

TM 1-1520-238-T-1

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**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  
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unlimited.

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**HEADQUARTERS  
DEPARTMENT OF THE ARMY  
31 March 1992**



CHANGE }  
NO. 9 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 15 FEBRUARY 2002

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

FAULT DETECTION/  
LOCATION SYSTEM

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

**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

A through D  
i and ii  
4-21 through 4-24  
-----

Insert pages

A through D  
i and ii  
4-21 through 4-24  
4-24.1/(4-24.2 blank)

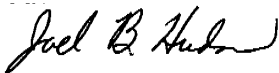
**TM 1-1520-238-T-1**  
**C 9**

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

**By Order of the Secretary of the Army:**

**ERIC K. SHINSEKI**  
*General, United States Army*  
*Chief of Staff*

Official: \_\_\_\_\_



**JOEL B. HUDSON**  
*Administrative Assistant to the*  
*Secretary of the Army*

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CHANGE } HEADQUARTERS  
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WASHINGTON, D.C., 25 May 2001

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

\_\_\_\_\_

3-13 and 3-14

3-19 and 3-20

Insert pages

A through D

3-13 and 3-14

3-19 and 3-20

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

TM 1-1520-238-T-1

C 8

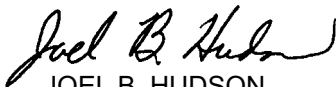
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CHANGE } HEADQUARTERS  
NO. 7 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 27 February 1998

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

ix/(x blank)

2-5 and 2-6

2-6.1/(2-6.2 blank)

Insert pages

ix/(x blank)

2-5 and 2-6

2-6.1/(2-6.2 blank)

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

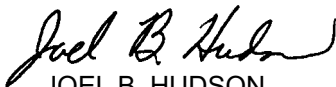
TM 1-1520-238-T-1

C 7

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CHANGE } HEADQUARTERS  
NO. 6 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 19 December 1997

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
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.

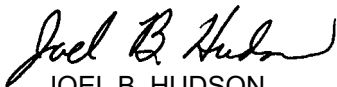
**TM 1-1520-238-T-1**

**C 6**

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JOEL B. HUDSON

*Administrative Assistant to the*  
*Secretary of the Army*

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CHANGE } HEADQUARTERS  
NO. 5 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 September 1996

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
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 2-29 through 2-30.1/(2-30.2 blank)	2-17 through 2-20 2-29 through 2-30.2
3-7 through 3-10 3-19 and 3-20	3-7 through 3-10 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

4-37 through 4-40

4-43 through 4-56

4-58.3/(4-58.4 blank)

4-61 through 4-68

—

4-69 through 4-72

4-75 through 4-78

4-88.3 through 4-92

4-97 through 4-100

4-107 through 4-114

—

4-115 through 4-126

—

Glossary 1 through

Glossary 6

—

Index 1 through Index

5/(Index 6 blank)

Insert pages

4-37 through 4-40

4-43 through 4-56

4-58.3/(4-58.4 blank)

4-61 through 4-68

4-68.1/(4-68.2 blank)

4-69 through 4-72

4-75 through 4-78

4-88.3 through 4-92

4-97 through 4-100

4-107 through 4-114

4-114.1/(4-114.2 blank)

4-115 through 4-126

4-127 through 4-138

Glossary 1 through

Glossary 6

Glossary 7/(Glossary 8  
blank)

Index 1 through Index

5/(Index 6 blank)

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

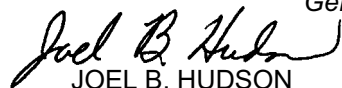
By Order of the Secretary of the Army:

Official:

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*General, United States Army*

*Chief of Staff*



JOEL B. HUDSON

*Administrative Assistant to the*

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To be distributed in accordance with DA Form 12-31-E, block no. 1436, requirements for TM1-1520-238-T -1.

CHANGE } HEADQUARTERS  
NO. 4 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 1 February 1996

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
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

4-67 through 4-74

4-79 through 4-88

—

4-89 and 4-90

4-105 and 4-106

4-125 and 4-126

Index 1 through Index 4

Insert pages

4-67 through 4-74

4-79 through 4-88

4-88.1 through 4-88.10

(4-89 blank)/4-90

4-105 and 4-106

4-125 and 4-126

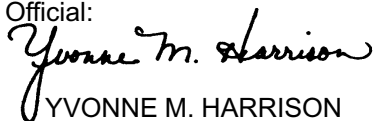
Index 1 through Index 4

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By Order of the Secretary of the Army:

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CHANGE } HEADQUARTERS  
NO. 3 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 28 December 1994

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.

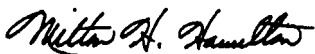
**TM 1-1520-238-T-1**

**C 3**

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GORDON R. SULLIVAN  
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*Chief of Staff*

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MILTON H. HAMILTON  
*Administrative Assistant to the*  
*Secretary of the Army*  
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CHANGE } HEADQUARTERS  
NO. 2 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 December 1993

AVIATION UNIT  
MAINTENANCE MANUAL  
for  
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.

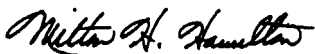
**TM 1-1520-238-T-1**

**C 2**

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*Administrative Assistant to the*  
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TM1-1520-238-T-1.

CHANGE } HEADQUARTERS  
NO. 1 } DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 November 1992

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

2-19 through 2-22

2-19 through 2-22

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

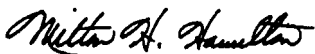
**TM 1-1520-238-T-1**

**C 1**

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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.**

**LIST OF EFFECTIVE PAGES**

**INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.**

**NOTE:** The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands.

**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

**TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 286, CONSISTING OF THE FOLLOWING:**

<b>Page No.</b>	<b>*Change No.</b>
Cover .....	5
Blank .....	5
a - b .....	6
A - D .....	9
i .....	9
ii .....	0
iii .....	5
iv - v .....	0
vi .....	1
vii .....	0
viii .....	4
ix .....	7
x Blank .....	7
1-1 - 1-19 .....	5
1-20 Blank .....	5
2-1 - 2-2 .....	0

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

**LIST OF EFFECTIVE PAGES**

**INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.**

<b>Page No.</b>	<b>*Change No.</b>
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
4-28 .....	6

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



**LIST OF EFFECTIVE PAGES**

**INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.**

Page No.	*Change No.
4-28.1 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 - 4-4.9 .....	5
4-88.10 Added .....	4
4-89 Blank Deleted .....	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
4-107 - 4-109 .....	5

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

<b>LIST OF EFFECTIVE PAGES</b>
------------------------------------

**INSERT LATEST CHANGED  
PAGES: DESTROY  
SUPERSEDED PAGES.**

<b>Page No.</b>	<b>*Change No.</b>
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 the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5230. A reply will be furnished directly to you.

You may also submit your recommended changes by E-mail directly to 2028@redstone.army.mil or by fax 205-842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the end of this manual immediately preceding the hard copy 2028.

**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.**

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CHAPTER 3 POWER APPLICATIONS . . . . .	3-1
CHAPTER 4 SYSTEMS FD/LS CHECKS . . . . .	4-1
APPENDIX A REFERENCES . . . . .	A-1
GLOSSARY . . . . .	Glossary 1
ALPHABETICAL INDEX . . . . .	Index 1

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## HOW TO USE THIS MANUAL – continued

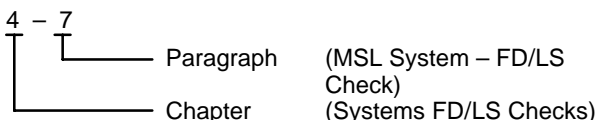
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### OVERVIEW

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.

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## HOW TO USE THIS MANUAL – continued

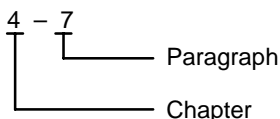
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### PARAGRAPHS

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.

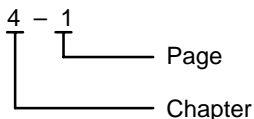
### PARAGRAPH NUMBERING

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.

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**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.

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## HOW TO USE THIS MANUAL – continued

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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.



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**HOW TO USE THIS MANUAL – continued**


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**INITIAL SETUP EXAMPLE**


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**4-7. MSL SYSTEM – FD/LS CHECK**


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4-7

**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
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:**

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

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**HOW TO USE THIS MANUAL – continued**


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**WARNINGS, CAUTIONS, AND NOTES**

<b>WARNING</b>
----------------

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

<b>CAUTION</b>
----------------

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 effectiveness 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:

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

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**HOW TO USE THIS MANUAL – continued**

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<u>Code</u>	<u>Helicopter Serial Number</u>
<b>ADC</b>	Before MWO 1-1520-238-50-49
<b>ADD</b>	After MWO 1-1520-238-50-49
<b>ADP</b>	After MWO 1-1520-238-50-50



# CHAPTER 1 INTRODUCTION

## CHAPTER OVERVIEW

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

## CHAPTER INDEX

Para Title	Para No.
<b>Section I – GENERAL INFORMATION</b>	
Fault Detection and Location System (FD/LS) – General .....	1-1
Major Functions .....	1-2
Controls and Indicators .....	1-3
Display Indications .....	1-4
<b>Section II – FD/LS OPERATING MODES</b>	
FD/LS Operation – General .....	1-5
Operator Applications for the DEK (ADC) – General .....	1-6
Operator Applications for the CDU (ADD) – General .....	1-7

## **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.

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**1-3 CONTROLS AND INDICATORS**

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1-3

**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.

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)

(4) 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).

(5) 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).

(6) 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.

(7) 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).

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

## 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.

<u>CONTINUOUS TEST MODE NO-GO MESSAGE</u>	<u>MAINTENANCE TEST MODE MENU ADDRESS</u>
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
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

1-5 FD/LS OPERATION – GENERAL (cont)

1-5

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
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
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

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

1-5

CONTINUOUS TEST MODE NO-GO MESSAGE	MAINTENANCE TEST MODE MENU ADDRESS
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
MUX COMMUNICATION NO-GO LT INBD	08 - MUX
MUX COMMUNICATION NO-GO RT INBD	08 - MUX
MUX COMMUNICATION NO-GO RT OUTBD	08 - MUX

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

1-5

<u>CONTINUOUS TEST MODE NO-GO MESSAGE</u>	<u>MAINTENANCE TEST MODE MENU ADDRESS</u>
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
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

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

1-5

<u>CONTINUOUS TEST MODE NO-GO MESSAGE</u>	<u>MAINTENANCE TEST MODE MENU ADDRESS</u>
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
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

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

1-5

<u>CONTINUOUS TEST MODE NO-GO MESSAGE</u>	<u>MAINTENANCE TEST MODE MENU ADDRESS</u>
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<b>DTC BATTERY LOW (ADD)</b>	<b>35 – DTU</b>
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<b>EGI SYSTEM NO-GO (ADD)</b>	<b>36 – EGI</b>
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<u>CONTINUOUS TEST MODE NO-GO MESSAGE</u>	<u>BORESIGHT MENU ADDRESS</u>
---	-----------------------------------

<b>TADS BORESIGHT NO-GO</b>	<b>22 – ED (EDIT MODE)</b>
---------------------------------	----------------------------

<b>GUN BORESIGHT NO-GO</b>	<b>25 – ED (EDIT MODE)</b>
--------------------------------	----------------------------

<b>PYLON BORESIGHT NO-GO</b>	<b>28 – ED (EDIT MODE)</b>
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<b>PNVS BORESIGHT NO-GO</b>	<b>31 – ED (EDIT MODE)</b>
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## 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:

<u>System In Use</u>	<u>Message</u>
TADS	<b>TADSBST?</b>
PNVS	<b>PNVSBST?</b>
GUN	<b>GUN BST?</b>
ROCKETS/ MISSILES	<b>PYLNBSST?</b>

(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

<u>SYSTEM</u>	<u>CONTINUOUS MESSAGE</u>	<u>MAINTENANCE MESSAGE</u>
GUN	<b>GUN BORESIGHT NO-GO</b>	<b>GUN BORESIGHT NO-GO RAM CHECKSUM</b>
PYLONS	<b>PYLON BORESIGHT NO-GO</b>	<b>PYLON BORESIGHT NO-GO RAM CHECKSUM</b>
TADS	<b>TADS BORESIGHT NO-GO</b>	<b>TADS BORESIGHT NO-GO RAM CHECKSUM</b>
PNVS	<b>PNVS BORESIGHT NO-GO</b>	<b>PNVS BORESIGHT NO-GO RAM CHECKSUM</b>

(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 – 1-6**  
**(ADC) GENERAL (cont)**

---

- (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**.

---

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


---

(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.

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

(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.

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

(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.

---

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

---

(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

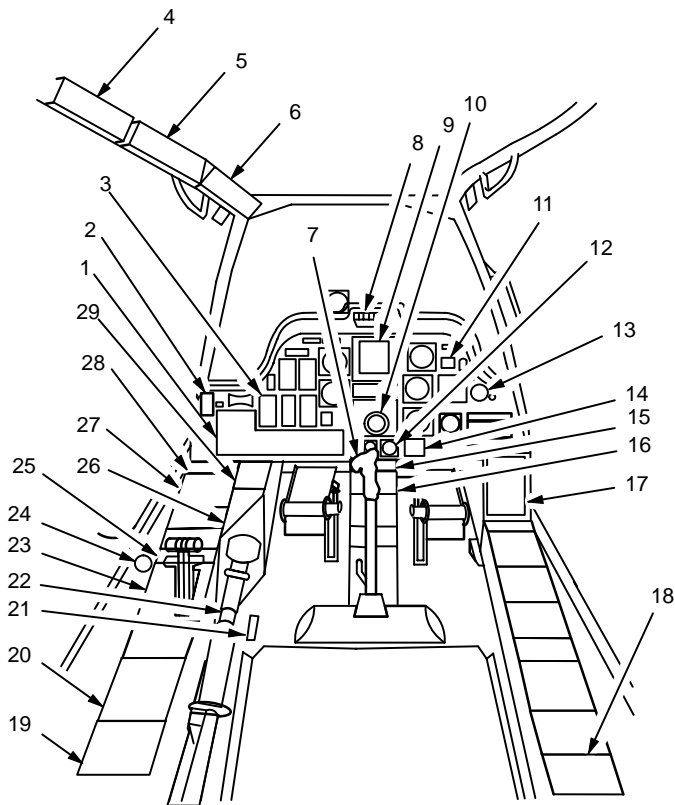
Chapter 2 contains locator figures of the cockpit controls and circuit breakers along with aft avionics bay circuit breakers.

