

**TM 9-1230-476-30**

**TECHNICAL MANUAL**

**AVIATION INTERMEDIATE  
MAINTENANCE MANUAL**

**FOR**

**ARMY  
AH-64A HELICOPTER**

**FIRE CONTROL SYSTEM**

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This copy is a reprint which includes current pages from Changes 1 Through 7.

**HEADQUARTERS, DEPARTMENT OF THE ARMY  
22 MARCH 1985**

TECHNICAL MANUAL

No. 9-1230-476-30

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D. C., 22 March 1985**AVIATION INTERMEDIATE  
MAINTENANCE MANUAL  
FOR****ARMY  
AH-64A HELICOPTER****FIRE CONTROL SYSTEM****REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5238. A reply will be furnished directly to you.

You may also send in your comments electronically to our e-mail address: [ls-lp@redstone.army.mil](mailto:ls-lp@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.

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## HOW TO USE THIS MANUAL

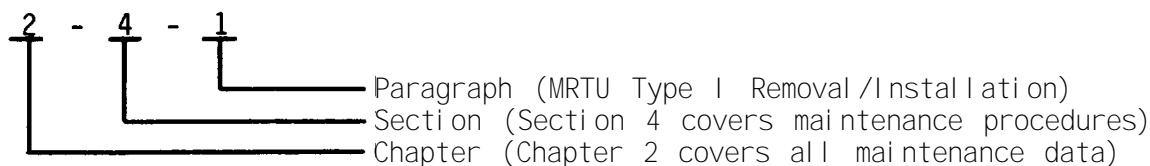
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### A. OVERVIEW

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 sections. Sections are made up of paragraphs, 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: 2-4-1



### B. VOLUMES

This manual has one volume.

1. The volume has appendices (A and B). These appendices have information you will need. They contain references and expendable supplies and materials.

### C. CHAPTERS

Most chapters have one or more sections.

1. Chapter 1 has two sections covering general information.
2. Chapter 2 covers all maintenance instructions.

### D. SECTIONS

Sections cover special information about the system for which the chapter is titled. Sections have the following kinds of information:

1. General Information
2. Equipment Description and Data
3. Aviation Intermediate Maintenance Instructions (AVIM)

### E. PARAGRAPHS

Paragraphs make up sections. 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.

GO TO NEXT PAGE

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HOW TO USE THIS MANUAL (cont)

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F. SETUP TABLE

Each maintenance task is headed by a setup table. This table outlines what is needed as well as certain conditions which must be met before starting the task.

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(a)	<u>2-4-39. AIR DATA PROCESSOR (AOP) COVER GASKET REPLACEMENT</u>	(b)	<u>2-4-39</u>
(c)	<u>This task covers: A. REMOVAL B. CLEANING C. INSTALLATION</u>		
(d)	Tools:	(i)	Personnel Required:
	<u>Nomenclature</u>		68J10 Aircraft Fire Control Repairer
(e)	Knife, Putty Toothbrush		
(f)	Materials/Parts:		
(g)	Gasket (2) Gasket (2) Gasket (2)	(j)	Equipment Conditions:
(h)	(B1) Cloth, Lint-Free (B6) Alcohol, Isopropyl (B12) Adhesive, Silicone	Ref	<u>Condition</u> 2-4-38 Covers removed

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SETUP TABLE KEY

- (a) Task paragraph number.
- (b) Task name.
- (c) What this task does.
- (d) A list of tools and equipment needed to do this task.
- (e) A typical tool. Part number/NSN can be found in the MAC of TM 9-1230-476-20-1.
- (f) The list of materials and parts needed to do this task.
- (g) A typical replacement part required in this task.
- (h) Expendable material also listed in Appendix B.
- (i) A list of the personnel required.
- (j) This is a list of tasks that must be done before doing this task.

