TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR FIRE CONTROL SUBSYSTEM TEST SET AN/GSM-249 P/N 2201736-05 NSN 4931-00-121-8707

PREPARED BY
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Current as of 11 May 1981

REPORTING OF ERRORS

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, U.S. Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, Illinois 61299. A reply will be furnished directly to you.

TABLE OF CONTENTS

TABLE OF CONTENTS – Continued

TABLE OF CONTENTS – Continued

TABLE OF CONTENTS – Continued

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual is for your use in operating and maintaining the AN/GSM-249 Fire Control Subsystem Test Set (the test set). The manual is divided into five chapters and three appendixes. Chapter 1 describes the test set; Chapter 2 provides detailed theory of operation, and Chapter 3 provides operating instructions. Chapter 4 provides maintenance instructions, and Chapter 5 provides final inspection instructions. Appendix A is a list of references. Appendix B contains a Basic Issue Items List and Repair Parts and Special Tools List. Appendix C is the Maintenance Allocation Chart.

1-2. Maintenance Forms and Records.

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed and prescribed in TM 38-750, The Army Maintenance Management Systems (TAMMS).

1-3. Administrative Storage.

Administrative storage of the test set shall be accomplished in accordance with the provisions of TM 740-90-1.

1-4. Destruction of Materiel to Prevent Enemy Use.

Refer to TM 750-244-1-5 for procedures to be used in destruction of the test set to prevent use by the enemy.

1-5. Calibration.

The digital multimeter in the test set is to be calibrated periodically. These calibration instructions are contained in TB 9-4931-363-50.

1-6. Quality Assurance/Quality Control (QA/QC).

There are no QA/QC requirements for the test set.

1-7. Reporting Equipment Improvement Recommendations (EIRs).

EIRs will be prepared on DA Form 2407, Maintenance Request. Instructions for preparing EIRs are provided in TM 38-750, The Army Maintenance Management System. EIRs should be mailed directly to Commander, U.S. Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, Illinois 61201. A reply will be furnished directly to you.

Section II. DESCRIPTION AND DATA

1-8. General (fig. 1-1).

a. The test set is used during alignment, boresighting, and test of a model XM12801- a model XM136 helmet sight subsystem (HSS); HSS XM128 is used in an AH-1Q/AH-1S(Mod) Cobra Helicopter and HSS XM136, in an AH-1S Cobra Helicopter. As shown in figure 1-1, the test set is made up of a test set subassembly, a linkage orientation device (LOD), a helmet boresight tool, a circuit card extractor, a connector shorting assembly, and four cable assemblies; these items are discussed in detail in paragraphs 1-9 through 1-16.

b. As covered in detailed procedures in TM 9-1270-212-14&P, the test set is used not only for alignment and bolesighting of the HSS but also for complete electrical testing, isolating and verifying equipment failures that are detected by the built-in-test (BIT) circuits in the HSS EIA. The test set is used to test the EIA and the two linkages as a system or us separate items, as well as the helmet sight assembly. It can also be used to test individual subassemblies of the EIA after they are removed from the EIA; separate tests are provided in TM 9-1270-212-14&P for buffer amplifier modules A1 through A8 and for circuit card assemblies A9 thlough A13 and A15. The only EIA subassembly that cannot be tested as a separate item is azimuth bias circuit card assembly A14 in the EIA for XM136; this circuit card assembly does not exist in the EIA for XM128.

NOTE

In an EIA from XM128, the logic circuit card assembly has a designation of A10 versus a designation of A15 in an EIA from XM136.

1-9. Test Set Subassembly.

The test set subassembly consists of two main items, which are the test set chassis assembly and the test set container, and two plates, which are the test set instruction plate and the test set identification plate. The test set chassis assembly is mounted in the bottom part of the test set container, as shown in figure 1-1, but may be removed and mounted in an electrical-equipment rack. The test set identification plate is mounted on the top (front panel) of the test set chassis assembly. The test set instruction plate, which states the part numbers of the HSS items which can be tested with the test set, is mounted on the cover for the test-set-container storage compartments. The test set container is discussed further in paragraph 1-10 and the test set chassis assembly, in paragraph 1-11.

1-10. Test Set Container.

All other test set items are stored in the test set container. Except for the test set chassis assembly, which is screw-mounted in the bottom part of the container, the other test set items are stored in the top part (the lid) of the container. (Figure 1-1 shows the container open and indicates the storage compartments in the container lid; figure 1-2 shows the closed container). The container is aluminum and is equipped with carrying handles, four clasp fasteners to secure the lid to the bottom section, and slip-out hinges to permit removal of the lid during operation. A seal between the lid and the bottom section insures that the container is airtight when the two sections are closed and secured. An air-bleed valve on the side of the container is depressed to equalize the container internal pressure and the external pressure. This valve must be depressed before an attempt is made to open the container.

1-11. Test Set Chassis Assembly.

The test set chassis assembly, mounted in the bottom of the test set container (fig. 1-1), has an aluminum control panel on which are mounted all the controls, indicators, and connectors. Inside the chassis are the other electrical components, including the two circuit card assemblies, A2 and A12, which are mounted on brackets secured to the back of the control panel.

1-12. Linkage Orientation Device (fig. 3-2).

a. The LOD is used to align the gunner and pilot linkage assemblies. The LOD consists of a leveling base to which is attached a bubble level assembly, a bubble level reflector, a rail clamp base assembly, an alignment pin, a magnet, a magnet adjustment device, and a borescope angle bracket.

b. The bubble level assembly is used to check the alignment of the linkage rails after the level assembly has been properly adjusted on the telescopic sighting unit (TSU) boresight device. The bubble level reflector enables the operator to check the bubble level from an angle. The rail clamp base assembly has deep parallel grooves in the base surface that are designed to fit up against the linkage rails

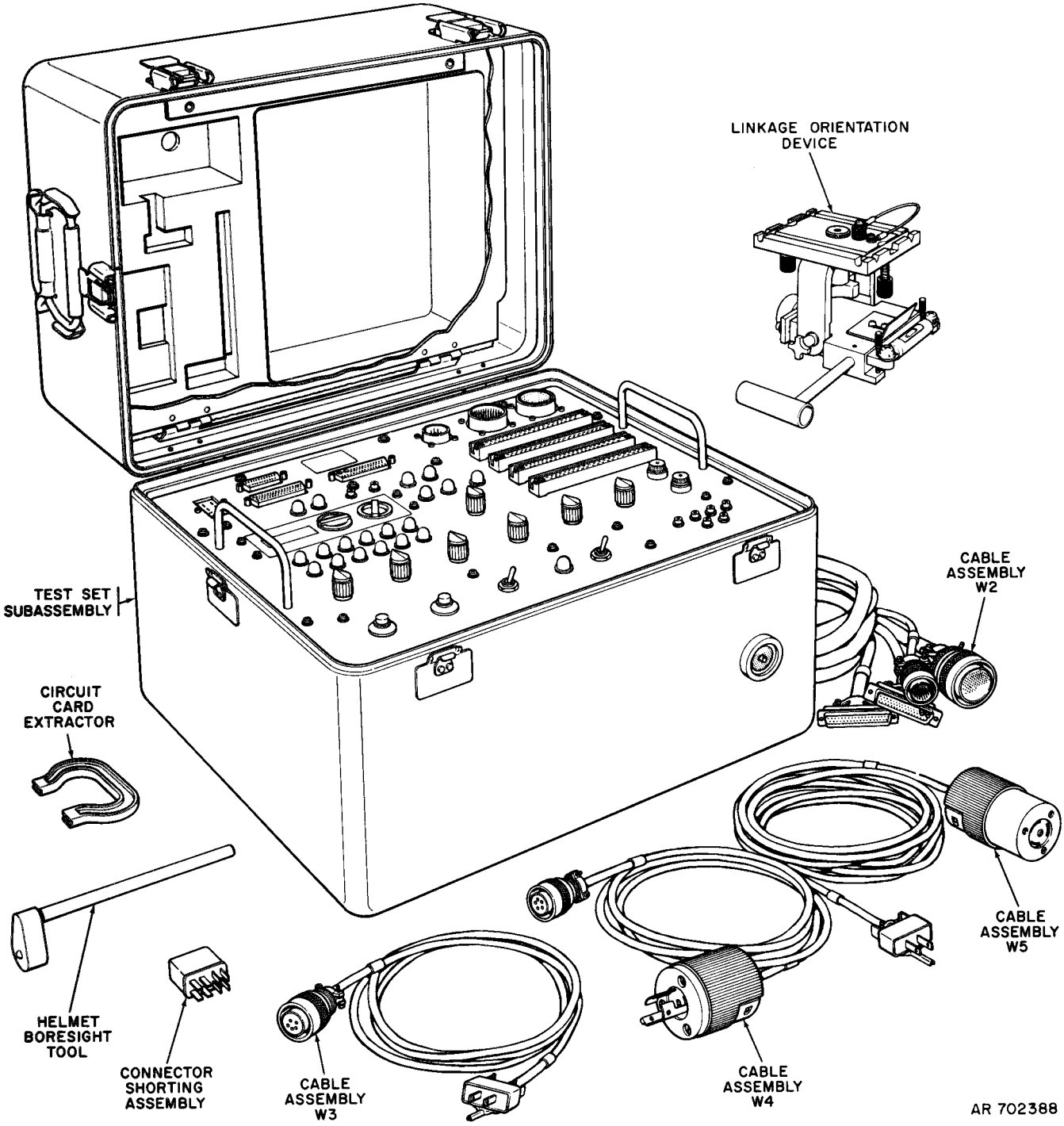


Figure 1-1. Test set AN/GSM-249

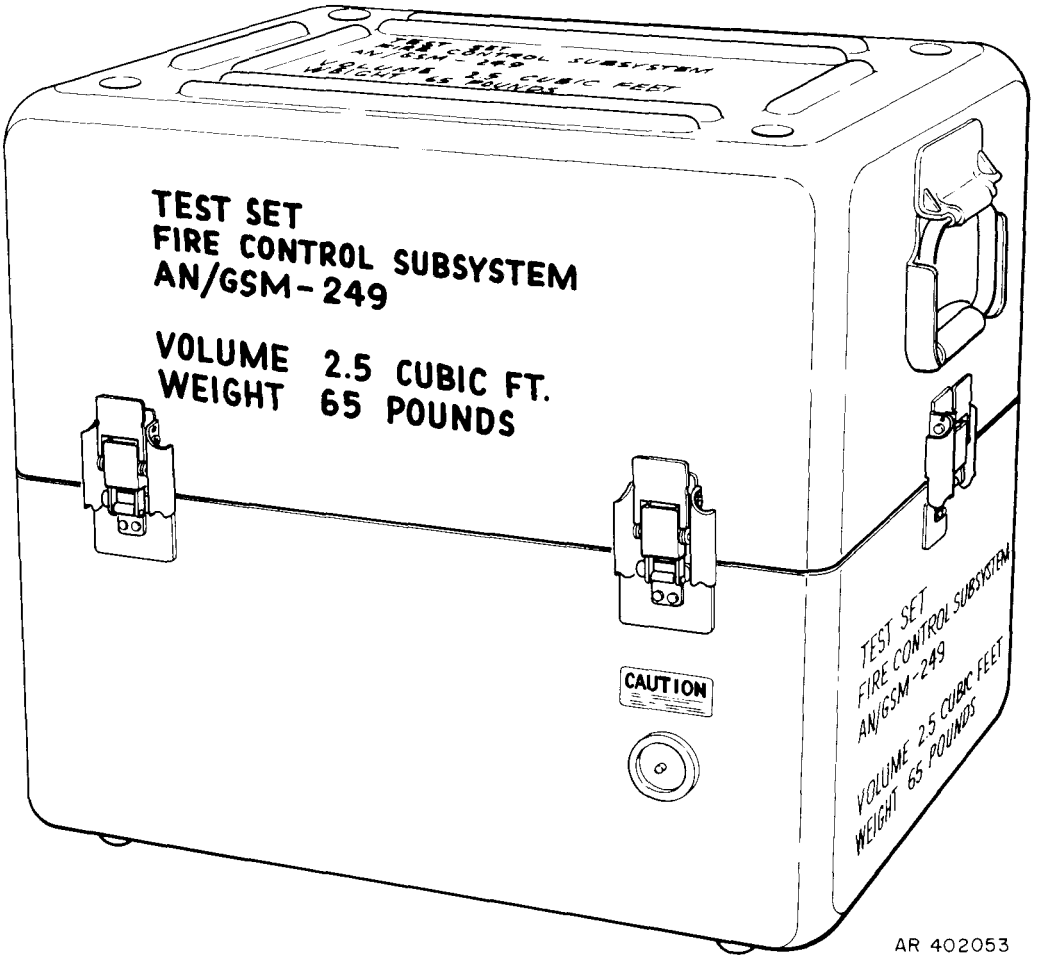


Figure 1-2. Test set container

c. Two T-bars and T-1ocks secure the rail clamp base to the linkage rails and, therefore, the LOD to the linkage assembly. The rail clamp base can be rotated in azimuth to the leveling base and has two locked positions in azimuth, a position which secures the rail clamp base parallel to the leveling base (the 0-degree position) and a position in which it is offset at a 5.5-degree angle. These positions are defined by two lines, marked 0° and 5.5°, on the rail clamp base. The selected line is aligned with a notch on the swivel plate and the alignment pin is inserted through a hole in the rail clamp base and into either of two holes in the swivel plate to hold the rail clamp base in the selected position. The 5.5-degree position is only used for rail-alignment and boresigbting procedures for the pilot linkage in HSS XM136 when installed in an AH-1S helicopter. The 0-degree position is used for all other rail-alignment and boresighting procedures. The elevation angle of the rail clamp base can also be adjusted by the swivel frame and locked into position.

d. The LOD magnet attaches to the linkage arm receptacle. The magnet has an adjustment device that aligns the magnet face perpendicular to the centerline through the borescope angle bracket. The borescope angle bracket holds the borescope device in position when sighting on the HSS target.

1-13. Helmet Boresight Tool.

The helmet boresight tool has three functions: (1) It provides a means for testing the magnetically operated reed switch in the helmet receptacle; (2) it is used for aligning the helmet receptacle with the reticle line-of-sight, and (3) it is used to align the linkage orientation device. The boresight tool consists of a tube with a small aperture in each end and a magnetic connector attached to one end. The magnetic connector mates with the helmet receptacle; consequently, the line of sight through the tool is perpendicular to the mating surface of the receptacle magnet.

1-14. Circuit Card Extractor.

The circuit card extractor is used to remove circuit cards A9 through A13 and A15 from the EIA. It is a horseshoe-shaped plastic device with slots in each end. The slots are beveled so the ends will slip sideways over two beveled protrusions extending above the top of the circuit card. Then, when the extractor is pulled up from the card, it pulls the card out of its connector.

1-15. Connector Shorting Assembly.

The connector shorting assembly is used to simulate the helmet-mounted reed switch when checking out the guns without the helmet sight assembly connected. It is an eight-pin shorting plug that is connected to the helicopter connector for the pilot's helmet sight assembly or the helicopter connector for the gunner's helmet sight assembly. The connector shorting assembly shorts out pins 5 and 6 in the helicopter connector to close the turret action interrupt relay in the helicopter interface control unit.

1-16. Cables.

Four cable assemblies (figs. 1-1 and 1-3) are furnished with the test set: test cable assembly W2, a branched cable used to connect the test set to the EIA for testing LRUs; power cable assembly W3, used to connect J3 on the test set to 115-volt, 60-Hz power: power cable W4, used to connect J3 on the test set to 115-volt, 400-Hz power; and adapter cable W5, used in series with W4 to connect to the helicopter 400-Hz receptacle.

1-17. Differences Between Models.

There is only one model of the test set.

1-18. Tabulated Data.

Weight 65 lbs

Volume 2.5 cu ft

Size 20-1/2 by 17 by 17 in.

Power 115 ±12V, 60 ±10 Hz, single phase at 1 ampere maximum or 115 ±12V, 400 ±20 Hz, single phase at 1 ampere maximum

1-19. Identification Plates.

The locations of the identification plates are described in table 1-1.

1-20. Organizational HSS Boresight Kit (fig. 1-4).

The organizational HSS boresight kit is a special tool and is not a part of the test set. The kit consists of a container, an extension cable, a helmet boresight tool, and two sockethead screw keys and is used for HSS alignment and boresighting. The helmet boresight tool in the kit is identical to the helmet boresight tool in the test set.

Table 1-1. Identification Plates

Name of item	Location of plate	Fig. ref
Test set	Control panel of test set chassis assembly	1-1
Linkage orientation device	Top of leveling base	1-1
Helmet boresight tool	Rear of connector block	1-1
Circuit card extractor	None	1-1
Connector shorting assembly	None	1-1
Test cables	Tag attached to each cable assembly	1-3

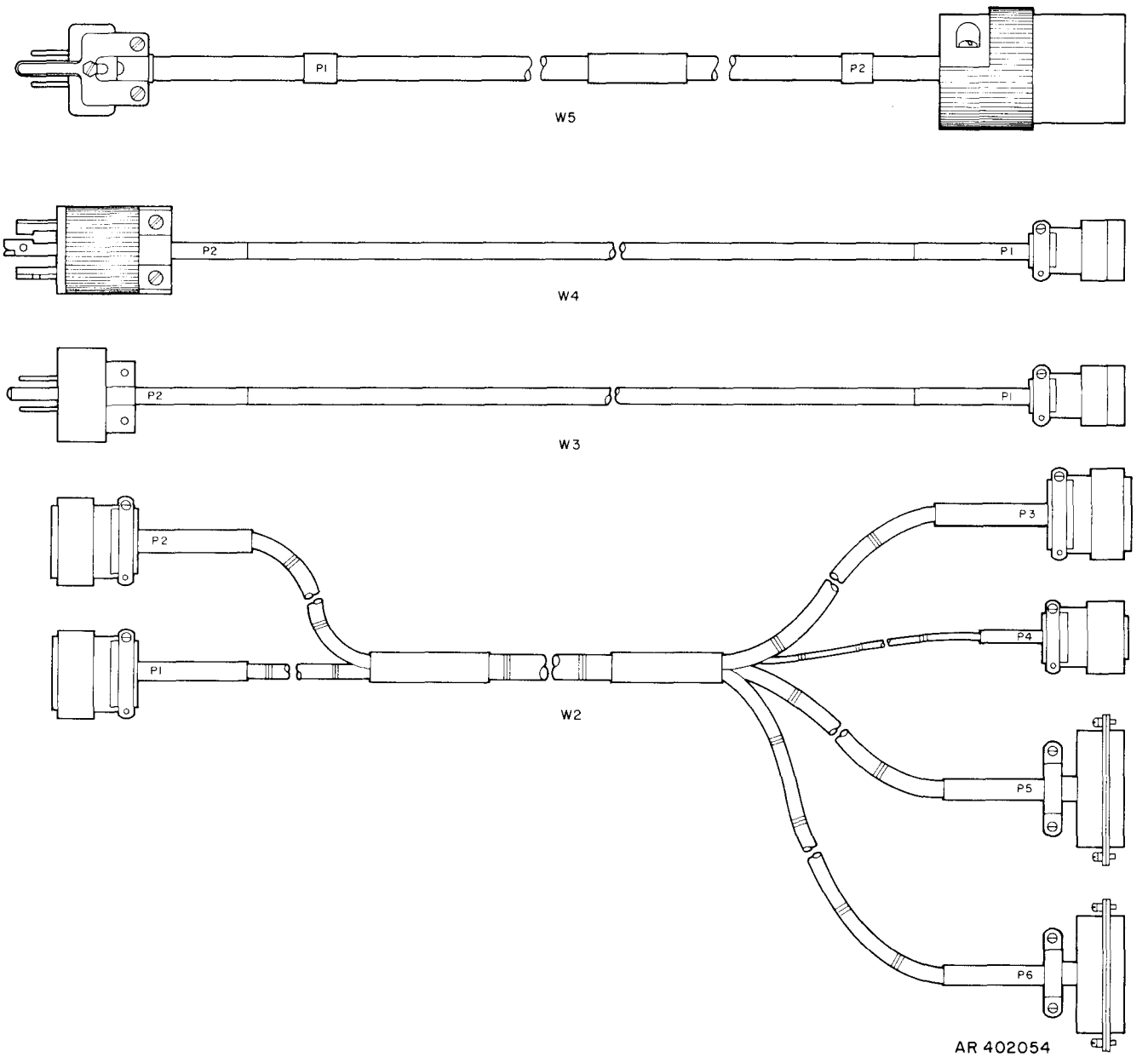


Figure 1-3. Test cable assemblies

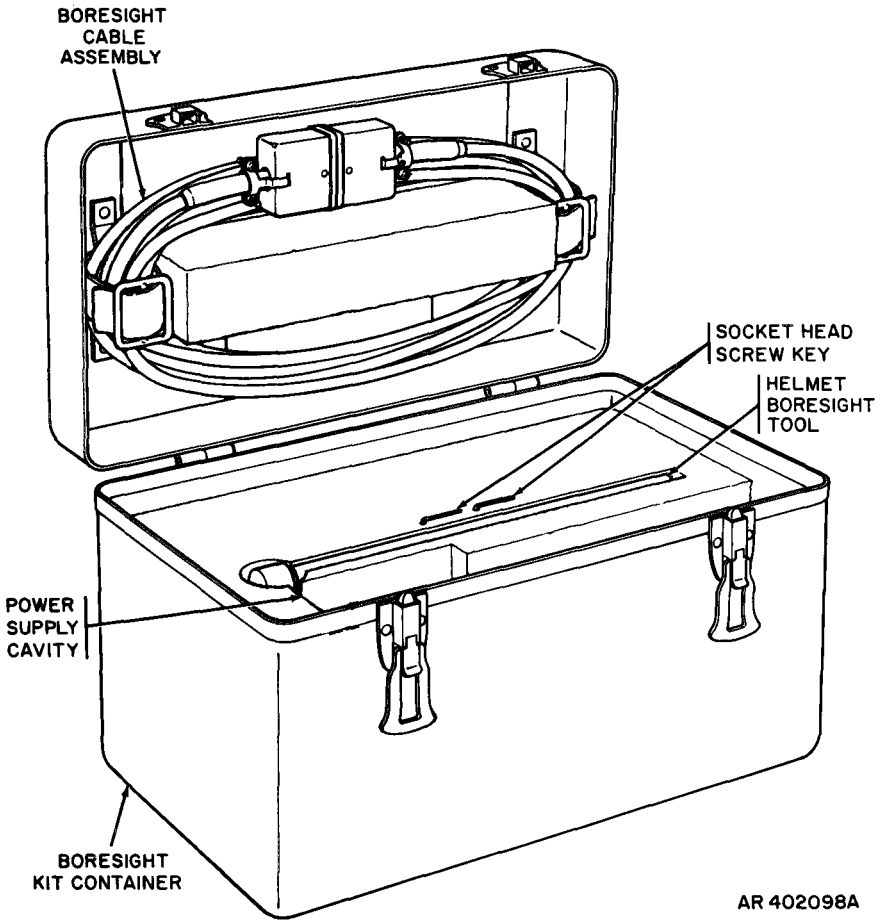


Figure 1-4. Organizational HSS boresight kit

CHAPTER 2

THEORY OF OPERATION

Section I. GENERAL

2-1. Scope.

a. This chapter provides the theory of operation of the test set and the theory of tests for the HSS items under test. Thus, the theory discussions are a composite of test set theory and item-under-test theory. The following material provides an understanding of the theory:

(1) Figure 2-1 is a timing diagram for the phase detector circuit on circuit card A2. Functional diagrams (figs. 2-2 through 2-12) show test set and adapter cable connections for each step of each test. The functional diagram layouts follow the same order as the steps of the troubleshooting tables in TM 9-1270-212-14&P.

(2) The schematic diagrams of applicable test cables W3, W4, and W5 (figs. 2-13 through 2-15) are located at the end of this chapter. The schematic diagram for test cable W2 (foldout FO-1) is located at the end of this manual.

NOTE

The schematic diagram of the helmet boresight cable is figure 2-16.

(3) The schematic diagram of the test set and two printed circuit cards (foldouts FO-2 through FO-4) are located at the end of this manual.

b. The theory discussions use test set connector and pin designations. For example, logic card A10 from the EIA used in XM128 and logic card A15 from the EIA used in XM136 are each tested in test set connector J8; therefore, all connections to and from a logic card in the theory carry the test set J8 designation.

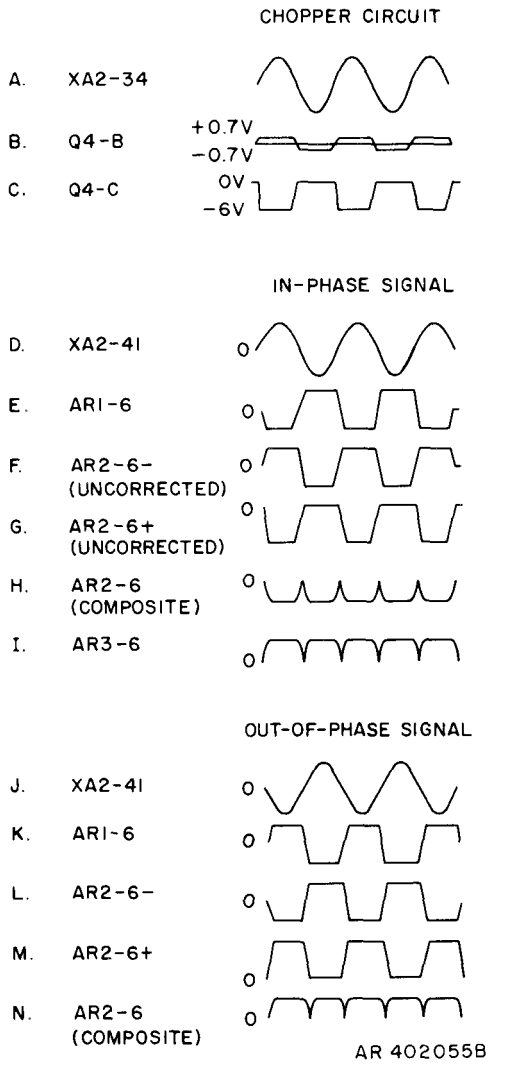


Figure 2-1. Phase detector timing diagram

c. The theory discussions are presented in the order shown in table 2-1.

2-2. Supporting Documents.

Supporting documents needed for the theory discussions consist of the following tables and illustrations:

a. The test table for each item under test from TM 9-1270-212-14&P

b. The schematic diagram of the item under test from TM 9-1270-212-14&P.

Table 2-1. Theory Discussion Sequence and Figure Reference

Paragraph	Paragraph title	Figure number
2-3	Test set power distribution	None
2-4	Test set self-test	2-1, 2-2
2-5	HSS test	2-3
2-7	Helmet sight assembly test	2-4
2-9	Linkage assembly test	2-5
2-11	Electronic interface assembly test	2-6
2-13	Buffer amplifier module test	2-7
2-14	Sequencer card A9 test	2-8
2-15	Logic card A10/A15 test	2-9
2-16	Comparator card A11 test	2-10
2-17	Power supply card A12 test	2-11
2-18	Amplifier card A13 test	2-12

Section II. POWER DISTRIBUTION AND SELF-TEST

2-3. Test Set Power Distribution.

a. Refer to the test set schematic in foldout FO-2, sheet 4. External power is connected to POWER connector J3. Either a 60- or 400-Hz source of 115-volt, single-phase ac power can be accepted; power cable W3 is to be used if the power source is 60 Hz and power cable W4 is to be used if the power source is 400 Hz.

b. Assume that power cable W3 is connected to a 60-Hz power source. While POWER switch S1 is in the center OFF position, no power is applied to the test set and POWER indicator DS18 is not lighted. When S1 is set to ON-60 HZ, 60-Hz power from J3-A is connected through fuse F1 and through S1-1 and -2 to 28-volt dc unregulated power supply PS1-1. The return is connected from J3-B through S1-4 and -5 to PS1-2. The +28 volts dc at PS1-3 is connected to POWER indicator DS18, lighting the indicator. The +28-volt dc power is also connected through line filter FL2 to 115-volt ac, 400-Hz inverter PS2-1. The 28-volt dc return is connected from PS1-4 to the connections listed for ECP7 on sheet 1 of the schematic, and through line filter FL1 to PS2-2. The output of the inverter is connected through S1-8 and -7 to the connections listed in ECP4. The inverter returns are connected as shown in ECP6, which is common with ECP1. Should S1 be accidentally placed to ON-400 HZ with the 60-Hz power connected, nothing will happen.

c. Assume that power cable W4 is connected to a 400-Hz power source. While POWER switch S1 is in the center OFF position, no power is applied to the test set and POWER indicator DS18 is not lighted. When S1 is set to ON-400 HZ, 400-Hz power from J3-D is connected through fuse F2 and through S1-3 to -2 to 28-volt dc unregulated power supply PS1. PS1 accepts either 60-Hz or 400-Hz, 115-volt power. The return is connected from J3-E through S1-6 and -5 to PS2-2. The +28 volts dc at PS1-3 is connected to POWER indicator DS18, lighting the indicator. The +28-volt dc power is also connected through line filter FL2 to 115-volt ac, 400-Hz inverter PS2-1. The +28-volt dc return is connected from PS1-4 to the connections listed for ECP7 on sheet 1 of the schematic and through line filter FL1 to PS2-2. The output of the inverter at PS2-4 is connected through S1-8 and -9 to the connections listed in ECP4. Thus, the 400-Hz inverter is active for 60- and 400-Hz inputs.

d. Refer to the test set schematic (foldout FO-2, sheet 7). Stepdown transformer T1 supplies ac power to the individual rectifier circuits on power supply card A12. The primary winding at T1-1 is connected to S4-C, contacts 2 through 10, and the return at T1-2 is connected to the 400-Hz returns at ECP6. Therefore, Tl (and T2 and T3 also) are energized for all positions of the TEST SELECT switch except the OFF position.

e. T1 provides a pair of 10-volt and a pair of 20-volt inputs to power supply card A12 through pins XA12-24 and -16, and -4, -38 and 40, and -2 and -4, and -26 and -28, respectively. The 10-volt transformer outputs are common with connector J6 and connector XA12. The 20-volt transformer outputs pass through contacts of relays K9 and K10, which, when deenergized, connect power to XAl2. Refer to the power supply A12 card schematic (foldout FO-4). The T1 outputs energize four full-wave bridge rectifiers, the outputs of which are connected to solid-state regulators AR1 through AR5. The regulators are current-limited and thermally protected against overload.

f. Power supply card A12 contains test logic that indicates the status of test set internal power. The 18-volt dc output of AR1 is attenuated across divider network R1 and R2 and connected as a high to U1-2. The 12-volt dc output of AR2 is attenuated across divider network R3 and R4 and connected as a high to U1-4. The 28-volt dc input from chassis-mounted PS1 through S11 and S4-B-5 to XA12-22 is attenuated across divider network R5 and R6 and connected as a high to U1-1. The 10-volt ac input from chassis-mounted T2-1 (ECP8) to XA12-12 and T2-4 (ECP9) to XA12-14 is rectified by diodes CR17 and CR18, is attenuated and filtered by R9, R10, and C16, and is applied as a high to U1-5. The three U2 inverters connected to A12-6 form a wired OR gate. If the output of any inverter goes low, it pulls the other outputs low also. Thus, if any input to U1 is low, U1-6 is high and U2-2 is low. The -6- and -18-volt dc outputs are monitored with divider CR19, R7, and CR20, and CR21, R8, and CR22. The voltage at U2-3 and U2-5 is the diode junction drop, or about -0.7 volt. R7 and R8 limit the current through 5.1-volt zener diodes CR19 and CR21. The lows at U2-3 and U2-5 are inverted to highs. Thus, if all monitored power sources are normal, the power fail output at XA12-6 is high. The use of the logic high is discussed in the theory of step 3 of the A12 card (paragraph 2-17).

