TM 9-4931-376-13&P

TECHNICAL MANUAL

OPERATOR'S, AVIATION UNIT, AND AVIATION INTERMEDIATE MAINTENANCE MANUAL WITH REPAIR PARTS AND SPECIAL TOOLS LIST (INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS)

BORESIGHT CONTROLLER XM34
PART NUMBER 8680400-505
NSN 4931-01-082-1547

prepared by

Teledyne Systems Company

(17863)

Contract DAAJ01-78-C-0400

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 81

TM 9-4931-376-13&P - BORESIGHT CONTROLLER XM34

NSN 4931-01-082-1547

MAY 1981

WARNING

Personnel performing instructions involving operations, procedures, and practices which are included, or implied in this technical manual, will observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury,
D E A T H
or an aborted mission.

To look along the axis of a laser beam without protective glasses is extremely dangerous. Align the laser so that personnel are unlikely to inadvertently look along the axis of its beam.

Laser firing systems may store a charge. Take care to prevent accidental pulsing of the laser and to avoid electric shock. Systems should be so designed as to include a “fail-safe” means of evvoiding this hazard.

Reflections from the laser beam are extremely dangerous. It is essential that all reflective material be removed from its path.

Universal gun turret (UGT) is dynamically exercised during boresight correction procedures. Ensure UGT gun is in a safe condition before starting procedures.

When operating in the manual mode, the boresight controller can input a maximum correction of +16.65 degrees (999 minutes of arc) to the GUN or TSU. To ensure that serious injury does not occur during manual mode operation, set MANUAL DATA ENTRY MSD switch to 0 initially and do not cause UGT or TSU to move until a qualified person states it is safe to do so.

ELECTRICAL SHOCK HAZARD

An ungrounded helicopter may store a static electrical charge. Ground helicopter electrically before performing any maintenance on avionics equipment.

DANGEROUS CHEMICALS

Resin, and acid are injurious to health and extremely flammable.
Use these materials only in well ventilated areas
Avoid breathing vapors and direct contact with skin and eyes.
Do not use near open flame, arcs or sparks;
do not take internally.
Isopropyl alcohol is injurious to health and flammable.
Use this material only in well ventilated areas.
Avoid breathing vapors and direct contact with skin and eyes.
Do not use near open flame, arcs or sparks;
do not take internally.
The epoxy-polyamide primer and paint contain resin and solvent which is injurious to health and extremely flammable.
Use these materials only in well ventilated areas.
Avoid breathing vapors and direct contact with skin and eyes.
Do not use near open flame, arcs, or sparks;
do not take internally.
Methylethylketone is injurious to health and is flammable.
Use methylethylketone in ventilated work areas.
Avoid breathing vapor and direct contact with eyes.
Do not use near open flame, arcs, or sparks;
do not take internally, Wear rubber gloves.

TECHNICAL MANUAL
TM 9-4931-376-13&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 8 May 1981

Operator's, Aviation Unit, and Aviation Intermediate Maintenance Instructions

BORESIGHT CONTROLLER XM34, PART NUMBER 8680400-505

NSN 4931-01-082-1547

Current as of 8 May 1981

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to U.S. Army Armament Materiel Readiness Command, Rock Island, Illinois 61299, ATTN: DRSAR-MAS. A reply will be furnished to you.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope. This manual is for use in operating and maintaining Boresight Controller XM34 (figure 1-1), hereinafter also referred to as the boresight controller. This manual provides information to familiarize operator and maintenance personnel with the physical, functional, and operating characteristics of the boresight controller.

1-2. Maintenance Forms and Records. Maintenance forms and procedures used for equipment maintenance will be those prescribed by TM 38-750.

1-3. Administrative Storage. Instructions for administrative storage are given in TM 740-90-1, Administrative Storage of Equipment.

1-4. Destruction of Army Material to Prevent Enemy Use. Instructions for destruction of Army material to prevent enemy use will be as prescribed in TM 750-244-2.

1-5. Calibration. The boresight controller does not require calibration.

1-6. Reporting Equipment Improvement Recommendations (EIR). EIR can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR may be submitted on SF 368 (Quality Deficiency Report). Mail directly to Us. Army Armament Material Readiness Command, Rock Island, Illinois 91299, ATTN: DRSAR-MAO. A reply will be furnished to you.

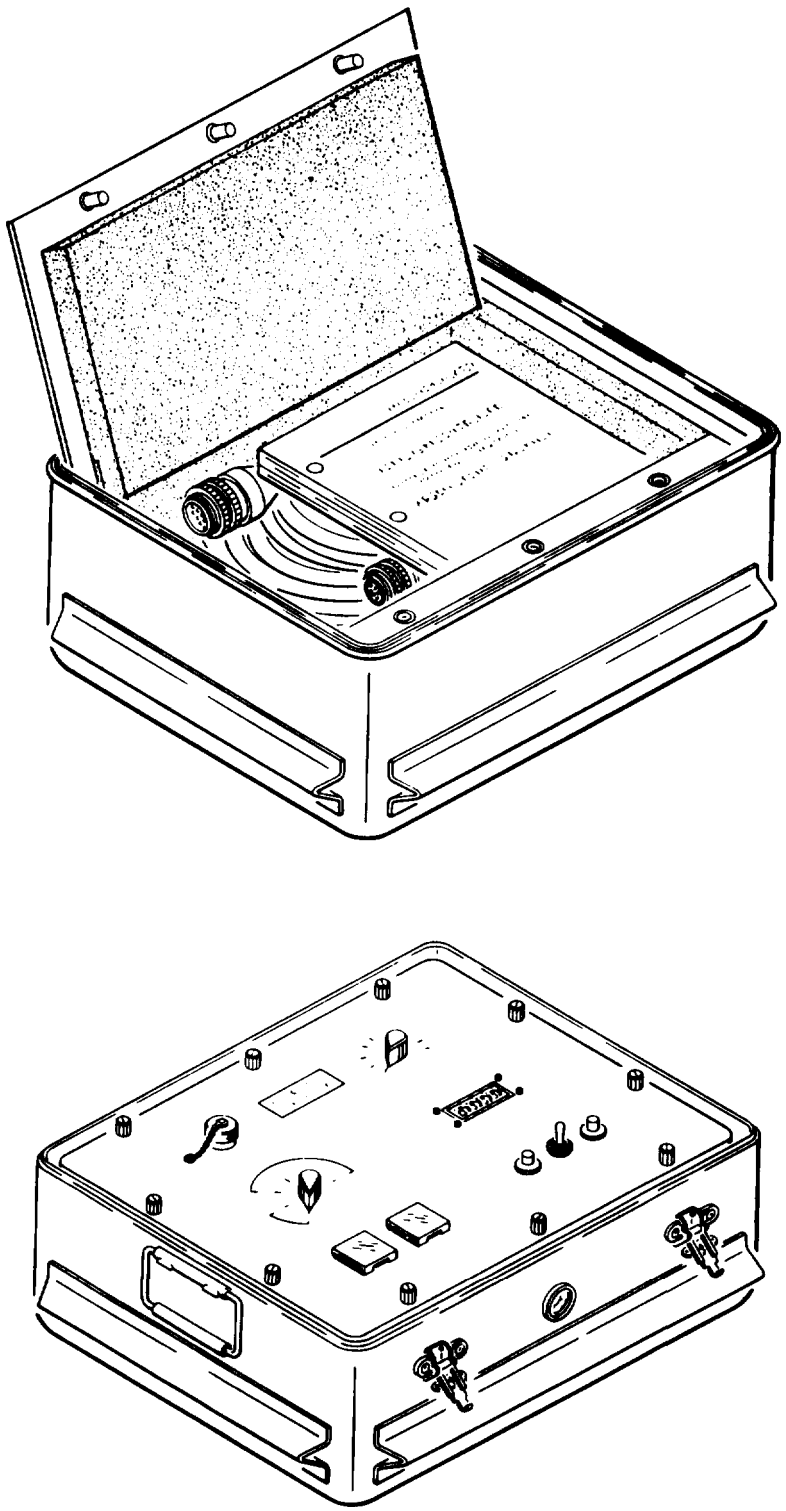
Section II. DESCRIPTION AND TABULATED DATA

1-7. Description. This section provides purpose of equipment and physical descriptions for the boresight controller, and tabulated data.

1-8. Purpose of Equipment. The boresight controller provides a means for boresight error constants, referred to as offset data during boresighting operations at the helicopter, to be applied to the Fire Control Computer Assembly (FCC) working memory of Digital Fire Control Computer XM22. This data is then applied from the working memory to the Boresight Memory Assembly of XM22 for permanent, nondestructive core storage. The Boresight Memory Assembly is plugged into the FCC J5 connector but is removed and remains with the helicopter when the FCC is removed and replaced. Should the FCC be replaced, the Boresight Memory Assembly is plugged into the replacement FCC as valid boresight offset data for that particular helicopter. The boresight controller interfaces with the FCC and the Boresight Memory Assembly as described in the following paragraphs.

1-9. Electrical Power and Data Interface. (See figure 1-2.) Cable assembly W1 interconnects electrical power and data between the FCC and boresight controller. Cable assembly W1 provides the following interface functions:

a. FILTERED +28 (+1, -6)V POWER INPUT from the FCC to the boresight controller.



NOTE:

COVER SHOWN REMOVED AND INVERTED 180°.

AR923989

Figure 1-1. Boresight Controller XM34

b. BORESIGHT CORRECTION DATA WORD SELECTION from the boresight controller to the FCC.

c. BORESIGHT OFFSET DATA from the boresight controller to the FCC.

d. CORE MEMORY DATA FILL VERIFICATION from the FCC to the boresight controller .

e. CABLE CONNECTED VERIFICATION Signal from the boresight controller to the FCC .

1-10. Unused Cable Connector Pins Grounding. All unused connector pins on cable assembly W1 are grounded at the boresight controller by W1. The grounded connector pins prevent noise and/or ground loops from entering the FCC input circuits.

1-11. Boresight Memory Assembly Interface. The boresight controller permits the filling or clearing memory of the Boresight Memory Assembly via cable assembly W1 and the FCC. The Boresight Memory Assembly is filled from, and constantly refreshes, a working memory in the FCC. The working memory fills the Boresight Memory Assembly under command of the boresight controller. Depressing LOAD BORESIGHT MEMORY switch-indicator on the boresight controller initiates memory fill of the Boresight Memory Assembly; verification of memory fill is indicated by illumination of the switch-indicator.

1-12. Physical Description. (See figure 1-3.)

a. The boresight controller is housed in a watertight, aluminimum combination case which provides environmental protection and electromagnetic shielding of the equipment during use, transit, and storage. The combination case consists of top and bottom shells, hereafter referred to respectively as cover and base, that are attached and secured by four latches located on the base. No hinge is used between the cover and base. Guard rails located around the exterior of the case and base provide protection of the combination case from damage.

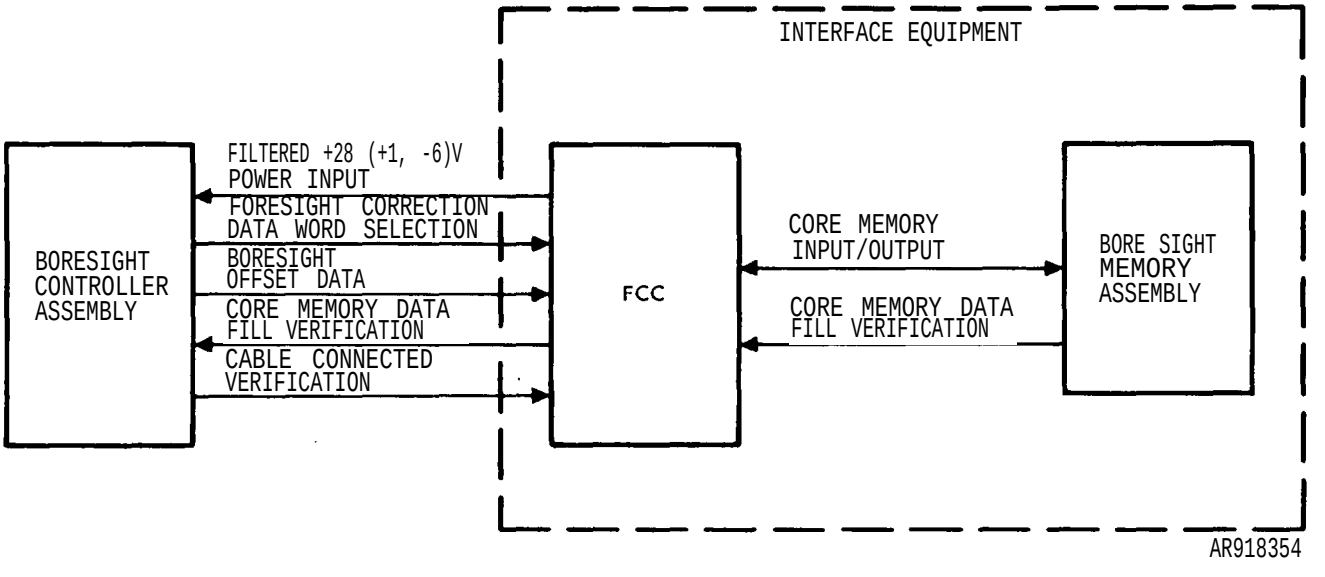


Figure 1-2. Boresight Controller XM34, Simplified Block Diagram

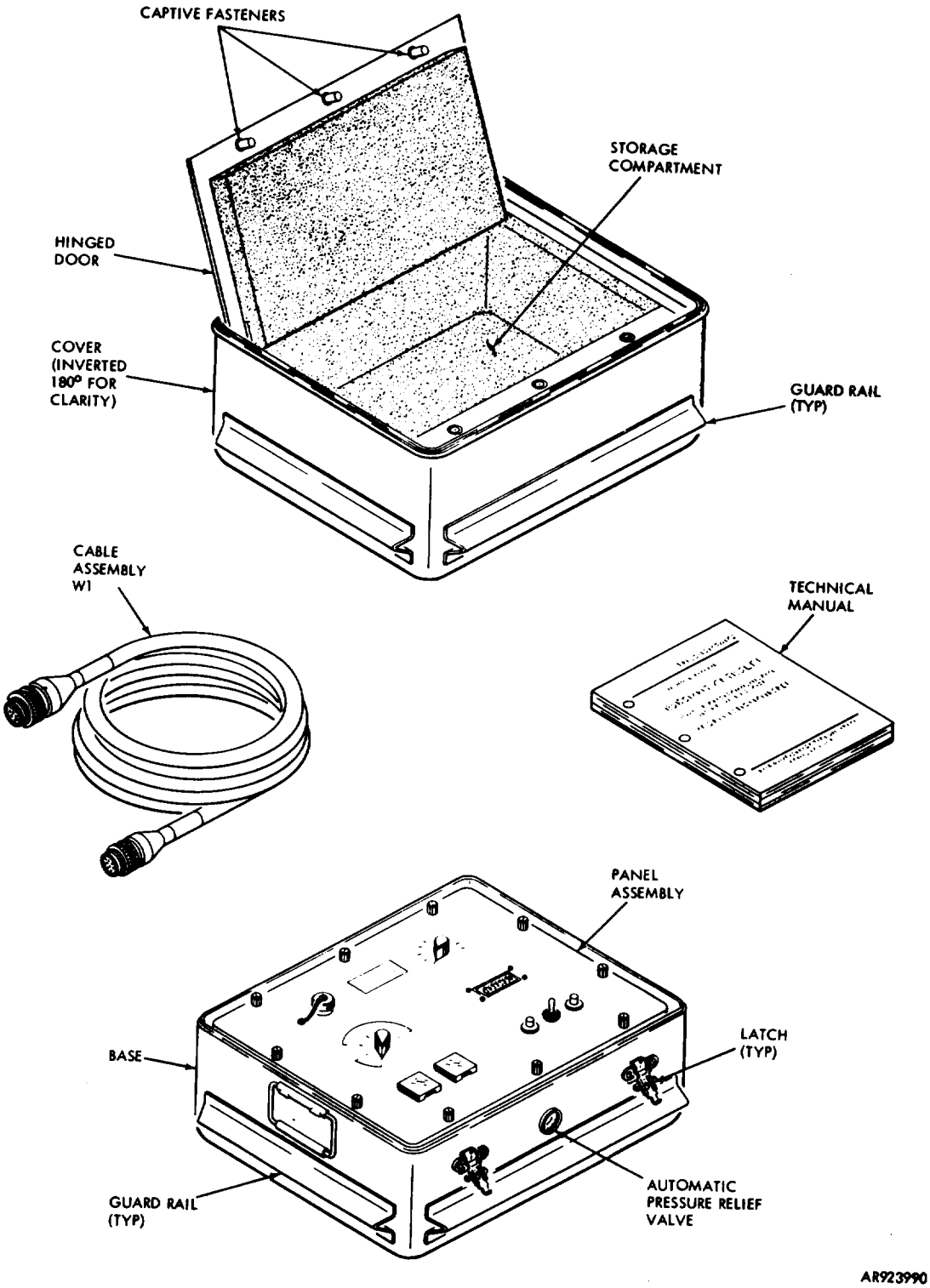


Figure 1-3. Boresight Controller XM34, Physical Features

b. The cover contains a hinged door and storage compartment lined with foam rubber. The door provides access to the storage compartment, which provides storage space for cable assembly W1 and this technical manual. When the hinged door is closed, the door is secured to the cover by three captive fasteners.

c. The base serves as a housing for the panel assembly. The panel assembly contains all the electronics comprising the boresight controller. The panel assembly is mounted on flanges inside the base and secured to the base by ten captive screws. Gasket seals between the base flanges and the panel assembly and on panel mounted detailed parts provide environmental protection of the internal electronics. An automatic pressure relief valve is located on the front of the base. The valve provides relief of air pressures within the sealed base when subjected to internal/external pressure differentials during altitude ascents or descents.

d. The front panel of the panel assembly contains the controls and indicators required for operation of the boresight controller. A connector, also located on the front panel, provides electrical interconnection of the boresight controller to the FCC via cable assembly W1.

e. Cable assembly W1 is a weatherized assembly with a male connector attached at one end and a female connector on the other end. The total length of W1, including the connectors, is 40.5 ±0.5 feet .

1-13. Tabulated Data. The following paragraphs contain a cross-reference of nomenclatures and common names and definition/meaning of non-standard abbreviations and symbols used throughout this manual. The tabulated data also provides leading particulars information which describes the physical and electrical characteristics of the boresight controller.

1-14. Nomenclatures and Common Names Cross-Reference. Common names for nomenclatures are used throughout this manual. Nomenclature and common name cross references are listed in table 1-1.

1-15. Nonstandard Abbreviations. Nonstandard abbreviations used throughout this manual are listed and defined in table 1-2.

1-16. Nonstandard Symbols. Nonstandard symbols used throughout this manual are listed in table 1-3.

1-17. Leading Particulars. Leading particulars for the boresight controller are listed in table 1-4. Leading particulars include pertinent physical and functional characteristics.

Table 1-1. Nomenclatures and Common Names Cross-Reference

Nomenclature	Common
Boresight Controller XM34	Boresight controller
Fire Control Computer Assembly	FCC

Table 1-2. Nonstandard Abbreviations

Abbreviation	MEANING
ALT	Airborne laser tracker
BAGSE	Boresight alignment ground support equipment
D	Depressed
DECR	Decrement
DMWR	Depot maintenance work requirement
FCC	Fire Control Computer Assembly
FSCM	Federal supply code for manufacturers
GHS	Gunner helmet sight
HUD	Heads up display
LOS	Line of sight
MAN	Manual
PHS	Pilot helmet sight
TMDE	Test, measurement, and diagnostic equipment
TSU	Telescopic sight unit
UGT	Universal gun turret
UTS	Universal turret subsystem

Table 1-3. Nonstandard Symbols

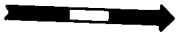
Symbol	Meaning
	Used on block diagrams to denote SRU enclosure
	Used on block diagrams to denote parallel signals
	Indicates equiment marking
*	Denotes logic negation (used with a logic signal, such as B15*)

Table 1-4. Leading Particulars

Item	Characteristic
Power requirement	
Logic power	5 ±0.5V
Display lighting	28 (+1, -6)V at 0.08A nominal (from FCC)
28V/5V dc-to-dc converter circuit	28 (+1, -6)V at 0.53A nominal (from FCC)
Data entry to FCC	
Manual mode	BCD-encoded, sign and three digits representing minutes of arc (word B)
Slew mode	Increments or decrements of preprogrammed data in FCC; represents azimuth or elevation data (word A)
Permanent data storage command (core memory fill)	Serial data entry; 10 µs for 512 bits (32 words, 16 bits each) maximum
Combination case	
Height	13.50 ±0.06 in.
Width	21.50 ±0.06 in. (including guard rails)
Depth	18.00 ±0.06 in. (including guard rails)
Weight	68 lb (includes cable assembly W1, technical manual, and panel)
Environmental conditions	
Operating	Temperature: -40 to 131 degrees F (-40 to 55 degrees C) Altitude: 0 to 10,000 ft
Nonoperating	Temperature: -79.6 to 185 degrees F (-62 to 85 degrees C) Altitude: 0 to 50,000 ft
Relative humidity	To 95 (+5, -0) percent rh; operating and nonoperating
Cable assembly W1	
Length	40.5 ±0.5 ft

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SITE AND SHELTER REQUIREMENT

Special site and shelter requirements are not applicable to Boresight Controller XM34 (boresight controller).

Section II. SERVICE UPON RECEIPT OF MATERIEL

2-1. Introduction. This section provides instructions for servicing Boresight Controller XM34 (boresight controller). These instructions include inspection, servicing, and installation.

CAUTION

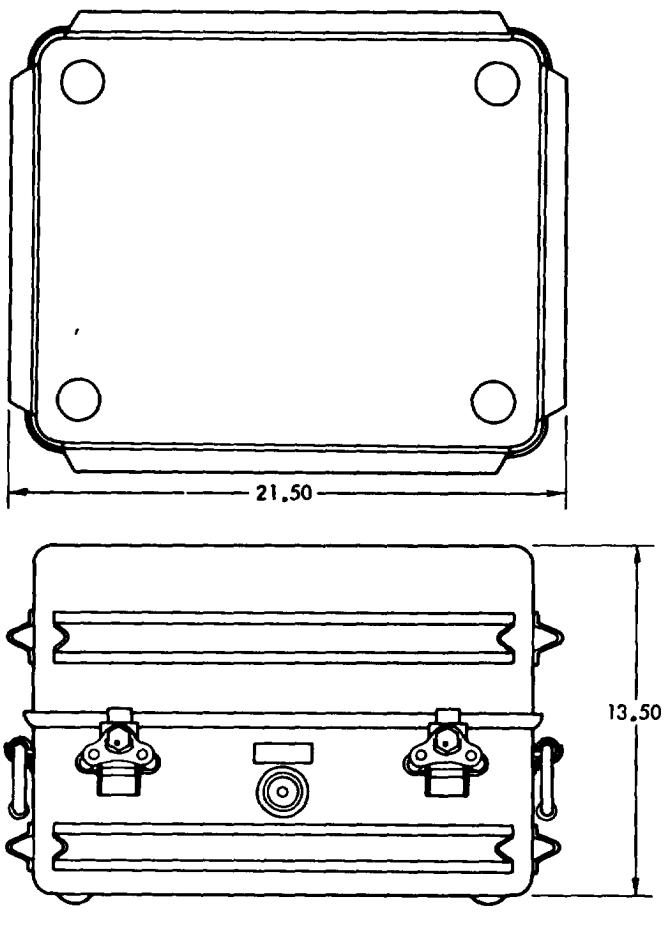
Before opening cover of boresight controller combination case, center core of automatic pressure relief valve on base must be depressed to release any possible internal pressure.

2-2. Checking Unpacked Equipment. After unpacking, make a thorough visual inspection of the equipment to determine if any apparent damage was incurred during shipment.

2-3. Servicing. No preliminary servicing is required upon receipt of the boresight controller.

Section III. INSTALLATION INSTRUCTIONS

2-4. The boresight controller is a portable unit and does not require permanent installation. Figure 2-1 provides an outline drawing for the boresight controller as an aid for you in establishing work area and space requirements for the boresight controller.



NOTES:

1. ALL DIMENSIONS ARE IN INCHES ±0.06 INCH.
2. WEIGHT -68 LB MAXIMUM.

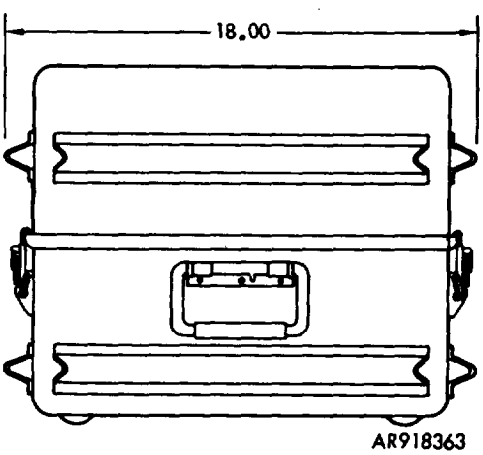


Figure 2-1. Boresight Controller XM34, Outline Drawing

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

3-1. Controls, Indicators, and Connectors. Boresight Controller XM34 (boresight controller) uses controls, a switch-indicator , and a connector located on a front panel as shown in figure 3-1. The functions of all controls, switch-indicator, and connector are given in table 3-1.

3-2. Damage from Improper Settings. There are no combinations of control settings which will cause damage to the boresight controller or create a hazard to personnel.

Section II. OPERATION UNDER USUAL CONDITIONS

NOTE

All references to the working memory refer to a random access memory located in Fire Control Computer Assembly (FCC) of Digital Fire Control Computer XM22. All references to registers refer to data registers located in the central processor unit of the FCC . All references to boresight memory refer to a core memory located in the Boresight Memory Assembly of XM22 installed on the FCC. A11 references to boresight offset data pairs refer to sighting/gunline boresight pairs that are selected during helicopter boresighting operations .

3-3. Introduction. This section contains instructions for the boresight controller as used during helicopter boresighting operations. The boresight controller aids the operator in obtaining and applying boresight offset data to the Boresight Memory Assembly for use by the FCC program while the helicopter is using the Fire Control Subsystem.

3-4. Applying Boresight Offset Data to Boresight Memory Assembly. The boresight controller operator can apply boresight offset correction data to the Boresight Memory Assembly either semiautomatically under FCC program control or manually. The following paragraphs describe boresight controller modes of operation, boresight pair selection, and boresight offset data storage and retrieval operations.

3-5. Slew Mode. The slew mode allows the boresight controller operator to enter offset correction data semiautomatically using the FCC program to contol and select memory location for storing the data. In this mode, the boresight controller increments or decrements FCC resisters which hold previous correction data. These registers automatically receive azimuth and elevation data, previously computed from yaw, pitch, roll, and elevation correction data, every time the FCC is powered up (turned on). When the operator adds to or subtracts from the register data and issues an ENTER COMPUTE switch command, the FCC computes new correction values and stores them in the proper memory location. This new data then becomes resident in the FCC working memory for use during fire control operations . Elevation corrections can be entered in both slew mode and manual mode .

3-6. Manual Mode. Manually inputted correction data consists of yaw, pitch, roll, and elevation data that algebraically adds to preprogrammed correction data resident in the FCC working memory. Manual data entry is accomplished via thumbwheel switches which convert decimal data representing polar notations into binary-code-decimal (BCD) notation. The polar notations, in minutes of arc, are manually calculated from X and Y coordinates indicated by the boresighting equipment. This polar data is given to the operator to input into the FCC memory. Along with the BCD data, other boresight controller switches output discrete siqnals which cause the FCC to store the input correction data at the correct Boresight Memory Assembly core location.

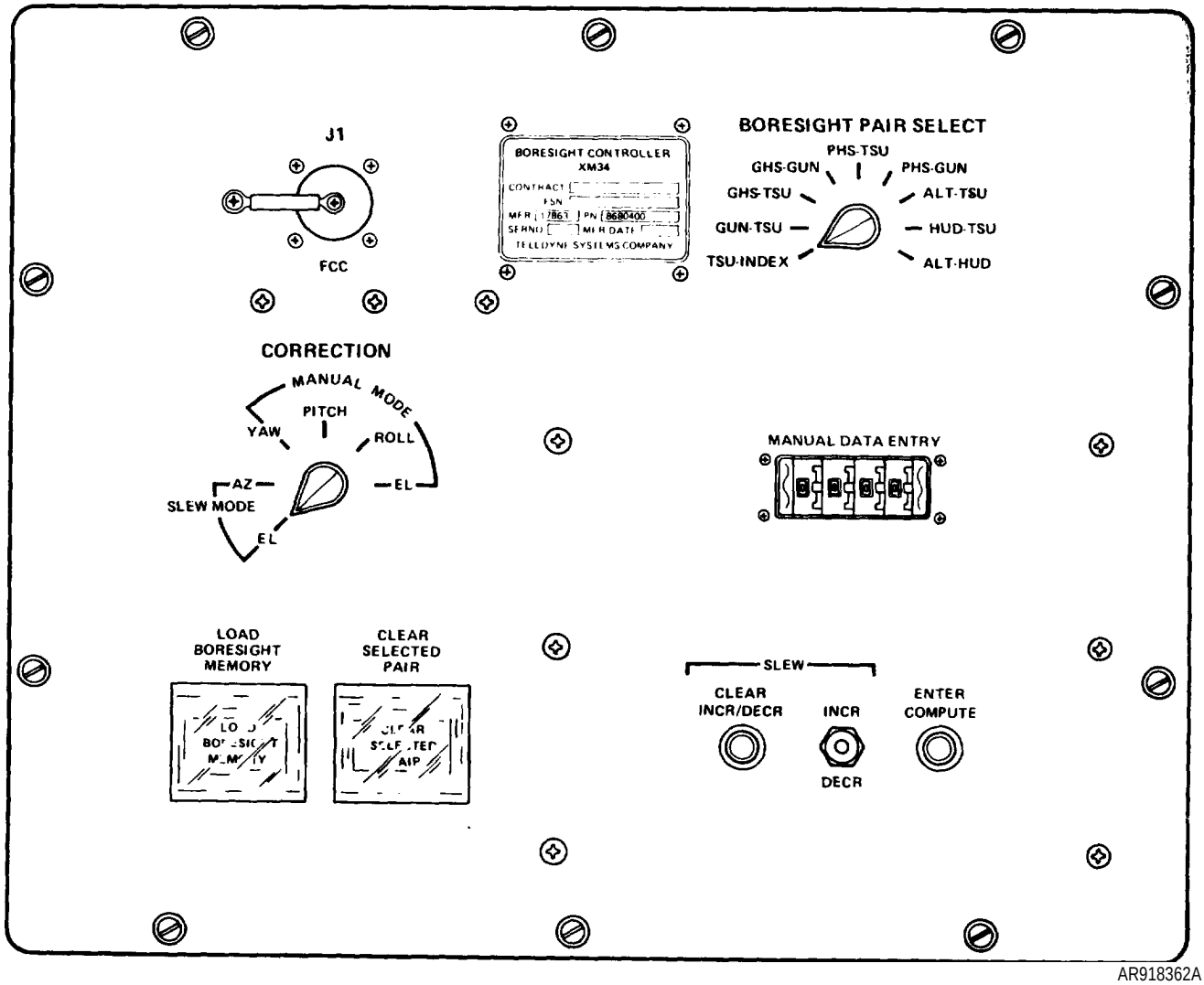


Figure 3-1. Boresight Controller XM34, Controls, Indicators, and Connectors

Table 3-1. Controls, Indicators, and Connectors

Control, indicator, or connector	Function
Connector J1 FCC	Provides connection of power and signals interface between boresight controller and FCC. Used with cable assembly W1 and common ground support equipment to check out and fault isolate electronic circuits .
BORESIGHT PAIR SELECT rotary switch (S1)	Selects the following combination of sighting/gunline pair to be foresighted:
	TSU-INDEX — Not used.
	GUN-TSU — Selects gun turret and telescopic sight unit pair.
	GHS-TSU — Selects copilot/gunner helment sight and telescopic sight unit pair.
	GHS-GUN — Selects copilot/gunner helmet sight and gun turret pair.
	PHS-TSU — Selects pilot helmet sight and telescopic sight unit pair.
	PHS-GUN — Selects pilot helmet sight and gun turret pair.
	ALT-TSU — Selects airborne laser tracker and telescopic sight unit pair.
	HUD-TSU — Selects heads up display and telescopic sight unit pair.
	ALT-HUD — Not used.
MANUAL DATA ENTRY thumbwheel switch (S2)	Inputs manual data in binary coded decimal notation into FCC working memory when ENTER COMPUTE pushbutton switch is depressed. Manual data represents sign and minutes of arc for selected variable as controlled by CORRECTION rotary switch .
ENTER COMPUTE pushbutton switch (S4)	Enables entry of boresight offset data into FCC working memory. During manual mode, enters manual boresight offset data into FCC working memory.

Table 3-1. Controls, Indicators, and Connectors - Continued

Control, indicator, or connector	Function
ENTER COMPUTE pushbutton switch (S4) - continued	During slew mode, causes FCC to compute offset corrections based on incremented or decremented FCC registers which are controlled by SLEW INCR/DECR toggle switch actuations before ENTER COMPUTE pushbutton switch is depressed. After the new corrections are computed, the FCC automatically enters them into the working memory at the correct locations.
SLEW INCR/DECR toggle switch (S5)	Enables automatic change of boresight offset data resident in FCC working memory as follows: INCR — Momentary-action; increments data at a rate of 1 minute of arc per second. Center position — Normal switch position. DECR — Momentary-action; decrements data at a rate of 1 minute of arc per second.
SLEW CLEAR INCR/DECR pushbutton switch (S6)	When depressed, clears FCC register incrementation or decrementation of resident boresight offset previously entered into registers.
LOAD BORESIGHT MEMORY switch-indicator (S7)	When depressed, enters boresight offset data resident in FCC working memory into Boresight Memory Assembly for permanent, nondestructive storage. When lighted, verifies that boresight memory location, as addressed, has been filled with boresight offset data. Switch guard prevents inadvertent operation of switch-indicator.
CLEAR SELECTED PAIR pushbutton switch (S8)	When depressed, clears boresight offset data entered into Boresight Memory Assembly for a particular sighting/gunline pair as selected by BORESIGHT PAIR SELECT rotary switch. Switch guard prevents inadvertent operation of switch.