GO TO NEXT PAGE

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 HOW TO USE THIS MANUAL (cont)
 

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G. MAINTENANCE INSTRUCTIONS

These Instructions tell you how to do the job.

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(a) 2-4-39. AIR DATA PROCESSOR (ADP) COVER GASKET REPLACEMENT

2-4-39

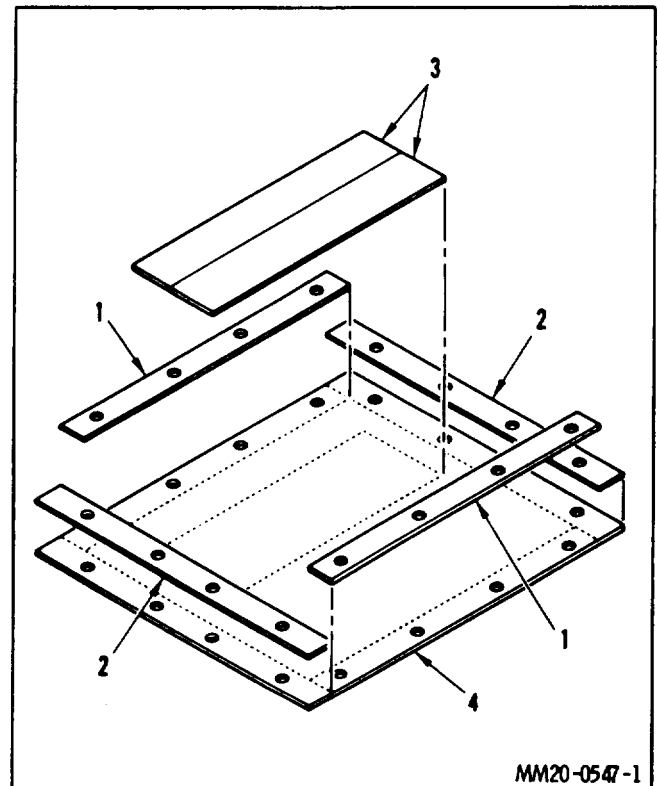
(b) A. REMOVAL

(e)

## NOTE

Two center gaskets are on bottom cover only.

- (c) 1. Remove gaskets (1), (2), (3)  
 (d) from cover (4). Note position of gaskets (3) before removal.



GO TO NEXT PAGE

## SAMPLE MAINTENANCE TASK

MAINTENANCE INSTRUCTION KEY

- (a) Task paragraph number and title (located at the top of all maintenance task pages).
- (b) Heading name which describes type of maintenance action being performed on the component.
- (c) Primary instruction steps (in bold type), describes, in order, how to do the task. It is used by the experienced and inexperienced repairer.
- (d) Substeps explain in greater detail how to do the primary steps which precede them. It is used by both the experienced and inexperienced repairer.
- (e) This maintenance illustration will show what has been described by one or more of the primary and secondary instruction steps.

GO TO NEXT PAGE

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**HOW TO USE THIS MANUAL (cont)**

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**H. GLOSSARY**

A glossary in the back of the manual lists words that may be new to you. Or, the word may be used in a different way from the meaning you already know.

**I. ALPHABETICAL INDEX**

The alphabetical index in the back of the manual lists all subjects in the manual in alphabetical order. Information you are looking for is listed under the first letter of the first word in the title. The number at the right of the task is the paragraph number. Black tabs on the manual cover show you where you will find information inside the manual. Look for a black tab on the page edge that is adjacent to the black index tab on the cover. That thin black line shows you where to open the manual.

**J. USING AH-64A HELICOPTER EFFECTIVITY CODES**

Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters within triangular borders in wiring diagrams and represent various helicopter serial number blocks. They are used throughout this manual as necessary to aid the helicopter troubleshooting effort.

The codes are used to designate serial number block differences as follows:

- a. When used within narrative text, and Fault Isolation Procedures, effectivity codes appear within parentheses.