#### CHAPTER INDEX

Para Title	Para No.
<b>Section I – CREW STATION CONFIGURATIONS</b>	
Pilot Station Layout .....	2-1
Copilot/Gunner (CPG) Station Layout .....	2-2
<b>Section II – AFT AVIONICS BAY COMPONENT LOCATIONS</b>	
Aft Avionics Bay .....	2-3

**Section I. CREW STATION CONFIGURATIONS****2-1 PILOT STATION LAYOUT.**

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



M54-046

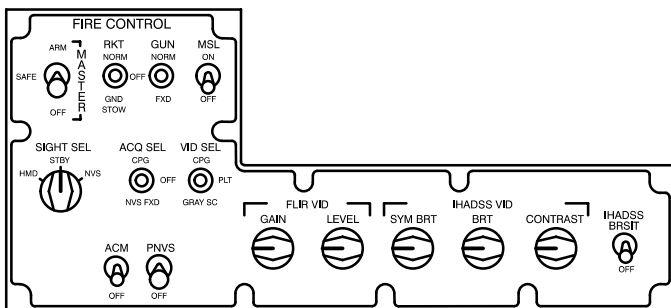
Figure 2-1. Station Locator

## 2-1 PILOT STATION LAYOUT (cont)

2-1

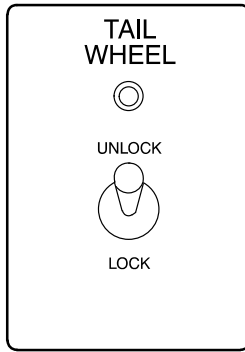
INDEX NO.	NOMENCLATURE	FIG NO.
1	FIRE CONTROL PANEL	2-2
2	TAIL WHEEL LOCK CONTROL PANEL	2-3
3	FUEL QUANTITY INDICATOR	2-4
4	AFT CIRCUIT BREAKER PANEL	2-5
5	CENTER CIRCUIT BREAKER PANEL	2-6
6	FORWARD CIRCUIT BREAKER PANEL (ADC)	2-7
6	FORWARD CIRCUIT BREAKER PANEL (ADD)	2-7.1
7	CYCLIC STICK GRIP	2-8
8	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
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19	ANTI ICE CONTROL PANEL	2-22
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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
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27	AREA ROCKET CONTROL PANEL	2-29
28	AUTOMATIC STABILIZATION EQUIPMENT PANEL	2-30
29	MISSILE PANEL	2-31



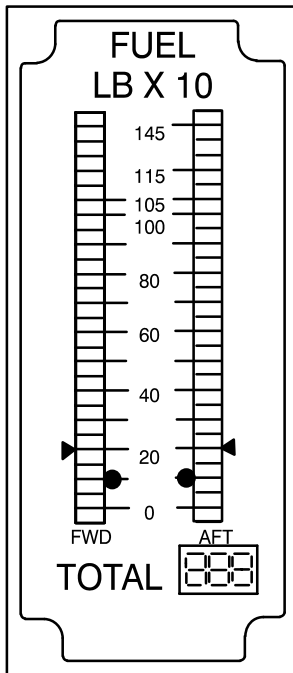
M54-047

Figure 2-2. Fire Control Panel



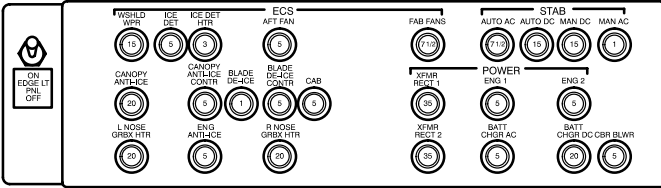
M54-048

Figure 2-3. Tail Wheel Lock Control Panel



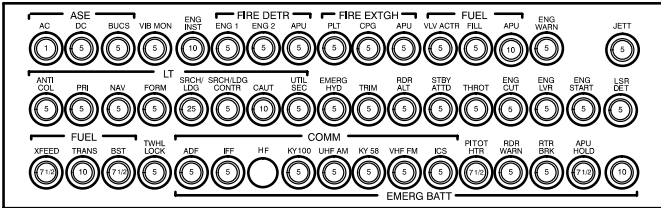
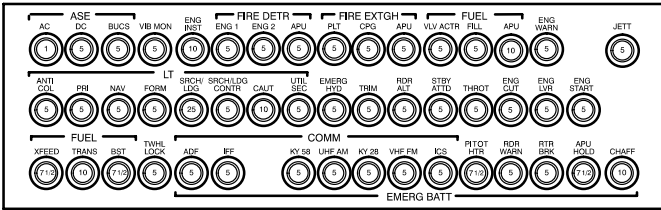
M54-049

Figure 2-4. Fuel Quantity Indicator



M54-050

Figure 2-5. Aft Circuit Breaker Panel

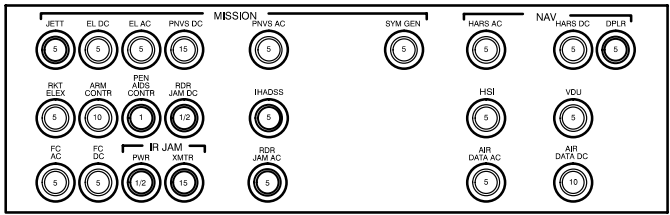


M54-051A

Figure 2-6. Center Circuit Breaker Panel

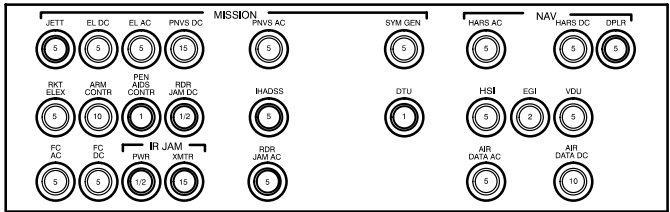
2-1 PILOT STATION LAYOUT (cont)

2-1



M54-052A

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

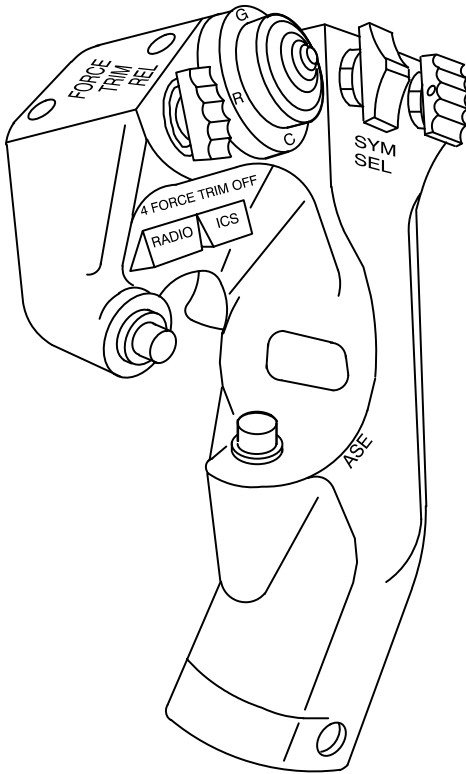


M54-100

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

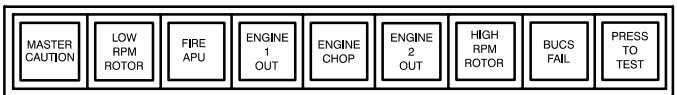






M54-053

Figure 2-8. Cyclic Stick Grip



M54-054

Figure 2-9. Master Caution/Warning Panel

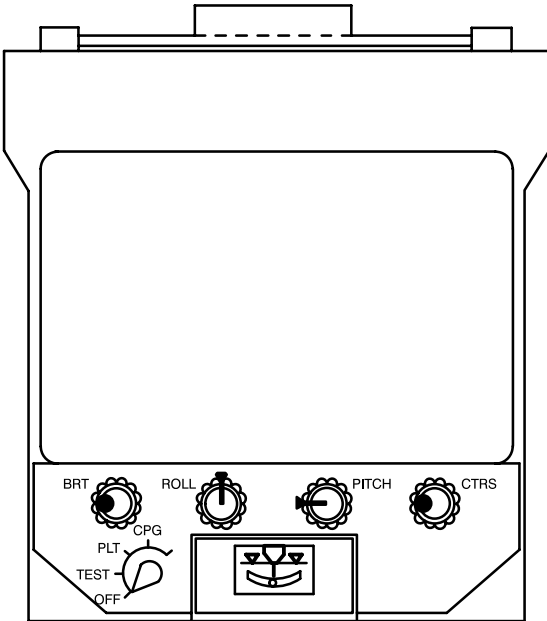


Figure 2-10. Video Display Unit

M54-055

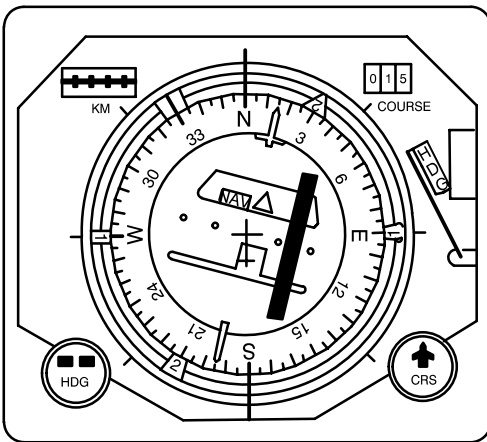
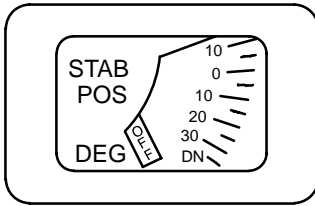


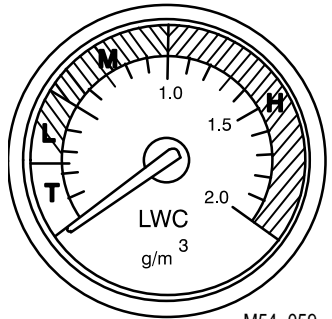
Figure 2-11. Horizontal Situation Indicator

M54-056



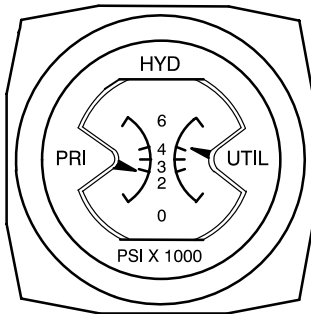
M54-057

Figure 2-12. Stabilator Position Indicator



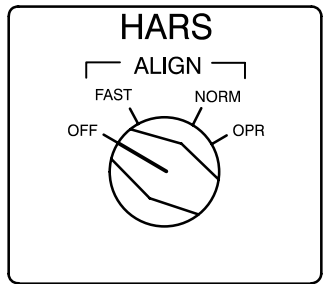
M54-059

Figure 2-14. Icing Severity Meter



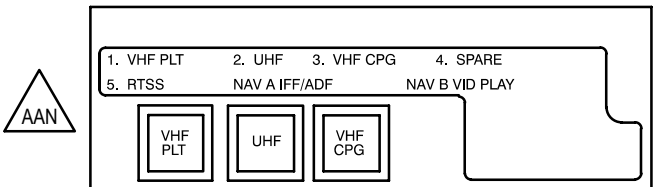
M54-058

Figure 2-13. Hydraulic Pressure Gage



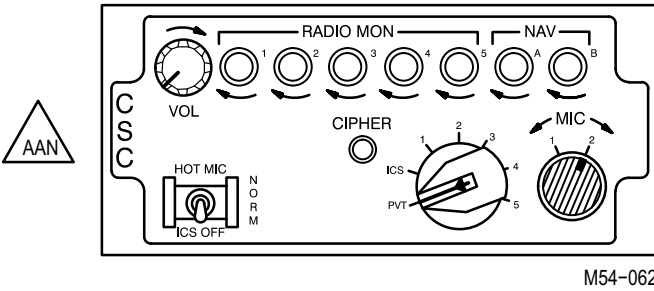
M54-060

Figure 2-15. HARS Panel



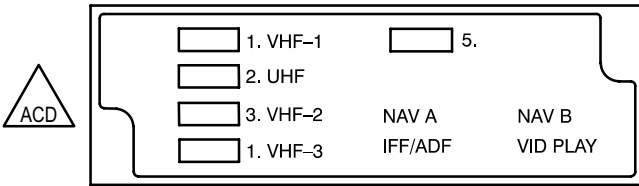
M54-061

Figure 2-16. Remote Transmit Selector Panel



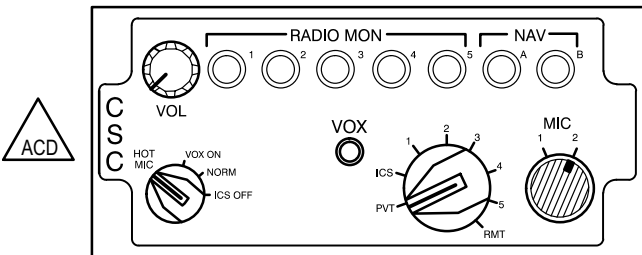
M54-062

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



M54-063

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

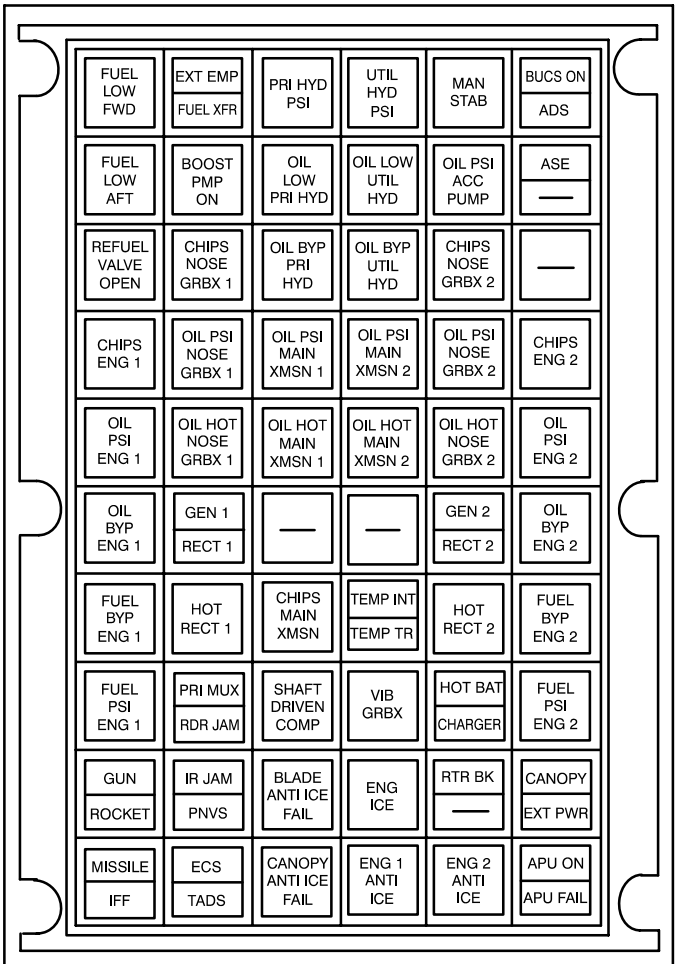


M54-064

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

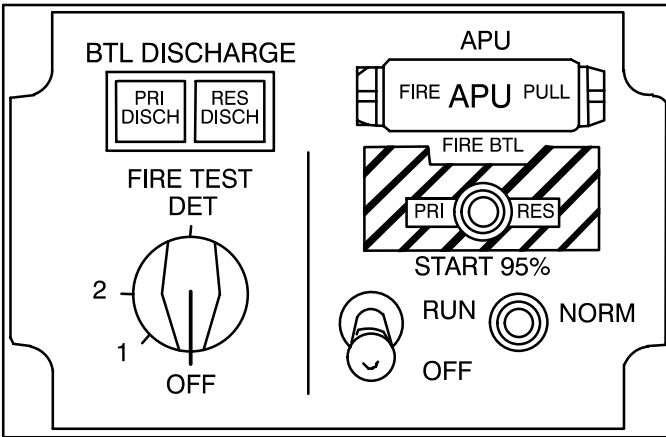
2-1 PILOT STATION LAYOUT (cont)