Table 3-1. Controls, Indicators, and Connectors - Continued

Control, indicator, or connector	Function
CORRECTION rotary switch (S3)	Provides selection of either slew or manual mode of boresighting offset data as follows: SLEW MODE EL — Enters elevation boresight constants into FCC working memory with ENTER COMPUTE pushbutton and SLEW INCR/DECR toggle switches . AZ — Enters azimuth boresight constants into FCC working memory with ENTER COMPUTE pushbutton and SLEW INCR/DECR toggle switches . MANUAL MODE With ENTER COMPUTE pushbutton switch, enters manual input data into FCC working memory as follows : YAW — Selects yaw offset angular data for input. PITCH — Selects pitch offset angular data for input. ROLL — Selects roll offset angular data for input. EL — Selects elevation offset angular data for input.

3-7. Boresight Memory Assembly Fill Verification. After boresight offset data is resident in the FCC working memory, the boresight controller operator is able to fill the core memory in the boresight memory assembly, one boresight data pair at a time. To enable visual verification that the core memory is indeed filled with boresight offset data, a switch-indicator (LOAD BORESIGHT MEMORY) lights after it is depressed. A timing circuit in the FCC causes the switch-indicator to go out again so that verification of another boresight data pair can be accomplished.

3-8. Boresight Sighting/Gunline Pair Selection. The boresight controller determines which sighting/gunline pair will be checked for boresight errors .

The boresight offset data for each pair is BCD encoded, multiplexed, and inputted to the FCC; and, under control of the boresight controller, stored in the Boresight Memory Assembly. It is possible to select up to nine sighting/gunline pairs during performance of boresighting procedures (only seven pairs are used).

3-9. Boresight Offset Data Storage and Retrieval.

a. Boresight offset data from the Boresight Memory Assembly (core memory) is stored in a working memory in the FCC and becomes resident storage data for use by the FCC central processor. The FCC working memory is automatically refreshed with core memory data every time the FCC is powered up. In addition, central processor data registers may be incremented or decremented to add or subtract data from the resident data in the working memory. This feature is controlled by the boresight controller operator. Upon a switch command made by the boresight controller operator, the boresight offset data in resident storage is applied to the Boresight Memory Assembly for permanent, nondestructive storage. However, stored data in the Boresight Memory Assembly may be cleared by the boresight controller operator, one memory location at a time. To prevent inadvertent loading or removal of data in the Boresight Memory Assembly, the memory load and clearing switches on the boresight controller are protected by special spring-loaded switch guards.

b. During helicopter Fire Control Subsystem operations, the working memory in the FCC is constantly refreshed by the boresight offset data stored in the Boresight Memory Assembly. If the FCC is ever replaced in the helicopter, the Boresight Memory Assembly is removed from the FCC and connected to the replacement FCC. The boresight offset data stored in the Boresight Memory Assembly is used to refresh the working q emery in the replaced FCC. Thus, boresighting data is valid for that particular helicopter. If a replacement FCC IS not immediately available when required, retain the Boresight Memory Assembly with the helicopter.

3-10. Operating Under Normal Conditions.

WARNING

Laser light beams may be present during performance of boresighting procedures. To look along the axis of a laser beam without protective glasses is extremely dangerous. Align the laser so that personnel are unlikely to inadvertently look along the axis of its beam.

Laser firing systems q ay store a charge. Take care to prevent accidental pulsing of the laser and to avoid electric shock.

Systems should be so designed as to include a fail-safe means of avoiding this hazard.

Reflections from the laser beam are extremely dangerous. It is essential that all reflective material be removed from its path.

The helicopter will be electrically grounded when parked. An ungrounded condition may cause static shock and/or damage to the FCC while connecting or disconnecting cable assembly W1 to connector J4 of FCC.

3-11. Preliminary Starting Procedures.

CAUTION

Every 90 days, ensure that boresight controller is checked out in accordance with paragraph 7-8 before performing boresighting procedures using the controller.

Before connecting or disconnecting boresight controller cable assembly W1 (figure 3-2) to or from the FCC, ensure that helicoper power to the FCC is turned off.

Before opening cover of boresight controller combination case , center core of automatic pressure relief valve on base must be depressed to release any possible internal pressure.

a. Turn off power to FCC from helicopter in accordance with instructions given in TM 55-1520 236/239-23.

b. Gain access to FCC installation mount (located in helicopter) accordance with instructions given in TM 55-1520-236/239-23.

c. If required, connect Boresight Memory Assembly to connector J5 of FCC .

d. Depress center core of automatic pressure relief valve (figure 1-3).

e. Release four latches (figure 1-3) securing boresight controller cover and base; remove cover.

f. Turn three captive fasteners on cover storage compartment and open compartment.

g. Remove cable assembly W1 from storage compartment.

h. Remove protective cap from connector J1 FCC (Figure 3-3) of boresight controller.

i. Remove protective cap from connector J4 of FCC.

j. Connect connector P2 of cable assembly W1 to connector J4 of FCC.

k. Connect connector P1 of cable assembly W1 to connector J1 FCC of boresight controller.

l. Turn on helicopter power to FCC in accordance with instructions given in TM 55-1520-236/239-23.

3-12. Boresighting Offset Corrections Procedure.

NOTE

Detailed composite boresight procedures on the helicopter are not provided in this manual. Refer to TM 9-1090-206-30.

a. These procedures are to be performed whenever a replacement Boresight Memory Assembly is installed on the FCC, if boresight corrections data is inadvertently lost, or if it is suspected that stored boresight corrections data is not valid.

b. Boresight correction data can be entered into the FCC memory by operating the boresight controller in either the slew mode or manual mode. Separate procedures are provided for each mode. The purpose of boresight corrections is to compensate for line-of-sight (LOS) errors that can exist between the sighting and controlled device pair. Depending on the selected sighting pair, the controlled device is the TSU or the Universal Gun Turret (UGT) which is a component of the Universal Turret Subsystem (UTS). After the corrections are entered, the sighting/gunline LOS deviations will be within allowable limits over the angular rotational range of the sight/device .

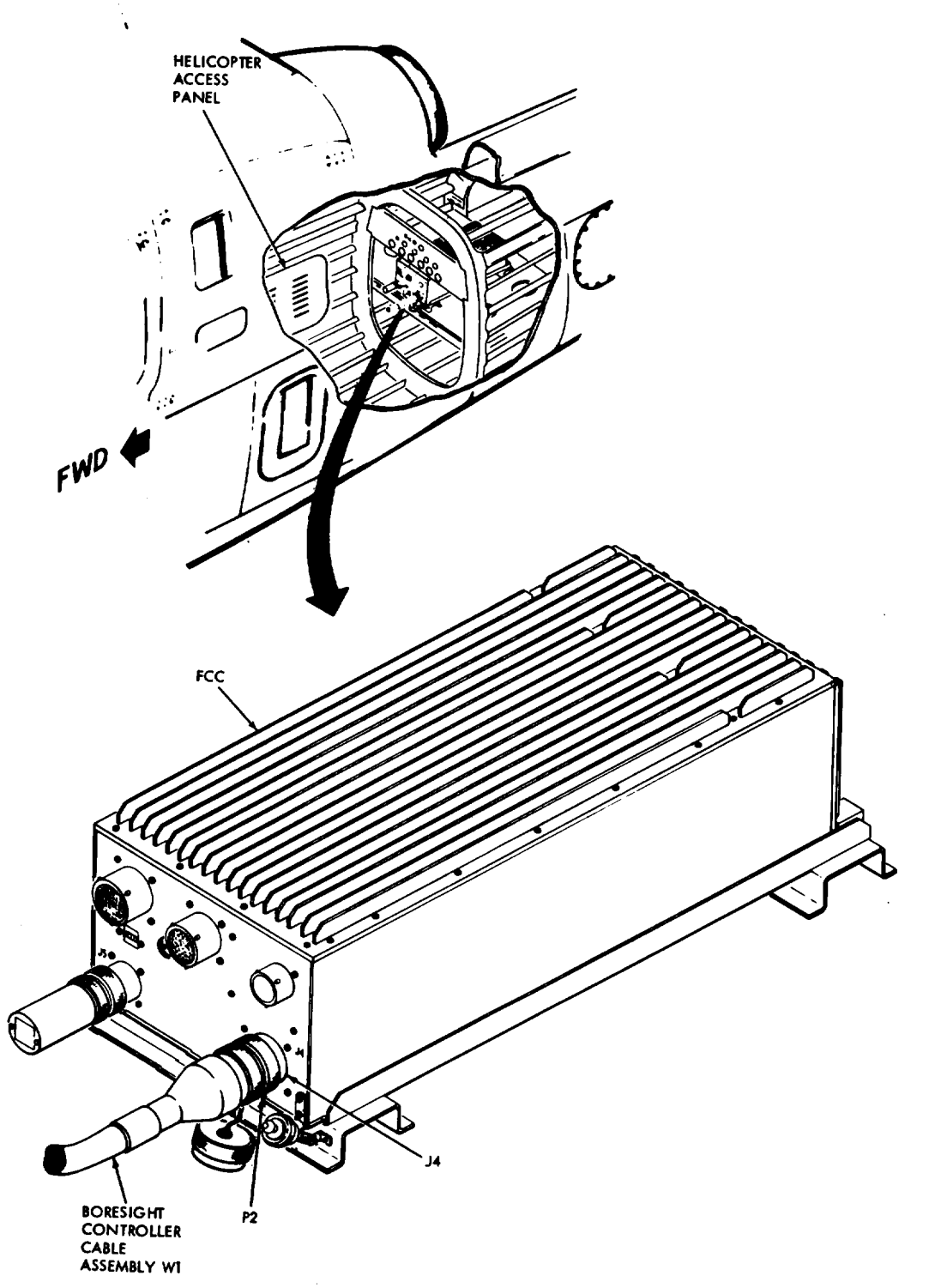
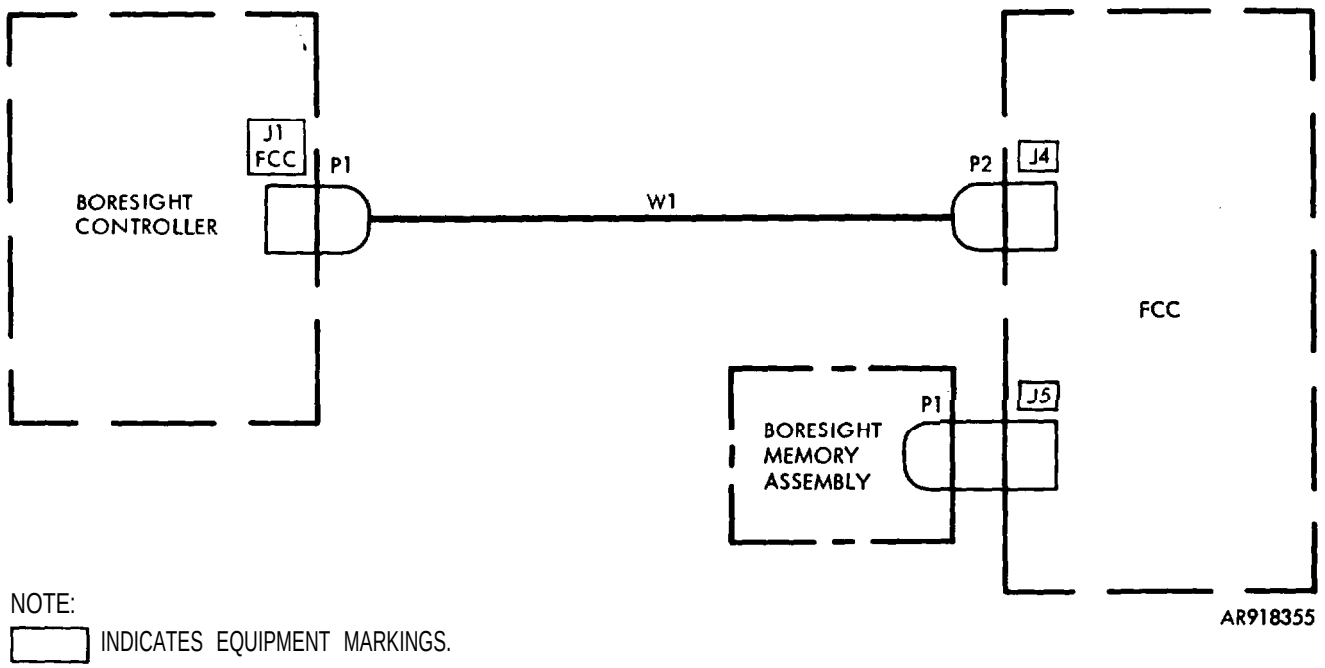


Figure 3-2. Fire Control Computer Assembly (FCC), Installation Connection of Cable Assembly W1



NOTE:
[ ] INDICATES EQUIPMENT MARKINGS.

Figure 3-3. Boresight Controller XM34, Operational Interconnection Diagram

c. When a choice in boresight controller operating mode can be made, the slew mode should be selected because it allows the operator to rapidly fill or modify the Boresight Memory Assembly.

d. For either boresight controller operating mode, all initial boresight offset errors should be optically measured and this data should be filed for possible later use. If, at some future time, boresight correction data is inadvertently lost during FCC maintenance routines, this data from the files could be used to calculate. a new set of boresight corrections. These new corrections could be entered into the FCC memory by operating the boresight controller in the manual mode. If this recommendation is followed, the FCC memory could be loaded with new valid boresight corrections without having to perform a complete system boresighting procedure.

3-13. Initial Requirements. Initial requirements for performing the boresight corrections procedures are as follows:

WARNING

UGT is dynamically exercised during boresight corrections procedures. Ensure UGT gun is in a safe condition before starting procedures.

a. Proper site is selected, Boresiqht Alignment GSE (BAGSE) is properly calibrated, and BAGSE is properly installed and aligned on the helicopter.

b. All telescopes used for boresighting are properly calibrated.

c. Qualified personnel available to energize helicopter systems as required.

d. Necessary reference material (mathematics books or equation sets) available and qualified personnel to use it to determine the sign and minutes of arc for each correction and each sighting pair. This computed data is to be provided to the boresight controller operator to input into the FCC.

3-14. Slew Mode Procedure. In this procedure, the FCC computes the actual corrections for each variable (yaw, roll, pitch, and elevation) correction quantity. This is at the order of boresight controller operator after he has entered necessary error inputs by incrementing or decrementing FCC registers. If the operator determines FCC register contents are excessively in error, he can clear the error by depressing SLEW CLEAR INCR/DECR pushbutton switch . This will clear the erroneous data from the register but will not affect other stored data. Enter slew mode corrections as follow:

a. Set BORESIGHT PAIR SELECT rotary switch to boresight pair designated to receive input corrections.

b. Lift switch guard and depress CLEAR SELECTED PAIR pushbutton switch.

c. Set CORRECTION rotary switch to SLEW MODE AZ.

CAUTION

Do not cause UGT or TSU to move until qualified personnel states that it is safe to do so.

d. Observe applicable sight and. target boresight optics (for some boresight pairs three targets are provided: forward, right, and left), depress SLEW CLEAR INCR/DECR pushbutton switch, and set SLEW INCR/DECR pushbutton switch to INCR or DECR as required to cause device being controlled (GUN or TSU) to move in the direction that diminishes the LOS error between the selected boresight pair.

e. Set CORRECTION rotary switch to SLEW MODE EL. Repeat step d with respect to elevation error.

f. Repeat steps c thru e until LOS error is within allowable limits and cannot be further diminished.

g. Repeat steps c thru f for the remaining boresight directions.

NOTE

At this point, all offset errors for the selected boresight pair are loaded into the FCC registers and the FCC can now compute the necessary corrections based on those errors.

h. Depress ENTER COMPUTE pushbutton switch (FCC computes and inserts them into the working memory at the correct locations).

i. Repeat steps a thru h for each boresight pair that is to receive input corrections.

NOTE

At this point, all boresight corrections have been computed by the FCC and entered into the working memory. These corrections can now be stored in the Boresight Memory Assembly (core memory).

j. To load Boresight Memory Assembly, lift switch guard and depress LOAD BORESIGHT MEMORY switch-indicator. Observe LOAD BORESIGHT MEMORY switch-indicator lights (confirms boresight corrections data was loaded). After an FCC predetermined time delay, observe LOAD BORESIGHT MEMORY switch-indicator goes out to indicate other boresight corrections data may be loaded.

k. Repeat step j for each boresight pair as applicable.

l. At the end of entering boresight corrections data, perform shut down procedure detailed in paragraph 3-17 below.

3-15. Manual Mode Procedure. In this procedure, the corrections automatically computed by the FCC for slew mode must be manually calculated. The calculated data is then entered into the FCC working memory by the boresight controller operator.

WARNING

When operating in the manual mode, the boresight controller can input a maximum correction of +16.65 degrees (999 minutes of arc) to the GUN or TSU. To ensure that serious injury does not occur during manual mode operation, set the MSD segment of MANUAL DATA ENTRY thumbwheel switch to O initially and do not cause UGT or TSU to move until a qualified person states it is safe to do so.

a. Set BORESIGHT PAIR SELECT rotary switch to boresight pair designated to receive input corrections.

b. Lift switch guard and depress CLEAR SELECTED PAIR pushbutton switch.

c. Set CORRECTION rotary switch to MANUAL MODE YAW.

d. Manually calculate sign and minutes of arc for the offset error obtained from optical boresight measurements.

e. Set MANUAL DATA ENTRY thumbwheel switch to sign and value obtained in step d.

f. Depress ENTER COMPUTE pushbutton switch to load data into FCC working memory at addressed location.

g. Repeat steps c thru f for PITCH, ROLL, and EL positions of CORRECTION rotary switch.

h. Repeat steps a thru g for each boresight pair that Is to receive corrections inputs.

i. Lift switch guard and depress LOAD BORESIGHT MEMORY switch-indicator. Correction data is loaded into addressed core memory location.

j. After correction is loaded, observe LOAD BORESIGHT MEMORY switch-indicator lights to indicate correction was in fact loaded. After a FCC predetermined time-delay, observe LOAD BORESIGHT MEMORY switch-indicator goes out to indicate other corrections may be loaded.

k. Repeat steps i and j for each boresight pair to receive correction inputs.

l. At the end of the manual mode corrections procedure, perform shut down procedure in accordance with paragraph 3-17 below.

3-16. Placing Equipment in Standby Condition. There are no standby operating conditions for the boresight controller.

3-17. Boresighting Shutdown Procedure.

CAUTION

Before disconnecting cable assembly W1 from the FCC, ensure that helicopter power to the FCC is turned off.

a. Turn off power from helicopter in accordance with instructions given in TM 55-1520-236/239-23.

b. Disconnect connector P2 of boresight controller cable assembly W1 (figure 3-3) from connector J4 of FCC .

c. Install protective cap on connector J4 of FCC.

d. Disconnect connector P1 of boresight controller cable assembly W1 from connector J1 FCC of boresight controller.

e. Install protective cap on connector J1 FCC of boresight controller.

f. Install or assemble any helicopter panels and hardware removed in step b, paragraph 3-11 above in accordance with instructions given in TM 55-1520-236/239-23.

g. Carefully coil boresight controller cable assembly W1 and stow in cover storage compartment (figure 1-3) of boresight controller. Turn three captive fasteners to secure storage compartment cover in place.

h. Position cover on base and secure cover to base with four latches.

i. Stow boresight controller in designated storage area.

Section III. OPERATING UNDER UNUSUAL CONDITIONS

This section is not applicable to the boresight controller.

Section IV. PREPARATION FOR MOVEMENT

The boresight controller is a portable unit and does not require special preparation for movement instructions.

CHAPTER 4

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Operator/crew maintenance of Boresight Controller XM34 (boresight controller) is not applicable.

CHAPTER 5

AVIATION UNIT MAINTENANCE INSTRUCTIONS

Aviation unit maintenance of Boresight Controller XM34 (boresight controller) is not required.

CHAPTER 6

FUNCTIONING OF EQUIPMENT

6-1. Introduction. This section contains a functional description of the logic circuits in the boresight controller. The discussion is divided between the slew mode of operation and the manual data entry mode of operation. Mnemonic coded signals are used to denote inputs into the Fire Control Computer Assembly (FCC) software program. These signal codes are used when necessary to describe the functional operation of the boresight controller.

6-2. Boresight Data Words. Boresight offset data is sent to the FCC in the form of two 16-bit data words, designated as data word A (figure 6-1) and data word B (figure 6-2). Data word A is used during the slew and manual modes of operation, while data word B is used during the manual mode of operation. The format and bit assignments of the data words are discussed in the paragraphs that follow. During the discussions, references are made to partial words; that is, only these bit positions of a word that contain data applicable to boresight controller operation are discussed. Every data word sent to the FCC is composed of 16 bits and is transq itted on I signal lines, I00 through 115.

6-3. Slew Mode. (See figure F0-1.)

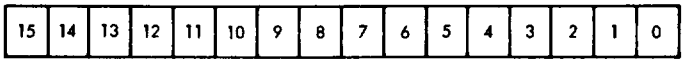
a. When CORRECTION switch S3 is set at a SLEW MODE position (EL or AZ), a MODE SELECT code representing the' slew mode is sent to the decimal-to-BCD encoder. In addition, the code representing the position of BORESIGHT PAIR SELECT switch S1 is sent to the encoder. The encoder, in turn, converts both coded signals from decimal to binary-coded decimal (BCD) notations. The encoder signal output, encoded CW06 thru CW13, is an 8-bit partial word which is sent directly to the data multiplexer. Since data word A consists of 14 bits, the remaining 6-bits are inputted as discrete switch signals to the latch circuit as outlined below. The 6 bits are coded according to the operating condition of the switches; switch contacts are either closed or open, depending upon whether a switch is depressed or in its normal position.

b. The switch operating conditions and their associated mnemonic signal codes are defined in table 6-1. The mnemonic signal codes for SLEW INCR/DECR switch S5 are unique in that S5 has two segments and parts of the segments are wired together; thus, the DECNC signal code appears twice.

c. When the boresight controller is operating in the slew mode, the latch circuit automatically furnishes the stored data word A bits to the data multiplexer circuit. The latch circuit always receives +5V at its reset input and a low (logic 0)at its enable input. In this operating condition, the latch circuit is always active and the output follows the input.

d. The 14-bit signal making up data word A is inputted to the data multiplexer circuit. Two additional bits are required to complete data word A. Bit no. 14 (logic 0) is not used and bit no. 15 is a logic 1 which is used for word selection in the FCC. Figure 6-1 shows the composition of data word A. Bits 6 thru 13 of data word A determine the memory location and the correction variable for the data being inputted.

DATA WORD A



BIT	MNEMONIC	FUNCTION
0	I00	ENTER DATA WORD INTO FCC
1	I01	DECREMENT FCC DATA REGISTER
2	I02	INCREMENT FCC DATA REGISTER
3	I03	CLEAR INCREMENTATION-DECREMENTATION
4	I04	CLEAR SELECTED FORESIGHT PAIR
5	I05	LOAD BORESIGHT MEMORY
6	I06	BORESIGHT PAIR SELECT (LSB)
7	I07	BORESIGHT PAIR SELECT
8	I08	BORESIGHT PAIR SELECT
9	I09	BORESIGHT PAIR SELECT (MSB)
10	I10	CORRECTION MODE (LSB)
11	I11	CORRECTION MODE
12	I12	CORRECTION MODE
13	I13	CORRECTION MODE (MSB)
14	I14	NOT USED
15	I15	WORD SELECT

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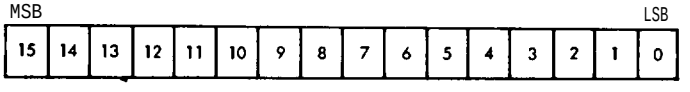
Figure 6-1. Boresight Data Word A Format

DATA WORD B



BIT	MNEMONIC	FUNCTION
0	I00	MANUAL DATA ENTRY (LSB)
1	I01	MANUAL DATA ENTRY
2	I02	MANUAL DATA ENTRY
3	I03	MANUAL DATA ENTRY (MSB)
4	I04	MANUAL DATA ENTRY (LSB)
5	I05	MANUAL DATA ENTRY
6	I06	MANUAL DATA ENTRY
7	I07	MANUAL DATA ENTRY (MSB)
8	I08	MANUAL DATA ENTRY (LSB)
9	I09	MANUAL DATA ENTRY
10	I10	MANUAL DATA ENTRY
11	I11	MANUAL DATA ENTRY (MSB)
12	I12	SIGN
13	I13	NOT USED
14	I14	NOT USED
15	I15	NOT USED

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Figure 6-2. Boresight Data Word B Format

Table 6-1. Switch Operating Conditions

Panel switch	Operating condition		Mnemonic signal code
	Depressed	Normal	
ENTER COMPUTE (S4)		X	ENTNC
	X		ENTNO
CLEAR SELECTED PAIR (S8)		X	CSPNC
	X		CSPNO
LOAD BORESIGHT MEMORY (S7)		X	LBSNC
	X		LBSNO
SLEW INCR/DECR (S5)		X	INCNC, DECNC, and INCNO
	X		DECNC, INCNO, and DECNO
SLEW CLEAR INCR/DECR (S6)		X	CIDNC
	X		CIDNO

This is the case for both the slew mode and manual mode.

6-4. Manual Mode. (See figure FO-1.)

a. When CORRECTION switch S3 is set at a MANUAL MODE position (YAW, PITCH, ROLL, or EL), a MODE SELECT signal code representing manual mode is inputted to the decimal-to-BCD encoder circuit. In addition, the coded signal representing the position of BORESIGHT PAIR SELECT switch S1 is sent to the encoder circuit. The encoder circuit converts both inputs from decimal-to-BCD notation in the same manner as described in subparagraph 6-3a. However, the 8-bit signal (encoded CW06 thru CW13) is used to make up data word A only, as before. Data word B consists of 13 bits in BCD notation furnished by MANUAL DATA ENTRY switch S2. These signal bits are inputted to the data multiplexer circuit. Bits 13 thru 15 of data word B are riot used for data and contain logic 0's. Figure 6-2 shows the composition of data word B.

6-5. Data Word Amplification and Buffering. (See figure FO-1.) Data word A and B, each consisting of an encoded 16-bit signal, are inputted from the data multiplexer circuit to 16 line drivers for amplification and buffering. Encoded I00 thru I15, the data words are sent to the FCC via a 40-foot cable assembly (cable assembly W1).

6-6. Data Multiplexing. In order for the boresight controller to output two data words to the FCC, serially one at a time, an FCC-generated DASEL (data select) signal is sent to the boresight controller. The DASEL signal is applied to a Schmitt trigger circuit for pulse shaping and then inputted to the data

multiplexer circuit. When the FCC requires data word A (via a programed scanning process), the DASEL signal inputted to the data multiplexer circuit goes low (logic 0) and switches the circuit for data word A operation. Thus, the 14 BITS DATA WORD A signal output of the latch circuit is inputted via the data multiplexer circuit to the line drivers for processing. The input to the line drivers is considered a 16-bit BCD word (coded B00* thru B15*) although not all bits of each word contains useable data (figures 6-1 and 6-2).

6-7. When the FCC requires data word B, the DASEL signal from the FCC is high (logic 1) and results in the switching of the data multiplexer circuit for data word B operation. Thus, the 13 BITS DATA WORD B signal output (coded SD00 thru SD12) is inputted via the data multiplexer circuit to the line drivers for processing as described for data word A (paragraph 6-6).

6-8. Data Words Amplification and Buffering. DATA WORD A or B signal output of the boresight controller requires amplification and buffering before it is outputted to the FCC via cable assembly W1. The 16 BITS BCD DATA signal output of the data multiplexer circuit is amplified and buffered by line drivers to output boresight offset data as a 16 BIT DATA WORD A or B signal (coded I00 thru I15) to the FCC.

6-9. Boresight Controller Connection Acknowledgement. Whenever the boresight controller is interconnected to the FCC with cable assembly W1, a ground bus within the controller is used to indicate the BORID signal to the FCC. The BORID (boresight identification) signal is used to indicate to the FCC that the boresight controller is connected to the FCC via W1.

6-10. Input Power and Boresight Memory Fill Complete Signal. The boresight controller receives filtered +28V from the FCC via cable assembly W1. The +28V is used to power lamp drivers which in turn drive lamps DS1 and DS2 of LOAD BORESIGHT MEMORY switch-indicator (S7) whenever the drivers receive a BSMC signal from the FCC. The BSMC signal lets the boresight controller operator know that the boresight memory assembly in the FCC has been filled with boresight offset data. The +28V is also used to power a +28v/+5v dc-to-dc converter assembly which supplies the logic assembly with +5v power. The +5V bus is filtered by seven electrolytic capacitors connected across the bus to eliminate transients and noise impulses.

CHAPTER 7

AVIATION INTERMEDIATE MAINTENANCE INSTRUCTIONS

Section I. GENERAL

7-1. Voltage and Resistance Measurements . Voltage measurements for Boresight Controller XM34 (boresight controller) are performed during checkout (paragraph 7-8). Resistance measurements are not required for aviation intermediate maintenance of the boresight controller.

7-2. Waveform Measurements. Waveform measurements are not required for aviation intermediate maintenance of the boresight controller.

7-3. Bench Testing. Bench testing of the boresight controller is accomplished by performing checkout (paragraph 7-8).

Section II. TOOLS AND EQUIPMENTS

7-4. Special Tools and Equipment. Special tools required for aviation intermediate maintenance of the boresight controller are listed in table 7-1. No special equipment is required.

7-5. Common Ground Support Equipment. Common Ground Support equipment are required for the aviation intermediate maintenance of the boresight controller. These equipment are listed in table 7-2.

Table 7-1. Special Tools

Name	AN/coml designation	Alternate	Use
Hand Installation Tool	NSN 5120-00-169-3003	None	Install panel fastener screws.
Removal Nose Adapter	Deutch Fastener Corp Model FRN 7505-10	None	Remove panel fastener screws.

Table 7-2. Common Ground Support Equipment

Name	AN/coml designation	Alternate	Use
Multimeter	AN/USM-223 (NSN 6625-00-999-7465)	Fluke Model 8600A (NSN 6625-01-010-0088)	Check continuity of cable assembly W1, lamps, switches, and point-to-point wiring.
Digital Voltmeter	8125A (NSN 1430-00-366-8753)		Check electronic circuit and cable assembly W1 voltages.

Section III. TROUBLESHOOTING

7-6. Introduction. This section contains the troubleshooting information for locating and correcting most of the operating troubles which may develop in the boresight controller. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine the corrective actions for you to take. You should perform the test/inspections and corrective actions in the order listed. This manual cannot list all possible malfunctions that may occur, nor all tests or inspections and corrective actions.

7-7. Test Requirements. The boresight controller requires a 28 (+1, -6) Vdc, 2 amperes maximum power supply for operation during test and troubleshooting. In order to test the boresight controller, the common ground support equipment listed in table 7-2 are required.

7-8. Checkout. Checkout descriptions provide preliminary and checkout procedures for testing the boresight controller functional operation. Perform the preliminary procedure prior to performing the checkout procedures.

7-9. Preliminary Procedure. (See figure 7-1.)

CAUTION

Before opening cover of boresight controller combination case, center core of automatic pressure relief valve on base must be depressed to release any possible internal pressure. While performing the preliminary procedure, test leads will be connected to pins of connector P2 of cable assembly W1. Exercise care to avoid shorting out the connector pins. Use insulated test probes to prevent damage to boresight controller and/or test equipment.

a. Remove protective cap from boresight controller connector J1 FCC (figure 3-1).

b. Connect connector P1 of cable assembly W1 to boresight controller connector J1 FCC.

c. Connect test lead between digital voltmeter (dvm) - (minus) terminal and power supply - (minus) terminal as shown in figure 7-1.

d. Ensure that 28 Vdc power supply power switch is set to off, and current and voltage controls are positioned for minimum output.

e. Connect test leads between 28 Vdc power supply + and - output terminals and pins 77 and 78 of connector P2 (cable assembly W1) as shown in figure 7-1.

f. Set 28 Vdc power supply and dvm power switches to on; allow time for test equipment to warm up.

g. Adjust 28 Vdc power supply voltage coarse and fine controls for power supply voltmeter indication of 28 (+1, -6) Vdc.

h. Adjust 28 Vdc power supply current coarse and fine controls for 2 amperes or less indication on power supply ammeter.

i. Set dvm controls as required to measure 1 Vdc.

j. Perform boresight controller checkout in accordance with instructions contained in paragraph 7-10 below.

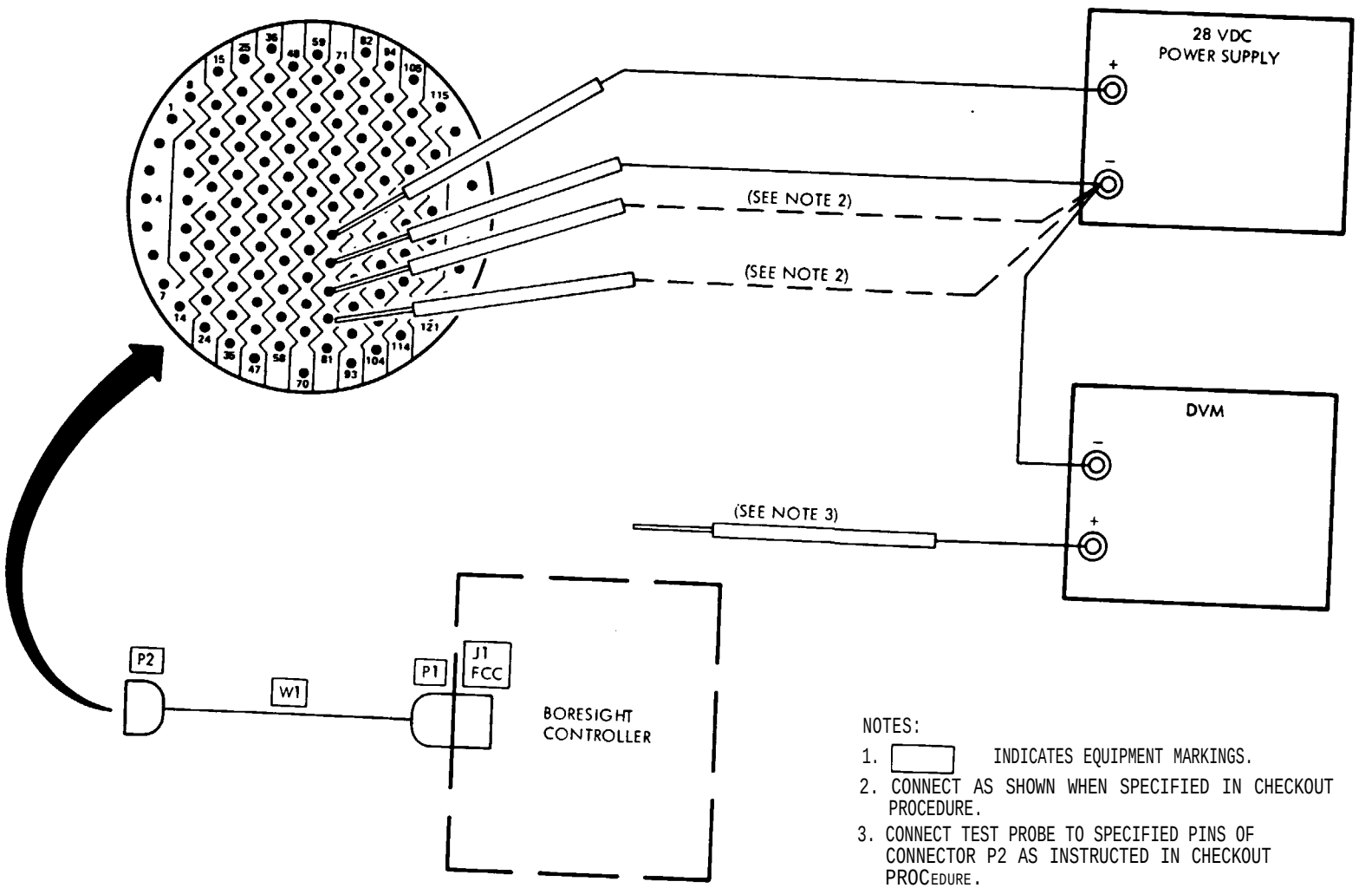


Figure 7-1. Boresight Controller XM34, Test Setup

7-10. Checkout Procedure.

