TECHNICAL MANUAL

AVIATION UNIT MAINTENANCE MANUAL

FOR

ARMY AH-64A HELICOPTER (NSN 1520-01-106-9519) (EIC: RHA)

FAULT DETECTION/ LOCATION SYSTEM

SUPERSEDURE NOTICE: This manual supersedes TM 1-1520-238-T-1, dated 8 May 1990, including all changes.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

HEADQUARTERS
DEPARTMENT OF THE ARMY
31 March 1992

The WARNINGS on these pages are to notify you of operating or maintenance procedures, practices or conditions, which, if not strictly observed, could result in long term health hazards, injury or death to personnel. If injury occurs, seek medical aid immediately. These WARNINGS must be obeyed by all personnel using this volume.

WARNING

DANGER
laser light

Direct exposure to laser light radiation or diffused reflections without protective glasses is extremely dangerous. Accidental exposure could cause blindness or serious eye injury.

WARNING

This aircraft hydraulic system is a high pressure system that operates at 3000 psig. Make sure that hydraulic pressure is removed before loosening any connections. A sudden release of hydraulic pressure could result in serious injury or death.

WARNING

Personnel in a high noise environment will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.

WARNING

Make sure proper gloves and eye protection (goggles or equivalent) are worn before pneumatic power is applied. Secure all pneumatic hose and coupling fittings before operating the pneumatic system. Failure to comply could result in serious injury.

WARNING

Personnel are to stay clear of control surfaces during FD/LS checks. Failure to comply could result in serious injury.

WARNING

Personnel are to stay clear of weapon or sighting systems turret travel areas when system is energized. Failure to comply could result in serious injury or death.

WARNING

- **Accidental APU starts are possible with aircraft battery cable attached. Verify APU and APU HOLD circuit breakers are open when the aircraft battery or an external electrical power source is attached to the aircraft. Failure to comply could enable an APU start sequence that could result in serious injury.**
- **APU fires or external mechanical anomalies are not readily noticed by the crew/operators in crew stations. Post a fire guard to alert crew/operators of any problems via the intercommunication system (ICS) during APU run–up.**

CHANGE NO. 10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 December 2003

AVIATION UNIT
MAINTENANCE MANUAL
FOR
ARMY AH-64A HELICOPTER
(NSN 1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/
LOCATION SYSTEM

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OZONE DEPLETING CHEMICAL INFORMATION:
This document has been reviewed for the presence of Class I Ozone depleting chemicals. As of Change 7 dated 27 February 1998, all references to Class I Ozone depleting chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric Ozone depletion.

TM 1-1520-238-T-1, 31 March 1992, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
A through D	A through D
i and ii	i and ii
ix/(x blank)	ix/(x blank)
1-5 through 1-12	1-5 through 1-12

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 10

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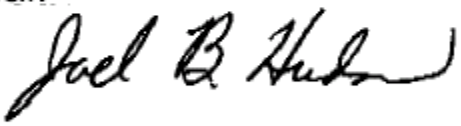

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CHANGE NO. 9

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AVIATION UNIT
MAINTENANCE MANUAL
FOR
ARMY AH-64A HELICOPTER
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FAULT DETECTION/
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Remove pages	Insert pages
A through D	A through D
i and ii	i and ii
4-21 through 4-24	4-21 through 4-24
– – – – –	4-24.1/(4-24.2 blank)

2. Retain this sheet in front of manual for reference purposes.

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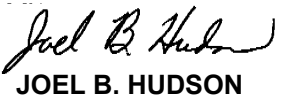

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CHANGE NO. 8

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MAINTENANCE MANUAL
FOR
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(NSN 1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/
LOCATION SYSTEM

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
————————	A through D
3–13 and 3–14	3–13 and 3–14
3–19 and 3–20	3–19 and 3–20

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 8

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CHANGE NO. 7

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AVIATION UNIT
MAINTENANCE MANUAL
FOR
ARMY AH-64A HELICOPTER
(NSN 1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/
LOCATION SYSTEM

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1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
ix/(x blank)	ix/(x blank)
2–5 and 2–6	2–5 and 2–6
2–6.1/(2–6.2 blank)	2–6.1/(2–6.2 blank)

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 7

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CHANGE NO. 6

HEADQUARTERS
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AVIATION UNIT
MAINTENANCE MANUAL
FOR
ARMY AH-64A HELICOPTER
(NSN 1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/
LOCATION SYSTEM

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TM 1-1520-238-T-1, 31 March 1992, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
a and b	a and b
i and ii	i and ii
3-1 through 3-6	3-1 through 3-6
----	3-6.1/(3-6.2 blank)
4-27 and 4-28	4-27 and 4-28
----	4-28.1/(4-28.2 blank)
4-135 and 4-136	4-135 and 4-136

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 6

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AVIATION UNIT
MAINTENANCE MANUAL
FOR
ARMY AH–64A HELICOPTER
NSN: (1520-01-106-9519)
(EIC: RHA)

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LOCATION SYSTEM

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Remove pages	Insert pages
i through iv	i through iv
——	ix/(x blank)
1–1 through 1–16	1–1 through 1–16
——	1–17 through 1–19/(20 blank)
2–3 through 2–6	2–3 through 2–6
——	2–6.1/(2–6.2 blank)
2–17 through 2–20	2–17 through 2–20
2–29 through 2–30.1/(2–30.2 blank)	2–29 through 2–30.2
3–7 through 3–10	3–7 through 3–10
3–19 and 3–20	3–19 and 3–20
4–1 through 4–36	4–1 through 4–36
——	4–36.1 through 4–36.4

TM 1-1520-238-T-1
C 5

Remove pages	Insert pages
4–37 through 4–40	4–37 through 4–40
4–43 through 4–56	4–43 through 4–56
4–58.3/(4–58.4 blank)	4–58.3/(4–58.4 blank)
4–61 through 4–68	4–61 through 4–68
——	4–68.1/(4–68.2 blank)
4–69 through 4–72	4–69 through 4–72
4–75 through 4–78	4–75 through 4–78
4–88.3 through 4–92	4–88.3 through 4–92
4–97 through 4–100	4–97 through 4–100
4–107 through 4–114	4–107 through 4–114
——	4–114.1/(4–114.2 blank)
4–115 through 4–126	4–115 through 4–126
——	4–127 through 4–138
Glossary 1 through Glossary 6	Glossary 1 through Glossary 6
——	Glossary 7/(Glossary 8 blank)
Index 1 through Index 5/(Index 6 blank)	Index 1 through Index 5/(Index 6 blank)

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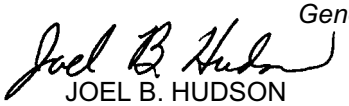

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CHANGE NO. 4

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AVIATION UNIT
MAINTENANCE MANUAL
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ARMY AH–64A HELICOPTER
NSN: (1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/LOCATION SYSTEM

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Remove pages	Insert pages
vii and viii	vii and viii
1–1 through 1–14	1–1 through 1–14
3–7 through 3–10	3–7 through 3–10
3–19 and 3–20	3–19 and 3–20
4–1 and 4–2	4–1 and 4–2
4–7 through 4–12	4–7 through 4–12
4–23 through 4–34	4–23 through 4–34
4–43 through 4–48	4–43 through 4–48
4–53 through 4–58	4–53 through 4–58
——	4–58.1 through 4–58.3/(4–58.4 blank)

TM 1-1520-238-T-1
C 4

Remove pages	Insert pages
4–67 through 4–74	4–67 through 4–74
4–79 through 4–88	4–79 through 4–88
——	4–88.1 through 4–88.10
4–89 and 4–90	(4–89 blank)/4–90
4–105 and 4–106	4–105 and 4–106
4–125 and 4–126	4–125 and 4–126
Index 1 through Index 4	Index 1 through Index 4

2. Retain this sheet in front of manual for reference purposes.

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CHANGE NO. 3

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AVIATION UNIT
MAINTENANCE MANUAL
for
ARMY AH–64A HELICOPTER
NSN: (1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/LOCATION SYSTEM

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Remove pages	Insert pages
1–15 and 1–16	1–15 and 1–16
2–17 through 2–22	2–17 through 2–22
2–29 and 2–30	2–29 and 2–30
——	2–30.1/(2–30.2 blank)
3–1 through 3–4	3–1 through 3–4
3–7 through 3–12	3–7 through 3–12
3–19 and 3–20	3–19 and 3–20

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 3

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CHANGE NO. 2

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AVIATION UNIT
MAINTENANCE MANUAL
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ARMY AH-64 HELICOPTER
NSN: (1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/LOCATION SYSTEM

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Remove pages	Insert pages
3–9 and 3–10	3–9 and 3–10
4–93 through 4–96	4–93 through 4–96

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 2

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CHANGE NO. 1

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AVIATION UNIT
MAINTENANCE MANUAL
for
ARMY AH-64A HELICOPTER
NSN: (1520-01-106-9519)
(EIC: RHA)

FAULT DETECTION/LOCATION SYSTEM

TM 1-1520-238-T-1, 31 March 1992,is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
2–19 through 2–22	2–19 through 2–22

2. Retain this sheet in front of manual for reference purposes.

TM 1-1520-238-T-1
C 1

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Date of issue for original and change pages are:

Original . . . . . 0 . . . . . 31 March 1992
Change . . . . . 1 . . . . 30 November 1992
Change . . . . . 2 . . . . 30 December 1993
Change . . . . . 3 . . . . 28 December 1994
Change . . . . . 4 . . . . . 1 February 1996
Change . . . . . 5 . . . . 30 September 1996
Change . . . . . 6 . . . . 19 December 1997
Change . . . . . 7 . . . . . 27 February 1998
Change . . . . . 8 . . . . . 25 May 2001
Change . . . . . 9 . . . . . 15 February 2002
Change . . . . . 10 . . . . 30 December 2003

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 278, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	5
Blank	5
a - b	6
A - D	10
i	10
ii	0
iii	5
iv - vii	0
viii	4
ix	10
x Blank	7
1-1 - 1-4	5
1-5 - 1-12	10
1-13 - 1-19	5
1-20 Blank	5

***Zero in this column indicates an original page.**

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

Page No.	*Change No.
2-1 - 2-2	0
2-3 - 2-4	5
2-5	0
2-6	7
2-6.1	7
2-6.2 Blank	7
2-7 - 2-17	0
2-18 - 2-20	5
2-21	3
2-22 - 2-29	0
2-30	5
2-30.1 - 2-30.2	5
3-1	0
3-2 - 3-6	6
3-6.1 Added	6
3-6.2 Blank Added	6
3-7	0
3-8	5
3-9	4
3-10	5
3-11	3
3-12	0
3-13	8
3-14 - 3-18	0
3-19	5
3-20	8
3-21	0
3-22 Blank	0
4-1 - 4-4	5
4-5	0
4-6 - 4-21	5
4-22 - 4-24	9
4-24.1 Added	9
4-24.2 Blank Added	9
4-25	5
4-26	0
4-27	4

***Zero in this column indicates an original page.**

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

Page No.	*Change No.
4-28	6
4-28.1 Added	6
4-28.2 Blank Added	6
4-29 - 4-30	5
4-31	4
4-32 - 4-36	5
4-36.1 - 4-36.4 Added	5
4-37	0
4-38 - 4-39	5
4-40 - 4-42	0
4-43 - 4-56	5
4-57 - 4-58	4
4-58.1 - 4-58.3 Added	4
4-58.4 Blank Added	4
4-59 - 4-60	0
4-61 - 4-68	5
4-68.1 Added	5
4-68.2 Blank Added	5
4-69-4-72	5
4-73	4
4-74	0
4-75 - 4-77	5
4-78	0
4-79	4
4-80 - 4-88	4
4-88.1 - 4-88.3 Added	4
4-88.4 - 4-88.6	5
4-88.7 Added	4
4-88.8 - 4-88.9	5
4-88.10 Added	4
4-89 Blank	5
4-90 - 4-92	5
4-93 - 4-95	2
4-96	0
4-97 - 4-100	5
4-101 - 4-104	0
4-105 - 4-106	4

***Zero in this column indicates an original page.**

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

Page No.	*Change No.
4-107 - 4-109	5
4-110	0
4-111 - 4-114	5
4-114.1 Added	5
4-114.2 Blank Added	5
4-115 - 4-117	5
4-118	0
4-119 - 4-125	5
4-126	4
4-127 - 4-134	5
4-135	6
4-136 - 4-138	5
A-1 - A-3	0
A-4 Blank	0
Glossary 1 - Glossary 7	5
Glossary 8 Blank	5
Index 1 - Index 5	5
Index 6 Blank	5

***Zero in this column indicates an original page.**

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 31 March 1992

AVIATION UNIT MAINTENANCE MANUAL

FOR

ARMY MODEL
AH-64A HELICOPTER
NSN 1520-01-106-3519
(EIC: RHA)

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 these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you.

You may also provide DA Form 2028 information to AMCOM via e-mail, datafax, or the World Wide Web. Our fax number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of the applicable Operator's manual immediately preceding the hardcopy 2028. For the World Wide Web use: https://amcom2028.redstone.army.mil.

OZONE DEPLETING CHEMICAL INFORMATION:
This document has been reviewed for the presence of Class I Ozone depleting chemicals. As of Change 7 dated 27 February 1998, all references to Class I Ozone depleting chemicals have been removed from this documentation by substitution with chemicals that do not cause atmospheric Ozone depletion.

*** SUPERSEDURE NOTICE**: This manual supersedes TM 1-1520-238-T-1, dated 8 May 1990, including all changes.

TABLE OF CONTENTS

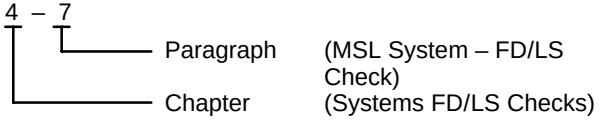
HOW TO USE THIS MANUAL – continued

OVERVIEW

If you can't find information, you can't do the job. Learn how to use this manual. Check how the manual is put together. Look at these examples. Before using the manual, learn how it works.

The manual is made up of chapters. The chapters are made up of paragraphs which are grouped into sections, and all are numbered. Every job and the information you need has a number. This lets you find it when you need it.

Example: Task Paragraph Number: 4–7



MANUALS

This manual has appendix A. This appendix has information you will need. It contains a list of all official publications referenced in this Technical Manual.

CHAPTERS

Each chapter has one or more paragraphs.

a. Chapter 1 has six paragraphs divided into two sections. The first section contains general information describing the fault detection and location system (FD/LS). The second section contains descriptions of FD/LS operating modes.

b. Chapter 2 has three paragraphs divided into two sections. The first section contains locator figures of the cockpit controls and circuit breakers. The second section contains a locator figure of the aft avionics bay circuit breakers.

c. Chapter 3 has four paragraphs composed of aircraft systems power-up, power down procedures, auxiliary power unit (APU) operating instructions, and APU emergency procedures.

d. Chapter 4 has 23 paragraphs composed of FD/LS checks **01** through **19** and **33** through **36**. The paragraphs are numbered the same as the FD/LS maintenance menu.

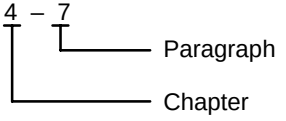
HOW TO USE THIS MANUAL – continued

PARAGRAPHS

Paragraphs make up chapters. It is the paragraphs that have the information you need for any job. USE THE INDEX TO FIND THE PARAGRAPH YOU NEED. DON'T USE THE PAGE NUMBERS.

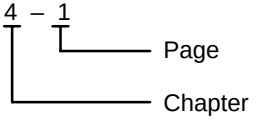
PARAGRAPH NUMBERING

Paragraphs are in two parts. The first is the chapter. The second is the paragraph. Each number is separated by a dash as shown in example:



PAGE NUMBERING

All page numbering is by chapters. Paragraph numerals are not included in the page numbers. The first number is the number of the chapter; the second number is the number of the page in that chapter. The numbers are separated by a dash as shown in the example:



NOTE: Page numbers are not used to find information. Use paragraph numbers.

MANUAL INDEX

The index for the entire manual is in the back of the manual. The index lists all paragraph titles in alphabetical order. After you find the title in the index, it tells the paragraph number. For example, if you need information on the MSL System FD/LS check, go to the "F" section of the index and look under "FD/LS Check, Systems". There you will find:

MSL System FD/LS Check . . . . . Para 4–7

The index informs you that the missile FD/LS check is in chapter 4, paragraph 7.

HOW TO USE THIS MANUAL – continued

You can find your paragraph in the index, even if you only know a single word in the title. In the sample FD/LS Check title you could also find your paragraph by looking under “MSL”. Examples:

MSL System FD/LS Check . . . . . Para 4–7

Any paragraph can be located in the way described. If you know the name of the operation, system, assembly, description, etc., you can use one of the words to find the paragraph number in the index. It makes locating information quick and easy.

GLOSSARY

The glossary in this manual is a list of abbreviations and acronyms. Abbreviations are shortened terms for words. Acronyms are shortened terms for several words and use only the first letter of each of the words. Abbreviations and acronyms are defined the first time used within the text of the chapter where they are found. The list in the glossary, however, provides a good place to check if there is any doubt.

The glossary also contains definitions of unusual terms that appear in the manual. Check the list of definitions if you see a word in the manual you’re not sure of.

It is always a good idea to look over the glossary and become familiar with abbreviations, acronyms, and unusual terms.

INITIAL SETUP

Each maintenance task is headed by an initial setup. This table outlines what is needed as well as certain conditions which must be met before starting the task. DON’T START A TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

An example initial setup is shown on page vii. Not all tasks have all the headings shown.

HOW TO USE THIS MANUAL – continued

The following subparagraphs (a through e) explain each part of the initial setup.

a. **Title:** The title in the upper border contains the paragraph number and title of the task as listed in the index.

b. **Tools/Equipment:** Special tools and equipment are listed when needed. Special tools and equipment use are called out in the task.

c. **Personnel Required:** This heading lists the number of people required to perform the task. Unless otherwise specified, any qualified and/or certified individual is authorized to perform power applications and FD/LS checks on the AH-64A.

d. **References:** This lists other technical manuals (TMs) you will need to complete the task. The steps in the task will tell you when you must refer to another TM. Paragraphs contained within the volume being referenced will not be shown in list of References.

e. **Equipment Conditions:** This lists things that must be done before starting the task. It may require an operation such as installing HELLFIRE modular missile systems (HMMS) launchers on the helicopter, installing training missiles, or removing parts, assemblies, etc. These operations are described in other tasks or TMs. The TMs that describe how to do these operations are referenced here. The statement “Helicopter safed” will appear here only in the power applications tasks. The reference refers to TM 1-1520-238-23 where helicopter safety procedures are described. Be sure to do the things necessary as called out under equipment conditions; then do the task.

HOW TO USE THIS MANUAL – continued

INITIAL SETUP EXAMPLE

4–7. MSL SYSTEM – FD/LS CHECK 4–7

Tools:

Nomenclature	Part Number
M-36 HELLFIRE Training missile (2)	1300377

Personnel Required:

(2)

References:

TM 1-1520-238-23	TM 9-1090-208-23-2
TM 9-1230-476-20-1	TM 9-1230-476-20-2
TM 9-1425-475-20	TM 9-1427-475-20
TM 11-1520-238-23-2	

Equipment Conditions:

Ref	Condition
TM 9-1427-475-20	HMMS launchers installed
TM 9-1425-475-20	Training missiles (2), minimum installed

HOW TO USE THIS MANUAL – continued

WARNINGS, CAUTIONS, AND NOTES

WARNING

An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to or death of personnel.

CAUTION

An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effictiveness or long term health hazards to personnel.

NOTE

An essential operating or maintenance procedure, condition, or statement which must be highlighted.

USING AH-64A HELICOPTER EFFECTIVITY CODES

Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters which represents various helicopter serial number blocks. They are used in this manual as necessary to identify cockpit configuration.

To use the Helicopter Effectivity Codes, note the helicopter serial number on the tail of the helicopter. Use this serial number to determine which configuration to use.

The effectivity codes, which are shown inside triangles, and helicopter serial number blocks are as follows:

Code	Helicopter Serial Number
AAN	83-23787 through 85-25415
ACD	85-25416 and subsequent
ACY	82–23355 thru 92–0485 (Before MWO 9–1230–476–50–01)
ACZ	82–23355 thru 92–0485 (After MWO 9–1230–476–50–01) 94–0328 and subsequent

HOW TO USE THIS MANUAL - continued

Code	Helicopter Serial Number
ADC	Before MWO 1-1520-238-50-49
ADD	After MWO 1-1520-238-50-49
ADP	After MWO 1-1520-238-50-50
ADY	Before AMWO 9-1270-476-55-04
ADZ	After AMWO 9-1270-476-55-04

CHAPTER 1
INTRODUCTION

CHAPTER OVERVIEW

Chapter 1 contains general information describing the Fault Detection and Location System and operating modes.

CHAPTER INDEX

Section I. GENERAL INFORMATION

1–1 FAULT DETECTION AND LOCATION SYSTEM (FD/LS) – GENERAL.

FD/LS is a method of automatically performing a built-in-test of various systems/line replaceable units (LRUs). Flight crew and maintenance personnel are provided with continuous monitoring of flight critical and mission essential systems, and keyboard initiated system testing. Faults are isolated to the malfunctioning system and LRUs. Various aircraft controls, displays, and indicators interface with FD/LS providing caution/warning advisory information and the media for operator interaction. FD/LS is a software module which resides within the fire control computer (FCC). The FCC is considered the primary bus controller and must be on-line to execute FD/LS functions. The back-up bus controller (BBC) contains a limited version of system fault detection.

1–2 MAJOR FUNCTIONS.

a. Provides caution/advisory displays, warning displays, and audible tones while monitoring flight critical and mission essential equipment performance.

b. Detects failed systems during flight and ground operations.

c. Isolates down to the aviation unit maintenance (AVUM) replaceable LRU.

d. Displays operational status (GO/NO-GO) of the systems that interface with the multiplex (MUX) bus.

1–3 CONTROLS AND INDICATORS.

a. Operator interaction with FD/LS is provided via the data entry keyboard (DEK) (fig. 2–49) (ADC) or control display unit (CDU) (fig. 2–49.2) (ADD).

b. In both pilot and CPG crew stations, visual indications are conveyed to the operator through master caution/warning panels (fig. 2–9 and 2–36), crew station caution/warning panels (fig. 2–20 and 2–40) and any video monitors available in that particular crew station, i.e., heads down display (HDD), helmet display unit (HDU), heads out display (HOD), and video display unit (VDU) (fig. 2–10).

1–4 DISPLAY INDICATIONS.

Displays indicating **TEST IN PROGRESS**, system/LRU status (GO/NO-GO) and location, and any required operator action (prompting) are visible on the appropriate display monitor.

a. Indicators on the caution/warning panels light to show a failure in a specific flight critical or mission essential system, or provide caution and advisory information.

b. System/LRU NO-GOs are displayed in the CPG station optical relay tube (ORT) (fig. 2–34) HDD and HOD, and HDU.

c. Video identical to what is viewed in the CPG crew station is available in the pilot crew station, if selected on the VDU and/or HDU.

NOTE

CPG HOD displays can be viewed on the HDD and HDU. The operator has the option of selecting the appropriate and convenient monitor for viewing of the FD/LS displays.

Section II. FD/LS OPERATING MODES

1–5 FD/LS OPERATION – GENERAL.

a. Continuous Test Mode.

(1) FD/LS continuous test mode is an automatic test that is performed continuously following power-up.

(2) During the continuous test mode each system test is performed one after the other until the operator selects **FD/LS** with the **DATA ENTRY** switch on the DEK (ADC) or the **FD/LS** fixed action button (FAB) on the CDU (ADD). A list of continuous test mode NO–GO indications is available for operator viewing.

(3) The mode is used to determine current status of flight critical and mission essential systems. All continuous test mode results are stored in an auto status buffer located within FCC memory.

(4) The **FD/LS** prompt software routine is bypassed until 2 minutes have lapsed from initial aircraft power-up. This allows for all system hardware components to stabilize and omits erroneous system NO-GOs due to power surges upon initialization.

NOTE

FD/LS NO-GO messages may take as long as 12 seconds after an associated system indicator lights on pilot or CPG caution/warning panel.

(5) A detected NO-GO causes a flashing **FD/LS** prompt to be displayed on the HOD, a ✓ **FDLS** message on the CDU (ADD) and the associated system indicator on the pilot and CPG caution/warning panels to light.

(6) The **FD/LS** prompt flashes at a rate of one flash per second for 8 seconds and does not repeat again until 56 seconds have elapsed.

(7) Once **FD/LS** is selected with the **DATA ENTRY** switch on the DEK (ADC) or the **FD/LS** FAB on the CDU (ADD), [an asterisk is displayed to the left of the FD/LS message which activated the FD/LS flasher (ACZ)] the **FD/LS** prompt is reset so that it does not appear again until a new NO-GO is detected.

(8) The results of the continuous test mode are displayed at a maximum of four lines of data per screen. To view the next page, it may be necessary to scroll. Scrolling is accomplished by pressing and releasing the **ENTER SPACE** key on the DEK (ADC) or **SPC** (space) key on the CDU (ADD).

(9) The end of the NO-GO list is indicated when the prompt **ANY KEY FOR FD/LS MENU** is displayed. Continuous scrolling repeats the NO-GO list.

b. Maintenance Test Mode.

(1) The operator may select the maintenance test mode displays by pressing and releasing any key except **ENTER SPACE** or **SHIFT** on the DEK (ADC); **SPC** on the CDU (ADD).

(2) The maintenance test mode is a CPG crew station keyboard initiated test; performance of any test is possible only when **FD/LS** has been selected with the **DATA ENTRY** switch on the DEK (ADC) or the **FD/LS** FAB on the CDU (ADD). All NO-GO system/LRUs are identified by name and location on-board the aircraft. This mode is used for preflight, maintenance and troubleshooting checks.

(3) Setting the **DATA ENTRY** switch on the DEK to **FD/LS** (ADC) or selecting the **FD/LS** FAB on the CDU (ADD) and any key except **ENTER SPACE** or **SHIFT** (ADC) or pressing or releasing any fixed action button (FAB), VAB or **SPC** key (ADD) displays the first page of the FD/LS menu. Pressing and releasing **ENTER SPACE** (ADC) or **SPC** (ADD) retrieves the second page of the FD/LS menu. Continuous pressing and releasing the **ENTER SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD) alternately displays the two menu pages.

(4) If **FCC FAULT HISTORY** is displayed on the FD/LS page, this indicates faults are stored in an Electrical Erasable Programmable Read Only Memory (EEPROM). The FCC will maintain the two previous faults. Any faults previous to these will be lost. Pressing VAB8 will display the EXTENDED ADVISORY page. Line two on the EXTENDED ADVISORY page will display **LAST FCC FAULT DATA**. If only one fault is stored or the user is viewing the last fault, line one will be blank. If the next to the last fault is displayed, line one will display **NEXT TO THE**. Lines three thru six will display the FCC fault. If two faults are stored, the left side of line seven will display **NEXT**. Pressing VAB4 will alternate between faults. The right side of line seven will display **CLEAR ALL**. Pressing VAB8 will change the right side of line seven to **ARE YOU SURE**. Pressing VAB8 again will clear the FCC faults and revert back to the FDLS page (ADZ).

FD/LS MENU

FIRST PAGE:

01 - ADS	**05 - HARS**	**09 - PNVS**
02 - DASE	**06 - IHDS**	**10 - PYLN**
03 - DICE	**07 - MSL**	**11 - RKT**
04 - GUN	**08 - MUX**	**12 - STAB**

SECOND PAGE:

13 - SYMG	**17 - APU**	**33 - CDU (ADD)**
14 - TADS	**18 - GEN**	**34 - DNS (ADD)**
15 - UTIL	**19 - TRAN**	**35 - DTU (ADD)**
16 - ETE	**32 - TAGA (ADD)**	**36 - EGI (ADD)**

(5) Concurrent Initiated FDLS (**CIFDLS**) allows the user to use or observe other CDU pages (e.g. READ page or others) to troubleshoot the aircraft systems while a FDLS or boresight (BST) is active. **CIFDLS** defaults to the **OFF** state at system power up. In the **OFF** state, FDLS and BST are only functional while the FDLS page is displayed on the CDU. Pressing VAB4 changes the **CIFDLS** state to **ON**. In the **ON** state, FDLS or BST remain active when moving off the FDLS page. The user must return to the FDLS page to use the CDU to control a FDLS or BST operation (ADZ).

(6) To initiate the FD/LS maintenance test mode, the operator selects the desired test from the menu and enters the menu address (two numbers) associated with that test using the DEK keys (ADC) or CDU keys (ADD).

(7) During the performance of the FD/LS maintenance test mode, the operator is sequenced through the test by a display of various system moding prompts. The system moding prompts, when performed, ensure the appropriate man and machine interaction occurs for the particular test being performed. To abort a FD/LS maintenance test-in-progress, press and release the **ENTER SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD).

(8) When the maintenance test is completed, all the current LRU NO-GOs associated with that test and their physical location on-board the aircraft are displayed.

(9) The prompt **ANY KEY FOR FD/LS MENU** indicates the end of the NO-GOs list. The NO-GO list may be rescrolled for review. Scrolling is accomplished by pressing and releasing the **ENTER SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD).

c. Continuous/Maintenance Test Mode.

(1) The FD/LS continuous test mode NO-GO message list is provided below along with the FD/LS maintenance test mode menu address. The list is provided to correlate the FD/LS continuous and maintenance test modes.