2-4. Self-Test Theory.

a. To prepare for the self-test theory discussion, refer to the test set self-test functional diagram (fig. 2-2) and to the test set self-test table (table 3-3). Refer to paragraph 3-5 and mentally perform steps *a, b,* and *c.*

b. Refer to step 1 in figure 2-2 and in table 3-3. Mentally perform step 1 of table 3-3. POWER indicator DS18 lights as described in paragraph 2-3.

c. Mentally perform step 2 of table 3-3 and refer to step 2 in figure 2-2. Wiper 1 and contacts 2 through 9 of S4-C apply 115 volts ac to the primary of T3. The secondary of T3 couples 10 volts ac rms to XA2-17 and -18. (Refer to foldout FO-3.) The full-wave rectifier consisting of CR4 through CR7 provides pulsating dc to input pin 1 of 8-volt regulator AR4. Pin 3 is the return and pin 2 is the output. Capacitors C4, C5, and C6 provide filtering. Note that the power supply is floating. Refer to figure 2-2, step 2. XA2-7 is connected through TB1-2 to the multimeter, where it is grounded. The ground at AR4-2 causes the regulator to provide -8 volts dc through XA2-16 and TB1-1 to energize the multimeter. Contacts 2 through 11 and wiper 1 of S3-L connect the ac voltages shown on figure 2-2 through contact 3 and wiper 1 of S4-I and through contacts 2 and 3 of S9 to contacts 2 and 8 of S5-A. Wiper 1 of S5-A connects each voltage through TB1-3 to the input of the multimeter for readout. Wiper 2 of S5-A connects each voltage to XA2-41 for phase determination.

d. Mentally perform step 3 of table 3-3 and refer to step 3 in figure 2-2. Contact 8 and wiper 2 of S7-F connect +28 volts dc through contact 3 and wiper 1 of S8-L and through S5-A and TB1-3 to the meter input for readout.

e. Mentally perform step 4 of table 3-3 and refer to step 4 in figure 2-2. Wiper 1 and contacts 2 through 6 of S7-F connect the dc voltages shown on figure 2-2 through contact 2 and wiper 1 of S8-L, through contact 6 and wiper 1 of S5-A, and through TB1-3 to the input of the multimeter for readout.

f. Mentally perform step 5 of table 3-3 and refer to step 5 in figure 2-2. Contact 9 and wiper 2 of S7-F connect -8 volts dc from XA2-16 through the same routing as described in *d* above to the multimeter.

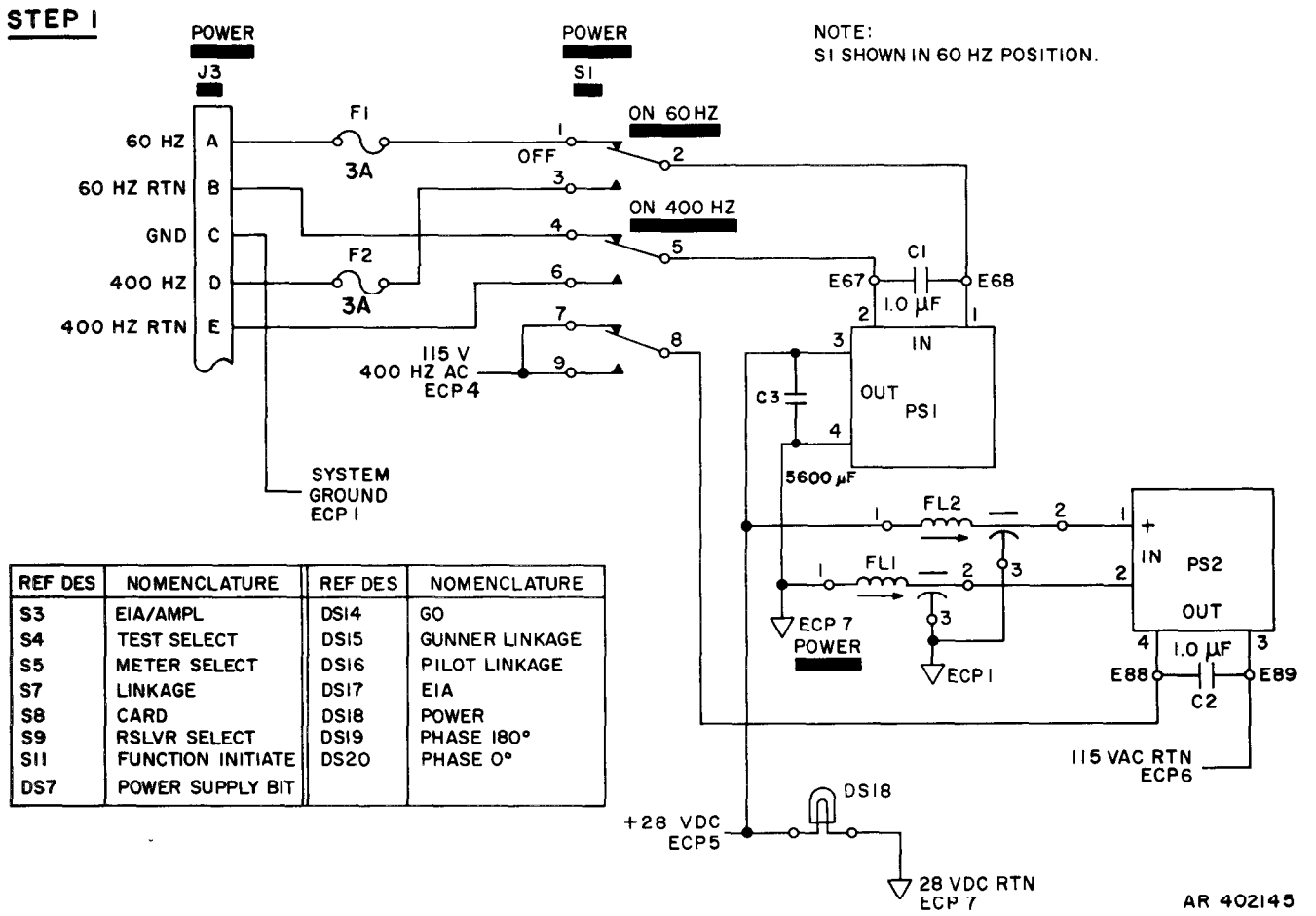
g. Mentally perform step 6 of table 3-3 and refer to step 6 in figure 2-2. Wiper 1 of S4-A connects +28 volts dc to contact 9 of S4-A, from which the voltage is connected to pin 28 of connector XA2. The voltage passes through CR16 on printed circuit card A2 and is routed through XA2-25 and through CR3 to energize relay K3. Contacts 1 and 2 of energized K3 apply a 28-volt ground to indicators DS14 through DS17. Pressing S11 connects +28 volts through wiper 1 and contact 9 of S4-B to energize K5 and K7, and through CR24 to provide a logic high at XA2-33. With XA2-31 open, the high activates the logic on card A2 to cause Q5 to provide a ground at XA2-27. A ground at XA2-27 lights DS7 because DS7-2 is connected to +28 volts. Indicators DS1 through DS6 znd DS8 through DS13 are connected to +28 volts. Energized contacts 1 and 2 of K5 connect +5 volts from XA12-32 through XA2-4 to the seven resistor and diode pairs shown in figure 2-2 and in foldout FO-3. The +5 volts turns on transistors Q2 through Q7 to provide grounds to light indicators DS1 through DS6. Energized contacts 5 and 4 of K5 provide grounds to light indicators DS8 through DS12. Energized contacts 1 and 2 of K7 connect +5 volts from XA12-32 to XA2-29, through the diode and resistor pair on card A2, and through XA2-24 to turn on Q1, which provides a ground to light DS13. Contacts 4 and 5 of energized K7 connect +28 volts through XA2-19 and through diodes CR22 through CR25 on card A2 to light indicators DS14 through DS17. POWER indicator DS18 lights as soon as power is turned on.

h. Mentally perform step 7 of table 3-3. Refer to step 7 of figure 2-2. Contact 2 and wiper 1 of S3-L connect 10 volts ac, phase angle 0 degrees, through contact 3 and wiper 1 of S4-I, through contacts 2 and 3 of S9, and through contact 8 and wiper 2 of S5-A to XA2-41 of phase detector card A2. The 10 volts ac, phase angle 0 degrees is also connected to XA2-34.

(l) Refer to foldout FO-3. The circuitry associated with PNP transistor Q4 and FET Q2 comprise a chopper which opens and closes the in-phase input at amplifier AR2-3. XA2-34 is connected to in-phase 10 volts ac, which becomes a reference for signals inserted for phase detection at XA2-41. The positive part of the reference signal from XA2-34 (fig. 2-1, waveform A) is conducted to ground through R11 and CR3. The drop across the junction of CR3 leaves Q4-B (waveform B) at +0.7 volt, which turns the transistor off, causing Q4C (waveform C) to go to -6 volts through R13. The -6 volts, in turn, pinches off FET Q2. When the reference signal goes negative, the drop across the emitter-to-base junction of PNP transistor Q4 causes the base to go to -0.7 volt and the transistor conducts, causing Q4-C to go to ground. When Q4-C goes to ground, it causes FET Q2 to conduct, which, in turn, grounds the signal on the noninverting input at AR2-3. Thus, the chopper circuit grounds the noninverting input to AR2 each time the reference signal at XA2-34 goes negative.

(2) If an in-phase signal (waveform D) is inserted for detection at XA2-41, the signal is connected to the inverting input of AR1. A low-amplitude signal is amplified 2.35 times and the output signal at AR1-6 (waveform E) is limited by 5.1-volt zener diodes CR1 and CR2. Thus, a low-amplitude signal will retain its original waveshape, while a signal exceeding 10.2 volts peak to peak will be limited at that value. The limited and inverted signal is applied through 200K resistor R4 to the inverting input at AR2-2. The theoretical output at AR2-6 (waveform F) will be an inverted square wave of the same amplitude as the input. The limited and inverted square wave from AR1-6 is also connected through R6 and R7 to the noninverting input at AR2-3. Since the input impedance 100K and the load resistance is 200K, the gain of the noninverting input is 2. The theoretical output at AR2-6 (waveform G) consists of amplified negative-going pulses only, since the positive-going pulses are grounded by the action of the chopper. The composite output of the two signals at AR2-6 (waveform H) is a series of negative pulses, the amplitude of which is the difference between the two waveforms. The faltering of R7, C2, and C3, and of C1 and R5, changes the signals to a dc level. The negative dc level at the base of Q1 keeps the transistor turned off. The negative dc level is applied to the inverting input at AR3-2. The output signal at AR3-6 (waveform I) is, effectively, a positive dc level, which turns on Q3, applying a ground at XA2-37 to light PHASE 0° indicator DS20 (fig. 2-2, step 7).

i. Mentally perform step 8 of table 3-3 and refer to step 8 in figure 2-2. Contact 3 and wiper 1 of S3-L connect 10 volts ac, phase angle 180 degrees, through the route described above to XA2-41. The out-of-phase signal (waveform J) is limited and inverted by AR1 and appears as an in-phase signal at AR1-6 (waveform K). The theoretical output of the signal at AR2-2 (inverting input) is an out-of-phase square wave (waveform L). The theoretical output of the signal at AR2-3 (noninverting input) is an in-phase amplified square wave (waveform M). The composite output of the two signals is a series of positive pulses (waveform N) that are, effectively, a dc level. The positive dc level turns on Q1, applying a ground at XA2-35 to light PHASE 180° indicator DS19 (fig. 2-2, step 8).



REF DES	NOMENCLATURE	REF DES	NOMENCLATURE
S3	EIA/AMPL	DS14	GO
S4	TEST SELECT	DS15	GUNNER LINKAGE
S5	METER SELECT	DS16	PILOT LINKAGE
S7	LINKAGE	DS17	EIA
S8	CARD	DS18	POWER
S9	RSLVR SELECT	DS19	PHASE 180°
S11	FUNCTION INITIATE	DS20	PHASE 0°
DS7	POWER SUPPLY BIT		

Figure 2-2. Test set self-test functional diagram (sheat 1 of 4)

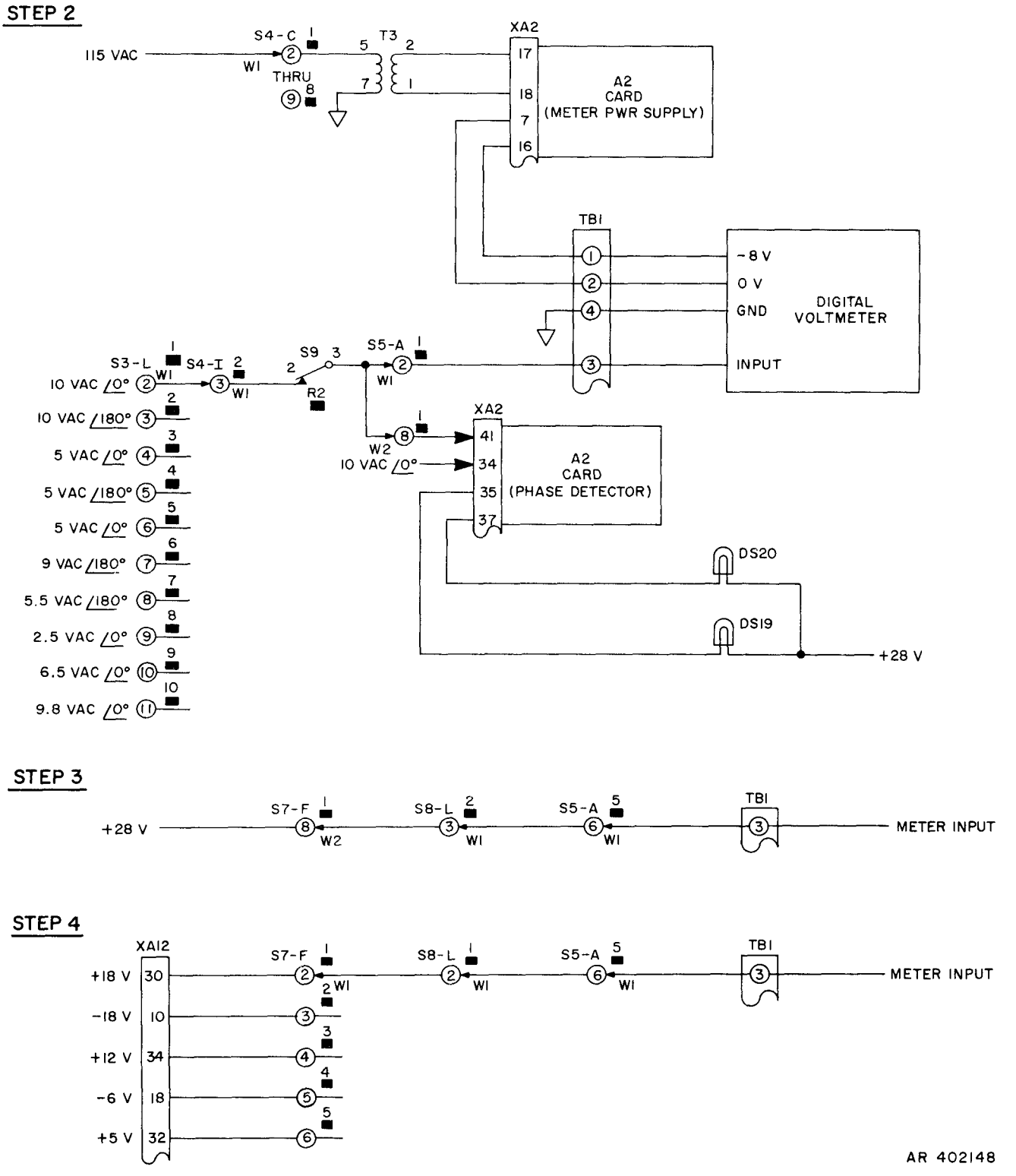


Figure 2-2. Test set self-test functional diagram (sheet 2 of 4)

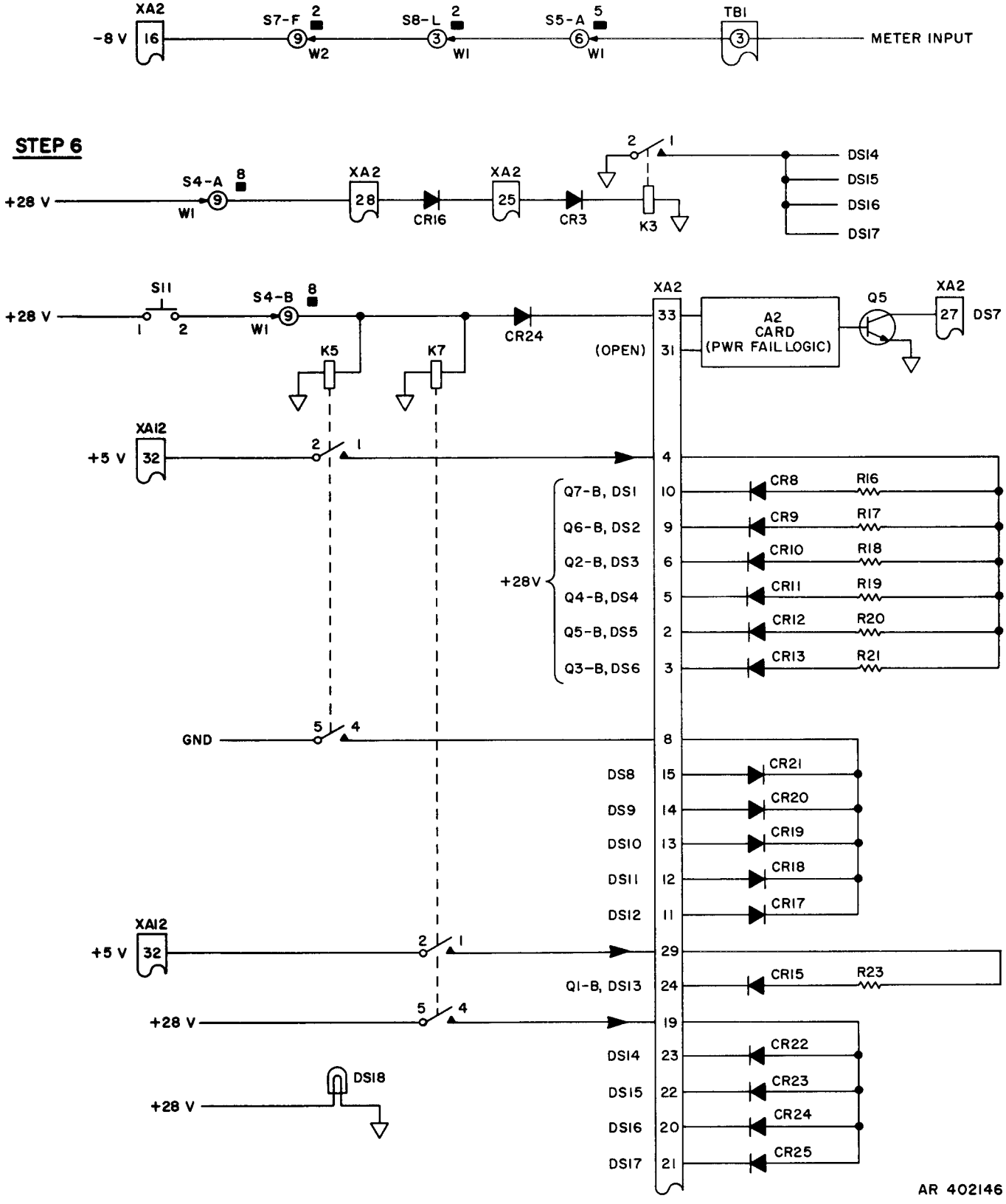


Figure 2-2. Test set self-test functional diagram (sheet 3 of 4)

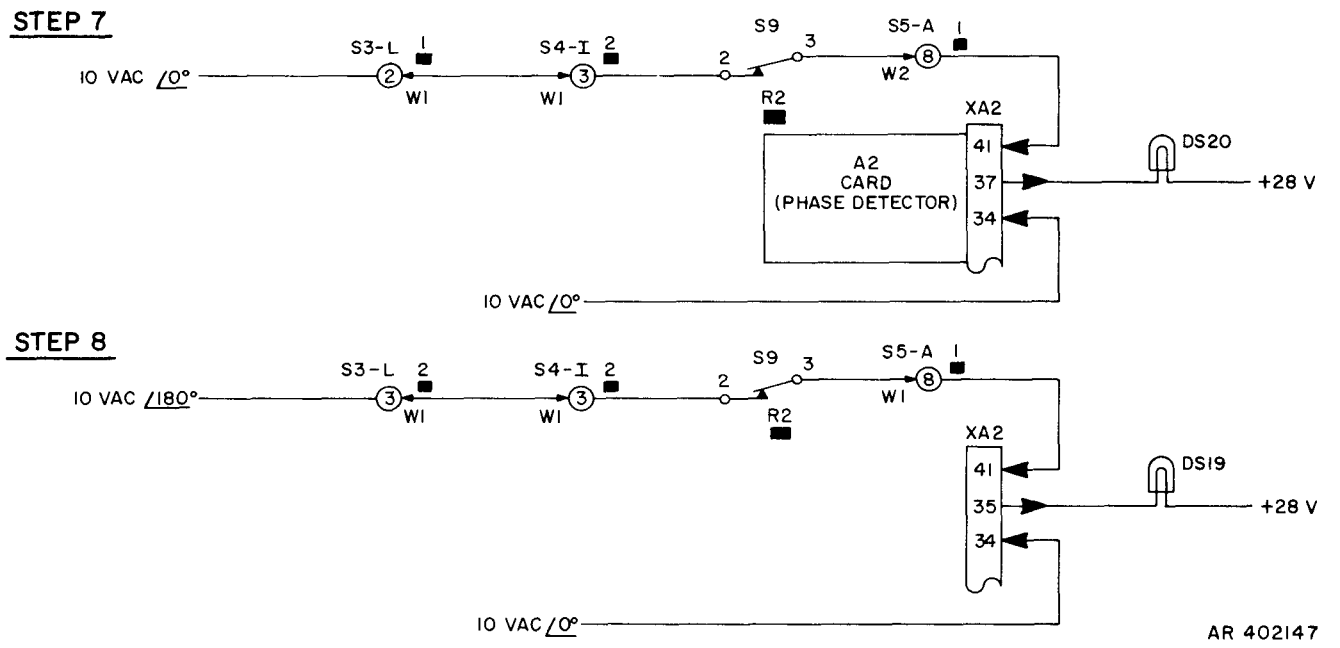


Figure 2-2. Test set self-test functional diagram (sheet 4 of 4)

Section III. HSS TEST THEORY

2-5. General.

The following reference materials are required to support the HSS test theory discussions:

a. HSS test table from TM 9-1270-212-14&P

b. EIA schematic diagrams from TM 9-1270-212-14&P

c. HSS test functional diagram (fig. 2-3)

d. Test cable W2 schematic diagram (foldout FO- 1)

e. Phase detector and light self-test card A2 schematic diagram (foldout FO-3).

2-6. HSS Test Theory.

a. To prepare for the HSS test theory discussion, refer to the HSS troubleshooting procedures in TM 9-1270-212-14&P and mentally perform steps *a* through *e.*

b. Refer to step 1 in figure 2-3 and in the HSS test table. Contact 6 of S4-A connects 28 volts dc through CR7 to energize K1. Energized K1 connects 115 volts ac to J1-J and 28 volts dc to J1-L, which apply power to the EIA. With SYSTEM switch S6 in position 1, pressing FUNCTION INITIATE switch S11 connects 28 volts dc through wiper 1 and contact 6 of S4-B and through wiper 1 and contact 2 of S6-B to XA2-33. J2-K, the power fail logic test signal from EIA power supply card A12, is connected through test cable W2 to J1-q and to XA2-31 in the test set. The power fail logic from the EIA under test is normally high. Refer to phase detector and light self-test A2 card schematic (foldout FO-3). The high is applied through XA2-31 to U1-1 on the test set A2 card. When S11 is pressed, the voltage divider consisting of R14 and R15 applies a high to U1-2. The low at U1-3 is inverted to a high at U1-6, which turns Q5 on. The resultant ground at XA2-27 completes the circuit for POWER SUPPLY BIT indicator DS7, which lights (fig. 2-3, step 1). When S11 is released, DS7 goes out. If the power fail logic signal at XA2-31 is low, DS7 does not light.

c. Refer to step 2 in figure 2-3 and in the HSS test table. Wiper 1 and contact 6 of S4-A apply 28 volts dc through wiper 2 and contact 9 of S6-B to K3-4. The output of S11 is connected through wiper 1 and contact 6 of S4-B and through wiper 1 and contact 3 of S6-B to J1-f and through CX3 to K3-5. When S11 is pressed, the momentary 28-volt dc signal becomes a BIT initiate for the EIA and K3 latches. The latched K3 applies returns for the four indicators that indicate the status of the EIA. If a linkage was bypassed at the beginning of step 2 in the HSS test table, the test set provided substitute voltages for the missing linkage. Steps 3 and 4 of the HSS test table isolate between a failed linkage and a failed EIA by having the test set provide the substitute voltages to the EIA. The test set substitute voltage connections are shown in steps 3 and 4 of figure 2-3.

d. Mentally set the EIA BIT switch to 2. The 28 volts dc is connected through wiper 1 and contact 6 of S4-A, through wiper 2 and contact 9 of S6-B, and through wiper 1 and contact 3 of S2-A to energize K4. When K4 energizes, it connects three reference voltages from variable resistors R8, R7, and R10 of the test set divider network (foldout FO-2) through wipers 1 and 2 and contacts 3 and 9 of S2-B and through wipers 1 and 2 and contacts 3 and 9 of S2-C, through J2 as six separate signals, and through branched test cable W2 by way of connectors P5 and P6 to linkage input connectors J3 and J4 on the EIA. The voltages provide an input for one or two bypassed linkages. If the failure repeats when S11 is pressed again, the EIA is faulty.

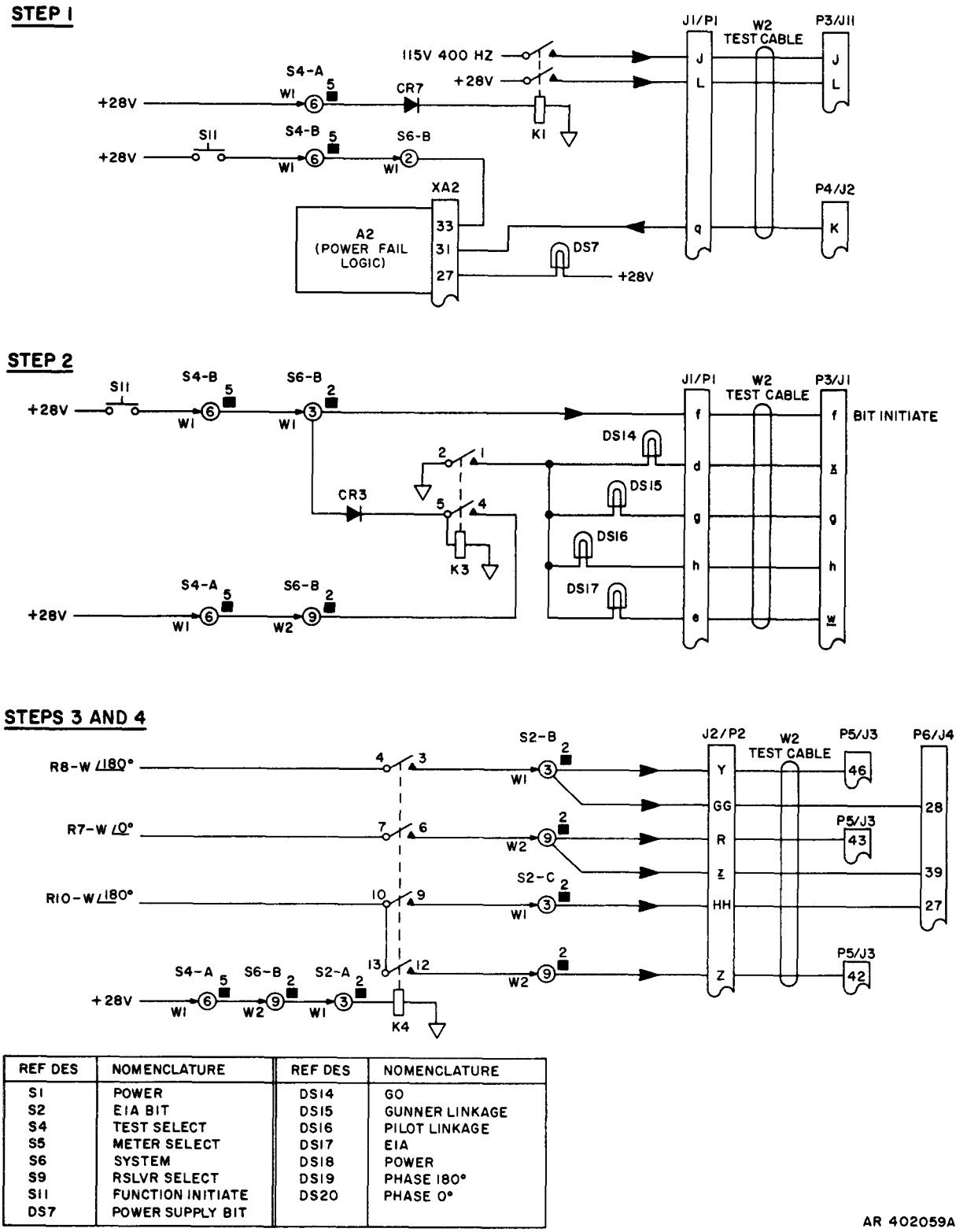
e. Should either or both linkages fail the EIA BIT of step 2 and subsequent testing fails to confirm a failure, an out-of-position BIT bracket on the front support of either or both linkages should be the cause. Steps 5, 6, and 7 check the gunner linkage channel of the EIA and steps 9, 10, and 11 check the pilot linkage channel of the EIA. The test setup procedure of step 5 in the HSS test table causes the test set to apply three signals to the EIA that simulate a turret or TSU position. Step 5 also applies a ground to one side of the four boresight potentiometers in the EIA, to eliminate any system noise on the potentiometer input lines to EIA amplifier card A13. The same signals are applied to the gunner and pilot inputs, and subsequent positioning of the test set METER SELECT and RSLVR SELECT switches connect the error signals generated by the EIA and linkages to the meter and phase detector, one at a time, to determine the voltage and phase of each signal. If a signal is outside the tolerance specified in the HSS table, the BIT bracket is moved until all three error signals are within tolerance.

f. Refer to figure 2-3, sheet 2. Five volts ac, phase angle 180 degrees, is connected through wiper 1 and contact 6 of S4-G, through wiper 1 and contact 5 of S6-D, and through test set connector J1-T and cable W2 to EIA connector

J1-T. The other two input simulation signals are connected to J1-S and J1-U of the EIA. With the linkages in their BIT brackets, three error signals of amplitude and phase specified in the HSS test table are connected from J1-P, -p, and -j of the EIA; through cable W2; through J1-P, -R, and -W of the test set connector; through the S9 connections shown on figure 2-3 for those test set pins; and through wipers 1 and 2 of S5-A to the test set meter and to the test set phase detector circuit on card A2. With S9 set to R2, the three error signal outputs of the gunner linkage are displayed as the METER SELECT switch is set to positions 2, 3, and 4, which correspond to steps 5, 6, and 7 in figure 2-3 and in the HSS test table. With S9 set to R3, the three error signal outputs of the pilot linkage are displayed as the METER SELECT switch is set to positions 2, 3, and 4, which correspond to steps 9, 10, and 11 in figure 2-3 and in the HSS test table.