2-1



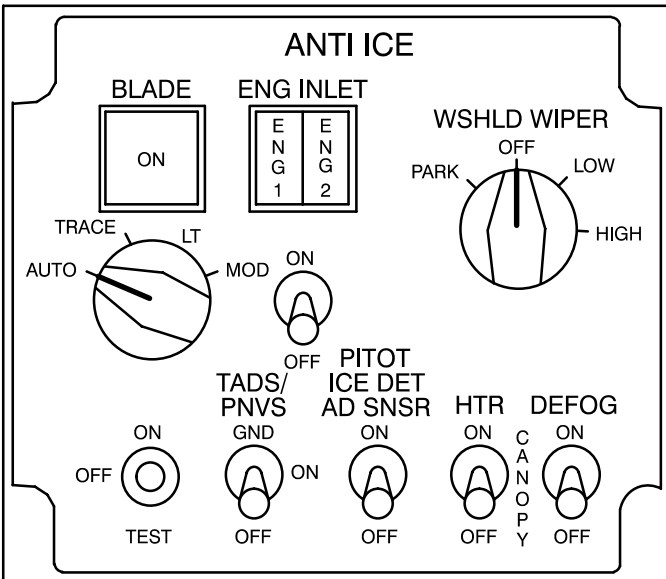
M54-065

Figure 2-20. Caution / Warning Panel



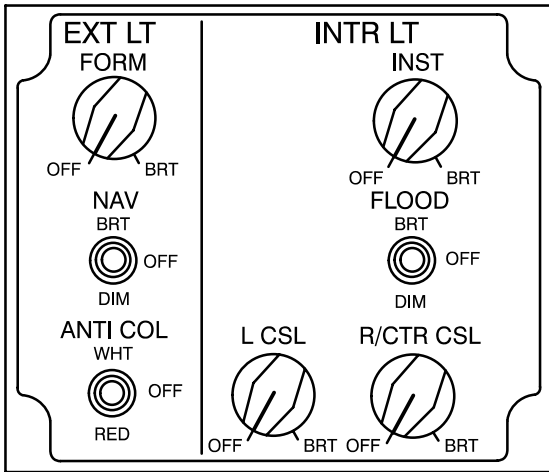
M54-066

Figure 2-21. APU/Fire Test Panel



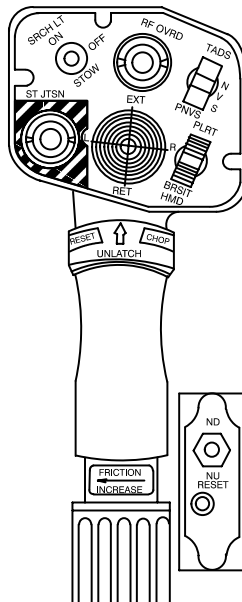
M54-067

Figure 2-22. Anti Ice Control Panel



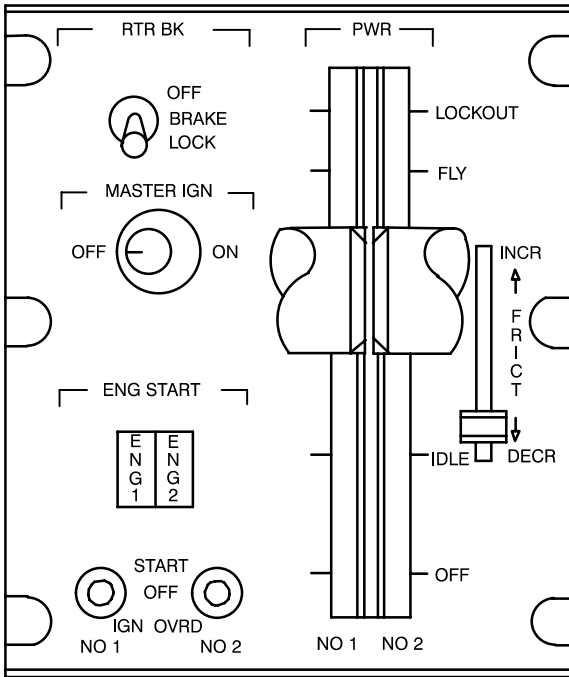
M54-068

Figure 2-23. EXT/INTR Lighting Control Panel



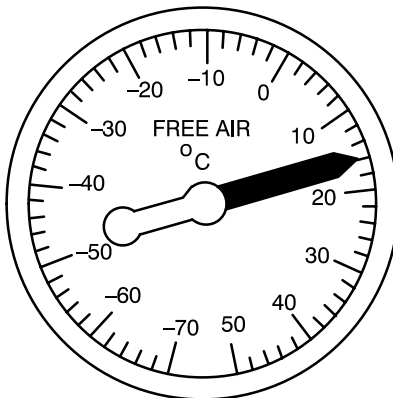
M54-069

Figure 2-24. Collective Stick/Stabilator Manual Control



M54-070

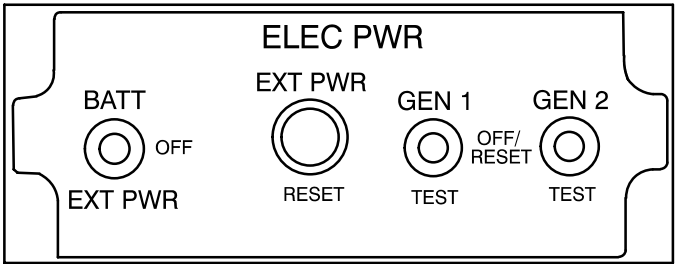
Figure 2-25. Power Lever Quadrant



M54-071

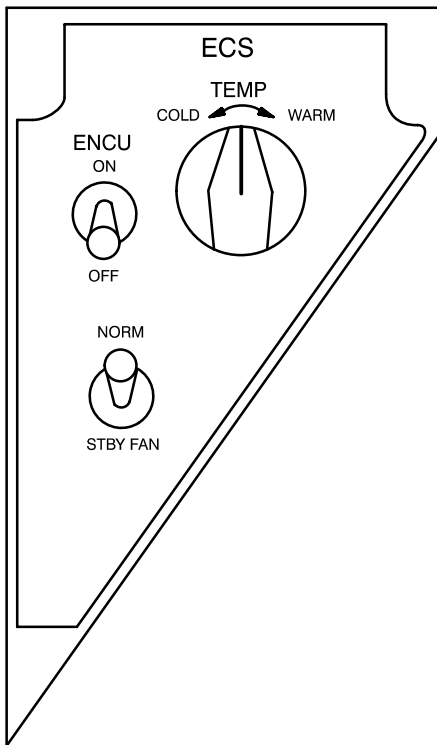
Figure 2-26. Outside Air Temperature Gage





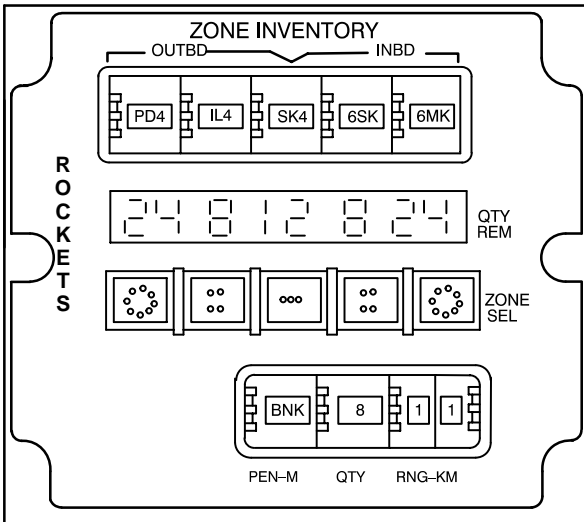
M54-072

Figure 2-27. Electrical Power Control Panel



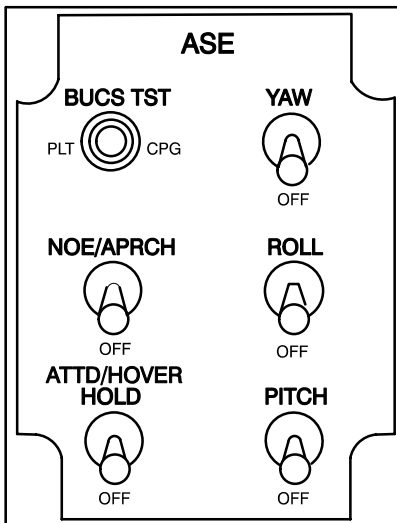
M54-073

Figure 2-28. Environmental Control System Panel



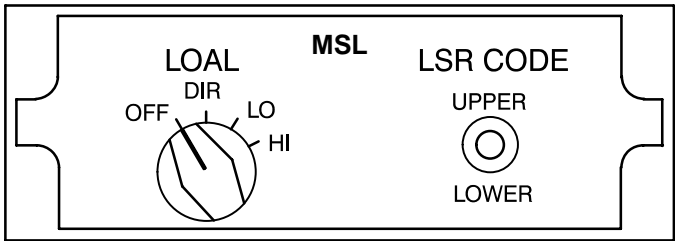
M54-074

Figure 2-29. Area Rocket Control Panel



M54-075

Figure 2-30. Automatic Stabilization Equipment Panel

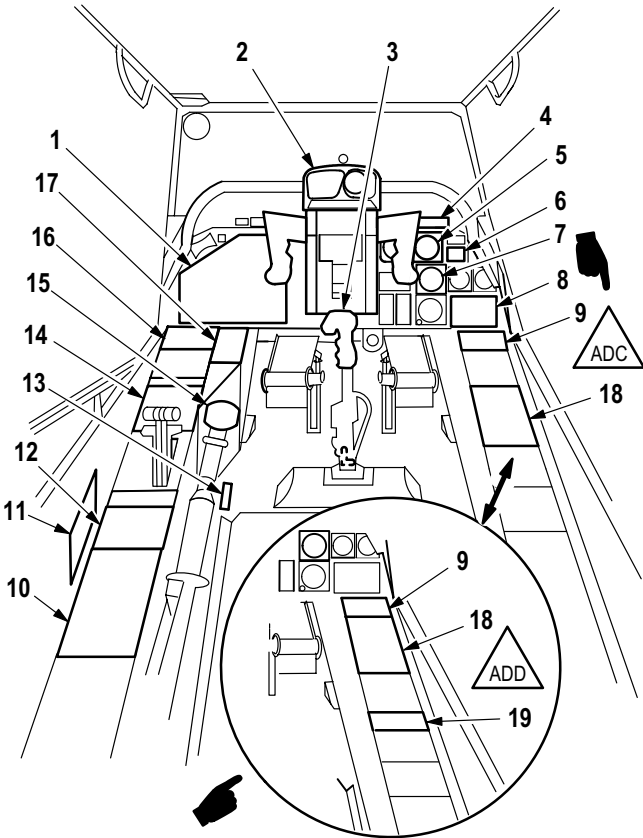


M54-076

Figure 2-31. Missile Panel

2-2 CPG STATION LAYOUT

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



M54-077C

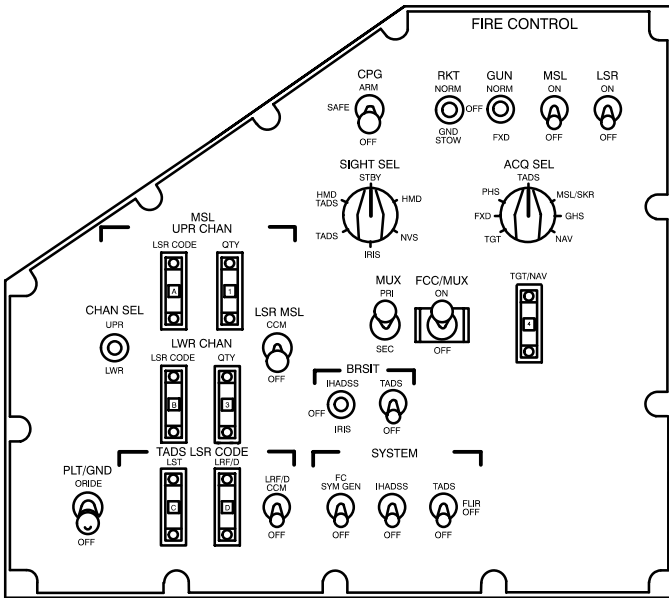
Figure 2-32. Station Locator

## 2-2 CPG STATION LAYOUT (cont)

2-2

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

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

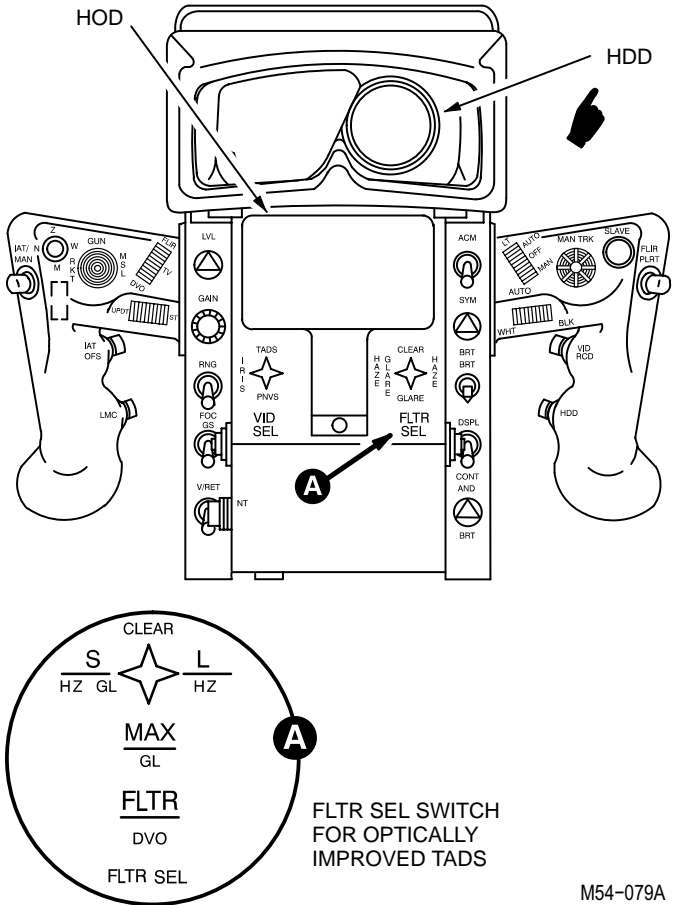
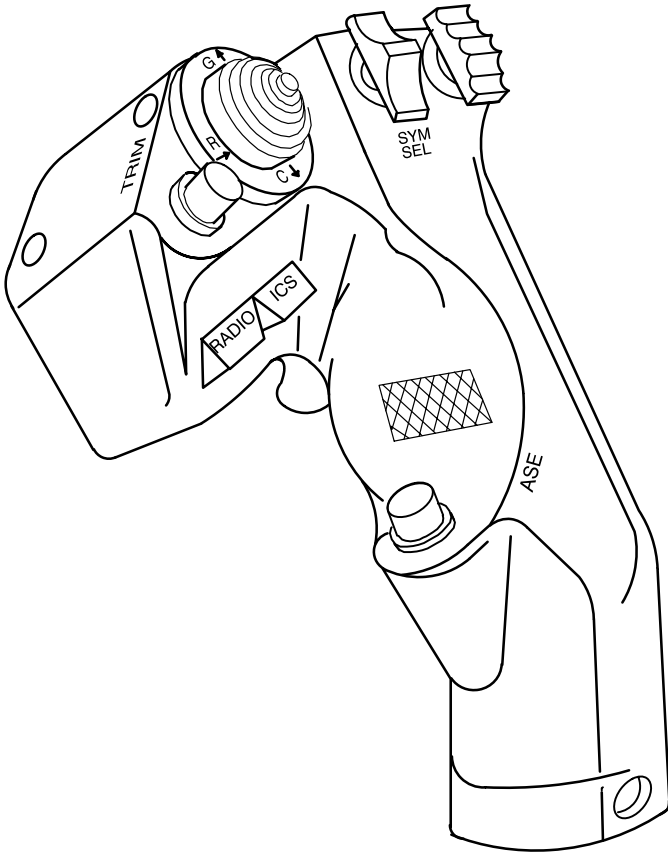
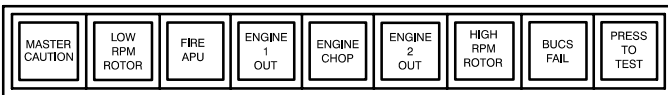