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
AIR DATA SENSOR SYSTEM NO-GO	**01 - ADS**
DASE SYSTEM NO-GO	**02 - DASE**
CANOPY TEMP CONTROLLER NO-GO	**03 - DICE**
CANOPY TEMP SENSOR NO-GO	**03 - DICE**
RTR BLADE DISTR DE-ICE NO-GO	**03 - DICE**
RTR BLADE PWR CONTROLLER NO-GO (ACY)	**03 - DICE**
RTR BLADE PWR CONT NO-GO (ACZ)	**03 - DICE**
MAIN ROTOR HEATER NO-GO	**03 - DICE**
TAIL ROTOR HEATER NO-GO	**03 - DICE**
ICE DET SIGN PROCESSOR NO-GO (ACY)	**03 - DICE**

1-5 FD/LS OPERATION - GENERAL (cont) 1-5

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
ICE DETECT SYSTEM NO-GO (ACZ)	**03 - DICE**
ICE DET CONTROLLER NO-GO	**03 - DICE**
ICE DETECTOR SENSOR NO-GO	**03 - DICE**
GUN NO-GO	**04 - GUN**
GUN NO-GO	**04 - GUN**
RNDS CNTR-MAG CONTROLLER NO-GO (ACY)	**04 - GUN**
RNDS CNTR-MAG CONT NO-GO (ACZ)	**04 - GUN**
HARS NO-GO	**05 - HARS**
IHADSS NO-GO	**06 - IHDS**
IHADSS DISPLAYS NO-GO	**06 - IHDS**
MISSILES NO-GO	**07 - MSL**
MISSILE LAUNCHER NO-GO LT OUTBD	**07 - MSL**
MISSILE LAUNCHER NO-GO LT INBD	**07 - MSL**
MISSILE LAUNCHER NO-GO RT INBD	**07 - MSL**
MISSILE LAUNCHER NO-GO RT OUTBD	**07 - MSL**
MISSILE 4 NO-GO LT OUTBD	**07 - MSL**
MISSILE 3 NO-GO LT OUTBD	**07 - MSL**
MISSILE 2 NO-GO LT OUTBD	**07 - MSL**

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
MISSILE 1 NO-GO LT OUTBD	**07 - MSL**
MISSILE 4 NO-GO LT INBD	**07 - MSL**
MISSILE 3 NO-GO LT OUTBD	**07 - MSL**
MISSILE 2 NO-GO LT INBD	**07 - MSL**
MISSILE 3 NO-GO RT OUTBD	**07 - MSL**
MISSILE 2 NO-GO RT INBD	**07 - MSL**
MISSILE 1 NO-GO RT INBD	**07 - MSL**
MISSILE 4 NO-GO RT OUTBD	**07 - MSL**
MISSILE 3 NO-GO RT OUTBD	**07 - MSL**
MISSILE 2 NO-GO RT OUTBD	**07 - MSL**
MISSILE 1 NO-GO RT OUTBD	**07 - MSL**
MUX COMMUNICATION NO-GO CPG COMPARTMENT	**08 - MUX**
MUX COMMUNICATION NO-GO LH FAB	**08 - MUX**
MUX COMMUNICATION NO-GO RH FAB	**08 - MUX**
MUX COMMUNICATION NO-GO AFT AVIONICS BAY	**08 - MUX**
MUX COMMUNICATION NO-GO LT OUTBD	**08 - MUX**

1-5 FD/LS OPERATION - GENERAL (cont) 1-5

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
MUX COMMUNICATION NO-GO LT INBD	**08 - MUX**
MUX COMMUNICATION NO-GO RT INBD	**08 - MUX**
MUX COMMUNICATION NO-GO RT OUTBD	**08 - MUX**
EXCESSIVE MSG ERRORS - MUX NO-GO (ACY)	**08 - MUX**
PNVS NO-GO	**09 - PNVS**
PNVS SERVO MODULE NO-GO	**09 - PNVS**
PNVS VIDEO NO-GO	**09 - PNVS**
PYLON ARTICULATION NO-GO	**10 - PYLN**
PYLON ARTICULATION NO-GO LT OUTBD	**10 - PYLN**
PYLON ARTICULATION NO-GO LT INBD	**10 - PYLN**
PYLON ARTICULATION NO-GO RT INBD	**10 - PYLN**
PYLON ARTICULATION NO-GO RT OUTBD	**10 - PYLN**
ROCKETS NO-GO	**11 - RKT**
ROCKETS NO-GO LT OUTBD	**11 - RKT**
ROCKETS NO-GO LT INBD	**11 - RKT**

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
ROCKETS NO-GO RT INBD	**11 - RKT**
ROCKETS NO-GO RT OUTBD	**11 - RKT**
AUTO STABILATOR SYSTEM NO-GO	**12 - STAB**
SYMBOL GENERATOR NO-GO	**13 - SYMG**
AND NO-GO	**14 - TADS**
TADS ECS NO-GO	**14 - TADS**
TADS NO-GO	**14 - TADS**
TADS LASER TRACKER NO-GO	**14 - TADS**
TADS LRF-D NO-GO	**14 - TADS**
TADS IAT NO-GO	**14 - TADS**
ORT COLUMN ASSY NO-GO	**14 - TADS**
TADS TV NO-GO	**14 - TADS**
TADS FLIR NO-GO	**14 - TADS**
TADS SERVO SYSTEM NO-GO	**14 - TADS**
BACKUP BUS CONTROLLER NO-GO	**15 - UTIL**
CPG FIRE CONTROL PANEL NO-GO	**15 - UTIL**

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
DATA ENTRY KEYBOARD NO-GO	**15 - UTIL**
CONTROL DISPLAY UNIT NO-GO (ADD)	**33 - CDU**
DOPPLER NAV SYSTEM NO-GO (ADD)	**34 - DNS**
DATA TRANSFER UNIT NO-GO (ADD)	**35 - DTU**
DTC BATTERY LOW (ADD)	**35 - DTU**
EGI SYSTEM NO-GO (ADD)	**36 - EGI**

CONTINUOUS TEST MODE NO-GO MESSAGE	BORESIGHT MENU ADDRESS
TADS BORESIGHT NO-GO	**22 - ED (EDIT MODE)**
GUN BORESIGHT NO-GO	**25 - ED (EDIT MODE)**
PYLON BORESIGHT NO-GO	**28 - ED (EDIT MODE)**
PNVS BORESIGHT NO-GO	**31 - ED (EDIT MODE)**

d. End-To-End (ETE) Check.

(1) A complete FD/LS maintenance test of the AH-64A systems can be performed by selecting FD/LS menu address **16 - ETE**. The ETE check performs the test menu addresses **01** through **15** (ACY), **1** through **3** and **5** through **15** (ACZ) **1** through **3**, **5** through **15** and **33** through **36** (ADD). FD/LS does not perform ETE testing on menu addresses **04 - GUN** (ACZ), (ADD), **17 - APU**, **18 - GEN**, **19 - TRAN**.

(2) The prompt **ETE COMPLETE** indicates all maintenance testing has been completed. A complete list of the current NO-GO messages is displayed upon completion of the ETE check.

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt or false NO-GO message is displayed.
- The FD/LS message on the HOD changes within 2 seconds after responding to a prompt (acknowledgement).

(3) Prompts and advisory messages are displayed on the HOD when specific interactive operator actions are required. These messages direct the operator to perform operations required by the systems tests.

(4) Test-in-progress messages are automatically displayed on the HOD to inform operators that a specific test requires additional time to complete.

(5) The operator is prompted through each test, until all tests are completed.

(6) The operator has the option to pass or abort any test and continue forward to the next test during the ETE check. Pressing and releasing the **ENTER SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD) executes the operators options.

(7) The pass/abort mode during the ETE check is inhibited only if a prompt or advisory message is displayed.

e. Boresight Corrector FD/LS Display for GUN, PYLON, TADS (target acquisition designation sight), and PNVS (pilot night vision sensor).

NOTE

The loss or significant reduction in the FCC battery voltage could cause loss of all data in random access memory (RAM), including boresight correctors. If FCC battery voltage is suspect, refer to TM 9-1230-476-20-2 (ACY). If **FCC LOAD** (ACZ) or **FCC LOAD FAIL, BST DATA LOAD FAIL, INIT DATA LOAD FAIL** (ADD) message appears, perform boresight editing procedures TM 9-1230-476-20-1.

(1) FD/LS provides checksum error checking of the boresight correctors for GUN, PYLONS, TADS, and PNVS in both the continuous and maintenance modes. Arithmetic checking takes place during program execution of the software to prevent unexpected changes or alterations to this data which could cause gross errors in pointing/aiming of these systems.

(2) When boresight correctors are entered via the DEK (ADC) or CDU (ADD) the checksum for these values is calculated for each system. These checksums are monitored continuously following power-up.

(3) Upon detection of a checksum error, a high-action-display (HAD) message is displayed to the appropriate crew member in the sight status or weapon status character field. The affected system(s) boresight correctors for the system(s) defaults automatically to zero until the operator intervenes.

(4) In order not to mask lower priority weapon status messages, the boresight (BST) message is blinked. The messages to be displayed are correlated to the systems affected as follows:

System In Use	Message
TADS	**TADSBST?**
PNVS	**PNVSBST?**
GUN	**GUN BST?**
ROCKETS/ MISSILES	**PYLNBST?**

(5) For checksum errors, FD/LS does not set the system status indicators signifying a failure for the respective system. Therefore, invalid boresight correctors do not result in lighting of caution and warning indicators, or display of system failure messages.

(6) When the flashing **FD/LS** prompt is initiated (ADC) or ↙ **FDLS** message appears on the CDU (ADD), the operator sets the **DATA ENTRY** switch to the **FD/LS** position (ADC) or selects the **FDLS** FAB on the CDU (ADD). Typical boresight checksum error related FD/LS continuous messages and corresponding maintenance messages are as follows:

NOTE

The loss or significant reduction in the FCC battery voltage could cause loss of all data in random access memory (RAM), including boresight correctors. If FCC battery voltage is suspect, refer to TM 9-1230-476-20-2 (ACY). If **FCC LOAD** (ACZ) or **FCC LOAD FAIL , BST DATA LOAD FAIL, INIT DATA LOAD FAIL** (ADD) message appears, perform boresight editing procedures TM 9-1230-476-20-1

SYSTEM	CONTINUOUS MESSAGE	MAINTENANCE MESSAGE
GUN	**GUN BORESIGHT NO-GO**	**GUN BORESIGHT NO-GO RAM CHECKSUM**
PYLONS	**PYLON BORESIGHT NO-GO**	**PYLON BORESIGHT NO-GO RAM CHECKSUM**
TADS	**TADS BORESIGHT NO-GO**	**TADS BORESIGHT NO-GO RAM CHECKSUM**
PNVS	**PNVS BORESIGHT NO-GO**	**PNVS BORESIGHT NO-GO RAM CHECKSUM**

(7) Once a checksum error occurs, the boresight failure message remains until the operator edits (or re-enters) the boresight corrector from the aircraft log book for the affected system(s), or reboresighting is accomplished.

1–6 OPERATOR APPLICATIONS FOR THE DEK (ADC) – GENERAL.

a. General Procedures for Operating FD/LS.

1–6 OPERATOR APPLICATIONS FOR THE DEK – (ADC) GENERAL (cont) **1–6**

(1) On the DEK, set the **DATA ENTRY** switch to **FD/LS**, press and release any key except **ENTER SPACE** or **SHIFT** to display the first page of the FD/LS menu.

(2) An alternate method of accessing the first page of the FD/LS menu is to set the **DATA ENTRY** switch to **FD/LS**, press and release **R SHIFT** and **DEF/2** keys on the DEK.

(3) Select the desired test from the FD/LS menu and enter the menu address associated with that test. If necessary, press and release the **ENTER SPACE** key to scroll to the second page of the FD/LS menu.

(4) When the system menu address is entered into the DEK, the FD/LS maintenance test is automatically performed; any NO-GOs along with the location of the faulty LRUs in the selected system are displayed on the selected display monitor.

(5) If the system is not faulty, a GO message indicates a successful test.

NOTE

- For certain conditions and situations, operator interaction (acknowledgement or answer, etc.) may be required during the FD/LS check.
- Control/switch position changes prompted by FD/LS are to be performed within 30 seconds of the appearance of the prompt, or a false NO-GO message appears on the selected display monitor.

(6) If a prompt or advisory message which requires an acknowledgement is received, perform the operations as stated in the message.

(7) Acknowledging the prompted action(s) that have been performed can be accomplished by pressing and releasing the **ENTER SPACE** key on the DEK. Upon responding to the prompt, FD/LS will proceed with the testing automatically.

NOTE

Shift keys (**L SHIFT, MID SHIFT**, and **R SHIFT**) are used to select left, center, or right alpha characters on the DEK keys.

(8) If a prompt and advisory message display requires a **Y** (Yes) or **N** (No) answer, press and release the **L SHIFT** and **YZ*/9** keys for **Y** and **MID SHIFT** and **MNO/5** keys for **N**.

(9) To abort the FD/LS check, press and release the **ENTER SPACE** key or set the **DATA ENTRY** switch to **STBY** on the DEK.

(10) To perform the next FD/LS check, enter the new system menu address into the DEK.

b. General Procedures Using the DEK to Perform Boresighting Alignments, Verifications, and Editing.

(1) On the DEK, set the **DATA ENTRY** switch to **FD/LS**.

(2) Press and release **MID SHIFT** and **ABC/1** keys to display the boresight menu. The following is an example of the boresight menu.

TADS	**AL – 20**	**VF – 21**	**ED – 22**
GUN	**AL – 23**	**VF – 24**	**ED – 25**
PYLN	**AL – 26**	**VF – 27**	**ED – 28**
PNVS	**AL – 29**	**VF – 30**	**ED – 31**

(3) The operator may select a boresight function from the menu by entering the menu address into the DEK.

(4) Operator interaction is required to perform the selected boresight function.

(5) For further information concerning the use and operation of the boresighting functions, refer to TM 9-1230-476-20-1.

1–7 OPERATOR APPLICATIONS FOR THE CDU (ADD) – GENERAL

a. General Procedures for Operating FD/LS.

(1) On the CDU select FAB **FDLS**, press and release any key except **SPC** to display the first page of the FD/LS menu.

(2) Select the desired test from the FD/LS menu and enter the menu address associated with that test. If necessary, press and release the **SPC** key to scroll to the second page of the FD/LS menu.

(3) When the system menu address is entered into the CDU, the FD/LS maintenance test is automatically performed; any NO-GOs along with the location of the faulty LRUs in the selected system are displayed on the selected display monitor.

(4) If the system is not faulty, a GO message indicates a successful test.

NOTE

- For certain conditions and situations, operator interaction (acknowledgement or answer, etc.) may be required during the FD/LS check.
- Control/switch position changes prompted by FD/LS are to be performed within 30 seconds of the appearance of the prompt, or a false NO-GO message appears on the selected display monitor.

(5) If a prompt or advisory message which requires an acknowledgement is received, perform the operations as stated in the message.

(6) Acknowledging the prompted action(s) that have been performed can be accomplished by pressing and releasing the **SPC** key on the CDU. Upon responding to the prompt, FD/LS will proceed with the testing automatically.

(7) If a prompt and advisory message display requires a **Y** (Yes) or **N** (No) answer, press and release the **Y** key for YES or the **N** key for NO.

(8) To abort the FD/LS check, press and release the **SPC** key.

(9) To perform the next FD/LS check, enter the new system menu address into the CDU.

b. General Procedures Using the CDU to Perform Boresighting Alignments, Verifications, and Editing.

(1) On the CDU, select FAB **FDLS**.

(2) Press and release the **B** key to display the boresight menu. The following is an example of the boresight menu.

TADS	**AL – 20**	**VF – 21**	**ED – 22**
GUN	**AL – 23**	**VF – 24**	**ED – 25**
PYLN	**AL – 26**	**VF – 27**	**ED – 28**
PNVS	**AL – 29**	**VF – 30**	**ED – 31**

(3) The operator may select a boresight function from the menu by entering the menu address into the CDU.

(4) The EGI boresight function may be selected by selecting the program FAB (**PGM**). **BST EGI** will appear on the first line next to the first VAB.

(5) Operator interaction is required to perform the selected boresight function.

(6) For further information concerning the use and operation of the boresighting functions, refer to TM 9-1230-476-20-1.

CHAPTER 2
COCKPIT CONFIGURATION AND CONTROLS

CHAPTER OVERVIEW

Chapter 2 contains locator figures of the cockpit controls and circuit breakers along with aft avionics bay circuit breakers.

CHAPTER INDEX

Section I. CREW STATION CONFIGURATIONS

2–1 PILOT STATION LAYOUT.

Pilot station configurations and controls are shown in the following figures.

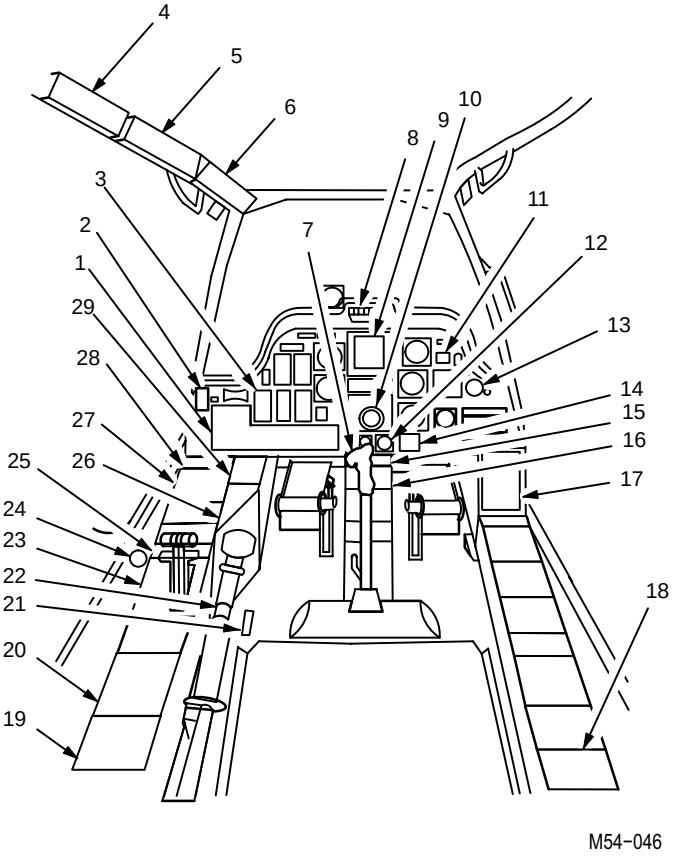
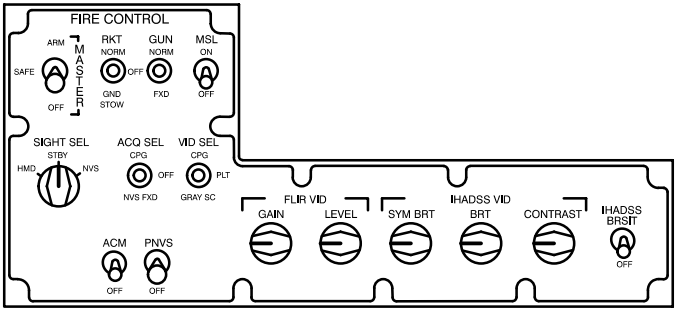


Figure 2–1. Station Locator

INDEX NO.	NOMENCLATURE	FIG NO.
1	FIRE CONTROL PANEL	2–2
2	TAIL WHEEL LOCK CONTROL PANEL	2–3
3	FUEL QUANTITY INDICATOR	2–4
4	AFT CIRCUIT BREAKER PANEL	2–5
5	CENTER CIRCUIT BREAKER PANEL	2–6
6	FORWARD CIRCUIT BREAKER PANEL (ADC)	2–7
6	FORWARD CIRCUIT BREAKER PANEL (ADD)	2–7.1
7	CYCLIC STICK GRIP	2–8
8	MASTER CAUTION/WARNING PANEL	2–9
9	VIDEO DISPLAY UNIT	2–10
10	HORIZONTAL SITUATION INDICATOR	2–11
11	STABILATOR POSITION INDICATOR	2–12
12	HYDRAULIC PRESSURE GAGE	2–13
13	ICING SEVERITY METER	2–14
14	HARS PANEL	2–15
15	REMOTE TRANSMIT SELECTOR PANEL	2–16
16	COMMUNICATION SYSTEM CONTROL PANEL, MODEL C–10414(V) 3/ARC	2–17
15	REMOTE TRANSMIT SELECTOR PANEL, MODEL ID–2403/ARC	2–18
16	COMMUNICATION SYSTEM CONTROL PANEL, MODEL C–11746(V) 4/ARC	2–19
17	CAUTION/WARNING PANEL	2–20
18	APU/FIRE TEST PANEL	2–21
19	ANTI ICE CONTROL PANEL	2–22
20	EXT/INTR LIGHTING CONTROL PANEL	2–23

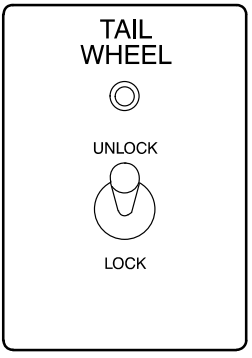
2–1 PILOT STATION LAYOUT (cont) 2–1

INDEX NO.	NOMENCLATURE	FIG NO.
21	STABILATOR MANUAL CONTROL	2–24
22	COLLECTIVE STICK	2–24
23	POWER LEVER QUADRANT	2–25
24	OUTSIDE AIR TEMPERATURE GAGE	2–26
25	ELECTRICAL POWER CONTROL PANEL	2–27
26	ENVIRONMENTAL CONTROL SYSTEM PANEL	2–28
27	AREA ROCKET CONTROL PANEL	2–29
28	AUTOMATIC STABILIZATION EQUIPMENT PANEL	2–30
29	MISSILE PANEL	2–31



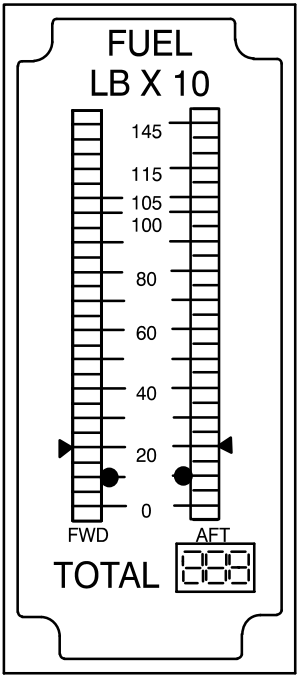
M54–047

Figure 2–2. Fire Control Panel



M54–048

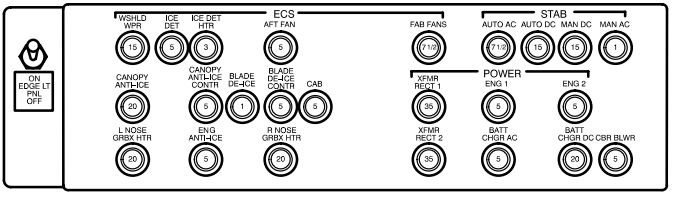
Figure 2–3. Tail Wheel Lock Control Panel



M54–049

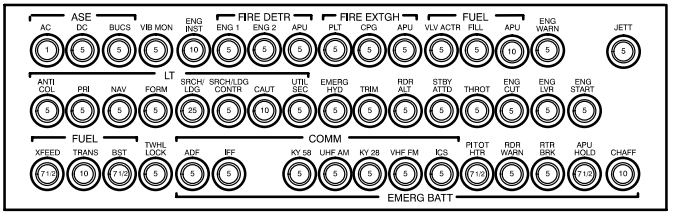
Figure 2–4. Fuel Quantity Indicator

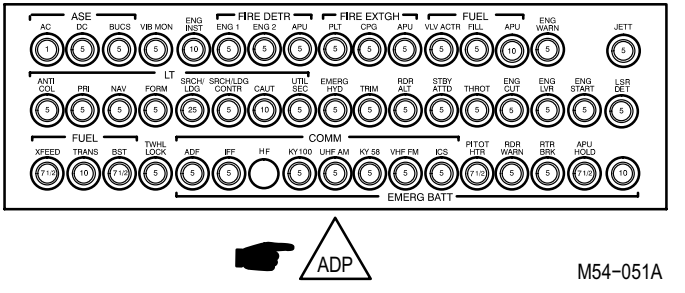
2–1 PILOT STATION LAYOUT (cont) 2–1



M54–050

Figure 2–5. Aft Circuit Breaker Panel





M54–051A

Figure 2–6. Center Circuit Breaker Panel

2–1 PILOT STATION LAYOUT (cont) 2–1

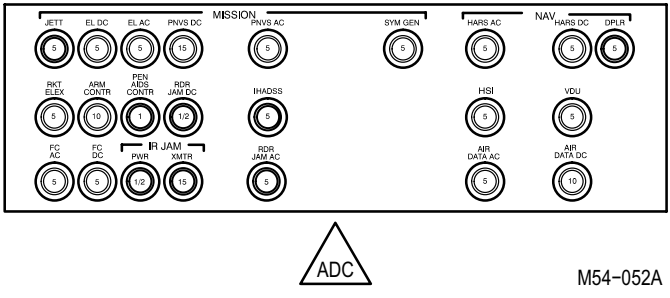


Figure 2–7. Forward Circuit Breaker Panel (ADC)

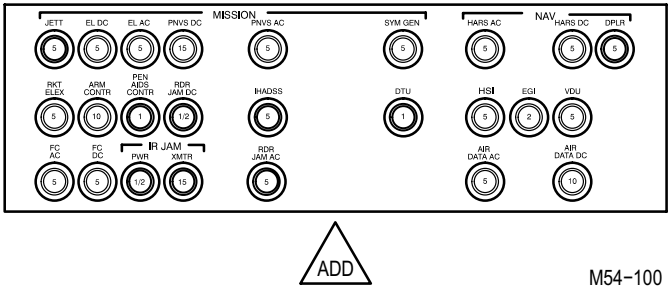


Figure 2–7.1. Forward Circuit Breaker Panel (ADD)

2–1 PILOT STATION LAYOUT (cont) 2–1

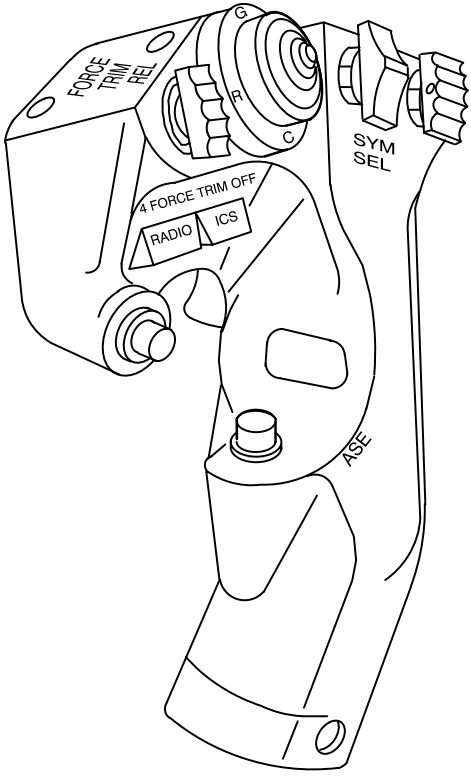


Figure 2–8. Cyclic Stick Grip

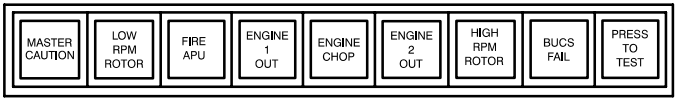


Figure 2–9. Master Caution/Warning Panel

2–1 PILOT STATION LAYOUT (cont) 2–1

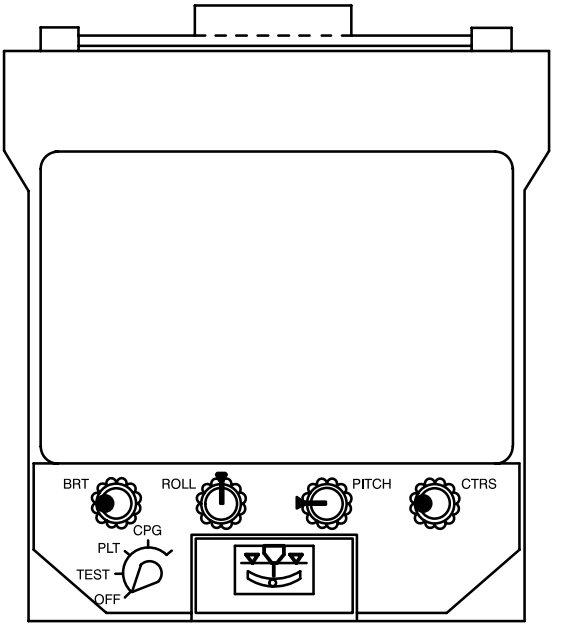
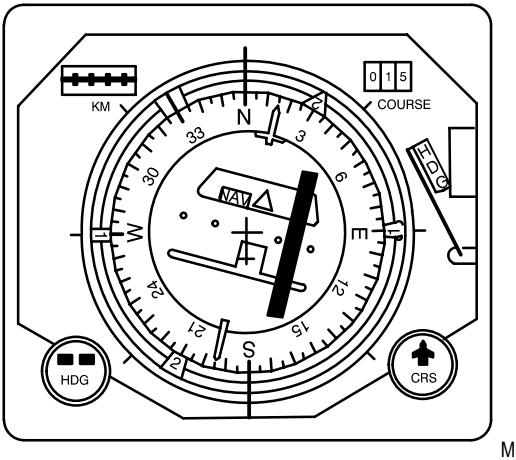


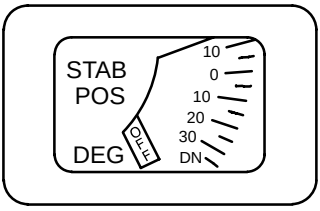
Figure 2–10. Video Display Unit M54–055



M54–056

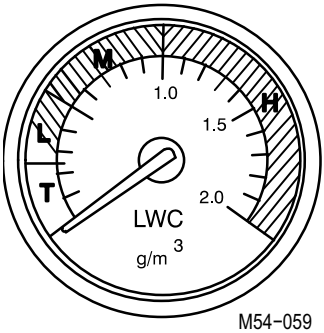
Figure 2–11. Horizontal Situation Indicator