NOTE

In steps 12 thru 17 of table 7-4, a malfunction is only indicated if the voltage on the pin being checked does not change levels when the specific switch is actuated. If voltages on other pins specified for the particular switch are not correct, proceed with checkout until some other switch does not cause a level change on the specified pin when it is actuated.

a. General.

(1) Procedural instructions for checkout of the boresight controller are contained in table 7-3 and cross-referenced to checkout data contained in table 7-4. When a normal indication (table 7-3) or test point indication (table 7-4) is not obtained for a given step, refer to the troubleshooting instructions (paragraph 7-12) to isolate the fault to a replaceable part or assembly.

CAUTION

To avoid possible damage to logic assembly, remove logic assembly before performing continuity checks of switches.

(2) Table 7-4, checkout data, lists panel switch positions/action and test point indications. Test point indications are obtained by probing pins of connector P2 of cable assembly W1 and observing their outputs on the dVM. For complete checkout of the boresight controller, always perform all 26 steps in table 7-4. For steps 1 thru 11, set switches to positions listed in the panel switch positions/action column (table 7-4). For steps 12 thru 26, connect test lead between pin 79 of connector P2 (cable assembly W1) and 28 Vdc power supply - (minus) terminal and activate switches as indicated in the panel switch positions/action column (table 7-4) for each step.

(3) Table 7-4 contains specific abbreviations and symbols. In the switch positions/action column, the following abbreviations and symbols are used:

(a) D means depressed; refers to momentary-action switches.

(b) INCR means incrementation and up physical switch position.

(c) DECR means decrementation and down physical switch position.

(d) + and - mean sign and most significant bit; refer to MANUAL DATA ENTRY thumbwheel switch.

(e) 0 thru 9 mean decimal bits; refer to MANUAL DATA ENTRY thumbwheel switch.

(f) SLEW-EL and SLEW-AZ respectively mean slew mode EL (elevation) and AZ (azimuth).

(g) MAN-YAW, MAN-PITCH, MAN-ROLL, and MAN-EL respectively mean manual mode yaw, pitch, roll, and elevation.

(4) In the test point indication column of table 7-4, the following symbols are used:

(a) 0 means a low logic level (0.00 ±0.25 Vdc.)

(b) 1 means a high logic level (4.0 ±1.5 Vdc).

NOTE

Perform all tests in the sequence stated in this manual, Voltages may exist at connector pins where voltage levels are not specified in table 7-4. Measurements at these connector pins are not required.

Table 7-3. Checkout

Step	Procedure	Normal indication
1	Perform preliminary procedure as instructed in paragraph 7-9.	Boresight controller LOAD BORESIGHT MEMORY switch-indicator lights.
2	Connect test leads between 28 Vdc power supply - (minus) terminal and connector P2 (cable assembly W1) pins 79 and 80. (This jumpers pins 79 and 80 of connector P2.)	Boresight controller LOAD BORESIGHT MEMORY switch-indicator goes out.
3	Remove test leads between pins 79 and 80 of connector P2 and 28 Vdc power supply.	Boresight controller LOAD BORESIGHT MEMORY switch-indicator lights.
4	Sequentially connect dvm test probe to following pins of connector P2 (cable assembly W1) and observe dvm indication at each pin connection: Pins 2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 26, 30, 34, 38, 46,48, 79, 111, and 113.	Dvm indicates 0.00 ±0.25 Vdc (logic 0) for each pin connection.
5	Remove dvm test probe from pin 113, connector P2 and set dvm controls as required to measure 6 Vdc.	
6	Perform procedural steps 1 thru 11 contained in table 7-4 as follows: connect dvm test probe (figure 7-1) to connector P2 pins (test point indication), activate or set switches to positions indicated (panel switch position/action), and observe dvm indications (test point indication).	Indications are as specified in test point indication, table 7-4 for each step. (0 = 0.00 ±0.25 Vdc and 1 = 2.5 to 5.5 Vdc.)
7	Connect test leads between 28 Vdc power supply - (minus) terminal and connector P2 (cable assembly W1) pins 71 and 79. (This jumpers pins 71 and 79 of connector P2.)	Normal Indication
8	Perform procedural steps 12 thru 28 contained in table 7-4 as follows: connect dvm test probe (figure 7-1) to connector P2 pins (test point indication), activate or set switches to positions indicated (panel switch position/action), and observe dvm indications (test point indication).	Indications are as specified in test point indication, table 7-4 for each step (0 = 0.00 ±0.25 Vdc and 1 = 4.0 ±1.5 Vdc.)
9	Perform shutdown power procedure In accordance with paragraph 7-11.	

Table 7-4. Checkout Data

Step	Panel switch positions/action												Test point indication															
	CORRECTION switch	BORESIGHT PAIR SELECT switch	CLEAR SELECTED PAIR switch	LOAD BORESIGHT MEMORY switch-indicator	SLEW CLEAR INCR/DECR switch	SLEW INCR/DECR switch	ENTER COMPUTE switch	MANUAL DATA ENTRY switch	MANUAL DATA ENTRY switch	MANUAL DATA ENTRY switch	MANUAL DATA ENTRY switch	P2-39	P2-37	P2-36	P2-35	P2-33	P2-32	P2-31	P2-29	P2-28	P2-27	P2-25	P2-24	P2-23	P2-21	P2-20	P2-19
1								+	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0
2								+	1	1	1	0			0	0	0	0	1	0	0	0	1	0	0	0	1	
3								+	2	2	2	0			0	0	0	1	0	0	0	1	0	0	0	1	0	
4								+	3	3	3	0			0	0	0	1	1	0	0	1	1	0	0	1	1	
5								+	4	4	4	0			0	0	1	0	0	0	1	0	0	0	1	0	0	
6								+	5	5	5	0			0	0	1	0	1	0	1	0	1	0	1	0	1	
7								+	6	6	6	0			0	0	1	1	0	0	1	1	0	0	1	1	0	
8								+	7	7	7	0			0	0	1	1	1	0	1	1	1	0	1	1	1	
9								+	8	8	8	0			0	1	0	0	0	1	0	0	0	1	0	0	0	
10								+	9	9	9	0			0	1	0	0	1	1	0	0	1	1	0	0	1	
11								-	9	9	9	0			1	1	0	0	1	1	0	0	1	1	0	0	1	
12							D					1																
13						DECR						1										0	0	0	0	0	1	
14						INCR						1										0	0	0	0	1	0	
15					D							1										0	0	0	1	0	0	
16				D								1										0	0	1	0	0	0	
17			D									1										1	0	0	0	0	0	
18	SLEW-EL	TSU-INDEX										1	0	0	0	0	0	0	0	0		0	1	0	0	0	0	
19	SLEW-AZ	GUN-TSU										1	0	0	0	1	0	0	0	1								
20	MAN-YAW	GHS-TSU										1	0	0	1	0	0	0	1	0								
21	MAN-PITCH	GHS-GUN										1	0	0	1	1	0	0	1	1								
22	MAN-ROLL	PHS-TSU										1	0	1	0	0	0	1	0	0								
23	MAN-EL	PHS-GUN										1	0	1	0	1	0	1	0	1								
24		ALT-TSU										1	0				0	1	1	0								
25		HUD-TSU										1	0				0	1	1	1								
26		ALT-HUD										1	0				1	0	0	0								

7-11. Checkout Shutdown Procedure.

a. Turnoff shop 28 Vdc power supply.

b. Disconnect shop 28 Vdc power supply and dvm from cable assembly W1.

c. Disconnect cable assembly W1 from boresight controller.

d. Store cable assembly W1 in storage compartment of boresight controller cover (figure 1-3).

7-12. Troubleshooting. Troubleshooting information, based on abnormal response indications (MALFUNCTION column) that may be observed during operational checkout, are provided in table 7-5. The associated information in the MALFUNCTION, TEST OR INSPECTION, and CORRECTIVE ACTION columns of table 7-5 describe the malfunction indication, followed by a test or inspection to be performed, and the corrective action to be taken. Malfunction indications are keyed to checkout procedures contained in table 7-3. Instructions for each malfunction given in table 7-3 are dependent on the successful performance of checkout procedures preceding the step where the malfunction was observed. When a corrective maintenance action is performed, repeat the performance of the step (table 7-3) in which the malfunction occurred to ensure that the failure was actually rectified. If performance of the corrective maintenance action specified does not correct the malfunction or an unlisted malfunction occurs, repair is beyond the scope of AVIM. These malfunctions will be reported to depot maintenance.

7-13. Panel Assembly Wire List.

7-14. General. The panel assembly wiring list Includes only wiring information for AVIM level of maintenance and repair. Wiring repair beyond AVIM level will be referred to the depot maintenance activity. Figure 7-2 provides terminal orientation information for the panel assembly wire list. Wiring information to aid in troubleshooting and repair of the boresight controller is tabulated in table 7-6.

7-15. Column Entries. Reference designation and pin number entries (listed under the From and To columns) identify the starting and termination points of a given wire. Entries in the From column are listed in alphanumerical sequence. Coded entries in the three remaining columns of the tables provide information related to wire type, gage, and color (Wire Ident column), signal codes (Signal column), and function (Signal Description column). The first symbol of the four-symbol coded entry in the Wire Ident column, a number, indicates the number of wires. (That is, a 1 indicates a single wire, 2 indicates a pair of wires, etc.)

The second symbol, a letter, indicates the type of wire as follows:

Letter Code	Wire Type
A	Stranded, Type E Insulated (Military Specification MIL-W-16878/4)
B	Solid , Uninsulated (Federal Specification QQ--W-343, Type S)
C	Solid, Type E Insulated (Military Specification MIL-W-16878/4)
D	Stranded, Type ET Insulated (Military Specification MIL-W-16878/6)
E	Solid, Type ET Insulated (Military Specification MIL-W-16878/6)
S	Shielded, Type E Insulated (Military Specification MIL-W-16878/4)
X	Wire part of detail part

Table 7-5. Troubleshooting

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. LOAD BORESIGHT MEMORY SWITCH-INDICATOR FAILS TO LIGHT AFTER PERFORMANCE OF PRELIMINARY PROCEDURE FOR CHECKOUT (step 1, table 7-3).

NOTE

Before performing steps 1 thru 4, be sure that you have performed all applicable operating checks contained in table 7-3.

Step 1. Remove lamps from switch assembly S7 (paragraph 7-19) and check lamps for continuity with multimeter.

"Remove defective lamp and substitute with replacement lamp (paragraph 7-19) l If switch-indicator still fails to light, proceed to step 2.

Step 2. Check cable assembly W1 for wiring continuity between connectors pins P1-49 and P2-77 and between connector pins P1-53 and P2-78 using multimeter. (Refer to figure 7-3.)

If cable assembly W1 is defective, replace W1. If W1 is not defective, proceed to step 3.

Step 3. Perform steps 2 and 3, table 7-3.

If switch-indicator still fails to light, remove and replace logic assembly (paragraphs 7-36 and 7-49). If problem is not corrected, proceed to step 4.

Step 4. Perform steps 2 and 3, table 7-3.

If switch-indicator still fails to light , remove and replace switch assembly S7 (paragraphs 7-38 and 7-47).

NOTE

For the following troubleshooting procedures, perform the complete checkout procedure given in table 7-3 for each malfunction listed.

2. LOAD BORESIGHT MEMORY SWITCH-INDICATOR DOES NOT GO OUT WHEN PINS 79 AND 80 OF CONNECTOR P2 ARE JUMPERED (step 2, table 7-3).

Step 1. Check cable assembly W1 for wiring continuity between connectors pins PL-36 and P2-80 and between P1-34 and P2-79 (figure 7-3) using multimeter.

If cable assembly W1 is defective, replace W1. If W1 is not defective proceed to step 2.

Step 2. Remove and replace logic assembly (paragraphs 7-36 and 7-49).

Table 7-5. Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. DVM DOES NOT INDICATE WITHIN 0.00 ±0.25 Vdc DURING PERFORMANCE OF STEP 4, TABLE 7-3.

Step 1. Check cable assembly W1 for wiring continuity between pins of connector P1 and P2 (figure 7-3) using multimeter.

If cable assembly WI is defective, replace W1. If W1 is not defective proceed to step 2.

Step 2. Remove and replace logic assembly (paragraphs 7-36 and 7-49).

4. ONE OR MORE DVM INDICATIONS ARE NOT OBTAINED AS SPECIFIED IN STEPS 1 THRU 11, TABLE 7-4 (step 6, table 7-3).

Step 1. Check cable assembly W1 for wiring continuity between pins of connectors P1 and P2 (figure 7-3) as indicated below using multimeter.

P-1 to P2-19	P1-11 to P2-25	P1-21 to P2-32
P1-3 to P2-20	P1-13 to P2-27	P1-23 to P2-33
P1-5 to P2-21	P1-15 to P1-28	P1-25 to P2-35
P1-7 to P2-23	P1-17 to P2-29	
P1-9 to P2-24	P1-19 to P2-32	

If cable assembly W1 is defective, replace W1. If W1 is not defective, proceed to step 2.

Step 2. Remove and replace logic assembly (paragraphs 7-36 and 7-49).

5. PIN 19 DVM INDICATION IS NOT OBTAINED WITH ENTER COMPUTE SWITCH DEPRESSED AS SPECIFIED IN STEP 12, TABLE 7-4 (step 8, table 7-3).

Step 1. Check cable assembly W1 for wiring continuity between connector pins P1-33 and P1-71 (figure 7-3).

If cable assembly W1 is defective, replace W1. If W1 is not defective proceed to step 2.

CAUTION

To avoid possible damage to logic assembly, remove logic assembly (paragraph 7-36) before performing continuity check of switches.

Table 7-5. Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

CAUTION

To avoid possible damage to logic assembly, remove logic assembly (paragraph 7-36) before performing continuity check of switches.

Step 1. Perform continuity and operation check of LOAD BORESIGHT MEMORY switch-indicator (S7) contacts (E, figure 7-2) using multimeter.

If LOAD BORESIGHT MEMORY switch-indicator (S7) is defective, remove and replace switch assembly S7 (paragraphs 7-38 and 7-47). If problem is not corrected, proceed to step 2.

Step 2. Replace logic assembly (paragraph 7-49).

9. PIN 24 DVM INDICATION IS NOT OBTAINED WHEN CLEAR SELECTED PAIR SWITCH IS DEPRESSED AS SPECIFIED IN STEP 17, TABLE 7-4 (step 8, table 7-3).

CAUTION

To avoid possible damage to logic assembly, remove logic assembly (paragraph 7-36) before performing continuity check of switches.

Step 1. Perform continuity and operation check of CLEAR SELECTED PAIR switch (S8) contacts (E, figure 7-2) using multimeter.

If CLEAR SELECTED PAIR switch (S8) is defective, remove and replace switch assembly S8 (paragraphs 7-38 and 7-47). If problem is not corrected, proceed to step 2.

step 2. Replace logic assembly (paragraph 7-49).

10. ONE OR MORE DVM INDICATIONS ARE NOT OBTAINED WHEN CORRECTION SWITCH AND BORESIGHT PAIR SELECT SWITCH ARE SET TO POSITIONS AS SPECIFIED IN STEPS 18 THRU 26, TABLE 7-4 (step 8, table 7-3).

CAUTION

To avoid possible damage to logic assembly, remove logic assembly (paragraph 7-36) before performing continuity check of switches.

Step 1. Perform continuity and operation check of BORESIGHT PAIR SELECT switch (S1) contacts (B, figure 7-2) using multimeter.

If BORESIGHT PAIR SELECT SWITCH (S1) is defective, remove and replace rotary switch S1 (paragraphs 7-32 and 7-53). If problem is not corrected , proceed to step 2.

Table 7-5. Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 2. Perform continuity and operation check of CORRECTION switch (S3) contacts (B, figure 7-2) using multimeter. If CORRECTION switch (S3) is defective, remove and replace rotary switch S3 (paragraphs 7-32 and 7-53). If problem is not corrected, proceed to step 3. Step 3. Replace logic assembly (paragraph 7-49).

The third and fourth symbols, a letter code and a number code, indicate the wire gage and wire color, respectively, as follows:

Letter Code	Wire Gage	Number Code	Wire Color
A	32	0	Black
B	30	1	Brown
C	28	2	Red
D	26	3	Orange
E	24	4	Yellow
F	22	5	Green
G	20	6	Blue
H	18	7	Violet
I	16	8	Grey
J	14	9	White

NOTE

In signal column, the symbol "*" indicates logic negation.

7-16. Cable Assembly W1 Wiring Diagram. Figure 7-3 contains information useful for point-to-point wire tracing between cable assembly W1 connectors P1 and P2. In addition, connector pin and socket terminal locations are given for reference.

Section IV. MAINTENANCE

7-17. Introduction. This section contains AVIM instructions for removal and replacement, cleaning, and inspection of detail parts and assemblies. Instructions for the cleaning and refinishing of painted surfaces are also provided in this section.

7-18. Removal and Replacement.

CAUTION

Do not connect or disconnect cable assembly W1 from the boresight controller when 28V power is applied by the FCC. Ensure that helicopter power to the FCC is turned off. Turn off helicopter power in accordance with instructions given in TM 55-1520-236/239-23.

Table 7-6. Panel Assembly Wire List

From	To	Wire ident	Signal
E1	U1-1	1DG 2	28VDC
	R1-2	1DG 2	28VDC
E2	U1-2	1DG 2	+5V1
E3	U1-GND	1DG 0	+5VRT1
	E5	1DG 0	+5VRT1
E4	U1-GND	1DG 0	+5VRT1
E5	E3	1DG 0	+5VRT1
	TB1-31	1DD 0	+28VLRP
	J1-53	1DF 0	28VRT1
	J1-54	1DF 0	28VRT2
	J1-55	1DF 0	28VRT3
FL1-1	HYO1-COMM	1DG 2	28VDC4
FL1-2	R1-1	1DG 2	28VDC5
HY01-COMM	J1-49	1DF 2	28VDC1
	J1-50	1DF 2	28VDC2
	J1-51	1DF 2	28VDC3
	FL1-1	1DG 2	28VDC4
J1-1	TB1-51	2DD 9	I00
J1-2	TB1-52	2DD 0	A3AR
J1-3	TB1-3	2DD 9	I0I
J1-4	TB1-4	2DD 0	TCLDR
J1-5	TB1-5	2DD 9	I01
J1-6	TB1-6	2DD 0	LGNDO1
J1-7	TB1-7	2DD 9	I03
J1-8	TB1-8	2DD 0	MEND*R
J1-9	TB1-41	2DD 9	I04
J1-10	TB1-42	2DD 0	HALTR
J1-11	TB1-43	2DD 9	I05
J1-12	TB1-44	2DD 0	LG02
J1-13	TB1-45	2DD 9	I06
J1-14	TB1-46	2DD 0	TECK*R
J1-15	TB1-13	2DD 9	I07
J1-16	TB1-14	2DD 0	INH*RT
J1-17	TB1-11	2DD 9	I08
J1-18	TB1-12	2DD 0	LG03
J1-19	TB1-19	2DD 9	I09
J1-20	TB1-20	2DD 0	XTM*RT
J1-21	TB1-17	2DD 9	I10
J1-22	TB1-18	2DD 0	DMAETR
J1-23	TB1-15	2DD 9	I11
J1-24	TB1-16	2DD 0	LG04
J1-25	TB1-55	2DD 9	I12
J1-26	TB1-56	2DD 0	INT14R
J1-27	TB1-53	2DD 9	I13
J1-28	TB1-54	2DD 0	INT15R
J1-29	TB1-57	2DD 9	I14
J1-30	TB1-58	2DD 0	LG05

Table 7-6. Panel Assembly Wire List - Continued

From	To	Wire ident	Signal
J1-31	TB1-59	2DD 9	I15
J1-32	TB1-60	2DD 0	RINTR
J1-33	TB1-21	2DD 9	DASEL
J1-34	TB1-26	2DD 0	BORID
J1-35	TB1-22	2DD 0	TPHBR
J1-36	TB1-23	2DD 9	83MC
J1-37	TB1-24	2DD 0	TPHCR
J1-38			
J1-39			
J1-40			
J1-41			
J1-42			
J1-43			
J1-44			
J1-45			
J1-46			
J1-47			
J1-48			
J1-49	HY01-COMM	IDF 2	28VDC1
J1-50	HY01-COMM	IDF 2	28VDC2
J1-51	HY01-COMM	IDF 2	28VDC3
J1-52			
J1-53	E5	IDF 0	28VTR1
J1-54	E5	IDF 0	28VRT2
J1-55	E5	IDF 0	28VRT3
R1-1	FL1-2	1DG 2	28VDC5
R1-2	E1	IDG 2	28VDC
R1-2	XDS7-G	lDD 2	28VLP
S1-C	TB1-101	lDD 0	GNDS 1
S1-1	TB1-67	1DD 9	TSUIDX
S1-2	TB1-29	1DD 9	GUNTSU
S1-3	TB1-28	1DD 9	GHSTSU
S1-4	TB1-27	1DD 9	GHSGUN
S1-5	TB1-62	1DD 9	PHSTSU
S1-6	TB1-63	1DD 9	PHSGUN
S1-7	TB1-64	1DD 9	ALTTSU
S1-8	TB1-65	1DD 9	HUDTSU
S1-9	TB1-66	1DD 9	ALTHUD
S2-A-B		1XD 8	
S-A-C	TB1-86	1XD 9/1	SDAG*
S2-A-1		1XD 1	
S2-A-1*	TB1-81	1XD 6	SD00
S2-A-2		1XD 2	
S2-A-2*	TB1-48	1XD 7	SD01
S2-A-4		1XD 4	
S2-A-4*	TB1-49	1XD 3	DS02
S2-A-8		1XD 8	
S2-A-8*	TB1-9	1XD 0	SD03
S2-B-C	TB1-87	1XD 9/1	SDBG*

Table 7-6. Panel Assembly Wire List - Continued

From	To	Wire ident	Signal
S2-B-1		1XD 1	
S2-B-1*	TB1-10	1XD 6	SD04
S2-B2		1XD 2	
S2-B-2*	TB1-88	1XD 7	SD05
S2-B-4		1XD 4	
S2-B-4*	TB1-90	1XD 3	SD06
S2-B–8		1XD 8	
S2–B-8*	TB1-91	1XD 0	SD07
S2-C-C	TB1-61	1XD 9/1	SDCG*
S2-C-1		1XD 1	
S2-C-1*	TB1-92	1XD 6	SD08
S2-C-2		1XD 2	
S2-C-2*	TB1-98	1XD 7	SD09
S2-C-4		1XD 4	
S2-C-4*	TB1-99	1XD 3	SD10
S2-C-8		1XD 8	
S2-C-8*	TB1-97	1XD 0	DS11
S2-D-A	TB1-89	1XD 9/1	SDDG*
S2-D-B		1XD 9/1	
S2-D-1		1XD 1	
S2-D-2	TB1-95	1XD 2	SD12
S2-D-3		1XD 3	
S2-D-4		1XD 4	
S3-C	TB1-37	1DD 0	GNDS 3
S3-1	TB1-78	1DD 9	EL
S3-2	TB1-77	1DD 9	AZ
S3-3	TB1-76	1DD 9	YAW
S3-4	TB1-75	1DD 9	PITCH
S3-5	TB1-39	1DD 9	ROLL
S3-6	TB1-40	1DD 9	ELEV
S4-1	S4-3	1DD 0	GNDS47
S4-2	TB1-47	1DD 9	ENTNC
S4-3	TB1-82	1DD 0	GNDS47
	S4-1	1DD 0	GNDS47
S4-4	TB1-83	1DD 9	ENTNO
S5-1	S5-5	1DD 9	S0501
S5-2	S6-1	1DD 0	GND568
S5-3	TB1-69	1DD 9	DECNO
S5-4	TB1-104	1DD 9	ICNC
S5-5	S5-1	1DD 9	S0501
S5-6	TB1-70	1DD 9	PUL08
S6-1	S5-2	1DD 0	GND568
S6-1	S6-3	1DD 0	GND568
S6-2	TB1-100	1DD 9	CIDNC
S6-3	S6-1	1DD 9	GND568
	S8-C	1DD 9	GND568
S6-4	TB1-105	1DD 9	CIDNO
S8-C	TB1-68	1DD 0	GND568
S8-C	S6-3	1DD 0	GND568

Table 7-6. Panel Assembly Wire List - Continued

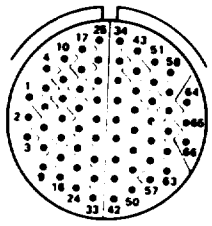
From	To	Wire ident	Signal
S8-NC	TB1-103	1DD 9	CS PNC
S8-NO	TB1-102	1DD 9	CS PNO
TB1-1	U1-2	2DE 2	+5V1
TB1-2	U1-2	2DE 2	+5V2
TB1-3	J1-3	2DD 9	I01
TB1-4	J1-4	2DD 0	TCLDR
TB1-5	J1-5	2DD 9	I02
TB1-6	J1-6	2DD 0	LGNDO1
TB1-7	J1-7	2DD 9	I03
TB1-8	J1-8	2DD 0	MEND*R
TB1-9	S2-A-8*	lXD 0	SD03
TB1-10	S2-B-1*	1XD 6	DS04
TB1-11	J1-17	2DD 9	I08
TB1-12	J1-18	2DD 9	LG03
TB1-13	J1-15	2DD 9	I07
TB1-14	J1-16	2DD 0	INH*RT
TB1-15	J1-23	2DD 9	I11
TB1-16	J1-24	2DD 0	LG04
TB1-17	J1-21	2DD 9	I10
TB1-18	J1-22	2DD 0	DMATER
TB1-19	J1-19	2DD 9	I09
TB1-20	J1-20	2DD 0	XTM*RT
TB1-21	J1-33	2DD 9	DASEL
TB1-22	J1-35	2DD 0	TPHBR
TB1-23	J1-36	2DD 9	BSMC
TB1-24	J1-37	2DD 0	TPHCR
TB1-25			
TB1-26	J1-34	1DD 0	BORID
TB1-27	S1-4	1DD 9	GHSGUN
TB1-28	S1-3	1DD 9	GHSTSU
TB1-29	S1-2	1DD 9	GUNTSU
TB1-30			
TB1-31	E5	1DD 0	28VLPR
TB1-32			
TB1-33			
TB1-34			
TB1-35	XDS7-A	1DD 9	28LMPA
TB1-36	XDS7-C	1DD 9	28LMPB
TB1-37	S3-C	1DD 0	GNDS 3
TB1-38			
TB1-39	S3-5	1DD 9	ROLL
TB1-40	S3-6	1DD 9	EL
TB1-41	J1-9	2DD 9	I04
TB1-42	J1-10	2DD 0	HALTR
TB1-43	J1-11	2DD 9	I05
TB1-44	J1-12	2DD 0	LG02
TB1-45	J1-13	2DD 9	I06
TB1-46	J1-14	2DD 0	TECK*R
TB1-47	S4-2	1DD 9	ENTNC

Table 7-6. Panel Assembly Wire List - C0ntinued

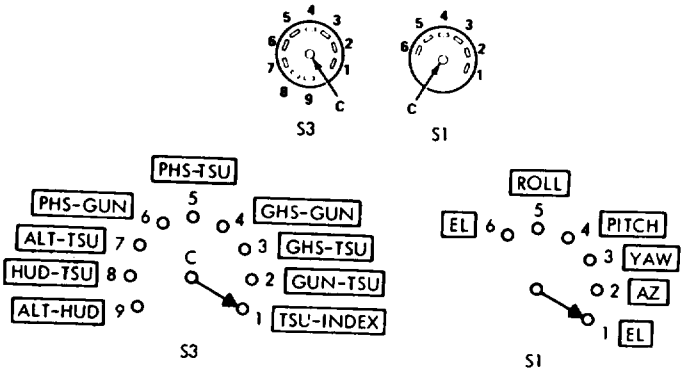
From	To	Wire ident	Signal
TB1-48	S2-A-2*	1XD 7	SD01
TB1-49	S2-A-4*	1XD 3	SD02
TB1-50			
TB1-51	J1-1	2DD 9	I00
TB1-52	J1-2	2DD 0	A3AR
TB1-53	J1-27	2DD 9	I13
TB1-54	J1-28	2DD 0	INT15R
TB1-55	J1-25	2DD 9	I12
TB1-56	J1-26	2DD 0	INT14R
TB1-57	J1-29	2DD 9	I14
TB1-58	J1-30	2DD 0	LG05
TB1-59	J1-31	2DD 9	I15
TB1-60	J1-32	2DD 0	RINTR
TB1-61	S2-C-C	1XD 9/1	SDCG*
TB1-62	S1-5	1DD 9	PHSTSU
TB1-63	S1-6	1DD 9	PHSGUN
TB1-64	S1-7	1DD 9	ALTTSU
TB1-65	S1-8	1DD 9	HUDTSU
TB1-66	S1-9	1DD 9	ALTHUD
TB1-67	S1-1	1DD 9	TSUIDX
TB1-68	S8-C	1DD 0	GND568
TB1-69	S5-3	1DD 9	DECNO
TB1-70	S5-6	1DD 9	PUL08
TB1-71			
TB1-72			
TB1-73			
TB1-74			
TB1-75	S3-4	1DD 9	PITCH
TB1-76	S3-3	1DD 9	YAW
TB1-77	S3-2	1DD 9	AZ
TB1-78	S3-1	1DD 9	EL
TB1-79			
TB1-80			
TB1-81	S2-A-1*	1XD 6	SD00
TB1-82	S4-3	1DD 0	GNDS47
	XDS7-COMM	1DD 0	GNDS47
TB1-83	S4-4	1DD 9	ENTNO
TB1-84	XDS7-NC	1DD 9	LBSNC
TB1-85	XDS7-NO	1DD	LBSNO
TB1-86	S2-A-C	1XD 9/1	SDAG*
TB1-87	S2-B-C	1XD 9/1	SDBG*
TB1-88	S2-B-2*	1XD 7	SD05
TB1-89	S2-D-A	1XD 9/1	SDDG*
TB1-90	S2-B-4*	1XD 3	SD06
TB1-91	S1-B-8*	1XD 0	SD07
TB1-92	S2-C-1*	1XD 6	SD08
TB1-93			
TB1-94			
TB1-95	S2-D-2	1XD 2	SD12

Table 7-6. Panel Assembly Wire List - Continued

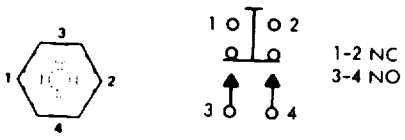
From	To	Wire ident	Signal
TB1-96			
TB1-97	S2-C-8*	1XD 0	SD11
TB1-98	S2-C-2*	1XD 7	DS09
TB1-99	S2-C-4*	1XD 3	SD10
TB1-100	S6-2	1DD 9	CIDNC
TB1-101	S1-C	1DD 0	GNDS1
TB1-102	S8-NO	1DD 9	CSPNO
TB1-103	S8-NC	1DD 9	CS PNC
TB1-104	S5-4	1DD 9	INCNC
TB1-105	S6-4	1DD 9	CIDNO
TB1-106			
TB1-107			
TB1-108			
TB1-109			
TB1-110			
TB1-111			
TB1-112			
TB1-113			
TB1-114			
TB1-115			
TB1-116			
TB1-117			
TB1-118			
TB1-119	U1-GND	2DE 0	+5VRT1
TB1-120	U1-GND	2DE 0	+5VRT2
U1-GND	TB1-119	2DE 0	+5VRT1
	E3	1DG 0	+5VRT1
	E4	1DG 0	+5VRT1
	TB1-120	2DE 0	+5VRT2
U1-1	E1	1DG 2	28VDC
U1-2	E2	2DE 2	+5V1
	TB1-1	2DE 2	+5V1
	TB2-2	2DE 2	+5V2
XDS7-A	TB1-35	1DD 9	28LMPA
XDS7-B			
XDS7-C	TB1-36	1DD 9	28LMPB
XDS7-D			
XDS7-G	R1-2	1DD 2	28VLP
XDS7-NC	TB1-84	1DD 9	LBSNC
XDS7-NO	TB1-85	1DD 9	LBSNO
XDS7-COM	TB1-82	1DD 0	GNDS47



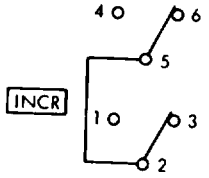
A. CONNECTOR J1

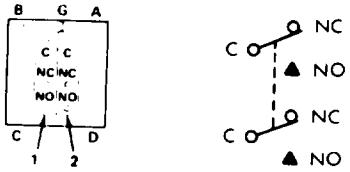


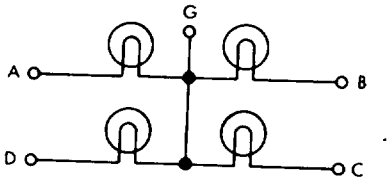
B. ROTARY SWITCHES S1 AND S3



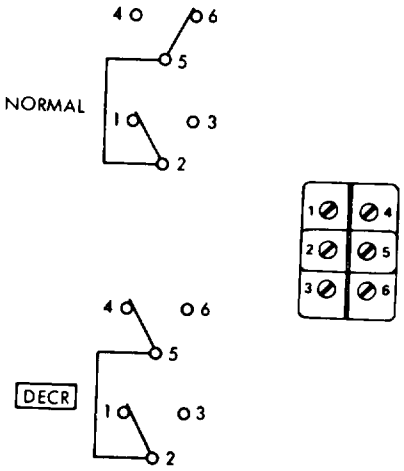
C. PUSH SWITCHES S4 AND S6







E. SWITCH ASSEMBLIES S7 AND S8



-D. TOGGLE SWITCH S5

NOTES:
1. ALL SWITCHES SHOWN FROM WIRING SIDE.
   J1 SHOWN AS VIEWED FROM FRONT SIDE.
2. [ ] INDICATES EQUIPMENT MARKING.

