting for SRP to align.

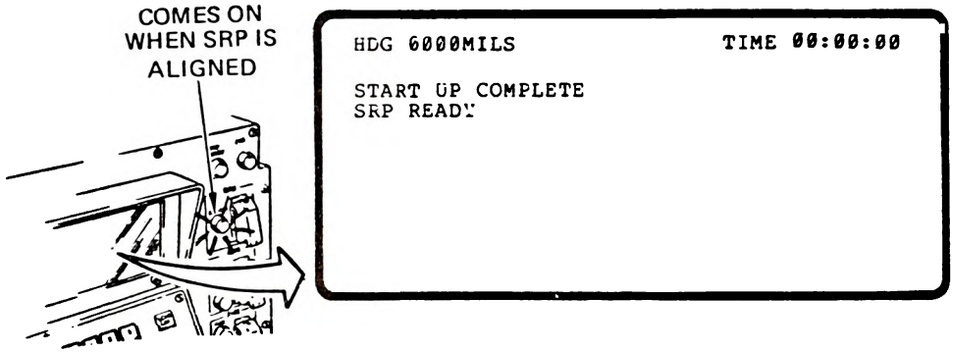
```
                                TIME 00:00:00

SRP ALIGNING
TIME TO GO:0:45;
```

2-25. NV MEMORY STARTUP (CONT)

NOTE

Allowing the SRP to stabilize 3 to 4 minutes longer, after SRP READY is displayed, will increase time before realignment is required.

(8) When SRP alignment is completed, the SRP RDY light on the FCP will come on and the START UP COMPLETE, SRP READY prompts will be displayed.



g. NV Memory Startup Flow Diagram.

A flow diagram of this operating procedure is shown in figure 2-6.

2-25. NV MEMORY STARTUP (CONT)

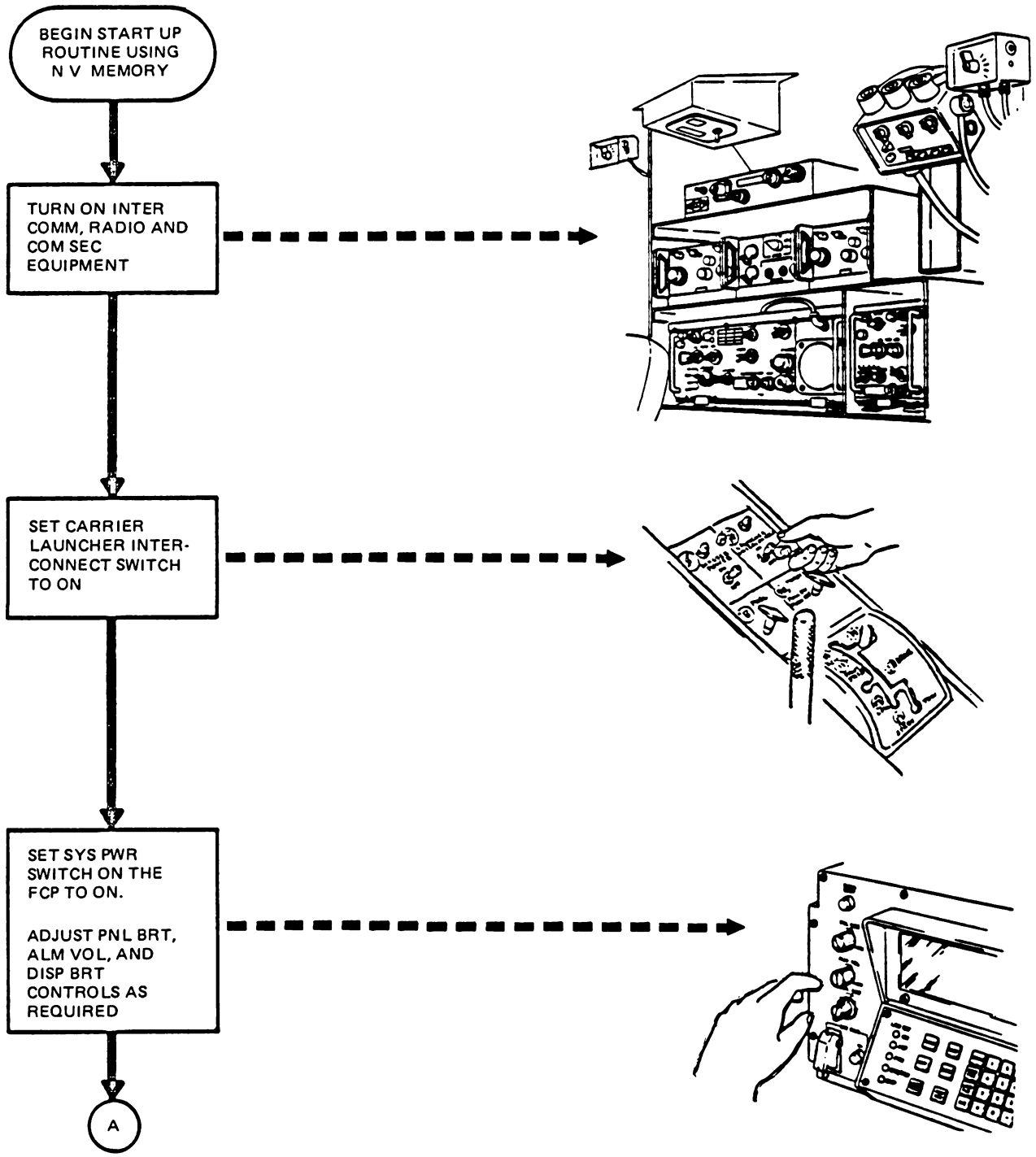


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 1 of 8)

2-25. NV MEMORY STARTUP (CONT)

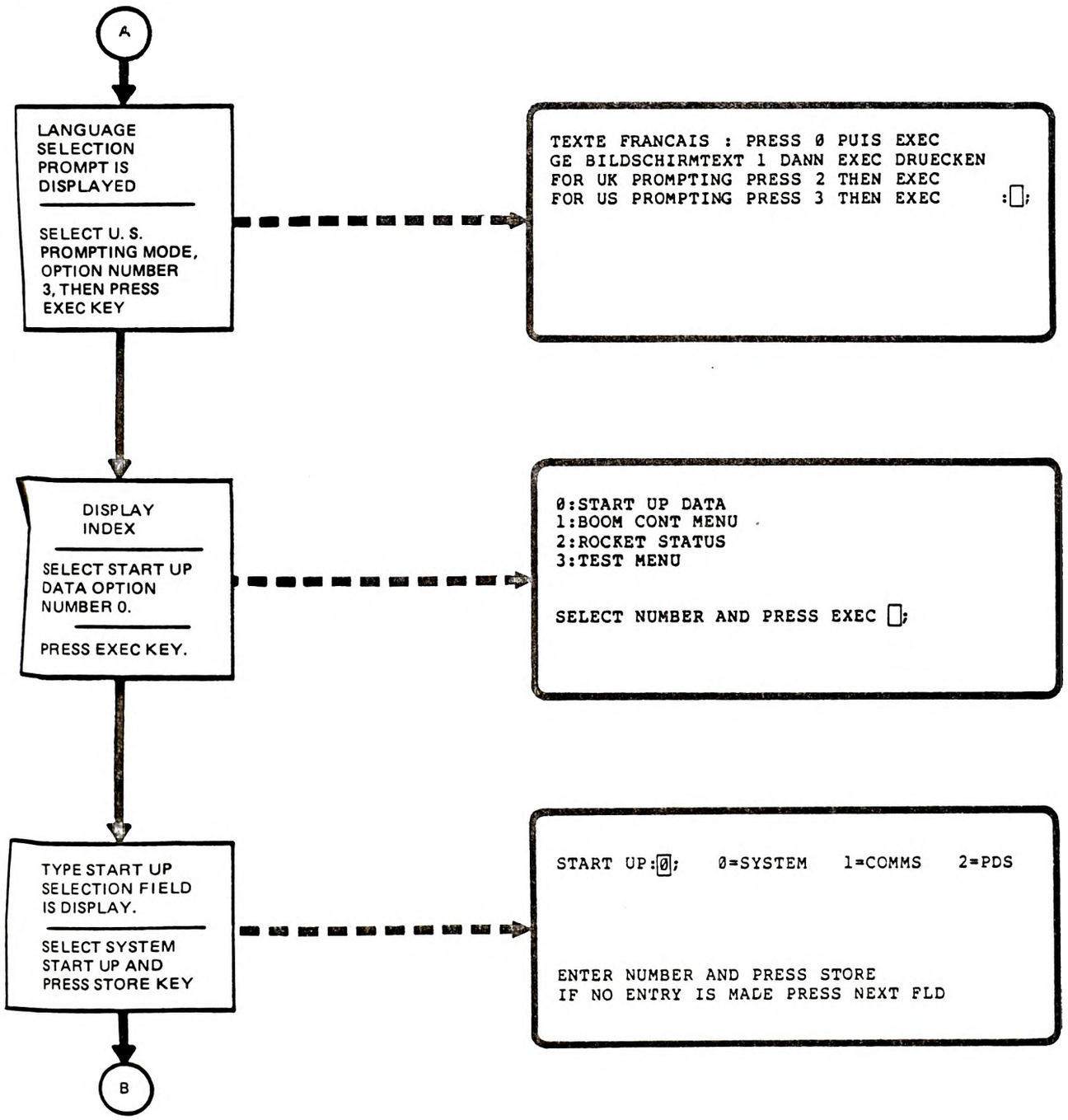


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 2 of 8)

2-25. NV MEMORY STARTUP (CONT)

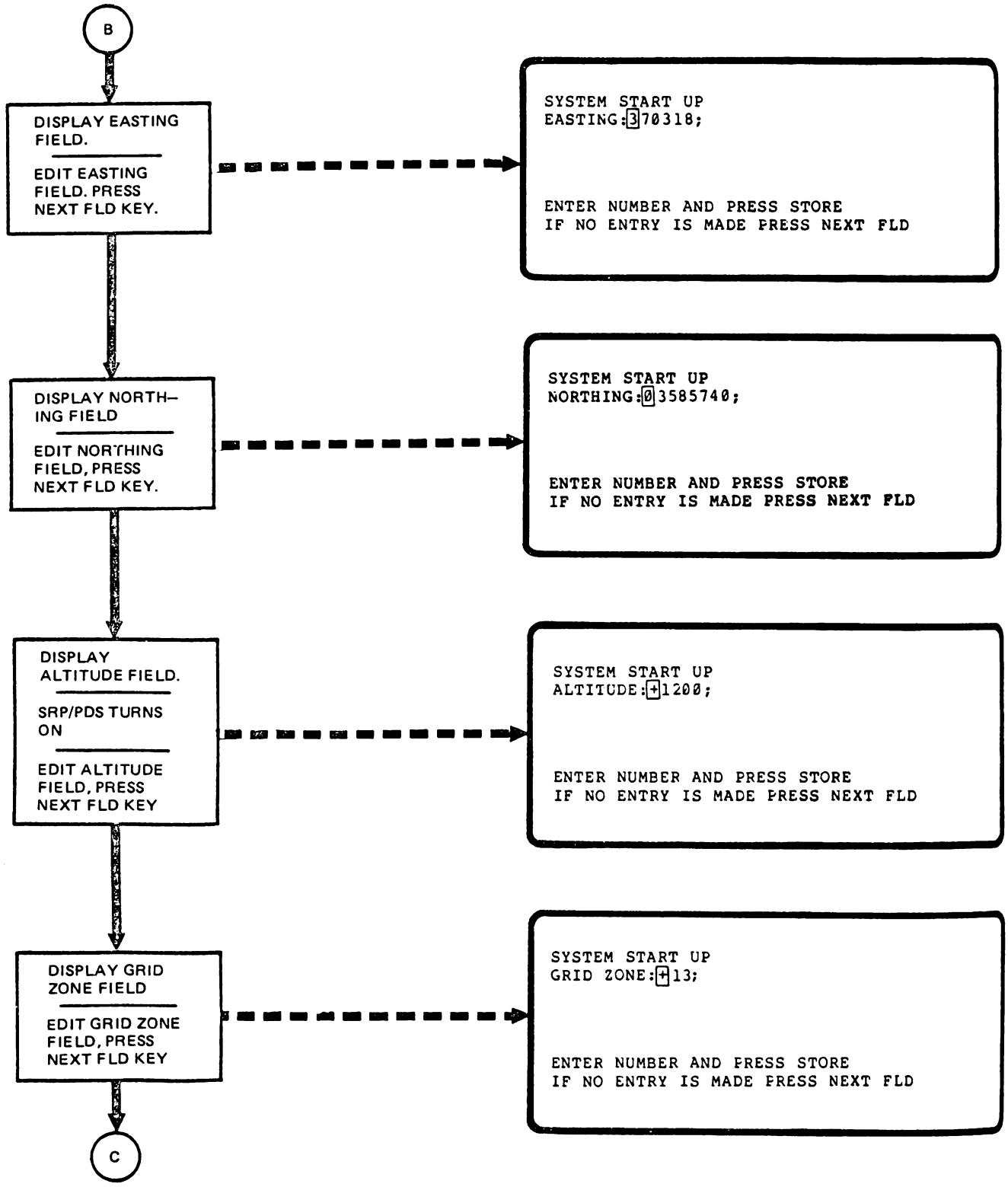


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 3 of 8)

2-25. NV MEMORY STARTUP (CONT)

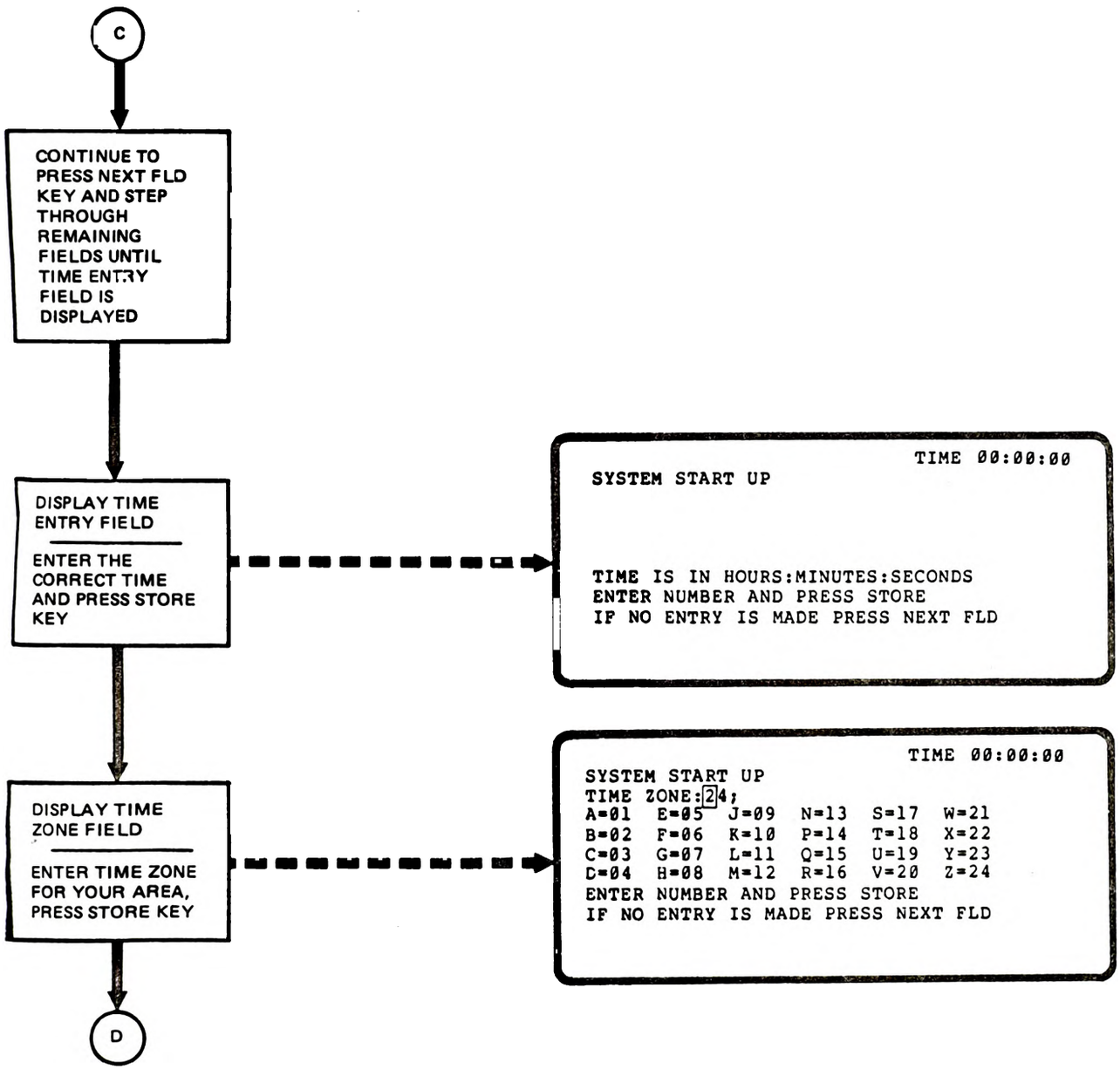


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 4 of 8)

2-25. NV MEMORY STARTUP (CONT)

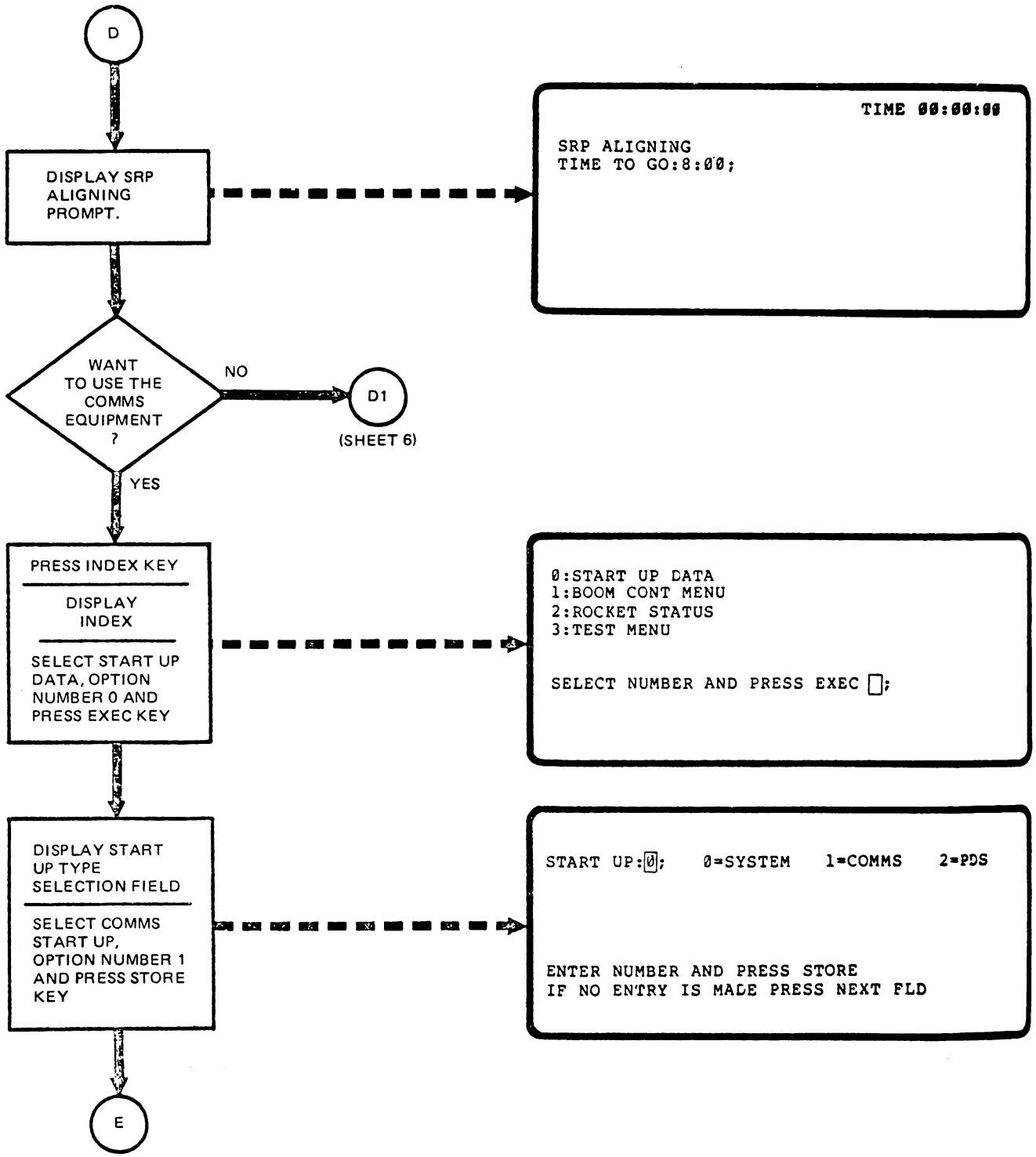


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 5 of 8)

2-25. NV MEMORY STARTUP (CONT)

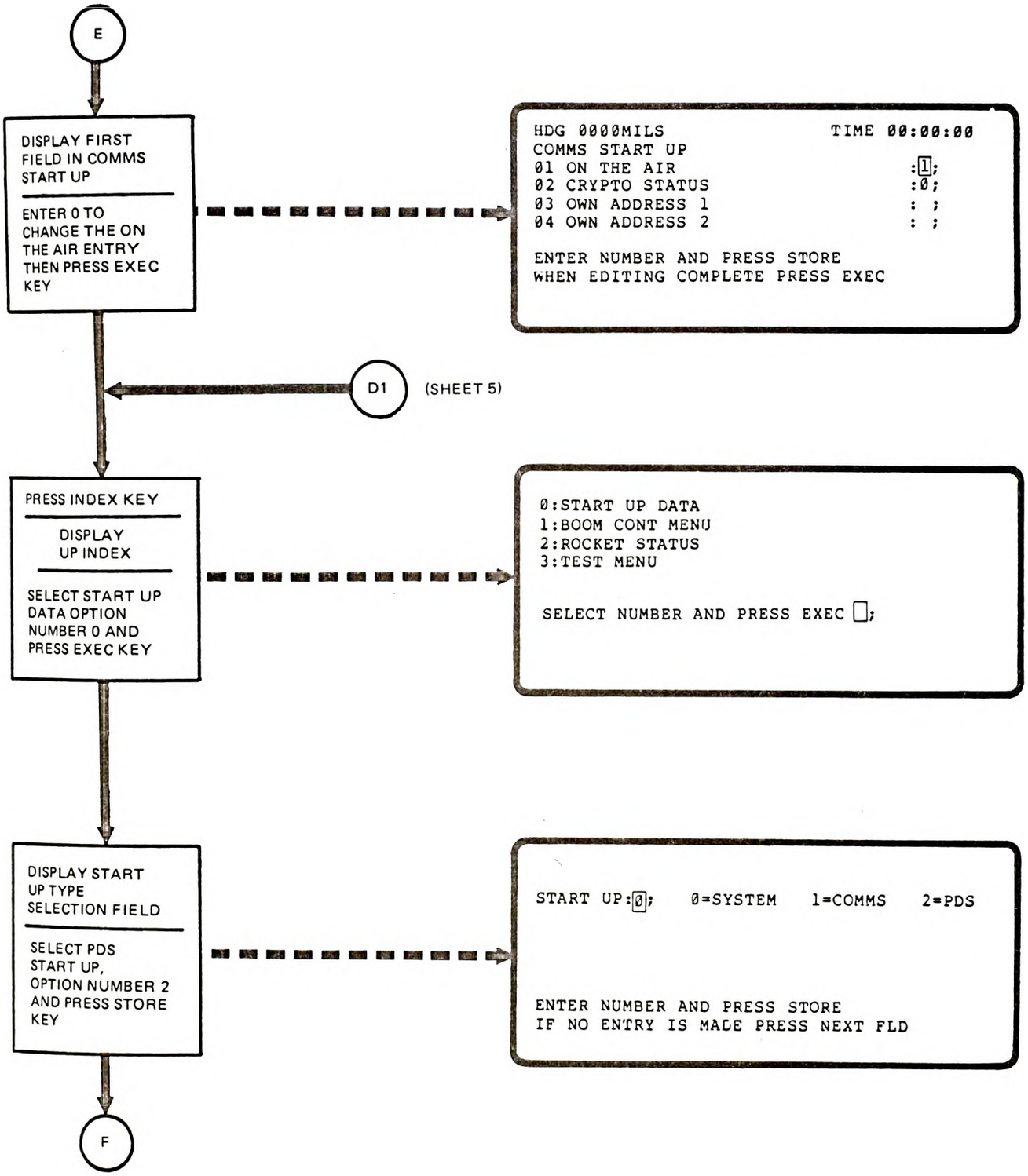


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 6 of 8)

2-25. NV MEMORY STARTUP (CONT)

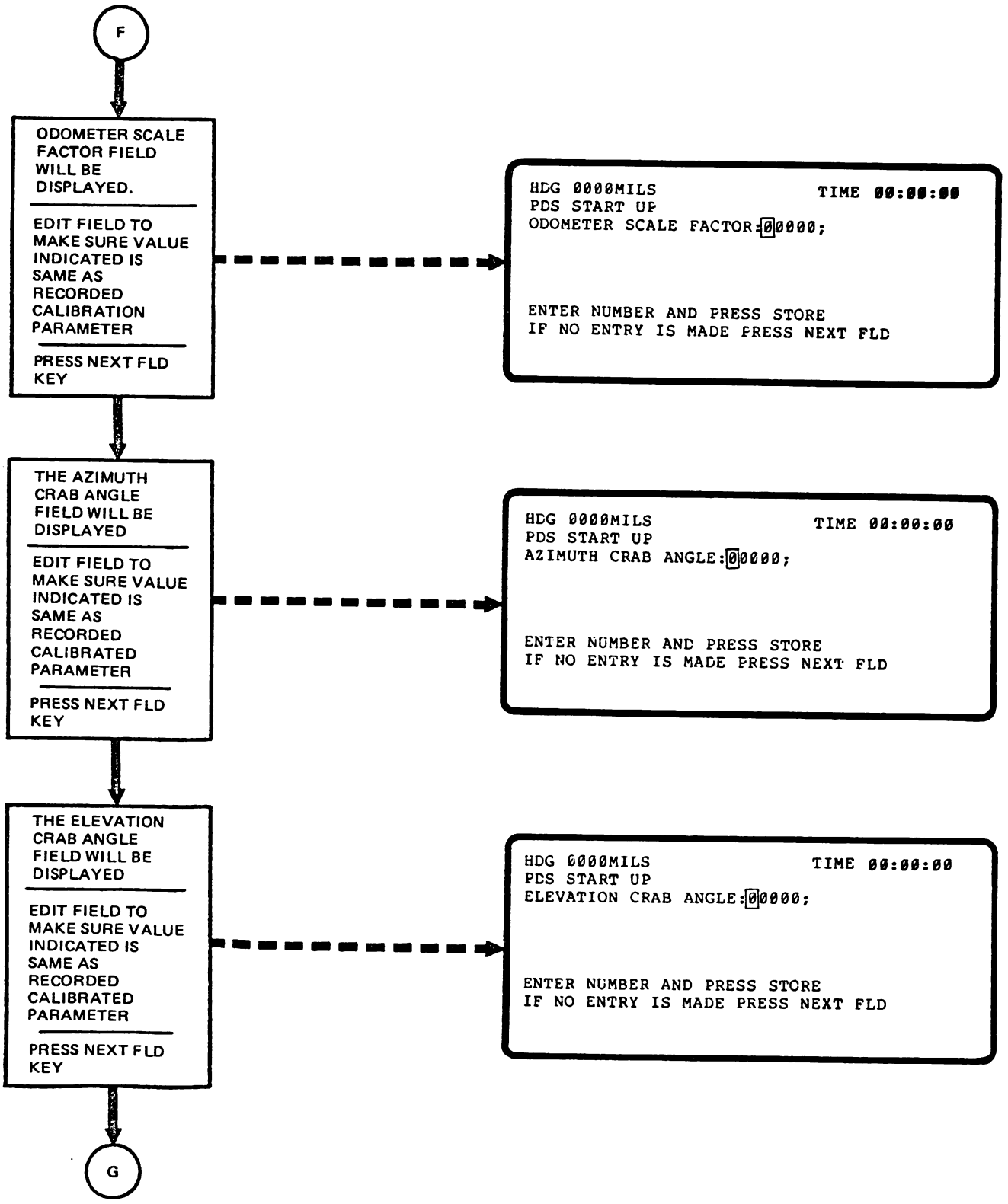


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 7 of 8)

2-25. NV MEMORY STARTUP (CONT)

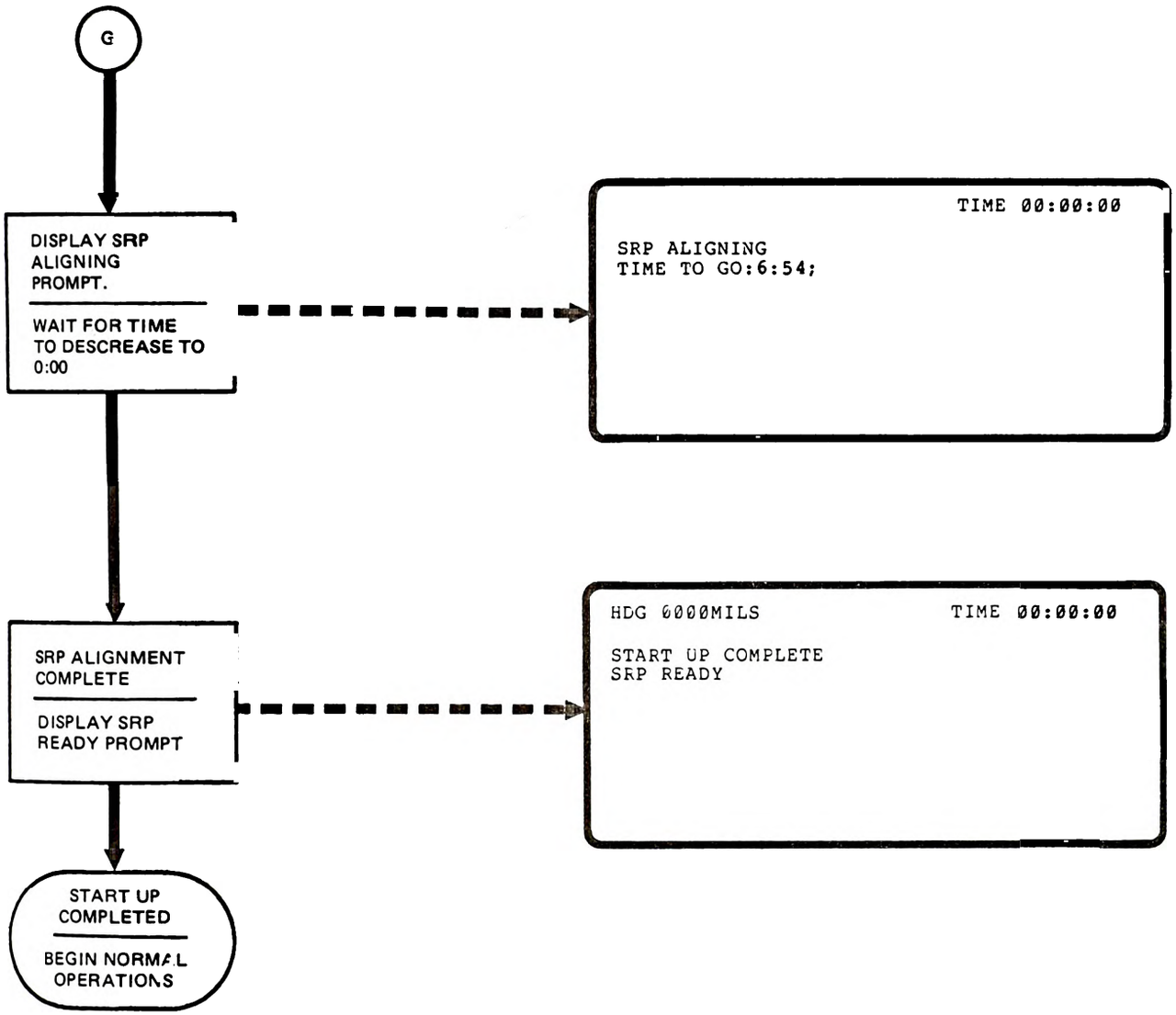


Figure 2-6. NV Memory Startup Flow Diagram (Sheet 8 of 8)

2-26. PDS UPDATE. The accuracy of the PDS depends on periodic updating of the PDS. Updating compares the PDS output against known survey control point (SCP) location data. The PDS output is changed (updated) to agree with the SCP. Internal calibration values in the PDS are not recomputed. PDS update requirements will be controlled by the SPLL use and local operating procedures. To maintain mission accuracy during normal operations, it is recommended that the PDS be updated after the SPLL has traveled 6 to 8 kilometers. However, greater distances of up to 20 kilometers are acceptable for platoon deployment changes.

The PDS output (SPLL location) is unacceptable if any of the SPLL location data (easting, northing, or altitude) is in error by more than 85 meters after being calibrated, while carrying LPCs with tactical or practice rounds, and traveling 6 to 8 kilometers. Corrective action must be taken. If corrective action is required, refer to troubleshooting symptom index (Chapter 3).

a. Request Update SCP Location.

After the SRP/PDS is turned on and the SRP is aligned, the PDS can be updated. Unless you have recorded SCP locations on your SPLL startup data form, you must request the SCP locations by radio.

If you are going to use the SCP location data recorded on your SPLL startup form, refer to paragraph b. If you need to request the data by radio, continue with the following paragraphs.

(1) To request SCP location data, press the INDEX key and display the INDEX MENU.

(2) Select MESSAGE MENU, option number 6, and press EXEC key. The MESSAGE MENU will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(3) From the MESSAGE MENU, select the REQUEST routine, option number 4, and press EXEC key. The MESSAGE DESTINATION field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC ;
```

2-26. PDS UPDATE (CONT)

(4) Select the MESSAGE DESTINATION required by local operating instructions and press STORE key. The REQUEST MENU will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
MESSAGE DESTINATION:0;    0=BTRY    1=PLT/TP



ENTER NUMBER AND PRESS STORE
```

(5) From the REQUEST MENU select SURVEY CONTROL POINT, option number 4, and press STORE key. The REQUEST MESSAGE READY prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
REQUEST MENU
DATA REQUESTED:;
0:CALL FOR FIRE       4:SURVEY CONTROL POINT
1:MET DATA            5:SPLL LOC/STATUS
2:RENDEZVOUS GRID     6:LOAD/SUPPLY POINT
3:MOVE TO GRID        7:NEXT FIRING POINT
ENTER NUMBER AND PRESS STORE
```

(6) Press the XMIT key and send the message.

```
HDG 0000MILS                    TIME 00:00:00




REQUEST MESSAGE READY-PRESS XMIT
```

b. Receive SCP Message.

(1) A command message will be used to send you the SCP coordinates. When the message is received, the alarm will sound and the command message received prompt will be displayed.

(2) Press the ALM ACK key. The alarm will shut off, and the SCP coordinates are stored in the FCS.

```
HDG 0000MILS                    TIME 00:00:00




COMMAND MSG FROM BTRY  -PRESS ALM ACK
```

2-26. PDS UPDATE (CONT)

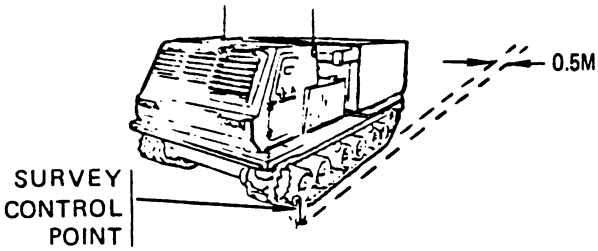
```
HDG 0000MILS                    TIME 00:00:00


SURVEY CONTROL POINT GRID:0000 0000;


WILL COMPLY MESSAGE READY-PRESS XMIT
```

(3) The SCP coordinates and the WILL COMPLY MESSAGE READY prompt will be displayed.

(4) Press the XMIT key and send the will comply message.

c. Updating the PDS.

(1) Drive the SPLL to the SCP. Park the SPLL at the SCP. To make an update as accurate as possible, you must always use same reference point on SPLL to park at the SCP. Use the rear edge of carrier's left drive sprocket. Park so that the rear edge of the sprocket is in line with and about 0.5 meters away from the SCP. Any vehicle heading is acceptable.




```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(2) When the SPLL is parked in position, press the INDEX key. The INDEX MENU will be displayed.

(3) From the INDEX MENU select the UPDATE PDS, option number 5. Press the EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION   :000000 00000000 +0000;
UPDATE LOCATION:000000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(4) The SPLL LOCATION and UPDATE LOCATION (SCP) field will be displayed.

The SPLL location is the output from the PDS. The update location is the SCP location you just received over the radio.

2-26. PDS UPDATE (CONT)

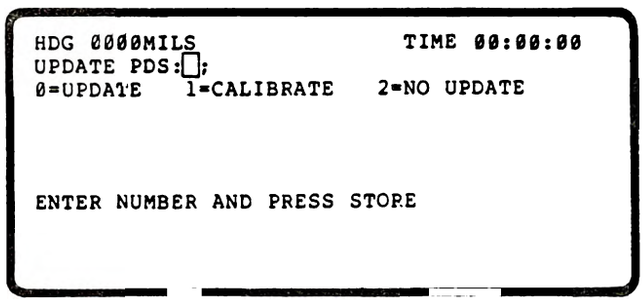
NOTE

An error in SPLL location of more than 85 meters in northing, easting, or altitude after traveling 6 to 8 kilometers with loaded LPCs, requires corrective action. Refer to symptom index (table 3-2).

(5) Check the SPLL LOCATION to insure there are no errors. Edit the UPDATE LOCATION entries. If no change is required, press NEXT FLD key. If a change is required, enter any changes necessary in the UPDATE LOCATION line. Press STORE key.

(6) When NEXT FLD or STORE key is pressed, the coordinates shown on the update location will be stored in the FCS. The display will also change to UPDATE, CALIBRATE, or NO UPDATE selection field.

(7) To update the PDS, select UPDATE option number 0. Press STORE key. The PDS will be updated.



d. No Update.

The NO UPDATE, option number 2, lets you edit the SPLL and update locations without updating the PDS. If you are displaying the update, calibration, no update field, and for some reason you decide not to update or calibrate, selecting no update option will end the routine without updating the PDS.

e. PDS Update Flow Diagram.

Figure 2-7 is a flow diagram showing the operating steps described in this procedure.

2-26. PDS UPDATE (CONT)

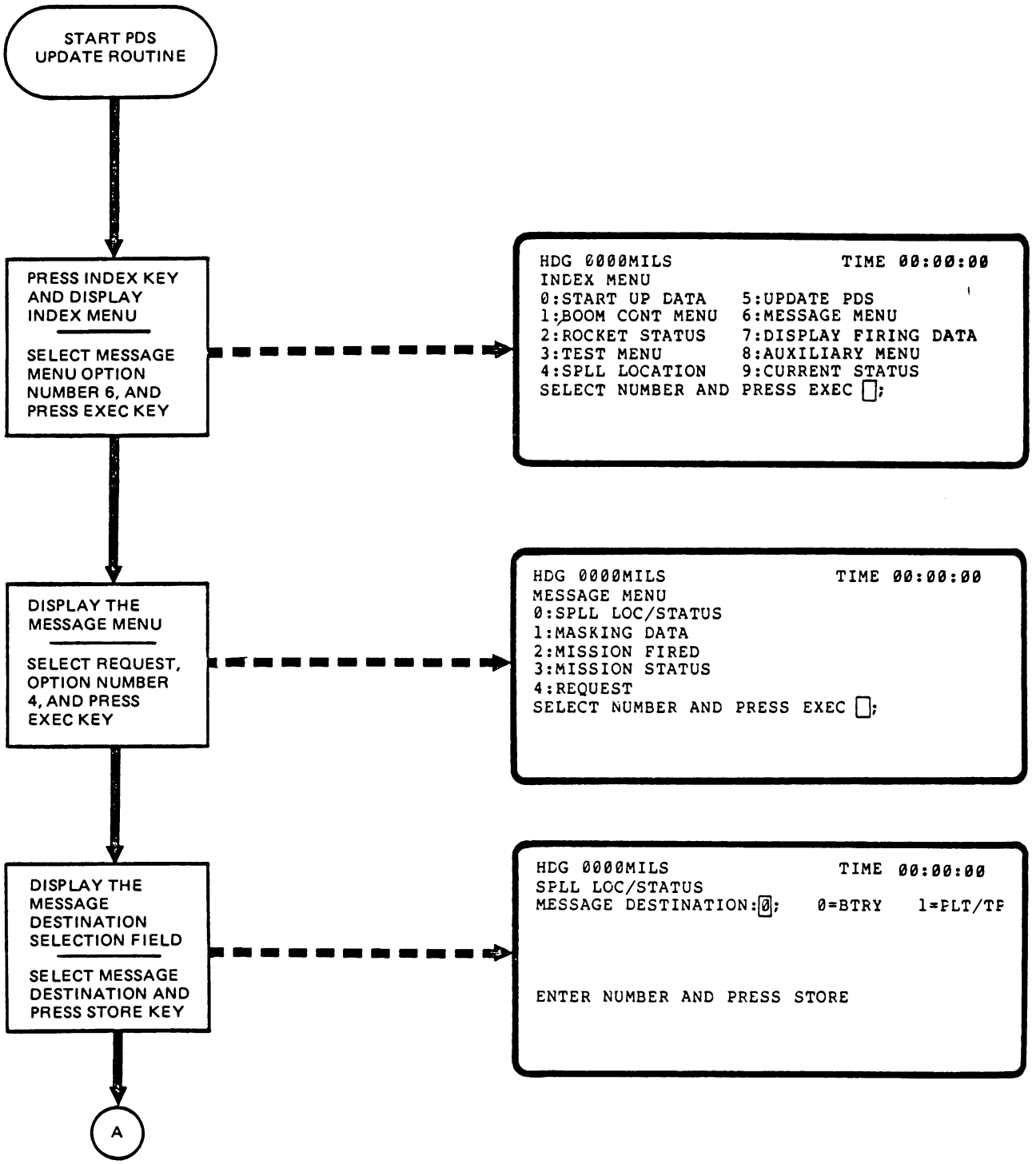


Figure 2-7. PDS Update Flow Diagram (Sheet 1 of 4)

2-26. PDS UPDATE (CONT)

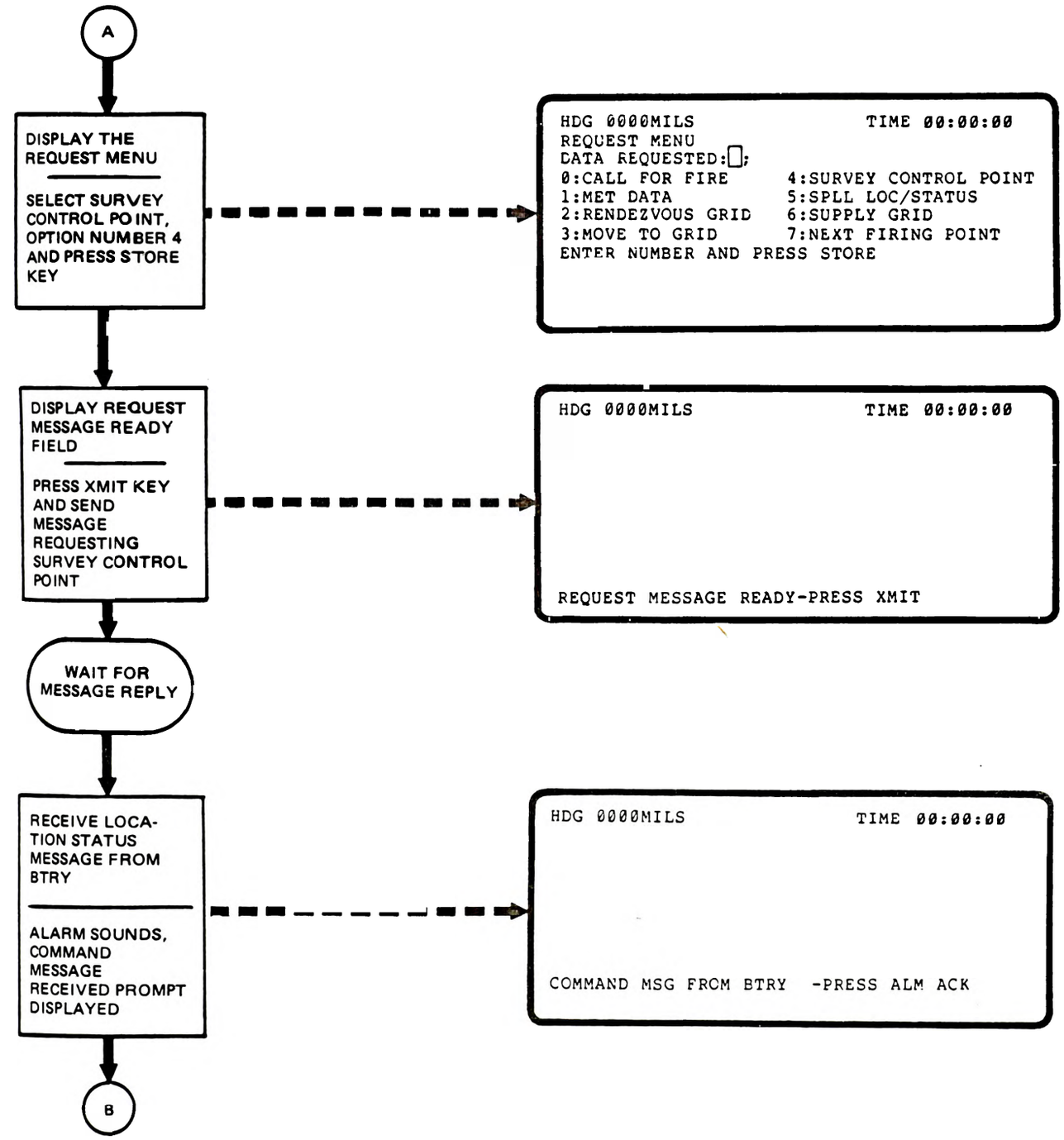


Figure 2-7. PDS Update Flow Diagram (Sheet 2 of 4)

2-26. PDS UPDATE (CONT)

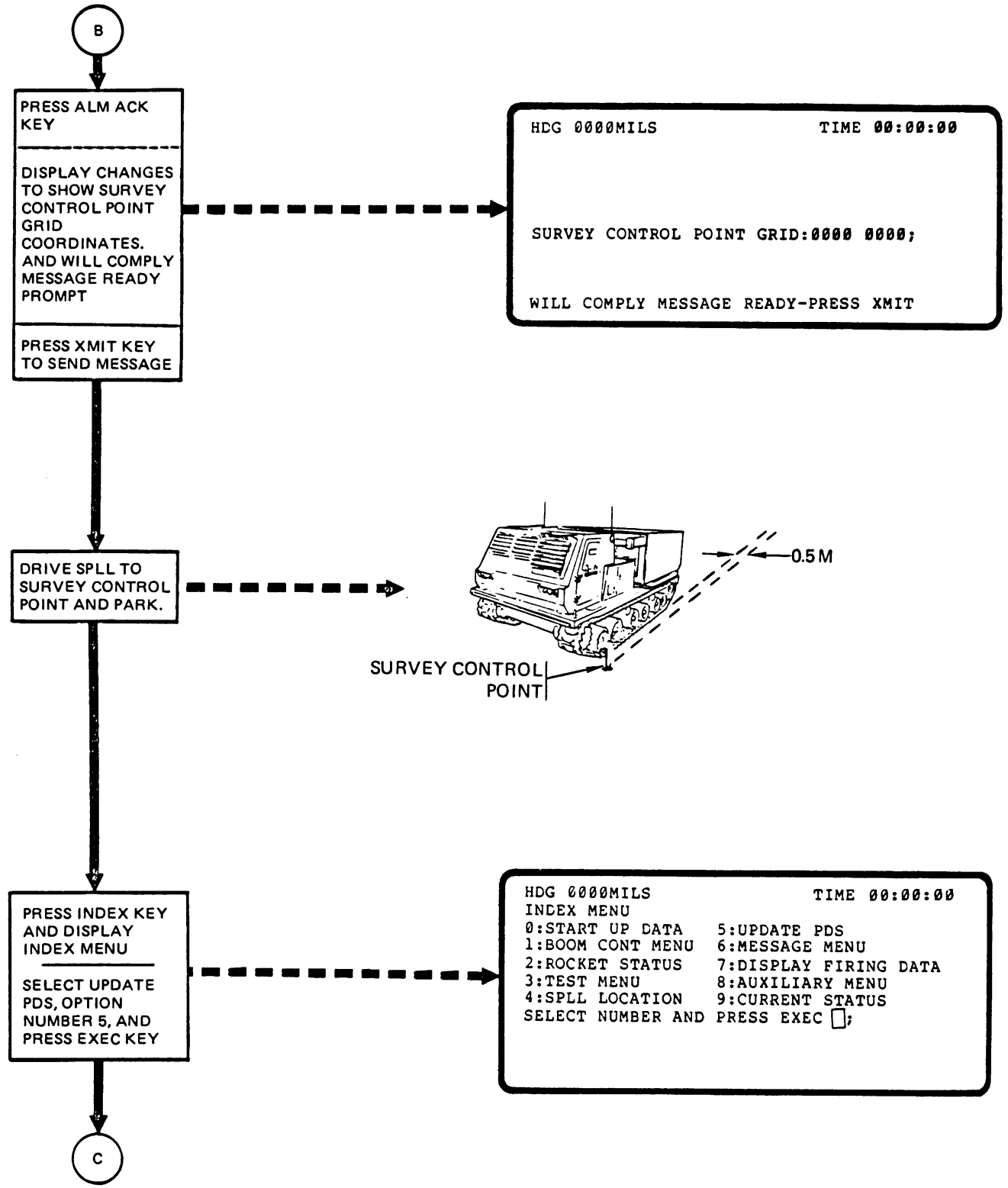


Figure 2-7. PDS Update Flow Diagram (Sheet 3 of 4)

2-26. PDS UPDATE (CONT)

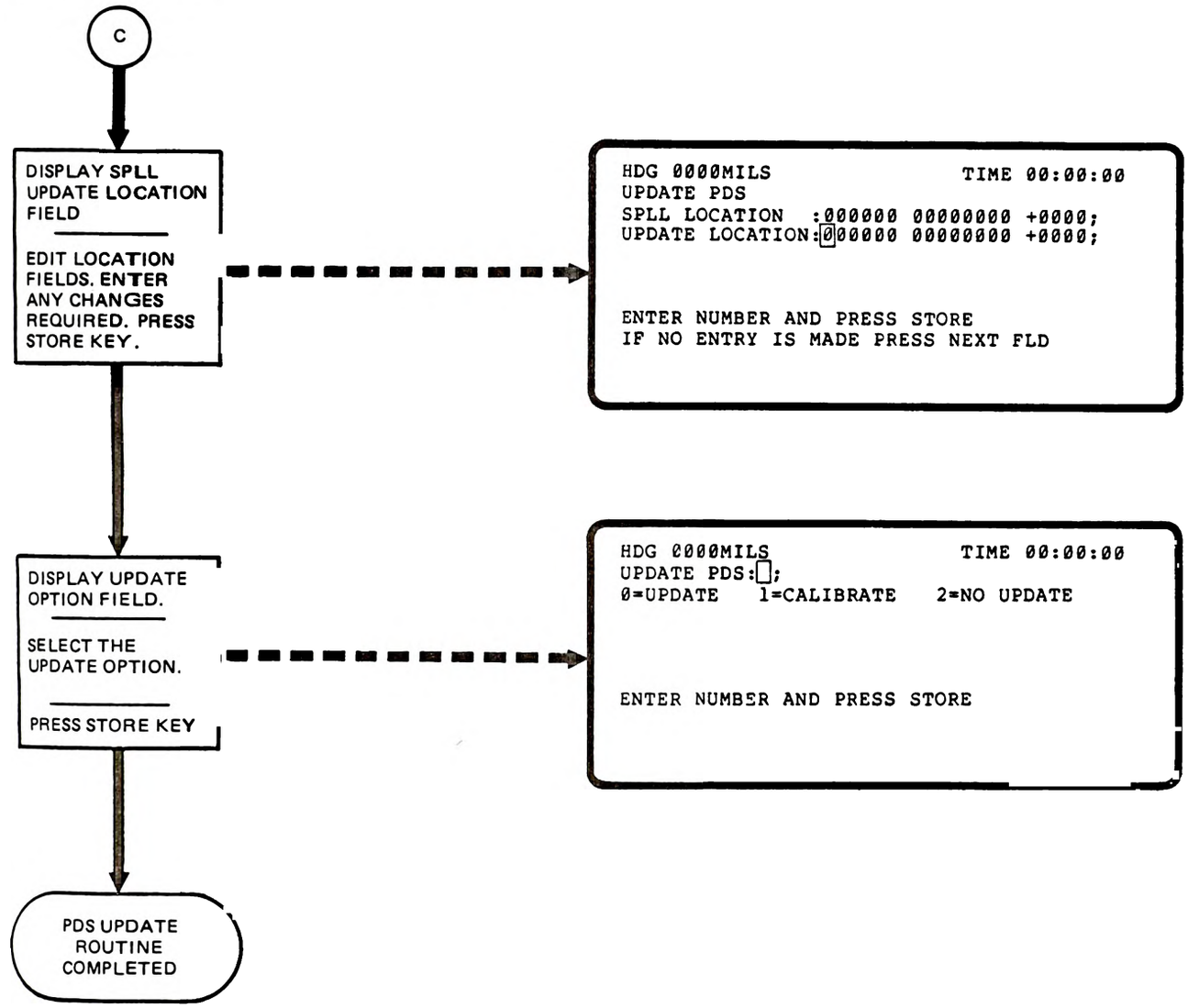


Figure 2-7. PDS Update Flow Diagram (Sheet 4 of 4)

2-27. PDS CALIBRATION. The accuracy of the PDS depends on having accurate internal calibration values.

Calibration compares the PDS against known SCPs and recomputing internal PDS calibration values. Two SCPs are used for calibration. The PDS must be updated at the first SCP. Standard values are entered for PDS calibration values (odometer scale factor, azimuth crab angle, and elevation crab angle) and the SPLL is driven to a second SCP and calibrated. The computed PDS calibration values are recorded. Standard PDS calibration values are then entered again. The PDS is updated, and the SPLL is driven back to the first SCP. The PDS is calibrated again. The computed PDS calibration values are recorded again. If all computed values recorded at both the first and second SCP are within allowable tolerances, the second set of computed values are then used as PDS calibration values until the next calibration is performed.

The PDS must be calibrated at least every 30 days. If PDS calibration values remain within specified limits and operating conditions do not change, calibration more often is not required. However, calibration is required after PDS system maintenance, and after major suspension or track drive maintenance.

PDS output data is displayed as SPLL LOCATION coordinates (easting, northing, and altitude) in the PDS update routine. An error in any coordinate of more than 85 meters, after the SPLL has traveled 6 to 8 kilometers, carrying LP/Cs fully loaded with tactical or practice rounds, is unacceptable. Corrective action must be taken. Changes in operating conditions can cause increases in PDS output data errors. Calibration is recommended when PDS output errors change noticeably and approach an unacceptable value. If corrective action becomes necessary, refer to troubleshooting symptom index (Chapter 3).

Calibration must always be performed with two LP/Cs loaded into the SPLL. If the two LP/Cs have tactical rounds, both umbilical cables must be connected to the LP/Cs. If the LP/Cs are training LP/Cs, two LP/Cs must still be loaded into the SPLL, but only one umbilical cable must be connected. The other umbilical cable must be connected to either cable connector W32J1 or W32J2 which, in turn, will connect it to the SNVT. (This must be done to allow for the weight difference between tactical and training LP/Cs.) After calibration is completed, the second umbilical cable must be connected to the other LP/C for normal operations. Also, if the SPLL is loaded just before calibrating the PDS, the SPLL must be driven 4 to 6 kilometers before parking at the first SCP. This will exercise the carrier suspension system, allowing for a more accurate calibration.

When calibrating, the distance between the first SCP and second SCP should be between 4 to 6 kilometers straight line distance. The LLM must not enter silent watch nor be unstowed while traveling between SCPs. When traveling between SCPs the SPLL should travel at a constant speed of approximately 40 kilometers per hour. It is expected that the SPLL will have to slow down on curves and in turns, but straight runs should be made at as near a constant speed as is possible.

Two SCP locations are used for calibration. Each location may be requested and received using digital radio messages. The procedure is the same as the one used for requesting and receiving update SCP locations (paragraph 2-26). If the SCP locations are received as digital radio messages, the locations will be automatically entered into the FCS as UPDATE LOCATION data in the PDS update routine.

SCP locations may also be provided in written form. Written locations must be manually entered into the FCS as UPDATE LOCATION data in the PDS update routine.

Calibrate the PDS using the following procedure.

2-27. PDS CALIBRATION (CONT)

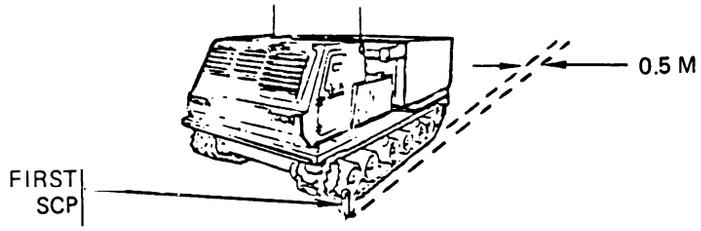
a. PDS Update Before Calibration.

NOTE

PDS must be updated at a separate SCP before calibration. If calibration is attempted and the PDS has not been updated at a previous SCP, the PDS NOT UPDATED prompt will be displayed. The PDS will not be calibrated. A PDS NOT UPDATED prompt will also be displayed if the LLM has been moved out of the stow position since the last update, a fire mission is performed, the BC is used, or the SPLL enters silent watch.

(1) Obtain an SCP location, either by digital radio message or as written data.

(2) Drive the SPLL to the SCP. Park the SPLL at the SCP. To make an update as accurate as possible, you must always use the same reference point on the SPLL to park at the SCP. Use the rear edge of the carrier's left drive sprocket. Park so that the rear edge of the sprocket is in line with and about 0.5 meters away from the SCP. Any vehicle heading is acceptable.



(3) When the SPLL is parked in position, press the INDEX key. The INDEX MENU will be displayed.

(4) From the INDEX MENU select the UPDATE PDS, option number 5. Press the EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(5) The SPLL LOCATION and UPDATE LOCATION (SCP) field will be displayed.

The SPLL LOCATION displayed is the output from the PDS. The UPDATE LOCATION will be the SCP location.

(6) If the SCP location was received as a digital radio message, the input was automatic. Record these coordinates to use again. Be sure to designate them as the first or number one SCP location. Press NEXT FLD key.

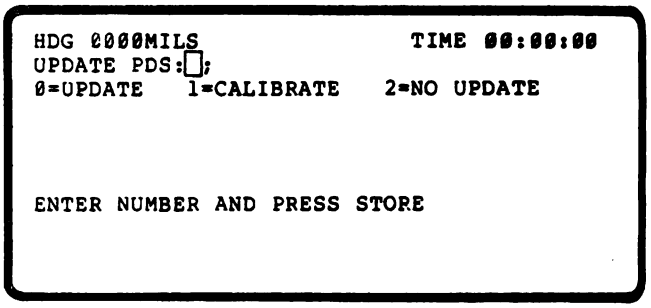
```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION  :000000 00000000 +0000;
UPDATE LOCATION:000000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(7) If the SCP location was obtained as written data, enter the SCP location coordinates. Be sure to designate these coordinates as the first or number one SCP location. Press STORE key.

2-27. PDS CALIBRATION (CONT)

(8) When either NEXT FLD or the STORE key is pressed, the coordinates shown on the update location will be stored in the FCS. The display will also change to the UPDATE, CALIBRATE, or NO UPDATE selection field.

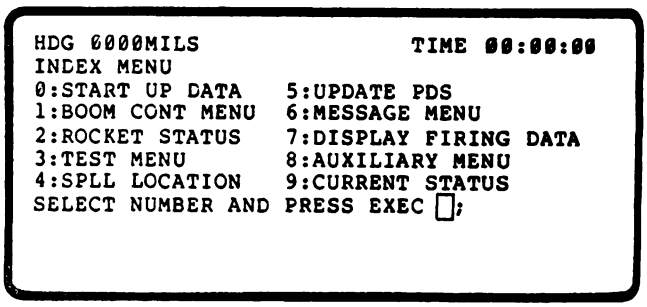
(9) Update the PDS, select UPDATE, option number 0, then press STORE key. The PDS will be updated.



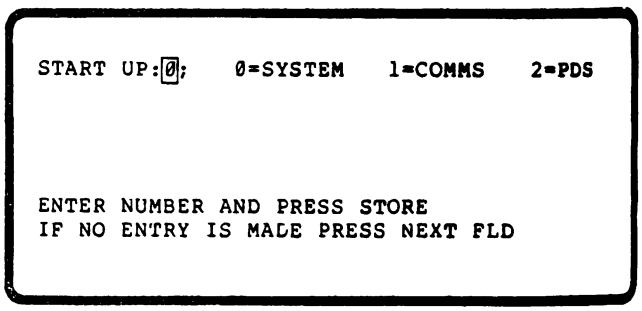
b. First Calibration Check.

(1) After PDS update and before moving the SPLL, press INDEX key. The INDEX MENU will be displayed.

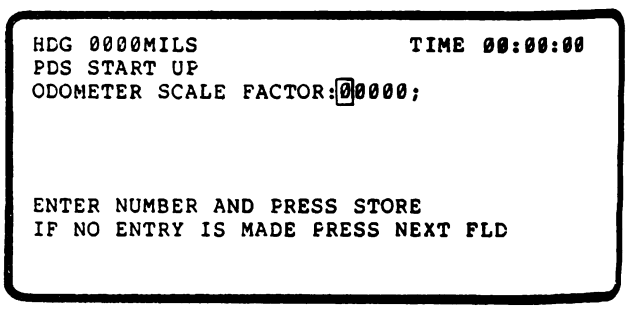
(2) Select the START UP DATA, option number 0. Press the EXEC key. The startup data selection field will be displayed.



(3) Select PDS, option number 2, and press STORE key. The ODOMETER SCALE FACTOR field will be displayed.



(4) Enter an ODOMETER SCALE FACTOR of 18966 and press STORE key. The AZIMUTH CRAB ANGLE field will be displayed.



2-27. PDS CALIBRATION (CONT)

(5) Enter an AZIMUTH CRAB ANGLE of 00000 and press STORE key. The ELEVATION CRAB ANGLE field will be displayed.

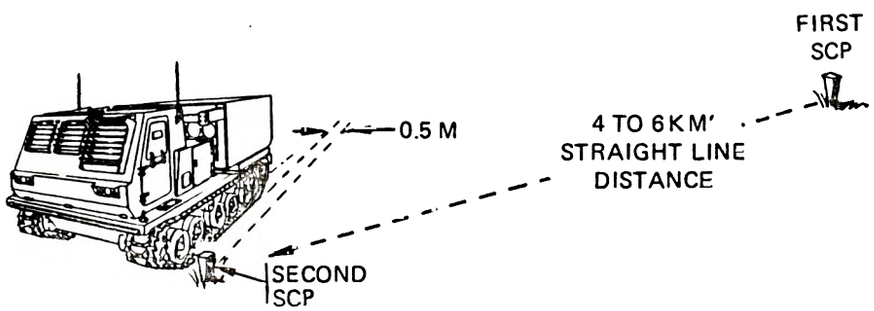
```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
AZIMUTH CRAB ANGLE:[0]0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(6) Enter an ELEVATION CRAB ANGLE of 00000 and press STORE key.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ELEVATION CRAB ANGLE:[0]0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(7) If obtaining the SCP by digital radio message, request a second SCP location. Designate the SCP as the second, or number 2 SCP. This SCP must be 4 to 6 kilometers straight line distance from the first, or number 1 SCP.

(8) Drive the SPLL to the second SCP. Park the SPLL properly, using the carrier's sprocket for reference.



2-27. PDS CALIBRATION (CONT)

(9) When the SPLL is properly parked at the second SCP, press INDEX key and display the INDEX MENU.

(10) From the INDEX MENU, select UPDATE PDS, option number 5, and press EXEC key. The SPLL LOCATION field in the PDS update routine will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

The SPLL LOCATION displayed is the output from the PDS caused by the move to the second SCP.

(11) If the SCP location is received as a digital radio message, the input was automatic. Record these coordinates for possible use again. Be sure to designate the SCP as the second or number 2 SCP. Press the NEXT FLD key.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION   :000000 00000000 +0000;
UPDATE LOCATION:000000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(12) If the SCP location was obtained as written data, enter the SCP location coordinates. Be sure to designate these coordinates as the second or number 2 SCP. Press STORE key.

(13) When either the NEXT FLD or the STORE key is pressed, the coordinates shown on the UPDATE LOCATION will be stored in the FCS. The UPDATE, CALIBRATE, NO UPDATE selection fields will then be displayed.

(14) Select CALIBRATE, option number 1, and press STORE key. The PDS will be calibrated.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS:;
0=UPDATE    1=CALIBRATE    2=NO UPDATE


ENTER NUMBER AND PRESS STORE
```

2-27. PDS CALIBRATION (CONT)

c. Second Calibration Check.

(1) After the PDS is calibrated and before the SPLL is moved, press INDEX key and display the INDEX MENU. Select START UP DATA option number 0, and press EXEC key. The startup selection field will be displayed.

(2) Select PDS, option number 2, and press STORE key. The ODOMETER SCALE FACTOR will be displayed.

```
START UP:0;    0=SYSTEM    1=COMMS    2=PDS


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(3) Record the odometer scale factor indicated, then enter an ODOMETER SCALE FACTOR of 18966. Press STORE key. The AZIMUTH CRAB ANGLE will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ODOMETER SCALE FACTOR:00000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(4) Record the azimuth crab angle indicated, then enter an AZIMUTH CRAB ANGLE of 00000. Press STORE key. The ELEVATION CRAB ANGLE will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
AZIMUTH CRAB ANGLE:00000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(5) Record the elevation crab angle indicated, then enter an ELEVATION CRAB ANGLE of 00000. Press STORE key.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ELEVATION CRAB ANGLE:00000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-27. PDS CALIBRATION (CONT)

(6) With the SPLL still parked at the second SCP, you must update the PDS again. To update press INDEX key. The INDEX MENU will be displayed.

(7) From the INDEX MENU select UPDATE PDS, option number 5. Press the EXEC key. The SPLL LOCATION and UPDATE LOCATION (SCP) field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(8) It is not necessary to make any entries at this time. The UPDATE LOCATION displayed will be the second SCP location you just entered when you calibrated. Press the NEXT FLD key. The display will also change to UPDATE, CALIBRATE, or NO UPDATE selection field.

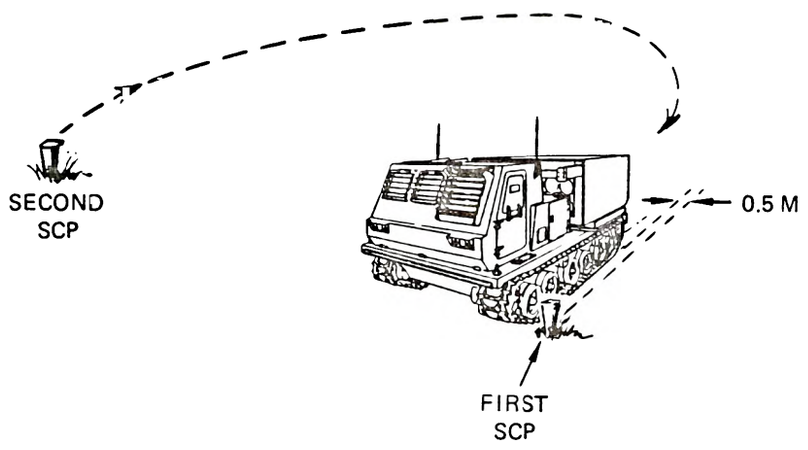
```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION   :000000 00000000 +0000;
UPDATE LOCATION:000000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(9) Update the PDS, select UPDATE, option number 0. Press STORE key. The PDS will be updated.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS:;
0=UPDATE    1=CALIBRATE    2=NO UPDATE



ENTER NUMBER AND PRESS STORE
```

2-27. PDS CALIBRATION (CONT)

(10) Drive the SPLL back to the first, or number 1 SCP. Park properly, using the carrier sprocket for reference.



(11) When parked at the first SCP, press INDEX key and display the INDEX MENU.

(12) From the INDEX MENU select UPDATE PDS, option number 5. Press EXEC key. The SPLL LOCATION field in the PDS update routine will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC □;
```

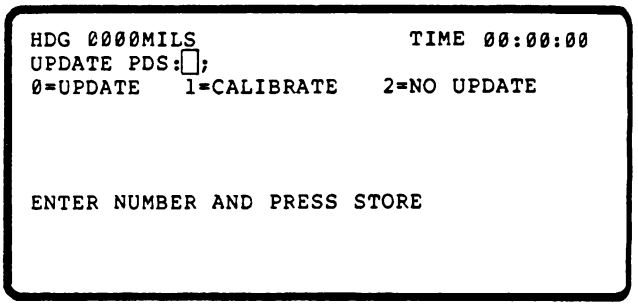
The SPLL LOCATION displayed is the output from the PDS caused by the move back to the first SCP.

(13) The UPDATE LOCATION will be the location of the second SCP. Enter the recorded location for the first SCP. Press STORE key. The SCP coordinates will be stored in the FCS. The UPDATE, CALIBRATE, and NO UPDATE fields will then be displayed.

```
HDG 0000MILS                    TIME 00:00:00
UPDATE PDS
SPLL LOCATION   :000000 00000000 +0000;
UPDATE LOCATION:□00000 00000000 +0000;


ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

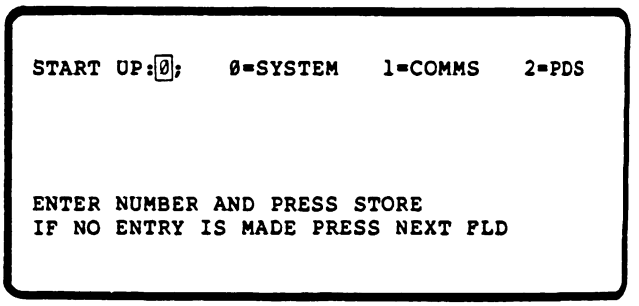
2-27. PDS CALIBRATION (CONT)

(14) Select CALIBRATE, option number 1, and press STORE key. The PDS will be calibrated.

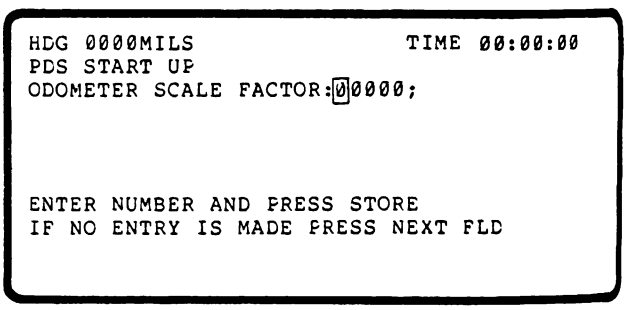


(15) After calibrating the PDS and before moving the SPLL, the PDS calibration values must be recorded. Press the INDEX key and display the INDEX MENU. From the INDEX MENU, select START UP DATA, option number 0, and press EXEC key. The startup selection field will be displayed.

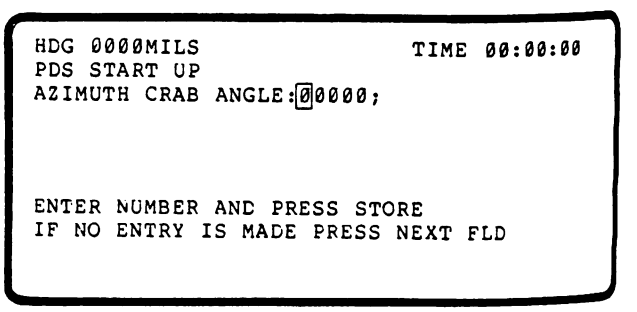
(16) Select PDS, option number 2. Press STORE key. The ODOMETER SCALE FACTOR field will be displayed.



(17) Record the odometer scale factor displayed. Do not change the data displayed. Press NEXT FLD key. The AZIMUTH CRAB ANGLE field will be displayed.



(18) Record the azimuth crab angle displayed. Do not change the data displayed. Press NEXT FLD key. The ELEVATION CRAB ANGLE will be displayed.



2-27. PDS CALIBRATION (CONT)

(19) Record the elevation crab angle displayed. Do not change the data displayed.

(20) Press NEXT FLD key to exit the PDS startup routine.

```
HDG 0000MILS                    TIME 00:00:00
PDS START UP
ELEVATION CRAB ANGLE:[0]0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

d. Comparing Calibration.

(1) Compare the computed PDS calibration values recorded at both SCPs with the limits listed.

Calibration Value	Limits
Odometer Scale Factor	18710 to 19222
Azimuth Crab Angle	65280 to 65535 and 0 to 00256
Elevation Crab Angle	65024 to 65535 and 0 to 00512

(2) If any calibration value recorded at either SCP is outside the specified limits, repeat the entire calibration procedure starting with paragraph a.

(3) If any calibration value, recorded at either SCP, is outside the specified limits after repeating the calibration procedure, maintenance action is required. Notify the next higher maintenance level.

(4) Record the odometer scale factor, azimuth crab angle, and elevation crab angle from the calibration at the second SCP to keep for future use. Use any available scratch pad. The PDS startup section of the SPLL startup form (figure 2-3) is recommended. Keep these values for use in comparing with displayed values at startup or in event FCS data is lost for any reason.

(5) If all calibration values are within specified limits, calibration is completed.

2-28. LOCATION/STATUS MESSAGE. The location/status message routine is used to send the SPLLs present position coordinates and operational status to BTRY or PLT/TP. The message is usually sent in answer to a request message from BTRY or PLT/TP.

The location/status message can also be used during SPLL operation. Location and status data can be sent to BTRY unrequested. Later the SPLL can use a request message and recall the data. This gives the SPLL a way to store position data to be used at startup.

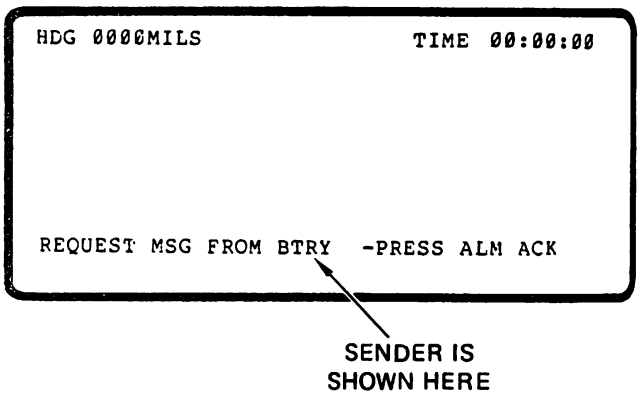
This procedure is an example of how the location/status message can be used to send SPLL position and status to BTRY or PLT/TP.

a. Receive Request Message.

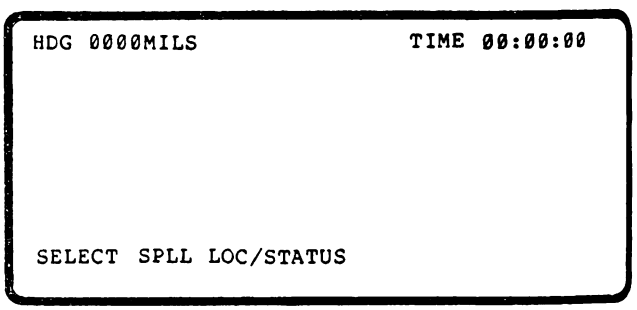
When either the BTRY or PLT/TP needs to know your location/status, you will receive a request message.

(1) The alarm will sound and the request message received prompt will be displayed. The sender of the message (BTRY or PLT/TP) is also displayed.

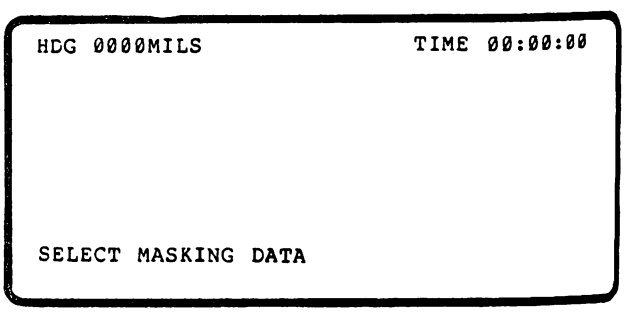
(2) Pressing the ALM ACK key turns off the alarm. The display will change to tell the type message requested.



(3) If you must send a location and status type message, the display will change to SELECT SPLL LOC/STATUS prompt.



(4) The request message is also used to request masking data. If the message you must send back is a masking data message, the display will change to SELECT MASKING DATA prompt. An explanation of how the masking data routine is usually used is provided in paragraph 2-31.



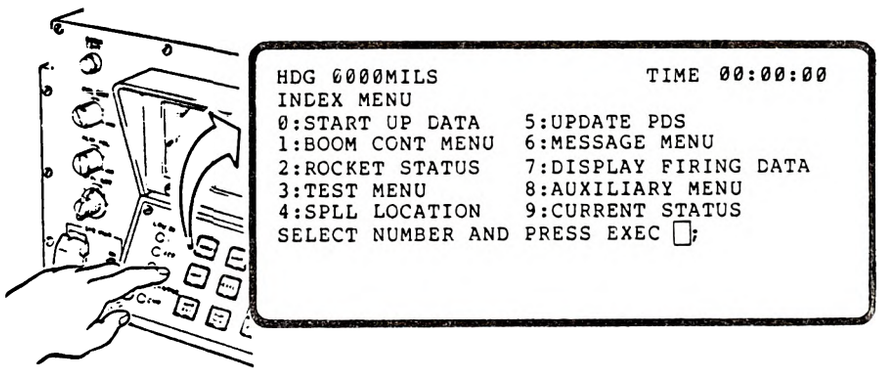
2-28. LOCATION/STATUS MESSAGE (CONT)

(5) You should remember which prompt is displayed and who sent the message. You will need to know what type of message to send, and which destination to send it to in reply.

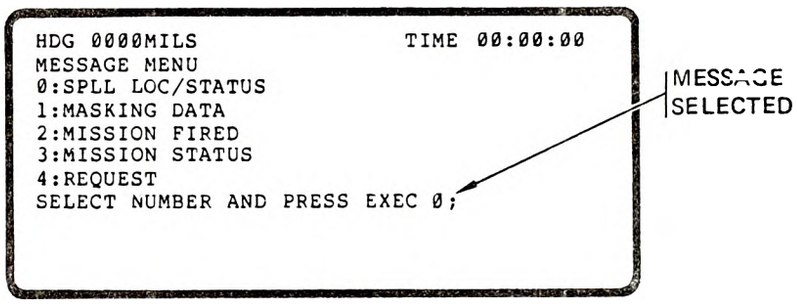
b. Selecting Message to Send.

(1) To select the reply message, press the INDEX key and display the INDEX MENU.

(2) Select MESSAGE MENU, option number 6, and press EXEC key. The MESSAGE MENU will be displayed.



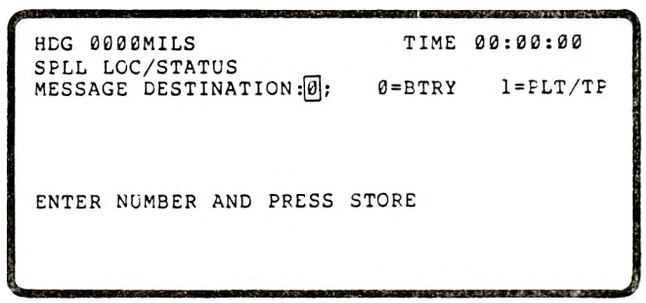
(3) The message type you are to send in reply is automatically entered as the default number. Press EXEC key. The message type indicated will be selected.



c. Message Destination and SPLL Status.

(1) After message type is selected, the MESSAGE DESTINATION prompt will be displayed.

(2) Check to insure the message destination entered as a default number is correct. Press EXEC key. The SPLL STATUS prompt will be displayed. (Remember that SPLL location/status was requested.)



2-28. LOCATION/STATUS MESSAGE (CONT)

(3) The default value for SPLL STATUS is the number 1 option, for SPLL GO. If the default is used, press NEXT FLD key to continue. If SPLL NO GO is selected, enter selection and press STORE key.

If your SPLL is operational and in a GO status, the next display will be your present position easting coordinates. If the SPLL status is GO, skip to paragraph d.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
SPLL STATUS:1;   0=SPLL NO GO    1=SPLL GO



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(4) If your SPLL status is NO GO, a list of possible causes for the no-go condition will be displayed.

(5) Select the number of the trouble that describes the cause of your no-go condition. Press STORE key.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
SPLL FAILURE:;
0:SRP/PDS NO GO    3:VEHICLE NO GO
1:FCS NO GO        4:AMMUNITION PROBLEM
2:LDS NO GO        5:OTHER REASON

ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

d. SPLL Location Coordinates.

(1) After the SPLLs status is entered, the SPLLs present location coordinates displays will appear. The first display in this group is for EASTING coordinate.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
EASTING:000000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

NOTE

Present location, easting, northing, and altitude coordinates displayed are automatically entered by the PDS. The grid zone and spheroid coordinates are those coordinates entered at startup. All coordinates can be manually entered or changed. However, when coordinates are manually entered or changed, if you review the message after making the change, the easting, northing, and altitude coordinates will change back to the PDS output and the changes you entered will be erased.

(2) If no entry required, press NEXT FLD key. If an easting change is required, enter the change and press STORE key. The NORTHING coordinate will be displayed.

2-28. LOCATION/STATUS MESSAGE (CONT)

(3) If no change is required, press NEXT FLD key. If a northing change is required, enter the change and press STORE key. The ALTITUDE coordinate will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
NORTHING:[0]0000000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(4) If no entry is required, press NEXT FLD key. If an altitude change is required, enter the change and press STORE key. The GRID ZONE will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
ALTITUDE:[+]0000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(5) If no entry required, press NEXT FLD key. If a grid zone change is required, enter the change and press STORE key. The SPHEROID coordinate will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
GRID ZONE:[+]00;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(6) If no entry is required, press NEXT FLD key. If a spheroid change is required, enter the change and press STORE key.

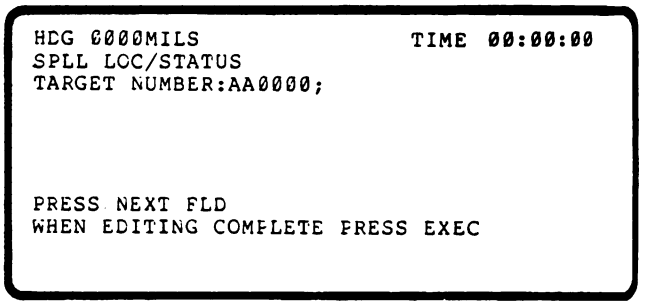
(7) If no target has been assigned and you only want to transmit your present location, press EXEC key instead of STORE key. Pressing EXEC key will end the data entry part of the routine. It is not necessary to edit all fields before sending the message. Continue with paragraph g for transmitting the message.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
SPHEROID:[ ];



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

2-28. LOCATION/STATUS MESSAGE (CONT)

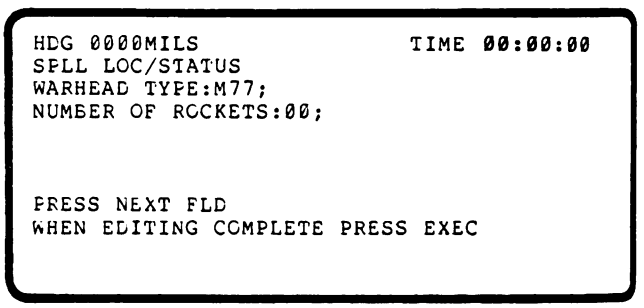
e. Target Number and Warhead Type.

The target number and warhead type displays are for editing only. There are no entries to make.



(1) After the SPHEROID display, the TARGET NUMBER for the next mission stored in the FCS will be displayed. If no target has been assigned, the entry for TARGET NUMBER will be blank.

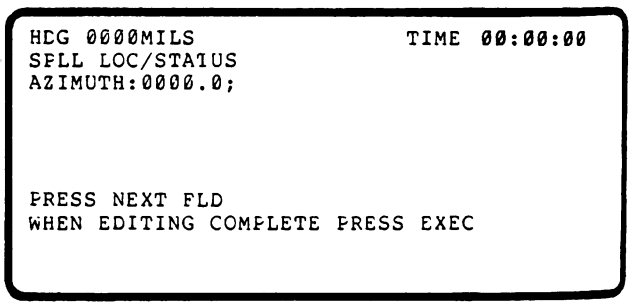
(2) When target number editing is complete, press NEXT FLD key. The NUMBER OF ROCKETS and the type of warhead in the rockets will be displayed. If no rockets are on board the SPLL, the numbers and type will be blank.



(3) When rocket number and warhead type editing is completed, press NEXT FLD key.

f. LLM Aiming Position Angles.

(1) After the number of rockets and type of warhead display, LLM aiming position data displays will appear. The first is the LLM AZIMUTH aim angle.



(2) The angle is in mils and referenced to grid north. If the LLM is not laid, the entries will be all zeros.

When editing is complete, press NEXT FLD key. The LLM QUADRANT elevation angle will be displayed.

2-28. LOCATION/STATUS MESSAGE (CONT)

(3) The quadrant elevation angle is also in mils. If the LLM is not laid, the entries will be all zeros. When editing is complete, press NEXT FLD key. The rocket FUZE TIME will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
QUADRANT:0000.0;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(4) Fuze time is in seconds. If the LLM is not laid, the entries will be all zeros. This is the last display in the location and status type message. When editing is complete, press EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
FUZE TIME:000.0;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

g. Transmitting the Message.

(1) Pressing the EXEC key ends the data entries. All data entries into the message should be complete. A LOC/STATUS MESSAGE READY prompt will be displayed.

(2) Pressing XMIT key will send the message. The prompt will disappear as soon as the message is sent. The message routine is ended.