2–1 PILOT STATION LAYOUT (cont) 2–1



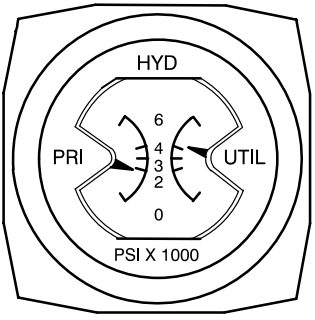
M54–057

Figure 2–12. Stabilator Position Indicator



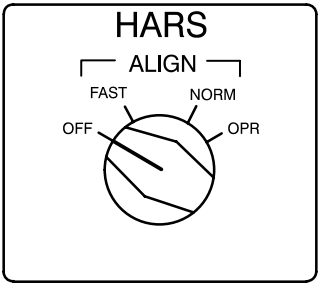
M54–059

Figure 2–14. Icing Severity Meter



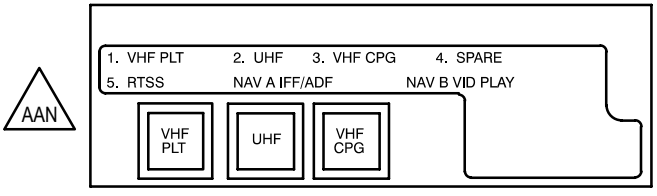
M54–058

Figure 2–13. Hydraulic Pressure Gage



M54–060

Figure 2–15. HARS Panel



M54–061

Figure 2–16. Remote Transmit Selector Panel

2–1 PILOT STATION LAYOUT (cont) 2–1

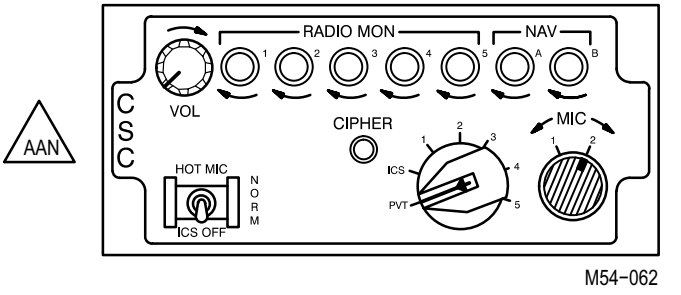


Figure 2–17. Communication System Control Panel, Model C–10414(V) 3/ARC

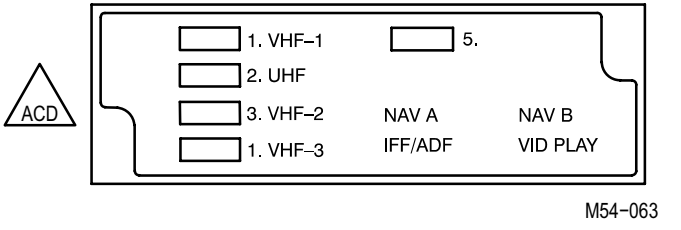


Figure 2–18. Remote Transmit Selector Panel, Model ID–2403/ARC

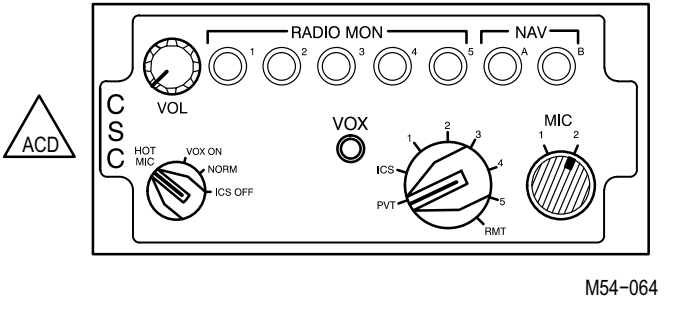
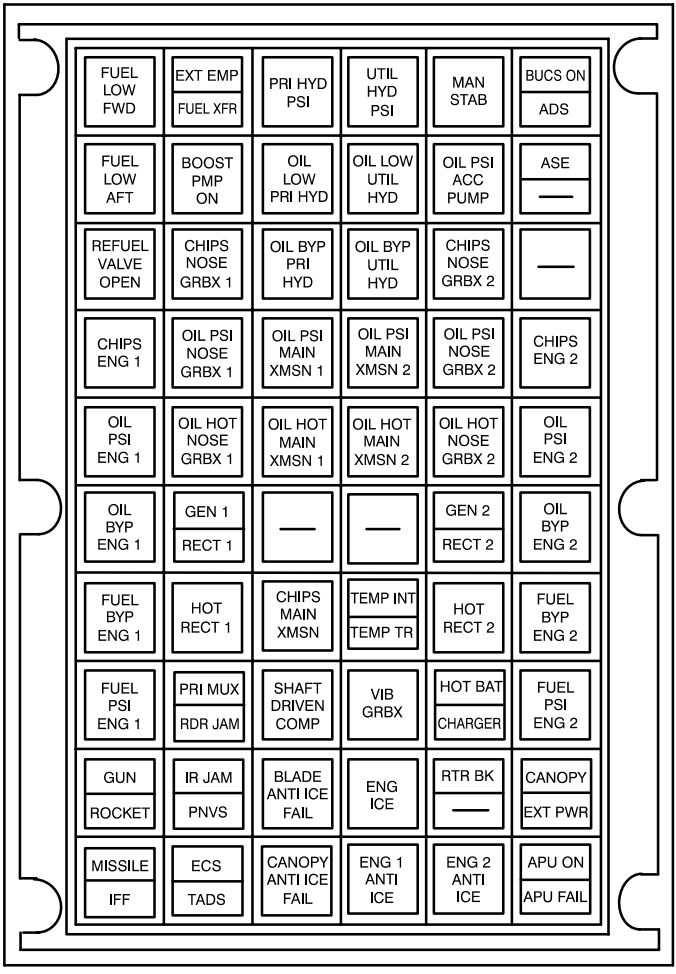


Figure 2–19. Communication System Control Panel, Model C–11746(V) 4/ARC

2–1 PILOT STATION LAYOUT (cont) 2–1



M54-065

Figure 2–20. Caution / Warning Panel

2–1 PILOT STATION LAYOUT (cont) 2–1

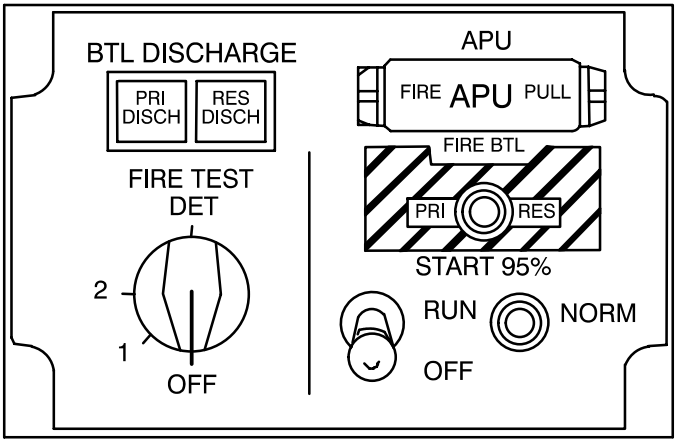


Figure 2–21. APU/Fire Test Panel

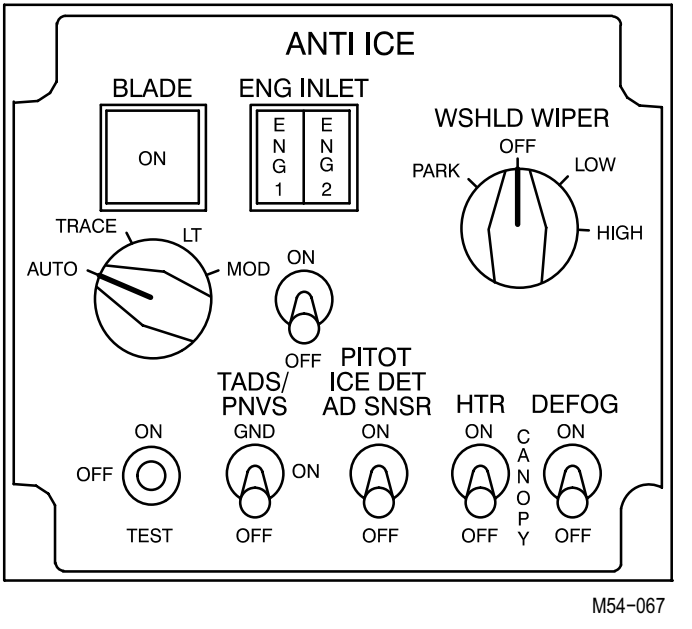


Figure 2–22. Anti Ice Control Panel

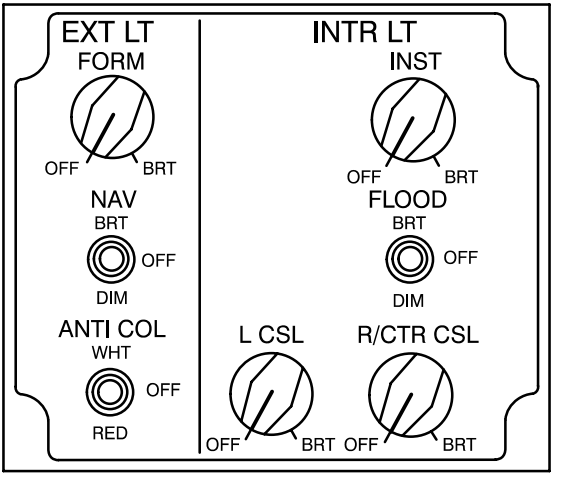


Figure 2–23. EXT/INTR Lighting Control Panel

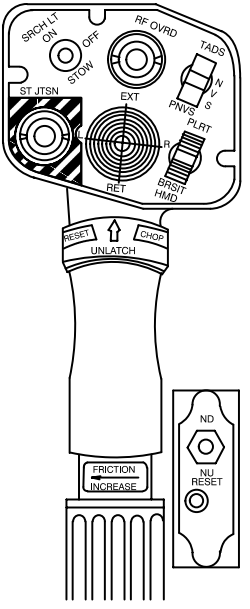


Figure 2–24. Collective Stick/Stabilator Manual Control

2–1 PILOT STATION LAYOUT (cont) 2–1

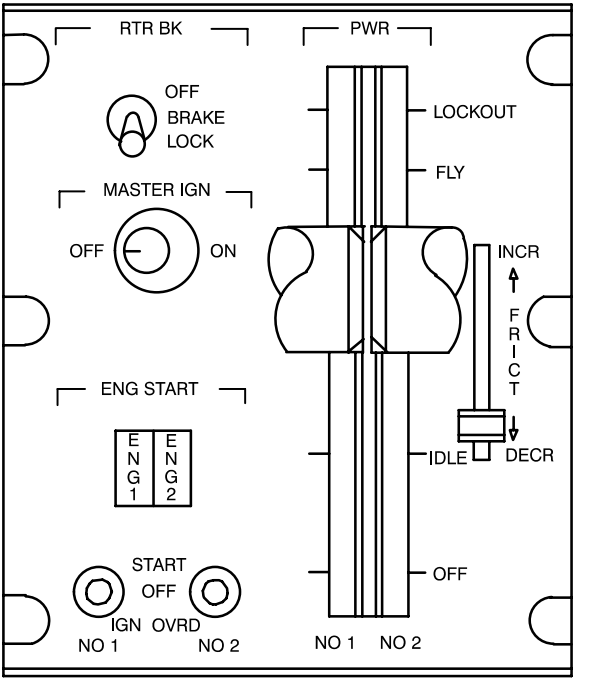


Figure 2–25. Power Lever Quadrant

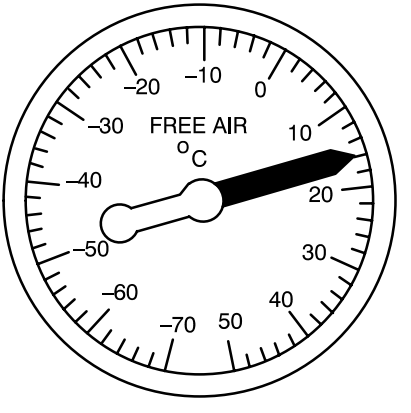


Figure 2–26. Outside Air Temperature Gage

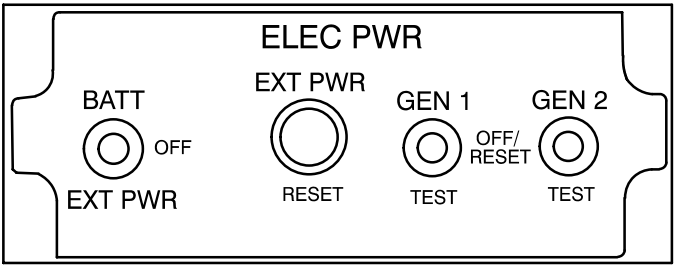


Figure 2–27. Electrical Power Control Panel

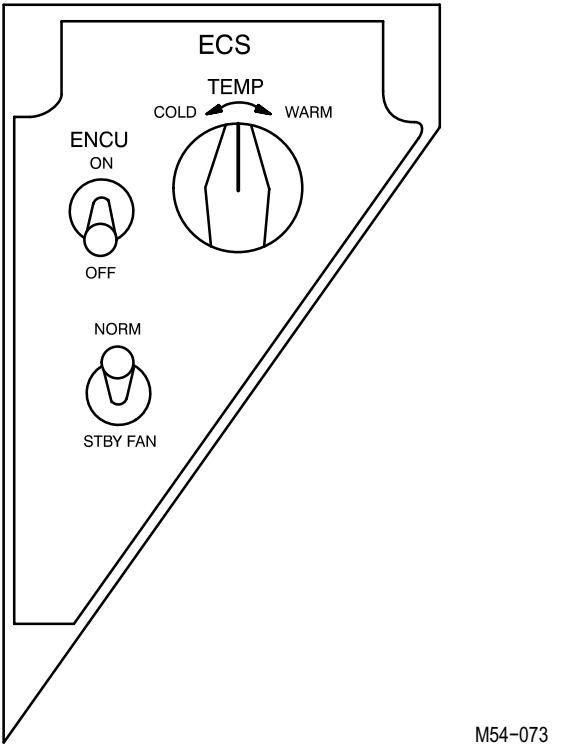


Figure 2–28. Environmental Control System Panel

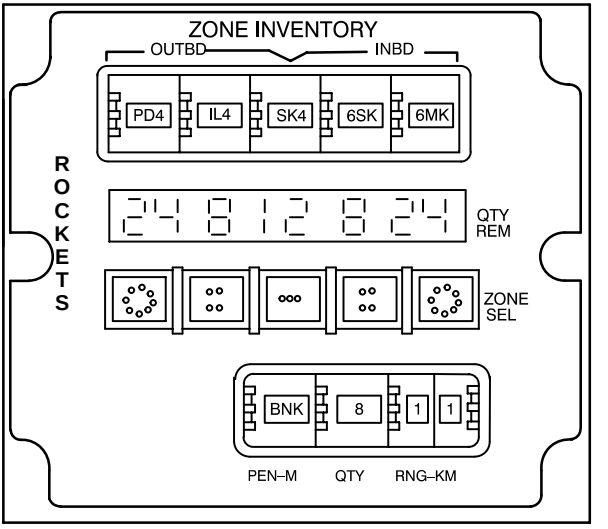


Figure 2–29. Area Rocket Control Panel

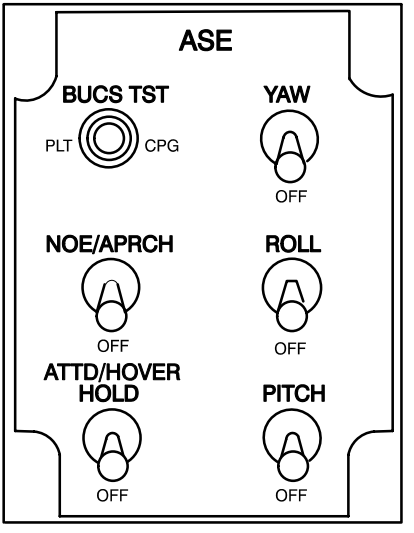


Figure 2–30. Automatic Stabilization Equipment Panel

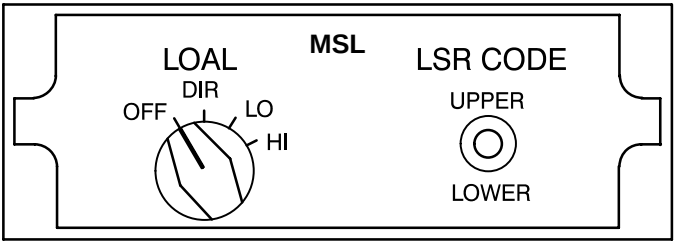


Figure 2–31. Missile Panel

2–2 CPG STATION LAYOUT

CPG station configurations and controls are illustrated in the following figures.

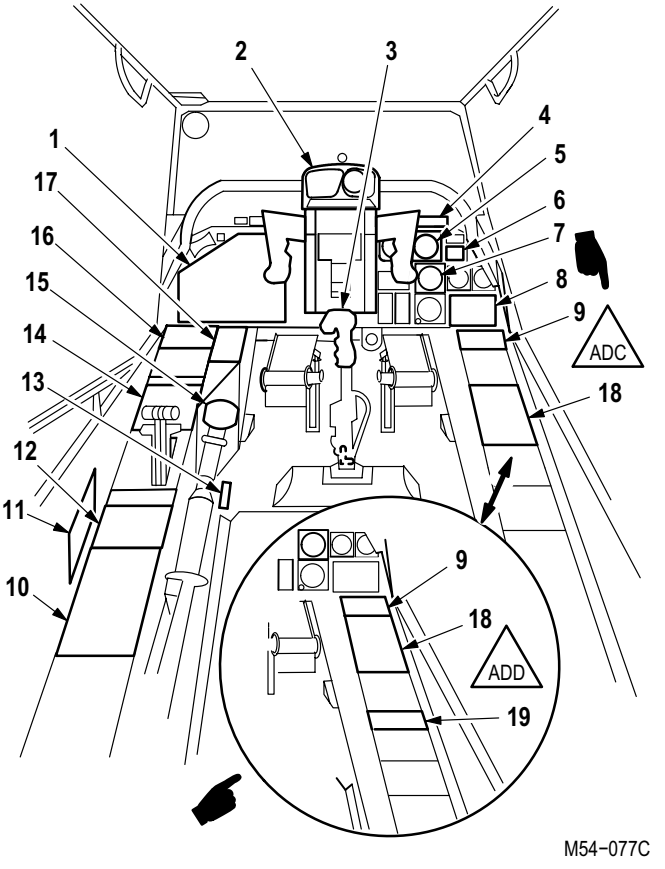
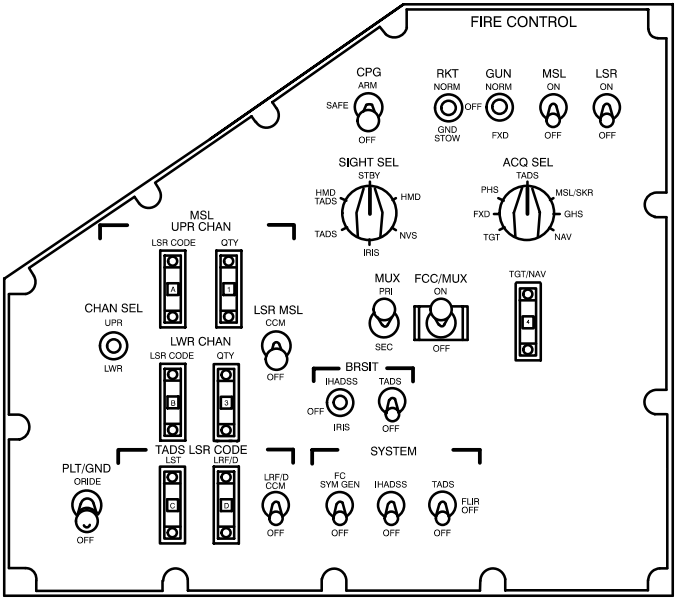


Figure 2–32. Station Locator

INDEX NO.	NOMENCLATURE	FIG NO.
1	FIRE CONTROL PANEL	2–33
2	OPTICAL RELAY TUBE	2–34
3	CYCLIC STICK	2–35
4	MASTER CAUTION/WARNING PANEL	2–36
5	REMOTE ATTITUDE INDICATOR	2–37
6	STABILATOR POSITION INDICATOR	2–38
7	RADIO MAGNETIC INDICATOR	2–39
8	CAUTION/WARNING PANEL	2–40
9	COMMUNICATION SYSTEM CONTROL PANEL, MODEL C–10414 (V) 3/ARC	2–41
9	COMMUNICATION SYSTEM CONTROL PANEL, MODEL C–11746 (V) 4/ARC	2–42
10	CIRCUIT BREAKER PANEL 1	2–43
11	CIRCUIT BREAKER PANEL 2	2–44
12	INTR LIGHTING CONTROL PANEL	2–45
13	STABILATOR MANUAL CONTROL	2–46
14	AUX/ANTI ICE PANEL	2–47
15	COLLECTIVE STICK	2–46
16	MISSILE CONTROL PANEL	2–48
17	DATA ENTRY KEYBOARD	2–49
18	DOPPLER (CP–1252 (XE–2)/ASN–128) (ADC)	2–49.1

2–2 CPG STATION LAYOUT (cont) 2–2

INDEX NO.	NOMENCLATURE	FIG NO.
18	DOPPLER (IP–1552/G/ASN–137) (ADD)	2–49.2
19	DATA TRANSFER RECEPTACLE (ADD)	2–49.3



M54–078

Figure 2–33. Fire Control Panel

2–2 CPG STATION LAYOUT (cont) 2–2

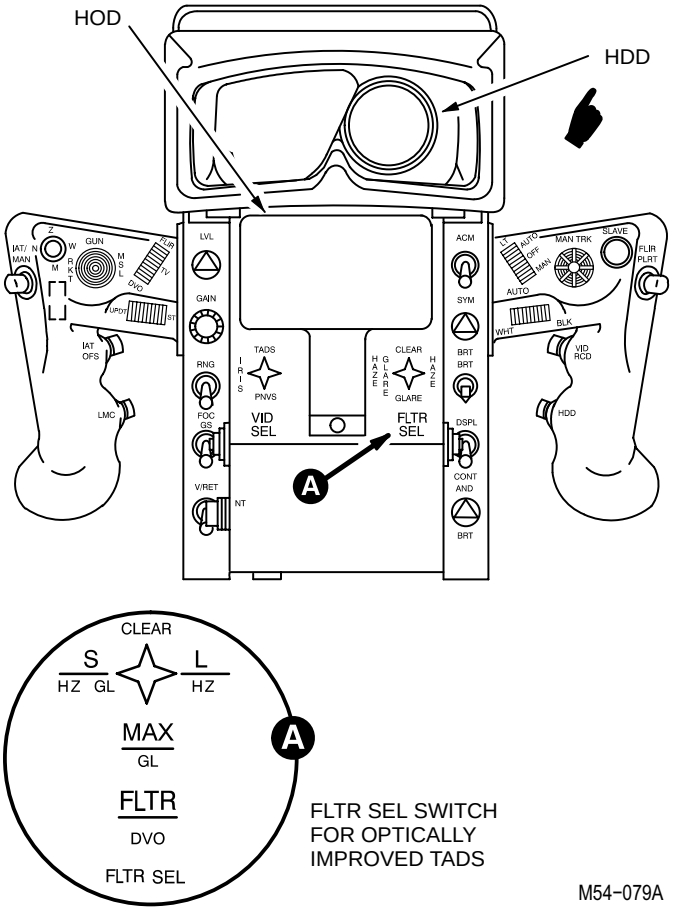


Figure 2–34. Optical Relay Tube

2–2 CPG STATION LAYOUT (cont) 2–2

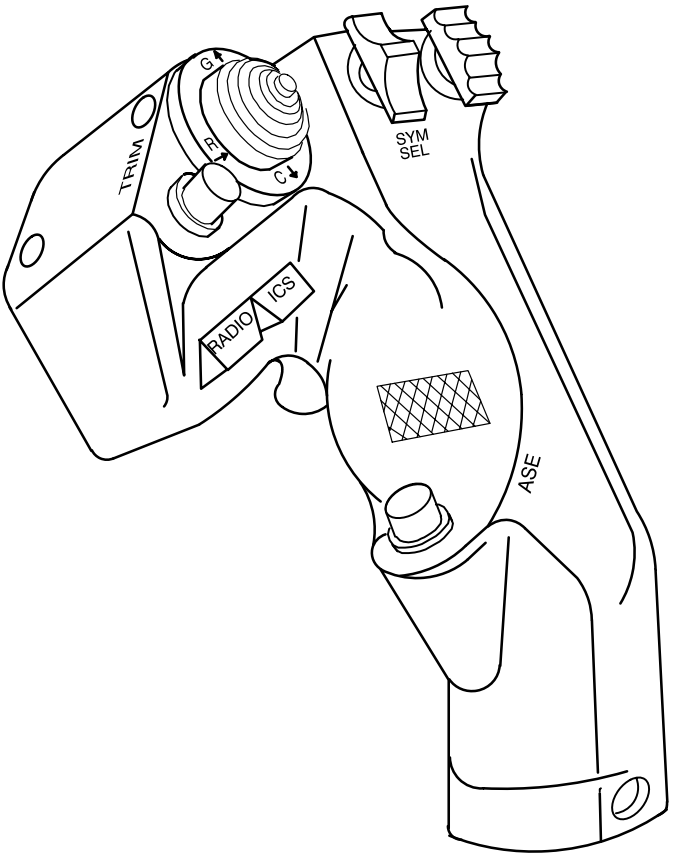


Figure 2–35. Cyclic Stick

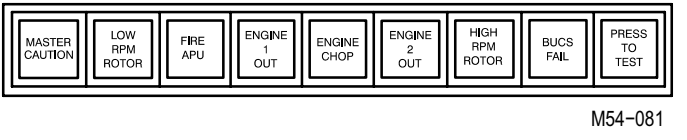
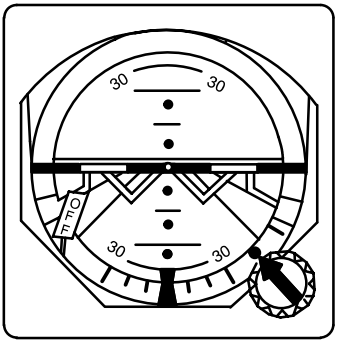
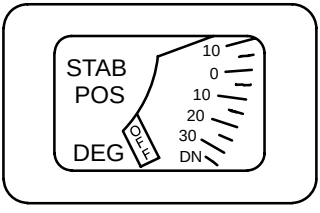


