TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE TROUBLESHOOTING MANUAL

FOR

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

THEORY OF OPERATION

SUPERSEDURE NOTICE: This manual supersedes TM 1-1520-238-T-9, dated 05 SEPTEMBER 1990, including all changes.

HEADQUARTERS, DEPARTMENT OF THE ARMY
30 APRIL 1992

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 30 April 1992

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly 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 256–842–6546/DSN 788–6546. Instructions for sending an electronic 2028 may be found at the end of this manual immediately preceding the hard copy 2028.

TABLE OF CONTENTS

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TABLE OF CONTENTS – continued

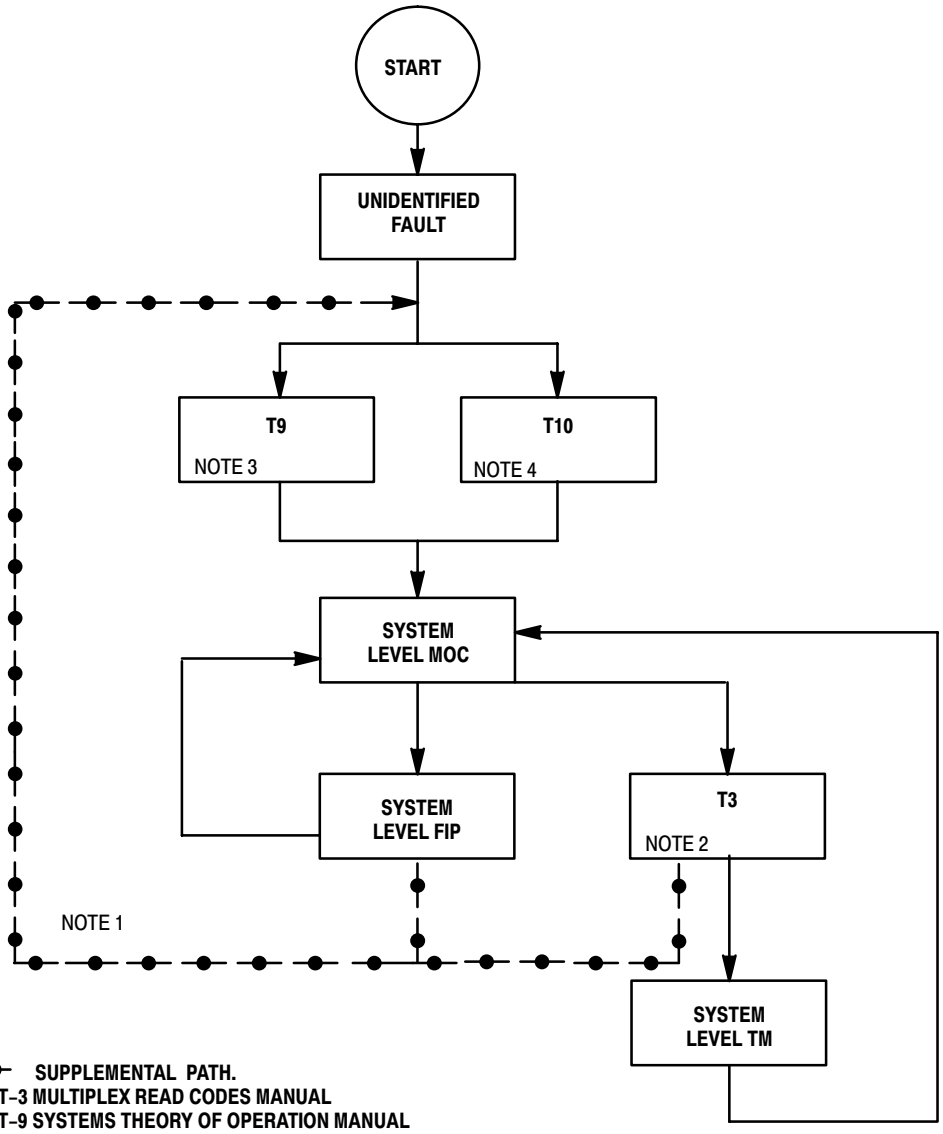
HOW TO USE THIS VOLUME

GENERAL

This volume (TM 1-1520-238-T-9) may be used in conjunction with the wiring information in the Army AH-64A helicopter Wiring Diagrams volume (TM 1-1520-238-T-10) to troubleshoot any fault not isolated by the appropriate maintenance operational check (MOC) and the associated fault isolation procedures (FIPs), the Army AH-64A helicopter Multiplex Read Codes volume (TM 1-1520-238-T-3), or the Army AH-64A helicopter Fault Detection/Location System (FD/LS) manual (TM 1-1520-238-T-1)

After the fault has been identified and the suspected component(s) is (are) replaced, the MOC, the multiplex read codes and/or the FD/LS must be performed again to prove the system is operational.