NOTE

Steps 8 and 12 in the HSS test table are basically mechanical (adjustment of the linkage BIT bracket) and are not, therefore, specifically called out above.



REF DES	NOMENCLATURE	REF DES	NOMENCLATURE
S1	POWER	DS14	GO
S2	EIA BIT	DS15	GUNNER LINKAGE
S4	TEST SELECT	DS16	PILOT LINKAGE
S5	METER SELECT	DS17	EIA
S6	SYSTEM	DS18	POWER
S9	RSLVR SELECT	DS19	PHASE 180°
S11	FUNCTION INITIATE	DS20	PHASE 0°
DS7	POWER SUPPLY BIT		

Figure 2-3. HSS test functional diagram (sheet 1 of 2)

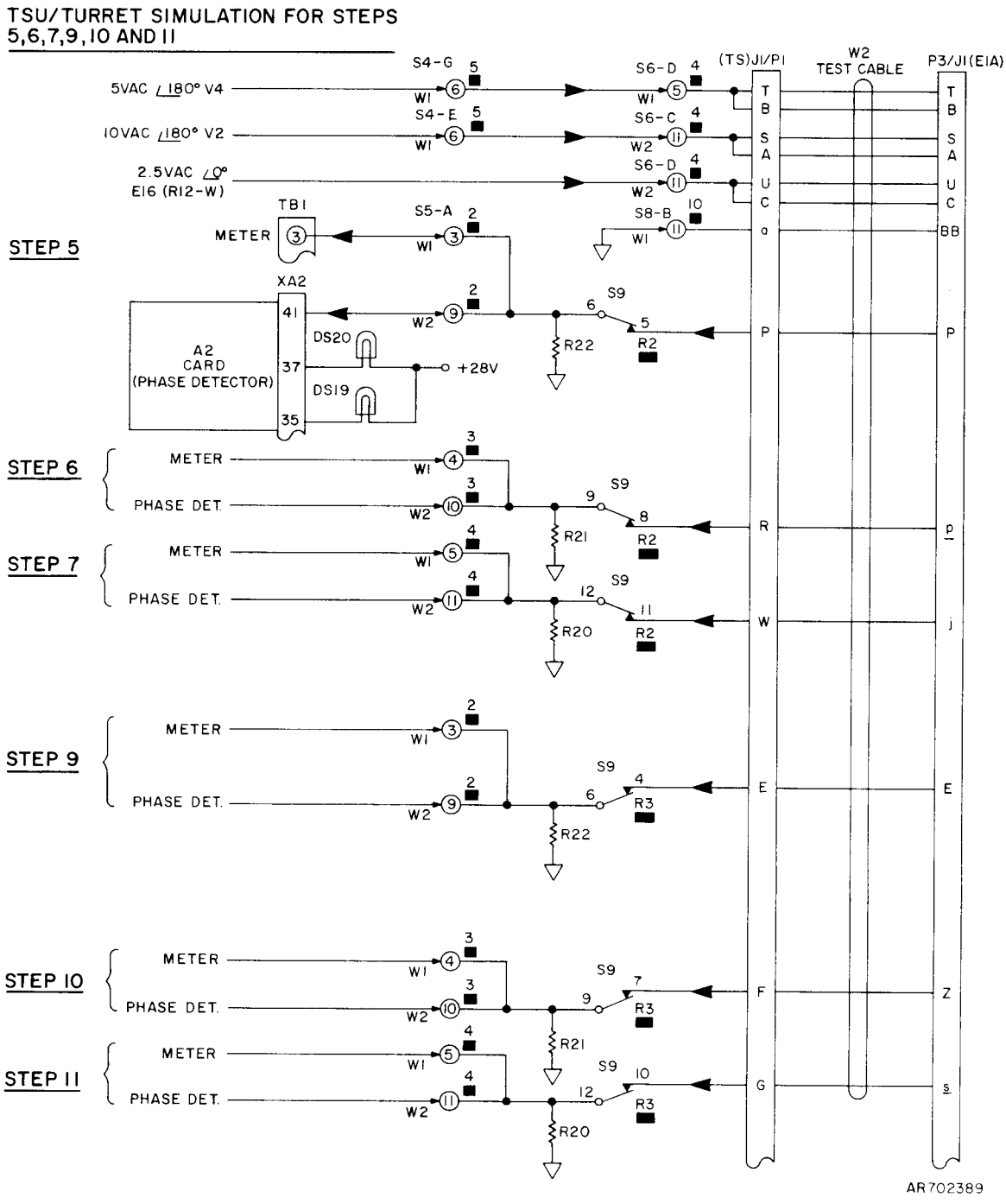


Figure 2-3. HSS test functional diagram (sheet 2 of 2)

Section IV. HELMET SIGHT ASSEMBLY TEST THEORY

2-7. General.

The following reference materials are required to support the helmet sight assembly test theory discussions:

a. Helmet sight assembly test table from TM 9-1270-212-14&P

b. Helmet sight assembly schematic diagram from TM 9-1270-212-14&P

c. Helmet sight assembly test functional diagram (fig. 2-4).

2-8. Helmet Sight Assembly Test Theory.

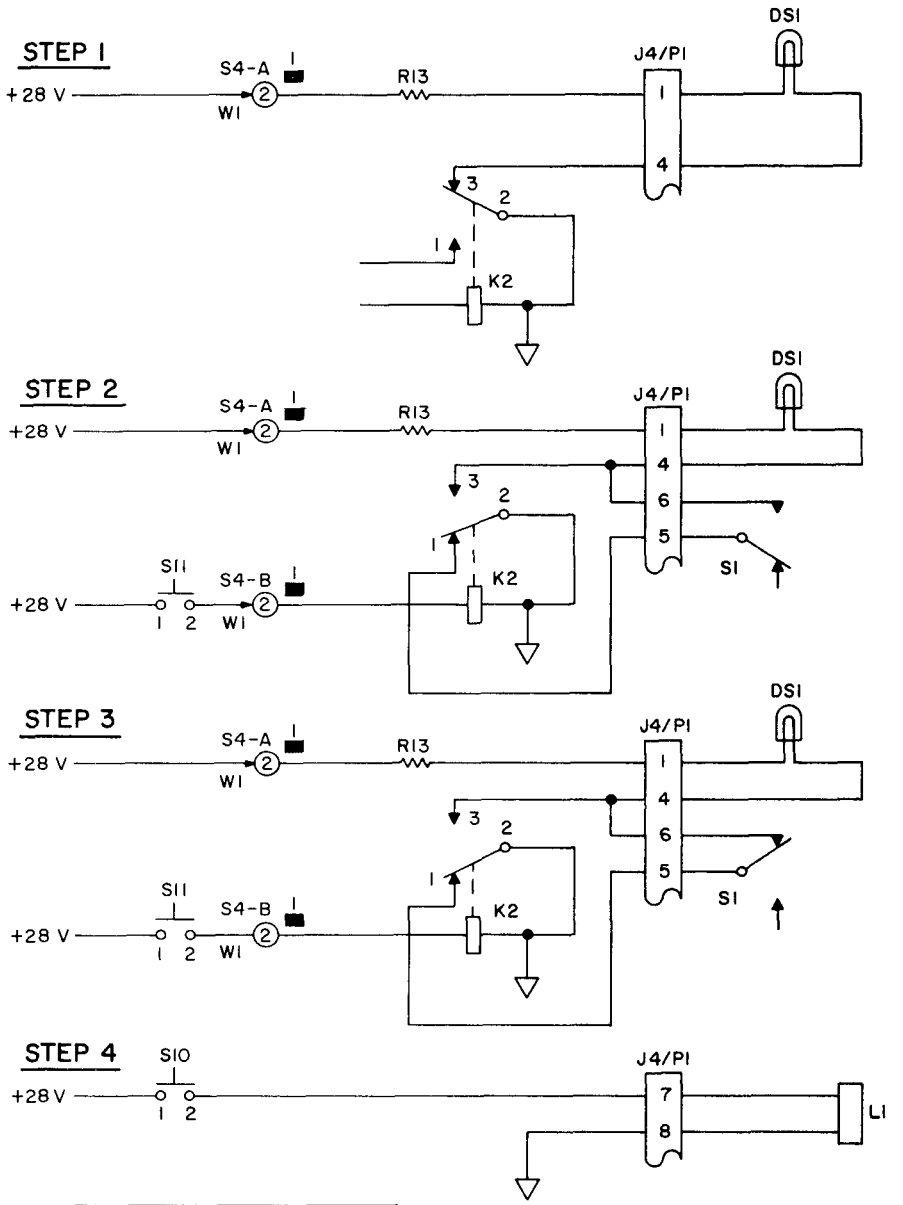
a. To prepare for the helmet sight assembly test discussion, refer to the helmet sight assembly checkout procedures in TM 9-1270-212-14&P and mentally perform steps *a* through *f.*

b. Refer to step 1 in figure 2-4 and in the helmet sight assembly test table. Wiper 1 and contact 2 of S4-A connect 28 volts dc through dropping resistor R13 and through J4-1 to helmet sight lamp assembly DS1. The return is connected through J4-4 and through K1-3 to ground.

c. Refer to step 2 in figure 2-4 and in the helmet sight assembly test table. The 28 volts is connected to helmet sight lamp assembly DS1 as explained in step 1. When S11 is pressed, contacts 1 and 2 of S11 and wiper 1 and contact 2 of S4-B connect 28 volts dc to energize K2. As S11 is pressed, DS1 should go out as the ground at J1-4 is removed. Note that when K2 is energized, a ground path is provided to switch S1 in the helmet sight. Without a steel receptacle attached to the magnet, switch S1 in the helmet sight should be open. If the switch is closed, the reticle will remain on.

d. Refer to step 3 in figure 2-4 and in the helmet sight assembly test table. The 28 volts is connected to helmet sight lamp assembly DS1 as explained in step 1. With the helmet boresight tool connected to the receptacle magnet, S1 in the helmet sight should be closed, causing the reticle to light. The return path is from J4-4, through J4-6, through S1, through J4-5, and through K2-1 and -2 to ground.

e. Refer to step 4 in figure 2-4 and in the helmet sight assembly test table. When S10 is pressed, it applies 28 volts dc to J4-7 and a return at J4-8, which causes retract solenoid L1 to energize.



REF DES	NOMENCLATURE
S1	POWER
S4	TEST SELECT
S10	SIGHT RETRACT
S11	FUNCTION INITIATE

Figure 2-4. Helmet sight assembly test functional diagram

Section V. LINKAGE ASSEMBLY TEST THEORY

2-9. General.

The following reference materials are required to support the linkage assembly test theory discussions:

a. Linkage assembly test table from TM 9-1270-212-14&P

b. Linkage assembly foldout schematic diagram from TM 9-1270-212-14&P

c. Linkage assembly test functional diagram (fig. 2-5).

2-10. Linkage Assembly Test Theory.

a. To prepare for the linkage assembly test theory discussion, refer to the linkage assembly checkout procedures in TM 9-1270-212-14&P and mentally perform steps *a* through *f.*

b. Refer to step 1 in figure 2-5 and in the linkage assembly test table. Wiper 1 and contact 5 of S4-A connect 28 volts dc to pin 4 of buffer amplifier AR1 and through wiper 1 and contact 2 of S7-A to K6, energizing K6. Contacts 4 and 5 of K6 connect 5 volts ac, phase angle 0 degrees, to pin 14 of AR1. Contacts 1 and 2 of K6 connect 10 volts ac, phase angle 0 degrees, to pin 6 of AR1. The five outputs of the buffer amplifier are connected as shown in figure 2-5 through banks A, B, and C of S7 and through test connector J5 to the linkage arm under test. The R2 output of resolver B1 in the arm is connected through J5-49, through contact 2 and wiper 1 of S7-D, through contact 5 and wiper 1 of S4-I, through contacts 2 and 3 of S9 set to position R2, and through contact 2 and wiper 1 of S5-A to XA2-41 of phase detector card A2, and through contact 8 and wiper 2 of S5-A to TB1-3. The meter displays the amplitude of the signal and DS19 or DS20 lights to indicate the phase of the signal. The linkage return signals are connected to ground through contact 5 and wiper 1 of S4-K.

c. Refer to step 2 in figure 2-5 and in the linkage assembly test table. Setting S9 to R3 connects the output of B1-R3 through J5-45, through contact 8 and wiper 2 of S7-D, through contact 5 and wiper 1 of S4-H, through contacts 1 and 3 of S9, and through S5-A to the meter and phase detector for display.

d. Refer to step 3 in figure 2-5 and in the linkage assembly test table. Setting S7 to position 2 connects the buffer amplifier through J5 to resolver B2 of the linkage arm under test. With S9 in position R2, the R2 output of the resolver is displayed on the meter and by the phase detector lights.

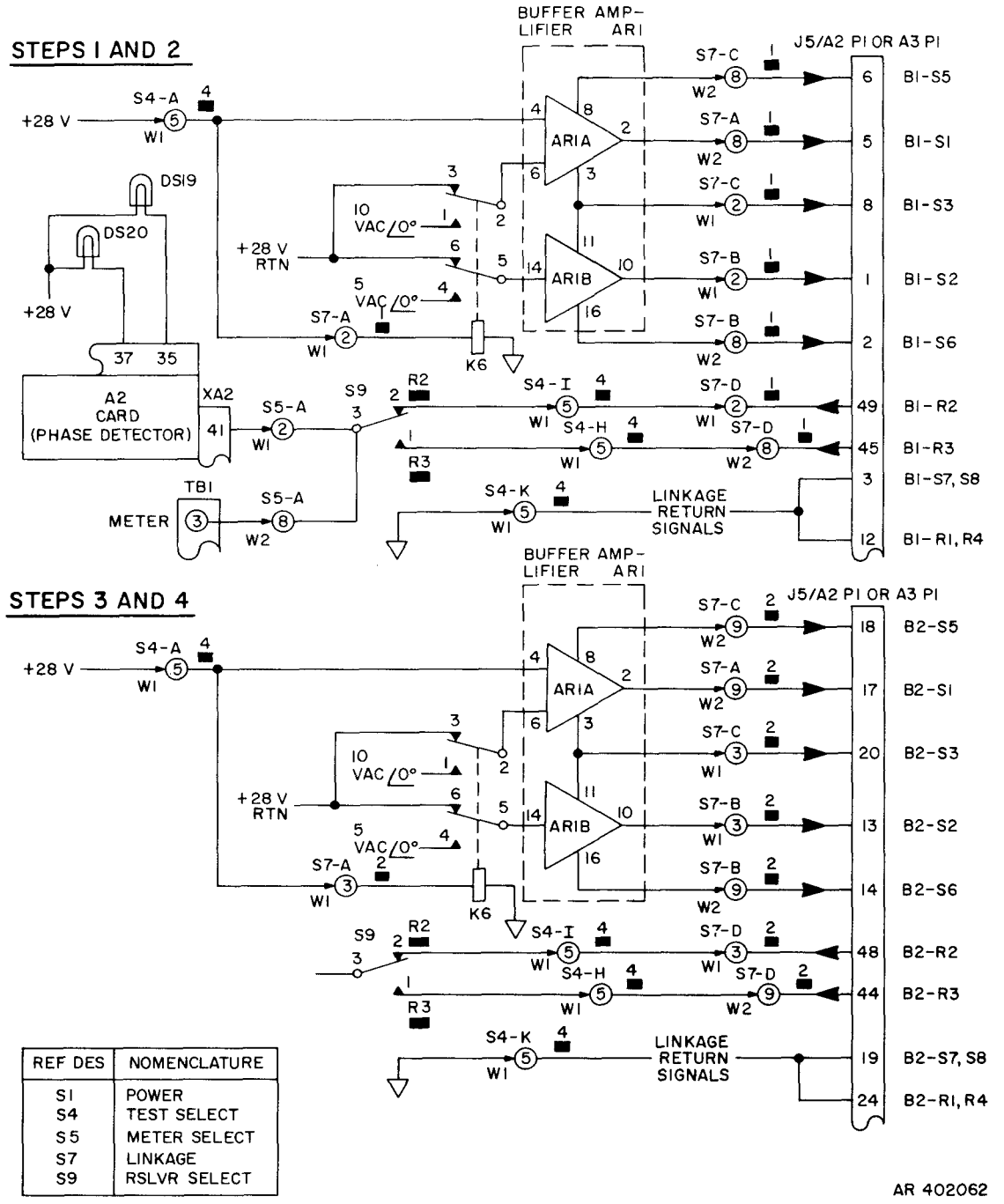
e. Refer to step 4 in figure 2-5 and in the linkage assembly test table. Setting S9 to R3 connects the R3 output of resolver B2 of the linkage arm under test to the meter and phase detector for display.

f. Refer to step 5 in figure 2-5 and in the linkage assembly test table. Setting S7 to position 3 connects the buffer amplifier through J5 to resolver B3 of the linkage arm under test. With S9 in position R2, the R2 output of the resolver is displayed on the meter and by the phase detector lights.

g. Refer to step 6 in figure 2-5 and in the linkage assembly test table. Setting S9 to R3 connects the R3 output of resolver B3 of the linkage arm under test to the meter and phase detector for display.

h. Refer to step 7 in figure 2-5 and in the linkage assembly test table. Setting S7 to position 4 connects the buffer amplifier through J5 to resolver B4 of the linkage arm under test. With S9 in position R2, the R2 output of the resolver is displayed on the meter and by the phase detector lights.

i. Refer to step 8 in figure 2-5 and in the linkage assembly test table. Setting S9 to R3 connects the R3 output of resolver B4 of the linkage arm under test to the meter and phase detector for display.



REF DES	NOMENCLATURE
S1	POWER
S4	TEST SELECT
S5	METER SELECT
S7	LINKAGE
S9	RSLVR SELECT

Figure 2-5. Linkage assembly test functional diagram (sheet 1 of 2)

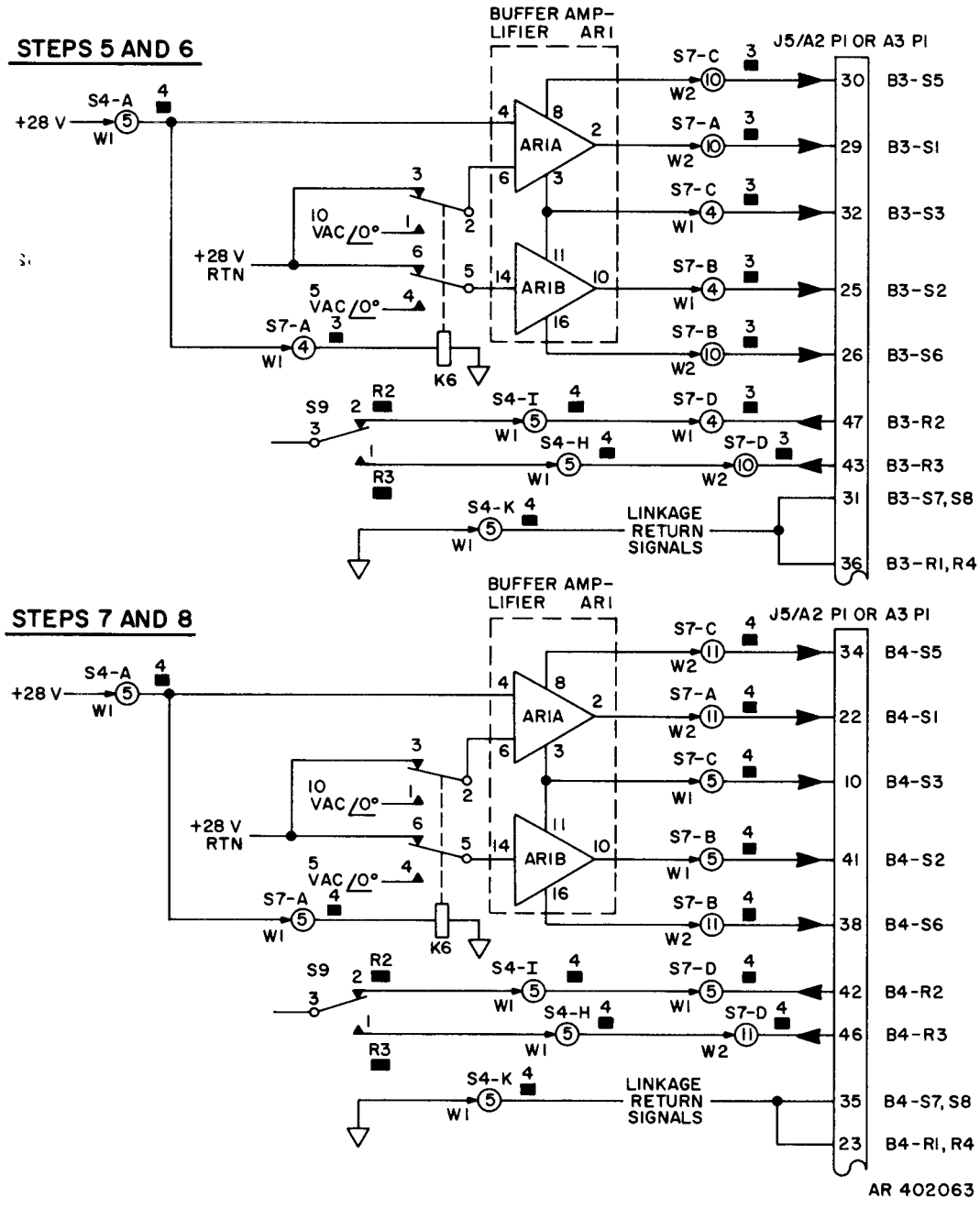


Figure 2-5. Linkage assembly test functional diagram (sheet 2 of 2)

Section VI. EIA TEST THEORY

2-11. General.

NOTE

The information in this section applies equally to both EIAs (from HSS XM128 and from HSS XM136) unless otherwise indicated. See TM 9-1270-212-14&P for correlation of the EIA part numbers with the HSS model numbers.

The following reference materials are required to support the EIA test theory discussions:

a. EIA test table from TM 9-1270-212-14&P

b. EIA foldout schematic diagrams from TM 9-1270-212-14&P

c. EIA test functional diagram (fig. 2-6).

2-12. EIA Test Theory.

a. To prepare for the EIA test theory discussion, refer to the EIA checkout procedures in TM 9-1270-212-14&P and mentally perform steps *a* through *f.*

NOTE

Where signal nomenclature differs between the two EIAs, the nomenclature applicable to the EIA from HSS XM128 is used as basic signal nomenclature and that for the EIA from HSS XM136 follows in parentheses.

b. Refer to step 1 in figure 2-6 and in the EIA test table. Wiper 1 and contact 3 of S4-A connect 28 volts dc through CR5 to energize K1 and through CR4 and through wiper 1 and contact 2 of S2-A to XA2-33 of card A2. If the power fail signal from the EIA under test through J2-K and J1-q to XA2-31 is a 5-volt high, the power fail logic circuitry on the A2 card will provide a ground for DS7 through XA2-27 and light the indicator. The 115-volt internal power to the test set is connected through wiper 1 and contact 3 of S4-C to T1-1 , T2-5, and T3-5.

c. Refer to step in figure 2-6 and in the EIA test table. With S4 in position 2, power is connected to the EIA as described in step *b.* The 28-volt power is also connected from S4-A, contact 2, through CR4 to energize K4. When K4 energizes, it connects three reference voltages from variable resistors R8, R7, and R10 of the test set divider network through wipers 1 and 2 and contacts 3 and 9 of S2-B and through wipers 1 and 2 and contacts 3 and 9 of S2-C, through J2 as six separate signals, and through branched test cable W2 by way of connectors P5 and P6 to connectors J3 and J4 of the EIA. The voltages are substitution signals for the linkages normally connected to J3 and J4. CR4 also applies 28 volts through wiper 1 and contact 3 of S2-A to contact 4 of K3. The output of S11 is connected through wiper 1 and contact 3 of S4-B, through wiper 2 and contact 9 of S2-A, and through CR3 to K3. When S11 is pressed, the momentary 28-volt signal becomes a BIT initiate for the EIA and K3 latches. Latched K3 applies returns for the four indicators that indicate the status of the EIA.

d. Refer to step 3 in figure 2-6 and in the EIA test table. Setting S2 to position 3 breaks the connection to J2-HH to test the gunner linkage fail logic in the EIA.

e. Refer to step 4 in figure 2-6 and in the EIA test table. Setting S2 to position 4 breaks the connection to J2-Z to test the pilot linkage fail logic in the EIA.

f. Refer to step 5 in figure 2-6 and in the EIA test table. Setting S2 to position 2 breaks the connection to J2-HH. Wiper 1 and contact 6 of S2-D apply a ground through R16 to J1-t, to J2-H, and to XA11, pin 4, in the EIA to force a simulated buffer amplifier failure.

g. Refer to step 6 in figure 2-6 and in the EIA test table. With S5 set to position 5 and S8 set to position 4, 14 volts dc is connected through J1-HH of the EIA, through the test cable to J1-FF, and through the switches and TB1-3 to the meter input. R24 simulates the series dc load of a typical pilot reticle lamp.

h. Refer to step 7 in figure 2-6 and in the EIA test table. Setting S8 to position 5 connects 14 volts dc from J2-GG of the EIA through J1-GG to the meter. R23 simulates the series dc load of a typical gunner reticle lamp.

i. Refer to step 8 in figure 2-6 and in the EIA test table. With S8 set to position 6, the output of the 28-volt regulated power supply in the EIA is connected through J2-W to the meter in the test set.

j. Refer to step 9 in figure 2-6 and in the EIA test table. Setting S8 to position 7 connects -18 volts from the EIA through J2-b to the meter in the test set.

k. Refer to step 10 in figure 2-6 and in the EIA test table. Setting S8 to position 8 connects 18 volts from the EIA through J2-a to the meter in the test set.

l. Refer to step 11 in figure 2-6 and in the EIA test table. Setting S8 to position 9 connects 12 volts from the EIA through J2-X to the meter in the test set.

m. Refer to step 12 in figure 2-6 and in the EIA test table. Setting S8 to position 10 connects 5 volts from the EIA through J2-Y to the meter in the test set.

n. Refer to step 13 in figure 2-6 and in the EIA test table. Setting S8 to position 11 connects -6 volts from the EIA through J2-Z to the meter in the test set.

o. Refer to step 14 in figure 2-6 and in the EIA test table. The output of T2-1 in the EIA is connected through J2-A, through J1-i, through contact 2 and wiper 1 of S3-K, through contact 3 and wiper 1 of S4-H, through contacts 1 and 3 of S9 set to position R3, and through contact 2 and wiper 1 of S5-A to the meter, and through contact 8 and wiper 2 of S5-A to the phase-determining input of card A2 at XA2-41.

p. Refer to step 15 in figure 2-6 and in the EIA test table. The output of T2-4 in the EIA is connected through J2-B, through J1-j, through contact 3 and wiper 1 of S3-K, and through the contacts described above to the meter and to the A2 card.

q. Refer to step 16 in figure 2-6 and in the EIA test table. Test signal A (test signal Pj) in the EIA is connected through J2-C, through J1-k, through contact 4 and wiper 1 of S3-K, and through the contacts described in *o* (step 14) to the meter and to the A2 card.

r. Refer to step 17 in figure 2-6 and in the EIA test table. Test signal B (test signal Pi) in the EIA is connected through J2-D, through J1-m, through contact 5 and wiper 1 of S3-K, and through the contacts described in *o* (step 14) to the meter and to the A2 card.

s. Refer to step 18 in figure 2-6 and in the EIA test table. Test signal C (test signal TR) in the EIA is connected through J2-E, through J1-n, through contact 6 and wiper 1 of S3-K, and through the contacts described in *o* (step 14) to the meter and to the A2 card.