Figure 2–36. Master Caution/Warning Panel



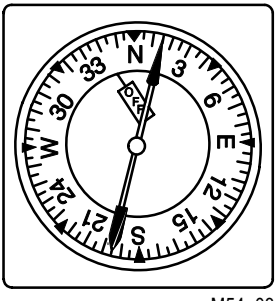
M54–082

Figure 2–37. Remote Attitude Indicator



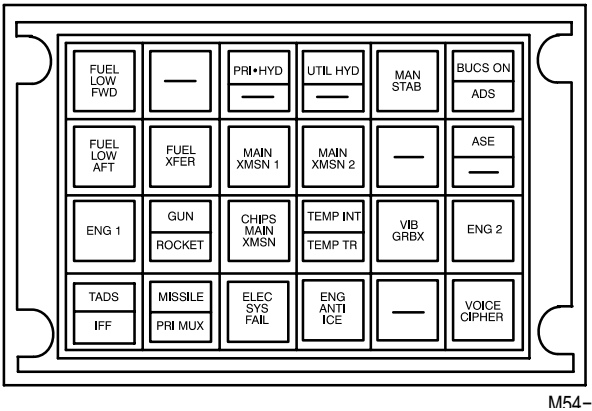
M54–083

Figure 2–38. Stabilator Position Indicator



M54–084

Figure 2–39. Radio Magnetic Indicator

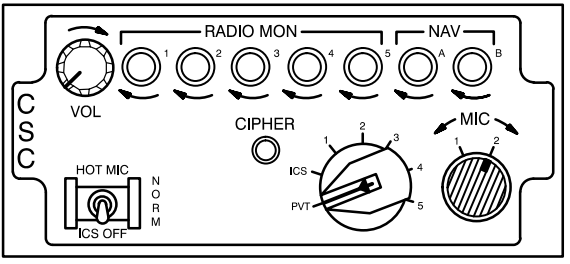


M54–085

Figure 2–40. Caution/Warning Panel

2–2 CPG STATION LAYOUT (cont) 2–2

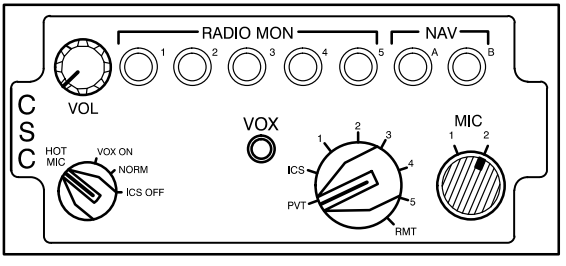
AAN



M54–086

Figure 2–41. Communication System Control Panel, Model C–10414 (V) 3/ARC

ACD



M54–087

Figure 2–42. Communication System Control Panel, Model C–11746 (V) 4/ARC

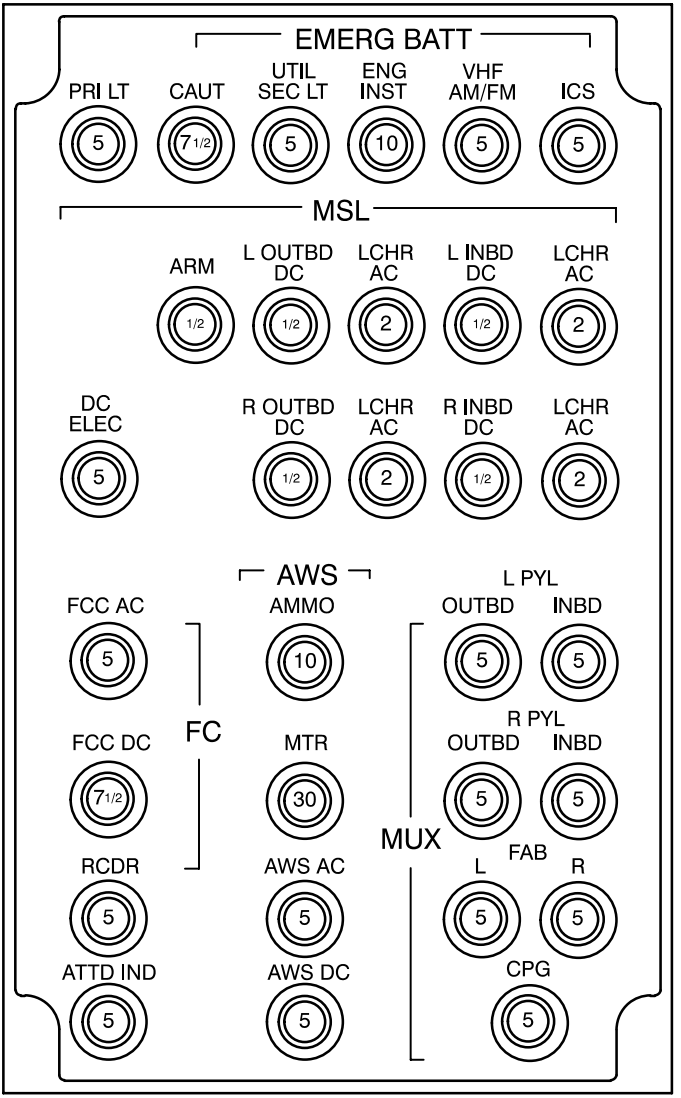


Figure 2–43. Circuit Breaker Panel 1

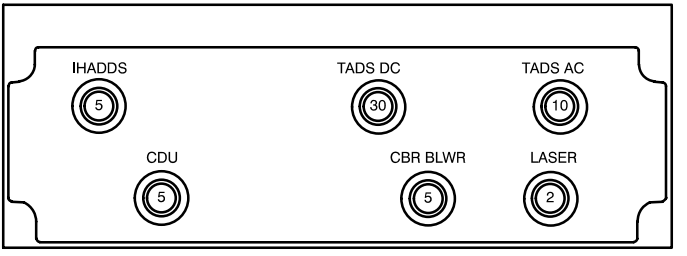


Figure 2–44. Circuit Breaker Panel 2

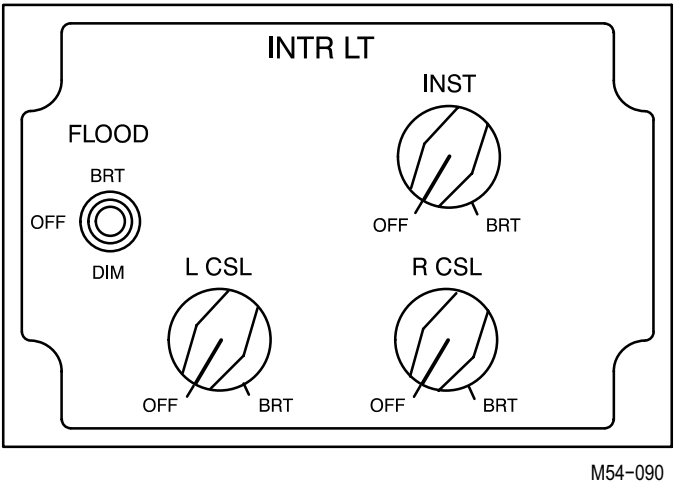


Figure 2–45. INTR Lighting Control Panel

2–2 CPG STATION LAYOUT (cont) 2–2

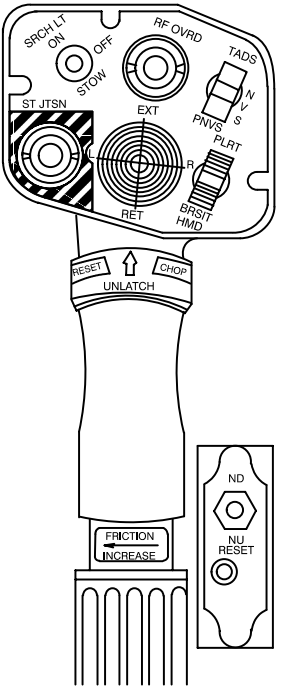


Figure 2–46. Collective Stick/Stabilator Manual Control

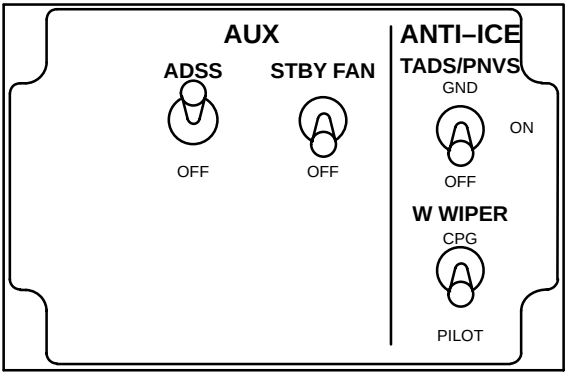


Figure 2–47. Aux/Anti Ice Panel

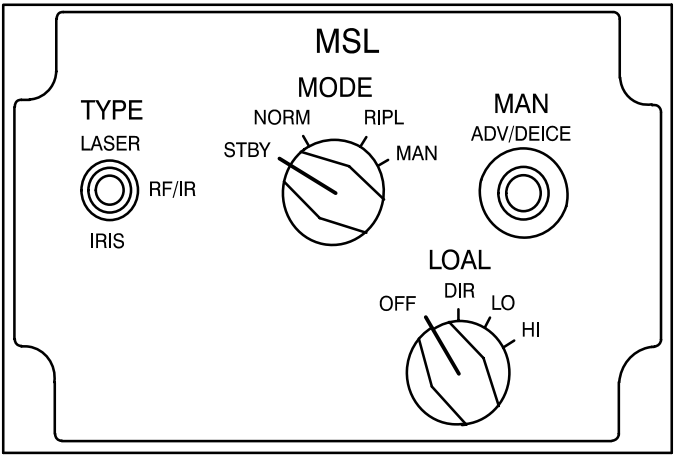


Figure 2–48. Missile Control Panel

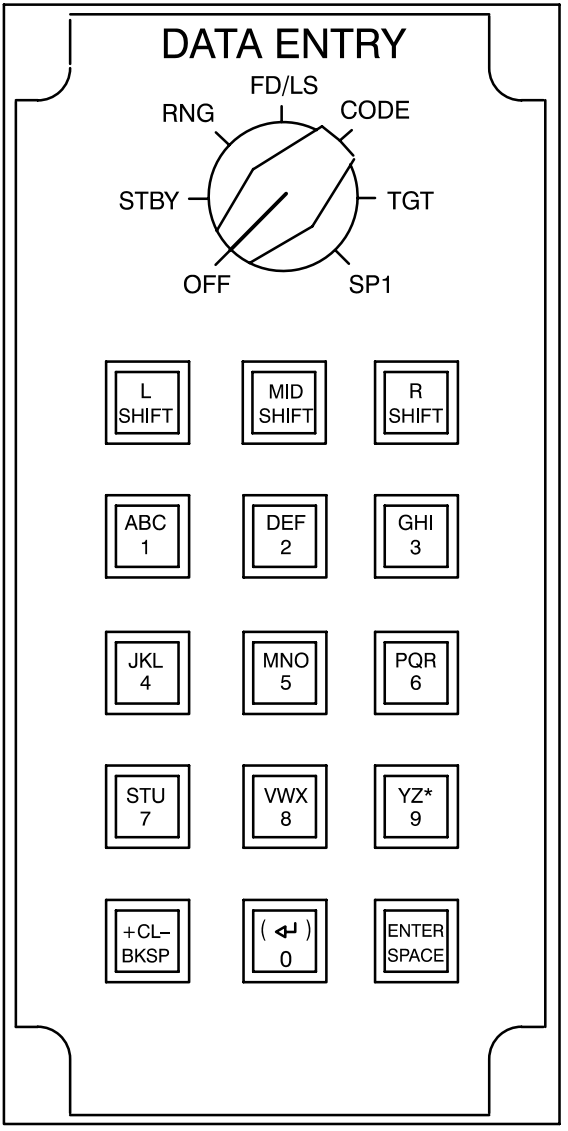


Figure 2–49. Data Entry Keyboard

2–2 CPG STATION LAYOUT (cont) 2–2

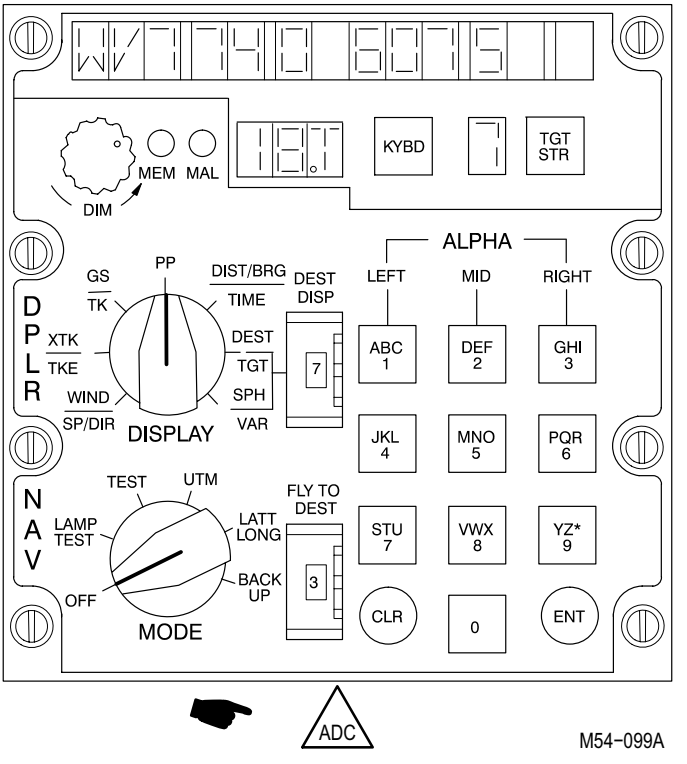


Figure 2–49.1. Doppler (CP–1252 (XE)/ASN–128)

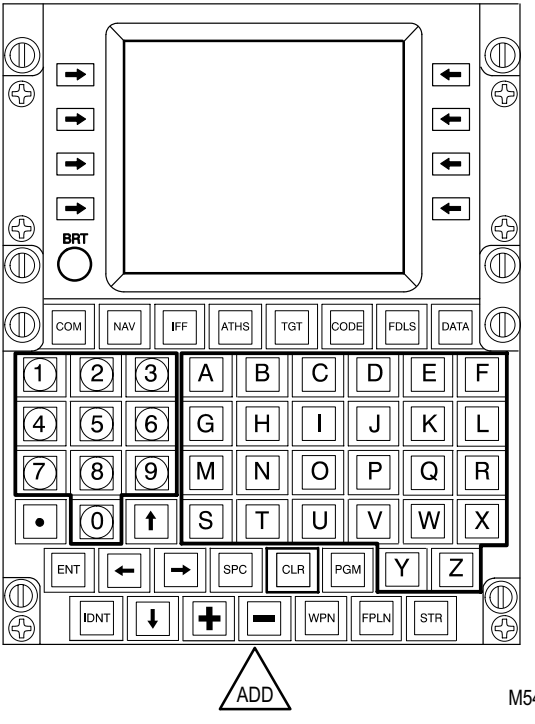


Figure 2–49.2. Doppler (IP–1552/G/ASN–137)

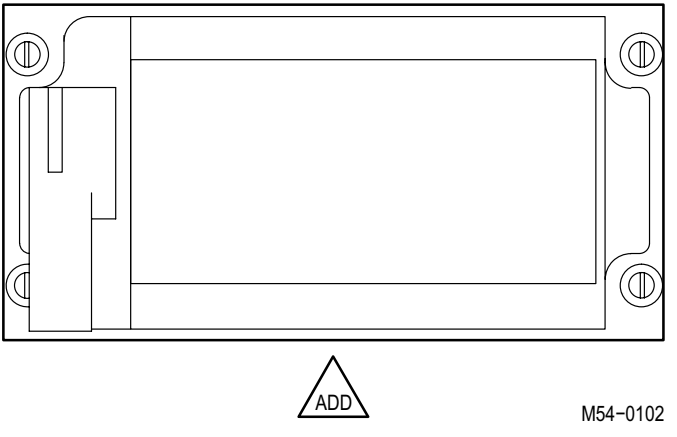


Figure 2–49.3. Data Transfer Receptacle

Section II. AFT AVIONICS BAY COMPONENT LOCATION

2–3 AFT AVIONICS BAY

The aft avionics bay is illustrated figure 2–50 to show location of the APU circuit breaker.

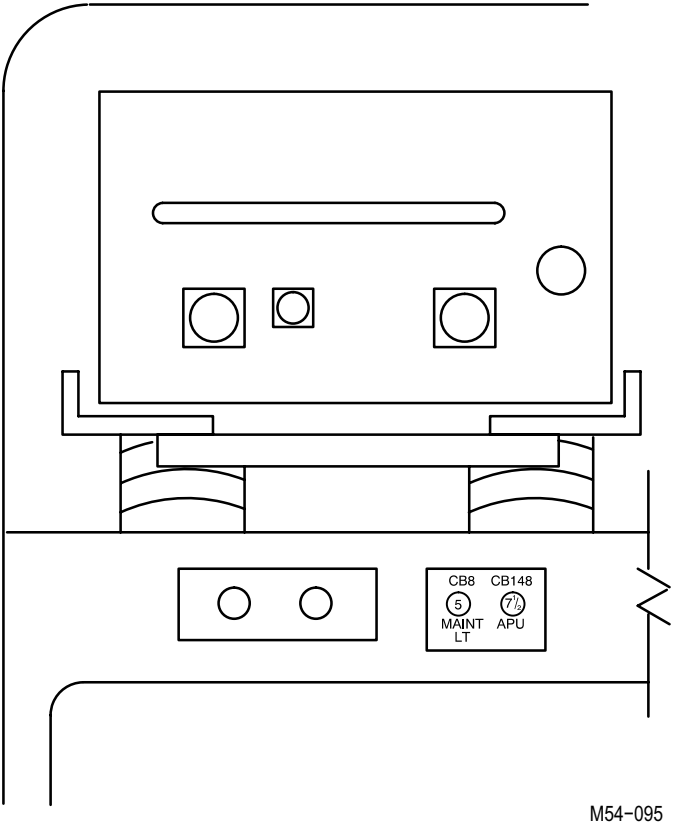


Figure 2–50. Aft Avionics Bay

CHAPTER 3
POWER APPLICATIONS

CHAPTER OVERVIEW

Chapter 3 contains aircraft power applications and emergency procedures that include systems – power–up, systems – power down, auxiliary power unit (APU) operating instructions and APU emergency procedures.

CHAPTER INDEX

3–1 SYSTEMS – POWER–UP 3–1

Tools:

Nomenclature	Part Number
Goggles–Industrial	GG–G–531
Headset–Microphone	H–157/AIC
Multi–Output Aviation Power Unit (Aviation Ground Power Unit (AGPU))	83–360A
Microphone Adapter Cord (2)	7–311B22060 (make item)

Personnel Required:

(2)

References:

TM 1-1270-476-20	TM 1-5855-265-20
TM 1-1520-238-T-4	TM 9-1090-208-23-1
TM 1-1520-238-23	TM 55-1730-229-12

Equipment Conditions:

Ref	Condition
TM 1-1520-238-T-4	Maintenance headset connected
TM 55-1730-229-12	AGPU available as required
TM 1-1520-238-23	Helicopter safed Access doors **LN5**, **R295**, **R325**, **R345** opened as required Battery attached Protective covers removed
TM 1-1270-476-20	Target Acquisition Designation Sight (TADS) window cover assemblies removed TADS Boresight Assembly cover removed
TM 1-5855-265-20	Pilots Night Vision Sensor (PNVS) window cover assembly removed

WARNING

DANGER
laser light

- **The TADS has a hazardous class IV neodymium laser. The laser emits a light beam with a light wavelength of 1064 nanometers and is invisible. Accidental application of laser power could result in direct exposure to the invisible beam or reflections from the beam. This could cause blindness or serious eye injury.**
- **To prevent accidental APU start, ensure that the APU circuit breaker in the AFT avionics bay and the APU HOLD circuit breaker on the pilot center circuit breaker panel are open when battery or external electrical power is attached to the helicopter and unqualified personnel are in and around the pilot crew station.**
- **Prior to helicopter operation, ensure that the gun turret area is clear. Failure to clear the area could result in injury to personnel or damage to equipment.**

CAUTION

- **If ambient outside temperature is below 18°C (0°F) or above 27°C (80°F) make sure the environmental control system (ECS) is ON. Allow pilot and copilot/gunner (CPG) crew stations to reach a comfortable level before proceeding. Failure to comply could result in damage to equipment**

- **Do not operate equipment if ECS indicator on the pilot caution/warning panel is lit. Failure to comply could result in damage to equipment.**
- **Do not position the AGPU under a main rotor blade. Main rotor blade damage may occur from intense radiant heat from the AGPU exhaust.**
- **If auxiliary fuel tank kits are installed, ensure pylon actuator connectors are installed on dummy connectors.**

1. Operating instructions, initial switch settings, electrical, hydraulic and pneumatic interfaces are provided for the application of external power using AGPU.

   a. Make sure that the **APU** circuit breaker in the aft avionics bay (fig. 2–50) and the **APU HOLD** circuit breaker on the pilot center circuit breaker panel (fig. 2–6) are open before proceeding.

WARNING

AGPU operation exceeds acceptable safe noise levels. Personnel working near or operating will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.

   b. Perform AGPU prestart procedures prior to placing the AGPU on–line (refer to TM 55-1730-229-12 for operator and aviation unit maintenance (AVUM) maintenance instructions on the AGPU.

   c. Attach AGPU power cable to the **EXTERNAL POWER CONNECTOR – 115 VAC/DC 400 Hz** receptacle on the aircraft and apply ac power via the **AC** control panel on the AGPU (refer to TM 55-1730-229-12 for operator and AVUM maintenance instructions on the AGPU).

WARNING

The aircraft hydraulic system is pressurized to 3000 psig. Make sure that hydraulic pressure is released before loosening any connections. Failure to comply could result in death or serious injury.

NOTE

In the event the gun drifts in azimuth during either aircraft power-up or power-down sequence, replace the hydraulic solenoid valve (TM 9-1090-208-23-1) prior to conducting the AWS FD/LS.

d. If hydraulics are required, perform the following procedures:

(1) Layout the hydraulic hoses in a manner which would prevent kinks and loops.

(2) Attach AGPU pressure and return hoses to the **PRIMARY** and/or **UTILITY** couplings on the aircraft (TM 1-1520-238-23).

(3) Verify all hydraulic hose connections are secured before applying hydraulic pressure.

(4) Apply hydraulic pressure to the aircraft via the hydraulic control panel on the AGPU (refer to TM 55-1730-229-12 for operator and AVUM maintenance instructions on the AGPU).

WARNING

Pneumatic hose and coupling fitting become extremely hot when pneumatic power is applied. Never touch hose or adapter fitting until pneumatic power is removed and the hose and adapter fitting have cooled. Wear proper gloves and eye protection (goggles or equivalent) when operating the pneumatic system.

e. If pneumatics are required, perform the following procedures:

(1) Layout the pneumatic hose in a manner which would prevent kinks and loops.

(2) Attach pneumatic hose coupling to aircraft air nipple (TM 1-1520-238-23).

WARNING

- **Never set PNEUMATIC POWER switch to ON unless pneumatic hose coupling is securely attached to the aircraft. The hose will attempt to straighten out with power applied, and whip around violently if not securely attached to the aircraft. Wear proper gloves and eye protection (goggles or equivalent) when operating the pneumatic system.**
- **AGPU operation exceeds acceptable safe noise levels. Personnel working near or operating will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.**

CAUTION

Handle pneumatic hose with care so spiral wrap and netting are not damaged. Keep hose off ground if wet or muddy (Use suitable supports).

NOTE

The **SHAFT DRIVEN COMP** indicator on the pilot caution/warning panel does not light when the pressurized air system (PAS) manifold is pressurized.

(3) Apply pneumatic power via the **PNEUMATIC** control panel on the AGPU (refer to TM 55-1730-229-12 for operator and AVUM maintenance instructions on the AGPU).

2. If aircraft APU power applications are required, initial checks, operating instructions, and switch/controls settings are provided in paragraph 3–3, APU – OPERATING INSTRUCTIONS.
3. Locate the communications cord on the left–hand side of the pilot seat.

4. Attach the microphone headset/microphone adapter cord plug to communications cord receptacle.
5. Verify all circuit breakers are closed, except for **MISSION JETT**, **JETT**, and any circuit breakers tagged to remain open with power applied to the aircraft (fig. 2–5, 2–7, 2–43, and 2–44).
6. Verify crew station switch/control settings as follows after an aircraft power source is on–line.

Pilot Station (fig. 2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
ELEC PWR (fig. 2–27)	**EXT PWR RESET**	Momentary press and release (Not required if using aircraft battery power)
	BATT/OFF/EXT PWR	EXT PWR (if aircraft battery power is required, set switch to BATT)
EXT LT/ INTR LT (fig. 2–23)	**L CSL**	As desired
	R/CTR CSL	As desired
Aft CB Panel (fig. 2–5)	**EDGE LT PNL**	**ON** (As desired)
VDU (fig.2–10)	**CPG/PLT/TEST/OFF**	**CPG**
CSC (fig. 2–17 or 2–19)	Transmitter Select	**ICS**
	MIC	**1** (for maintenance headset without power adapter)
		2 (for helmet or maintenance headset with power adapter)
	ICS SELECT	**NORM**
	VOL	As desired
ECS (fig. 2–28)	**NORM/STBY/FAN**	**NORM**
	ENCU	**ON**
	TEMP	As required

7. Locate the communications cord on the left–hand side of the CPG seat.
8. Attach the microphone headset/microphone adapter cord plug to communications cord receptacle.

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
CSC (fig. 2–41 or 2–42)	Transmitter Select	**ICS**
	MIC	**1** (for maintenance headset without power adapter) **2** (for helmet or maintenance headset with power adapter)
	ICS SELECT	**NORM**
	VOL	As desired
FIRE CONTROL (fig. 2–33)	**MUX**	**PRI**
	FCC/MUX	**ON**
	SYSTEM FCC SYM GEN	**FC SYM GEN**
	PLT/GND ORIDE	**ORIDE**
	CPG SAFE ARM	**SAFE**
	CPG MSL	**ON**
	SYSTEM TADS	**OFF**
AUX/ANTI–ICE (fig. 2–47)	**STBY FAN**	**OFF**
	ADSS	**ADSS**
INTR LT (fig. 2–45)	**INST**	As desired
	L CSL	As desired
	R CSL	As desired
DEK (ADC) (fig. 2–49)	**DATA ENTRY**	**STBY**
Doppler (AN/ASN-128) (ADC) (fig. 2–49.1)	**MODE**	**UTM**

NOTE

When **GEN 1**, **GEN 2** and **EXT PWR** indicators on the pilot caution/warning panel (fig. 2–20) light at the same time, the indication means external power is applied and generator 1 and generator 2 are off–line.

9. Verify the **GEN 1**, **GEN 2**, and **EXT PWR** indicators on pilot caution/warning panel are lit.
10. Verify the **HOT RECT 1**, **HOT RECT 2**, **RECT 1**, and **RECT 2** indicators on pilot caution/warning panel are not lit.
11. If **HOT RECT 1**, **HOT RECT 2**, **RECT 1**, or **RECT 2** indicators on pilot caution/warning panel light, power down aircraft (paragraph 3–2).
12. Proceed with applicable FD/LS check or maintenance task as required.

END OF TASK

3–2 SYSTEMS – POWER DOWN 3–2

Personnel Required:
(2)

References:
TM 55-1730-229-12 TM 1-1520-238-23

1. Restore crew station switch/control settings as follows:

CPG Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**CPG**	**OFF**
	RKT	**OFF**
	GUN	**OFF**
	MSL	**OFF**
	LSR	**OFF**
	SIGHT SEL	**STBY**
	ACQ SEL	**FXD**
	MUX	**PRI**
	FCC/MUX	**ON**
	PLT/GND	**OFF**
	SYSTEM FC SYM GEN	**OFF**
	SYSTEM TADS	**OFF**
	SYSTEM IHADSS	**OFF**
DEK (ADC) (fig. 2–49)	**DATA ENTRY**	**OFF**
MSL (fig. 2–48)	**MODE**	**STBY**
	LOAL	**OFF**
AUX/ANTI–ICE (fig. 2–47)	**ADSS**	**OFF**
	STBY FAN	**OFF**
INTR LT (fig. 2–45)	**L CSL**	**OFF**
	R CSL	**OFF**
CSC (fig. 2–41 or 2–42)	**ICS SELECT**	**ICS OFF**

Pilot Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**MASTER**	**OFF**
	RKT	**OFF**
	GUN	**OFF**
	MSL	**OFF**
	SIGHT SEL	**STBY**
	ACQ SEL	**NVS FXD**
	VID SEL	**PLT**
	ACM	**OFF**
	PNVS	**OFF**
VDU (fig. 2–10)	**CPG/PLT/TEST/OFF**	**OFF**
HARS (fig. 2–15)	**HARS**	**OFF**
MSL (fig. 2–31)	**LOAL**	**OFF**
POWER LEVER QUADRANT	**RTR BK**	**OFF**
ANTI ICE (fig. 2–22)	**ENG INLET ON/OFF**	**OFF**
	WSHLD WIPER	**OFF**
	BLADE ON/OFF/TEST	**OFF**
	AUTO/TRACE/LT/MOD	**AUTO**
EXT LT/ INTR LT (fig. 2–23)	**INST**	**OFF**
	L CSL	**OFF**
	R/CTR CSL	**OFF**
Aft CB Panel (fig. 2–5)	**EDGE LT PNL**	**OFF**
ELEC PWR (fig. 2–27)	**BATT/OFF/EXT PWR**	**OFF**

2. Locate the communications cord on left–hand side of both crew members seat.
3. Detach microphone headset/microphone adapter cord plug from communications cord receptacle.
4. Remove squat switch fixture, if installed.
5. If APU is operating, perform APU shutdown procedures in accordance with paragraph 3–3.
6. If external power is being provided by the AGPU, perform appropriate power down procedures in accordance with TM 55-1730-229-12 and TM 1-1520-238-23 and secure all access doors opened.

END OF TASK

3–3 APU – OPERATING INSTRUCTIONS 3–3

Tools:

Nomenclature	Part Number
Headset–Microphone	H–157/AIC or equivalent
Cord Assembly, Maintenance Headset	7–262100009
Microphone Adapter Cord (2)	7–311B22060 (make item)

Personnel Required:

(3)

References:

TM 1-1270-476-20	TM 1-1520-238-23
TM 1-1520-238-T-4	TM 1-1520-238-T-7
TM 1-5855-265-20	

Equipment Conditions:

Ref	Condition
TM 1-1520-238-T-4	Maintenance headset connected
TM 1-1520-238-23	Helicopter safed Moorings removed Protective covers removed Access doors **R190**, **R295**, **R330**, **R325**, **R345**, **RN5**, **L190**, **L330**, **RW12**, and **T50** opened as required Battery attached
TM 1-1520-238-T-7	Fuel System – Visual Check completed
TM 1-1270-476-20	TADS window cover assembly removed TADS Boresight Assembly cover removed
TM 1-5855-265-20	PNVS window cover assembly removed

WARNING

- **To prevent accidental APU start, ensure that the APU circuit breaker in the AFT avionics bay or the APU HOLD and the APU FUEL circuit breakers on the pilot center circuit breaker panel are open when battery or external electrical power is attached to the helicopter and unqualified personnel are in and around the pilot crew station.**
- **APU fires may go unnoticed by crew/operators in crew stations. Post a fire guard in continuous communication via the intercommunication system (ICS) with the crew/operators during APU run–up.**

NOTE

If any aircraft subsystem requires servicing after it has been briefly checked, perform the required servicing prior to proceeding to the next step.

1. The following procedures specify APU operator walk–around and external checks.
   a. Verify the following fluid servicing points for proper levels prior to APU operation and add as required (TM 1-1520-238-23).
      (1) Main transmission oil level (left and right side)
      (2) APU oil level
      (3) Utility hydraulic fluid level
      (4) Primary hydraulic fluid level
      (5) Aft fuel tank level

CAUTION

Use of excessive force to actuate hydraulic hand pump could cause damage to aircraft components.

   b. Verify external utility hydraulic pressure gage is indicating within the range of 2600 to 3000 psig. If hydraulic pressure is below 2600 psig, use the hand pump to increase pressure to 3000 psig.

c. Verify fire extinguisher blowout indicator below left engine nacelle is intact.

d. Verify **APU** circuit breaker in aft avionics bay is closed.

CAUTION

Only qualified and/or certified individuals are authorized to operate the APU. Failure to comply could result in equipment damage.

NOTE

Refer to paragraph 3–4 for APU emergencies.

2. Enter pilot and CPG crew stations and observe all safety precautions.
   a. On pilot center circuit breaker panel, verify the following circuit breakers are closed:
      (1) **FIRE DETR–ENG 1**
      (2) **FIRE DETR–ENG 2**
      (3) **FIRE DETR–APU**
      (4) **FIRE EXTGH–PLT**
      (5) **FIRE EXTGH–CPG**
      (6) **FIRE EXTGH–APU**
      (7) **LT–CAUTION**
      (8) **FUEL–APU**
      (9) **FUEL–BST**
      (10) **APU HOLD**
3. Locate communications cable on left–hand side of pilot seat.
4. Attach microphone headset/microphone adapter cord plug to communications cord receptacle.
5. Attach microphone headset/maintenance headset cord assembly to connector **J306** located behind right wing tip door **RW12**.
6. Verify pilot station switch/control settings as follows:

Pilot Station

PANEL	SWITCH/CONTROL	POSITION (set to)
ELEC PWR	**EXT PWR RESET**	Momentary press and release (Not necessary if using aircraft battery power)
	BATT/OFF/EXT PWR	**BATT** (If AGPU or equivalent is on–line and providing electrical power, set switch to **EXT PWR**)
CSC	Transmitter Select	**ICS**
	MIC	**1** (for maintenance headset without power adapter) **2** (for helmet or maintenance headset with power adapter)
	ICS SELECT	**NORM**
	VOL	As desired
APU FIRE/TEST (fig. 2–21)	**PRI/RES**	Centered

7. Locate communications cable on left–hand side of CPG seat.
8. Attach microphone headset/microphone adapter cord plug to communications cord receptacle.
9. Verify CPG station switch/control settings as follows:

CPG Station

PANEL	SWITCH/CONTROL	POSITION (set to)
CSC	Transmitter Select	**ICS**
	MIC	**1** (for maintenance headset without power adapter) **2** (for helmet or maintenance headset with power adapter)
	ICS SELECT	**NORM**
	VOL	As desired

10. Perform APU Fire Detection System check as follows and achieve acceptable confidence level with system.

CAUTION

Ensure fire bottle select switch PRI/RES is centered or fire bottle may discharge.

a. On **APU/FIRE TEST** panel (fig. 2–21), set **FIRE TEST DET** switch to **1**.

b. On pilot/CPG master caution/warning panel (fig. 2–9 and 2–36), verify **FIRE APU** indicator is lit.

c. On **APU/FIRE TEST** panel, verify **APU FIRE PULL** handle is lit.

d. On **APU/FIRE TEST** panel, set **FIRE TEST DET** switch to **2**.

e. On pilot/CPG master caution/warning panel, verify **FIRE APU** indicator is lit.

f. On **APU/FIRE TEST** panel, verify **APU FIRE PULL** handle is lit.

g. On **APU/FIRE TEST** panel, set **FIRE TEST DET** switch to **OFF**.