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Figure 7-2. Panel Assembly Detail Parts, Terminal Orientation Diagrams

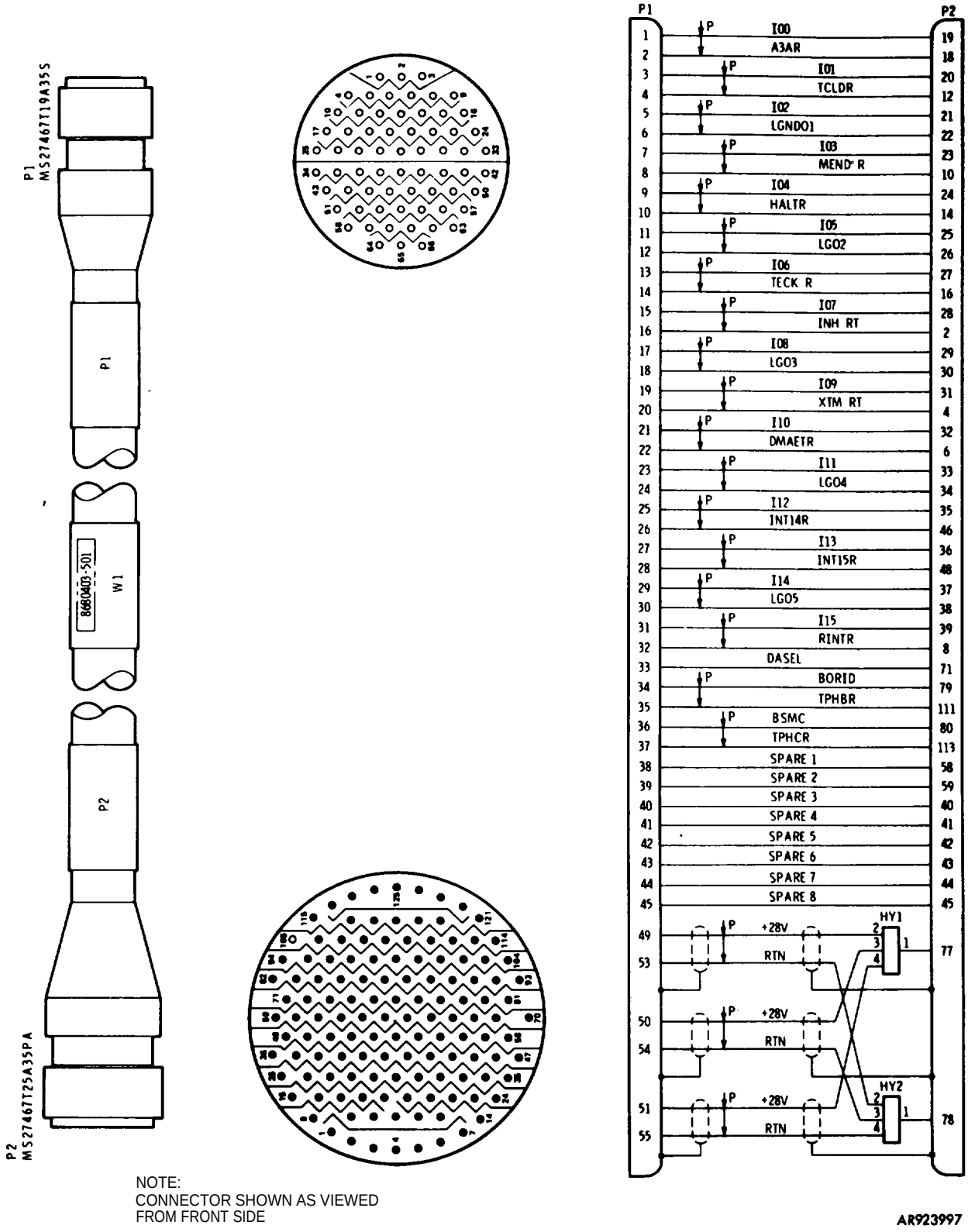


Figure 7-3. Cable Assembly W1

7-19. Load Boresight Memory or Clear Select Pair Switch-Indicator Lamps Removal and Replacement. (See figure 3-1.)

NOTE

The front end assembly (2, figure 7-4) is comprised of an actuator switch lens (3), display screen (4), RFI screen (5), lamp bulb filter (6) and lamps (7 and 8). Although the front end assembly is shown exploded, the front end assembly is not normally disassembled unless a "detailed part (3 thru 8) is damaged or lost during lamps (7 and 8) replacement operation.

a. Lift up and prop switch guard (9, figure 7-4) of Load Boresight Memory switch-indicator; remove outer panel seal (1) from panel assembly (11).

b. Grasp front end assembly (2) in grooves at each side of actuator switch lens (3) as shown in Step No. 1, figure 7-5; gently pull front end assembly outward until limit stop is reached.

c. Rotate front end assembly (2, figure 7-4) about 45 degrees counterclockwise as shown in Step NO. 2, figure 7-5, to release retaining spring from switch housing.

d. Rotate front end assembly (2, figure 7-4) to 90 degrees counterclockwise as shown in Step .No. 3, figure 7-5, and pull front end assembly out of switch housing.

e. Carefully pry base of lamp (7, figure 7-4) to remove lamp out of front end assembly (2).

f. Install replacement lamp (7).

8 Remove and replace lamp (8) in accordance with procedure contained in steps e and f above.

h. Lift up and prop switch guard (9) and install front end assembly (2) into switch-indicator housing.

i. Lift up and prop switch guard (9) and install outer panel seal (1) into inner panel seal on panel assembly (11).

j. Remove and replace lamps of CLEAR SELECT PAIR switch-indicator in accordance with method described in steps a thru i.

7-20. Knobs Removal and Replacement.

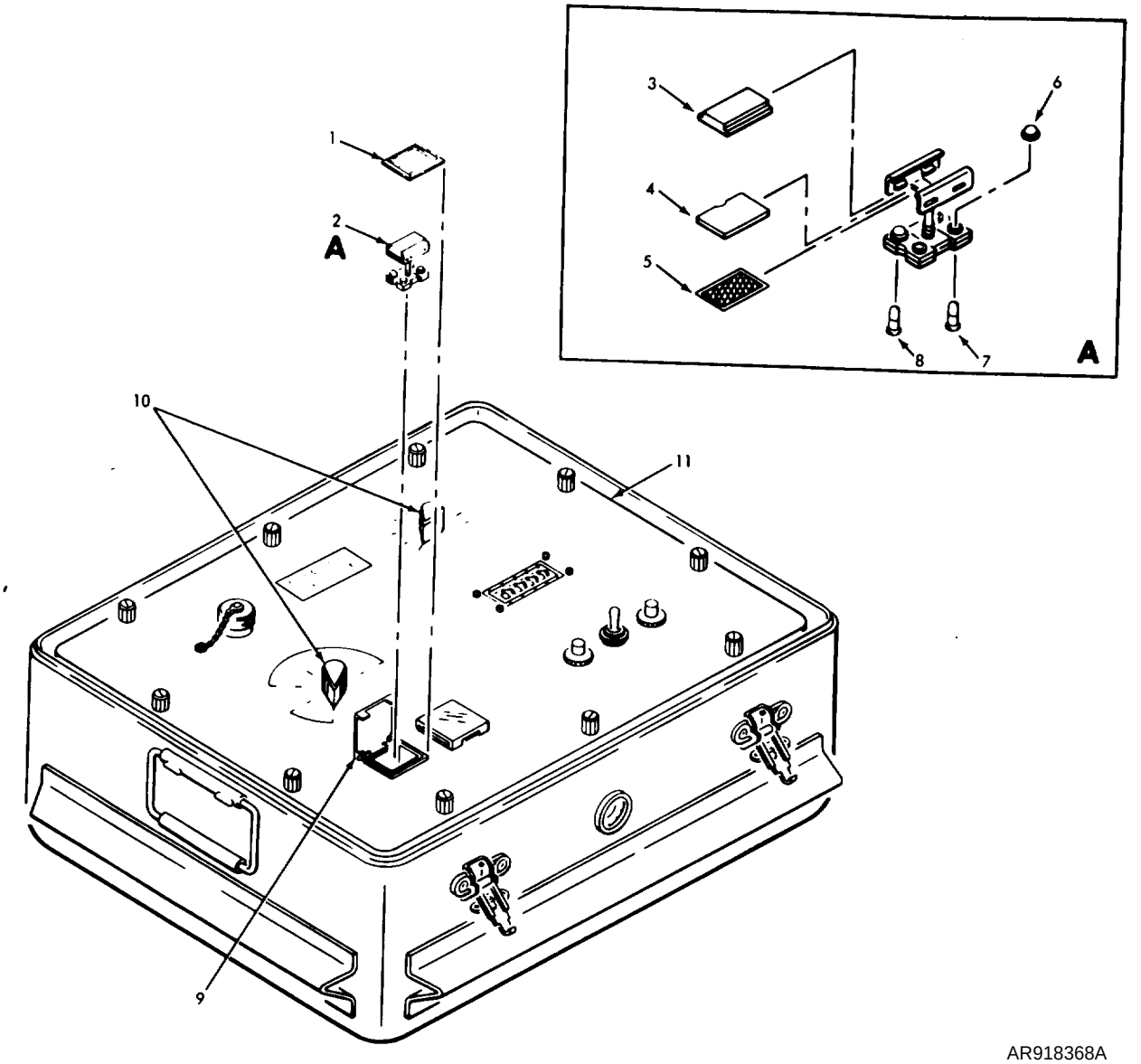
a. Remove knobs (10, figure 7-4) by loosening setscrews in knobs and pulling knobs from switch shafts.

b. Install knobs (10) by positioning knobs on switch shafts, orienting knobs correctly, and tightening setscrews in knobs.

7-21. Cleaning. Tools and materials required for cleaning exterior boresight controller surfaces and parts are listed in table 7-7.

Table 7-7. Tools and Materials Required for Cleaning Exterior Surfaces

Item No.	Tool/Material
1	Isopropyl alcohol
2	Lint-free cloth
3	Soft-bristle brush
4	Liquid soap (detergent)



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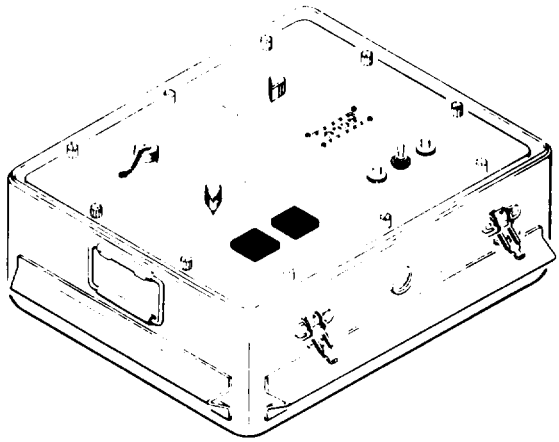
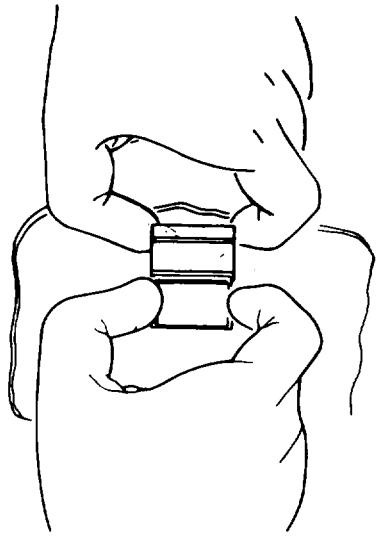
Legend:

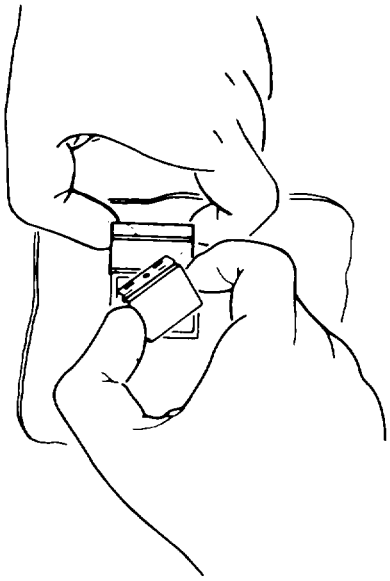
1. Outer panel seal
2. Front end assembly
3. Actuator switch lens
4. Display screen
5. RFI screen
6. Bulb filter
7. Lamp
8. Lamp
9. Switch guard
10. Knob
11. panel assembly

Figure 7-4. Boresight Controller XM34, Removal and Replacement



STEP NO. 1





STEP NO. 2

STEP NO. 3

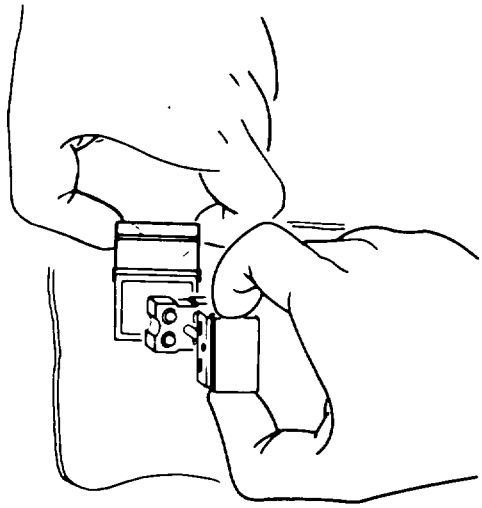


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Figure 7-5 push Switch Front End Assembly, Removal and Replacement

WARNING

Isopropyl alcohol is injurious to health and is flammable. Use isopropyl alcohol only in ventilated work areas. Avoid breathing vapor and direct contact with eyes. Do not use near open flame, arcs, or sparks; do not take internally.

a. Remove dirt, grease, and other foreign material from parts with clean, lint-free cloth or soft-bristle brush moistened with isopropyl alcohol; allow isopropyl alcohol to air dry.

b. Clean exterior surfaces with lint-free cloth moistened with mild detergent and water; dry with lint-free cloth.

7-22. Inspection. Inspect the boresight controller for evidence of mechanical and/or electrical defects as directed in table 7-8.

7-23. Refinishing Painted Surfaces. Refinishing of painted surfaces on the boresight controller is limited to minor marred exterior surfaces. Refer to applicable cleaning and refinishing practices specified in TM 9-213, Painting Instructions for Field Use. Specific requirements for refinishing and repainting the boresight controller are described in the following procedures. Tools and materials required to refinish painted surfaces are listed in table 7-9.

Table 7-8. Maintenance Inspection Requirements

Item	Inspect for
External surfaces	Dents, scratches, corrosion, or other physical damage.
Electrical connectors	Bent, broken, disengaged or loose pins; broken, loose or deformed housings; damaged insulators, dirt and corrosion.
Cabling and flexible wiring	Broken wires, damaged insulation and sleeving, dirt and corrosion.
Attaching hardware	Damage, looseness, or absence.
Logic assembly	Charred or overheated surfaces; broken or otherwise damaged printed circuit wiring; overheated or otherwise damaged parts; dirt and corrosion.
Electronic components	Overheated or otherwise damaged parts; bent, broken, or loose wires or terminals; dirt and corrosion.
Gasket	Cracks, breaks, or other physical damage.

7-24. Refinishing Combination Case.

a. Using crocus cloth, smooth marred surfaces.

WARNING

Isopropyl alcohol is injurious to health and extremely flammable. Use these materials only in well ventilated areas. Avoid breathing vapors and direct contact with skin and eyes. Do not use near open flame, arcs or sparks; do not take internally.

Table 7-9. Tools and Material Required for Refinishing Painted Surfaces

Item	Tool/Material
1	Blue pretreatment wash primer (MIL-P-15328, Formula No. 117-B)
2	Yellow, lusterless, epoxy-polynide paint (Class 1)
3	Epoxy-polymide primer coating
4	Light gray enamel (MIL-E-15090, Formula No. 111, Type I, Class 2)
5	Small artist brush
6	Crocus cloth
7	Isopropyl alcohol
8	Yellow zinc chromate primer coating (Color No. 13538)

b. Clean smoothed area to be painted, using lint-free cloth, swab, or soft bristel brush moistened with isopropyl alcohol; allow isopropyl alcohol to air dry.

c. Apply blue pretreatment wash primer to prepared exterior bare metal surfaces requiring repainting; air dry for 30 minutes.

d. Apply yellow zinc chromate primer coating over blue pretreatment wash primed surfaces of step c above; air dry at 70 to 72 degrees F (21 to 22 degrees C) temperature for 30 minutes or more.

e. Paint primed surfaces of step d above with two coats of light-gray equipment enamel (formula No. 111); air dry for 8 hours.

7-25. Refinishing Panel Assembly.

a. Perform steps a thru c of paragraph 7-24.

WARNING

Resin and acid are injurious to health and extremely flammable. Use these materials only in well ventilated areas. Avoid breathing vapors and direct contact with skin and eyes. DO not use near open flame, arcs or sparks; do not take internally.

b. Apply one coat of epoxy-polyamide primer over blue pretreatment wash primed surfaces; allow to air dry for one hour.

c. Apply two coats of lusterless yellow, epoxy-polyamide paint over primed surfaces; allow paint to dry between coats.

7-26. Disassembly. Disassembly instructions for the boresight controller are provided to permit access and removal of aviation intermediate maintenance replaceable assemblies and detail parts. The boresight controller is disassembled only to the extent necessary to perform aviation intermediate maintenance.

CAUTION

Perform all disassembly actions for the boresight controller in a Protected work area.

Before removing cover of bore-Sight controller combination case, center core of pressure relief valve on base must be depressed to release any possible internal pressure.

7-27. Neoprene Case Seal.

CAUTION

Before removing cover (2, figure 7-6) of boresight controller combination case (9), center core of pressure relief valve (8) must be depressed to release any possible internal pressure.

a. Depress center core of pressure relief valve (8, figure 7-6).

b. Release four latch assemblies (1) securing cover (2); remove cover.

c. Place cover (2) on work bench with inner lid (2, figure 7-7) facing upward.

d. Using putty knife, gently pry and remove neoprene case seal (1).

7-28. Fastener Assembly.

CAUTION

Before removing cover (2, figure 7-6) of boresight controller combination case (9), center core of pressure relief valve (8) must be depressed to release any possible internal pressure.

a. Depress center core or pressure relief valve (8, figure 7-6).

b. Release four latch assemblies (1) securing cover (2); remove cover.

c. Place cover (2) on work bench with inner lid (2, figure 7-7) facing upward.

d. Release three fastener assembly studs (5, 8, and 10) securing inner lid (2); open inner lid.

e. Remove cable assembly W1 (3).

f. Remove fastener retainer (4) securing fastner assembly stud (5); remove fastener assembly Stud .

g Remove nut (6) securing fastener assembly receptacle (7).

h. Using a flat tip screwdriver or similar tool, gently pry and remove fastener assembly receptacle (7).

i. Remove fastener assembly studs (8 and 10) and fastener assembly receptacles (9 and 11) in accordance with method described in steps a thru h above.

7-29. Panel Assembly

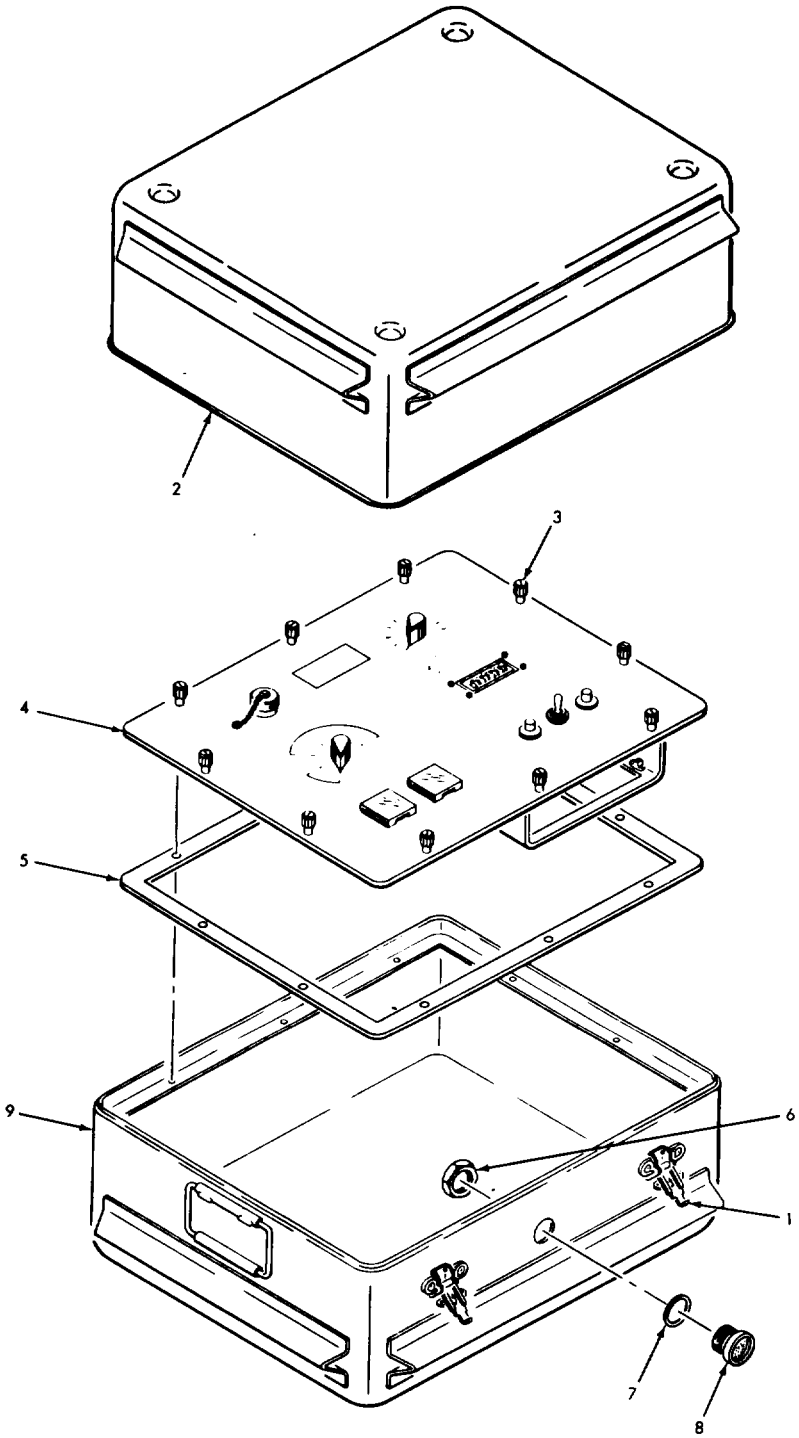
a. If boresight controller has been in operation, perform shutdown procedure (paragraph 7-11) and proceed to step d below; if boresight controller has been stowed, proceed to step b below.

CAUTION

Before removing cover (2, figure 7-6) of boresight controller combination case (9), center core of pressure relief valve (8) must be depressed to release any possible internal pressure.

b. Depress center core of pressure relief valve (8, figure 7-6).

c. Release four latch assemblies (1) securing cover (2); remove cover.



Legend:

1. Latch assembly
2. Cover
3. Captive screw
4. Panel assembly
5. Electromagnetic gasket
6. Nut
7. O-ring
8. Pressure relief valve
9. Combination case

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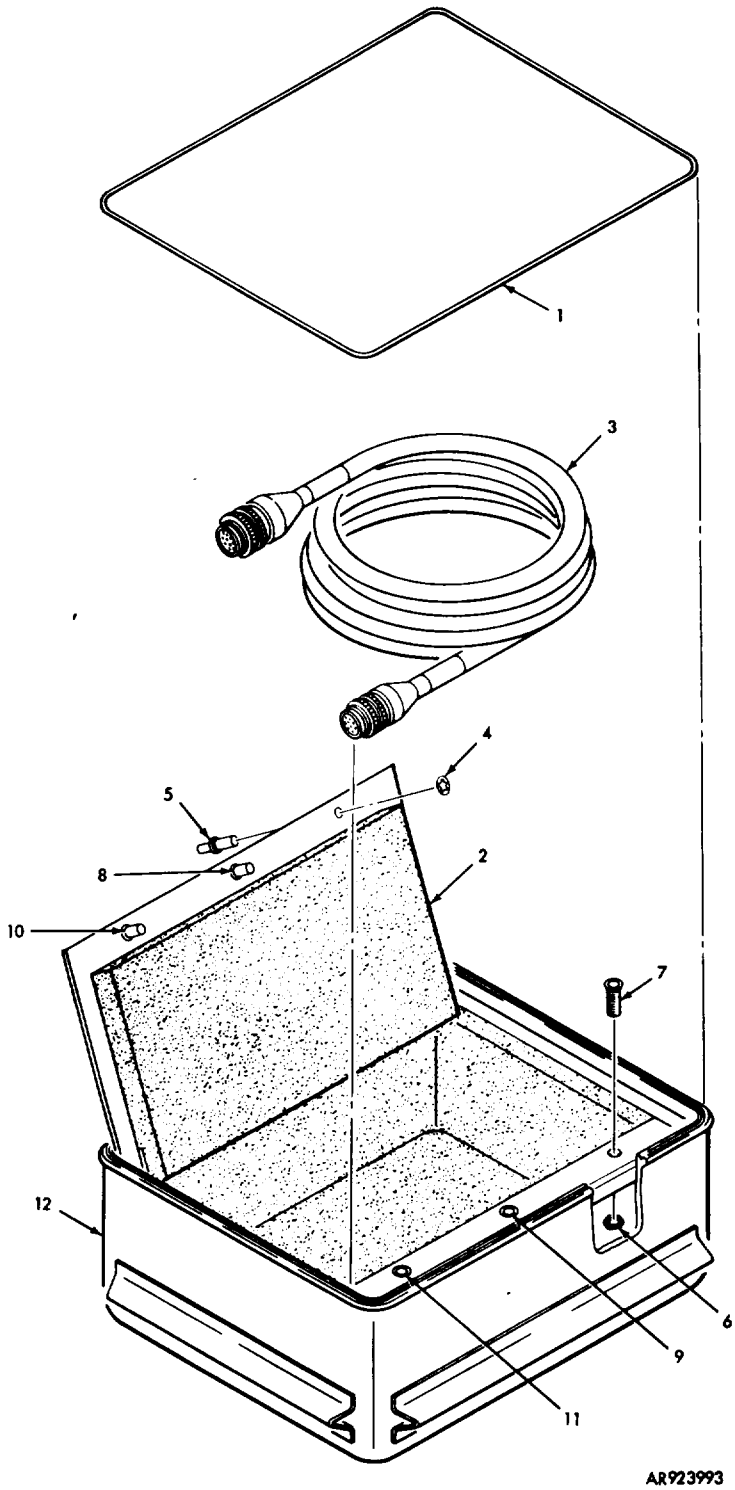
Figure 7-6. Panel Assembly and Cover, Removal and Replacement



Legend:

1. Neoprene case seal
2. Inner lid
3. Cable assembly W1
4. Fastener retainer
5. Fastener assembly stud
6. Nut
7. Fastener assembly receptacle
8. Fastener assembly stud
9. Fastener assembly receptacle
10. Fastener assembly stud
11. Fastener assembly receptacle
12. Cover

Figure 7-7. Neoprene Case Seal, Fastener Assembly, and Cable Assembly W1, Remwal

d. Loosen ten captive screws (3) securing panel assembly (4) to combination case (9).

e. Grasp captive screws (3) and lift panel assembly (4) upward as required to remove panel assembly from combination case (9); place panel assembly face down on a suitable work surface.

7-30. Electromagnetic Gasket.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Using putty knife, gently pry and remove electromagnetic gasket (5).

7-31. Pressure Relief Valve.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove nut (6) and O-ring (7) securing pressure relief valve (8); remove pressure relief valve.

7-32. Rotary Switches S1 and S3.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. note and cut spot ties as required to gain access to wires connected to terminals of rotary switch S1 (4, figure 7-8).

NOTE

Tag or otherwise identify each wire as it is unsoldered or cut.

c. Unsolder or cut wires from terminals of rotary switch S1 (4).

d. Loosen setscrew in knob (l); remove knob.

e. Remove nut (2) and lock washer (3) securing rotary switch S1 (4); remove switch S1.

f. Remove rotary switch S3 (5) in accordance with method described in steps a thru e above.

7-33. Insulated Terminals.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove screw (8, figure 7-9) and flat washer (9) securing insulated terminal (10); remove insulated terminal with wires attached.

NOTE

Tag or otherwise identify each wire as it is disconnected.

c. Cut wires from insulated terminal (10); remove insulated terminal.

d. Remove insulated terminals (11 thru 13) and insulated terminals attached to push switch s6 (1) in accordance with method described in steps a thru c above.

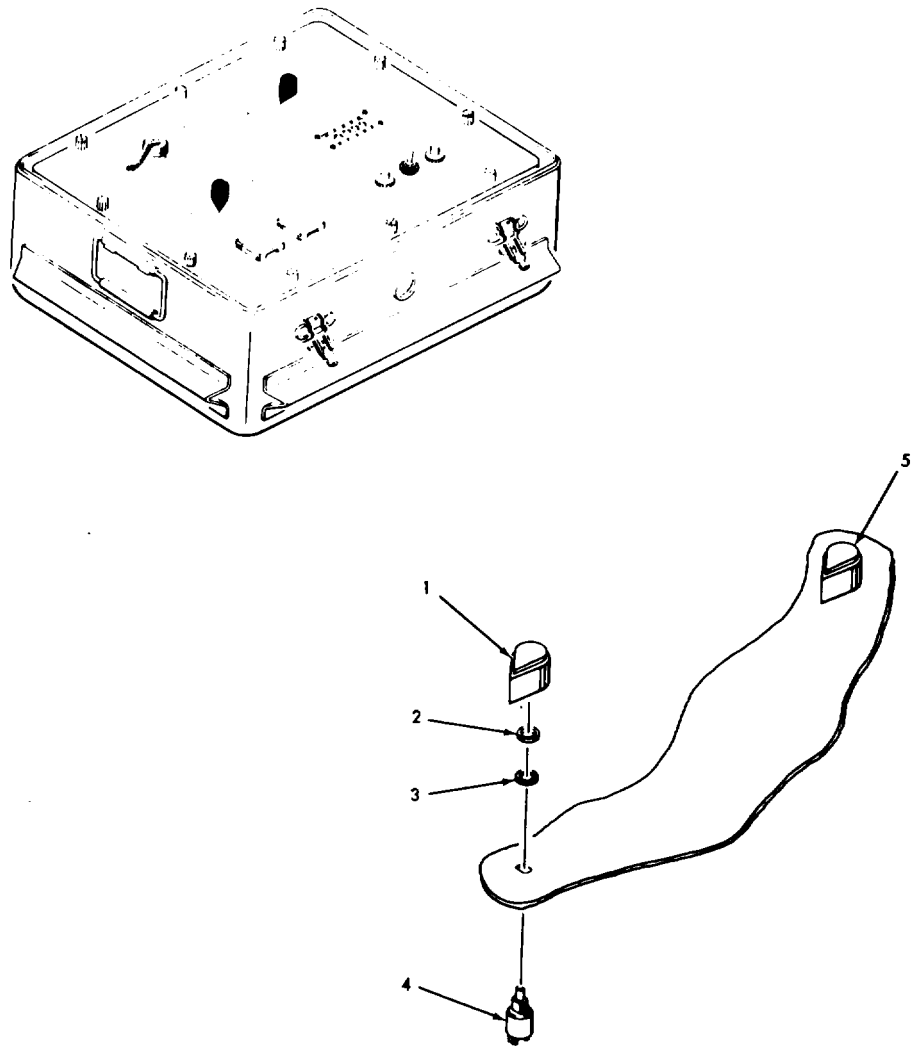
7-34. Push Switches S4 and S6.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove screw (8, figure 7-9) and flat washer (9) securing insulated terminal (10); remove insulated terminal with wires attached.

c. Remove insulated terminals (11 thru 13) in accordance with method described in step b above.

d. Remove nut (14) and lock washer (15) securing push switch S4 (17); remove switch s4 with gasket (16) attached.