t. Refer to step 19 in figure 2-6 and in the EIA test table. Test signal Gk from the EIA (from XM136) is connected through EIA J1-t, J2-A of the test set, contact 7 and wiper 1 of S3-K, and the contacts described in *o* (step 14) to the meter and to the A2 card. (Jl-t is not connected in the EIA from XM128.)

u. Refer to step 20 in figure 2-6 and in the EIA test table. Test signal Gi from the EIA (from XMl36) is connected through EIA J1-u, J2-B of the test set, contact 8 and wiper 1 of S3-K, and the contacts described in *o* (step 14) to the meter and to the A2 card. (J1-u is not connected in the EIA from XM128.)

v. Refer to step 21 in figure 2-6 and in the EIA test table. The output of T3-1, the pilot ac reticle output, is connected through J1-d, through J1-EE, through contact 9 and wiper 1 of S3-K, and through the contacts described in *o* (step 14) to the meter and to the A2 card. R26 in the test set simulates the parallel load of the three lamps in a typical pilot reticle lamp assembly.

w. Refer to step 22 in figure 2-6 and in the EIA test table. The output of T3-4, the gunner ac reticle output, is connected through J1-e, through J1-HH, through contact 10 and wiper 1 of S3-K, and through the contacts described in *o* (step 14) to the meter and to the A2 card. R25 in the test set simulates the parallel load of the three lamps in a typical gunner reticle lamp assembly.

x. Refer to step 23 in figure 2-6 and in the EIA test table. Test signal Gj from the EIA (from XM136) is connected through EIA J1-v, J2-b of the test set, contact 11 and wiper 1 of S3-K, and the contacts described in *o* (step 14) to the meter and to the A2 card. (Jl-v is not connected in the EIA from XM128.)

y. Refer to step 24 in figure 2-6 and in the EIA test table. The 5 volts ac, phase angle 0 degrees, is connected through wiper 1 and contact 4 of S4-F, through wiper 1 and contact 10 of S3-C, through J1-a, and through J1-BB to the in-phase end of variable resistors R1 through R4 in the EIA. The 5 volts ac, phase angle 180 degrees, is connected through wiper 1 and contact 4 of 84-G, through wiper 1 and contact 10 of S3-D, through J1-b, and through J1-CC to the out-of-phase end of variable resistors R1 through R4 in the EIA. The gunner azimuth error signal output from the A13 card in the EIA is connected through J1-P, through J1-P in the test set, through contacts 5 and 6 of S9 set to position R2, and through contact 3 and wiper 1 of S5-A and TB1-3 to the meter, and through contact 9 and wiper 2 of S5-A to XA2-41. With no input signal to the A13 card from the linkage, R2 is adjusted for a null. (The inputs to amplifier card Al3 in the EIA are grounded through EIA J3-43 and J4-39 to insure that the readout is not affected by these inputs during this zeroing.)

z. Refer to step 25 in figure 2-6 and in the EIA test table. With S5 set to position 3, the gunner elevation error signal output from the A13 card in the EIA is connected through J1-p, through J1-R, through contacts 8 and 9 of S9, and through S5A to the meter and A2 card for display. The other connections remain the same as in *v* (step 21). With no input signal to the A13 card from the linkage, R4 is adjusted for a null. (The inputs to amplifier card A13 in the EIA are grounded through EIA J3-46 and J4-28 to insure that the readout is not affected by these inputs during this zeroing.)

aa. Refer to step 26 in figure 2-6 and in the EIA test table. With other switch positions remaining the same and S9 set to position R3, the pilot azimuth error signal output from the A13 card in the EIA is connected through J1-Z, through J1-F, through contacts 7 and 9 of S9, and through S5-A to the meter and A2 card for display. With no input signal to the A13 card from the linkage, R3 is adjusted for a null. (The inputs to amplifier card A13 in the EIA are grounded as in *z* (step 25).)

ab. Refer to step 27 in figure 2-6 and in the EIA test table. With other switch positions remaining the same and S5 set to position 2, the pilot elevation error signal output from the A13 card in the EIA is connected through J1-E, through J1-E in the test set, through contacts 4 and 6 of S9, and through contact 3 and wiper 1 of S5-A to the meter, and through contact 9 and wiper 2 of S5-A to the A2 card. With no input signal to the A13 card from the linkage, R1 is adjusted for a null. (The inputs to amplifier card A13 are grounded as in *y* (step 24).)

ac. Refer to step 28 in figure 2-6 and in the EIA test table. The 10 volts ac, phase angle 0 degrees, is connected through wiper 1 and contact 4 of S4-D, through wiper 1 and contact 2 of S3-A, through J1-B, and through J1-B of the EIA as one simulated turret input. The 5 volts ac, phase angle 0 degrees, is connected through wiper 1 and contact 4 of S4-F, through wiper 1 and contact 2 of S3-C, through J1-A, and through J1-A of the EIA as another simulated turret input. These inputs excite buffer amplifier A1 in the EIA and the buffer amplifier outputs are brought to the resolver in the test set for readout. The buffer amplifier outputs at J3-5, -6, -1, -2, -8, and -3 are connected respectively through J1-x, -AA, -Y, -BB, and -z, and through J2-a of the test set to test set resolver B1. The R2 output of test set resolver B1 is connected through contact 4 and wiper 1 of S4-I, through contacts 2 and 3 of S9 set to position R2, and through S5-A to the meter and phase detector card A2 for readout.

ad. Refer to step 29 in figure 2-6 and in the EIA test table. With other switch positions remaining the same and S9 set to position R3, the R3 output of test set resolver B1 is connected to the meter and A2 card for readout. This test checks buffer amplifier A1.

ae. Refer to step 30 in figure 2-6 and in the EIA test table. Setting S3 to position 2 connects the same excitation inputs to buffer amplifier A3 in the EIA as were connected to A1. The buffer amplifier outputs are connected to the test set resolver as shown in figure 2-6. The R2 output from the test set resolver is connected for readout on the meter and A2 card.

af. Refer to step 31 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

ag. Refer to step 32 in figure 2-6 and in the EIA test table. Setting S3 to position 3 connects the excitation inputs to buffer amplifier A5 in the EIA. With S9 set to position R2, the R2 output of the test set resolver is connected to the meter and A2 card for readout.

ah. Refer to step 33 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

ai. Refer to step 34 in figure 2-6 and in the EIA test table. Setting S3 to position 4 connects the excitation inputs to buffer amplifier A7 in the EIA. With S9 set to position R2, the R2 output of the test set resolver is connected to the meter and A2 card for readout.

aj. Refer to step 35 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

ak. Refer to step 36 in figure 2-6 and in the EIA test table. Setting S3 to position 5 connects the excitation inputs to buffet amplifier A2 in the EIA. With S9 set to position R2. the R2 output of the test set resolver is connected to the meter and A2 card.

al. Refer to step 37 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

am. Refer to step 38 in figure 2-6 and in the EIA test table. Setting S3 to position 6 connects the excitation inputs to buffer amplifier A4 in the EIA. With S9 set to

position R2, the R2 output of the test set resolver is connected to the meter and A2 card.

an. Refer to step 39 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

ao. Refer to step 40 in figure 2-6 and in the EIA test table. Setting S3 to position 7 connects the excitation inputs to buffer amplifier A6 in the HA. With S9 set to position R2, the R2 output of the test set resolver is connected to the meter and A2 card.

up. Refer to step 41 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

aq. Refer to step 42 in figure 2-6 and in the EIA test table. Setting S3 to position 8 connects the excitation inputs to buffer amplifier A8 in the HA. With S9 set to ~sition R2, the R2 output of the test set resolver is connected to the meter and A2 card.

ar. Refer to step 43 in figure 2-6 and in the EIA test table. Setting S9 to position R3 connects the R3 output of the test set resolver to the meter and A2 card for readout.

as. Refer to step 44 in figure 2-6 and in the EIA test table. A ground is connected through wiper 1 and contact 12 of S8-B, through J1-v, through J2-P, and through J7-2 to relays K1, K2, and K3 in buffer amplifier A3 in the EIA. The energized relays apply fixed inputs to the buffer amplifier and connect its output to the test resolver in the EIA. The R2 output from the EIA test resolver is connected through J2-R, through J1-P, through contact 2 and wiper 1 of S4-1, and through contacts 2 and 3 of S9 to the meter and A2 card for readout.

at. Refer to step 45 in figure 2-6 and in the EIA test table. With S9 set to position R3, the R3 output from the EIA test resolver is connected through J2-S, through Jl-H, through contact 2 and wiper 1 of S4-1, and through contacts 1 and 3 of S9 to the meter and A2 card for readout.

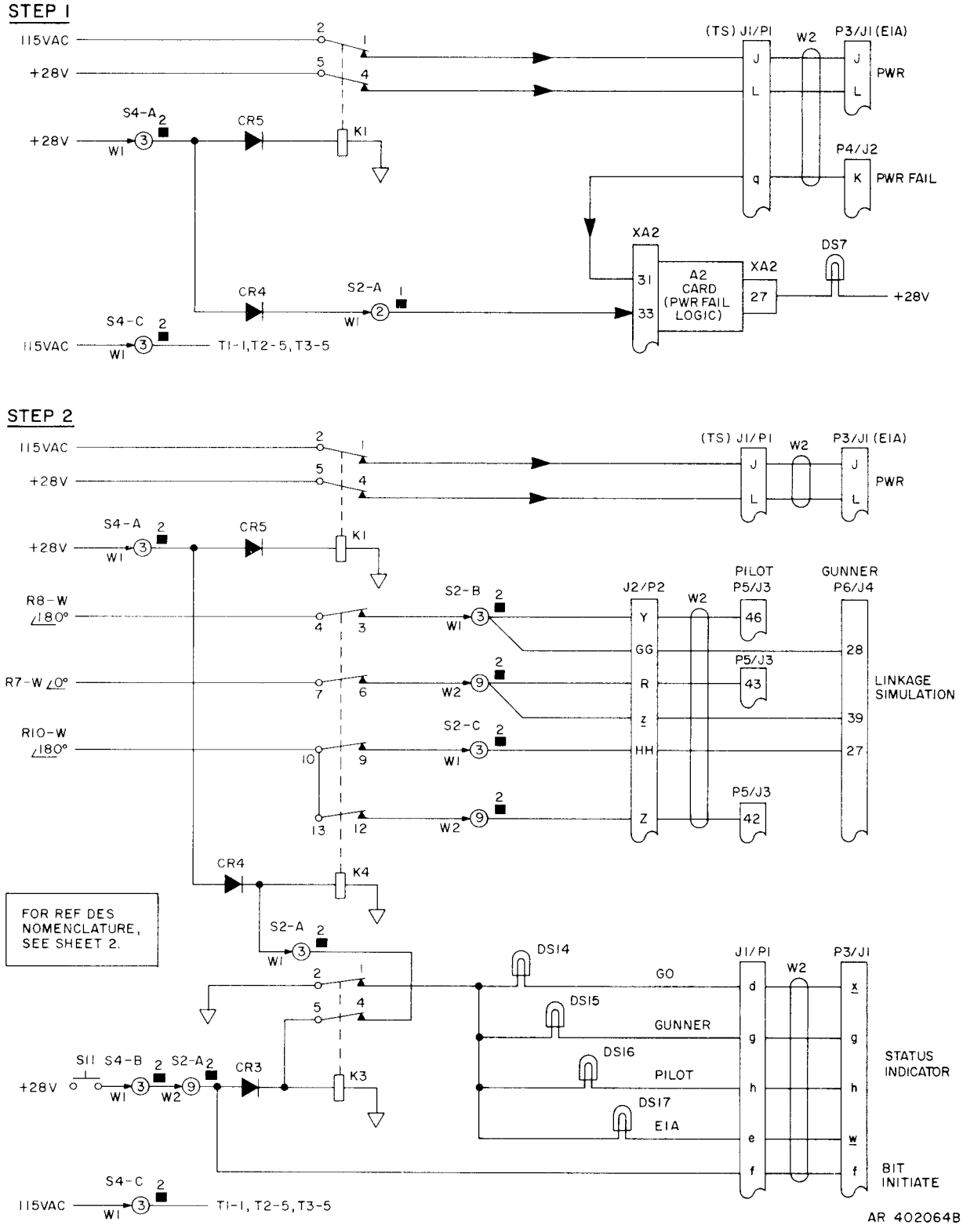
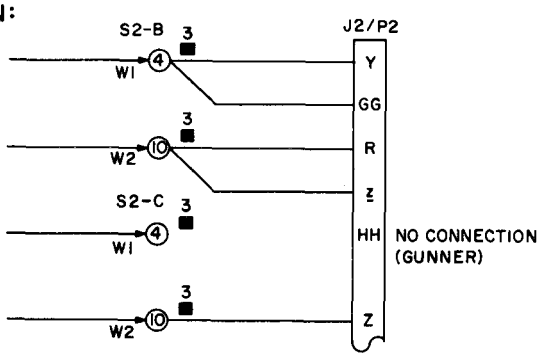


Figure 2-6. Electronic interface assembly test functional diagram (sheet 1 of 15)

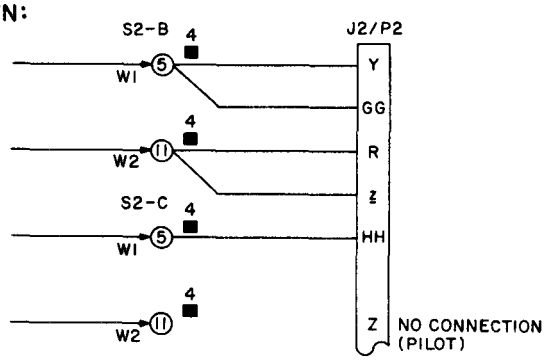
STEP 3

SAME AS STEP 2 EXCEPT AS SHOWN:



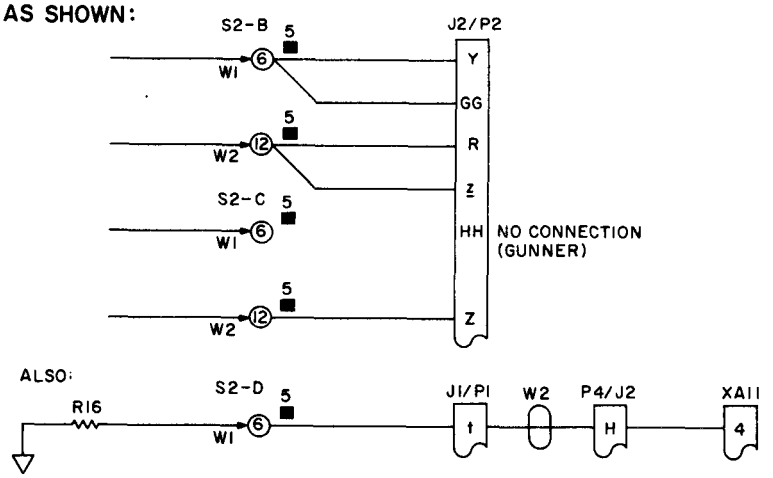
STEP 4

SAME AS STEP 2 EXCEPT AS SHOWN:



STEP 5

SAME AS STEP 2 EXCEPT AS SHOWN:



REF DES	NOMENCLATURE	REF DES	NOMENCLATURE	REF DES	NOMENCLATURE
S2	EIA BIT	S8	CARD	DS16	PILOT LINKAGE
S3	EIA/AMPL	S9	RSLVR SELECT	DS17	EIA
S4	TEST SELECT	DS7	POWER SUPPLY BIT	DS19	PHASE 180°
S5	METER SELECT	DS14	GO	DS20	PHASE 0°
S7	LINKAGE	DS15	GUNNER LINKAGE		

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Figure 2-6. Electronic interface assembly test functional diagram (sheet 2 of 15)

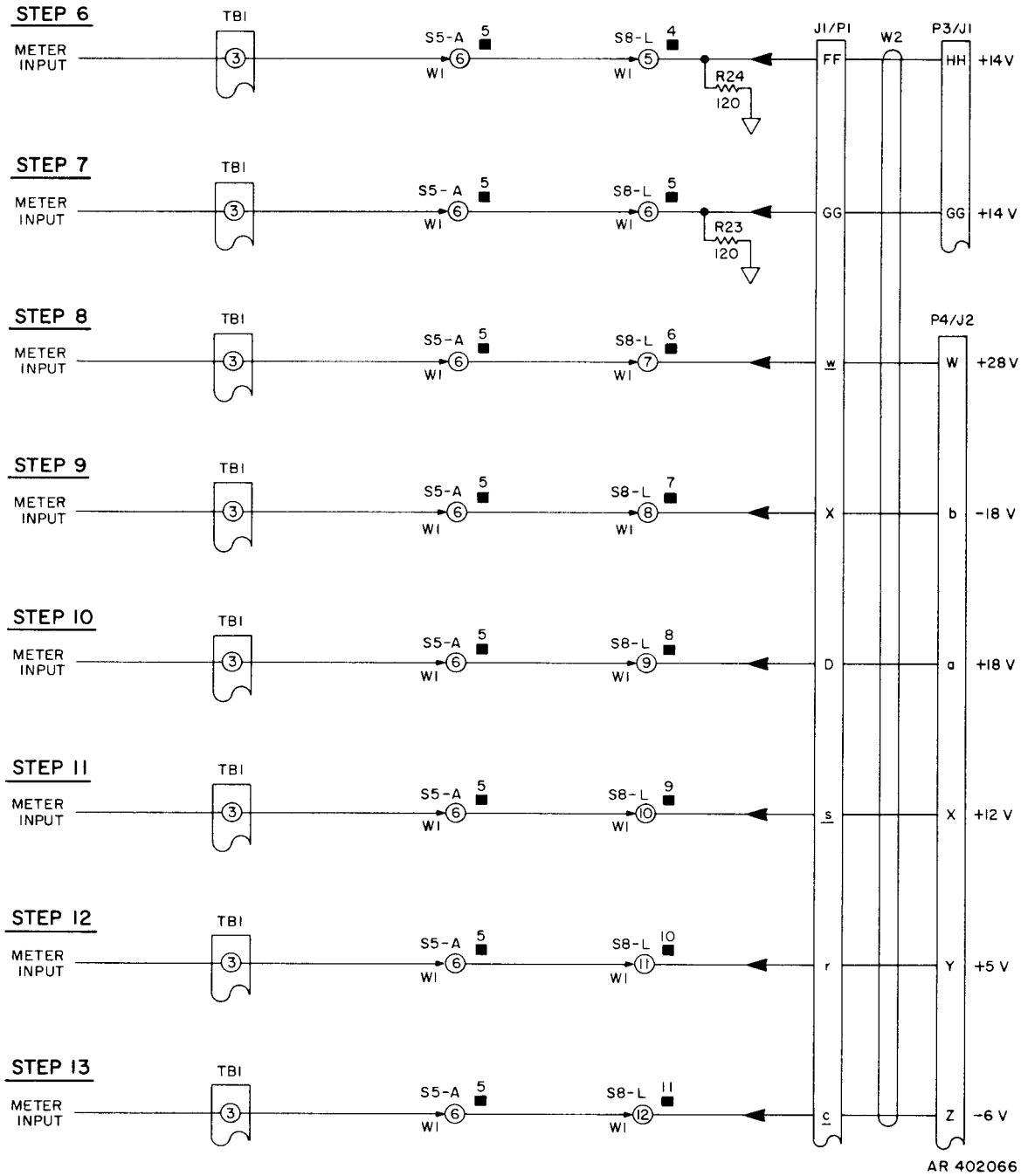


Figure 2-6. Electronic interface assembly test functional diagram (sheet 3 of 15)

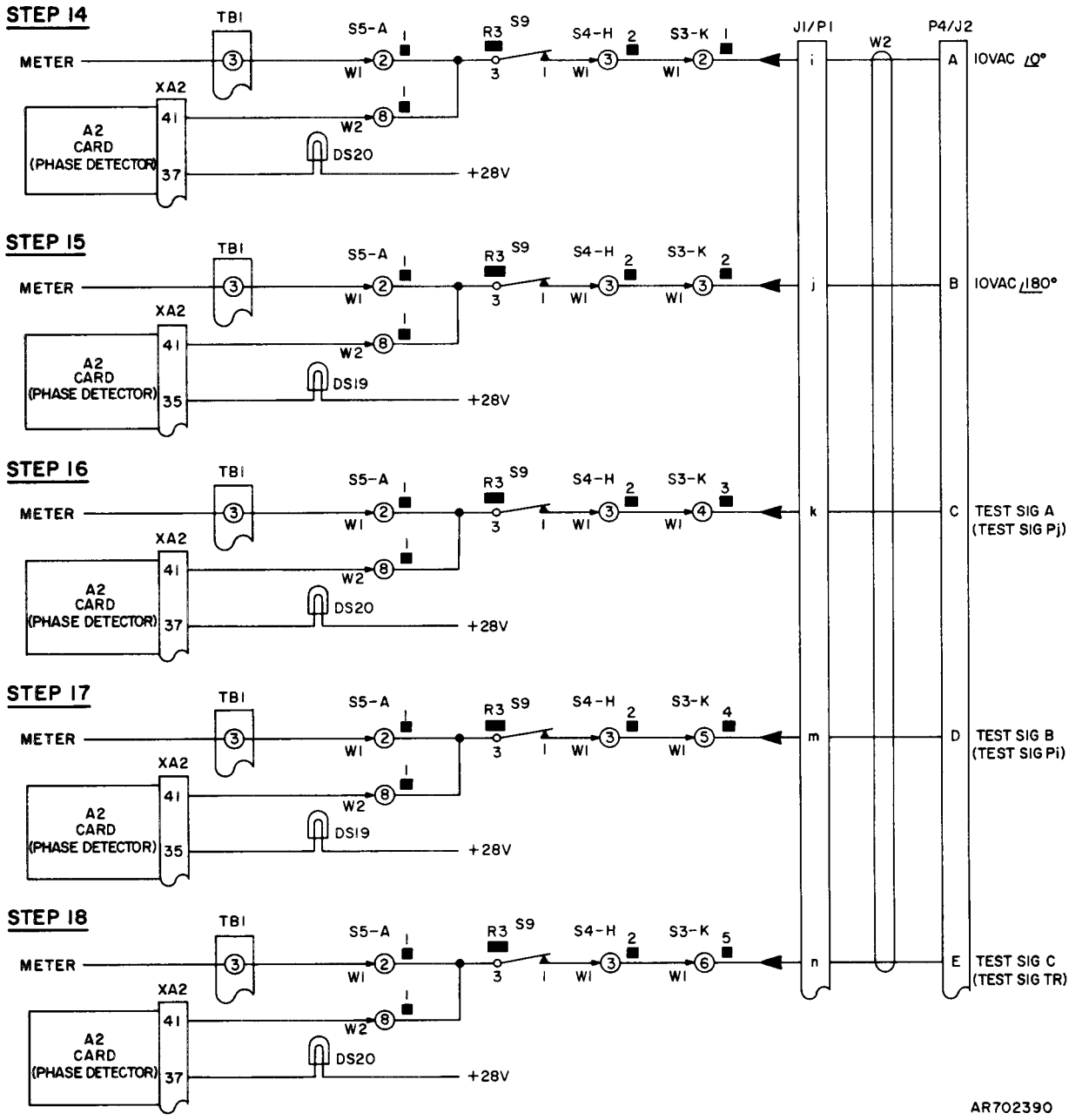


Figure 2-6. Electronic interface assembly test functional diagram (sheet 4 of 15)

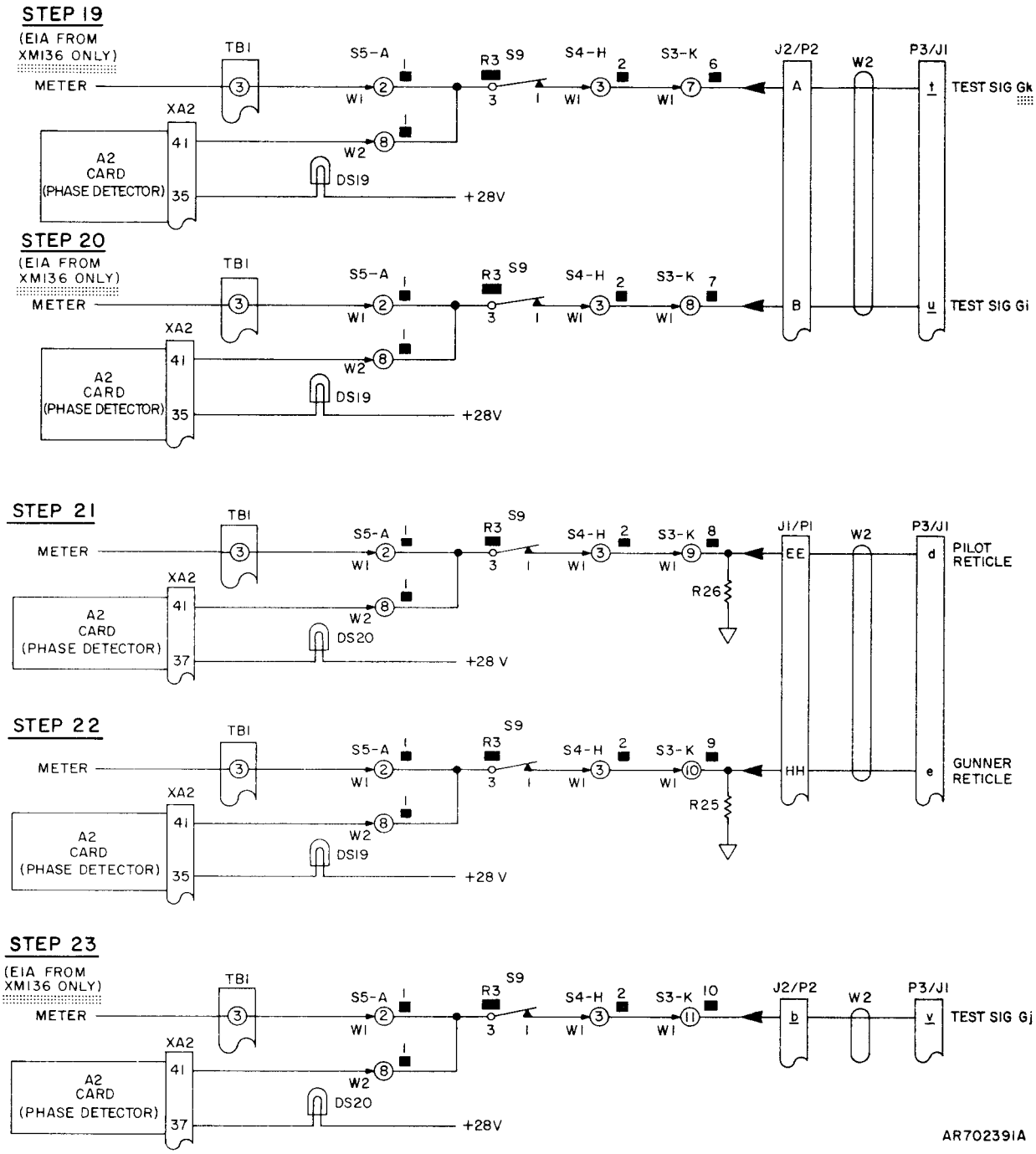


Figure 2-6. Electronic interface assembly test functional diagram (sheet 5 of 15)

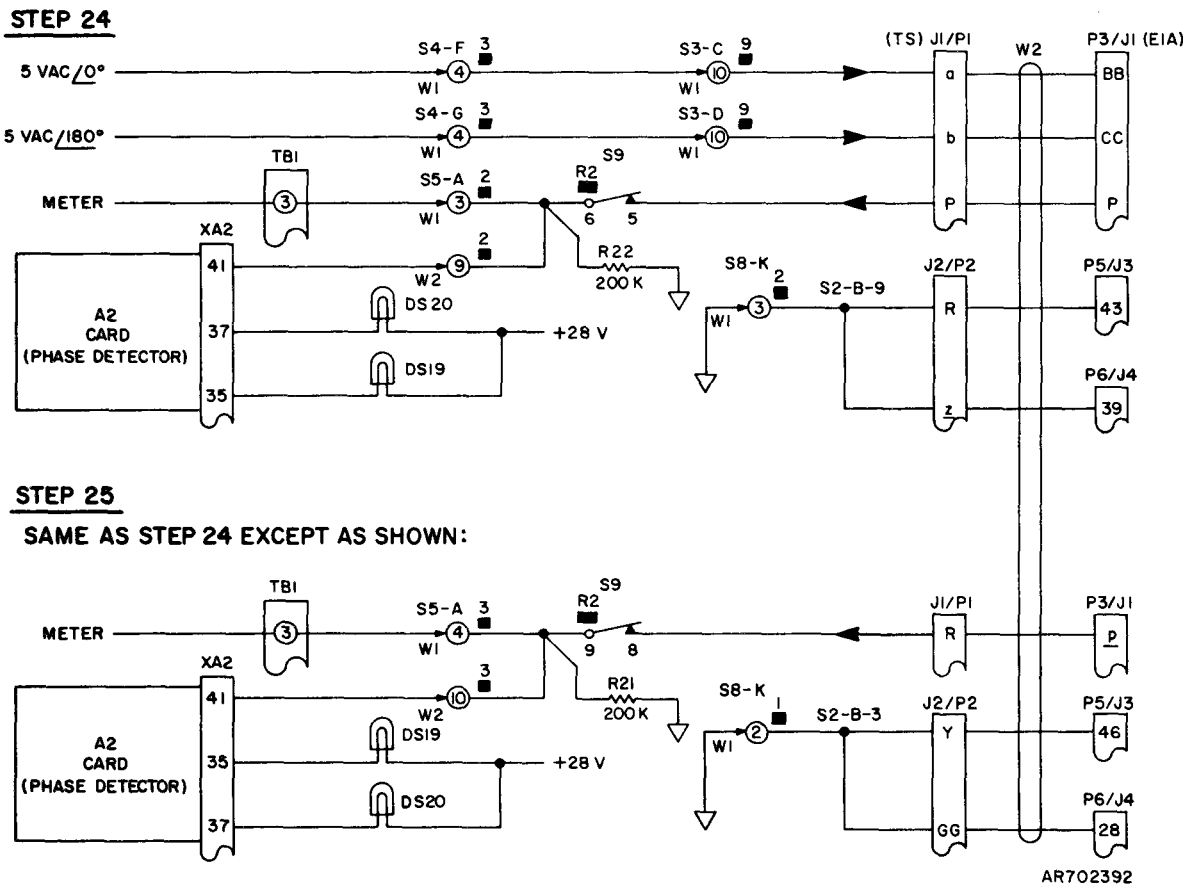


Figure 2-6. Electronic interface assembly test functional diagram (sheet 6 of 15)