WARNING

APU operation exceeds acceptable safe noise levels. Personnel working near or operating will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.

CAUTION

- **Do not attempt to use the 95%/NORM switch when outside ambient air temperature is above –18°C (0°F). The viscosity of the hydraulic fluid and APU oil lubricant varies with surrounding climatic conditions of the region. If the 95%/NORM switch is used in warm climatic conditions, extreme mechanical stress is placed on the utility hydraulic accumulator shaft. Excessive wear loads are also placed on the power takeoff (PTO) clutch during sudden engagement which occurs during 95%/NORM operation, thus decreasing the duty life of the dry friction clutch.**
- **Make sure access door R325 is closed and secured before initiating APU start–up. Failure to comply could result in thermal damage to the aircraft structure.**

NOTE

- **APU START/RUN/OFF** switch is a spring loaded toggle switch which will return to **RUN** from **START**.
- **APU FAIL** indicator on the pilot caution/warning panel remains lit until APU oil pressure reaches normal operating APU oil pressure.

- When the APU turbine rotor has achieved 95 percent or greater of normal revolutions per minute (rpm), the **APU ON** indicator on the pilot caution/warning panel lights.

11. Initiate APU start–up as specified in the following procedures.

    a. On **APU/FIRE TEST** panel, set **START/RUN/OFF** switch to **RUN** – hold for 5 seconds.

    b. Transition **START/RUN/OFF** switch to **START** for 1 to 2 seconds, then return to **RUN**.

    c. Verify **APU ON** indicator on pilot caution/warning panel is lit.

CAUTION

On the ground, the APU may be restarted after roll down (compressor comes to a complete stop). Wait 30 seconds for fuel to drain. The PTO clutch duty cycle shall be observed. The clutch duty cycle allows two consecutive start attempts and then a 20–minute delay before the next start attempt. No more than three starts shall be allowed in a 1–hour period. Start attempts in which the clutch does not engage do not apply. Failure to comply could result in damage to the PTO clutch.

NOTE

- The APU is hydraulically started. If the APU fails to start and there are no reported NO/GOs, check the utility hydraulic accumulator pressure for a minimum of 2600 psig. Manual compression (pumping) of the hydraulic pressure to 3000 psig may be necessary before attempting another APU start.
- If external power is to be used concurrently with the APU, bypass procedural step 12.

12. Select test generator 1 (GEN 1) and generator 2 (GEN 2) as specified in following procedures.

a. On **ELEC PWR** panel, set **GEN 1** switch to **TEST** and hold.

b. Verify **GEN 1** indicator on pilot/CPG caution/warning panel (fig. 2–20/fig. 2–40) is not lit.

c. Release **GEN 1** switch to **OFF/RESET**.

d. Set **GEN 2** switch to **TEST** and hold.

e. Verify **GEN 2** indicator on pilot/CPG caution/warning panel is not lit.

f. Release **GEN 2** switch to **OFF/RESET**.

g. Set **GEN 1** switch to **GEN 1**.

h. Set **GEN 2** switch to **GEN 2**.

13. Verify CPG crew station switch/control settings as follows:

CPG Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**MUX**	**PRI**
	FCC/MUX	**ON**
	SYSTEM FC SYM GEN	**FC SYM GEN**
	SYSTEM TADS	**OFF**
DEK (ADC) (fig. 2–49)	**DATA ENTRY**	**STBY**

CAUTION

- **If XMSN 1 and XMSN 2 temperatures exceed 130°C (266°F), shutdown APU. Allow the transmission fluid to cool for 30 minutes prior to resuming APU ground operations; or transmission fluid may be cooled by authorized personnel operating engine with rotor turning.**
- **Do not operate the APU for more than 5 minutes at a main transmission oil temperature of 120°C (248°F). Shutdown APU to prevent damaging accessory gear box components.**

NOTE

- The main transmission and nose gearboxes oil temperature and pressure readouts are dynamic displays. The operator can view the readouts on the CPG heads out display (HOD) or any selected pilot/CPG crew station video monitor.
- If **ECS** air temperature is very warm and cannot be adjusted with **TEMP** control, shutdown APU.

14. Monitor transmission oil temperature and pressure every 30 minutes (or as required) of APU operation.
    a. On data entry keyboard (DEK), set **DATA ENTRY** switch to **FD/LS** (ADC).On CDU, select **FDLS** FAB (ADD).
    b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC): any CDU key except **SPC** (ADD).
    c. On DEK, press and release **ABC/1** and **YZ*/9** keys (ADC). On CDU, press and release 1 and **9** keys (ADD).
    d. To return to the maintenance FD/LS menu and abort the FD/LS transmission check, set **DATA ENTRY** switch to **STBY** and repeat steps **a** and **b** (ADC) or press and release any key on the CDU except **SPC** (ADD).
15. Proceed with the applicable FD/LS check or maintenance task as required.
16. Shutdown APU as specified in following procedures.

NOTE

On Back Up Control System (BUCS) aircraft, set **GEN 2** switch to **OFF/RESET** then **GEN 1** switch to **OFF/RESET**.

    a. On **ELEC PWR** panel, set **GEN 1** switch to **OFF/RESET** and **GEN 2** switch to **OFF/RESET**.

NOTE

Allow APU to roll down before proceeding with following procedures.

    b. On **APU/FIRE TEST** panel, set **APU START/RUN/OFF** switch to **OFF**.
    c. On **ELEC PWR** panel, set **BATT/OFF/EXT PWR** switch to **OFF**.
17. Detach aircraft battery (TM 1-1520-238-23).
18. Secure all access doors opened during APU – OPERATION INSTRUCTIONS (TM 1-1520-238-23).

END OF TASK

3–4 APU EMERGENCIES 3–4

Personnel Required:
(3)

1. In case of an **APU FIRE**, perform emergency procedures as specified in the following steps.
   a. Announce the type of emergency over the intercommunication system (ICS) and advise assisting personnel of your intentions.
   b. On **APU/FIRE TEST** panel, pull **APU FIRE PULL** handle up (out).
   c. Set **FIRE BTL** switch to **PRI**.
   d. Set **FIRE BTL** switch to **RES**.
   e. On **APU/FIRE TEST** panel, set **APU START/RUN/OFF** switch to **OFF**.
   f. On **ELEC PWR** panel, set **BATT/OFF/EXT PWR** switch to **OFF**.
   g. Get out of aircraft quickly as possible and stand clear of emergency personnel.
2. For all **NON–FIRE** related emergencies, perform emergency procedures as follows:
   a. Announce the type of emergency over the ICS and advise assisting personnel of your intentions.
   b. On **APU/FIRE TEST** panel, set **APU START/RUN/OFF** switch to **OFF**.
   c. On **ELEC PWR** panel, set **BATT/OFF/EXT PWR** switch to **OFF**.
   d. Get out of aircraft as quickly as possible and stand clear of emergency personnel.
3. If an environmental control unit (ENCU) malfunction occurs, perform the emergency procedures as follows:
   a. On **ECS** panel, set **ENCU** switch to **OFF**.
   b. Set **ECS** switch to **STBY FAN** – if desired.
   c. Emergency crew station ventilation door – Open if desired.

END OF TASK

CHAPTER 4
SYSTEMS FD/LS CHECKS

CHAPTER OVERVIEW

Chapter 4 contains fault detection and location system (FD/LS) checks 01 through 19 (ADC) and 33 through 36 (ADD).

CHAPTER INDEX

4–1 ADS – INTERACTIVE FD/LS CHECK 4–1

Personnel Required:
(2)

References:
TM 9-1230-476-20-1 TM 9-1230-476-20-2

NOTE

If the aviation ground power unit (AGPU) is selected to provide power to the aircraft, refer to paragraph 3–1. If the auxiliary power unit (APU) is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph (3–1).
2. Perform FD/LS Check as follows:

TASK	RESULT
a. On CPG **AUX/ANTI ICE** panel (fig. 2–47), set **ADSS** switch to **ADSS**.	
b. On data entry keyboard (DEK) (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on heads out display (HOD) (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the multiplex (MUX) system.

4–1 ADS – INTERACTIVE FD/LS CHECK (cont) 4–1

TASK	RESULT
d. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

e. On DEK, press and release **(.↵)/0** and **ABC/1** keys (ADC). On CDU, press and release **0** and **1** keys (ADD).	If **AIR DATA SENSOR SYSTEM GO** appears on HOD and AIR DATA SYSTEM – OPERATIONAL CHECK is to be performed, go to TM 9-1230-476-20-2. If one or more FD/LS NO–GO displays listed below appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS POWER DOWN (para 3–2). (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on the HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC).

4–1 ADS – INTERACTIVE FD/LS CHECK (cont) 4–1

TASK	RESULT
	(5) Repeat FD/LS check beginning with step **c**. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 9-1230-476-20-2.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

f. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by the AIR DATA SYSTEM – OPERATIONAL CHECK (TM 9-1230-476-20-2), omit step **3**.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power is no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
AIR DATA PROCESSOR NO–GO AFT AVIONICS BAY	Replace air data processor (TM 9-1230-476-20-1). If replacement does not remove NO–GO, refer to TM 9-1230-476-20-2 for troubleshooting the air data system (ADS).
OMNI DIR AIRSPEED SENSOR NO–GO MAIN ROTOR MAST	Replace omnidirectional air speed sensor (TM 9-1230-476-20-1). If replacement does not remove NO–GO, refer to TM 9-1230-476-20-2 for troubleshooting the ADS.

END OF TASK

4–2 DASE – INTERACTIVE FD/LS CHECK 4–2

Personnel Required:
(2)

References:

TM 1-1520-238-T-6
TM 1-1520-238-23
TM 9-1230-476-20-2
TM 11-1520-238-23-2
TM 1-1520-238-T-7
TM 9-1230-476-20-1
TM 11-1520-238-23-1

NOTE

- For a helicopter with back–up control system (BUCS) deactivated, make sure **ASE BUCS** circuit breaker on pilot center circuit breaker panel (fig.2–6) is open and locked. Digital automatic stabilization equipment (DASE) FD/LS is an interactive check which prompts the operator to act. The DASE FD/LS check is discontinued when an advisory message **28 VDC BUCS NO–GO** is displayed. Remaining DASE FD/LS check displays are deactivated and do not occur.
- For a helicopter with BUCS deactivated, **BUCS FAIL** indicators on the pilot and co–pilot/gunner (CPG) Master Caution and Warning panels (fig.2–9 and 2–36) are normally lit.
- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false NO–GO message appears.
- If FD/LS message on HOD does not change within 2 seconds after responding to the prompt (acknowledge), discontinue FD/LS test; go to TM 1-1520-238-T-7 and perform the DASE – OPERATIONAL CHECK.
- Primary and utility hydraulics are required for DASE – INTERACTIVE FD/LS CHECK.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform FD/LS check as follows:

TASK	RESULT
a. On CPG **AUX/ANTI ICE** panel (fig.2–47), set **ADSS** switch to **ADSS.**	
b. On DEK (fig.2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig.2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

d. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

TASK	RESULT

WARNING

On helicopters with BUCS activated, automatic flight control motion occurs when on command DASE FD/LS is initiated. Make sure all personnel keep clear of flight controls immediately after pressing and releasing keys (↵)/0 and DEF/2 on the DEK (ADC) or 0 and 2 on the CDU (ADD).

CAUTION

During on command DASE FD/LS, cyclic sticks, collective sticks, and directional pedals will move. Any restriction of flight controls may result in damage to the shear pin activated decoupler (SPAD) shear pins.

NOTE

- Begin DASE FD/LS with cyclic stick (fig.2–8 or 2–35) and collective stick (fig. 2–24 or 2–46) centered and do not apply foot pressure on the directional control pedals.
- Special purpose one (SP1) present position (PPOS) data, magnetic variance (MV), and spheroid (SPH) data can be obtained from:

  Maintenance Officer, S–3 or Department of Defense (DOD) flight information publication (FLIP) (e.g. visual flight rules (VFR) Supplement, instrument flight rules (IFR) Supplement, Airport Directory VFR Sectional) and universal transverse mercator (UTM) Map.

SP1 data must be within 500 to 750 meters of present location.

- If SP1 data greater than 360 degrees is entered for magnetic heading or 179.9 is entered for magnetic variation, the message **ERROR** is displayed near the upper left corner of the display (ACZ).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
e. On DEK, rotate **DATA ENTRY** switch to **SP1** (ADC). On CDU select **NAV** FAB (ADD).	The first page of the aircraft position menu is displayed. Go to next step (ADC). **MV** data is displayed on line 2. Go to step h (ADD).
f. On DEK, press and release the **ENTER SPACE** key (ADC).	The second page of the aircraft position menu is displayed.
g. On DEK, press and release **L SHIFT** and **MNO/5** keys (ADC).	The cursor appears under the first character in the **MV** line and both begin flashing.
h. Enter the **MV** data into the DEK (ADC). Enter the **MV** data into the CDU (ADD).	The **MV** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) to save data (ACZ). Go to next step (ADC). Press VAB 1. New data will overwrite old data. Go to step j (ADD).
i. On DEK, press and release **L SHIFT** and **STU/7** keys (ADC).	The cursor appears under the first character in the **SPH** line and both begin flashing.
j. Enter the **SPH** data into DEK (ADC). Enter the datum data preceded by **D** into the CDU (ADD).	The **SPH** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) to save data (ACZ). Go to next step (ADC). Press VAB 1. New data will overwrite old data. Go to step m (ADD).
k. On DEK, press and release the **ENTER SPACE** key (ADC).	The first page of the aircraft position menu is displayed.
l. On DEK, press and release **L SHIFT** and **PQR/6** keys (ADC).	The cursor appears under the first character in the **PPOS** line and both begin flashing.

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
m. Enter the present position (**PPOS**) data into the DEK (ADC). Enter the present position (**PPOS**) data into the CDU (ADC).	The PPOS data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited. (ACY). Press **MID** and **2** (**E**) to save data (ACZ). Press VAB 1. New data will overwrite old data (ADD).
n. On DEK, rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU select **FDLS** FAB (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
o. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any CDU key except **SPC** (ADD).	The FD/LS menus are displayed on HOD one page at time.

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
p. On DEK, press and release **(↵)/0** and **DEF/2** keys (ADC). On CDU, press and release **0** and **2** keys (ADD).	If **CANNOT RUN WHILE IN AIR** appears on HOD, stop FD/LS testing, refer to TM 1-1520-238-T-6 to perform troubleshooting on squat relay switch and associated wiring. When **PUT HARS POWER SWITCH IN NORM –– WAIT –– ALLOW 90 SECONDS FOR HARS WARM–UP** appears on HOD and pilot Video Display Unit (VDU) (fig. 2–10), go to next step.

CAUTION

Degradation of heading attitude reference system (HARS) navigational accuracy occurs if HARS switch is placed in the OPR position for an extended length of time and aircraft remains stationary.

NOTE

Once HARS electronic unit is in **NORM** align mode, it requires approximately 6 to 9 minutes for warm–up and inertial alignment.

q. On pilot **HARS** control panel (fig. 2–15), rotate **HARS** switch to **NORM**.	**HARS TEST IN PROGRESS** should appear briefly on VDU within 90 seconds. If NO–GO appears on VDU, stop FD/LS testing and go to step **aa**. When **PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD** appears on VDU, go to next step.
r. On pilot power lever quadrant (fig. 2–25), set **RTR BK** switch to **BRAKE**.	

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
s. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** key (ADD).	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **CHECK FOR FREE CYCLIC, PEDAL AND COLLECTIVE MOVEMENT ANSWER Y–N VIA KBD** appears on VDU, go to next step.

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT

CAUTION

Do not attempt to move flight controls against any motion restriction. Failure to comply could result in damage to the SPAD shear pins.

t. Operate pilot cyclic stick to full left, full right, full back, and full forward positions. Apply alternate foot pressure to directional control pedals. Operate pilot collective stick to full up and full down positions.	If flight control movement is restricted, perform the following: On DEK, press and release **MID SHIFT** and **MNO/5** keys (ADC) or **N** key on the CDU (ADD). When **PERFORM CORRECTIVE ACTION** appears on VDU stop DASE FD/LS testing and refer to TM 1-1520-238-T-7 to perform flight rigging operational check(s) as required. If pilot flight control movements are restricted, go to CPG station and repeat step **t**. If flight control movement is unrestricted, press and release **L SHIFT** and **YZ*/9** keys (ADC) or **Y** key on the CDU (ADD). When **CENTER ALL CONTROLS AND ENGAGE FORCE TRIM ACK VIA KBD** appears on VDU, go to next step.
u. Remove foot pressure from directional control pedals and center cyclic and collective sticks.	

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
v. On pilot cyclic stick grip, set **FORCE TRIM REL** switch to **ON**.	

NOTE

- DASE FD/LS is an interactive check which prompts the operator to act. The DASE FD/LS check is discontinued when an advisory message **28 VDC BUCS NO–GO** is displayed. Remaining DASE FD/LS check displays are deactivated and do not occur.
- When the interactive message **DISPLAY BUCS SELF TEST RESULTS** is displayed, answer **N** (ACZ).

w. On DEK, press and release **ENTER SPACE** key (ADC) or **SPC** key on the CDU (ADD).	The FD/LS advisory message **DASE SYSTEM TEST IN PROGRESS** is displayed to indicate the DASE computer has begun internal BITE testing, and the first ground BITE test has been initiated. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on VDU, go to next step.
x. On pilot power lever quadrant, set **RTR BK** switch to **OFF**.	

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

TASK	RESULT
y. On DEK, press and release **ENTER SPACE** key (ADC) or **SPC** key on the CDU (ADD).	If one or more FD/LS NO–GO displays listed appear on HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2) (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step o. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 1-1520-238-T-7.
z. On pilot **HARS** control panel, rotate **HARS** switch to **OFF**.	

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

aa. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by the DASE – OPERATIONAL CHECK, omit step **3**.

3. Perform SYSTEMS – POWER DOWN (para 3–2), if power is no longer required.

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
26 VAC EXCITATION XFMR 2 NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace 26 VAC excitation transformer T2 (TM 1-1520-238-23).
26 VAC EXCITATION XFMR 1 NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace 26 VAC excitation transformer T1 (TM 1-1520-238-23).
DASE ENGAGE PANEL NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace ASE panel assembly (fig. 2–30) (TM 1-1520-238-23).
COLL ACTUATOR NO–GO RH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace collective servoactuator (TM 1-1520-238-23).
DIR ACTUATOR NO–GO TAIL SECTION	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace directional servoactuator (TM 1-1520-238-23).
LAT ACTUATOR NO–GO LH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace lateral servoactuator (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
LONG ACTUATOR NO–GO RH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace longitudinal servoactuator (TM 1-1520-238-23).
AIR DATA PROCESSOR NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace air data processor (TM 9-1230-476-20-1).
HARS ELECTRONIC UNIT NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 11-1520-238-23-2). If troubleshooting does not remove NO–GO, replace HARS electronic unit (TM 11-1520-238-23-1).
DASE COMPUTER NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace DASE computer (TM 1-1520-238-23).
ROTOR BRAKE NO–GO PLT COMPARTMENT	Perform UTILITY HYDRAULIC SYSTEM – OPERATIONAL CHECK (TM 1-1520-238-T-6).
PILOT CYCLIC GRIP NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot cyclic grip (TM 1-1520-238-23).
PILOT COLL 2 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot collective SPAD switch S2 (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PILOT COLL 1 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot collective SPAD switch S1 (TM 1-1520-238-23).
PILOT DIR 2 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot directional SPAD switch S2 (TM 1-1520-238-23).
PILOT DIR 1 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot directional SPAD switch S1 (TM 1-1520-238-23).
PILOT LAT 2 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot lateral SPAD switch S2 (TM 1-1520-238-23).
PILOT LAT 1 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot lateral SPAD switch S1 (TM 1-1520-238-23).
PILOT LONG 2 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot longitudinal SPAD switch S2 (TM 1-1520-238-23).
PILOT LONG 1 DCPLR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot longitudinal SPAD switch S1 (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PILOT COLL LVDT NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot collective linear variable differential transformer (LVDT) (TM 1-1520-238-23).
PILOT DIR LVDT NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot directional LVDT (TM 1-1520-238-23).
PILOT LAT LVDT NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot lateral LVDT (TM 1-1520-238-23).
PILOT LONG LVDT NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace pilot longitudinal LVDT (TM 1-1520-238-23).
CPG BUCS SEL NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace BUCS select switch (TM 1-1520-238-23).
CPG CYCLIC GRIP NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG cyclic grip (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
CPG COLL 2 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG collective SPAD switch S2 (TM 1-1520-238-23).
CPG COLL 1 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG collective SPAD switch S1 ((TM 1-1520-238-23).
CPG DIR 2 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG directional SPAD switch S2 (TM 1-1520-238-23).
CPG DIR 1 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG directional SPAD switch S1 (TM 1-1520-238-23).
CPG LAT 2 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG lateral SPAD switch S2 (TM 1-1520-238-23).
CPG LAT 1 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG lateral SPAD switch S1 (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
CPG LONG 2 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG longitudinal SPAD switch S2 (TM 1-1520-238-23).
CPG LONG 1 DCPLR NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG longitudinal SPAD switch S1 (TM 1-1520-238-23).
CPG COLL LVDT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG collective LVDT (TM 1-1520-238-23).
CPG DIR LVDT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG directional LVDT (TM 1-1520-238-23).
CPG LAT LVDT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG lateral LVDT (TM 1-1520-238-23).
CPG LONG LVDT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace CPG longitudinal LVDT (TM 1-1520-238-23).

4–2 DASE – INTERACTIVE FD/LS CHECK (cont) 4–2

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
SQUAT SWITCH NO–GO AFT OF LH FAB	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace squat switch S350 (TM 1-1520-238-23).
TURN RATE INDICATOR NO–GO PLT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 11-1520-238-23-2). If troubleshooting does not remove NO–GO, replace turn and slip indicator on pilot VDU (TM 11-1520-238-23-1).

END OF TASK

4–3 DE–ICE – INTERACTIVE FD/LS CHECK 4–3

Personnel Required:
(2)

References:
TM 1-1520-238-T-8
TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

Ref	Condition
TM 1-1520-238-23	Canopy anti–ice system inspection completed Engine anti–ice system inspection completed Rotor blades de–ice system inspection completed

1. Start APU (para 3–3).

NOTE

Fire control computer must be up and looking at the system prior to performing FD/LS check.

2. Perform FD/LS check as follows:

NOTE

- Perform control/switch position changes prompted by FD/LS within 30 seconds of prompt message to prevent a false NO–GO message.
- If FD/LS message on HOD (fig. 2–34) does not change within 2 seconds after prompt control/switch position change acknowledge, discontinue FD/LS test and go to applicable UTILITY SYSTEM – OPERATIONAL CHECK (TM 1-1520-238-T-8).

4–3 DE–ICE – INTERACTIVE FD/LS CHECK (cont) 4–3

TASK	RESULT
a. On DEK (fig.2–49), rotate DATA ENTRY switch to FD/LS (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

c. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on HOD, go to next step.

TASK	RESULT

CAUTION

When outside air temperature is above 25°C (77°F), do not perform rotor blades de–ice checks for periods longer than 10–minute intervals. Failure to comply with this precaution could cause damage to aircraft components.

d. On pilot **ANTI ICE** panel (fig. 2–22), rotate **BLADE AUTO/TRACE/LT/ MOD** selector switch to **AUTO**. Set and hold **BLADE ON/OFF/TEST** switch to **TEST** (ACY). Set **BLADE ON/OFF/TEST** switch to **ON** (ACZ).

e. On DEK, press and release **(↵)/0** and **GHI/3** (ADC). On CDU, press and release **0** and **3** (ADD).

When **PUT CANOPY HEATER SWITCH TO ON POSITION ACK VIA KBD** appears on HOD, go to next step.

NOTE

Switch must be held in the test position until the ”TEST IN PROGRESS” message disappears.

f. On pilot **ANTI ICE** panel, set **CANOPY HTR** switch to **ON**.

Go to step h (ACY). When **PLACE ROTOR BLADE DEICE – SW TO THE ON POSITION – AND HOLD – ACK VIA KBD** appears on HOD, go to step g (ACZ).

4–3 DE–ICE – INTERACTIVE FD/LS CHECK (cont) 4–3

TASK	RESULT
g. Set and hold **BLADE ON/OFF/TEST** switch to **TEST** (ACZ).	
h. On DEK, press and release **ENTER SPACE** key (ADC). On CDU, press and release **SPC** key (ADD).	The prompt: **DE–ICE SYSTEM TEST IN PROGRESS** appears on HOD for 8 seconds. At the conclusion of the 8 second test, the following message (prompt): **PUT CANOPY HEATER SWITCH TO DESIRED POSITION ACK VIA KBD** appears on HOD, go to next step (ACY). **PLACE ROTOR BLADE DEICE – AND CANOPY HEAT SWITCHES TO DESIRED POSITION – ACK VIA KBD** appears on HOD, go to next step (ACZ).
i. On pilot **ANTI ICE** panel, set **CANOPY HTR** switch to **OFF**.	

TASK	RESULT
j. On DEK, press and release **ENTER SPACE** key (ADC). On CDU, press and release **SPC** key (ADD).	If NO–GOs were not displayed, then the following appears: **DE–ICE SYSTEM GO ANY KEY FOR FDLS MENUS** If one or more FD/LS NO–GO displays listed appear on HOD, perform the following: (1) Shutdown APU (para 3–4). (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Start APU (para 3–3). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step b. If NO–GO repeats after **CORRECTIVE ACTION**, refer to applicable UTILITY SYSTEM – OPERATIONAL CHECK (TM 1-1520-238-T-8).
k. On pilot **ANTI ICE** panel, set **BLADE ON/OFF/TEST** switch to **OFF**.	

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

l. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

4–3 DE–ICE – INTERACTIVE FD/LS CHECK (cont) 4–3

TASK	RESULT

NOTE

If FD/LS check is to be followed by an operational check, omit step 3.

3. Shutdown APU (para 3–4).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
CANOPY TEMP CONTROLLER NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace electronic control box (canopy temperature controller) (TM 1-1520-238-23).
CANOPY TEMP SENSOR NO–GO CPG FR WINDSHIELD	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace canopy temp sensor (TM 1-1520-238-23).

CAUTION

When ambient air temperature is above 25°C (77°F), do not perform rotor blades de–ice checks for periods longer than 10–minute intervals. Failure to comply with this precaution could cause damage to aircraft components.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TAIL ROTOR HEATER NO–GO TAIL ROTOR	On pilot **ANTI ICE** panel, set **BLADE** de–ice switch to **TEST**. Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, check for faulty tail rotor blade de–ice heater(s) (TM 1-1520-238-T-8).
MAIN ROTOR HEATER NO–GO MAIN ROTOR	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, check for faulty main rotor blade de–ice heater(s) (TM 1-1520-238-T-8).
RTR BLADE DISTR DE–ICE NO–GO MAIN RTR MAST	Troubleshoot wiring to isolate faul t (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace main rotor power distributor (TM 1-1520-238-23).
RTR BLADE PWR CONTROLLER NO–GO RH XMSN BAY (ACY) OR RTR BLADE PWR CONT NO–GO RH XMSN BAY (ACZ)	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace blades de–ice controller (TM 1-1520-238-23).
ICE DETECTOR CONTROLLER NO–GO FIREWALL LH SIDE	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace ice detector signal processor (TM 1-1520-238-23).
ICE DETECTOR SENSOR NO–GO ENG INLET LH SIDE (ACY) OR ICE DETECTOR SENSOR NO–GO DOGHOUSE FAIRING (ACZ)	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO–GO, replace ice detector sensor (TM 1-1520-238-23).

4–4 AWS – INTERACTIVE FD/LS CHECK 4–4

Personnel Required:
(2)

References:

TM 9-1090-208-23-1	TM 9-1230-476-20-1
TM 9-1090-208-23-2	TM 9-1230-476-20-2

WARNING

- **Prior to helicopter operation, ensure that the gun turret area is clear. Failure to clear the area could result in injury to personnel or damage to equipment.**
- **Prior to initializing FD/LS (IBIT), set PLT/GND ORIDE switch to OFF position. Failure to perform this action may result in uncommanded gun turret slewing during an AWS FD/LS IBIT abort. Uncommanded gun turret slewing can cause injury or death. If injury occurs, seek medical aid.**

NOTE

- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.
- Utility hydraulics are required for AWS – FD/LS CHECK.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

4–4 AWS – INTERACTIVE FD/LS CHECK (cont) 4–4

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**

4–4 AWS – INTERACTIVE FD/LS CHECK (cont) 4–4

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on HOD, go to next step.

NOTE

The fire control computer (FCC) software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.

4–4 AWS – INTERACTIVE FD/LS CHECK (cont) 4–4

TASK	RESULT
d. On DEK, press and release **(↵)/0** and **JKL/4** keys (ADC). On CDU, press and release **0** and **4** keys (ADD).	If aircraft is on the ground (Weight–on–Wheels) **GUN TEST IN PROGRESS** prompt (message) appears for 7 minutes and 15 seconds. If aircraft is airborne or squat switch fixture is installed, the extended ground test is bypassed. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD (fig. 2–34). (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1090-208-23-2.
e. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

NOTE

If this FD/LS check is to be followed by AREA WEAPON SYSTEM – OPERATIONAL CHECK (TM 9-1090-208-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
GUN TURRET CONTROL BOX NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace gun turret control box (TM 9-1090-208-23-1).
RNDS CNTR–MAG CONTROLLER NO–GO AFT OF LH FAB (ACY) OR RNDS CNTR–MAG CONT NO–GO AFT OF LH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace rounds counter (TM 9-1090-208-23-1).
TRAIN RATE SENSOR NO–GO GUN TURRET ASSY	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace train rate sensor (TM 9-1090-208-23-1).
GUN CONTROL BOX NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace gun control box (TM 9-1090-208-23-1).
GUN BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 . (ACY)

END OF TASK

4–5 HARS – INTERACTIVE FD/LS CHECK (ADC) 4–5

Personnel Required:
(2)

References:
TM 11-1520-238-23-2 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform the FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT**.	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

4–5 HARS – INTERACTIVE FD/LS CHECK (ADC) (cont) 4–5

TASK	RESULT
c. On DEK, press and release (↵)/0 and **WV/8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

SP1 PPOS data, MV, and SPH data can be obtained from:

Maintenance Officer, S–3 or DOD FLIP (e.g. VFR Supplement, IFR Supplement, Airport Directory VFR Sectional) and UTM Map.