```
HDG 0000MILS                    TIME 00:00:00









LOC/STATUS MESSAGE READY-PRESS XMIT
```

h. Location/Status Message Flow Diagram.

Figure 2-8 is a location/status message flow diagram. The diagram shows the flow of the operating steps described in this procedure.

2-28. LOCATION/STATUS MESSAGE (CONT)

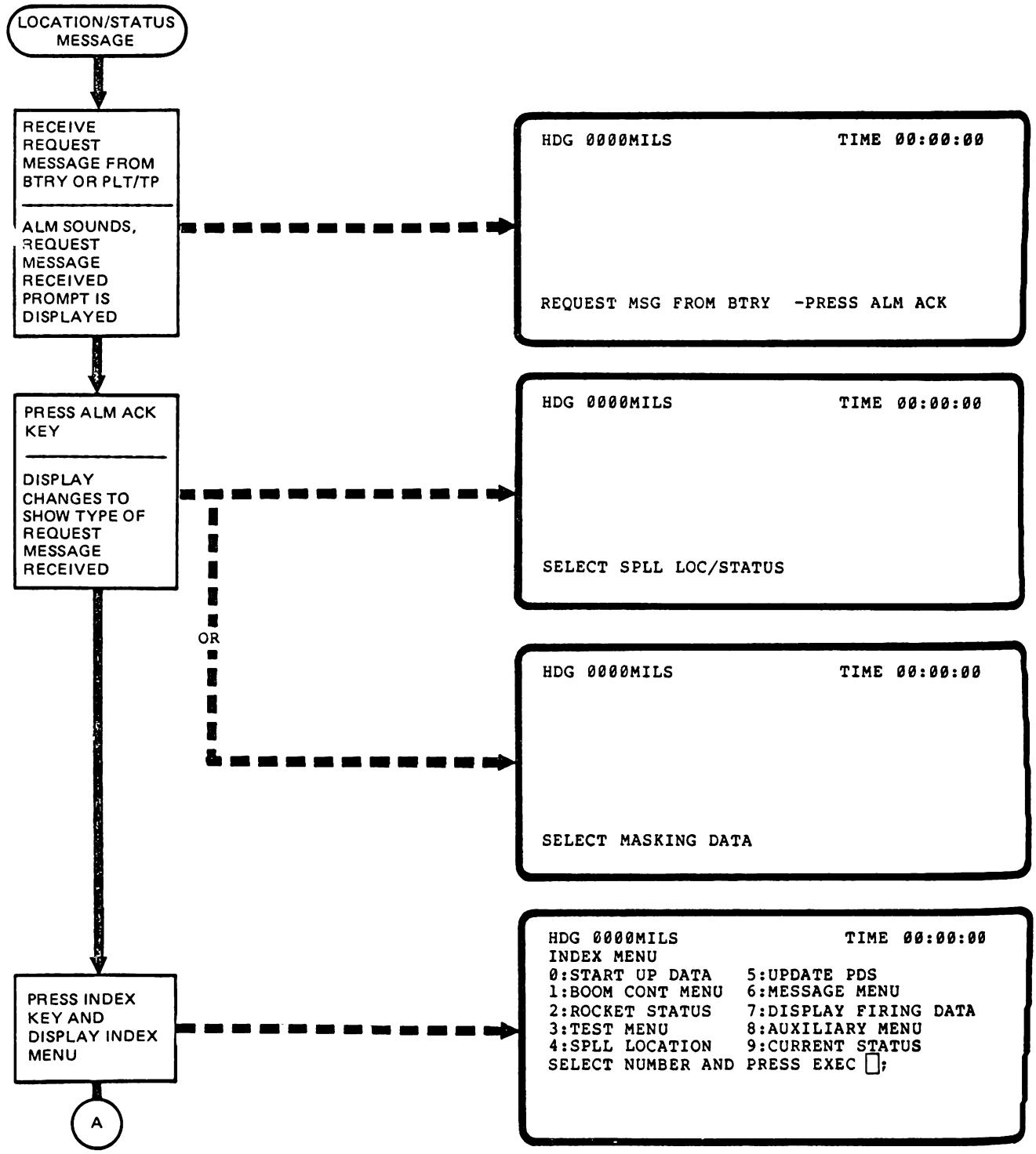


Figure 2-8. Location/Status Message Flow Diagram (Sheet 1 of 6)

2-28. LOCATION/STATUS MESSAGE (CONT)

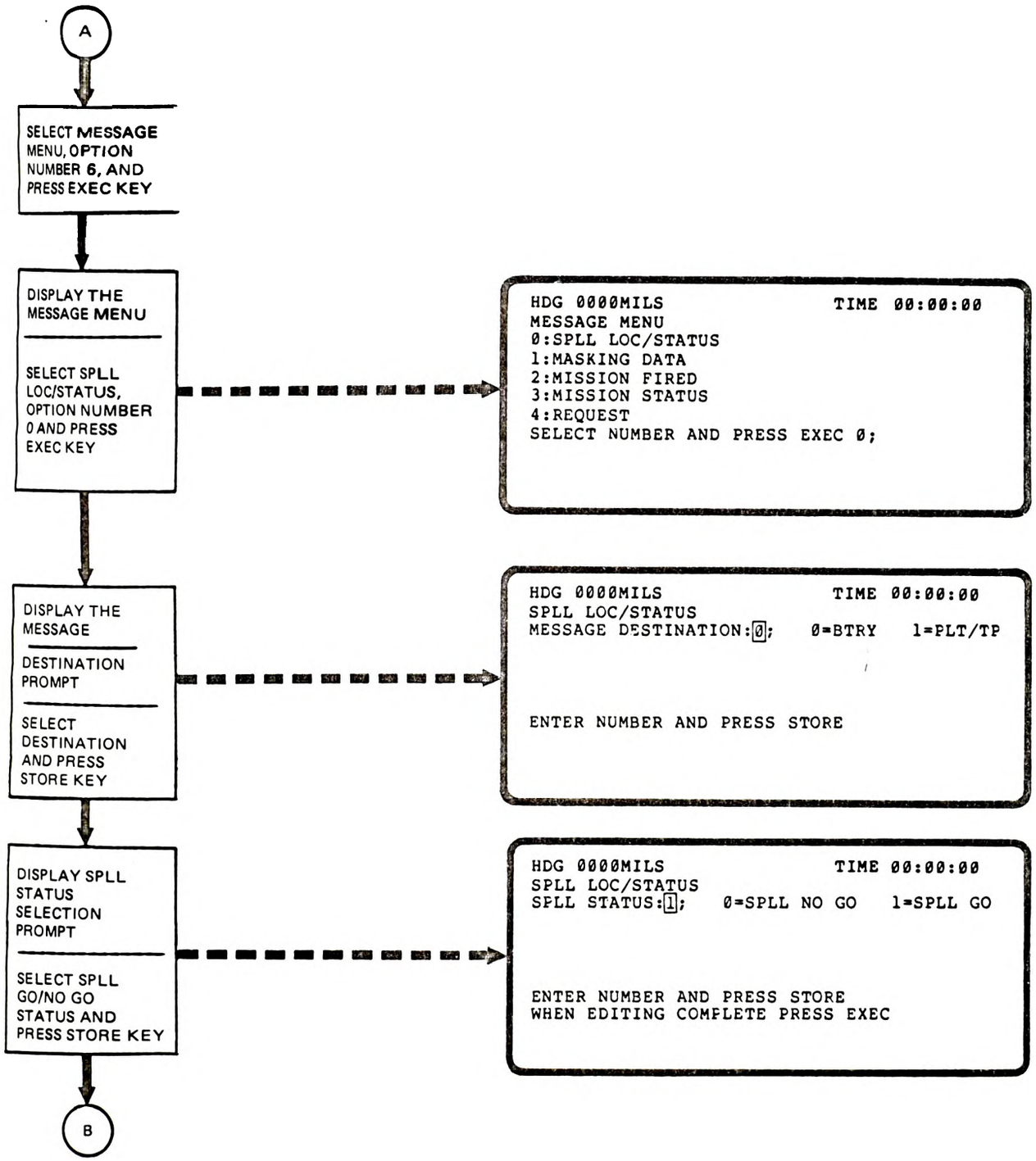


Figure 2-8. Location/Status Message Flow Diagram (Sheet 2 of 6)

2-28. LOCATION/STATUS MESSAGE (CONT)

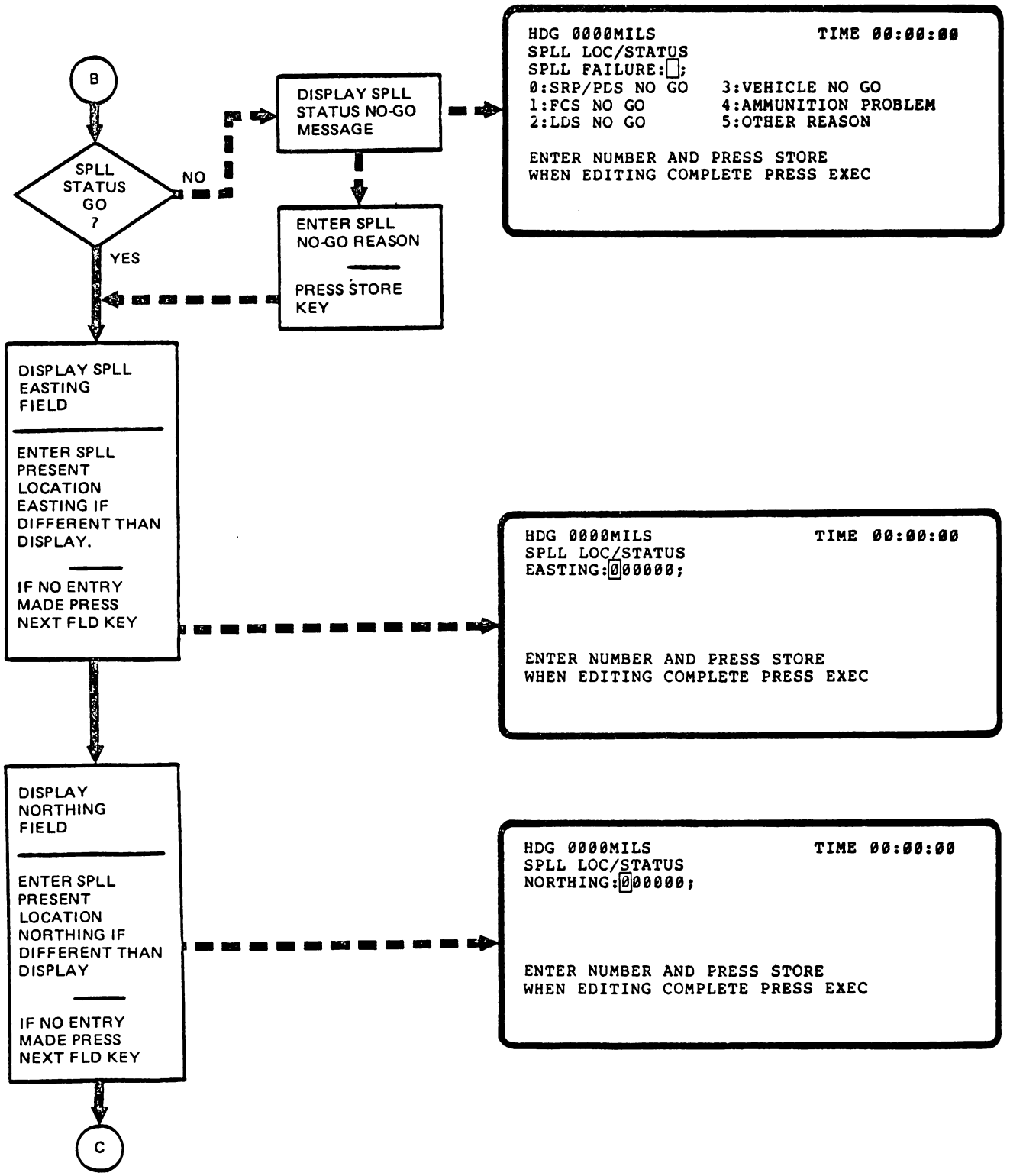


Figure 2-8. Location/Status Message Flow Diagram (Sheet 3 of 6)

2-28. LOCATION/STATUS MESSAGE (CONT)

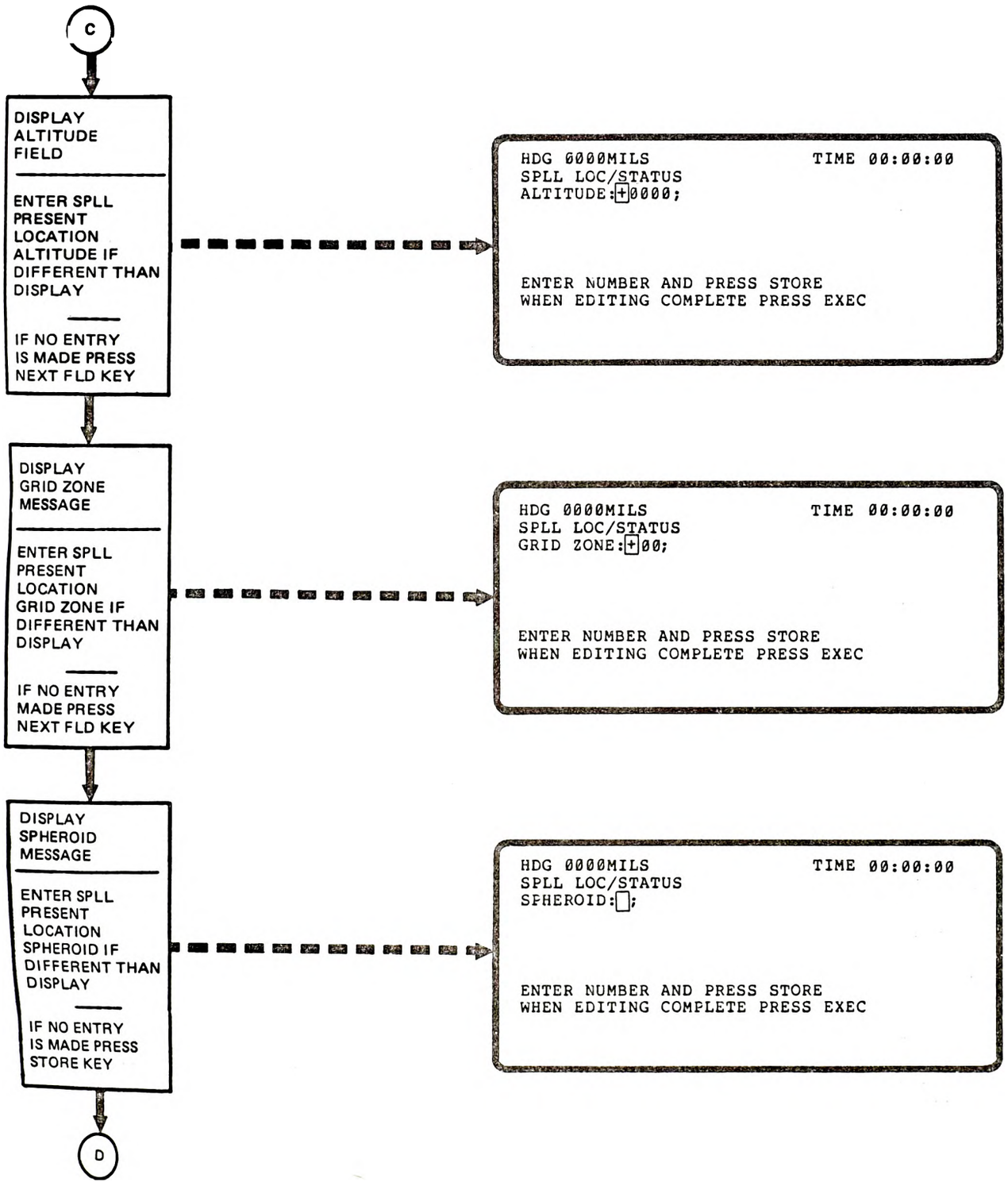


Figure 2-8. Location/Status Message Flow Diagram (Sheet 4 of 6)

2-28. LOCATION/STATUS MESSAGE (CONT)

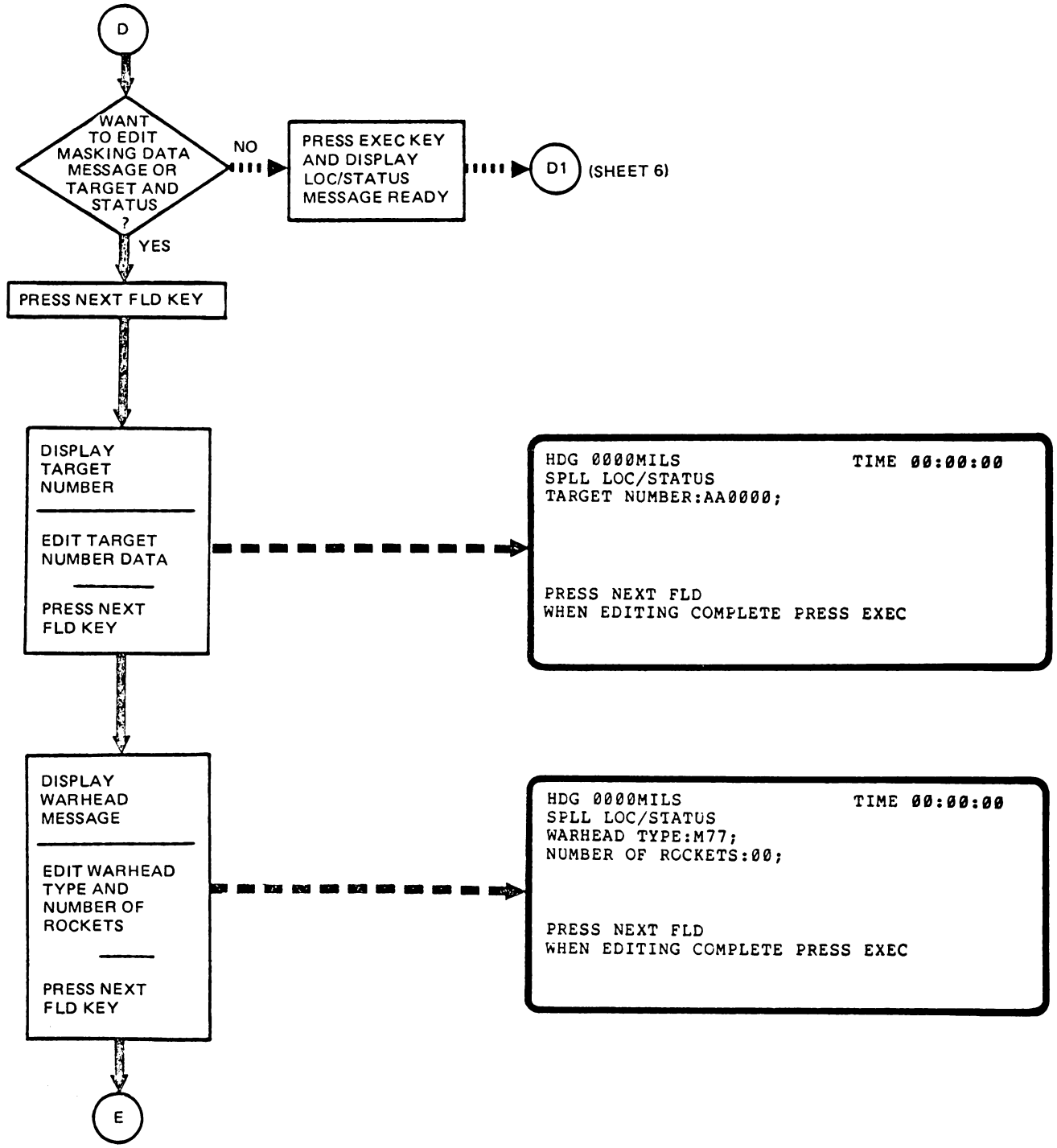


Figure 2-8. Location/Status Message Flow Diagram (Sheet 5 of 6)

2-28. LOCATION/STATUS MESSAGE (CONT)

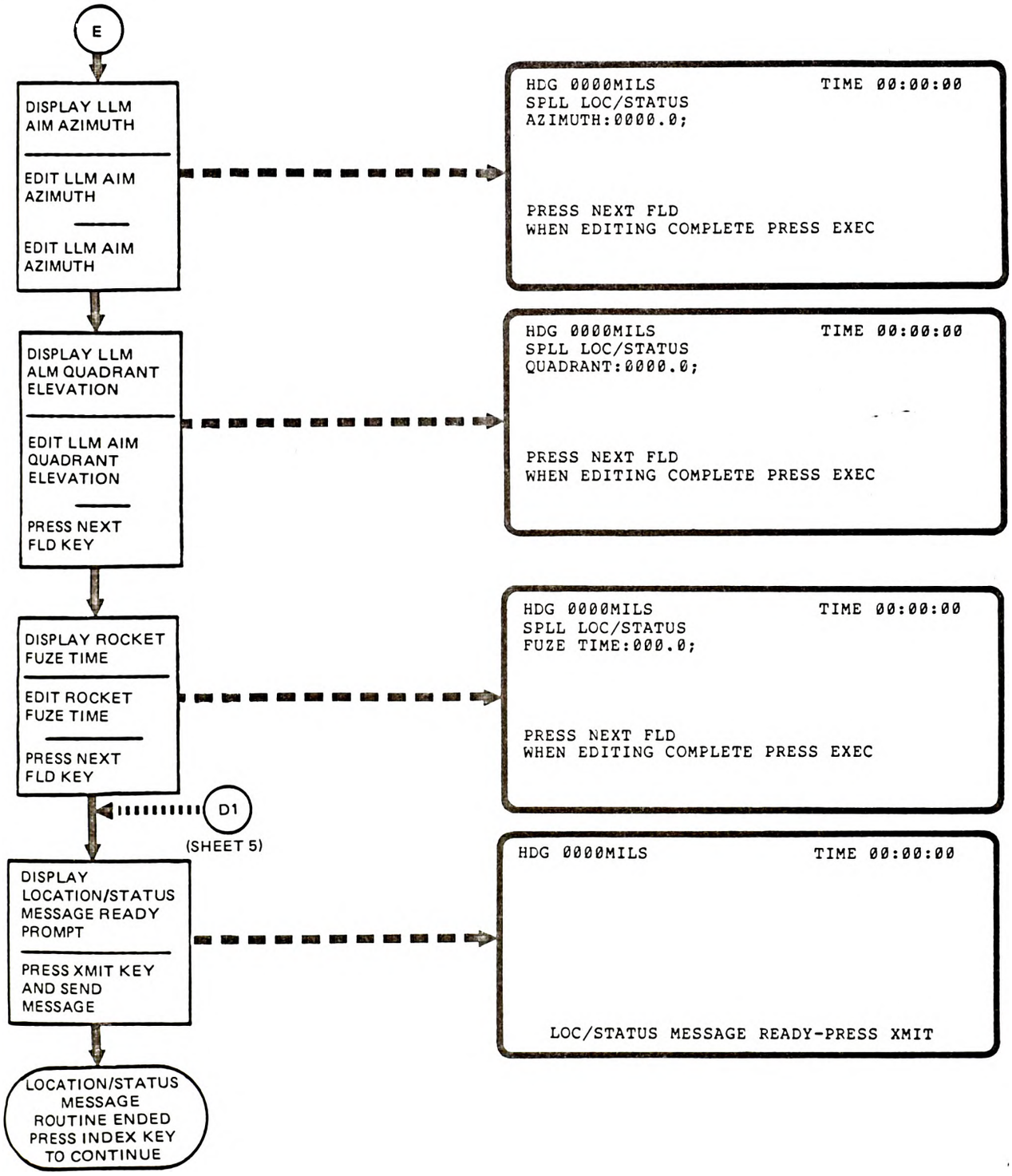


Figure 2-8. Location/Status Message Flow Diagram (Sheet 6 of 6)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY. Tactical fire mission data is normally received by the SPLL in a call for fire (CFF) message sent over the radio. When sent over the radio, pressing the ALM ACK key automatically enters the fire mission data into the proper places in this routine. However, there are operating conditions when you will want to manually enter fire mission data into the FCS. There are also times when you will want to review (edit) the data entered by a CFF message. This procedure is a method to use in both editing data or manually entering new or amended data.

When entering new data, the information can come from any source. This procedure will assume that the data has been recorded earlier on a mission data form (figure 2-4). The mission data form has space for all tactical data that you will need to enter a fire mission. Tactical data provides the FCS with inputs such as, target location, firing point location, and aimpoint shift locations. The FCS uses this information and other internally stored data to compute the aiming azimuth, quadrant elevation, and fuze times.

Most of the fields in this procedure, where you can enter new data or edit data already entered, have two operator instruction prompts. One prompt says to enter number and press STORE. This is the prompt to follow if you make a change or enter completely new data. Pressing STORE key will enter the data into the FCS to be ready for processing. The other prompt says that if no entry is made press NEXT FLD. This is the prompt to follow if you are editing the field and have not entered any change data. Pressing NEXT FLD key will advance the routine without entering a change.

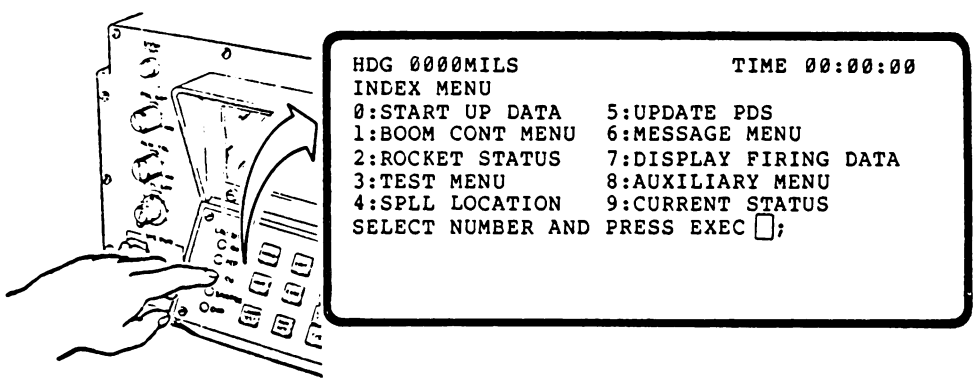
The fire mission displayed for editing is always the next mission to be executed. Editing the fire mission routine without data entries has the effect of entering a false or nonexistent fire mission. If you edit a fire mission with no data entries and you do not enter the proper data, edit the entire routine. Use the NEXT FLD key and advance through the routine. When instructed, press the EXEC key and exit the routine. Next, press the LLM STOW key. This is important. Pressing the LLM STOW key cancels the blank fire mission you just edited. Failure to press the LLM STOW key will cause the blank or false mission to be displayed as the next fire mission, preventing a valid fire mission from being displayed.

a. Selecting the Tactical Fire Mission Routine.

To display the fire mission routine, you must select it from the auxiliary menu.

(1) To display the auxiliary menu, press INDEX key. The INDEX MENU will be displayed.

(2) From the INDEX MENU select the AUXILIARY MENU, option number 8. Press EXEC key. The AUXILIARY MENU will be displayed.



2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(3) Select FIRE MISSION, option number 4, from the AUXILIARY MENU and press EXEC key. The first field in the fire mission routine will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC ;
```

b. Editing or Entering Mission Data.

The first field in the routine is the TARGET NUMBER.

(1) This field is for editing (review) only. After you have edited the field, press NEXT FLD key. The LP/C WARHEAD data selection field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TARGET NUMBER:AA0000;


PRESS NEXT FLD
```

(2) If you are editing the field displayed and no changes are made, press NEXT FLD key.

NOTE

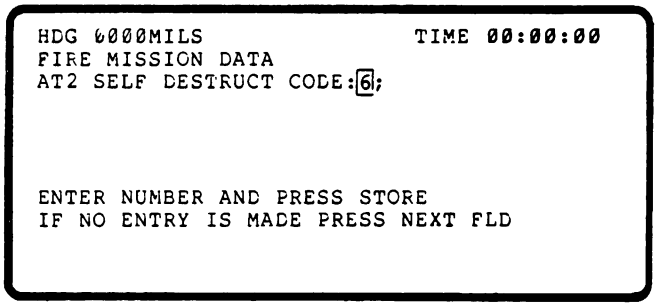
When M77 practice rounds are used, M77 warhead type must be selected.

(3) If mission data is manual entry, enter WARHEAD data written in block 7 of your mission data form. Press STORE key to enter data.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
WARHEAD:0;
0=M77   3=SMOKE   6=G
1=AT2   4=E       7=H
2=TGW   5=F       8=I

ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(4) If the type of warhead selected was an AT2 mine type, the next display will be the AT2 SELF DESTRUCT CODE field.



(5) If you are editing the field displayed and no change is made, press NEXT FLD key.

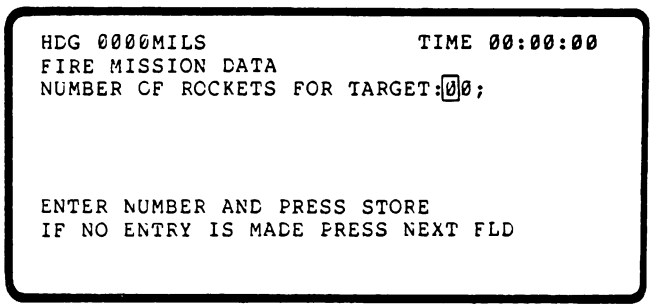
NOTE

The default value for this field is 6.

(6) If mission data is manual entry, enter the SELF DESTRUCT code written in block 8 of your mission data form. Press STORE key to enter data.

The NUMBER OF ROCKETS FOR TARGET is the next field displayed after warhead type, or after AT2 self destruct code, if AT2 mine warhead is used.

(7) If you are editing the number of rockets field, and no change is made, press NEXT FLD key.

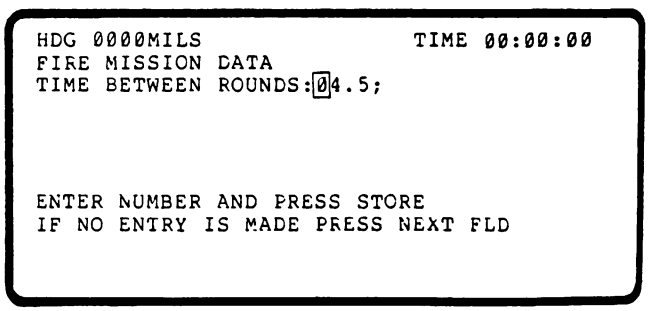


(8) If mission data is manual entry, enter the NUMBER OF ROCKETS written in block 9 of your mission data form. Press STORE key to enter data.

The time between firing rocket rounds (TIME BETWEEN ROUNDS) field will be displayed.

NOTE

The time entered can be any time between 01.5 and 99.9 seconds. Time between 05 and 99 will always be in seconds. The default time is always 4.5 seconds. Time less than 05 seconds will be in 10ths of seconds.



(9) If you are editing the time between rounds field, and no change is made, press NEXT FLD key.

(10) If mission data is manual entry, enter the TIME BETWEEN ROUNDS written in block 10 of your mission data form. Press STORE key to enter the data.

The METHOD OF FIRE CONTROL field will be displayed.

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(11) If you are editing the method of fire control field, and no change is made, press NEXT FLD key.

(12) If mission data is manual entry, enter the METHOD OF FIRE CONTROL written in block 11 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
METHOD OF FIRE CONTROL:[1];
0-AT MY COMMAND       3=TIME TO FIRE
1=FIRE WHEN READY     4=ON CALL
2=TIME ON TARGET

ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

The different methods for fire control are as follows:

(a) 0 = AT MY COMMAND (AMC). The fire command is sent by the BTRY to the SPLL after the LLM is aimed, the rockets are armed, and a ready to fire message is sent to BTRY.

(b) *1 = FIRE WHEN READY (FWR).* The fire command is automatic as soon as the LLM is aimed and the rockets are armed.

(c) 2 = TIME ON TARGET (TOT). The fire command is given at a specified time. During the mission, the time to fire is displayed as a countdown time in the middle of the display heading and time line. The fire command will be automatically given so that the rockets reach the target at time 00:00.

(d) 3 = TIME TO FIRE (TTF). The fire command is given at a specified time. During the mission, the time to fire is displayed as a countdown time in the middle of the heading and time line. The fire command will be given at countdown time 00:00.

(e) 4 = ON CALL. This method is almost the same as AMC. The fire command is given by BTRY after the LLM is aimed, the rockets are armed, and a ready to fire message is sent. However, the fire command is not received right away. There will be some delay before the fire command is given.

After the method of fire control field is displayed, if the method of fire selected is either TOT or TTF, the next field displayed will be the TIME OF FIRE field.

(13) If the method of fire control is TOT the field will display TIME ON TARGET time.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TIME ON TARGET:[0]0:00:00;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(14) If the method of fire control is TTF, the next field will display the TIME TO FIRE time.

(15) If you are editing the field displayed and no change is made, press NEXT FLD key.

(16) If mission data is manual entry for a TOT mission, enter the TIME ON TARGET written in block 12 of your mission data form. If the mission is a TTF, enter the TIME TO FIRE written in block 13. Press STORE key to enter the data.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TIME TO FIRE:00:00:00



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

The TIME ZONE field for the firing location will be displayed.

(17) If you are editing the time zone field and no change is made, press NEXT FLD key.

(18) If mission data is manual entry, enter the TIME ZONE written in block 14 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TIME ZONE:24;
A=01  E=05  J=09  N=13  S=17  W=21
B=02  F=06  K=10  P=14  T=18  X=22
C=03  G=07  L=11  Q=15  U=19  X=23
D=04  H=08  M=12  R=16  V=20  Z=24
ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

c. Editing SPLL Move Data.

Move data is the location that your SPLL will be instructed to move to at the end of the fire mission. These fields are displayed after the method of fire field for AMC, FWR, and on call type fire missions. The fields are displayed after the time zone field for TOT and TTF type fire missions. Move data is used only with fire missions entered by a CFF message from BTRY or PLT/TP. If no move data is sent with the CFF message or if this is a manually entered mission, the move data will be all zeros.

The first move location field is the MOVE EASTING field.

(1) Edit the move easting field. You cannot change this field. Press NEXT FLD key to continue.

After the move easting field, the MOVE NORTHING field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
MOVE EASTING:000000;



PRESS NEXT FLD
```

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(2) Edit the move northing field. You cannot change this field. Press NEXT FLD key.

After the move northing field, the MOVE GRID ZONE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
MOVE NORTHING:00000000;



PRESS NEXT FLD
```

(3) Edit the move grid zone field. You cannot change the field. Press NEXT FLD key.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
MOVE GRID ZONE:+00;



PRESS NEXT FLD
```

d. Editing or Entering Firing Point Data.

Firing point data is not sent to the SPLL as part of a CFF message. This data is usually received as a location/status or a command message. The fields are displayed as part of the fire mission routine for editing and manual entries if required.

After the move grid zone field, the FIRING POINT EASTING field will be displayed.

(1) If you are editing the firing point easting field, and no change is made, press NEXT FLD key.

(2) If mission data is manual entry, enter the FIRING POINT EASTING written in block 15 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
FIRING POINT EASTING:000000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

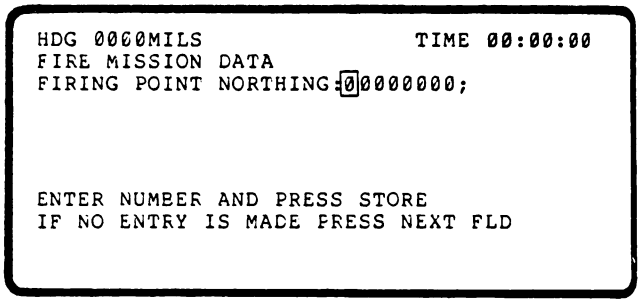
The FIRING POINT NORTHING field will be displayed.

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(3) If you are editing the firing point northing field, and no change is made, press NEXT FLD key.

(4) If mission data is manual entry, enter the FIRING POINT NORTHING data written in block 16 of your mission data form. Press STORE key to enter the data.

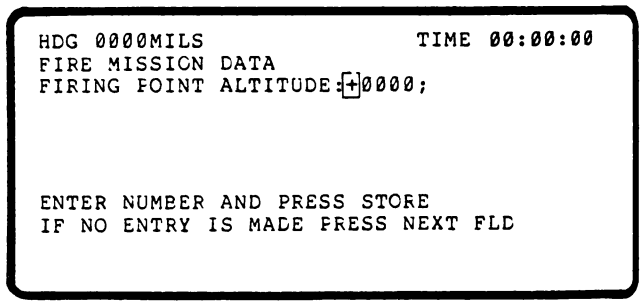
The FIRING POINT ALTITUDE field will be displayed.



(5) If you are editing the firing point altitude field, and no change is made, press NEXT FLD key.

(6) If mission data is manual entry, enter the FIRING POINT ALTITUDE written in block 17 of your mission data form. Press STORE key to enter the data.

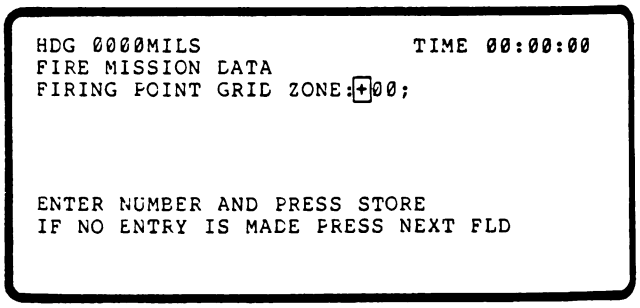
The FIRING POINT GRID ZONE field will be displayed.



(7) If you are editing the firing point grid zone field, and no change is made, press NEXT FLD key.

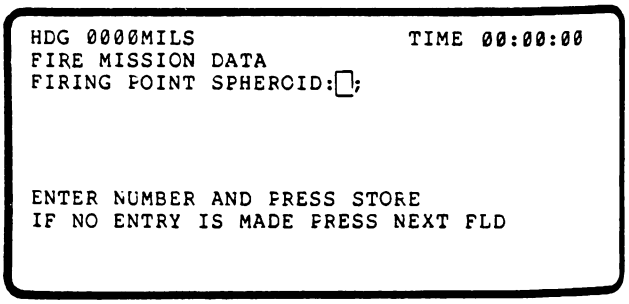
(8) If mission data is manual entry, enter FIRING POINT GRID ZONE written in block 18 of your mission data form. Press STORE key to enter the data.

The FIRING POINT SPHEROID field will be displayed.



(9) If you are editing the firing point spheroid field, and no change is made, press NEXT FLD key.

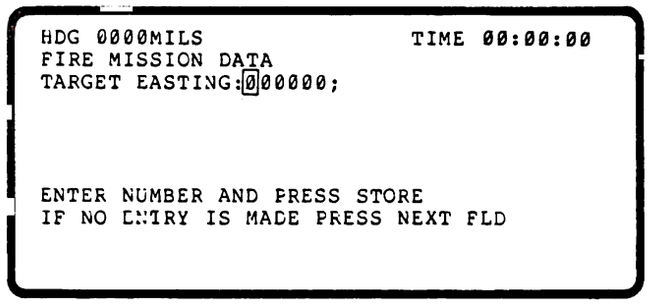
(10) If mission data is manual entry, enter FIRING POINT SPHEROID written in block 19 of your mission data form. Press STORE key to enter the data.



2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

e. Editing or Entering Target Data.

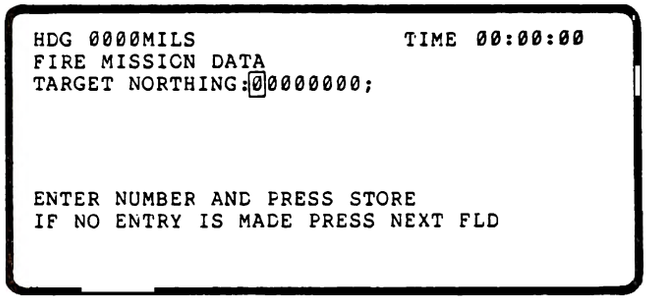
After the firing point data is edited or entered, the target data is displayed. The first target data field is the TARGET EASTING field.



(1) If you are editing the target easting field, and no change is made, press NEXT FLD key.

(2) If mission data is manual entry, enter the TARGET EASTING written in block 20 of your mission data form. Press STORE key to enter the data.

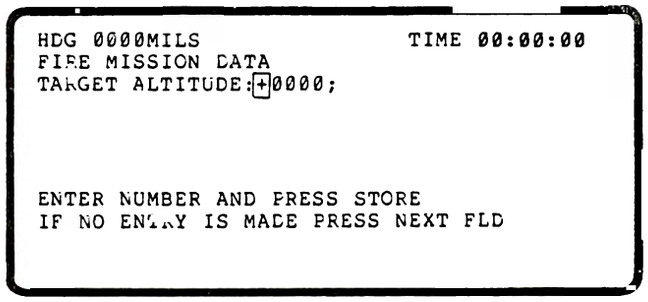
The TARGET NORTHING field will be displayed.



(3) If you are editing the target northing field, and no change is made, press NEXT FLD key.

(4) If mission data is manual entry, enter the TARGET NORTHING written in block 21 of your mission data form. Press STORE key to enter the data.

The TARGET ALTITUDE field will be displayed.



(5) If you are editing the target altitude field, and no change is made, press NEXT FLD key.

(6) If mission data is manual entry, enter TARGET ALTITUDE written in block 22 of your mission data form. Press STORE key to enter the data.

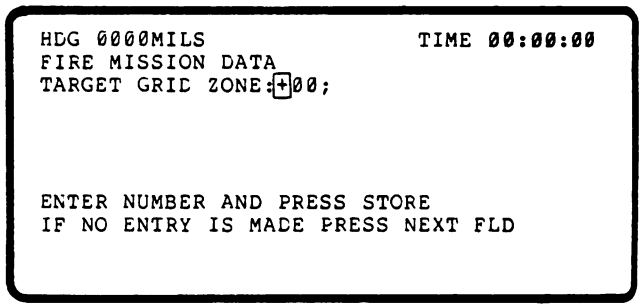
The TARGET GRID ZONE field will be displayed.

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(7) If you are editing the target grid zone field, and no change is made, press NEXT FLD key.

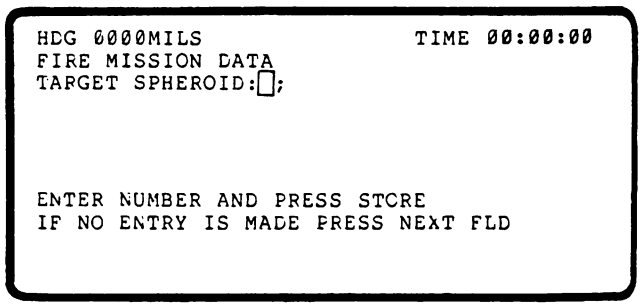
(8) If mission data is manual entry, enter the TARGET GRID ZONE written in block 23 of your mission data form. Press STORE key to enter the data.

The TARGET SPHEROID field will be displayed.



(9) If you are editing the target spheroid field, and no change is made, press NEXT FLD key.

(10) If mission data is manual entry, enter TARGET SPHEROID written in block 24 of your mission data form. Press STORE key to enter the data.



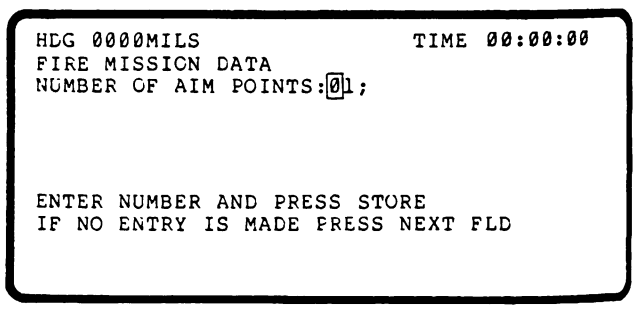
f. Editing or Entering Aimpoint Shifts.

There can be as many as 12 aimpoints for a single target.

After the target spheroid field, the NUMBER OF AIM POINTS field will be displayed.

(1) If you are editing the number of aimpoints field, and no change is made, press NEXT FLD key.

(2) If mission data is manual entry, enter the NUMBER OF AIM POINTS written in block 25 of your mission data form. Press STORE key to enter the data.



2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

After the number of aimpoints field, AIM POINT 01 EASTING SHIFT field will be displayed.

(3) Edit the aimpoint 01 easting shift field. If no change is made, press NEXT FLD key.

(4) If mission data is manual entry, enter the AIM POINT 01 EASTING SHIFT written in block 26 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                TIME 00:00:00
FIRE MISSION DATA
AIM POINT 01 EASTING SHIFT:+0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

The AIM POINT 01 NORTHING SHIFT field will be displayed.

(5) If you are editing the aimpoint 01 northing shift field, and no change is made, press NEXT FLD key.

(6) If mission data is manual entry, enter AIM POINT 01 NORTHING SHIFT written in block 26 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                TIME 00:00:00
FIRE MISSION DATA
AIM POINT 01 NORTHING SHIFT:+0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

The AIM POINT 01 ALTITUDE field will be displayed.

(7) If you are editing the aimpoint 01 altitude field, and no change is made, press NEXT FLD key.

(8) If mission data is manual entry, enter the AIM POINT NUMBER 01 ALTITUDE written in block 26 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                TIME 00:00:00
FIRE MISSION DATA
AIM POINT 01 ALTITUDE:+0000;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

The AIM POINT 01 NUMBER OF ROCKETS field will be displayed.

(9) If you are editing the aimpoint 01 number of rockets field, and no change is made, press NEXT FLD key.

(10) If mission data is manual entry, enter AIM POINT 01 NUMBER OF ROCKETS written in block 26 of your mission data form. Press STORE key to enter the data.

```
HDG 0000MILS                TIME 00:00:00
FIRE MISSION DATA
AIM POINT 01 NUMBER OF ROCKETS:00;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

(11) Aimpoint 01 number of rockets is the last field for aimpoint 01 data. If the number of aimpoints for the target is more than one, the easting shift, northing shift, altitude, and number of rockets field will automatically be displayed for each aimpoint in turn. Continue to enter aimpoint data for each aimpoint assigned.

(12) After the number of rockets field for the last aimpoint assigned is entered, a review selection field will be automatically displayed.

(13) This field lets you review the complete fire mission data routine again. To review the entries, press NEXT FLD key and the target number field will be displayed. Continue to press NEXT FLD key as each field is displayed and you can review the complete routine. When you want to exit or end the routine press EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA



PRESS NEXT FLD TO REVIEW ENTRY
WHEN EDITING COMPLETE PRESS EXEC
```

The first prompt in the fire mission routine will be automatically displayed.

The FCS will automatically compute firing data from the mission data just displayed.

(14) If no fire mission is to be conducted, press INDEX key and continue operations.

If a fire mission is to be conducted, follow instructions on the display. An example of a fire mission routine is provided in paragraph 2-30.

```
HDG 0000MILS                    TIME 00:00:00
FIRING POINT GRID:0000 0000;
COMPUTING FIRING DATA
AT END OF MISSION MOVE TO GRID:0000 0000;
METHOD OF FIRE CONTROL:AT MY COMMAND

PARKING HEADING:0000MILS OR 3200MILS
WHEN PARKED PRESS INIT
```

g. Tactical Fire Mission Data Flow Diagram.

Figure 2-9 is a tactical fire mission data editing or manual entry flow diagram. The diagram shows the operating steps described in this procedure.

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

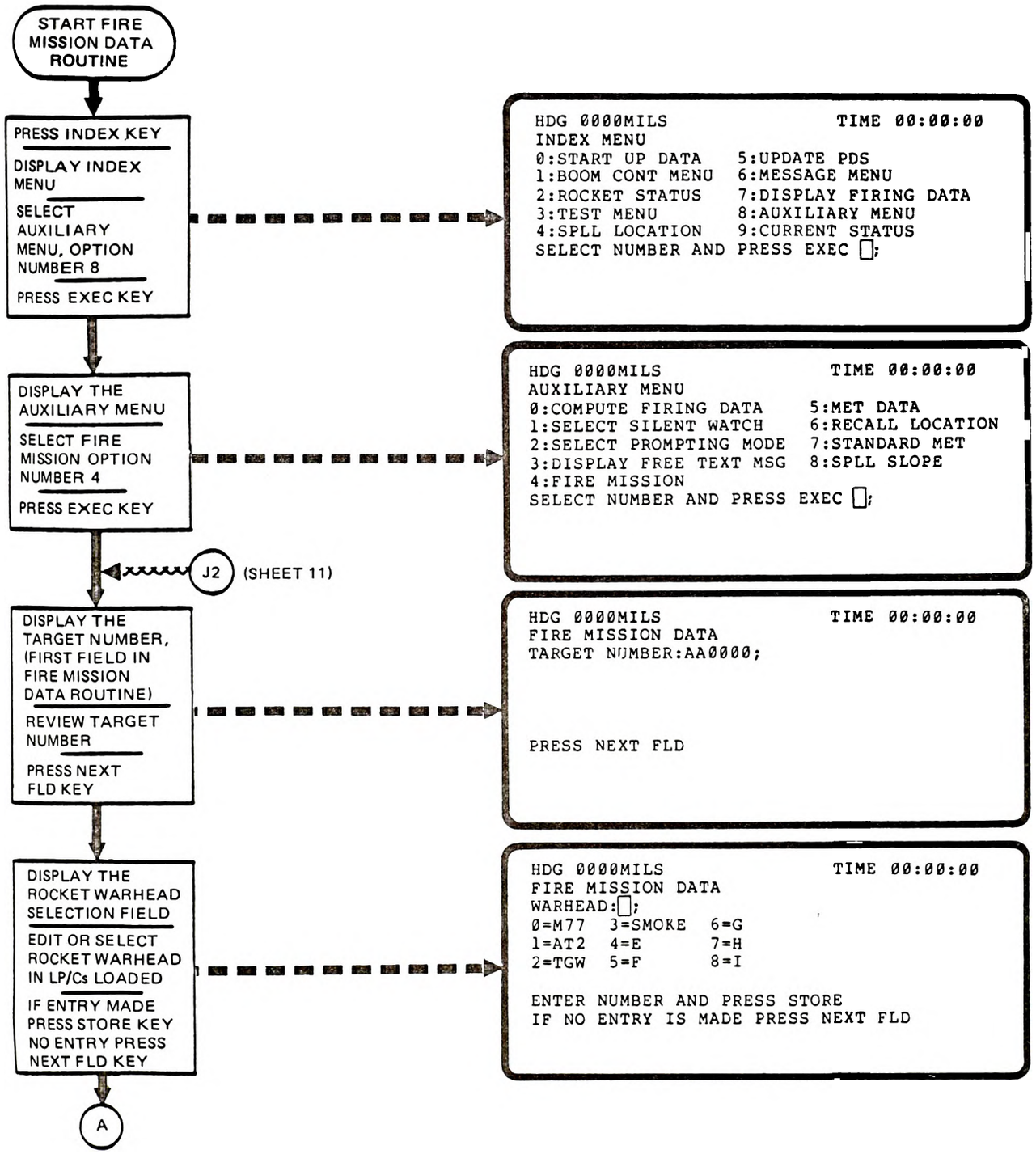


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 1 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

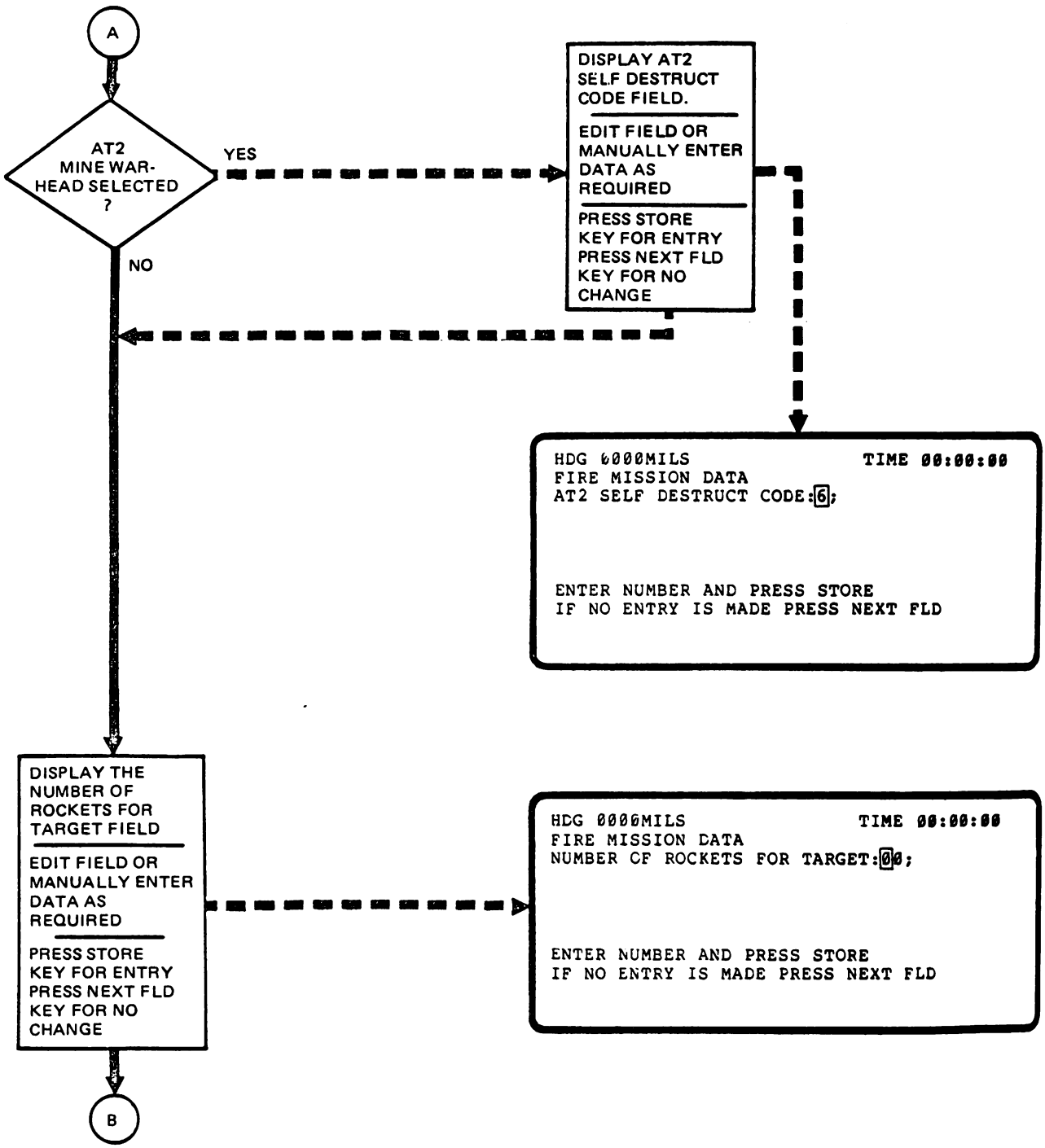


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 2 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

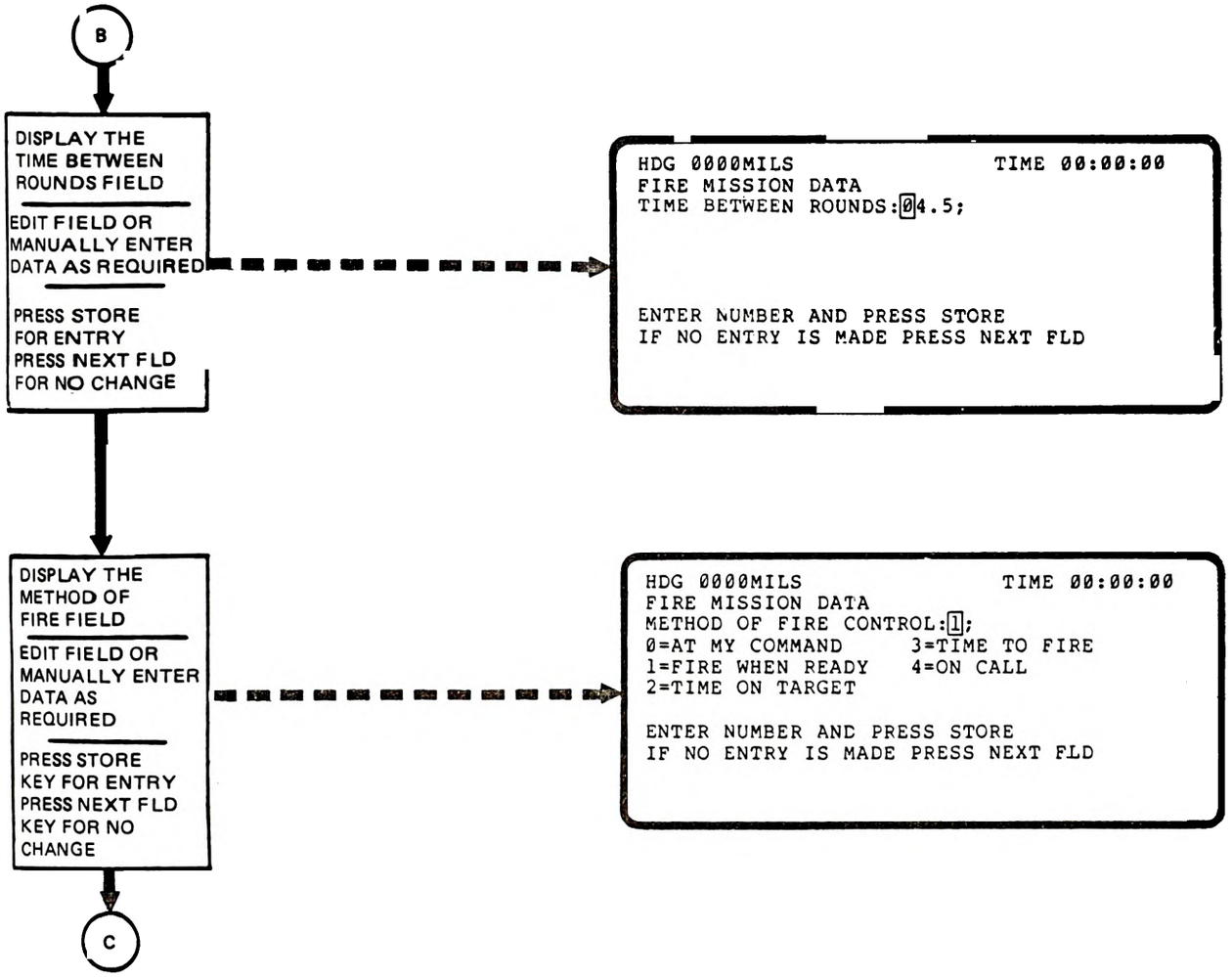


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 3 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

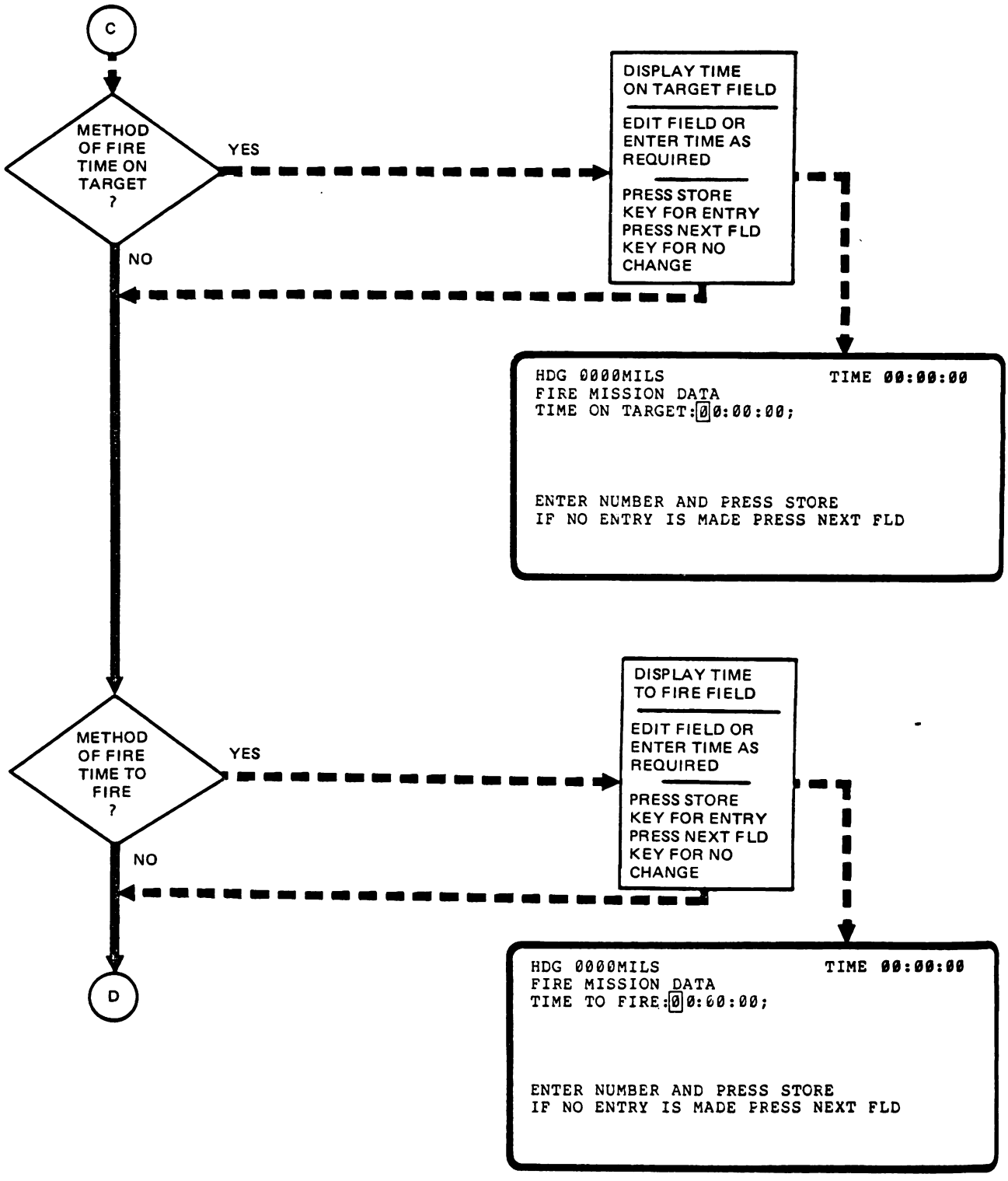


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 4 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

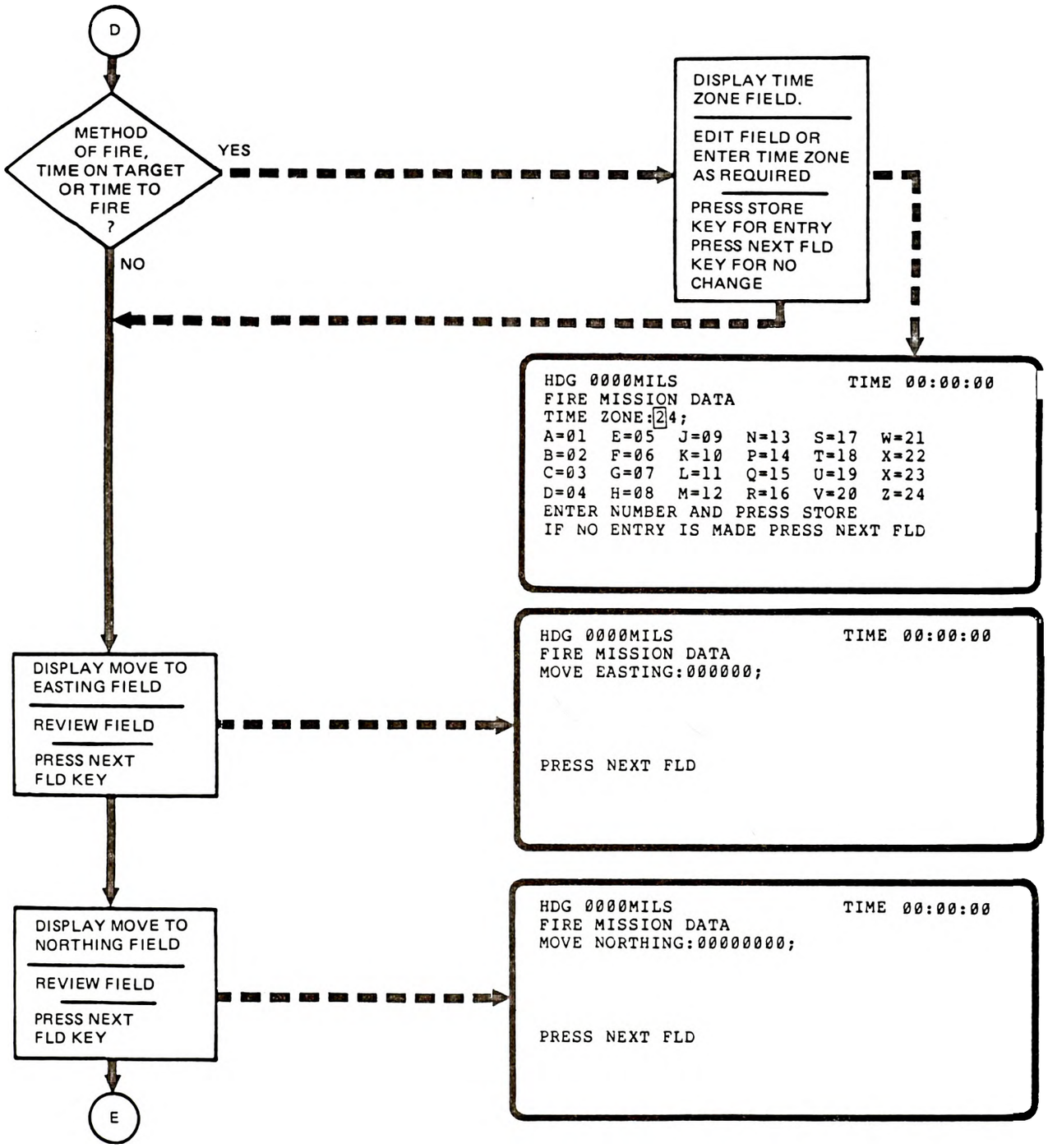


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 5 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

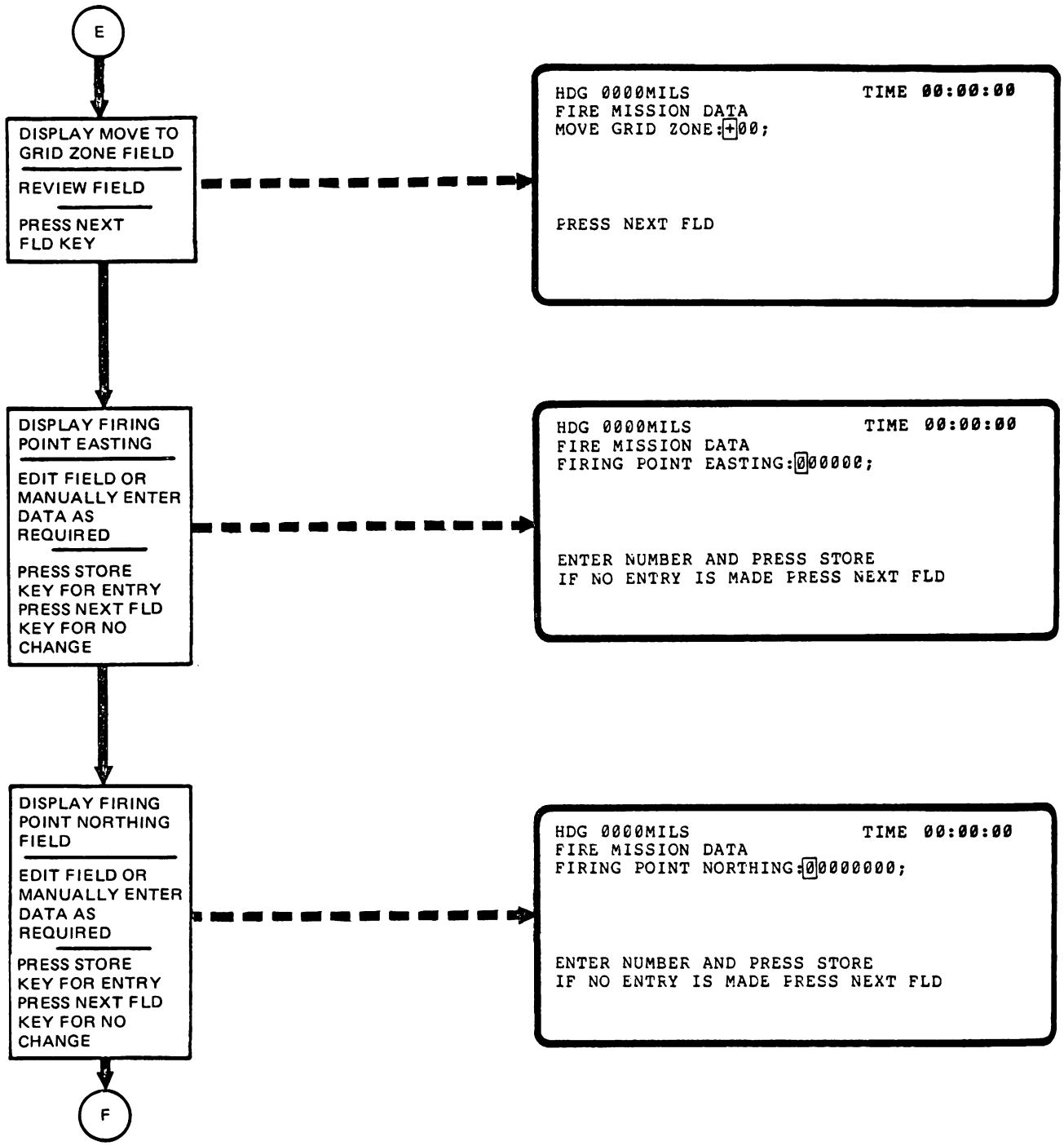


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 6 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

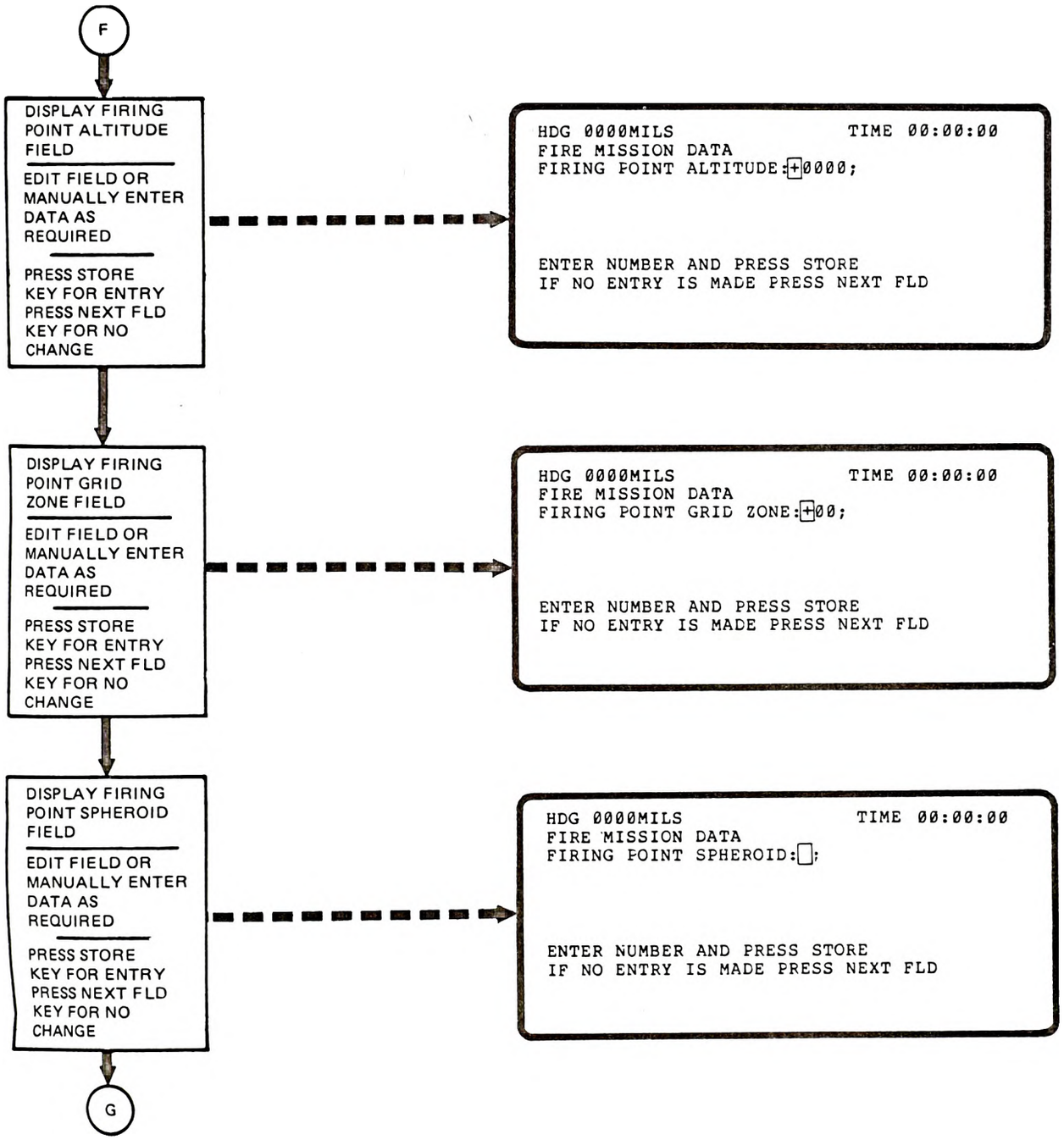


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 7 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

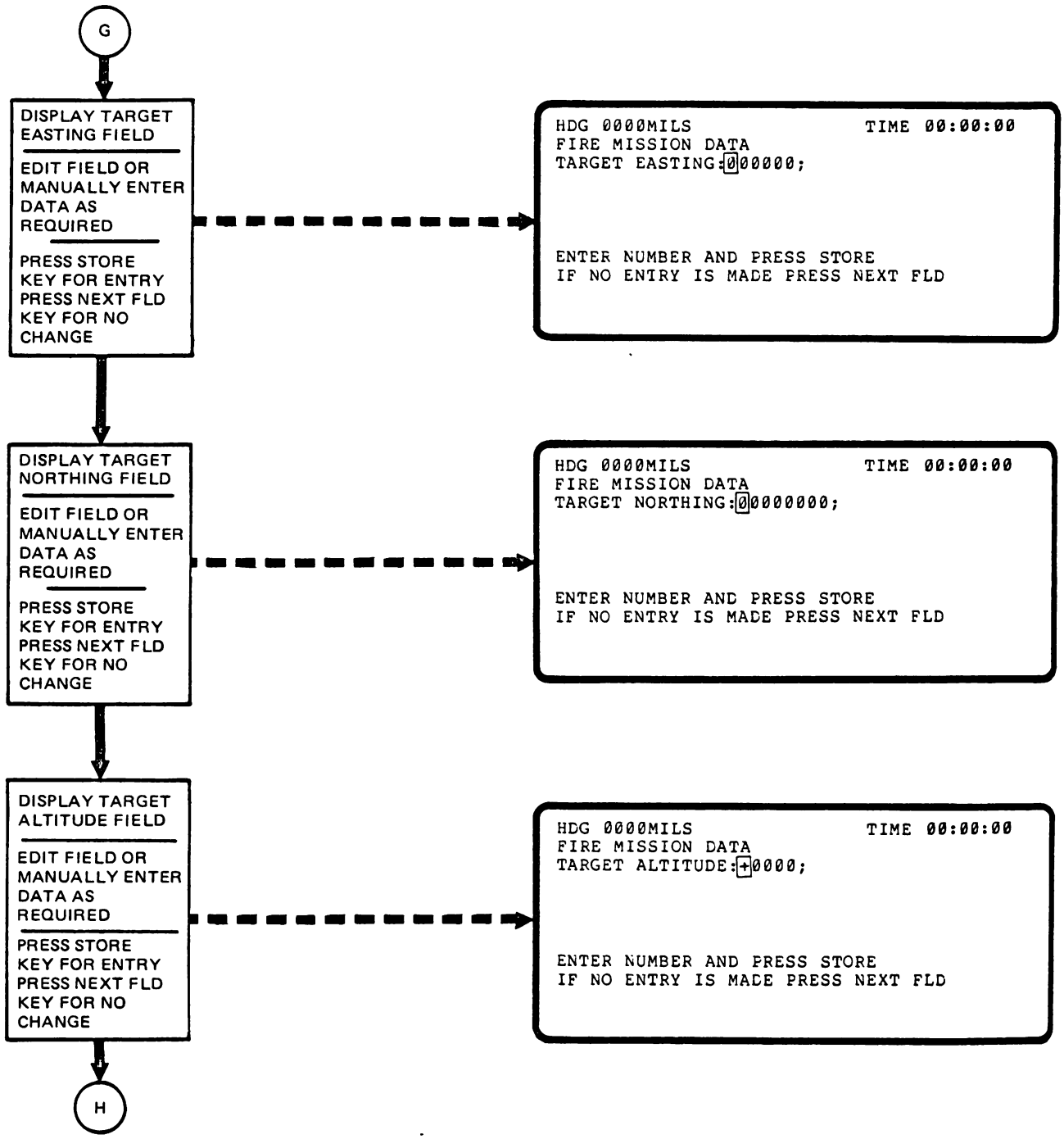


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 8 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

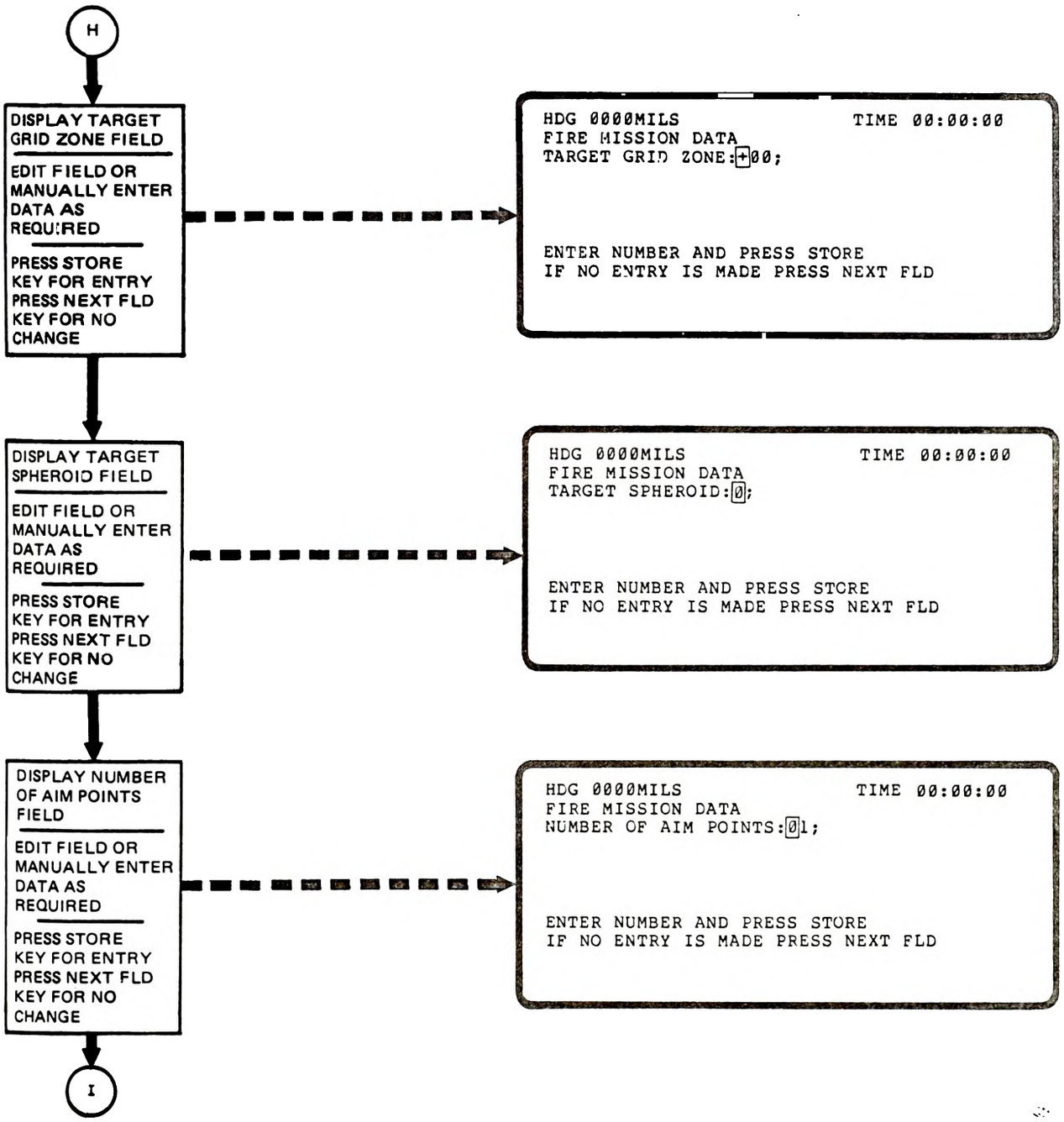


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 9 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

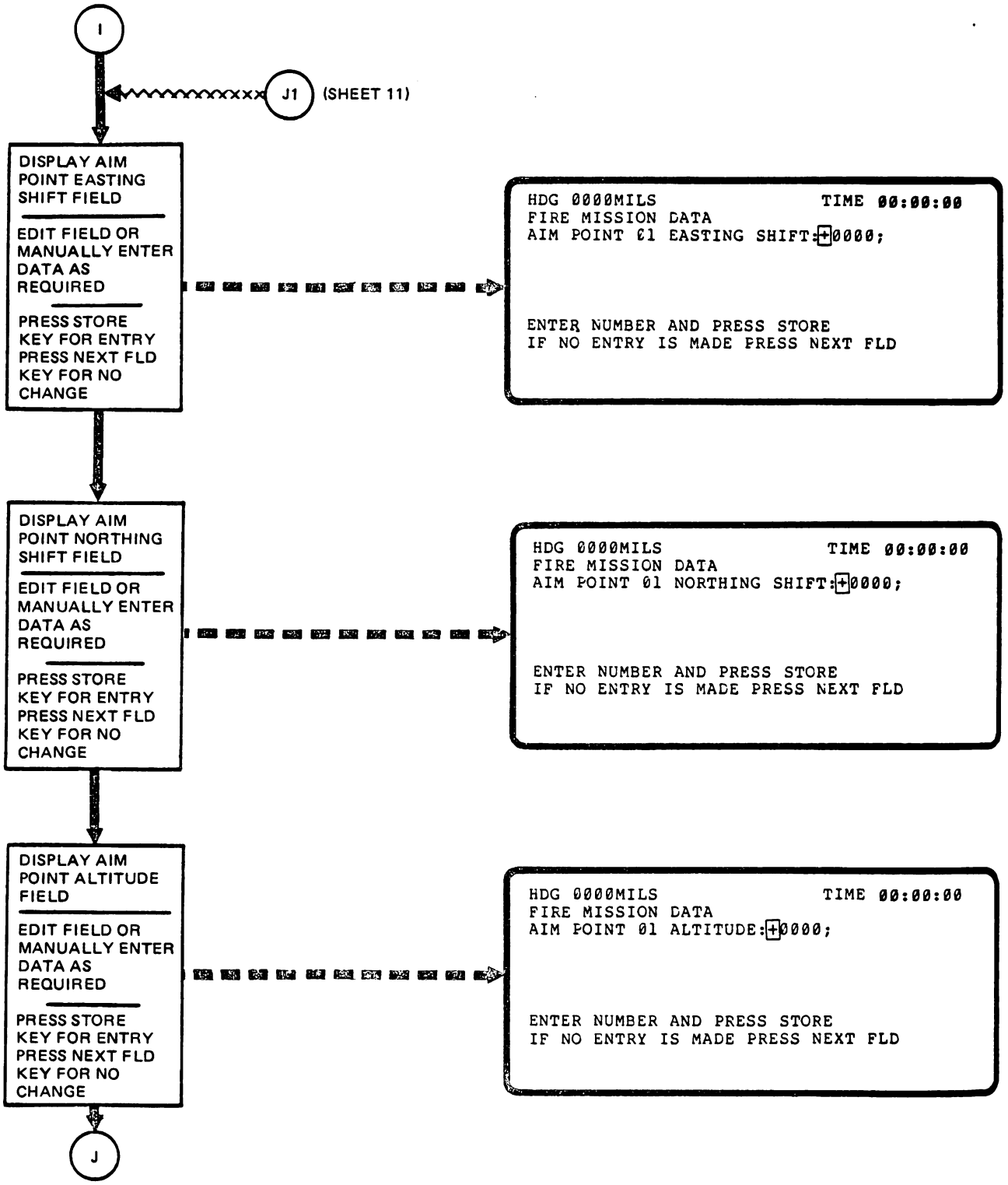


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 10 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

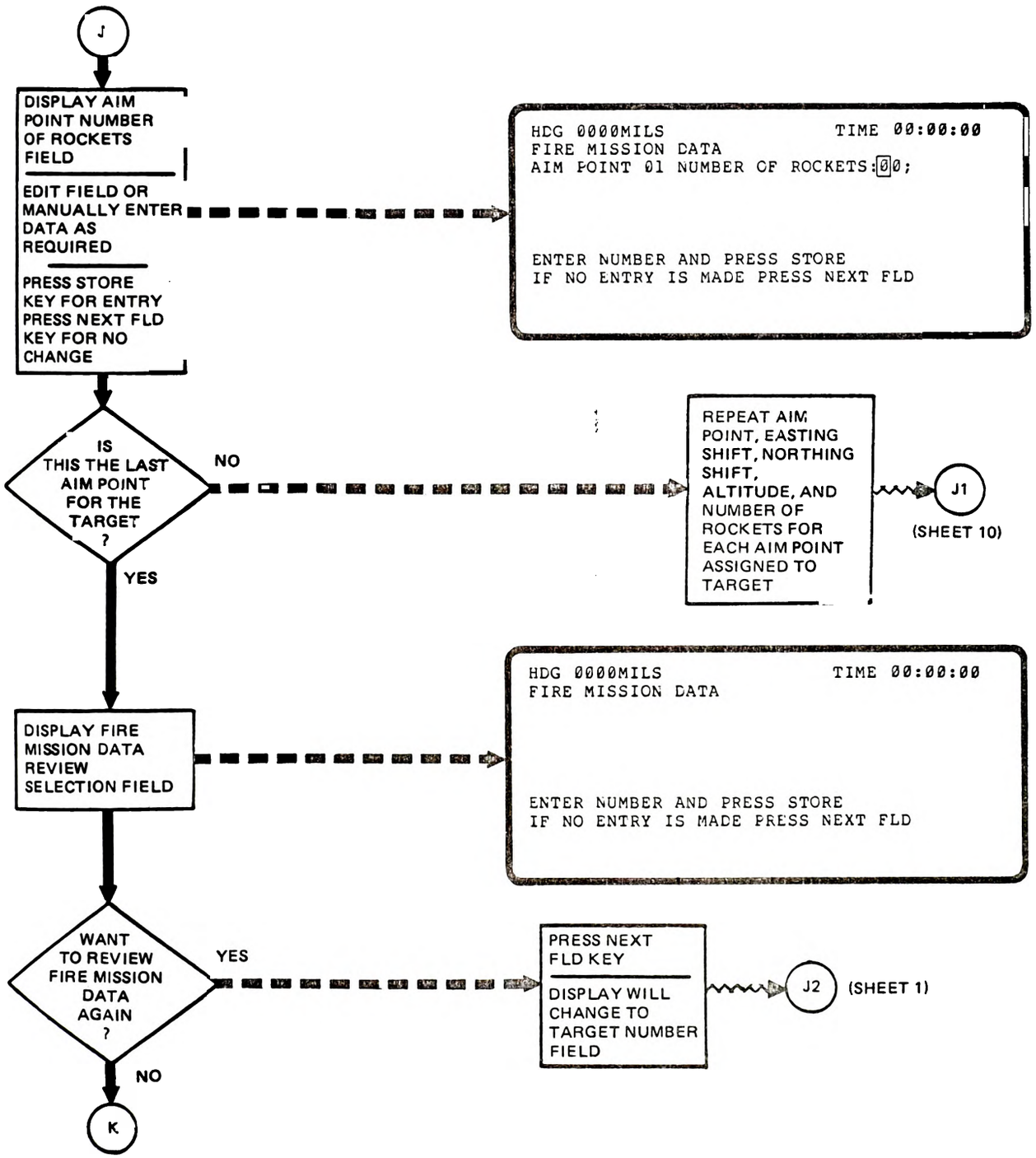


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 11 of 12)

2-29. TACTICAL FIRE MISSION DATA EDITING/MANUAL ENTRY (CONT)

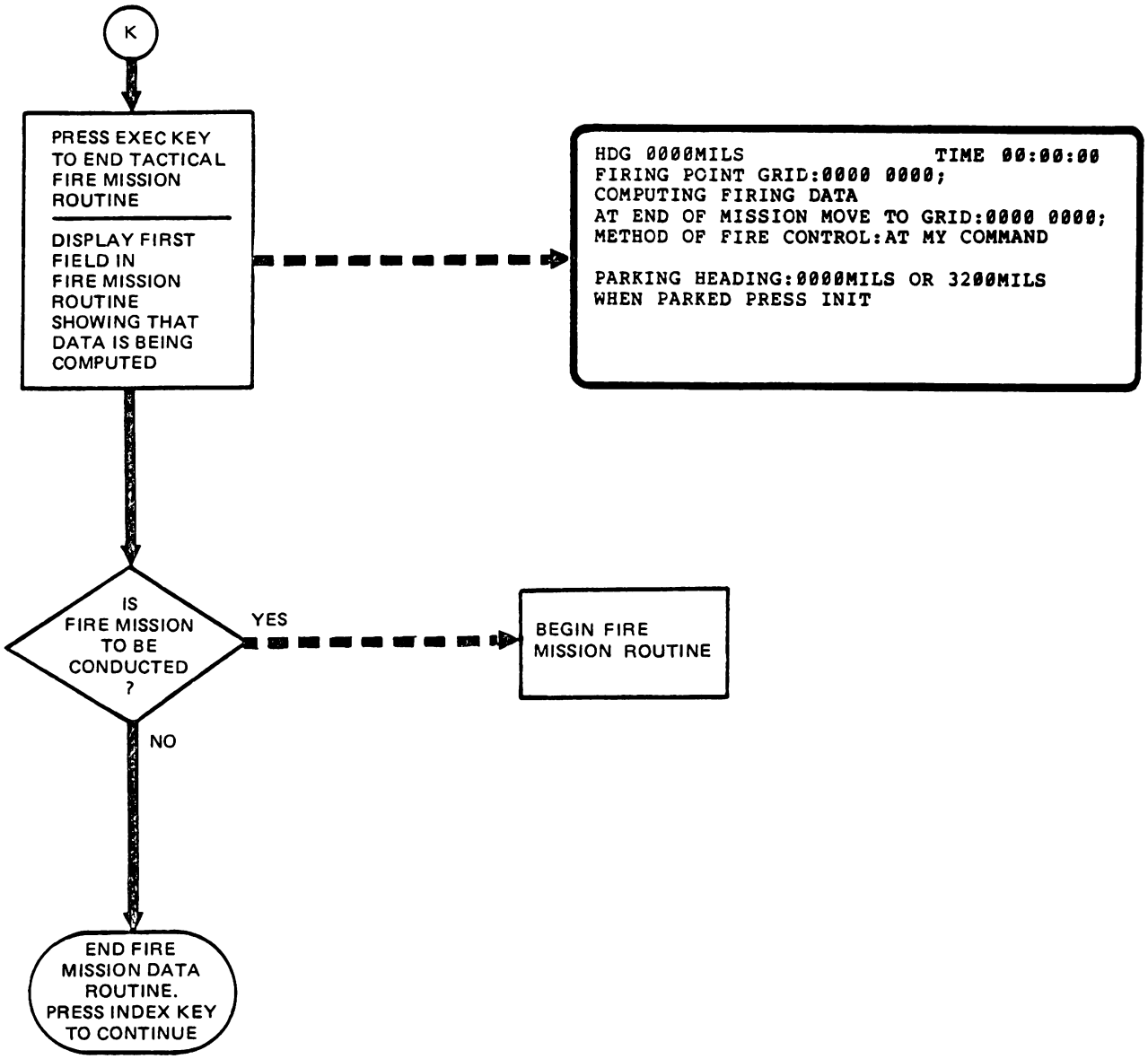


Figure 2-9. Tactical Fire Mission Data Entry Flow Diagram (Sheet 12 of 12)

2-30. FIRE MISSION. The following fire mission procedures describe the actions required for a typical fire mission. It includes actions and explanations of how to park the SPLL, fire the rockets, and leave the firing point. Explanations of the procedures to be taken in event of a misfire, hangfire, or checkfire are described at the end of the procedure.

a. Starting the Fire Mission.