Figure 2-34. Optical Relay Tube



M54-080

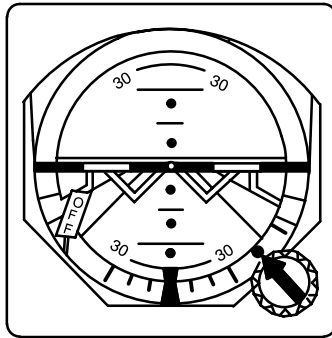
Figure 2-35. Cyclic Stick



M54-081

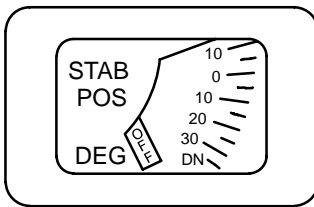
Figure 2-36. Master Caution/Warning Panel





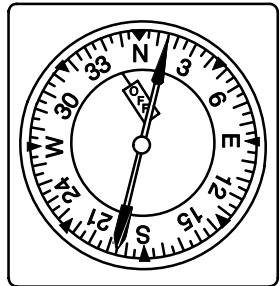
M54-082

Figure 2-37. Remote Attitude Indicator



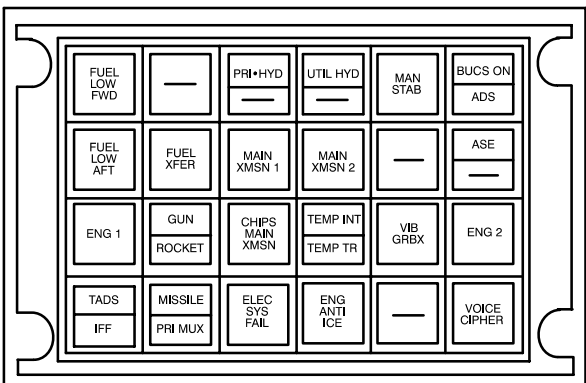
M54-083

Figure 2-38. Stabilizer Position Indicator



M54-084

Figure 2-39. Radio Magnetic Indicator



M54-085

Figure 2-40. Caution/Warning Panel

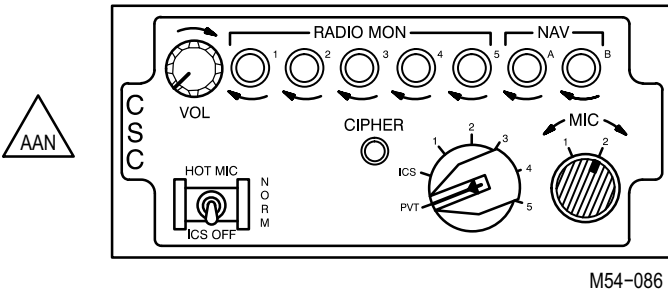


Figure 2-41. Communication System Control Panel, Model C-10414 (V) 3/ARC

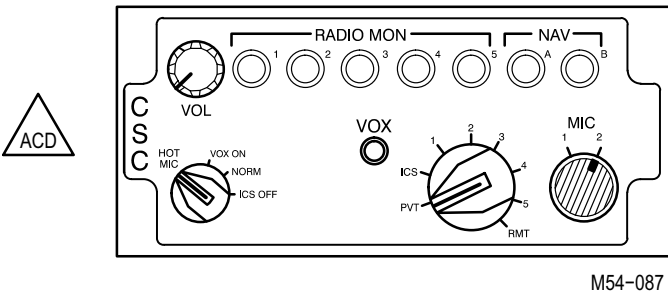
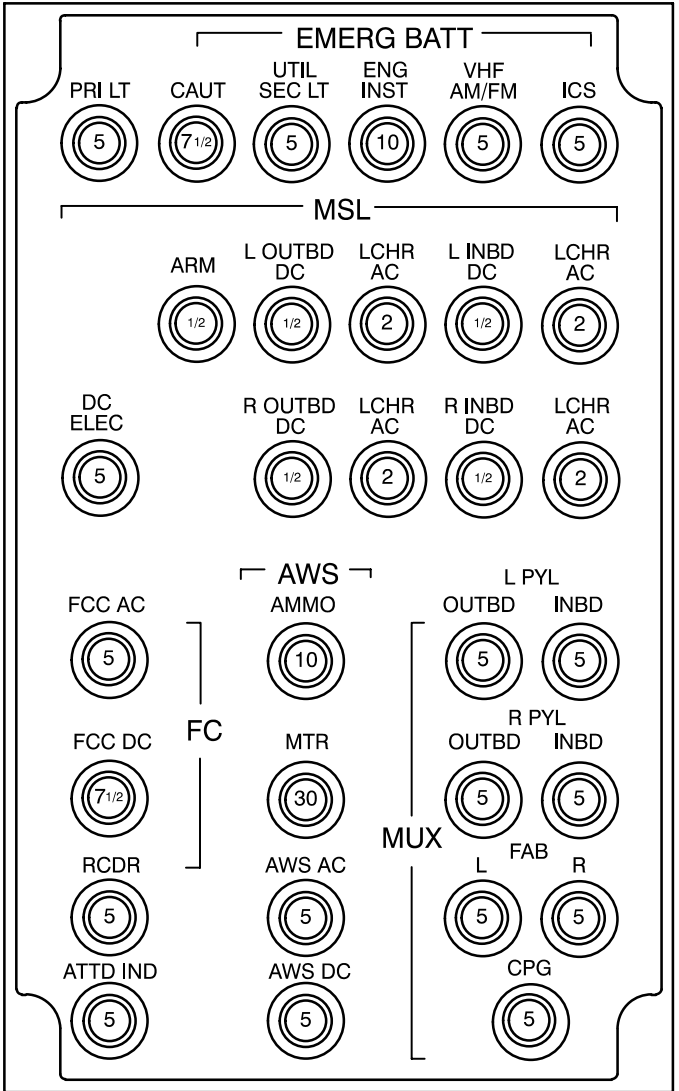
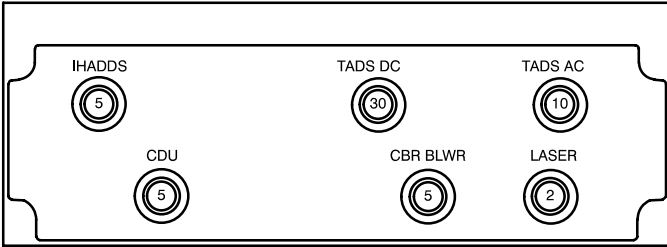


Figure 2-42. Communication System Control Panel, Model C-11746 (V) 4/ARC



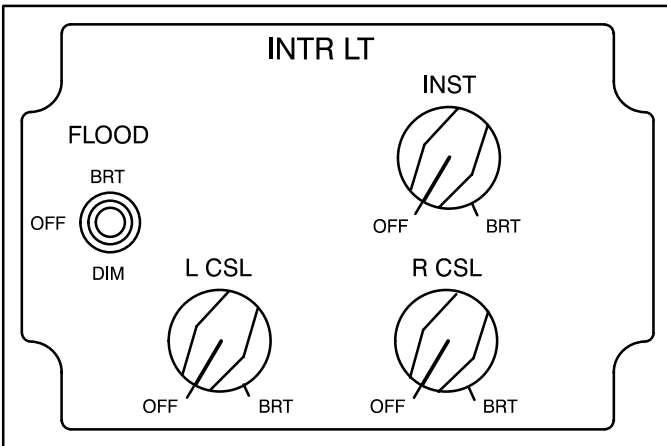
M54-088

Figure 2-43. Circuit Breaker Panel 1



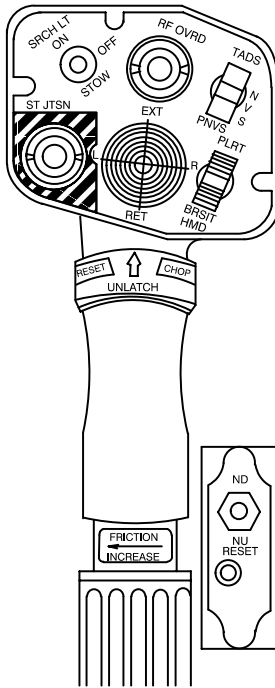
M54-089

Figure 2-44. Circuit Breaker Panel 2



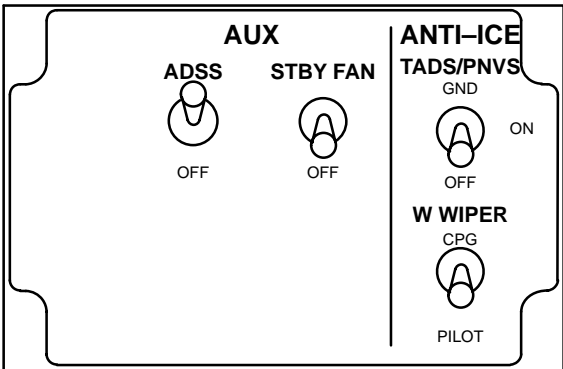
M54-090

Figure 2-45. INTR Lighting Control Panel



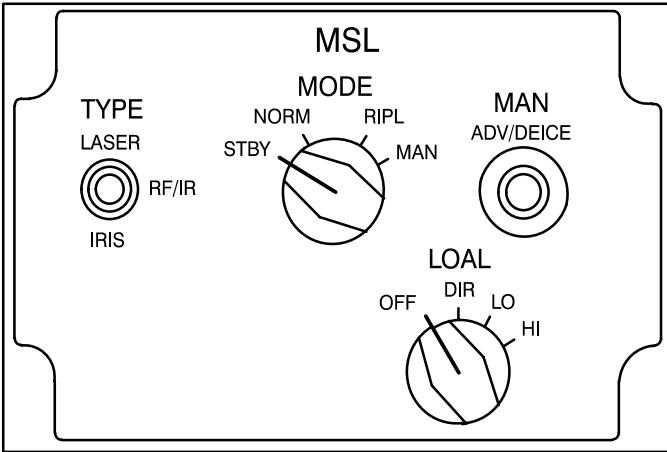
M54-091

Figure 2-46. Collective Stick/Stabilator Manual Control



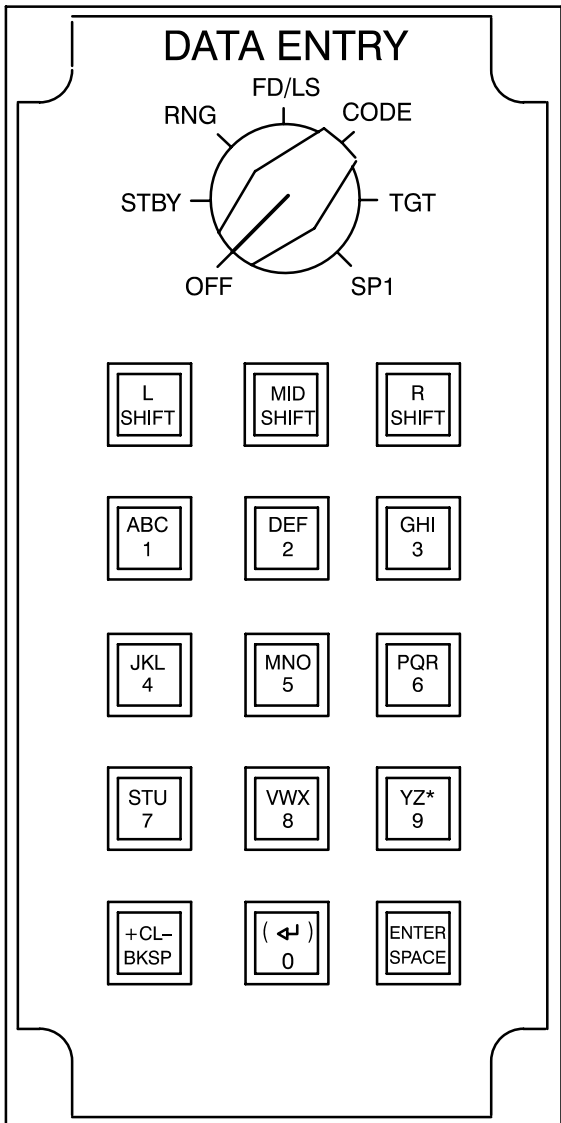
M54-092

Figure 2-47. Aux/Anti Ice Panel



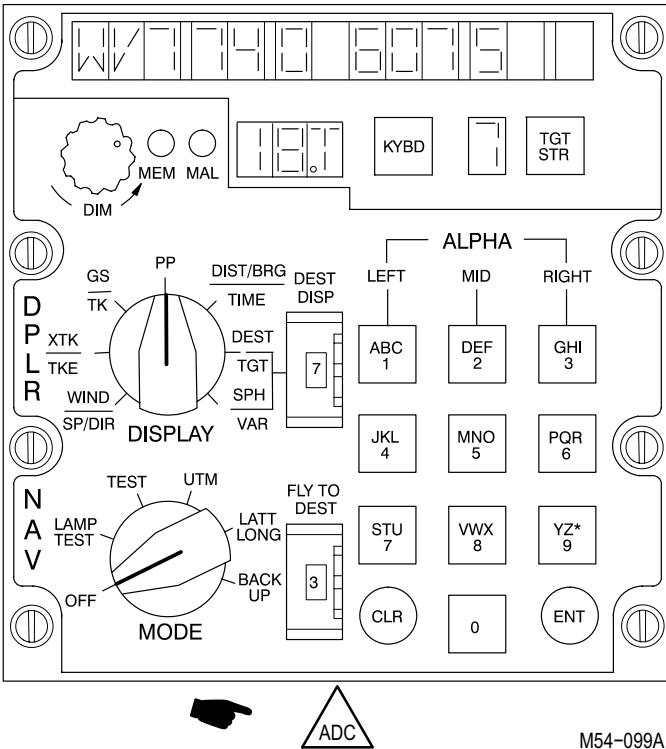
M54-093

Figure 2-48. Missile Control Panel



M54-094

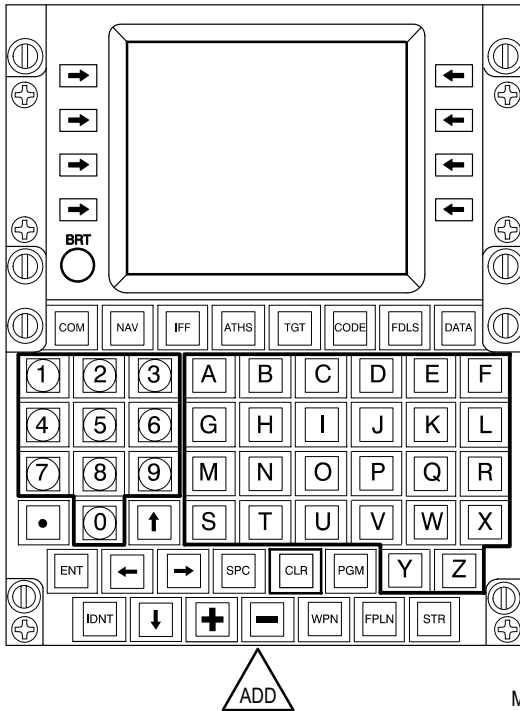
Figure 2-49. Data Entry Keyboard



M54-099A

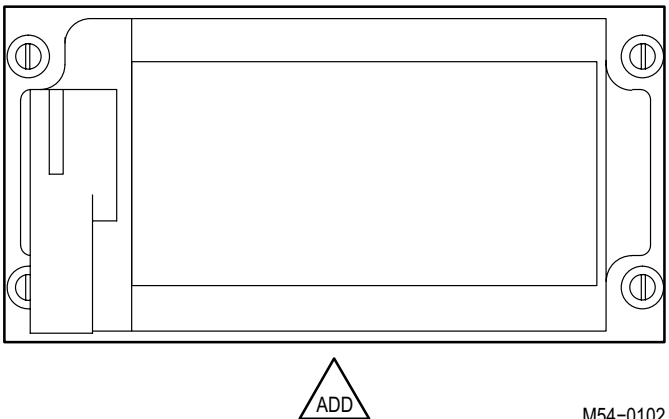
Figure 2-49.1. Doppler (CP-1252 (XE)/ASN-128)





M54-0101

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



M54-0102

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.