Example: Narrative text, ..... (AAC)  
 Example: Fault Isolation Procedures ..... (AAC)

- b. When used inside interconnect diagrams, effectivity codes appear within triangular borders and are placed on the line which represents that particular helicopter's configuration.

Example: Interconnect diagrams .....AAA

This manual uses these effectivity codes and corresponding helicopter serial numbers for reference.

To use the helicopter effectivity codes, note the helicopter serial number on the left-hand side of the fuselage directly below the CPG window. Use this serial number to determine which procedures, or which path in an interconnection diagram or fault isolation procedure to use.

The effectivity codes and helicopter serial number blocks applicable to this manual are as follows:

<u>Effectivity Code</u>	<u>Helicopter Serial No.</u>
ACY	82-23355 thru 92-0485 (Before MWO 9-1230-476-50-01)
ACZ	82-23355 thru 92-0485 (After MWO 9-1230-476-50-01) 94-0328 and subsequent

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**HOW TO USE THIS MANUAL (cont)**


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**Effectivity Code**

ADC  
ADD

**Helicopter Serial No.**

Before MWO 1-1520-238-50-49  
After MWO 1-1520-238-50-49

**K. APPENDICES**Appendix

A

Information:

REFERENCES - Contains a list of other manuals you might need to do your job

B

EXPENDABLE SUPPLIES AND MATERIALS LIST:

Lists all supplies and materials used (rags, grease, dry-cleaning solvent, lockwire, etc.)

**L. OFF-HELICOPTER TROUBLESHOOTING**

Troubleshooting the following components off the helicopter is performed as instructed in TM 11-6625-3085-12, Operator and Aviation Unit Maintenance Technical Manual for Electronic Equipment Test Facility QQ-290(V)2/MSM:

Fire Control Computer  
MRTU Type I  
MRTU Type II  
MRTU Type III  
Air Data Processor  
Pilot Fire Control Panel  
CPG Fire Control Panel  
Data Entry Keyboard

**END OF HOW TO USE THIS MANUAL****Change 9 vii/(viii blank)**



# CHAPTER 1

## INTRODUCTION

### Section I. GENERAL INFORMATION

---

#### 1-1-1. SCOPE

1-1-1

**Type of Manual.** This manual covers intermediate maintenance of the following components of the Fire Control System:

Fire Control Computer (FCC).

Pilot and CPG Fire Control Panels (FCP).

Multiplex Remote Terminal Units (MRTU).

Air Data Processor (ADP).

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#### 1-1-2. MAINTENANCE RECORDS, FORMS AND REPORTS

1-1-2

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System Aircraft (TAMMS-A). The DA PAM is published in the Maintenance Management Update: Units may subscribe to Maintenance Management UPDATE by submitting a complete DA Form 12-13 to: Commander, USAAG Publication Center, ATTN: AGDM-CD, 2800 Eastern Boulevard, Baltimore, MD 21220.

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#### 1-1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

1-1-3

Destruction procedures you need to know are found in TM 750-244-1-5.

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#### 1-1-4. PREPARATION FOR STORAGE AND SHIPMENT

1-1-4

Procedures for packing, storage and shipping electrostatic discharge sensitive (ESDS) devices are in Chapter 3.

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#### 1-1-5. QUALITY ASSURANCE/QUALITY CONTROL

1-1-5

Quality assurance information you are required to use is explained in FM 55-411.

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**1-1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

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**1-1-6**

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know what you don't like about the design. Put it on SF 368 (Quality Deficiency Report). Mail it to us at Commander, US Missile

- Command, ATTN: Command, ATTN: AMSAM-MMC-RE-FD, Redstone Arsenal, AL 35898-5230. We'll send you a reply.

**Section II. EQUIPMENT DESCRIPTION AND DATA**

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**1-2-1. FIRE CONTROL SYSTEM**

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1-2-1

A **Purpose.** The Fire Control System (FCS) of the AH-64A directs the helicopter weapons systems employment. The controls fire the weapons automatically, or manually toward selected targets.