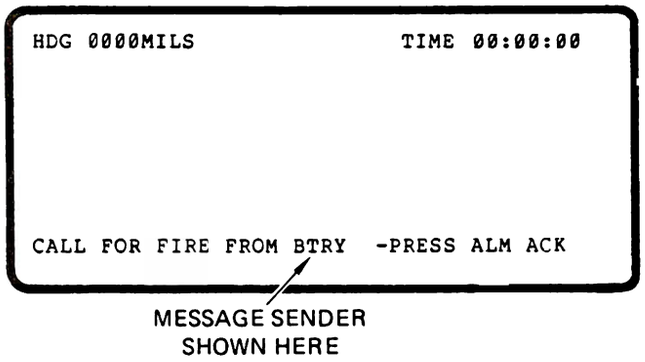
There are two ways to start the fire mission routine. One way is when a CFF message is received. Pressing the ALM ACK key, to acknowledge the message, causes the message to be entered into the FCS and processed. At the same time, the first field in the fire mission routine is automatically displayed. This allows the SPLL to begin the mission immediately.

The second way to start the fire mission routine is after editing or manually entering data in the tactical fire mission data routines. After all data has been edited or entered and the EXEC key is pressed, the first field in the fire mission routine is automatically displayed.

b. Receiving Mission Assignment.

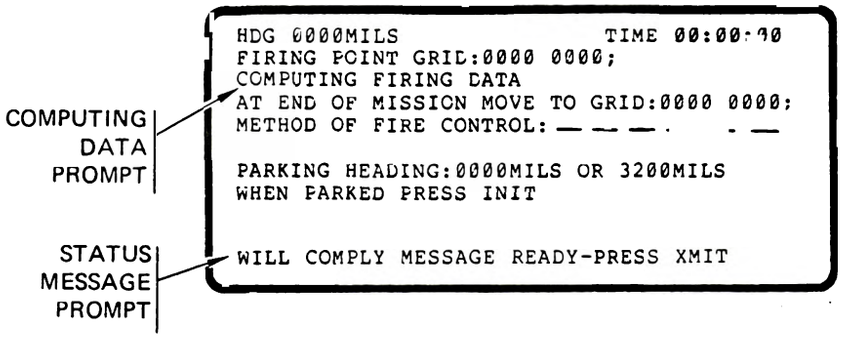
If your mission is a manual data entry mission, your assignment will be written on a mission data form. Refer to tactical fire mission data editing/manual entry procedures (paragraph 2-29) for detailed instructions on how to manually enter fire missions and start the fire mission routine.

(1) When the mission is received by radio message, the alarm will sound and the CFF message received prompt is displayed.



(2) Pressing the ALM ACK key shuts off the alarm and displays the first field in the fire mission routine.

(3) This message has a lot of information about the fire mission you need to know. Also, it tells you about two very important tasks that are happening automatically.



(a) One is that the FCS computer is doing the mathematics (COMPUTING FIRING DATA) needed for the fire mission. The FCS does this at the start of every fire mission. When the problem is completed, the COMPUTING FIRING DATA prompt will be erased.

2-30. FIRE MISSION (CONT)

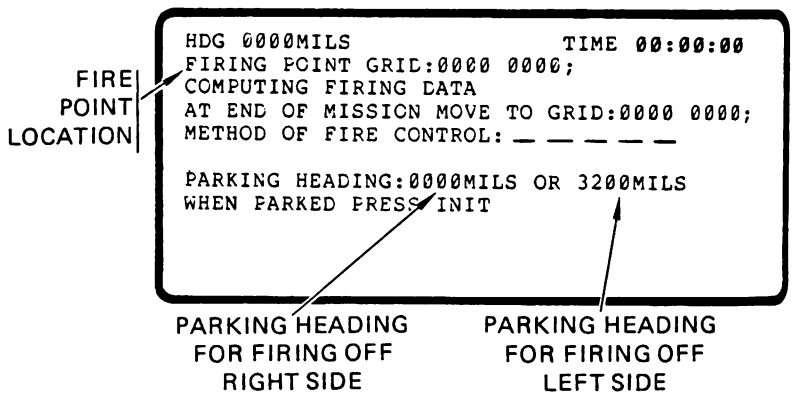
However, before computing firing data, the FCS checks to make sure all data is ready for use. If the SRP is aligning when the CFF message is received, the FCS will wait until the alignment is complete, then compute the firing data. Also, if your SPLL is in the silent watch mode, the FCS will automatically turn on the SRP and wait for it to align. While the SRP is aligning the SRP aligning time to go field will be displayed. When SRP alignment is completed, the first field in the fire mission routine will be automatically displayed.

(b) The second task, started immediately, is to send a mission status message. The message prompt is displayed at the bottom of the field as a will comply response to the CFF message. You must decide immediately if your SPLL can comply. If for some reason the SPLL cannot conduct a fire mission, the BTRY and PLT/TP must be informed. To change a will comply message to a cannot comply message, refer to mission status message explanation (paragraph 2-19, e). If the SPLL will comply, wait until the firing data is computed, then press the XMIT key. The message will be sent and the prompt erased.

c. Firing Point and Parking Headings.

The field also displays the FIRING POINT GRID coordinates and firing point PARKING HEADINGS.

(1) Two parking headings are displayed. The first heading is for firing rockets from the right side of the SPLL. This is the preferred parking heading. The second heading is an alternate heading for firing from the left side.

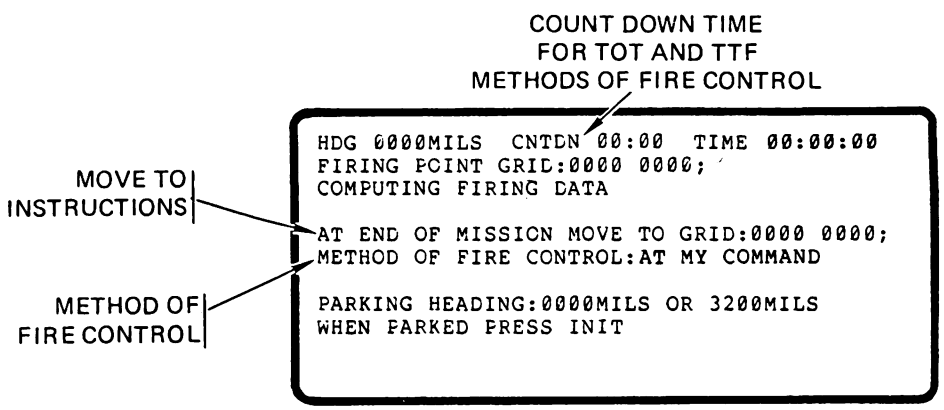


(2) When the FIRING POINT GRID coordinates and PARKING HEADING are displayed, the SPLL should be driven to these coordinates. Always try to park in the direction of the first heading displayed.

d. Move to Instructions, and Method of Fire Control.

Other information displayed in the first field is move instructions for use after the fire mission is completed, and the method of fire control.

(1) The move instructions will be displayed again at the end of the mission. They are displayed here for your information.



2-30. FIRE MISSION (CONT)

(2) The method of fire control tells you what method is going to be used to give you orders to fire. The methods of fire control are described in tactical fire mission data entry (paragraph 2-29). The methods available are as follows:

(a) AT MY COMMAND (AMC)
(b) FIRE WHEN READY (FWR)
(c) TIME ON TARGET (TOT)
(d) TIME TO FIRE (TTF)
(e) ON CALL

(3) When the method of fire control is TOT or TTF, a countdown time will be displayed in the heading and time line of the field. When the method of fire control is TOT or TTF, the SPLL must be parked at the firing point (For vehicle parking refer to paragraph e.) and the LCHR LAY key pressed before the countdown time reaches 2 minutes, 30 seconds (02:30). If the LCHR LAY key is not pressed before CNTDN 02:30, the FCS will end the mission and one of the following prompts will be displayed.

(a) TOT – TOO LATE ON TARGET-END OF MISSION
(b) TTF – TOO LATE TO ARM-END OF MISSION

e. *Parking and Getting Ready.*

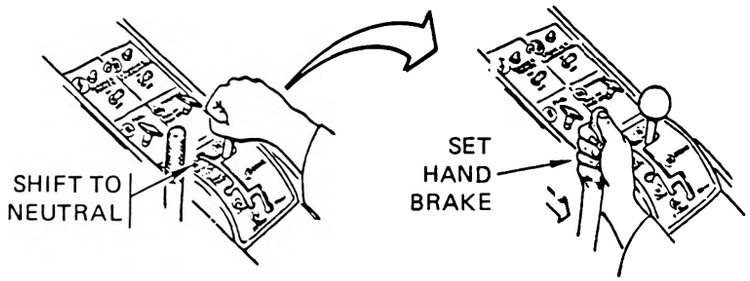
(1) As the SPLL approaches the firing point, look at the surrounding area. Make sure there are no objects that may have been overlooked and could mask the field of fire. If there are such objects, notify BTRY or PLT/TP. You may have to send a masking data message. To send a masking data message, refer to paragraph 2-31.

(2) When you arrive at the firing position, park the SPLL. Use the direction of the first heading shown on the display.

It is not expected that the SPLL can be parked exactly as instructed. Park the SPLL within 150 meters of the firing point grid location in both northing and easting. Park the SPLL at a heading within 100 mils of the parking heading shown on the display. Try to park on ground as level as possible. SPLL slope affects the no fire zone. Depending on target location and firing point conditions, the SPLL can fire from a 265-mil slope. However, more than 89 mils is not recommended. The greater the slope, the greater the chance of having to repark to stay inside the fire zone. If in doubt about slope, use the SPLL SLOPE routine, option 8, on the auxiliary menu to check it before pressing INIT key. A slope more than 265 mils is too much.

(3) When a firing point location is located on hard smooth surface, the chance for SPLL movement during firing is increased. One way to reduce the chance of SPLL movement is, after parking at the assigned SPLL heading, use forward and reverse to move the SPLL back and forth. This action will allow the tracks to settle in. The SPLL can also be pivoted in place, in addition to moving back and forth, to make the tracks settle in. However, after settled, the assigned SPLL heading must be maintained.

(4) As soon as SPLL is parked, tell the driver to shift the RANGE SELECTOR to NEUTRAL and set handbrake.



2-30. FIRE MISSION (CONT)

(5) Make sure that the carrier LAUNCHER INTERCONNECT switch is set to ON. Check that the carrier voltmeter is indicating in the upper half of the yellow zone or the green zone. If voltmeter is not indicating correctly, refer to troubleshooting (Chapter 3).

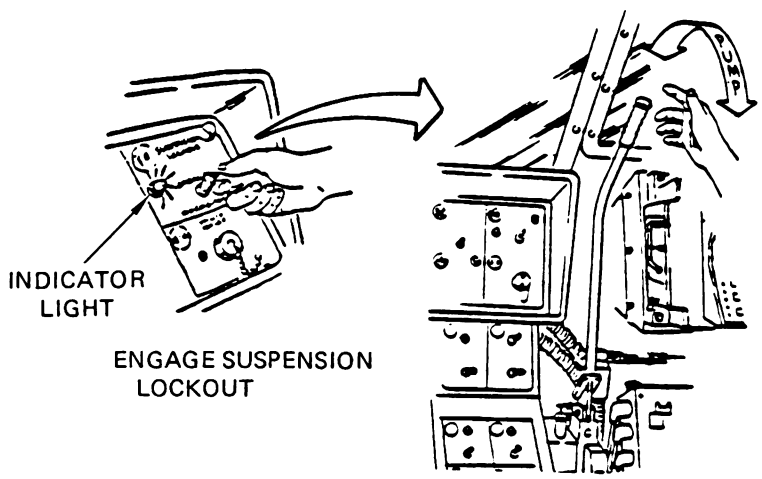
CAUTION

Do not drive SPLL with suspension lockout system ENGAGED. Suspension can be damaged.

NOTE

After the suspension lockout has been engaged, pressure may lower slightly. If the light goes off, pump the handle again to turn the light back on.

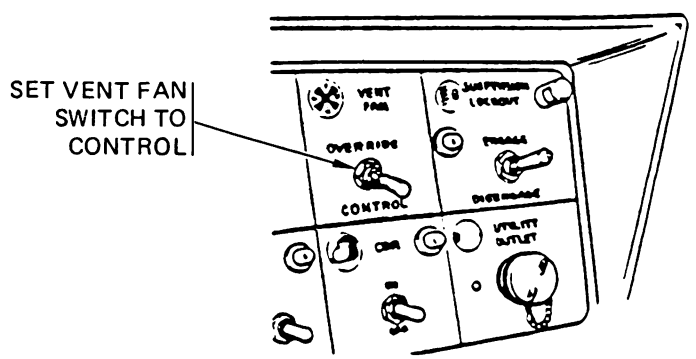
(6) Set SUSPENSION LOCKOUT switch to ENGAGED. Operate suspension lockout pump handle until SUSPENSION LOCKOUT ENGAGED indicator light comes on. Lock the handle in the forward position.



WARNING

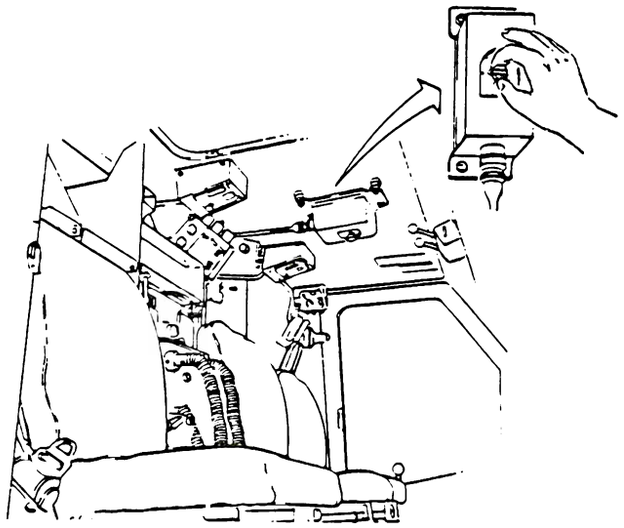
Do not set vent fan switches to either HIGH or OVERRIDE when ventilation damper is in FIRING position and engine is at idle. Dangerous fumes may be drawn into the carrier cab.

(7) Remind the driver to set the VENT FAN switch, on the instrument panel, to CONTROL.

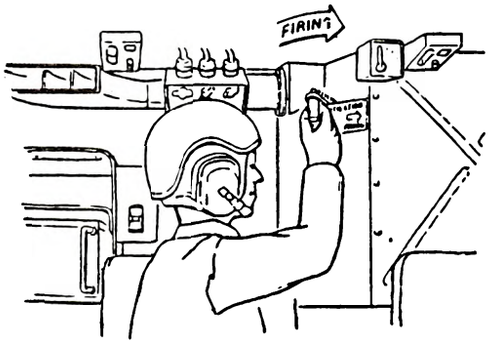


2-30. FIRE MISSION (CONT)

(8) Check to make sure the carrier vehicle VENT FAN switch is set to MED. If it is not, set the switch to MED.



(9) Make sure the carrier vehicle ventilation damper, in back of the gunners position, is set to FIRING.



2-30. FIRE MISSION (CONT)

WARNING

Rocket exhaust gases are poisonous. Prolonged breathing of rocket exhaust gas can cause severe injury or death. Keep your NBC mask ready for immediate use. Wear your mask if any of the following conditions exist when rocket exhaust gases are present.

Either crew compartment door or commanders hatch is open.

Ventilation damper is set to NORMAL.

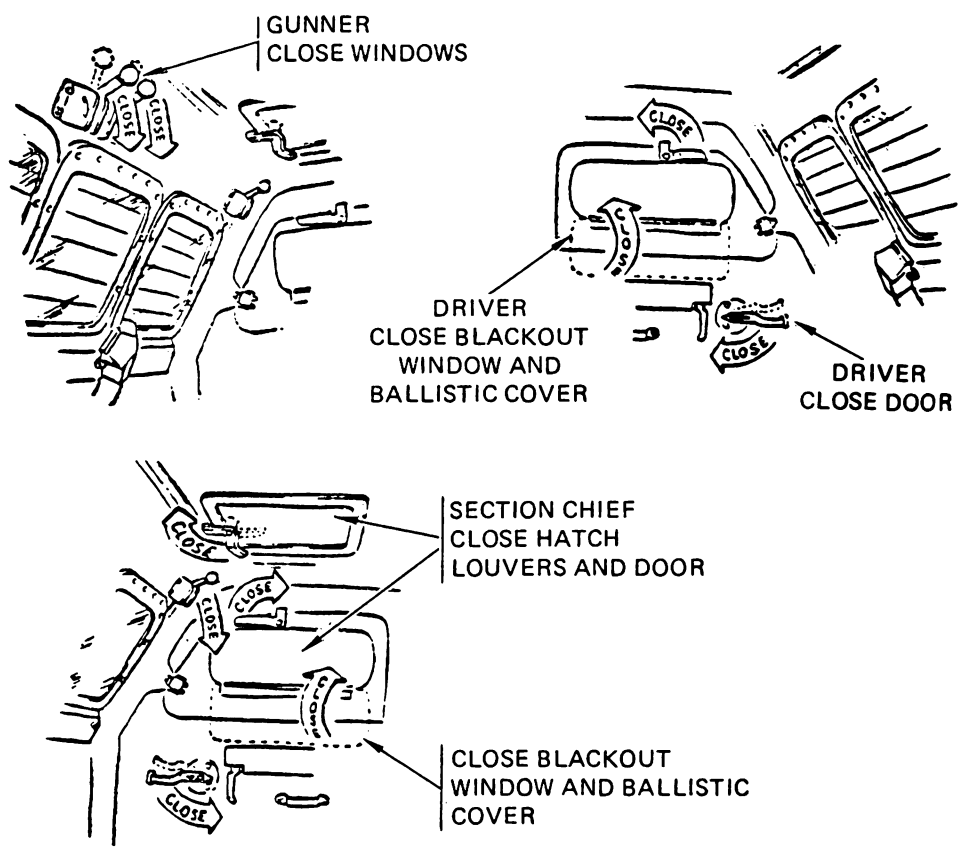
Gas cloud is still present around vehicle after 5 minutes.

Your eyes, nose, or throat become irritated.

NOTE

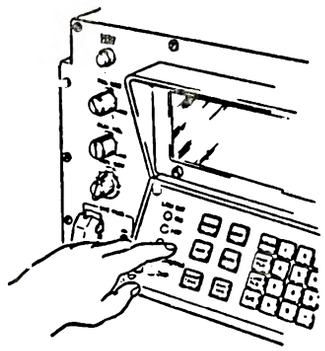
To help prevent rocket exhaust gases from entering the carrier cab, the doors, hatches, and louvers must be closed to outside air and the cab ventilation system must be set for proper filtering. If this is not done properly, the CAB indicator light and alarm will come on.

(10) Make sure all doors, hatches, windows, and louvers are closed.



2-30. FIRE MISSION (CONT)

(11) Press the INIT key after you are parked. This tells the FCS you are parked and ready to continue the mission.



After the INIT key is pressed, the mission can be manually cancelled by pressing LLM STOW key. If the rockets are not safed, you will be prompted to safe the rockets. The MISSION CANCELLED MANUALLY prompt will then be displayed.

When INIT key is pressed, the FCS will check to again make sure that all data is ready for use. The firing data will be computed again using the SPLLs actual position and parking heading.

If the firing data cannot be computed to obtain a solution, a NO SOLUTION ERROR fault prompt will be displayed and the mission automatically ended.

(12) After the firing data has been computed again, the FCS checks to make sure the LLM can aim at all the assigned aimpoints. If all the aimpoints cannot be reached, the FCS rechecks all data. It uses the actual parking heading and ground slope to determine the best SPLL heading for the mission. If the actual heading is 90 mils or more from the recomputed heading, an INCORRECT HEADING MOVE VEHICLE prompt will be displayed.

```
HDG 0000MILS                TIME 00:00:00
FIRING POINT GRID:0000 0000;



PARKING HEADING:0000MILS OR 3200MILS
WHEN PARKED PRESS INIT


INCORRECT HEADING MOVE VEHICLE
```

Have the driver move the SPLL and park again at the new heading. Park as close to the new heading as possible, and on ground that is as level as possible.

(13) When the SPLL is parked at the new heading, press the INIT key again. The SPLL slope will be checked again. If the slope is still too great, a SLOPE TOO GREAT MOVE VEHICLE prompt will be displayed.

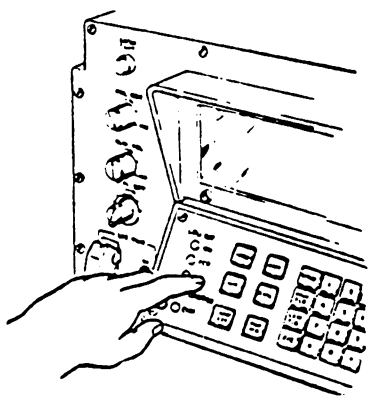
The SPLL will have to be moved again to more level ground.

```
HDG 0000MILS                TIME 00:00:00
FIRING POINT GRID:0000 0000;.



PARKING HEADING:0000MILS OR 3200MILS
WHEN PARKED PRESS INIT


SLOPE TOO GREAT MOVE VEHICLE
```

2-30. FIRE MISSION (CONT)

```
HDG 0000MILS                    TIME 00:00:00
FIRING POINT GRID:0000 0000;


PARKING HEADING:0000MILS OR 3200MILS


OUTSIDE FIRE ZONE-PRESS INIT TO CONTINUE
```

(14) When properly parked and INIT key is pressed, the FCS will automatically check the aimpoints. If for some reason all the aimpoints cannot be reached, an OUTSIDE FIRE ZONE prompt will be displayed.



(15) If the prompt appears, press the INIT key.

This tells the FCS to continue the mission, and to aim the LLM at the aimpoints that can be reached.

NOTE

If all the aimpoints fall outside the fire zone, the prompt will change to OUTSIDE FIRE ZONE - MISSION CANCELLED. The mission will be ended.

```
HDG 0000MILS                    TIME 00:00:00
FIRING POINT GRID:0000 0006;


PARKING HEADING:0000MILS OR 3200MILS
TO CONTINUE MISSION PRESS LCHR LAY
```

(16) After you press the INIT key and the FCS has successfully completed all of the checks, instructions to PRESS LCHR LAY key will be displayed.

Press LCHR LAY key.

2-30. FIRE MISSION (CONT)

WARNING

Rocket exhaust gases are poisonous. Prolonged breathing of rocket exhaust gas can cause severe injury or death. Keep your NBC mask ready for immediate use. Wear your mask if any of the following conditions exist when rocket exhaust gases are present.

Either crew compartment door or commanders hatch is open.

Ventilation damper is set to NORMAL.

Gas cloud is still present around vehicle after 5 minutes.

Your eyes, nose, or throat become irritated.

NOTE

If CAB indicator light comes on and the alarm sounds, a door, window, hatch, or the ventilation damper is not closed properly. Check all doors, window, louvers, hatches, and the ventilation damper to insure they are closed.

(17) When the SPLL is parked correctly, if the method of fire control is FWR or AMC, the LLM aim position and rocket status field will be displayed. However, if the method of fire control is TOT or TTF, the display will go blank. The heading and time line will still be shown, but other data is erased. A countdown clock will appear in the middle of the heading and time line. The clock counts down to 00:00. At CNTDN time 02:10, the LLM aim position and rocket status field will be displayed.

(18) If the method of fire is TOT or TTF, refer to paragraph g to continue.

(19) If the method of fire is AMC, FWR, or ON CALL, continue with the following paragraph.

2-30. FIRE MISSION (CONT)

f. AMC, FWR, and On Call Method of Fire Control.

Once the LCHR LAY key is pressed, the mission is started. The rocket status and LLM aim position field will be displayed and remain displayed until the firing is completed.

The LDS will turn on and the LLM will begin to move to the aim position.

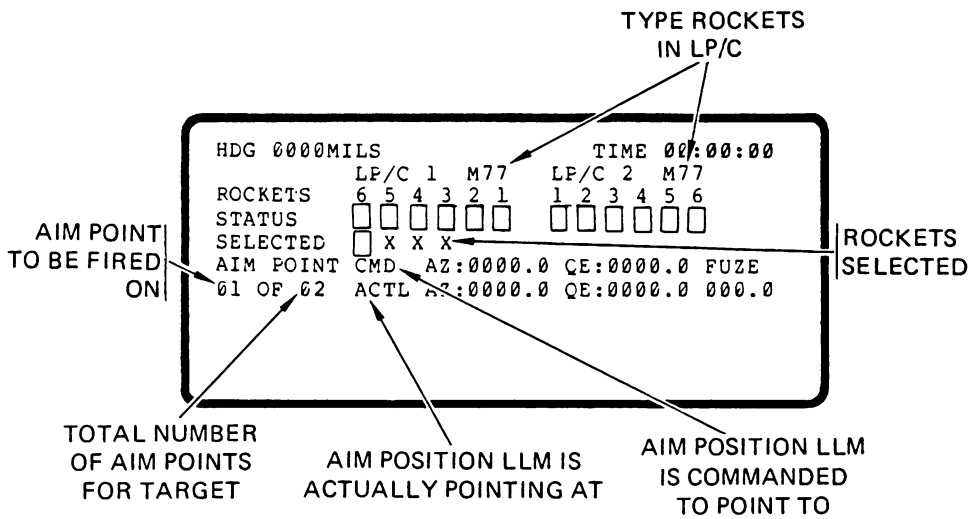
As the LLM aims, you can see the LLM azimuth and elevation angles change. (ACTL AZ: and QE:)

Also, you can tell by the bright square on the STATUS line under each rocket number which rockets you have in your LP/Cs. (LP/C 1 and LP/C 2)

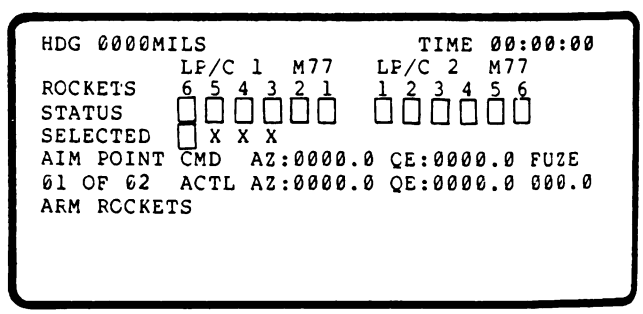
The bright Xs along the SELECTED line indicates the rockets that have been selected to be fired at the target. A bright square on the SELECTED line under a bright square on the STATUS line indicates the next rocket to be fired.

The number under FUZE is the time set into the rocket fuzes.

The aimpoint tells you which aimpoint you are firing at and how many aimpoints there are for this target.



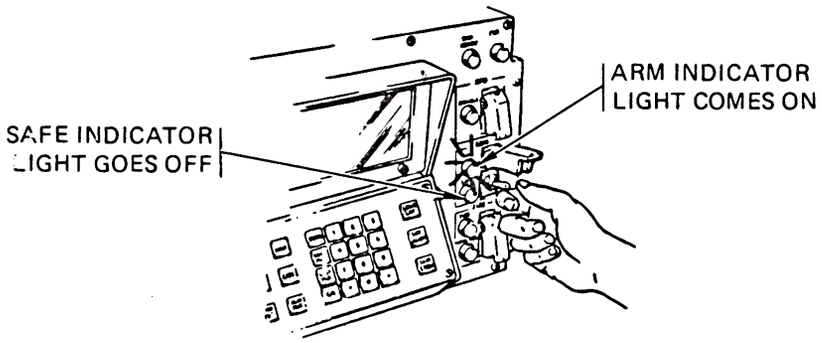
(1) Arming Rockets for FWR Method of Fire Control. When the LLM has moved to the commanded position, aiming is completed. Instructions to ARM ROCKETS will appear on the display.



2-30. FIRE MISSION (CONT)

When the instructions to ARM ROCKETS appear, raise the switchguard and set ARM switch up. Observe that ARM indicator light comes on and the SAFE indicator light goes off.

The rockets are now armed. Proceed to firing rockets, paragraph (3).



(2) Arming Rockets for AMC or ON CALL Method of Fire Control. If the method of fire control is AMC or ON CALL, as soon as the LLM moves to the aim position, a READY TO FIRE MESSAGE READY prompt will be displayed.

The message is automatically displayed. To send the message, press the XMIT key. This will tell the BTRY and PLT/TP that the system is ready to fire rockets.

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77    LP/C 2  M77
ROCKETS   6 5 4 3 2 1    1 2 3 4 5 6
STATUS    □ □ □ □ □ □    □ □ □ □ □ □
SELECTED  □ X X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
01 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
ARM ROCKETS


READY TO FIRE MESSAGE READY-PRESS XMIT
```

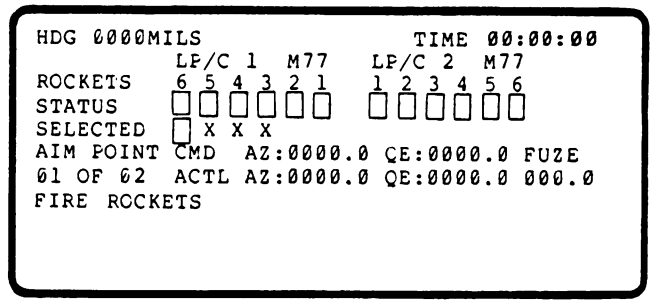
When it is time to fire, the SPLL will be sent a fire command message. When the fire command is received, the ARM ROCKETS prompt and a WILL COMPLY MESSAGE READY prompt will be displayed.

Press the XMIT key to send the will comply message. Raise the switchguard and set the ARM switch up. The ARM indicator light will come on and the SAFE indicator light will go off. The rockets are now armed.

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77    LP/C 2  M77
ROCKETS   6 5 4 3 2 1    1 2 3 4 5 6
STATUS    □ □ □ □ □ □    □ □ □ □ □ □
SELECTED  □ X X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
01 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
ARM ROCKETS


WILL COMPLY MESSAGE READY-PRESS XMIT
```

2-30. FIRE MISSION (CONT)

(3) Firing Rockets. When the rockets are armed, a FIRE ROCKETS prompt will be displayed. Raise the switchguard and set the FIRE switch up. Hold the switch up for 2 or 3 seconds, then release the switch. Rockets will start firing.



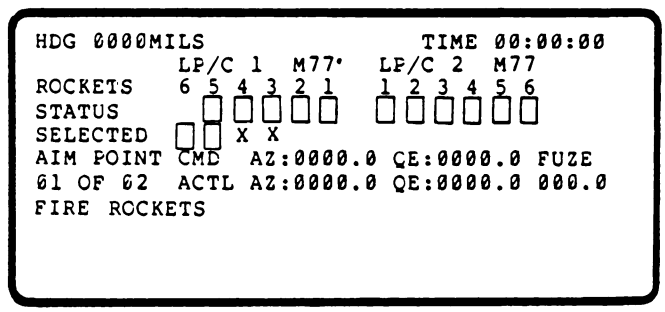
NOTE

If method of fire control is FWR, the FIRE ROCKETS prompt appeared immediately after rockets were armed.

Observe that the FIRE indicator light comes on when rocket fires. If two or more rockets are selected to be fired, the FIRE indicator light will stay on until the last selected rocket is fired and then go off.

As the selected rockets are fired, the FCP display will tell you the status.

When a rocket is fired, the bright square along the STATUS line, under the rocket number, will disappear. The X in the SELECTED line under the next rocket to be fired will change to a bright square.

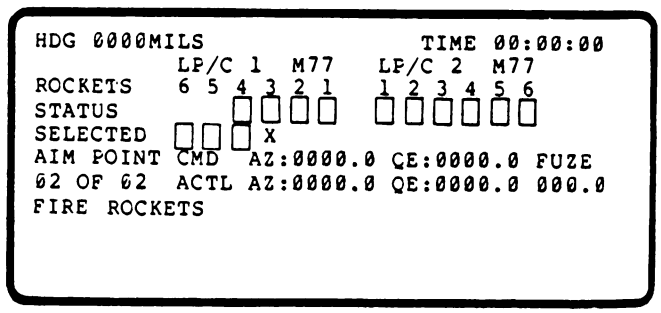


If a hangfire should occur, proceed to paragraph i for an explanation of what to do to keep firing, and continue the mission.

If a misfire should occur, proceed to paragraph j for an explanation of what to do to keep firing, and continue the mission.

If a checkfire message should be received, proceed to paragraph k for an explanation of checkfire procedures.

If more than one aimpoint has been assigned to the target, as soon as the rockets selected for AIM POINT 01 have been fired, the display will change to show that you are firing at AIM POINT 02.



The LLM will move to AIM POINT 02. The rockets selected for AIM POINT 02 will be fired. If more aimpoints are assigned, the display will change each time a new aimpoint is fired on. This will keep up until all the aimpoints assigned are fired on. If the LLM does not reach a new aimpoint within 1 minute after leaving an aimpoint, the mission will be aborted. The LLM POSITION FAILURE prompt will be displayed. If you are on the air, using the radio for message transmission, a mission fired message will be composed. The prompt MISSION FIRED MESSAGE READY - PRESS XMIT will be displayed. To send the message, press the XMIT key. The mission fired message will inform the BTRY of your SPLLs status.

2-30. FIRE MISSION (CONT)

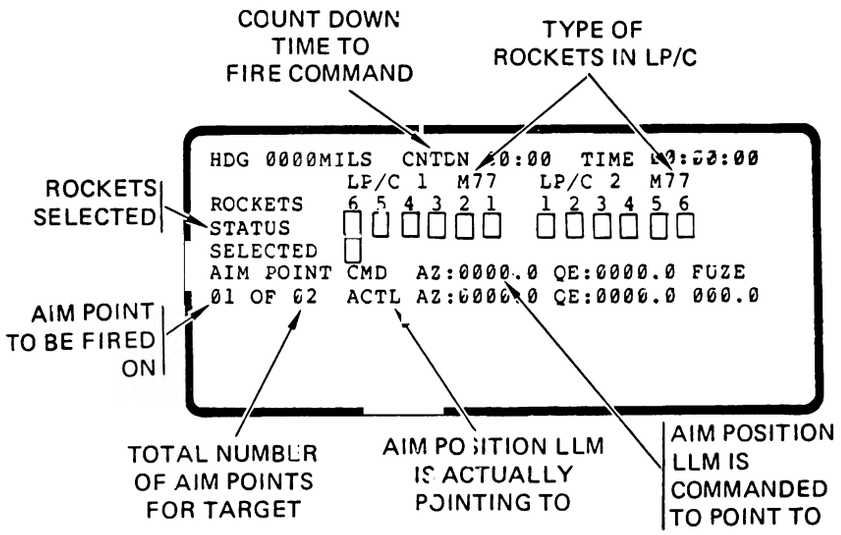
When parking the SPLL and if during the parking check, the FCS determined an aimpoint was in the no fire zone. That aimpoint will be skipped over during the firing. The number for that aimpoint will not be displayed. For example, four aimpoints were assigned. After parking and all data computed, aimpoint 03 was in the no fire zone. The FCS will fire rockets at aimpoints 01, 02, and 04. Aimpoint 03 will be skipped.

After rockets are fired at all assigned aimpoints, the procedure for ending the fire mission is the same for all methods of fire control. Proceed to end of mission (paragraph h) to continue.

g. TOT and TTF Method of Fire Control.

Once the LCHR LAY key is pressed, the display will go blank except for the heading and time line. The rockets status and LLM aim position field will be displayed again when CNTDN time is 02:10. It will remain until the firing is completed.

If for some reason the LCHR LAY key is not pressed before the CNTDN time reaches 2:10, the mission will be aborted. The prompt TOO LATE ON TARGET - END OF MISSION will be displayed. If you are on the air using the radio for message transmission, the prompt MISSION FIRED MESSAGE READY - PRESS XMIT will also be displayed. To send the message, press the XMIT key. The mission fired message will inform the BTRY of your SPLLs status.



When the display comes on, the LDS will also turn on. The LLM will begin to move to the aim position.

As the LLM aims, you can see the LLM azimuth and elevation angles change. (ACTL AZ: and QE:)

You can also tell, by the bright square on the STATUS light under each rocket number, which rockets you have in your LP/Cs. (LP/C 1 and LP/C 2)

The bright Xs and square along the SELECTED line indicates the rockets that have been selected to be fired at the target.

The number under FUZE is the time set into the fuze of the rocket selected.

The aimpoint tells you which aimpoint you are firing at, and how many aimpoints there are for this target.

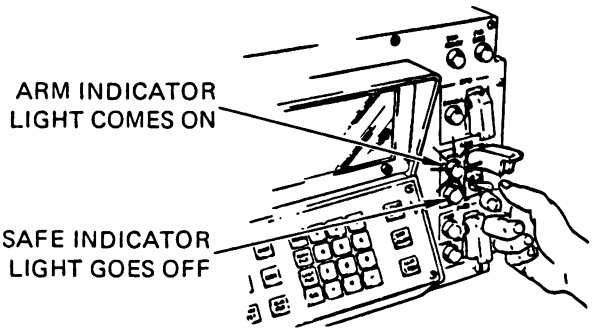
2-30. FIRE MISSION (CONT)

(1) Arming Rockets for TOT or TTF Method of Fire Control. When LLM aiming is completed, at 10 seconds on the CNTDN clock, an instruction prompt to ARM ROCKETS appears on the FCP display.

```
HDG 0000MILS  CNTDN 00:10  TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS    □□□□□□ □□□□□□
SELECTED  □ X X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
01 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
ARM ROCKETS
```

When the command ARM ROCKETS appears, raise the switchguard and set ARM switch up.

Observe that ARM indicator light comes on and the SAFE indicator light goes off.

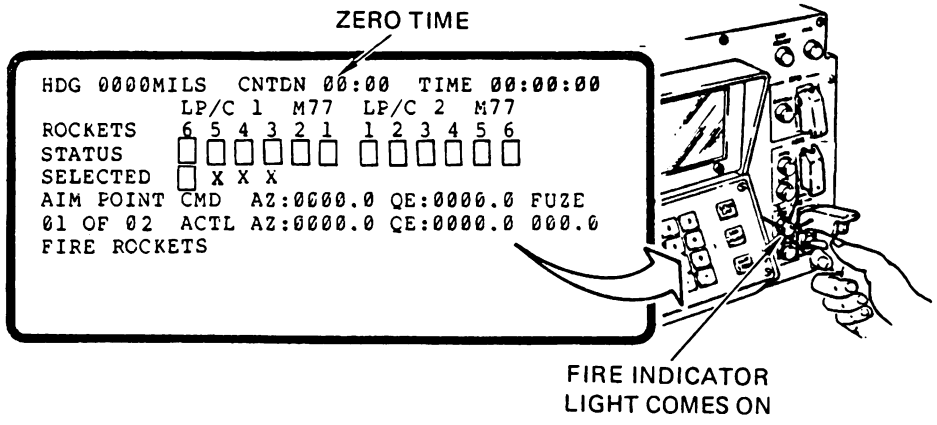


The rockets must be armed before the CNTDN time is 00:00 or the fire mission will be aborted. A prompt telling you TOO LATE TO ARM-END OF MISSION will be displayed. If you are on the air using the radio for message transmission, a mission fired message will be composed. The prompt MISSION FIRED MESSAGE READY-PRESS XMIT will be displayed. To send the message, press the XMIT key. The mission fired message will inform the BTRY of your SPLLs status.

(2) Firing Rockets for TOT or TTF Method of Fire Control. Watch the display. At 00:00 CNTDN time, the FIRE ROCKETS prompt appears.

When the command FIRE ROCKETS appears, raise the switchguard and set the FIRE switch up. Hold the switch up for 2 or 3 seconds, then release the switch. Rockets will start firing.

Observe that the red indicator light comes on when the rocket fires. If two or more rockets are selected to be fired, the fire indicator light will stay on until the last selected rocket is fired and then go off.



2-30. FIRE MISSION (CONT)

As each selected rocket is fired, the display will tell you the status.

When a rocket is fired, the bright square along the STATUS line under the rocket number will disappear. The X in the SELECTED line under the rocket number will change to a bright square.

```
HDG 0000MILS  CNTDN 00:00  TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS      □ □ □ □ □   □ □ □ □ □ □
SELECTED  □ □ X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
01 OF 02  ACTL AZ:0006.0 QE:0000.0 000.0
```

If a hangfire should occur, proceed to paragraph i for an explanation of what to do to keep firing and continue the mission.

If a misfire should occur, proceed to paragraph j for an explanation of what to do to keep firing and continue the mission.

If a checkfire message should be received, proceed to paragraph k for an explanation of checkfire procedures.

If more than one aimpoint has been assigned to the target, as soon as the rockets selected for AIM POINT 01 have been fired the display will change to show that you are firing at AIM POINT 02.

```
HDG 0000MILS  CNTDN 00:00  TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS      □ □ □ □   □ □ □ □ □ □
SELECTED  □ □ □ X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
FIRE ROCKETS
```

The LLM will move to AIM POINT 02. The rockets selected for AIM POINT 02 will be fired. If more aimpoints are assigned, the display will change each time a new aimpoint is fired on. This will keep up until all aimpoints are fired on. If the LLM does not reach a new aimpoint within 1 minute after leaving an aimpoint, the mission will be aborted. The LLM POSITION FAILURE prompt will be displayed. If you are on the air, using the radio for message transmission, a mission field message will be composed. The prompt MISSION FIRED MESSAGE READY-PRESS XMIT will be displayed. To send the message, press the XMIT key. The mission fired message will inform the BTRY of your SPLLs status.

When parking the SPLL and if during the parking checks, the FCS determined an aimpoint was in the no fire zone, that aimpoint will be skipped over during the firing. The number for that aimpoint will not be displayed. For example, four aimpoints were assigned. After parking and all data computed, aimpoint 03 was in the no fire zone. The FCS will fire rockets at aimpoints 01, 02, and 04. Aimpoint 03 will be skipped.

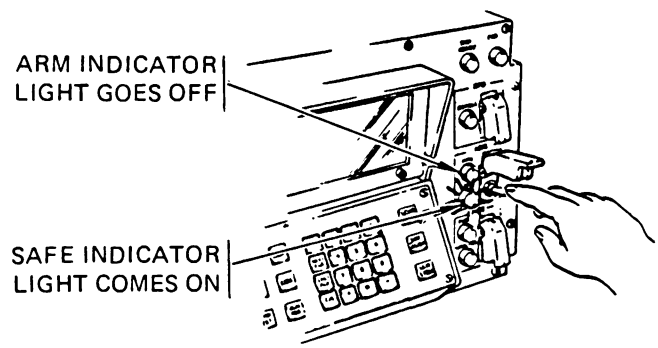
After rockets are fired at all assigned aimpoints, the procedure for ending the fire mission is the same for all methods of fire control. Continue with the next paragraph.

2-30. FIRE MISSION (CONT)

h. End of Fire Mission.

```
HDG 0000MILS                    TIME 00:00:00
AT END OF MISSION MOVE TO GRID:0000 0000;


SAFE ROCKETS END OF MISSION
```

When all assigned rockets have been fired, the rocket status display field will disappear. An end of mission field with a move location and instructions to safe rockets will appear.



(1) When this field appears, set the ARM switch down (safe). Lower the switchguard.

```
HDG 0000MILS                    TIME 00:00:00
AT END OF MISSION MOVE TO GRID:0000 0000;


PRESS LLM STOW OR PRESS INDEX

MISSION FIRED MESSAGE READY-PRESS XMIT
```

(2) As soon as the rockets are safe, a field with two sets of instructions will appear.

NOTE

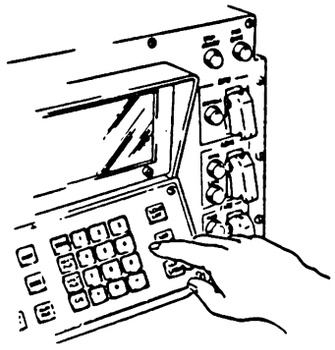
These instructions will also appear if a mission is cancelled, unless you are not operating on the air using radio messages.

One set tells you that a mission fired message is ready, and to press XMIT key to send it.

(3) When the prompt appears, press the XMIT key. The message will be sent automatically.

The other instruction is to press either the LLM STOW key or INDEX key.

2-30. FIRE MISSION (CONT)



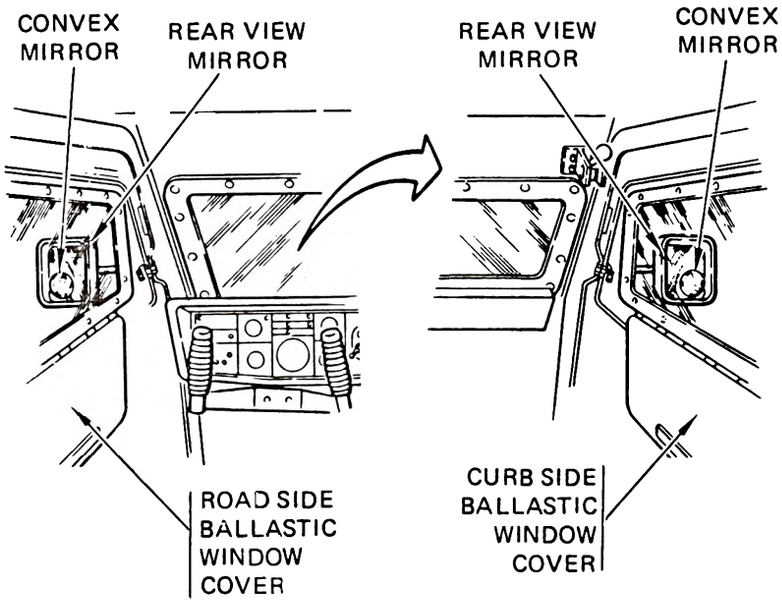
(4) If you are to remain at the site to conduct other operations, press INDEX key. The INDEX MENU will be displayed. You can then select the next operating routine.

(5) If you are going to drive away, you will have to stow the LLM. Press LLM STOW key. The LLM will begin to stow.

NOTE

Fire in an LP/C launch tube, after firing, is always a remote possibility. A check of each LP/C for fire, should be made after each firing.

(6) After firing, whether the LLM remains unstowed or the LLM is stowed, check the LP/C launch tubes for fire. Open the ballistic window covers on each door. Use the convex mirrors, on the rear view mirrors, to observe the front and rear of the LLM. Look for signs of black smoke, flame, or other evidence of fire coming from a launch tube.



WARNING

Poisonous rocket exhaust gases are present around SPLL after firing. Do not set the ventilation system to normal until after the SPLL has left the firing position. If you must open a door or hatch, be sure air around SPLL is safe. (Gas cloud has blown away.) If you should open a door or hatch and your eyes, nose, or throat starts to become irritated, put on your NBC mask immediately.

At the section chief's option, depending on the local conditions and local instructions, the commanders hatch may be opened. The ends of the LP/C launch tubes can then be checked directly without the aid of the mirrors.

If a fire is detected, notify your battery and platoon leader at once. Do not move the SPLL unless the tactical situation requires it. Follow the emergency procedures provided in paragraph 2-39.

2-30. FIRE MISSION (CONT)

(7) When the LLM is stowed, the instructions to press LLM STOW will disappear and the LLM STOWED prompt will be displayed.

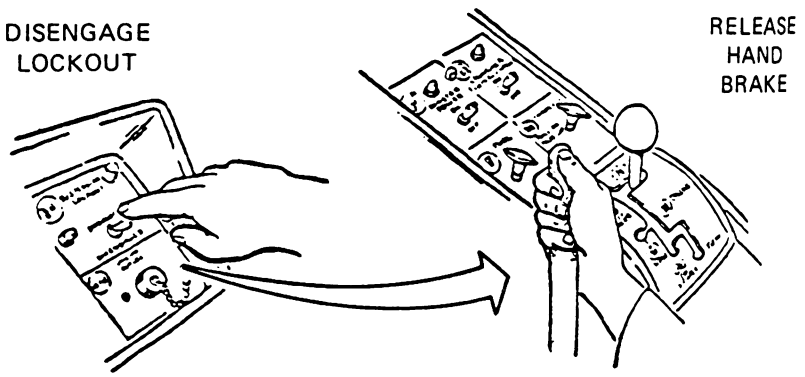
```
HDG 0000MILS                    TIME 00:00:00

AT END OF MISSION MOVE TO GRID:0000 0000;


LLM STOWED
```

CAUTION

Do not drive SPLL with suspension lockout system engaged. Suspension can be damaged.

(8) Tell driver to disengage suspension lockout and release handbrake. Move the SPLL to the new position.

Fire mission is now complete. Follow your move instructions. The crew can open the carrier louvers as needed to see to move the SPLL.

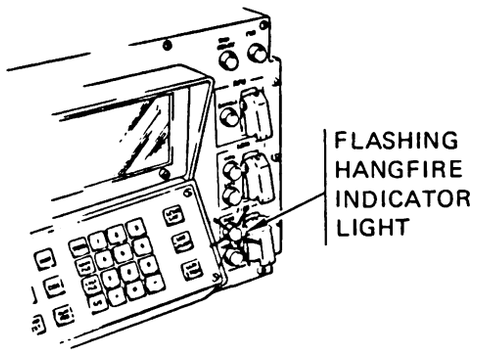


2-30. FIRE MISSION (CONT)

i. Hangfire when Firing.

WARNING

Hangfire is indicated when the HANGFIRE indicator light comes on flashing. An H will also appear under the rocket number on the STATUS line of the FCP display. If you have a hangfire, notify your S/C at once. Your emergency hangfire procedures are in paragraph 2-38.



(1) If a hangfire occurs and if the stop on hangfire option was selected during startup, rocket firing sequence will stop immediately. Instructions to safe and then to arm the rockets to continue firing will appear on the FCP display.

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77  LP/C 2  M77
ROCKETS   6 5 4 3 2 1  1 2 3 4 5 6
STATUS      H □□□□ □□□□□□
SELECTED  □□ X X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
01 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
HANGFIRE-SAFE AND ARM TO CONTINUE
```

(2) To continue firing rockets, set the ARM switch down (safe) and then back up again (arm). This will rearm the rockets. Raise the switchguard and set the FIRE switch to up position. Hold the switch up for 2 or 3 seconds, then release the switch. Firing will continue. The FCS will try to fire the hangfire rocket again. If the rocket does not fire, another rocket will automatically be selected to replace the hangfire rocket.

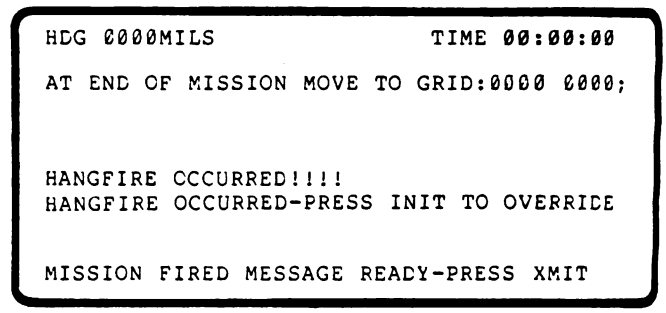
If continue to fire on hangfire was selected during startup, you do not have to do anything during the firing. An H will appear in the STATUS line under the hangfire rocket. Another rocket will be automatically selected to replace it.

(3) At the end of the mission when all firing is completed, a HANGFIRE OCCURRED!!! prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00

AT END OF MISSION MOVE TO GRID:0000 0000;


HANGFIRE OCCURRED!!!!
PRESS LLM STOW OR PRESS INDEX


MISSION FIRED MESSAGE READY-PRESS XMIT
```

2-30. FIRE MISSION (CONT)

(4) If the LLM STOW key is pressed, the prompt will change to HANGFIRE OCCURRED-PRESS INIT TO OVERRIDE. The LLM will not stow.



WARNING

Do not stow LLM with a HANGFIRE without direct orders from PLT/TP or EOD. Make sure you follow emergency procedures (paragraph 2-38). Hangfire rocket could ignite and kill someone.

(5) To stow the LLM, press INIT key. The HANGFIRE OCCURRED!!! prompt will be erased. Press the LLM STOW key and the LLM will stow.

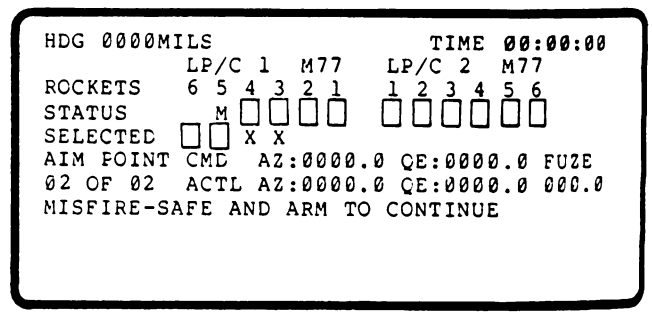
NOTE

The preceding procedures allow you to override the hangfire prompt and stow the LLM with a hangfired rocket. The HANGFIRE OCCURRED!!! prompt will be erased, but the HANGFIRE indicator light on the FCP will stay on until the LP/C with the faulty rocket is unloaded.

This change in stowing procedure is to make sure you do not miss the fact that there was a hangfire. It makes sure you want to stow the LLM.

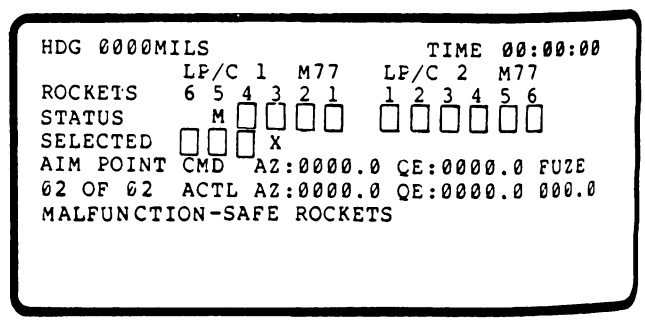
j. Misfire when Firing.

If a misfire occurs and if stop on misfire option was selected during startup, rocket firing sequence will stop. Instructions to safe and then to arm the rockets to continue will appear on the FCP display.



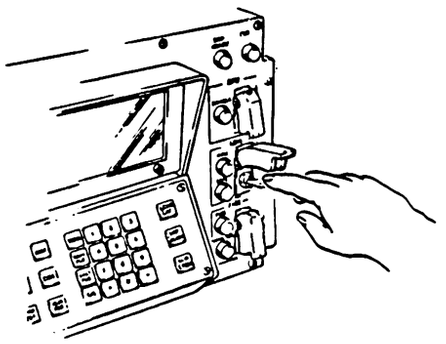
(1) To continue firing rockets, set the ARM switch down (safe) and then back up again (arm). This will rearm the rockets. Raise the switchguard and set the FIRE switch to up position. Hold the switch up for 2 or 3 seconds, then release the switch, firing will continue.

(2) If the next rocket should also misfire, the instructions will change to tell you there is a malfunction (fault). The FCU, LRU BIT indicator light will also come on.



2-30. FIRE MISSION (CONT)

(3) Set the ARM switch down (safe). This will safe the rockets.



When the rockets have been safed, a SQUIB DRIVER MALFUNCTION prompt will be displayed. Your SPLL has a malfunction and the mission will be aborted.

```
HDG 0000MILS  CNTDN 00:00  TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS      M □□□□   □□□□□□
SELECTED  □□ X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
MALFUNCTION-SAFE ROCKETS


SQUIB DRIVER MALFUNCTION
```

(4) If only one misfire occurs, another rocket will automatically be selected to replace the misfire. The rocket will be fired in its turn when the firing is continued.

(5) If to continue to fire on misfire was selected during startup, you do not have to do anything. The M will appear in the STATUS line and firing will continue. If a SQUIB DRIVER MALFUNCTION appears the mission will be aborted. The FCU, LRU BIT indicator light will come on.

k. Checkfire.

When operating using radio messages, you can receive a checkfire message at any time. Your FCS can store data for up to three targets. Each target has a number. You can get a checkfire message for any one target, by target number, or all of them at once.

When a checkfire message is received, the alarm will sound and a CHECKFIRE MSG FROM BTRY (or PLT/TP) - PRESS ALM ACK prompt will be displayed.

```
HDG 0000MILS                TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS        □□□   □□□□□□
SELECTED  □□□□
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0


 CHECKFIRE MSG FROM BTRY  -PRESS ALM ACK
```

(1) Pressing the ALM ACK key will turn off the alarm, and the prompt will be erased.

(2) If the checkfire message was for one of the targets stored in the FCS, no further action is required.

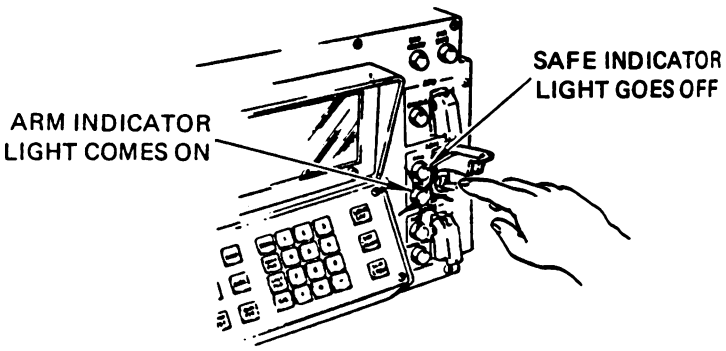
2-30. FIRE MISSION (CONT)

(3) If you are on a fire mission and receive a checkfire message that is for the target you are firing on, when you press ALM ACK a checkfire prompt will be displayed.

A time for the checkfire will also be displayed. If the time is 00:00, the checkfire is for immediate action. If a time is entered, the checkfire is to be in effect at the time shown.

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77    LP/C 2  M77
ROCKETS   6 5 4 3 2 1    1 2 3 4 5 6
STATUS     □□□□□□         □□□□□□
SELECTED   □□ X X
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0
CHECKFIRE AT 00:00:00 Z-SAFE ROCKETS
```

(4) To checkfire, set the ARM switch down (safe). Firing will cease.



Whenever a checkfire message is received, you must send BTRY or PLT/TP a mission status message.

(5) As soon as the ALM ACK key is pressed to turn off the alarm, a WILL COMPLY MESSAGE READY prompt will be displayed.

This prompt will appear in any field displayed. When it appears, press the XMIT key. The message is sent, and tells BTRY or PLT/TP you got the checkfire message.

```
HDG 0000MILS                    TIME 00:00:00




WILL COMPLY MESSAGE READY-PRESS XMIT
```

2-30. FIRE MISSION (CONT)

l. Cancel Checkfire.

The checkfire will remain in effect until it is cancelled.

When a cancel checkfire or end of mission message is received, the alarm will sound and the command message received prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00




COMMAND MSG FROM BTRY  -PRESS ALM ACK
```

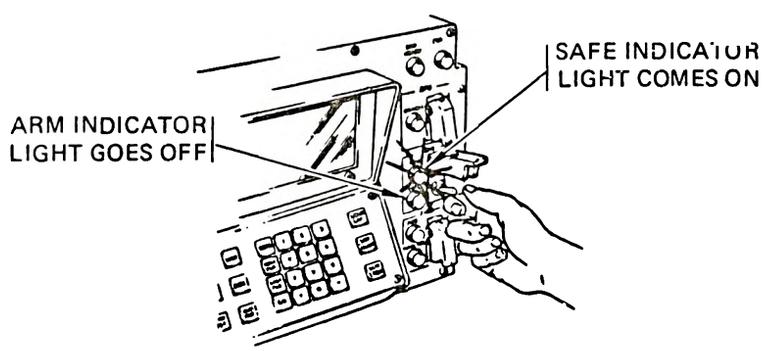
(1) Press the ALM ACK key. If the cancel checkfire was for a target number stored in the FCS, no further action is needed. The checkfire will be cancelled.

(2) If the message is for a fire mission you are on, when you press ALM ACK key, a cancel checkfire prompt will be displayed.

A time for the cancel checkfire is also given. If the time is 00:00, the action is to be taken right away. If a time is shown, the firing is to start again at the time shown.

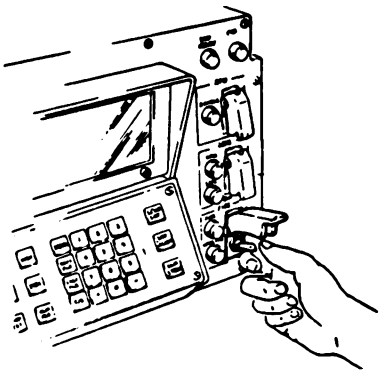
```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS                  □□□□□□□□□□□□
SELECTED  □□□□
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0

CANCEL CHECKFIRE AT 00:00:00
WILL COMPLY MESSAGE READY-PRESS XMIT
```

(3) To resume firing, lift the switchguard and set the ARM switch up (arm). Rockets will be armed.



2-30. FIRE MISSION (CONT)

(4) When the rockets are armed, raise the switchguard and set the FIRE switch to the up position. Hold the switch up for 2 or 3 seconds, then release the switch. Rockets will start firing.



(5) A mission status message must also be sent to BTRY and/or the PLT/TP. When the cancel checkfire prompt is displayed, a WILL COMPLY MESSAGE READY prompt will also be displayed.

Press the XMIT key and the mission status message is sent.

```
HDG 0000MILS                    TIME 00:00:00
          LP/C 1  M77   LP/C 2  M77
ROCKETS   6 5 4 3 2 1   1 2 3 4 5 6
STATUS                  □□□□□□□□□□□□
SELECTED  □□□□
AIM POINT CMD  AZ:0000.0 QE:0000.0 FUZE
02 OF 02  ACTL AZ:0000.0 QE:0000.0 000.0


CANCEL CHECKFIRE AT 00:00:00
WILL COMPLY MESSAGE READY-PRESS XMIT
```

m. Fire Mission Flow Diagram.

Figure 2-10 is a flow diagram showing the operation steps described in this procedure.

2-30. FIRE MISSION (CONT)

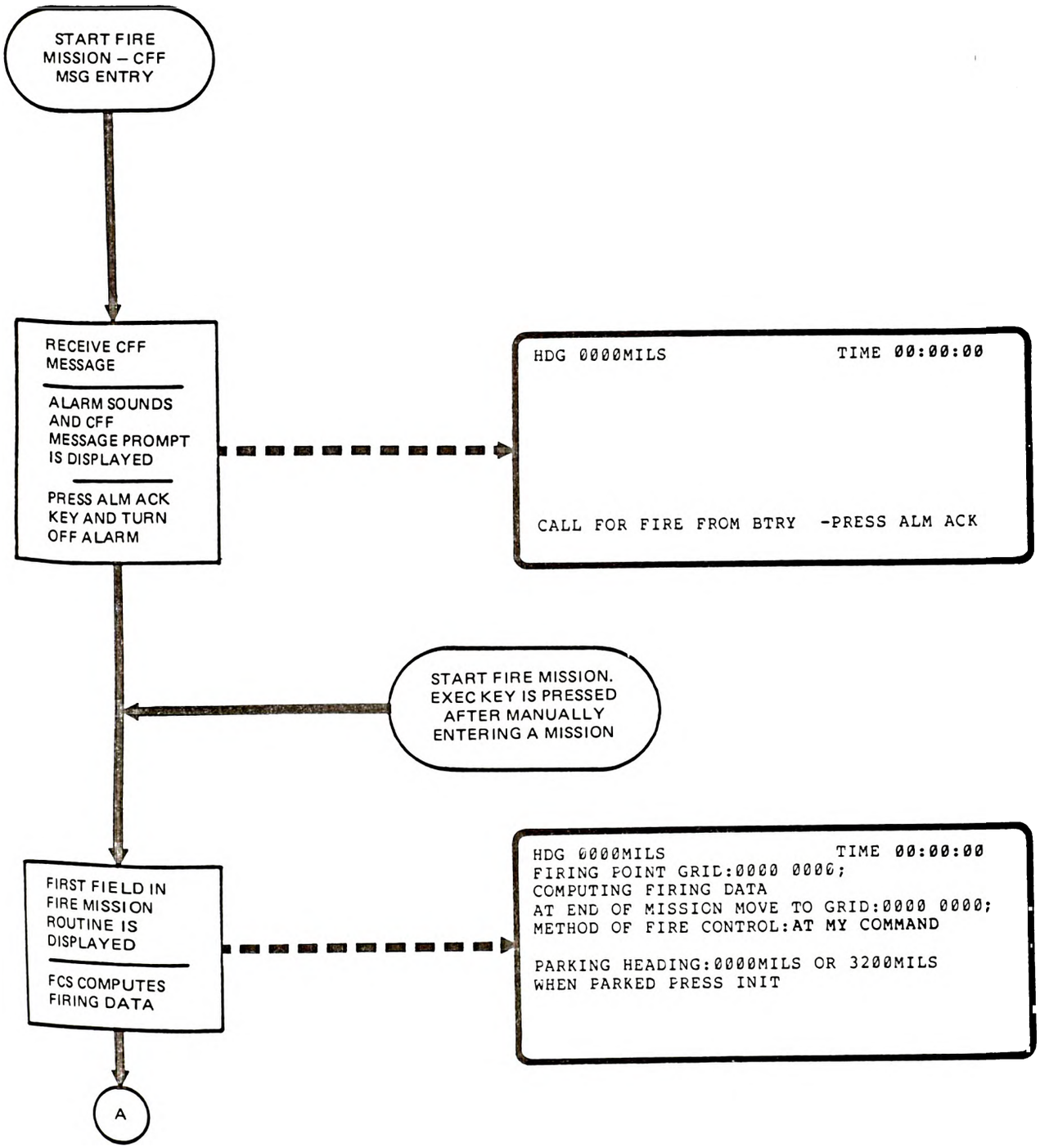


Figure 2-10. Fire Mission Flow Diagram (Sheet 1 of 17)

2-30. FIRE MISSION (CONT)

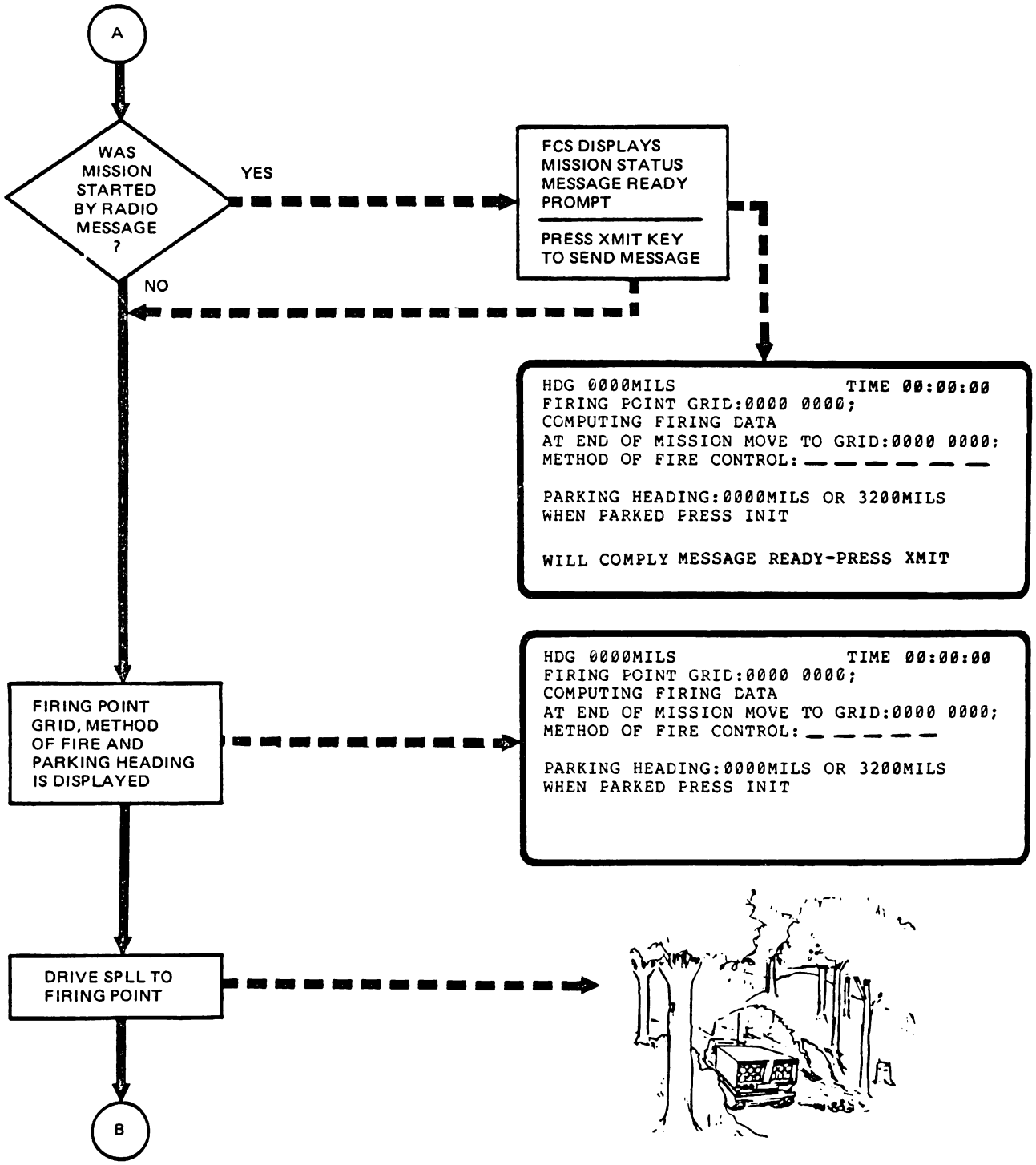


Figure 2-10. Fire Mission Flow Diagram (Sheet 2 of 17)

2-30. FIRE MISSION (CONT)

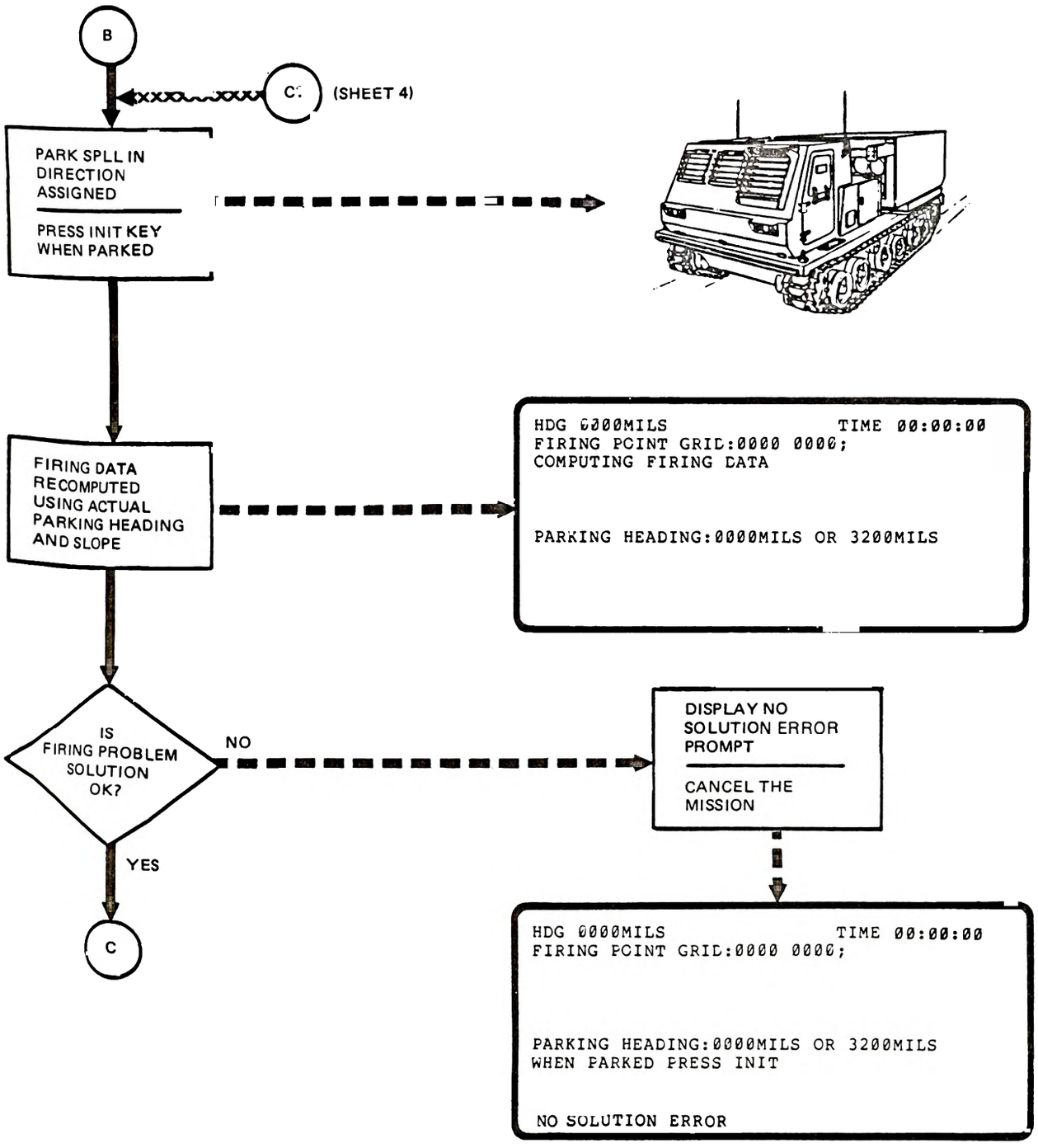


Figure 2-10. Fire Mission Flow Diagram (Sheet 3 of 17)

2-30. FIRE MISSION (CONT)

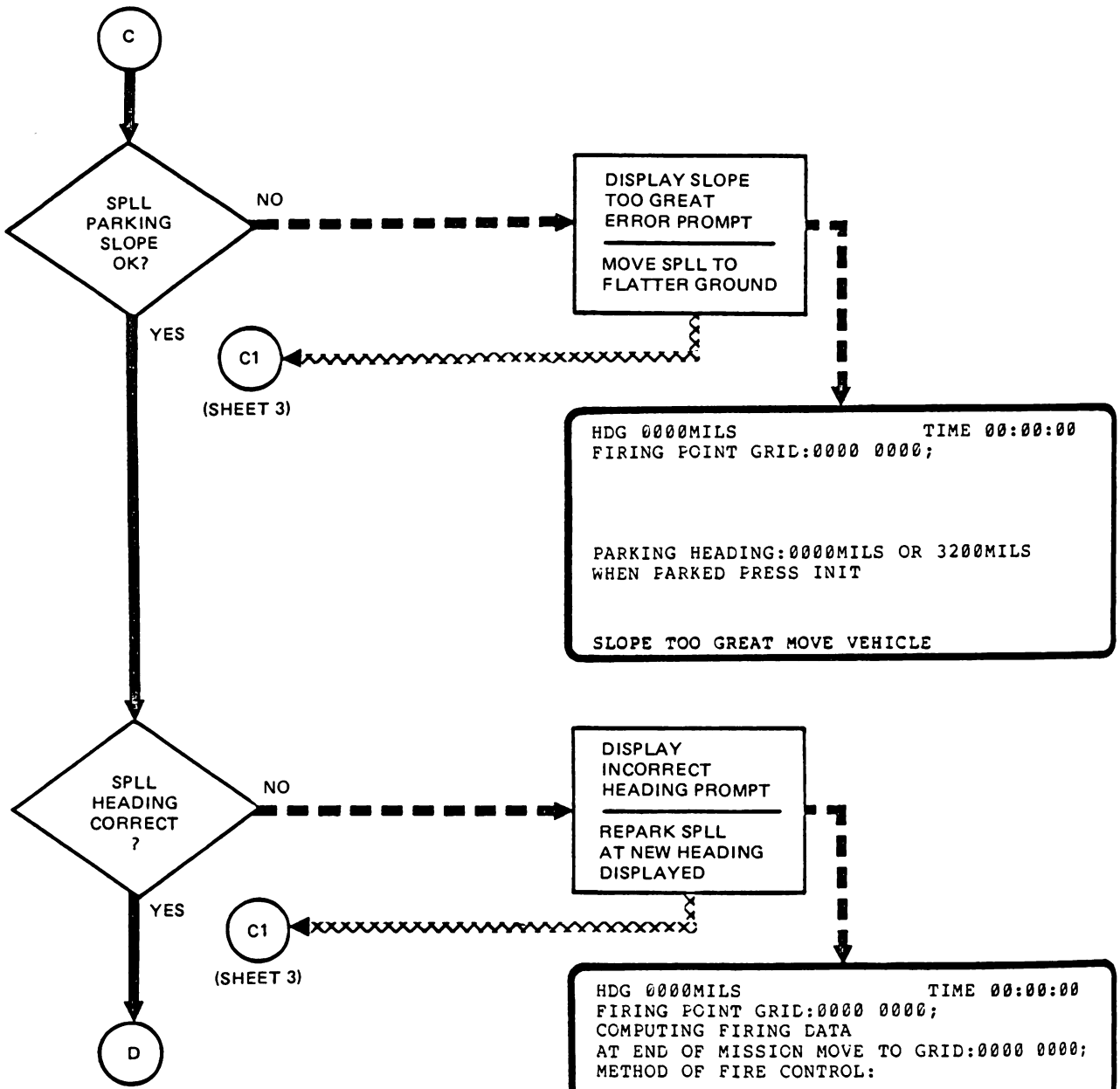


Figure 2-10. Fire Mission Flow Diagram (Sheet 4 of 17)

2-30. FIRE MISSION (CONT)

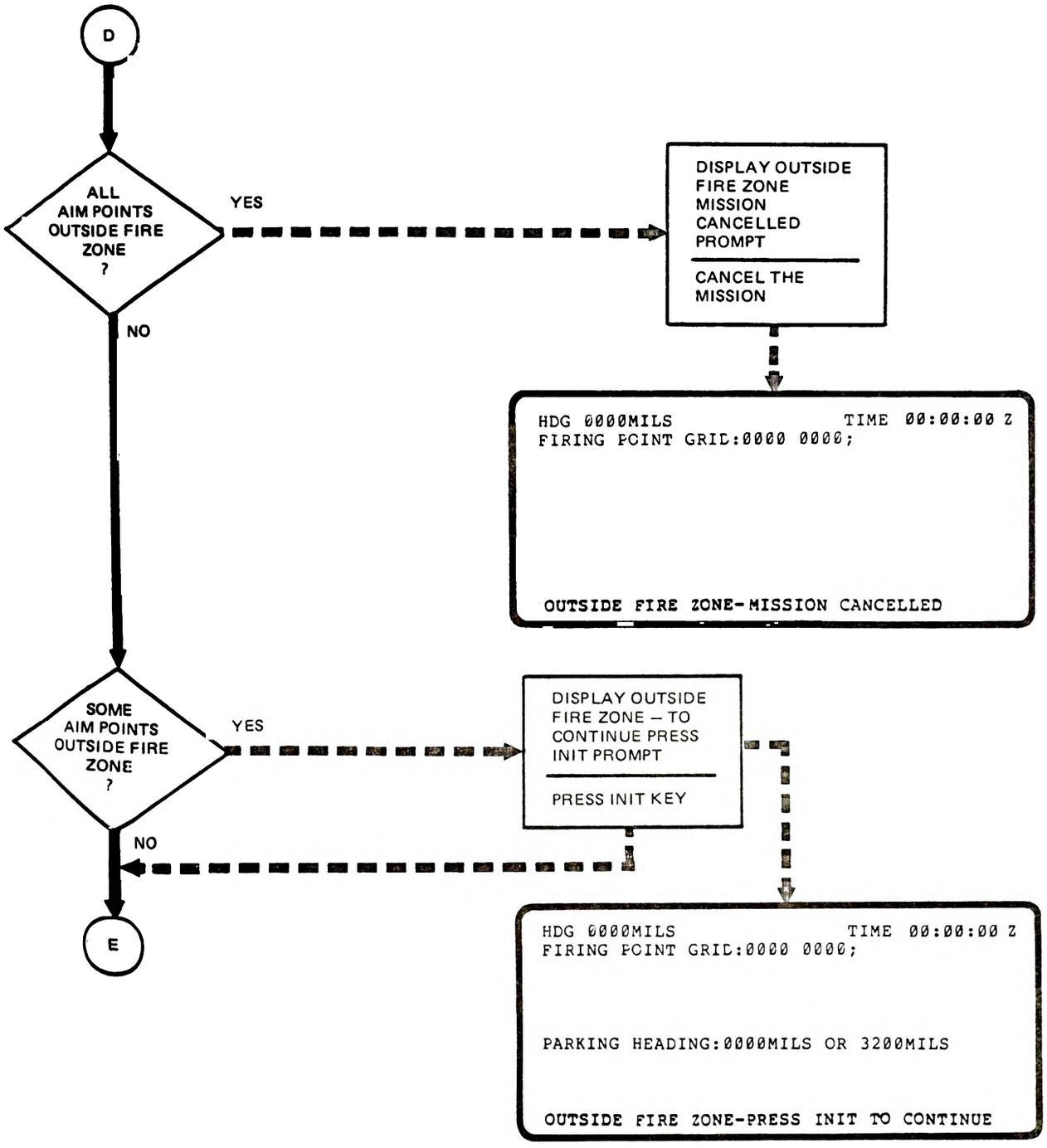


Figure 2-10. Fire Mission Flow Diagram (Sheet 5 of 17)

2-30. FIRE MISSION (CONT)

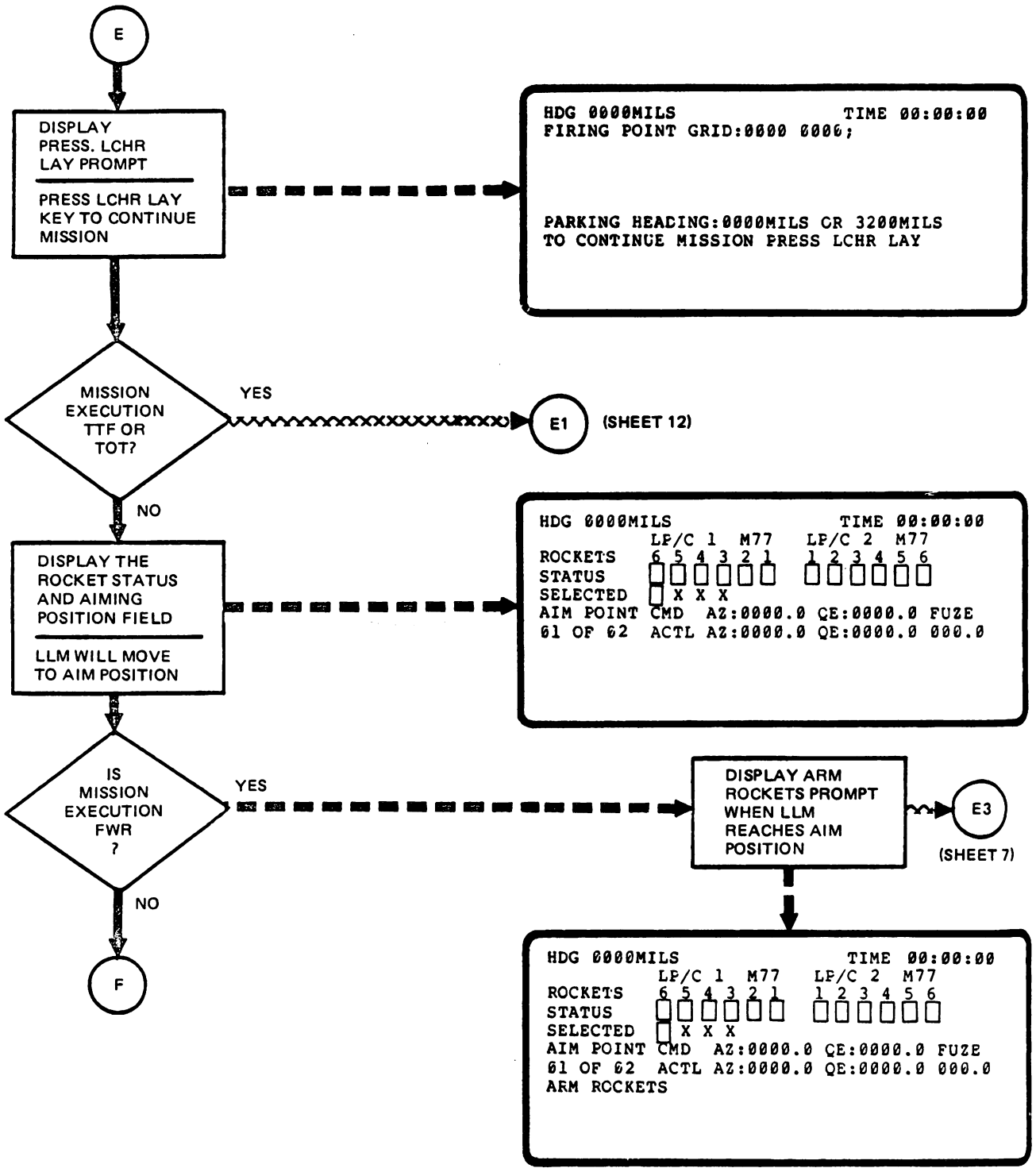


Figure 2-10. Fire Mission Flow Diagram (Sheet 6 of 17)

2-30. FIRE MISSION (CONT)