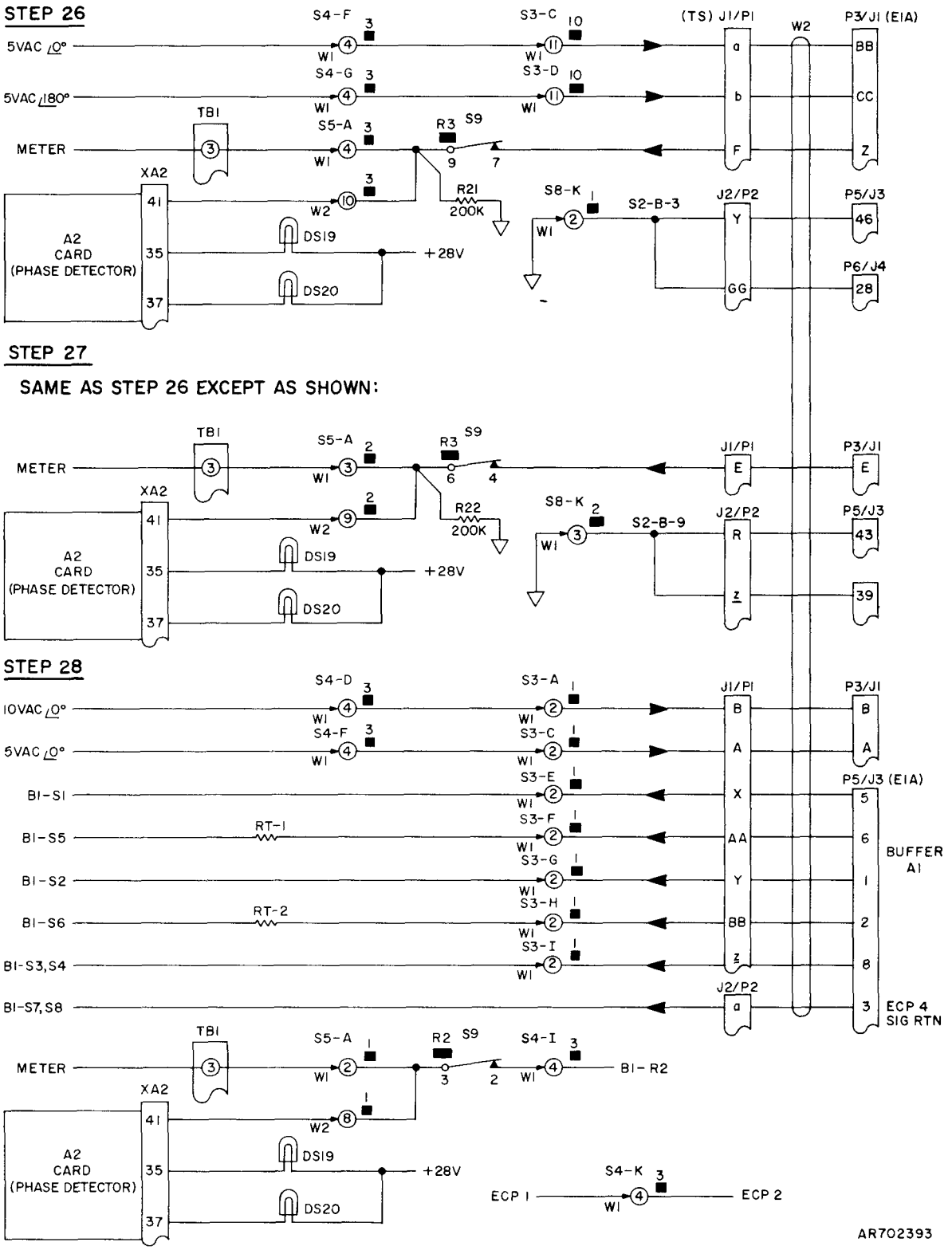


Figure 2-6. Electronic interface assembly test functional diagram (sheet 7 of 15)

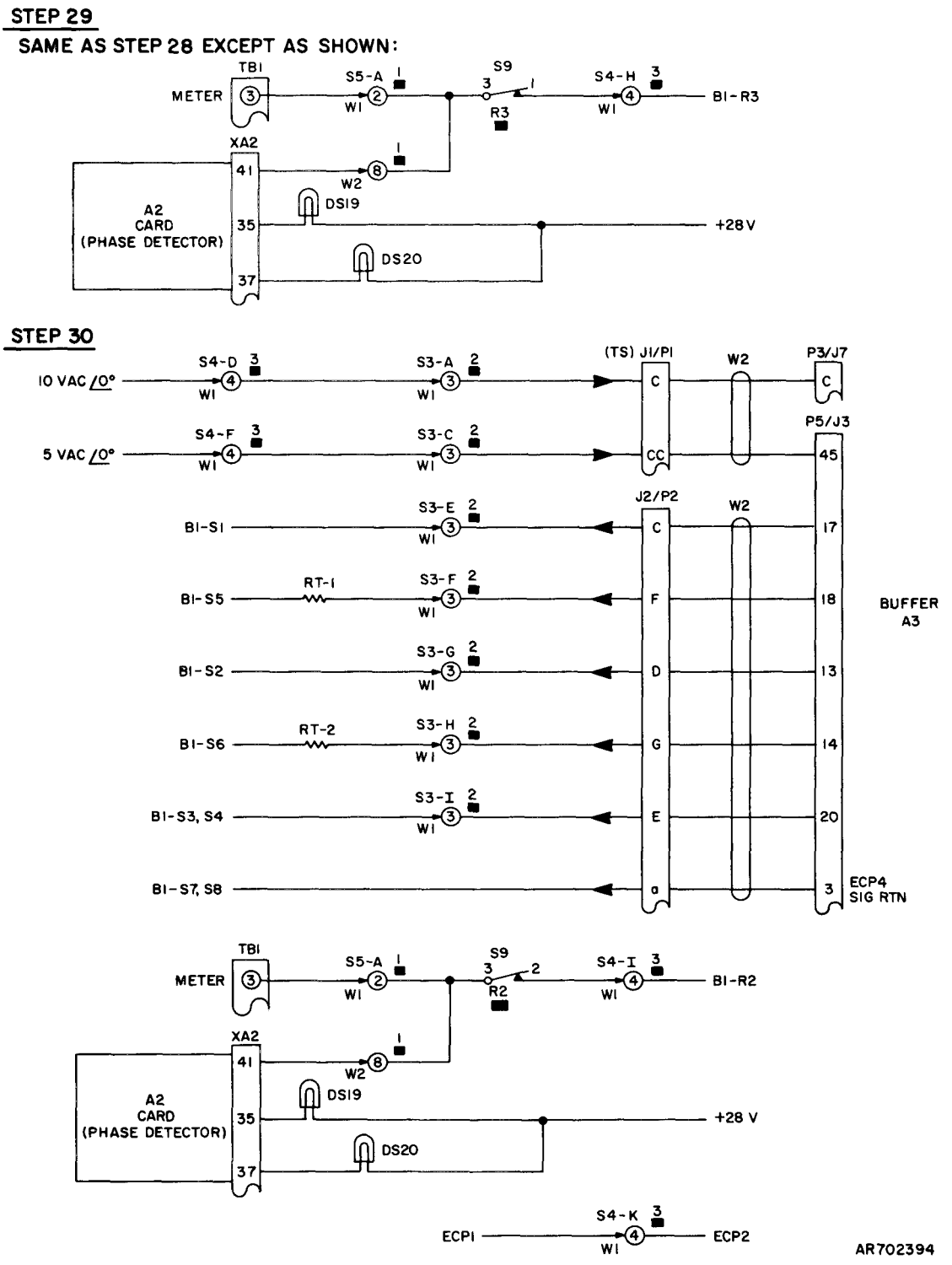


Figure 2-8. Electronic interface assembly test functional diagram (sheet 8 of 15)

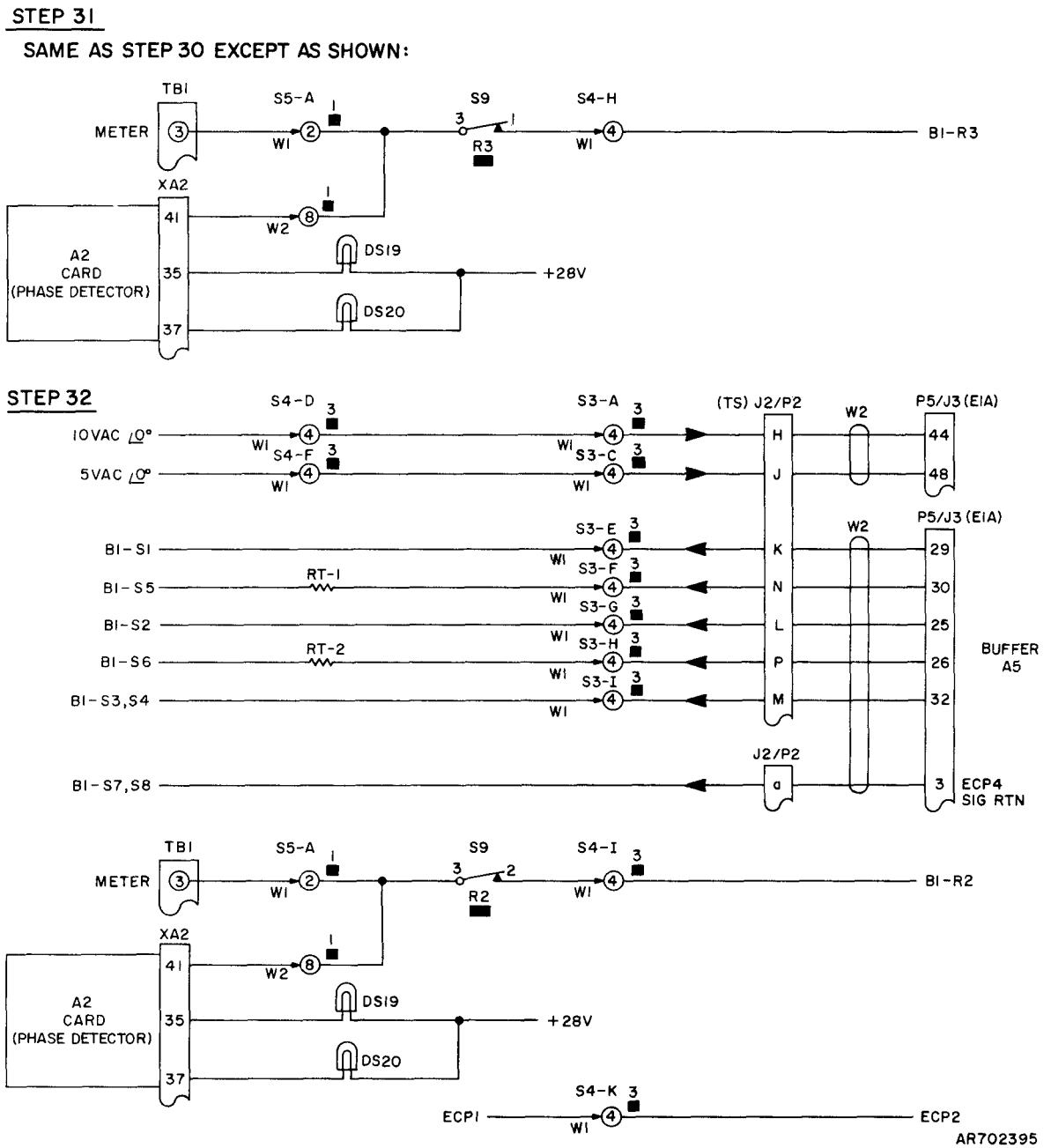


Figure 2-6. Electronic interface assembly test functional diagram (sheet 9 of 15)

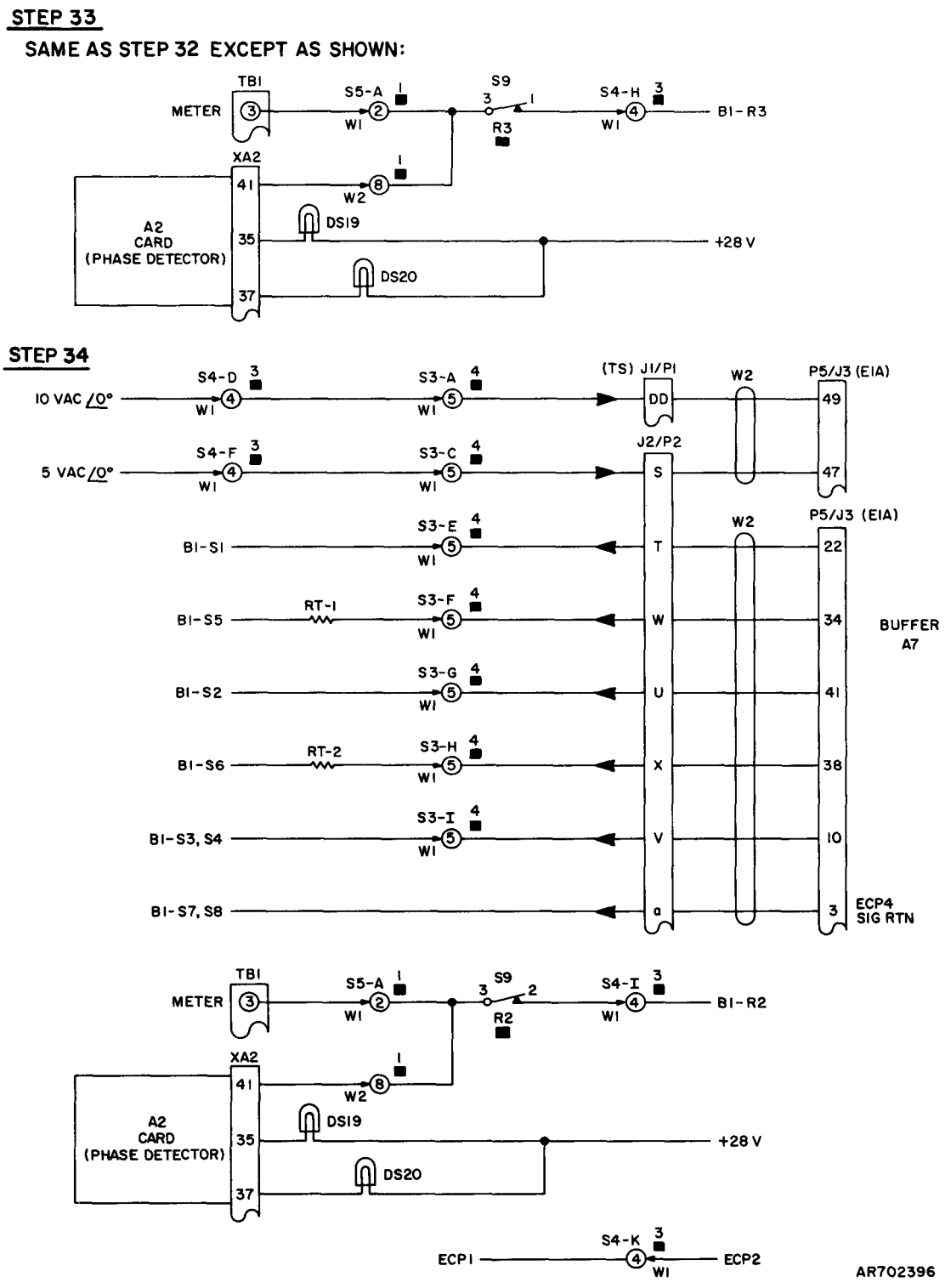


Figure 2-6. Electronic interface assembly test functional diagram (sheet 10 of 15)

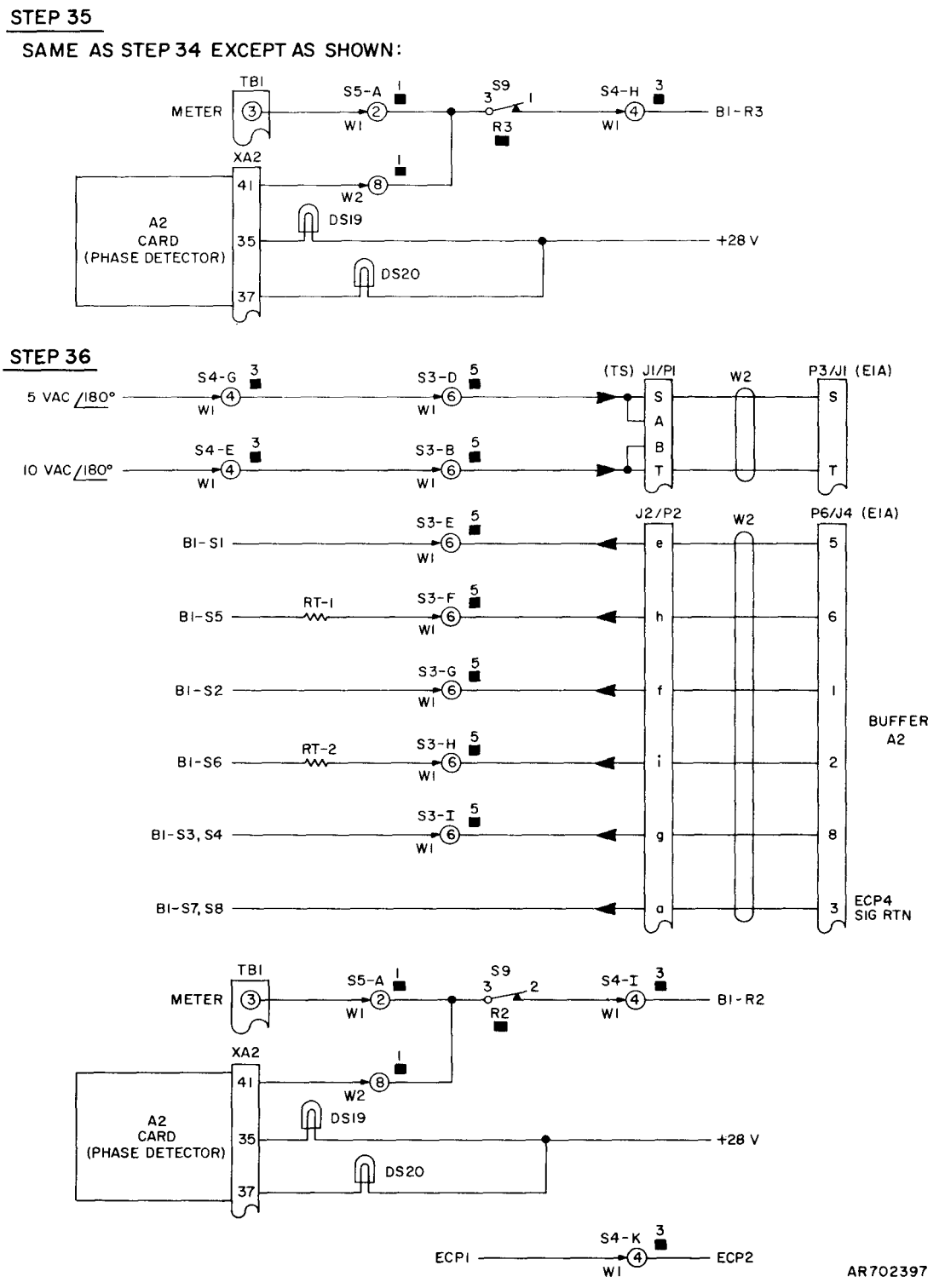


Figure 2-6. Electronic interface assembly test functional diagram (sheet 11 of 15)

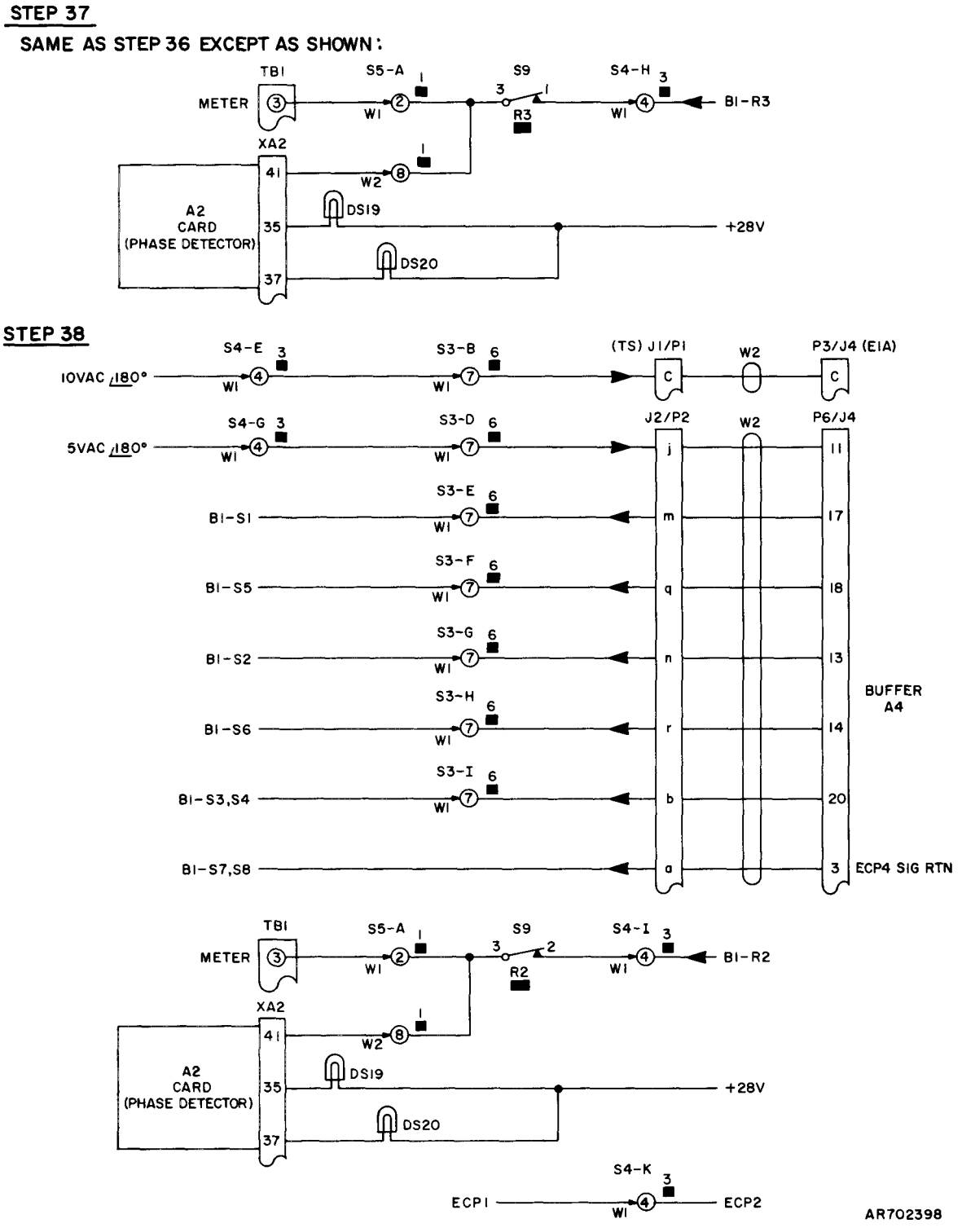


Figure 2-6. Electronic interface assembly test functional diagram (sheet 12 of 15)

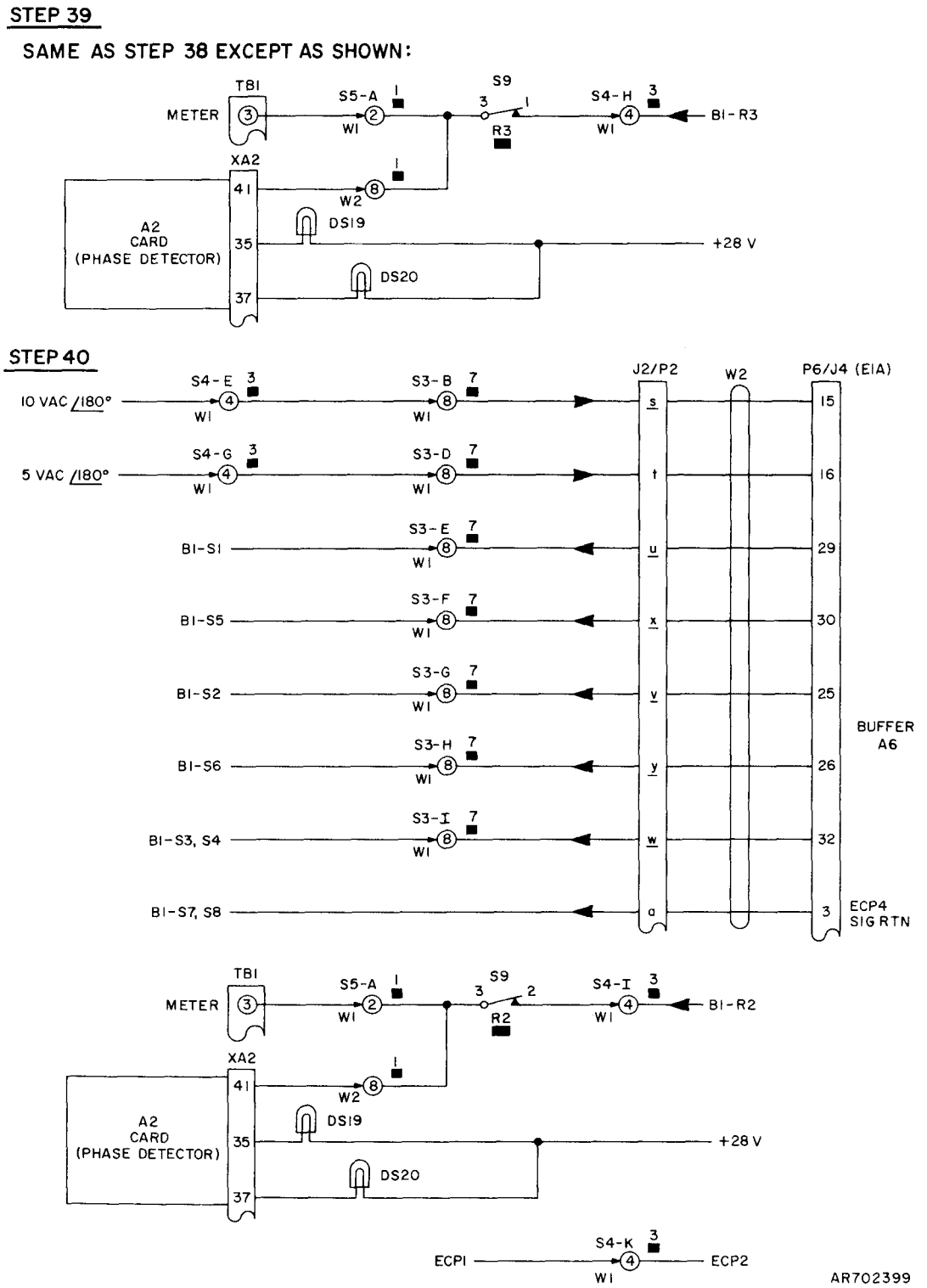


Figure 2-6. Electronic interface assembly test functional diagram (sheet 13 of 15)

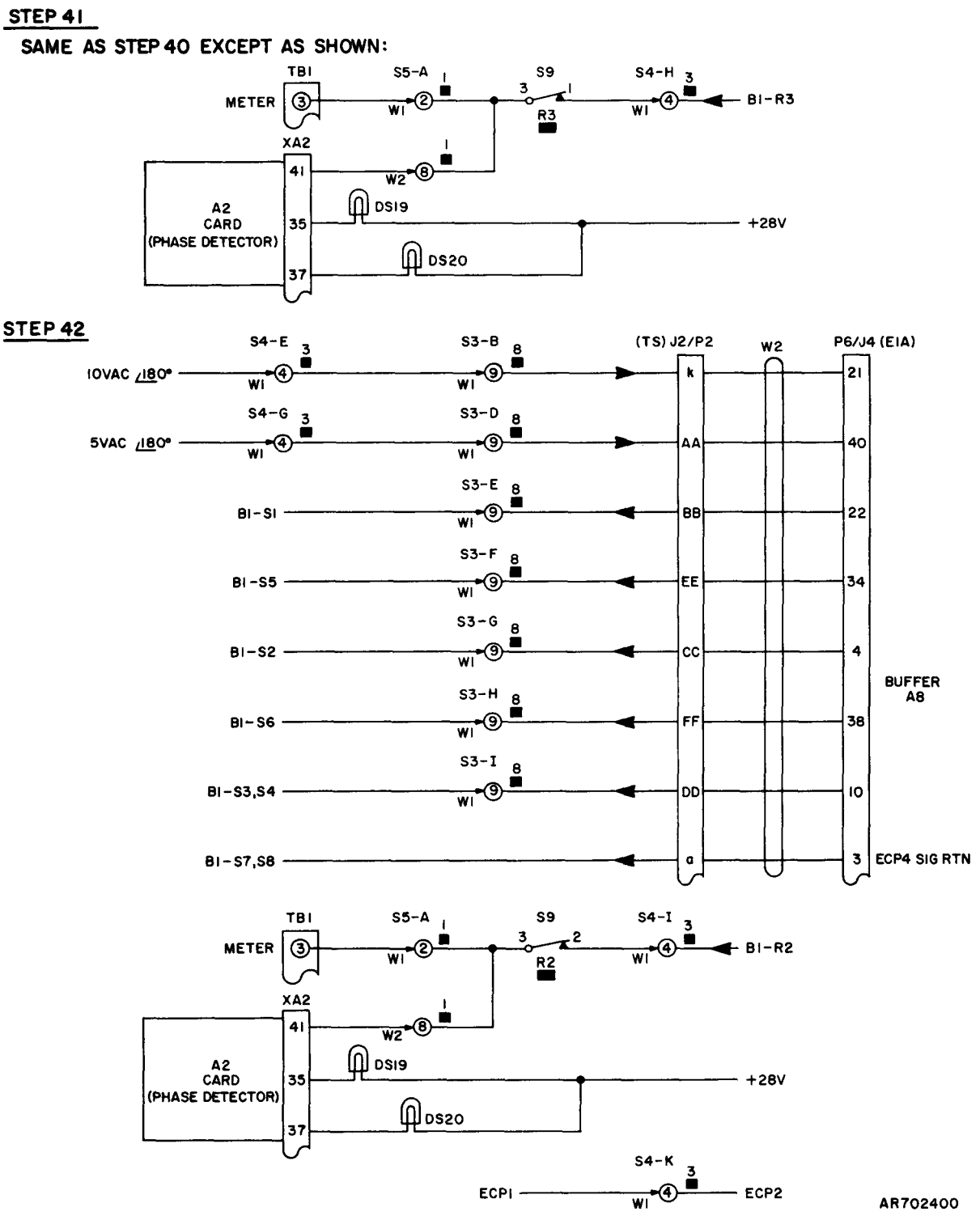


Figure 2-6. Electronic interface assembly test functional diagram (sheet 14 of 15)