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**1-2-2. FIRE CONTROL SYSTEM EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES**

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1-2-2

**A. General.**

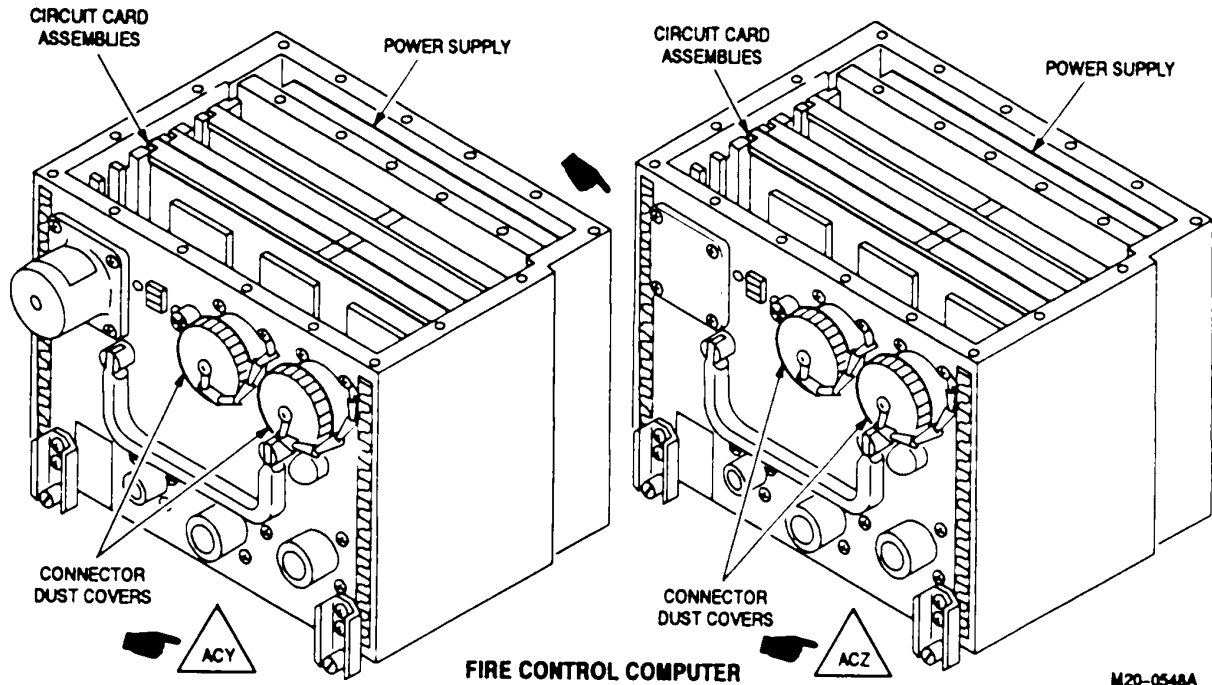
1. The Fire Control System (FCS) controls weapon systems firing. The operation is such that simultaneous firing of any two weapons is possible. The only exception is the Hellfire/rocket combination.
2. Individual FCS components and associated subsystems characteristics are given in the following paragraphs.

**B. Fire Control Computer (FCC).**

1. Characteristics. The FCC performs computations necessary to supply commands regulating the fire control system. The FCC contains the required software to interface with the weapon systems.
2. Capabilities. The FCC:
  - a. Provides functions to control the multiplex data bus for the firing of Hellfire missiles, 30mm gun, and aerial rockets.
  - b. Gathers data necessary for targeting navigation, and weapon ballistic compensation from the:
    - (1) Target Acquisition Designation Sight (TADS).
    - (2) Air Data Subsystem (ADSS).
    - (3) Integrated Helmet and Display Sight System (IHADSS).
    - (4) Heading Attitude Reference System (HARS).
3. Features. The FCC:
  - a. Is an LRU of modular construction.
  - b. Contains a storage battery used to maintain the computer RAM memory when the helicopter's 28 Vdc power is OFF (ACY).
  - c. Components are three modules and a power supply. The modules are:
    - (1) Central Processing Unit (CPU).
    - (2) Memory.
    - (3) Input/Output (I/O).