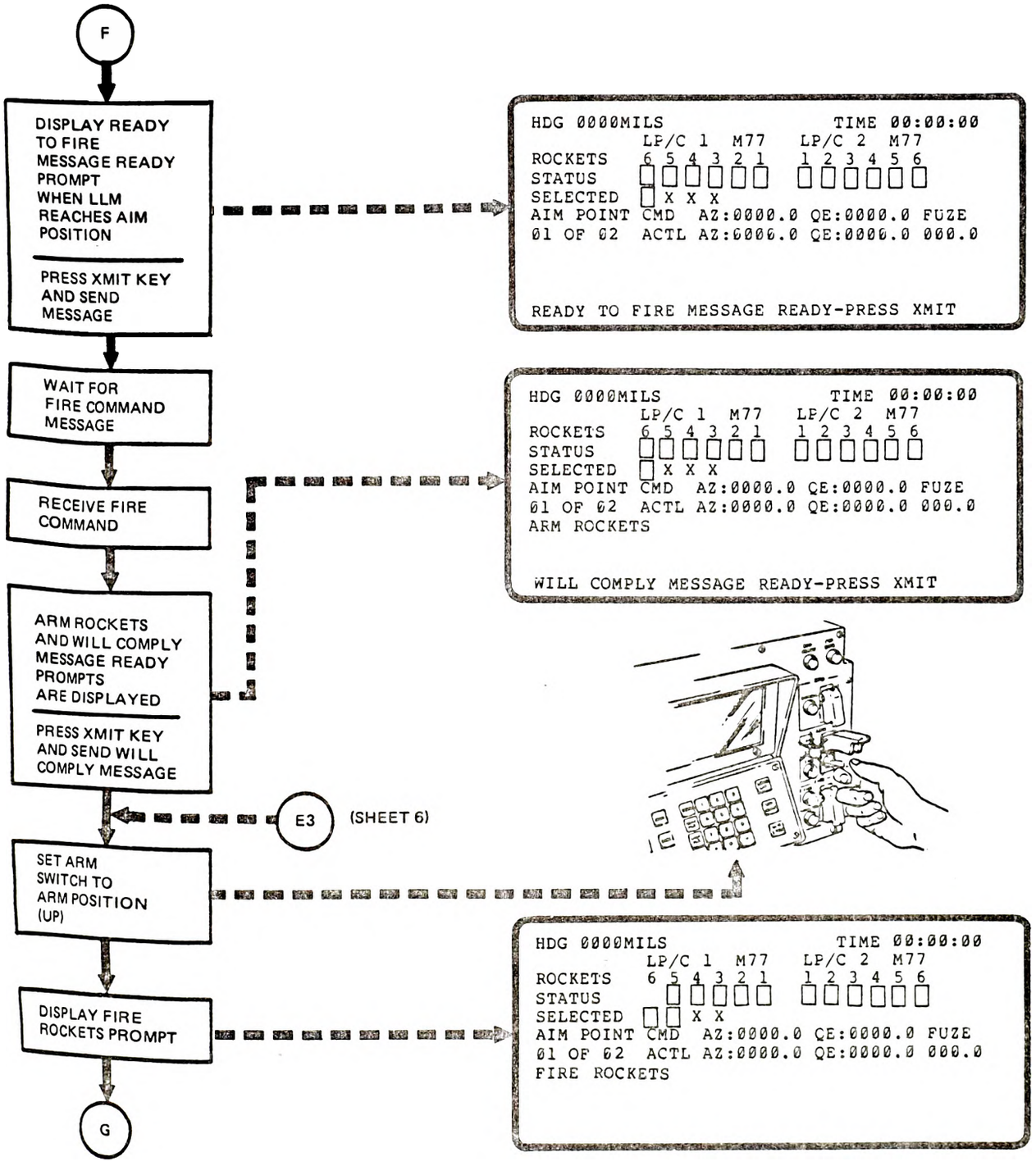


Figure 2-10. Fire Mission Flow Diagram (Sheet 7 of 17)

2-30. FIRE MISSION (CONT)

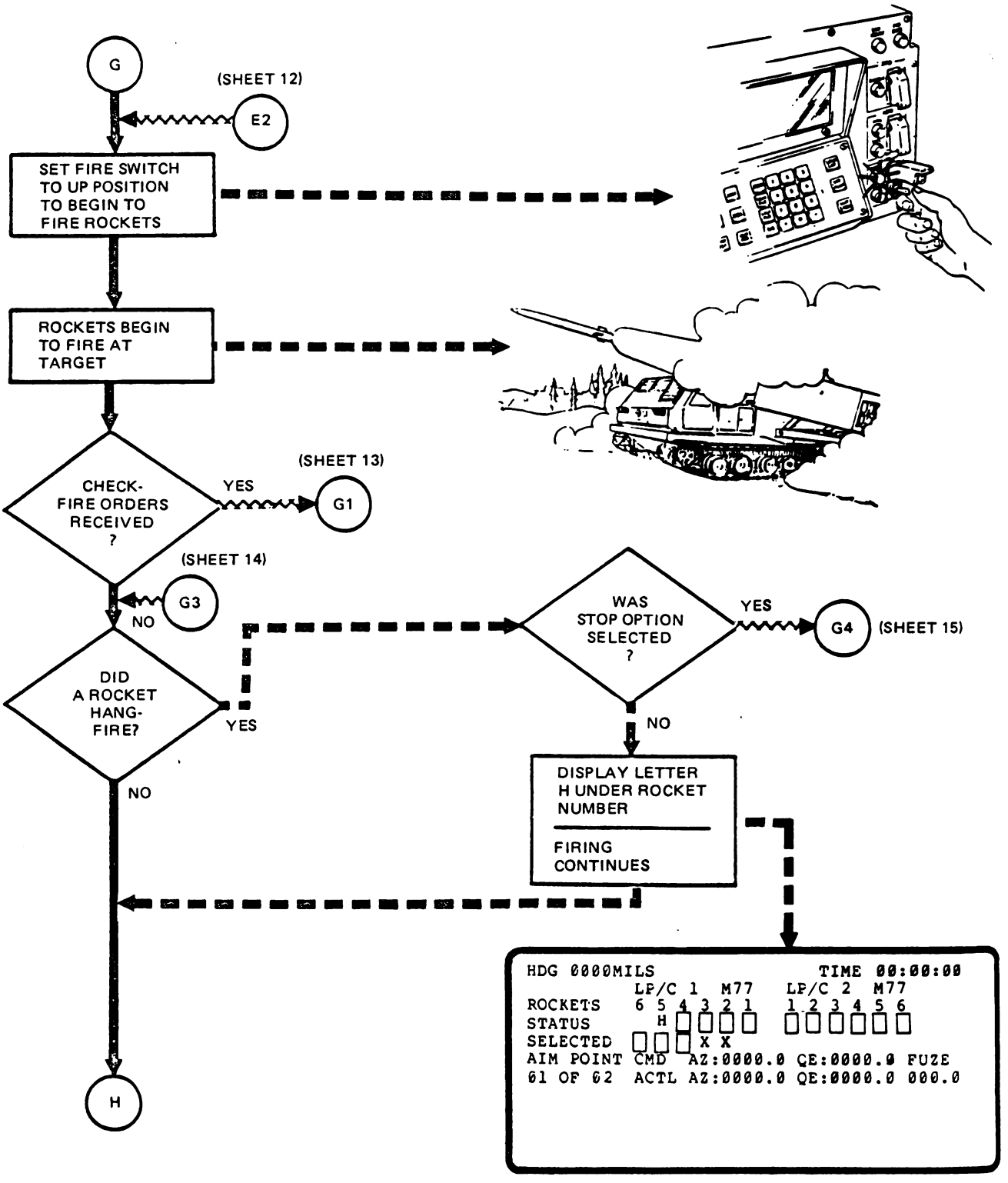


Figure 2-10. Fire Mission Flow Diagram (Sheet 8 of 17)

2-30. FIRE MISSION (CONT)

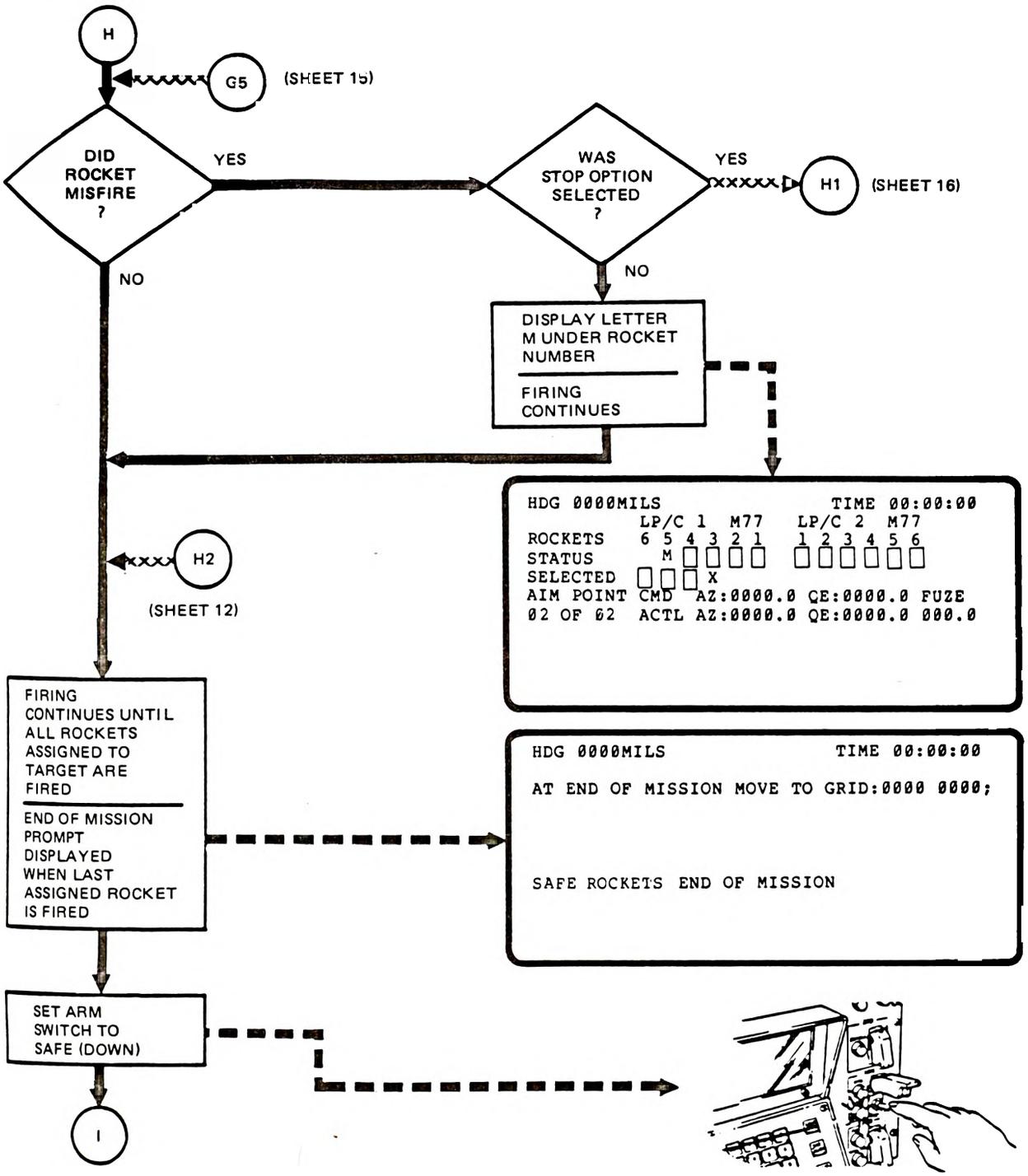


Figure 2-10. Fire Mission Flow Diagram (Sheet 9 of 17)

2-30. FIRE MISSION (CONT)

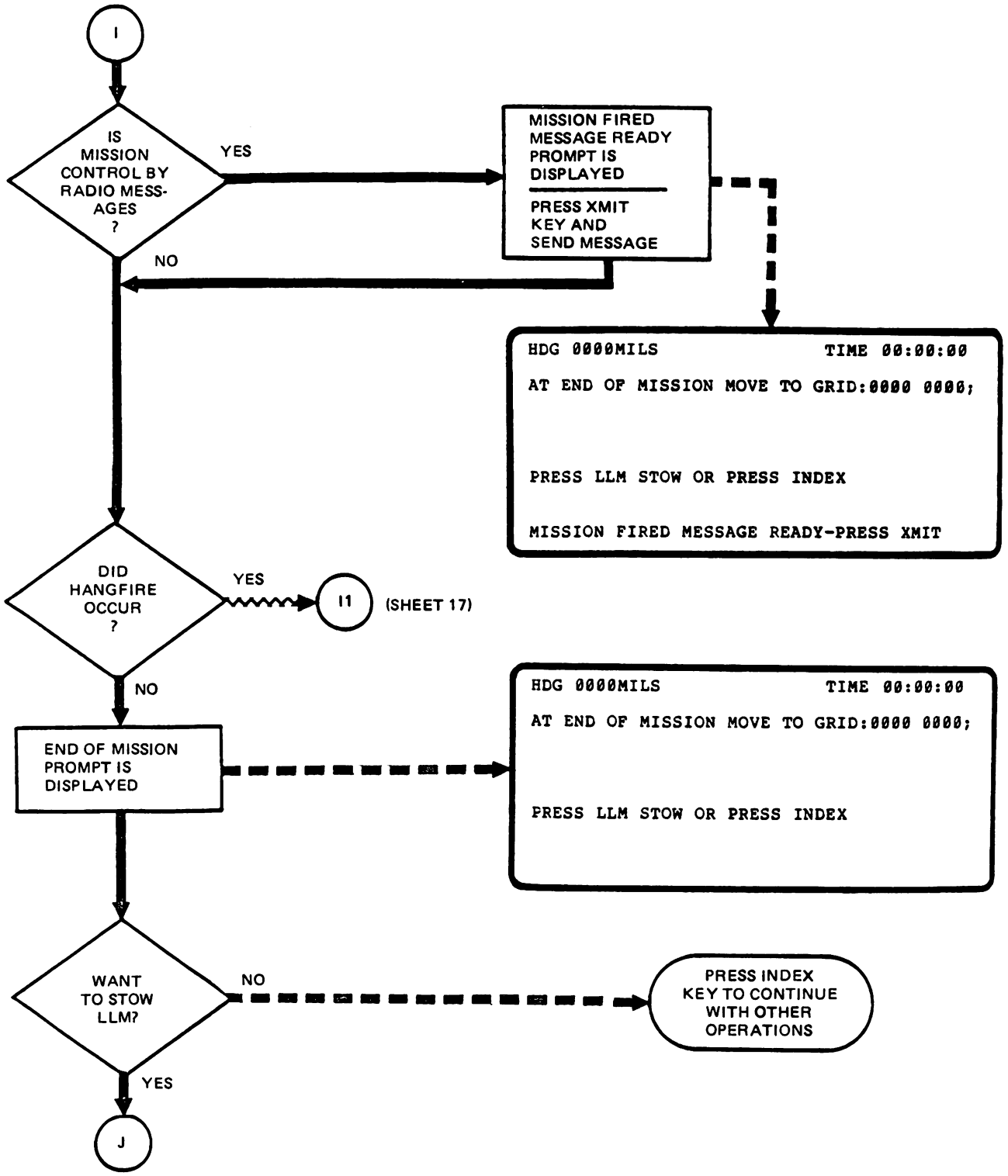


Figure 2-10. Fire Mission Flow Diagram (Sheet 10 of 17)

2-30. FIRE MISSION (CONT)

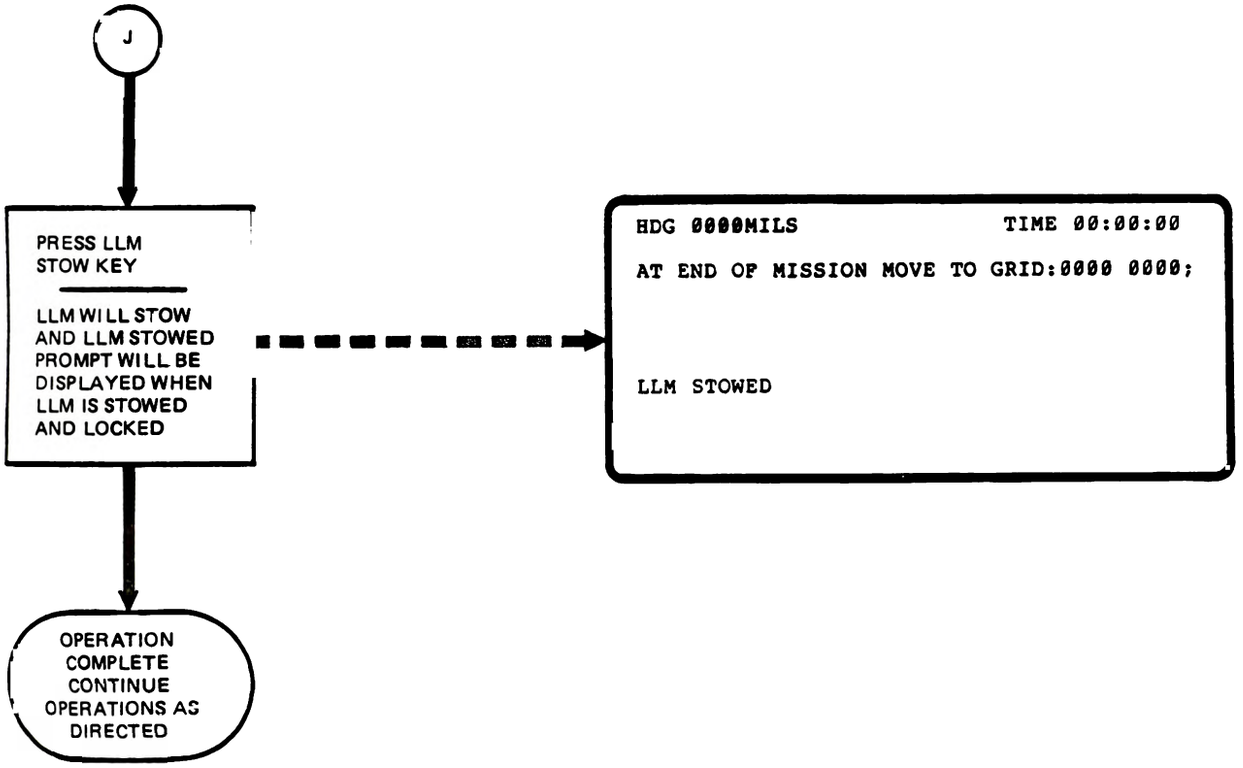


Figure 2-10. Fire Mission Flow Diagram (Sheet 11 of 17)

2-30. FIRE MISSION (CONT)

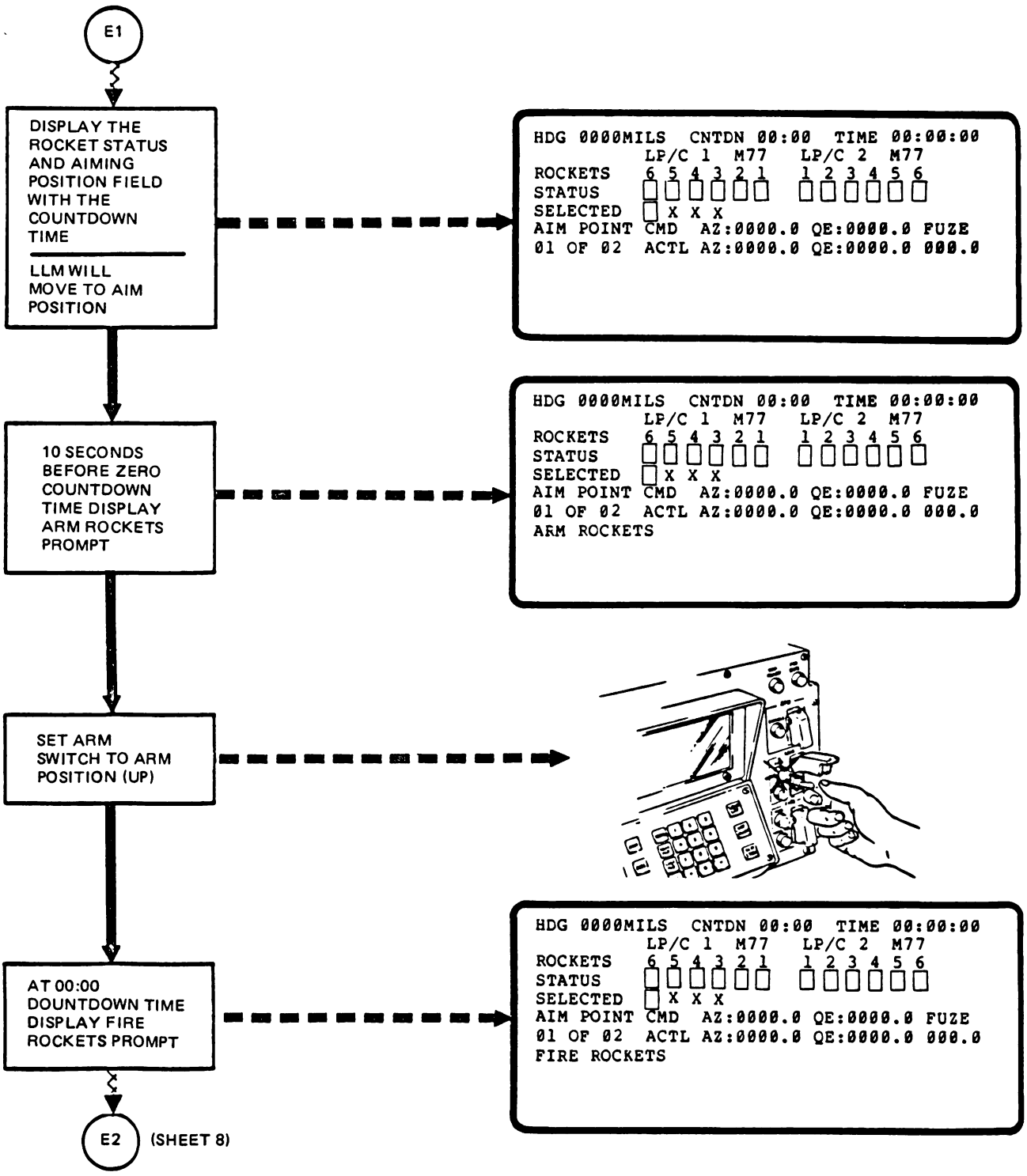


Figure 2-10. Fire Mission Flow Diagram (Sheet 12 of 17)

2-30. FIRE MISSION (CONT)

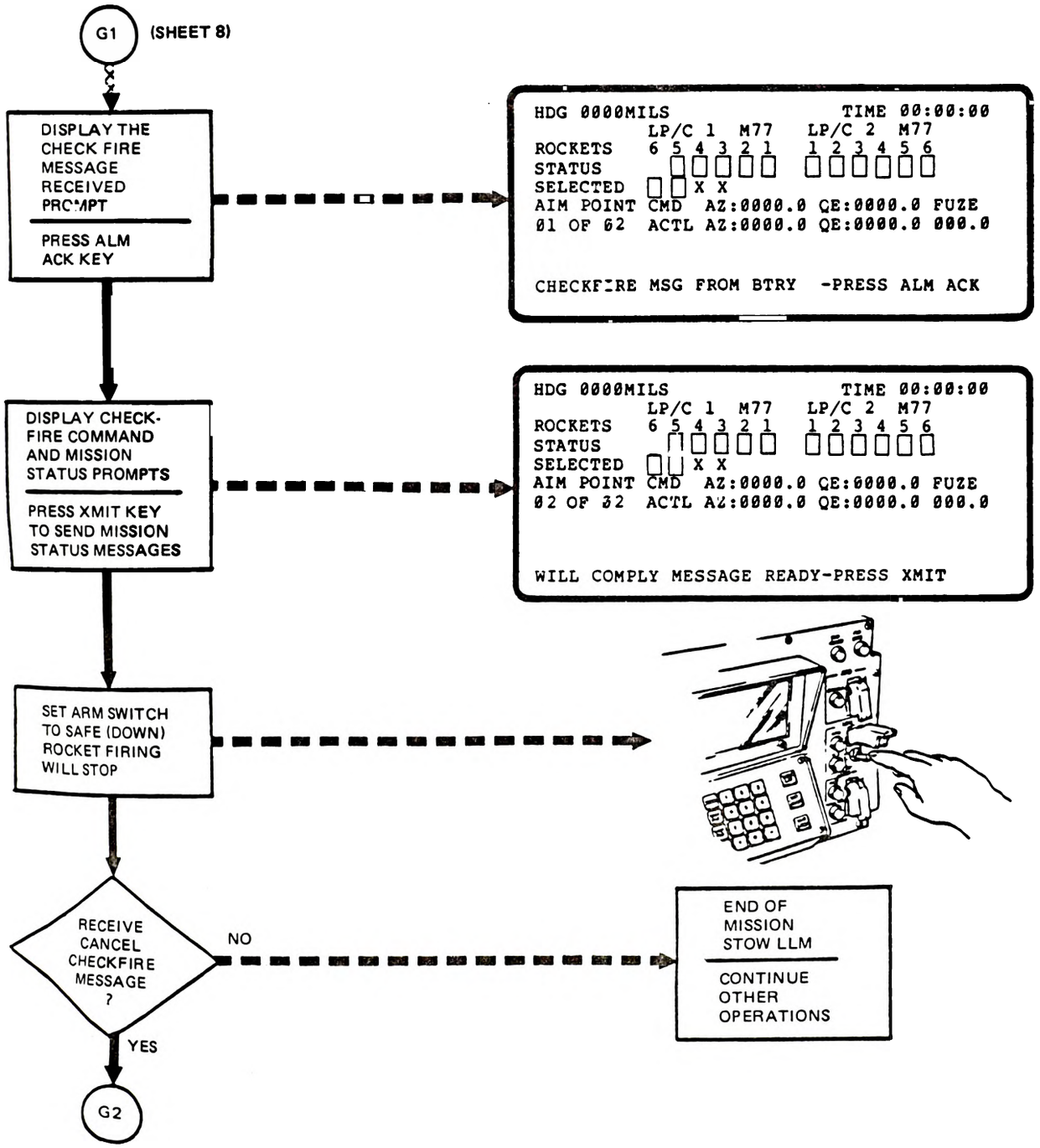


Figure 2-10. Fire Mission Flow Diagram (Sheet 13 of 17)

2-30. FIRE MISSION (CONT)

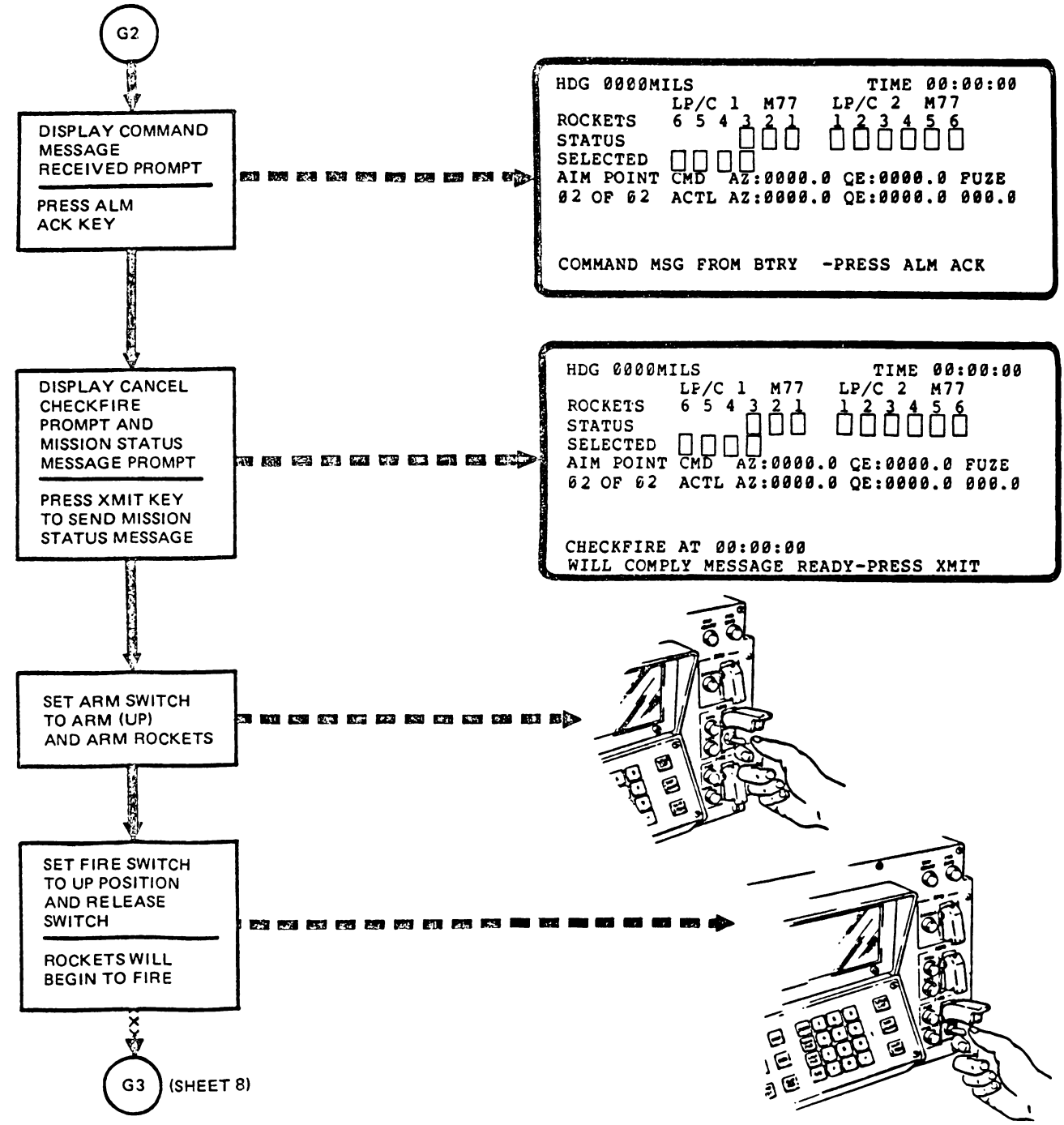


Figure 2-10. Fire Mission Flow Diagram (Sheet 14 of 17)

2-30. FIRE MISSION (CONT)

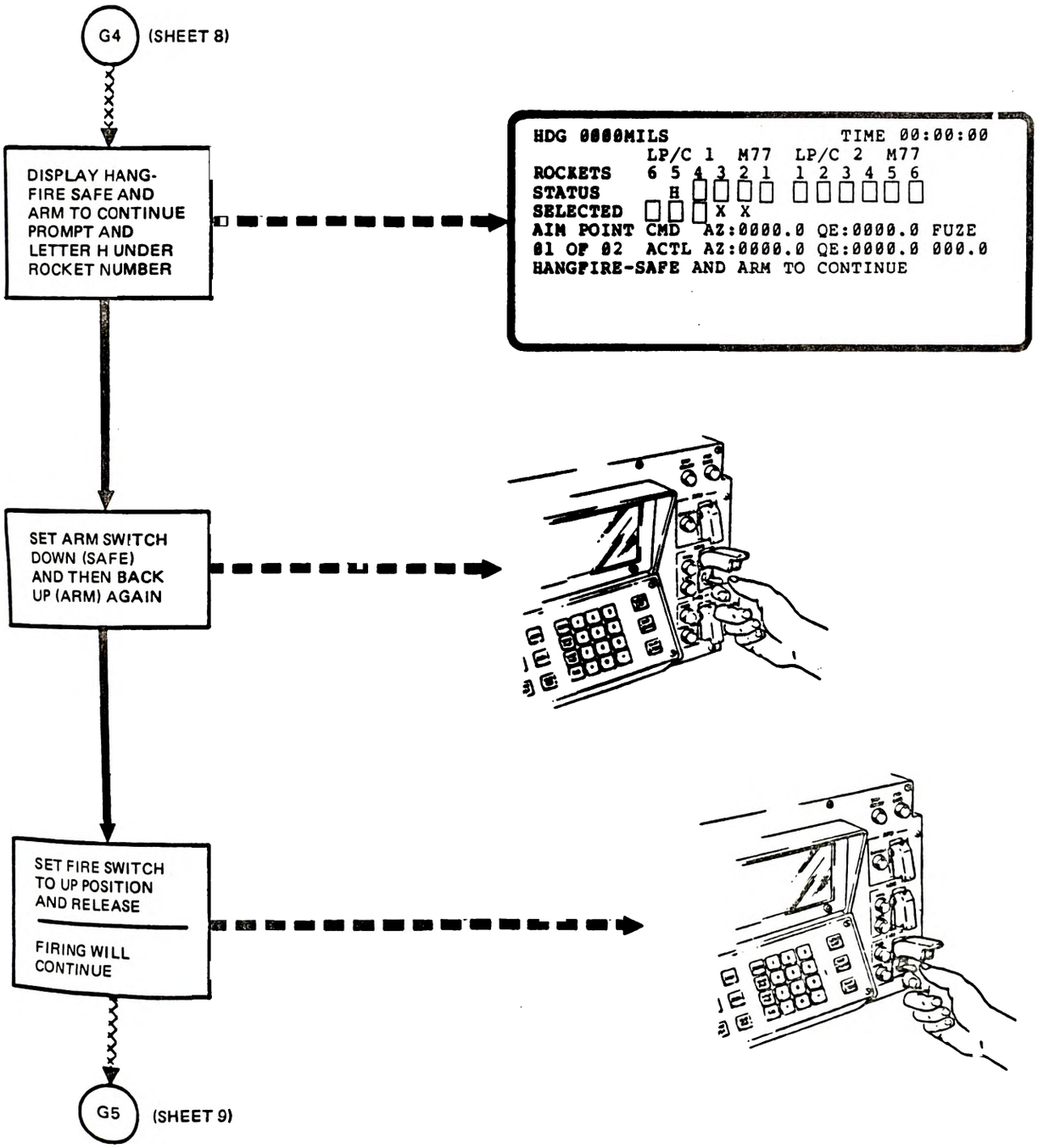


Figure 2-10. Fire Mission Flow Diagram (Sheet 15 of 17)

2-30. FIRE MISSION (CONT)

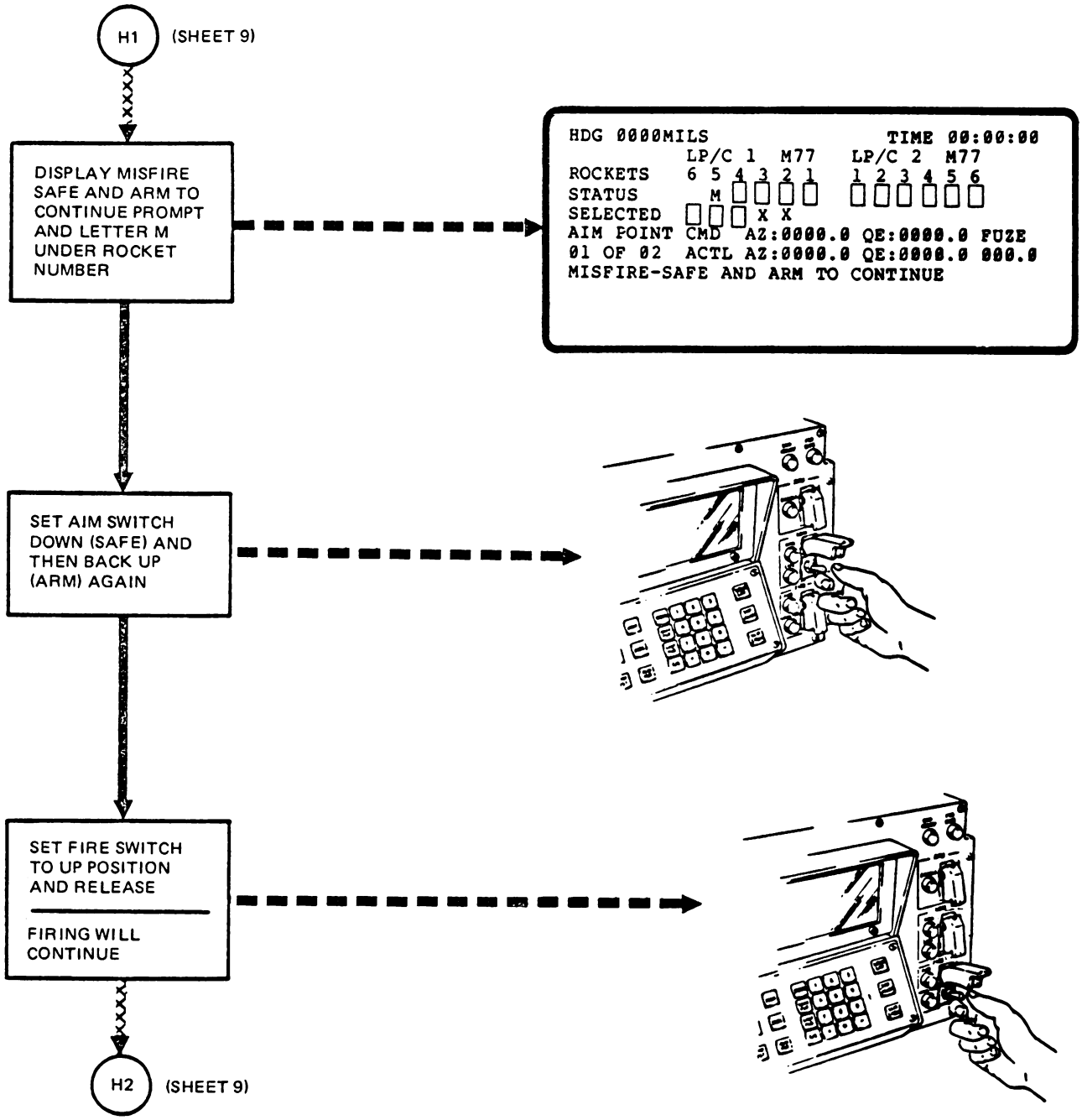


Figure 2-10. Fire Mission Flow Diagram (Sheet 16 of 17)

2-30. FIRE MISSION (CONT)

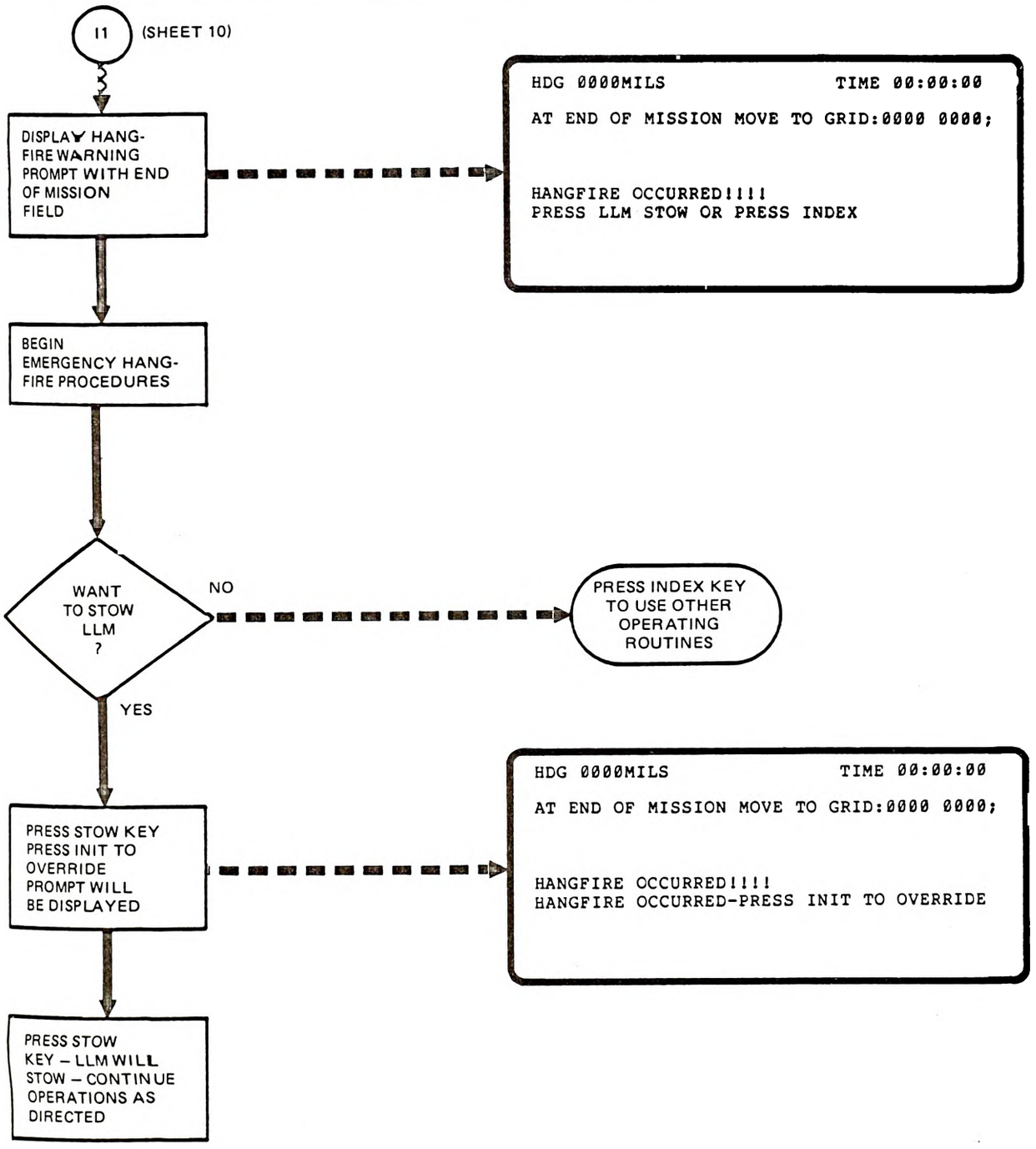


Figure 2-10. Fire Mission Flow Diagram (Sheet 17 of 17)

2-31. MASKING DATA. At sometime your section chief (S/C) will have to determine masking data for a firing point. When this happens the mask clearance and azimuth field will have to be measured. The distance to the mask will have to be estimated, and the data entered into the FCS for use. When masking data is entered, the data is used to help compute the no fire zone.

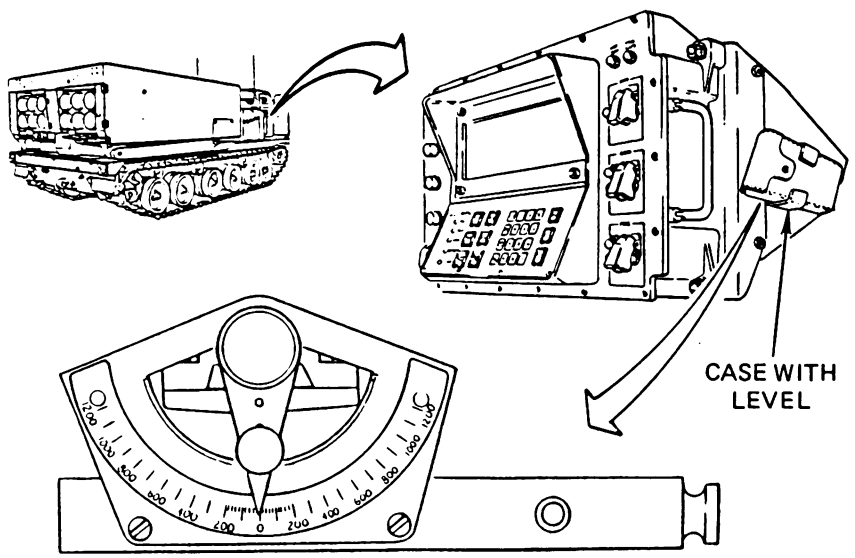
When a CFF message is received, the firing data does not include any masking data for the firing point. If masking data is needed, it must be entered manually. During a mission, the data can be entered at anytime until the INIT key is pressed. To enter the masking data, compose a masking data message to BTRY or PLT/TP. The masking data option is selected from the message menu, and the masking data is entered into the message. The masking data will automatically be entered into the FCS when the message is composed and the EXEC key is pressed.

If masking data is entered into the FCS when there is no fire mission in the FCS, the data will be applied to the next fire mission entered. If masking data is entered when there is a fire mission entered, the data will be applied to the mission. The data will be used for only one mission and will be cleared (erased) at the end of the mission it was applied to.

Masking data is usually obtained before the SPLL is sent to a firing point.

a. Measuring Mask Clearance.

The surveying level M1, hereafter called level, is provided to measure mask clearance. It is stored in a case attached to the right side of the FCP.



2-31. MASKING DATA (CONT)

Measure the mask clearance as follows:

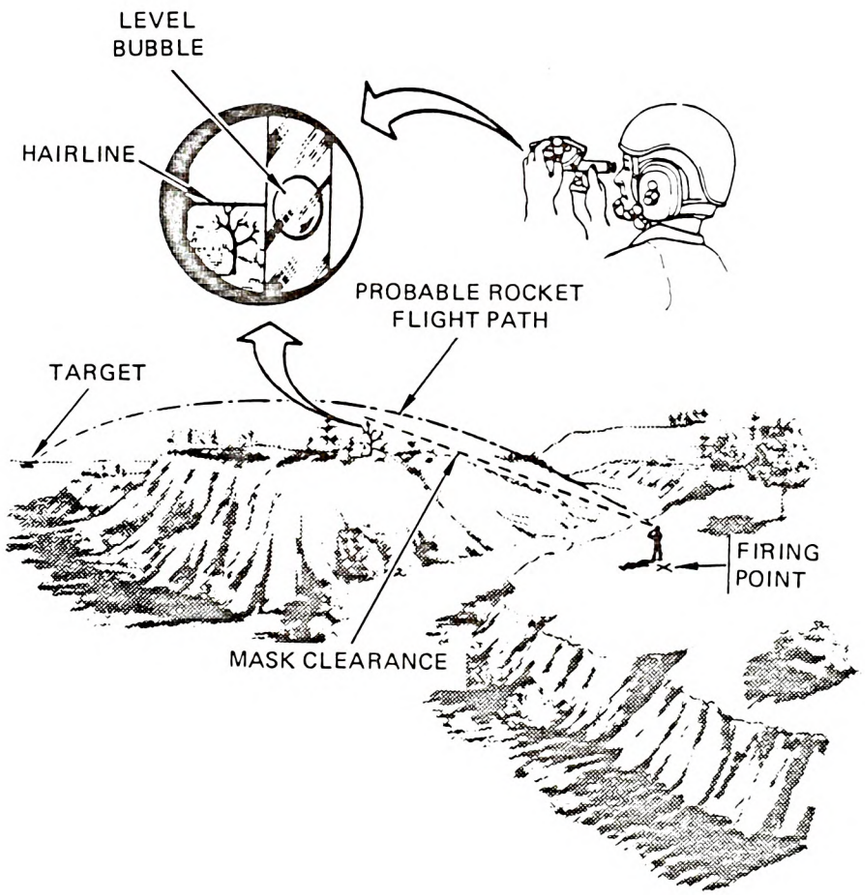
(1) Visually inspect the terrain in the sector of fire. From the firing point, determine the highest mask the rockets must clear to reach the target.

NOTE

The level can be focused by sliding the eyepiece in and out.

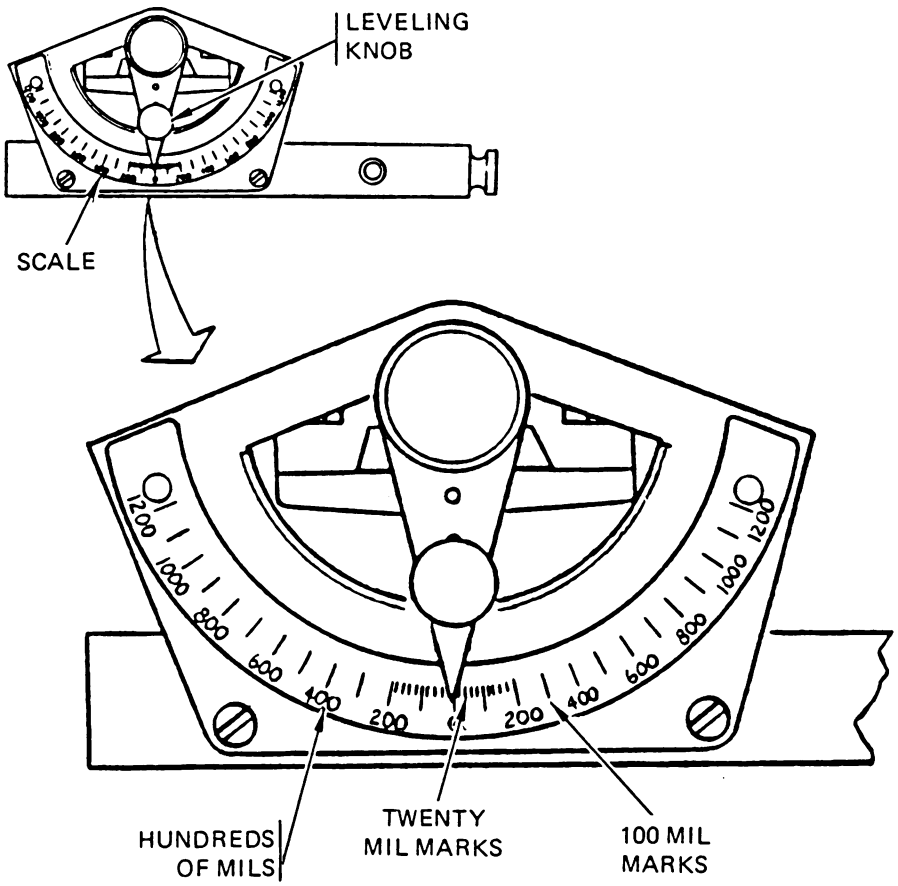
(2) Sight through the level at the highest point on the mask.

(3) While holding the hairline in the level on the highest point of the mask, turn the leveling knob on the level until the level bubble is centered next to the hairline.



2-31. MASKING DATA (CONT)

(4) Read the mask clearance from the scale on the level. Record mask clearance to the closest 10 mils.



b. Measuring Mask Azimuth.

NOTE

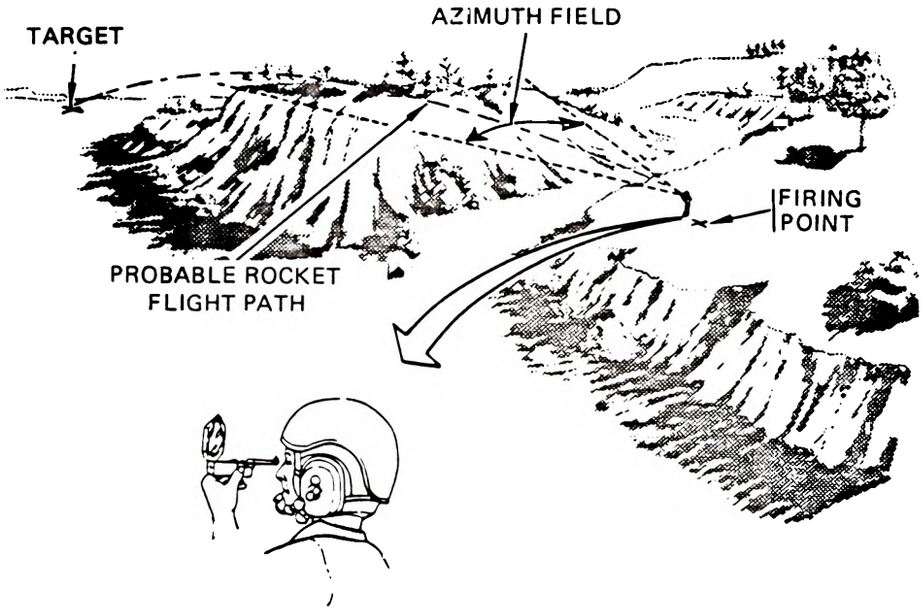
The compass should not be used less than 30 meters from the SPLL or other equipment that may attract the compass' magnetic needle.

The M2 compass is used to measure mask azimuth limits.

2-31. MASKING DATA (CONT)

Measure the mask azimuth limits as follows:

(1) Extend the sighting arm of the compass and fold the top so the needle and scale can be seen in the mirror as you sight through the compass.



(2) Sight through the compass at the left side of the masking area. Read the azimuth from the scale at the black tip of the needle.

(3) Record the left mask azimuth in mils.

(4) Sight through the compass at the right side of the masking area. Read the azimuth from the scale at the black tip of the needle.

(5) Record the right mask azimuth in mils.

c. *Estimating Distance to Mask.*

Distance to the mask can be estimated using one of the following methods:

(1) Locate SPLL position and masking feature on a map, and measure the distance.

(2) If mask is a nearby object, such as a tree or building, have driver pace the distance.

(3) Estimate the distance.

(4) Record the distance to the mask.

2-31. MASKING DATA (CONT)

d. Selecting the Masking Data Message Routine.

Masking data is sent to BTRY and/or PLT/TP in the masking data message routine.

(1) To display the masking data message routine, press INDEX key. The INDEX MENU will be displayed.

(2) Select the MESSAGE MENU, option number 6.

Press the EXEC key. The MESSAGE MENU will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 6;
```

(3) Select the MASKING DATA routine, option number 1.

Press EXEC key. The MESSAGE DESTINATION selection field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC 1;
```

(4) Select the message destination, 0 to send to BTRY and platoon leader, 1 to send to PLT/TP only.

Press STORE key. The first field showing the SPLL present location will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
MESSAGE DESTINATION:0;    0=BTRY    1=PLT/TP


ENTER NUMBER AND PRESS STORE
```

2-31. MASKING DATA (CONT)

e. Editing SPLL Present Location.

The first present location field is the EASTING field.

Present location easting, northing, and altitude coordinates displayed are automatically entered by the PDS. The grid zone and spheroid are the values entered at startup. Any of the present location data can be manually entered or changed. However, if you exit the routine and then reselect it from the index, the easting, northing, and altitude will change back to the PDS output. The changes you entered will be erased.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
EASTING:0 00000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(1) If there is no change, press NEXT FLD key. If an easting change is required, enter the change and press the STORE key. The NORTHING field will be displayed.

(2) If there is no change, press the NEXT FLD key. If a northing change is required, enter the change and press the STORE key. The ALTITUDE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
NORTHING:0 0000000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(3) If there is no change, press NEXT FLD key. If an altitude change is required, enter the change and press the STORE key. The GRID ZONE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
ALTITUDE:+0000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

2-31. MASKING DATA (CONT)

(4) If there is no change, press NEXT FLD key. If a grid zone change is required, enter the change and press STORE key. The SPHEROID field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
GRID ZONE:+00;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(5) If there is no change, press NEXT FLD key. If a spheroid field change is required, enter the change and press STORE key. The first field for MASKING DATA entries will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL MASKING DATA
SPHEROID:0;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

f. Entering Masking Data.

The first field for masking data entries is the mask AZIMUTH.

(1) Enter the LEFT AND RIGHT AZIMUTH values you recorded. Press STORE key.

The MASK CLEARANCE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MASKING DATA
        LEFT AND RIGHT
AZIMUTH:0000      0000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(2) Enter the MASK CLEARANCE value you recorded. Press STORE key.

The DISTANCE TO MASK field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MASKING DATA
MASK CLEARANCE:0000.0;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

2-31. MASKING DATA (CONT)

(3) Enter the DISTANCE TO MASK you recorded. Press STORE key.

```
HDG 0090MILS                    TIME 00:00:00
MASKING DATA
DISTANCE TO MASK:0000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

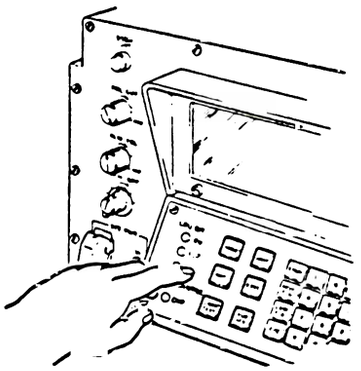
(4) Next press the EXEC key. The masking data will be entered into the FCS. At the same time the MASKING DATA MESSAGE READY prompt will be displayed.

(5) If you do not want to send the masking data to BTRY or PLT/TP press C/E key. The message ready prompt will be erased, and the message cleared without sending it over the radio.

```
HDG 0000MILS                    TIME 00:00:00









MASKING DATA MESSAGE READY-PRESS XMIT
```

(6) If you want to send the message to BTRY or PLT/TP, press XMIT key and the message will be sent.

(7) The masking data routine is completed. Press INDEX to continue with other operations.



2-32. RELOADING. This procedure describes a method for reloading the SPLL. The procedure uses a command message to receive the resupply location coordinates. It uses an automatic LLM positioning selection listed on the BC menu to position the LLM for unloading. Expended LP/Cs are unloaded two at a time on to the ground at the left side of the SPLL. Loaded LP/Cs are reloaded two at a time off of the ground at the SPLL left rear quarter. Loading LP/Cs directly from a resupply vehicle (RSV) or a resupply trailer (RST) is not a normal operation. Descriptions of additional requirements and restrictions for loading directly from a RSV are provided in paragraph 2-41. Descriptions of additional requirements and restrictions for loading directly from a RST are provided in paragraph 2-42.

Conditions at each resupply position will be different. The task described in this procedure must be adjusted to allow for the changed conditions. When loading LP/Cs two at a time, special attention must be given to the position of the LLM to the SPLL. Refer to paragraph 1-9, d for an explanation of loading LP/Cs from other LLM positions. Refer to boom controller operation (paragraph 2-20) for an explanation of other automatic LLM positioning selections for unloading. Terrain conditions at the resupply position must be given some attention. Reloading should be done on ground as level as is possible. This is to keep SPLL slope (pitch and roll) to a minimum. When the SPLL is level, the LLM is also level. LP/Cs can easily be lifted to proper position against the hoist carriage, retracted, and then lowered onto the positioning pins. Too much slope will cause the LP/Cs to be lifted slightly out of position against the hoist carriage. The LP/Cs will then have to be pushed or pulled into proper position against the hoist carriage. When lowered onto the centering pins, the pendulum effect can cause the LP/Cs not to align exactly on the centering pins. The LP/Cs will have to be pushed into position again. It may be necessary to raise or lower the LLM to keep it level as possible for loading. When parking the SPLL, pay attention to the terrain conditions. The SPLL may have to be parked in a different position than the one described in these procedures, and loading steps adjusted as required. If you have doubts about the slope, use the SPLL SLOPE routine, option 8, on the auxiliary menu and check it before using the BC. Maximum operating slope limit is 89 mils.

This procedure assumes you know about handling loaded LP/Cs. Before you start reloading be sure you know about handling loaded LP/Cs and obey all warnings and cautions associated with handling live rockets. Refer to ammunition (Chapter 4) for instructions about identification, safety, and handling MLRS LP/Cs.

To keep reloading time to a minimum, this procedure gives you the recommended duties of each crewmember.

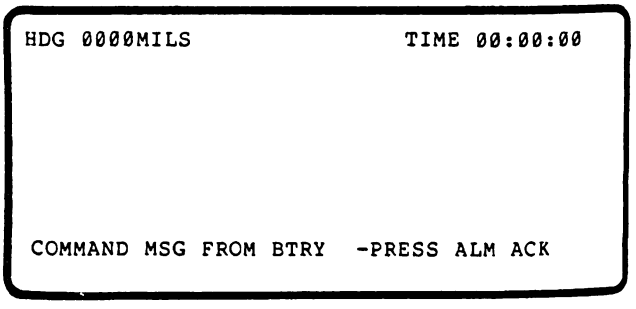
a. Receive Resupply Assignment.

WARNING

Hangfire rockets are dangerous. They can ignite and kill someone. Never unload an LP/C with a hangfire unless hangfire procedures (paragraph 2-38) have been performed.

Resupply location coordinates can be recorded in your mission data form for later use. When using radio communications, the resupply assignment will be received by a command message from either the BTRY or PLT/TP.

(1) When the message is received, the alarm will sound and a command message received prompt will be displayed on the FCP.



2-32. RELOADING (CONT)

(2) Press the ALM ACK key. The alarm will shutoff. The resupply location coordinates and the status message ready prompt will be displayed.

(3) Unless there is some reason you cannot comply with the command, press XMIT key. A mission status message will be sent and the message ready prompt will be erased.

```
HDG 0000MILS                    TIME 00:00:00


SUPPLY AT GRID:0000 0000;M77 00 M77 00


WILL COMPLY MESSAGE READY-PRESS XMIT
```

(4) If for some reason you cannot comply with the command, you must send a cannot comply message to the BTRY and/or PLT/TP. Refer to mission status message explanation (paragraph 2-19, e) for instructions on how to send a cannot comply message.

As soon as you receive your resupply location coordinates and send your status message, drive to the resupply location.

b. Prepare to Reload.

As the SPLL moves to the resupply location and before you start to reload, check for the following conditions.

WARNING

Everyone who uses or rides in the SPLL must wear ear protection. Noise levels could cause permanent hearing damage.

(1) System has been set up as required in equipment startup checks and procedures (paragraph 2-22).

(2) CVC helmets are on.

(3) Carrier LAUNCHER/CARRIER INTERCONNECT switch is set to ON.

c. Parking the SPLL.

When reloading site comes into view, watch for objects which could interfere with reloading operations.

SECTION CHIEF (S/C)

WARNING

Always keep a shorting plug connected to a loaded LP/C. Remove shorting plug only when you are going to connect a tested LLM umbilical cable to the LP/C. Stray voltage could cause rocket to fire and kill someone.

(1) As the LP/Cs to be loaded are approached, stop the SPLL. Unplug, but do not remove, your CVC helmet and then dismount from the SPLL. Check the LP/Cs for damage or unsafe conditions which could prevent a safe resupply operation. Refer to ammunition (Chapter 4), for identification, safety, inspection, and care and handling instructions for MLRS LP/Cs.

2-32. RELOADING (CONT)

(2) Make sure the LP/Cs are in the proper position for loading. LP/Cs should be side by side. Front of LP/Cs should point away from SPLL.

(3) Move into position in view of the SPLL driver.

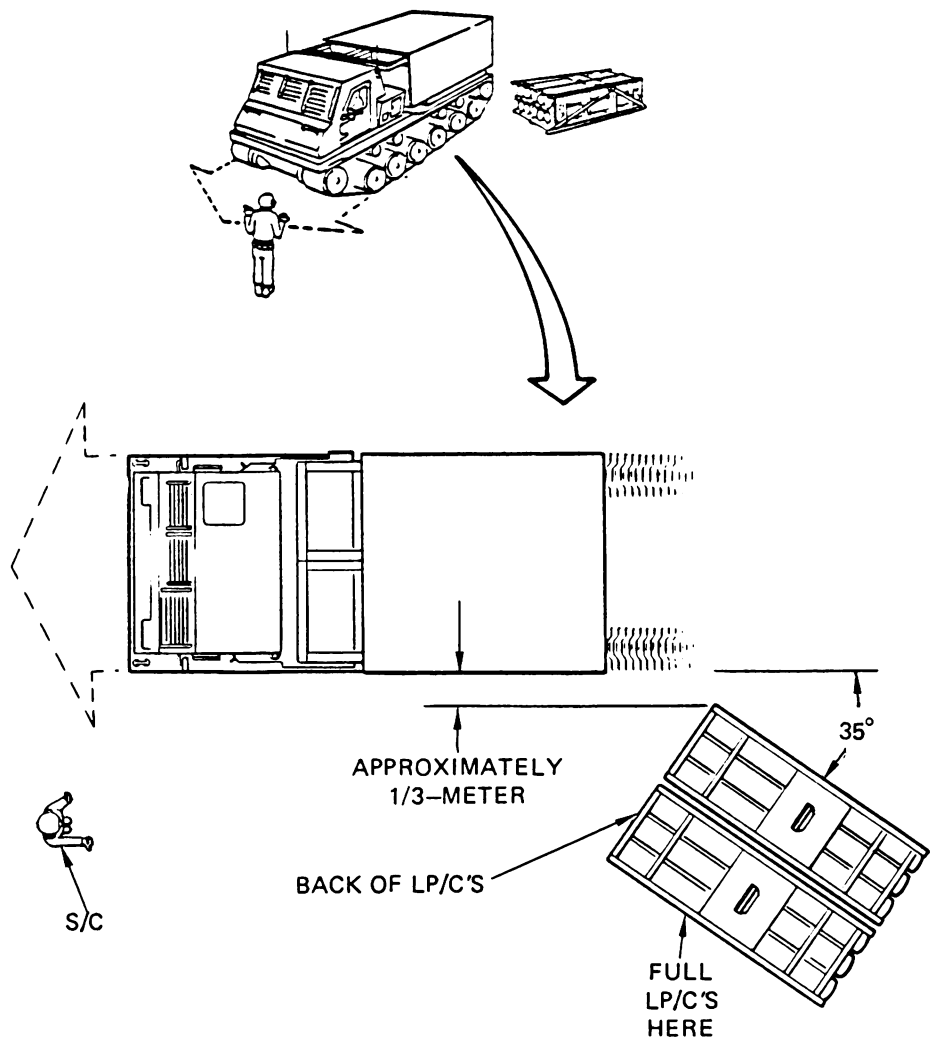
(4) Using hand signals, guide SPLL into position for reloading.

(5) Park with SPLL at about 1/3-meter away from, and at about a 35 degree angle to the side of the LP/Cs. Stop the SPLL when the rear of the SPLL is about even with the most forward corner of the LP/Cs.

(6) When SPLL is in position, signal driver to set handbrake and engage suspension lockout.

(7) Signal gunner to start unloading.

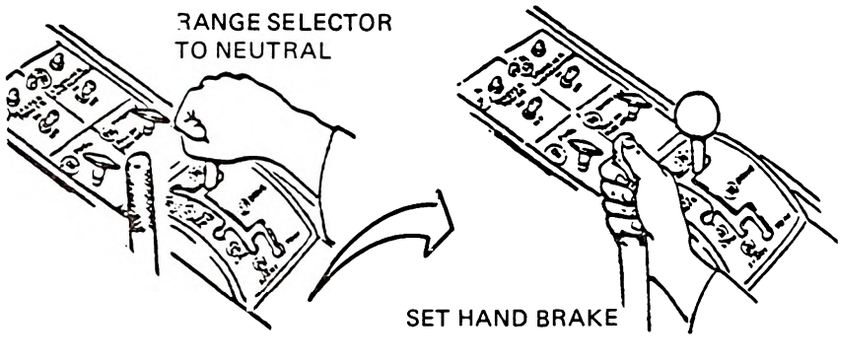
(8) Move to left rear of LLM to unlatch LP/Cs.



2-32. RELOADING (CONT)

DRIVER

(1) As soon as SPLL is parked, move RANGE SELECTOR to NEUTRAL and set handbrake.



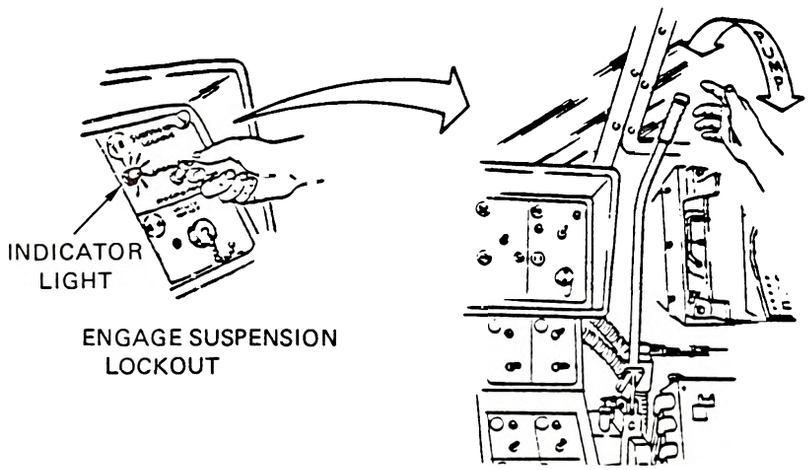
CAUTION

Do not drive SPLL with suspension lockout system ENGAGED. Suspension can be damaged.

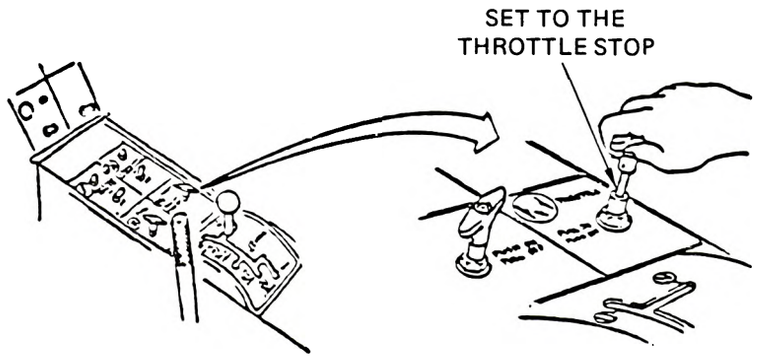
NOTE

After the suspension lockout has been engaged, the hydraulic pressure may lower slightly. If the indicator light goes back off, pump the handle again to turn the light back on.

(2) Set SUSPENSION LOCKOUT switch to ENGAGED. Operate suspension lockout pump handle until SUSPENSION LOCKOUT ENGAGED indicator light comes on. Lock the handle in forward position.



(3) Pull the THROTTLE control all the way out to the throttle stop. The engine alternator should be charging the batteries.



2-32. RELOADING (CONT)

(4) Make sure that the LAUNCHER INTERCONNECT switch is set to ON. Check that the carrier voltmeter is indicating in the upper half of the yellow zone or in the green zone. If voltmeter is not indicating correctly, refer to troubleshooting (Chapter 3).

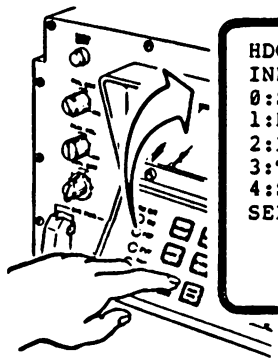
(5) Unplug, but do not remove CVC helmet. Exit cab and move to rear of LLM.

d. Unloading.

GUNNER

(1) While the driver is parking, press the INDEX key. The INDEX MENU will be displayed.

(2) Select the BOOM CONT MENU, option number 1. Press EXEC key.



```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

The BOOM CONTROL menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC ;
```

(3) As soon as the SPLL is parked, select the LLM LEFT, option number 1. Press EXEC key.

A field showing the LLM position will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

2-32. RELOADING (CONT)

NOTE

BOOM CONT indicator light on the FCP, and the ENBL indicator light on the BC do not come on right away. The lights come on after the LLM has moved to the selected unloading position.

When the LLM has moved to the selected unloading position, the BOOM CONT indicator light on the FCP, and the ENBL indicator light on the BC will come on.

(4) Unplug, but do not remove CVC helmet. Exit cab and move to left rear of LLM where BC is stowed.

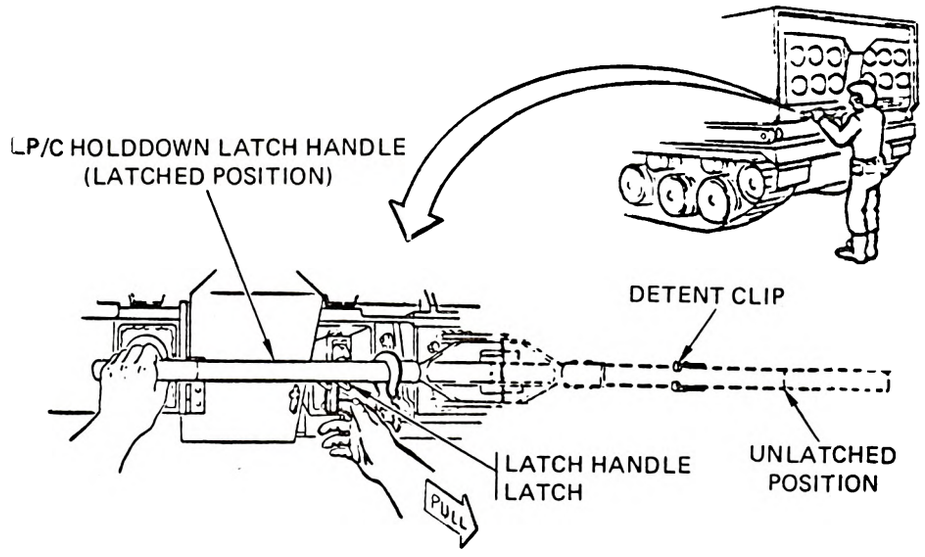
S/C

(1) As quickly as possible, unlatch both LP/Cs.

WARNING

When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety restraint hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

(2) To unlatch an LP/C, release the holddown latch handle latch. Disconnect the latch handle safety restraint hook. Swing holddown latch handle out and to the right until it snaps into place in detent clip.



2-32. RELOADING (CONT)

S/C (at right LP/C) and DRIVER (at left LP/C)

WARNING

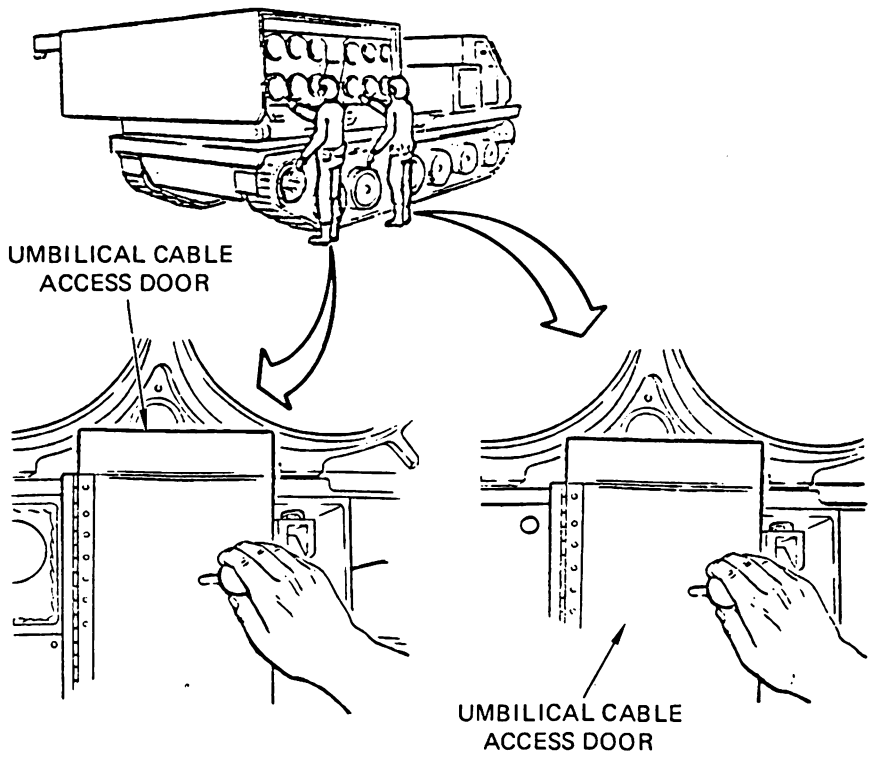
Beware of moving equipment. LLM is automatically turned to unloading position. It can also be turned by using the BC. Use care to avoid injury from moving equipment.

NOTE

Disconnecting and connecting right- and left-hand umbilical cables should be done as quickly as possible. It may be necessary to do this while the LLM is raising.

(1) Disconnect right and left umbilical cables from LP/Cs as follows.

(2) Turn latches on umbilical cable access doors. Open doors and swing them out of the way.



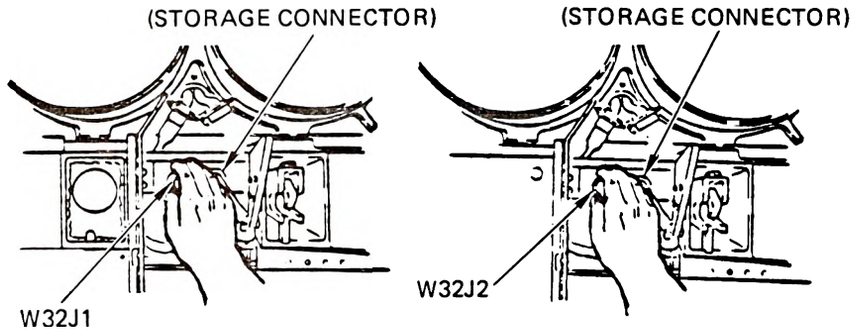
2-32. RELOADING (CONT)

NOTE

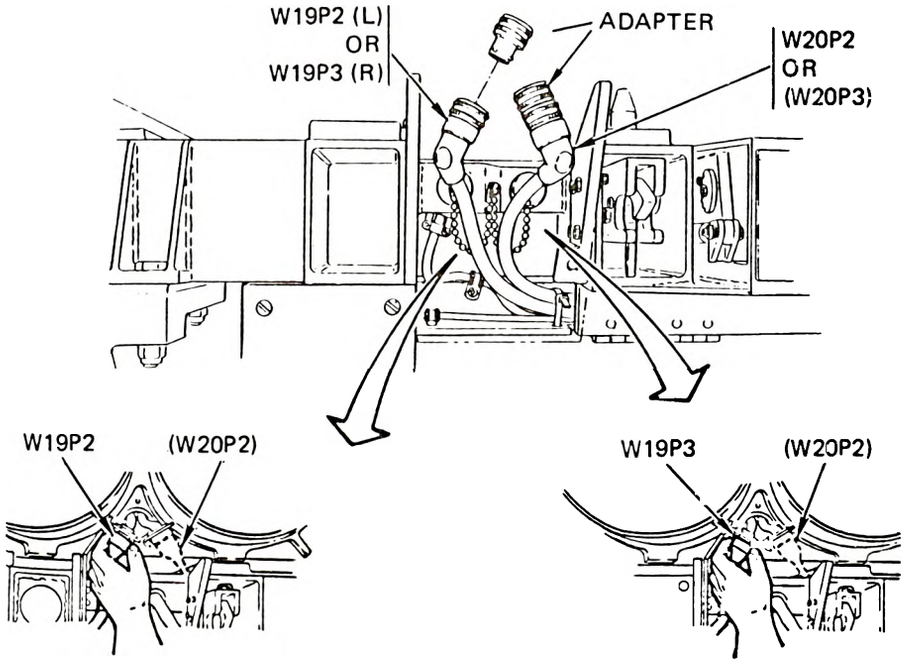
An LP/C with rockets that have an AT2 warhead requires two umibilical cables. In this procedure, the words in parenthesis, ( ), apply only when loading, or unloading an LP/C with rockets that have an AT2 warhead and two cable connectors.

Connector covers (and storage connector) used on SPLL and LP/C umbilical cable connections are also shorting plugs.

(3) Reach in and remove connector cover from connector W32J1 (and storage connector) and W32J2 (and storage connector).



(4) Use care not to disconnect the umbilical cable from the adapter. Disconnect umbilical cable connector W19P2 (and W20P2) and W19P3 (and W20P3) from LP/Cs. Replace connector covers on LP/C connectors.

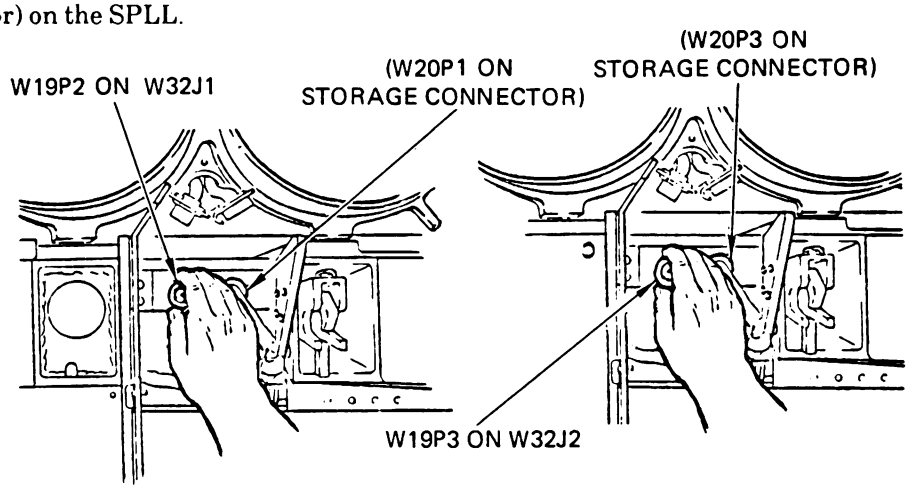


2-32. RELOADING (CONT)

NOTE

LLM hoists and booms will not operate unless umbilical cables are connected to LLM connectors W32J1 and W32J2 (and storage connectors).

(5) Connect umbilical cable connector W19P2 (and W20P2) to connector W32J1 (and storage connector) on the SPLL. Connect umbilical cable connector W19P3 (and W20P3) to connector W32J2 (and storage connector) on the SPLL.



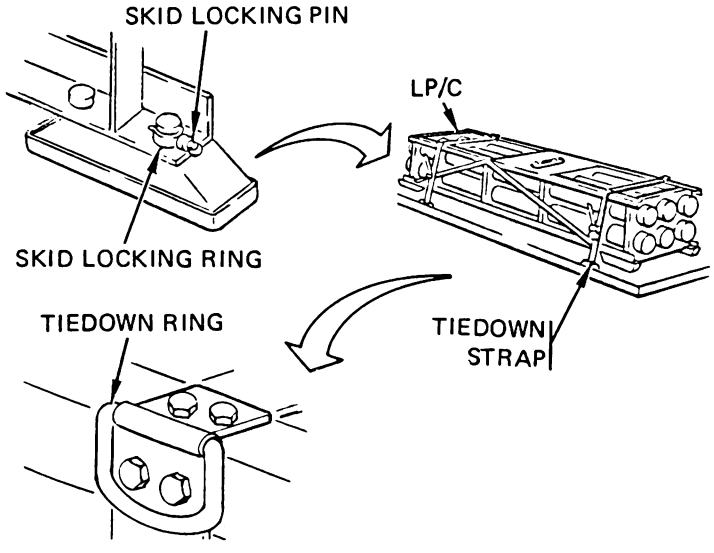
DRIVER

(1) When umbilical cable is connected to W32J1 (and storage connector), move to LP/Cs that are to be loaded. Check that LP/Cs are ready to be loaded.

(2) Pull skid locking pins and rings from skids at the bottom corners of each LP/C to be loaded.

(3) Unbuckle and remove tiedown straps as required. Make sure the tiedown rings are folded flat against the frame of each LP/C.

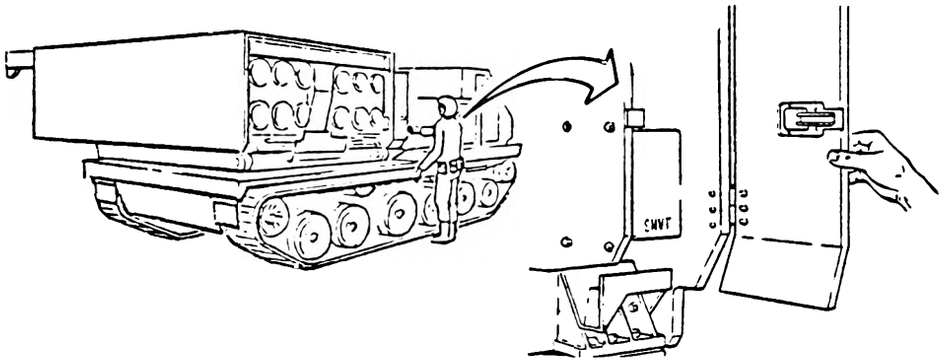
(4) When LP/Cs are ready to be loaded, move into position on side of SPLL to help unhook the empty LP/Cs when they are unloaded.



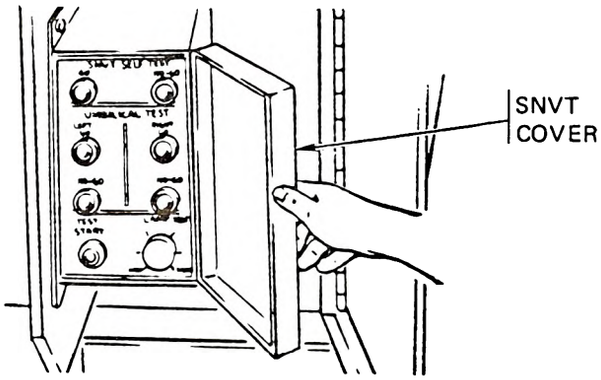
2-32. RELOADING (CONT)

S/C

(1) Unlatch and swing SNVT storage compartment door out of the way.

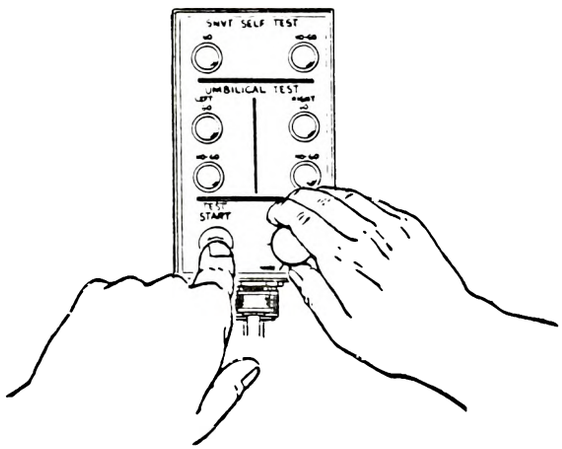


(2) Swing SNVT cover back out of the way and test umbilical cables as described.



(3) Press and hold SNVT TEST START switch. At the same time adjust LAMP BRT control until indicator lights on SNVT are as bright as you want them.

(4) Check to make sure that all indicator lights are on. (If all indicator lights are not on notify platoon leader immediately, then refer to maintenance (Chapter 3) and replace faulty indicator lamp.)



(5) Release the TEST START switch. All indicator lights will go off for a few seconds. The SNVT SELF TEST green GO indicator light will come back on, indicating the SNVT self-test is good. A few seconds later the UMBILICAL TEST, RIGHT and LEFT GO indicator lights will come back on.

2-32. RELOADING (CONT)

NOTE

If the SNVT NO-GO indicator light comes on, the SNVT self-test has failed and the SNVT has a fault.

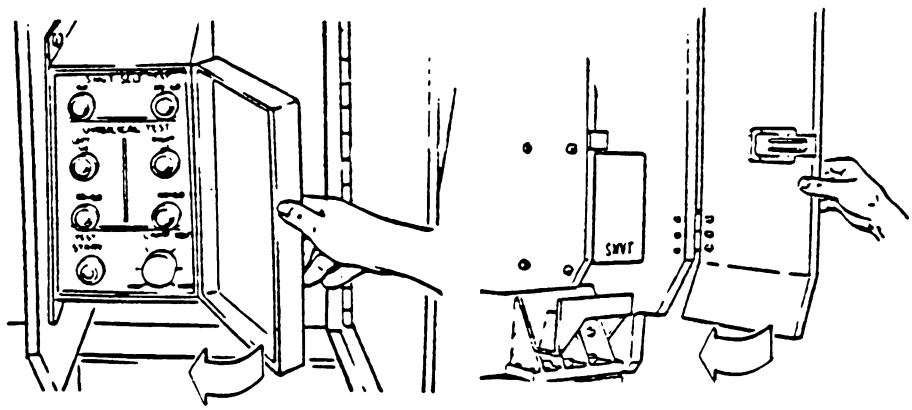
(6) If either the UMBILICAL TEST red, LEFT NO-GO, or the RIGHT NO-GO indicator light comes on, umbilical cable test has failed. Notify your PLT/TP at once. Wait for further instructions.

CAUTION

Elevating LLM at some azimuths will cause open SNVT storage compartment door to hit engine housing and be damaged.

(7) After cables are tested, close SNVT cover. Close and latch storage compartment door.

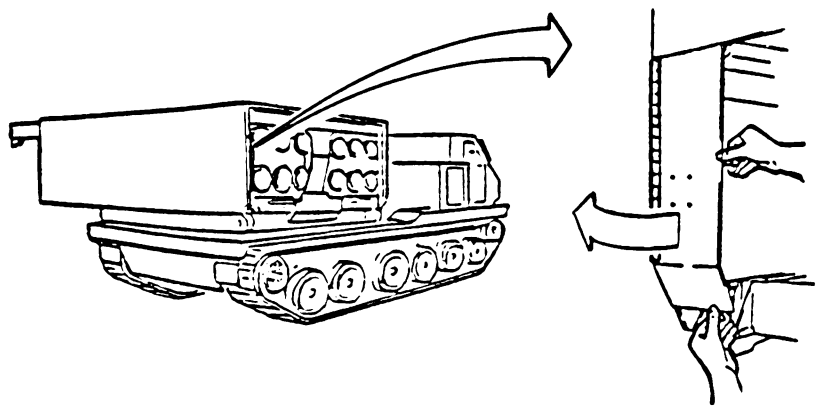
Move to position to direct unloading operation.