SP1 data must be within 500 to 750 meters of present location.

d. On DEK, rotate **DATA ENTRY** switch to **SP1**.	The first page of the aircraft position menu is displayed.
e. On DEK, press and release the **ENTER SPACE** key.	The second page of the aircraft position menu is displayed.
f. On DEK, press and release **L SHIFT** and **MNO/5** keys.	The cursor appears under the first character in the **MV** line and both begin flashing.
g. Enter the magnetic variation (**MV**) data into the DEK.	The **MV** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) to save data (ACZ).
h. On DEK, press and release **L SHIFT** and **STU/7** keys.	The cursor appears under the first character in the **SPH** line and both begin flashing.

i. Enter the spheroid (**SPH**) data into DEK.	The SPH data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) to save data (ACZ).
j. On DEK, press and release the **ENTER SPACE** key.	The first page of the aircraft position menu is displayed.
k. On DEK, press and release **L SHIFT** and **PQR/6** keys.	The cursor appears under the first character in the present position (**PPOS**) line and both begin flashing.
l. Enter the present position (**PPOS**) data into the DEK.	The **PPOS** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) to save data (ACZ).
m. On DEK, rotate **DATA ENTRY** switch to **FD/LS**.	If there are no system failures, the following message (prompt) appears **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
n. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT**.	If FD/LS menus do not appear on heads out display (HOD), refer to TM 9-1230-476-20-2, Chapter 2 for troubleshooting the multiplex system.

4–5 HARS – INTERACTIVE FD/LS CHECK (ADC) (cont) **4–5**

o. On DEK, press and release **(.↵)/0** and **MNO/5** keys.	Check that the following message appears on HOD: **PUT HARS POWER SWITCH IN NORM POSITION –––WAIT––ALLOW 90 SECONDS FOR HARS WARM–UP**
p. On **HARS** panel, rotate **HARS** switch to **NORM**.	Once the **HARS** has started outputting data, the following message (prompt) appears: **HARS TEST IN PROGRESS** If the prompt message remains for more 90 seconds, the HARS is NO–GO.

NOTE

Once the HARS is turned on, it requires approximately 6 to 9 minutes for warm–up and inertial alignment.

If FD/LS NO–GO display appears on the HOD, perform the following in sequence:

(1) Rotate **HARS** switch to **OFF**, then back to **NORM**.

(2) If HARS passes the FD/LS Check, go to step **q**. If HARS fails the FD/LS check, perform HARS – SELF – CHECK (TM 11-1520-238-23-2).

(3) If HARS fails HARS – SELF – CHECK, refer to TM 11-1520-238-23-2 for troubleshooting Navigation System.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY**.

q. On DEK, rotate **DATA ENTRY** switch to **STBY**

NOTE

If this FD/LS check is to be followed by HARS – OPERATIONAL–CHECK (TM 11-1520-238-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
HARS ELECTRONICS UNIT NO–GO AFT AVIONICS BAY	Refer to TM 11-1520-238-23-2, for troubleshooting the HARS System.

END OF TASK

4–5A HARS – INTERACTIVE FD/LS CHECK (ADD) 4–5A

Personnel Required:
(2)

References:
TM 11-1520-238-23-2 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform the FD/LS check as follows:

TASK	RESULT
a. On CDU (fig. 2–49.2), select FAB **FDLS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **SPC** key on the CDU. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except **SPC**).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

4–5A HARS – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–5A**

TASK	RESULT
c. On CDU, press and release **0** and **8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

TASK	RESULT

NOTE

The aircraft must be on the ground, **LAND** selected and no torque from either engine for at least 90 seconds for the **EXTENDED ALIGN TEST** to be performed.

d. On CDU, press and release **0** and **5** keys.	Check that the following message appears on HOD: **ENTER THE NUMBER OF THE TEST TO PERFORM** **1 QUICK TEST** **2 EXTENDED ALIGN TEST** If **1** is selected, check that the following message appears on HOD: **PUT HARS POWER SWITCH IN NORM POSITION** **––WAIT––ALLOW 90 SECONDS FOR HARS WARM–UP**
e. On CDU, press and release **0** and **5** keys.	If **2** is selected, check that the following message appears on HOD: **PUT HARS POWER SWITCH TO OFF – THEN TO NORM – WAIT FOR ALIGN TO END**

4–5A HARS – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–5A**

TASK	RESULT
f. On **HARS** panel, rotate **HARS** switch to **NORM**.	If **1** was selected, once the **HARS** has started outputting data, the following message (prompt) appears: **HARS** **TEST IN PROGRESS** If the prompt message remains for more 90 seconds, the HARS is NO–GO. If **2** was selected, the following message (prompt) appears: **PUT HARS POWER SWITCH TO OFF – THEN TO NORM** **ANY KEY FOR FDLS MENU** There is no display of HARS status (NO–GOs) when the test is completed.

NOTE

Once the HARS is turned on, it requires approximately 6 to 9 minutes for warm–up and inertial alignment.

If FD/LS NO–GO display appears on the HOD, perform the following in sequence:

(1) Rotate **HARS** switch to **OFF**, then back to **NORM**.

(2) If HARS fails the FD/LS check, perform HARS – SELF – CHECK (TM 11-1520-238-23-2).

(3) If HARS fails HARS – SELF – CHECK, refer to TM 11-1520-238-23-2 for troubleshooting Navigation System.

4–5A HARS – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–5A**

TASK	RESULT

NOTE

If this FD/LS check is to be followed by HARS – OPERATIONAL–CHECK (TM 11-1520-238-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

END OF TASK

4–6 IHADSS – INTERACTIVE FD/LS CHECK 4–6

Tools:

Nomenclature	Part Number
Integrated Helmet Unit (IHU) (2)	LG1120AB06 (Large) or LG1205AB01 (Extra Large)

Personnel Required:

(2)

References:

TM 9-1230-476-20-2 TM 9-1270-221-23

NOTE

- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.
- Install helmets in both crew stations before proceeding with FD/LS check.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Preset crew station switch/control settings as follows after an aircraft power source is on–line.

Pilot Station (fig.2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**SIGHT SEL**	**STBY**
	ACQ SEL	**OFF**

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig.2–33)	**SIGHT SEL**	**STBY**
	ACQ SEL	**FXD**

3. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** and **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

4–6 IHADSS – INTERACTIVE FD/LS CHECK (cont) 4–6

TASK	RESULT
d. On DEK, press and release **(.↵)/0** and **PQR/6** keys (ADC). On CDU, press and release **0** and **6** keys (ADD).	When **PUT IHADSS POWER SWITCH IN ON POSITION** appears on HOD, go to next step.
e. On CPG **FIRE CONTROL** panel, set **SYSTEM IHADSS to IHADSS**.	**IHADSS TEST IN PROGRESS** appears on HOD for 57 seconds. If one or more FD/LS NO–GO displays listed below appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 9-1270-221-23.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

f. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by an IHADSS OPERATIONAL CHECK (TM 9-1270-221-23.), omit step 4.

4. Perform SYSTEMS – POWER DOWN (para 3–2).

4–6 IHADSS – INTERACTIVE FD/LS CHECK (cont) 4–6

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
SEU NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace sight electronics unit (SEU) (TM 9-1270-221-23).
DEU NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace display electronics unit (DEU) (TM 9-1270-221-23).
PILOT DAP OR HDU NO–GO PILOTS COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace pilot display adjust panel (DAP) or helmet display unit (HDU) (TM 9-1270-221-23).
CPG DAP OR HDU NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace CPG DAP or HDU (TM 9-1270-221-23).
CPG RIGHT SSU NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace CPG right sensor surveying unit (SSU) (TM 9-1270-221-23).
CPG LEFT SSU NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace CPG left SSU (TM 9-1270-221-23).

4–6 IHADSS – INTERACTIVE FD/LS CHECK (cont) 4–6

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PILOT RIGHT SSU NO–GO PILOT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace pilot right SSU (TM 9-1270-221-23).
PILOT LEFT SSU NO–GO PILOT COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1270-221-23). If troubleshooting does not remove NO–GO, replace pilot left SSU (TM 9-1270-221-23).
CPG HELMET ELECTRONICS NO–GO	Refer to TM 9-1270-221-23.
PILOT HELMET ELECTRONICS NO–GO	Refer to TM 9-1270-221-23.

END OF TASK

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK 4–7

Tools:

Nomenclature	Part Number
M–36 HELLFIRE Training missile (2)	1300377

Personnel Required:

(2)

References:

TM 9-1090-208-23-2	TM 9-1230-476-20-1
TM 9-1230-476-20-2	TM 9-1425-475-20
TM 9-1427-475-20	TM 11-1520-238-23-2

Equipment Conditions:

Ref	Condition
TM 9-1427-475-20	HMMS launcher(s) installed
TM 9-1425-475-20	Training missiles (2), minimum installed

NOTE

- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.
- Utility hydraulics are required for HELLFIRE missile equipment (HME) SYSTEM–FD/LS CHECK

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Preset the CPG crew station switch/control settings as follows after an aircraft power source is on–line.

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**PLT/GND**	ORIDE
	CPG	SAFE
	MSL	ON
MSL (fig. 2–48)	**TYPE**	LASER
	MODE	STBY
	LOAL	OFF

3. Perform FD/LS check as follows:

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
c. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

The FCC software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT
d. On DEK, press and release **ABC/1** and **(↵)/0** keys (ADC). On CDU, press and release **1** and **0** keys (ADD).	If **PYLON ARTICULATION GO** appears on the HOD, go to next step. If **PYLON BORESIGHT NO–GO RAM CHECK SUM** appears on the HOD, refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If any other NO–GO appears on HOD, refer to TM 9-1090-208-23-2.

NOTE

SP1 PPOS data, MV, and SPH data can be obtained from:

- Maintenance Officer, S–3 or DOD FLIP (e.g. VFR Supplement, IFR Supplement, Airport Directory VFR Sectional) and UTM Map.
- SP1 data must be within 500 to 750 meters of present location.

e. On DEK, rotate **DATA ENTRY** switch to **SP1** (ADC). On CDU select **NAV** FAB (ADD).	The first page of the aircraft position menu is displayed. Go to next step (ADC). **MV** data is displayed on line 2. Go to step h (ADD).
f. On DEK, press and release the **ENTER SPACE** key (ADC).	The second page of the aircraft position menu is displayed.
g. On DEK, press and release **L SHIFT** and **MNO/5** keys (ADC).	The cursor appears under the first character in the **MV** line and both begin flashing.

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT
h. Enter the **MV** data into the DEK (ADC). Enter the **MV** data into the CDU (ADD).	The **MV** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) keys to save data (ACZ). Go to next step (ADC). Press VAB 1. New data will overwrite old data. Go to step j (ADD).
i. On DEK, press and release **L SHIFT** and **STU/7** keys (ADC).	The cursor appears under the first character in the **SPH** line and both begin flashing.
j. Enter **SPH** data into DEK (ADC). Enter the datum data preceded by **D** into the CDU (ADD).	The **SPH** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) keys to save data (ACZ). Go to next step (ADC). Press VAB 1. New data will overwrite old data. Go to step m (ADD).
k. On DEK, press and release the **ENTER SPACE** key (ADC).	The first page of the aircraft position menu is displayed.
l. On DEK, press and release **L SHIFT** and **PQR/6** keys (ADC).	The cursor appears under the first character in the **PPOS** line and both begin flashing.
m. Enter **PPOS** data into the DEK (ADC). Enter the present position (**PPOS**) data into the CDU (ADD).	The **PPOS** data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press **MID** and **2** (**E**) keys to save data (ACZ). Press VAB 1. New data will overwrite old data (ADD).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT
n. On DEK, rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU select **FDLS** FAB (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
o. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any CDU key except **SPC** (ADD).	

NOTE

Once HARS electronic unit is turned on, it requires approximately 6 to 9 minutes for warmup and inertial alignment.

p. On DEK, press and release **(↵)/0** and **MNO/5** keys (ADC). On CDU, press and release **0** and **5** keys (ADD).	If **HARS GO** appears on HOD, go to next step. If any NO–GO appears on HOD, refer to TM 11-1520-238-23-2 to troubleshoot the HARS.
q. Check training missiles for seeker spin–up (Stare Mode).	If missile seeker fails to spin–up, unlatch missile and reseat on launcher rail, then latch missile. If problem still exists, replace training missile (TM 9-1425-475-20).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT

NOTE

Since the missile GO/NO–GO signal is routed through the launcher to the multiplex remote terminal unit (MRTU), a failure of the MRTU may prevent a GO/NO–GO display of both missile and launcher. A launcher failure will prevent a GO/NO–GO display of any missile on that launcher.

r. On DEK, press and release **(↵)/0** and **STU/7** keys (ADC). On CDU, press and release **0** and **5** keys (ADD).

If **MISSILES TEST IN PROGRESS** appears on HOD and is then replaced by **MISSILES GO**, go to next step. If a NO–GO is displayed perform the following:

(1) Set **MSL** switch on CPG **FIRE CONTROL** panel to OFF.

(2) Set CPG **MSL MODE** switch on **MSL** panel to **NORM**.

(3) Open the **MSL DC ELEC** circuit breaker on the CPG circuit breaker panel 1 (fig. 2–43).

(4) Close the **MSL DC ELEC** circuit on the CPG circuit breaker panel 1.

(5) On DEK, press and release **(↵)/0** and **STU/7** keys(ADC). On CDU, press and release **0** and **7** keys (ADD).

(6) If one or more FD/LS NO–GO displays listed below appear on the HOD, perform the following in sequence:

(a) Perform SYSTEMS – POWER DOWN (para 3–2).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

TASK	RESULT
	(b) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD.
	(c) Perform SYSTEMS – POWER–UP (para 3–1).
	(d) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1427-475-20.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

s. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by the HME – SYSTEM OPERATIONAL CHECK (TM 9-1427-475-20), omit step 4. This eliminates the need for the 6 to 9 minute HARS gyro warm–up period.

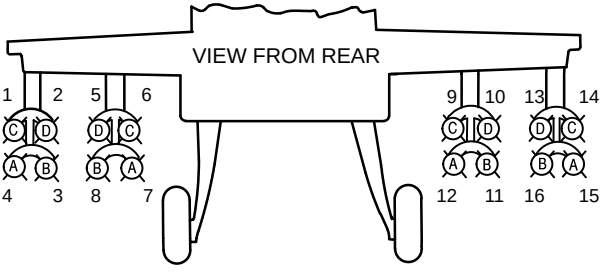
4. Perform SYSTEMS – POWER DOWN (para 3–2), if power is no longer required.

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) 4–7

NOTE

HELLFIRE Missile System performs built–in test (BIT) in the following sequence if all launchers and missiles are present as shown on the following figure.

- Remote HELLFIRE Electronics (RHE)
- All missile launchers simultaneously
- Group A missiles simultaneously
- Group B missiles simultaneously
- Group C missiles simultaneously
- Group D missiles simultaneously



SEQUENCE FOR MISSILE RANKING AND BIT

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
REMOTE HELLFIRE ELECT NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace RHE (TM 9-1427-475-20).
MISSILE LAUNCHER NO–GO LT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace left outboard launcher (TM 9-1427-475-20).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
MISSILE LAUNCHER NO–GO LT INBD	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace left inboard launcher (TM 9-1427-475-20).
MISSILE LAUNCHER NO–GO RT INBD	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace right inboard launcher (TM 9-1427-475-20).
MISSILE LAUNCHER NO–GO RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace right outboard launcher (TM 9-1427-475-20).
MISSILE LAUNCHER NO–GO LT OUTBD and **MISSILE LAUNCHER NO–GO LT INBD** appear on **HOD.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20).
MISSILE LAUNCHER NO–GO RT INBD and **MISSILE LAUNCHER NO–GO RT OUTBD** appear on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20).
All four missile launcher NO–GOs appear on HOD.	Troubleshoot wiring to isolate fault (TM 9-1427-475-20).

NOTE

The missile number contained in the FD/LS message does not relate to the missile ranking sequence, but corresponds to the missile rail on the launcher.

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
MISSILE 1 NO–GO LT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 1 (TM 9-1425-475-20).
MISSILE 2 NO–GO LT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 2 (TM 9-1425-475-20).
MISSILE 3 NO–GO LT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 3 (TM 9-1425-475-20).
MISSILE 4 NO–GO LT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 4 (TM 9-1425-475-20).
MISSILE 1 NO–GO LT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 5 (TM 9-1425-475-20).
MISSILE 2 NO–GO LT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 6 (TM 9-1425-475-20).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
MISSILE 3 NO–GO LT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 7 (TM 9-1425-475-20).
MISSILE 4 NO–GO LT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 8 (TM 9-1425-475-20).
MISSILE 1 NO–GO RT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile 9 (TM 9-1425-475-20).
MISSILE 2 NO–GO RT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile10 (TM 9-1425-475-20).
MISSILE 3 NO–GO RT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile11 (TM 9-1425-475-20).
MISSILE 4 NO–GO RT INBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile12 (TM 9-1425-475-20).

4–7 MSL SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–7**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
MISSILE 1 NO–GO RT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile13 (TM 9-1425-475-20).
MISSILE 2 NO–GO RT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile14 (TM 9-1425-475-20).
MISSILE 3 NO–GO RT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile15 (TM 9-1425-475-20).
MISSILE 4 NO–GO RT OUTBD – appears on HOD**.**	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO–GO, replace missile16 (TM 9-1425-475-20).
PYLON BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 (ACY).

END OF TASK

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK 4–8

Personnel Required:

(2)

References:

TM 1-1520-238-23
TM 9-1230-476-20-1
TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

TASK	RESULT
a. On CPG FCP set **SYSTEM** switch to **FC SYM GEN**, **CPG SAFE ARM** switch to **SAFE** and **CPG MSL** switch to **ON** (ACZ) (ADD).	If **BIT IN** and **PROGRESS** do not alternately appear on HOD, refer to TM 9-1427-475-20.

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

TASK	RESULT
b. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) will be displayed: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** If no FD/LS displays appear on HOD (fig. 2–34), the advisory message: **BBC IN CONTROL FD/LS NONFUNCTIONAL POSITION** appears on HOD, or if **PRI MUX** indicator on CPG caution/warning panel (fig. 2–40) lights, refer to TM 9-1230-476-20-2. Then complete this FD/LS check. If the advisory message: **CPG MUX NO–GO CHECK CIR BRKR** appears on HOD, refer to TM 9-1230-476-20-2.
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE or SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

TASK	RESULT
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
d. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	When **MUX COMMUNICATION GO** appears on the HOD, go to next step. If one or more FD/LS NO–GO displays listed below appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step b. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
NOTE Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).	
e. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

TASK	RESULT

NOTE

If this FD/LS check is to be followed by a MULTIPLEX SYSTEM – OPERATIONAL CHECK (TM 9-1230-476-20-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TYPE IIIA MRTU NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type IIIA multiplex remote terminal unit (MRTU) (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC.
TYPE IIIA MRTU – RT BUS NO–GO CPG COMPARTMENT (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE IIIA MRTU – LT BUS NO–GO CPG COMPARTMENT (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE I MRTU NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type I MRTU (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1).
TYPE I MRTU – RT BUS NO–GO LH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) 4–8

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TYPE I MRTU – LT BUS NO–GO LH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE I MRTU NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type I MRTU (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If both Type I MRTU NO–GOs (LH and RH FAB) appear on HOD, refer to TM 9-1230-476-20-2.
TYPE I MRTU – RT BUS NO–GO RH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE I MRTU – LT BUS NO–GO RH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
DASE MRTU NO–GO AFT AVIONICS BAY	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace DASE computer (TM 1-1520-238-23). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If NO–GO still exists, refer to TM 9-1230-476-20-2.
DASE MRTU – RT BUS NO–GO AFT AVIONICS BAY (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
DASE MRTU – LT BUS NO–GO AFT AVIONICS BAY (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TYPE II MRTU NO–GO LT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type II MRTU on left outboard pylon (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If NO–GO still exists, refer to TM 9-1230-476-20-2.
TYPE II MRTU – RT BUS NO–GO LT OUTBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU – LT BUS NO–GO LT OUTBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU NO–GO LT INBD	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type II MRTU on left inboard pylon (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If NO–GO still exists, refer to TM 9-1230-476-20-2.
TYPE II MRTU – RT BUS NO–GO LT INBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU – LT BUS NO–GO LT INBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TYPE II MRTU NO–GO RT INBD	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type II MRTU on right inboard pylon (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If NO–GO still exists, refer to TM 9-1230-476-20-2.
TYPE II MRTU – RT BUS NO–GO RT INBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU – LT BUS NO–GO RT INBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU NO–GO RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type II MRTU on right outboard pylon (TM 9-1230-476-20-1). If replacement does not remove NO–GO, replace FCC (TM 9-1230-476-20-1). If NO–GO still exists, refer to TM 9-1230-476-20-2.
TYPE II MRTU – RT BUS NO–GO RT OUTBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
TYPE II MRTU – LT BUS NO–GO RT OUTBD (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
SYM GEN – RT BUS NO–GO LH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

4–8 MUX SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–8**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
SYM GEN – LT BUS NO–GO LH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
RHE – RT BUS NO–GO RH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
RHE – LT BUS NO–GO RH FAB (ACZ)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX CDU – LT BUS NO–GO CPG COMPARTMENT (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX CDU – RT BUS NO–GO CPG COMPARTMENT (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX DNS – LT BUS NO–GO LH AFT CATWALK (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX DNS – RT BUS NO–GO LH AFT CATWALK (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX DTU – LT BUS NO–GO CPG COMPARTMENT (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX DTU – RT BUS NO–GO CPG COMPARTMENT (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX EGI – LT BUS NO–GO RFAB TAILCONE (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
MUX EGI – RT BUS NO–GO RFAB TAILCONE (ADD)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

END OF TASK

4–9 PNVS – INTERACTIVE FD/LS CHECK 4–9

Personnel Required:
(2)

References:

TM 9-1230-476-20-1	TM 9-1230-476-20-2
TM 1-1270-476-20	TM 1-1270-476-T
TM 1-5855-265-20	TM 1-5855-265-T
TM 11-5855-265-30	

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Preset crew station switch/control settings as follows after an aircraft power source is on–line.

CAUTION

- **Do not turn pilot night vision sensor (PNVS) power on immediately after power was turned off. Damage to the PNVS Electronics Unit (PEU) may result.**
- **When icing conditions exist, ensure that target acquisition and designation sight (TADS)/PNVS gear teeth are free of ice, or damage may result.**

NOTE

- If the FD/LS functional check does not locate the faulty component or continues to indicate the same component after it has been replaced and the problem still exists refer to the PNVS malfunction symptom index (TM 1-5855-265-T).
- If **PNVS** switch was just set to **OFF**, wait a minimum of 10 seconds before recycling the **PNVS** switch.

NOTE

Pause 60 seconds before proceeding to set the **ACM** switch to **ACM**. PNVS requires 60 seconds for gyro run–up before PNVS turret assembly can be commanded out of the stow position.

Pilot Station (fig. 2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**SIGHT SEL**	**STBY**
	ACQ SEL	**NVS FXD**
	VID SEL	**PLT**
	PNVS	**PNVS**
FIRE CONTROL (fig. 2–2)	**ACM**	**ACM**

WARNING

Personnel are not allowed closer than 3 feet from an energized PNVS or TADS system. A turret assembly rotating under power has enough force to cause bodily injury.

CAUTION

If PNVS turret assembly does not come out of the stow position, quickly open MISSION/PNVS AC and MISSION/PNVS DC circuit breakers. Failure to comply may result in damage to drive motor.

	SIGHT SEL	**NVS**
COLLECTIVE CONTROL STICK (fig. 2–24)	**NVS**	**PNVS**
	PLRT/BRSIT HMD	**center (off)**
ANTI ICE (fig. 2–22)	**TADS/PNVS**	**GND**

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**SIGHT SEL**	**NVS**
	ACQ SEL	**FXD**
	PLT/GND/ORIDE	**ORIDE**
	BRSIT/IHADSS/IRIS	**OFF**
	BRSIT/TADS	**OFF**
COLLECTIVE CONTROL STICK (fig. 2–46)	**NVS**	**PNVS**
	PLRT/BRSIT HMD	center (off)
TADS ORT (fig. 2–34)	**VID SEL**	**PNVS**
	Z/W/M/N	**W**
	RKT/GUN/MSL	center (off)
	FLIR/TV/DVO	**TV**
AUX/ANTI ICE (fig. 2–47)	**TADS/PNVS**	**GND**

3. Perform manual FD/LS procedures (TM 1-1270-476-T) before entering FD/LS mode.

4. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**

4–9 PNVS – INTERACTIVE FD/LS CHECK (cont) 4–9

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE or SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
d. Respond to prompts (messages) within 30 seconds of appearing on the HOD.	If more than 30 seconds elapse, the prompt (message) **PROMPT TIMED OUT REENTER PROMPTS (Y) OR EXIT FD/LS (N)** appears on HOD. When response is (Y), on DEK, press and release **L SHIFT** and **YZ*/9** keys (ADC) or **Y** key on the CDU (ADD). When the response is (N), press and release **MID SHIFT** and **MNO/5** keys (ADC) or the **N** key on the CDU (ADD).

4–9 PNVS – INTERACTIVE FD/LS CHECK (cont) 4–9

TASK	RESULT
NOTE • If the advisory message **TEST IN PROGRESS** does not appear within 2 seconds after initiating a PNVS FD/LS check, the TEU has failed and testing is halted; go to TM 1-1270-476-T and perform TADS – OPERATIONAL CHECK. • The FCC software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.	
e. On DEK, press and release **(.↵)/0** and **YZ*/9** keys (ADC). On CDU, press and release **0** and **9** keys (ADD).	The advisory message **TEST IN PROGRESS** is displayed for about 1.5 minutes during automatic part of initiated BIT. If a prompt appears before the **TEST IN PROGRESS** message appears, perform the required actions on the optical relay tube (ORT) or aircraft controls.
NOTE Some prompts that contain (ACK) responses are automatically acknowledged for the operator by the TADS computer when the required actions are performed. These prompts do not require operator interaction. Failure to respond appropriately results in an invalid FD/LS check.	

TASK	RESULT
	When the response is acknowledged **(ACK)** press and release **ENTER SPACE** (ADC) or **SPC** (ADD) key ONLY if prompt does not change. Refer to TM 1-5855-265-T for descriptions of and remarks about this message and these prompts. If one or more FD/LS NO–GO displays listed appear on HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2) (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step **2**. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 1-5855-265-T. If no failures are detected, the automatic part of initiated BIT is exited and prompt **ARE OPERATOR INTERACTIVE TESTS REQUIRED?(Y/N)** appears on HOD. Go to next step.

TASK	RESULT
f. On DEK, press and release **L SHIFT** and **YZ*/9** keys to respond with **(Y)**. Press and release **MID SHIFT** and **MNO/5** keys to respond with a **(N)** (ADC) or on the CDU press **Y** key to respond with **(Y)** and **N** key to respond with a **(N)** (ADD).	The PNVS forward looking infrared radar (FLIR) operator interactive test is initiated. The equipment exits the FD/LS mode.

5. Perform PNVS FLIR operator interactive test.

a. The following prompt is displayed on the HOD: **SET ACM SW TO ON. IS PNVS FLIR VISIBLE? (Y/N)**	This prompt is the first of many prompts to be displayed that requires some type of operator interaction. Refer to TM 1-5855-265-T for description of prompts and any remarks about prompts.
b. Act upon and respond to each prompt as it appears on the HOD.	If failures are detected, NO–GOs appear on HOD and the equipment exits FD/LS testing. Perform **CORRECTIVE ACTION**. If no failure is detected, the TADS operator interactive test is exited and HOD displays the following:

NOTE

If the PNVS FLIR has not cooled down, the advisory message **FLIR NOT COOLED** is displayed in conjunction with other prompts (messages).

PNVS
GO FLIR NOT COOLED
ANY KEY FOR FDLS MENUS

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

TASK	RESULT
c. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

6. Restore crew station switch/control settings as specified in the following tables:

CPG Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL	**ACQ SEL**	FXD
	SIGHT SEL	STBY
	SYSTEM/TADS	OFF
	PLT/GND	OFF
COLLECTIVE CONTROL STICK	**NVS**	TADS
AUX/ANTI ICE	**TADS/PNVS**	OFF

Pilot Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL	**SIGHT SEL**	STBY
	ACQ SEL	OFF
	VID SEL	PLT
	ACM	OFF
	PNVS	OFF
ANTI ICE	**TADS/PNVS**	OFF

NOTE

If this FD/LS check is to be followed by the PNVS–OPERATIONAL CHECK, omit step 7.

7. Perform SYSTEMS – POWER DOWN (para 3–2).

4–9 PNVS – INTERACTIVE FD/LS CHECK (cont) 4–9

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PNVS NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace TEU (TM 1-1270-476-20).
TADS NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace TEU (TM 1-1270-476-20).
PNVS SERVO MODULE NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS torquer amplifier (TM 1-5855-265-20).
PNVS VIDEO NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS turret assembly (TM 1-5855-265-20).
TADS POWER SUPPLY NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace TADS power supply (TM 1-1270-476-20).
TADS ELECTRONIC UNIT NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace TEU (TM 1-1270-476-20).
PNVS TURRET NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS turret assembly (TM 1-5855-265-20).