1-2-3. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

A. Fire Control Computer (FCC). The FCC houses three removable modules which control operations of all onboard weapon systems. At the rear of the FCC is the power supply providing 28 Vdc to the modules. The battery (ACY) is used to retain random access memory when aircraft power is off. An Electrically-Erasable Programmable Read-Only Module (EEPROM) is used to store memory (ACZ).

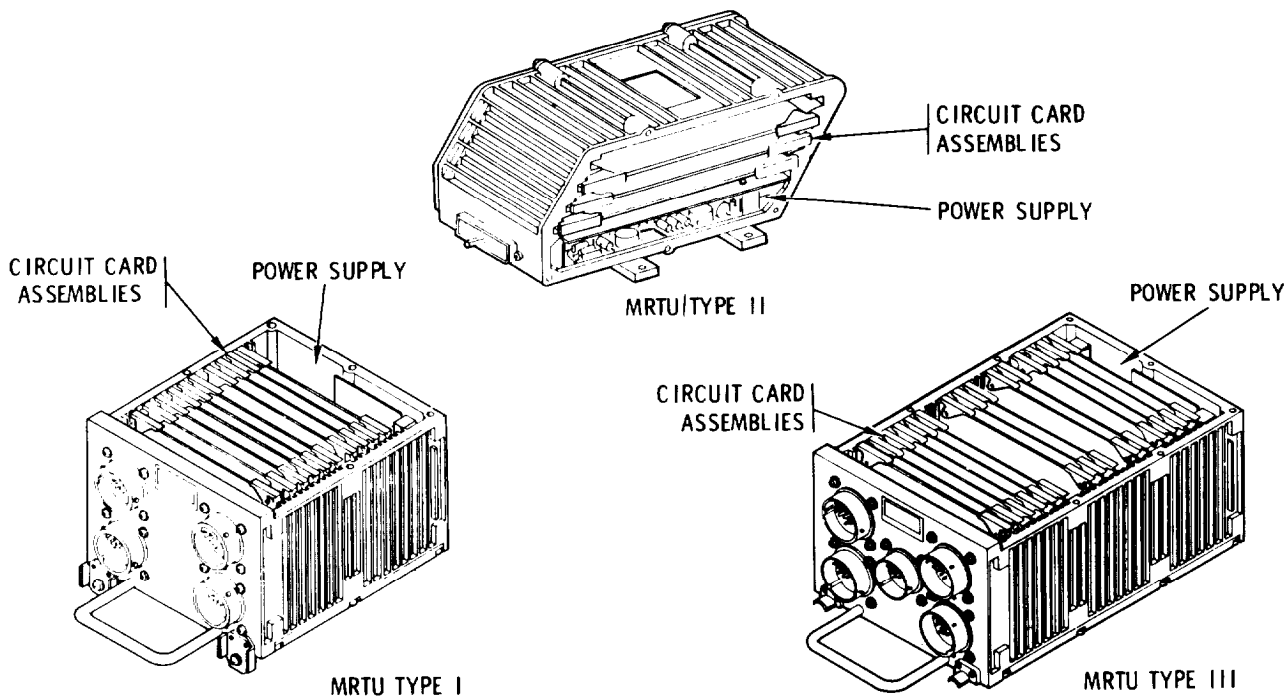


1-4 Change 8

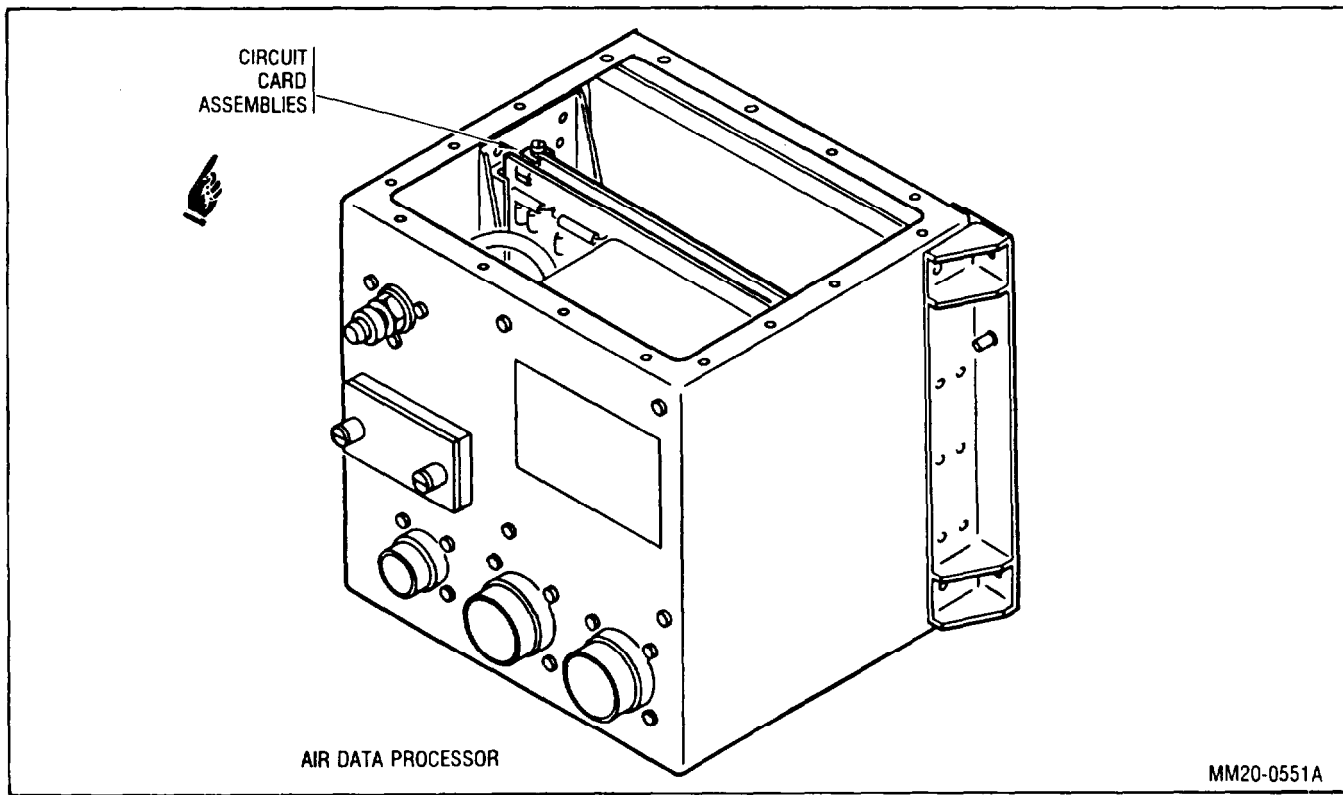
1-2-3. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

1-2-3

B. Multiplex Remote Terminal Units (MRTU). There are seven MRTUs within the multiplex system: Two type I, four type II, and one type III. Each unit contains removable circuit cards which interface with both primary and secondary data buses and a removal power supply which provides 28 Vdc to the circuit cards.