GUNNER

As soon as you get to the rear of the LLM, remove boom controller (BC) from storage compartment as follows:

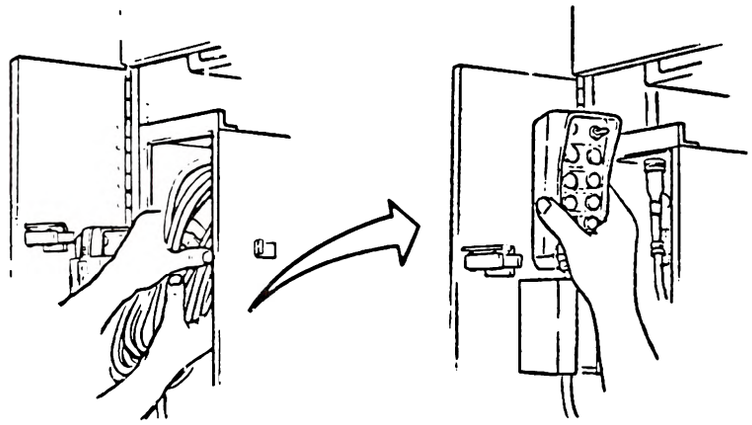
(1) Release both latches on BC storage compartment door and swing door open.



2-32. RELOADING (CONT)

(2) Remove BC cable from storage compartment.

(3) Unfasten strap securing BC in the holder. Remove the BC.



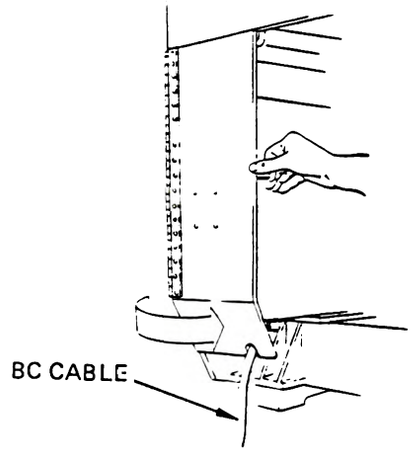
CAUTION

Keep the BC storage compartment door closed. Elevating LLM at some azimuths will cause open BC storage compartment door to hit engine housing and be damaged.

Keep BC cable clear of equipment at all times. Be careful not to let cable get trapped under moving equipment or vehicle tracks and become damaged.

(4) Make sure cable is laying in slot in bottom of storage compartment. Close and latch storage compartment door.

(5) With BC, move to front of LLM and get into position to observe reloading operation.

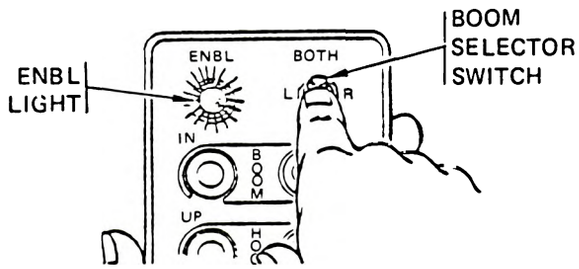


NOTE

LDS turns off automatically when the LLM reaches the selected position. The LDS will startup again and turn off automatically when BC control switches are pressed and released.

(6) When LLM is in the selected position, check that BC ENBL indicator light comes on.

(7) Set boom selector switch to BOTH and wait for instructions from the S/C.



2-32. RELOADING (CONT)

WARNING

Do not attempt to unload or load two loaded LP/Cs at the same time from side loading positions (paragraph 1-9, d). This may offbalance the SPLL and injure someone, or damage equipment.

CAUTION

When lifting LP/Cs up against boom carriages, make sure limit switch stops hoist motor. Do not try to operate hoist after LP/Cs are up against boom carriage, or hoist and cable can be damaged.

Make sure holddown latch handle is in unlatched position before lifting LP/C. Lifting LP/C with latch handle in latched position will damage bottom of LP/C and/or holddown latch assembly.

NOTE

If red baton (flashlight) is used for signaling during blackout operation, no light means stop.

Hoist and boom controls will not operate unless umbilical cables are properly connected to LLM.

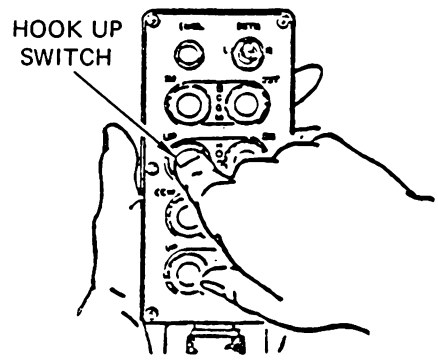
S/C

When in position to direct unloading and LLM is at offloading azimuth, signal gunner to raise empty LP/Cs.

GUNNER

On S/C signal, press and hold HOOK UP switch until LP/Cs are automatically stopped in place against boom carriages. Release the switch.

HOOKS UP



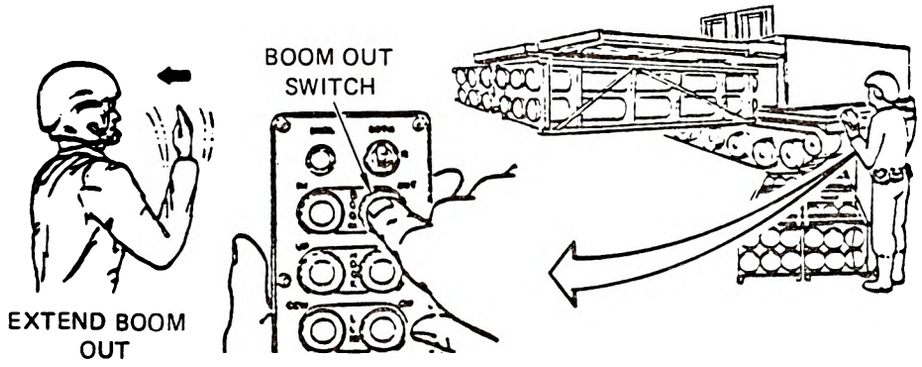
2-32. RELOADING (CONT)

S/C

When LP/Cs are stopped against boom carriages, signal gunner to extend booms.

GUNNER

On S/C signal, press and hold BOOM OUT switch until both booms are fully extended and stop automatically. Release the switch.

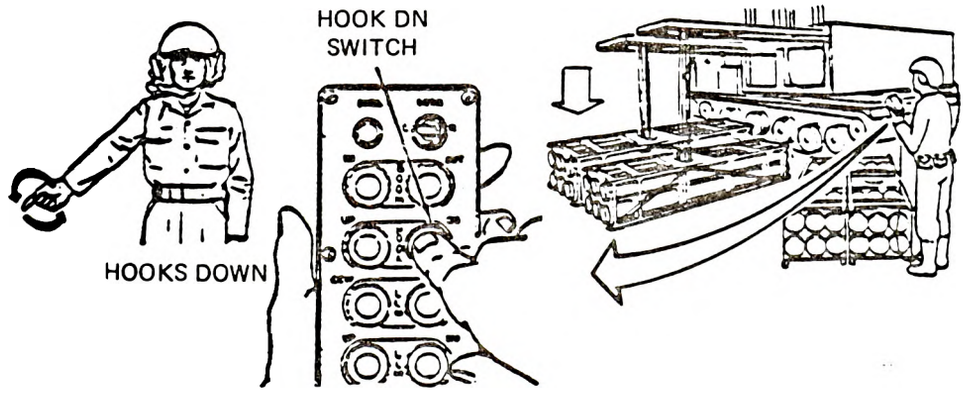


S/C

When booms are fully extended, signal gunner to lower LP/Cs to the ground and then stop when hook cables are slack enough to unhook hoist hooks.

GUNNER

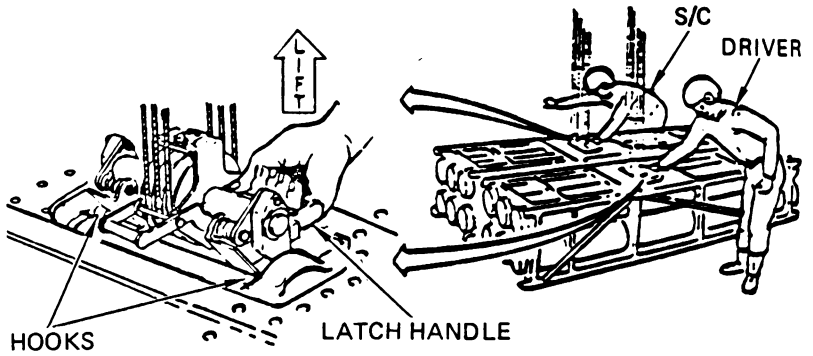
On S/C command, press and hold HOOK DN switch until LP/Cs are resting on ground and cables are slack. Release the switch.



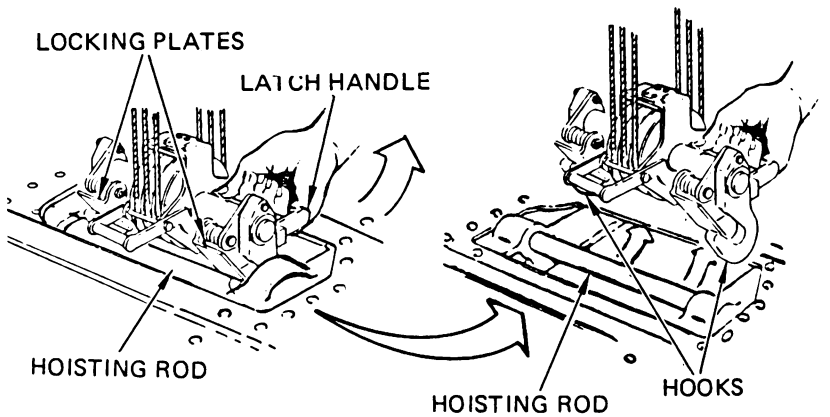
2-32. RELOADING (CONT)

S/C (at right LP/C) and DRIVER (at left LP/C)

(1) Move to LP/Cs and unhook hoist hooks by grasping hook latch handle and latch locking bar. Squeeze the locking bar to release the latch. Lift the hoist hooks clear of the LP/C.



(2) When hook handles are raised enough for the locking plates to clear the hoisting rod, pull hooks away from rod.



e. Loading.

S/C

CAUTION

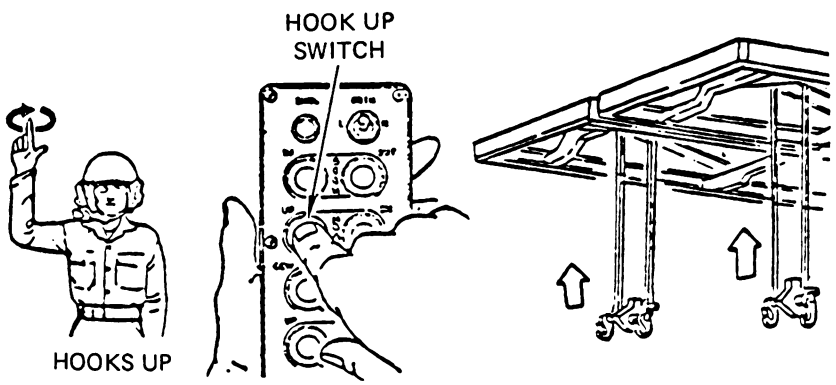
If LP/Cs are stacked on a resupply truck, the front of the LLM will have to be raised so the booms or hooks will not hit and damage the loaded LP/Cs. Refer to paragraph 2-41 for instructions on additional steps required for loading off a resupply truck.

(1) When both LP/Cs are unhooked signal gunner to raise hooks enough to clear the top of LP/Cs.

(2) When both hooks are raised enough to clear LP/Cs that are to be loaded, signal gunner to stop.

GUNNER

At S/C signal, press and hold HOOK UP switch until both hooks are clear of empty LP/Cs. Release the switch.



2-32. RELOADING (CONT)

CAUTION

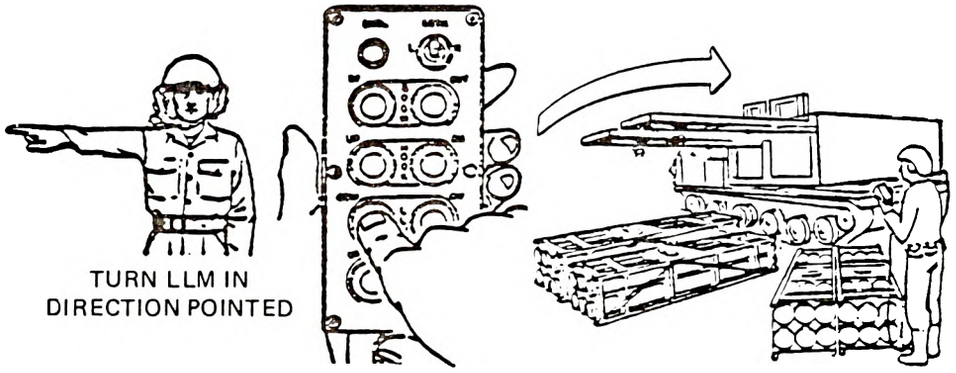
To prevent damage to hoist assembly and LP/Cs, do not drag the LPCs. Hoist hooks should always be positioned as close as possible to directly over the LP/C hoisting rods. Never attempt to lift the LP/C if the hoist hooks are not positioned close to the hoisting rod. The maximum distance allowed is one-half the width of the LP/C. When LP/Cs are on the ground, this distance decreases in proportion if LP/Cs are on a RSV or RST.

S/C

Signal gunner as required to position hooks directly over the loaded LP/Cs.

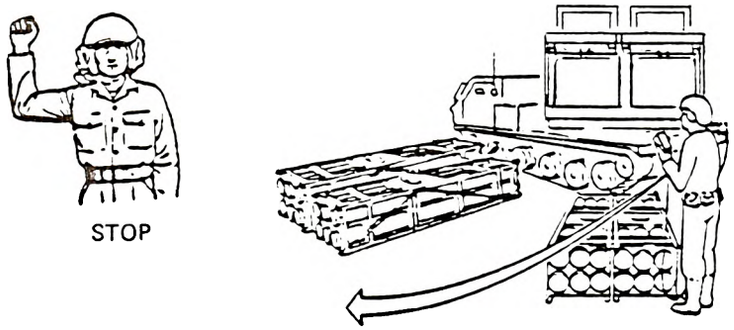
GUNNER

At S/C signal, press and hold LLM CCW switch to move LLM in the direction of LP/C to be loaded.



S/C

When hooks are over LP/Cs hoisting rod, signal gunner to stop.



GUNNER

Release LLM CCW switch.

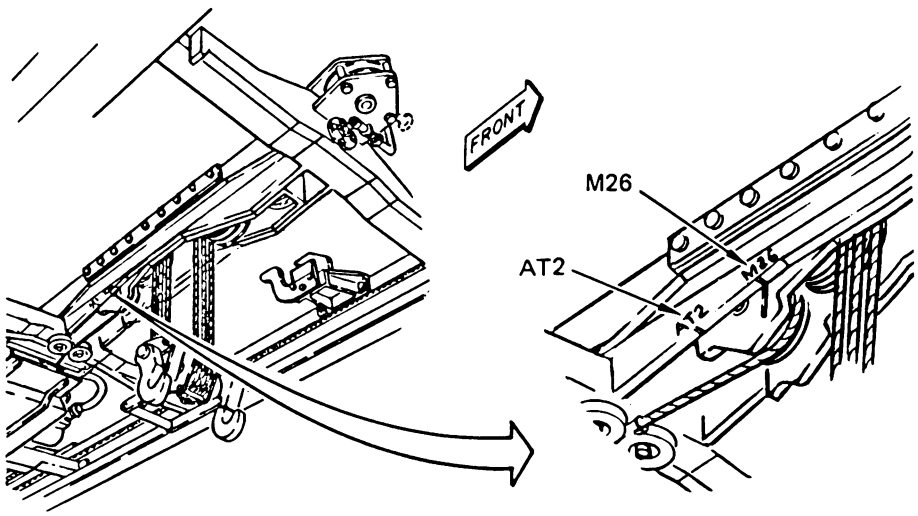
2-32. RELOADING (CONT)

S/C

(1) Check the position of the pulleys in the carriage hoist assembly to insure pulleys are in the correct position for the type of rockets loaded into the LP/C.

CAUTION

Do not reposition hoist pulley assembly unless hoist hooks are lowered at least 1/3 meter. Do not reposition with LP/C suspended. Hoist pulley positioning assembly screw and crank could be damaged.

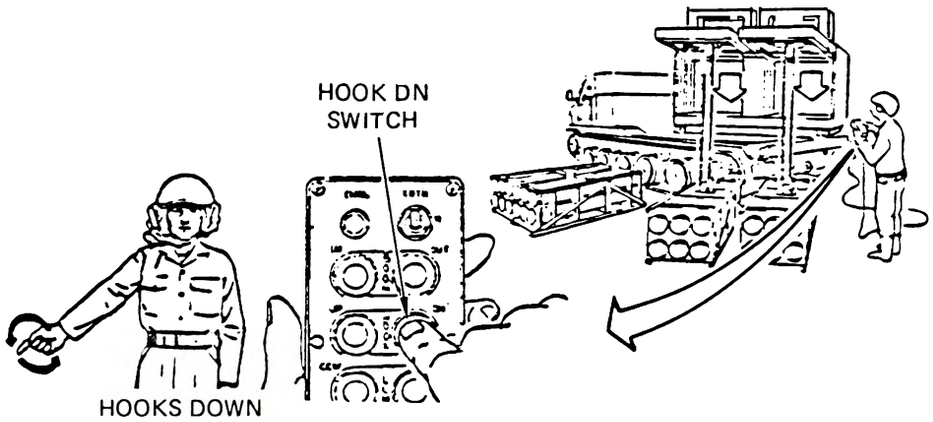


2-32. RELOADING (CONT)

(2) When you are sure hoist upper pulleys are in the correct position, signal gunner to lower hooks.

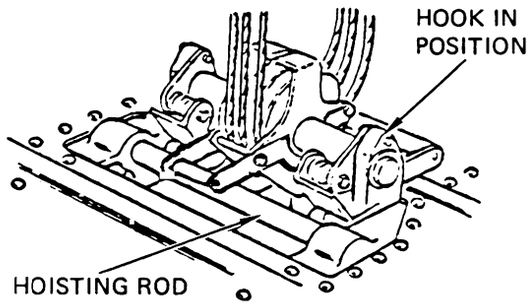
GUNNER

Press and hold HOOK DN switch.



S/C

When hooks are in position over the LP/C hoisting rod and there is slack in cables, signal gunner to stop.



GUNNER

At S/C signal, release HOOK DN switch.

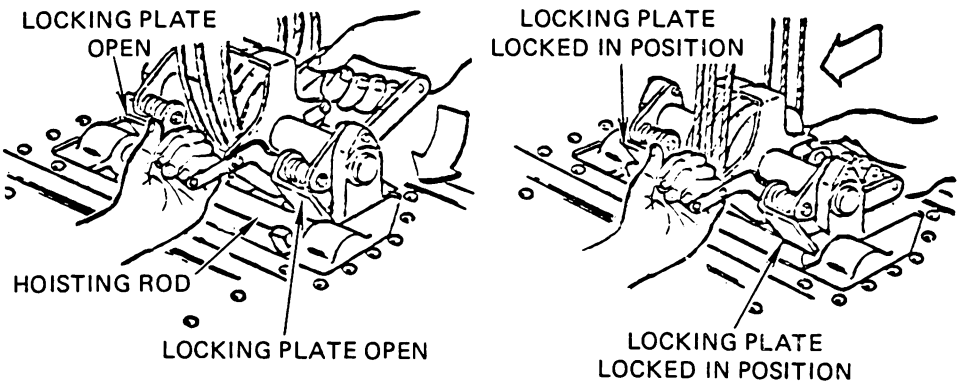
2-32. RELOADING (CONT)

S/C (at right LP/C) and DRIVER (at left LP/C)

(1) Grasp hook latch handle and position hook locking plates against hoisting rod.

(2) Squeeze the locking bar to release the latch. With a lifting and pushing motion, guide hooks forward until they clear the opened locking plates and fit into place under the hoisting rod.

(3) Release hook latch handle and locking bar. Make sure the locking plates close and lock hooks in position on the hoisting rod.



WARNING

Do not attempt to unload or load two loaded LP/Cs at the same time from side loading positions (paragraph 1-9, d). This may offbalance the SPLL and injure someone or damage equipment.

(4) When both hooks are locked in place, stand clear of LP/Cs.

S/C

Signal gunner to raise hooks.

HOOKS UP

2-32. RELOADING (CONT)

S/C and DRIVER

WARNING

To prevent injury, you must not put hands or other parts of the body under hanging LP/C. Always watch out for LP/C skids which may drop off after LP/C has been lifted.

CAUTION

To prevent damage to hoist assembly and LP/Cs, do not drag the LP/Cs. Hoist hooks should always be positioned as close as possible to directly over the LP/C hoisting rods. Never attempt to lift the LP/C if the hoist hooks are not positioned close to the hoisting rod. The maximum distance allowed is one-half the width of the LP/C when LP/Cs are on the ground. This distance decreases in proportion if LP/Cs are on a RSV or RST.

When guiding LP/Cs up against boom carriage, make sure hooks seat properly against carriage. Misaligned hooks will not engage up limit switch and hook assembly will be damaged.

NOTE

With pins removed, skids will normally drop off when LP/C is lifted. If skids do not come loose, it may be necessary to stop raising LP/Cs to let driver remove skids.

Move to front of LP/Cs. Steady and guide the LP/Cs as they are lifted. If necessary, remove skids. Guide the LP/Cs so that each one is positioned in the center of its boom carriage.

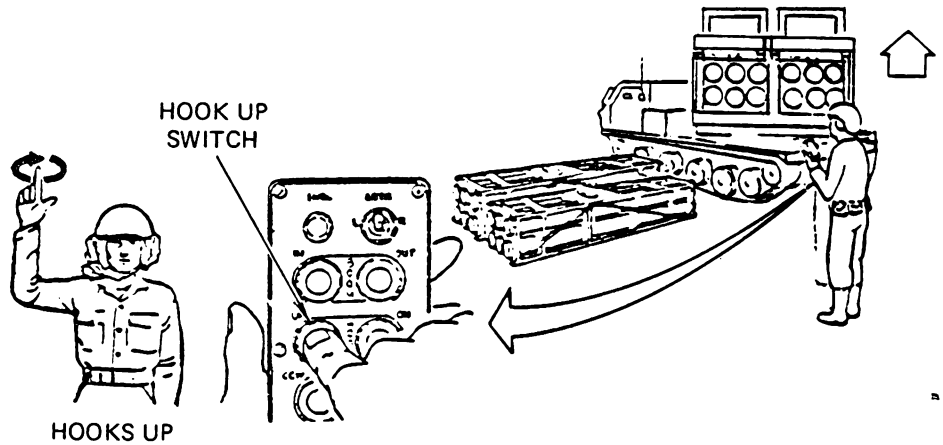
2-32. RELOADING (CONT)

GUNNER

The hoist hooks cannot always be positioned exactly over the LP/C hoisting rods. To avoid a dangerous swing when the LP/Cs are first lifted, press and release HOOK UP switch quickly, in short pulses. This will let the LP/Cs be lifted a little at a time. LP/Cs can then be safely lifted up against the boom carriages.

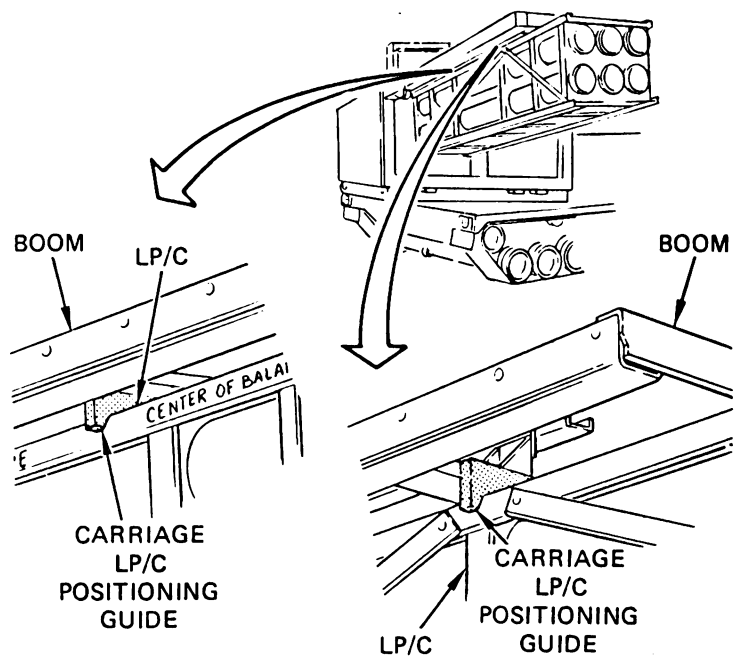
(1) At S/C signal, press and release HOOK UP switch as required until LP/Cs are raised into position against boom carriage and then stop.

(2) When the LP/Cs are automatically stopped in position against carriages, release the switch.



S/C

(1) Check that LP/Cs are in proper position (centered) in carriage, all skids are removed, and tiedown rings flat against side frames of LP/C.



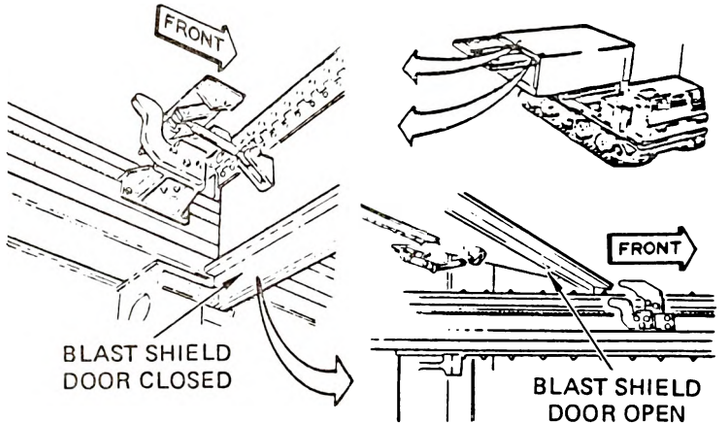
2-32. RELOADING (CONT)

CAUTION

LP/C latch handle must be opened all the way and LP/C latch hooks in bottom of each bay lowered out of the way, or latch hooks and LP/C will be damaged.

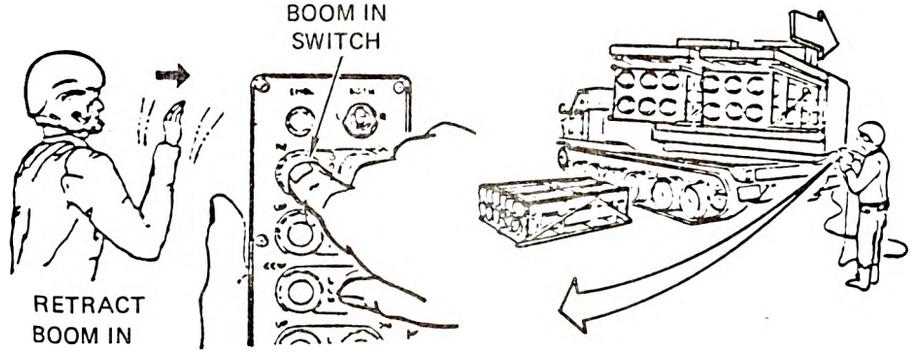
(2) Check LLM and make sure latch hooks, inside each bay, are lowered out of the way. Check the bottom of the LP/Cs to make sure the positioning pin holes are not plugged with mud, ice, or other objects. Then, signal gunner to retract booms.

(3) As the booms are retracted and the LP/Cs enter the LLM, watch the blast shield doors at the top of the LLM to make sure doors remain open. If a door should happen to be jarred shut, stop retracting boom and manually open door. Make sure to push up on the link that holds the door open so the door will stay open by itself.



GUNNER

At S/C signal, press and hold BOOM IN switch until booms are fully retracted and automatically stop moving. Release the switch.



2-32. RELOADING (CONT)

S/C

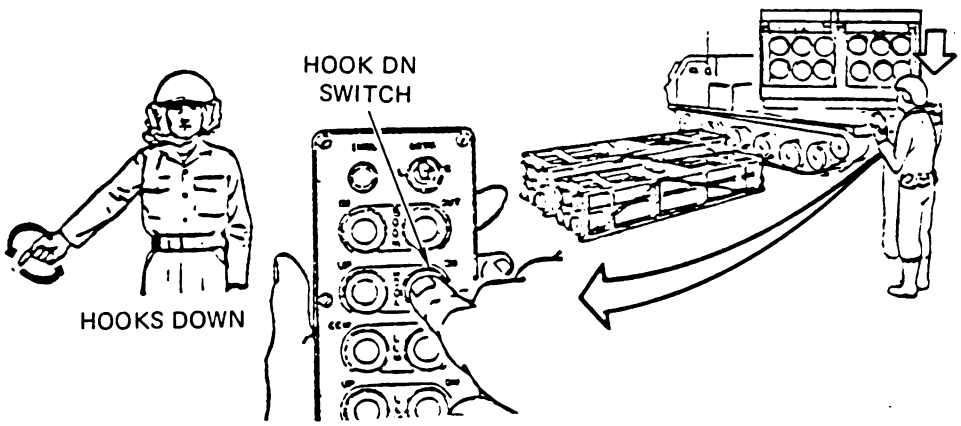
When boom is fully retracted, signal gunner to lower LP/Cs.

CAUTION

To keep extra slack out of hoist cable, release HOOK DN switch as soon as LP/C is seated. Cables could become tangled.

GUNNER

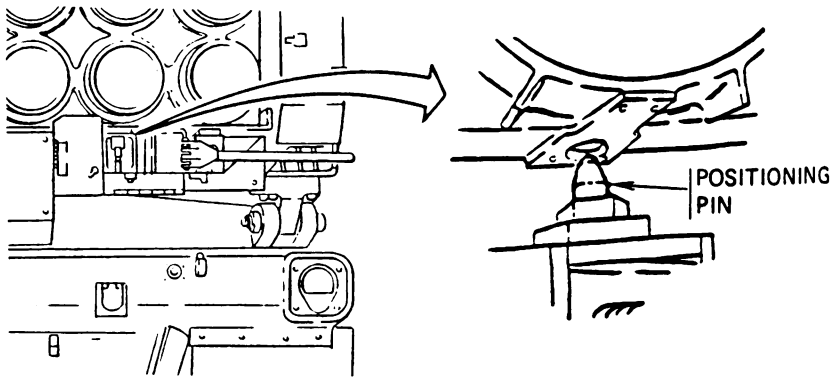
(1) At S/C signal, press HOOK DN switch until LP/Cs are seated in place over positioning pins and on the bed of LLM.



NOTE

It may be necessary to use the BC to raise, lower, or turn the LLM to a level position to seat the LP/C on the pins.

(2) When LP/Cs are seated, release HOOK DN switch.



2-32. RELOADING (CONT)

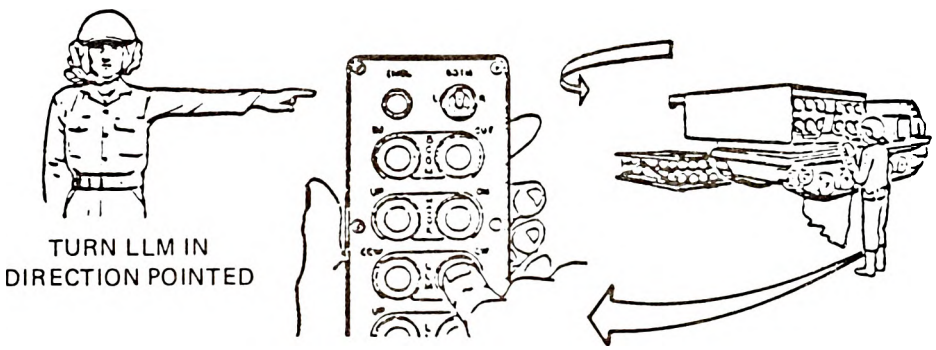
S/C

(1) Check to make sure LP/Cs are properly seated.

(2) Signal gunner to turn the LLM clockwise, to the right, so you can reach the LP/C latches, umbilical cables, and SNVT.

GUNNER

(1) At S/C signal, press and hold LLM CW switch until LLM is turned far enough to reach the LP/C holddown latch handles, umbilical cables, and SNVT. Release the switch.

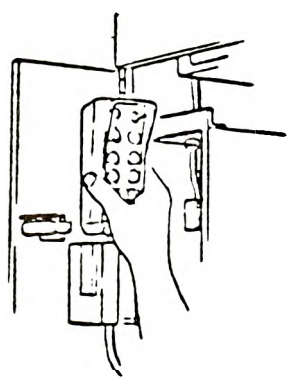


(2) When LLM is in position, store BC and cable as described.

(a) Unlatch and open BC storage compartment door. Coil BC cable into several small loops.

WARNING

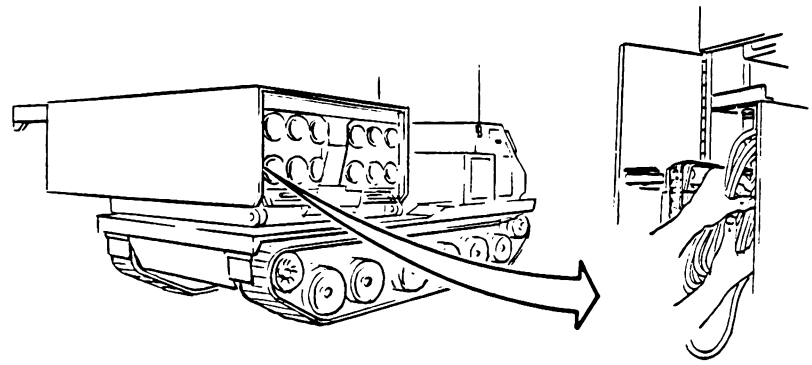
Use care not to press BC switches when putting BC in bracket. BC is still enabled and can cause LLM or LP/Cs to move and hurt someone.



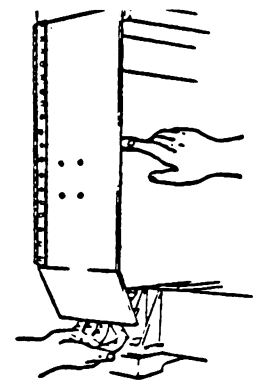
(b) Open storage compartment door. Place BC onto the bracket provided on compartment door. Make sure that the holding strap is fastened properly.

2-32. RELOADING (CONT)

(c) Insert cable into storage compartment. Make sure there will be enough room for BC when the compartment door is closed.



(d) Close storage compartment door. Make sure cable will clear BC with door closed, and that both door latches catch.



(3) When BC is stored, return to SPLL cab.

S/C (at right LP/C) and DRIVER (at left LP/C)

While the gunner stores the BC, move to rear of LLM and perform short/no-voltage test and connect umbilical cables.

2-32. RELOADING (CONT)

S/C

(1) Unlatch and open SNVT storage compartment door and cover.

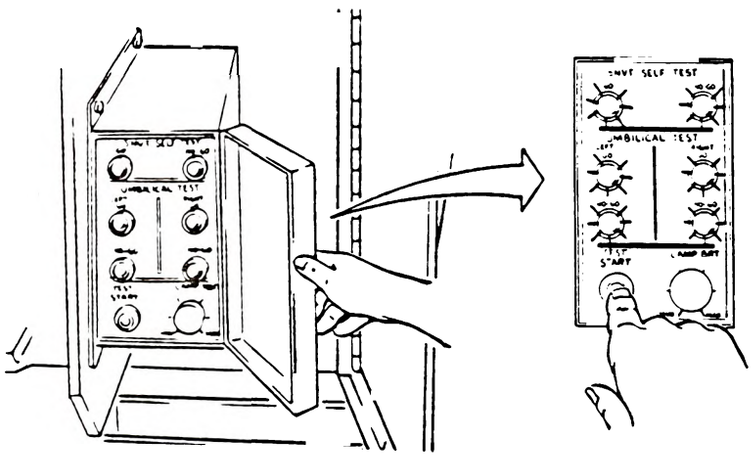
WARNING

Short/no-voltage test is not good unless SNVT passes self-test. If SNVT SELF TEST green GO indicator light does not come on, SNVT has a fault. Stop cable test immediately.

(2) Test umbilical cables as described.

(a) Press and hold SNVT TEST START switch. If it is necessary, adjust LAMP BRT control until indicator lights on SNVT are as bright as you want them.

(b) Release TEST START switch. All indicator lights will go off for a few seconds. The SNVT SELF TEST green GO indicator light will come back on, indicating the SNVT self-test is good. A few seconds later the UMBILICAL TEST, RIGHT and LEFT GO indicator lights will come back on.



NOTE

If the SNVT NO-GO indicator light comes on, the SNVT self-test failed and the SNVT has a fault.

(c) If either the UMBILICAL TEST red, LEFT NO-GO, or RIGHT NO-GO indicator light comes on, umbilical cable test has failed. Notify your PLT/TP at once. Wait for further instructions.

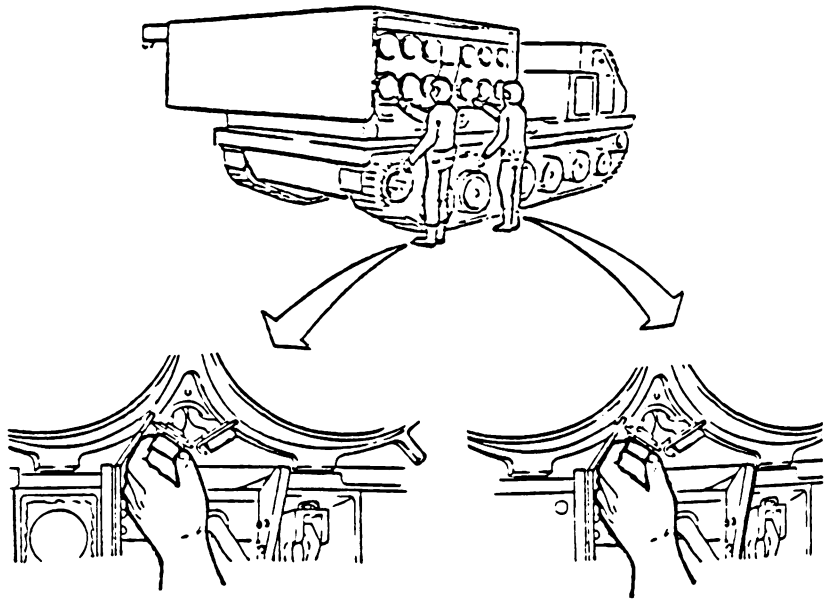
2-32. RELOADING (CONT)

S/C (at right LP/C) and DRIVER (at left LP/C)

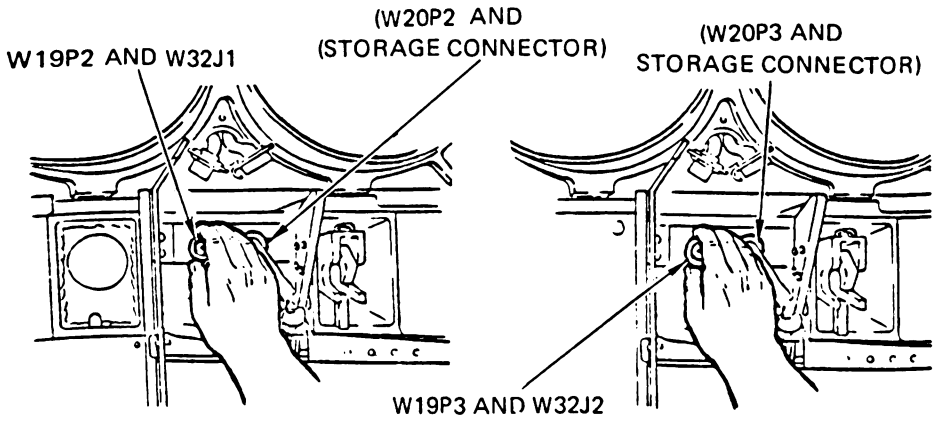
WARNING

Do not connect faulty or untested cable to LP/C. Rockets may ignite and kill you. If you are in doubt retest the cables.

(1) Remove protective covers (shorting plugs) from electrical connectors on each LP/C.

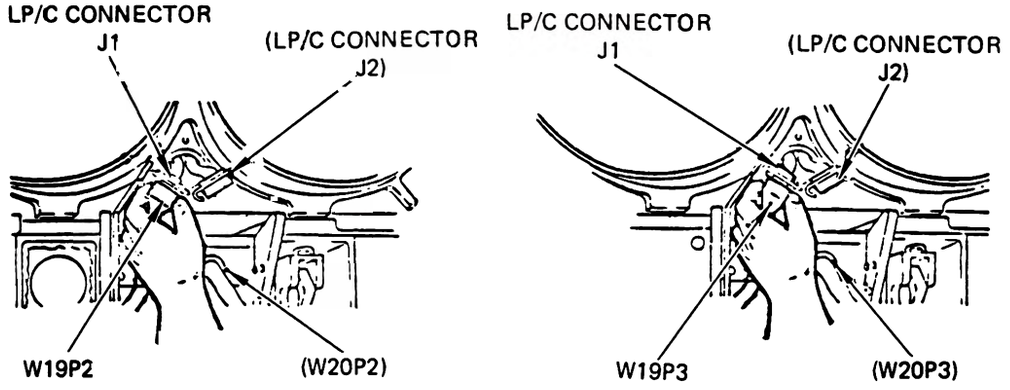


(2) Disconnect umbilical cable connector W19P2 (and W20P2) from connector W32J1 (and storage connector). Disconnect umbilical cable connector W19P3 (and W20P3) from connector W32J2 (and storage connector) on the SPLL.

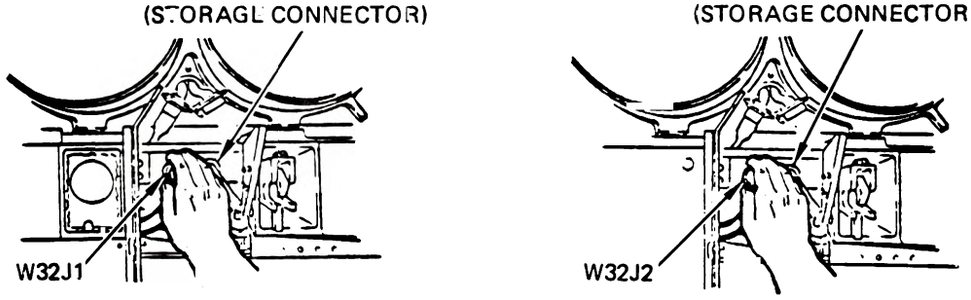


2-32. RELOADING (CONT)

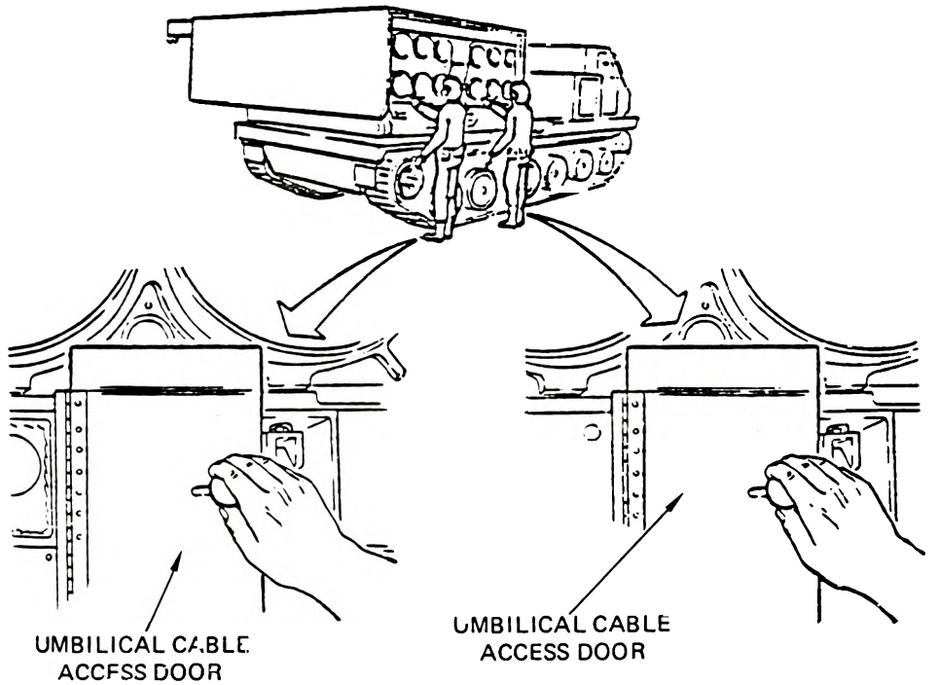
(3) Connect umbilical cable connector W19P2 (and W20P2) to LP/C connector J1 (and J2).



(4) Replace connector covers on SPLL connectors W32J1 (and storage connector) and W32J2 (and storage connector).

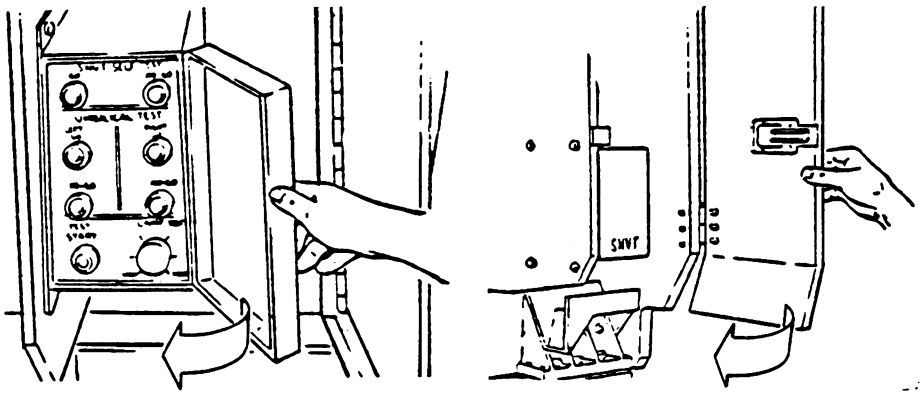


(5) Close and latch umbilical cable access doors.



2-32. RELOADING (CONT)

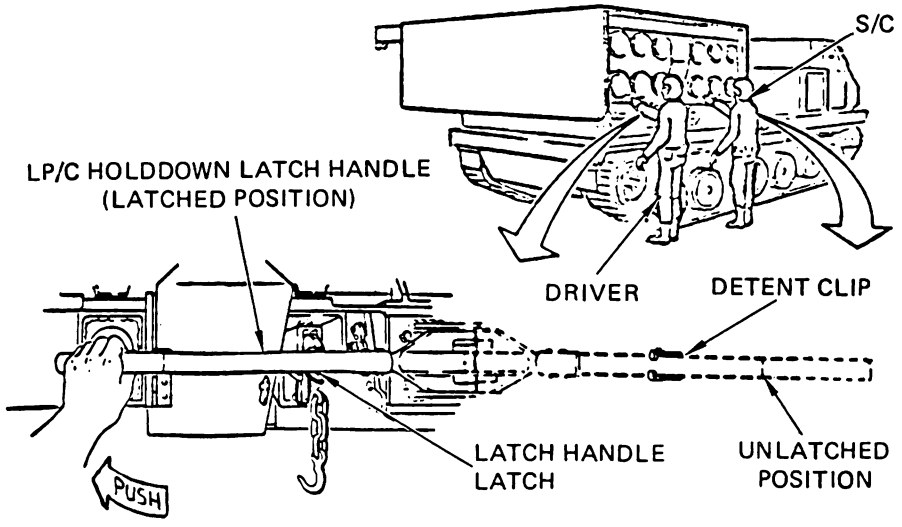
(6) Close SNVT cover, then close and latch storage compartment door.



S/C (at right LP/C) and DRIVER (at left LP/C)

(1) Pull LP/C holddown handles free from detent clip.

(2) Swing handle out and to the left until it locks in place in latch handle latch. Connect the latch safety restraint hook to the latch handle.



S/C

As soon as LP/Cs are locked in place, signal gunner to stow LLM.

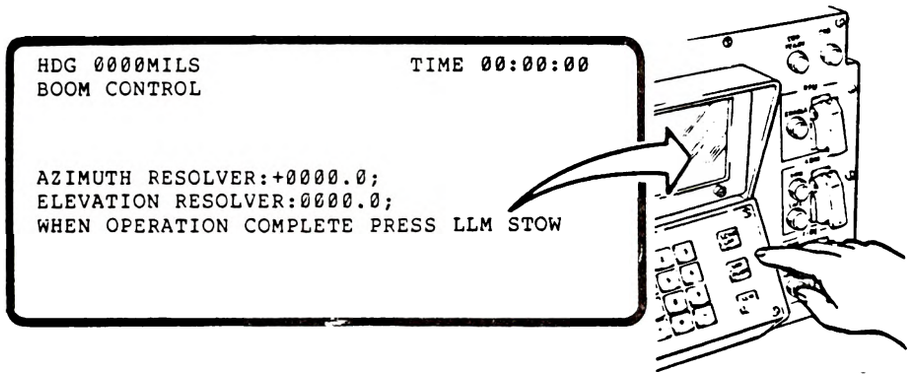
S/C and DRIVER

Return to SPLL cab.

2-32. RELOADING (CONT)

GUNNER

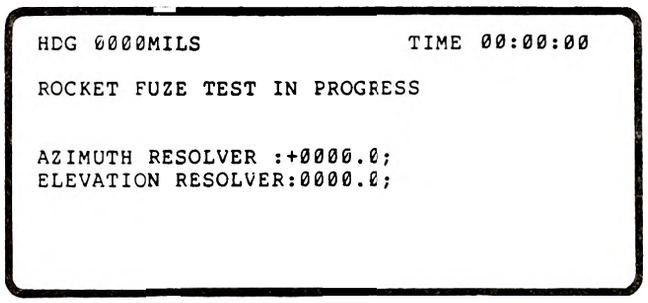
(1) As soon as the S/C signals, press LLM STOW key to stow the LLM.



NOTE

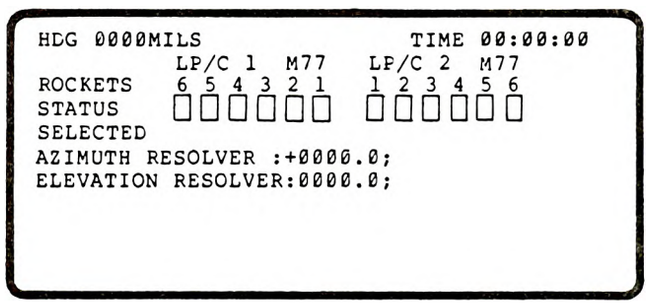
Rocket fuzes are tested each time the LLM is stowed. If there are no LP/Cs or no rockets in LP/C, ignore the fuze test.

(2) As soon as the LLM STOW key is pressed, the LLM will start to stow and the display will change to the rocket fuze test prompt. The azimuth and elevation resolver output is also displayed, showing you the LLM heading as it stows.



The rocket fuze test takes just a few seconds, then the rocket status will be displayed.

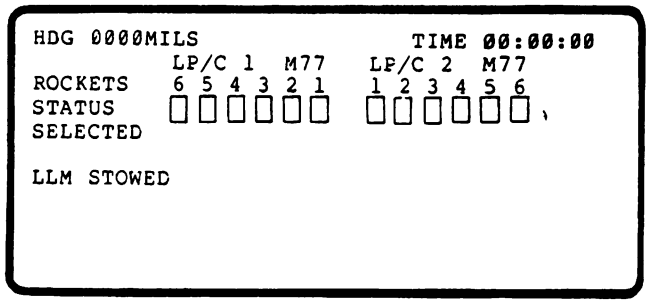
(3) The status message will tell you if the rockets have passed the fuze test. A fuze that failed the test will be indicated by the letter D under the number of the rocket that failed. If any rocket fuze fails the test, notify your S/C or platoon leader and wait for instructions.



The azimuth and elevation resolver outputs will remain on the display until the LLM is stowed.

2-32. RELOADING (CONT)

(4) When the LLM is stowed, the resolver readouts will be erased and the LLM STOWED prompt will be displayed.



CREW

Plug in CVC helmets.

GUNNER

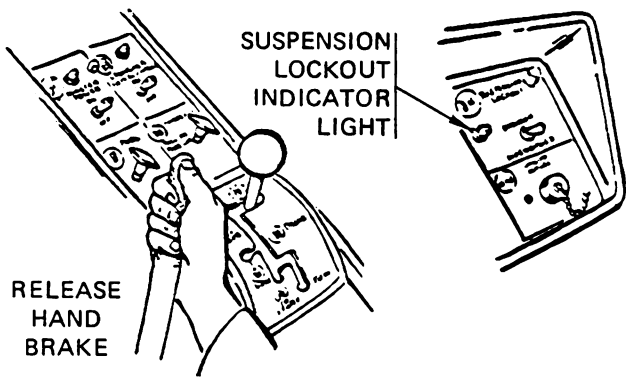
When LLM is stowed, notify the driver to release the carrier suspension lockout system.

CAUTION

Do not drive SPLL with suspension lockout system engaged. Suspension can be damaged.

DRIVER

(1) Set SUSPENSION LOCKOUT switch to DISENGAGE and release the throttle and the handbrake.



(2) Observe, SUSPENSION LOCKOUT indicator light goes off.

S/C

Reloading operation is now complete. Follow unit operating instructions, or wait for further orders.

2-33. MET DATA EDITING/MANUAL ENTRY. MET data is normally sent to the SPLL using a digital coded radio message. The data is automatically entered into the FCS when the message is acknowledged. The following procedure is a method of reviewing (editing) the MET data when it is received. This procedure can also be used for manually entering new data. The MET message form, DA Form 3677 (figure 2-5) has space for recording MET data, for manual entry when needed or for reference.

a. Receiving MET Data.

When a MET data radio message is received, the alarm will sound and a MET data received prompt will be displayed on the FCP.

Pressing the ALM ACK key will turn off the alarm, erase the message received prompt, and process the message.

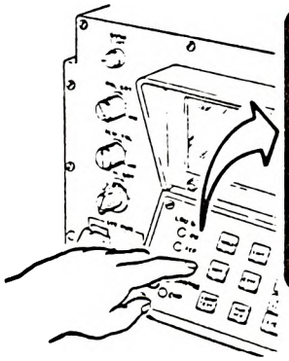
```
HDG 0000MILS                    TIME 00:00:00




MET DATA MSG FROM BTRY  -PRESS ALM ACK
```

b. Selecting MET Data Routine.

Editing MET data, or manually entering data changes, requires that the MET data routine be selected from the auxiliary menu. To display the auxiliary menu you must select it from the index menu.

(1) Press the INDEX key and the INDEX MENU will be displayed.

(2) Select the AUXILIARY MENU, option number 8, and press the EXEC key. The AUXILIARY MENU will be displayed.



```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(3) From the AUXILIARY MENU, select the MET DATA routine, option number 5, and press the EXEC key. The first field in the MET data routine will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC ;
```

2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

c. Edit/Enter MET Data.

The first field in the MET data routine is the MET STATION ALTITUDE.

```
HDG 0000MILS                    TIME 00:00:00
MET DATA
MET STATION ALTITUDE:000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

The MET STATION ALTITUDE is given in decameters (000 to 999 maximum). Each decameter is 10 meters. (Example: 100 decameters x 10 = 1000 meters.)

(1) If you edit the field and if no change in the MET station altitude is required, press NEXT FLD key. The MET data line number selection field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MET DATA
MET LINE NUMBER:00;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(2) If you need to make a change in the MET station altitude, enter the new numbers and press the STORE key. The change will be entered and the MET LINE NUMBER selection field will be displayed.

The MET data lines are numbered from 00 to 35. Select the line number that you want to edit or enter data and press STORE key. The MET data in the line selected will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MET DATA
MET LINE NUMBER 00
WDR:000,WSP:000,TMP:0000,PRS:0000;



ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(3) Edit the data or enter any changes that are necessary.

Each MET data line contains four separate types of data fields as follows:

(a) WDR (Wind direction in mils). The number entered times 10 is the wind direction. (Example: 160 x 10 = 1600 mils)

(b) WSP (Windspeed). The windspeed is in knots. (0 to 300 maximum)

(c) TMP (Virtual (effective) air temperature). The temperature is in 0.1 degrees kelvin. (0 to 5000 maximum)

(d) PRS (Air pressure). The air pressure is in millibars. (0 to 1100 maximum)

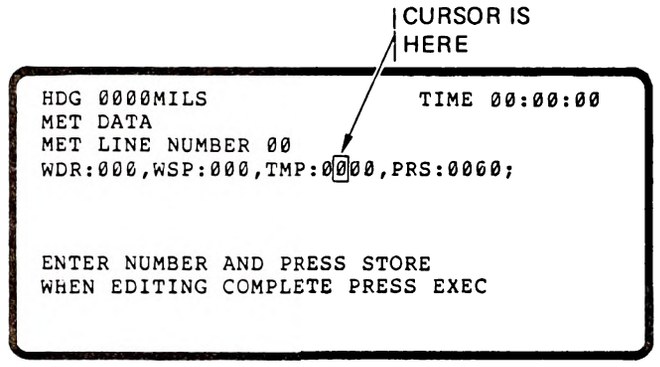
2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

When the LINE NUMBER field is first displayed, the cursor will be in the first space in the WDR field. The cursor will advance from space to space with each entry, moving from left to right. Entering three digits (numbers) will move the cursor to the first space in the WSP field and so on.

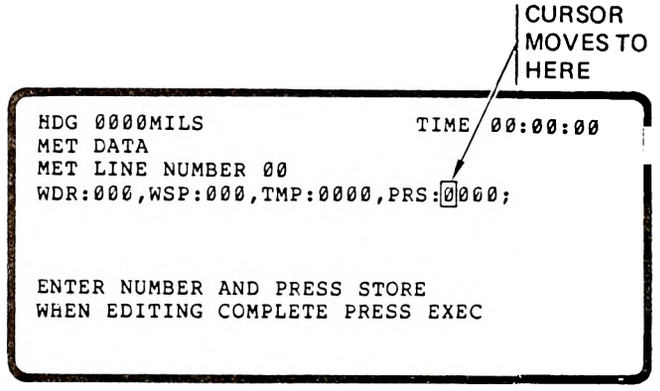
(4) Pressing the NEXT FLD or LAST FLD key causes the cursor to jump from field to field.

Example:

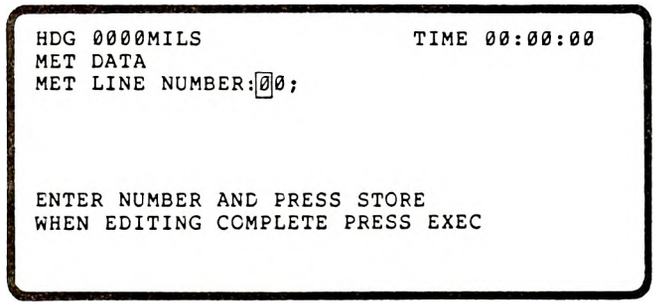
(a) Cursor is in the TMP field.



(b) Pressing NEXT FLD moves cursor to PRS field in one jump.



(5) When editing or manual entries for the line are completed, pressing STORE key will store the data and cause the line number selection field to be displayed again.



2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

A new MET data line may be selected and the editing or manual entry procedure can be repeated. These procedures can be repeated until all MET lines are edited, or all data entered.

(6) Pressing the EXEC key will end the routine.

d. MET Data Editing/Manual Entry Flow Diagram.

Figure 2-11 is a MET data flow diagram. The diagram shows the flow of the operating steps described in this procedure.

2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

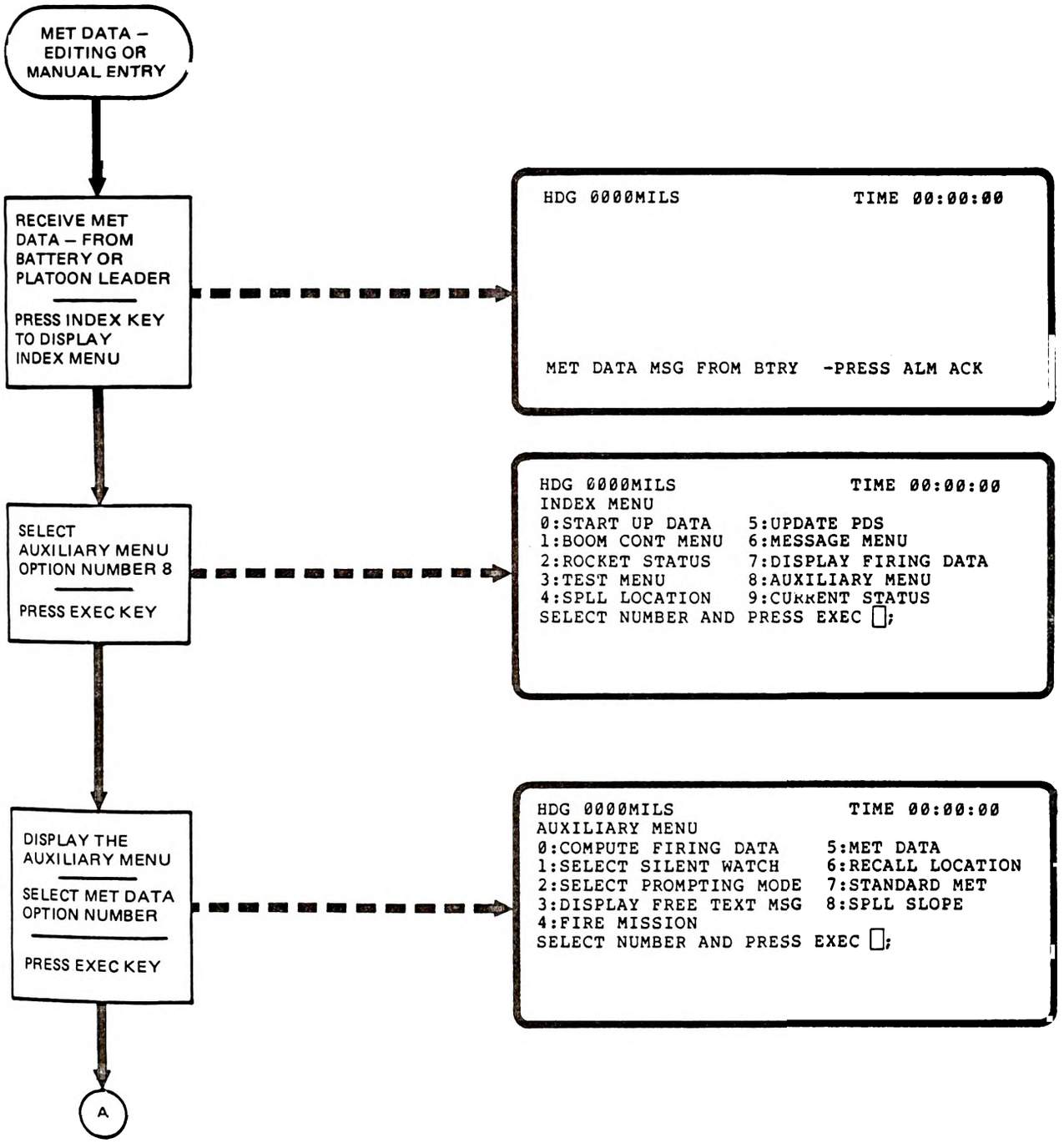


Figure 2-11. MET Data Fditing/Manual Entry Flow Diagram (Sheet 1 of 3)

2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

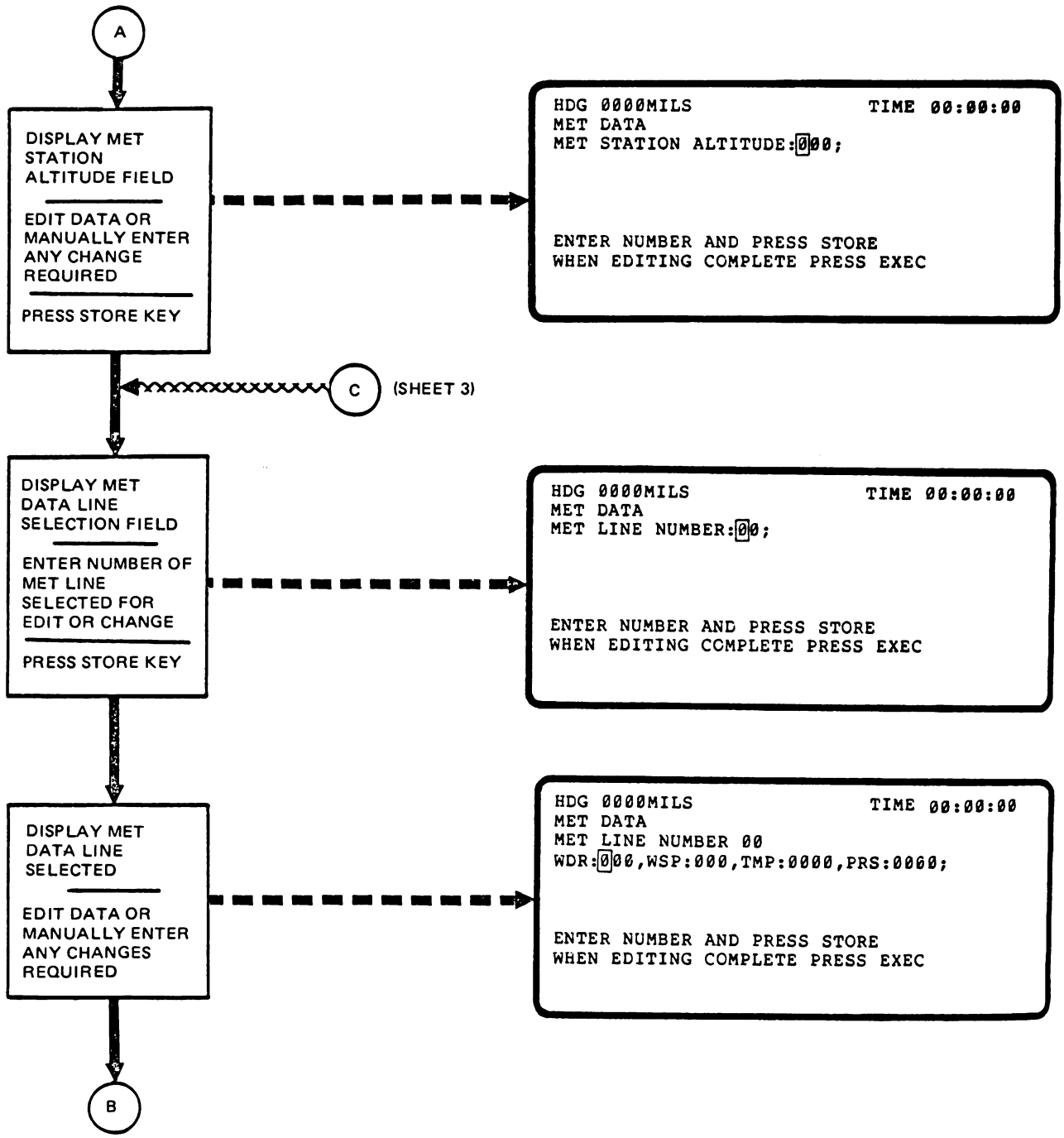


Figure 2-11. MET Data Editing/Manual Entry Flow Diagram (Sheet 2 of 3)

2-33. MET DATA EDITING/MANUAL ENTRY (CONT)

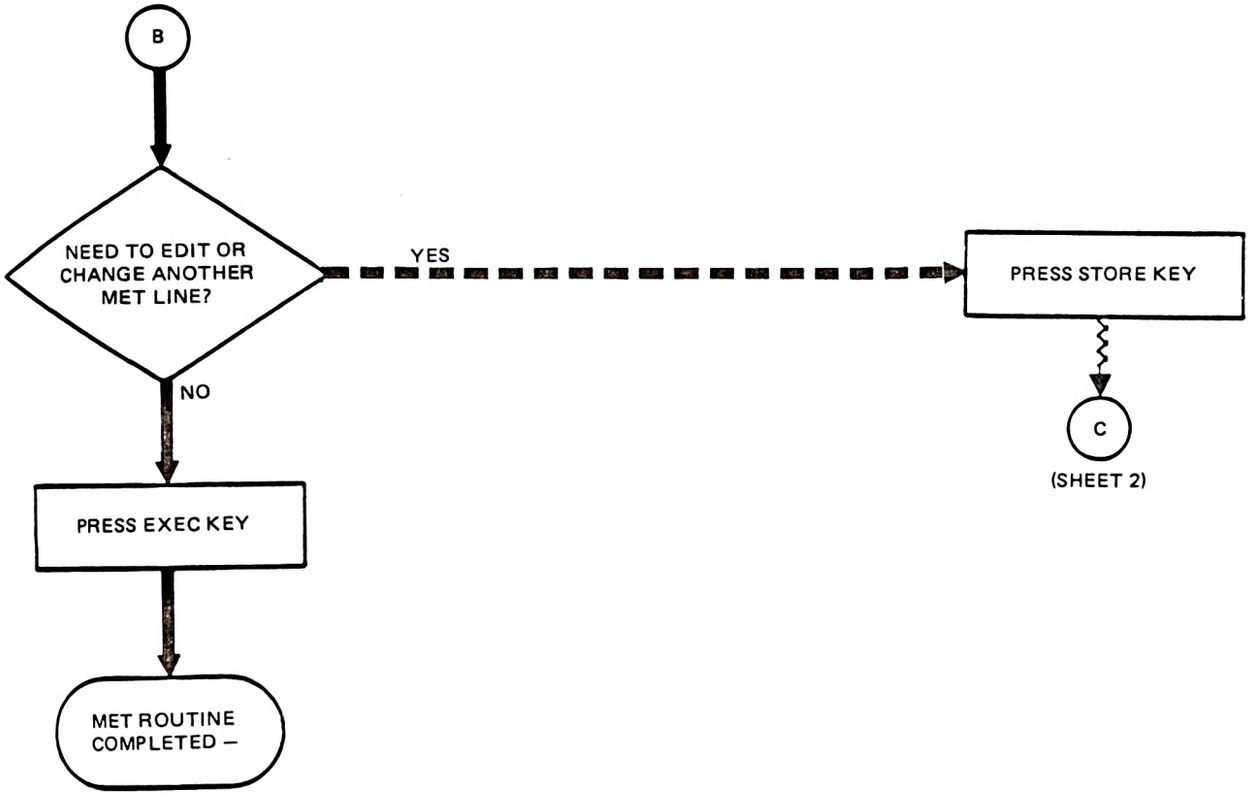
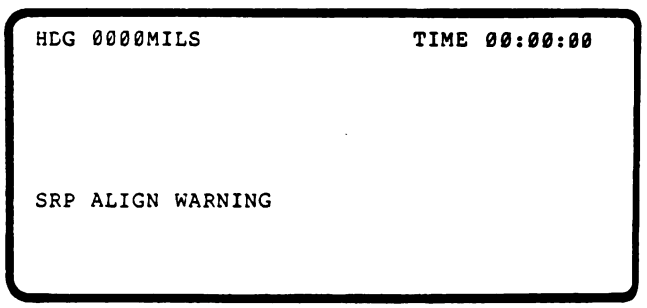


Figure 2-11. MET Data Editing/Manual Entry Flow Diagram (Sheet 3 of 3)

2-34. SRP REALIGNMENT. Normal SPLL operations require periodic SRP realignment. The exact time between realignments is not determined. The SRP is continually checking the operating conditions. Internal clocks keep an account of the time the SPLL is both moving and sitting still. When the SRP needs to be realigned, a warning will be displayed.

The following procedure uses the SRP ALIGN WARNING prompt to warn you that the SRP needs alignment. However, it is not necessary to wait until the SRP must be realigned. The SRP can be aligned at any time. The only restrictions are that the SPLL must not be moving, and the LLM must be stowed. If you press the SRP ALIGN key and the SPLL is not moving and the LLM is stowed, the SRP will align as described in paragraph c. If the SPLL is moving or if the LLM is not stowed, the ILLEGAL KEY PRESSED prompt will be displayed.

a. SRP Align Warning.



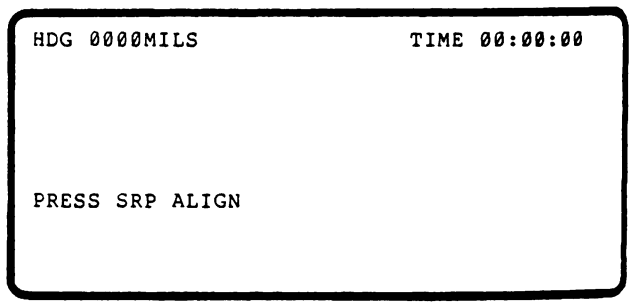
Three minutes before the SRP must be realigned, the audible alarm will sound. A warning prompt is displayed.

The alarm goes off automatically in about 10 seconds. The prompt remains displayed until the SRP ALIGN key is pressed, or another prompt must be displayed.

Nothing else happens now. This is just a warning. It gives you time to realign the SRP before it becomes necessary.

When the warning is displayed, the SRP should be realigned as soon as possible.

b. Press SRP Align Instructions.



Three minutes after the warning, PRESS SRP ALIGN prompt will be displayed and the alarm will sound.

The alarm will go off in about 10 seconds. The prompt remains displayed until SRP ALIGN key is pressed, or another prompt must be displayed.

Once this prompt is displayed, the SRP must be realigned. The LCHR LAY key will be inhibited (will not function) until the SRP is realigned. While the LCHR key is inhibited, a fire mission cannot be started. If the LCHR LAY key is pressed when it is inhibited, a PRESS SRP ALIGN prompt will be displayed again, as an error prompt at the bottom of the display.

However, once a fire mission is started, the need to realign the SRP will not interfere with the mission. The PRESS SRP ALIGN prompt will not be displayed if, LCHR LAY key is pressed before it is time to realign the SRP and the prompt appears.

2-34. SRP REALIGNMENT (CONT)

c. SRP Align.

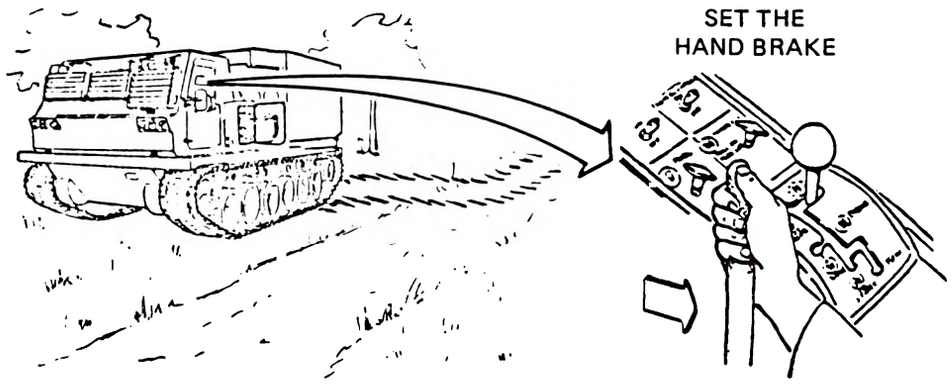
When the SRP warning prompt appears, the SPLL should be realigned as soon as possible. Realign SRP as follows.

NOTE

SRP will not start to realign if SPLL is moving, or LLM is not stowed.

(1) If moving, park the SPLL, and set the handbrake.

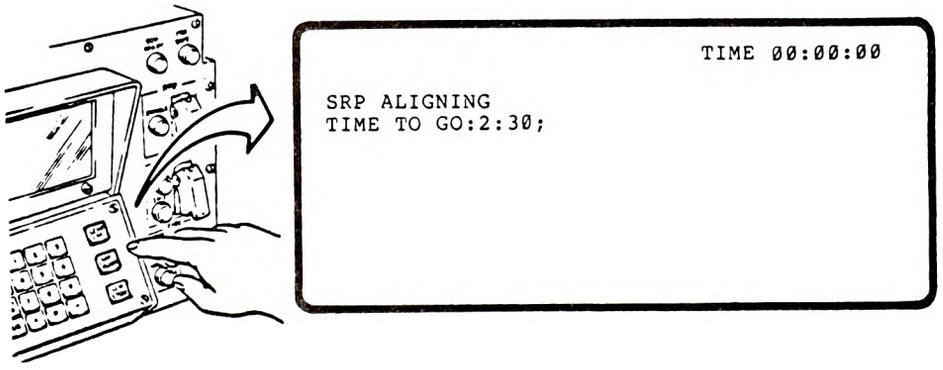
(2) Make sure the LLM is stowed.



CAUTION

Do not move SPLL during SRP realignment. If SPLL is moved, SRP/PDS data will not be usable. To return to normal operation, the FCS must be turned off, then turned back on. The SRP must go through a complete alignment and the PDS updated.

(3) When parked, press the SRP ALIGN key. SRP ALIGNING prompt will be displayed. SRP RDY indicator light will go off.

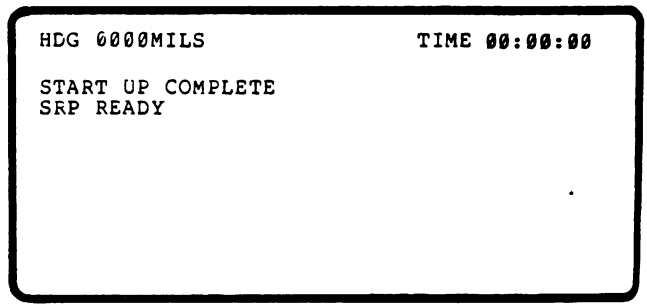


2-34. SRP REALIGNMENT (CONT)

NOTE

Allowing the SRP to stabilize 3 to 4 minutes longer after SRP READY is displayed, will increase the time before realignment is required again.

(4) When SRP realignment is completed, SRP RDY indicator light will come on and SRP READY prompt will be displayed.



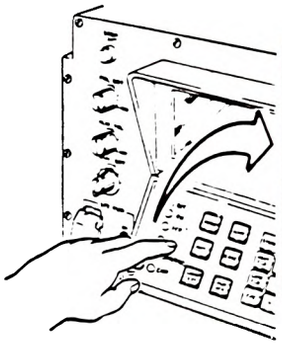
Normal operation can now continue. Release the handbrake. Continue normal operations.

2-35. MISSION FIRED MESSAGE. The mission fired message is sent to BTRY or PLT/TP at the end of a fire mission. The message contains updated target data on the fire mission just completed. It also contains the SPLLs rocket status. The message is automatically displayed. There is no way to change the data. This routine will let you review the data only. The following procedure is an example of how the mission fired message can be reviewed.

a. Select Mission Fired Message Routine.

The mission fired message routine is listed on the message menu. To display the message menu press INDEX key. The INDEX MENU will be displayed.

(1) Select the MESSAGE MENU, option number 6. Press the EXEC key. The MESSAGE MENU will be displayed.



```
HDG 0000MILS                TIME 00:00:00
INDEX MENU
0:START UP DATA    5:UPDATE PDS
1:BOOM CONT MENU   6:MESSAGE MENU
2:ROCKET STATUS    7:DISPLAY FIRING DATA
3:TEST MENU        8:AUXILIARY MENU
4:SPLL LOCATION    9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC 6;
```

(2) From the MESSAGE MENU, select the MISSION FIRED routine, option number 2. Press EXEC key.

The MESSAGE DESTINATION field will be displayed.

```
HDG 0000MILS                TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC 2;
```

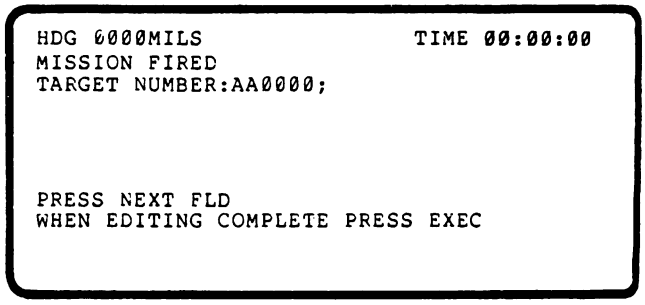
(3) Select the MESSAGE DESTINATION, 0 to send message to both BTRY and PLT/TP, and 1 to send message to PLT/TP only.

(4) Press STORE key. The first field in the mission fired message routine will be displayed.

```
HDG 0000MILS                TIME 00:00:00
MISSION FIRED
MESSAGE DESTINATION:0;   0=BTRY   1=PLT/TP


ENTER NUMBER AND PRESS STORE
```

2-35. MISSION FIRED MESSAGE (CONT)

b. Reviewing Mission Fired Message Data.



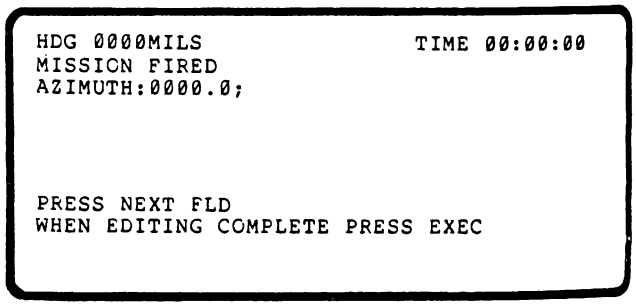
The first field in the message is the TARGET NUMBER.

(1) The TARGET NUMBER displayed is the number of the target just fired on. Press NEXT FLD key.

NOTE

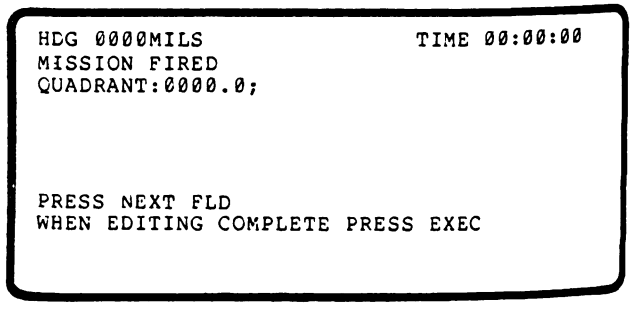
Pressing the EXEC key will end the message routine review, and the message ready prompt will be displayed.

The target AZIMUTH will be displayed.



(2) The field displays the target azimuth angle in mils.

Press NEXT FLD key. The target QUADRANT elevation field will be displayed.



(3) This field displays the target quadrant elevation angle in mils.

Press NEXT FLD key. The rocket FUZE TIME field will be displayed.

2-35. MISSION FIRED MESSAGE (CONT)

(4) This field displays the rocket fuze time for the target in seconds.

Press NEXT FLD key. The field with the time the first rocket was fired (TIME OF FIRST FIRE) at the target will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FUZE TIME:000.0;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(5) After reviewing the field, press NEXT FLD key. The NUMBER OF ROCKETS fired field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
TIME OF FIRST FIRE 00:00:00 ;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(6) This field displays the number of good rockets (no duds or hangfires) fired at the target, and the type of warheads used.

Press NEXT FLD key. The number of ROCKETS REMAINING field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
WARHEAD TYPE: M77 ;
NUMBER OF ROCKETS:00;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(7) This field displays the number of serviceable rockets remaining in the SPLL.

Press NEXT FLD key. The ROCKETS MALFUNCTION field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
ROCKETS REMAINING:00;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

2-35. MISSION FIRED MESSAGE (CONT)

(8) The type of malfunction will be indicated by a number after the words ROCKET MALFUNCTION. No number entered indicates no rocket malfunction.

Press NEXT FLD key. The FIRING POINT EASTING field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
ROCKET MALFUNCTION: ;
0=HANGFIRE    1=MISFIRE    2=DUD FUZE


PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(9) The firing point easting displayed is the SPLL position easting computed by the PDS.

Press NEXT FLD key. The FIRING POINT NORTHING field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FIRING POINT EASTING:000000;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(10) The firing point northing displayed is also the SPLL position northing computed by the PDS.

Press NEXT FLD key. The FIRING POINT ALTITUDE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FIRING POINT NORTHING:00000000;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(11) The firing point altitude displayed is the SPLL position altitude computed by the PDS.

Press NEXT FLD key. The FIRING POINT GRID ZONE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FIRING POINT ALTITUDE:+0000;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

2-35. MISSION FIRED MESSAGE (CONT)

(12) The firing point grid zone displayed is the grid zone sent to the SPLL with the fire mission.

Press NEXT FLD key. The FIRING POINT SPHEROID field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FIRING POINT GRID ZONE:+00;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

(13) The firing point spheroid displayed is the spheroid sent to the SPLL with the fire mission.

After reviewing the field, press NEXT FLD key.

```
HDG 0000MILS                    TIME 00:00:00
MISSION FIRED
FIRING POINT SPHEROID:0;



PRESS NEXT FLD
WHEN EDITING COMPLETE PRESS EXEC
```

c. Mission Fired Message Ready Prompt.

(1) The MISSION FIRED MESSAGE READY prompt is displayed after the spheroid field. The prompt will also be displayed after any field in the message routine when EXEC key is pressed. (Pressing the EXEC key ends the message review routine.)

(2) Pressing the XMIT key will send the message. To clear the message without sending it over the radio, press C/E key. When either the XMIT or the C/E key is pressed, the prompt will be erased.

```
HDG 0000MILS                    TIME 00:00:00




MISSION FIRED MESSAGE READY-PRESS XMIT
```

2-36. SHUTDOWN. This shutdown procedure is intended for use, after normal operation, in shutting down the SPLL for a long period of time. A long period of time is described as more time taken than necessary for the FCS to loose the nonvolatile memory. Also, the procedure assumes that the SPLL will not be moved from its location while shutdown. To remain shutdown until the FCS memory is lost, requires a complete system startup before resuming normal operations again.

Sending the battery a location message at shutdown, allows you to easily recall your position coordinates at startup. Recording your position coordinates is not required in this procedure. However, if you are not sure that battery will remain on the air, record your position coordinates at shutdown. This will make sure they are available for you at startup.

This procedure includes a general reminder to turn off the command intercom equipment. Instructions for complete shutdown of the radio set are in TM 11-5820-401-12 and TM 11-5830-340-12 for the intercom. Shutdown instructions for the carrier vehicle are provided in TM 9-1450-646-10 and local operating instructions.

a. Send SPLL Location/Status Message.

To give the battery your present location, you must send a SPLL location/status message.

(1) Press INDEX key and display the INDEX MENU.

(2) Select the MESSAGE MENU, option number 6, and press the EXEC key. The MESSAGE MENU will be displayed.

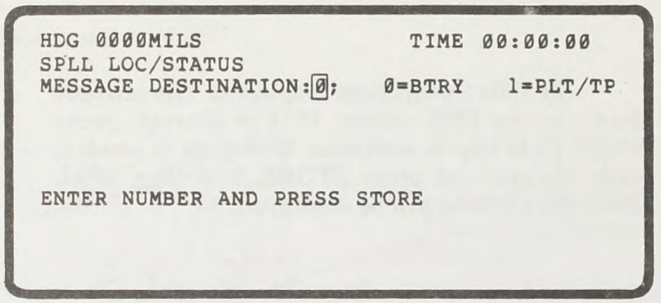
```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(3) Select the SPLL LOC/STATUS message, option number 0, and press the EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
MESSAGE MENU
0:SPLL LOC/STATUS
1:MASKING DATA
2:MISSION FIRED
3:MISSION STATUS
4:REQUEST
SELECT NUMBER AND PRESS EXEC 0;
```

2-36. SHUTDOWN (CONT)

After the loc/status message is selected, the MESSAGE DESTINATION prompt will be displayed.

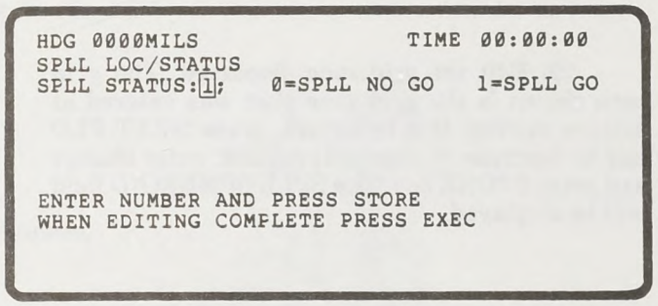


NOTE

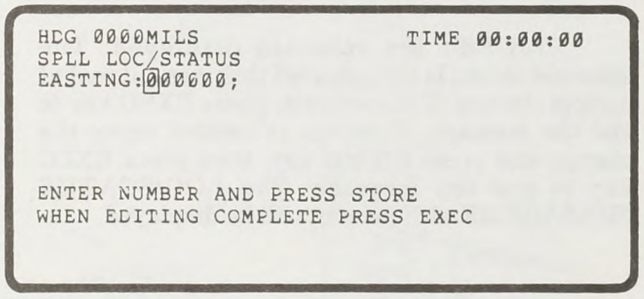
Shutdown procedures assume normal shutdown of an operating SPLL. If SPLL status is no-go, refer to paragraph 2-28, c for sending a SPLL no-go status message.

(4) Select BTRY, option number 0, as the message destination and press STORE key. The SPLL STATUS selection field will be displayed.

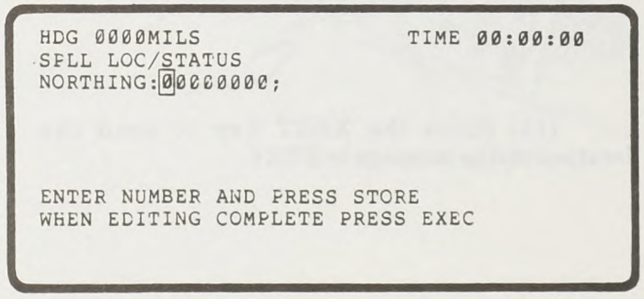
(5) Enter the status of your SPLL. Press STORE key. The SPLL EASTING field will be displayed.



(6) Edit the easting displayed. The easting shown is the PDS output. If it is correct, press NEXT FLD key to continue. If change is needed, enter the change and press STORE key. The SPLL NORTHING field will be displayed.



(7) Edit the northing displayed. It is also the PDS output. If northing is correct, press NEXT FLD key to continue. If change is needed, enter change and press STORE key. The SPLL ALTITUDE field will be displayed.



2-36. SHUTDOWN (CONT)

(8) Edit the altitude displayed. The altitude shown is the PDS output. If it is correct, press NEXT FLD key to continue. If change is needed, enter change and press STORE key. The SPLL GRID ZONE field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
ALTITUDE:+0000;


ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(9) Edit the grid zone displayed. The grid zone shown is the grid zone that was entered at system startup. If it is correct, press NEXT FLD key to continue. If change is needed, enter change and press STORE key. The SPLL SPHEROID field will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
GRID ZONE:+00;


ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(10) Edit the spheroid displayed. The spheroid shown is the spheroid that was entered at system startup. If it is correct, press EXEC key to end the message. If change is needed enter the change and press STORE key, then press EXEC key to end the message. The LOC/STATUS MESSAGE READY prompt will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
SPLL LOC/STATUS
SPHEROID:0;


ENTER NUMBER AND PRESS STORE
WHEN EDITING COMPLETE PRESS EXEC
```

(11) Press the XMIT key to send the location/status message to BTRY.