4–9 PNVS – INTERACTIVE FD/LS CHECK (cont) 4–9

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PNVS ELECTRONIC UNIT NO–GO RH FAB	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PEU assembly (TM 1-5855-265-20).
PNVS SHROUD NO–GO	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS shroud assembly (TM 1-5855-265-20).
ORT HOD RIGHT HAND GRIP NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace right hand grip assembly (TM 1-1270-476-20).
ORT HOD CONTROLS NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace optical relay column (ORC) assembly (TM 1-1270-476-20).
ORT HOD LEFT HAND GRIP NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace left hand grip assembly (TM 1-1270-476-20).
PNVS AZ GEAR NO–GO TURRET BULKHEAD	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS azimuth drive gimbal assembly (TM 11-5855-265-30).

4–9 PNVS – INTERACTIVE FD/LS CHECK (cont) 4–9

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PNVS TORQUER AMP NO–GO TURRET BULKHEAD	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO–GO, replace PNVS torquer amplifier (TM 1-5855-265-20).
PNVS BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 (ACY).

END OF TASK

4–10 PYLN SYSTEM – INTERACTIVE FD/LS CHECK 4–10

Personnel Required:

(2)

References:

TM 1-1520-238-23
TM 9-1090-208-23-1
TM 9-1090-208-23-2
TM 9-1230-476-20-1
TM 9-1230-476-20-2

NOTE

- Utility hydraulics are required for PYLN System – FD/LS CHECK.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**

4–10 PYLN SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–10**

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	When **MUX COMMUNICATION GO** appears on HOD, go to next step.

NOTE

- The FCC software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.
- Pylons with external fuel tanks will not be articulated.

4–10 PYLN SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–10**

TASK	RESULT
d. On DEK, press and release **ABC/1** and **(↵)/0** keys (ADC). On CDU, press and release **1** and **0** keys (ADD).	If **PYLON ARTICULATION GO** appears on the HOD, go to next step. If **PYLON BORESIGHT NO–GO RAM CHECKSUM** appears on the HOD, refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 (ACY). If any other NO–GO appears on HOD, refer to TM 9-1090-208-23-2. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step **b**. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1090-208-23-2.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY**(ADC).

4–10 PYLN SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–10**

TASK	RESULT
e. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

NOTE

If this FD/LS check is to be followed by ESC SYSTEM – OPERATIONAL CHECK (TM 9-1090-208-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
EXT STORES CONTROL BOX NO–GO AFT OF LH FAB	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace external stores controller (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
(All) **PYLN ACTUATOR CONTROLLER NO–GO**	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
PYLN ACTUATOR CONTROLLER NO–GO LT INBD/LT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
PYLN ACTUATOR CONTROLLER NO–GO RT INBD/RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).

4–10 PYLN SYSTEM – INTERACTIVE FD/LS CHECK (cont) **4–10**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
PYLN ACTUATOR CONTROLLER NO–GO LT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated controller (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
PYLN ACTUATOR CONTROLLER NO–GO LT INBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated controller (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
PYLN ACTUATOR CONTROLLER NO–GO RT INBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated controller (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
PYLN ACTUATOR CONTROLLER NO–GO RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated controller (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
PYLN BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 (ACY).

END OF TASK

4–11 RKT – INTERACTIVE FD/LS CHECK 4–11

Personnel Required:
(2)

References:

TM 9-1090-208-23-1	TM 9-1230-476-20-2
TM 9-1090-208-23-2	TM 9-1427-475-20
TM 9-1230-476-20-1	

Equipment Conditions:

Ref	Condition
TM 9-1427-475-20	HMMS missile launchers removed

NOTE

- Utility hydraulics are required for RKT – FD/LS CHECK
- Station director NO–GOs are masked (or hidden) from FD/LS when either a missile launcher is hung on the pylon rack or the pylon MRTU Type II has a MUX communication NO–GO condition.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Preset the pilot crew station switch/control setting as follows after an aircraft power source is on–line.

Pilot Crew Station (fig. 2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**MASTER**	**SAFE**

4–11 RKT – INTERACTIVE FD/LS CHECK (cont) 4–11

CPG Crew Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**CPG PILOT/GND**	**SAFE ORIDE**

3. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
c. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on HOD, go to next step.

4–11 RKT – INTERACTIVE FD/LS CHECK (cont) 4–11

TASK	RESULT
NOTE The FCC software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.	
d. On DEK, press and release **ABC/1** and **(.↵)/0** keys (ADC). On CDU, press and release **1** and **0** keys (ADD).	If **PYLON ARTICULATION GO** appears on the HOD, go to next step. If **PYLON BORESIGHT NO–GO RAM CHECKSUM** appears on the HOD, refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If any other NO–GO appears on HOD, refer to TM 9-1090-208-23-2.
e. On DEK, press and release **ABC/1** and **ABC/1** keys (ADC). On CDU, press and release **1** and **1** keys (ADD).	If **ROCKETS GO** appears on the HOD, go to next step. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1).

TASK	RESULT
	(4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1090-208-23-2.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

f. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by ARCS – OPERATIONAL CHECK (TM 9-1090-208-23-2), omit step 4.

4. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
ROCKET CONTROL PANEL NO–GO PILOTS COMPARTMENT	Troubleshoot wiring to isolate fault TM 9-1090-208-23-2. If troubleshooting does not remove NO–GO, replace **ROCKET** panel (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
(All) **STATION DIRECTOR NO–GO**	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
STATION DIRECTOR NO–GO LT OUTBD/LT INBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
STATION DIRECTOR NO–GO RT INBD/RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).

4–11 RKT – INTERACTIVE FD/LS CHECK (cont) 4–11

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
STATION DIRECTOR NO–GO LT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated director. (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
STATION DIRECTOR NO–GO LT INBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated director (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
STATION DIRECTOR NO–GO RT INBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated director (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.

4–11 RKT – INTERACTIVE FD/LS CHECK (cont) 4–11

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
STATION DIRECTOR NO–GO RT OUTBD	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2). If troubleshooting does not remove NO–GO, replace designated director (TM 9-1090-208-23-1). If replacement does not remove NO–GO, refer to TM 9-1090-208-23-2.
PYLN BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and insert correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-2 (ACY).

END OF TASK

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) 4–12

4-80

Tools:

Nomenclature	Part Number
Headset–Microphone	H–157/AIC
Cord Assembly, Maintenance Headset	7–262100009

Personnel Required:

(3)

References:

TM 1-1520-238-T-7	TM 9-1230-476-20-2
TM 1-1520-238-23	

Equipment Conditions:

Ref	Condition
TM 1-1520-238-23	Stabilator inspection and rigging performed

NOTE

- For a helicopter with BUCS deactivated, **BUCS FAIL** indicators on the pilot and CPG master caution/warning panels (fig. 2–9 and 2–36) are normally lit.
- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO–GO** message appears.
- If FD/LS message on HOD (fig. 2–34) does not change within 2 seconds after responding to the prompt (acknowledge), discontinue FD/LS test; go to TM 1-1520-238-T-7 and perform the STABILATOR – OPERATIONAL CHECK.
- Utility hydraulics are required for STAB – INTERACTIVE FD/LS CHECK.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.
- If NO–GOs are detected during the FD/LS check, the prompt (message) **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on the HOD. Acknowledging the prompt causes the system NO–GOs to appear on the HOD.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Attach the microphone headset/maintenance headset cord assembly to connector **J306** located behind right wing tip door **RW12**.
3. Perform FD/LS check as follows:

CAUTION

Make sure the stabilator is clear of all obstructions before proceeding with the FD/LS check. Failure to comply could cause damage to aircraft components.

NOTE

- When moving stabilator with manual control **ND** (Nose Down)/**NU** (Nose Up) switch on collective sticks, use pulsating switch action to slow movement of stabilator. **ND** switch action moves stabilator trailing edge down while **NU** switch action moves trailing edge up.
- Refer to TM 1-1520-238-23 to replace units referenced in this paragraph. Once a gyro, actuator, or stabilator control unit (SCU) has been replaced, do not replace again unless directed by fault isolation procedure. Continue test; do not repeat previous task setup.
- Begin STAB–INTERACTIVE FD/LS check with cyclic stick and collective stick centered. Do not apply foot pressure on the directional control pedals.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
a. On pilot cyclic stick grip (fig. 2–8), set **FORCE TRIM REL** switch to **ON**.	
b. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT**.	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
d. On DEK, press and release **(↵)/0**and **VWX/8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
e. On DEK, press and release any key except **ENTER/SPACE**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
f. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT**.	The FD/LS menus are displayed on HOD one page at time.
g. Pulse **ND/NU** switch on stabilator manual control (fig.2–24) next to pilot collective stick to **NU** and then **ND** (only enough to verify upward/downward movement of the stabilator).	Observe the stabilator position on the stabilator position indicator (fig. 2–12) and have an assistant observe stabilator proper movement. If stabilator does not move in both directions or moves only in one direction, refer to TM 1-1520-238-T-7.
h. On DEK, press and release **ABC/1** and **DEF/2** keys.	If **CANNOT RUN WHILE IN AIR** appears on HOD, stop FD/LS testing, refer to TM 1-1520-238-T-6 to troubleshoot squat relay, squat switch and associated wiring. When **PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD** appears on VDU (fig. 2–10), go to next step.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
i. On pilot power lever quadrant (fig. 2–25), set **RTR BK** switch to **BRAKE**.	
j. On DEK, press and release **ENTER SPACE** key.	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **SLEW STAB TO UP LIMIT THEN DEPRESS RESET ACK VIA KBD** appears on HOD, go to next step.
k. Next to pilot collective stick, pulse **ND/NU** switch on stabilator manual control to **NU** until stabilator reaches its full up position.	Observe the stabilator position on the stabilator position indicator. When the stabilator has reached its full up position, press the stabilator **RESET** button on the stabilator manual control panel. When **PUSH COLL TO FULL DOWN SLEW STAB TO DOWN LIMIT** appears on HOD, go to next step.
l. Push pilot collective stick to full down stop and pulse **ND/NU** switch on stabilator manual control panel to **ND** until stabilator reaches its full down position.	The operator can observe the current stabilator position on the stabilator position indicator.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
NOTE An advisory message **AUTO STABILATOR SYSTEM TEST IN PROGRESS** indicates a dynamic test has been initiated for 30 seconds on each of the following stabilator systems: top stabilator position actuator, bottom stabilator position actuator, rate gyro1, rate gyro 2, airspeed transducer 1, airspeed transducer 2, stabilator control unit 1, and stabilator control unit 2.	
	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **HOLD COLL AT FULL UP–ACK VIA KBD** appears on VDU, go to next step.
m. Pull pilot collective stick to the full up stop position	
n. On DEK, press and release **ENTER SPACE** key.	Once acknowledged, the SCUs are tested to see if both position actuators indicate the full up position. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **SLEW STAB TO UP LIMIT THEN DEPRESS RESET ACK VIA KBD** appears on VDU, go to next step.
o. Next to pilot collective stick, pulse **ND/NU** switch on stabilator manual control to **NU** until stabilator reaches its full up position.	Observe the stabilator position on the stabilator position indicator. When the stabilator has reached its full up position, press the stabilator **RESET** button on the stabilator manual control.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
NOTE The stabilator is automatically driven to –15 degrees down after stabilator has reached its full up position in response to testing commands.	
p. On DEK, press and release **ENTER SPACE** key.	Once acknowledged, the advisory message **AUTO STABILATOR SYSTEM TEST IN PROGRESS** is displayed on the VDU for duration of the dynamic testing. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **PUSH COLL TO FULL DOWN SLEW STAB TO DOWN LIMIT** appears on VDU, go to next step.
q. Push pilot collective stick to full down stop and pulse **ND/NU** switch on stabilator manual control to **ND** until stabilator reaches its full down position.	Observe the current stabilator position on the stabilator position indicator. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on VDU, go to next step.
r. On pilot power lever quadrant, set **RTR BK** switch to **OFF**.	
s. On DEK, press and release **ENTER SPACE** key.	When **AUTO STABILATOR SYSTEM GO ANY KEY FOR FDLS MENUS** appears on HOD and VDU, go to next step.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

TASK	RESULT
	If one or more FD/LS NO–GO displays listed appear on HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2) (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS**. (5) Repeat FD/LS check beginning with step f. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 1-1520-238-T-7.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY**.

t. On DEK, rotate **DATA ENTRY** switch to **STBY**.

NOTE

After successfully completing the FD/LS check, STABILATOR–OPERATIONAL CHECK (TM 1-1520-238-T-7) should be performed to check the response of the stabilator system to various simulated airspeeds and other additional inputs not included in the FD/LS check. If the operational check is to be performed, omit step 4.

4. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TOP STAB ACTUATOR NO–GO TAIL SECTION	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace top stabilator actuator (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.
BOTTOM STAB ACTUATOR NO–GO TAIL SECTION	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace bottom stabilator actuator (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.
RATE GYRO 1 NO–GO LH AFT CATWALK	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace rate gyro 1 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to (TM 1-1520-238-T-7).
RATE GYRO 2 NO–GO RH AFT CATWALK	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace rate gyro 2 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.

4–12 STAB – INTERACTIVE FD/LS CHECK (ACY) (cont) **4–12**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
AIRSPEED TRANSDUCER 1 NO–GO LH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace airspeed transducer 1 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.
AIRSPEED TRANSDUCER 2 NO–GO LH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace airspeed transducer 2 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.
STAB CONTROL UNIT 1 NO–GO LH AFT CATWALK	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace SCU 1 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.
STAB CONTROL UNIT 2 NO–GO LH AFT CATWALK	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-7). If troubleshooting does not remove NO–GO, replace SCU 2 (TM 1-1520-238-23). If replacement does not remove NO–GO, refer to TM 1-1520-238-T-7.

END OF TASK

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) 4–12A

Tools:

Nomenclature	Part Number
Headset–Microphone	H–157/AIC
Cord Assembly, Maintenance Headset	7–262100009

Personnel Required:

(3)

References:

TM 1-1520-238-T-7
TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

Ref	Condition
TM 1-1520-238-23	Stabilator inspection and rigging performed

NOTE

- For a helicopter with BUCS deactivated, **BUCS FAIL** indicators on the pilot and CPG master caution/warning panels (fig. 2–9 and 2–36) are normally lit.
- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO–GO** message appears.
- If FD/LS message on HOD (fig. 2–34) does not change within 2 seconds after responding to the prompt (acknowledge), discontinue FD/LS test; go to TM 1-1520-238-T-7 and perform the STABILATOR – OPERATIONAL CHECK.
- Utility hydraulics are required for STAB – INTERACTIVE FD/LS CHECK.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.
- If any failure occurs, press pilot or CPG collective RESET pushbutton prior to proceeding to maintenance operational check.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Attach the microphone headset/maintenance headset cord assembly to connector **J306** located behind right wing tip door **RW12**.
3. Perform FD/LS check as follows:

CAUTION

Make sure the stabilator is clear of all obstructions before proceeding with the FD/LS check. Failure to comply could cause damage to aircraft components.

NOTE

- Refer to TM 1-1520-238-23 to replace units referenced in this paragraph. Once a gyro, actuator, or stabilator control unit (SCU) has been replaced, do not replace again unless directed by fault isolation procedure. Continue test; do not repeat previous task setup.
- Begin STAB–INTERACTIVE FD/LS check with cyclic stick and collective stick centered. Do not apply foot pressure on the directional control pedals.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
a. On pilot cyclic stick grip (fig. 2–8), set **FORCE TRIM REL** switch to **ON**.	
b. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
d. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
e. On DEK, press and release any key except **ENTER/SPACE** key (ADC); or on the CDU, **SPC** key (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
f. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	The FD/LS menus are displayed on HOD one page at time.
g. Press **ND/NU** switch on stabilator manual control (fig.2–24) next to pilot collective stick to **NU** and then **ND** (only enough to verify upward/downward movement of the stabilator).	Observe the stabilator position on the stabilator position indicator (fig. 2–12) and have an assistant observe stabilator proper movement. If stabilator does not move in both directions or moves only in one direction, refer to TM 1-1520-238-T-7.
h. On DEK, press and release **ABC/1** and **DEF/2** keys (ADC). On CDU, press and release **1** and **2** keys (ADD).	If **CANNOT RUN WHILE IN AIR** appears on HOD, stop FD/LS testing, refer to TM 1-1520-238-T-6 to troubleshoot squat relay, squat switch and associated wiring.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
i. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** KEY (ADD).	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **SLEW STAB TO UP LIMIT ACK VIA KBD** appears on HOD, go to next step.
j. Next to pilot collective stick, press **ND/NU** switch on stabilator manual control to **NU** until stabilator reaches its full up position.	Observe the stabilator position on the stabilator position indicator. When the stabilator has reached its full up position, acknowledge.
k. On DEK, press and release **ABC/1** and **DEF/2** keys (ADC). On CDU, press and release **1** and **2** keys (ADD).	When **PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD** appears on VDU (fig. 2–10), go to next step.
l. On pilot power lever quadrant (fig. 2–25), set **RTR BK** switch to **BRAKE**.	
m. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** KEY (ADD).	When **HOLD COLL AT FULL UP ACK VIA KBD** appears on VDU, go to next step.
n. Pull pilot collective stick to the full up stop position.	
o. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** KEY (ADD).	Once acknowledged, the SCUs are tested to see if both SCU status bits indicate GO. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
p. Operator shall observe HOD for next prompt.	When **SLEW STAB TO DOWN LIMIT ACK VIA KBD** appears on HOD, go to next step.
q. Next to pilot collective stick, press **ND/NU** switch on stabilator manual control to **ND** until stabilator reaches its full down position.	The operator can observe the current stabilator position on the stabilator position indicator. When indication is full down, go to next step. If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**.

NOTE

An advisory message **AUTO STABILATOR SYSTEM TEST IN PROGRESS** indicates a dynamic test has been initiated for 30 seconds on each of the following stabilator systems: top stabilator position actuator, bottom stabilator position actuator, rate gyro1, rate gyro 2, airspeed transducer 1, airspeed transducer 2, stabilator control unit 1, and stabilator control unit 2.

r. Operator shall observe HOD for next prompt.	When **SLEW STAB TO UP LIMIT THEN DEPRESS RESET ACK VIA KBD** appears on VDU, go to next step.
s. Next to pilot collective stick, press **ND/NU** switch on stabilator manual control to **NU** until stabilator reaches its full up position.	Observe the stabilator position on the stabilator position indicator. When the stabilator has reached its full up position, press the stabilator **RESET** button on the stabilator manual control.

NOTE

An advisory message **AUTO STABILATOR SYSTEM TEST IN PROGRESS** indicates a dynamic test has been initiated for 30 seconds.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
NOTE When acknowledged, the stabilator is automatically driven to –15 degrees down after stabilator has reached its full up position in response to testing commands.	
t. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** KEY (ADD).	
	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **PUSH COLL TO FULL DOWN** appears on HOD, go to next step.
u. Push the pilot collective stick to the full down position.	
	If NO–GOs appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**. When **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on VDU, go to next step.
v. On pilot power lever quadrant, set **RTR BK** switch to **OFF**.	
w. On DEK, press and release **ENTER SPACE** key (ADC); or on the CDU, **SPC** KEY (ADD).	When **AUTO STABILATOR SYSTEM GO ANY KEY FOR FDLS MENUS** appears on HOD and VDU, go to next step.

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT
	If one or more FD/LS NO–GO displays listed appear on HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2) (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step f. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 1-1520-238-T-7.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

x. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

4–12A STAB – INTERACTIVE FD/LS CHECK (ACZ) (cont) **4–12A**

TASK	RESULT

NOTE

After successfully completing the FD/LS check, STABILATOR–OPERATIONAL CHECK (TM 1-1520-238-T-7) should be performed to check the response of the stabilator system to various simulated airspeeds and other additional inputs not included in the FD/LS check. If the operational check is to be performed, omit step 4.

4. Perform SYSTEMS – POWER DOWN (para 3–2).

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END OF TASK

4–13 SYMG – INTERACTIVE FD/LS CHECK 4–13

Personnel Required:
(2)

References:
TM 9-1230-476-20-2
TM 11-1520-238-23-1
TM 11-1520-238-23-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform the FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–13 SYMG – INTERACTIVE FD/LS CHECK (cont) 4–13

TASK	RESULT
c. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

d. On DEK, press and release **ABC/1** and **GHI/3** keys (ADC). On CDU, press and release **1** and **3** keys (ADD).	If **SYMBOL GENERATOR GO** appears on HOD, go to next step. If one or more FD/LS NO–GO displays listed below appears on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Replace symbol generator (TM 11-1520-238-23-1). (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step **b**. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 11-1520-238-23-2.

4–13 SYMG – INTERACTIVE FD/LS CHECK (cont) 4–13

TASK	RESULT

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

e. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by SYMBOL GENERATOR – OPERATIONAL CHECK (TM 11-1520-238-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
SYMBOL GENERATOR NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 11-1520-238-23-2). If troubleshooting does not remove NO–GO, replace symbol generator (TM 11-1520-238-23-1).

END OF TASK

4–14 TADS – INTERACTIVE FD/LS CHECK 4–14

Personnel Required:
(2)

References:

TM 1-1270-476-T	TM 9-1230-476-20-1
TM 1-1270-476-20	TM 9-1230-476-20-2
TM 1-5855-265-T	TM 9-1270-476-30

Equipment Conditions:

Ref	Condition
TM 1-1270-476-T	Inspect optics and clean as required

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Preset crew station switch/control settings as follows after an aircraft power source is on–line.

CAUTION

- **When icing conditions exist, ensure that TADS/PNVS gear teeth are free of ice, or damage may result.**

NOTE

If the FD/LS functional check does not locate the faulty component or continues to indicate the same component after it has been replaced and the problem still exists refer to the PNVS malfunction symptom index (TM 1-5855-265-T).

CAUTION

- **Do not power PNVS up until TADS has been powered up. Failure to comply may result in equipment damage.**

Pilot Station (fig. 2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**SIGHT SEL**	STBY
	ACQ SEL	NVS FXD
	VID SEL	PLT
	SIGHT SEL	NVS
COLLECTIVE CONTROL STICK (fig.2–24)	**NVS**	**PNVS**
	PLRT/BRSIT HMD	center (off)
ANTI ICE (fig. 2–22)	**TADS/PNVS**	GND

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–33)	**CPG**	SAFE
	SIGHT SEL	STBY
	ACQ SEL	FXD
	PLT/GND	ORIDE
	BRSIT/IHADSS/IRIS	OFF
	BRSIT/TADS	OFF

CAUTION

- **Do not recycle SYSTEM/TADS switch to TADS immediately after setting SYSTEM/TADS switch to OFF. Failure to comply may result in damage to the TADS power supply.**

NOTE

- If **SYSTEM/TADS** switch was set to **OFF**, pause 10 seconds before recycling the switch to **TADS**.
- Pause 60 seconds before proceeding to set the **ACM** switch to **ACM**. PNVS requires 60 seconds for gyro run–up before PNVS turret assembly can be commanded out of the stow position.

SYSTEM/TADS TADS

Pilot Station (fig. 2–1)

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL (fig. 2–2)	**PNVS**	PNVS
	ACM	ACM

WARNING

Personnel are not allowed closer than 3 feet from an energized PNVS or TADS system. A turret assembly rotating under power has enough force to cause bodily injury.

NOTE

Pause 60 seconds before proceeding to set the **SIGHT SEL** switch to **TADS**. TADS requires 60 seconds for gyro run–up before TADS turret assembly can be commanded out of the stow position.

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

CPG Station (fig. 2–32)

PANEL	SWITCH/CONTROL	POSITION (set to)
	SIGHT SEL	TADS
TADS ORT (fig. 2–34)	**SLAVE**	press and release (as required)
	VID SEL	**TADS**
	Z/W/M/N	**W**
	RKT/GUN/MSL	center (off)
	PLRT/BRSIT HMD	center (off)
	FLIR/TV/DVO	**TV**
COLLECTIVE CONTROL STICK (fig. 2–46)	**NVS**	**TADS**
AUX/ANTI ICE (fig. 2–47)	**TADS/PNVS**	GND

CAUTION

Erratic behavior of the TADS turret may indicate a servo function problem. When erratic behavior is observed, immediately initiate a FD/LS check. Failure to identify a servo function failure as soon as possible may result in damage to the electronic control assembly (ECA).

3. Perform FD/LS check as follows:

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
c. On DEK, press and release **(.↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

d. Respond to prompts (messages) within 30 seconds of appearing on the HOD.	If more than 30 seconds elapse, the prompt (message) **PROMPT TIMED OUT REENTER PROMPTS (Y) OR EXIT FD/LS (N)** appears on HOD.

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

TASK	RESULT
	When response is (Y), on DEK, press and release **L SHIFT** and **YZ*/9** keys. When the response is (N), press and release **MID SHIFT** and **MNO/5** keys (ADC).When response is (Y), on CDU, press and release **Y** key.When the response is (N), press and release **N** key (ADD).

NOTE

- The FCC software can detect a boresight corrector loss for a weapon and/or sighting system. Flight crew or maintenance personnel are advised of the degraded accuracy on the high–action–display. Continuous and maintenance FD/LS messages are displayed upon selection.

e. On DEK, press and release **ABC/1** and **JKL/4** keys (ADC). On CDU, press and release **1** and **4** keys (ADD).	Perform manual FD/LS procedures (TM 1-1270-476-T) before entering operator interactive test. The advisory message **TEST IN PROGRESS** is displayed for about 1.5 minutes during automatic part of initiated BIT. If a prompt appears before the **TEST IN PROGRESS** message appears, perform the required actions on the ORT or aircraft controls.

NOTE

Some prompts that contain (ACK) responses are automatically acknowledged for the operator by the TADS computer when the required actions are performed. These prompts do not require operator interaction. Failure to respond appropriately results in an invalid FD/LS check.

TASK	RESULT
	When the response is **(ACK)**, press and release **ENTER SPACE** (ADC) or **SPC** (ADD) key ONLY if prompt does not change. Refer to (TM 1-1270-476-T) for descriptions of and remarks about this message and these prompts. If one or more FD/LS NO–GO displays listed appear on HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2) (2) Perform **CORRECTIVE ACTION** indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after **CORRECTIVE ACTION**, refer to TM 1-1270-476-T. If no failures are detected, the automatic part of initiated BIT is exited and prompt **ARE OPERATOR INTERACTIVE TESTS REQUIRED? (Y/N)** appears on HOD, go to next step.
f. On DEK, press and release **L SHIFT** and **YZ*/9** keys to respond with a **(Y)** (ADC) or **(Y)** key on CDU (ADD).	The TADS operator interactive test is initiated.

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

TASK	RESULT
Press and release **MID SHIFT** and **MNO/5** keys to respond with a **(N)** (ADC) or **(N)** key on CDU (ADD).	The equipment exits the FD/LS mode and displays the prompt: **TADS GO ANY KEY FOR FDLS MENUS**

4. Perform TADS FLIR operator interactive

a. The following prompt is displayed on the HOD: **CONTINUE WITH FULL SYSTEM TEST (Y) OR A SYSTEM TEST (N)?**	This prompt is the first of many prompts to be displayed and require some type of operator interaction. Refer to TM 9-1230-476-20-1 for description of prompts and any remarks about prompts.
b. Act upon and respond to each prompt as it appears on the HOD.	If failures are detected, NO–GOs appear on HOD and the equipment exits FD/LS testing. Perform **CORRECTIVE ACTION**. If no failure is detected, the TADS operator interactive test is exited and HOD displays the following:

NOTE

If the TADS FLIR has not cooled down the advisory message **FLIR NOT COOLED** is displayed in conjunction with other prompts (messages).

TADS
GO FLIR NOT COOLED
ANY KEY FOR FDLS
MENUS

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

c. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

5. Restore crew station switch/control settings as follows:

CPG Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL	**SIGHT SEL**	STBY
	ACQ SEL	FXD
	PLT/GND	OFF
	SYSTEM/TADS	OFF
COLLECTIVE CONTROL STICK	**NVS**	TADS
AUX/ANTI ICE	**TADS/PNVS**	OFF

Pilot Station

PANEL	SWITCH/CONTROL	POSITION (set to)
FIRE CONTROL	**SIGHT SEL**	STBY
	ACQ SEL	OFF
	VID SEL	PLT
	ACM	OFF
	PNVS	OFF
ANTI ICE	**TADS/PNVS**	OFF

NOTE

If this FD/LS check is to be followed by the PNVS – OPERATIONAL CHECK, omit step 6.

6. Perform SYSTEMS – POWER DOWN (para 3–2).

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
AND NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace alphanumeric display (AND) assembly (TM 1-1270-476-20).
TADS LASER TRANSCEIVER NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace TADS laser transceiver unit (LTU) assembly (TM 1-1270-476-20).
TADS LASER ELECTRONICS NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replaceTADS laser electronics unit (LEU) (TM 1-1270-476-20).
TADS POWER SUPPLY NO–GO LH FAB	Check fuses F1, F2, and F3. If any fuses are bad, replace fuse(s) and repeat FD/LS check. If fuses are good, troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace TADS power supply (TPS) (TM 1-1270-476-20).
TADS ELECTRONIC UNIT NO–GO LH FAB	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace TEU assembly (TM 1-1270-476-20).

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TADS ECS ASSEMBLY NO–GO TURRET BULKHEAD	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace environmental control system (ECS) assembly (TM 1-1270-476-20).
TADS IVD–HDD ELECTRONICS NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace indirect view display (IVD) assembly (TM 1-1270-476-20).
BORESIGHT MODULE NO–GO TURRET BULKHEAD	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace boresight assembly (TM 1-1270-476-20).
TADS TV SHROUD NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace day sensor shroud assembly (TM 1-1270-476-20).
TADS FLIR SHROUD NO–GO NSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace night sensor shroud assembly (TM 1-1270-476-20).
TADS LASER TRACKER NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace laser tracker receiver (LTR) assembly (TM 1-1270-476-20).

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
TADS TORQ–SERVO MODULE NO–GO TURRET BULKHEAD	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace electronic control (torquer) amplifier (ECA) assembly (TM 1-1270-476-20).
TADS PITCH GYRO NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace pitch gyro circuit card assembly (CCA) (TM 1-1270-476-20).
TADS YAW GYRO NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace yaw gyro circuit card assembly (CCA) (TM 1-1270-476-20).
TADS ROLL GYRO NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace roll gyro CCA (TM 1-1270-476-20).
TADS DSA SUB–ASSY NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace day sensor assembly (DSA) (TM 1-1270-476-20).
TADS NIGHT SENSOR NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace night sensor assembly (NSA) (TM 1-1270-476-20).