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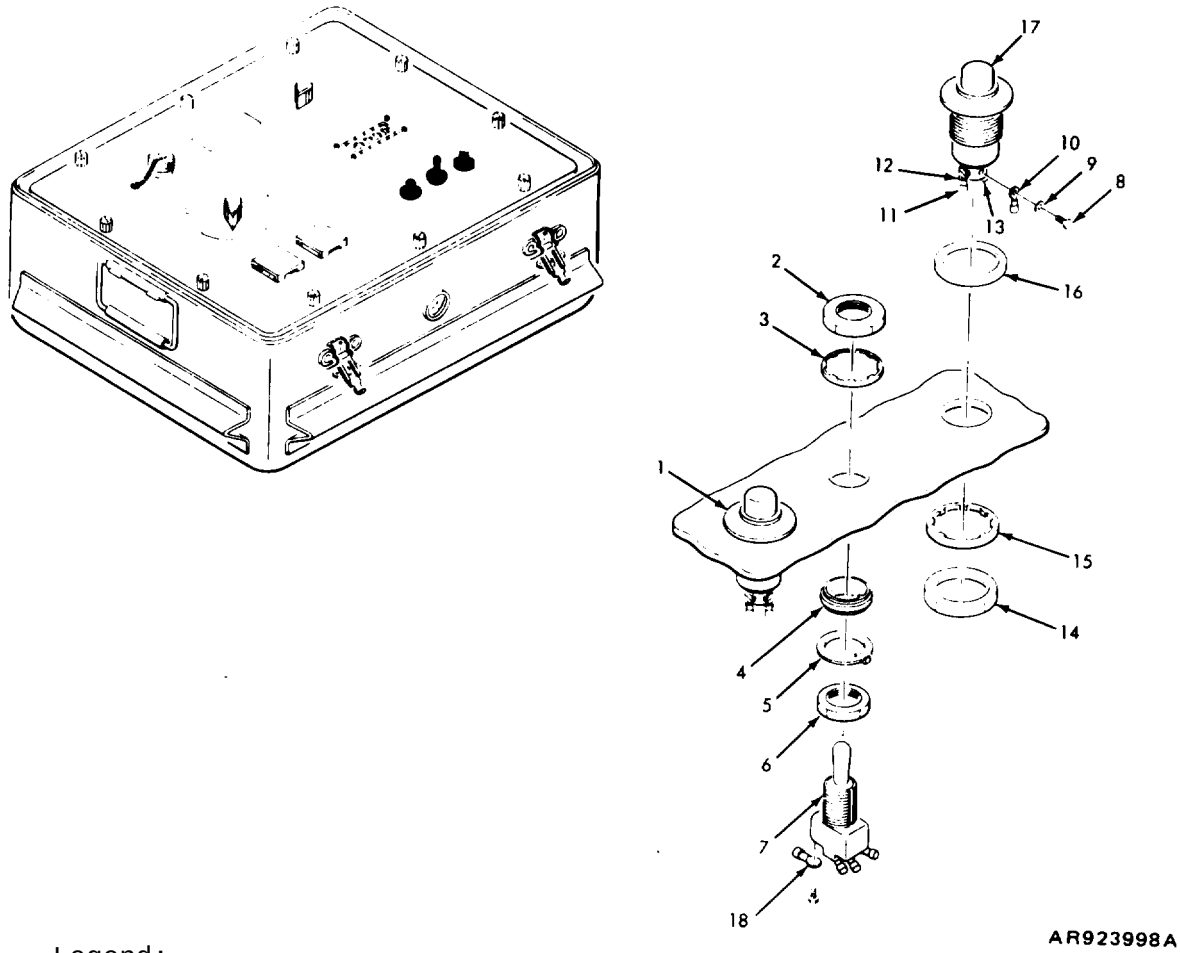
Legend:

1. Knob
2. Nut
3. Lock washer
4. Rotary switch S1
5. Rotary switch S3

Figure 7-8. Rotary Switches S1 and s3, Removal



Legend:

1. Push switch S6
2. Nut
3. Lock washer
4. Panel seal
5. Key washer
6. Nut
7. Toggle switch S5
8. Screw
9. Flat washer
10. Insulated terminal
11. Insulated terminal
12. Instalated terminal
13. Insulated terminal
14. Nut
15. Lock washer
16. Gasket
17. Push switch S4
18. Terminal lug

Figure 7-9. Push Switches S4, and S6, Toggle Switch S5, and Insulated Terminals, Removal

e. Remove push switch S6 (1) in accordance with method described in steps a thru d above.

7-35. Toggle Switch S5.

a. Remove panel assembly (4, figure 7-6) in-accordance with paragraph 7-29 above.

NOTE

Tag or otherwise identify each wire as it is disconnect.

b. Disconnect wires from terminals (18, figure 7-9) of toggle switch S5 (7).

c. Remove nut (2) and lock washer (3) securing toggle switch S5 (7); remove switch S5 with panel seal (4), key washer (5), and nut (6) attached.

7-36. Logic Assembly.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove four screws figure 7-10), flat washers(2), and spacers (3) securing logic assembly (5).

CAUTION

To avoid possible damage to logic assembly (5), place logic assembly on a padded surface. When logic assembly is being replaced, use packaging material of replacement logic assembly to store removed logic assembly, or when returning removed logic assembly to depot .

c. Remove logic assembly (5) by carefully pulling logic assembly as required to disconnect logic assembly connector P1 (4) from terminal board TB1 connector J1 (17); remove logic assembly.

7-37. Terminal Board TB1.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove four screws (1, figure 7-10), flat washers (2), ‘and spacers (3) securing logic assembly (5).

CAUTION

To avoid possible damage to logic assembly (5), place logic assembly on a padded surface. When logic assembly is being replaced, use packaging material of replacement logic assembly to store removed logic assembly, or when returning removed logic assembly to depot.

c. Remove logic assembly (5) by carefully pulling logic assembly as required to disconnect logic assembly connector P1 (4) from terminal board TB1 connector J1 (17); remove logic assembly.

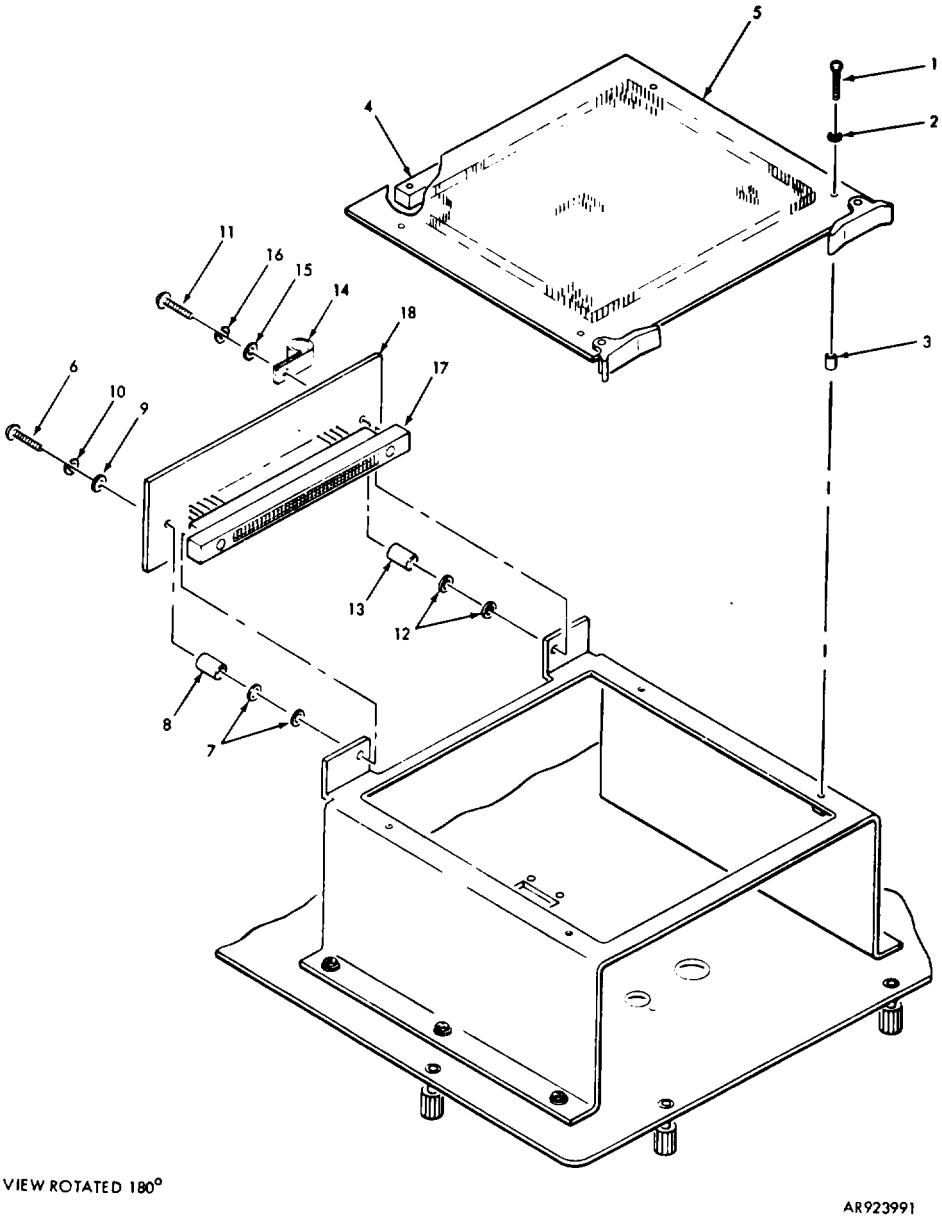
NOTE

Tag or otherwise identify each wire as it is unsoldered or cut .

d. Unsolder or cut wires from terminals of terminal board TB1 (18).

e. Remove screw (6), three flat washers (7), one spacer (8), flat washer (9), and lock washer (10).

f. Remove screw (11), three flat washers (12), one spacer (13), loop clamp (14), flat washer (15), and lock washer (16); remove terminal board TB1 (18) with



Legend:

1. Screw
2. Flat washer
3. Spacer
4. Connector P1
5. Logic assembly
6. Screw
7. Flat washer
8. Spacer
9. Flat washer
10. Lock washer
11. Screw
12. Flat washer
13. Spacer
14. Loop clamp
15. Flat washer
16. Lock washer
17. Connector J1
18. Terminal board TB1

FIGURE 7-10. logic Assembly and Terminal Board TB1, Removal

terminal board TB1 connector J1 (17) attached.

7-38. Switch Assemblies S7 and S8.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Note position of spot ties; cut and remove spot ties as requird to gain access to wires connected to terminals of switch assembly S7 (12, figure 7-11) and switch housing (11).

NOTE

Tag or otherwise identify each wire as it is unsoldered or cut .

c. Unsolder or cut wires from terminals of switch housing (11) and switch assembly s7 (12).

d. Remove two nuts (1, lock washers (2), flat washers (3), and screws (4) securing switch guard (5); remove switch guard.

e. Remove outer panel seal (6).

f. Grasp front end assembly (7) in grooves at each side of actuating switch lens (14) as shown in Step No. 1 (figure 7-5); gently pull front end assembly outward until limit stop is encountered.

g. While gently pulling front end assembly (7, figure 7-11) outward, rotate front end assembly counterclockwise (approximately 45 degrees as shown in Step No. 2, figure 7-5 until front end assembly becomes disengaged.

h. Remove front end assembly (7, figure 7-11) as shown in Step No. 3, figure 7-5.

i. Using a flat tip screwdriver or similar tool, loosen two sleeve retainer screws (8, figure 7-11) as required to release associated mounting sleeve retainer (9); remove mounting sleeve (10) from switch housing (11).

j. Remove switch housing (11) with switch assembly S7 (12) attached.

k. Remove inner panel seal (13).

1. Remove switch assembly S8 (19) in accordance with method described in steps a thru k above.

7-39. Connector J1.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Remove connector cover (5, figure 7-12) from connector J1 (11).

c. Remove nut (1), lock washer (2), flat washer (3), and screw (4); remove connector cover (5).

d. Note position of spot ties on wires connected to pin contacts of connector J1 (11); cut spot ties as required to gain access to wires connected to pin contacts of connector J1.

NOTE

Tag or otherwise identify each wire as each pin contact with wire attached is removed.

e. Using a removal/insertion tool (Military Standard MS27534-22D) from front of connector JI (11), remove pin contacts with wires attached from rear side of connector J1.

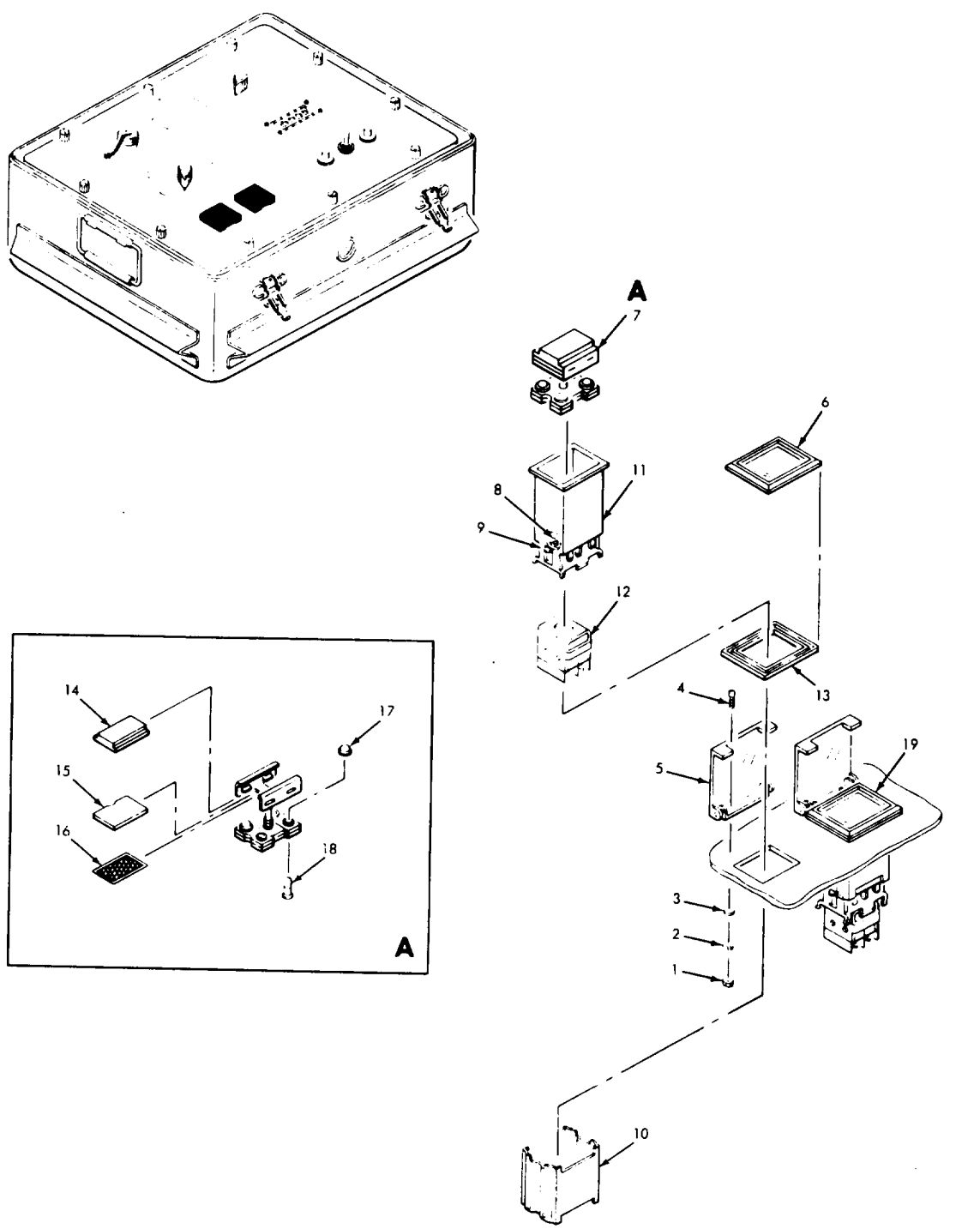


Figure 7-11. Push Switches S7 and S8, Removal (Sheet 1 of 2)

Legend for figure 7-11:

1. Nut
2. Lock washer
3. Flat washer
4. Screw
5. Switch guard
6. Outer panel seal
7. Front end assembly
8. Screw
9. Mounting sleeve retainer
10. Mounting sleeve
11. Switch housing
12. Switch assembly S7
13. Inner panel seal
14. Actuator switch lens
15. Display screen
16. RFI screen
17. Bulb filter
18. Lamp
19. Switch assembly S8

Figure 7-11. Push Switches S7 and S8, Removal (Sheet 2 of 2)

NOTE

Omit step f unless pin contacts removed from connector J1 (11) require replacement.

f. Cut pin contacts from tagged or otherwise identified wires removed in preceding step e.

g. Remove four nuts (6), lock washers (7), flat washers (8), and screws (9) securing connector J1 (11); remove connector J1 with gasket (10) attached.

h. Remove gasket (10) from connector J1 (11).

7-40. Captive Screws.

a. Remove panel assembly (4, figure 7-6) in accordance with paragraph 7-29 above.

b. Using a removal nose adapter tool (Deutch Fastener Corporation P/N FRN-7505-10) or standard shop practice, remove captive screws (12, figure 7-12)

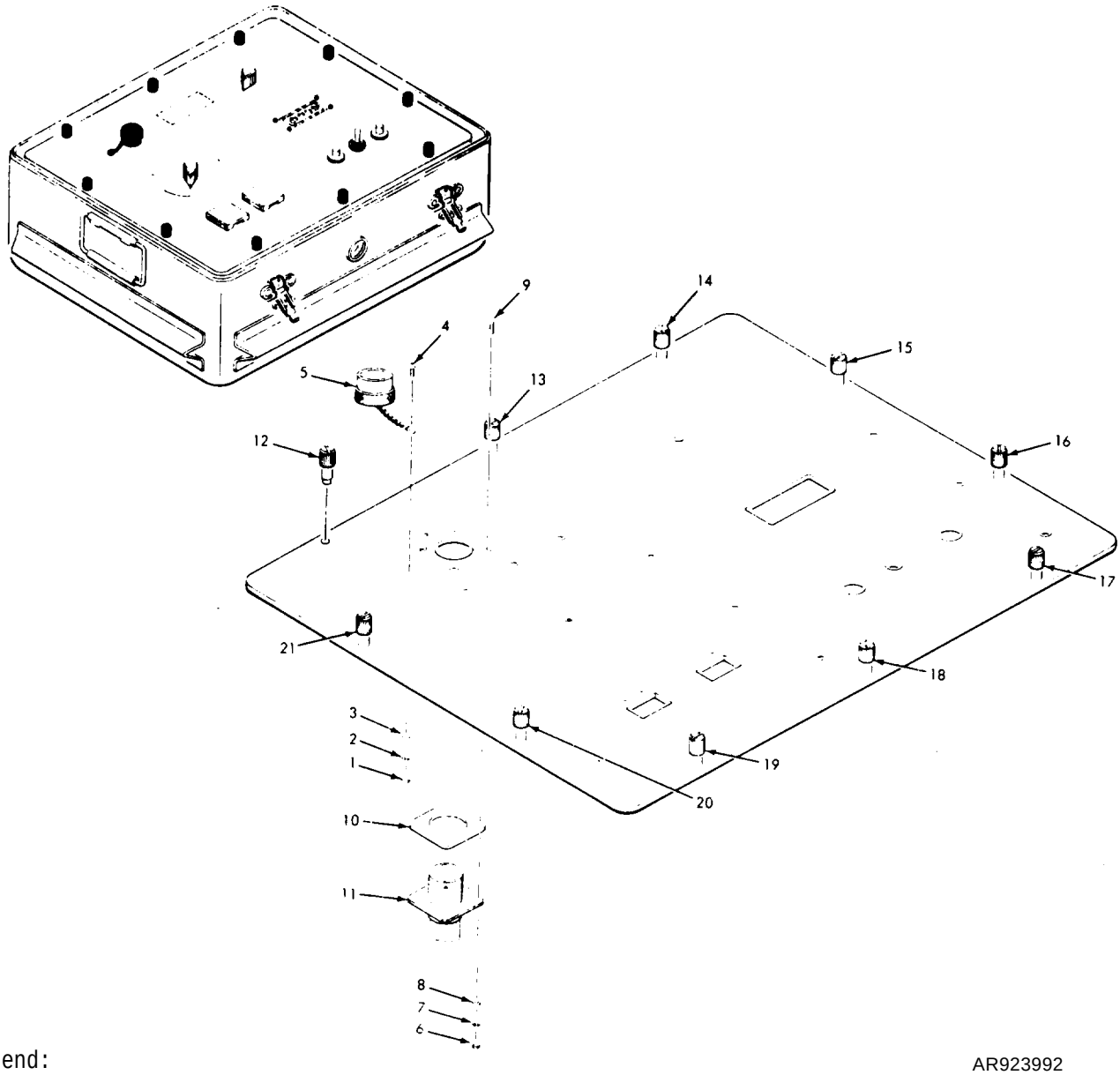
7-41. Cleaning. Tools and materials required for cleaning a disassembled part are listed in table 7-10.

Table 7-10. Tools and Materials Required for Cleaning Disassembled Parts

Item No.	Tool/Material
1	Isopropyl alcohol
2	Lint-free cloth
3	Soft-bristle brush
4	Liquid soap (detergent)

WARNING

Isopropyl alcohol is injurious to health and flammable. Use isopropyl alcohol only in ventilated work areas. Avoid breathing vapor and direct contact with eyes. Do not use near open flame, arcs, or sparks; do not take internally.



Legend:

1. Nut
2. Lock washer
3. Flat washer
4. Screw
5. Connector cover
6. Nut
7. Lock washer
8. Flat washer
9. Screw
10. Gasket
11. Connector J1
12. Captive screw

Figure 7-12. Connector J1 and Captive Screws Removal

a. Remove dirt, grease, and other foreign material from parts with clean, lint-free cloth or soft-bristle brush moistened with isopropyl alcohol; allow isopropyl alcohol to air dry.

b. Clean exterior surfaces with lint-free cloth moistened with mild detergent and water; dry with lint-free cloth.

7-42. Inspection. Inspect the boresight controller for evidence of mechanical and/or electrical defects as directed by table 7-11.

7-43. Repair. Repair at the aviation intermediate level is limited to replacement of items removed during disassembly. Repair beyond this level will be referred to depot maintenance activities.

7-44. Assembly. Tools and materials required for boresight controller assembly are listed in table 7-12.

Table 7-12. Tools and Materials Required for Assembly

Item No.	Tool/Material
1	Lacing and tying tape, Type I, Finish B
2	Solder, SN63W, Type RMA
3	Removal/Insertion Tool, MS27534-22D
4	Captive screw tool, Type H7503-10
5	Isopropyl alcohol
6	Methylethylketone
7	Able Bond 190-3

7-45. Captive Screws.

a. Using a hand installation tool (Deutch Fastener Corporation P/N H7503-10, FSN 5120-00-169-3003), install captive screws (12), figure 7-12).

Table 7-11. Repair Inspection Requirements

Item	Inspect for
External surfaces	Dents, scratches, corrosion, or other physical damage.
Electrical connectors	Bent, broken, disengaged or loose pins; broken, loose or deformed housings; damaged insulators, dirt and corrosion.
Cabling and flexible wiring	Broken wires, damaged insulation and sleeving, dirt and corrosion.
Attaching hardware	Damage, looseness, or absence.
Logic assembly	Charred or overheated surfaces; broken or otherwise damaged printed wiring; overheated or otherwise damaged parts; dirt and corrosion.
Electronic components	Overheated or otherwise damaged parts; bent, broken, or loose wires or terminals; dirt and corrosion.
Gasket	Cracks, breaks, or other physical damage.

b. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-46. Connector J1.

a. If removed during disassembly, crimp connector J1 (11, figure 7-12) pin contacts to previously tagged or otherwise identified wires of connector Jl, using crimping tool (Military Standard MS3198-1) and turret dye (Military Standard MS3198-8P).

b. From rear side of connector J1 (11), insert pin contacts with attached wires into connector Jl, using removal/insertion tool (Military Standard MS27534-22D); remove tag on each wire as each pin contact is inserted into connector Ji.

c. Install gasket (10) on connector J1 (11).

d. Place connector J1 (11) with gasket (10) attached, on its mounting surface and secure with four screws (9), flat washers (8), lock washers (7), and nuts (6).

e. Install connector cover (5) on connector J1 (11); install screw (4), flat washer (3), lock washer (2), and nut (1).

f. Replace spot ties noted and removed during disassembly.

g. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-47. Switch Assemblies S7 and S8.

a. Install inner panel seal (13, figure 7-11).

b. Insert switch housing (11) with switch assembly S7 (12) attached, through mounting hole on panel assembly (4, figure 7-6).

c. With mounting sleeve retainers (9, figure 7-11) in their unlatched position, place mounting sleeve (10) over switch housing (11).

d. Using a flat-tip screw driver or similar tool, adjust two sleeve retainer screws (8) as required to secure switch housing (11) with two sleeve retainers (9); ensure that mounting sleeve retainers engage behind mounting sleeve.

e. Connect and solder previously tagged or otherwise identified wires to terminals of switch housing (11) and switch assembly S7(12); remove tag as each wire is connected.

f. Align front end assembly (7) with switch housing (11) as shown in Step No. 3, figure 7-5.

g. While pushing inward on front end assembly (7, figure 7-11) slowly rotate actuating switch lens (14) clockwise until keyway is encountered; push front end assembly through keyway as shown in Step No. 2, figure 7-5.

h. Rotate actuating switch lens (14, figure 7-11) clockwise to an upright position as shown in Step No. 1, figure 7-5, then press inward until front end assembly (7, figure 7-11) snaps into place.

i. Replace switch assembly S8 (19) in accordance with method described in steps a thru h above.

j. Install panel assembly (4, figure 7-6) In accordance with paragraph 7-56 below.

7-48. Terminal Board TB1.

a. Place terminal board TB1 (18, figure 7-10), with terminal board connector J1 (17) attached, on its mounting surface and secure with three flat washers (7), one spacer

(8), flat washer (9), lock washer (10), screw (6), three flat washers (12), one spacer (13), loop clamp (14), flat washer (15), lock washer (16), and screw (11).

b. Connect and solder previously tagged or otherwise identified wires to terminal board TB1 (18); remove tag as each wire is connected.

c. Position logic assembly (5) as required to mate logic assembly connector P1 (4) with terminal board TB1 connector J1 (17); secure logic assembly with four spacers (3), flat washers (2), and screws (1).

7-49. Logic Assembly.

a. Position logic assembly (5, figure 7-10) as required to mate logic assembly connector P1 (4) with terminal board TB1 connector Jl (17); secure logic assembly with four spacers (3), flat washers (2), and screws (1).

b. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-50. Toggle Switch S5.

a. Install nut (6, figure 7-9), key washer (5), and panel seal (4) on toggle switch S5 (7).

b. Place toggle switch S5 (7) with nut (6), key washer (5), and panel seal (4) attached, on its mounting surface and secure with lock washer (3) and nut (2).

c. Connect previously tagged or otherwise identified wires to terminals of toggle switch S5 (7); remove tag as each wire is connected.

d. Install panel assembly (4, figure 7-6) in accordance with Paragraph 7-56 below.

7-51. Push Switches S4 and S6.

a. Install gasket (16, figure 7-9) on push switch S4 (17).

b. Place push switch S4 (17), with gasket (16) attached, on its mounting surface and secure with lock washer (15) and nut (14).

c. Secure insulated terminals (10 thru 13) with previously tagged or otherwise identified wires attached, to terminals on push switch S4 (17), using flat washer (9) and screw (8); remove tag as each insulated terminal with attached wire is connected.

d. Replace push switch S6 (1) in accordance with method described in steps a thru c above.

e. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-52. Insulated Terminals.

a. Crimp insulated terminal (10, figure 7-9) to previously tagged wires, using crimping tool (Military Standard MS90413); remove approximately 1/4 inch of insulation from end of wire prior to crimping insulated terminal to wire.

b. Connect insulated terminal (10) with previously tagged wires attached, to push switch S4 (17) with flat washer (9) and screw (8); remove each tag as each insulated terminal is connected.

c. Replace insulated terminal (11 thru 13) and insulated terminals attached to push switch S6 (1) in

accordance with method described in steps a and b above.

d. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-53. Rotary Switch S1 and S3.

a. Place rotary switch S1 (4, figure 7-8) on its mounting surface and secure with lock washer (3) and nut (2).

b. Install knob (1) and secure with setscrew in knob.

c. Connect previously tagged wires to terminals of rotary switch S1 (4); remove each tag as each wire is connected.

d. Replace spot ties noted and removed during disassembly.

e. Replace rotary switch S3 (5) in accordance with method described in steps a thru d above.

f. Install panel assembly (4, figure 7-6) in accordance with paragraph 7-56 below.

7-54. Pressure Relief Valve.

a. Place pressure relief valve (8, figure 7-6) on its mounting surface and secure with o-ring (7) and nut (6).

b. Install panel assembly (4) in accordance with paragraph 7-56 below.

7-55. Electromagnetic Gasket.

WARNING

Methylethylketone is injurious to health and is flammable. Use methylethylketone in ventilated work areas. Avoid breathing vapor and direct contact with eyes. Do not use near open flame, arcs, or sparks; do not take internally. Wear rubber gloves.

a. Clean electromagnetic gasket (5, figure 7-6) mounting surface with a soft bristle brush moistened with methylethylketone.

WARNING

Isopropyl alcohol is injurious ‘to health and is flammable. Use isopropyl alcohol only in ventilated work areas. Avoid breathing vapor and direct contact with eyes. Do not use near open flame, arcs, or sparks; do not take internally.

b. Remove methylethylketone from electromagnetic gasket (5) mounting surface with a lint-free cloth moistened with isopropyl alcohol; allow isopropyl alcohol to air dry.

c. Bond electromagnetic gasket (5) to its mounting surface using able bond 190-3; allow 96 hours (4 days) or more curing time.

d. Install panel assembly (4) in accordance with paragraph 7-56 below.

7-56. Panel Assembly.

a. Place panel assembly (4, figure 7-6) on its mounting surface and secure with ten captive screws (12 thru 21, figure 7-12).

b. Place cover (2, figure 7-6) on combination case (9) and secure four latch assemblies (1).

7-57. Fastener Assembly.

a. Place fastener assembly receptacle (7, figure 7-7) on its mounting surface and secure with nut (6).

b. Place fastener assembly stud (5) on its mounting surface and secure with fastener retainer (4).

c. Replace fastener assembly receptacles (9 and 11) and fastener assembly studs (8 and 10) in accordance with method described in steps a and b above.

d. Place electrical special purpose cable assembly W1 (3) inside cover (12), close inner lid (2) and secure-with three fastener" assembly studs (5, 8, and 10).

e. Place cover (2, figure 7-6) on combination case (9) and secure with four latch assemblies (1).

7-58. Neoprene Case Seal.

a. Apply liquid soap (detergent) to replacement neoprene case seal (1, figure 7-7).

b. Using fingertips, press neoprene case seal (1) into grooved surface in cover (12).

c. Place cover (2, figure 7-6) on combination case (9) and secure with four latch assemblies (l).

7-59. Functional Test. Perform functional test of the repaired boresight controller in accordance with checkout instructions given in paragraph 7-8.

Section V. TESTING PROCEDURES

Aviation intermediate maintenance testing procedures are accomplished by performing checkout procedures given in paragraph 7-10.

APPENDIX A

REFERENCES

A-1. Technical Manuals.

TM 9-1090-206-12	Aviation Unit Maintenance Manual for Armament Subsystem, Helicopter: 20-mm Automatic Gun: XM97E2
TM 9-1090-206-30	Aviation Intermediate Maintenance Manual for Armament Subsystem, Helicopter: 20-mm Automatic Gun: XM97E2
TM 9-1090-207-13&P	Aviation Unit and Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Stores Management
TM 9-1270-212-14&P	Operator, Organizational, Direct and General Support Maintenance Manual for M128 and M136 Helmet Sight Subsystem (HSS) (Including Depot Maintenance Repair Parts and Special Tools List)
TM 9-1270-218-13&P	Operator's, Aviation Unit and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Digital Fire Control Computer: XM22
TM 9-1270-219-13&P	Aviation Unit and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Air Data Subsystem: XM143
TM 9-1270-220-13&P	Aviation Unit and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Heads-Up Display Subsystem: XM76
TM 9-4931-375-13&P	Operator's, Aviation Unit, and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Fire Control Subsystem Test Set: XM141
TM 9-4933-211-14	Operator, Organizational, Direct Support, and General Support Maintenance Manual with Repair Parts and Special Tools List for Portable Hydraulfc/Electric Power Supply

A-2. Repair Parts and Special Tools List.

TM 9-1090-206-20P	Aviation Unit Maintenance Repair Parts and Special Tools List for Armament Subsystem, Helicopter; 20-mm Automatic Gun: XM97E2.
TM 9-1090-206-30P	Aviation Intermediate Maintenance Repair Parts and Special Tools List for Armament Subsystem, Helicopter; 20-mm Automatic Gun: XM97E2.

A-3. General Type Publications.

TM 9-207	Operation and Maintenance of Army Materiel in Extreme Cold Weather
FM-5-20	Camouflage, Basic Principles, and Field Camouflage
FM 21-40	Chemical, Biological and Nuclear Defense
TM 3-220	Chemical, Biological and Radiological (CBR) Decontamination
TM 9-213	Painting Instructions For Field Use.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment
TN 743-200-1	Storage and Materiel Handling
TM 750-244-1-5	Procedures for Destruction of Aircraft and Associated Equipment to Prevent Enemy Use
TM 750-244-2	Procedures for Destruction of Army Materiel to Prevent Enemy Use

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I: Introduction

B-1: appendix lists integral components of and basic issue items for the boresight controller to help you inventory items required for safe and efficient operation.

B-2: General. This components of end Item List is divided into the following sections:

a: Section II: Integral components of the end item. These items, when assembled comprise the boresight controller and must accompany it whenever it is transferred or trned in. the illustrations will help you identify these items:

b. Section III: Basic Issue Items. These are the minimum essential items required to place the boresight controller in operation, to operate it, and to perform emergency repairs: Although shipped separately packed they must accompany the boresight controller during operation and whenever it is transferred between accountable officers: The illustrations will assist you with hard-to identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item:

B-3. Explanation of columns.

a. Illustration. This colunn is divided as follows.

(1) Figure Number: Indicates the figure number of the ilustration on which the item is shown.

(2) Item NUmber. The number used to identify item called out in the illustration.

b. National Stock Number. Inidcates the National stock Number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventoy all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code. "USABLE ON" are included to help you indenty which components items are used on the different models, Identification of the codes used in these lists are:

EXAMPLE:

Code	Used On	
BAA	Model	114
BAB	Mdel	114A
BAG	MODEL	114B

g. Quantity Required (Qty reqd). This column lists the quantity of each item required for a complete major item:

h. Quantity. This column is left blank For use during an inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item at a later date; such as for shipment to another site.

(1) ILLUSTRATION (a) FIGURE NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) PART NO.	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY Rcv,D	DATE	DATE	DATE

Section II

INTEGRAL COMPONENTS OF END ITEM

Information to be supplied in subsequent changes to this manual.

Section III

BASIC ISSUE ITEMS

Information to be supplied in susequent changes to this manual.