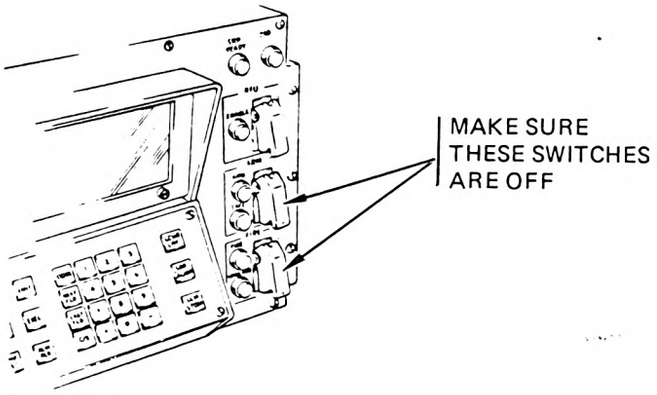
```
HDG 0000MILS                    TIME 00:00:00




LOC/STATUS MESSAGE READY-PRESS XMIT
```

2-36. SHUTDOWN (CONT)

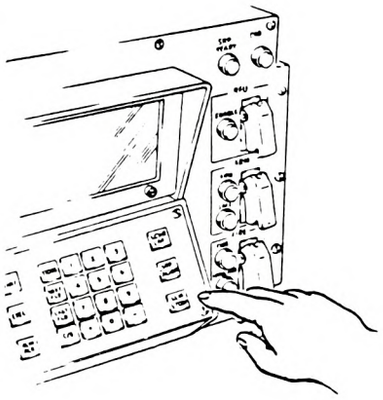
b. Equipment Check and Power off.

Visually check the FCP to make sure the system is ready for power turn off.

(1) Check the front panel switches. Lift the ARM, and FIRE switchguards and make sure the switches are off, then put the switchguards down.



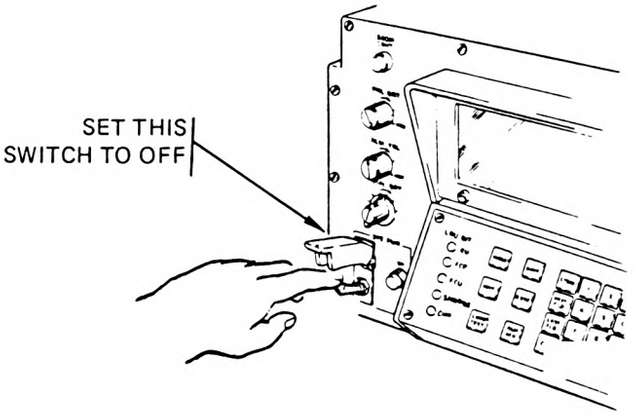
(2) Make sure the LLM is stowed. If it is not stowed, press LLM STOW key and stow the LLM.



(3) If the LLM was stowed, lift the switchguard and set the SYS PWR switch to OFF, then put the switchguard down.

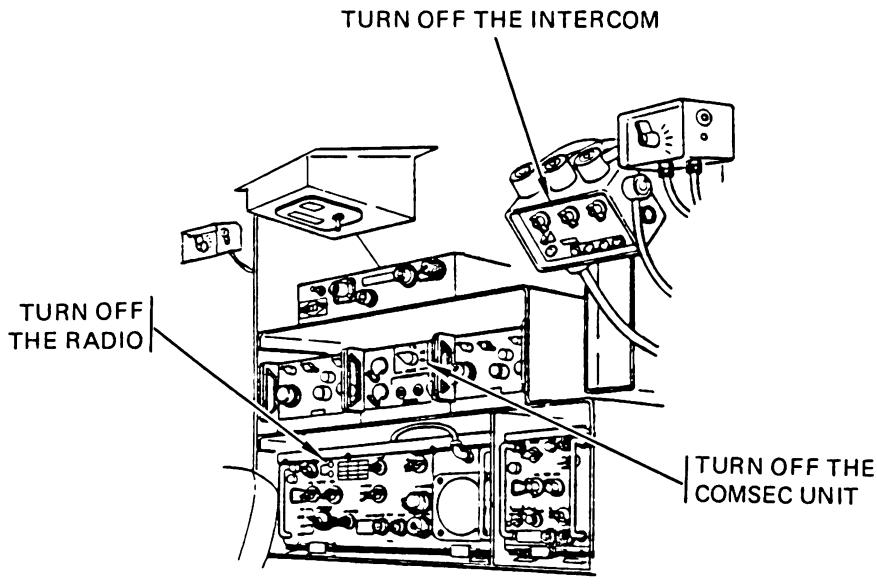
If the LLM was not stowed and you had to stow it, wait 30 seconds to allow hydraulic system pressure to reduce. Lift the switchguard and set the SYS PWR switch to OFF, then put the switchguard down.

The FCS is now turned off. All switches and switchguards should be down, and all indicator lights off.



2-36. SHUTDOWN (CONT)

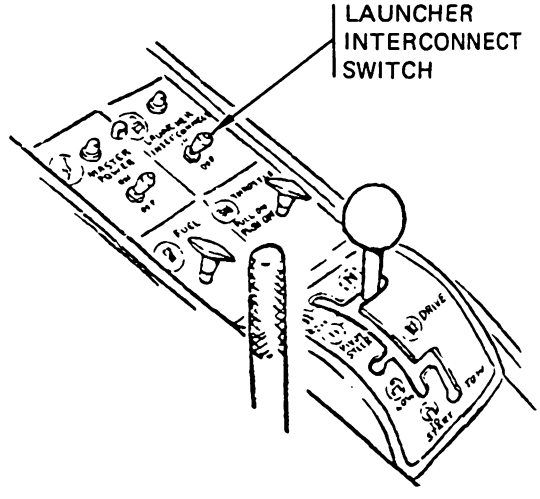
(4) Turn off the COMSEC units, the radio sets ,and the intercom system.



NOTE

Turn off the carrier LAUNCHER INTERCONNECT switch only if carrier engine is to be shutdown. This is so that SPLL batteries can charge when carrier engine is running.

(5) Set the carrier LAUNCHER INTERCONNECT switch on the carrier instrument console to OFF.



Section V. OPERATION UNDER UNUSUAL CONDITIONS

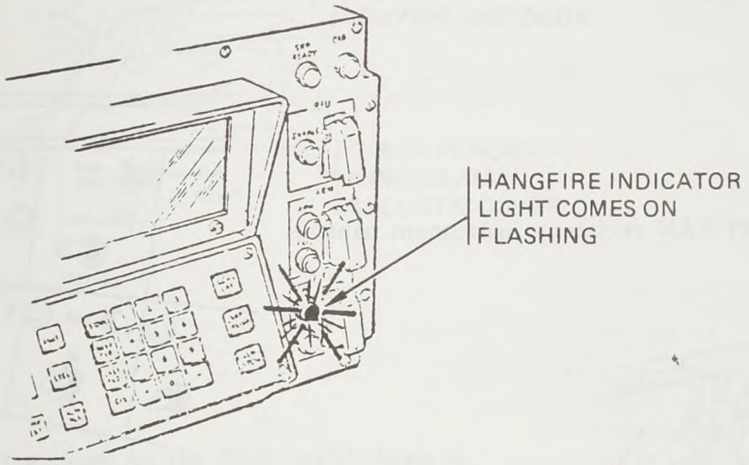
2-37. EMERGENCY PROCEDURES.

NOTE

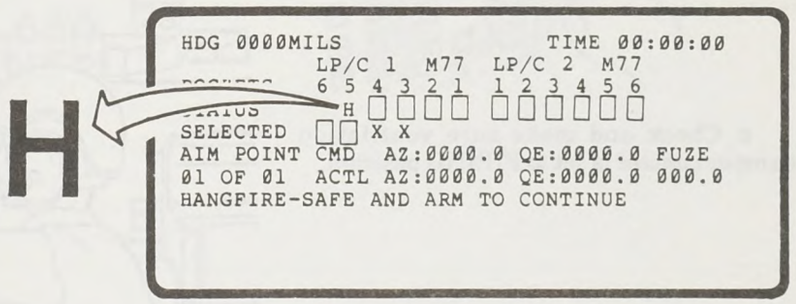
Refer to TM 9-1450-646-10 for carrier vehicle emergency operating procedures.

If your SPLL stops working properly during a fire mission, notify your platoon leader right away. Some problems may not be serious enough to stop a fire mission. Other problems may require you to stop immediately.

2-38. HANGFIRE PROCEDURES. If one or more rockets hangfire, the HANGFIRE indicator light on the front of the FCP will come on flashing. It will continue to flash until the LLM is stowed after the BC is used, such as during a reload operation.

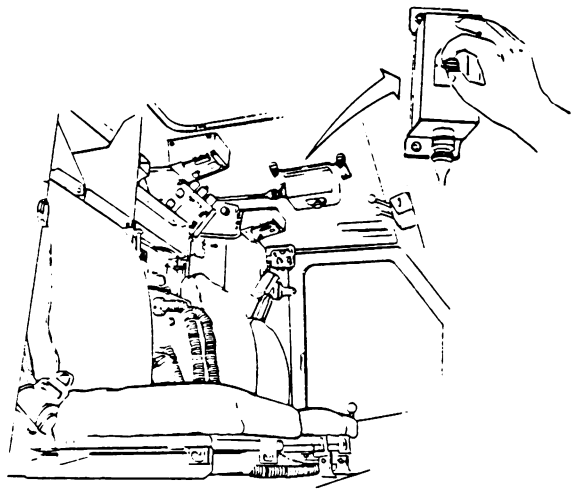


In the rocket status message, the letter H will appear on the status line under the number of the rocket, or rockets, that is a hangfire.



2-38. HANGFIRE PROCEDURES (CONT)

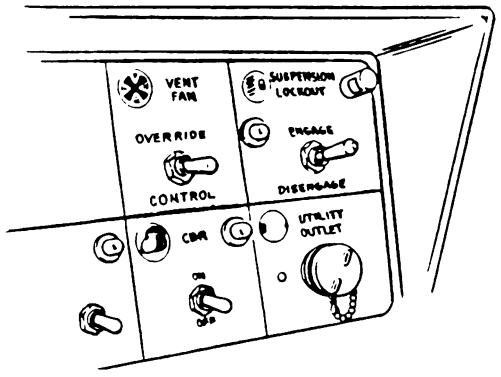
If a hangfire should occur and you are ordered to stay in position, double check the SPLL cab.



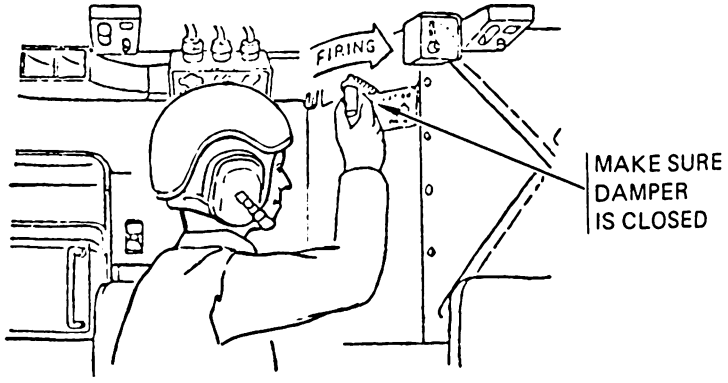
WARNING

Do not set VENT FAN switches to HIGH or OVERRIDE when ventilation damper (intake filter) is in FIRING position. Dangerous fumes may be drawn into the SPLL cab and harm you.

a. Make sure VENT FAN switch on cab ceiling is set to MED.



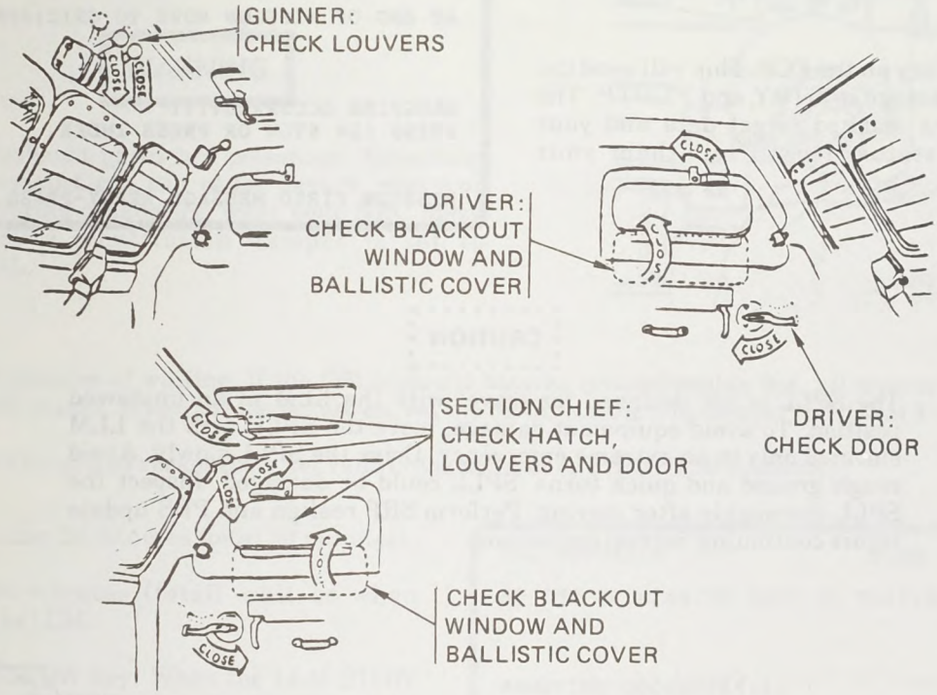
b. Make sure VENT FAN switch on instrument panel is set to CONTROL.



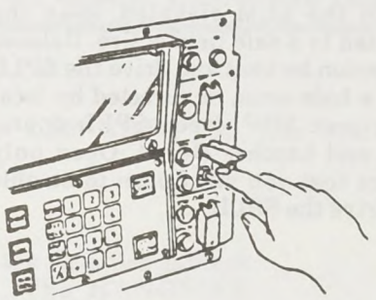
c. Check and make sure ventilation damper control is set to FIRING position.

2-38. HANGFIRE PROCEDURES (CONT)

d. Check and make sure all doors, windows, hatches, and louvers are closed.



e. When rocket firing stops, set the ARM switch down to safe the system.



2-38. HANGFIRE PROCEDURES (CONT)

f. A hangfire message will appear on the FCP display.

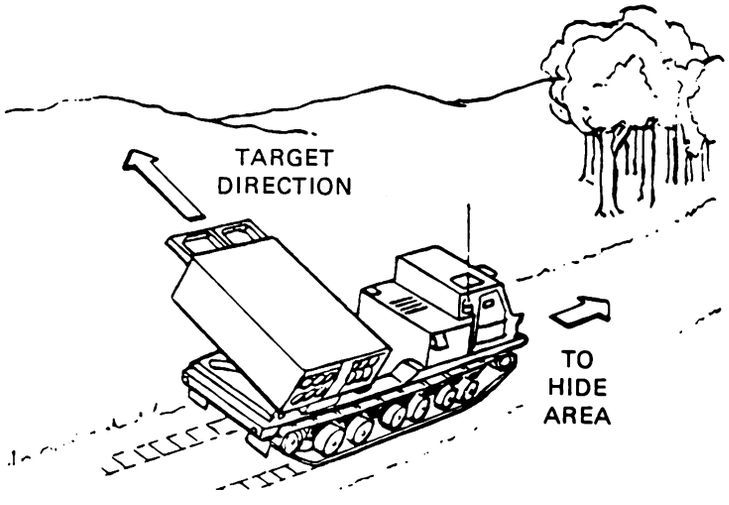
Press the XMIT key on the FCP. This will send the mission fired message to BTRY and PLT/TP. The message contains updated target data and your SPLLs rocket status. It will tell them your situation.

```
HDG 0000MILS                    TIME 00:00:00
AT END OF MISSION MOVE TO GRID:0000 0000;


HANGFIRE OCCURRED!!!!
PRESS LLM STOW OR PRESS INDEX

MISSION FIRED MESSAGE READY-PRESS XMIT
```

CAUTION

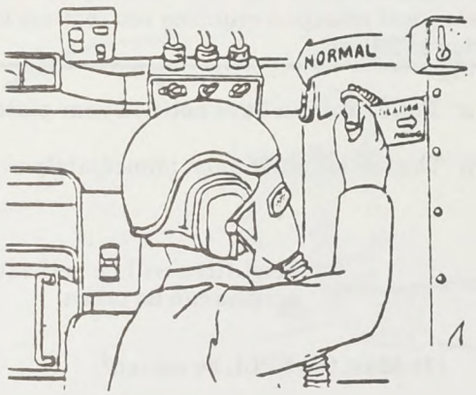
The SPLL is not designed for travel with the LLM in an unstowed position. To avoid equipment damage, move the SPLL with the LLM elevated only in an extreme emergency. Drive the SPLL slowly. Avoid rough ground and quick turns. SPLL could be damaged. Inspect the SPLL thoroughly after moving. Perform SRP realign and PDS update before continuing normal operations.

g. Stay in the firing position unless ordered to move the SPLL. If ordered to move with the LLM elevated, keep the LLM pointed to a safe field of fire. Release the suspension lockout and drive the SPLL slowly to a hide area, as directed by local orders or unit SOP. Keep SPLL doors, windows, and hatches closed. Open only the louvers that you must open to be able to see to drive the SPLL.



2-38. HANGFIRE PROCEDURES (CONT)

h. If a 30 minute wait time is ordered before starting rocket disposal action, first wait for 10 minutes!



WARNING

Rocket exhaust gases are poisonous. Breathing rocket exhaust gas can cause severe injury or death. During a hangfire, wear your NBC mask while SPLL ventilation damper is set to NORMAL.

i. After 10 minutes of waiting, if the SPLL should become uncomfortably hot, all crewmembers should put on their NBC masks. When the masks are on, set the SPLL ventilation damper to NORMAL.

Stay alert. If the hangfired rocket fires, set ventilation damper to FIRING immediately.

j. Wait another 20 minutes (total 30 minutes).

k. After 30 minutes (total) wait or when ordered, stow the LLM.

Press the LLM STOW key. When the LLM STOW key is pressed, the FCP prompt will change to HANGFIRE OCCURRED-PRESS INIT TO OVERRIDE. The LLM will not begin to stow right away.

```
HDG 0000MILS                    TIME 00:00:00
AT END OF MISSION MOVE TO GRID:0000 0000;


HANGFIRE OCCURRED!!!!
PRESS LLM STOW OR PRESS INDEX


MISSION FIRED MESSAGE READY-PRESS XMIT
```

To stow the LLM you must also press INIT key, then press the LLM STOW key. The HANGFIRE OCCURRED!!! prompt will be erased and the LLM will stow.

NOTE

The preceding procedures allow you to override the hangfire prompt and stow the LLM with a hangfired rocket. The HANGFIRE OCCURRED!!! prompt will be erased, but the HANGFIRE indicator light on the FCP will stay on until the LPC with the faulty rocket is unloaded.

l. After LLM is stowed, wait for further orders, or follow unit SOP to dispose of LP/Cs. Keep SPLL doors, windows, and hatches closed while SPLL is moving to the unload site. Open only the louvers that you must open to be able to see to drive the SPLL.

m. After unloading, continue with normal operating procedures.

2-39. LAUNCH TUBE FIRE EMERGENCY PROCEDURES. If a fire is discovered in a launch tube, do not move the SPLL unless absolutely necessary. It will only fan the fire and delay emergency procedures. If the tactical situation requires you to move the SPLL, move only a minimum safe distance. Take emergency action as follows:

a. Make sure you have notified your platoon leader and battery.

b. The section chief must immediately evaluate the situation and determine the action to be taken.

NOTE

Most fires will be self-extinguishing and will go out before emergency actions can be taken.

(1) Must the SPLL be moved?

(2) Does there appear to be time for the SPLL to complete stowing?

c. If the SPLL must be moved and time permits, allow the SPLL to complete stowing. When stowing is complete, move SPLL to safe location. Continue with paragraph d. If SPLL must be moved and you cannot wait to complete stow operation, carefully drive SPLL to safe location as LLM stows.

d. As the LLM stows, or immediately after parking at safe position, press INDEX key. The INDEX MENU will be displayed. From the INDEX MENU select BOOM CONT menu, option number 1. Press EXEC key. The BOOM CONTROL menu will be displayed.

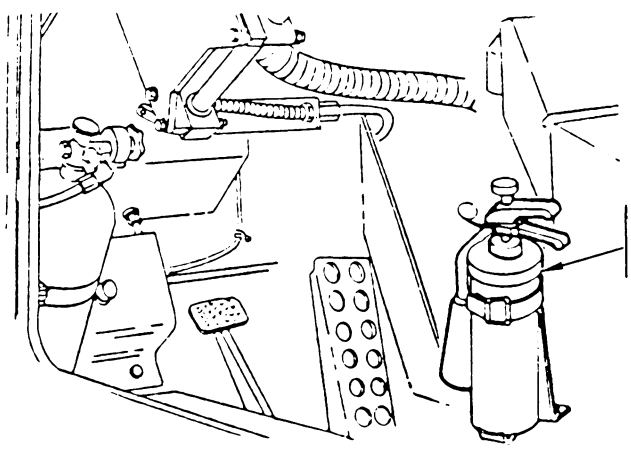
From the BOOM CONTROL menu select the reloading position (LLM RIGHT or LLM LEFT) best suited for unloading LP/Cs at the site where you are parked. Press EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC ;
```

WARNING

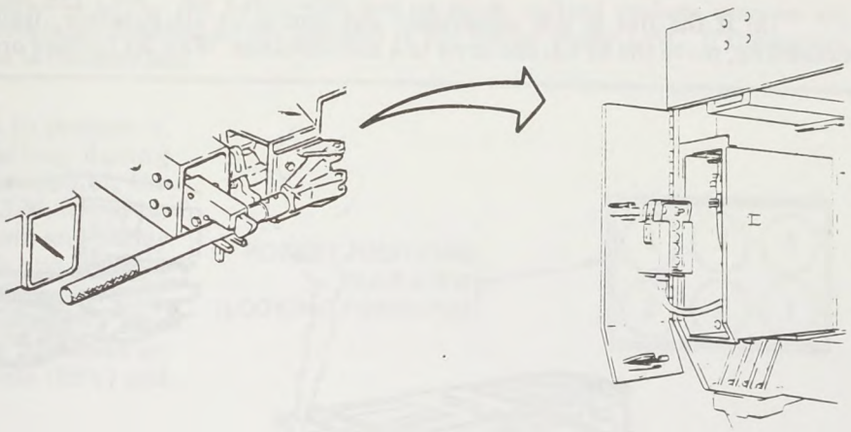
Fumes from burning launch tube are NOXIOUS. If a large amount of smoke is present, stand upwind if possible. If not, wear your NBC mask.

e. As the LLM moves into position, one crewmember must get the portable fire extinguisher, located in the cab beside the driver, and exit the cab. Take your NBC mask with you. Go immediately to the side of the SPLL that showed evidence of fire. (Most fires will usually start at the front end of the LLM.) Get into position to use the portable fire extinguisher on the fire.



2-39. LAUNCH TUBE FIRE EMERGENCY PROCEDURES (CONT)

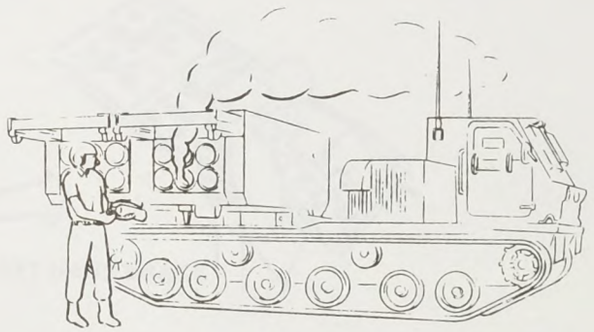
f. At the same time, second crewmember must exit cab. Take your NBC mask with you. Move into position to unload the LP/C. Prepare to unlatch the LP/C, disconnect the umbilical cable, and remove the BC from the storage compartment.



WARNING

Danger of explosion of burning rocket is minimal. Burning rocket propellant is toxic, and cannot be extinguished. Wear your NBC mask if you must be near burning rocket propellant.

g. When the crewmember reaches the burning launch tube, use the fire extinguisher. Direct the flow from the extinguisher toward the base or bottom of the flame.



h. Section chief must immediately decide if LP/C, with burning launch tube, presents an immediate threat to crew and equipment. Determine the following:

(1) Was the fire put out using portable fire extinguisher?

(2) Is there a danger of the fire igniting the launch tube again? (Once out, the danger of the launch tube fire igniting again is minimal.)

(3) Are there unfired rounds in the LP/C? If so, are they in immediate danger of catching on fire?

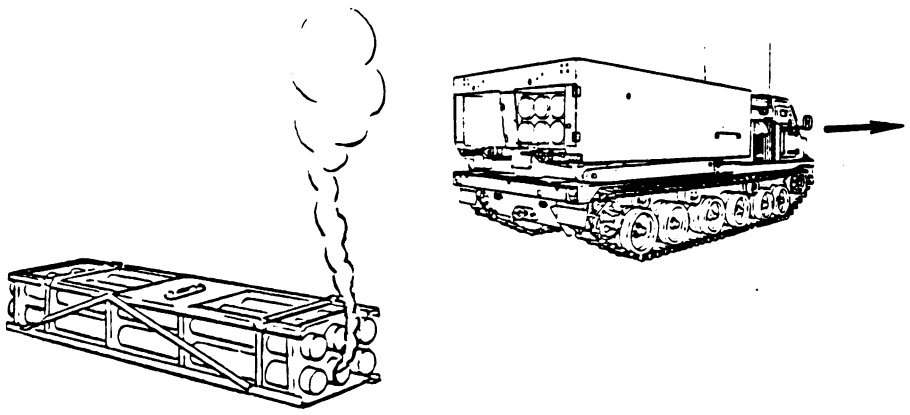
i. Based on the section chiefs decision, one of the following actions should be taken:

(1) If the LP/C was empty, and the fire is put out, the danger is over. Advise your platoon leader of the situation. Normal operations can continue.

(2) If the LP/C has unexpended rounds and the fire is out, advise your platoon leader. Wait for instructions.

2-39. LAUNCH TUBE FIRE EMERGENCY PROCEDURES (CONT)

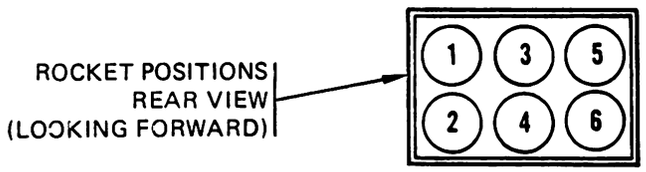
(3) If the fire is not completely out and if at all possible, unload the LP/C immediately. After unloading, move the SPLL and crew to a safe distance. Wait for further orders.



(4) If fire is out of control, abandon the SPLL. Move crew to a safe distance.

2-40. UNLOADING UNBALANCED LP/C. An LP/C with one or more unfired rockets may be an unbalanced LP/C. The amount of unbalance depends on the location of the rocket in the LP/C. If the rocket is number 1, 2, 5, or 6, the unbalance is the greatest.

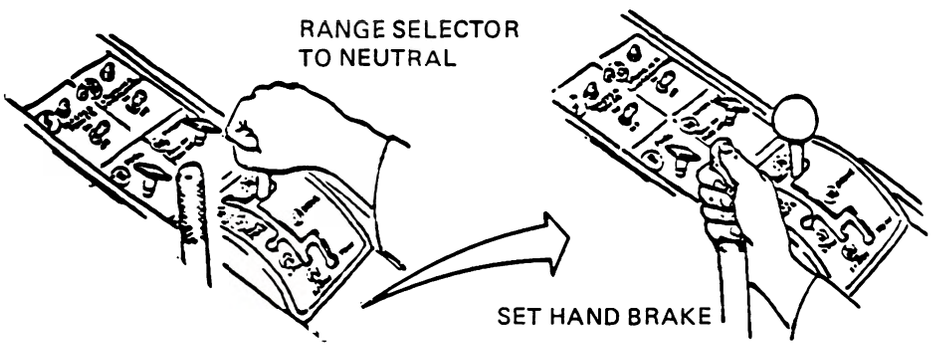
An unbalanced LP/C with rocket(s) in position 1, 2, 5, or 6, requires special handling during unloading. When the LP/C is suspended on the wire rope as it is lowered from the LLM, it will tip to one side. This causes the hoist hook and pulley assembly to tip. The pulley assembly and the wire rope could be damaged as the LP/C is lowered, unless special precautions are taken. The following procedures describe a way to unload an unbalanced LP/C on a resupply vehicle (RSV) and prevent equipment damage.



a. Notify battery or platoon leader, according to unit SOP, and request that an empty RSV meet the SPLL at the unloading location.

b. At the unloading location, park the SPLL on the flattest ground possible. There must be enough room for the RSV to park along side and about 2 to 2-1/2 meters away from SPLL.

(1) When the SPLL is parked, signal driver to move RANGE SELECTOR to NEUTRAL and set handbrake.



2-40. UNLOADING UNBALANCED LP/C (CONT)

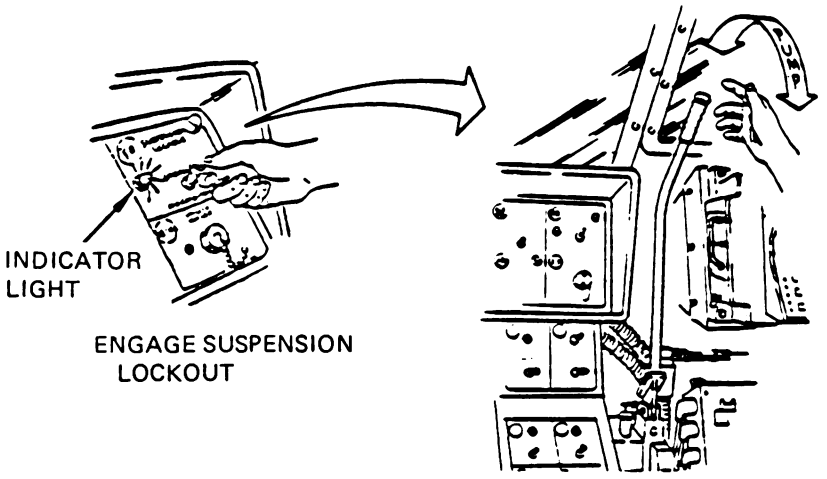
CAUTION

Do not drive SPLL with suspension lockout system ENGAGED. Suspension system can be damaged.

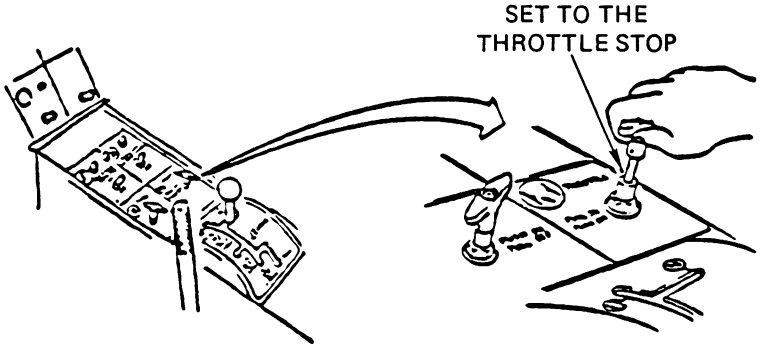
NOTE

After the suspension lockout has been engaged, the hydraulic pressure may lower slightly. If the indicator light goes off, pump the handle again to turn the light back on.

(2) Set SUSPENSION LOCKOUT switch to ENGAGED. Operate suspension lockout pump handle until SUSPENSION LOCKOUT ENGAGED indicator light comes on. Lock the handle in forward position.



(3) Pull the THROTTLE control all the way out to the throttle stop, so that the engine alternator is charging.



2-40. UNLOADING UNBALANCED LP/C (CONT)

c. After the SPLL is parked, press the INDEX key and display the INDEX MENU. From the menu select BOOM CONT menu, option number 1. Press the EXEC key. The BOOM CONTROL menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC □;
```

d. From the BOOM CONTROL menu select LLM RIGHT, option number 0. Press EXEC key. The BOOM CONTROL position field will be displayed and the LLM will begin to move to the unloading position selected.

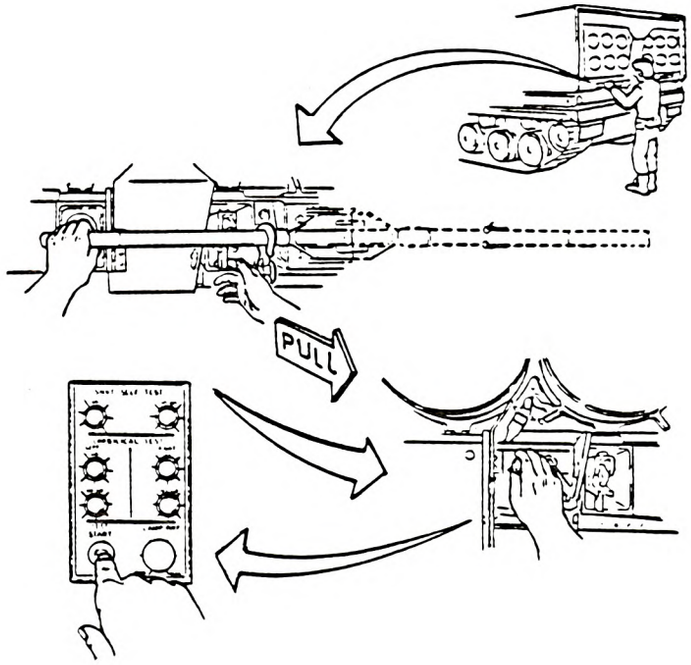
```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

e. When the LLM reaches the unloading position, prepare the SPLL for unloading.

WARNING

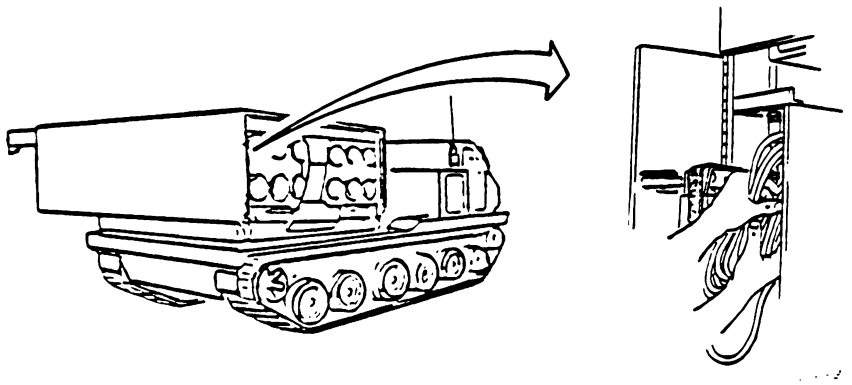
When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety restraint hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

(1) Unlatch the LP/C holddown latch. Disconnect the latch handle safety restraint hook. Disconnect and test the umbilical cable.

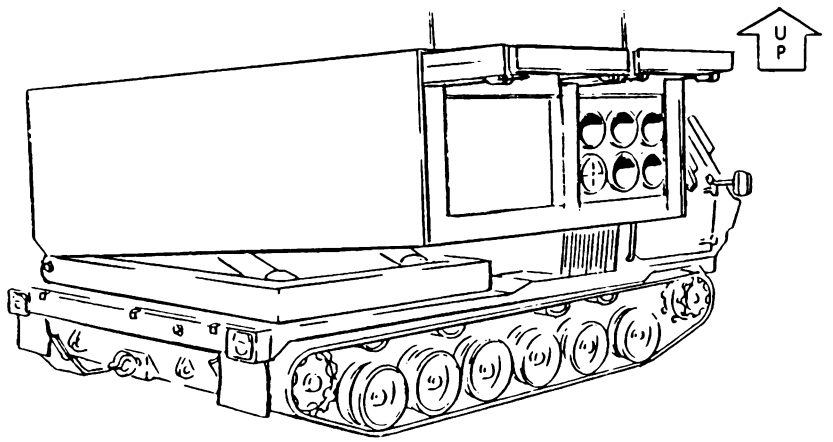


2-40. UNLOADING UNBALANCED LP/C (CONT)

(2) Remove the BC from the storage compartment.

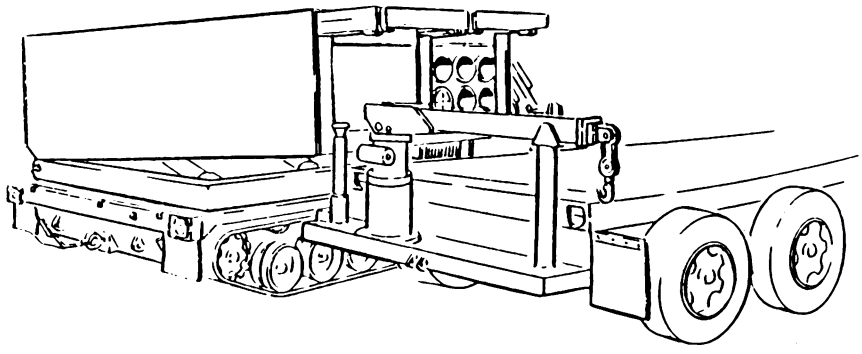


(3) Use BC and raise front of LLM high enough to allow empty RSV to park along side SPLL, without hitting the LLMs main booms.



f. Park empty RSV along side of and about 2 to 2-1/2 meters away from SPLL.

g. Without lowering the LLM, use the BC and lift the LP/C up against the boom carriage.

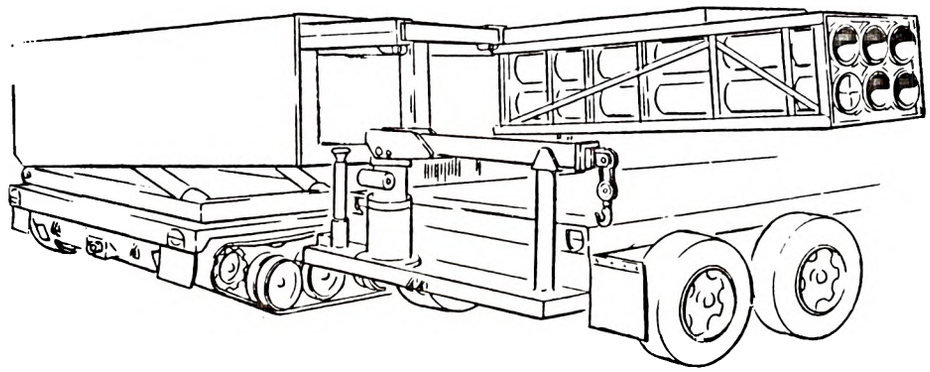


2-40. UNLOADING UNBALANCED LP/C (CONT)

CAUTION

Before extending boom, make sure front of LLM is raised high enough **for LP/C** to clear the RSV cargo bed, when boom is extended.

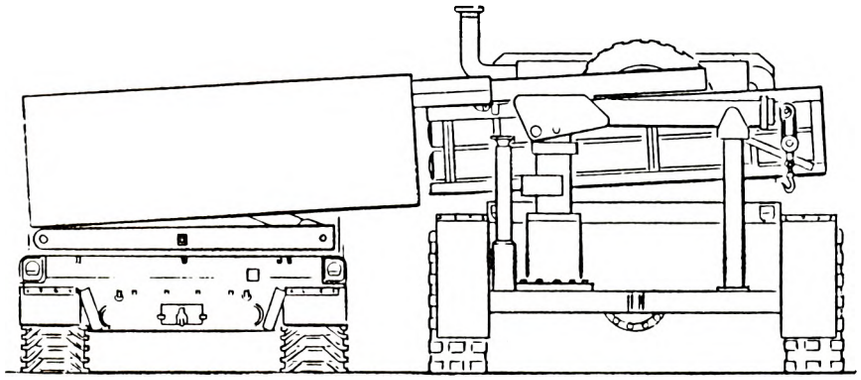
h. **Using the BC, extend** the boom and LP/C all the way out.



i. Using **BC**, lower front of LLM until **bottom** of LP/C is about 50 cm from **RSV cargo** bed.

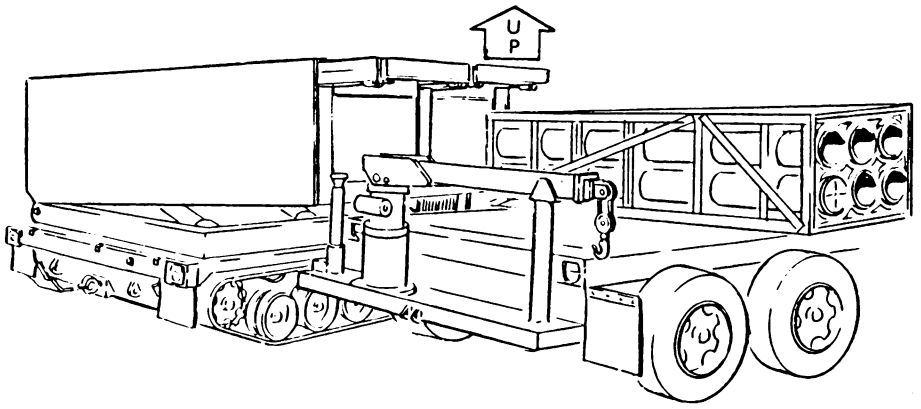
j. Using **BC**, lower LP/C onto RSV cargo **bed.**

k. Disconnect hoist hooks from LP/C, then **raise** hoist hooks up against **carriage,** until they engage the limit **switch and** stop.



2-40. UNLOADING UNBALANCED LP/C (CONT)

l. Using the BC, retract the boom, then raise the front of the LLM so that the RSV will clear the main booms as it is moved away from the SPLL.

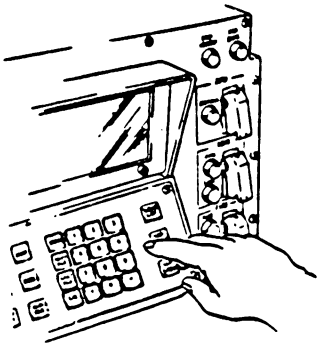


CAUTION

The SPLL is not designed for travel with the LLM in an unstowed position. To avoid equipment damage, move the SPLL with the LLM elevated only in an extreme emergency. Drive the SPLL slowly. Avoid rough ground and quick turns. SPLL could be damaged. Inspect the SPLL thoroughly after moving. Perform SRP realign and PDS update before continuing normal operations.

m. Move the RSV with the unbalanced LP/C away from the SPLL.

n. Latch the holddown latch. Connect the latch handle safety restraint hook to the latch handle. Store the BC.



o. Stow the LLM.

p. Disengage the suspension lockout and continue normal operation. Dispose of LP/C according to unit SOP.

2-41. RELOADING FROM A RESUPPLY VEHICLE. Reloading the SPLL directly from the resupply vehicle (RSV) is time consuming and reasonably difficult. This reloading method should be used only when there are no other methods available for reloading the SPLL. The loading area used for this type reloading operation should be fairly level and clear of obstacles. The operation requires the use of force to hold the LP/Cs in set positions as they are lifted. The use of guidelines is necessary. The reloading should not be attempted without them. Not using them will place the crewmembers in hazardous positions during the operation. Guidelines of 15 millimeters diameter or larger are recommended. Performing this operation in high winds increases the hazards. It is recommended that this operation not be performed during winds of 24 kilometers per hour (15 mph) or more.

The reloading operation can be performed with the SPLL parked parallel to the RSV or backed up to it. The procedure described in this paragraph will have the SPLL parked parallel to the RSV. If the SPLL is backed up to the RSV, the distances described will remain the same. Positions and tasks described and illustrated will have to be adjusted as required. These procedures also describe loading LP/Cs stacked two high on the RSV. The positions and tasks described also apply when the LP/Cs are loaded directly from the RSV bed.

Position of the SPLL, causes the hoist cables to have to be twisted approximately 90 degrees to fasten the hooks to the LP/Cs. In order to lift an LP/C with the hoist cable twisted, there must be at least 3/4-meter space between the upper pulleys and the LP/C hoisting rod.

Because of the twist in the hoist cable, and position of the LP/Cs, only one LP/C can be loaded at a time. When the LP/C is lifted, the weight of the LP/C and the twist in the hoist cable will cause the LP/C to turn quickly to untwist the hoist cable. Two guidelines must be used to help steady the LP/C. Care must be taken not to let the LP/C swing hard into other equipment. Pressing and quickly releasing the HOOK UP switch on the BC several times will allow the LP/C to move a little at a time and its swing will be easier to control. Also, because of the position of the SPLL to the RSV, all movement of the LLM should be controlled using the BC. Using any of the automatic positioning options listed on the BC menu is not recommended.

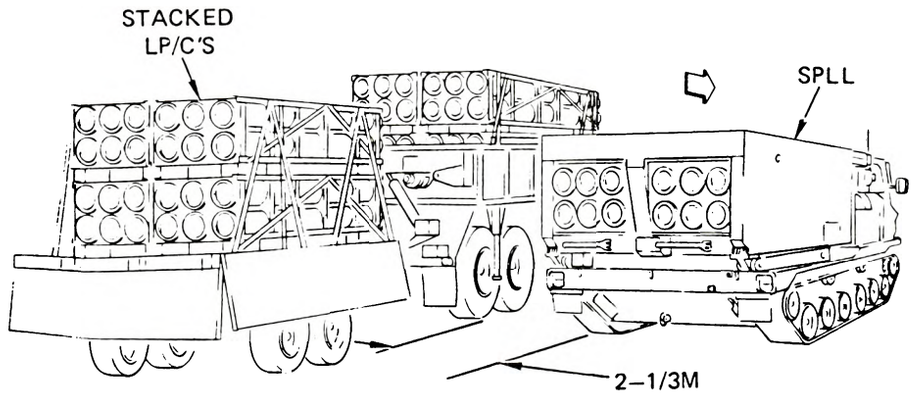
The following procedures describe, in general terms, how a SPLL can reload when parked parallel to the RSV and the LP/Cs are stacked two high. Exact positions and task descriptions are not described. The positions and tasks described are an example of a loading method. The positions and tasks described in paragraph 2-32 for loading LP/Cs off the ground should be followed where possible. Adjust the operations described as required by the procedures in this paragraph and the local conditions at the reloading area.

Reload LP/Cs, when parked parallel to the RSV, using the following procedures.

a. Unload Empty LP/Cs.

(1) Park with the side of the SPLL about 2-1/3 meters from the RSV.

(2) Engage the suspension lockout system and set the SPLL engine throttle.



2-41. RELOADING FROM A RESUPPLY VEHICLE (CONT)

(3) Press the FCP INDEX key. Display the INDEX MENU and select the BOOM CONT menu, option number 1. Press EXEC key. The BOOM CONTROL menu will be displayed.

Select BOOM CONT MANUAL, option number 4. Press EXEC key.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC 4;
```

A field showing BC operation with the LLM headings was selected will be displayed.

The travel lock will unlock, the LDS will come on, and the BC will be turned on.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

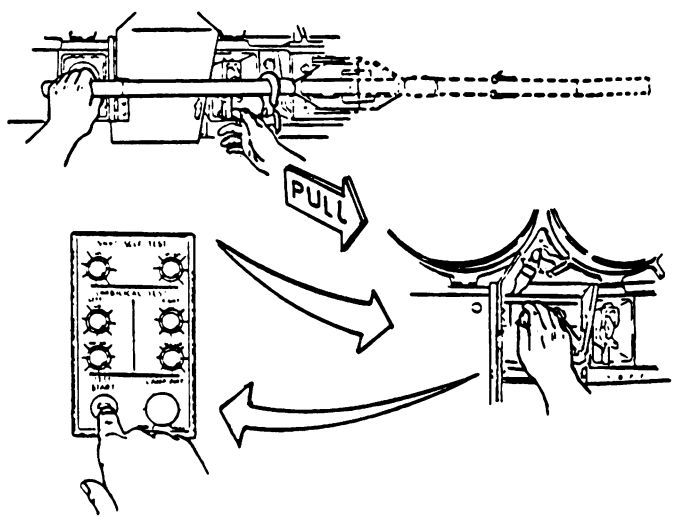
WARNING

When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety restraint hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

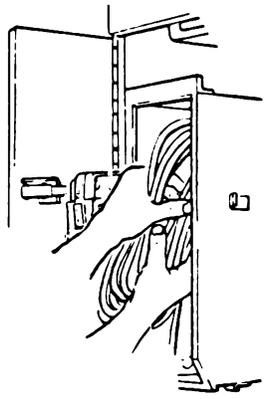
NOTE

LLM hoists and booms will not operate unless umbilical cables are connected to LLM correctly.

(4) Unlatch the LP/C holddown latches. Disconnect the latch safety restraint hooks. Disconnect and test the umbilical cables and prepare to unload LP/Cs in the normal manner.



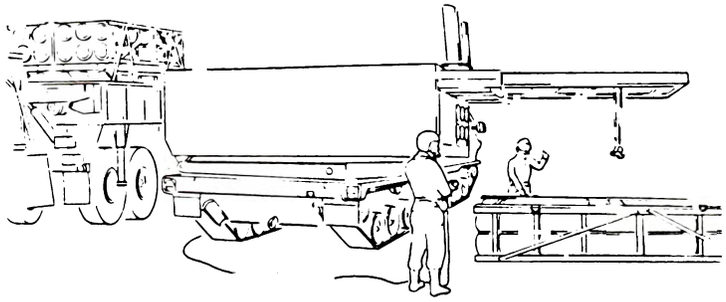
2-41. RELOADING FROM A RESUPPLY VEHICLE (CONT)



(5) Remove the BC from the storage compartment. (LLM should be pointed toward carrier cab and raised slightly.)

CAUTION

When operating BC to move LLM, watch the LLM movement very closely. Do not let the LLM hit the RSV or LP/Cs. Equipment may be damaged.



(6) Using the BC, raise and turn the LLM right (cw) to position the LLM to the right side. Lower the LLM to a level position.

(7) Unload empty LP/Cs and raise the hooks.

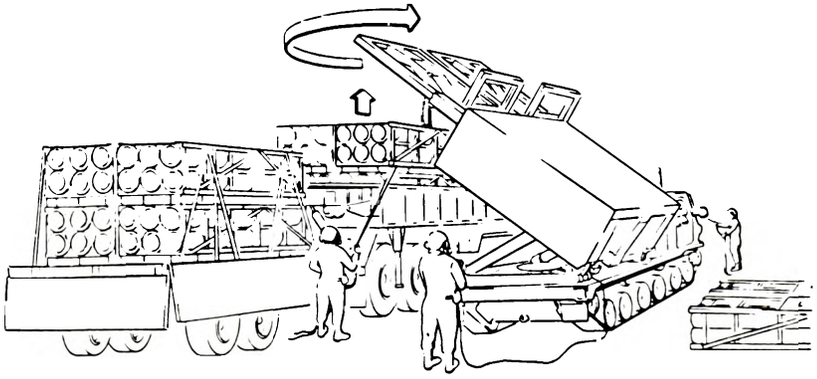
b. Load First LP/C.

(1) Using the BC, keep the booms extended and raise the hooks. Raise and turn the LLM to the left (ccw). Move it over the SPLL cab to the left side. Position the left hooks over the LP/C nearest to the SPLL.

(2) Tie a guideline to each end of the LP/C. Set the L BOTH R switch on the BC to L. Lower the left hook and fasten to LP/C.

WARNING

When LP/C is lifted, hoist cable will try to untwist. LP/C will swing with force. Restrain LP/C with guidelines only. Keep away from hanging LP/C. Bodily injury can occur.



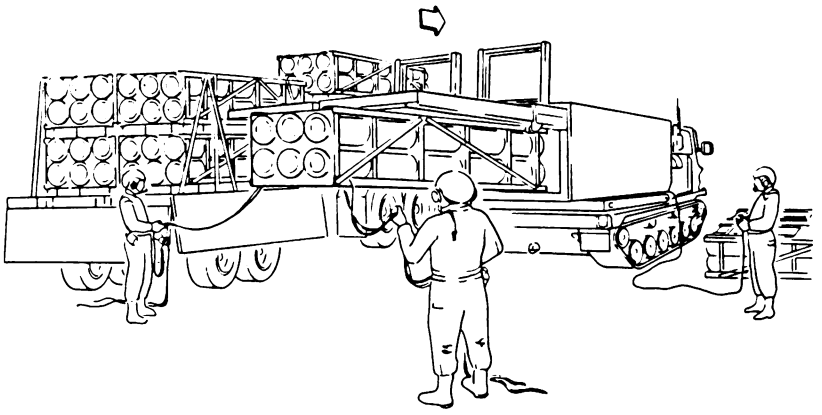
Lift the LP/C just high enough to clear other LP/Cs and the RST. Raise and turn LLM to left rear (ccw) as needed to swing the LP/C clear of the RSV. Use guidelines as needed to steady and slowly turn the LP/C to align with the boom, as the LLM is turned to the rear and lowered.

2-41. RELOADING FROM A RESUPPLY VEHICLE (CONT)

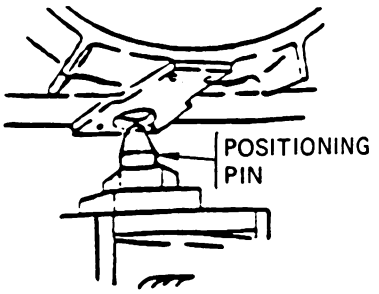
CAUTION

Do not fully retract booms unless LLM is level. Blast shield door assembly can be damaged.

(3) When the LLM is turned to the rear and the LP/C is clear of the RSV, lower the LLM to a level position. Raise the LP/C up into position against the boom. Remove the guidelines and LP/C skids.



(4) Retract the boom to bring the LP/C inside the LLM. Lower the LP/C on the positioning pins.



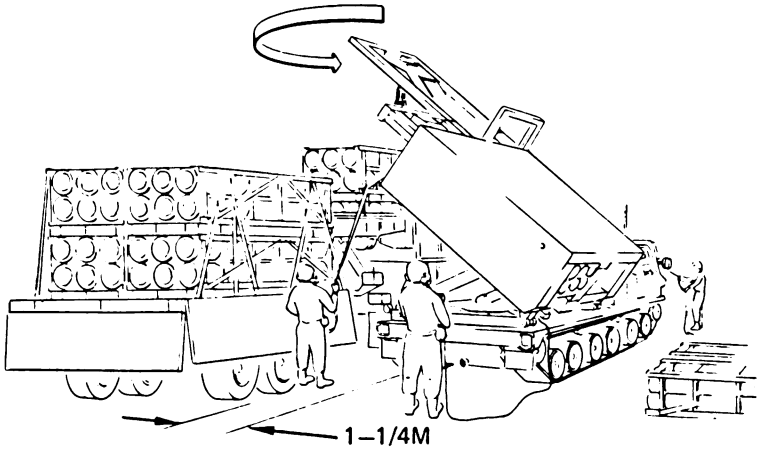
c. Load Second LP/C.

CAUTION

LLM is not designed for travel in the unstowed position. To avoid damage to the LLM, do not move the SPLL with LLM elevated. Do not move SPLL with an LP/C hooked on an extended boom. When repositioning SPLL, move only the minimum distance required. Do not accelerate or stop suddenly.

(1) With the LP/C retracted into the LLM and the LLM lowered to a level position, carefully move the SPLL closer to the RSV. Park with the side of the SPLL about 1-1/4 meters away from the side of the RSV.

(2) Set the L BOTH R switch on the BC to R. Raise and turn the LLM to the right (cw) and position the right boom and hooks over the stacked LP/C that is farthest from the SPLL.



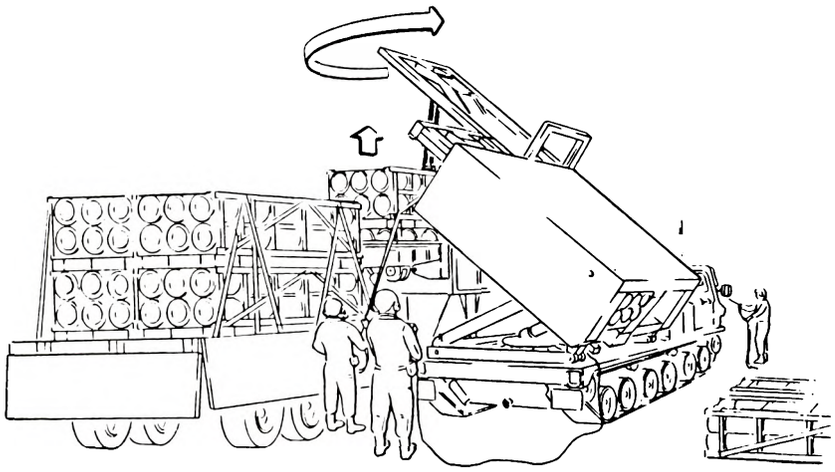
2-41. RELOADING FROM A RESUPPLY VEHICLE (CONT)

(3) Lower the right boom hooks and fasten them to the LP/C. Tie a guideline to each end of the LP/C.

WARNING

When LP/C is lifted, hoist cable will try to untwist. The LP/C will swing with force. Restrain the LP/Cs with guidelines only. Keep away from hanging LP/C. Bodily injury can occur.

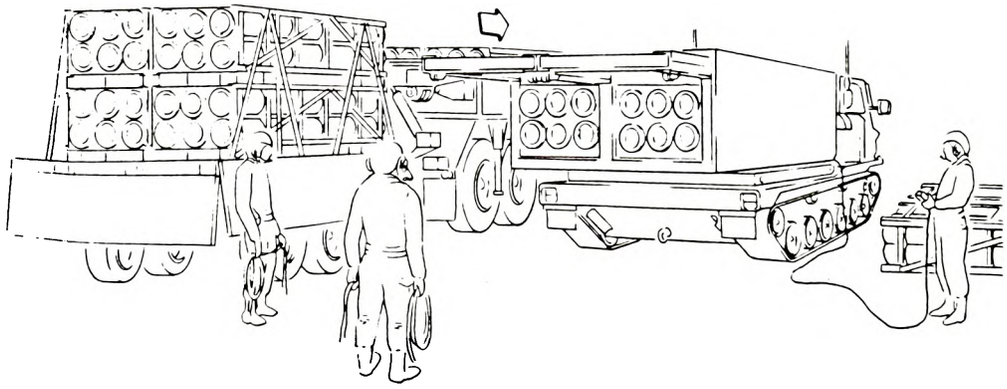
(4) Raise and turn the LLM to the left rear (ccw) as required to swing the LP/C clear of the RSV. Use guidelines to steady and slowly turn LP/C to align with the boom, as the LLM is turned to the rear and lowered.



CAUTION

Do not fully retract booms unless LLM is level. Blast shield door assembly can be damaged.

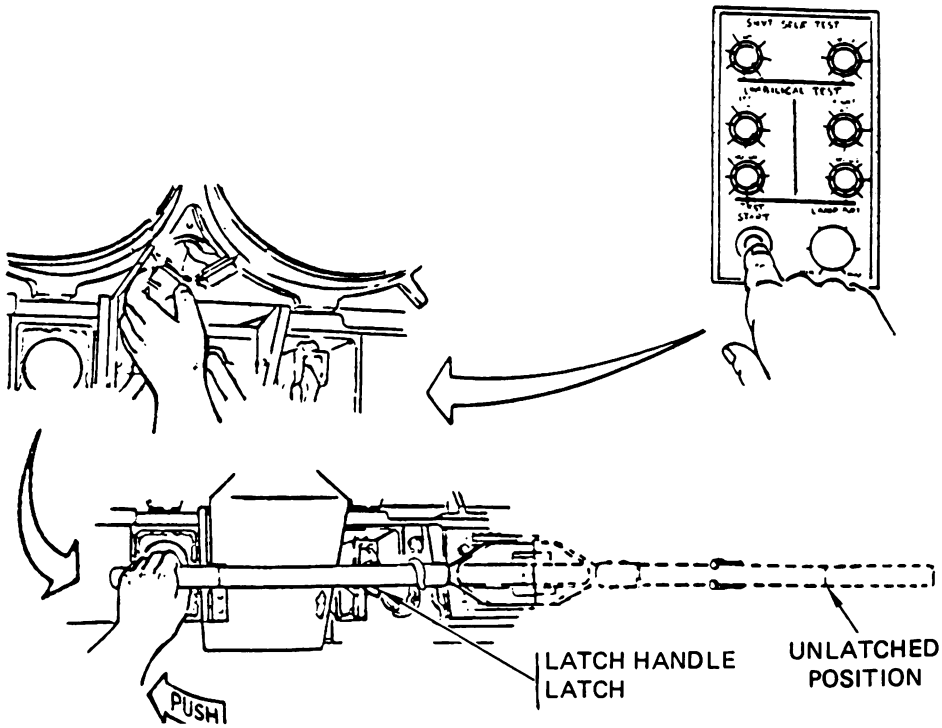
(5) When LP/C is clear of the RSV, lower the LLM to a level position. Raise the LP/C up into position against the boom. Remove the guidelines and LP/C skids. Retract the boom into the LLM, and lower LP/C on the positioning pins.



2-41. RELOADING FROM A RESUPPLY VEHICLE (CONT)

(6) Retest umbilical cables and connect cables to LP/Cs. Latch the LP/Cs in place. Connect the safety restraint hooks to the LP/C latches.

(7) Store the BC in the storage compartment. Stow the LLM and continue normal operations.



2-42. RELOADING FROM A RESUPPLY TRAILER. Reloading LP/Cs from a resupply trailer (RST) requires that extra steps be performed and special precautions must be taken not to damage the equipment.

Special attention must be given to parking the SPLL beside the RST. If parked too close, the LLM cannot be moved without hitting the RST or LP/Cs. If parked too far away, the booms cannot reach the LP/Cs. To help control the position of the LP/Cs when lifted, guidelines must always be used. All movement of the LLM should be done very carefully. If an automatic positioning option from the BC menu is used to position the LLM for unloading, make sure that there is enough room for the LLM to turn.

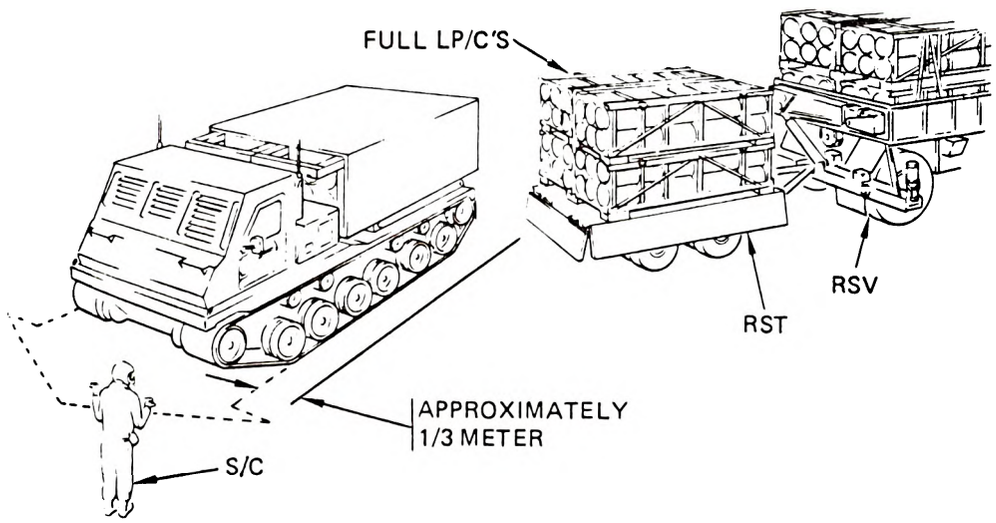
The following procedures describe how the SPLL can reload LP/Cs loaded on an RST. The procedures describe, in general terms, the main differences between loading from the ground and from an RST. Exact crew position and task descriptions are not described. Positions shown in the following procedures are left quarter loading, but are only an example of a loading method. The positions and tasks described in paragraph 2-32, for loading LP/Cs off the ground should be followed. Adjust the operation described, as required, by the procedures described in this paragraph, and the local conditions at the reloading area.

Reload LP/Cs stacked on an RST using the following procedures.

a. Unload Empty LP/Cs.

(1) Park the SPLL in the same position described for loading off the ground. The LP/Cs should be aligned about 145 degrees from the front of the SPLL.

(2) Engage the suspension lockout system and set the SPLL engine throttle.



(3) Press the FCP INDEX key. Display the INDEX MENU. Select the BOOM CONT menu, option number **1**, then press EXEC key. The BOOM CONTROL menu will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL
0:LLM RIGHT
1:LLM LEFT
2:LLM RIGHT REAR
3:LLM LEFT REAR
4:BOOM CONT MANUAL
SELECT NUMBER AND PRESS EXEC □;
```

2-42. RELOADING FROM A RESUPPLY TRAILER (CONT)

NOTE

If LLM is moving in an automatic positioning mode of operation, pressing LLM STOW key will cause LLM to stop and then begin to go back to the stowed position.

Select LLM LEFT, option number 1. Press EXEC key. The BOOM CONTROL operation field with LLM headings will be displayed.

The travel lock will unlock, the LDS will come on and the LLM will move into position for unloading to the left.