The following diagram shows how this volume relates to the other troubleshooting volumes within this manual and to other manuals.



NOTES:

1. SUPPLEMENTAL PATH.
2. TM 1-1520-238-T-3 MULTIPLEX READ CODES MANUAL
3. TM 1-1520-238-T-9 SYSTEMS THEORY OF OPERATION MANUAL
4. TM 1-1520-238-T-10 WIRING DIAGRAMS MANUAL

M52-395

Use of this Volume to Isolate Faults that the Normal Troubleshooting Process Failed to Isolate

HOW TO USE THIS VOLUME (cont)

OVERVIEW

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

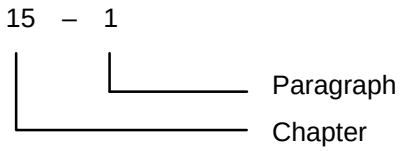
CHAPTERS

The volume is made up of chapters. The chapters are made up of paragraphs and all are numbered. Chapter 1 contains several paragraphs on introductory discussion, general information about the AH-64A helicopter physical configuration and the features of the 22 systems installed aboard the AH-64A helicopter. Chapters 2 through 23 have three paragraphs which present the system's purpose, major components, and theory of operation.

PARAGRAPHS

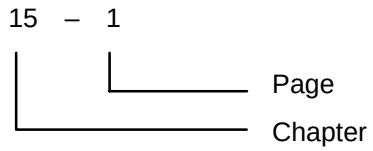
Paragraphs make up chapters. The paragraph contains the information you need to do the job. USE A PARAGRAPH NUMBER TO FIND THE INFORMATION YOU NEED. DON'T USE THE PAGE NUMBERS unless you are using the Table of Contents which shows page numbers.

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



PAGE NUMBERING

All page numbering is by chapters. 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.

HOW TO USE THIS VOLUME (cont)

APPENDIX

APPENDIX A lists all official publications referenced in this volume.

GLOSSARY

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

Look over the glossary and become familiar with abbreviations, acronyms, and unusual terms.

INDEX

An alphabetical index is located in the back of this volume. The index lists all paragraph titles in an alphabetical order. After you find the title in the index, it tells the paragraph number. For example, if you need information on theory of operation for the area weapons system, go to the “A” section of the index and look under area weapons system. There you will find:

Area Weapons System Theory of Operation . . . . . (Para) 20–3

The index informs you that the area weapons system theory of operation is in chapter 20, paragraph 3. The information may also be located in the “T” section of the index under the heading “Theory of Operation.”

USING AH-64A HELICOPTER EFFECTIVITY CODES

Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters that represent various helicopter serial number blocks.

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

When used within narrative text and fault isolation procedures, effectivity codes appear within parenthesis.

For Example: Narrative text and fault isolation procedures (AAA)

When used inside interconnect diagrams and major component locations, effectivity codes appear within triangular borders and are placed on the line which represents that particular helicopter’s configuration.

For Example: Wiring interconnect diagrams 

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

HOW TO USE THIS VOLUME (cont)