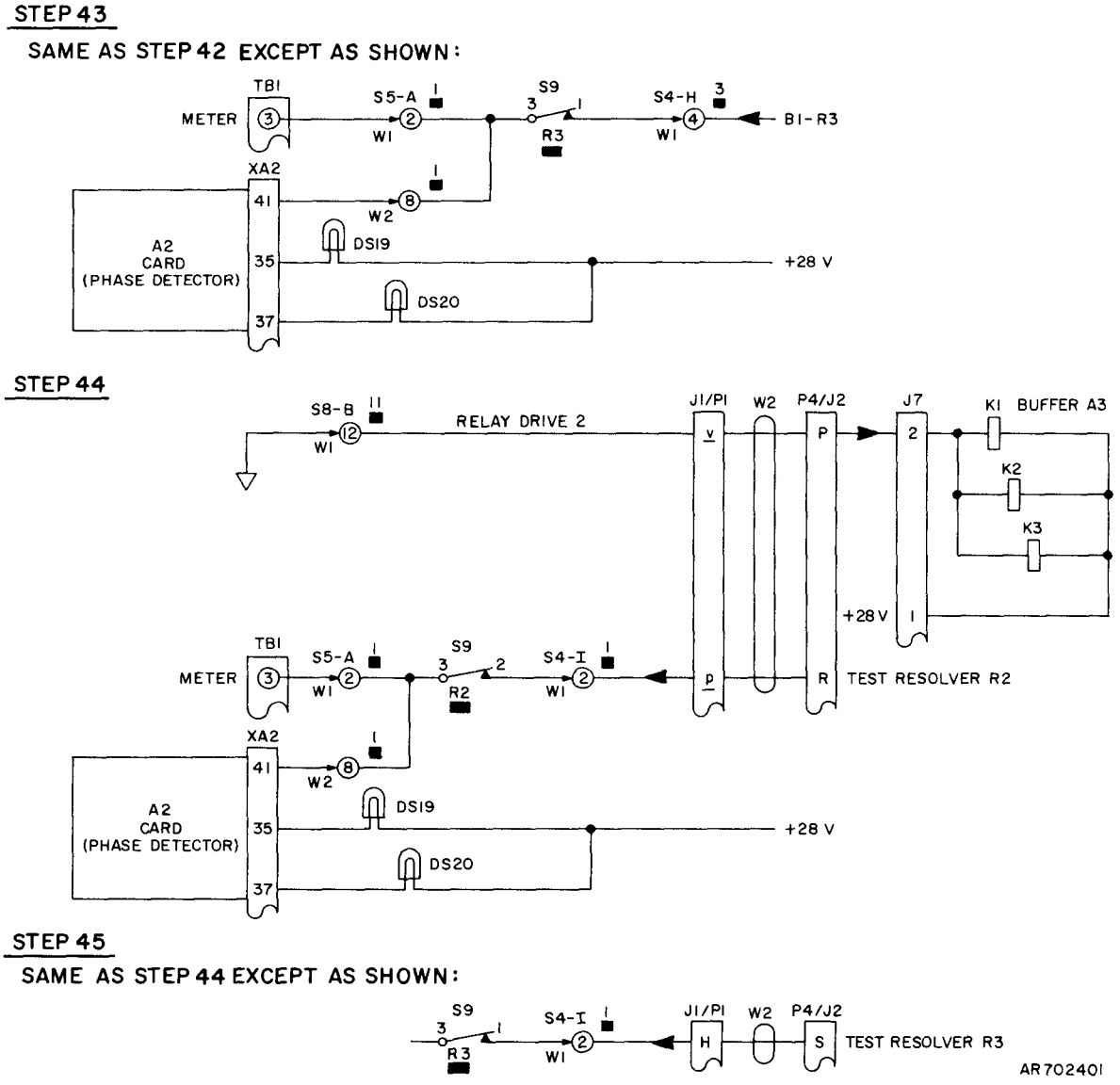


Figure 2-6. Electronic interface assembly test functional diagram (sheet 15 of 15)

2-13. Buffer Amplifier Test Theory.

a. Reference *Material.* The following reference materials are required to support the buffer amplifier test theory discussion:

(1) Buffer amplifier test table from TM 9-1270-212-14&P

(2) Buffer amplifier schematic diagram from TM 9-1270-212-14&P

(3) Buffer amplifier module test functional diagram (fig. 2-7).

b. Theory Discussion.

(1) To prepare for the buffer amplifier test theory discussion, refer to the troubleshooting procedures for buffer amplifier modules A1 through A8 in TM 9-1270-212-14&P and mentally perform steps *a* through *e.*

(2) Refer to figure 2-7 and to step 1 in the buffer amplifier test table. The buffer amplifier module under test is connected to J10 on the test set. Both channels of the buffer amplifier are excited through wiper 1 and contact 4 of S4, banks D through G, and through wiper 1 and contact 12 of S3, banks A through D, to the buffer amplifier under test. The outputs from the buffer amplifier under test are connected through wiper 1 and contact 12 of S3, banks C, E, F, H, and I, to the test set resolver. With S9 set to position R2, the R2 output of the test resolver is connected through S5-A to the meter and A2 card for readout.

(3) Refer to figure 2-7 and to step 2 in the buffer amplifier test table. When S11 is pressed, 28 volts is applied through W1 and contact 4 of S4-B to J10-1, energizing K1, K2, and K3 in the buffer amplifier. This connects the out-of-phase signals at J10-17 and -22 to the buffer amplifier. With S9 set to position R2, the R2 output of the test set resolver is connected to the meter and A2 card for readout.

(4) Refer to figure 2-7 and to step 3 in the buffer amplifier test table. With S9 set to position R3, the R3 output of the test set resolver is connected to the meter and A2 card for readout.

(5) Refer to figure 2-7 and to step 4 in the buffer amplifier test table. When S11 is pressed and S9 is set to position R3, the R3 output of the test resolver is connected to the meter and the A2 card for readout.

2-14. Sequencer Card A9 Test Theory.

a. Reference Material. The following reference materials are required to support the sequencer card A9 test theory discussion:

(1) Sequencer card A9 test table from TM 9-1270-212-14&P

(2) Sequencer card A9 foldout schematic diagram from TM 9-1270-212-14&P

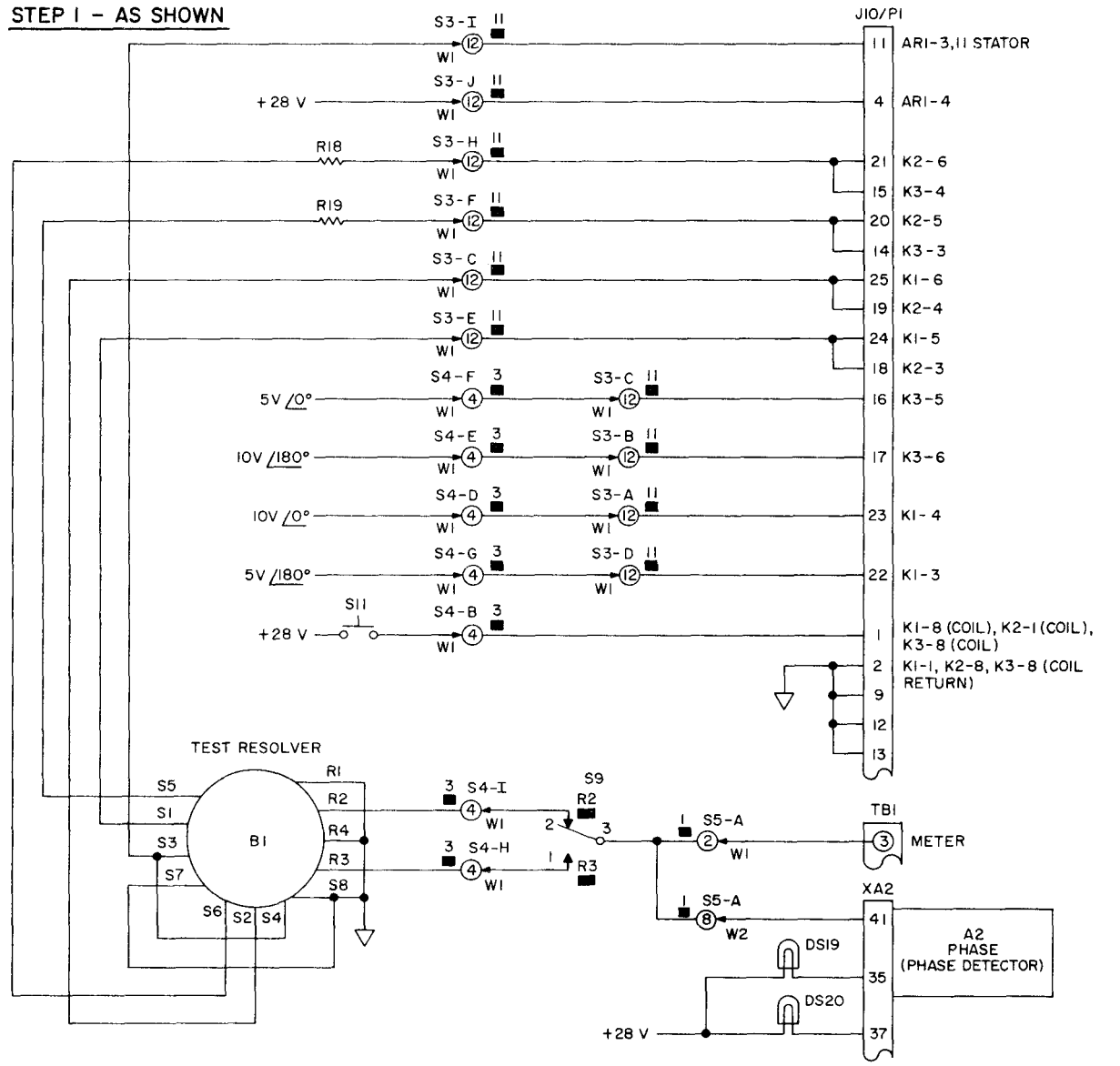
(3) Sequencer card A9 test functional diagram (fig. 2-8).

b. Theory Discussion

(1) To prepare for the sequencer card A9 test theory discussion, refer to the troubleshooting sequencer card A9 procedures in TM 9-1270-212-14&P and mentally perform steps *a* through *d.*

(2) Refer to step 1 in figure 2-8 and in the A9 test table. The A9 sequencer card under test is connected to J7 on the test set. With S8 set to position 5, 5 volts dc is connected from XA12-32 through wiper 1 and contact 6 of S8-F to J7-1. The signal return from the card is connected to J7-41. Wiper 1 and contact 6 of S8-B apply a ground to J7-24, which inhibits the skip function on the card. J7-11 and J7-13 are also grounded through CR16, which enables decoder U10 on the card. Setting S5 to position 8 connects the enable A signal at J7-10 through contact 8 and wiper 2 of S5-B to J12 on the test set front panel. An oscilloscope is connected between J12 and J18 as shown in figure 2-8. Pressing S11 connects 28 volts dc through wiper 1 and contact 7 of S4-B, and through wiper 1 and contact 6 of S8-F to energize K8 in the test set. Contacts 2 and 1 of K8 apply a ground to J7-6 causing the reset signal to go low momentarily. Refer to the A9 foldout schematic from TM 9-1270-212-14&P. The momentary low resets the logic circuitry on the card, and when the switch is released, the logic circuitry begins a normal count. Since the skip signal is low, the count from U10 proceeds in a normal sequence. When U10-13 goes low, counter U4 is inhibited by lows at pins 7 and 10 and the count stops automatically. The two enable-A signals will be displayed on the oscilloscope. S11 can be pressed repeatedly as required to display the pulses.

(3) Refer to step 2 in figure 2-8 and in the A9 test table. With S5 in position 2, the enable-B signals at J7-8 are connected through contact 9 and wiper 2 of S5-B and through J12 to the oscilloscope. The timing sequence of step 1 is repeated by momentarily pressing S11 repeatedly, as required to display the enable-B signals.



REF DES	NOMENCLATURE
S1	POWER
S3	EIA/AMPL
S4	TEST SELECT
S5	METER SELECT
S9	RSLVR SELECT
S11	FUNCTION INITIATE
DS18	POWER
DS19	PHASE 180°
DS20	PHASE 0°

Figure 2-7. Buffer amplifier module test functional diagram

(4) Refer to step 3 in figure 2-8 and in the A9 test table. With all switches set for step 2, changing the oscilloscope time base enables the first enable-B signal to be displayed.

(5) Refer to step 4 in figure 2-8 and in the A9 test table. Indicators DS8 and DS13 will be lighted for steps 1, 2, and 3. With 5 volts dc connected at J7-1, and the SKIP, GO LATCH, and PWR FAIL LATCH inputs at J7-24, -13, and -11 grounded through S8-B, the open RESET signal input at J7-6 enables the logic circuitry to count. Refer to the A9 foldout schematic from TM 9-1270-212-14&P. The circuitry counts until U10-13 goes low. As described in step 1, the low at U10-13 is connected to U4-7 and -10 where it inhibits counter U4. The low at U10-13 is also connected to U3-5 which causes U3-6 to go low. The low is connected through J7-26 to Q1 in the test set where it turns Q1 on, causing DS13 to light. During the count when U10-7 goes low, the low at U3-9 causes U3-11 to go low. The low is inverted at U2-10 to turn on Q5. The resulting low at J7-22 causes DS8 in the test set to light.

(6) Refer to step 5 in figure 2-8 and in the A9 test table. The same basic connections are made for step 5 as for step 4. When S11 is held, K8 is energized, which applies a low to the reset signal at J7-6. Refer to the A9 foldout schematic from TM 9-1270-212-14&P. With U4 reset, U10-1 is low. The low is inverted to a logic high at U2-6, which is coupled through J7-23 to Q7 in the test set. The high turns on Q7, causing DS1 to light.

(7) Refer to step 6 in figure 2-8 and in the A9 test table. When S11 is released, K8 deenergizes, which allows the reset signal at J7-6 to go high. The high at J7-6 allows the logic circuitry to count. Refer to the A9 foldout schematic from TM 9-1270-212-14&P. As U10-1 goes high, the high is inverted to a low at U2-6. The low at U2-6 is connected through J7-23 to turn off DS1. As the count continues and the signals at relay drives 1 through 9 are grounded, one at a time, test set indicators DS3, DS4, DS5, DS6, DS8, DS9, DS10, DS11, and DS12 light in sequence, about five indicators a second. When U10-13 goes low, the count stops and J7-16 goes high. The high at J7-26 lights DS13. The flip-flop associated with relay drive 5 keeps J7-22 grounded, and DS8 remains lighted.

(8) Refer to step 7 in figure 2-8 and in the A9 test table. Setting S8 to position 6 maintains 5 volts dc at J7-1 through wiper 1 and contact 7 of S8-F. J7-11 and -13 remain grounded through contact 7 and wiper 1 of S8B; however, the skip signal at J7-24 is isolated by CR16 and goes high. The high at J7-24 enables the skip function on the card. Pressing S11 energizes K8, applying a reset low at J7-6, which, in turn, causes J7-23 to go high as explained in (6) above. DSl again lights.

(9) Refer to step 8 in figure 2-8 and in the A9 test table. When S11 is released, K8 deenergizes and the reset signal at J7-6 goes high. Since the skip function is enabled, the count skips to U10-7 and the signals at relay drives 5 through 9 are grounded, one at a time, to light test set indicators DS8, DS9, DS10, DS11, and DS12 in sequence, about five indicators a second. DS8 and DS13 remain lighted as explained above.

(10) Refer to step 9 in figure 2-8 and in the A9 test table. With the card logic set at the end of step 8 as explained in (9), applying 28-volt power to J7-18 energizes relays K1 and K2 on the card. The 5-volt power applied to J7-1 is also applied to J7-33 and J7-27. The 5 volts is connected through energized contacts 7 and 6, and 2 and 1 of K1 and through R14 to the base of Q4 in the test set. Q4 conducts, turning on DS4. The 5 volts is also connected through energized contacts 7 and 6, and 2 and 1 of K2 and through R15 to the base of Q2. Q2 conducts, turning on DS3. Indicator DS8 remains lighted as previously discussed.

(11) Refer to step 10 in figure 2-8 and in the A9 test table. Pressing S11 causes the reset signal at J7-6 to go low. The reset signal resets the relay drive 5 flip-flop and turns Q5 off. J7-22 goes high, which turns off DS8 in the test set. The high also deenergizes relays K1 and K2 on the card, opening the circuits to DS3 and DS4, which go out.

(12) Refer to step 11 in figure 2-8 and in the A9 test table. Releasing S11 causes the reset signal at J7-6 to go high but no count occurs because J7-11 and -13 are not held low. Therefore, DS3, DS4, and DS8 remain off.

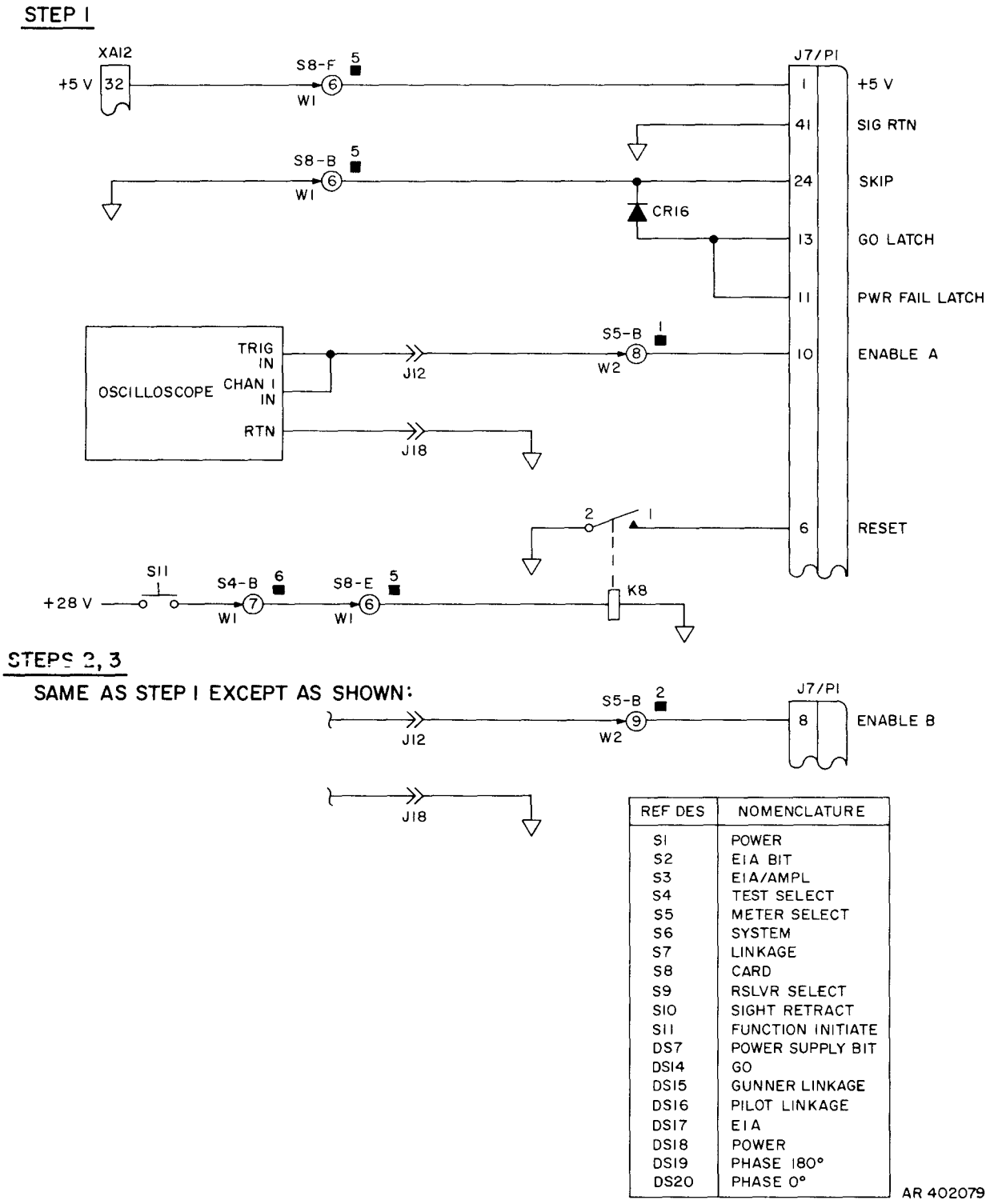
2-15. Logic Card A10/A1 5 Test Theory.

NOTE

Unless otherwise indicated, the information in this paragraph applies equally to logic card A10, used in the EIA from XM128, and logic card Al5, used in the EIA from XM136. Where signal nomenclature differs between the two logic cards, the nomenclature for the logic card (A10) used in the EIA from XM128 is used as the basic signal nomenclature, with the signal nomenclature for the other logic card (A15) following in parentheses.

a. Reference Material. The following reference materials are required to support the logic card A10/A15 test theory discussion:

(1) Logic-card-A10 or logic-card-A15 test table from TM 9-1270-212-14&P



REF DES	NOMENCLATURE
S1	POWER
S2	EIA BIT
S3	EIA/AMPL
S4	TEST SELECT
S5	METER SELECT
S6	SYSTEM
S7	LINKAGE
S8	CARD
S9	RSLVR SELECT
S10	SIGHT RETRACT
S11	FUNCTION INITIATE
DS7	POWER SUPPLY BIT
DS14	GO
DS15	GUNNER LINKAGE
DS16	PILOT LINKAGE
DS17	EIA
DS18	POWER
DS19	PHASE 180°
DS20	PHASE 0°

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Figure 2-8. Sequencer card A9 test functional diagram (sheet 1 of 5)

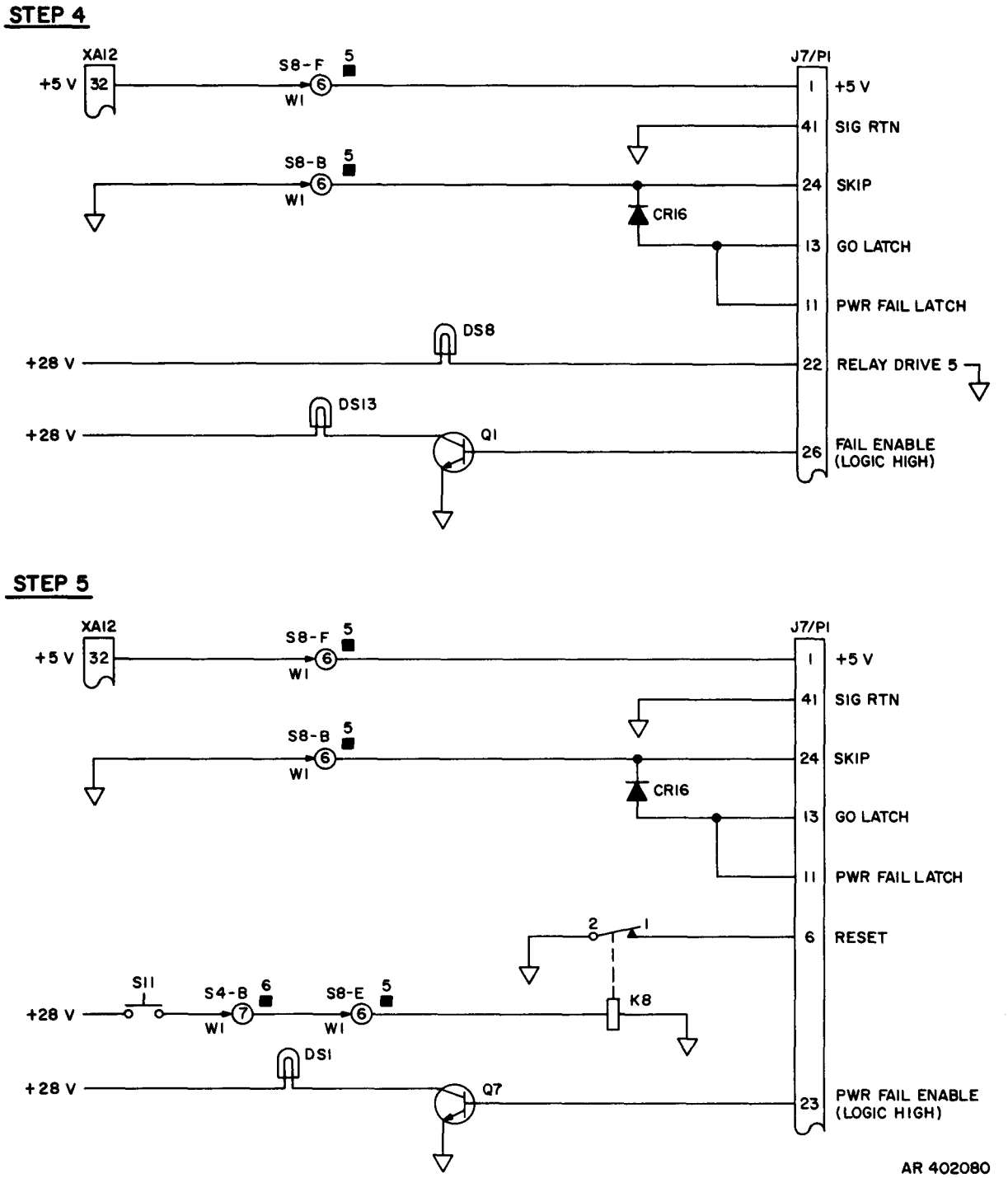


Figure 2-8. Sequencer card A9 test functional diagram (sheet 2 of 5)

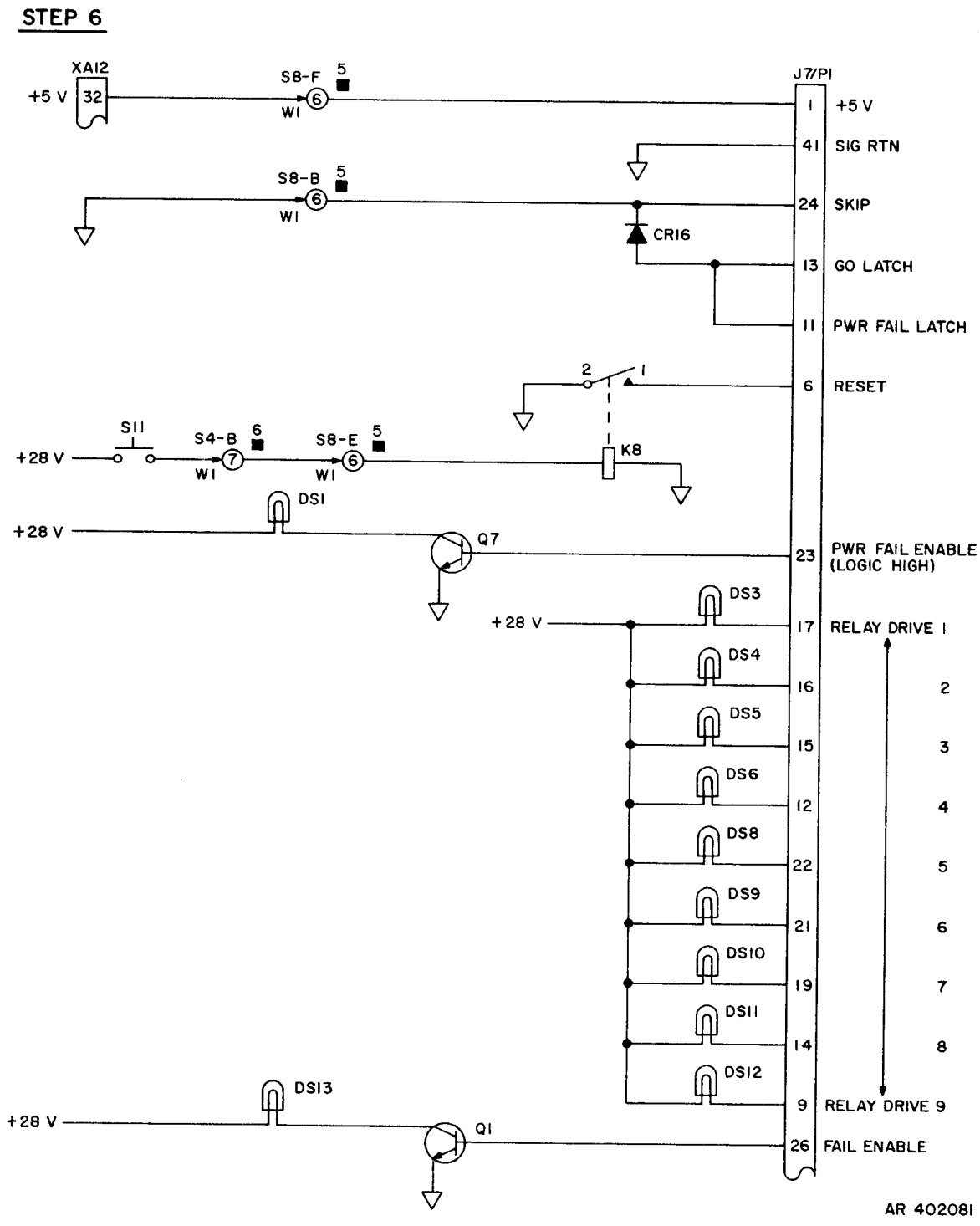


Figure 2-8. Sequencer card A9 test functional diagram (sheet 3 of 5)