```
HDG 0000MILS                    TIME 00:00:00
BOOM CONTROL


AZIMUTH RESOLVER:+0000.0;
ELEVATION RESOLVER:0000.0;
WHEN OPERATION COMPLETE PRESS LLM STOW
```

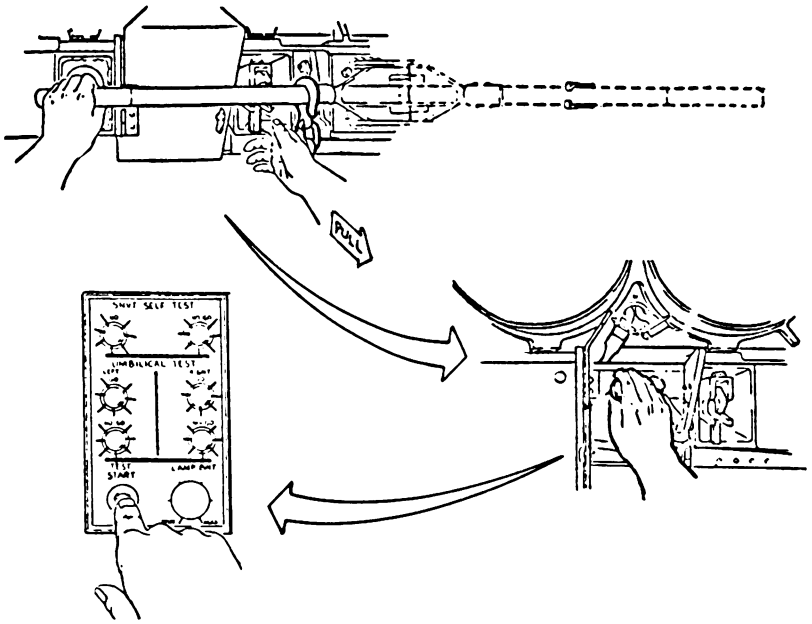
WARNING

When latch handle is latched with LP/Cs loaded, handle is under pressure. Make sure safety restraint hook is connected before unlatching handle. If hook is not connected, the handle can swing and cause bodily injury.

NOTE

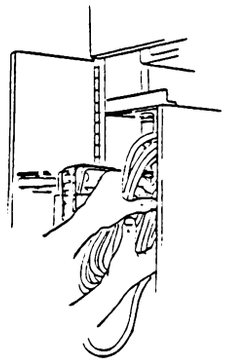
LLM hoists and booms will not operate unless umbilical cables are connected to LLM correctly.

(4) At the same time, prepare to unload the empty LP/Cs. Unlatch the LP/Cs, and disconnect the latch handle restraint safety hooks. Disconnect and test the umbilical cables.



2-42. RELOADING FROM A RESUPPLY TRAILER (CONT)

(5) Remove the BC from the BC storage compartment.



WARNING

Do not attempt to unload or load two loaded LP/Cs at the same time from side loading positions. (Refer to paragraph 1-9, d). This may offbalance the SPLL.

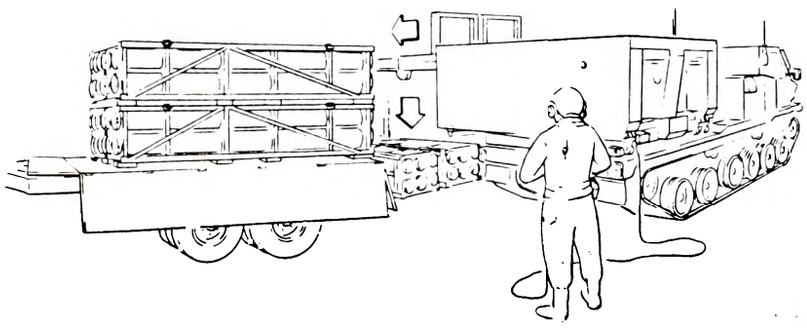
CAUTION

Make sure holddown latch handle is in unlatched position before lifting LP/C. Lifting LP/C with latch handle in latched position will damage bottom of LP/C and/or holddown latch assembly.

NOTE

LLM hoists and booms will not operate unless umbilical cables are connected to LLM correctly.

(6) Unload both empty LP/Cs from the LLM and set them on the ground.



CAUTION

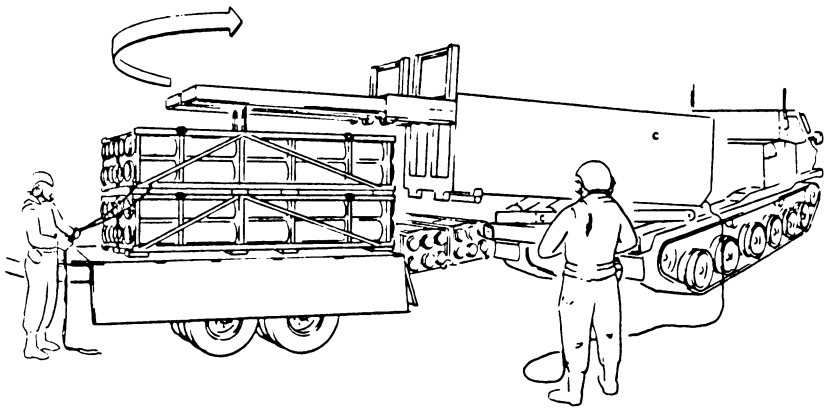
When operating BC to move LLM, watch the LLM movement carefully. Do not let the LLM hit the RST or LP/Cs. Equipment will be damaged.

(7) With the boom still extended and using the BC, raise the hooks. Raise and turn the LLM toward rear of SPLL and position hooks over the RST. Position the left boom hooks as close as possible to the hoisting ring on the left LP/C.

2-42. RELOADING FROM A RESUPPLY TRAILER (CONT)

b. Load First LP/C.

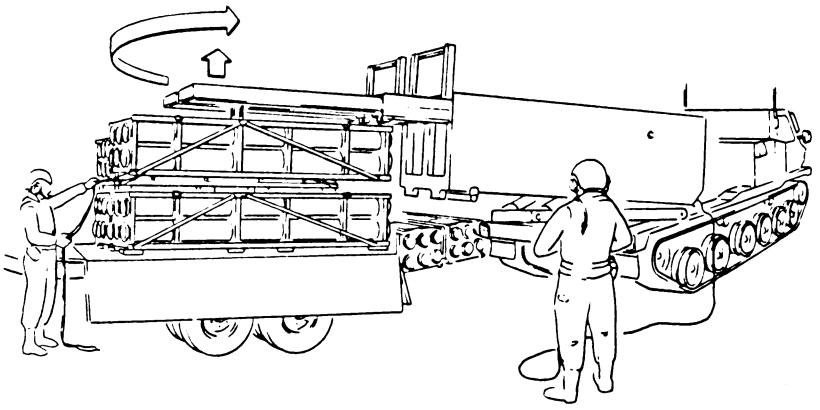
(1) Set the L BOTH R switch on the BC to L. Lower the left hook and fasten it to the LP/C. Tie a guideline to each end of the LP/C.



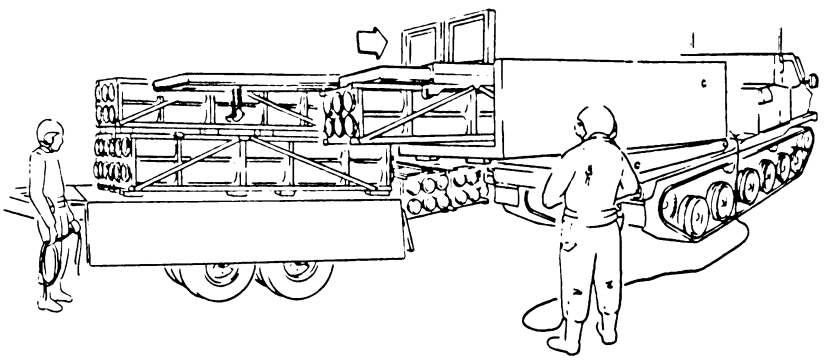
NOTE

Pressing and quickly releasing HOOK UP switch several times will lift the LP/C a little at a time. LP/C will slide until it is directly under the hooks and can be lifted without a violent swing.

(2) Lift the LP/C just high enough to clear the other LP/Cs. Raise and turn the LLM to the left (ccw) as needed to swing the LP/C clear of the RST. Use the guidelines to steady the LP/C and keep it in line with the boom, as the LLM is turned and lowered.



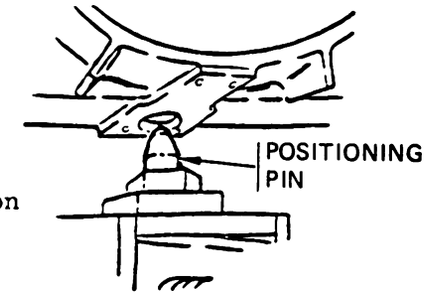
(3) When the LLM is turned to the rear and the LP/C is clear of the RST, lower the LLM to a level position. Raise the LP/C up against the boom. Remove the guideline and LP/C skids.



2-42. RELOADING FROM A RESUPPLY TRAILER (CONT)

CAUTION

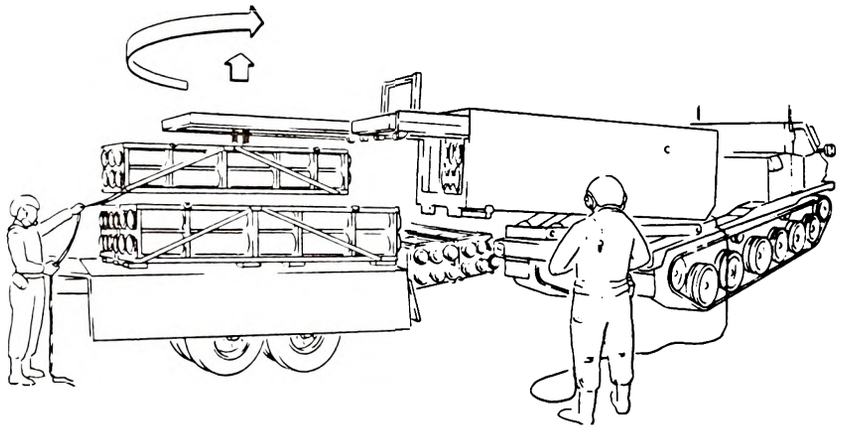
Do not fully retract booms unless LLM is level. Blast shield door assembly can be damaged.



(4) Retract the boom all the way into the LLM. Lower the LP/C on the positioning pins.

c. Load Second LP/C.

(1) Set the L BOTH R switch on the BC to R. Raise and turn the LLM to the right (cw). Position the right boom and hooks over the LP/C stacked on the right side of the RST.



(2) Lower the right boom hook and fasten to the LP/C. Tie a guideline to each end of the LP/C.

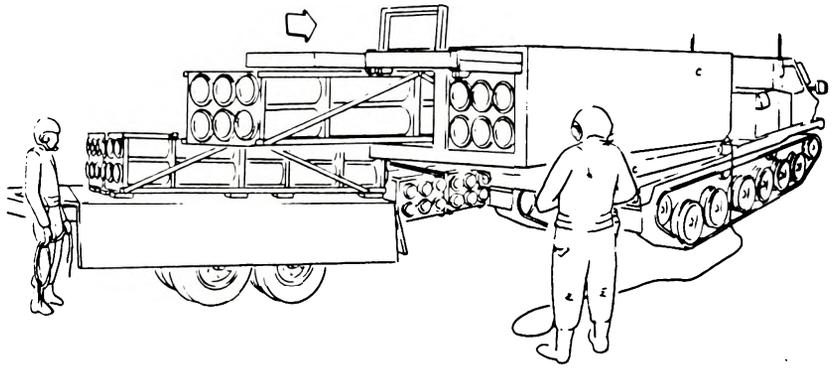
(3) Lift the LP/C just high enough to clear the other LP/Cs. Raise and turn the LLM to the left (ccw), as needed to swing the LP/C clear of the RST. Use the guidelines to steady the LP/C and keep it in line with the boom as the LLM is turned.

(4) When the LLM is turned to the rear and the LP/C is clear of the RST, lower the LLM to a level position. Raise the LP/C up against the boom. Remove the guideline and LP/C skids.

CAUTION

Do not fully retract booms unless LLM is level. Blast shield door assembly can be damaged.

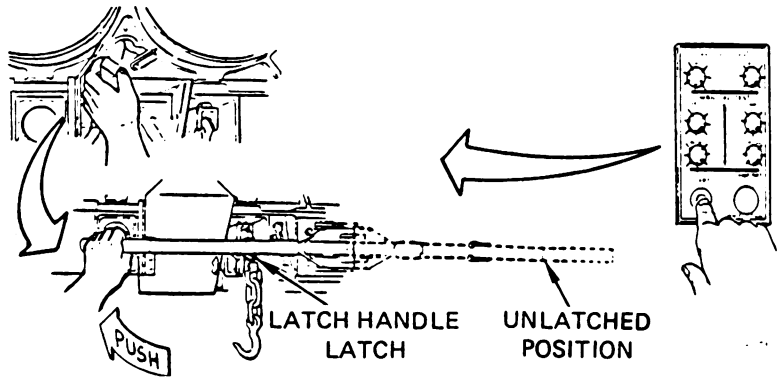
(5) Retract the boom all the way into the LLM. Lower the LP/C on the positioning pins.



2-42. RELOADING FROM A RESUPPLY TRAILER (CONT)

(6) Retest umbilical cables, and connect cables to LP/Cs. Latch LP/Cs in place. Connect safety restraint hooks to latch handles.

(7) Store the BC in the storage compartment. Stow the LLM and continue normal operation.



2-43. LLM MANUAL OPERATION.

CAUTION

During manual operation protective limit switches do not have any control. Use care not to drive LLM or booms into SPLL, or the equipment will be damaged.

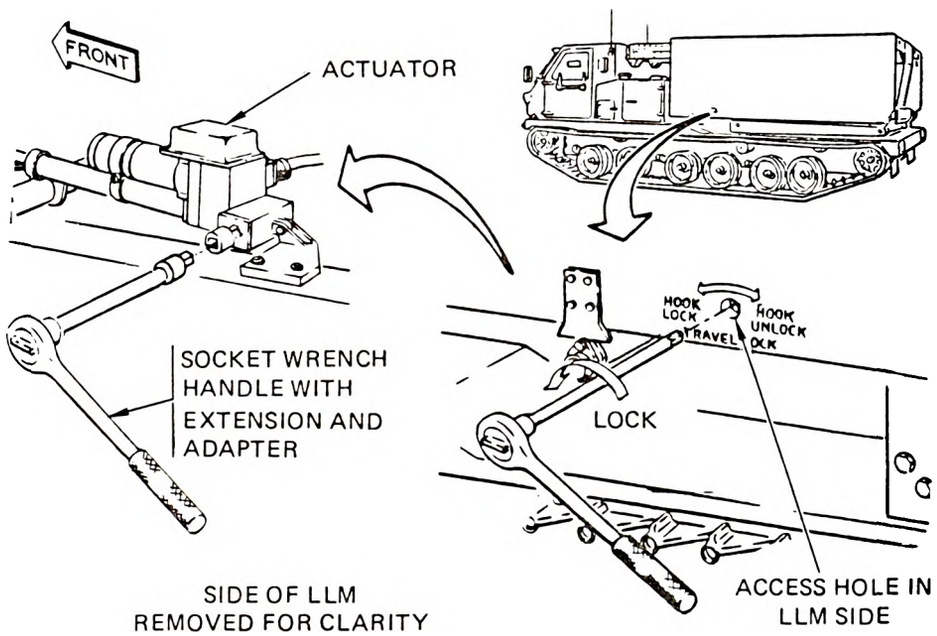
Use only authorized tools to manually operate SPLL, or SPLL drive mechanisms can be damaged.

LLM manual drive controls are provided for emergency operation and, when necessary, for maintenance. It is not intended that these controls be used as an alternate way of operating the LLM under normal conditions. Tools to operate the LLM manual drive mechanisms are in the SPLL tool bag.

a. Travel Lock - Unlock and Lock.

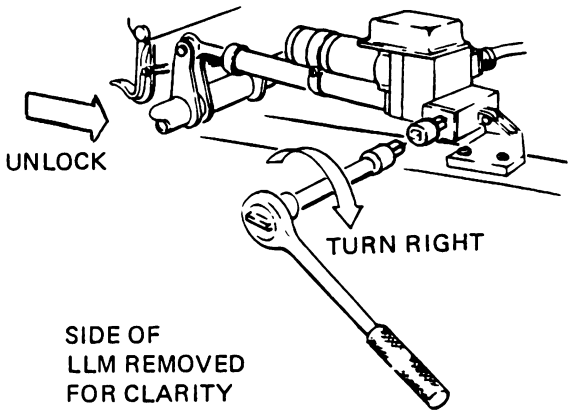
The travel lock must be unlocked before the LLM can be moved from the stowed position.

(1) Manual operation of the travel lock requires use of the 1/2-inch drive socket wrench handle, 1/2- to 3/8-inch socket adapter, and the 1/2-inch drive, 10-inch extension from the SPLL tool bag.



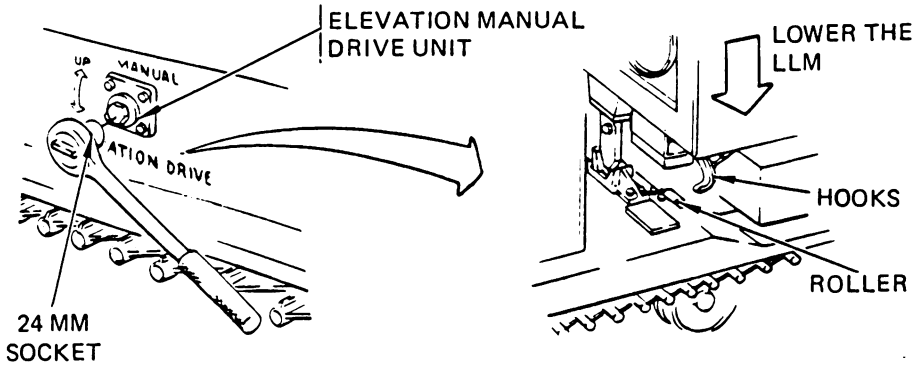
2-43. LLM MANUAL OPERATION (CONT)

(2) To unlock the travel lock, insert socket extension, with adapter and handle attached, through access hole in side of LLM. Engage actuator drive socket with socket adapter. Turn socket wrench handle to right to extend the actuator arm and unlock the travel lock hooks.



(3) To lock the travel lock, the LLM must be lowered far enough for the hooks to easily go under the rollers on the SPLL.

Use socket wrench handle with the 24mm socket. Refer to elevating and lowering procedure (paragraph b) and lower LLM until it is resting firmly on the SPLL. The bumpers must be compressed a little.



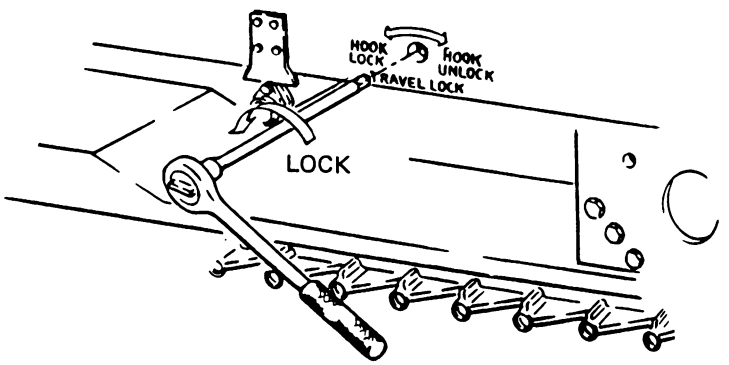
CAUTION

Do not force hooks under rollers. Too much force can cause damage to actuator drive.

(4) Insert socket wrench handle, with 10-inch extension and 1/2- to 3/8-inch adapter through access hole in LLM and engage adapter drive. Turn wrench handle to the left to lock the travel lock.

(5) If hooks do not go under rollers, try to lower the LLM more. Try to lock the hooks again.

(6) When hooks are in place under rollers, elevate LLM slightly to place pressure on the hooks.



2-43. LLM MANUAL OPERATION (CONT)

b. Elevation and Lowering.

CAUTION

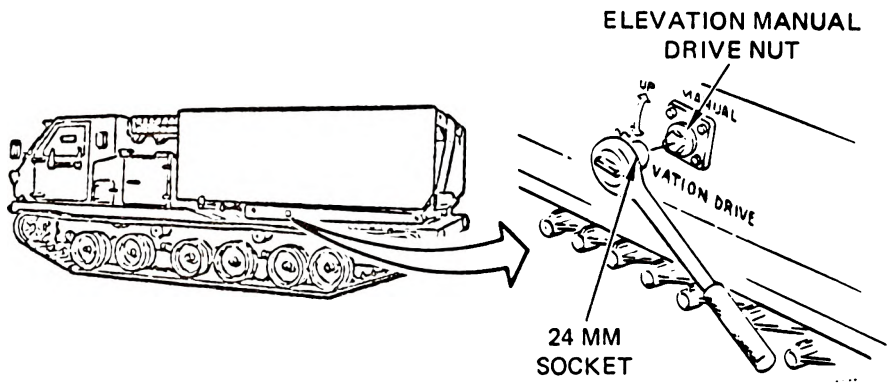
When manually operating LLM. Use care not to run LLM into carrier engine compartment.

Manual elevation (raising) or lowering of the LLM requires use of the 1/2-inch drive socket wrench handle and the 24mm drive socket, from the SPLL tool bag.

(1) Elevation manual drive nut is located on the left side of the LLM turret.

CAUTION

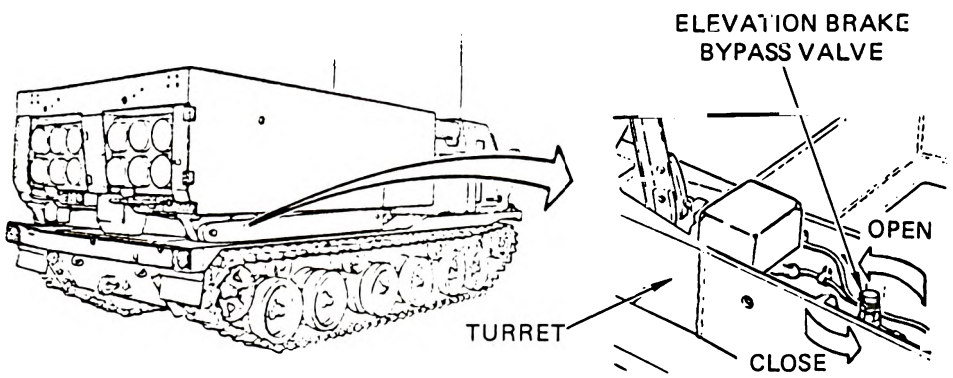
Do not elevate LLM unless travel lock is unlocked. Elevation manual drive mechanism will be damaged.



(2) Unlock travel lock. Using socket wrench handle with 24mm socket, turn handle to right to elevate and to left to lower.

(3) The elevation drive system has a brake operated by hydraulic pressure, during normal operation. After the LLM has been stowed normally, it takes time for the hydraulic pressure to reduce and engage the brake. The LLM cannot be elevated manually unless the brake is engaged. If the LLM cannot be elevated (brake not engaged), the pressure must be reduced to zero. Use bypass valve located on the right side of the turret to reduce pressure and engage the brake in an emergency.

Turn and open the valve slowly. Wait a few seconds and shut the valve. The LLM can then be elevated manually.



c. Turning LLM Left and Right.

Manually traversing the LLM requires use of the 1/2-inch drive socket wrench handle and the 24mm drive socket, from the SPLL tool bag.

2-43. LLM MANUAL OPERATION (CONT)

(1) The azimuth drive nut is located on the right side of the SPLL storage box, at the rear of the SPLL.

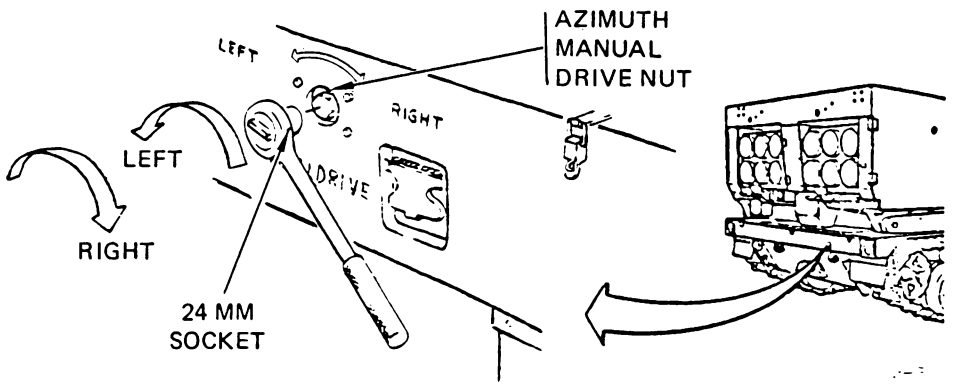
CAUTION

Do not attempt to turn the LLM when it is stowed. The drive unit or other equipment will be damaged. When LLM is in stow position, elevate LLM to about 265 mils before turning LLM in either direction. This will raise the LLM probe clear of the socket and LLM will clear engine compartment.

Do not turn the LLM more than 3484 mils in either direction, or hydraulic lines and electric cables will be damaged.

(2) If stowed, unlock and elevate LLM.

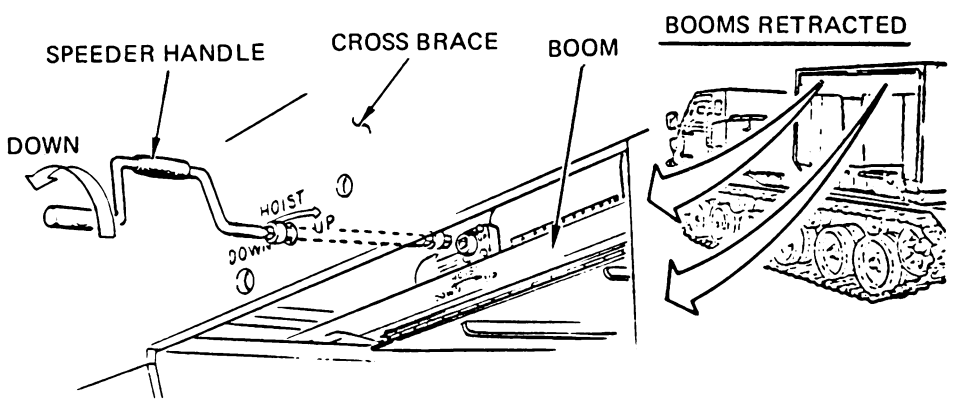
(3) Using socket wrench handle with 24mm socket, turn handle to right to turn LLM to the right. Turn handle to left to turn LLM left.



d. Raising and Lowering Hoists.

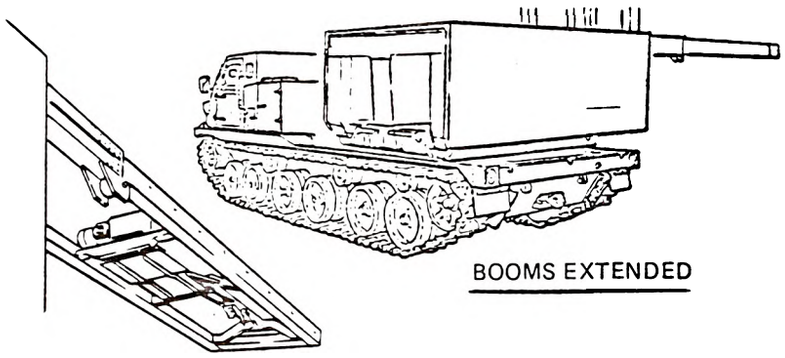
Manual operation of each hoist requires use of the 1/2-inch drive speeder handle and the 1/2- to 3/8-inch reducer, from the SPLL tool bag. If LLM is loaded and the booms retracted, you will also need the 10- and 20-inch drive extensions.

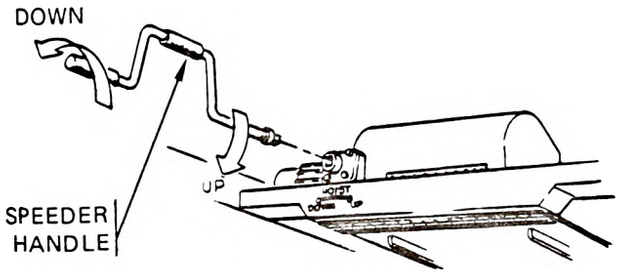
(1) The hoists manual drive units are located on the gear drive between the hoist motor and cable drum. If the booms are retracted, the speeder handle with extensions and reducer must be inserted from the rear of LLM through the access hole, and between the rear crossbrace and the boom.



2-43. LLM MANUAL OPERATION (CONT)

(2) Insert speeder handle, with extension and reducer, into hoist drive receptacle. Push in firmly. Turn the speeder handle to the right to raise the hoist hooks and to the left to lower the hooks.

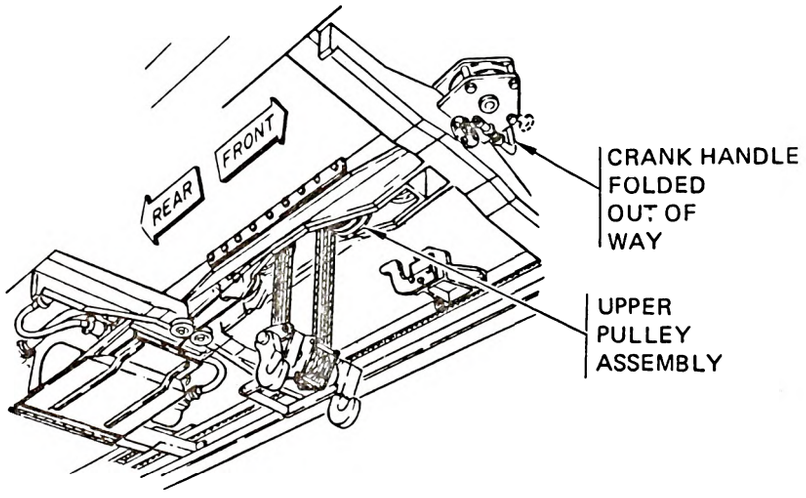




e. *Hoist Hook and Pulley Positioning.*

LP/Cs with different types of warheads will have different balance points for lifting. To make sure the LP/C is always lifted into the same place in the carriage, the upper pulley assembly must be moved.

The carriage assembly has a screw and crank handle assembly. The assembly is connected so the upper pulley assembly can be moved back and forth, when the crank handle is turned. The crank handle is fixed to the carriage and can be folded back out of the way when not in use.



2-43. LLM MANUAL OPERATION (CONT)

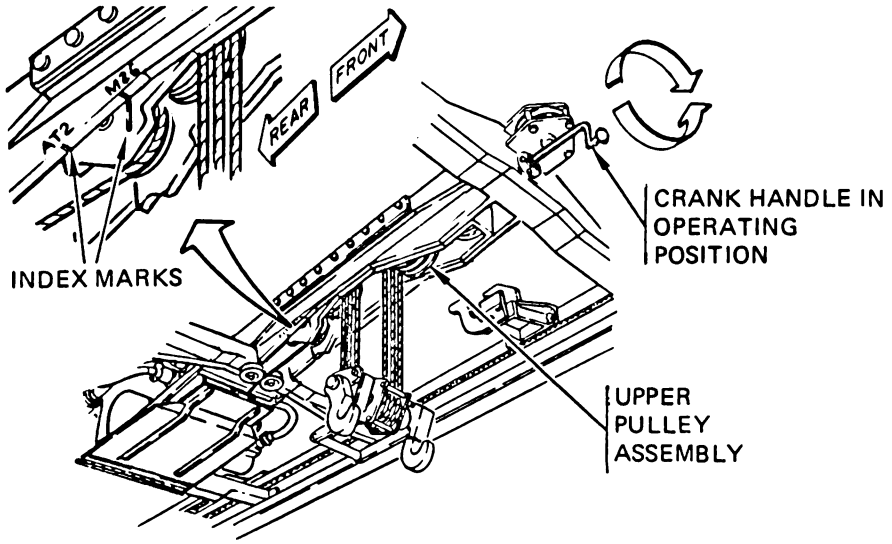
CAUTION

Do not reposition assembly unless hooks are lowered at least 1/3 meter. Do not reposition assembly with suspended load. Assembly screw and crank could be damaged.

(1) Pulling the crank handle out, and turning it to the left will move the hoist upper pulley assembly and hooks to the rear of the carriage. Turning the crank handle to the right will move the pulley assembly and hooks toward the front of the carriage.

(2) Index marks on the side of the pulley assembly and crossbraces indicate the correct position for different type LP/Cs.

(3) Always fold crank handle back out of the way when it is not in use.



2-43. LLM MANUAL OPERATION (CONT)

f. Extending and Retracting Booms.

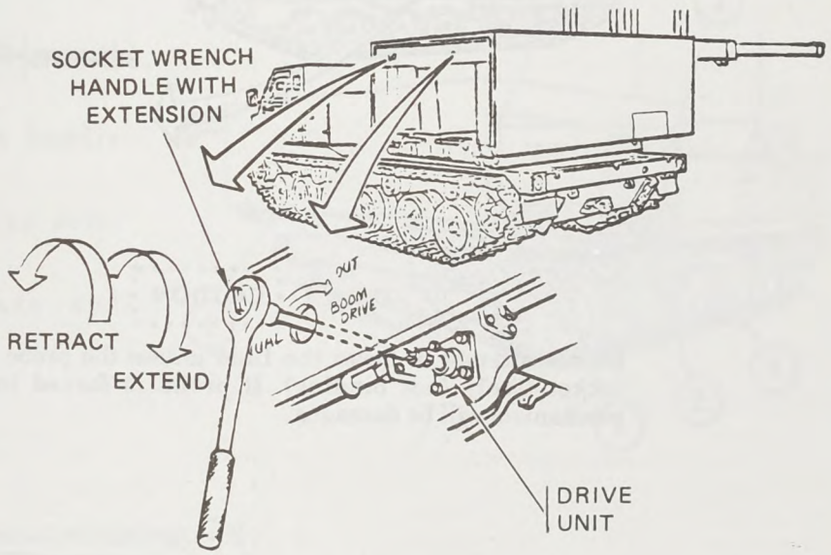
Manually extending and retracting the booms requires the use of the 1/2-inch drive socket wrench handle, and the 10-inch drive extension, from the SPLL tool bag.

NOTE

Procedures explain operation only. If LP/Cs are installed, LP/Cs must be unlocked and raised before booms can be extended.

(1) Each boom must be extended or retracted separately. A 1/2-inch square drive socket is located on the boom mechanical drive assembly at the upper rear of each LP/C compartment. There are holes in the LLM rear crossbrace through which the socket wrench handle is inserted to engage drive socket.

(2) Turn the socket wrench handle to the right to extend the boom and to the left to retract the boom.



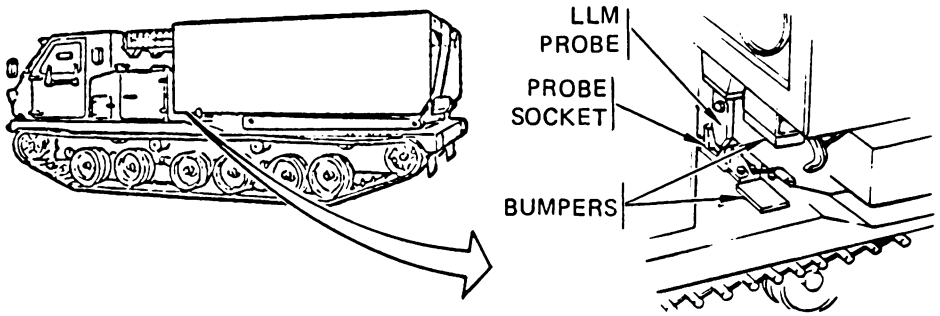
g. Stowing the LLM.

Two crewmembers are needed to manually stow the LLM. To stow the LLM the booms must be fully retracted.

(1) Manually traverse the LLM to align the center of the LLM with the vehicle center. Raise the LLM if necessary to clear the engine compartment.

2-43. LLM MANUAL OPERATION (CONT)

(2) When the LLM is centered, lower the LLM until LLM probe is about to enter the carrier probe socket. The first crewmember must get into a position to observe the LLM probe and carrier's probe socket, and signal the second crewmember.

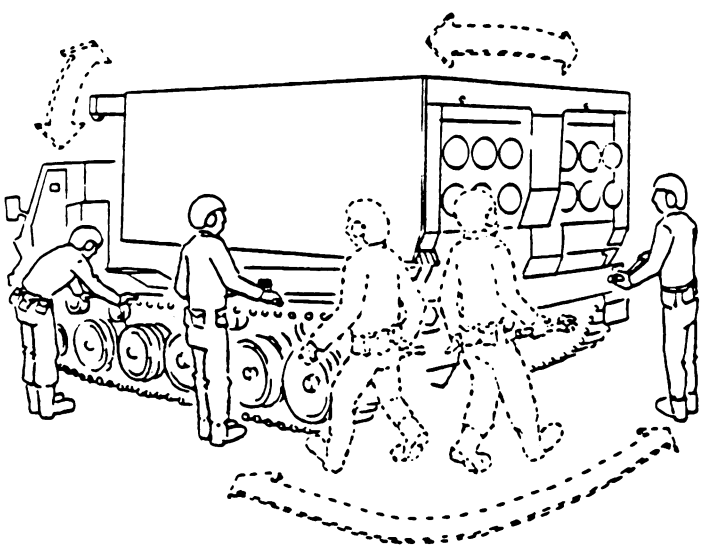


CAUTION

Do not attempt to lower the LLM unless the probe is going into the socket freely (not binding). If probe is forced into probe drive, mechanism will be damaged.

(3) The second crewmember, using the socket wrench handle and 24mm socket, must traverse and lower the LLM on signal from the first crewmember, until LLM is lowered and resting on the bumpers.

(4) When LLM is fully lowered, lock travel lock.



2-44. COLD WEATHER OPERATION. The SPLL does not require any special preparation for cold weather operation other than lubrication (TM 9-1425-646-20). However, ice and snow must be removed from certain areas of the SPLL if it interferes with system operation. The vehicle and LLM batteries must be kept in a charged condition, especially during extended shutdown.

a. Snow and Ice Removal.

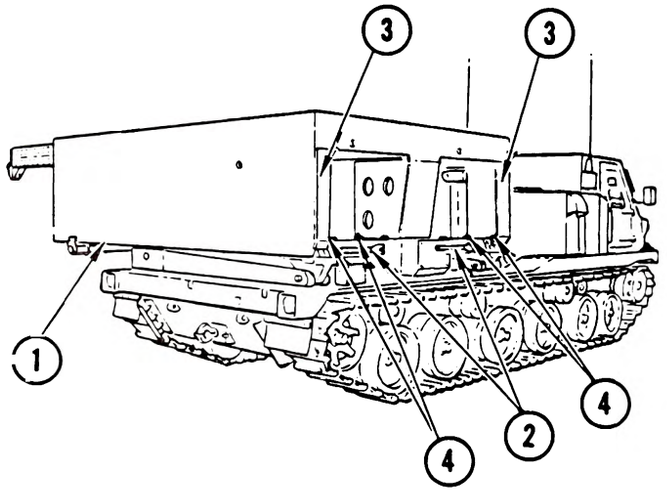
The areas to watch for snow and ice buildup that may interfere with system operation are listed and identified by corresponding numbers shown on the illustration.

(1) Travel lock actuator and manual drive socket.

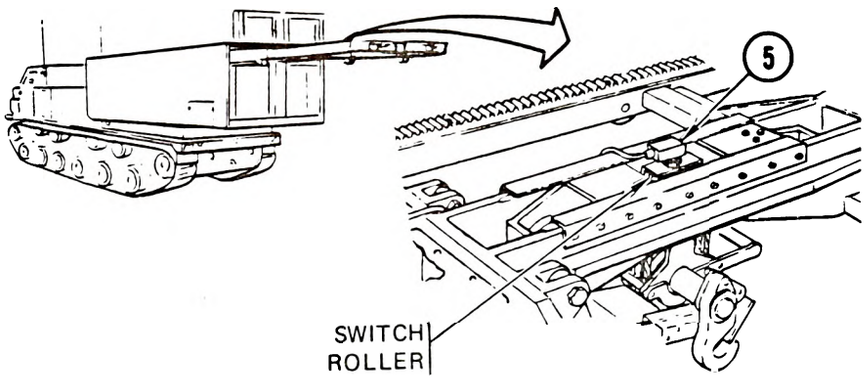
(2) LP/C holddown latch handle mechanisms.

(3) BC and SNVT storage compartment door hinges and latches.

(4) LP/C alignment pads and positioning pins.



(5) Hoist-up limit switches (when reloading).



2-44. COLD WEATHER OPERATION (CONT)

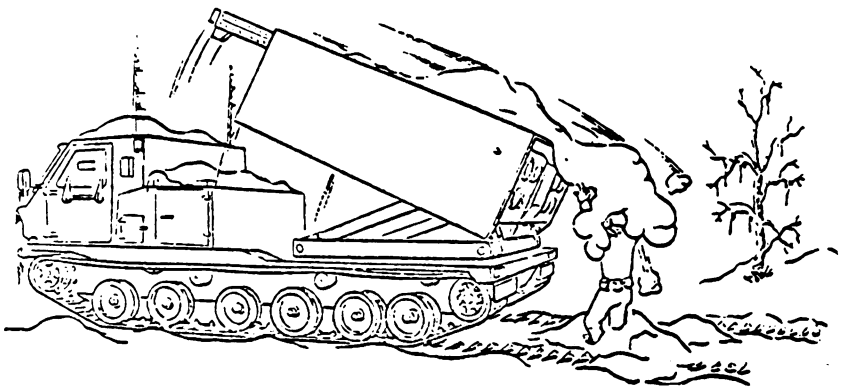
CAUTION

Do not hammer or scrape LP/C alignment pads, positioning pins, or limit switches. Such action could affect rocket aiming accuracy.

Remove ice carefully to prevent damage to the equipment. Use a method approved by unit SOP.

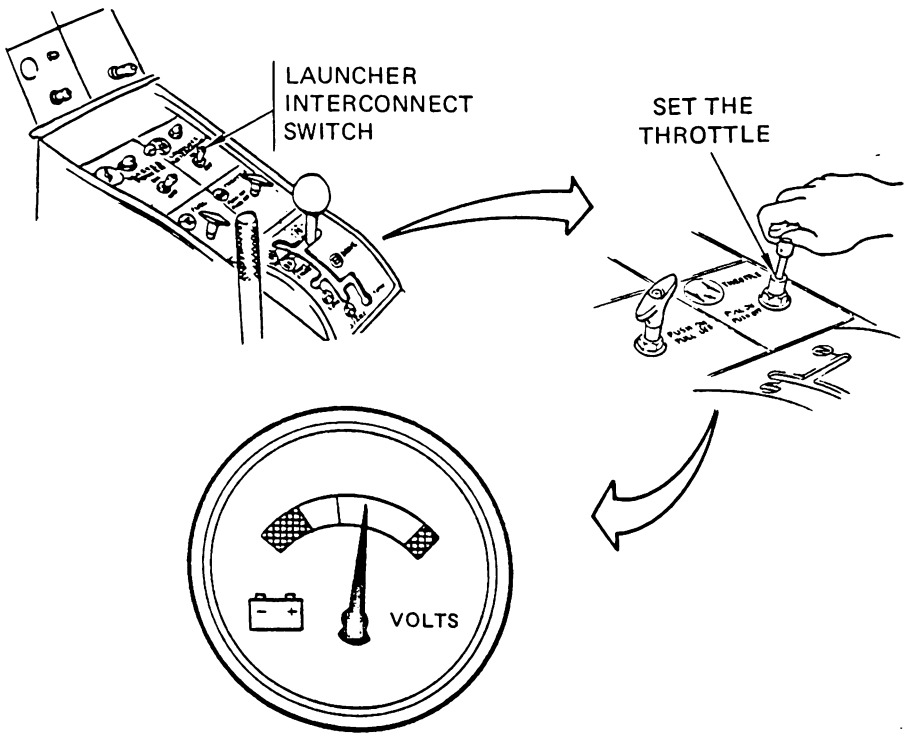
Keep caps installed on all unused cable receptacles.

During reloading operations, watch for sliding ice and snow from the LLM cage assembly roof.



b. Charging LLM Batteries.

(1) In extremely cold weather, make sure that the LLM batteries receive a charge each time the vehicle batteries are charged by the vehicle generator. To charge the LLM batteries, make sure that the LAUNCHER INTERCONNECT switch on the driver's control panel is set to ON. Pull the THROTTLE all the way out to the throttle stop and check the carrier voltmeter during charge time. At the end of charge time (not to exceed 2 hours), voltmeter should indicate in green zone or at least in upper half of yellow zone.



2-44. COLD WEATHER OPERATION (CONT)

If batteries cannot be charged as described, notify next higher maintenance level.

(2) Operation when the temperature is 4°C (40°F) or less requires that the LLM batteries be charged periodically during extended shutdowns. Use the vehicle engine generator system as described to charge the batteries according to the following schedule.

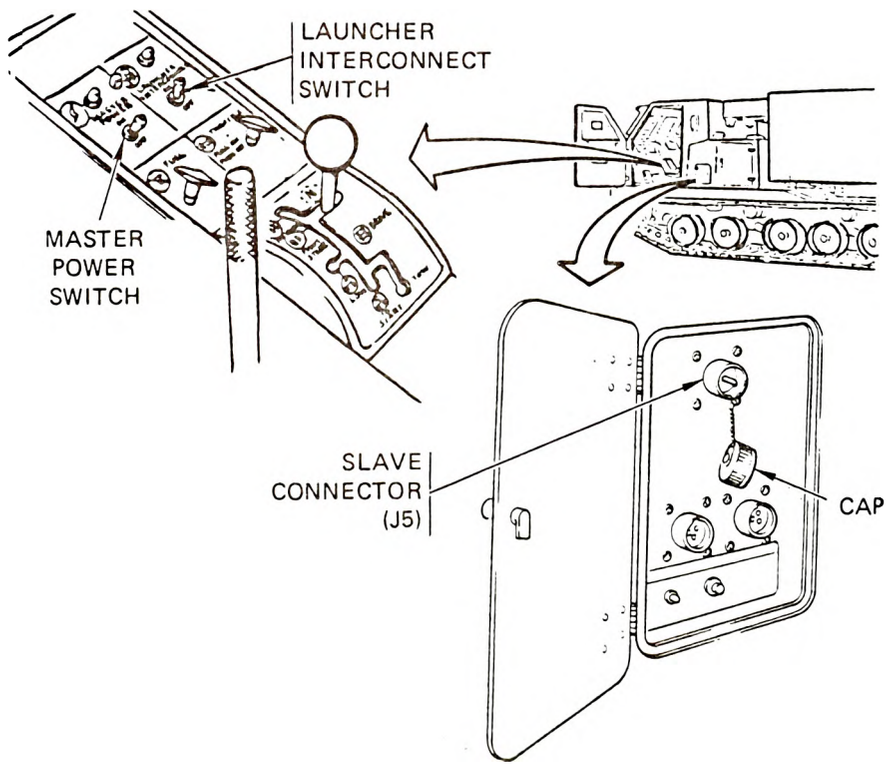
NOTE

Time specified before first charge assumes the batteries are in a charged state at shutdown. If batteries are suspected of having a low charge, time before first charge should be decreased.

(a) Charge batteries for 2 hours after 16 hours from initial shutdown.

(b) Charge batteries for 2 hours after every 6-hour shutdown thereafter.

(3) External battery charger may also be used to charge batteries. If external battery charger is used, connect charger to batteries through slave connector (J5). Set the vehicle MASTER POWER switch to ACCESS ON and the LAUNCHER INTERCONNECT switch to ON. Adjust the charger output for 29.1 (±0.3) volts dc output. Be sure to set both switches to OFF position when battery charging is completed.

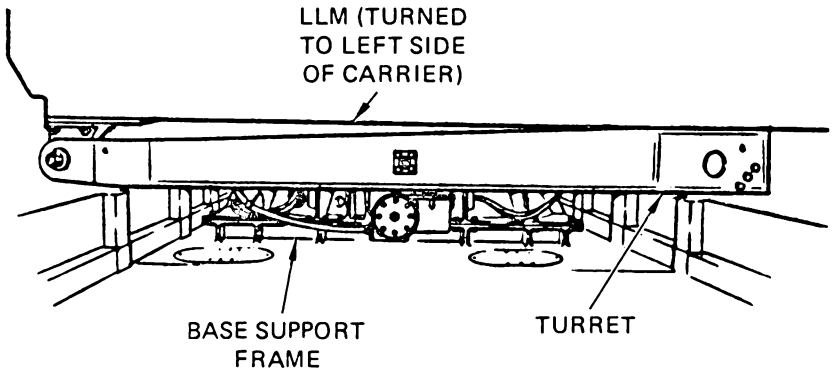


2-45. FORDING AND HEAVY RAIN.

CAUTION

Do not operate LDS if water level in carrier bed is above the base support frame.

After fording and during periods of heavy rainfall, make sure water has not accumulated in the carrier bed. If water does accumulate, drain it by removing carrier drain plugs as instructed in carrier vehicle operator's manual TM 9-1450-646-10.



2-46. OPERATION WITHOUT SUSPENSION LOCKOUT ENGAGED. At the commanders option, fire missions and reloading can be executed without engaging the SPLL suspension lockout (SLO). However, to maintain safe operation and system accuracy the following procedures must be followed.

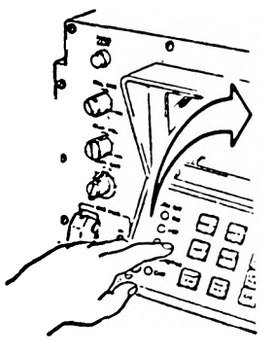
a. Fire Missions.

The time between rounds (firing interval) can affect accuracy during a multiple round mission. The time between rounds must be 4.5 seconds or more. Before executing a fire mission without engaging the SLO, display the fire mission data and edit the time between rounds entry. If it is less than 4.5 seconds, change as required. Display the fire mission data to edit the time between rounds entry as follows.

NOTE

Editing and manually entering tactical fire mission data is described in detail in paragraph 2-29.

(1) Press INDEX key. The INDEX MENU will be displayed.



```
HDG 0000MILS                    TIME 00:00:00
INDEX MENU
0:START UP DATA     5:UPDATE PDS
1:BOOM CONT MENU    6:MESSAGE MENU
2:ROCKET STATUS     7:DISPLAY FIRING DATA
3:TEST MENU         8:AUXILIARY MENU
4:SPLL LOCATION     9:CURRENT STATUS
SELECT NUMBER AND PRESS EXEC ;
```

(2) From the index menu select the AUXILIARY MENU, option number 8. Press EXEC key. The AUXILIARY MENU will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
AUXILIARY MENU
0:COMPUTE FIRING DATA     5:MET DATA
1:SELECT SILENT WATCH     6:RECALL LOCATION
2:SELECT PROMPTING MODE   7:STANDARD MET
3:DISPLAY FREE TEXT MSG   8:SPLL SLOPE
4:FIRE MISSION
SELECT NUMBER AND PRESS EXEC ;
```

2-46. OPERATION WITHOUT SUSPENSION LOCKOUT ENGAGED (CONT)

(3) Select FIRE MISSION, option number 4, from the auxiliary menu and press EXEC key. The first field in the fire mission routine will be displayed.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TARGET NUMBER:AA0000;



PRESS NEXT FLD
```

(4) Press the NEXT FLD key four times. This will advance the routine and display the time between rounds field.

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
WARHEAD:0;
0=M77   3=SMOKE   6=G
1=AT2   4=E       7=H
2=TGW   5=F       8=I

ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

(5) Check the time entry. It must be 4.5 seconds or more. If it is not, change it to 4.5 seconds, or to the time given you by your section chief.

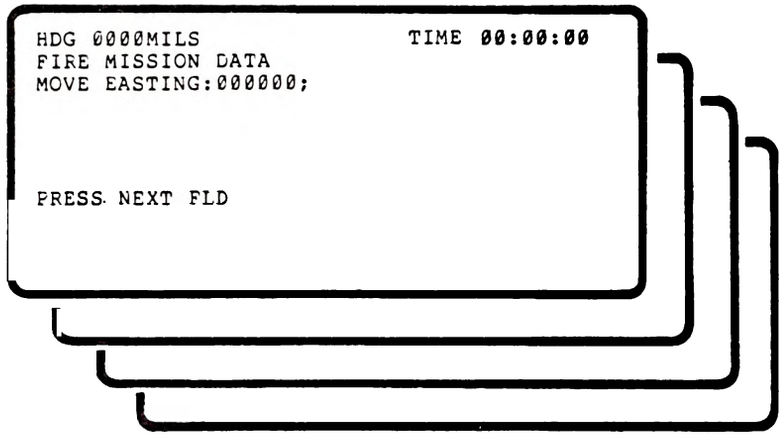
When the new time is entered press the STORE key.

MUST BE
4.5 SECONDS
OR MORE

```
HDG 0000MILS                    TIME 00:00:00
FIRE MISSION DATA
TIME BETWEEN ROUNDS:04.5;