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

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

Effectivity Code	Helicopter Serial No.
AAA	82-23355 thru 82-23365
AAK	82-23355 thru 85-25488
AAN	83-23787 thru 85-25415
ABD	82-23355 thru 85-25415
ABQ	86-8940 and Subsequent
ACA	82-23355 thru 88-0199
ACB	88-0200 and Subsequent
ACD	85-25416 and Subsequent
ACJ	82-23355 thru 90-0290, 90-0292 thru 90-0301 (Before MWO 1-1520-238-50-07)
ACK	82-23355 thru 90-0290, 90-0292 thru 90-0301 (After MWO 1-1520-238-50-07) 90-0291, 90-0302 and Subsequent
ACQ	82-23355 thru 90-0448 (Before MWO 1-1520-238-50-36)
ACR	82-23355 thru 90-0448 (After MWO 1-1520-238-50-36) 90-0449 and Subsequent
ACV	89-0192 thru 90-0434 with T700-GE-701C engines (Before MWO 1-1520-238-50-38)
ACW	89-0192 thru 90-0434 with T700-GE-701C engines (After MWO 1-1520-238-50-38) 90-0435 and subsequent with T700-GE-701C engines
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
ADC	Before MWO 1-1520-238-50-49
ADD	After MWO 1-1520-238-50-49
ADF	Before MWO 1-1520-238-50-52
ADG	After MWO 1-1520-238-50-52
ADH	Before MWO 1-1520-238-50-15
ADI	After MWO 1-1520-238-50-15
ADN	AN/APR–39(V)1 installed
ADO	AN/APR–39A(V)1 installed
ADP	After MWO 1-1520-238-50-50

CHAPTER 1 INTRODUCTION

CHAPTER INDEX

SECTION I. GENERAL INFORMATION

1–1. SCOPE

This theory of operation manual is an Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) volume. The material will assist you to understand the overall description and principles of operation of integrated helicopter systems and how they interrelate. The information presented enhances information contained in the system/subsystem troubleshooting manuals. The information contained in this manual may be used by anyone capable of using the present AH-64A technical manuals. (Appendix A lists all official publications referenced in this manual)**.**

1–2. MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of Army forms and instructions for those forms will be those described by DA PAM 738-751, The Army Maintenance Management System–Aircraft (TAMMS-A).

1–3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Destruction procedures you need to know are found in TM 750-244-1-5, Procedures for the Destruction of Aircraft and Associated Equipment to Prevent Enemy Use.

1–4. QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance information you are required to use is explained in FM 1-511, Army Aircraft Quality Control and Technical Inspection.

1–5. DEFICIENCY REPORTING

If your equipment needs correction or improvement, let us know. Send us a Deficiency Report. You, the user, are the only one who can tell us what you don't like about the design. Put it on SF 368 (Quality Deficiency Report). Mail it to us at Commander, U.S. Army Aviation and Missile Command, Attn: AMSAM-MMC-RE-FD, Redstone Arsenal, AL 35898-5230. A reply will be furnished directly to you.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1–6. GENERAL

The AH-64A advanced attack helicopter (fig. 1–1) is a twin engine helicopter designed specifically for the attack helicopter role. The helicopter accommodates an aircrew of two in a tandem configuration. The helicopter delivers various combinations of ordnance while providing maximum helicopter survivability and aircrew protection.

a. Maximum helicopter survivability is achieved by providing redundant systems/components, flight maneuverability and agility, critical components ballistic resistance, high impact survivability, reduced detectability, and wire strike protection.

b. The wings provide mounting surfaces for four external pylons, which can carry external fuel tanks, point target missiles, 2.75-inch folding fin aerial rocket (FFAR) launchers, or a symmetrically loaded combination of any two weapon racks.

c. A turret-mounted 30 mm chain gun, under the forward fuselage, can fire as many as 625 rounds per minute.

d. The helicopter is powered by two T700-GE-701 or T700-GE-701C engines which drive the main rotor through individual engine nose-mounted gearboxes and a main transmission. The main transmission power takeoff shaft drives the tail rotor through intermediate and tail rotor gearboxes.

1–6. GENERAL (cont) **1–6**

e. The auxiliary power unit (APU) drives the accessory drive section of the main transmission to provide full electrical, pneumatic, and hydraulic power to the helicopter when the main engines are not on line. The APU is also used to provide pressurized air system (PAS) air to start the main engines.

f. The flight controls are mechanically actuated, hydraulically powered, and electrically assisted in all flight control axes.

g. A curved canopy structure provides integral rollover protection. The canopy has a blast shield between the two crew stations. Each crew station contains an adjustable armored seat. The seats incorporate armored wings which pivot to facilitate entrance to, and exit from, the crew stations.