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope. This appendix lists additional items you are authorized for the support of the boresight controller.

C-2. General. This list identifies items that do not have to accompany the boresight controller and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, OR JTA.

C-3. Explanation of Listing. National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER & FSCM / USABLE ON CODE	(3) U/M	(4) QTY AUTH
	Information to be supplied in subsequent changes to this manual.		

APPENDIX D

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

D-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in section 11 designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

D-2. Maintenance Functions

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test . To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, to replenish fuel, lubricants, hydraulic fluids , or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or testing measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services[1] or other maintenance actions[2] to restore serviceability to an

[1]services - inspect, test, service, adjust, align, calibrate or replace.

[2]Action - welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/ operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications . Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

D-3. Explanation of Columns in the MAC, Section II.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of comDonents, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions , see para. C-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate "work time" figure will be shown for each level. The number of manhours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

c . . . . . Operator or crew

o . . . . . .Aviation unit maintenance

F..Aviation intermediate maintenance

D . . . . . Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools. TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

D-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III.

a. Column 1, Reference Code. The tool and TMDE reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or TMDE .

e. Column 5, Tool Part Number. The manufacturer's part number.

D-5 . Explanation of Columns in Remarks, Section IV.

a. Reference Code. The code recorded in column 6, section II.

b. Remarks. This column lists information pertinent to the q aintenance function being performed as indicated in the MAC, section II.

Section 11

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS

Boresight Controller

(1) GROUP NUMBER	(2) COMPONENT/ASEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQUIPMENT	(6) REMARK:
00	Boresight-Controller	Inspect		.2			
		Test		.1			A
		Repair		.5		1,2,3,4	
01	Panel Assy	Inspect		.3			
		Test		.6		1,2	
		Repair		.5		3,4	
0101	Logic Assy	Inspect		.2			
		Test		.4		1	
		Replace		.4		3,4	
0102	Terminal Bd Assy	Inspect		.3			
		Test		.3		1/2	
		Replace		.3		3,4	
02	Cable	Inspect		.1			
		Test		.5		1	
		Replace		.1			
		Repair		.6		3,4	
03	Case	Inspect		.1			
		Service		.2		3,4	B

Section III. Tool and Test Equipment Requirements

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	F	Multimeter	6625-00-999-7465	AN/USN-223
2	F	Power Supply 28VDC Distribution Panel	6130-00-542-6385 4933-00-916-9582	PP1104 B538C60REVA (12007200)
3	F	Tool Set, Aircraft Armament Repairman (Basic)	4933-00-987-9816	SC 4933-95-CL-A13
4	F	Tool Set, Aircraft Armament Repairman (Supplemental)	4933-00-994-9242	SC 4933-95-CL-A14
5	F	Digital Voltmeter	1430-00-366-8753	8125A
6	F	Removal/Insertion Tool		MS27534-22D

Section IV. Remarks

Reference Code	Remarks/Notes
A	Test indicates self-test of test set prior to use.
B	Service is limited to preventive maintenance as stated in narrative.

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST
(INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS)

Section 1. INTRODUCTION

E-1. Scope.

This appendix lists spares and repair parts; special tools; special test , measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of operator's, aviation unit, and aviation intermediate maintenance of the boresight controller. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

E-2. General.

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List . A list of spares and repair parts authorized for use in the performance of maintenance . The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in numeric sequence, with the parts in each group listed in figure and item number sequence . Bulk materials are listed in NSN sequence.

b. Section III. Special Tools List . A list of special tools , special TMDE , and other special support equipment authorized for the performance of maintenance.

c. Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbers (NSN) appearing in the listings, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. This index is followed by a cross-reference list of reference designators to figure and item numbers.

E-3. Explanation of Columns.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. Source , Maintenance, 'and Recoverability (SMR) Codes.

(1) Source Code. Source codes indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	- Item procured and stocked for anticipated or known usage .
PB	- Item procured and stocked for insurance purpose because essentiality dictates that a minimmn quantity be available in the supply system.
PC	- Item procured and stocked and which otherwise would be coded PA except that it

Code	Definition
	is deteriorative in nature.
PD	- Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment .
PE	- Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF	- Support equipment which will not be stocked but which will be centrally procured on demand.
PG	- Item procured and stocked to provide for sustained support for the life of the equipment . It is applied to an item peculiar to the equipment which , because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	- An item of a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at a time of overhaul or repair.
KF	- An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at aviation unit or aviation intermediate levels of maintenance.
KB	- Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	- Item to be manufactured or fabricated at aviation unit level
MF	- Item to be manufactured or fabricated at the aviation intermediate maintenance level.
MD	- Item to be manufactured or fabricated at the depot maintenance level.
AO	- Item to be assembled at aviation unit level.
AF	- Item to be assembled at aviation intermediate maintenance level.
AD	- Item to be assembled at depot maintenance level.
XA	- Item is not procured or stocked because the *requirements* for the item will result in the replacement of the next higher assembly.
XB	- Item is not procured or stocked. If not available through salvage, requisition.
XC	- Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	- A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any items coded above *except* those coded XA and aircraft support items as restricted by AR 700-42.

(2) Maintenance Code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	Application/Explanation
C	- Crew or operator maintenance performed within aviation unit maintenance.
O	- Support item is removed, replaced, used at the aviation unit level.
F	- Support item is removed, replaced, used at the aviation intermediate level.
D	- Support items that are removed, replaced, used at depot, mobile depot, or specialized repair activity only.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	- The lowest maintenance level capable of complete repair of the support item is the aviation unit level.
F	- The lowest maintenance level capable of complete repair of the support item is the aviation intermediate level.
D	- The lowest maintenance level capable of complete repair of the support item is the depot level.
L	- Repair restricted to (enter applicable designated specialized repair activity). Specialized Repair Activity.
Z	- Nonreparable. No repair is authorized.
B	- No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

(3) Recoverability Code. Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability Code	Definition
Z	- Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
O	- Reparable item. When uneconomically reparable, condemn and dispose at aviation unit level.
F	- Reparable item. When uneconomically reparable, condemn and dispose at the aviation intermediate level.
D	- Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	- Reparable item. Repair, condemnation, and disposal

Recoverability Code	Definition
	not authorized below depot/specialized repair activity level.
A	- Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions .

c. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

d. Part Number. Indicates the primary number used by the manufacturer (Individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the item received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in H4-1 which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the item. Items that are included in kits and sets are listed below the name of the kit or set with the quantity of each item in the kit or set indicated in the quantity incorporated in unit column. When the part to be used differs between serial numbers of the same model, the effective serial numbers are shown as the last line of the description. In the Special Tools List, the initial basis of issue (BOI) appears as the last line in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased accordingly.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable, (e.g., shims, spacers, etc.).

E-4. Special Information.

a. Detailed manufacturing instructions for items source coded to be manufactured or fabricated are found in TM 9-4931-376-13&P.

b. Detailed assembly instructions for items source coded to be assembled are found in TM-9-4931-376-13&P. Assembly components are listed immediately following the item to be assembled.

E-5. How to Locate Repair Parts.

a. When National Stock Number of Part Number is Unknown:

(1) First. Using the table of contents, determine the functional group subgroup within which the item belongs. This is necessary since illustrations are prepared for functional groups or subgroups, and listings are divided into the same groups.

(2) Second. Find the illustration covering the functional group or subgroup to which the item belongs.

(3) Third. Identify the item on the illustration and note the illustration figure and item number of the item.

(4) Fourth. Using the Repair Parts Listing, find the figure and item number noted on the illustration.

b. When National Stock Number of Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number. This index is in NIIN sequence followed by a list of part numbers in alphameric sequence, cross-referenced to the illustration figure number and item number.

(2) Second. After finding the figure and item number, locate the figure and item number, in the repair parts list.

Section II. REPAIR PARTS LIST

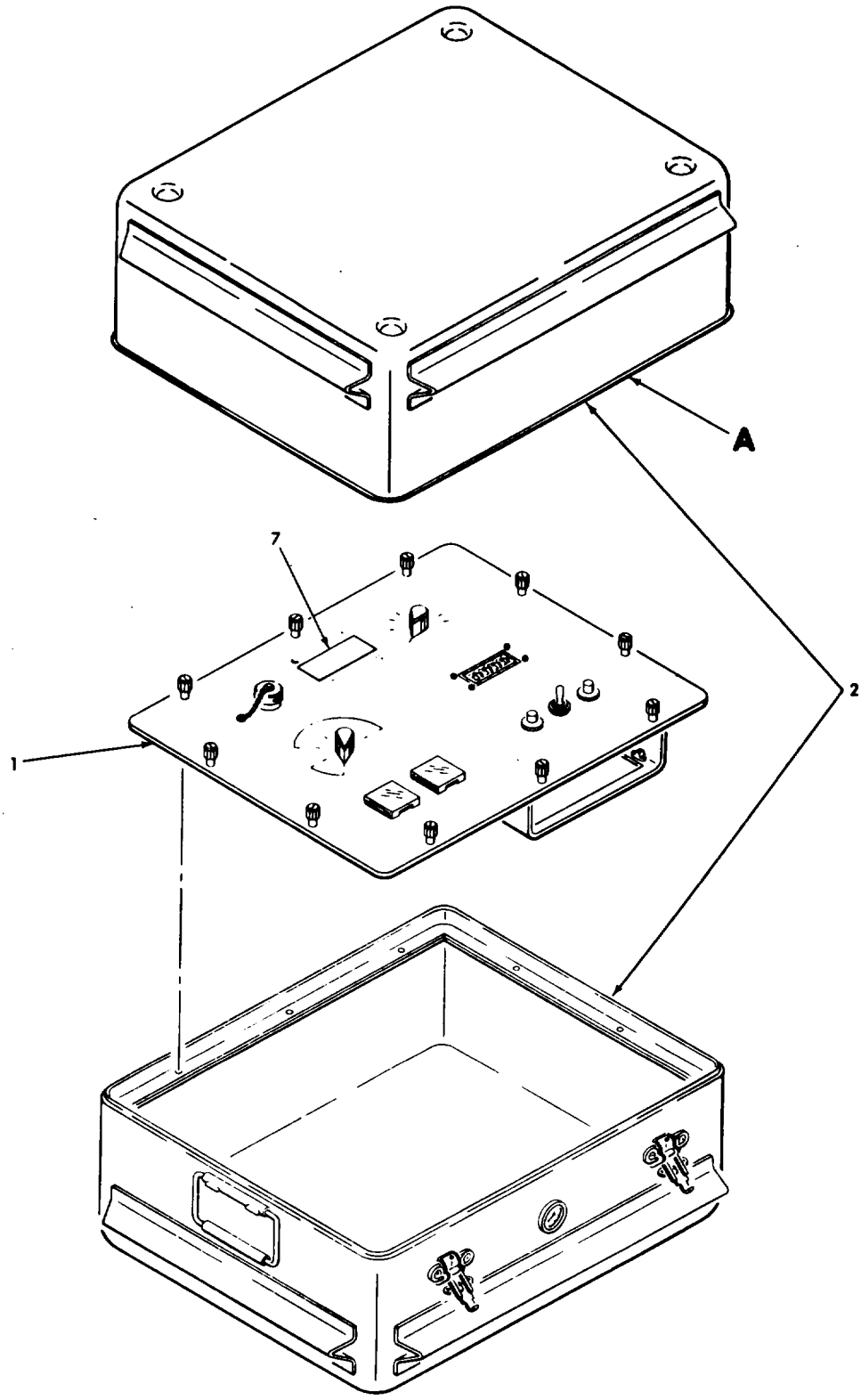


Figure E-1. Boresight Controller XM34 (Sheet 1 of 2)

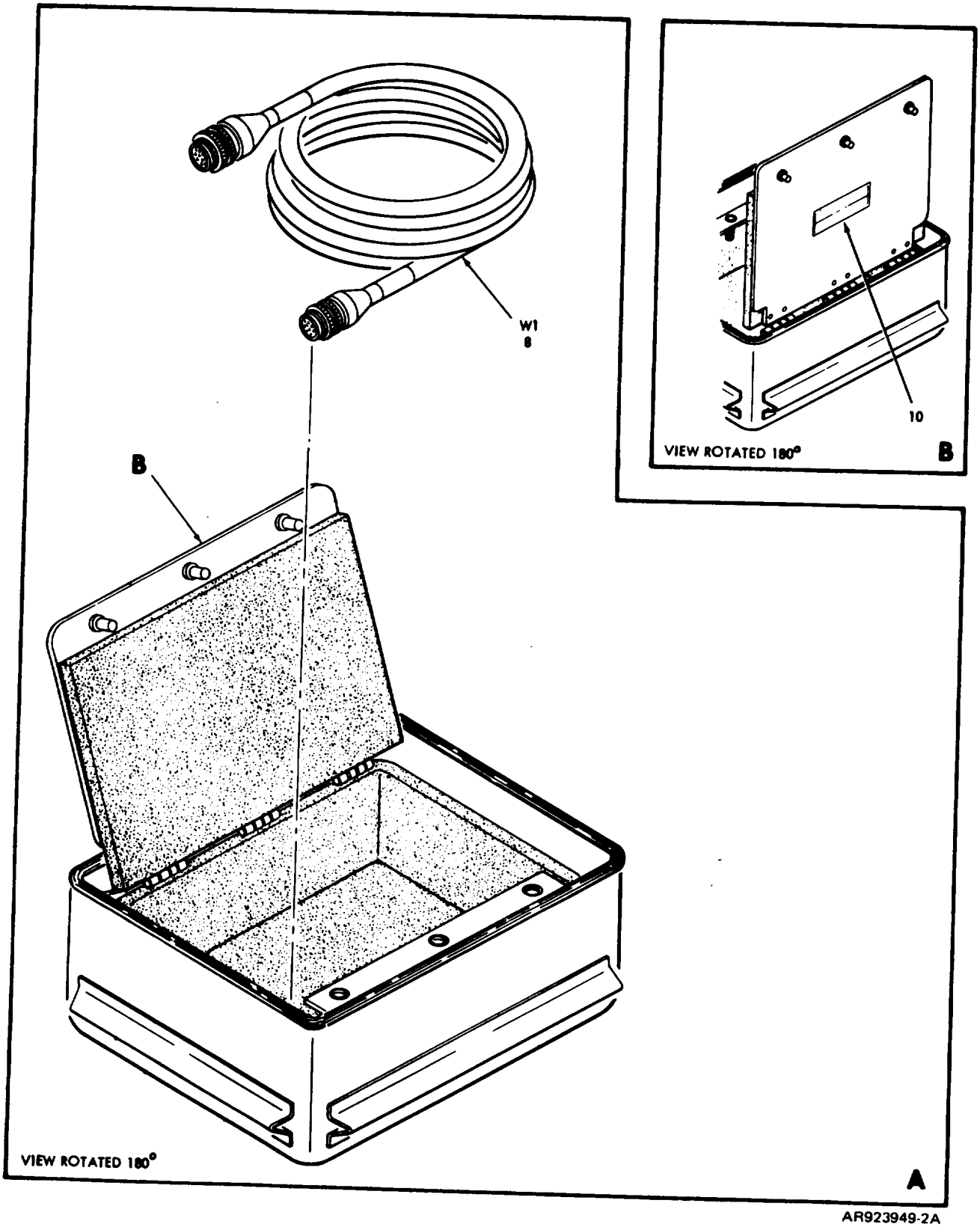


Figure E-1. Boresight Controller XM34 (Sheet 2 of 2)

(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 00 BORESIGHT CONTROLLER XM34			
						PART NUMBER 8680400-505			
E-1	1	PBFDD	4931-01-096-4450	8680402-505	17863	PANEL ASSEMBLY		EA	1
E-1	2	PADDD	4931-01-082-1559	7117894-1	17863	CASE, COMBINATION		EA	1
E-1	7	MDDZZ		868000-3	17863	NAMEPLATE		EA	1
E-1	8	PAODD	4931-01-082-1570	8680403-501	17863	CABLE ASSEMBLY		EA	1
E-1	10	MDDZZ		8680419-1	17863	PLATES, INFORMATION		EA	1

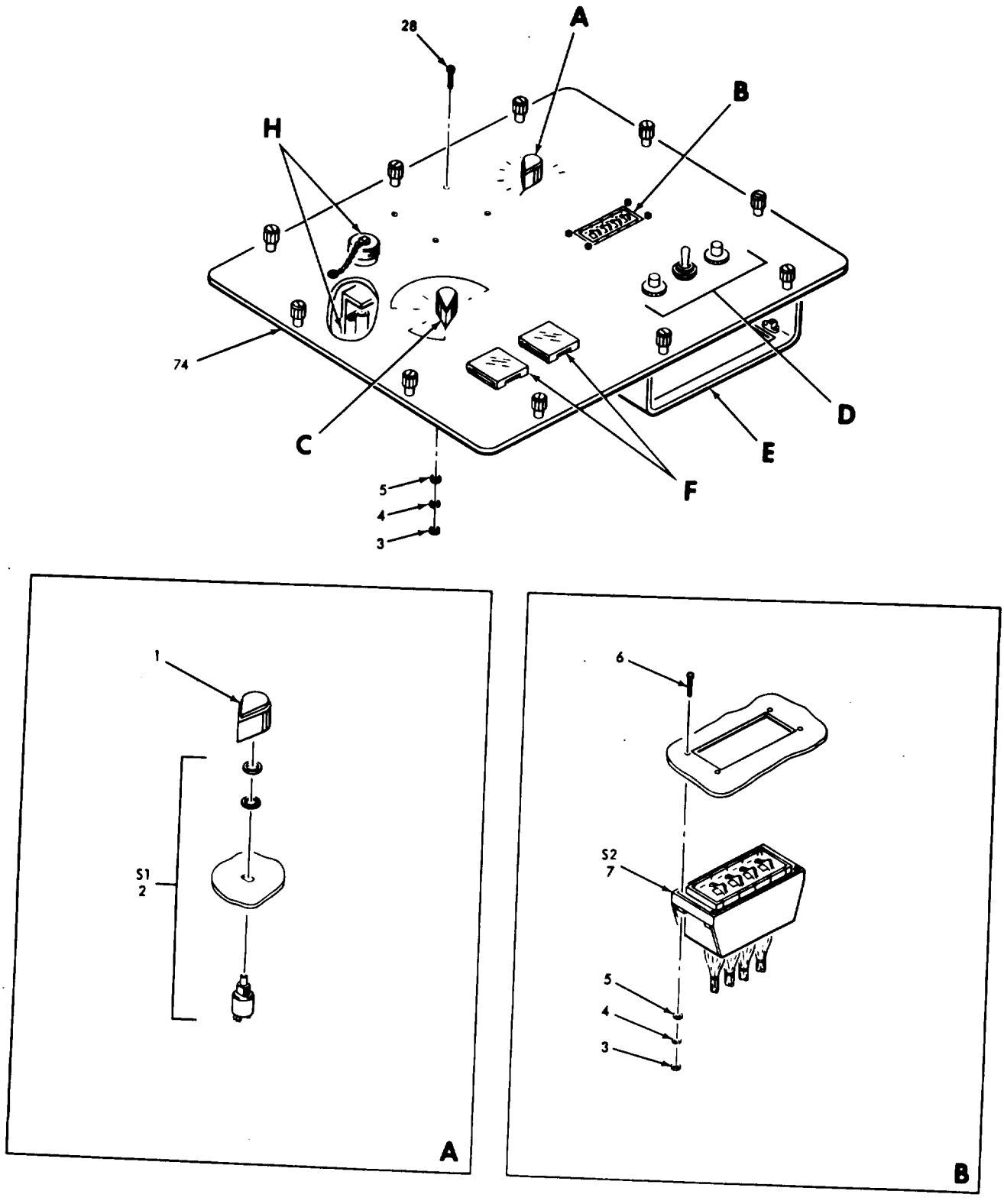
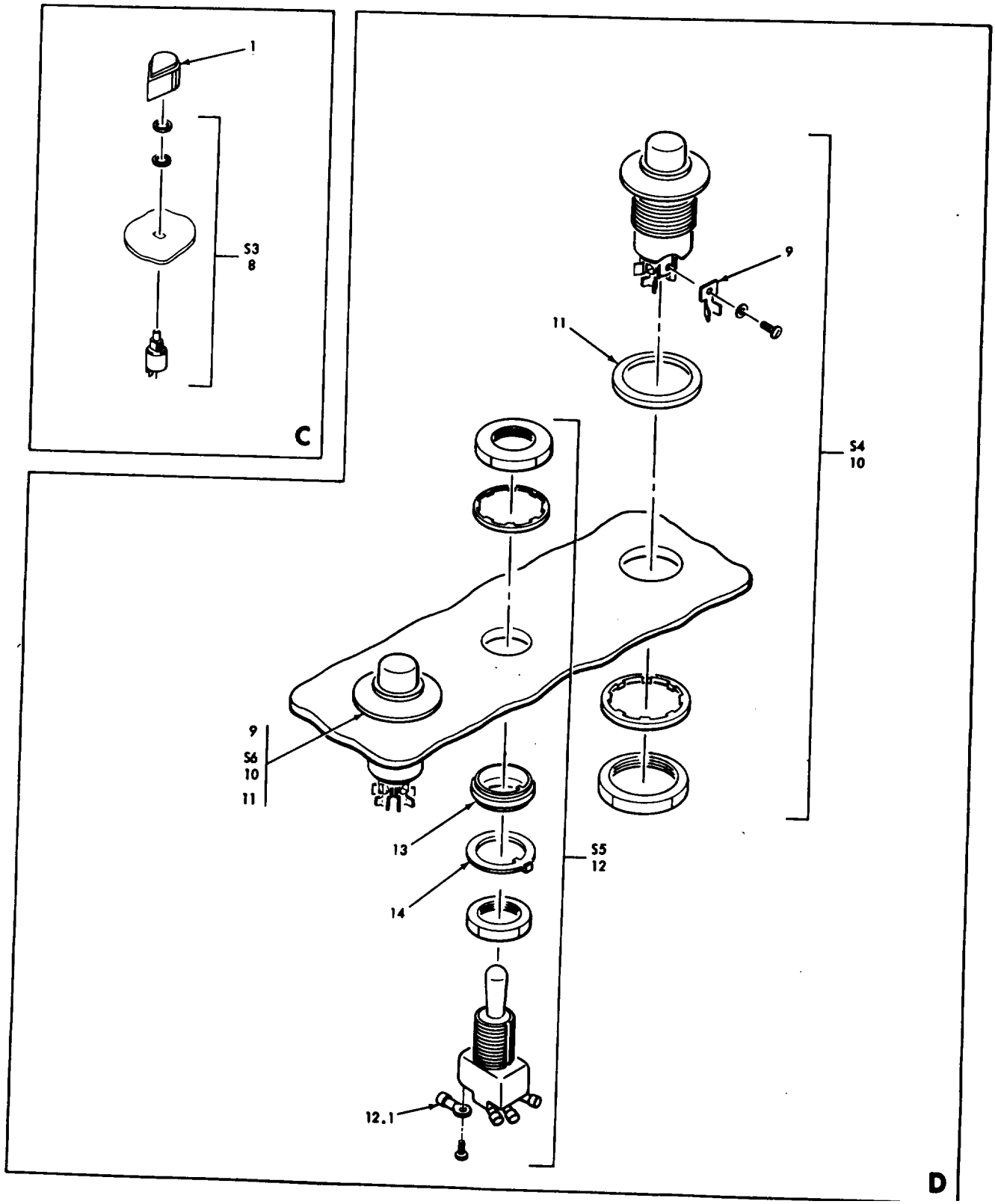
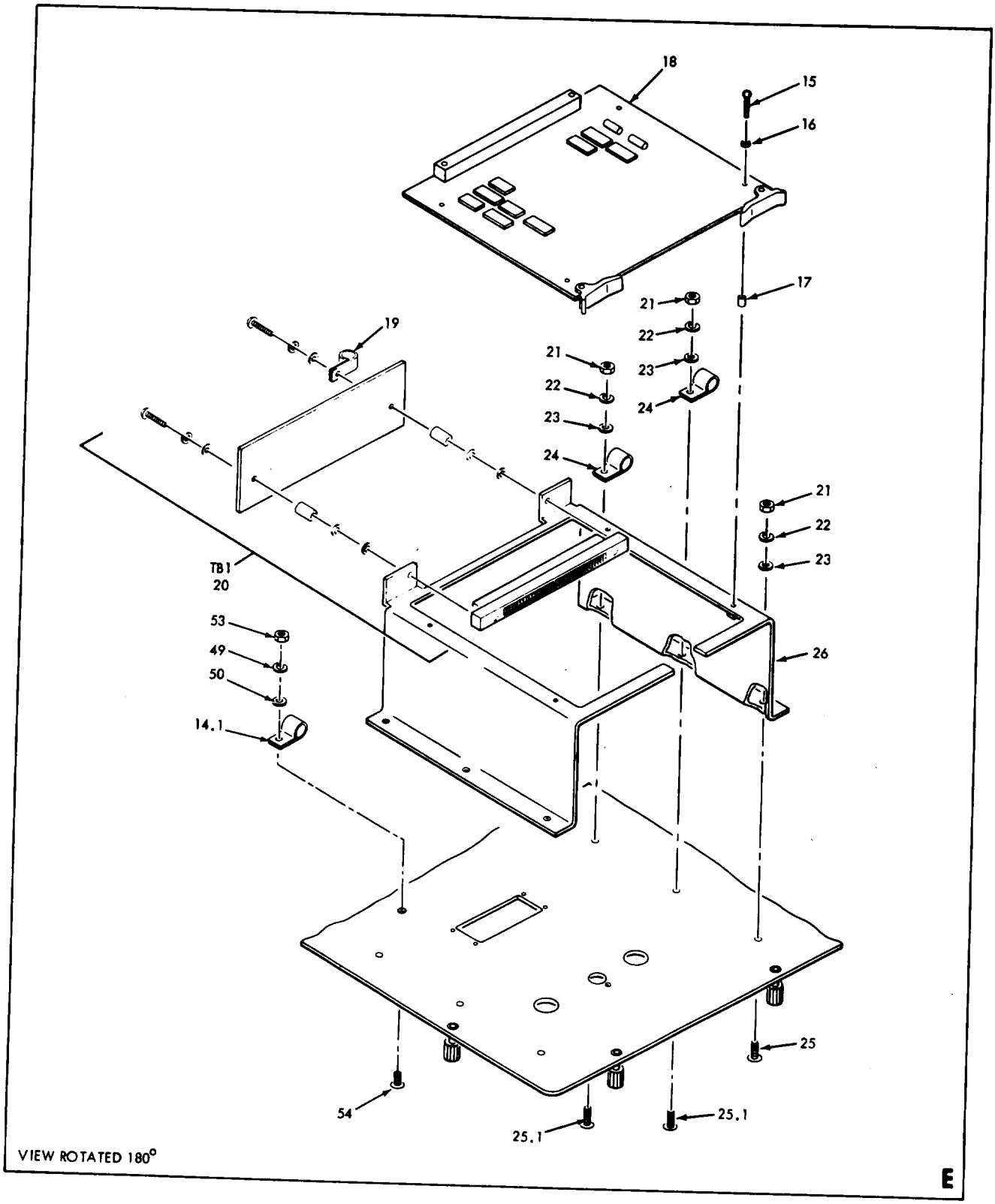


Figure E-2. Panel Assembly (Sheet 1 of 6)



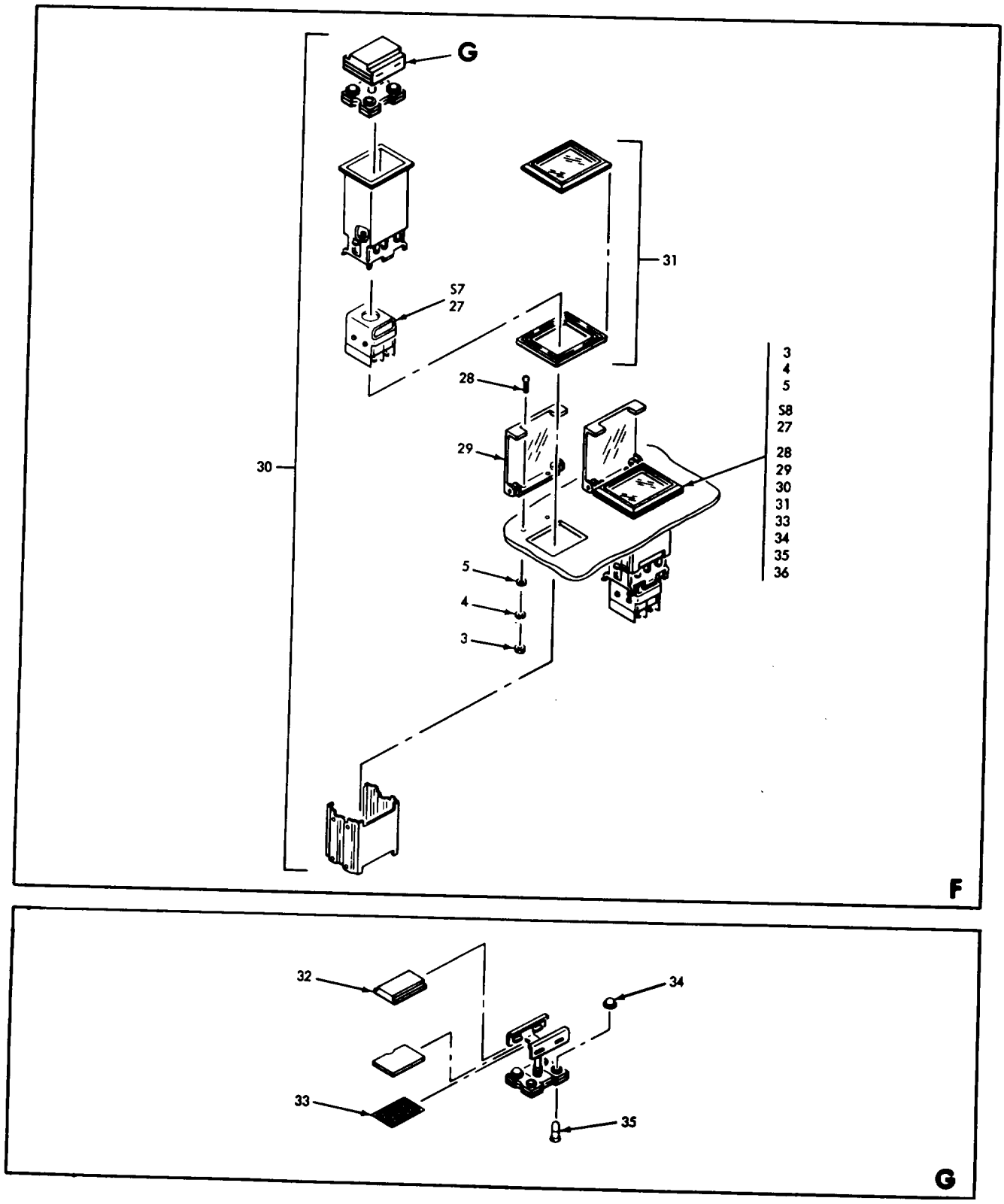
AR923950-2A

Figure E-2. Panel Assembly (Sheet 2 of 6)



AR923950-3A

Figure E-2. Panel Assembly (Sheet 3 of 6)



AR923950-4

Figure E-2. Panel Assembly (Sheet 4 of 6)