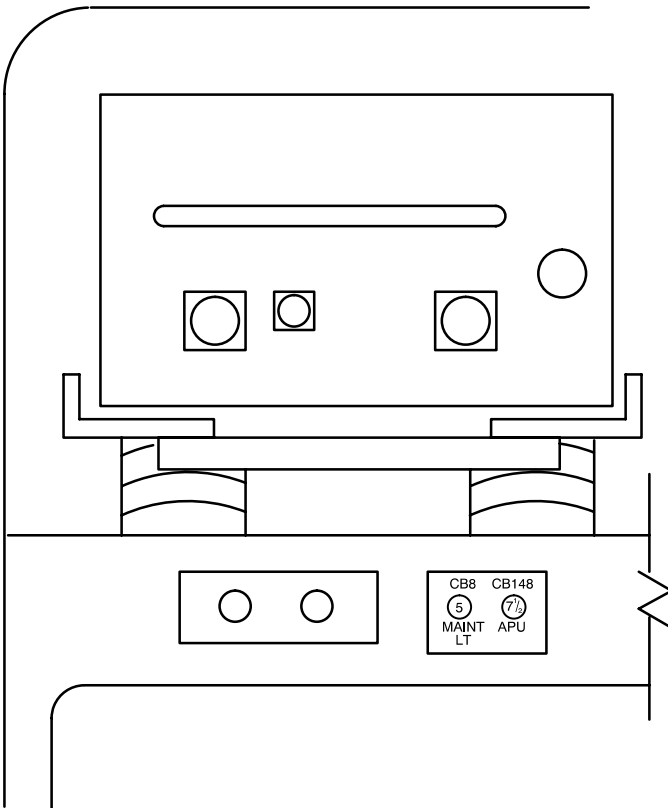


Figure 2-50. Aft Avionics Bay

## CHAPTER 3

### POWER APPLICATIONS

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#### CHAPTER OVERVIEW

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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

Para Title	Para No.
Systems – Power-Up .....	3-1
Systems – Power Down .....	3-2
APU – Operating Instructions .....	3-3
APU Emergencies .....	3-4

---

**3-1 SYSTEMS – POWER-UP**

---

**3-1****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
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:**

<u>Ref</u>	<u>Condition</u>
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 <b>LN5, R295, R325, R345</b> 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.

<b>WARNING</b>
----------------

**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).



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**3-1 SYSTEMS – POWER-UP (cont)**

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**3-1**

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.



## 3-1 SYSTEMS – POWER-UP (cont)

3-1

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

## 3-1 SYSTEMS - POWER-UP (cont)

3-1

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

**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

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

## 3-2 SYSTEMS – POWER DOWN (cont)

3-2

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

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:**

<u>Nomenclature</u>	<u>Part Number</u>
Headset–Microphone Cord Assembly, Maintenance Headset	H-157/AIC or equivalent 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:**

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-T-4	Maintenance headset connected
TM 1-1520-238-23	Helicopter safed Moorings removed Protective covers removed Access doors <b>R190, R295, R330, R325, R345, RN5, L190, L330, RW12,</b> and <b>T50</b> 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

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**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.



**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:

## 3-3 APU – OPERATING INSTRUCTIONS (cont)

3-3

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	<b>BATT</b> (If AGPU or equivalent is on-line and providing electrical power, set switch to <b>EXT PWR</b> )
CSC	Transmitter Select <b>MIC</b>	<b>ICS</b>  <b>1</b> (for maintenance headset without power adapter) <b>2</b> (for helmet or maintenance headset with power adapter)
	<b>ICS SELECT</b>	<b>NORM</b>
	<b>VOL</b>	As desired
APU FIRE/TEST (fig. 2-21)	<b>PRI/RES</b>	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)
<b>CSC</b>	Transmitter Select	<b>ICS</b>
	<b>MIC</b>	<b>1</b> (for maintenance headset without power adapter) <b>2</b> (for helmet or maintenance headset with power adapter)
	<b>ICS SELECT</b> <b>VOL</b>	<b>NORM</b> As desired

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



**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  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ). 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.



**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.

**3-3 APU – OPERATING INSTRUCTIONS (cont) 3-3**

- 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)
<b>FIRE CONTROL</b> (fig. 2-33)	<b>MUX</b>	<b>PRI</b>
	<b>FCC/MUX</b>	<b>ON</b>
	<b>SYSTEM FC SYM GEN</b>	<b>FC SYM GEN</b>
	<b>SYSTEM TADS</b>	<b>OFF</b>
<b>DEK (ADC)</b> (fig. 2-49)	<b>DATA ENTRY</b>	<b>STBY</b>



- 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



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**3-4 APU EMERGENCIES**

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3-4

**Personnel Required:**(3)

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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

3-21/(3-22 blank)



## 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

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**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 <b>AUX/ANTI ICE</b> panel (fig. 2-47), set <b>ADSS</b> switch to <b>ADSS</b> .	
b. On data entry keyboard (DEK) (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS (ADC)</b> . On CDU (fig. 2-49.2), select <b>FAB FDLS (ADD)</b> .	<p>If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p>
c. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT (ADC)</b> ; or any key on the CDU, except <b>SPC (ADD)</b> .	<p>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.</p>

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

4-1

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

**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.

<p>e. On DEK, press and release (<b>↵</b>)/<b>0</b> and <b>ABC/1</b> keys (ADC). On CDU, press and release <b>0</b> and <b>1</b> keys (ADD).</p>	<p>If <b>AIR DATA SENSOR SYSTEM GO</b> appears on HOD and AIR DATA SYSTEM – OPERATIONAL CHECK is to be performed, go to TM 9-1230-476-20-2.</p> <p>If one or more FD/LS NO-GO displays listed below appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS POWER DOWN</b> (para 3-2).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on the HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> </ol>
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4-1 ADS – INTERACTIVE FD/LS CHECK (cont) 4-1

TASK	RESULT
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- (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
<p><b>AIR DATA PROCESSOR NO-GO AFT AVIONICS BAY</b></p>	<p>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).</p>
<p><b>OMNI DIR AIRSPEED SENSOR NO-GO MAIN ROTOR MAST</b></p>	<p>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.</p>

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-T-7

TM 1-1520-238-23

TM 9-1230-476-20-1

TM 9-1230-476-20-2

TM 11-1520-238-23-1

TM 11-1520-238-23-2

**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 <b>AUX/ANTI ICE</b> panel (fig.2-47 ), set <b>ADSS</b> switch to <b>ADSS</b> .	
b. On DEK (fig.2-49 ), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	<p>If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p>
c. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (ADD).	<p>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.</p>
<b>NOTE</b>	
<p><b>RHE – RT BUS NO-GO RH FAB (ACZ)</b> and/or <b>RHE – LT BUS NO-GO RH FAB (ACZ)</b> will appear if both pilot and CPG <b>SAFE/ARM</b> switches are off.</p>	
d. On DEK, press and release <b>(_)0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD).	<p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p> <p>When <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.</p>



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

4-2

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).

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

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

4-2

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

TASK	RESULT
p. On DEK, press and release (←)/0 and DEF/2 keys (ADC). On CDU, press and release 0 and 2 keys (ADD).	<p>If <b>CANNOT RUN WHILE IN AIR</b> 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.</p> <p>When <b>PUT HARS POWER SWITCH IN NORM — WAIT — ALLOW 90 SECONDS FOR HARS WARM-UP</b> appears on HOD and pilot Video Display Unit (VDU) (fig. 2-10), go to next step.</p>

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

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

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**4-2**

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

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.**

- |   |   |
|---|---|
| <p>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.</p> | <p>If flight control movement is restricted, perform the following:</p> <p>On DEK, press and release <b>MID SHIFT</b> and <b>MNO/5</b> keys (ADC) or <b>N</b> key on the CDU (ADD).</p> <p>When <b>PERFORM CORRECTIVE ACTION</b> 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.</p> <p>If pilot flight control movements are restricted, go to CPG station and repeat step <b>t</b>.</p> <p>If flight control movement is unrestricted, press and release <b>L SHIFT</b> and <b>YZ*/9</b> keys (ADC) or <b>Y</b> key on the CDU (ADD).</p> <p>When <b>CENTER ALL CONTROLS AND ENGAGE FORCE TRIM ACK VIA KBD</b> appears on VDU, go to next step.</p> |
| <p>u. Remove foot pressure from directional control pedals and center cyclic and collective sticks.</p>   |   |

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

4-2

TASK	RESULT
v. On pilot cyclic stick grip, set <b>FORCE TRIM REL</b> switch to <b>ON</b> .	
<b>NOTE</b>	
<ul style="list-style-type: none"> <li>● DASE FD/LS is an interactive check which prompts the operator to act. The DASE FD/LS check is discontinued when an advisory message <b>28 VDC BUCS NO-GO</b> is displayed. Remaining DASE FD/LS check displays are deactivated and do not occur.</li> <li>● When the interactive message <b>DISPLAY BUCS SELF TEST RESULTS</b> is displayed, answer <b>N (ACZ)</b>.</li> </ul>	
w. On DEK, press and release <b>ENTER SPACE</b> key (ADC) or <b>SPC</b> key on the CDU (ADD).	<p>The FD/LS advisory message <b>DASE SYSTEM TEST IN PROGRESS</b> is displayed to indicate the DASE computer has begun internal BITE testing, and the first ground BITE test has been initiated.</p> <p>If NO-GOs appear on VDU, stop FD/LS testing and perform <b>CORRECTIVE ACTION</b>.</p> <p>When <b>PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD</b> appears on VDU, go to next step.</p>
x. On pilot power lever quadrant, set <b>RTR BK</b> switch to <b>OFF</b> .	

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

4-2

TASK	RESULT
y. On DEK, press and release <b>ENTER SPACE</b> key (ADC) or <b>SPC</b> key on the CDU (ADD).	<p>If one or more FD/LS NO-GO displays listed appear on HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2)</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step o. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 1-1520-238-T-7.</li> </ol>
z. On pilot <b>HARS</b> control panel, rotate <b>HARS</b> switch to <b>OFF</b> .	

**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
<b>26 VAC EXCITATION XFMR 2 NO-GO AFT AVIONICS BAY</b>	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).
<b>26 VAC EXCITATION XFMR 1 NO-GO AFT AVIONICS BAY</b>	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).
<b>DASE ENGAGE PANEL NO-GO PLT COMPARTMENT</b>	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).
<b>COLL ACTUATOR NO-GO RH XMSN BAY</b>	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).
<b>DIR ACTUATOR NO-GO TAIL SECTION</b>	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).
<b>LAT ACTUATOR NO-GO LH XMSN BAY</b>	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
<b>LONG ACTUATOR NO-GO RH XMSN BAY</b>	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).
<b>AIR DATA PROCESSOR NO-GO AFT AVIONICS BAY</b>	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).
<b>HARS ELECTRONIC UNIT NO-GO AFT AVIONICS BAY</b>	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).
<b>DASE COMPUTER NO-GO AFT AVIONICS BAY</b>	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).
<b>ROTOR BRAKE NO-GO PLT COMPARTMENT</b>	Perform UTILITY HYDRAULIC SYSTEM – OPERATIONAL CHECK (TM 1-1520-238-T-6).
<b>PILOT CYCLIC GRIP NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT COLL 2 DCPLR NO-GO PLT COMPARTMENT</b>	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
<b>PILOT COLL 1 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT DIR 2 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT DIR 1 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LAT 2 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LAT 1 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LONG 2 DCPLR NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LONG 1 DCPLR NO-GO PLT COMPARTMENT</b>	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
<b>PILOT COLL LVDT NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT DIR LVDT NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LAT LVDT NO-GO PLT COMPARTMENT</b>	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).
<b>PILOT LONG LVDT NO-GO PLT COMPARTMENT</b>	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).
<b>CPG BUCS SEL NO-GO CPG COMPARTMENT</b>	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).
<b>CPG CYCLIC GRIP NO-GO CPG COMPARTMENT</b>	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
<b>CPG COLL 2 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG COLL 1 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG DIR 2 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG DIR 1 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LAT 2 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LAT 1 DCPLR NO-GO CPG COMPARTMENT</b>	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
<b>CPG LONG 2 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LONG 1 DCPLR NO-GO CPG COMPARTMENT</b>	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).
<b>CPG COLL LVDT NO-GO CPG COMPARTMENT</b>	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).
<b>CPG DIR LVDT NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LAT LVDT NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LONG LVDT NO-GO CPG COMPARTMENT</b>	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).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>SQUAT SWITCH NO-GO AFT OF LH FAB</b>	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).
<b>TURN RATE INDICATOR NO-GO PLT COMPARTMENT</b>	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

**Personnel Required:**

(2)

**References:**

TM 1-1520-238-T-8

TM 1-1520-238-23

TM 9-1230-476-20-2

**Equipment Conditions:**RefCondition

TM 1-1520-238-23

Canopy anti-ice system  
inspection completedEngine anti-ice system  
inspection completedRotor 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).



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


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TASK	RESULT
a. On DEK (fig.2-49 ), rotate DATA ENTRY switch to FD/LS (ADC). On CDU (fig. 2-49.2), select FAB <b>FDLS</b> (ADD).	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b> When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(↵)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD). | If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.<br><br>When <b>MUX COMMUNICATION GO</b> appears on HOD, go to next step. |
|--|---|

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

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).