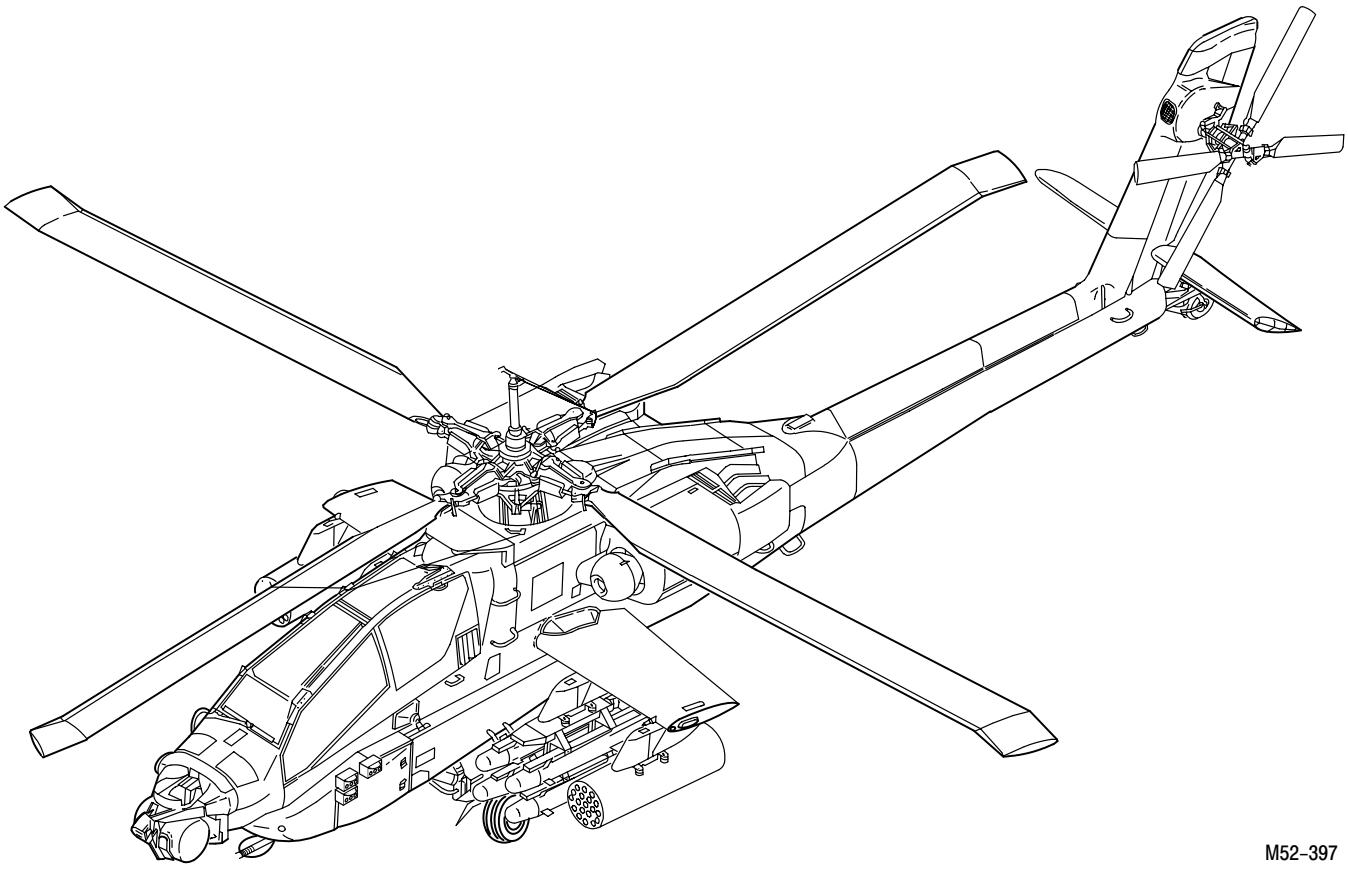


Figure 1–1. AH-64A Helicopter

1–7. AH-64A HELICOPTER SYSTEM INTERFACES

The AH-64A is composed of airframe systems/subsystems. Chapters 2 thru 23 of this manual describe the following airframe system/subsystems.

a. **Airframe.** The airframe (Chapter 2) is a one-piece integral design. The airframe provides mounting points for the helicopter systems and components, and absorbs load during high-impact landings. The wings mount two external pylons per wing which provide external stores stations.