ENTER NUMBER AND PRESS STORE
IF NO ENTRY IS MADE PRESS NEXT FLD
```

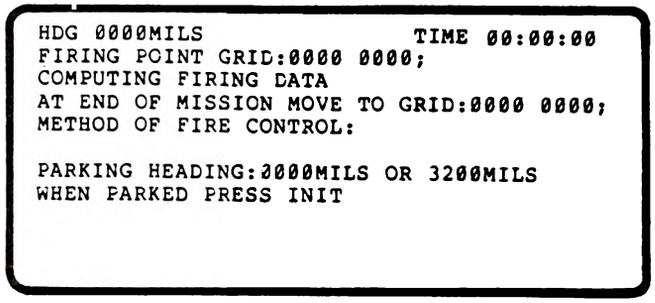
2-46. OPERATION WITHOUT SUSPENSION LOCKOUT ENGAGED (CONT)

(6) Press NEXT FLD key as many times as necessary to advance through the rest of the routine until the instruction WHEN EDITING COMPLETE PRESS EXEC is displayed.



(7) Press the EXEC key. The first field in the fire mission routine will be displayed.

(8) Continue the fire mission as directed.



b. Reloading.

Loading or unloading full LP/Cs must be performed with LLM positioned to the rear of the SPLL. Only one full LP/C is loaded or unloaded at a time. Expended LP/Cs can be unloaded two at a time to either side of the SPLL.

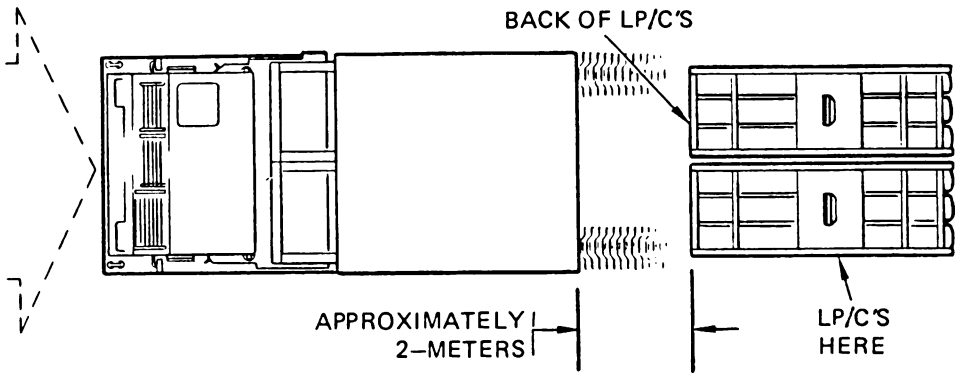
When reloading LP/Cs generally follow the procedures described in reloading (paragraph 2-32), but with the following changes.

2-46. OPERATION WITHOUT SUSPENSION LOCKOUT ENGAGED (CONT)

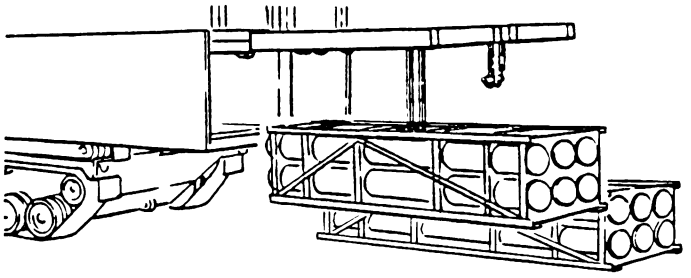
(1) Park the SPLL in front of the LP/Cs.

Position the rear of the SPLL approximately 2 meters away from the back of the LP/Cs.

(2) Unload expended LP/Cs to either side as described in the reloading procedure.

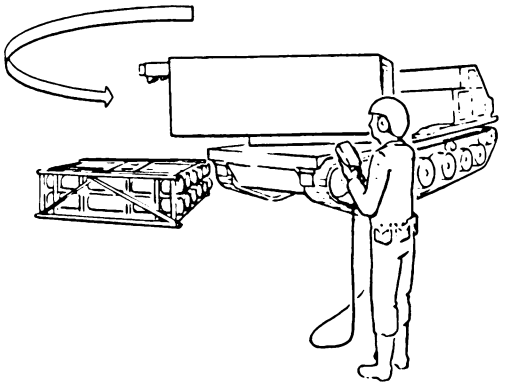


(3) After unloading, use the BC and turn the LLM to the rear of the SPLL with the loading hooks over the LP/Cs.



(4) Load one LP/C at a time.

(5) When both LP/Cs are loaded, use the BC to turn the LLM back to the same side that the empty LP/Cs were unloaded from. This will provide easy access to the rear of the SPLL.



(6) Test and connect the umbilical cables. Latch the LP/Cs, and stow the LLM.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

CHAPTER CONTENTS

Section I. LUBRICATION

3-1. GENERAL. For safe, trouble-free operation, the SPLL must always be properly lubricated. Lubrication instructions for the carrier are in TM 9-1450-646-10. LLM lubrication tasks for the crew are limited to the fixed beam and the limit switches, after cleaning. Lubrication instructions for those items are included in the maintenance section of this chapter as part of the cleaning and service instructions.

Section II. TROUBLESHOOTING

3-2. GENERAL. If your SPLL quits working or you find something wrong during scheduled maintenance, you have to locate the problem and get it repaired. You may be able to repair it yourself, or you may have to notify the next higher maintenance level. This section of the manual has troubleshooting information to use in troubleshooting the LLM and FCS. Troubleshooting information for the carrier is in TM 9-1450-646-10.

If a fault happens during operation of the SPLL, there are two ways the FCS can tell you about the fault. One way is by turning on one of the LRU BIT indicator lights on the front of the FCP. The other way is by displaying a short message on the FCP. If the fault is serious, any operation will be stopped automatically. If the fault is not too serious, the operation will not be stopped. The mission can probably be completed before you start troubleshooting. Further operation is not recommended and your platoon leader and battery should be notified immediately.

3-3. FAULT PROMPT AND SYMPTOM INDEXES. Table 3-1 contains an index which is a list of the fault prompts that appear on the FCP display if the SPLL has a fault. If a fault prompt appears, the table will

3-3. FAULT PROMPT AND SYMPTOM INDEXES (CONT)

that can also help you find a fault. In the right-hand column of each table, opposite the fault prompt or symptom, the troubleshooting page for that fault or symptom is listed. Go to that page and you will find troubleshooting procedures to help you.

Corrective actions to be taken by the crewmembers are limited. Some faults can happen and you will not be able to take any corrective action. When this happens, make note of the fault prompt or other symptoms you have seen. This will help personnel in the next higher maintenance level find the fault. The fault prompts and symptoms listed in tables 3-1 and 3-2 for which you cannot take corrective maintenance actions have an asterisk (*) in the troubleshooting column. These faults are not listed in the troubleshooting table and should be reported directly to the next higher maintenance level. The information written in parentheses after these faults is information to help you understand what may be wrong.

At times, unwanted power changes or other voltage changes will cause the FCS to react to false internal signals. Fault prompts may be displayed or BIT lights may come on when there is no actual malfunction. Before taking corrective action, make sure the malfunction indication is not false.

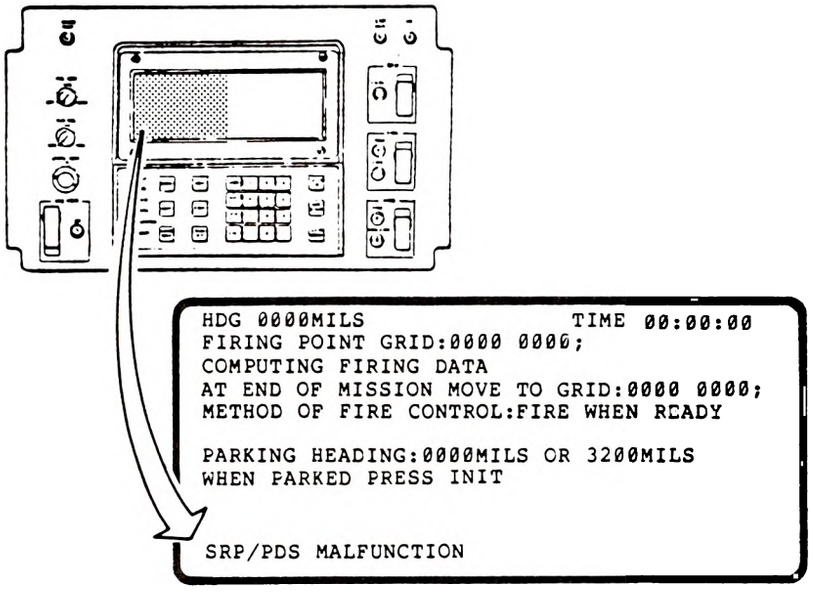
There are two actions you can take, depending on the type indication displayed.

a. If a fault prompt is displayed, pressing the C/E key on the FCP will erase the fault prompt. If the prompt reappears immediately, or if the prompt reappears after the operation that caused the prompt to appear is repeated, then the malfunction indication is real. Corrective action must be taken. If the prompt does not reappear, normal operation can continue.

b. If a BIT light comes on, the FCS must be cycled. To cycle the FCS, if not stowed, stow the LLM. Turn system power off, wait for at least 30 seconds and turn system power back on. If the BIT light indication was false, the light will go off. NV memory startup can be performed and normal operations continued. If the BIT light comes back on, the malfunction indication is real and corrective action must be taken.

Table 3-1. Fault Prompt Index

FAULT PROMPT	TROUBLESHOOTING PROCEDURE PAGE



NOTE

Only the fault prompt from display field is listed here. Other information that may be on the display is operating information and will not help you find the fault.

Before taking corrective action, use the C/E key and make sure the prompt is not false. Refer to paragraph 3-3 for an explanation of false indications.

BATTERY BOX FAILURE (One or more voltages supplied by battery box is incorrect.) . . *

COMMS CONTROLLER FAILURE (Controller module in EU has failed self-test.) . . . *

COMMS PROCESSOR FAILURE (Processor failed an internal automatic BITE test.) . . . *

EU CANNOT SEND MESSAGE TO CMP (Data lines between EU and COMMS processor have failed.) . . . . . *

FILTER IS CLOGGED (The LDS filters indicate a very low or no-flow rate condition.) . . . *

FLUID OVER TEMPERATURE (The LDS hydraulic fluid temperature is too high.) . . . . *

FUZE SETTER MALFUNCTION (Both fuze setter circuits in the FCU have a fault.) . . . *

FUZE SETTER 1 BAD (No. 1 fuze setter circuit in FCU has a fault.) . . . . . *

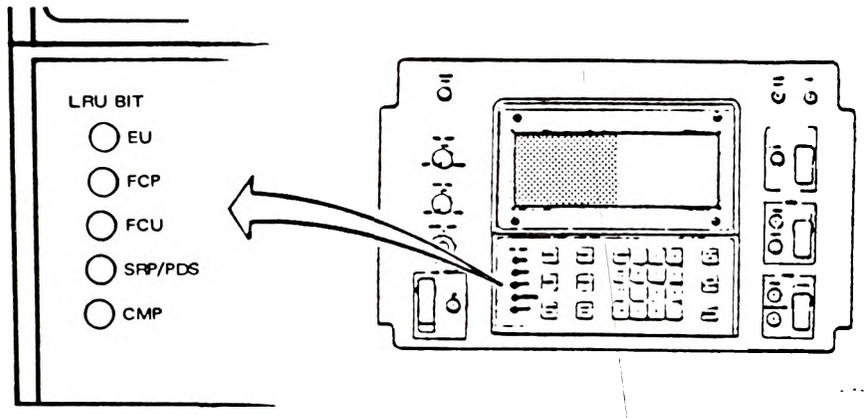
FUZE SETTER 2 BAD (No. 2 fuze setter circuit in FCU has a fault.) . . . . . *

Table 3-1. Fault Prompt Index – Continued

FAULT PROMPT	TROUBLESHOOTING PROCEDURE PAGE
HARDWARE FAILURE-ILLEGAL KEYBOARD CODE (The FCP has a fault.)	*
INCONSISTENT COMMS DATA (Overhead message from EU to COMMS processor does not contain complete or correct data.)	3-8
LDS MALFUNCTION (LDS did not pass all system tests before turn on.)	*
LLM POSITION FAILURE (The LLM is too slow in moving to the aimpoint.)	3-9
LOW FLUID (LDS hydraulic fluid level is too low.)	3-10
LP/C 1 INTERFACE TEST BAD-REPLACE FCU (No. 1 LP/C interface circuit in FCU has a fault.)	*
LP/C 2 INTERFACE TEST BAD-REPLACE FCU (No. 2 LP/C interface circuit in FCU has a fault.)	*
MINE SETTER MALFUNCTION (Both mine setting circuits in FCU have a fault (Used with AT2 mine LP/Cs only.).)	*
MINE SETTER 1 BAD (No. 1 mine setting circuit in FCU has a fault (Used with AT2 mine LP/Cs only.).)	*
MINE SETTER 2 BAD (No. 2 mine setting circuit in FCU has a fault (Used with AT2 mine LP/Cs only.).)	*
MOTOR OVER TEMPERATURE (LDS hydraulic power supply motor has overheated.)	*
PDS DATA BAD (PDS data from SRP/PDS does not pass error free data.)	*
PUMP PRESSURE IS LOW (LDS hydraulic pressure is too low.)	3-10
RESOLVERS NOT INITIATED WITHIN BOUNDS (Accuracy of the resolvers output does not test good at beginning of fire mission.)	*
SQUIB DRIVER MALFUNCTION (Both squib circuits in the FCU have a fault.)	*
SQUIB DRIVER 1 BAD (No. 1 squib driver circuit in FCU has a fault.)	*
SQUIB DRIVER 2 BAD (No. 2 squib driver circuit in FCU has a fault.)	*
SRP/PDS MALFUNCTION (SRP/PDS has fault and has failed self-test.)	*
SRP/RESOLVER TEST BAD (SRP and resolver outputs do not compare within tolerance.)	*
STOW PRESSURE FAILURE (LDS hydraulic pressure too high while stowing LLM.)	*
UNABLE TO STOW LLM (LLM does not stow in the time allowed.)	3-11
V24 INTERFACE TEST BAD (This test is performed automatically the first time the operator selects COMMS startup and then presses the EXEC key, after turning on system power.)	*

Table 3-2. Symptom Index

SYMPTOM	TROUBLESHOOTING PROCEDURE PAGE



NOTE

Before taking corrective action for a BIT light indication, cycle the FCS. Refer to paragraph 3-3 for an explanation of how to cycle the FCS.

Table 3-2. Symptom Index – Continued

SYMPTOM	TROUBLESHOOTING PROCEDURE PAGE
SNVT fails self-test	3-11
Umbilical cable fails SNVT test	*
FCP indicates a DUD or NO ROCKET (FCP indicates a DUD or NO ROCKET during rocket status test.)	3-12
FCP indicator lights do not dim	*
FCP goes blank, LDS will not come on, travel lock hooks close	*
Boom controller ENBL indicator light does not come on	3-10
Blank, missing, or garbled display on FCP	3-12
One or more FCP controls do not operate correctly	*
PDS calibration values are not within the limits listed	3-13
Calibration Value — Limit: Odometer Scale Factor — 18710 to 19222; Azimuth Crab Angle — 65280 to 65535 and 0 to 00255; Elevation Crab Angle — 65024 to 65535 and 0 to 00512	
SPLL location error is more than 85 meters in northing, easting, or altitude after 6 to 8 kilometers of travel with loaded LP/Cs	*
ILLEGAL KEY PRESSED error prompt is displayed when INIT key is pressed to start a fire mission	3-14
During a fire mission LDS shuts off before elevating to clear vehicle cab (PUMP PRESSURE LOW prompt may also be displayed.)	*
LAUNCHER DRIVE SYSTEM	
One or more boom controller LLM azimuth (CW CCW) or elevation (UP DN) control switches do not operate properly	3-10
LDS pump motor has shut off and will not turn back on (Cannot be heard running.)	3-9
LAUNCHER LOADER MODULE	
One or more manual controls do not operate	*
One or more boom controller hoist or boom control switches do not operate	3-10
Either boom operates erratic	*
LP/C holddown latch mechanism does not engage properly	*
LLM does not stow (LLM STOWED prompt is displayed on FCP.)	3-11
LLM azimuth or elevation movement erratic	*

Table 3-2. Symptom Index – Continued

SYMPTOM	TROUBLESHOOTING PROCEDURE PAGE
LLM remains stressed (LLM is stowed and travel lock is engaged but tension on the elevation actuators is not reduced when LDS shuts off.)	*
LLM stops stowing at +35 mils elevation indication on FCP	*
LLM blast shield door does not close properly	*
Travel lock assembly hooks do not engage or unlock properly	3-8

3-4. TROUBLESHOOTING. Crewmember troubleshooting procedures are given in table 3-3. The table lists the common malfunctions which you may find during the operation or maintenance of the SPLL. You should perform the tests or inspections and corrective actions in the order listed.

a. This manual cannot list all the common faults (malfunctions) that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

b. Troubleshooting procedures requiring tasks inside or under the LLM, assume that the SPLL is not loaded with LP/Cs. In addition, the jury struts must be installed (paragraph 3-6) for those tasks that require the LLM to be elevated.

CAUTION

The SPLL is not designed for travel in an unstowed position. Drive the SPLL slowly. Avoid rough ground and quick turns.

c. You may have to move the SPLL before troubleshooting can begin. Move the SPLL with the LLM not stowed and locked only in an emergency.

d. If you discover a fault during a fire mission and have already pressed LCHR LAY key on the FCP, make a note of the following information. This information will help your platoon leader decide what you can safely do about the problem.

(1) Was SRP RDY indicator light on?

(2) Was ARM indicator light on?

(3) Was HANGFIRE indicator light on and flashing?

(4) Did any prompts appear on the bottom line of the FCP display?

This information is needed when the fault prevents the fault prompts or other indications from appearing on the FCP to tell you what is wrong.

Table 3-3. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Travel lock assembly hooks do not engage or unlock properly.		
	Step 1. Check connector on cable connected to travel lock actuator. Make sure it is connected properly.	
		If connector is not connected properly, connect it. Stow LLM to cause travel lock to lock properly.
	Step 2. If connector is connected properly, look for possible foreign obstructions.	
		Clear any obstructions, then stow LLM.
		Notify next higher maintenance level.
2. Communications equipment completely inoperative.		
	Step 1. Make sure that all cable connectors are connected properly. If cable connectors are not connected properly, reconnect cable.	
	Step 2. Make sure that power is applied to other equipment.	
		If power is applied to the communications equipment, perform troubleshooting steps as outlined in communications equipment manual (TM 11-5820-401-12).
		If power is not applied to the communication equipment and other equipment is turned on, notify next higher maintenance level.
3. INCONSISTENT COMMS DATA prompt is displayed when overhead message is sent to EU during comms startup.		
	Step 1. Review all comms startup data. Make sure data is correct and has been entered properly.	
		If all data is correct, retransmit message and fault prompt does not reappear, continue operation.
		If all data is correct and fault prompt reappears when message is retransmitted, notify next higher maintenance level.
4. SYS PWR indicator light on FCP does not come on.		
	Step 1. Set SYS PWR switch to OFF. Reset switch by pressing switch lever down momentarily then releasing it.	
		If SYS PWR indicator light comes on or any other FCP indicator light comes on, continue operation.
		If no indicator lights on FCP come on, notify next higher maintenance level.

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. FCP lamp test fails, one or more indicator lights remain off.	None	Refer to lamp replacement (paragraph 3-7) and replace indicator light lamp.
6. Audible alarm and keyboard beep do not sound in headset. (Alarm in FCP works.)	Step 1. Check out intercom to make sure intercom equipment is working.	If intercom does not work, use intercom technical manual (TM 11-5830-340-12) and troubleshoot intercom. If intercom works, notify next higher maintenance level for possible EU replacement.
7. Audible alarm does not sound when SPLL door, hatch, or filter vent is opened during a fire mission. (Intercom works properly.)	Step 1. Make sure vehicle VENT FAN switch is set to LOW or MED.	Notify next higher maintenance level to troubleshoot cab warning system.
8. LDS pump motor has shut off and will not turn back on.	Step 1. Refer to paragraph 1-9, c and make sure LLM has not moved beyond travel limits and into a limit switch.	If LLM is into a limit switch, refer to manual operation (paragraph 2-43) and manually move LLM out into a normal operating position. If LLM position is not past limits, notify next higher maintenance level.
9. LLM POSITION FAILURE prompt is displayed when LLM is moving to a commanded position. (If LLM will move, operation can continue.)	**CAUTION** Do not move SPLL when LLM is not stowed unless there is an emergency. SPLL may be damaged. If SPLL must be moved, move very slowly. Avoid rough ground and quick turns. Inspect SPLL thoroughly after moving. Perform SRP realign and PDS update before continuing normal operations again. Step 1. If LLM will stow automatically, stow the LLM.	Notify next higher maintenance level.

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. If unable to stow LLM automatically, refer to manual operating procedures (paragraph 2-43) and manually stow the LLM.	Notify next higher maintenance level.
10. LOW FLUID prompt is displayed when LDS is turned on.		
	Step 1. If possible, check fluid level indicator on hydraulic power supply. Do not operate the LLM any more than is necessary.	Notify next higher maintenance level.
11. PUMP PRESSURE IS LOW prompt is displayed when LDS is turned on.		
	Step 1. If the LLM is not stowed and the SPLL must be moved, attempt to stow the LLM. If the LLM will not stow, refer to manual operating procedures (paragraph 2-43) and manually stow LLM.	Notify next higher maintenance level.
12. Boom controller ENBL indicator light does not come on.		
	Step 1. Make sure that boom controller cable is connected properly to connector in storage box and to boom controller. If cable is not connected properly, reconnect cable.	
	Step 2. Press the ENBL indicator light lens and test the lamp.	If indicator light lamp does not come on when tested, replace indicator lamp (paragraph 3-7). If indicator light lamp tests good, notify next higher maintenance level.
13. One or more boom controller hoist or boom control switches do not operate.		
	Step 1. Visually inspect all boom and hoist limit switches.	Try to operate switch manually to see if it is stuck. Refer to cleaning instructions (paragraph 3-9) and clean switch. If one or more boom or hoist control switches do not operate after cleaning, notify next higher maintenance level.
14. One or more boom controller azimuth (CW CCW) or elevation (UP DN) control switches do not operate.		
	Step 1. Make sure that the LLM has not been allowed to move beyond the travel limits. Refer to paragraph 1-9, c for a description of LLM travel limits.	If the LLM appears to have moved beyond a travel limit, refer to manual operation (paragraph 2-43) and move LLM so that boom controller will have control. Notify next higher maintenance level.

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

If LLM appears to be within limits of movement, notify next higher maintenance level.

15. **UNABLE TO STOW LLM prompt is displayed when LLM STOW key is pressed. LLM does not stow in time allotted.**

Step 1. Observe LLM movement. If LLM will continue to move to stow position, allow LLM to stow automatically.

Notify next higher maintenance level.

Step 2. Refer to manual operation (paragraph 2-43) and manually stow LLM.

Notify next higher maintenance level.

16. **SNVT fails self-test.**

WARNING

Do not connect umbilical cables to LP/Cs when SNVT is not working properly.

Step 1. Make sure umbilical cables are connected to SNVT properly and that LAMP BRT control is turned all the way to the right (MAX). Press and hold SELF TEST switch to test indicator light lamps. Release switch.

If any indicator light does not come on when switch is held, refer to lamp replacement (paragraph 3-7) and replace indicator light lamp.

If indicator lights are good, notify next higher maintenance level.

17. **LLM does not stow. (LLM STOWED prompt is displayed on FCP. Resolver indication did not change to show LLM was stowed.)**

WARNING

Do not get under a raised LLM.

Step 1. Manually operate the LLM cage down limit switch. (Switch is on bracket next to stowing probe on front of LLM.)

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

CAUTION

Do not move SPLL when LLM is not stowed unless there is an emergency. If SPLL must be moved, move very slowly. Avoid rough ground and quick turns. Inspect SPLL thoroughly after moving. Perform SRP realign and PDS update before continuing normal operations.

If switch is stuck or broken so that it will not operate, select BC manual operation. Use BC to position LLM as close to stow position as possible. Refer to manual operation (paragraph 2-43) and manually stow the LLM. Notify next higher maintenance level.

Step 2. After manually operating cage down limit switch, select BC manual operation. Stow the LLM automatically.

If LLM stows automatically, continue operation. Notify next higher maintenance level and have switch thoroughly cleaned and lubricated at end of operations.

If LLM does not stow automatically, stow LLM as described in step 1 and notify next higher maintenance level.

18. Blank, missing, or garbled display on FCP. (No fault prompt displayed, no BIT light comes on.)

Step 1. Check display for heading and time line.

If heading and time line is displayed, press INDEX key. INDEX MENU should be displayed. Select CURRENT STATUS, option number 9, and press EXEC. FCP display should change and display the field that was on the screen when it went blank. If it does not, press INDEX key again. Select routine you were using when display went blank and start the routine from the beginning again.

If display is completely blank or has missing or garbled words in the field, notify next higher maintenance level.

19. FCP indicates a dud or no rocket (FCP indicates a dud or no rocket during rocket status test.)

Step 1. Notify next higher maintenance level. Have them change adapter on the umbilical cable to the LP/C indicating the dud or no rocket.

Step 2. After changing adapter, perform rocket status test.

If dud or no rocket indication is still present, LP/C has a fault. Notify your platoon leader and request LP/C use or disposal instructions.

If LP/C passes rocket status test. Continue normal operation.

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

20. EU LRU BIT indicator light comes on and/or NV MEMORY DATA BAD prompt appears on FCP display after shutdown of less than 10 hours.

Step 1. Perform NV MEMORY BATTERY test. (Number 4 option listed on the test menu.)

If NV MEMORY BATTERY TEST GOOD is displayed when test completed, FCS has a malfunction. Notify next higher maintenance level.

If NV MEMORY BATTERY TEST BAD – REPLACE BATTERY is displayed when test is completed, battery voltage is low. Have next higher maintenance level replace NV batteries at the end of normal operations or at the platoon leaders discretion.

21. PDS calibration is not within limits listed.

Calibration Value	Limit
Odometer Scale Factor	18710 to 19222
Azimuth Crab Angle	65280 to 65535 and 0 to 00256
Elevation Crab Angle	65024 to 65535 and 0 to 00512

Step 1. Perform PDS calibration (paragraph 2-27).

If PDS calibration values are within limits, continue normal operation.

If PDS calibration values remain outside of limits after calibration, notify next higher maintenance level.

22. Carrier voltmeter does not indicate in upper half of yellow zone or in the green zone. (Launcher interconnect switch is set to ON and carrier engine is running.)

Step 1. Set carrier LAUNCHER INTERCONNECT switch to OFF. Check the carrier voltmeter.

If voltmeter does not indicate in the upper half of the yellow zone or in the green zone, refer to troubleshooting in the carrier operators manual (TM 9-1450-646-10) and check the carrier generator and batteries.

If voltmeter indicates in the upper half of the yellow zone or in the green zone, perform LLM battery PMCS checks.

Table 3-3. Troubleshooting – Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION

23. SYS PWR indicator light on the FCP goes off. SYS PWR switch is set to ON and has not been over loaded. (Other indicator lamps may be indicating normally.)

Step 1. Check indicator lamp to make sure it is good. To check, replace with known good lamp.

If lamp is burned out, replace lamp and continue operations.

If lamp tests good, go to step 2.

Step 2. Make sure LAUNCHER INTERCONNECT switch is set to ON and that carrier voltmeter is indicating in upper half of yellow zone or in green zone.

If carrier voltmeter indicates in upper half of yellow zone or in the green zone, perform LLM battery PMCS checks.

If carrier voltmeter does not indicate in the upper half of the yellow zone or in the green zone, refer to troubleshooting in the carrier operators manual (TM 9-1450-646-10) and check the carrier generator and batteries.

24. ILLEGAL KEY PRESSED error prompt is displayed when INIT key is pressed to start a fire mission.

Step 1. Incomplete operation must be cleared to continue. Observe the display screen closely. As you watch the display, press the C/E, NEXT FLD, 0, STORE, and EXEC keys in the order listed. As each key is pressed watch for an overwrite from an operation routine.

If overwrite appears, do not press another key. Use NEXT FIELD and EXEC key to exit the operation. When operation is completed, press INDEX key, then select CURRENT STATUS, option number 9, and press EXEC key. First field in the fire mission routine will be displayed. Continue normal operations.

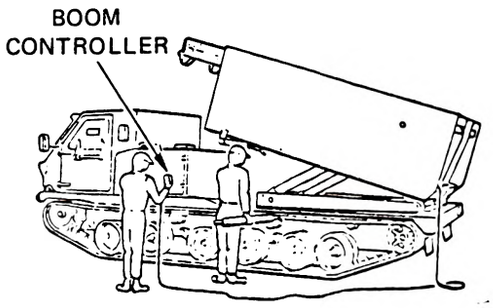
If no overwrite appears and you are unable to determine which operation is incomplete, turn off system power. After about 10 seconds, turn system power back on. Perform NV memory startup. When startup is complete, press INDEX key. Select AUXILIARY MENU, option number 8, and press EXEC key. From the AUXILIARY MENU, select FIRE MISSION, option number 4. The first field in the fire mission data routine will be displayed. Press EXEC key. Continue normal operations.

Section III. MAINTENANCE PROCEDURES

3-5. GENERAL. These maintenance procedures do not include the carrier or communications equipment. Maintenance procedures for the carrier are in TM 9-1450-646-10. Maintenance procedures for the communications equipment are in TM 11-5820-401-12. Maintenance procedures requiring tasks inside or under the LLM assume that the SPLL is not loaded with LP/Cs.

3-6. JURY STRUT INSTALLATION AND REMOVAL. These instructions are for installation and removal of the jury struts. The struts are installed under the raised LLM for safety during maintenance. The struts are kept by the organizational maintenance and available as required. Two crewmembers are needed to install the jury struts.

a. Installation.



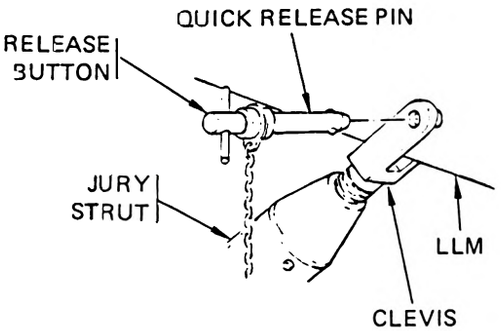
(1) Turn on system power. Select manual BC operation.

(2) Using BC, elevate LLM until elevation resolver indication on FCP is 375 mils.

CAUTION

Do not turn system electrical power on when jury struts are installed.

(3) Set SYS PWR switch on FCP to OFF.



NOTE

The adjusting hole in the strut is closest to the lower end of the strut.

(4) With a crewmember on each side of LLM, line up hole in clevis on upper end of strut with hole in LLM.

NOTE

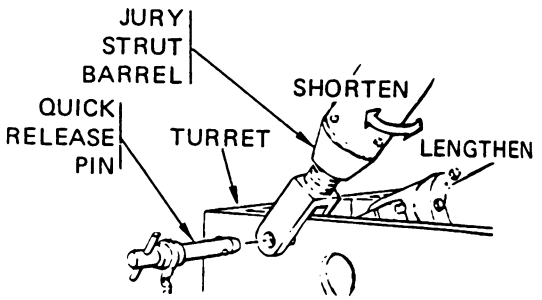
Check that pins are locked in place.

(5) Press and hold release button on quick-release pin. Insert quick-release pin through the clevis and LLM. Release button when pin is all the way through clevis and LLM.

3-6. JURY STRUT INSTALLATION AND REMOVAL (CONT)

(6) Line up holes in clevis at lower end of strut with hole in turret. Struts may be shortened or lengthened to line up holes by turning barrel of the struts.

(7) Press release button on quick-release pin and insert quick-release pin through clevis and turret. Release button when quick-release pin is all the way through clevis and turret. Check that pins are locked in place.



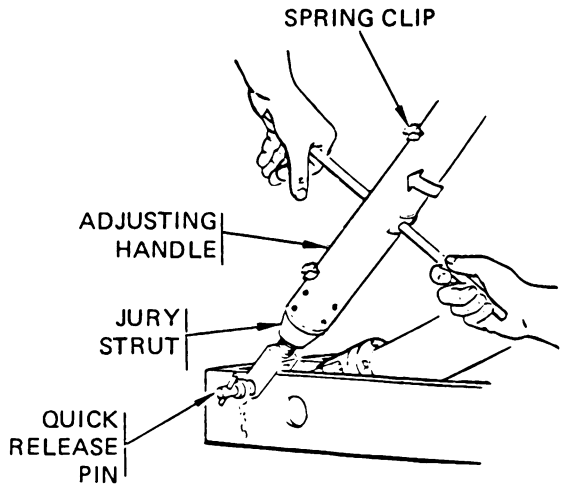
b. Removal.

WARNING

To prevent injury, use care when removing adjusting handles from spring clips.

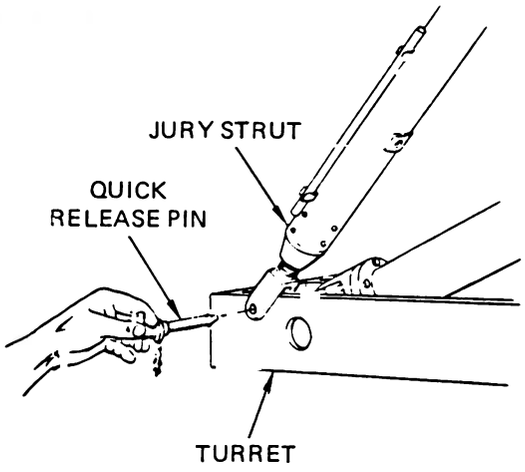
(1) Remove adjusting handles from spring clips on side of struts.

(2) Using adjusting handles, adjust length of struts until quick-release pin in lower clevis can be turned easily.



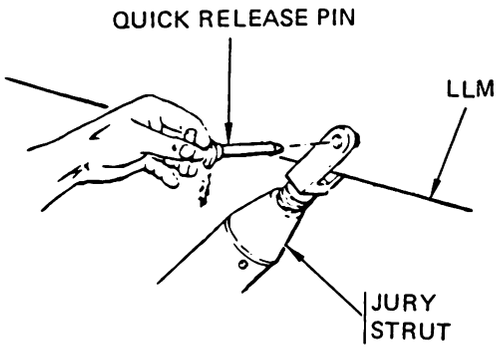
3-6. JURY STRUT INSTALLATION AND REMOVAL (CONT)

(3) Press and hold release button on quick-release pin. Pull release pin all the way out of clevis.



(4) Press and hold release button on upper clevis quick-release pin. Pull release pin all the way out of clevis.

(5) Remove and store jury struts.

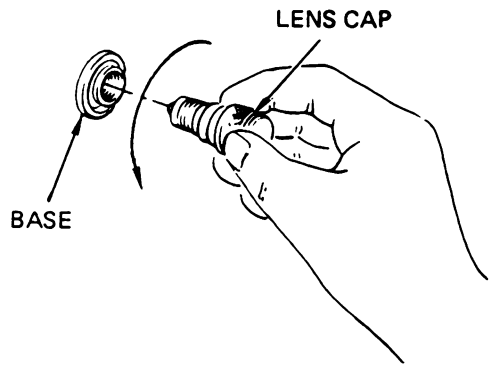


(6) Set SYS PWR switch on FCP to ON. Stow the LLM.

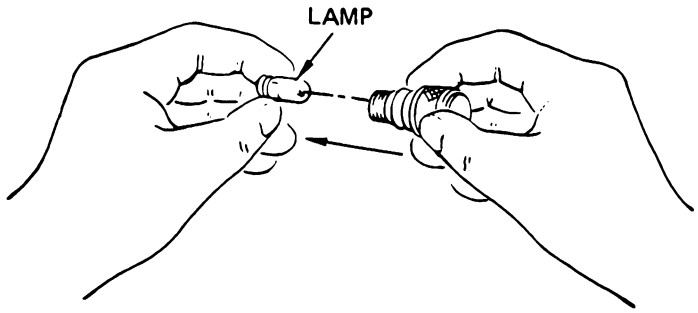
3-7. LAMP REPLACEMENT. Location of all FCS and SNVT indicator lights is shown in figure 3-1.

a. FCS Lamp Replacement.

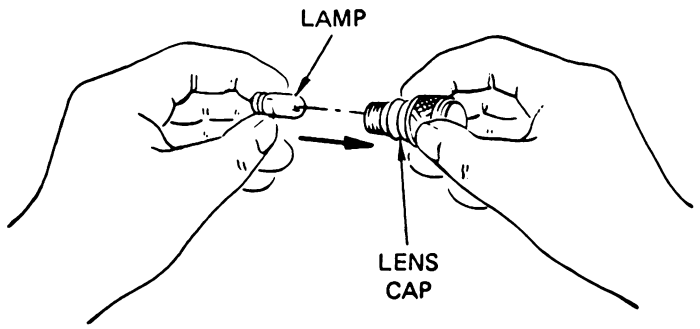
(1) Turn lens cap to left and unscrew lens cap from base.



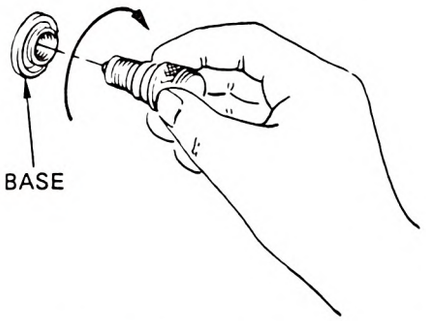
(2) Remove burned out lamp from lens cap.



(3) Insert new lamp in lens cap.



3-7. LAMP REPLACEMENT (CONT)



NOTE

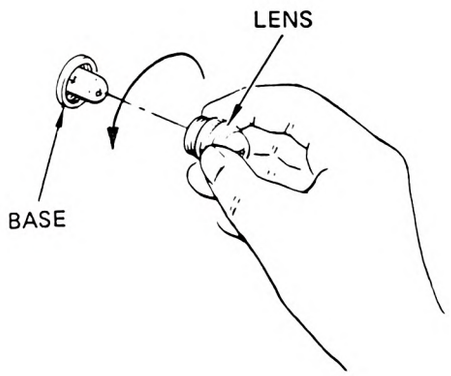
On BC, push in on lamp and lens assembly to engage threads in base.

(4) Install lens cap with lamp into base by turning lens cap to right and screwing lens cap firmly in place.

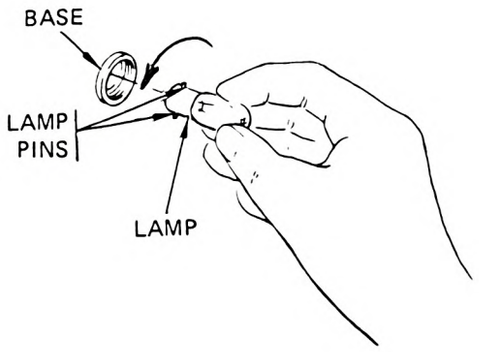
(5) On FCP only, set SYS PWR switch to on. All FCP indicator lights will come on for 1 or 2 seconds. Press the LAMP TEST key. All indicator lights will come on and the alarm will sound for 5 seconds. After the lights go off and the alarm turns off, the SYS PWR and SAFE indicator lights will stay on. If all indicator lights did not come on, notify next higher maintenance level.

(6) On the BC only, turn lens cap dimmer to the left, then press lens cap to test lamp. If lamp does not come on when lens cap is pressed, notify next higher maintenance level.

b. SNVT Lamp Replacement.



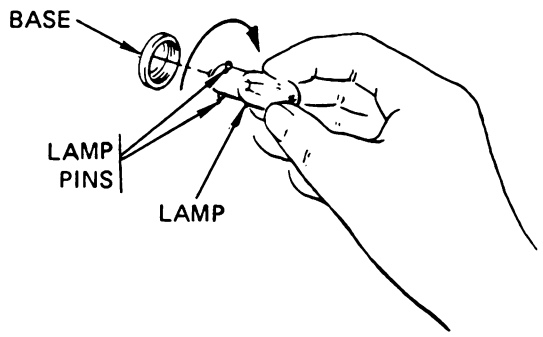
(1) Turn indicator light lens to left and unscrew the lens from the base.



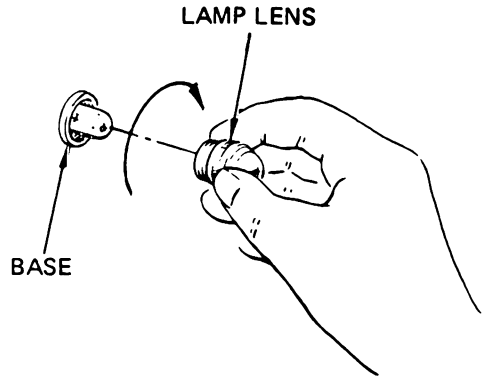
(2) To unlock lamp from base, press in on lamp and twist lamp to left disengaging lamp pins from base socket. Pull loosened lamp from base.

3-7. LAMP REPLACEMENT (CONT)

(3) Insert new lamp into base. Press in on lamp and twist lamp to right and engage pins in base socket, locking lamp in place.

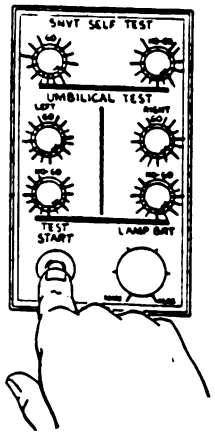


(4) Replace lamp lens, turn to right and screw lens into base.

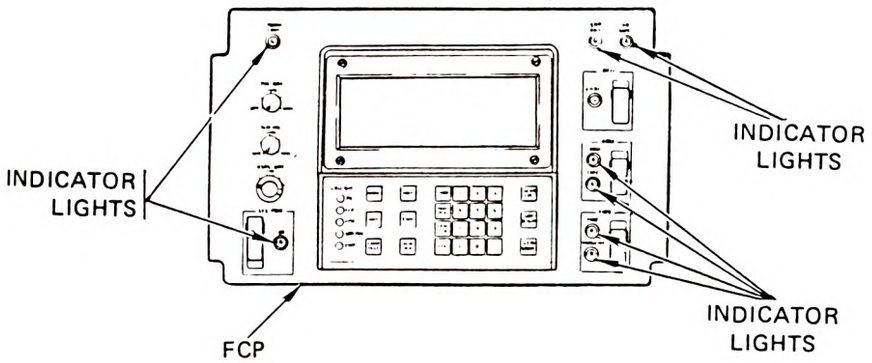


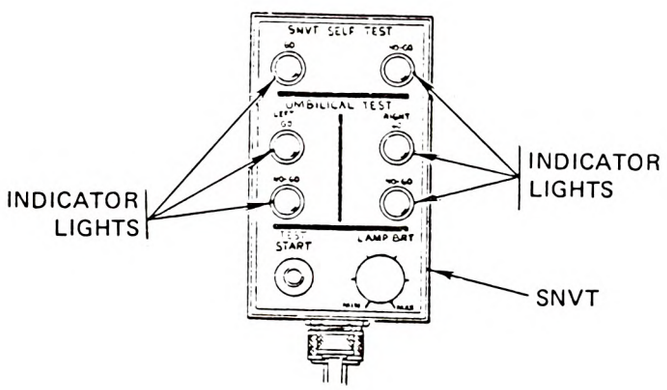
(5) Press and hold SNVT TEST START switch.

Check that all lamps come on. If all lamps do not come on, notify next higher maintenance level.



3-7. LAMP REPLACEMENT (CONT)





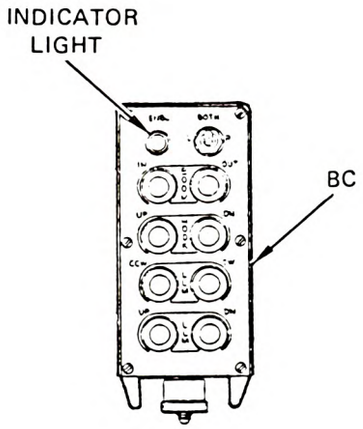
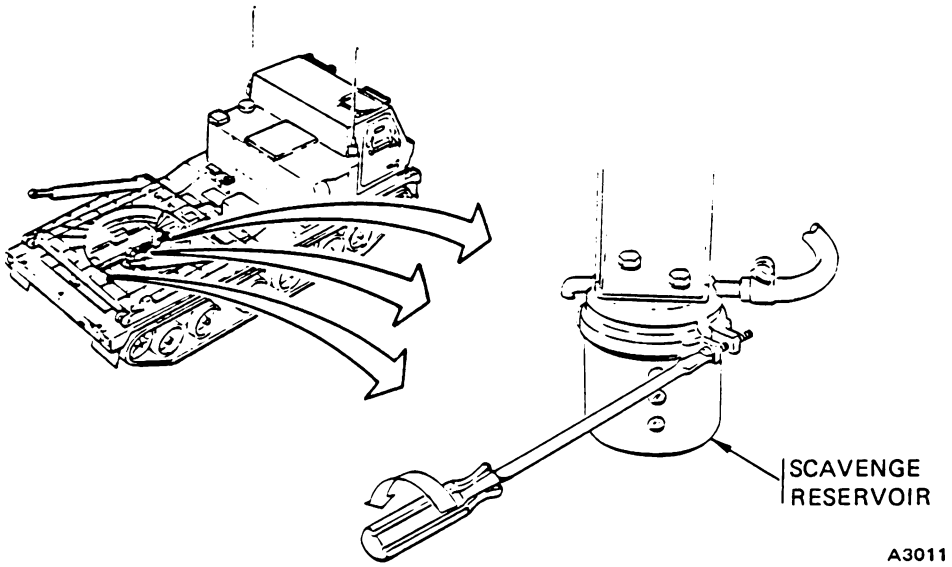


Figure 3-1. Indicator Light Locations

3-8. SCAVENGE RESERVOIR MAINTENANCE.

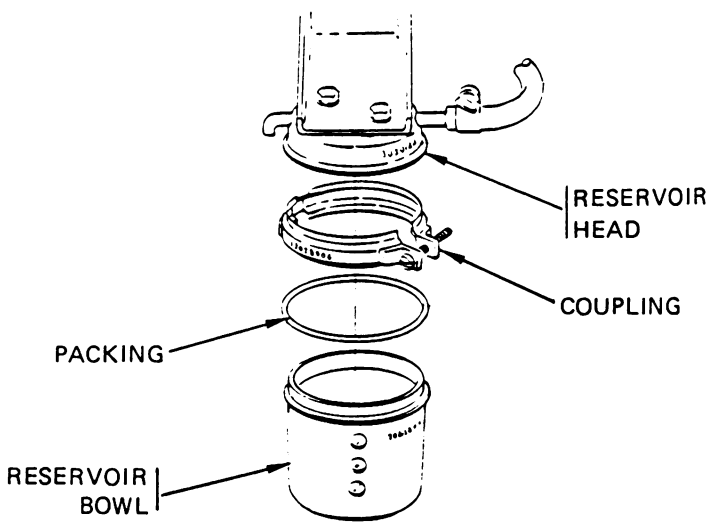
a. Using flat tip screwdriver, loosen screw on coupling that holds bowl to reservoir head.



b. Remove coupling, packing, and reservoir bowl.

c. Empty fluid from bowl into waste container.

d. Install packing on bowl and position bowl on reservoir head. Tighten coupling screw.



3-9. CLEANING INSTRUCTIONS.

a. General.

Keep the SPLL clean. Dust, dirt, and grime is abrasive to all the moving parts. Clean the SPLL as needed using the procedures below.

(1) Use soap and water to clean rubber or plastic material.

CAUTION

Do not use high pressure water or steam to clean interior and rear of LLM, or carrier vehicle bed. Water may penetrate electrical equipment and cause damage.

Do not flood the vehicle bed. When washing the LLM, refer to after fording paragraph in carrier operator's manual (TM 9-1450-646-10) and remove drain plugs.

(2) Use light spray of water at normal tap pressure, but not more than 350 kpa (about 50 psi), to clean interior and rear of LLM and carrier vehicle bed and equipment mounted in it.

(3) Clean FCP display panel with a soft cleaning cloth dampened with water, and then wipe dry.

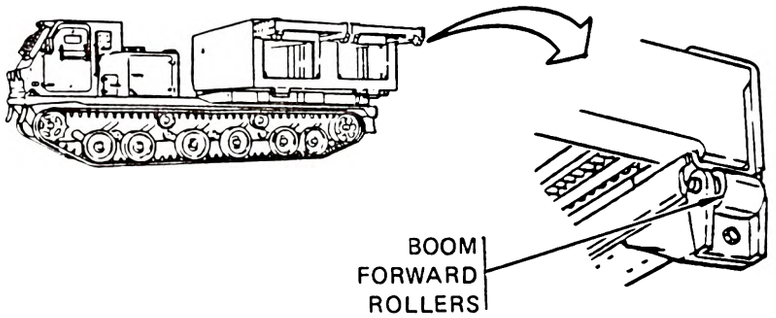
b. Boom Forward Rollers.

(1) Spray rollers with lubricant cleaner. If necessary, manually extend boom slightly while spraying roller with lubricant cleaner.

(2) Allow cleaner to soak into rocket motor exhaust deposits for about 10 minutes.

(3) Using cleaning cloth, clean rollers and surrounding area.

(4) Repeat procedure and clean the other three rollers.



3-9. CLEANING INSTRUCTIONS (CONT)

c. Travel Lock Rollers.

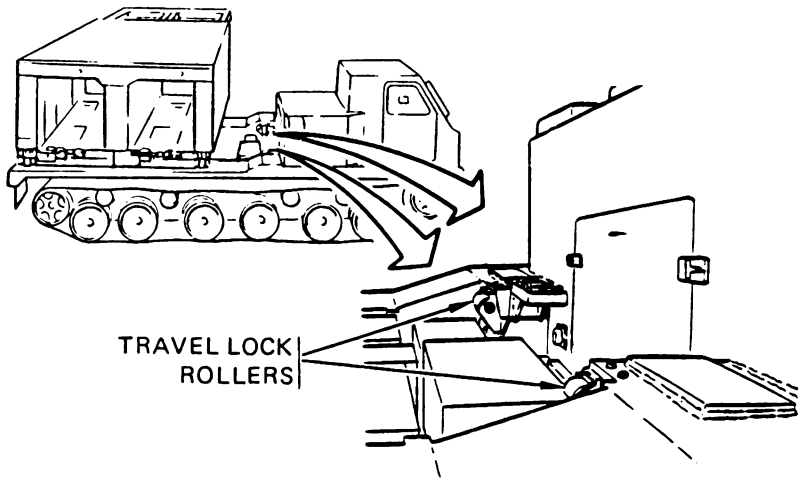
(1) Using boom controller, position LLM to 1600 mils azimuth and 0 mils elevation.

(2) Spray both travel lock rollers with lubricant cleaner.

(3) Allow cleaner to soak into rocket motor exhaust deposits for about 10 minutes.

(4) Using cleaning cloth, clean rollers and surrounding area. Check rollers for free movement.

(5) Using boom controller, stow LLM.



d. LP/C Holddown Latch Hook Rollers.

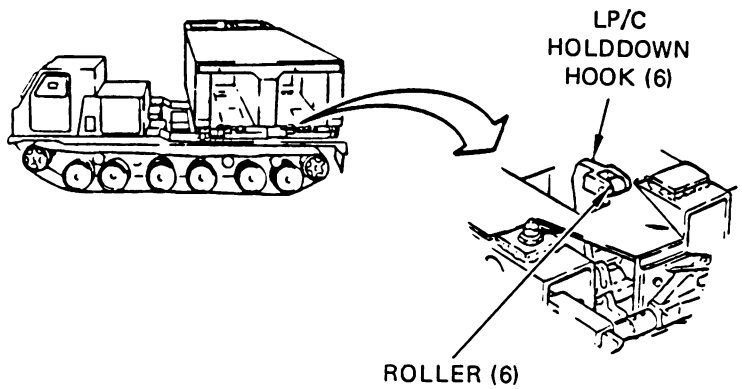
(1) Place LP/C latch handle in the locked position.

(2) Spray lubricant cleaner on all six hook rollers.

(3) Allow cleaner to soak into rocket motor exhaust deposits for about 10 minutes.

(4) Using cleaning cloth, clean rollers and surrounding area. Check rollers for free movement.

(5) Place LP/C latch handle in the unlatched position.



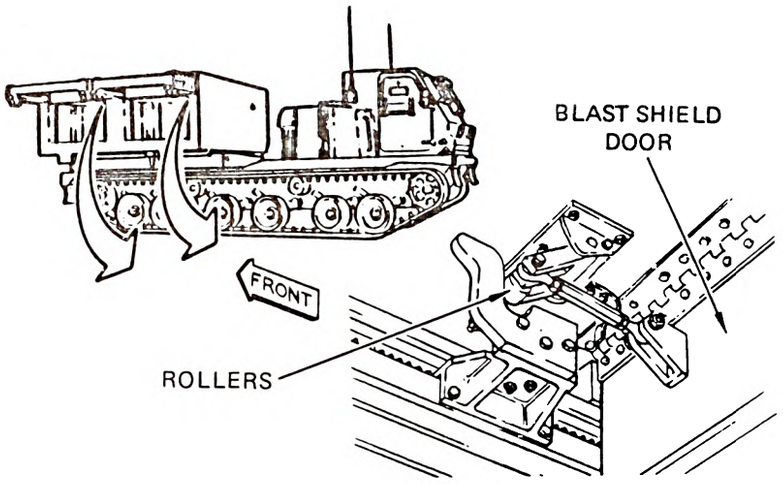
3-9. CLEANING INSTRUCTIONS (CONT)

e. *Blast Shield Door Rollers.*

(1) Spray lubricant cleaner on rollers and cams in both blast shield doors.

(2) Allow cleaner to soak into rocket motor exhaust deposits for about 10 minutes.

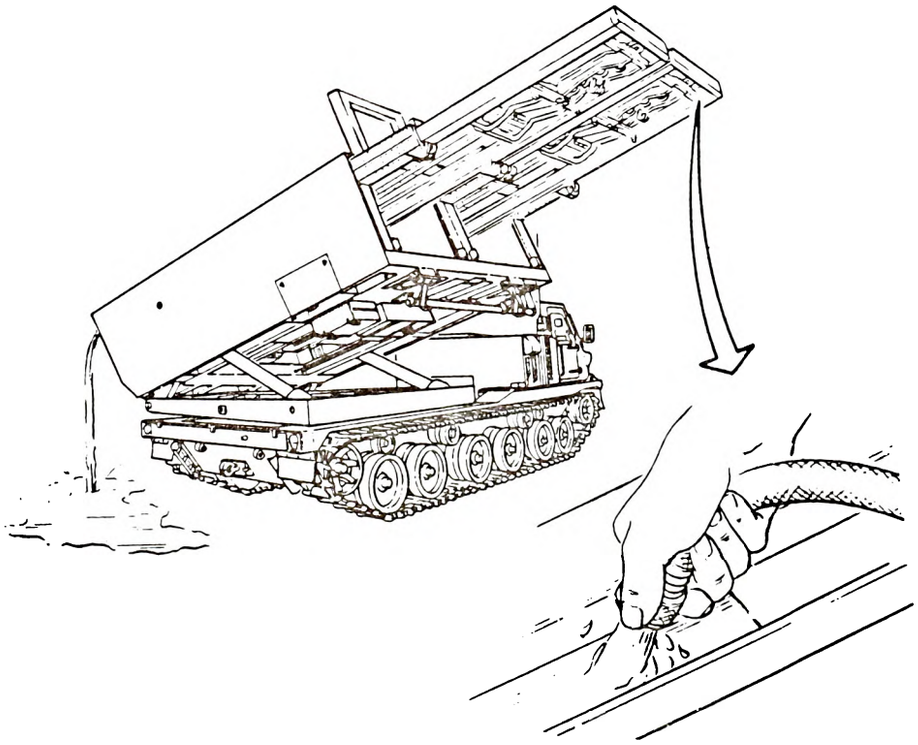
(3) Using cleaning cloth, clean rollers, cams, and surrounding area. Check rollers for free movement.



f. *Boom Channels.*

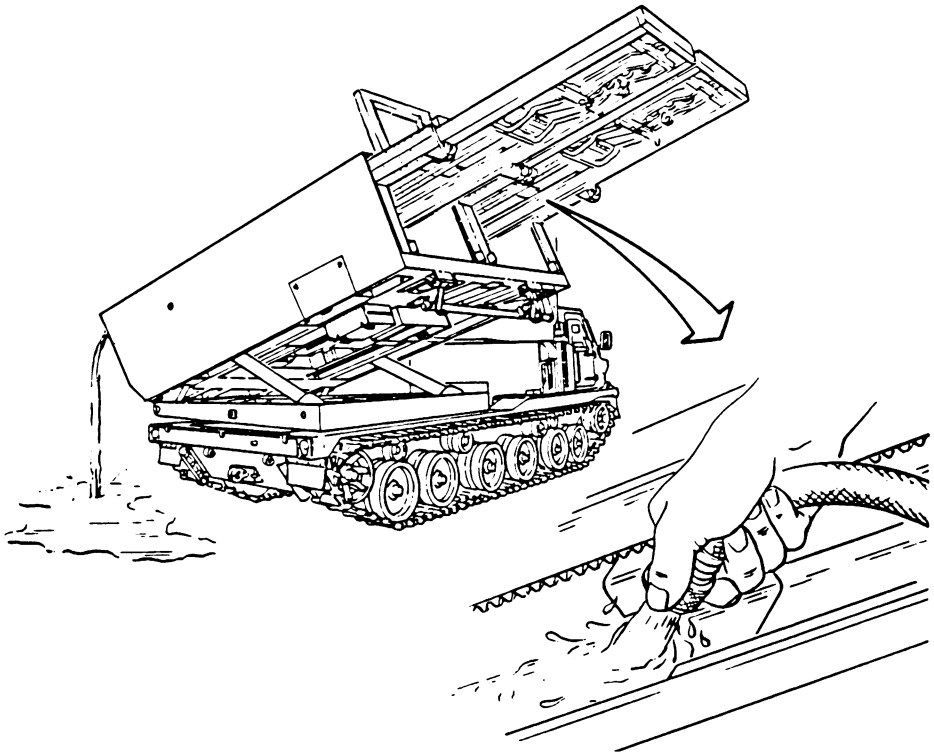
(1) With LLM positioned 1600 mils to the right, elevate LLM to about 200 mils and extend both booms all the way out. Open FCU/SRP storage compartment and PDB/SNVT storage compartment doors.

(2) Run water down through bottom inside channel of intermediate beam. Water will flow through beam and flush out dust and dirt that has collected there. Continue to run water through beam channel until water coming out at rear of beam is fairly clean.



3-9. CLEANING INSTRUCTIONS (CONT)

(3) Run water down through bottom inside channel of fixed beam until water coming out rear is fairly clean.



(4) Perform steps (1) and (2) on the four intermediate beams and four fixed beams.

(5) Let beams drain for about 5 minutes. Use cleaning cloth to remove dirt and grease that was not washed out in steps (1) and (2).

(6) Use cleaning cloth to remove any standing water from top of FCU, SRP, PDB and SNVT.

3-9. CLEANING INSTRUCTIONS (CONT)

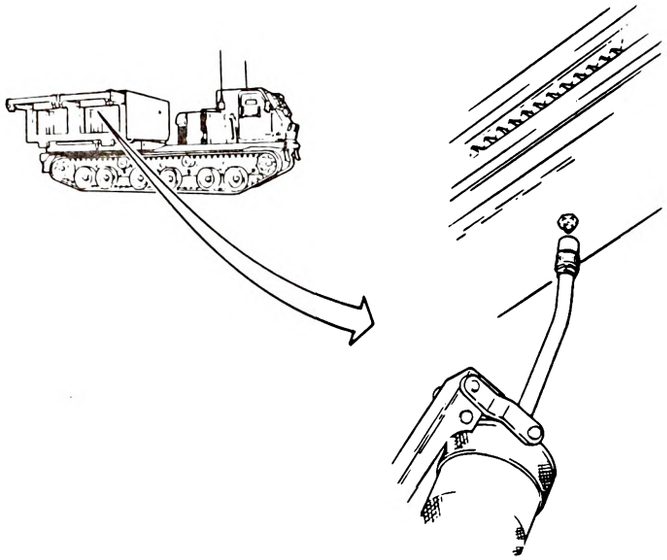
(7) Dry ball screws and ball screw assemblies with dry cleaning cloth.

(8) Close and latch FCU/SRP and PDB/SNVT storage compartment doors.

(9) Turn on system power. Select manual BC operation.

(10) Using BC, lower LLM to about 36 mils elevation, shutdown BC.

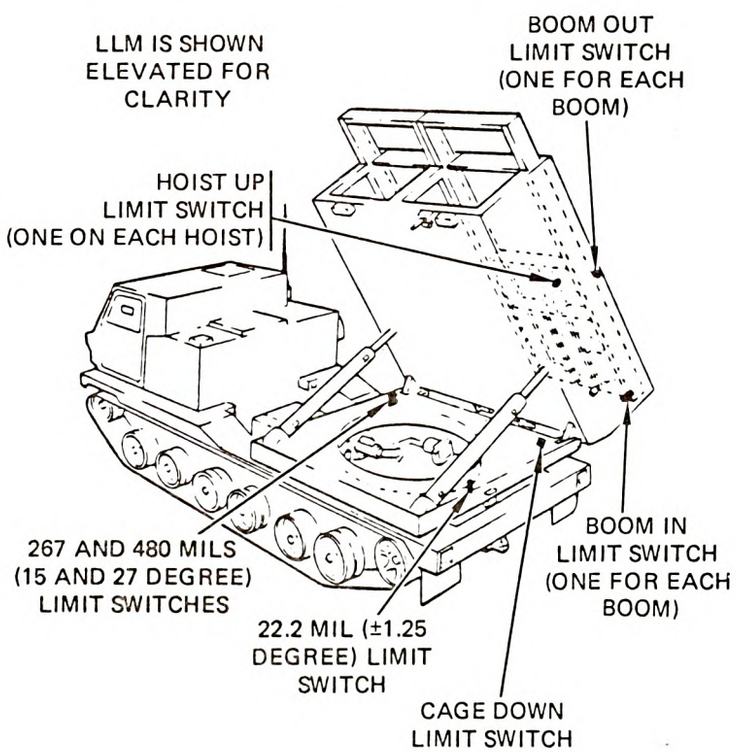
(11) Use grease gun and apply eight pumps of grease to each of the two grease fittings on each fixed beam.



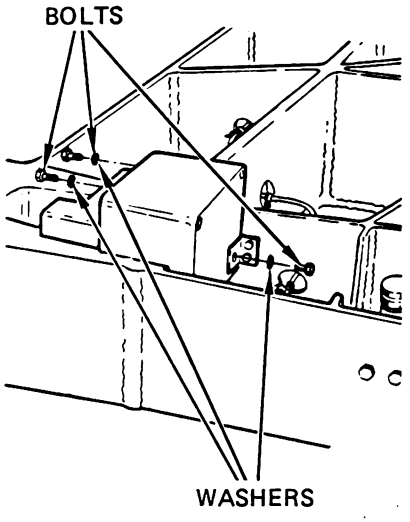
(12) Turn on system power. Select manual BC operation. Fully retract both booms.

g. Limit Switches and Plunger Assemblies.

The limit switches shown and their plunger assemblies require cleaning and lubrication.



3-9. CLEANING INSTRUCTIONS (CONT)



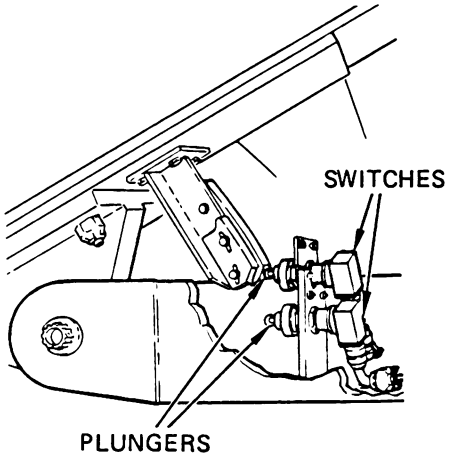
(1) 267 and 480 Mil Switches.

(a) Install jury struts (paragraph 3-6).

CAUTION

Do not turn system electrical power on when jury struts are installed.

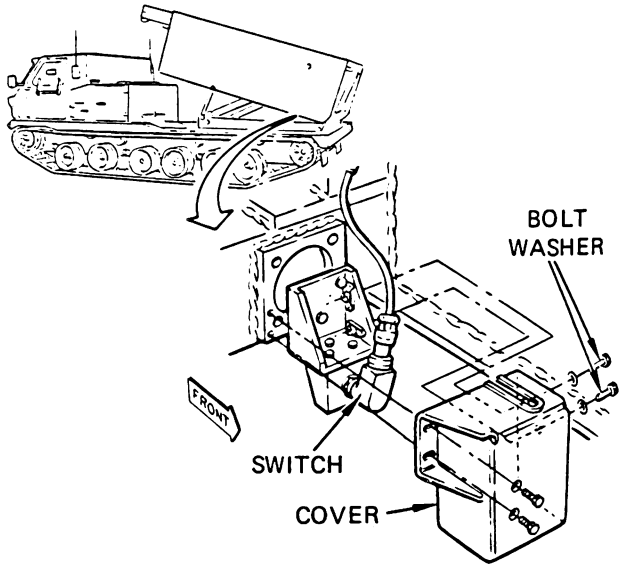
(b) Using 10mm open end/box end wrench, remove three bolts and washers securing cover over switches.



(c) Apply a liberal amount of lubricant cleaner to each switch actuating plunger and roller. Push plunger in and out by hand. This causes a washing and cleaning action. Continue this procedure until plunger and roller are clean and operate freely.

(d) Wipe excess lubricant from switch assembly and adjacent area.

(e) Install cover over limit switches with three bolts and washers.



(2) Cage Down Limit Switch.

(a) With the jury struts still installed and FCS power off, remove switch cover. Use 10mm open end/box end wrench to remove four bolts and washers securing cover over switch.

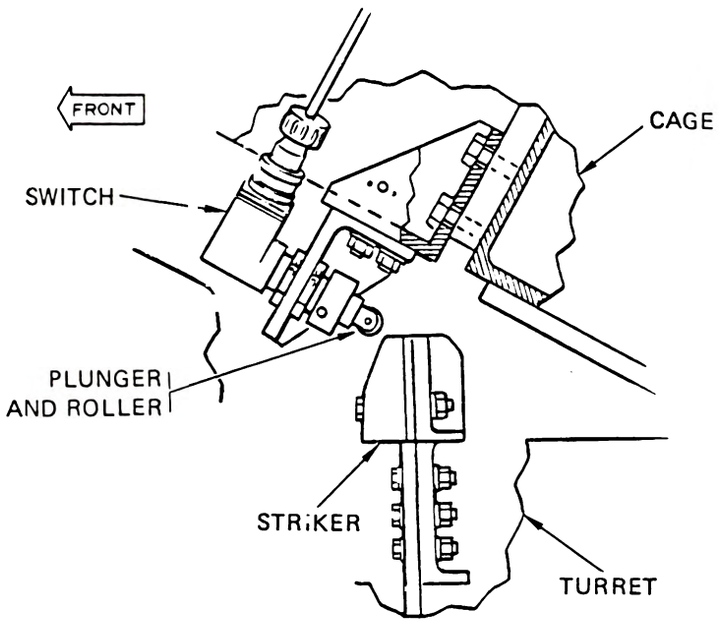
3-9. CLEANING INSTRUCTIONS (CONT)

(b) Apply liberal amount of lubricant cleaner to switch actuating plunger and roller. Push plunger in and out by hand. This causes a washing action. Continue this procedure until plunger and roller are clean and operate freely.

(c) Wipe excess lubricant from switch and adjacent areas.

(d) Install cover over limit switch. Install four bolts and washers.

(e) Remove jury struts. Do not stow LLM.



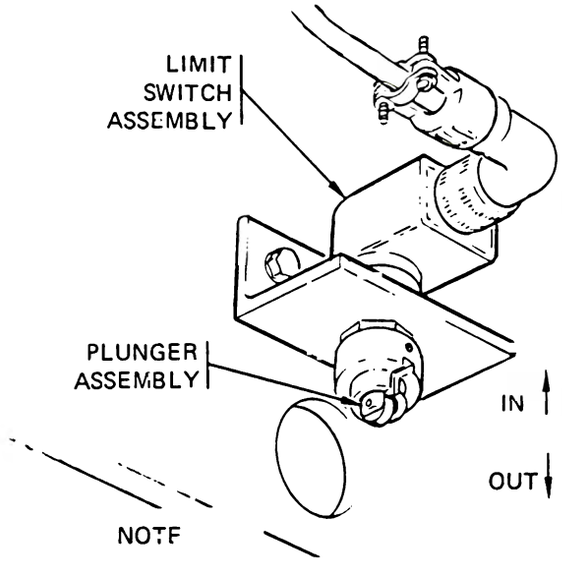
(3) All Other Limit Switches.

(a) Turn on system power. Select BC operation and position LLM to 1600 mils right or left at 36 mils elevation by selecting LLM RIGHT or LLM LEFT.

(b) Using boom controller, extend both booms approximately 1 meter and lower both hoist hooks approximately 1 meter. Turn system power OFF.

(c) Apply liberal amount of cleaner lubricant to each switch actuating plunger and roller while pushing plunger in and out (by hand). This causes a washing and cleaning action. Continue this procedure until plunger and roller are clean and operate freely.

(d) Wipe excess solution from switch assembly and adjacent area.



BOOM IN SWITCH IS SHOWN AND IS TYPICAL OF ALL LIMIT SWITCHES

3-9. CLEANING INSTRUCTIONS (CONT)

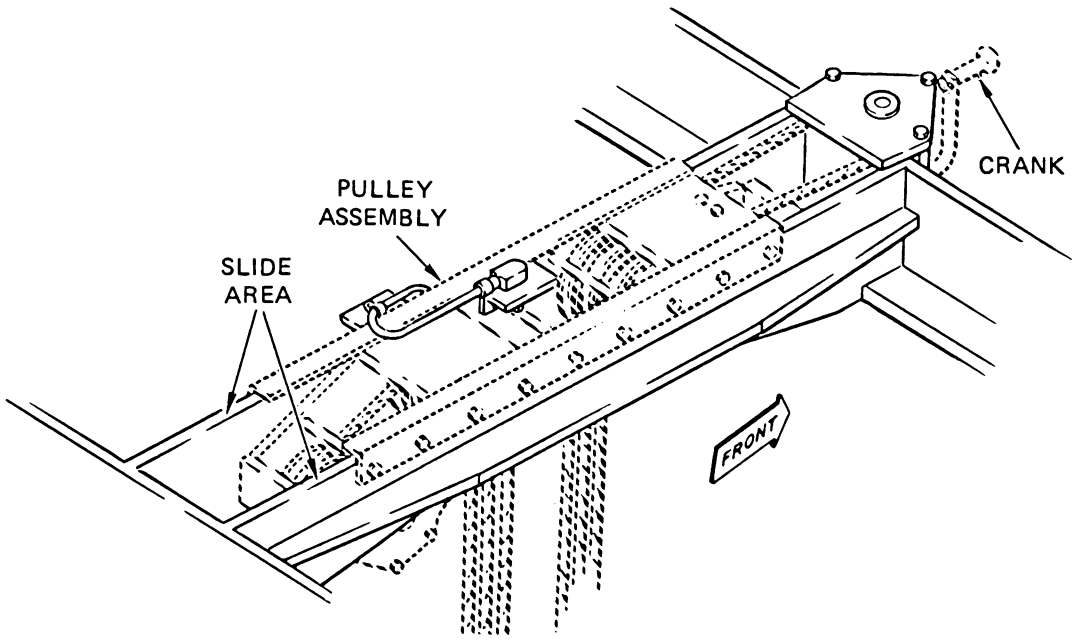
h. Hoist Positioning Assembly.

(1) Apply a liberal amount of lubricant cleaner along positioning screw and top of beam where pulley assembly slides on beam.

CAUTION

Do not reposition assembly unless hooks are lowered at least 1/3 meter. Do not reposition assembly with suspended load. Assembly screw and crank could be damaged.

(2) Pull crank handle out to cranking position. Turn crank as required to move pulley assembly to rear of hoist carriage past the AT2 index mark.



3-9. CLEANING INSTRUCTIONS (CONT)

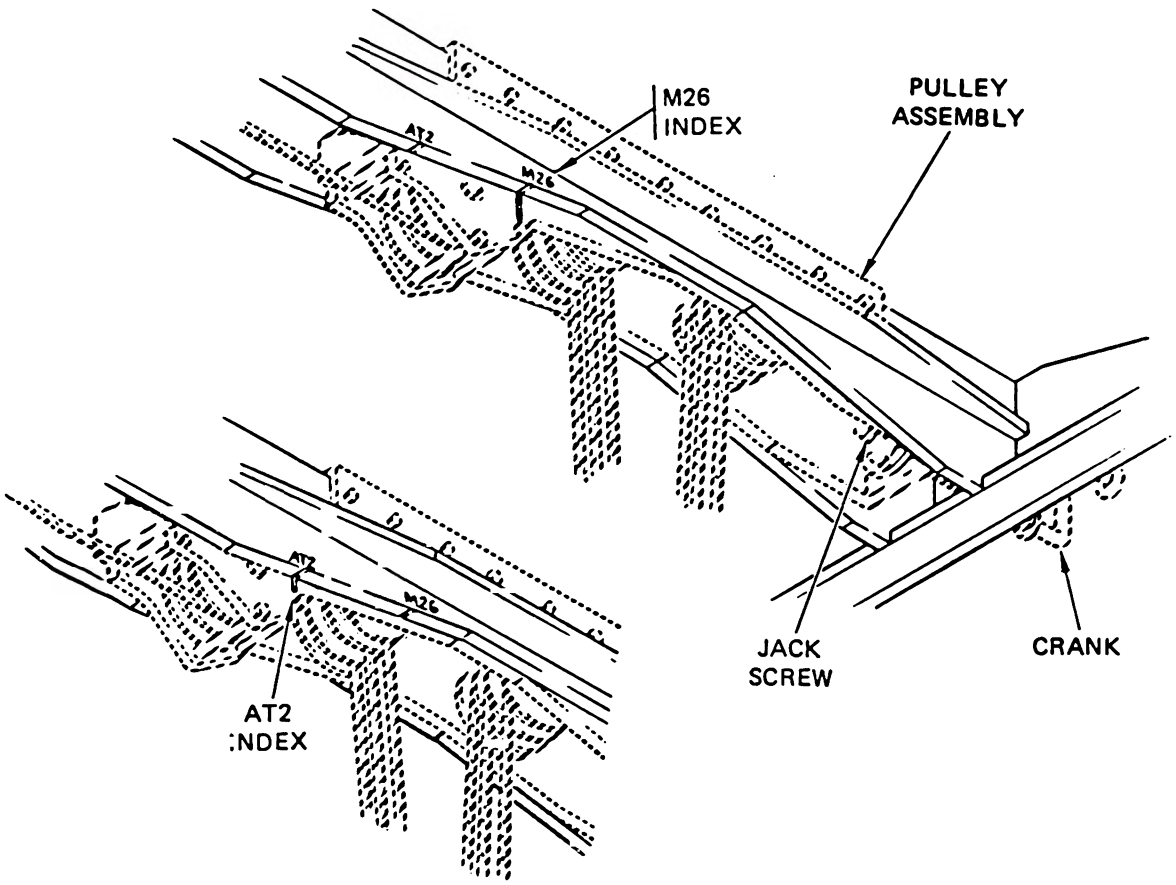
(3) Apply more lubricant cleaner to jack screw and pulley assembly slide areas.

(4) Use crank and move pulley assembly to full front position and then back to rear position again.

(5) Using wiping rag wipe off excess lubricant cleaner from front slide area.

(6) Using crank, move pulley assembly to align with the M26 index mark. Fold handle out of way into storage clip.

(7) Using wiping rag wipe off excess lubricant cleaner from rear slide area.



3-9. CLEANING INSTRUCTIONS (CONT)

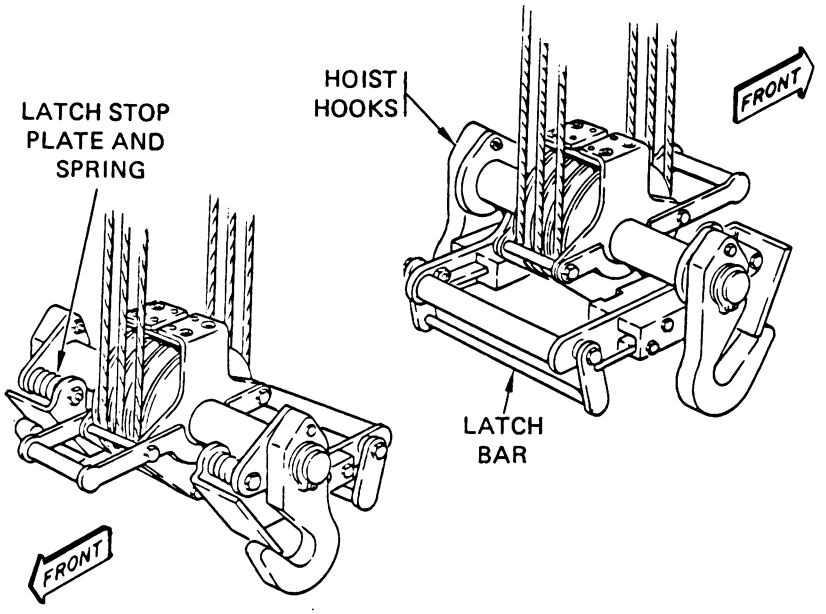
i. Hoist Hook Handle Latch Assembly.

(1) Apply liberal amount of lubricant cleaner to hook handle latch bar where it is attached to hook handle.

(2) Apply lubricant cleaner to latch stop plate and spring.

(3) Allow lubricant cleaner to soak for a few minutes, then operate the latch several times. Make sure it is operating freely.

(4) Using wiping rag wipe off excess lubricant cleaner.



j. Elevation Actuator.

(1) Install jury struts (paragraph 3-6).

CAUTION

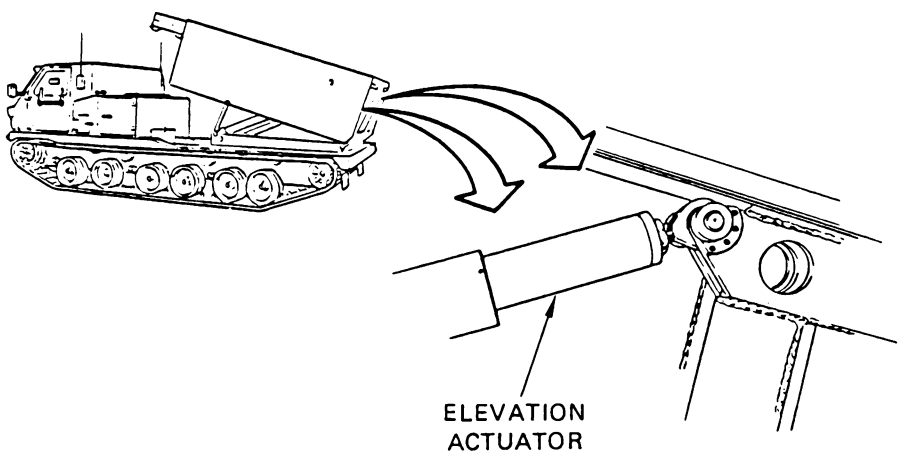
Do not turn system electrical power on when jury struts are installed.

(2) Apply liberal amount of cleaner lubricant along exposed polished metal surface of actuator arm.

(3) Allow lubricant cleaner to soak into rocket motor deposits for several seconds.

(4) Using wiping rag clean off the actuator. Wipe off excess lubricant cleaner.

(5) Remove jury struts, and stow LLM.



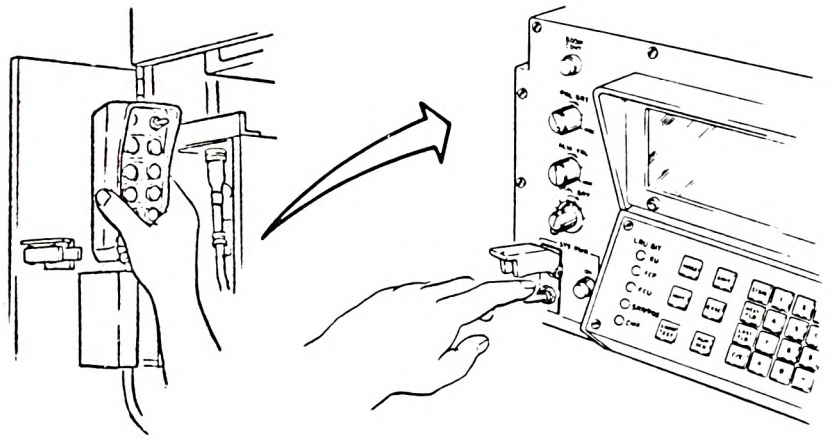
3-10. HOIST CABLE INSPECTION.

a. With the LLM positioned to the rear, use the BC and fully extend both booms. Lower both hooks until hoist down limit switch on each hoist stops the movement. As hooks are lowered, a second crewmember must assist by pulling on hooks and placing hooks on a clean surface.

WARNING

Make sure FCS power is turned off and BC is disabled before continuing the inspection.

b. Store BC in storage compartment. Set FCP SYS PWR switch to OFF.

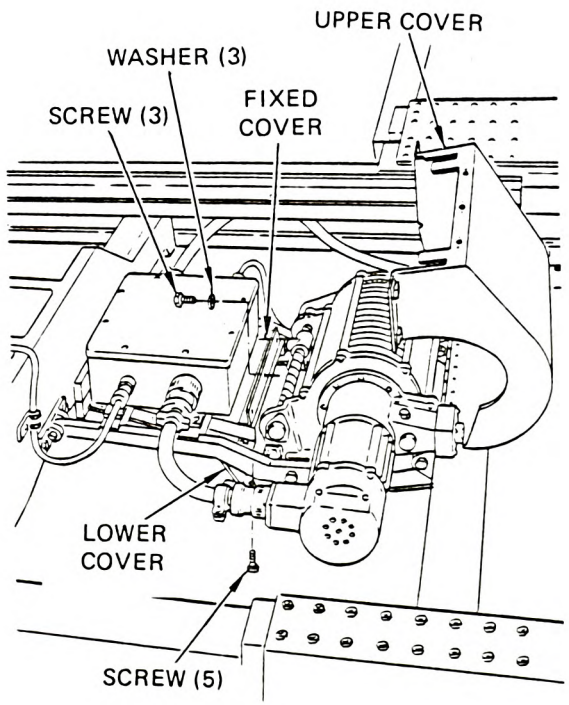


(1) Left Hoist Cable Inspection.

(a) Using crosstip screwdriver, remove five screws securing hoist upper dust cover to lower dust cover.

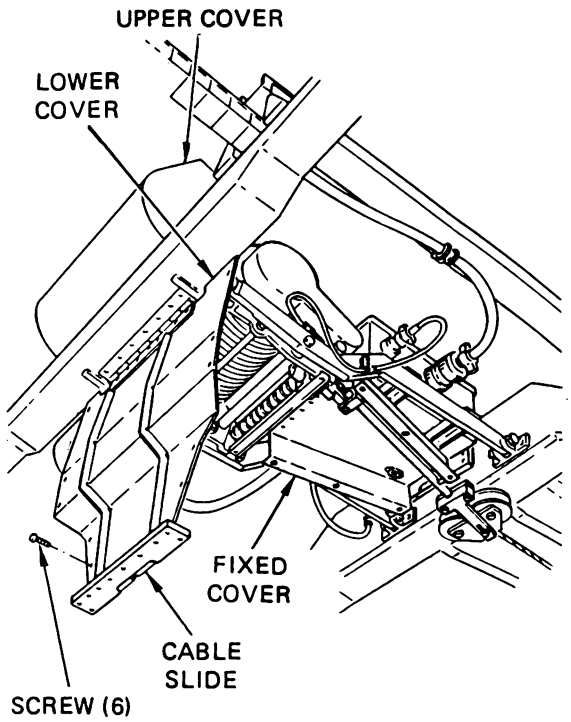
(b) Using 10mm open end wrench, remove three screws and washers securing hoist upper dust cover to fixed cover. Open upper dust cover.

(c) Using crosstip screwdriver, remove six screws securing lower dust cover to fixed cover. Open lower dust cover.



3-10. HOIST CABLE INSPECTION (CONT)

(d) Remove and retain cable slides in lower cover. Hoist cable guide tube should hold cable slide in fixed cover. If not, remove and retain.



(e) While wearing cloth gloves, grip cable lightly, carefully run your hand up and down cable. Check entire length of cable. Check cable for broken strand, bulges, or kinks.

CAUTION

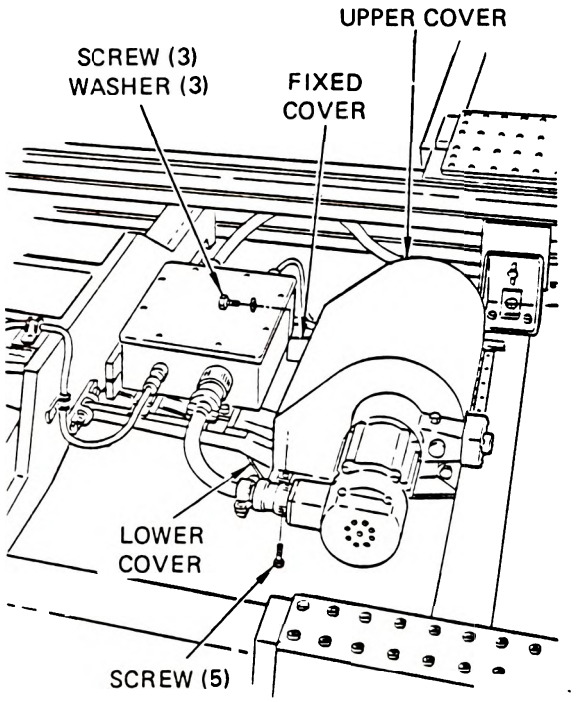
Use care not to lower hoist. Attempting to lower hoist past down limit switch will damage switch.

(f) Refer to manual hoist operation (paragraph 2-43, d) and carefully raise hoist hook a little. Inspect cable wraps on hoist drum for broken strands, bulges, or kinks.

Notify next higher maintenance level if cable has broken strand, bulge, or kink.

(g) Install cable slides. Close lower dust cover and install six screws securing lower cover to fixed cover. Using crosstip screwdriver, tighten screws.

3-10. HOIST CABLE INSPECTION (CONT)



(h) Close upper dust cover and install three screws and washers securing upper cover to fixed cover. Using 10mm box end wrench, tighten screws.

(i) Install five screws securing upper dust cover to lower cover. Using crosstip screwdriver, tighten screws.

(2) Right Hoist Cable Inspection.

Repeat inspection instructions (paragraph a). When inspection is completed and if no other inspections are to be performed, turn on FCS. Select boom control operation. Using boom controller, raise both hoists. As hoists are raised, a second crewmember should assist by pulling on hoists hooks as they are raised, and releasing hooks as they go out of reach. When hooks are raised, retract both booms, store boom controller.

CHAPTER 4
AMMUNITION

CHAPTER CONTENTS

Section I. INTRODUCTION

4-1. SCOPE. This chapter provides information needed for identification and safety in the care and handling of 298 Millimeter Rocket Pod M26, hereafter called launch pod/container (LP/C). This information should be thoroughly understood by all persons performing ammunition resupply operations and the operations described in this manual. The information is provided in addition to the precautions described in TM 9-1300-206 and AMCR 385-100, that apply to rockets in general.

4-2. FORMS, RECORDS, AND REPORTS.

a. Forms.

Refer to DA Pamphlet 738-750 for instructions on the use of forms described in this chapter.

b. Reports.

The reports that may have to be submitted in the care and handling of LP/Cs are as follows:

(1) Injury to Personnel or Damage to Equipment. Accidents causing injury to personnel or damage to equipment will be reported as required by AR 385-40 on DA Form 285.

(2) Damaged or Improper Shipment. All shipments of LP/Cs received in a damaged or unsatisfactory condition will be reported as required by AR 700-58.

(3) Condition of Ammunition (DA Form 2415). An ammunition condition report (ACR) will be prepared on all unserviceable LP/Cs so that proper disposition orders can be issued. This report will be prepared as required by DA Pamphlet 738-750 and mailed to: Commander, U.S. Army Missile Command ATTN: DRSMI-SNLP Redstone Arsenal, AL 35898.

4-2. FORMS, RECORDS, AND REPORTS (CONT)

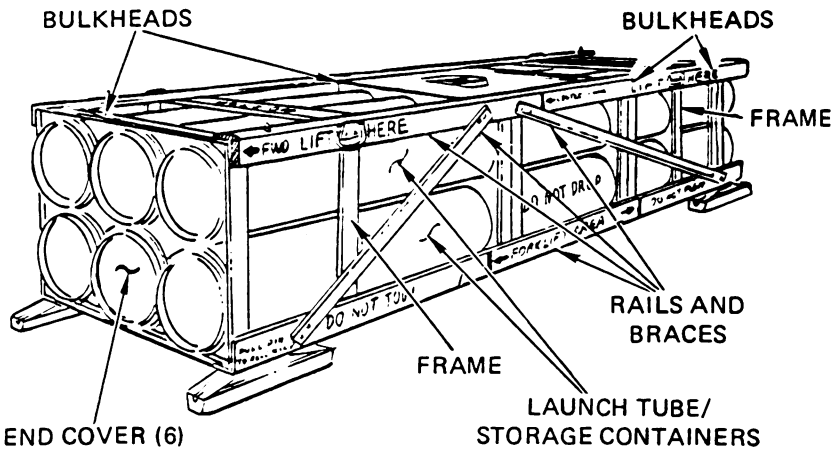
(4) Malfunctions Involving Ammunition. Rockets which fail to operate properly or otherwise defective LP/Cs will be reported as required by AR 75-1. Where applicable, the affected lots will be suspended from use as required in ARM 385-63.

c. Records.

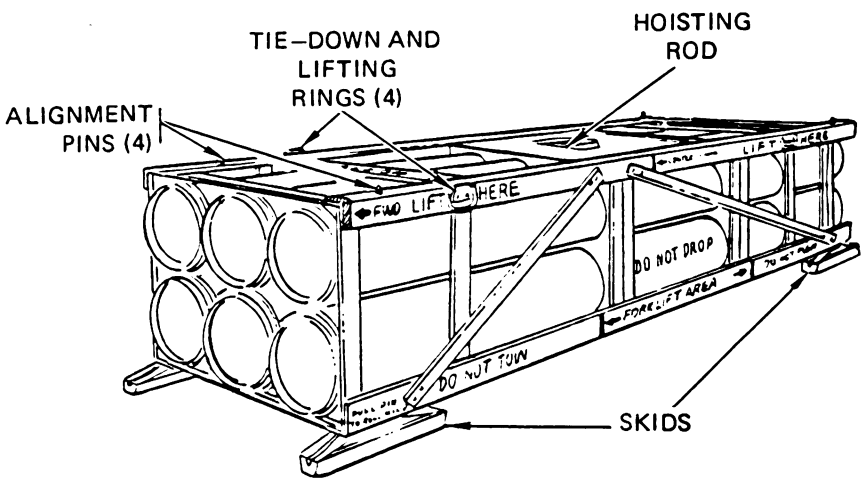
An ammunition data card, DD Form 1650, is prepared for each LP/C. Copies of the data cards are supplied with each shipment of LP/Cs. The card contains the lot number of the LP/Cs, the lot number of the rockets, igniters, and other items. It also lists applicable drawings and other data about manufacturing and procurement of the LP/Cs.

4-3. DESCRIPTION. An LP/C is made up of six filament wound fiberglass tubes. The tubes are supported and aligned accurately in a rectangular box-like structure. The structure is made up of a combination of aluminum angle rails, diagonal braces, frames, and bulkheads.

A rocket is stored inside each tube. The tube serves as both a launch tube and a storage container. The end of each tube is sealed with a cover. The rockets are fired with the covers in place.



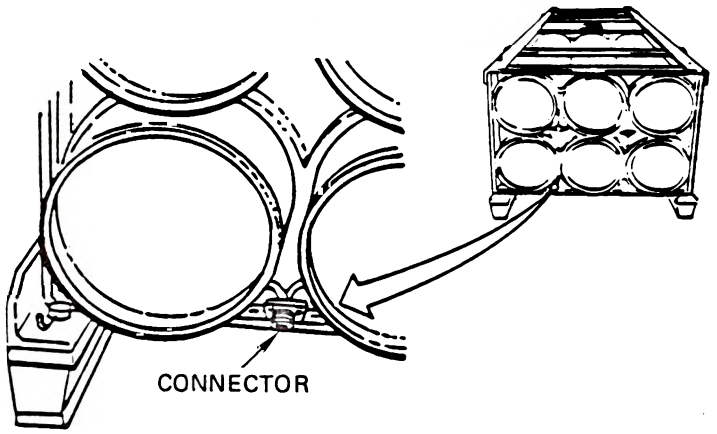
Each LP/C has four D-shaped lifting rings (one near each corner). The rings are used for tiedown during shipping and transport and lifting with a hoist and sling. The LP/C also has a special low profile hoisting rod for use when loading the LP/C into the SPLL. Four removable skids are attached to the bottom of the LP/C. The skids protect the bottom of the LP/C during shipment and storage. They must be removed when the LP/C is loaded into the SPLL.



In addition, there are four alignment pins near the ends of the top rails. When LP/Cs are stacked on top of each other, these pins fit into holes in the bottom of the skids on the top LP/C. This keeps the LP/Cs aligned and lessens the chance of them slipping off of each other.

4-3. DESCRIPTION (CONT)

Wiring from each rocket motor and fuze is routed along side of the launch tubes and LP/C structure. The wiring comes together at a connector at the lower rear end of the LP/C. The LP/C is electrically connected to the SPLLs fire control system through this connector.



4-4. DATA. Physical data for the LP/C is provided in table 4-1. The data is applicable to the 298 Millimeter Rocket Pod M26 with M77 warhead. Data for an LP/C trainer is provided in TM 9-6920-646-14.

Table 4-1. LP/C Data

Length:	
With skids	4214mm (166 in.)
Without skids	4014mm (158 in.)
Width:	
With skids	1051mm (41 in.)
Without skids	1051mm (41 in.)
Height:	
With skids	839mm (33 in.)
Without skids	716mm (28 in.)
Weight:	
Loaded	2270 kg (5005 lb)
Empty	396 kg (873 lb)

Section II. SAFETY

4-5. GENERAL. This section covers general safety information and instructions for handling and using MLRS rocket ammunition. This section also identifies hazards that exist when using or handling the ammunition and what to do in the event of an accident.

WARNING

Personnel working in or near the area where loaded LP/Cs are handled or stored may be exposed to hazards associated with high explosives. Be sure you are aware of the general safety precaution as contained in AR 385-62, -63, and -64.

Explosive rocket components in the LP/Cs are designed to be as safe in handling and use as is possible and remain consistent with its function. Because explosives always present a hazard, each person that works with the LP/Cs must be aware of the risks and hazards involved. All unsafe conditions must be avoided.

4-6. HAZARDS. The hazards described in these paragraphs are some of the hazards that could occur. They could be the result of malfunctions during use or accidents when handling the LP/Cs. All personnel handling or using the LP/Cs must always exercise care and be alert for unsafe conditions.

a. Rocket Malfunctions.

(1) Dud Fuze. When the rocket fuzes are tested by the SPLLs fire control system (FCS) and a fuze fails the test, no special precautions are necessary. Handle in the same manner as any LP/C with live rounds. Take action in accordance with unit SOP.

(2) Misfire. An attempt was made to fire the rocket. The FCS did not detect any squib current. No special precautions are necessary. Handle in the same manner as any LP/C with live rounds. Take action in accordance with unit SOP.

(3) Hangfire. An attempt was made to fire the rocket. Squib current to the rocket was detected. Emergency hangfire procedures (paragraph 2-38) must be followed. LP/Cs with hangfire rockets should be handled only in accordance with unit SOP.

b. Hazardous Conditions.

(1) Penetration of LP/C Launch Tube. Penetration of an LP/C launch tube could cause a flaw in the rocket. A penetrated launch tube can also cause irratic rocket flight after firing. Do not load an LP/C with a penetrated launch tube. Take action in accordance with unit SOP.

(2) Premature Rocket Ignition. Premature motor ignition may cause injury to personnel and damage equipment. Other rockets in LP/C could be damaged. If LP/C is in the LLM, treat this hazard the same as a hangfire. Refer to (paragraph 2-38) for instructions on unloading LP/C. If the LP/C is on an RSV or RST, take precautions as described in (paragraph 4-7, a). Take action in accordance with unit SOP.

(3) Mishandling. Mishandling an LP/C can cause a flaw in a rocket. When handling LP/Cs do not drop, tumble, roll, drag, or walk an LP/C. If an LP/C is damaged by mishandling, take action in accordance with unit SOP EOD.

(4) External Fire. External fire may cause rocket to explode. Notify fire department. Take action in accordance with unit SOP.

4-7. PERSONNEL SAFETY REQUIREMENTS.

a. *Precautions.*

Personnel safety requirements are precautions which must be observed by all persons working on or near loaded LP/Cs.

WARNING

Personnel working in or near the area where loaded LP/Cs are stored may be exposed to hazards associated with high explosives. Be sure you are aware of the general precautions as contained in AR 385-62, -63, and -64.

Always keep a shorting plug connected to a loaded LP/C. Remove shorting plug only when you are going to connect a tested LLM umbilical cable to the LP/C. Stray voltage could cause rocket to fire and cause death.

Burning rocket propellant cannot be extinguished. If fire engulfs an LP/C, all personnel will be evacuated as directed by section chief or platoon leader.

Burning rocket propellant is toxic. Immediate access to NBC masks is required for all operations outside of SPLL cab where personnel may become exposed to ignited rocket propellant.

To make sure of your safety and the safety of others when you are working near or with MLRS rocket ammunition, observe the following precautions:

(1) Do not operate electrical generating equipment in area unless authorized and then only after all LP/Cs have been inspected (paragraph 4-9, b).

(2) Do not carry spark producing devices into high explosive storage areas.

(3) Do not smoke within 50 meters of LP/C loading area.

(4) Do not have fires or flame producing devices in area of high explosives.

(5) Do not allow litter to accumulate. Pick up trash.

(6) Do not allow oily rags or other material subject to spontaneous ignition to be stored or accumulate in area of high explosives.

b. *Limits.*

All personnel working near explosive rocket ammunition must observe the following personnel safety limits:

(1) Nonemergency maintenance tasks not directly related to MLRS tactical mission will be prohibited in the loading area where LP/Cs are stored and on SPLL when loaded.

(2) The number of personnel permitted at or near SPLL loading area shall be the minimum necessary to carry out the operation.

(3) Operations in an enclosed area shall be separated by protective barriers.

4-7. PERSONNEL SAFETY REQUIREMENTS (CONT)

c. Responsibilities.

Personnel working with rocket ammunition must always be aware of the safeguards, limitations, and the information in the following procedures.

(1) Make sure you know what to do in case of fire. The section chief should instruct the crew on what to do, including evacuation to a safe distance from potentially explosive ammunition in case of an accident involving a fire.

(2) Make sure you know where NBC masks are stored and how to use them.

(3) Make sure you know what to do when an ammunition malfunction, such as hangfire or misfire occurs. Refer to emergency procedures in paragraph 2-38.

4-8. AREA SAFETY REQUIREMENTS. The hazardous nature of high explosive rocket ammunition requires operations, involving MLRS rockets, be performed in an area specifically designated for this purpose.

Area safety requirements for MLRS ammunition shall be according to the quantity-distance information in TM 9-1300-206.

Loading operations in the area must be supervised by personnel who understand the hazards and risks involved and the emergency procedures in case of an accident.

4-9. INSPECTION. Inspection of MLRS rocket ammunition by crewmember is limited to a visual check of the LP/C. The inspection procedure described in these paragraphs applies to all phases of LP/C handling within the battery. The checks are for any damage which could affect the safety of a firing mission. LP/Cs that do not pass inspection must be rejected. Take action in accordance with unit SOP if any LP/C is rejected.

a. Definition of Terms.

The following terms are defined as used in this manual only.

(1) Crack. A narrow break in a material. A partial break, but the material is not completely divided.

(2) Dent. A slight depression. A small rounded hollow in the surface of a material.

(3) Gouge. A scooped out area in a material due to cutting or tearing as in a scraping action.

(4) Penetrate. To make a hole into or though a material.

(5) Scrape. A slight scratch.

(6) Scratch. A narrow, shallow displacement of material from a surface.

(7) Shattered. To break apart, or to break into pieces.

b. Visual Inspection.

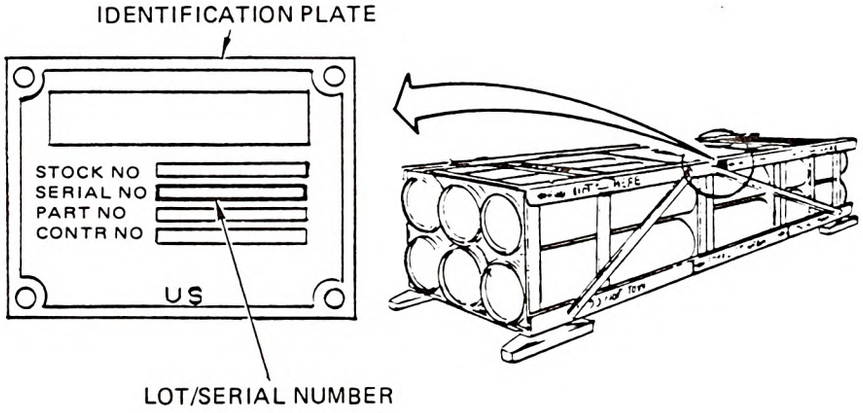
LP/Cs should be inspected before they are loaded onto the ammunition resupply vehicles, or into the SPLL. Any LP/C defect or damage, which could affect the safety of a mission, is cause for rejection.

4-9. INSPECTION (CONT)

Perform LP/C inspection as follows:

(1) (Ammunition platoon crew chief) Check ammunition data cards, for LP/Cs to be loaded, to make sure they are correct.

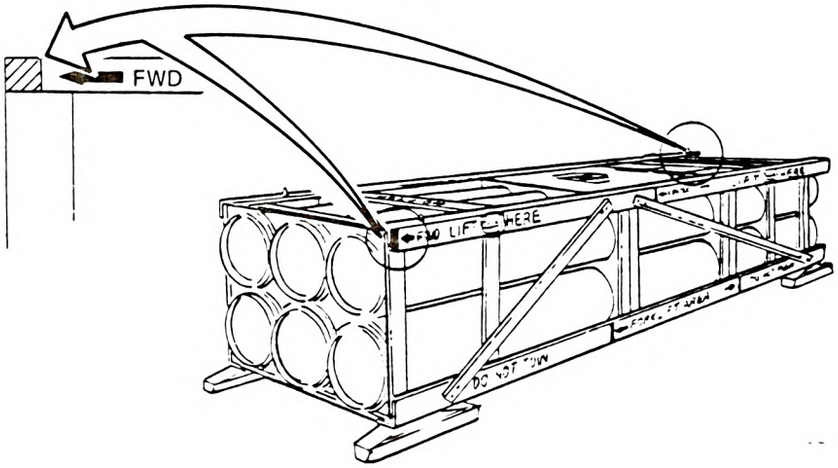
The LP/C identification plate is located on the side of the LP/C. The LP/C lot/serial number is stamped on the identification plate. Lot/serial numbers are assigned to rockets made under the same condition. This number is used in all reports concerning rocket ammunition.



(2) Check type of LP/Cs to be loaded to make sure they are the same type as specified in your loading or resupply orders.

Color codes identify the type of rockets in the LP/C. The rocket color code is located on opposite corners of the LP/C.

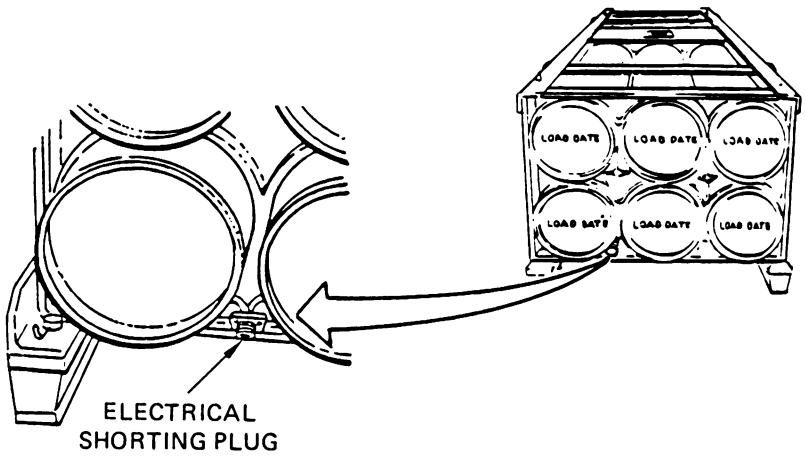
LP/C color identifications are as listed.



LP/C Warhead	Corner	Modified 1st Band	Modified 2nd Band
Training (total inert)	Bronze		
M77 (live)	Yellow		Brown
Practice (M77)	Blue	Light Green	Brown

4-9. INSPECTION (CONT)

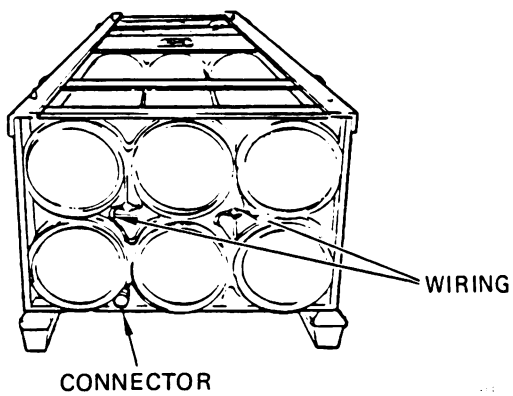
(3) Make sure an electrical shorting plug is installed on the LP/C wiring connector.



(4) Check LP/C wiring for crimped, frayed, loose, or broken wiring.

(5) Check LP/C for damage as follows:

(a) Cracked, gouged, or shattered launch tubes.



(b) Check launch tube end covers for looseness or other indications the seal may be damaged or broken.

(c) Check LP/C rails, braces, and bulkheads for bends and dents.

(d) Check lifting bar for bends and cracks.

(e) Check condition of D-rings and their mountings. Make sure the D-rings will lay flat against side of LP/C. Look for structural cracks, or bends that could interfere with loading LP/C onto an RSV or into a SPLL.

(f) Check LP/C for missing components or any other evidence to indicate LP/C is damaged.

(g) Check bottom of LP/C to make sure skids are properly in place and bottom of LP/C is not damaged.

4-10. CARE AND HANDLING.

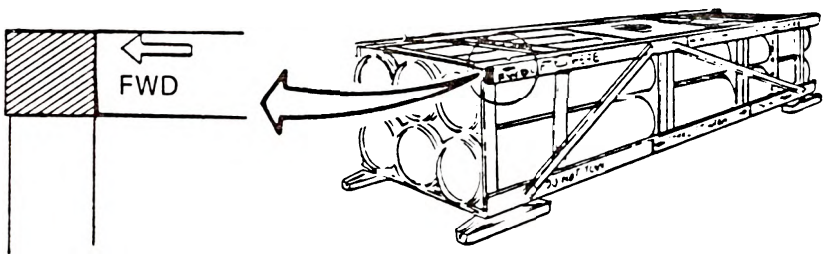
a General.

The explosive submunitions and rockets used in the MLRS rockets are designed for safe handling. The LP/Cs are designed to withstand most conditions the LP/C will come across in normal storage and handling. During handling, care must be taken. LP/Cs can be damaged by rough handling, such as dropping. Whenever handling LP/Cs, use only authorized equipment. Do not allow LP/Cs to strike hard against each other. Do not tumble, roll, drag excessively, or walk the LP/Cs on the ground or floor. LP/Cs that have been mishandled should not be used.

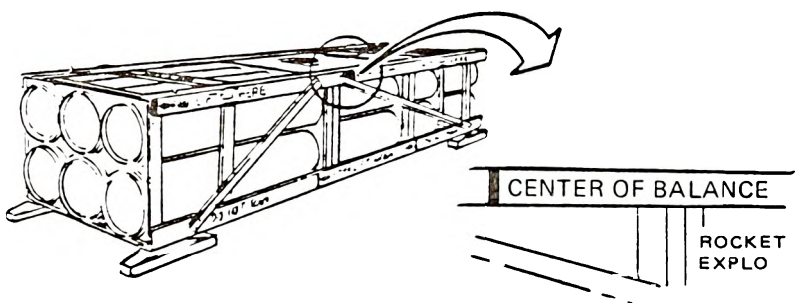
Markings are stenciled on each LP/C to aid in identification, loading, storage, and transportation.

You should know and observe the following markings when handling the LP/Cs. These markings are in addition to the identification plate and LP/C type color code markings described in visual inspection (paragraph 4-9, b).

(1) The FWD marking shows you which end is the front end of the LP/C.

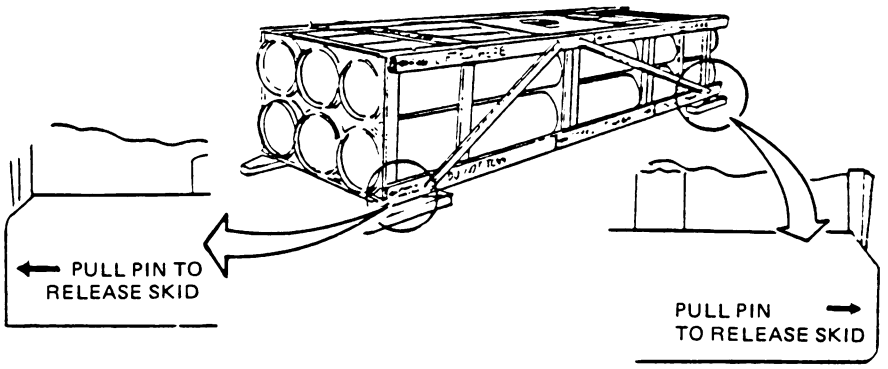


(2) The CENTER OF BALANCE marking shows the point between the front and rear of the LP/C where the weight is equal.

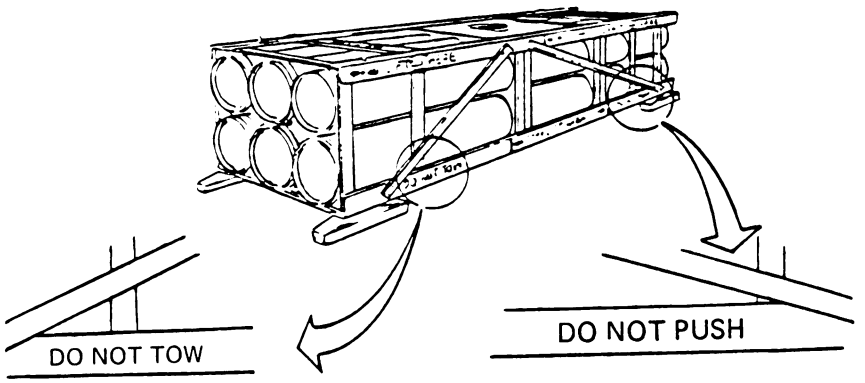


4-10. CARE AND HANDLING (CONT)

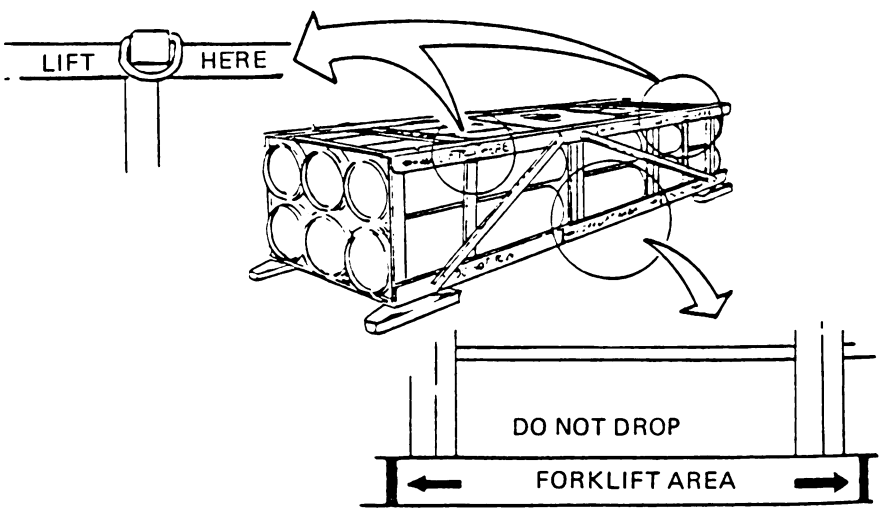
(3) Markings at the bottom of each corner show you where the skid pins are located. The skid pins release the skids, which must be removed before the LP/C can be loaded into the SPLL.



(4) These markings tell you what you cannot do when handling the LP/C.

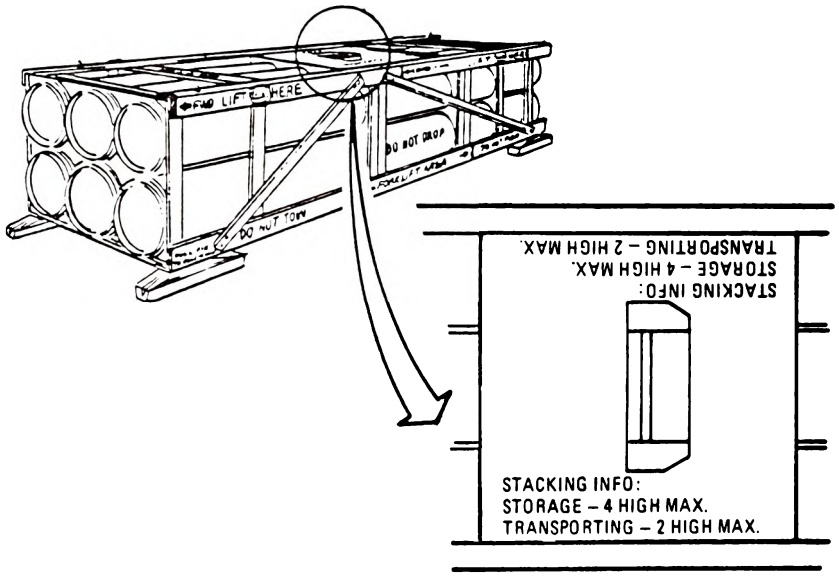


(5) Where to lift is stenciled on the LP/C. The D-rings on top are for lifting with a sling and attaching tiedown straps. There is a place for lifting the LP/C with a forklift also.

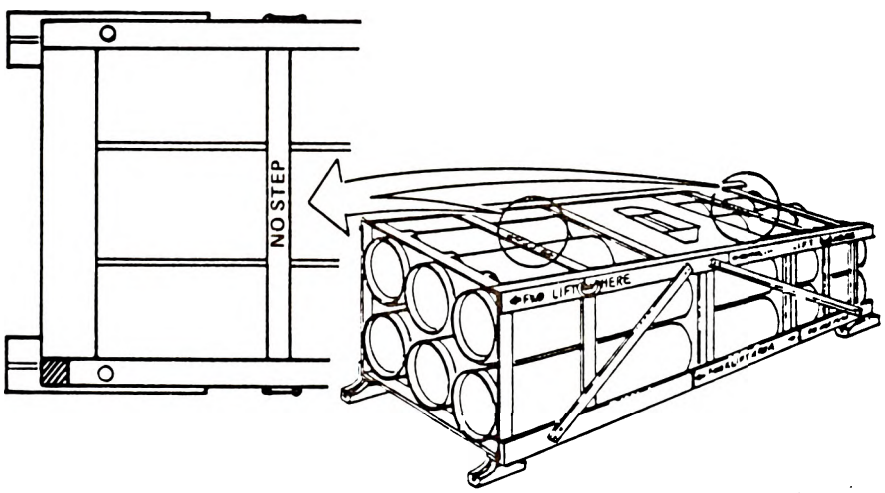


4-10. CARE AND HANDLING (CONT)

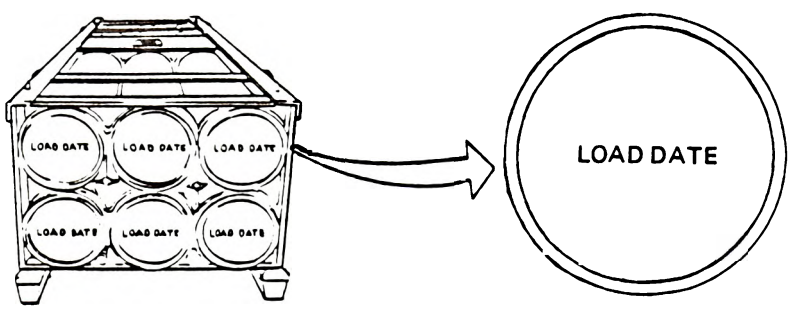
(6) Information on how high to stack the LP/Cs is stenciled on the top near the hoisting rod.



(7) NO STEP signs are stenciled on the top to remind you that if you must climb up onto an LP/C, not to step on the frames or on the launch tubes.



(8) The LOAD DATE is stenciled on the rear cover of each launch tube. It tells when the rockets were loaded into the LP/C.



4-10. CARE AND HANDLING (CONT)

b. SPLL Loading and Offloading.

Reloading instructions for the SPLL crew are provided in paragraph 2-32.

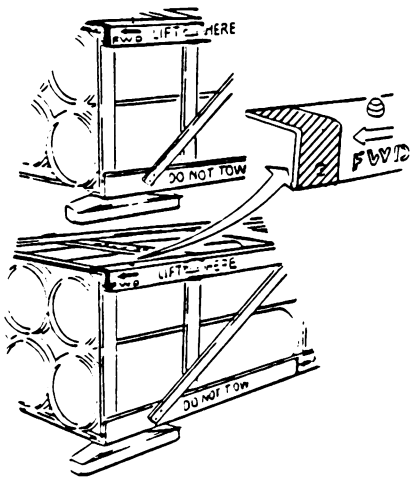
c. Ammunition Vehicle Loading and Offloading.

The primary vehicle used as an MLRS resupply vehicle (RSV) is the type M985, Heavy Expanded Mobility Tactical Truck (HEMTT). The HEMTT is a 10-ton truck with a self-contained medium duty crane mounted at the rear. The crane has a 5400-pound (12 000 kg) lift capacity at a maximum radius of 16 feet (488mm). Operating instructions for the HEMTT and the crane are provided in TM 9-2320-279-10.

The primary vehicle used as an MLRS resupply trailer (RST) is the Heavy Expanded Mobility Ammunition Trailer (HEMAT). The RST is capable of carrying four LP/Cs. The trailer is equipped with four jacks for stabilizing during loading and offloading operations. The trailer is normally towed by an RSV but can be towed by the SPLL if necessary.

The normal load for both the RSV and RST is four LP/Cs each or a total of eight LP/Cs. The LP/Cs are stacked only two high for transport. The LP/Cs have an alignment pin at each upper corner and matching hole in each skid. The alignment pins aide in positioning the LP/Cs and make sure the weight of the top LP/C is distributed correct on the bottom LP/C.

When stacking LP/Cs, make sure the top LP/C is setting over the alignment pins properly.



(1) Loading and Tiedown.

(a) Position the RST and RSV about 1 meter away from the LP/Cs to be loaded.

(b) Set vehicle brakes, chock wheels, and lower trailer jacks.

(c) Remove vehicle tail gates and sideboards.

(d) Remove any covers, straps, or any other tiedown material from LP/Cs to be loaded.

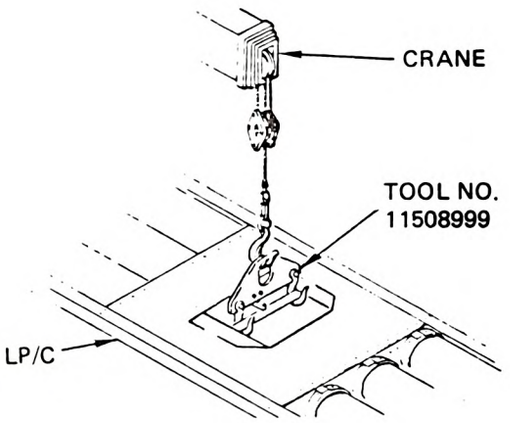
(e) Inspect LP/Cs to be loaded as outlined in paragraph 4-9, b.

4-10. CARE AND HANDLING (CONT)

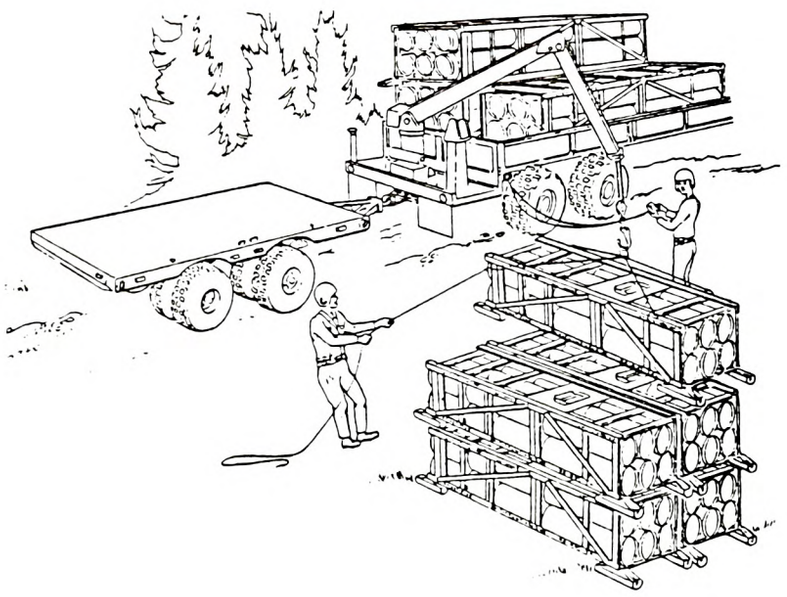
NOTE

An alternate way to lift the LP/Cs is to use tool No. 11508999 and lift the LP/Cs by the hoisting rod.

(f) Attach lifting sling to LP/C D-rings. Attach guide rope(s) to side of LP/C.



(g) Carefully raise LP/C and position it on the RSV. Always position LP/Cs with the front end toward the front of the RSV and RST. Set the first loaded LP/C on the left side of the vehicle and centered on the vehicle bed.

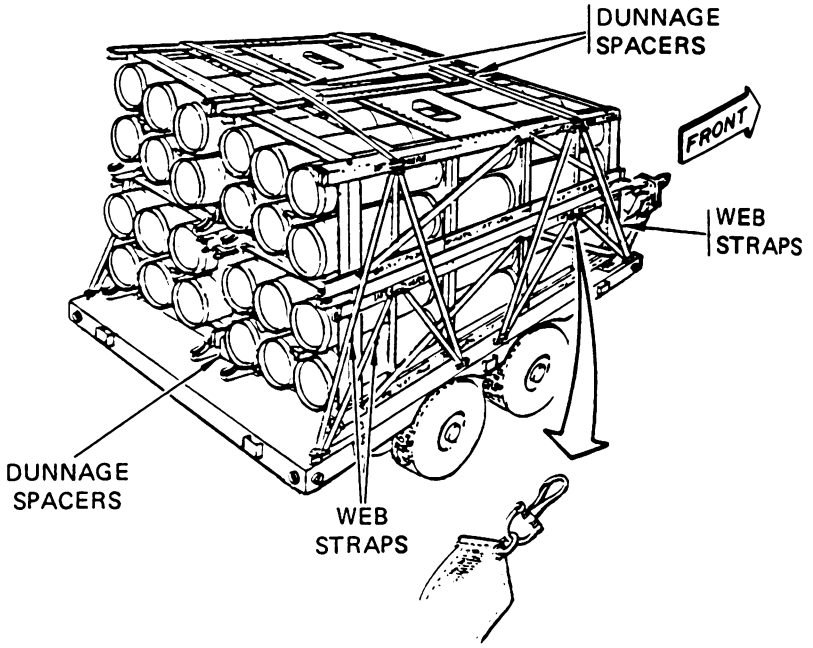


(h) Disconnect lifting sling and guide rope.

(i) Repeat steps (f) through (h) until all LP/Cs are loaded. Use 4X4 dunnage lumber as spacers between LP/Cs. Make sure alignment pins on bottom LP/Cs mate properly with skids of top LP/C.

4-10. CARE AND HANDLING (CONT)

(j) Position web straps on the LP/Cs as shown and tighten straps.



CAUTION

To prevent weakening of straps, all web straps must be hooked properly at points indicated. Avoid twisting straps and make sure straps lay flat on take up spools. A tightened strap must make at least 1-1/2 turns on take up spool.

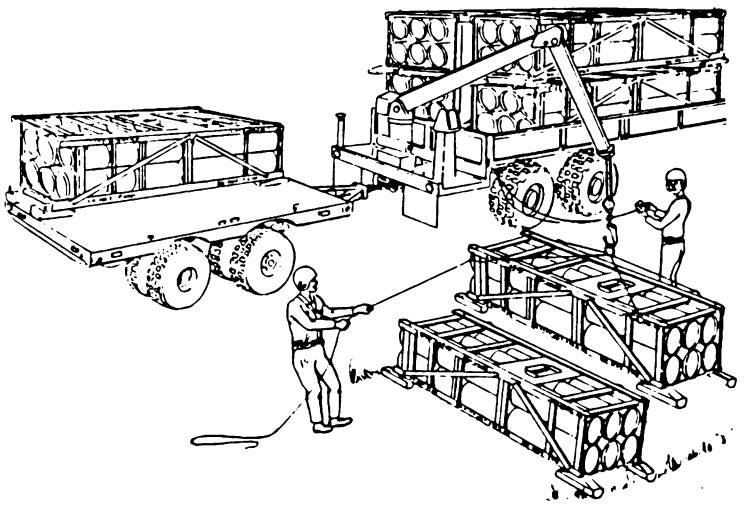
Do not use mechanical device to tighten ratchets. Use adjustable pad on strap or other padding where strap may pass over sharp edge of LP/C or other objects. Tie back loose ends of straps.

(2) Offloading. At the SPLL resupply location, position of the RSV and RST will be controlled by the method used to reload the SPLL. Observe the following steps as they apply.

(a) Choose a position, at resupply area, where ground is as level as possible. Area should also be free of overhead obstructions such as tree limbs.

(b) When offloading, always set RSV brakes, chock wheels, and lower RST stabilizer jacks.

(c) Offload onto the ground.



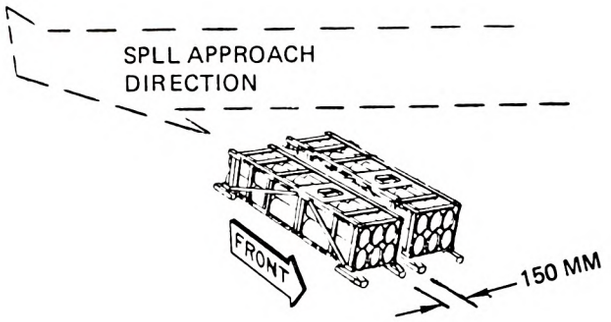
1 Observe reload area and choose a position where LP/Cs can be positioned to allow SPLL to approach LP/Cs from SPLLs left side.

2 Remove web straps from LP/Cs to be unloaded.

3 Attach lifting sling and guide rope(s) to LP/Cs. Set two LP/Cs on ground beside each other.

4-10. CARE AND HANDLING (CONT)

4 Set LP/Cs so that SPLL can approach LP/C with the FWD end of LP/C pointing away from the SPLL. Set them so that they are about 150mm apart.



(d) Offload from rear of RST.

1 Position RST to allow SPLL approach to rear of trailer. (FWD end of LP/Cs must be pointing away from SPLL, toward RSV.)

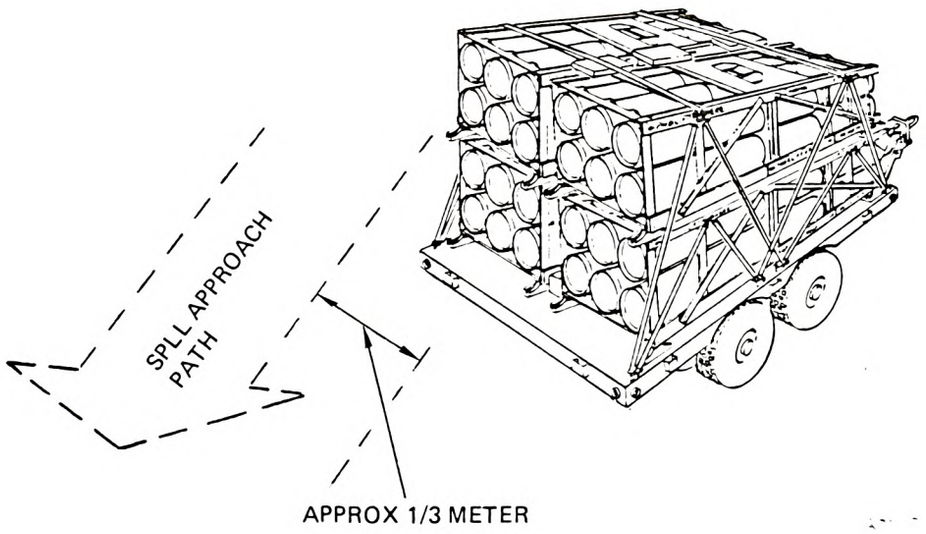
2 Remove web straps tiedowns from LP/Cs to be unloaded.

(e) Offload from RSV.

1 Position RSV to allow SPLL to approach side of RSV. (Either side is acceptable.)

2 Remove web straps tiedowns from LP/Cs to be unloaded.

(f) At end of offloading operation, check all tiedowns before moving vehicles.



APPENDIX A

REFERENCES

A-1. SCOPE. This appendix lists all forms, regulations, and technical manuals referred to in this manual.

A-2. FORMS.

DA Form 2028
Recommended Changes to Publications

DA Form 2415
Condition of Ammunition Form

DA Form 285
Accident Report Form

DA Form 3677
Computer Met Message

DD Form 1650
Ammunition Data Card

SF 368
Quality Deficiency Report Form

Unassigned
SPLL Mission Data Form

Unassigned
SPLL Startup Data Form

A-3. ARMY REGULATIONS.

AMCR 385-100
Safety Manual

AR 385-40
Accident Reporting and Records

AR 385-69
Ammunition and Explosives Safety Standards

AR 700-58
Report of Damaged or Improper Shipment

AR 75-1
Logistics (General) Malfunctions Involving Ammunitions and Explosives (Reports Control Symbol ORD 43)

ARM 385-63, -62, and -64
Regulations for Firing Ammunition for Training, Target Practice and Combat

A-4. TECHNICAL MANUALS.

TM 11-5830-340-12
Intercommunication Set AN/VIC-1(V)

TM 11-5820-401-12
Radio Sets, Operator's and Organizational Maintenance

TM 9-1300-206
Ammunition and Explosive Standards

TM 9-1450-646-10
Carrier, Multiple Launch Rocket System Operating and Maintenance Instructions

TM 9-2320-279-10
Operators Manual, Heavy Expanded Mobility Tactical Truck, Type M985

TM 9-6920-646-14
Operator, Organizational, and Direct Support Maintenance Manual for Training Launch Pod/Container

TM 9-7440-648-12 (formerly TM 9-7440-648-14&P)
Operator and Organizational Maintenance Manual for Communications System, MLRS

A-5. MISCELLANEOUS PUBLICATIONS.

DA Pamphlet 738-750
The Army Maintenance Management System (TAMMS)

APPENDIX B
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE. This appendix lists components of end item and basic issue items for the SPLL to help you inventory items required for safe and efficient operation.

B-2. GENERAL. This Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the SPLL in operation, to operate it, and to perform emergency repairs. Although shipped seperately packaged, basic issue items (BII) must be with the SPLL during operation and whenever it is transfered between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS. The following provides an explanation of columns found in the tabular listings.

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

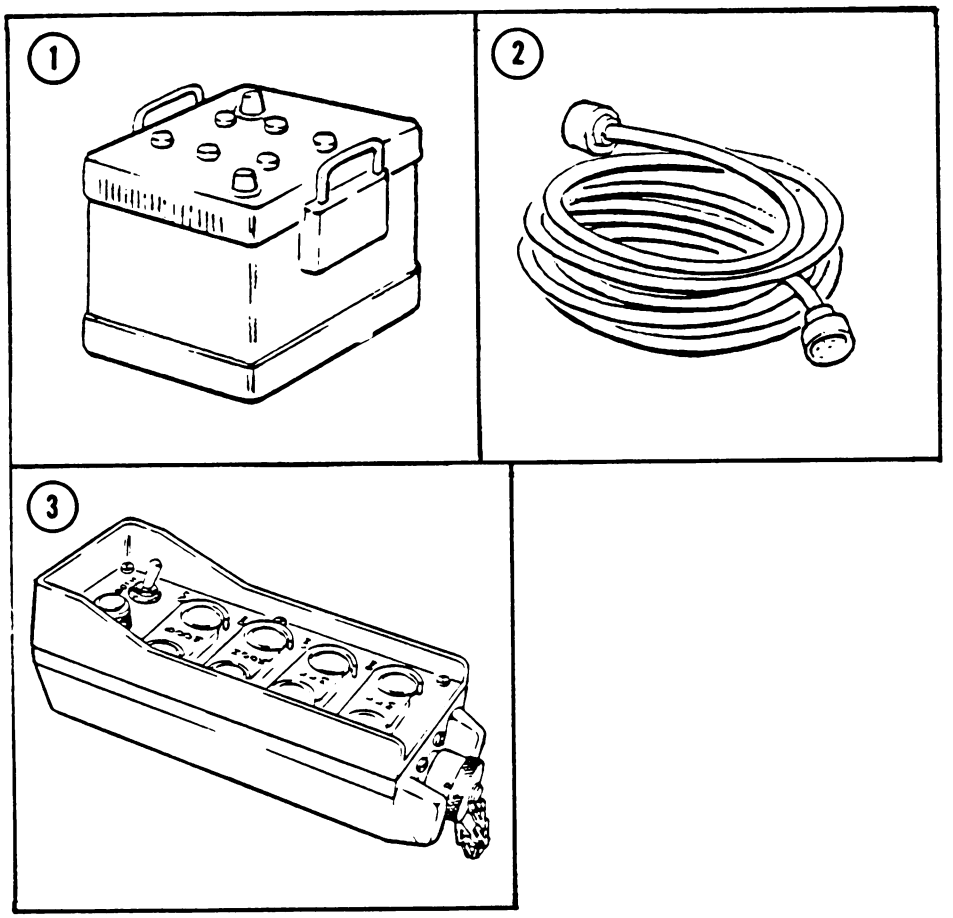
c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number. If item needed differs for different models of this equipment, the model is shown under the Usable On heading in this column. These codes are identified as:

Code	Used On
PAA	Model XXX
PAB	Model XXXX
PAC	Model XXXX

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/ maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

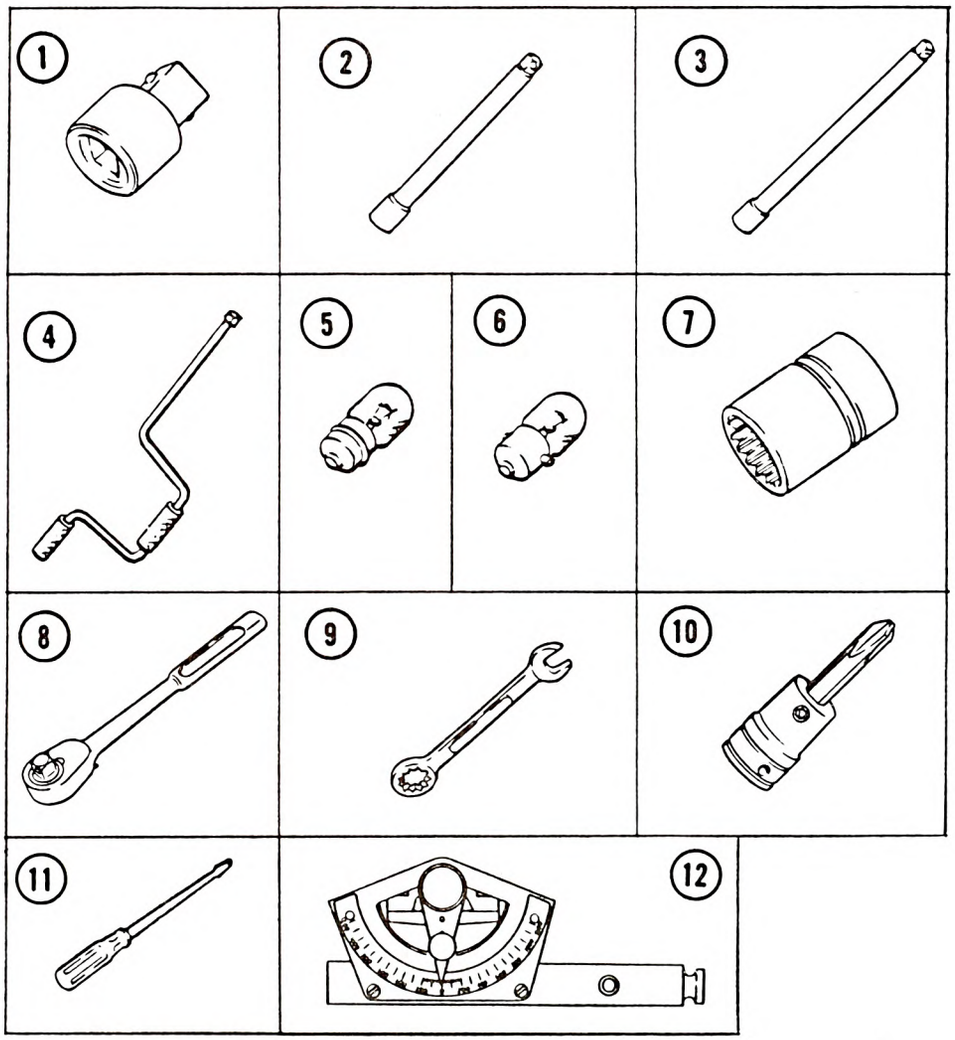
e. Column (5) - Quantity Required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
1		BATTERY, (In battery box behind engine compartment) (96906) MS35000-4		EA	6
2		CABLE ASSEMBLY, W18 (In BC storage compartment at rear of LLM) (80378) 1303019		EA	1
3		CONTROLLER, BOOM (In BC storage compartment at rear of LLM) (95542) 13031127		EA	1

Section III. BASIC ISSUE ITEMS



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER	(4) USABLE ON CODE	(4) U/M	(5) QTY RQR
1	5120-00-240-8702	ADAPTER, socket wrench, 1/2-in. sq male to 3/8-in. sq female (22888) P456		EA	1
2	5120-00-227-8074	EXTENSION, socket wrench, 1/2-in. sq dr, 10 in. long (55739) 5X10		EA	1
3	5120-00-240-8705	EXTENSION, socket wrench, 1/2-in. sq dr, 20 in. long (55719) S20		EA	1
4	5120-00-249-1071	HANDLE, socket wrench speeder, 1/2-in. dr, (55719) S4		EA	1
5	6240-00-763-7744	LAMP, incandescent (96906) MS25237-387		EA	6
6	6240-00-266-9940	LAMP, incandescent (96906) MS25231-1827		EA	6
7	5120-01-025-0201	SOCKET, socket wrench, 1/2-in. sq dr, 12 pt 24mm opening (55712) SWM-241		EA	1
8	5120-00-230-6385	HANDLE, socket wrench, ratchet, 1/2-in. sq dr, A702K		EA	1
9	5120-01-045-4904	WRENCH, open end/box end, 10mm, GOEXM-10		EA	1
10		BIT, screwdriver, crosstip, No. 3 Phillips, SP32A		EA	1
11	5120-00-278-1283	SCREWDRIVER, flat tip 5/16-in., 1007		EA	1
12		LEVEL, SURVEYING MI (In holder on right side of FCP) (33363) 13030227-1		EA	1

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists additional items you are authorized for support of the SPLL.

C-2. GENERAL. This list identifies items that do not come with the SPLL and do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING. National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you need to support this equipment. If the item you need differs for different models of this equipment, the model is listed in the Usable On column. These codes are identified as follows:

Code	Used On
PAA	Model XXX
PAB	Model XXXX
PAC	Model XXXX

Section II. ADDITIONAL AUTHORIZATION LIST

(1)	(2) DESCRIPTION		(3)	(4)
NATIONAL STOCK NUMBER	PART NO. AND FSCM	USABLE ON CODE	U/M	QTY AUTH
NONE				

APPENDIX D
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE. This appendix lists expendable supplies and materials you will need to operate and maintain the SPLL. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS.

a. Column (1), Item number. This number is assigned to the entry in the list and is referenced in the text to identify the material. (Example: Use cleaning compound, item 5, App D).

b. Column (2), Level. This column gives the lowest level of maintenance using the listed item.

C – Operator/Crew

O – Organizational Maintenance

F – Direct Support Maintenance

H – General Support Maintenance

c. Column (3), National Stock Number. This is the national stock number assigned to the item. Use it to request or requisition the item.

d. Column (4), Description. Indicates the federal item name and a description to identify it. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses, followed by the part number.

e. Column (5), Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. The measure is expressed by a two-character alphabetical abbreviation such as, ea, in., or pr. If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will meet your needs.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	6240-00-266-9940	Lamp, Incandescent MS25231-1829	EA
2	C	6240-00-763-7744	Lamp, Incandescent MS25237-387	EA
3	C	7920-00-205-1711	Rag, Wiping, cotton bleached or unbleached, designed for general purpose use, 50-lb bale.	EA
4	C	7920-00-044-9281	Cloth, Cleaning, lint free, miracle wipe.	EA
5	C	9150-01-054-6453	Cleaner, Lubricant CLP-5	PT
6	C	5970-01-106-8574	Tape, Adhesive MIS-13563	EA
7	C	8415-00-634-5026	Gloves, Cloth JJG001396	PR
8	C	9150-00-190-0904	Grease, automotive and artillery MIL-G-10924	PT

APPENDIX E

PROMPT INDEX

E-1. GENERAL. This index lists prompts that are displayed as a result of operating error or an equipment fault or malfunction condition. Some of the prompts listed are also instructions for the operator to correct an operating condition due to rocket malfunction. The prompts are listed in alphabetical order. The location given is the table where the prompt is listed and a general explanation of its use provided. Some prompts are not listed in a table within the manual. The paragraph number where the explanation is given is listed for those prompts.

E-1. GENERAL (CONT)

E-1. GENERAL (CONT)

E-1. GENERAL (CONT)

ALPHABETICAL INDEX

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

M

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

ALPHABETICAL INDEX – Continued

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:
ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-32, Block III, Organizational Maintenance requirements for Multiple Launch Rocket System.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
CDR, 1st Bn, 65th ADA
ATTN: SP4 John Doe
Key West, FL 33040

DATE SENT
14 January 1979

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72	Unit of Radar Set AN/MPQ-50 Tested at the HFC

BE EXACT. . . PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C		21-2

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

NOTE TO THE READER:

Your comments will go directly to the writer responsible for this manual, and he will prepare the reply that is returned to you. To help him in his evaluation of your recommendations, please explain the reason for each of your recommendations, unless the reason is obvious.

All comments will be appreciated, and will be given immediate attention. Handwritten comments are acceptable.

For your convenience, blank "tear out" forms, preprinted, addressed, and ready to mail, are included in this manual.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SP4 John Doe, Autovon 222-222

SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

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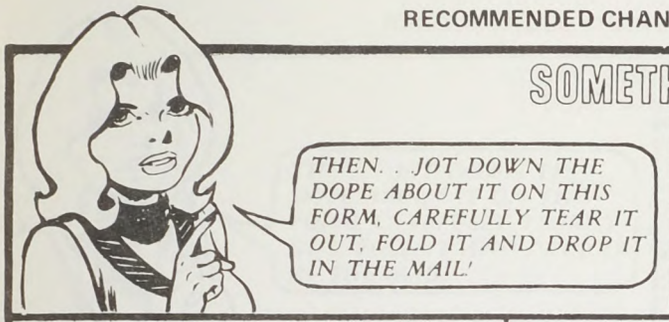
RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

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PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE

DA FORM 1 JUL 79 2028-2

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Commander
U. S. Army Missile Command
ATTN: DRSMI-SNPM
Redstone Arsenal, AL 35898

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