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


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



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


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TASK	RESULT
<p>j. On DEK, press and release <b>ENTER SPACE</b> key (ADC). On CDU, press and release <b>SPC</b> key (ADD).</p> <p>k. On pilot <b>ANTI ICE</b> panel, set <b>BLADE ON/OFF/TEST</b> switch to <b>OFF</b>.</p>	<p>If NO-GOs were not displayed, then the following appears:  <b>DE-ICE SYSTEM GO ANY KEY FOR FDLS MENUS</b></p> <p>If one or more FD/LS NO-GO displays listed appear on HOD, perform the following:</p> <ol style="list-style-type: none"> <li>(1) Shutdown APU (para 3-4).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Start APU (para 3-3).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step b. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to applicable <b>UTILITY SYSTEM – OPERATIONAL CHECK</b> (TM 1-1520-238-T-8).</li> </ol>

**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.

- 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.**

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TAIL ROTOR HEATER NO-GO TAIL ROTOR</b>	On pilot <b>ANTI ICE</b> panel, set <b>BLADE</b> de-ice switch to <b>TEST</b> .  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).
<b>MAIN ROTOR HEATER NO-GO MAIN ROTOR</b>	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).
<b>RTR BLADE DISTR DE-ICE NO-GO MAIN RTR MAST</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8). If troubleshooting does not remove NO-GO, replace main rotor power distributor (TM 1-1520-238-23).
<b>RTR BLADE PWR CONTROLLER NO-GO RH XMSN BAY (ACY) OR RTR BLADE PWR CONT NO-GO RH XMSN BAY (ACZ)</b>	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).
<b>ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE</b>	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).
<b>ICE DETECTOR SENSOR NO-GO ENG INLET LH SIDE (ACY) OR ICE DETECTOR SENSOR NO-GO DOGHOUSE FAIRING (ACZ)</b>	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).

**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:



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

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**4-4**

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



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

4-4

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(↓)0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD). | If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.<br><br>When <b>MUX COMMUNICATION GO</b> 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.

TASK	RESULT
<p>d. On DEK, press and release (↵) <b>0</b> and <b>JKL/4</b> keys (ADC). On CDU, press and release <b>0</b> and <b>4</b> keys (ADD).</p>	<p>If aircraft is on the ground (Weight-on-Wheels) <b>GUN TEST IN PROGRESS</b> prompt (message) appears for 7 minutes and 15 seconds.</p> <p>If aircraft is airborne or squat switch fixture is installed, the extended ground test is bypassed.</p> <p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2).</li> <li>(2) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD (fig. 2-34).</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after CORRECTIVE ACTION, refer to TM 9-1090-208-23-2.</li> </ol>
<p>e. On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> (ADC).</p>	

**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).

## 4-4 AWS - INTERACTIVE FD/LS CHECK (cont)

4-4

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>GUN TURRET CONTROL BOX NO-GO RH FAB</b>	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).
<b>RNDS CNTR-MAG CONTROLLER NO-GO AFT OF LH FAB (ACY) OR RNDS CNTR-MAG CONT NO-GO AFT OF LH FAB (ACZ)</b>	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).
<b>TRAIN RATE SENSOR NO-GO GUN TURRET ASSY</b>	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).
<b>GUN CONTROL BOX NO-GO RH FAB</b>	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).
<b>GUN BORESIGHT NO-GO RAM CHECKSUM</b>	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

**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:

<u>TASK</u>	<u>RESULT</u>
a. On DEK (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> .	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK. Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> .	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 <b>WV/8</b> keys.	<p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p> <p>When <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.</p>

**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 <b>DATA ENTRY</b> switch to <b>SP1</b> .         | The first page of the aircraft position menu is displayed.   |
| e. On DEK, press and release the <b>ENTER SPACE</b> key.           | The second page of the aircraft position menu is displayed.  |
| f. On DEK, press and release <b>L SHIFT</b> and <b>MNO/5</b> keys. | The cursor appears under the first character in the <b>MV</b> line and both begin flashing.  |
| g. Enter the magnetic variation ( <b>MV</b> ) data into the DEK.   | The <b>MV</b> data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press <b>MID</b> and <b>2 (E)</b> to save data (ACZ). |
| h. On DEK, press and release <b>L SHIFT</b> and <b>STU/7</b> keys. | The cursor appears under the first character in the <b>SPH</b> 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 <b>MID</b> and <b>2 (E)</b> to save data (ACZ).  |
| j. On DEK, press and release the <b>ENTER SPACE</b> key.   | The first page of the aircraft position menu is displayed.  |
| k. On DEK, press and release <b>L SHIFT</b> and <b>PQR/6</b> keys.   | The cursor appears under the first character in the present position ( <b>PPOS</b> ) line and both begin flashing.  |
| l. Enter the present position ( <b>PPOS</b> ) data into the DEK.   | The <b>PPOS</b> data is being edited during this operation and after the last character has been entered, the edit mode is automatically exited (ACY). Press <b>MID</b> and <b>2 (E)</b> to save data (ACZ).  |
| m. On DEK, rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> .   | <p>If there are no system failures, the following message (prompt) appears <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK. Scroll until the following message (prompt) appears:<br/><b>ANY KEY FOR FD/LS MENUS</b></p> |
| n. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> . | 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.   |



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


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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**.

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


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4-5

- 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).
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**FD/LS NO-GO  
DISPLAY**


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**HARS ELECTRONICS  
UNIT NO-GO AFT  
AVIONICS BAY**

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**CORRECTIVE ACTION**


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Refer to  
TM 11-1520-238-23-2, for  
troubleshooting the HARS  
System.

END OF TASK

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


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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:

<u>TASK</u>	<u>RESULT</u>
a. On CDU (fig. 2-49.2), select FAB <b>FDLS</b> .	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>SPC</b> key on the CDU. Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except <b>SPC</b> ).	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 <b>0</b> and <b>8</b> keys.	If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.  When <b>MUX COMMUNICATION GO</b> 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 <b>0</b> and <b>5</b> keys. | <p>Check that the following message appears on HOD:<br/><b>ENTER THE NUMBER OF THE TEST TO PERFORM</b><br/><b>1 QUICK TEST</b><br/><b>2 EXTENDED ALIGN TEST</b></p> <p>If <b>1</b> is selected, check that the following message appears on HOD:<br/><b>PUT HARS POWER SWITCH IN NORM POSITION</b><br/><b>—WAIT—ALLOW</b><br/><b>90 SECONDS FOR HARS WARM-UP</b></p> |
| e. On CDU, press and release <b>0</b> and <b>5</b> keys. | <p>If <b>2</b> is selected, check that the following message appears on HOD:<br/><b>PUT HARS POWER SWITCH TO OFF – THEN TO NORM – WAIT FOR ALIGN TO END</b></p>  |

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


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4-5A

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

**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.

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

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**TASK**

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**RESULT**

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**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

Integrated Helmet Unit (IHU)  
(2)

Part Number

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)**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b> (fig. 2-2)	<b>SIGHT SEL</b> <b>ACQ SEL</b>	<b>STBY</b> <b>OFF</b>

**CPG Station (fig. 2-32)**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b> (fig.2-33)	<b>SIGHT SEL</b> <b>ACQ SEL</b>	<b>STBY</b> <b>FXD</b>

## 3. Perform FD/LS check as follows:

TASK	RESULT
a. On DEK (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	<p>If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> and <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(↵)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD). | <p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p> <p>When <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.</p> |
|--|--|



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


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TASK	RESULT
d. On DEK, press and release (↵)/0 and <b>PQR/6</b> keys (ADC). On CDU, press and release <b>0</b> and <b>6</b> keys (ADD).	When <b>PUT IHADSS POWER SWITCH IN ON POSITION</b> appears on HOD, go to next step.
e. On CPG <b>FIRE CONTROL</b> panel, set <b>SYSTEM IHADSS to IHADSS</b> .	<p><b>IHADSS TEST IN PROGRESS</b> appears on HOD for 57 seconds.</p> <p>If one or more FD/LS NO-GO displays listed below appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 9-1270-221-23.</li> </ol>

**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
<b>SEU NO-GO RH FAB</b>	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).
<b>DEU NO-GO RH FAB</b>	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).
<b>PILOT DAP OR HDU NO-GO PILOTS COMPARTMENT</b>	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).
<b>CPG DAP OR HDU NO-GO CPG COMPARTMENT</b>	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).
<b>CPG RIGHT SSU NO-GO CPG COMPARTMENT</b>	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).
<b>CPG LEFT SSU NO-GO CPG COMPARTMENT</b>	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).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>PILOT RIGHT SSU NO-GO PILOT COMPARTMENT</b>	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).
<b>PILOT LEFT SSU NO-GO PILOT COMPARTMENT</b>	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).
<b>CPG HELMET ELECTRONICS NO-GO</b>	Refer to TM 9-1270-221-23.
<b>PILOT HELMET ELECTRONICS NO-GO</b>	Refer to TM 9-1270-221-23.

END OF TASK

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

**4-7**

**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
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:**

<u>Ref</u>	<u>Condition</u>
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)**

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

3. Perform FD/LS check as follows:

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


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4-7

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

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

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

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

4-7

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

TASK	RESULT
n. On DEK, rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU select <b>FDLS</b> FAB (ADD).	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
o. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any CDU key except <b>SPC</b> (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 <b>(-)/0</b> and <b>MNO/5</b> keys (ADC). On CDU, press and release <b>0</b> and <b>5</b> keys (ADD). | If <b>HARS GO</b> appears on HOD, go to next step.<br>If any <b>NO-GO</b> 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 reseal on launcher rail, then latch missile. If problem still exists, replace training missile (TM 9-1425-475-20). |



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


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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).

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


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4-7

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**TASK**


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**RESULT**


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- (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**

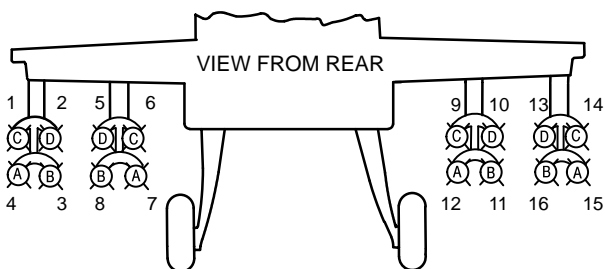
If this **FD/LS** check is to be followed by the **HME – SYSTEM OPERATIONAL CHECK** (TM 9-1427-475-20), omit step 4. This eliminates the need for the 6 to 9 minute **HARS** gyro warm-up period.

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

**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
<b>REMOTE HELLFIRE ELECT NO-GO RH FAB</b>	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO-GO, replace RHE (TM 9-1427-475-20).
<b>MISSILE LAUNCHER NO-GO LT OUTBD</b>	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).

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


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**4-7**

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>MISSILE LAUNCHER NO-GO LT INBD</b>	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).
<b>MISSILE LAUNCHER NO-GO RT INBD</b>	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).
<b>MISSILE LAUNCHER NO-GO RT OUTBD</b>	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).
<b>MISSILE LAUNCHER NO-GO LT OUTBD and MISSILE LAUNCHER NO-GO LT INBD appear on HOD.</b>	Troubleshoot wiring to isolate fault (TM 9-1427-475-20).
<b>MISSILE LAUNCHER NO-GO RT INBD and MISSILE LAUNCHER NO-GO RT OUTBD appear on HOD.</b>	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.

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>MISSILE 1 NO-GO LT OUTBD</b> – 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).
<b>MISSILE 2 NO-GO LT OUTBD</b> – 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).
<b>MISSILE 3 NO-GO LT OUTBD</b> – 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).
<b>MISSILE 4 NO-GO LT OUTBD</b> – 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).
<b>MISSILE 1 NO-GO LT INBD</b> – 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).
<b>MISSILE 2 NO-GO LT INBD</b> – 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).

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


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4-7

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>MISSILE 3 NO-GO LT INBD</b> - 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).
<b>MISSILE 4 NO-GO LT INBD</b> - 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).
<b>MISSILE 1 NO-GO RT INBD</b> - 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).
<b>MISSILE 2 NO-GO RT INBD</b> - appears on HOD.	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO-GO, replace missile 10 (TM 9-1425-475-20).
<b>MISSILE 3 NO-GO RT INBD</b> - appears on HOD.	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO-GO, replace missile 11 (TM 9-1425-475-20).
<b>MISSILE 4 NO-GO RT INBD</b> - appears on HOD.	Troubleshoot wiring to isolate fault (TM 9-1427-475-20). If troubleshooting does not remove NO-GO, replace missile 12 (TM 9-1425-475-20).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>MISSILE 1 NO-GO RT OUTBD</b> – 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).
<b>MISSILE 2 NO-GO RT OUTBD</b> – 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).
<b>MISSILE 3 NO-GO RT OUTBD</b> – 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).
<b>MISSILE 4 NO-GO RT OUTBD</b> – 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).
<b>PYLON BORESIGHT NO-GO RAM CHECKSUM</b>	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

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


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4-8

**Personnel Required:**

(2)

**References:**

TM 1-1520-238-23

TM 9-1230-476-20-2

TM 9-1230-476-20-1

**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 <b>SYSTEM</b> switch to <b>FC SYM GEN</b> , <b>CPG SAFE ARM</b> switch to <b>SAFE</b> and <b>CPG MSL</b> switch to <b>ON</b> (ACZ) (ADD).	If <b>BIT IN</b> and <b>PROGRESS</b> do not alternately appear on HOD, refer to TM 9-1427-475-20.



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


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

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


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**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
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**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
<b>TYPE IIIA MRTU NO-GO CPG COMPARTMENT</b>	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.
<b>TYPE IIIA MRTU – RT BUS NO-GO CPG COMPARTMENT (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE IIIA MRTU – LT BUS NO-GO CPG COMPARTMENT (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE I MRTU NO-GO LH FAB</b>	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).
<b>TYPE I MRTU – RT BUS NO-GO LH FAB (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TYPE I MRTU – LT BUS NO-GO LH FAB (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE I MRTU NO-GO RH FAB</b>	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.
<b>TYPE I MRTU – RT BUS NO-GO RH FAB (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE I MRTU – LT BUS NO-GO RH FAB (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>DASE MRTU NO-GO AFT AVIONICS BAY</b>	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.
<b>DASE MRTU – RT BUS NO-GO AFT AVIONICS BAY (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>DASE MRTU – LT BUS NO-GO AFT AVIONICS BAY (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TYPE II MRTU NO-GO LT OUTBD</b>	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.
<b>TYPE II MRTU – RT BUS NO-GO LT OUTBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU – LT BUS NO-GO LT OUTBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU NO-GO LT INBD</b>	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.
<b>TYPE II MRTU – RT BUS NO-GO LT INBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU – LT BUS NO-GO LT INBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TYPE II MRTU NO-GO RT INBD</b>	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.
<b>TYPE II MRTU – RT BUS NO-GO RT INBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU – LT BUS NO-GO RT INBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU NO-GO RT OUTBD</b>	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.
<b>TYPE II MRTU – RT BUS NO-GO RT OUTBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>TYPE II MRTU – LT BUS NO-GO RT OUTBD (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).
<b>SYM GEN – RT BUS NO-GO LH FAB (ACZ)</b>	Troubleshoot wiring to isolate fault (TM 9-1230-476-20-2).