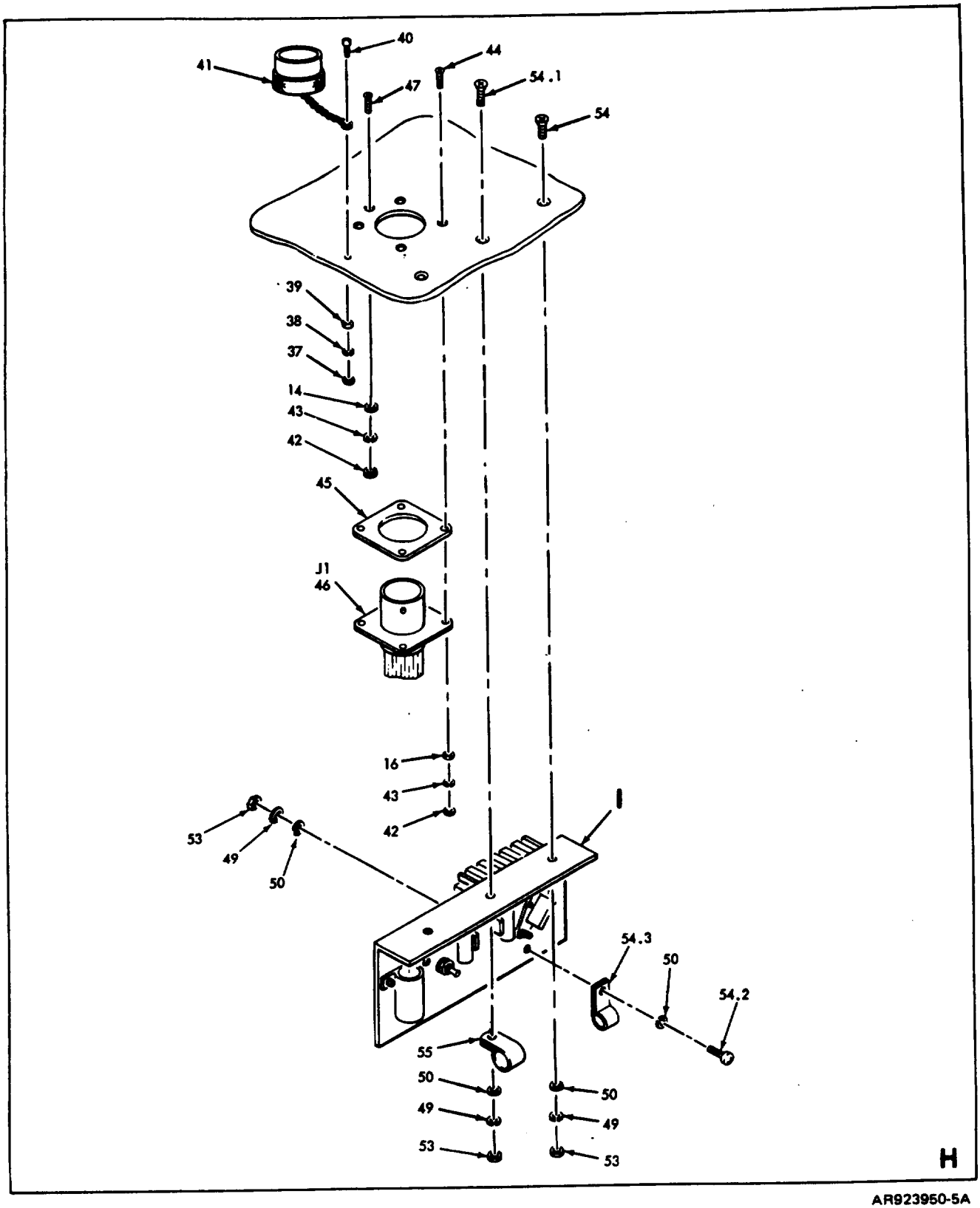
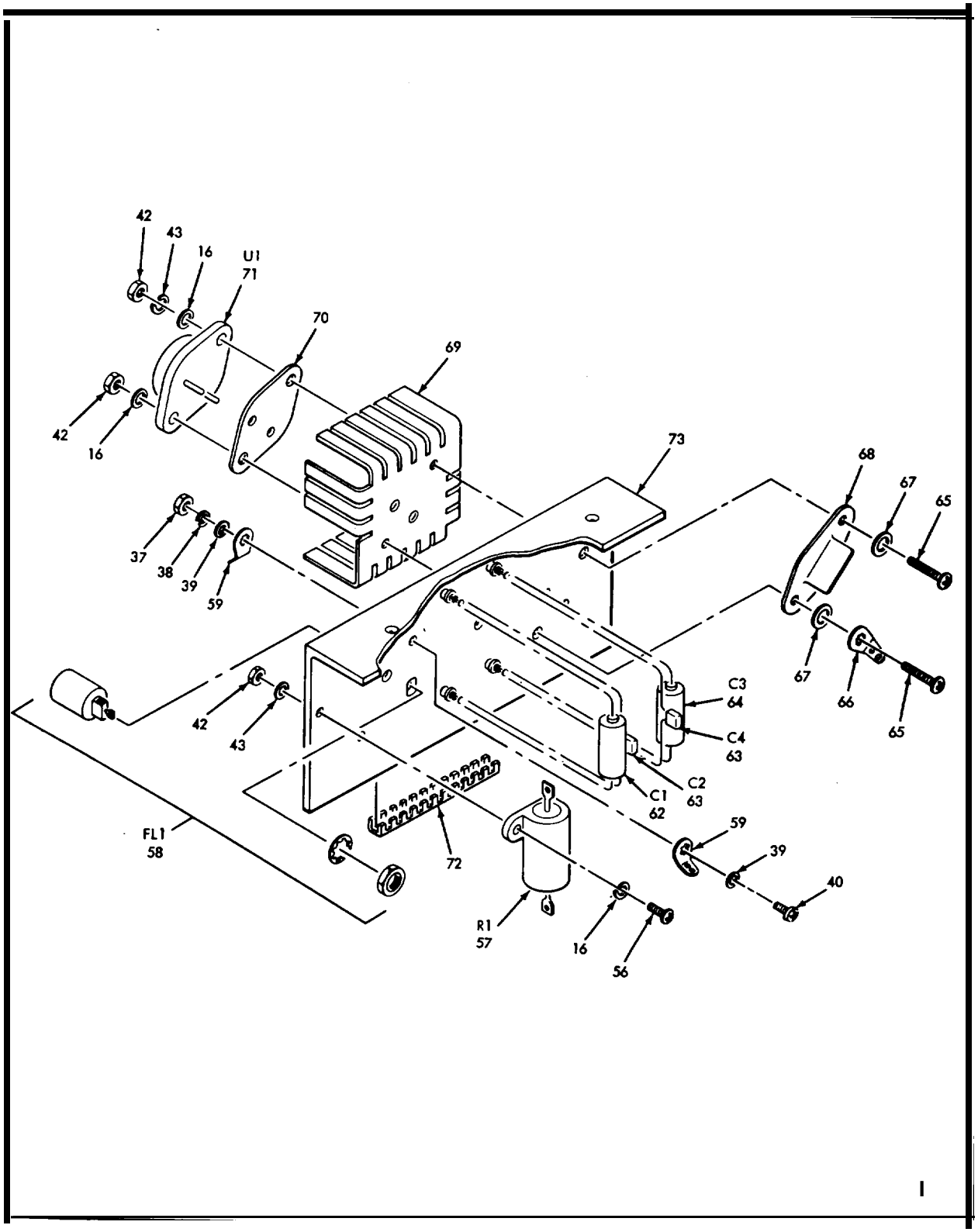


Figure E-2. Panel Assembly (Sheet 5 of 6)

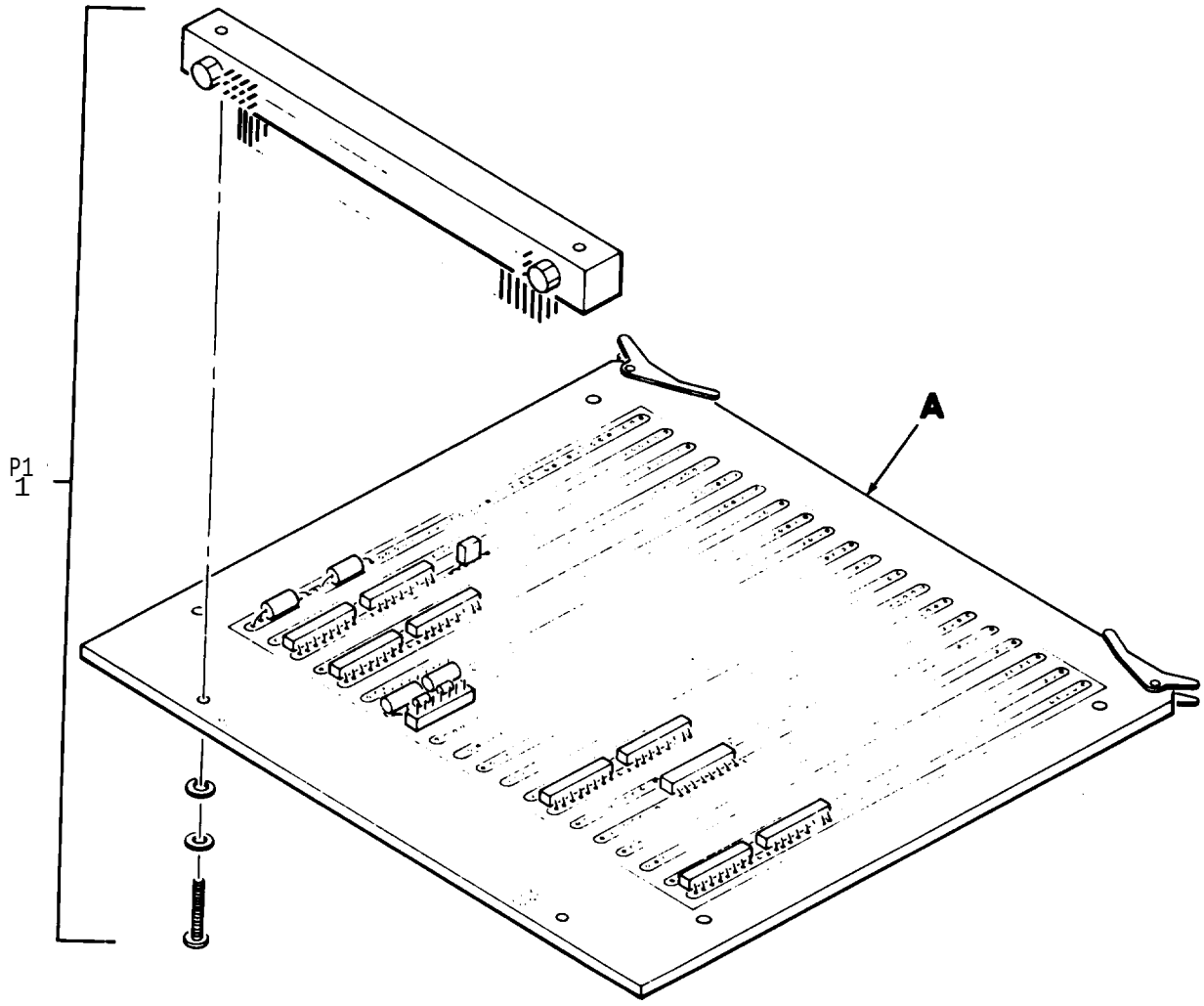


AR923950-6A

Figure E-2. Panel Assembly (Sheet 6 of 6)

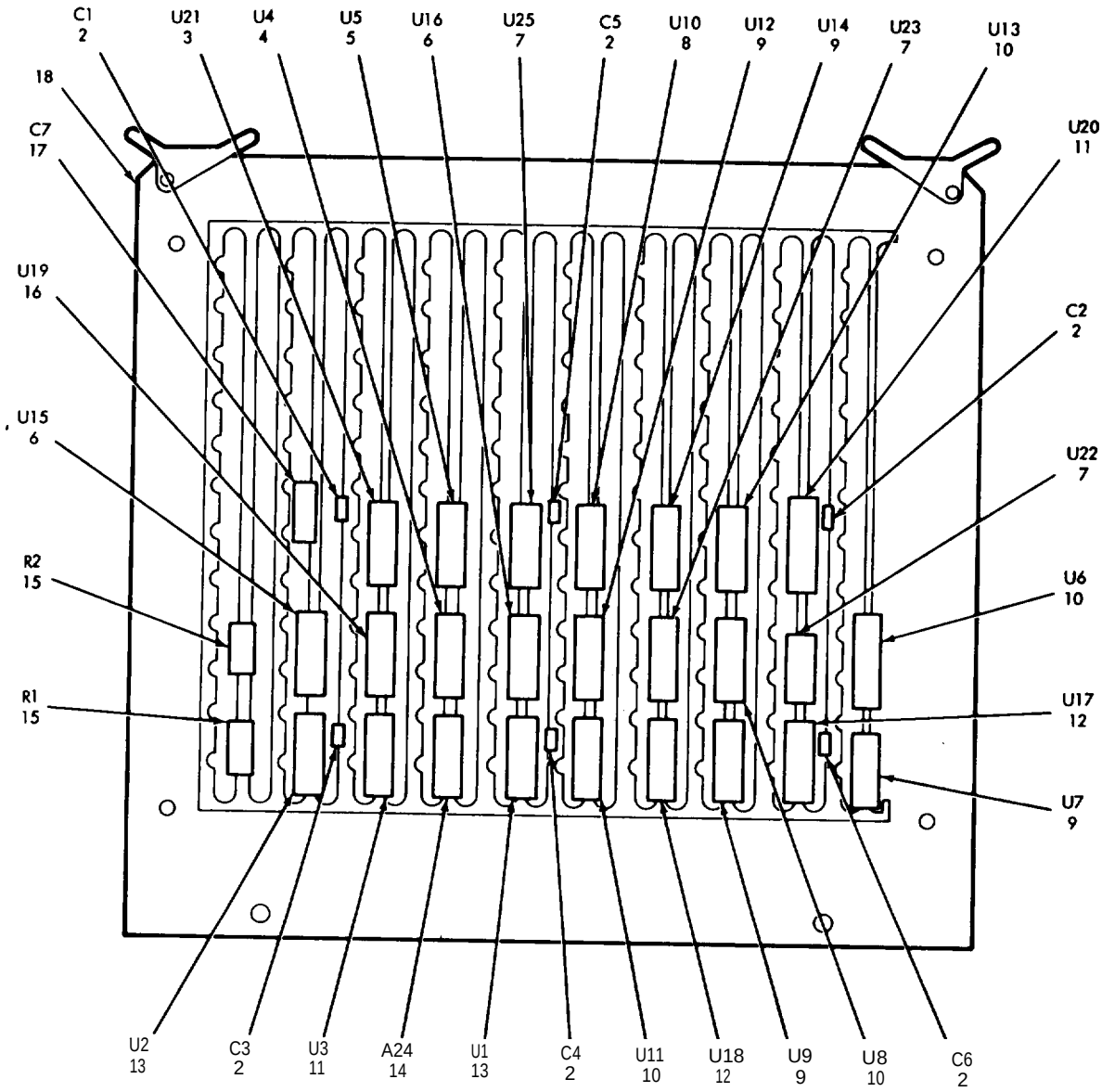
(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 01 PANEL ASSEMBLY		
						PART NUMBER 8680402-505		
E-2	1	PAFZZ		MS91528-2T38	96906	KNOB	EA	2
E-2	2	PAFZZ		M3786/20-092	81349	SWITCH,ROTARY	EA	1
E-2	3	PAFZZ	5310-00-938-2013	MS35649-224	96906	NUT,PLAIN,HEXAGON	EA	8
E-2	4	PAFZZ	5310-00-928-2690	MS35338-134	96906	WASHER,LOCK	EA	8
E-2	5	PAFZZ	5310-00-043-4708	NAS620C2	80205	WASHER,FLAT	EA	8
E-2	6	PAFZZ	5305-00-054-5640	MS51957-6	96906	SCREW,MACHINE	EA	4
E-2	7	PAFZZ	5930-01-085-6975	7117992-1	17863	SWITCH,ROTARY	EA	1
E-2	8	PAFZZ		M3786/20-047	81349	SWITCH,ROTARY	EA	1
E-2	9	PAFZZ	5940-00-723-4929	M7928/1-6	81349	TERMINAL,LUG	EA	8
E-2	10	PAFZZ		7117891-1	17863	SWITCH,PUSH	EA	2
E-2	11	PAFZZ	5330-01-074-4347	7117893-1	17863	GASKET	EA	2
E-2	12	PAFZZ	5930-00-488-4691	MS27407-6	96906	SWITCH, TOGGLE	EA	1
E-2	12.1	PADZZ	5940-00-577-3807	MS25036-145	96906	TERMINAL,LUG	EA	6
E-2	13	PAFZZ	5330-00-806-B769	MS25196-1	96906	PACKING WITH	EA	1
E-2	14	PAFZZ	5310-00-924-5968	MS25081-4	96906	WASHER,KEY	EA	1
E-2	14.1	PADZZ	5340-00-964-2555	NAS1397P6N	80205	CLAMP,LOOP	EA	1
E-2	15	PAFZZ	5305-00-054-5656	MS51957-22	96906	SCREW,MACHINE	EA	4
E-2	16	PAFZZ	5310-00-057-0573	NAS620C4	80205	WASHER,FLAT	EA	13
E-2	17	PAFZZ	5365-00-632-3102	NAS43DD0-52	80205	SPACER, SLEEVE	EA	4
E-2	18	PAFDD	1270-01-074-4806	8680413-503	17863	CIRCUIT CARD	EA	1
E-2	19	PAFZZ	5340-00-686-1302	NAS1397P7N	80205	CLAMP,LOOP	EA	1
E-2	20	PAFDD	5940-01-075-1886	8680407-501	17863	TERMINAL BOARD	EA	1
E-2	21	PAFZZ		MS35649-304	96906	NUT,PLAIN,HEXAGON	EA	6
E-2	22	PAFZZ	5310-00-933-B120	MS35338-138	96906	WASHER, LOCK	EA	6
E-2	23	PAFZZ	5310-00-781-9483	NAS620-C10L	80205	WASHER,FLAT	EA	6
E-2	24	PAFZZ	5340-00-998-0611	MS25281F3	96906	CLAMP,LOOP	EA	2
E-2	25	PAFZZ	5305-00-781-5664	MS24693C271	96906	SCREW,MACHINE	EA	4
E-2	25.1	PADZZ	5305-00-959-4158	MS24693C273	96906	SCREW,MACHINE	EA	2
E-2	26	PADDD	1270-01-076-2414	8680411-501	17863	BRACKET,BORESIGHT	EA	1
E-2	27	PAFZZ	5930-00-948-8962	M22885/11-01	81349	SWITCH ASSEMBLY	EA	2
E-2	28	PAFZZ	5305-00-054-5638	MS51957-4	96906	SCREW,MACHINE	EA	8
E-2	29	PAFZZ	4931-01-096-4472	7117993-1	17863	GUARD,SWITCH	EA	2
E-2	30	PAFZZ	5930-00-433-5445	M22885/9-01	81349	SWITCH, PUSH-LIGHT	EA	2
E-2	31	PAFZZ	5930-00-409-5597	M22885/13-02	81349	PANEL SEAL	EA	2
E-2	32	PAFZZ	6210-01-074-4373	7117916-11	17863	LENS,SWITCH	EA	1

(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 01 PANEL ASSEMBLY			
						PART NUMBER 8680402-505			
						CONTINUED			
E-2	33	PAFZZ		7117928-1	17863	SCREEN,FULL		EA	2
E-2	34	PAFZZ	5930-00-728-6250	M22885-12-04	81349	CAP,COLOR FILTER		EA	2
E-2	35	PAFZZ	6240-00-763-7744	MS25237-387	96906	LAMP,INCANDESCENT		EA	2
E-2	36	PAFZZ	6210-01-074-4372	7117916-10	17863	LENS,SWITCH		EA	1
E-2	37	PAFZZ	5310-00-934-9761	MS35649-264	96906	NUT,PLAIN,HEXAGON		EA	2
E-2	38	PAFZZ	5310-00-929-6395	MS35338-136	96906	WASHER,LOCK		EA	2
E-2	39	PAFZZ	5310-00-773-7624	NAS620C6	80205	WASHER,FLAT		EA	3
E-2	40	PAFZZ	5305-00-054-6652	MS51957-28	96906	SCREW,MACHINE		EA	2
E-2	41	PAFZZ	5935-01-006-8345	MS27502A19C	96906	COVER,ELECTRICAL		EA	1
E-2	42	PAFZZ	5310-00-934-9748	MS35649-244	96906	NUT,PLAIN,HEXAGON		EA	9
E-2	43	PAFZZ	5310-00-933-8118	MS35338-135	96906	WASHER,LOCK		EA	8
E-2	44	PAFZZ	5305-00-068-6605	MS24693C6	96906	SCREW,MACHINE		EA	4
E-2	45	PAFZZ		7118919-8	17863	GASKET		EA	1
E-2	46	PAFZZ		MS27656T19A35P	96906	CONNECTOR		EA	1
E-2	47	PAFZZ	5305-00-957-2383	MS2469383	96906	SCREW,MACHINE		EA	1
E-2	48	PAFZZ	5310-00-933-8119	MS35338-137	96906	WASHER,LOCK		EA	5
E-2	50	PAFZZ	5310-00-069-5291	NAS620CB	80205	WASHER,FLAT		EA	5
E-2	51	PAFZZ	5310-00-934-9759	MS35649-284	96906	NUT,PLAIN,HEXAGON		EA	4
E-2	54	PAFZZ	5305-00-079-5835	MS24693C50	96906	SCREW,MACHINE		EA	3
E-2	54.1	PADZZ	5305-00-088-9666	MS24693C51	96906	SCREW,MACHINE		EA	1
E-2	54.2	PADZZ	5305-00-054-6671	MS51957-46	96906	SCREW,MACHINE		EA	1
E-2	54.3	PADZZ	5340-00-782-8737	NAS1397P4N	80205	CLAMP,LOOP		EA	1
E-2	55	PAFZZ	5340-00-988-6735	NAS1397P5N	80205	CLAMP,LOOP		EA	1
E-2	56	PAFZZ	5305-00-054-5649	MS51957-15	96906	SCREW,MACHINE		EA	2
E-2	57	PADZZ		RH25Q15R0	81349	RESISTOR		EA	1
E-2	58	PADZZ	5915-01-056-3277	M15733/23-0060	81349	FILTER,RADIO		EA	1
E-2	59	PAFZZ	5940-00-827-2653	MS77068-2	96906	TERMINAL,LUG		EA	2
E-2	62	PADZZ		M39003/01-2861	81349	CAPACITOR,FIXED		EA	1
E-2	63	PADZZ	5910-00-010-B717	M39014-01-1593	81349	CAPACITOR,FIXED		EA	1
E-2	64	PADZZ	5910-00-018-1585	M39003-01-2997	81349	CAPACITOR,FIXED		EA	1
E-2	65	PAFZZ	5305-00-054-5652	MS51957-18	96906	SCREW,MACHINE		EA	2
E-2	66	PAFZZ	5940-00-682-2477	MS77068-1	96906	TERMINAL,LUG		EA	1
E-2	67	PAFZZ	5310-00-782-1349	MS15795-804	96906	WASHER,FLAT		EA	2
E-2	68	PADZZ		7117419-1	17863	TRANSISTOR MOUNT		EA	1
E-2	69	PAFZZ	5999-01-074-4409	7117999-2	17863	HEAT SINK		EA	1
E-2	70	PAFZZ	5999-01-074-4410	7117337-1	17863	HEAT SINK		EA	1
E-2	71	PADZZ		M38510/10706BYX	81349	MICROCIRCUIT		EA	1
E-2	72	PAFZZ	5325-00-926-1394	MS21266-3N	96906	GROMMET,NONMETALLIC		EA	1
E-2	73	PADZZ	5340-01-075-8989	8680408-501	17863	BRACKET,ANGLE		EA	1
E-2	74	XADDD		8680410-503	17863	PANEL SUBASSEMBLY		EA	1



AR923951-1

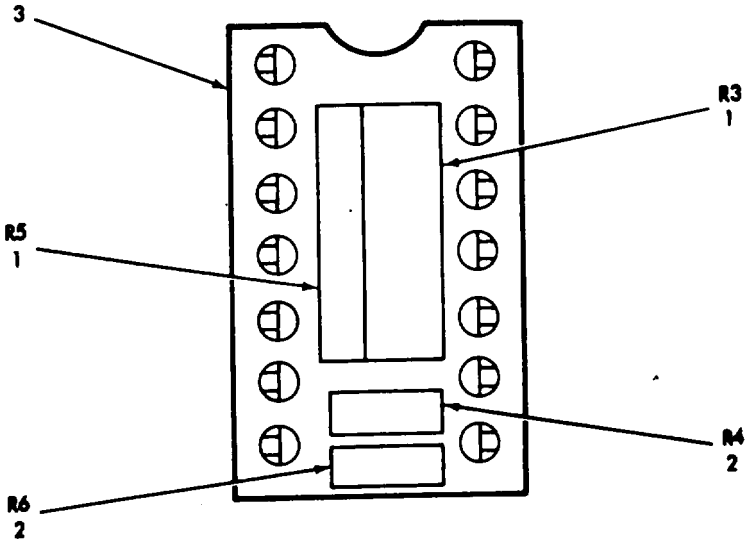
FIGURE E-3. Logic Assembly (Sheet 1 of 2)



AR923951-2

Figure E-3. Logic Assembly (Sheet 2 of 2)

(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0101 LOGIC ASSEMBLY			
						PART NUMBER 8680413-503			
E-3	1	PADZZ	5935-01-076-8049	7117890-2	17863	CONNECTOR,PLUG		EA	1
E-3	2	PADZZ	5910-00-010-8717	M39014-01-1593	81349	CAPACITOR,FIXED		EA	6
E-3	3	PADZZ	5961-01-074-9721	7117970-1	17863	SEMICONDUCTOR		EA	1
E-3	4	PADZZ	5962-01-027-6863	M38510/30003BCB	81349	MICROCIRCUIT		EA	1
E-3	5	PADZZ	5962-00-331-9837	M38510/00109BCB	81349	MICROCIRCUIT		EA	1
E-3	6	PADZZ		M8340102M4701JS	81349	RESISTOR NETWORK		EA	2
E-3	7	PADZZ	5961-01-074-4369	7117974-1	17863	SEMICONDUCTOR		EA	3
E-3	8	PADZZ	5962-01-061-6583	M38510/31302BCB	81349	MICROCIRCUIT		EA	1
E-3	9	PADZZ	5962-00-024-0653	M38510/00302BCB	81349	MICROCIRCUIT		EA	4
E-3	10	PADZZ	5962-01-059-0583	M38510/30904BEB	81349	MICROCIRCUIT		EA	4
E-3	11	PADZZ	5962-01-026-2494	M38510/01504BEB	81349	MICROCIRCUIT		EA	2
E-3	12	PADZZ		M340102M6BR0JA	81349	RESISTOR NETWORK		EA	2
E-3	13	PADZZ	5962-01-076-1667	7117957-1	17863	MICROCIRCUIT		EA	2
E-3	14	PAFDD	1270-01-076-2413	B6B0430-501	17863	ADAPTER ASSEMBLY		EA	1
E-3	15	PADZZ	5905-00-106-9344	RCR20G101JS	81349	RESISTOR,FIXED		EA	2
E-3	16	PADZZ	5905-01-051-1744	M8340102M1001JS	81349	RESISTOR NETWORK		EA	1
E-3	17	PADZZ	5910-00-439-0475	M39003-01-2764	81349	CAPACITOR,FIXED		EA	1
E-3	18	XADZZ		7117878-1	17863	PRINTED WIRING BOARD		EA	1



NOTE: REFERENCE DESIGNATIONS ARE ABBREVIATED.
PREFIX DESIGNATIONS WITH A24.

AR923969

Figure E-4. Terminal Board

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 010101 TERMINAL BOARD		
						PART NUMBER 8680430-501		
E-4	1	PADZZ	5905-00-240-2751	RLR20C22000R	81349	RESISTOR, FIXED.....	EA	2
E-4	2	PADZZ	5905-00-006-6978	RLR05C33C00R	81349	RESISTOR, FIXED.....	EA	2
E-4	3	XADZZ		614-C01	91504	ADAPTER.....	EA	1

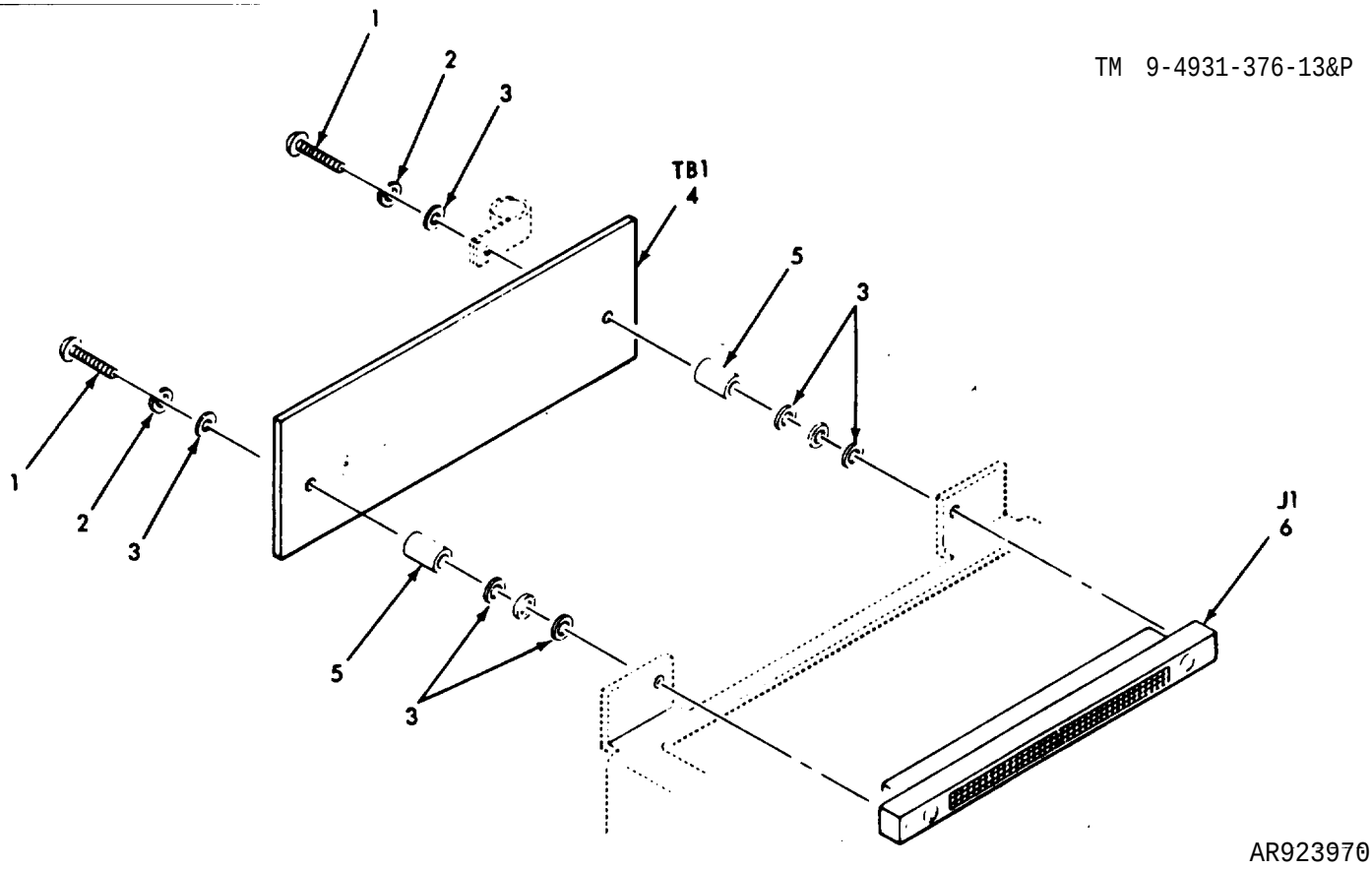
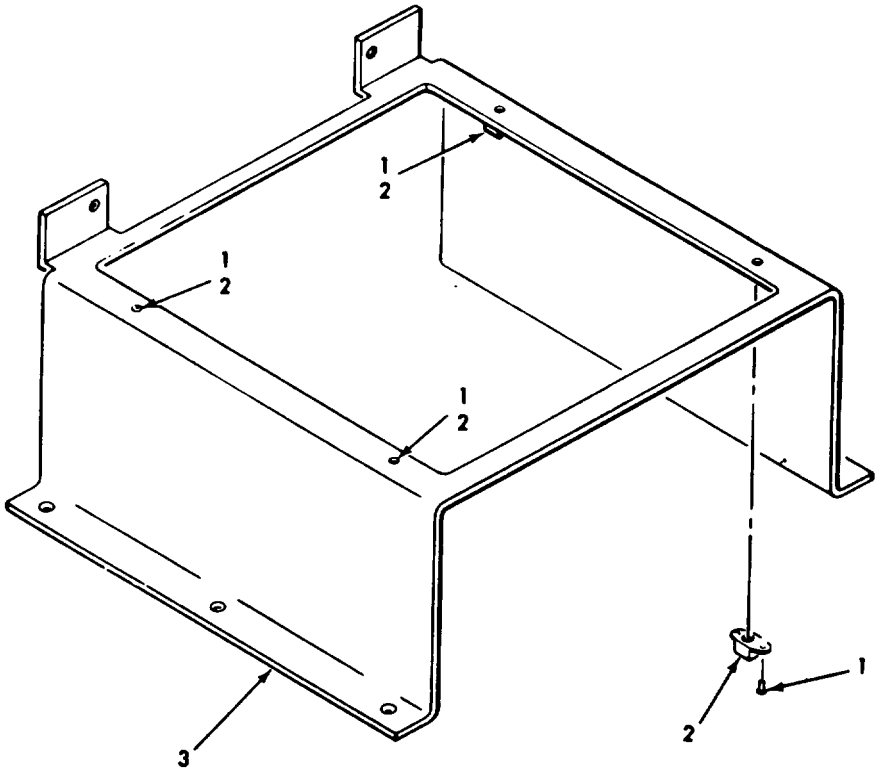


Figure E-5. Terminal Board

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0102 TERMINAL BOARD		
						PART NUMBER 8680407-501		
E-5	1	PADZZ	5305-00-239-9314	NAS1635-04-16	80205	SCREW, MACHINE	EA	2
E-5	2	PADZZ	5310-00-933-8118	MS35338-135	96906	WASHER, LOCK	EA	2
E-5	3	PADZZ	5310-00-782-1349	MS15795-804	96906	WASHER, FLAT	EA	8
E-5	4	XADZZ		8680428-3	17863	PRINTED WIRING BOARD	EA	1
E-5	5	PADZZ	5365-00-632-3103	NAS430D0-32	80205	SPACER, SLEEVE	EA	2
E-5	6	PADZZ	5935-01-077-6400	7117890-1	17863	CONNECTOR	EA	1



AR923973

Figure E-6. Angle Bracket

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0103 ANGLE BRACKET		
						PART NUMBER 8680411-501		
E-6	1	PAFZZ	5320-00-655-4757	MS20426-A3-4	96906	RIVET, SOLID.....	EA	8
E-6	2	PADZZ	5310-00-764-2395	MS21075-04	96906	NUT, SELF-LOCKING.....	EA	4
E-6	3	XADZZ		8680411-1	17863	BRACKET.....	EA	1

All data on Page E-27, including Figure E-7 deleted.