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
ORT COLUMN ASSY NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace ORT column assembly (TM 1-1270-476-20).
TADS AC TORQUER AMP NO–GO TURRET BULKHEAD (ACY)	Refer to TM 9-1270-476-30, and troubleshoot the TADS turret assembly.
TADS TURRET ASSY NO–GO TURRET BULKHEAD (ACZ)	Refer to TM 9-1270-476-30, and troubleshoot the TADS turret assembly.
TADS TV SENSOR NO–GO DSA	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace television (TV) sensor assembly (TM 1-1270-476-20).
ORT HOD CONTROLS NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace control panel assembly (TM 1-1270-476-20).
ORT HOD LEFT HAND GRIP NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace left hand grip assembly (TM 1-1270-476-20).

4–14 TADS – INTERACTIVE FD/LS CHECK (cont) 4–14

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
ORT HOD RIGHT HAND GRIP NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO–GO, replace right hand grip assembly (TM 1-1270-476-20).
TADS BORESIGHT NO–GO RAM CHECKSUM	Refer to TM 9-1230-476-20-1 for boresight editing and inserting correctors from the aircraft logbook. If FCC battery is suspect, refer to TM 9-1230-476-20-1 (ACY).

END OF TASK

4–15 UTIL – INTERACTIVE FD/LS CHECK 4–15

Personnel Required:
(2)

References:
TM 9-1230-476-20-1 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to FD/LS (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) will be displayed: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD)	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–15 UTIL – INTERACTIVE FD/LS CHECK (cont) 4–15

TASK	RESULT
c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on HOD, go to next step.
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
d. On DEK, press and release **ABC/1** and **MNO/5** keys (ADC). On CDU, press and release **1** and **5** keys (ADD).	If **BBC–KBRD–CPG–IFCP GO** (ADC) or **BBC–CPG–IFCP GO** (ADD) appears on the HOD, go to next step. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step b. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 9-1230-476-20-2.

4–15 UTIL – INTERACTIVE FD/LS CHECK (cont) 4–15

TASK	RESULT

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

e. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by a MULTIPLEX SYSTEM – OPERATIONAL CHECK (TM 9-1230-476-20-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
BACKUP BUS CONTROLLER NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace Type IIIA MRTU (TM 9-1230-476-20-1). If replacement does not remove NO–GO,replace FCC (TM 9-1230-476-20-1). If NO–GO still exist, refer to TM 9-1230-476-20-2.
DATA ENTRY KEYBOARD NO–GO CPG COMPARTMENT (ADC)	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace DEK (TM 9-1230-476-20-1). If NO–GO still exist, refer to TM 9-1230-476-20-2.
CPG FIRE CONTROL PANEL NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2). If troubleshooting does not remove NO–GO, replace CPG **FIRE CONTROL** panel (fig. 2–33) (TM 9-1230-476-20-1) .If NO–GO still exist, refer to TM 9-1230-476-20-2.

END OF TASK

4–16 ETE – INTERACTIVE FD/LS CHECK 4–16

Personnel Required:
(2)

References:
TM 9-1230-476-20-2

NOTE

- The FD/LS End to End (ETE) check is a continuous limited keystroke execution of all the maintenance mode FD/LS tests, except for the APU, generator, and transmission tests. It is not normally used for routine maintenance. Unnecessary exercising of this FD/LS check shortens the operational life span of flight critical and mission essential aircraft systems that FD/LS monitors.
- For a helicopter with BUCS deactivated, make sure **ASE BUCS** circuit breaker on pilot center circuit breaker panel (fig. 2–6) is open and locked. DASE FD/LS is an interactive check which prompts the operator to act. The DASE FD/LS check is discontinued when an advisory message **28 VDC BUCS NO–GO** is displayed. Remaining DASE FD/LS check displays are deactivated and do not occur.
- For a helicopter with BUCS deactivated, **BUCS FAIL** indicators on the pilot and CPG master caution and warning panels (fig. 2–9 and fig. 2–36) are normally lit.
- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO–GO** message appears.
- If FD/LS message on HOD (fig. 2–34) does not change within 2 seconds after responding to the prompt (acknowledge), discontinue FD/LS test; go to appropriate system operational check.
- Primary and utility hydraulics are required for ETE – FD/LS CHECK.
- If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

4–16 ETE – INTERACTIVE FD/LS CHECK (cont) 4–16

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

TASK	RESULT
a. On **CPG AUX/ ANTI ICE** panel (fig.2–47), set **ADSS** switch to **ADSS**.	
b. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
c. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

4–16 ETE – INTERACTIVE FD/LS CHECK (cont) 4–16

TASK	RESULT
d. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

WARNING

- **On helicopters with BUCS activated, automatic flight control motion occurs when on command DASE FD/LS is initiated. Make sure all personnel keep clear of flight controls immediately after pressing and releasing keys ABC/1 and PQR/6 on the DEK.**
- **Personnel are not allowed closer than 3 feet from an energized PNVS or TADS system. A turret assembly rotating under power has enough force to cause bodily injury.**

4–16 ETE – INTERACTIVE FD/LS CHECK (cont) 4–16

TASK	RESULT

CAUTION

- **During on command DASE FD/LS, cyclic sticks, collective sticks, and directional pedals will move. Any restriction of flight controls may result in damage to the SPAD shear pins.**
- **Degradation of HARS navigational accuracy occurs if HARS switch (fig. 2–15) is placed in the OPR position for an extended length of time and aircraft remains stationary.**
- **When outside air temperature is above 25°C (77°F), do not perform rotor blades de–ice checks for periods longer than 10–minute intervals. Failure to comply with this precaution could result in damage to aircraft components.**
- **Do not turn PNVS power on immediately after power was turned off. This may damage the PEU.**
- **Make sure the stabilator is clear of all obstructions before proceeding with the FD/LS check. Failure to comply could result in damage to aircraft components.**

NOTE

Periodically during the ETE check, the test is interrupted by advisory messages and prompts which require operator interaction.

e. On DEK, press and release **ABC/1** and **PQR/6** keys (ADC). On CDU, press and release **1** and **6** keys (ADD).

All FD/LS maintenance tests (FD/LS checks) for all systems with the exception of FD/LS menu addresses 4 (ACZ), 7 through 19 (ACY) and 33 through 36 (ADD) are automatically initiated sequentially. A complete list of the current NO–GO messages is displayed upon completion of the ETE check.

TASK	RESULT
f. When check is complete, check the HOD. Note and record any NO–GO message.	If **NO FAULTS DETECTED ALL SYSTEMS ARE GO** appear on the HOD, go to next step. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence: (1) Perform SYSTEMS – POWER DOWN (para 3–2). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step **c**. If NO–GO repeats after CORRECTIVE ACTION, refer to the applicable technical manual.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

g. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC)**.**

4–16 ETE – INTERACTIVE FD/LS CHECK (cont) 4–16

TASK	RESULT

NOTE

If this FD/LS check is to be followed by an OPERATIONAL CHECK or any other maintenance tasks, omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2).

NOTE

The FD/LS NO–GO display(s) that may be listed on the screen are repeated along with the CORRECTIVE ACTION at the end of each systems FD/LS check.

END OF TASK

4–17 APU – INTERACTIVE FD/LS CHECK 4–17

Tools:

Nomenclature	Part Number
Headset–Microphone	H–157/AIC
Cord Assembly, Maintenance Headset	7–262100009

Personnel Required:

(3)

References:

TM 1-1520-238-T-8 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform the FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–17 APU – INTERACTIVE FD/LS CHECK (cont) 4–17

TASK	RESULT
c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

d. Perform APU start–up (para 3–3) with two exceptions:	If APU start sequence does not begin, refer to TM 1-1520-238-T-8.
(1) Pause before performing step 10 in the APU Operating Instructions until prompted by the FD/LS check.	On the pilots center circuit breaker panel (fig. 2–6), if **FUEL BST, FUEL APU, APU HOLD**, and aft avionics bay circuit breaker panel (fig. 2–50), **APU** circuit breakers do not stay closed, refer to TM 1-1520-238-T-8. Upon successfully completing this step, go to next step.
(2) If the APU is not going to be placed on–line as aircraft power source, omit steps 11 and 12.	
e. On DEK, press and release **ABC/1** and **STU/7** keys (ADC). On CDU, press and release **1** and **7** keys (ADD).	When the prompt (message) **MOVE APU START SWITCH TO START THEN RELEASE** appears on HOD, perform step 10 in the APU – Operating Instructions. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence:

TASK	RESULT
	(1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step b .If NO–GO repeats after CORRECTIVE ACTION, refer to TM 1-1520-238-T-8.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

f. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

- After APU start–up has been initiated and no failures detected within a 90–second period has elapsed, the advisory message **APU GO ANY KEY FOR FDLS MENUS** appears on the HOD.
- If this FD/LS check is to be followed by a APU – OPERATIONAL CHECK (TM 1-1520-238-T-8), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3) if power no longer required.

4–17 APU – INTERACTIVE FD/LS CHECK (cont) 4–17

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
APU NO–GO UNDERSPEED	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO OVERTEMP	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO OVERCURRENT	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO FUEL SOL NOT ON	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO PTO CLUTCH	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO START RELAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO IGNITION NOT ON	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO IGNITION NOT OFF	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO LOW OIL PRESSURE	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
APU NO–GO OVERSPEED	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).

END OF TASK

4–18 GEN – INTERACTIVE FD/LS CHECK 4–18

Personnel Required:
(3)

References:
TM 1-1520-238-T-6
TM 1-1520-238-23
TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform the FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD (fig. 2–34), refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–18 GEN – INTERACTIVE FD/LS CHECK (cont) 4–18

TASK	RESULT
c. On DEK press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
d. Perform APU start–up (para 3–3) with one exception, stop after performing step 10 and do not proceed with the APU Operating Instructions until prompted by the FD/LS check.	If any circuit breakers do not stay closed, refer to TM 1-1520-238-T-6. Upon successfully completing this step, go to next step.
e. On DEK, press and release **ABC/1** and **VWX/8** keys (ADC). On CDU, press and release **1** and **8** keys (ADD).	When the prompt (message) **PUT GEN 1 SWITCH IN TEST POSITION** appears on HOD, go to next step.
f. On **ELEC PWR** panel (fig. 2–27), set and hold **GEN1/OFF/RESET/ TEST** switch to **TEST**.	Generator 1 is continually tested for test power for 30 seconds. When the prompt (message) **PUT GEN 2 SWITCH IN TEST POSITION** appears on HOD, go to next step.

4–18 GEN – INTERACTIVE FD/LS CHECK (cont) 4–18

TASK	RESULT
g. On **ELEC PWR** panel, release **GEN1/OFF/RESET/ TEST** switch, and set and hold **GEN 2/OFF/RESET/TEST** switch to **TEST**.	Generator 2 is continually tested for test power for 30 seconds. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence. (1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) On DEK, rotate **DATA ENTRY** switch to **STBY** for 5 seconds, then back to **FD/LS** (ADC). (5) Repeat FD/LS check beginning with step b. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 1-1520-238-T-6. When the advisory message **GENERATOR SYSTEMS GO** appears on HOD, go to next step.
h. Release the **GEN 2 /OFF/RESET/TEST** switch.	

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

i. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).	

4–18 GEN – INTERACTIVE FD/LS CHECK (cont) 4–18

TASK	RESULT

NOTE

If this FD/LS check is to be followed by a AC ELECTRICAL POWER GENERATION – OPERATIONAL CHECK (TM 1-1520-238-T-6), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) and APU shut down (para 3–3) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
GENERATOR 1 NO–GO LH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-6). If troubleshooting does not remove NO–GO, replace generator 1 (TM 1-1520-238-23).
GENERATOR 2 NO–GO RH XMSN BAY	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-6). If troubleshooting does not remove NO–GO, replace generator 2 (TM 1-1520-238-23).
GENERATOR 1 CONTROL NO–GO POWER CENTER	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-6). If troubleshooting does not remove NO–GO, replace generator 1 (TM 1-1520-238-23).
GENERATOR 2 CONTROL NO–GO POWER CENTER	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-6) .If troubleshooting does not remove NO–GO, replace generator 2 (TM 1-1520-238-23).

END OF TASK

4–19 TRAN – INTERACTIVE FD/LS CHECK 4–19

Personnel Required:
(3)

References:
TM 1-1520-238-T-4 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO–GO** message appears.
- If FD/LS message on HOD (fig. 2–34) does not change within 2 seconds after responding to the prompted control/switch position change (acknowledge), discontinue FD/LS test; go to TM 1-1520-238-T-4 and perform the DRIVE SYSTEM – OPERATIONAL CHECK.

TASK	RESULT
a. On DEK (fig. 2–49), rotate **DATA ENTRY** switch to **FD/LS** (ADC). On CDU (fig. 2–49.2), select FAB **FDLS** (ADD).	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **ENTER/ SPACE** key on the DEK (ADC) or **SPC** key on the CDU (ADD). Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**

4–19 TRAN – INTERACTIVE FD/LS CHECK (cont) 4–19

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except **ENTER SPACE** or **SHIFT** (ADC); or any key on the CDU, except **SPC** (ADD).	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
c. On DEK, press and release **(↵)/0** and **VWX/8** keys (ADC). On CDU, press and release **0** and **8** keys (ADD).	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
d. On pilot center circuit breaker panel (fig. 2–6), open **ENG START** circuit breaker.	
e. On DEK, press and release **ABC/1** and **YZ*/9** key s (ADC). On CDU, press and release **1** and **9** keys (ADD).	When the advisory message **NOSE GEAR BOX +XSN DATA** **NGB1 XMN1 XMN2 NGB2** **00LB 00LB 00LB 00LB** **–31°C –31°C –31°C –31°C** Appears on HOD, go to next step. If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence.

TASK	RESULT
	(1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 1-1520-238-T-4.

NOTE

Record all NO–GOs before rotating **DATA ENTRY** switch to **STBY** (ADC).

f. On DEK, rotate **DATA ENTRY** switch to **STBY** (ADC).

NOTE

If this FD/LS check is to be followed by a DRIVE SYSTEM – INDICATORS OPERATIONAL CHECK (TM 1-1520-238-T-4), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

4–19 TRAN – INTERACTIVE FD/LS CHECK (cont) 4–19

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
NGB1 00LB	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
XMN1 00LB	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
XMN2 00LB	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
NGB2 00LB	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
NGB1 –31°C	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
XMN1 –31°C	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
XMN2 –31°C	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
NGB2 –31°C	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.

END OF TASK

4–33 CDU – INTERACTIVE FD/LS CHECK (ADD) 4–33

Personnel Required:
(2)

References:
TM 11-1520-238-23-2 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform FD/LS check as follows:

TASK	RESULT
a. On CDU (fig. 2–49.2), select FAB **FDLS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **SPC** key on the CDU. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except **SPC**.	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

4–33 CDU – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–33**

TASK	RESULT
c. On CDU, press and release **0** and **8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
e. On CDU, press and release **3** and **3** keys.	If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence. (1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2.

4–33 CDU – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–33**

TASK	RESULT

NOTE

If this FD/LS check is to be followed by a DOPPLER OPERATIONAL CHECK (TM 11-1520-238-23-2), omit step 3.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
CONTROL DISPLAY UNIT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.

END OF TASK

4–34 DNS – INTERACTIVE FD/LS CHECK (ADD) 4–34

Personnel Required:

(2)

References:

TM 11-1520-238-23-1
TM 11-1520-238-23-2
TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

TASK	RESULT
a. On CDU (fig. 2–49.2), select FAB **FDLS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **SPC** key on the CDU. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except **SPC**.	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

4–34 DNS – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–34**

TASK	RESULT
c. On CDU, press and release **0** and **8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
e. On CDU, press and release **3** and **4** keys.	If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence. (1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
SIGNAL DATA CONV–COMP NO–GO LH AFT CATWALK	Replace SDCC TM 11-1520-238-23-1.
RCVR–XMTR ASSY NO–GO BELLY	Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.

4–34 DNS – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–34**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
ATT–HDG INPUT SIGNALS NO–GO SDCC–HARS WIRING	Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.
ARINC OUTPUT SIGNAL NO–GO	Troubleshoot wiring to isolate fault lt TM 11-1520-238-23-2.

END OF TASK

4–35 DTU – INTERACTIVE FD/LS CHECK (ADD) 4–35

Personnel Required:
(2)

References:
TM 11-1520-238-23-2 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.

2. Perform FD/LS check as follows:

TASK	RESULT
a. On CDU (fig. 2–49.2), select FAB **FDLS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **SPC** key on the CDU. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except **SPC**.	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.
c. On CDU, press and release **0** and **8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–35 DTU – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–35**

TASK	RESULT
NOTE **RHE – RT BUS NO–GO RH FAB (ACZ)** and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.	
	When **MUX COMMUNICATION GO** appears on the HOD, go to next step.
e. On CDU, press and release **3** and **5** keys.	If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence. (1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2
3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.	

4–35 DTU – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–35**

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
DATA TRANSFER UNIT NO–GO CPG COMPARTMENT	Troubleshoot wiring to isolate fault (TM 11-1520-238-23-2).
DTC BATTERY LOW NO–GO CPG COMPARTMENT	Replace DTC batteries (TM 11-1520-238-23-2).

END OF TASK

4–36 EGI – INTERACTIVE FD/LS CHECK (ADD) 4–36

Personnel Required:
(2)

References:
TM 11-1520-238-23-2 TM 9-1230-476-20-2

NOTE

If the AGPU is selected to provide power to the aircraft, refer to paragraph 3–1. If the APU is selected to provide power to the aircraft, refer to paragraph 3–3.

1. Perform SYSTEMS – POWER–UP procedures in accordance with paragraph 3–1.
2. Perform FD/LS check as follows:

NOTE

Datum must be entered.

TASK	RESULT
a. On CDU (fig. 2–49.2), select FAB **FDLS**.	If there are no system failures, the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS** When a list of failures is displayed, the list is scrolled by pressing and releasing the **SPC** key on the CDU. Scroll until the following message (prompt) appears: **ANY KEY FOR FD/LS MENUS**
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except **SPC**.	If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.

4–36 EGI – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–36**

TASK	RESULT
c. On CDU, press and release **0** and **8** keys.	If any MUX NO–GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When **MUX COMMUNICATION GO** appears on the HOD, go to next step.

NOTE

RHE – RT BUS NO–GO RH FAB (ACZ) and/or **RHE – LT BUS NO–GO RH FAB (ACZ)** will appear if both pilot and CPG **SAFE/ARM** switches are off.

NOTE

The aircraft must be on the ground, **LAND** selected and no torque from either engine for at least 90 seconds for the **EXTENDED ALIGN TEST** to be performed.

e. On CDU, press and release **3** and **6** keys.	Check that the following message appears on HOD: **ENTER THE NUMBER OF THE TEST TO PERFORM** **1 QUICK TEST** **2 EXTENDED ALIGN TEST** If **2** is selected, check that the following message appears on HOD: **EGI TEST IN PROGRESS – WAIT FOR ALIGN TO END** If one or more FD/LS NO–GO displays listed appear on the HOD, perform the following in sequence.

4–36 EGI – INTERACTIVE FD/LS CHECK (ADD) (cont) **4–36**

TASK	RESULT
	(1) Perform SYSTEMS – POWER DOWN (para 3–2) and APU shutdown (para 3–3). (2) Perform CORRECTIVE ACTION indicated for first NO–GO displayed on HOD. (3) Perform SYSTEMS – POWER–UP (para 3–1). (4) Repeat FD/LS check beginning with step 2. If NO–GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2.

3. Perform SYSTEMS – POWER DOWN (para 3–2) if power no longer required.

FD/LS NO–GO DISPLAY	CORRECTIVE ACTION
EGI UNIT NO–GO RFAB TAILCONE	Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.

END OF TASK

APPENDIX A
REFERENCES

A–1 GENERAL.

This appendix contains a list of all official publications referenced in this technical manual.

A–2 REFERENCES.

TECHNICAL MANUALS

TM 1-1270-476-T	Aviation Unit Troubleshooting Manual, Target Acquisition Designation Sight (TADS) Assembly AN/ASQ–170 AH–64A Attack Helicopter
TM 1-1270-476-20	Aviation Unit Maintenance Manual, Target Acquisition Designation Sight (TADS) Assembly AN/ASQ–170 AH–64A Attack Helicopter
TM 1-1520-238-23	Aviation Unit and Aviation Intermediate Maintenance Manual for Army AH–64A Helicopter
TM 1-1520-238-T-4	AVUM/AVIM Troubleshooting; Introduction; Airframe; Landing Gear; Power Plants; Rotor; Drive System
TM 1-1520-238-T-5	AVUM/AVIM Troubleshooting; Hydraulic and Pneumatic Systems; Instruments
TM 1-1520-238-T-6	AVUM/AVIM Troubleshooting; Electrical
TM 1-1520-238-T-7	AVUM/AVIM Troubleshooting; Fuel Systems; Flight Controls
TM 1-1520-238-T-8	AVUM/AVIM Troubleshooting; Utilities System; Environmental System; Hoists and Winches; Auxiliary Power Unit; Mission Equipment
TM 1-5855-265-20	Aviation Unit Maintenance Manual, Pilot Night Vision Sensor (PNVS) Assembly AN/AAQ–11
TM 1-5855-265-T	Aviation Unit Troubleshooting Manual, Pilot Night Vision Sensor (PNVS) Assembly AN/AAQ–11

TECHNICAL MANUALS (cont)

TM 9-1090-208-23-1	Aviation Unit and Intermediate Maintenance Manual for Armament Subsystem, Helicopter: M139 Gun, Automatic, 30–Millimeter: M230 Rocket Management Subsystem, Inventory – Deployment: M140
TM 9-1090-208-23-2	Aviation Unit and Intermediate Troubleshooting Manual for Armament Subsystem, Helicopter: M139 Gun, Automatic, 30–Millimeter: M230 Rocket Management Subsystem, Inventory – Deployment: M140
TM 9-1230-476-20-1	Aviation Unit Maintenance Manual for Army AH–64A Helicopter Fire Control System
TM 9-1230-476-20-2	Aviation Unit Troubleshooting Manual for Army AH–64A Helicopter Fire Control System
TM 9-1270-221-23	Aviation Unit and Intermediate Maintenance Manual for Fire Control Subsystem, Helmet Directed: M142 (Used with M139 Helicopter Armament Subsystem)
TM 9-1270-476-30	Aviation Intermediate Maintenance Manual, Target Acquisition Designation Sight (TADS) Assembly AN/ASQ–170 AH–64A Attack Helicopter
TM 9-1425-475-20	Maintenance Instructions, Aviation Unit Maintenance; Launcher, Guided Missile, Aircraft, M272 Part No. 13009444; Guided Missile, Surface Attack, AGM–114A Part No. 13007352; HELLFIRE Modular Missile System
TM 9-1427-475-20	Aviation Unit Maintenance Manual for Army AH–64A Helicopter HELLFIRE Missile Equipment (Point Target Weapon System) and AH–64A Helicopter Launcher Interface (Launcher, Guided Missile, Aircraft, M272)
TM 11-1520-238-23-1	Aviation Unit and Intermediate Maintenance Manual, Army Model AH–64A Helicopter, Avionics Configuration

TECHNICAL MANUALS (cont)

TM 11-1520-238-23-2	Aviation Unit and Intermediate Troubleshooting Manual, Army Model AH–64A Helicopter, Avionics Configuration
TM 11-5855-265-30	Aviation Intermediate Maintenance Manual, AH–64A Attack Helicopter Pilot Night Vision Sensor (PNVS) Assembly AN/AAQ–11
TM 1-1520-238-23	Aviation Unit and Aviation Intermediate Maintenance Manual for Army AH–64A Helicopter
TM 55-1730-229-12	Operator and Organizational Maintenance Manual, Power Unit, Aviation, Multi–Output GTED Electrical, Hydraulic, Pneumatic (AGPU) Wheel Mounted, Self–Propelled, Towable, AC 400Hz, 3PH, 0.8PF, 115/200V, 30 KW. DC 28 VDC 700 Amps, Pneumatic 60 lbs/min at 40 psig, Hydraulic 15 gpm at 3300 psig. DOD Model MEP 360A, Class Precise, Hertz 400 (NSN 1730–01–144–1897)

GLOSSARY

Section I. ABBREVIATIONS AND ACRONYMS

ACK	Acknowledge
ACM	Automatic Control Module
ACQ SEL	Acquisition Select
ADS	Air Data System
ADSS	Air Data Sybsystem
AGPU	Aviation Ground Power Unit
AL	Align
AND	Alphanumeric Display
APRCH	Approach
APU	Auxiliary Power Unit
AQC	Acquire
ARCS	Aerial Rocket Control System
ATT	Attitude
ATTD	Attitude
AUX	Auxiliary
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
AWS	Area Weapon System
AZ	Azimuth
BATT	Battery
BBC	Back–Up Bus Controller
BIT	Built–In–Test
BITE	Built–In–Test Electronics
BST	Boost, Boresight
BTL	Bottle
BUCS	Back–Up Control Subsystem
C	Celsius

CCA	Circuit Card Assembly
CDU	Control Display Unit
CIR BRKR	Circuit Breaker
COLL	Collective
COMP	Computer
CONV	Converter
CPG	Copilot/Gunner
CSC	Communication System Control
DAP	Display Adjust Panel
DASE	Digital Automatic Stabilization Equipment
DEK	Data Entry Keyboard
DEU	Display Electronics Unit
DICE	De–Ice
DIR	Direct
DOD	Department of Defense
DNS	Doppler Navigation System
DSA	Day Sensor Assembly
DTC	Data Transfer Cartridge
DTR	Data Transfer Receptacle
DTU	Data Transfer Unit
DVO	Direct View Optics
ECA	Electronic Control Amplifier
ECS	Environmental Control System
ED	Edit
EDGE LT PNL	Edge Light Panel
EGI	Embedded GPS Inertial
ENCU	Environmental Control Unit
ESC	External Stores Controller
ETE	End–to–End
EXT PWR	External Power
F	Fahrenheit

FAB	Forward Avionics Bay, Fixed Action Button
FCC	Fire Control Computer
FD/LS	Fault Detection and Location System
FIRE EXTGH	Fire Extinguisher
FLIP	Flight Information Publications
FLIR	Forward Looking Infrared
GEN	Generator
GHS	Gunner Helmet Sight
GND	Ground
GUN BST	Gun Boresight
HAD	High–Action–Display
HARS	Heading Attitude Reference System
HDD	Heads Down Display
HDG	Heading
HDU	Helmet Display Unit
HOD	Heads Out Display
HMD	Helmet
HMMS	HELLFIRE Modular Missile Systems
HSI	Horizontal Situation Indicator
HTR	Heater
ICS	Intercommunication System
IFR	Instrument Flight Rules
IGN	Ignition
IHADSS	Integrated Helmet and Display Sight System
INTR/EXT	Interior/Exterior
IVD	Indirect View Display
KBD	Keyboard
L	Left
LAT	Lateral
L CSL	Left Console

LEU	Laser Electronics Unit
LH FAB	Left Hand Forward Avionics Bay
LOAL	Lock On After Launch
LONG	Longitude
LRU	Line Replaceable Unit
LSR	Laser
LT OUTBD	Left Out Board
LTR	Laser Tracker Receiver
LTU	Laser Transceiver Unit
LVDT	Linear Variable Differential Transformer
MIC	Microphone
MID	Middle
MRTU	Multiplex Remote Terminal Unit
MSG	Message
MSL	Missile
MUX	Multiplex
MV	Magnetic Variation
N	No
NAV	Navigation
ND	Nose Down
NOE	Nap–of–the–Earth
NORM	Normal
NSA	Night Sensor Assembly
NU	Nose Up
NVS FXD	Night Vision Sensor Fixed
OPR	Operate
ORC	Optical Relay Column
ORIDE	Override
ORT	Optical Relay Tube
PAS	Pressurized Air System
PEU	Pilot Night Vision Sensor Electronic Unit

PGM	Program
PLT	Pilot
PLRT/BRSIT	Polarity/Boresight
PNVS	Pilot Night Vision Sensor
PNVS BST	Pilot Night Vision Sensor Boresight
PPOS	Present Position
PRI	Primary
PTO	Power Takeoff
PWR	Power
PYLN	Pylon
PYLN BST	Pylon Boresight
R	Right
RAM	Random Access Memory
R CTR CSL	Right Center Console
RCVR	Receiver
RHE	Remote HELLFIRE Electronics
RH FAB	Right Hand Forward Avionics Bay
RKT	Rocket
RNDS CRT–MAG	Rounds Counter – Magazine
RT OUTBD	Right Outboard
RTR BK	Rotor Brake
SCU	Stabilization Control Unit
SDCC	Signal Data Converter Computer
SEU	Sight Electronics Unit
SIGHT SEL	Sight Select
SPAD	Shear Pin Activated Decoupler
SPC	Space
SPH	Spheroid
SSU	Sight Survey Unit
STAB	Stabilator
STBY	Standby
SYMG	Symbol Generator

TADS	Target Acquisition and Designation Sight
TAGA	TADS Auto Gyro Align
TADS BST	Target Acquisition and Designation Sight Boresight
TEMP	Temperature
TEU	Target Acquisition Designation Sight Electronics Unit
TRAN	Transmission
TV	Television
UTIL	Utility
UTM	Universal Transverse Mercator
VAB	Variable Action Button
VDU	Video Display Unit
VF	Verify
VFR	Visual Flight Rules
VOL	Volume
VID	Video
W	Wide
WSHLD	Windshield
Y	Yes
Z/W/M/N	Zoom/Wide/Medium/Narrow

Section II.

AUDIBLE	Capable of being heard.
PROMPTING	Symbols that appear on a display notifying the operator to perform an action.

INDEX

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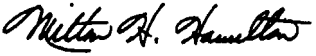
GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMIILTON
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01130

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To: 2028@redstone.army.mil
Subject DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-2840-229-23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04-JUL-85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

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PFC John DOE
CO A 3rd Engineer Bn
Ft. Leonardwood, MO 63108

DATE SENT

10 January 1999

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 1–1520–238-T-1	30 December 1998	Troubleshooting Manual for AH-64

BE EXACT PIN–POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2–1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4–3 is pointed at a bolt. In key to figure 4–3, item 16 is calle a shim. Please correct one or the other

EXAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317–7111

SIGN HERE

JOHN DOE John Doe

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Temperature (Exact)

° F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	° C

PIN: 067713–009