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


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

END OF TASK





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

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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

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**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)

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION</u> (set to)
<b>FIRE CONTROL</b> (fig. 2-2)	<b>SIGHT SEL</b>	<b>STBY</b>
	<b>ACQ SEL</b>	<b>NVS FXD</b>
	<b>VID SEL</b>	<b>PLT</b>
	<b>PNVS</b>	<b>PNVS</b>
<b>FIRE CONTROL</b> (fig. 2-2)	<b>ACM</b>	<b>ACM</b>

**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.

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

CPG Station (fig. 2-32)		
<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION</u> (set to)
<b>FIRE CONTROL</b> (fig. 2-33)	<b>SIGHT SEL</b>	<b>NVS</b>
	<b>ACQ SEL</b>	<b>FXD</b>
	<b>PLT/GND/ORIDE</b>	<b>ORIDE</b>
	<b>BRSIT/IHADSS/IRIS</b>	<b>OFF</b>
	<b>BRSIT/TADS</b>	<b>OFF</b>
<b>COLLECTIVE CONTROL STICK</b> (fig. 2-46)	<b>NVS</b>	<b>PNVS</b>
	<b>PLRT/BRSIT HMD</b>	center (off)
<b>TADS ORT</b> (fig. 2-34)	<b>VID SEL</b>	<b>PNVS</b>
	<b>Z/W/M/N</b>	<b>W</b>
	<b>RKT/GUN/MSL</b>	center (off)
	<b>FLIR/TV/DVO</b>	<b>TV</b>
<b>AUX/ANTI ICE</b> (fig. 2-47)	<b>TADS/PNVS</b>	<b>GND</b>

3. Perform manual FD/LS procedures (TM 1-1270-476-T) before entering FD/LS mode.
  
4. Perform FD/LS check as follows:

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

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(-)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD). | If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.<br><br>When <b>MUX COMMUNICATION GO</b> 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) <b>PROMPT TIMED OUT REENTER PROMPTS (Y) OR EXIT FD/LS (N)</b> appears on HOD.<br><br>When response is (Y), on DEK, press and release <b>L SHIFT</b> and <b>YZ*/9</b> keys (ADC) or <b>Y</b> key on the CDU (ADD).<br><br>When the response is (N), press and release <b>MID SHIFT</b> and <b>MNO/5</b> keys (ADC) or the <b>N</b> key on the CDU (ADD). |

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


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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
	<p>When the response is acknowledged (<b>ACK</b>) press and release <b>ENTER SPACE</b> (ADC) or <b>SPC</b> (ADD) key <u>ONLY</u> if prompt does not change.</p> <p>Refer to TM 1-5855-265-T for descriptions of and remarks about this message and these prompts.</p> <p>If one or more FD/LS NO-GO displays listed appear on HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS - POWER DOWN (para 3-2)</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS - POWER-UP (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 1-5855-265-T.</li> </ol> <p>If no failures are detected, the automatic part of initiated BIT is exited and prompt <b>ARE OPERATOR INTERACTIVE TESTS REQUIRED?(Y/N)</b> appears on HOD. Go to next step.</p>

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

4-9

TASK	RESULT
f. On DEK, press and release <b>L SHIFT</b> and <b>YZ*/9</b> keys to respond with <b>(Y)</b> . Press and release <b>MID SHIFT</b> and <b>MNO/5</b> keys to respond with a <b>(N)</b> (ADC) or on the CDU press <b>Y</b> key to respond with <b>(Y)</b> and <b>N</b> key to respond with a <b>(N)</b> (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: <b>SET ACM SW TO ON. IS PNVS FLIR VISIBLE? (Y/N)</b>	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 <b>CORRECTIVE ACTION</b> . 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).

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

TASK	RESULT
c. On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> (ADC).	
6. Restore crew station switch/control settings as specified in the following tables:	

**CPG Station**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b>	<b>ACQ SEL</b>	FXD
	<b>SIGHT SEL</b>	STBY
	<b>SYSTEM/TADS</b>	OFF
	<b>PLT/GND</b>	OFF
COLLECTIVE CONTROL STICK	<b>NVS</b>	TADS
	<b>TADS/PNVS</b>	OFF

**Pilot Station**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b>	<b>SIGHT SEL</b>	STBY
	<b>ACQ SEL</b>	OFF
	<b>VID SEL</b>	PLT
	<b>ACM</b>	OFF
	<b>PNVS</b>	OFF
<b>ANTI ICE</b>	<b>TADS/PNVS</b>	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).



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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>PNVS NO-GO</b>	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO-GO, replace TEU (TM 1-1270-476-20).
<b>TADS NO-GO</b>	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO-GO, replace TEU (TM 1-1270-476-20).
<b>PNVS SERVO MODULE NO-GO</b>	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).
<b>PNVS VIDEO NO-GO</b>	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).
<b>TADS POWER SUPPLY NO-GO LH FAB</b>	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).
<b>TADS ELECTRONIC UNIT NO-GO LH FAB</b>	Troubleshoot wiring to isolate fault (TM 1-5855-265-T). If troubleshooting does not remove NO-GO, replace TEU (TM 1-1270-476-20).
<b>PNVS TURRET NO-GO</b>	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
<b>PNVS ELECTRONIC UNIT NO-GO RH FAB</b>	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).
<b>PNVS SHROUD NO-GO</b>	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).
<b>ORT HOD RIGHT HAND GRIP NO-GO CPG COMPARTMENT</b>	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).
<b>ORT HOD CONTROLS NO-GO CPG COMPARTMENT</b>	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).
<b>ORT HOD LEFT HAND GRIP NO-GO CPG COMPARTMENT</b>	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).
<b>PNVS AZ GEAR NO-GO TURRET BULKHEAD</b>	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).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>PNVS TORQUER AMP NO-GO TURRET BULKHEAD</b>	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).
<b>PNVS BORESIGHT NO-GO RAM CHECKSUM</b>	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



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


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4-10

**Personnel Required:**

(2)

**References:**

TM 1-1520-238-23

TM 9-1230-476-20-1

TM 9-1090-208-23-1

TM 9-1230-476-20-2

TM 9-1090-208-23-2

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

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


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4-10

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (ADD).	<p>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.</p> <p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p>

**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 ( <b>↵</b> )/ <b>0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD). | When <b>MUX COMMUNICATION GO</b> 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.

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


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4-10

TASK	RESULT
d. On DEK, press and release <b>ABC/1</b> and <b>(-)/0</b> keys (ADC). On CDU, press and release <b>1</b> and <b>0</b> keys (ADD).	<p>If <b>PYLON ARTICULATION GO</b> appears on the HOD, go to next step.</p> <p>If <b>PYLON BORESIGHT NO-GO RAM CHECKSUM</b> 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).</p> <p>If any other NO-GO appears on HOD, refer to TM 9-1090-208-23-2.</p> <p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2).</li> <li>(2) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step <b>b</b>. If NO-GO repeats after CORRECTIVE ACTION, refer to TM 9-1090-208-23-2.</li> </ol>

**NOTE**

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

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

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TASK	RESULT
e. On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> (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
<b>EXT STORES CONTROL BOX NO-GO AFT OF LH FAB</b>	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.
<b>(All) PYLN ACTUATOR CONTROLLER NO-GO</b>	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
<b>PYLN ACTUATOR CONTROLLER NO-GO LT INBD/LT OUTBD</b>	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).
<b>PYLN ACTUATOR CONTROLLER NO-GO RT INBD/RT OUTBD</b>	Troubleshoot wiring to isolate fault (TM 9-1090-208-23-2).



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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>PYLN ACTUATOR CONTROLLER NO-GO LT OUTBD</b>	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.
<b>PYLN ACTUATOR CONTROLLER NO-GO LT INBD</b>	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.
<b>PYLN ACTUATOR CONTROLLER NO-GO RT INBD</b>	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.
<b>PYLN ACTUATOR CONTROLLER NO-GO RT OUTBD</b>	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.
<b>PYLN BORESIGHT NO-GO RAM CHECKSUM</b>	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

**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:**

<u>Ref</u>	<u>Condition</u>
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)**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b> (fig. 2-2)	<b>MASTER</b>	<b>SAFE</b>

## CPG Crew Station (fig. 2-32)

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION (set to)</u>
<b>FIRE CONTROL</b> (fig. 2-33)	<b>CPG PILOT/GND</b>	<b>SAFE ORIDE</b>

## 3. Perform FD/LS check as follows:

<u>TASK</u>	<u>RESULT</u>
a. On DEK (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(↵)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD).	If any <b>MUX NO-GO</b> appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.  When <b>MUX COMMUNICATION GO</b> appears on HOD, go to next step.

## 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).

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

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

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>STATION DIRECTOR NO-GO LT OUTBD</b>	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.
<b>STATION DIRECTOR NO-GO LT INBD</b>	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.
<b>STATION DIRECTOR NO-GO RT INBD</b>	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
<b>STATION DIRECTOR NO-GO RT OUTBD</b>	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.
<b>PYLN BORESIGHT NO-GO RAM CHECKSUM</b>	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

<sup>4-80</sup>  
**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
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:**

<u>Ref</u>	<u>Condition</u>
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.



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

4-12

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:



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

---

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


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4-12

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

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

4-12

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

---

**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 gyro 1, 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)**


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4-12

TASK	RESULT
	<p>If one or more FD/LS NO-GO displays listed appear on HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2)</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b>.</li> <li>(5) Repeat FD/LS check beginning with step f. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 1-1520-238-T-7.</li> </ol>

**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
<b>TOP STAB ACTUATOR NO-GO TAIL SECTION</b>	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.
<b>BOTTOM STAB ACTUATOR NO-GO TAIL SECTION</b>	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.
<b>RATE GYRO 1 NO-GO LH AFT CATWALK</b>	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).
<b>RATE GYRO 2 NO-GO RH AFT CATWALK</b>	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.



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


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4-12

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>AIRSPEED TRANSDUCER 1 NO-GO LH XMSN BAY</b>	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.
<b>AIRSPEED TRANSDUCER 2 NO-GO LH XMSN BAY</b>	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.
<b>STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK</b>	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.
<b>STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK</b>	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

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


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4-12A

**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
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:**

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Stabilator inspection and rigging performed

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**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.

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

4-12A

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:



**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.

TASK	RESULT
a. On pilot cyclic stick grip (fig. 2-8), set <b>FORCE TRIM REL</b> switch to <b>ON</b> .	
b. On DEK (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	<p>If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p>
c. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (ADD).	<p>If FD/LS menus do not appear on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p>

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

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

4-12A

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

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

4-12A

TASK	RESULT
i. On DEK, press and release <b>ENTER SPACE</b> key (ADC); or on the CDU, <b>SPC KEY</b> (ADD).	If NO-GOs appear on VDU, stop FD/LS testing and perform <b>CORRECTIVE ACTION</b> .  When <b>SLEW STAB TO UP LIMIT ACK VIA KBD</b> appears on HOD, go to next step.
j. Next to pilot collective stick, press <b>ND/NU</b> switch on stabilator manual control to <b>NU</b> 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 <b>ABC/1</b> and <b>DEF/2</b> keys (ADC). On CDU, press and release <b>1</b> and <b>2</b> keys (ADD).	When <b>PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD</b> appears on VDU (fig. 2-10), go to next step.
l. On pilot power lever quadrant (fig. 2-25), set <b>RTR BK</b> switch to <b>BRAKE</b> .	
m. On DEK, press and release <b>ENTER SPACE</b> key (ADC); or on the CDU, <b>SPC KEY</b> (ADD).	When <b>HOLD COLL AT FULL UP ACK VIA KBD</b> appears on VDU, go to next step.
n. Pull pilot collective stick to the full up stop position.	
o. On DEK, press and release <b>ENTER SPACE</b> key (ADC); or on the CDU, <b>SPC KEY</b> (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 <b>CORRECTIVE ACTION</b> .

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


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4-12A

TASK	RESULT
p. Operator shall observe HOD for next prompt.	When <b>SLEW STAB TO DOWN LIMIT ACK VIA KBD</b> appears on HOD, go to next step.
q. Next to pilot collective stick, press <b>ND/NU</b> switch on stabilator manual control to <b>ND</b> 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 <b>CORRECTIVE ACTION</b> .

**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 gyro 1, 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 <b>SLEW STAB TO UP LIMIT THEN DEPRESS RESET ACK VIA KBD</b> appears on VDU, go to next step.
s. Next to pilot collective stick, press <b>ND/NU</b> switch on stabilator manual control to <b>NU</b> 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 <b>RESET</b> 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.

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


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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.



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


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4-12A

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**TASK**


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**RESULT**


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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).

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

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---

**TASK**

---

---

**RESULT**

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**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).

Page 4-89 deleted

END OF TASK



**Personnel Required:**

(2)

**References:**

TM 9-1230-476-20-2

TM 11-1520-238-23-2

TM 11-1520-238-23-1

**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 <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(-)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD).	If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.  When <b>MUX COMMUNICATION GO</b> 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 <b>ABC/1</b> and <b>GHI/3</b> keys (ADC). On CDU, press and release <b>1</b> and <b>3</b> keys (ADD). | If <b>SYMBOL GENERATOR GO</b> appears on HOD, go to next step.<br><br>If one or more FD/LS NO-GO displays listed below appears on the HOD, perform the following in sequence:<br><br>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2).<br><br>(2) Replace symbol generator (TM 11-1520-238-23-1).<br><br>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).<br><br>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).<br><br>(5) Repeat FD/LS check beginning with step <b>b</b> . If NO-GO repeats after <b>CORRECTIVE ACTION</b> , refer to TM 11-1520-238-23-2. |
|--|---|

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

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TASK

RESULT

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**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

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

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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:**RefCondition

TM 1-1270-476-T

Inspect optics and clean as required

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**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).



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

#### Pilot Station (fig. 2-1)

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

#### CPG Station (fig. 2-32)

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

	<b>SYSTEM/TADS</b>	<b>TADS</b>
	<b>Pilot Station</b> (fig. 2-1)	
<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION</u> (set to)
<b>FIRE CONTROL</b> (fig. 2-2)	<b>PNVS</b>	<b>PNVS</b>
	<b>ACM</b>	<b>ACM</b>

**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.

**CPG Station (fig. 2-32)**

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



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

## 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.

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

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

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

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


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TASK	RESULT
	<p>When the response is <b>(ACK)</b>, press and release <b>ENTER SPACE</b> (ADC) or <b>SPC</b> (ADD) key <u>ONLY</u> if prompt does not change.</p> <p>Refer to (TM 1-1270-476-T) for descriptions of and remarks about this message and these prompts.</p> <p>If one or more FD/LS NO-GO displays listed appear on HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2)</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 1-1270-476-T.</li> </ol> <p>If no failures are detected, the automatic part of initiated BIT is exited and prompt <b>ARE OPERATOR INTERACTIVE TESTS REQUIRED? (Y/N)</b> appears on HOD, go to next step.</p>
f. On DEK, press and release <b>L SHIFT</b> and <b>YZ*/9</b> keys to respond with a <b>(Y)</b> (ADC) or <b>(Y)</b> key on CDU (ADD).	The TADS operator interactive test is initiated.

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

## 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:

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

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**CPG Station**

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

**Pilot Station**

<u>PANEL</u>	<u>SWITCH/CONTROL</u>	<u>POSITION</u> (set to)
<b>FIRE CONTROL</b>	<b>SIGHT SEL</b>	STBY
	<b>ACQ SEL</b>	OFF
	<b>VID SEL</b>	PLT
	<b>ACM</b>	OFF
	<b>PNVS</b>	OFF
<b>ANTI ICE</b>	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).
-

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>AND NO-GO CPG COMPARTMENT</b>	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).
<b>TADS LASER TRANSCEIVER NO-GO DSA</b>	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).
<b>TADS LASER ELECTRONICS NO-GO LH FAB</b>	Troubleshoot wiring to isolate fault (TM 1-1270-476-T). If troubleshooting does not remove NO-GO, replace TADS laser electronics unit (LEU) (TM 1-1270-476-20).
<b>TADS POWER SUPPLY NO-GO LH FAB</b>	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).
<b>TADS ELECTRONIC UNIT NO-GO LH FAB</b>	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).