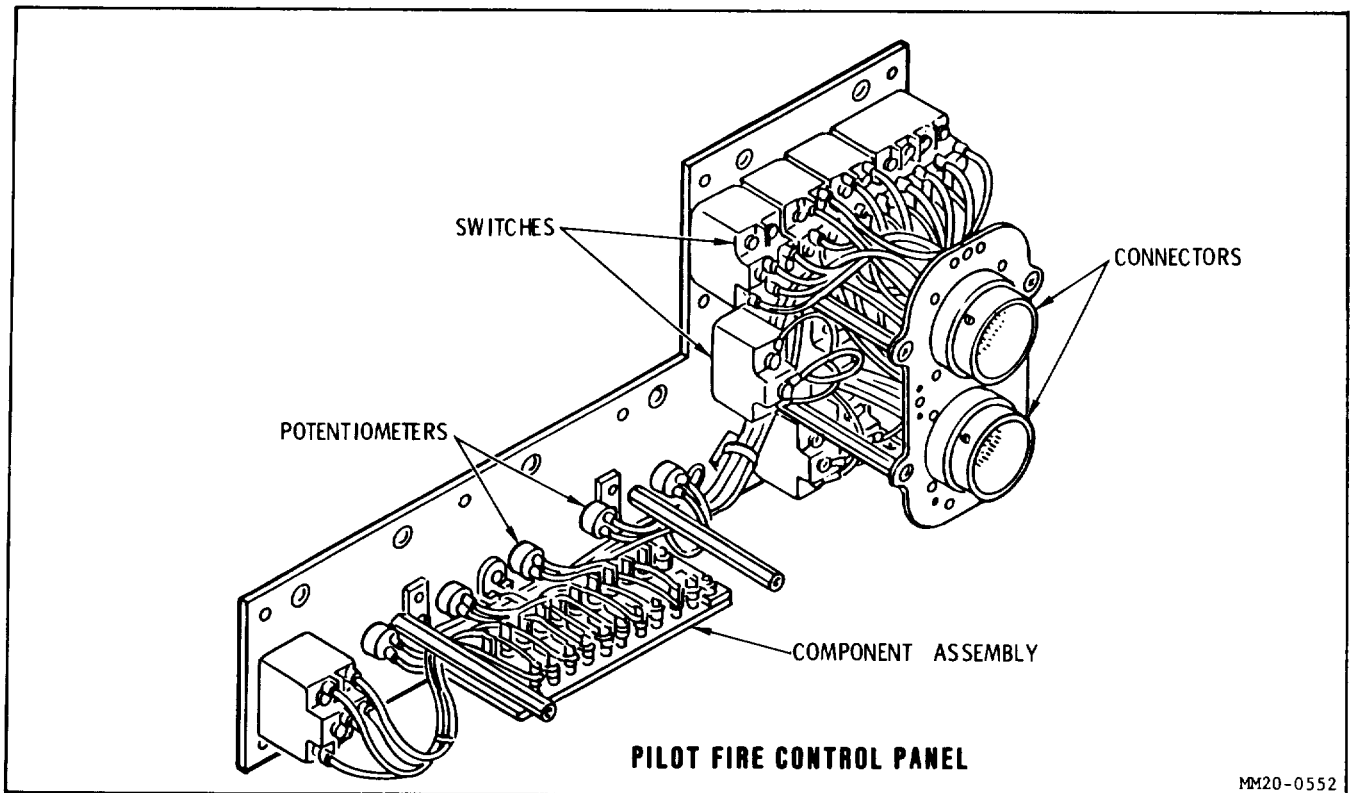
MM20-0549



C. Air Data Processor (ADP). The ADP contains two removable circuit card assemblies which provide electronic Air Data outputs from the Omnidirectional Airspeed Sensor (OAS), Ambient Temperature Sensor, and Barometric Pressure Transducer inputs.

## 1-2-3. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

1-2-3



D. Pilot Fire Control Panel (FCP). The FCP houses a variety of toggle switches, selector switches, and potentiometers which provide weapon selection, video selection, and video symbol imagery control. Each component is easily and individually removed.