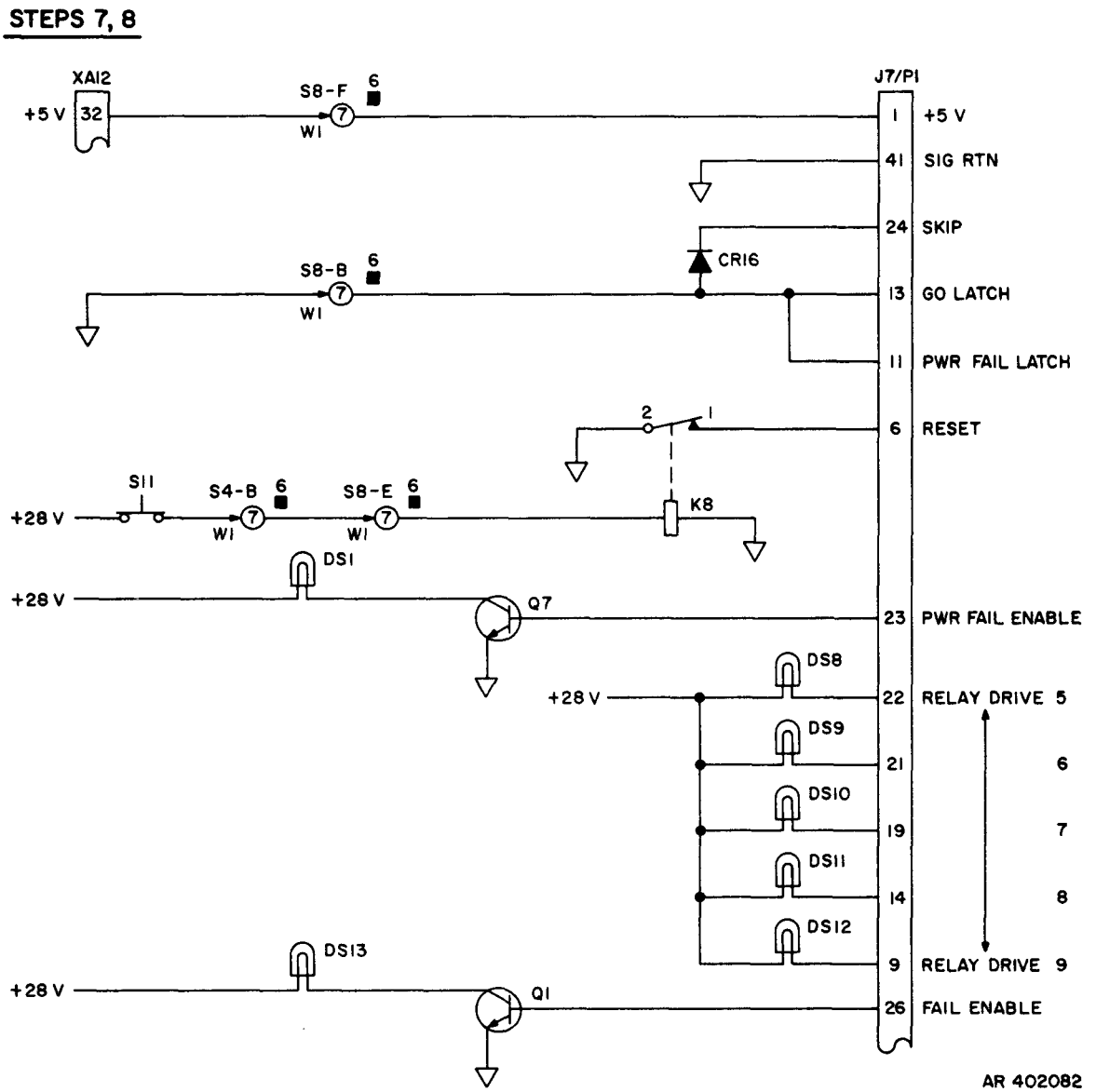


Figure 2-8. Sequencer card A9 test functional diagram (sheet 4 of 5)

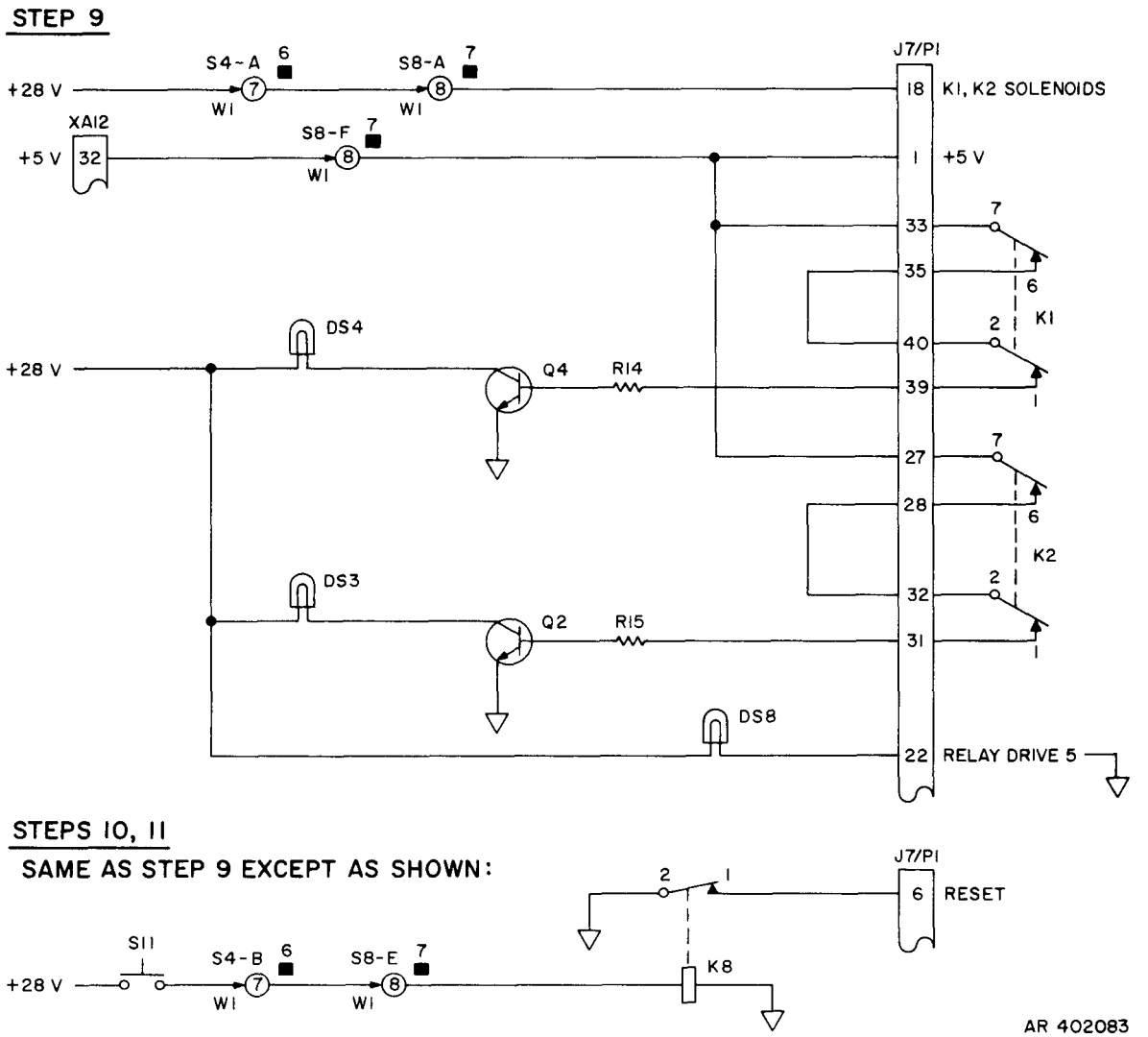


Figure 2-8. Sequencer card A9 test functional diagram (sheet 5 of 5)

(2) Logic-card-A10 or logic-card-A15 foldout schematic diagram from TM 9-1270-212-14&P

(3) Logic card A10/A15 test functional diagram (fig. 2-9).

NOTE

TM 9-1270-212-14&P information on logic card A15 differs basically only in that it has two additional steps.

(1) To prepare for the logic card test theory discussion, refer to the troubleshooting procedures for the applicable logic card (A10 or A15) in TM 9-1270-212-14&P and mentally perform steps *a* through *e* .

(2) Refer to step 1 in figure 2-9 and in the logic card test table. The logic card under test is connected to J8 on the test set. Setting S4 to position 6 and S8 to position 1 connects 28 volts dc through wiper 1 and contact 7 of S4-A and through wiper 1 and contact 2 of S8-A to J8-6 and -18. The test set provides a 28-volt return at J8-12. The 5 volts dc is connected to J8-1 through wiper 1 and contact 2 of S8-F. The test set provides a signal return at J8-4. The -6 volts dc is connected to J8-16 through wiper 1 and contact 2 of S8-H. Connector J8 in the test set connects J8-25 to J8-37. Pressing S11 connects 28 volts dc through S11, through wiper 1 and contact 7 of S4-B, through wiper 1 and contact 2 of S8-E to J8-9, the BIT initiate input. The 28 volts is connected from contact 2 of S8-E to energize K8. Energized K8 applies a ground to J8-24. The 28 volts is also connected from contact 2 of S8-E through CR15 to

K3. The 28 volts is connected from contact 2 of S8-A to K3-4, which causes K3 to latch. K3-2 and -1 apply a ground to indicators DS14 through DS17. Refer to the logic card schematic from TM 9-1270-212-14&P. With the fail enable input at J8-24 held low and the BIT initiate input at J8-9 held high, the four indicator outputs at J8-13, -20, -14, and -23 of the logic card are open.

(3) Refer to step 2 in figure 2-9 and in the logic card test table. When S11 is released, K3 remains latched, 28 volts dc is removed from J8-9, and the ground at J8-24 is removed. The TR3 comparator output at J8-33 is grounded through contact 2 and wiper 1 of S8-B. The go-latch-not output at J8-26 is grounded through contact 2 and wiper 1 of S8-K. With the inputs to the logic card as specified, the go output at J8-13 and the EIA output at J8-23 are both 28 volts, lighting DS14 and DS17 on the test set.

(4) Refer to step 3 in figure 2-9 and in the logic card test table. The 10 volts ac, in phase, is connected to J8-11 to energize part of the voltage divider network on the logic card. J8-4 provides a signal return. The test signal A (test signal Pj) output at J8-2 is connected through contact 2 and wiper 1 of S8-1, through contact 7 and wiper 1 of S4-1, through S9-2 and -3, and through contact 2 and wiper 1 of S5-A to the meter input, and through contact 8 and wiper 2 of S4-A to the phase-sensing input to the A2 card.

(5) Refer to step 4 in figure 2-9 and in the logic card test table. Setting S9 to position R3 connects the test signal C (test signal TR) output at J8-3 through contact 2 and wiper 1 of S8-J, through contact 7 and wiper 1 of S4-H, and through S9-1 and -3 to the meter and phase detector as in (3) above.

(6) Refer to step 5 in figure 2-9 and in the logic card test table. Setting S8 to position 2 maintains the same basic connections described in step 1. The ground connections are removed from J8-33 and -26. With S11 pressed, K8 energizes and again provides a ground at J8-24. K3 also energizes to provide grounds for indicators DS14 through DS17.

(7) Refer to step 6 in figure 2-9 and in the logic card test table. When S11 is released, K3 remains latched, 28 volts dc is removed from J8-9, and the ground at J8-24 is removed. The skip-not output at J8-27 is grounded through contact 3 and wiper 1 of S8-K. The relay drive 5 input at J8-28 is grounded through contact 3 and wiper 1 of S8-B. With these inputs to the logic card, the go output at J8-13 and gunner linkage output at J8-14 are each 28 volts, which lights DS14 and DS15 on the test set.

(8) Refer to step 7 in figure 2-9 and in the logic card test table. The 10 volts ac, out of phase, is connected to J8-8 to energize the remaining part of the voltage divider network on the logic card. J8-4 provides the signal return. The test signal B (test signal Pi) output at J8-7 is connected through contact 3 and wiper 1 of S8-1, and through the previously discussed contacts of S4-1, S9, and S5-A, to the meter input and to the phase-sensing input of the A2 card.

(9) Refer to step 8 in figure 2-9 and in the logic card test table. Setting S9 to position R3 connects the test signal D (test signal Gk) output at J8-5 through contact 3 and wiper 1 of S8-J, through contact 7 and wiper 1 of S4-H, and through the previously discussed contacts of S9 and S5-A, to the meter input and to the phase-sensing input of the A2 card.

(10) Refer to step 9 in figure 2-9 and in the logic card test table. Setting S8 to position 3 maintains the same basic conditions described in step 1. The ground connections are removed from J8-27 and -28. With S11 pressed, energized relays K3 and K8 provide grounds as discussed in paragraph (6).

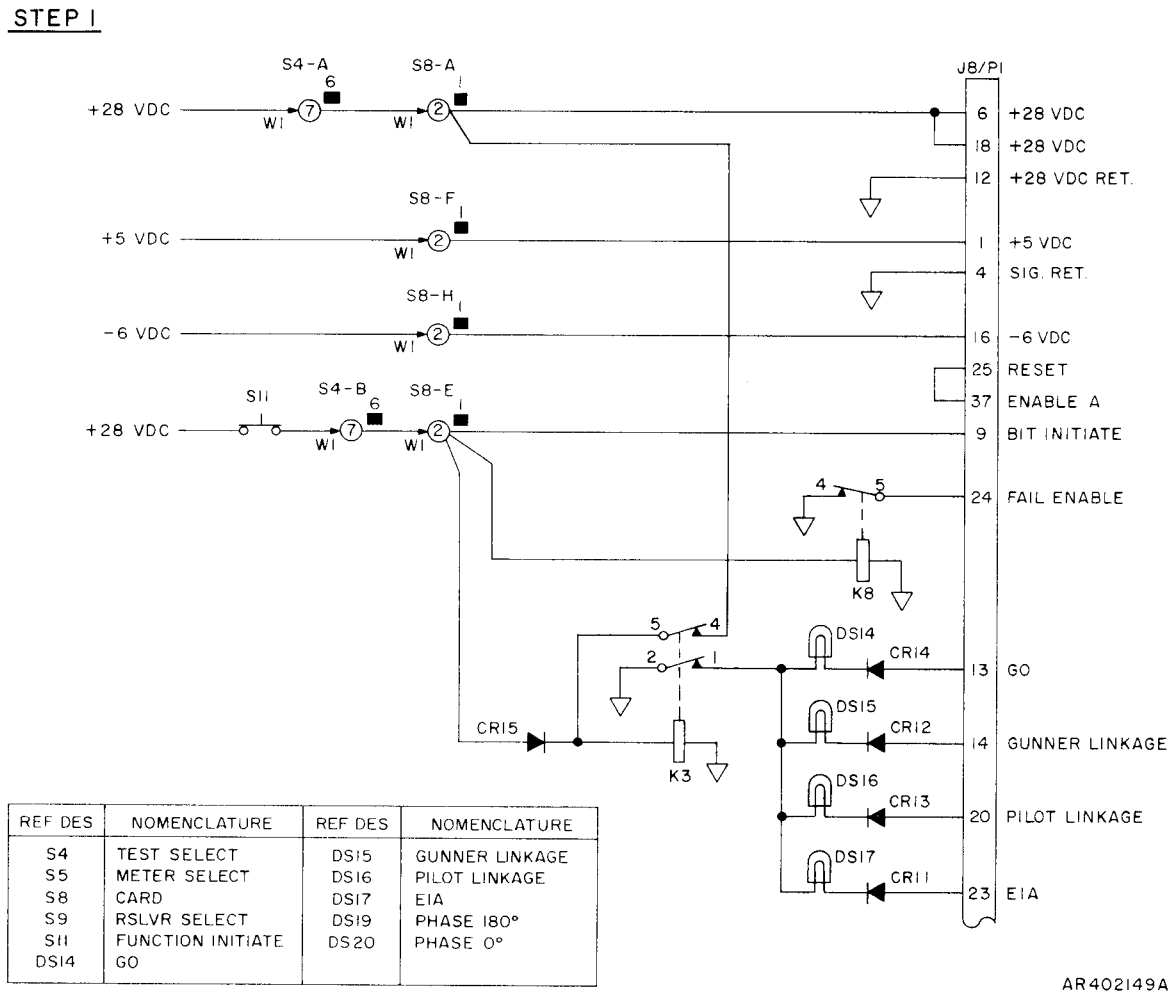
(11) Refer to step 10 in figure 2-9 and in the logic card test table. When S11 is released, K3 again remains latched, 28 volts dc is removed from J8-9, and the ground at J8-24 is removed. The power fail input at J8-31 is grounded through contact 4 and wiper 1 of S8-B. With these inputs to the logic card, the pilot linkage output at J8-20 and EIA output at J8-23 are each 28 volts, lighting DS16 and DS17 on the test set.

NOTE

The information in (12) and (13) below applies to logic card A15, used in the EIA from XM136, only. P1-15 and -17 of logic card A10, used in the EIA from XM128, are not connected.

(12) Refer to step 11 in figure 2-9 and in the A15 test table. The connections for the out-of-phase 10 volts ac and for the signal return are the same as in (7) above, as are the connections for S5, A2, and DS19 and DS20. The test signal Gj output from the logic card into J8-15 is connected to the meter through contact 4 and wiper 1 of S8-1, through contact 7 and wiper 1 of S4-H, and through contact 2 of S9 in the R2 position.

(13) Refer to step 12 in figure 2-9 and in the A15 test table. The connections for this step are the same as for (12) above except that test signal Gi from logic card A15 is connected to the meter through J8-17, through contact 4 and wiper 1 of S8, and through contact 1 of S9 in the R3 position.



REF DES	NOMENCLATURE	REF DES	NOMENCLATURE
S4	TEST SELECT	DS15	GUNNER LINKAGE
S5	METER SELECT	DS16	PILOT LINKAGE
S8	CARD	DS17	EIA
S9	RSLVR SELECT	DS19	PHASE 180°
S11	FUNCTION INITIATE	DS20	PHASE 0°
DS14	GO		

Figure 2-9. Logic card A10/A15 test functional diagram (sheet 1 of 9)

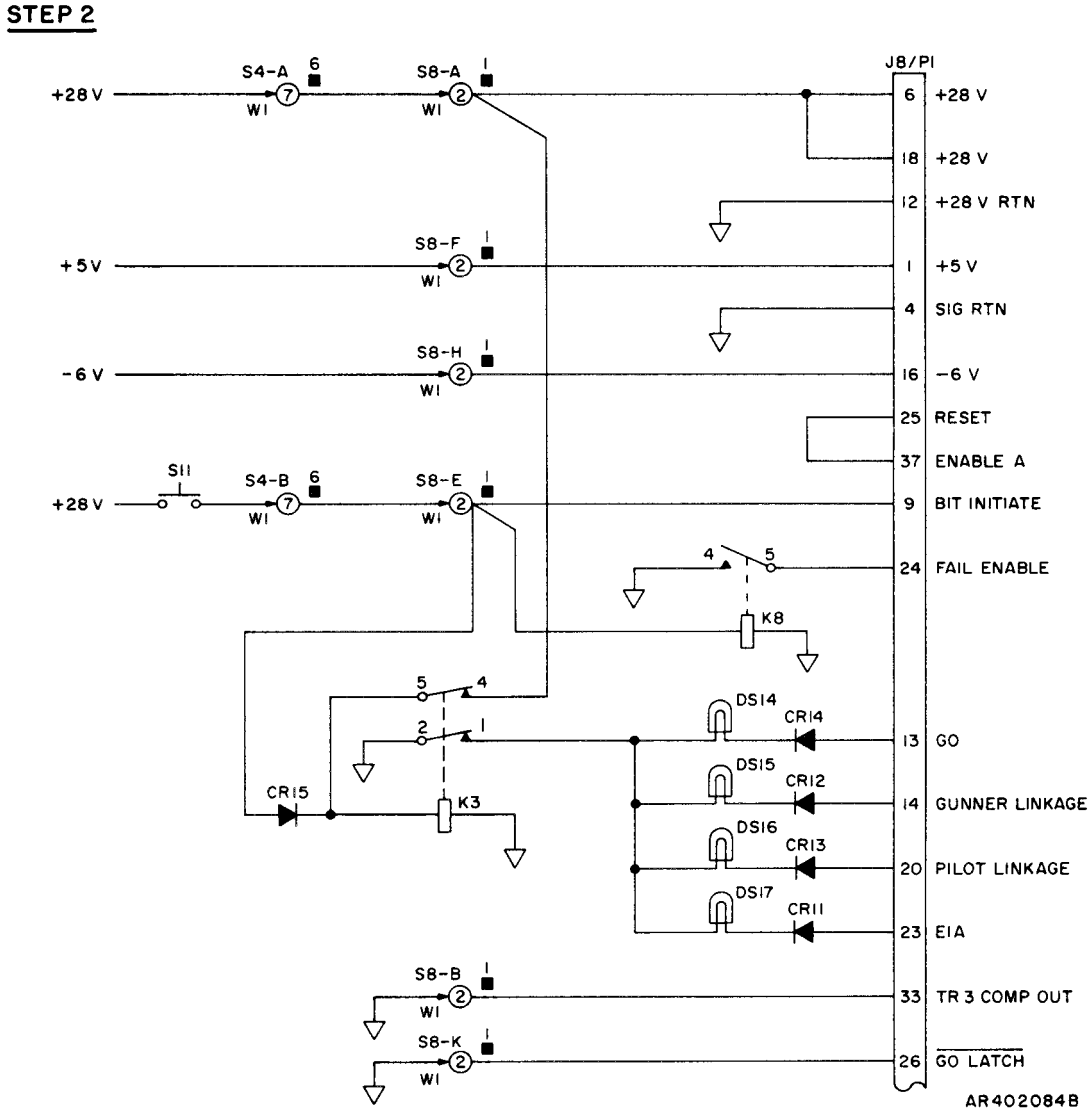


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 2 of 9)

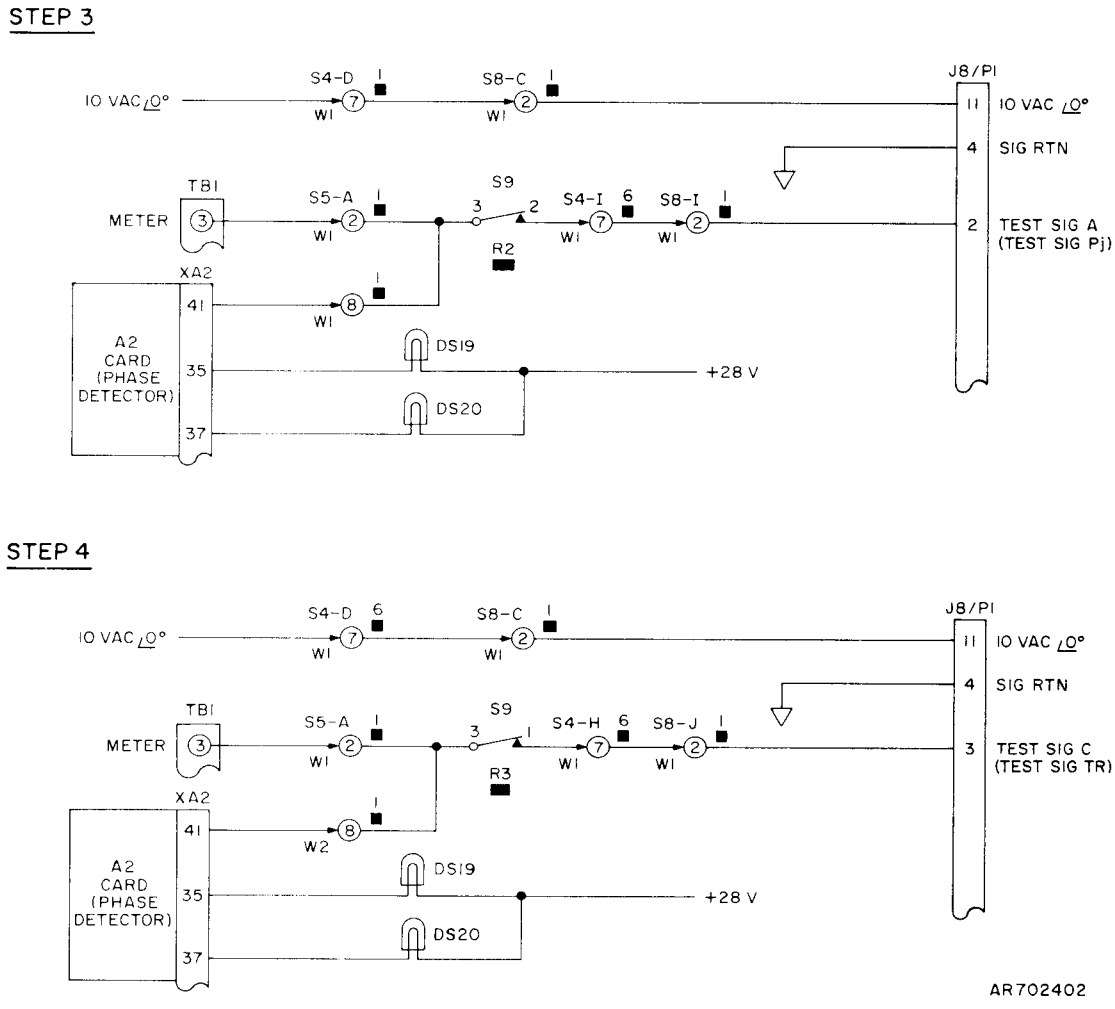


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 3 of 9)

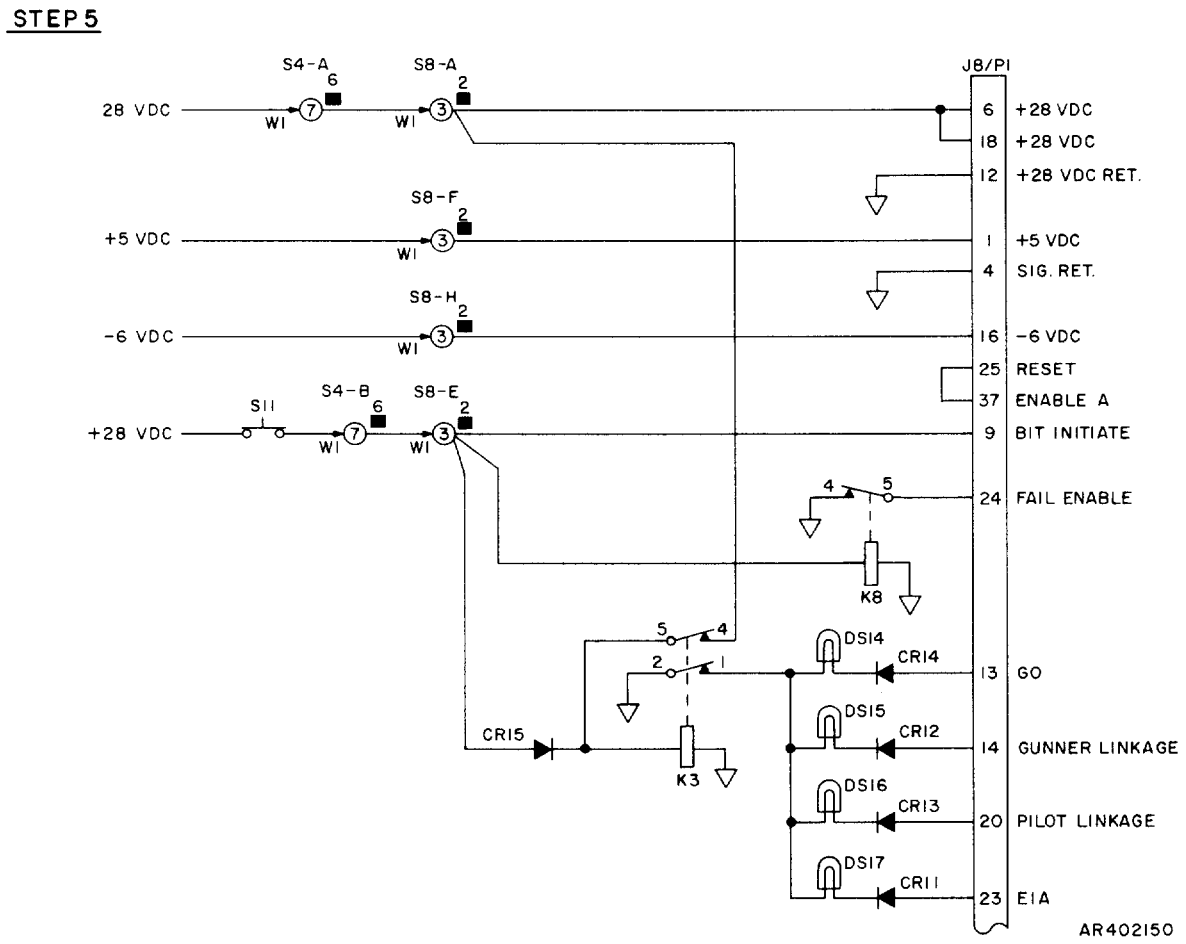


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 4 of 9)