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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TADS ECS ASSEMBLY NO-GO TURRET BULKHEAD</b>	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).
<b>TADS IVD-HDD ELECTRONICS NO-GO CPG COMPARTMENT</b>	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).
<b>BORESIGHT MODULE NO-GO TURRET BULKHEAD</b>	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).
<b>TADS TV SHROUD NO-GO DSA</b>	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).
<b>TADS FLIR SHROUD NO-GO NSA</b>	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).
<b>TADS LASER TRACKER NO-GO DSA</b>	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).

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


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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>TADS TORQ-SERVO MODULE NO-GO TURRET BULKHEAD</b>	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).
<b>TADS PITCH GYRO NO-GO DSA</b>	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).
<b>TADS YAW GYRO NO-GO DSA</b>	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).
<b>TADS ROLL GYRO NO-GO DSA</b>	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).
<b>TADS DSA SUB-ASSY NO-GO DSA</b>	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).
<b>TADS NIGHT SENSOR NO-GO DSA</b>	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).

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

4-14

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>ORT COLUMN ASSY NO-GO CPG COMPARTMENT</b>	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).
<b>TADS AC TORQUER AMP NO-GO TURRET BULKHEAD (ACY)</b>	Refer to TM 9-1270-476-30, and troubleshoot the TADS turret assembly.
<b>TADS TURRET ASSY NO-GO TURRET BULKHEAD (ACZ)</b>	Refer to TM 9-1270-476-30, and troubleshoot the TADS turret assembly.
<b>TADS TV SENSOR NO-GO DSA</b>	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).
<b>ORT HOD CONTROLS NO-GO CPG COMPARTMENT</b>	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).
<b>ORT HOD LEFT HAND GRIP NO-GO CPG COMPARTMENT</b>	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).

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

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FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>ORT HOD RIGHT HAND GRIP NO-GO CPG COMPARTMENT</b>	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).
<b>TADS BORESIGHT NO-GO RAM CHECKSUM</b>	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 <b>DATA ENTRY</b> switch to FD/LS (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	If there are no system failures, the following message (prompt) will be displayed: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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.

TASK	RESULT
c. On DEK, press and release <b>(-)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> keys (ADD).	If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system. When <b>MUX COMMUNICATION GO</b> 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 <b>ABC/1</b> and <b>MNO/5</b> keys (ADC). On CDU, press and release <b>1</b> and <b>5</b> keys (ADD). | <p>If <b>BBC-KBRD-CPG-IFCP GO</b> (ADC) or <b>BBC-CPG-IFCP GO</b> (ADD) appears on the HOD, go to next step.</p> <p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step b. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 9-1230-476-20-2.</li> </ol> |
|--|--|

## 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

**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 <b>CPG AUX/ ANTI ICE</b> panel (fig.2-47), set <b>ADSS</b> switch to <b>ADSS</b> .	
b. On DEK (fig. 2-49), rotate <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	<p>If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p> <p>When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b></p>
c. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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.

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 <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.

<b>WARNING</b>
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- 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.

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.

- |   |   |
|---|---|
| <p>e. On DEK, press and release <b>ABC/1</b> and <b>PQR/6</b> keys (ADC). On CDU, press and release <b>1</b> and <b>6</b> keys (ADD).</p> | <p>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.</p> |
|---|---|

TASK	RESULT
<p>f. When check is complete, check the HOD. Note and record any NO-GO message.</p>	<p>If <b>NO FAULTS DETECTED ALL SYSTEMS ARE GO</b> appear on the HOD, go to next step.</p> <p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence:</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step <b>c</b>. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to the applicable technical manual.</li> </ol>

#### 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

Headset–Microphone  
Cord Assembly,  
Maintenance Headset

Part Number

H-157/AIC  
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:

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

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 <b>MUX COMMUNICATION GO</b> 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:<br><br>(1) Pause before performing step 10 in the APU Operating Instructions until prompted by the FD/LS check.<br><br>(2) If the APU is not going to be placed on-line as aircraft power source, omit steps 11 and 12. | If APU start sequence does not begin, refer to TM 1-1520-238-T-8.<br><br>On the pilots center circuit breaker panel (fig. 2-6), if <b>FUEL BST, FUEL APU, APU HOLD</b> , and aft avionics bay circuit breaker panel (fig. 2-50), <b>APU</b> circuit breakers do not stay closed, refer to TM 1-1520-238-T-8. Upon successfully completing this step, go to next step. |
| e. On DEK, press and release <b>ABC/1</b> and <b>STU/7</b> keys (ADC). On CDU, press and release <b>1</b> and <b>7</b> keys (ADD).  | When the prompt (message) <b>MOVE APU START SWITCH TO START THEN RELEASE</b> appears on HOD, perform step 10 in the APU – Operating Instructions.<br><br>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence:   |



## 4-17 APU – INTERACTIVE FD/LS CHECK (cont)

4-17

TASK	RESULT
	<ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2) and APU shutdown (para 3-3).</li> <li>(2) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step b .If NO-GO repeats after CORRECTIVE ACTION, refer to TM 1-1520-238-T-8.</li> </ol>

**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.

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>APU NO-GO UNDERSPEED</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO OVERTEMP</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO OVERCURRENT</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO FUEL SOL NOT ON</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO PTO CLUTCH</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO START RELAY</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO IGNITION NOT ON</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO IGNITION NOT OFF</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO LOW OIL PRESSURE</b>	Troubleshoot wiring to isolate fault (TM 1-1520-238-T-8).
<b>APU NO-GO OVERSPEED</b>	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 9-1230-476-20-2

TM 1-1520-238-23

**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.

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 <b>DATA ENTRY</b> switch to <b>FD/LS</b> (ADC). On CDU (fig. 2-49.2), select <b>FAB FDLS</b> (ADD).	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>ENTER/ SPACE</b> key on the DEK (ADC) or <b>SPC</b> key on the CDU (ADD). Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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.

TASK	RESULT
c. On DEK press and release (–)/0 and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> 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 <b>ABC/1</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>1</b> and <b>8</b> keys (ADD).	When the prompt (message) <b>PUT GEN 1 SWITCH IN TEST POSITION</b> appears on HOD, go to next step.
f. On <b>ELEC PWR</b> panel (fig. 2-27), set and hold <b>GEN1/OFF/RESET/TEST</b> switch to <b>TEST</b> .	Generator 1 is continually tested for test power for 30 seconds. When the prompt (message) <b>PUT GEN 2 SWITCH IN TEST POSITION</b> appears on HOD, go to next step.

## 4-18 GEN – INTERACTIVE FD/LS CHECK (cont)

4-18

TASK	RESULT
g. On <b>ELEC PWR</b> panel, release <b>GEN1/OFF/RESET/TEST</b> switch, and set and hold <b>GEN 2/OFF/RESET/TEST</b> switch to <b>TEST</b> .	<p>Generator 2 is continually tested for test power for 30 seconds.</p> <p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence.</p> <ol style="list-style-type: none"> <li>(1) Perform <b>SYSTEMS – POWER DOWN</b> (para 3-2) and <b>APU shutdown</b> (para 3-3).</li> <li>(2) Perform <b>CORRECTIVE ACTION</b> indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform <b>SYSTEMS – POWER-UP</b> (para 3-1).</li> <li>(4) On DEK, rotate <b>DATA ENTRY</b> switch to <b>STBY</b> for 5 seconds, then back to <b>FD/LS</b> (ADC).</li> <li>(5) Repeat FD/LS check beginning with step b. If NO-GO repeats after <b>CORRECTIVE ACTION</b>, refer to TM 1-1520-238-T-6.</li> </ol> <p>When the advisory message <b>GENERATOR SYSTEMS GO</b> appears on HOD, go to next step.</p>
h. Release the <b>GEN 2 /OFF/RESET/TEST</b> switch.	

**NOTE**

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

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

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**4-18 GEN – INTERACTIVE FD/LS CHECK (cont) 4-18**


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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.
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 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.

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

TASK	RESULT
b. Obtain maintenance menu by pressing and releasing any DEK key except <b>ENTER SPACE</b> or <b>SHIFT</b> (ADC); or any key on the CDU, except <b>SPC</b> (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 <b>(-)/0</b> and <b>VWX/8</b> keys (ADC). On CDU, press and release <b>0</b> and <b>8</b> 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** keys (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.



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**4-19 TRAN – INTERACTIVE FD/LS CHECK (cont)**      **4-19**


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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.
-

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<b>NGB1 00LB</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>XMN1 00LB</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>XMN2 00LB</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>NGB2 00LB</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>NGB1 -31°C</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>XMN1 -31°C</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>XMN2 -31°C</b>	If this part of the FD/LS advisory message does not appear on HOD, refer to TM 1-1520-238-T-4.
<b>NGB2 -31°C</b>	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

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**4-33 CDU – INTERACTIVE FD/LS CHECK  
(ADD)**


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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:

<u>TASK</u>	<u>RESULT</u>
a. On CDU (fig. 2-49.2), select <b>FAB FDLS</b> .	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>SPC</b> key on the CDU. Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except <b>SPC</b> .	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 <b>0</b> and <b>8</b> keys.	<p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p> <p>When <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.</p>
e. On CDU, press and release <b>3</b> and <b>3</b> keys.	<p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence.</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2) and APU shutdown (para 3-3).</li> <li>(2) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2.</li> </ol>

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**4-33 CDU – INTERACTIVE FD/LS CHECK** **4-33**  
**(ADD) (cont)**


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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
 

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**CONTROL  
 DISPLAY UNIT  
 NO-GO CPG  
 COMPARTMENT**

 CORRECTIVE ACTION
 

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 Troubleshoot wiring to isolate  
 fault TM 11-1520-238-23-2.

END OF TASK

**Personnel Required:**

(2)

**References:**

TM 11-1520-238-23-1

TM 9-1230-476-20-2

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 FD/LS check as follows:

TASK	RESULT
a. On CDU (fig. 2-49.2), select FAB <b>FDLS</b> .	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>SPC</b> key on the CDU. Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except <b>SPC</b> .	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
<p>c. On CDU, press and release <b>0</b> and <b>8</b> keys.</p>	<p>If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.</p> <p>When <b>MUX COMMUNICATION GO</b> appears on the HOD, go to next step.</p>
<p>e. On CDU, press and release <b>3</b> and <b>4</b> keys.</p>	<p>If one or more FD/LS NO-GO displays listed appear on the HOD, perform the following in sequence.</p> <ol style="list-style-type: none"> <li>(1) Perform SYSTEMS – POWER DOWN (para 3-2) and APU shutdown (para 3-3).</li> <li>(2) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD.</li> <li>(3) Perform SYSTEMS – POWER-UP (para 3-1).</li> <li>(4) Repeat FD/LS check beginning with step 2. If NO-GO repeats after CORRECTIVE ACTION, refer to TM 11-1520-238-23-2.</li> </ol>
<p>3. Perform SYSTEMS – POWER DOWN (para 3-2) if power no longer required.</p>	

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
<p><b>SIGNAL DATA CONV-COMP NO-GO LH AFT CATWALK</b></p>	<p>Replace SDCC TM 11-1520-238-23-1.</p>
<p><b>RCVR-XMTR ASSY NO-GO BELLY</b></p>	<p>Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.</p>

**4-34 DNS – INTERACTIVE FD/LS CHECK  
(ADD) (cont)****4-34**

<b>FD/LS NO-GO DISPLAY</b>	<b>CORRECTIVE ACTION</b>
<b>ATT-HDG INPUT SIGNALS NO-GO SDCC-HARS WIRING</b>	Troubleshoot wiring to isolate fault TM 11-1520-238-23-2.
<b>ARINC OUTPUT SIGNAL NO-GO</b>	Troubleshoot wiring to isolate fault It TM 11-1520-238-23-2.

END OF TASK



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**4-35 DTU – INTERACTIVE FD/LS CHECK  
(ADD)**


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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 <b>FAB FDLS</b> .	If there are no system failures, the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>  When a list of failures is displayed, the list is scrolled by pressing and releasing the <b>SPC</b> key on the CDU. Scroll until the following message (prompt) appears: <b>ANY KEY FOR FD/LS MENUS</b>
b. Obtain maintenance menu by pressing and releasing any key on the CDU, except <b>SPC</b> .	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 <b>0</b> and <b>8</b> 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

<b>FD/LS NO-GO DISPLAY</b>	<b>CORRECTIVE ACTION</b>
<b>DATA TRANSFER UNIT NO-GO CPG COMPARTMENT</b>	Troubleshoot wiring to isolate fault (TM 11-1520-238-23-2).
<b>DTC BATTERY LOW NO-GO CPG COMPARTMENT</b>	Replace DTC batteries (TM 11-1520-238-23-2).

END OF TASK

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

**4-36 EGI – INTERACTIVE FD/LS CHECK  
(ADD) (cont)**

4-36

TASK	RESULT
c. On CDU, press and release <b>0</b> and <b>8</b> keys.	If any MUX NO-GO appears on HOD, refer to TM 9-1230-476-20-2 for troubleshooting the MUX system.  When <b>MUX COMMUNICATION GO</b> 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 <b>3</b> and <b>6</b> keys.	Check that the following message appears on HOD: <b>ENTER THE NUMBER OF THE TEST TO PERFORM</b> <b>1 QUICK TEST</b> <b>2 EXTENDED ALIGN TEST</b>  If <b>2</b> is selected, check that the following message appears on HOD: <b>EGI TEST IN PROGRESS – WAIT FOR ALIGN TO END</b>  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
3. Perform SYSTEMS – POWER DOWN (para 3-2) if power no longer required.	(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.

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

## TM 1-1520-238-T-1

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.



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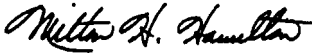




**By Order of the Secretary of the Army:**

GORDON R. SULLIVAN  
*General, United States Army*  
*Chief of Staff*

Official:



MILTON H. HAMILTON  
*Administrative Assistant to the*  
*Secretary of the Army*  
01130

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To be distributed in accordance with DA Form 12-31-E,  
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## ***These are the instructions for sending an electronic 2028***

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" [whomever@avma27.army.mil](mailto:whomever@avma27.army.mil)  
To: [2028@redstone.army.mil](mailto: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:**

This is the text for the problem below line 27.



THEN ... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

# SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC John DOE  
CO 4 3rd Engineer Bn  
Ft. Leonardwood, MD 63108

DATE SENT

10 January 1999

PUBLICATION NUMBER

TM 1-1520-238-T-1

PUBLICATION DATE

30 December 1998

PUBLICATION TITLE

Troubleshooting Manual for AH-64

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

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 in figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is called a shim. Please correct one or the other

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE

JOHN DOE *John Doe*



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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

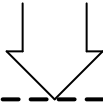
DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
--------------------	------------------	-------------------

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE
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FILL IN YOUR  
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

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OFFICIAL BUSINESS

COMMANDER  
U.S. ARMY AVIATION AND MISSILE COMMAND  
ATTN: AMSAM-MMC-MA-NP  
REDSTONE ARSENAL, AL 35898-5230

TEAR ALONG PERFORATED LINE



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PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

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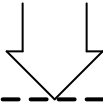
IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

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UNITS ADDRESS



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DEPARTMENT OF THE ARMY

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COMMANDER  
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TEAR ALONG PERFORATED LINE





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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

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IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO

PARA-GRAPH

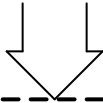
FIGURE NO

TABLE NO

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

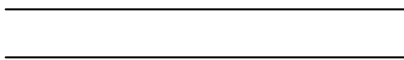
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DEPARTMENT OF THE ARMY



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TEAR ALONG PERFORATED LINE

## 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	5/9 (after	Celsius	° C
	temperature	subtracting	temperature	
		32)		

**PIN: 067713-009**