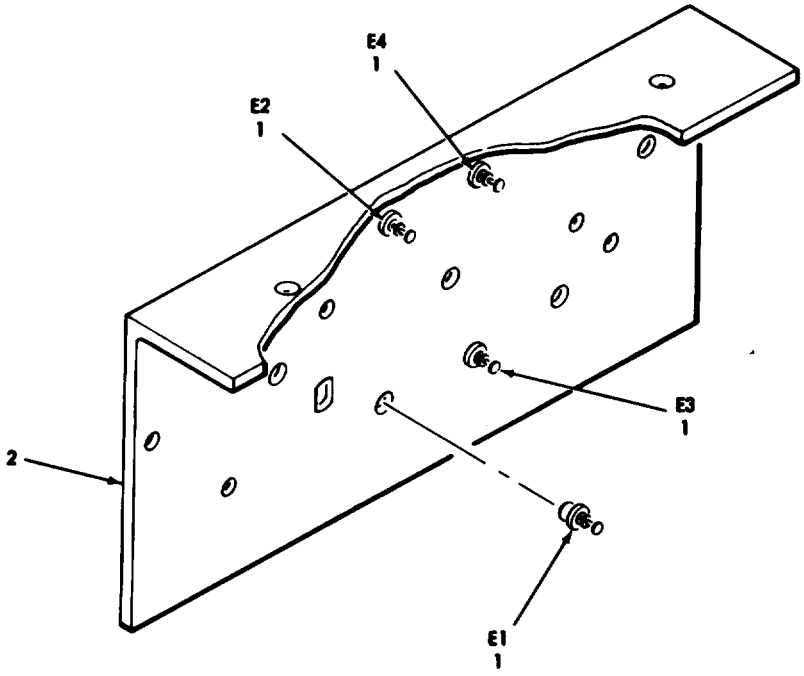
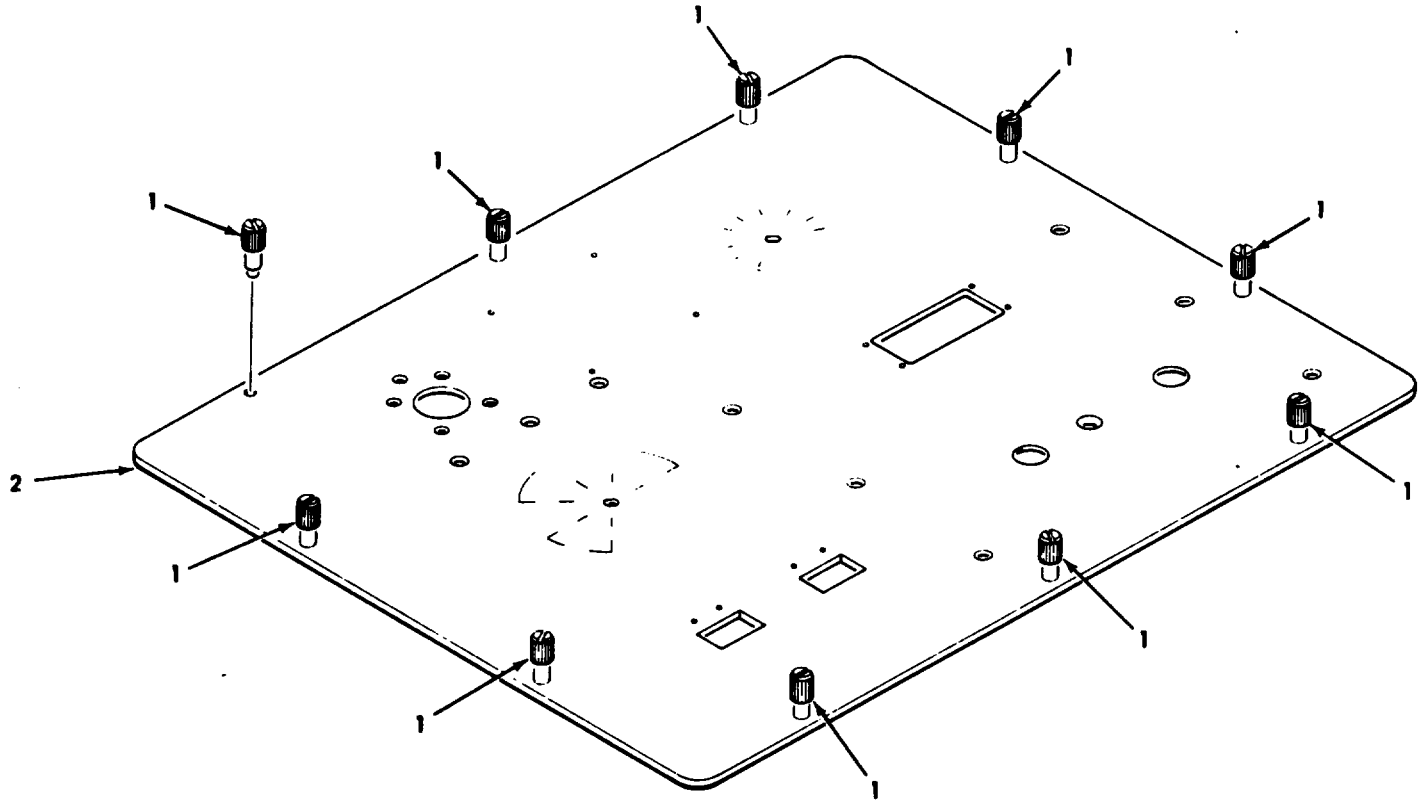


Figure E-8. Angle Bracket

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0105 ANGLE BRACKET		
						PART NUMBER 8680408-501		
E-8	1	PAFZZ		8E0798028	81349	TERMINAL.....	EA	4
E-8	2	XADZZ		8680408-1	17863	BRACKET.....	EA	1



AR923967

Figure E-9. Panel Subassembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0106 PANEL SUBASSEMBLY		
						PART NUMBER 8680410-503		
E-9	1	PAFZZ	5325-00-559-7855	7118640-50	17863	STUD, ASSEMBLY.....	EA	10
E-9	2	XADZZ		8680410-3	17863	PANEL.....	EA	1

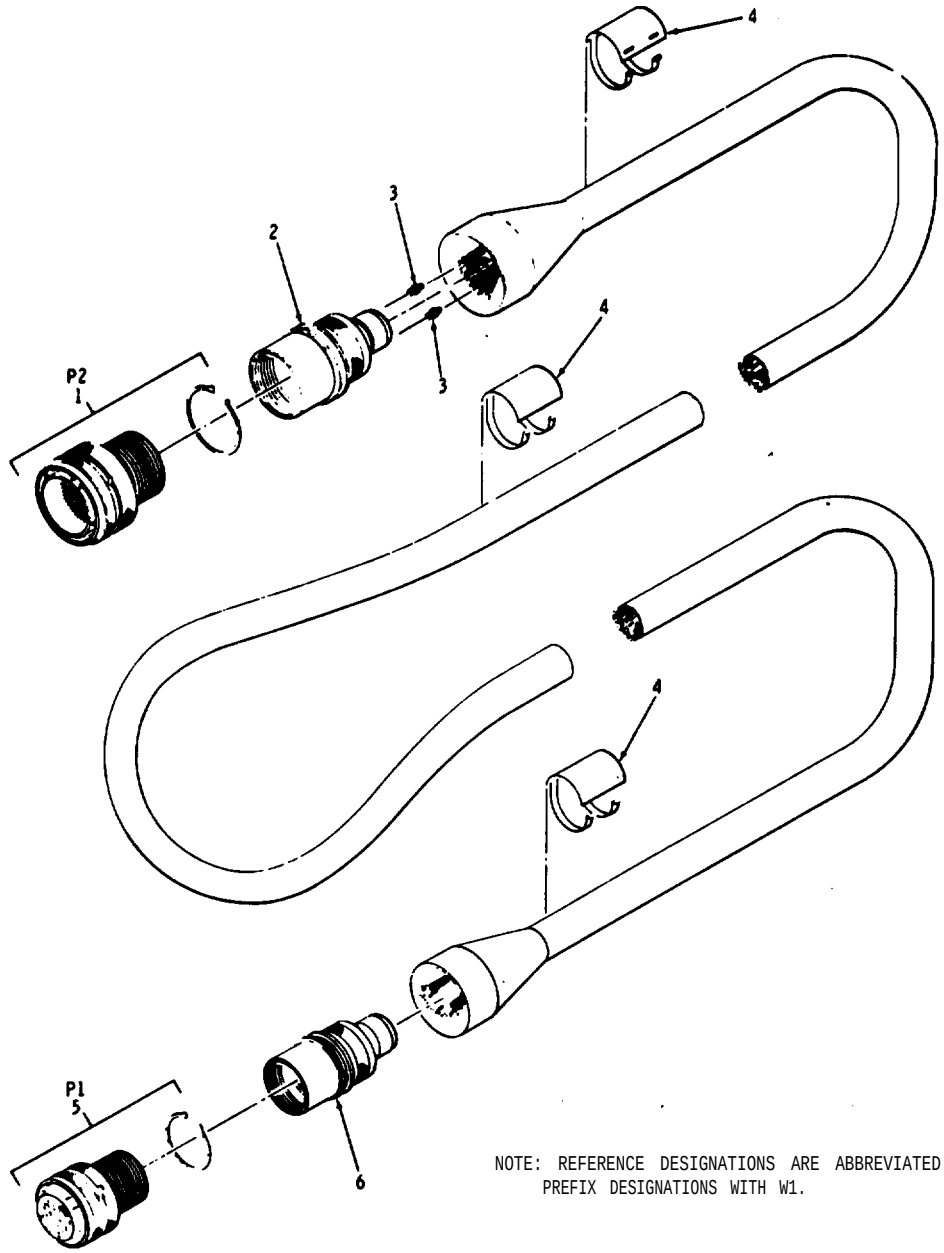
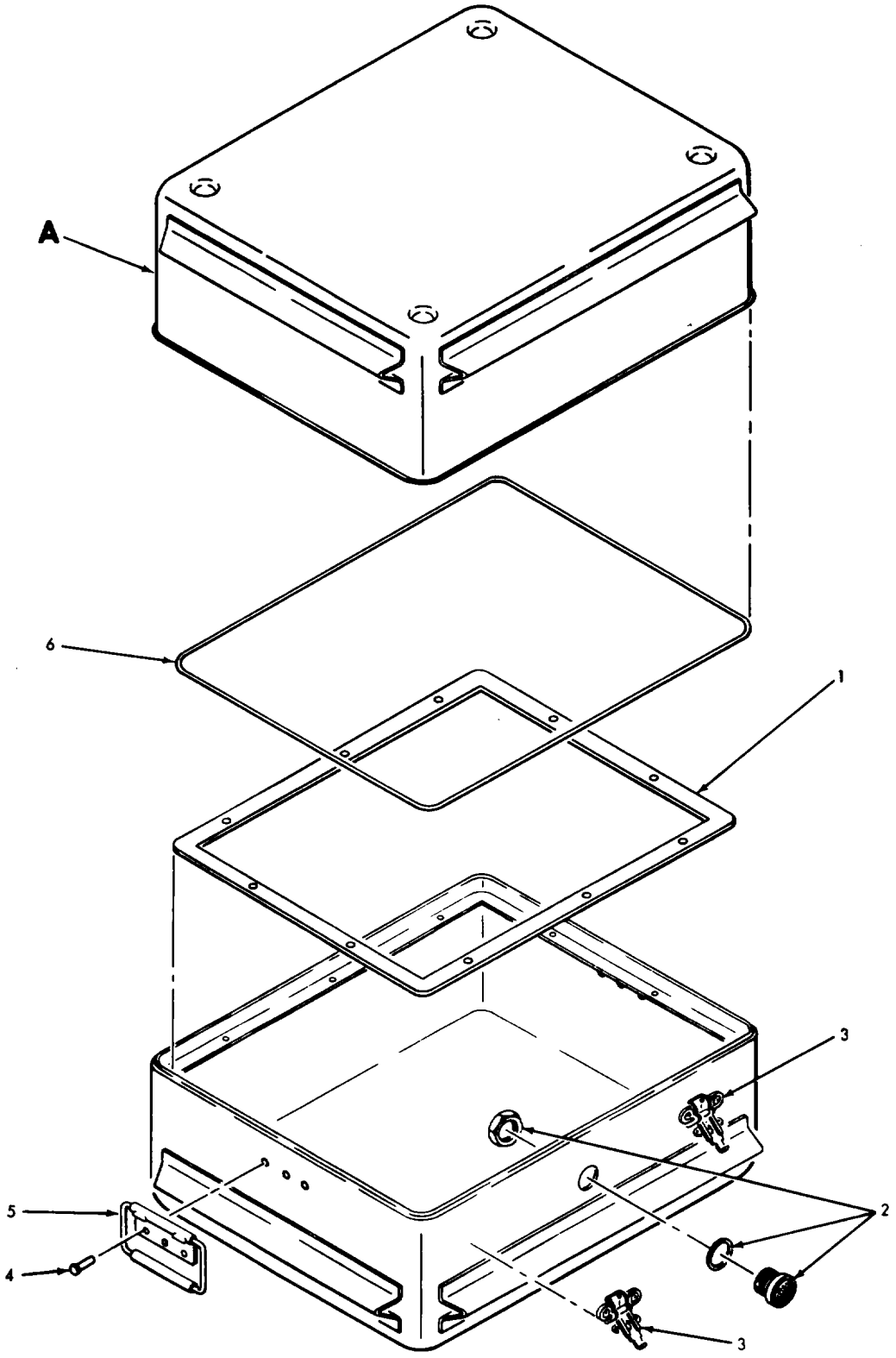


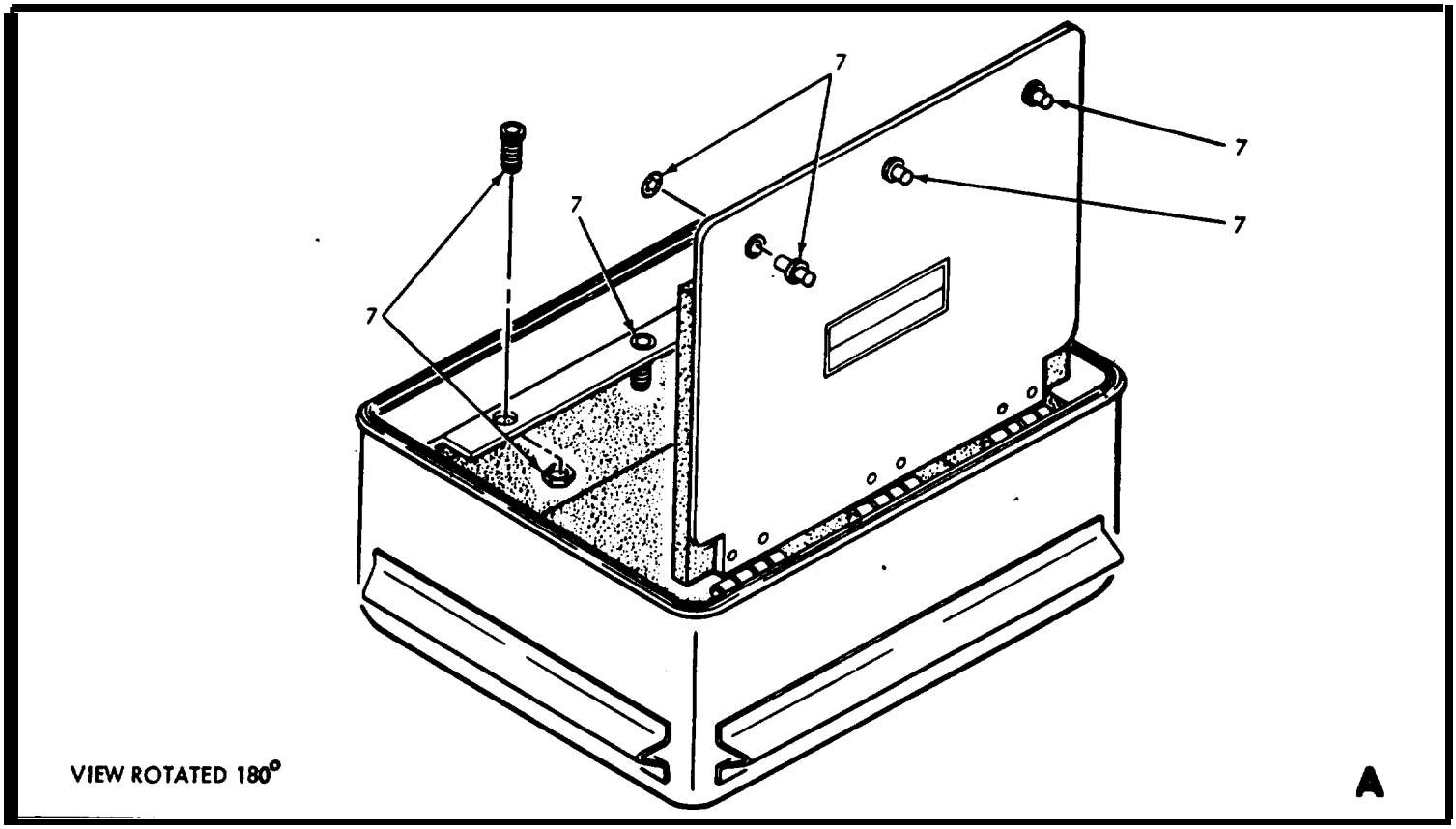
Figure E-10. Electrical Special Purpose Cable Assembly W1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 02 ELECTRICAL SPECIAL PURPOSE		
						CABLE ASSEMBLY, W1		
						PART NUMBER 8680403-501		
E-10	1	PADZZ	5935-00-433-4820	M527467T253B3SPA	96906	CONNECTOR, PLUG.....	EA	1
E-10	2	PADZZ	5935-01-076-8065	7117991-1	17863	CONNECTOR.....	EA	1
E-10	3	PADZZ	5970-01-074-4411	7117153-10	17863	INSULATION.....	EA	2
E-10	4	PADZZ	5975-00-419-9812	MS3368-3-9C	96906	STRAP, TIEDOWN.....	EA	3
E-10	5	PADZZ		MS27467T19A35S	96906	CONNECTOR, PLUG.....	EA	1
E-10	6	PADZZ	5935-01-074-4356	7117991-2	17863	CONNECTOR.....	EA	1



AR925888-1

Figure E-11. Case Assembly (Sheet 1 of 2)



AR925888-2

Figure E-11 Case Assembly (Sheet 2 of 2)

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 03 CASE, COMBINATION, BORESIGHT CONTROLLER XM34 PART NUMBER 7117894-1		
E-11	1	PAFZZ		D43375C1	98376	GASKET, ELECTROMAGNET	EA	1
E-11	2	PAFZZ	4820-00-898-3003	ZBP6-037-4	98376	VALVE, PRESSURE RELIEF	EA	1
E-11	3	PADZZ		ZBP2-230-1	98376	LATCH ASSEMBLY, CASE	EA	4
E-11	4	PADZZ		M820470AD4-5	96906	RIVET, SOLID	EA	6
E-11	5	PADZZ		ZP20136	98376	HANDLE ASSEMBLY	EA	2
E-11	6	PAFZZ		ZSP5-504	98376	SEAL, NEOPRENE CASE	EA	1
E-11	7	PAFZZ	5325-00-630-4894	ZSP2-2004-1	98376	FASTENER, ASSEMBLY	EA	3

Section III. SPECIAL TOOL'S LIST

No special tools are required

SECTION IV. NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER	STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
5905-00-006-6978	E-4	2	5310-00-924-5968	E-2	14
5910-00-010-8717	R-2	63	5325-00-926-1394	E-2	72
5910-00-010-8717	E-3	2	5310-00-928-2690	E-2	4
5910-00-018-1585	E-2	64	5310-00-929-6395	E-2	38
5962-00-024-0653	E-3	9	5310-00-933-8118	E-2	43
5310-00-043-4708	E-2	5	5310-00-933-8118	E-5	2
5305-00-054-5638	E-2	28	5310-00-933-8119	E-2	49
5305-00-054-5640	E-2	6	5310-00-933-8120	E-2	22
5305-00-054-5649	E-2	56	5310-00-934-9748	E-2	42
5305-00-054-5652	E-2	65	5310-00-934-9759	E-2	53
5305-00-054-5656	E-2	15	5310-00-934-9761	E-2	37
5305-00-054-6652	E-2	40	5310-00-938-2013	E-2	3
5305-00-054-6671	E-2	54.2	5930-00-948-8962	E-2	27
5310-00-057-0573	E-2	16	5305-00-957-2383	E-2	47
5305-00-068-6605	E-2	44	5305-00-959-4158	E-2	25.1
5310-00-069-5291	E-2	50	5340-00-964-2555	E-2	14.1
5305-00-079-5835	E-2	54	5340-00-988-6735	E-2	55
5305-00-088-9666	E-2	54.1	5340-00-998-0611	E-2	24
5905-00-106-9344	E-3	15	5935-01-006-8345	E-2	41
5305-00-239-9314	E-5	1	5962-01-026-2494	E-3	11
5905-00-240-2751	E-4	1	5962-01-027-6863	E-3	4
5962-00-331-9837	E-3	5	5905-01-051-1744	E-3	16
5930-00-409-5597	E-2	31	5915-01-056-3277	E-2	58
5975-00-419-9812	E-10	4	5962-01-059-0583	E-3	10
5935-00-433-4820	E-10	1	5962-01-061-6583	E-3	8
5930-00-433-5445	E-2	30	5330-01-074-4347	E-2	11
5910-00-439-0475	E-3	17	5935-01-074-4356	E-10	6
5930-00-488-4691	E-2	12	5961-01-074-4369	E-3	7
5325-00-559-7855	E-9	1	6210-01-074-4372	F-2	36
5940-00-577-3807	E-2	12.1	6210-01-074-4373	E-2	32
5325-00-630-4894	E-11	7	5999-01-074-4409	E-2	69
5365-00-632-3102	E-2	17	5999-01-074-4410	E-2	70
5365-00-632-3103	E-5	5	5970-01-074-4411	E-10	3
5320-00-655-4757	E-6	1	1270-01-074-4806	E-2	18
5940-00-682-2477	E-2	66	5961-01-074-9721	E-3	3
5340-00-686-1302	E-2	19	5940-01-075-1886	E-2	20
5940-00-723-4929	E-2	9	5340-01-075-8989	E-2	73
5930-00-728-6250	E-2	34	5962-01-076-1667	E-3	13
6240-00-763-7744	E-2	35	1270-01-076-2413	E-3	14
5310-00-764-2395	E-6	2	1270-01-076-2414	E-2	26
5310-00-773-7624	E-2	39	5935-01-076-8049	E-3	1
5305-00-781-5664	E-2	25	5935-01-076-8065	E-10	2
5310-00-781-9483	E-2	23	5935-01-077-6400	E-5	6
5310-00-782-1349	E-2	67	4931-01-082-1559	E-1	2
5310-00-782-1349	E-5	3	4931-01-082-1570	E-1	8
5340-00-782-8737	E-2	54.3	5930-01-085-6975	E-2	7
5330-00-806-8769	E-2	13	4931-01-096-4450	E-1	1
5940-00-827-2653	E-2	59	4931-01-096-4472	E-2	29
4820-00-898-3003	E-11	2			

PART NUMBER	FSCM	FIG NO	ITEM NO	PART NUMBER	FSCM	FIG NO	ITEM NO
D43375C1	98376	E-11	1	MS35338-135	96906	E-5	2
MS15795-804	96906	E-2	67	MS35338-136	96906	E-2	38
MS15795-804	96901	E-5	3	MS35338-137	96906	E-2	49
MS20426-A3-4	96901	E-6	1	MS35338-138	96906	E-2	22
MS20470AD4-5	96901	E-11	4	MS35649-224	96906	E-2	3
MS21075-04	96906	E-6	2	MS35649-244	96906	E-2	42
MS21266-3N	96906	E-2	72	MS35649-264	96906	E-2	37
MS24693C271	96906	E-2	25	MS35649-284	96906	E-2	53
MS24693C273	96906	E-2	25.1	MS35649-304	96906	E-2	21
MS24693C50	96906	E-2	54	MS5195/-15	96906	E-2	56
MS24693C51	96906	E-2	54.1	MS5195/-18	96906	E-2	65
MS24693C6	96906	E-2	44	MS5195/-22	96906	E-2	15
MS2469383	96906	E-2	47	MS5195/-28	96906	E-2	40
MS25036-145	96906	E-2	12.1	MS5195/-4	96906	E-2	28
MS25081-4	96906	E-2	14	MS5195/-46	96906	E-2	54.2
MS25196-1	96906	E-2	13	MS5195/-6	96906	E-2	6
MS25237-387	96906	E-2	35	MS77068-1	96906	E-2	66
MS25281F3	96906	E-2	24	MS77068-2	96906	E-2	59
MS27407-6	96906	E-2	12	MS91528-2T3B	96906	E-2	1
MS27467T19A35S	96906	E-10	5	M15733/23-0060	81349	E-2	58
MS27467T25B35PA	96906	E-10	1	M22885-12-04	81349	E-2	34
MS27502A19C	96906	E-2	41	M22885/11-01	81349	E-2	27
MS27656T19A35P	96906	E-2	46	M22885/13-02	81349	E-2	31
MS3368-3-9C	96906	E-10	4	M22885/9-01	81349	E-2	30
MS35338-134	96906	E-2	4	M3786/20-047	81349	E-2	8
MS35338-135	96906	E-2	42	M3786/20-092	81349	E-2	2

PART NUMBER	FSCM	FIG NO	ITEM NO	PART NUMBER	FSCM	FIG NO	ITEM NO
M38510/00109BCB	81349	E-3	5	ZSP6-037-4	98376	E-11	2
M38510/00302BCB	81349	E-3	9	614-CQ1	91504	E-4	3
M38510/01504BEB	81349	E-3	11	7117153-10	17863	E-10	3
M38510/10706BYX	81349	E-2	71	7117337-1	17863	E-2	70
M38510/30003BCB	81349	E-3	4	7117419-1	17863	E-2	68
M38510/30904BEB	81349	E-3	10	7117878-1	17863	E-3	18
M38510/31302BCB	81349	E-3	8	7117890-1	17863	E-5	6
M39003-01-2784	81349	E-3	17	7117890-2	17863	E-3	1
M39003-01-2997	81349	E-2	64	7117891-1	17863	E-2	10
M39003/01-2861	81349	E-2	62	7117893-1	17863	E-2	11
M39014-01-1593	81349	E-2	63	7117894-1	17863	E-1	2
M39014-01-1593	81349	E-3	2	7117916-10	17863	E-2	36
M7928/1-6	81349	E-2	9	7117916-11	17863	E-2	32
MS340102M1001JS	81349	E-3	16	7117919-8	17863	E-2	45
MS340102M4701JS	81349	E-3	6	7117928-1	17863	E-2	33
MS40102M6BROJA	81349	E-3	12	7117957-1	17863	E-3	13
S139/P4N	80205	E-2	54.3	7117970-1	17863	E-3	3
NAS1397P5N	80205	E-2	55	7117974-1	17863	E-3	7
NAS1397P6N	80205	E-2	14.1	7117991-1	17863	E-10	2
NAS1397P7N	80205	E-2	19	7117991-2	17863	E-10	6
NAS1635-04-16	80205	E-5	1	7117992-1	17863	E-2	7
NAS43DD0-32	80205	E-5	5	7117993-1	17863	E-2	29
NAS43DD0-52	80205	E-2	17	7117999-2	17863	E-2	69
NAS620-C10L	80205	E-2	23	7118640-50	17863	E-9	1
NAS620C2	80205	E-2	5	8680003-3	17863	E-1	7
NAS620C4	80205	E-2	16	8680402-505	17863	E-1	1
NAS620C6	80205	E-2	39	8680403-501	17863	E-1	8
NAS620C8	80205	E-2	50	8680407-501	17863	E-2	20
P-F-624	29800			8680408-1	17863	E-6	2
RCR20G101JS	81349	E-3	15	8680408-501	17863	E-2	73
RH25015R0	81349	E-2	57	8680410-3	17863	E-9	2
RLR05C3300GR	81349	E-4	2	8680410-503	17863	E-2	74
RLR20C2200GR	81349	E-4	1	8680411-1	17863	E-6	3
SE079B02S	81349	E-6	1	8680411-501	17863	E-2	26
ZP20136	98376	E-11	5	8680413-503	17863	E-2	18
ZSF2-2004-1	98376	E-11	7	8680419-1	17863	E-1	10
ZSP2-230-1	98376	E-11	3	8680428-3	17863	E-5	4
ZSP5-504	98376	E-11	6	8680430-501	17863	E-3	14

Section III. SPECIAL TOOLS LIST

Special tools are to be determined

APPENDIX F

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

F-1. Scope. This appendix lists expendable supplies and materials you will need to operate and maintain the Boresight Controller XM34. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

F-2. Explanation of Columns.

a. Column 1 - Item number. This is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. F").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

(Enter as Applicable)

C - Operator/Crew

0 - Aviation Unit Maintenance

F - Aviation Intermediate Maintenance

c. Column 3 - National Stock Number- This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue. requisition the lowest unit of issue that will satisfy your requirements.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	F	8030-00-535-9780	BLUE PRETREATMENT WASH PRIMER	KT
2	F	8010-00-935-7080	YELLOW LUSTERLESS, EPOXY POLYMIDE PAINT CLASS 1	KT
3	F		EPOXY POLYMIDE PRIMER COATING	GL
4	F	8010-00-285-4868	LIGHT GRAY ENAMEL MIL-E-15090 FOR III TYPE 1 CLASS 2	GL
5	F	8010-00-063-5776	YELLOW ZINC CHROMATE COLOR #13538	GL
6	F	6810-00-753-4993	ISOPOPYL ALCHOHOL	CN
7	F	8305-00-286-5461	LINT FREE CLOTH	YD
8	F	8020-00-597-4767	SOFT BRISTLE BRUSH	EA

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
9	F	8020-00-224-8024	SMALL ARTIST BRUSH	EA
10	F	7930-00-177-4220	LIQUID SOAP (DETERGENT)	PT
11	F	5350-00-221-0872	CROCUS CLOTH (P-C-458)	SH
12	F	3439-00-163-4348	SOLDER	LB
13	F	6810-00-281-6929	METHYLETHYLKETONE	PT
14	F	4020-00-974-1875	LACING AND TYING TAPE	YD

INDEX

Subject | Paragraph, Figure, Table, Number

C - Continued

D

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E. C. MEYER
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Chief of Staff

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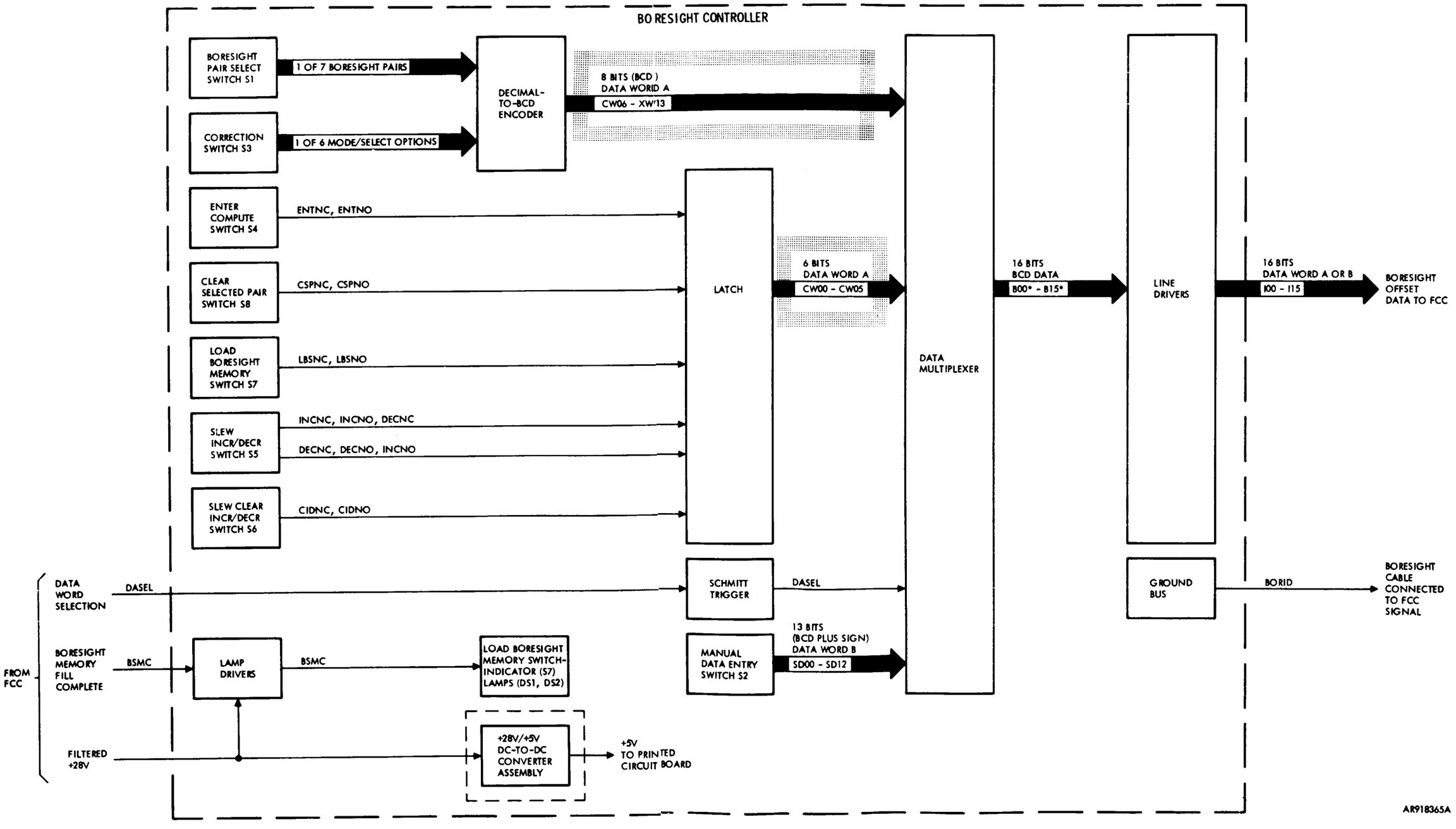

Figure FO-1. Boresight Controller XM34 Functional Block Diagram

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TM 9-4931-376-13&P	8 May 1981	Maint Manual for Boresight Controller XM 34 4931-01-082-1547

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
7-1			7-1

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

The NSN for Hand Installation Tool should read "5120-01-169-3003"

SAMPLE

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TM 9-4931-376-13&P	8 May 1981	Maint Manual for Boresight Controller XM 34 4931-01-082-1547

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TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
I Master= 100 Centimeters= 1000 Millimeters =39.37 Inches
1 Kilometer= 1000 Meters= 0.621 Miles

WEIGHTS

1 Gram= 0.001 Kilogram = 1000 Milligrams =0.035 Ounces
1 Kilogram =1000 Gems =2.2 Lb
1 Metric Ton =1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE

1 Milliliter=0.001 Liters= 0.0338 Fluid Ounces
I Liter= 1000 Milliliters= 33.82 Fluid Ounces

SQUARE MEASURE

I Sq Centimeter = 100 Sq Millimeters= 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters= 10.76 Sq Feet
1 Sq Kilometer= 1,000,000 Sq Meters= 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter =1000 Cu Millimeters=0.06 Cu Inches
1 Cu Meter =1,000,000 Cu Centimeters =35.31 Cu Feet

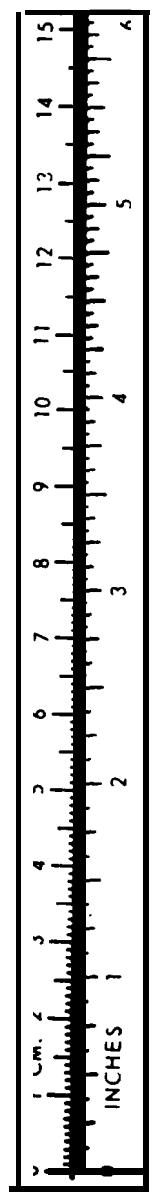
TEMPERATURE

5/9 (°F-32)=°C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C°+ 32= F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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