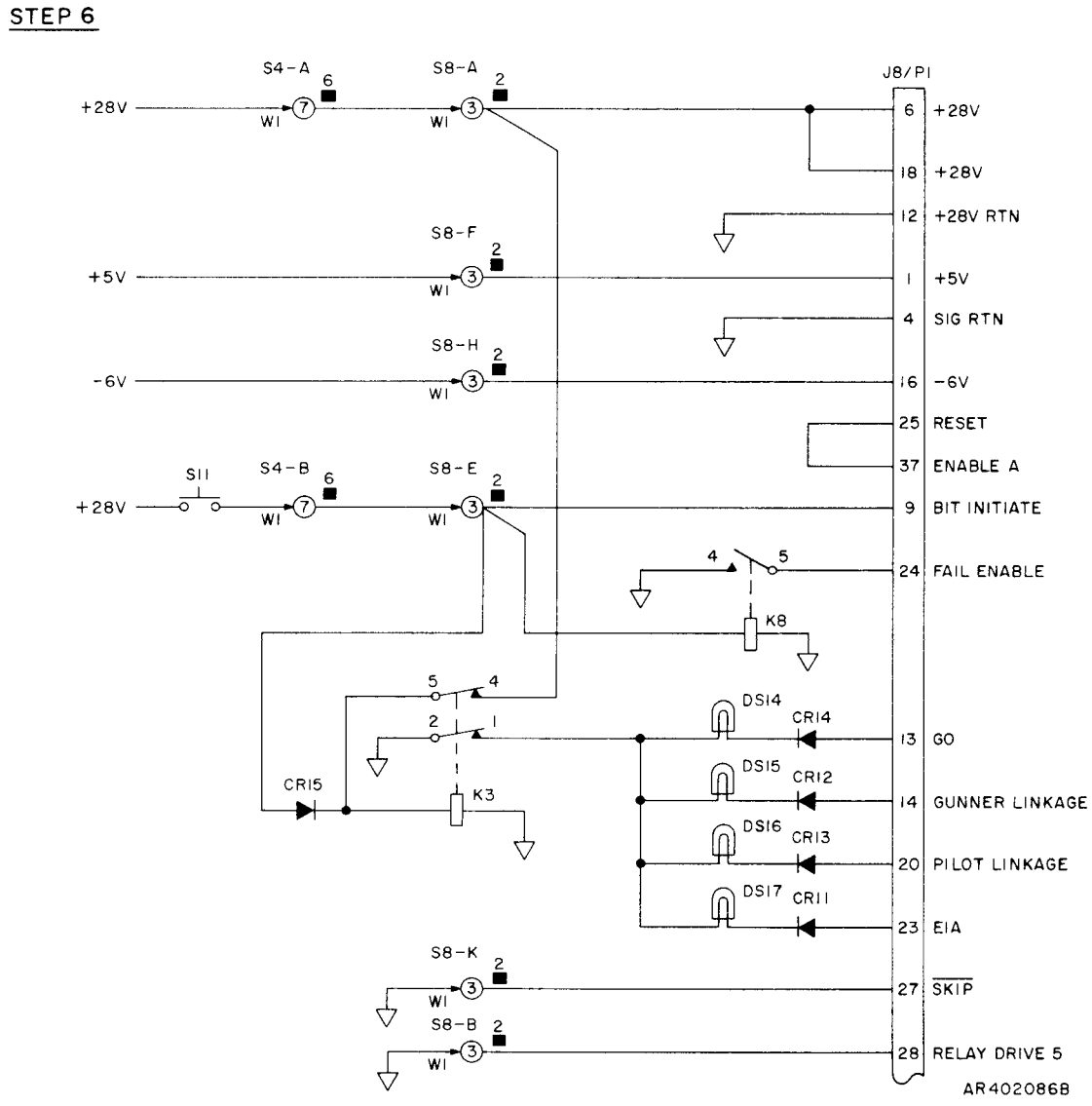


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 5 of 9)

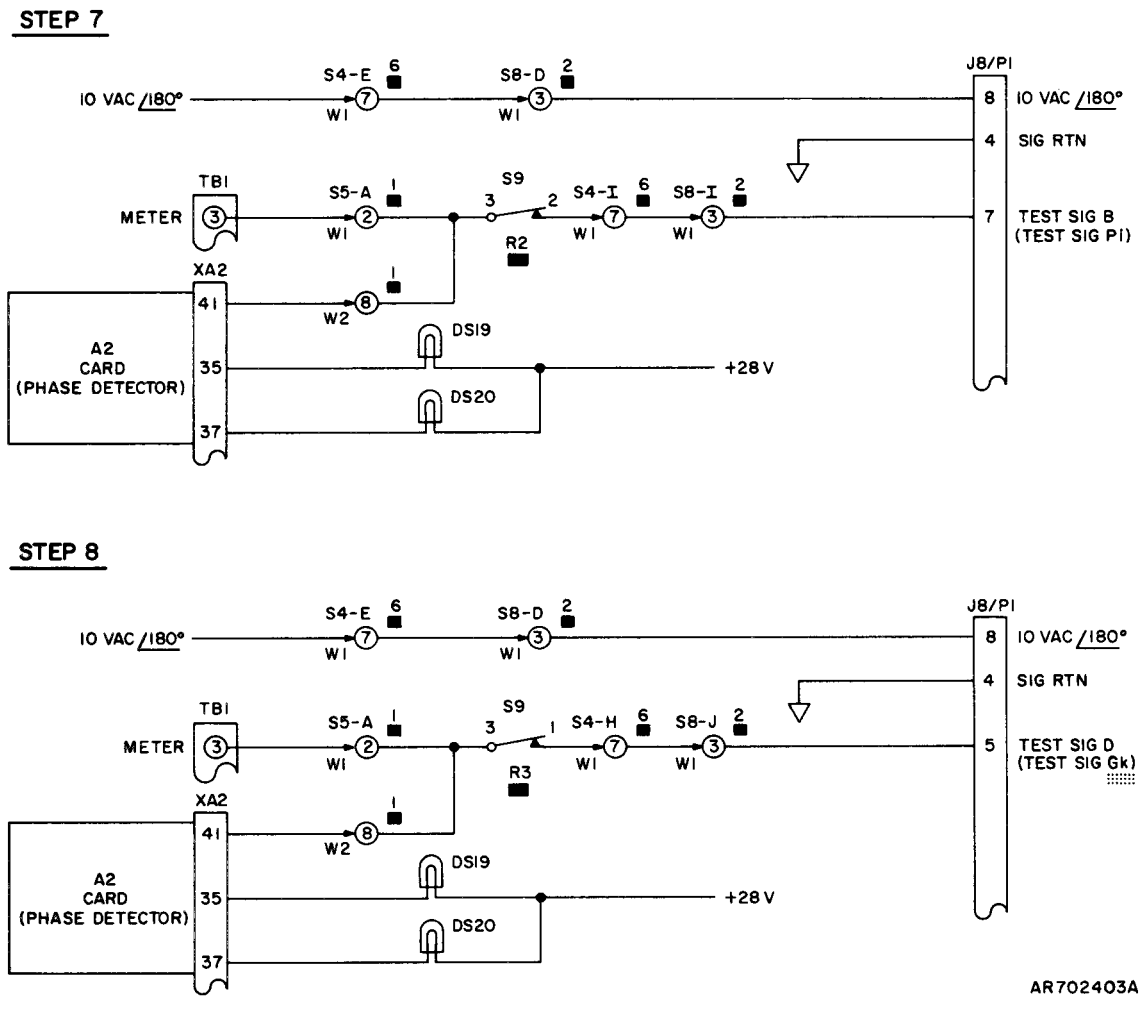


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 6 of 9)

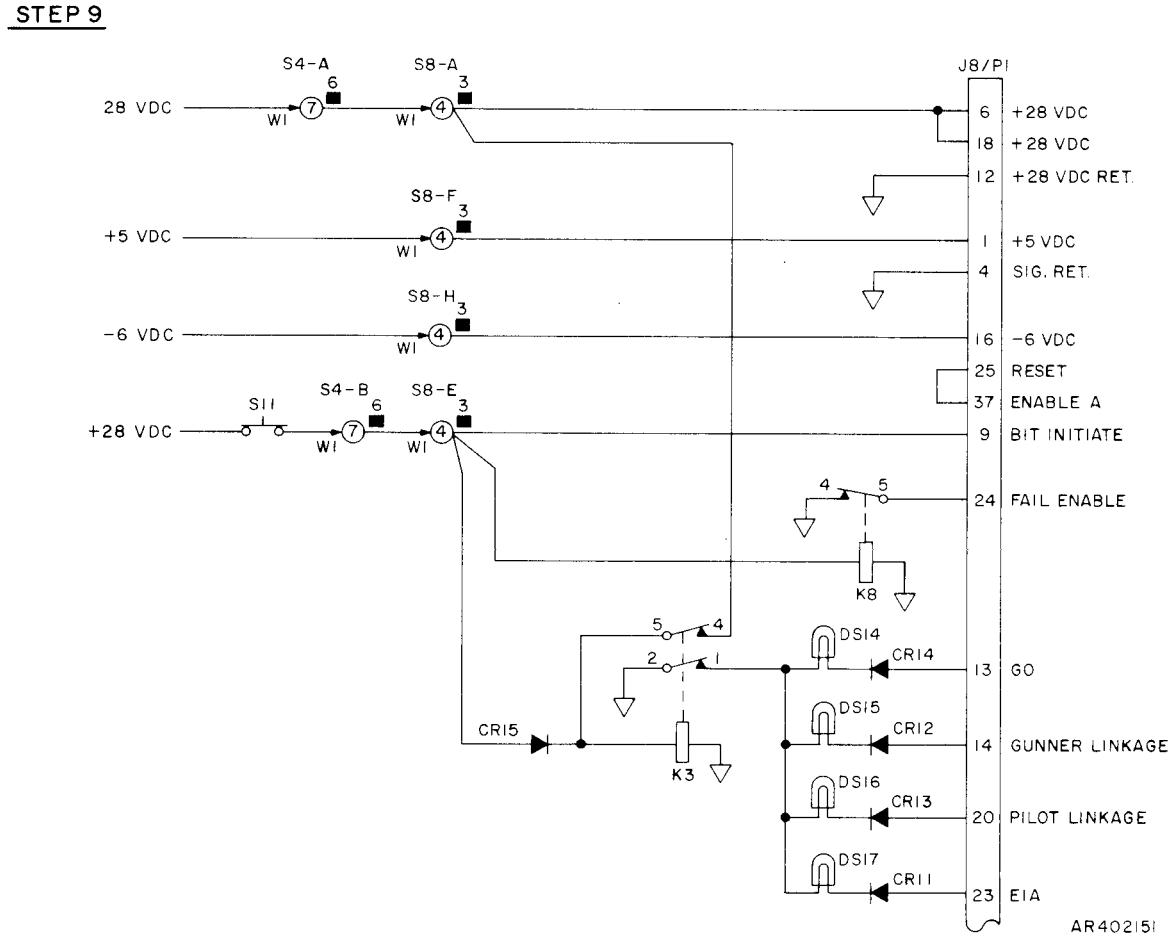


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 7 of 9)

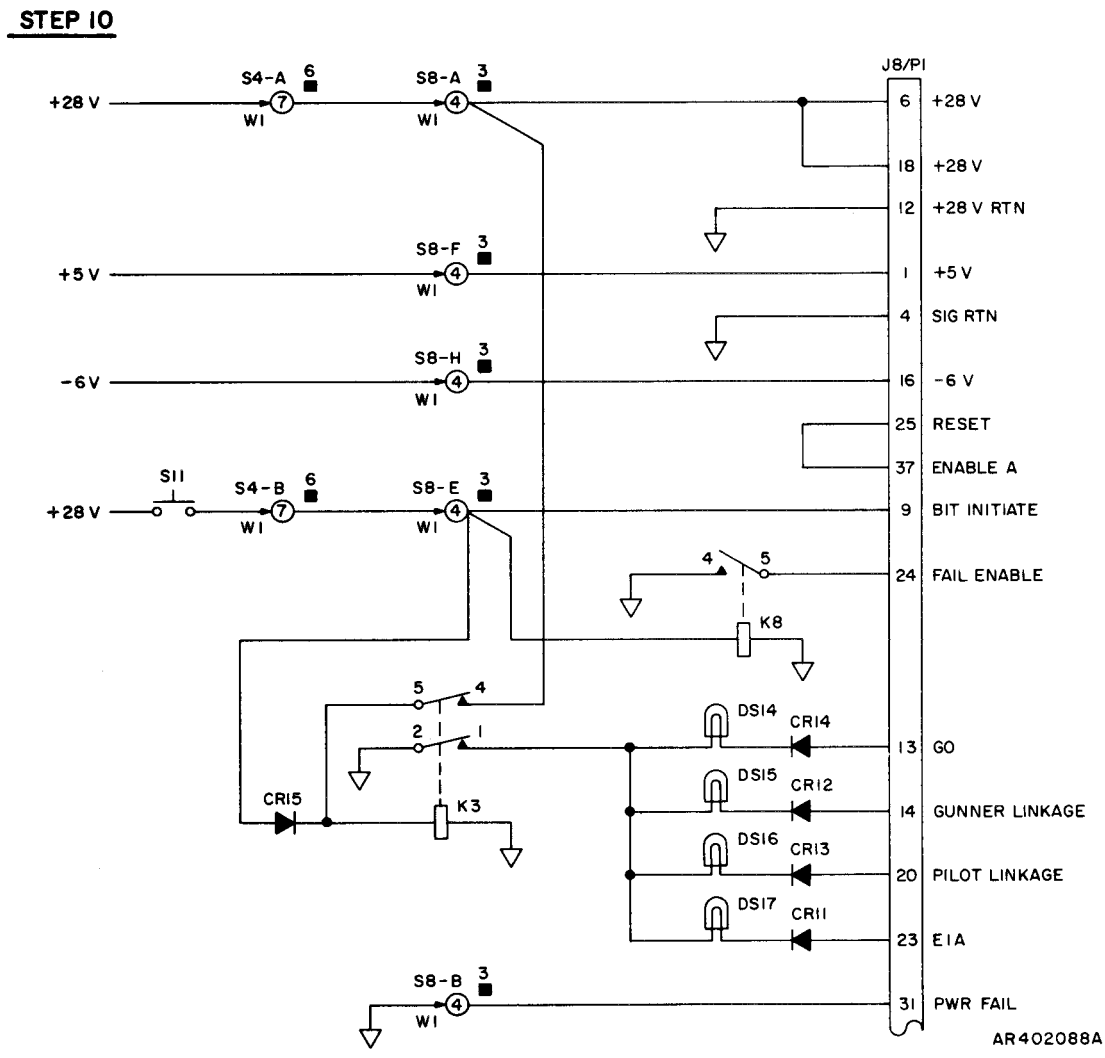


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 8 of 9)

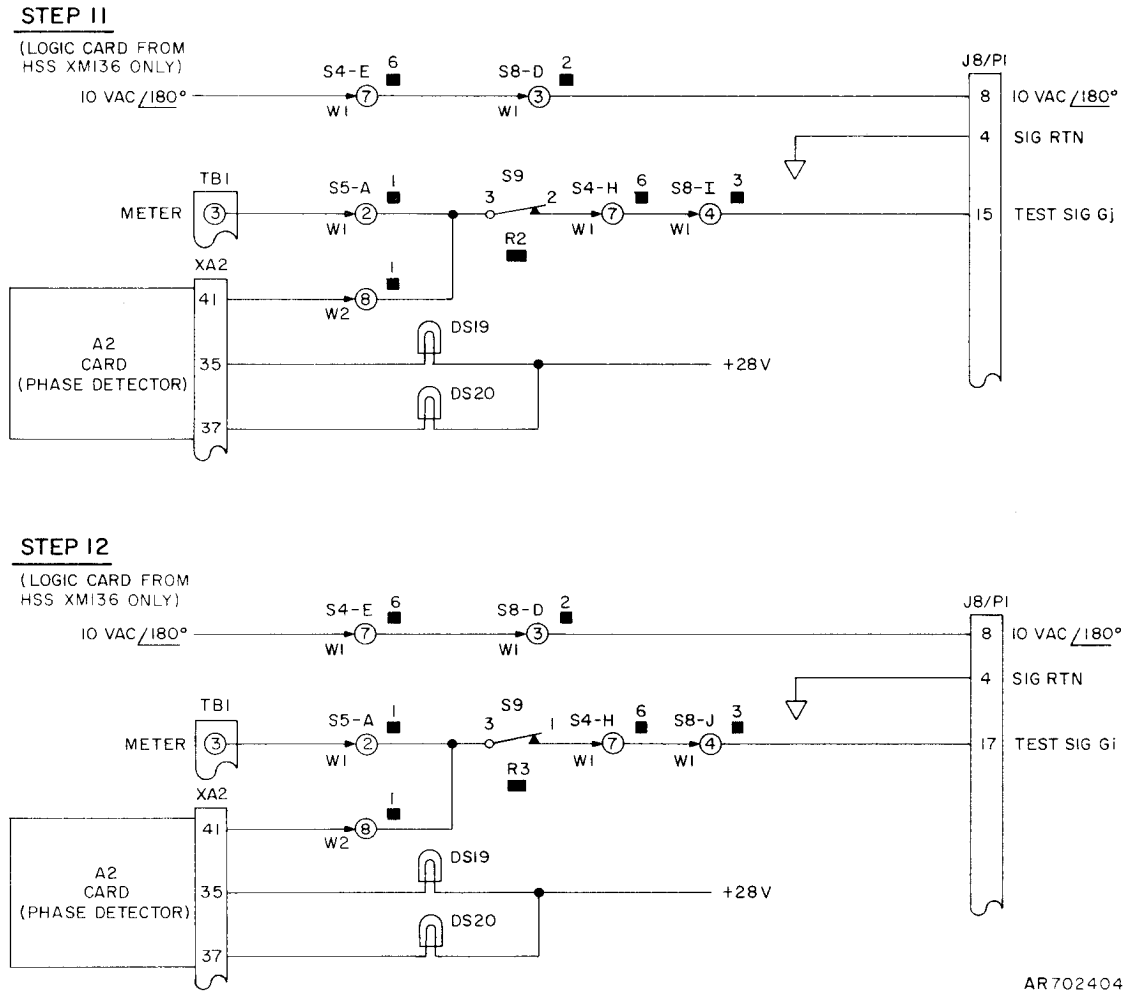


Figure 2-9. Logic card A10/A15 test functional diagram (sheet 9 of 9)

2-16. Comparator Card A11 Test Theory.

a. Reference Material. The following reference materials are required to support the comparator card Al1 test theory discussion:

(1) Comparator card Al1 troubleshooting procedures from TM 9-1270-212-14&P

(2) Comparator- card Al1 foldout schematic diagram from TM 9-1270-212-14&P

(3) Comparator card A11 test functional diagram (fig. 2-10).

b. Theory Discussion

(1) To prepare for the comparator card Al1 test theory discussion, refer to the troubleshooting procedures for comparator card A11 in TM 9-1270-212-14&P and mentally perform steps *a* through *c*.

(2) Refer to figure 2-10 and step *d* of the A11 troubleshooting procedure, The A11 comparator card under test is connected to J9 on the test set. The 28 volts dc is connected through wiper 1 and contact 7 of S4-A, through wiper 1 and contact 5 of S8-A, and through CR23 to energize K4. The energized K4 connects three voltages to the card that represents a particular linkage position. Reference voltage V8 (paragraph 4-8c and table 4-5) from the wiper of R8 is connected through contacts 4 and 3 of K4 to J9-38. Reference voltage V5 from the wiper of R7 is connected through contacts 7 and 6 of K4 to J9-40. Reference voltage V9 from the wiper of R10 is connected through contacts 10 and 9 of K4 to R9-39. Two voltages that represent normal outputs from the test resolver when a buffer amplifier is under test are connected to the card.

Reference voltage V6, in phase, from the wiper of R9 is connected to J9-24, and reference voltage V7, in phase, from the wiper of R11 is connected to J9-16. Reference voltage V1, in phase, is connected through wiper 1 and contact 7 of S4-D to J9-32. This voltage provides excitation for upper and lower tolerances of in-phase comparators AR2 and AR4. Refer to the A11 foldout schematic in TM 9-1270-212-14&P. Reference voltage V2, out of phase, is connected through wiper 1 and contact 7 of S4-E and through wiper 1 and contact 5 of S8-D to J9-12. This voltage provides excitation for upper and lower tolerances of out-of-phase comparators AR6, AR8, and AR10. Logic excitation is provided as follows: +5 volts dc through wiper 1 and contact 5 of S8-F to J9-1; +12 volts dc through wiper 1 and S8-G to J9-34; and -6 volts dc through wiper 1 and contact 5 of S8-H to J9-36. The input signals cause the comparator card to generate logic highs at J9-19, -16, -14, -8, and -6. The highs turn on, respectively, transistors Q6, Q2, Q3, Q4, and Q5 in the test set to light, respectively, DS2, DS3, DS6, DS4, and DS5.

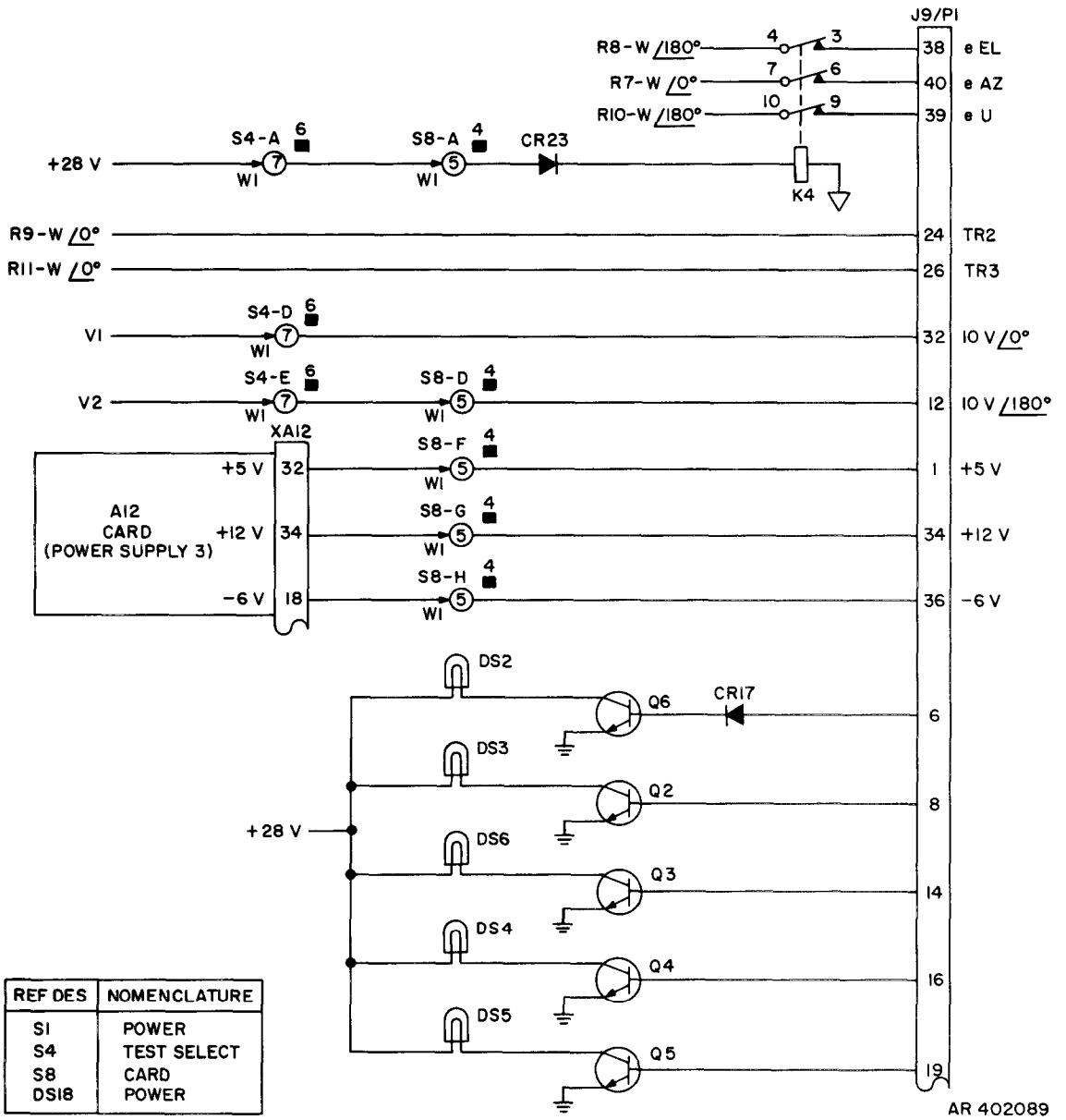


Figure 2-10. Comparator card A11 test functional diagram

2-17. Power Supply Card A12 Test Theory.

a. Reference Material. The following reference materials are required to support the power supply card A12 test theory discussion:

(1) Power supply card A12 test table from TM 9-1270-212-14&P

(2) Power supply card A12 foldout schematic from TM 9-1270-212-14&P

(3) Power supply card A12 test functional diagram (fig. 2-11).

b. Theory Discussion.

(1) To prepare for the power supply card A12 test theory discussion, refer to the troubleshooting procedures for power supply card A12 in TM 9-1270-212-14&P and mentally perform steps *a* through *e.*

(2) Refer to step 1 in figure 2-11 and in the A12 test table. The A12 power supply card under test is connected to J6 on the test set. With S4 set to position 7, the primary winding of T1 in the test set is energized. The 28 volts dc is connected through wiper 1 and contact 8 of S4-A to energize K9 and K10 in the test set. The energized contacts of relays K9 and K10 disconnect the two 20-volt transformer windings of T1 from the A12 card in the test set and connect the windings to the A12 card under test. The 10-volt windings remain connected to both A12 cards. With S8 set to position 7, the -18-volt dc output of the card at J6-10 is connected through contact 8 and wiper 1 of S8-L, and through contact 6 and wiper 1 of S5-A to the meter input.

(3) Refer to step 2 in figure 2-11 and in the A12 test table. With S8 set to position 8, the +18-volt dc output of the card at J6-30 is connected through contact 9 and wiper 1 of S8-L, and through contact 6 and wiper 1 of S5-A to the meter input.

(4) Refer to step 3 in figure 2-11 and in the A12 test table. To provide a check of the power fail circuitry on the A12 card, three power inputs, in addition to those provided in step 1, are required. The 10 volts ac, in phase, is connected through wiper 1 and contact 8 of S4-D, and through wiper 1 and contact 9 of S8-C to J6-12. The 10 volts ac, out of phase, is connected through wiper 1 and contact 8 of S4-E, and through wiper 1 and contact 9 of S8-D to J6-14. The 28 volts dc is connected through wiper 1 and contact 8 of S4-A, through CR6, and through wiper 1 and contact 9 of S8-A to J6-22. The logic high at J6-6 is applied to X42-31 in the test set. When S11 is pressed, 28 volts dc is connected through wiper 1 and contact 8 of S4-B, and through wiper 1 and contact 9 of S8-E to XA2-33. The activated logic circuitry provides a ground at XA2-27 which lights DS7 on the test set.

(5) Refer to step 4 in figure 2-11 and in the A12 test table. With S8 set to position 9, the +12-volt output of the card at J6-34 is connected through contact 10 and wiper 1 of S8-L, and through contact 6 and wiper 1 of S5-A to the meter input.

(6) Refer to step 5 in figure 2-11 and in the A12 test table. With the A12 card bridge rectifiers activated as in step 1 but the three added power inputs of step 3 removed, the output of the power fail circuit at J6-6 is a logic low. Thus, when S11 on the test set is pressed to activate the test set power fail logic, XA2-27 remains a logic high and DS7 is not lighted.

(7) Refer to step 6 in figure 2-11 and in the A12 test table. With S8 set to position 10, the +5-volt dc output of the card at J6-32 is connected through contact 11 and wiper 1 of S8-L, and through contact 6 and wiper 1 of S5-A to the meter input.

(8) Refer to step 7 in figure 2-11 and in the A12 test table. With S8 set to position 11, the -6-volt dc output of the card at J6-18 is connected through contact 12 and wiper 1 of S8-L, and through contact 6 and wiper 1 of S5-A to the meter input.

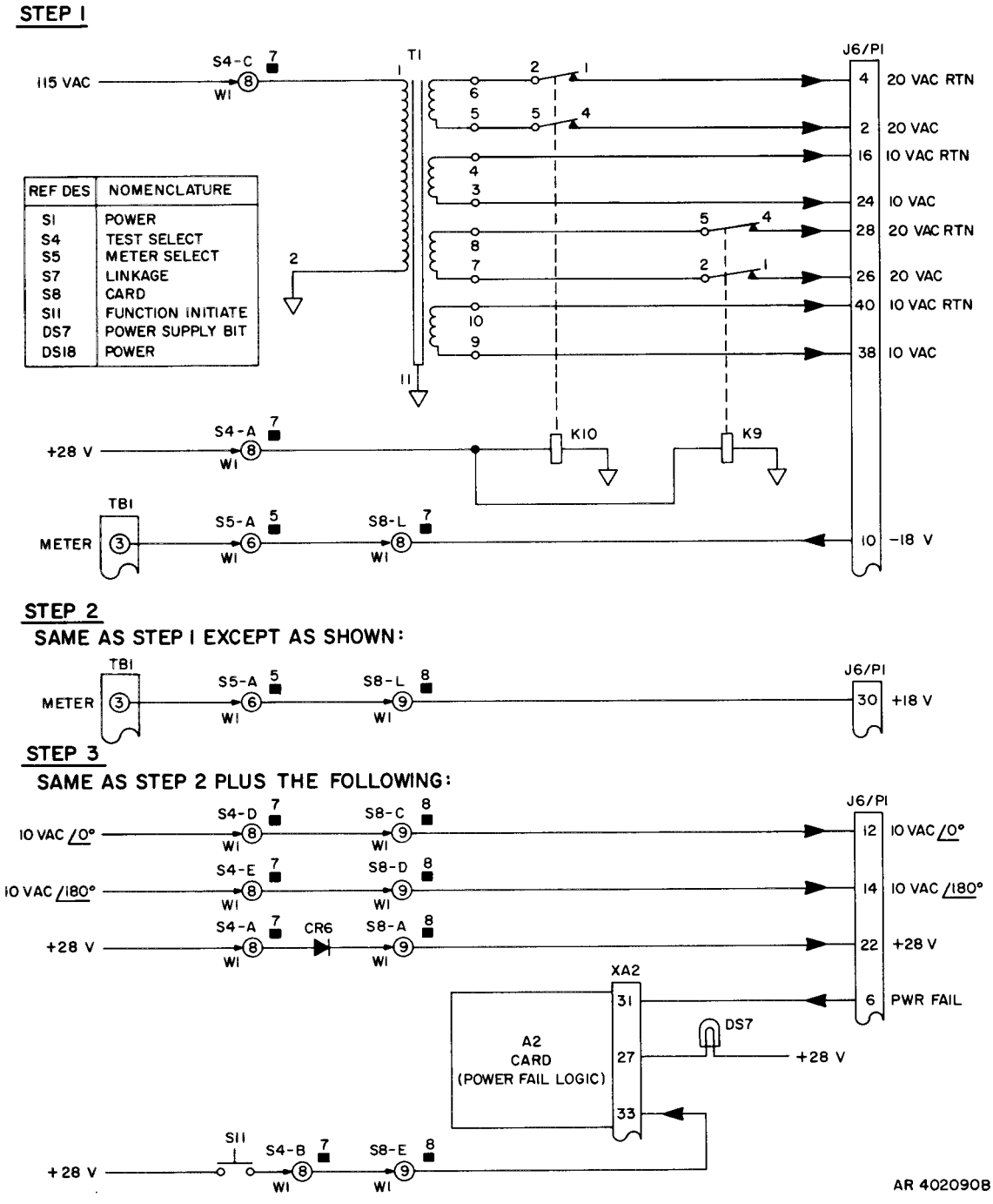


Figure 2-11. Power supply card A12 test functional diagram (sheet 1 of 2)

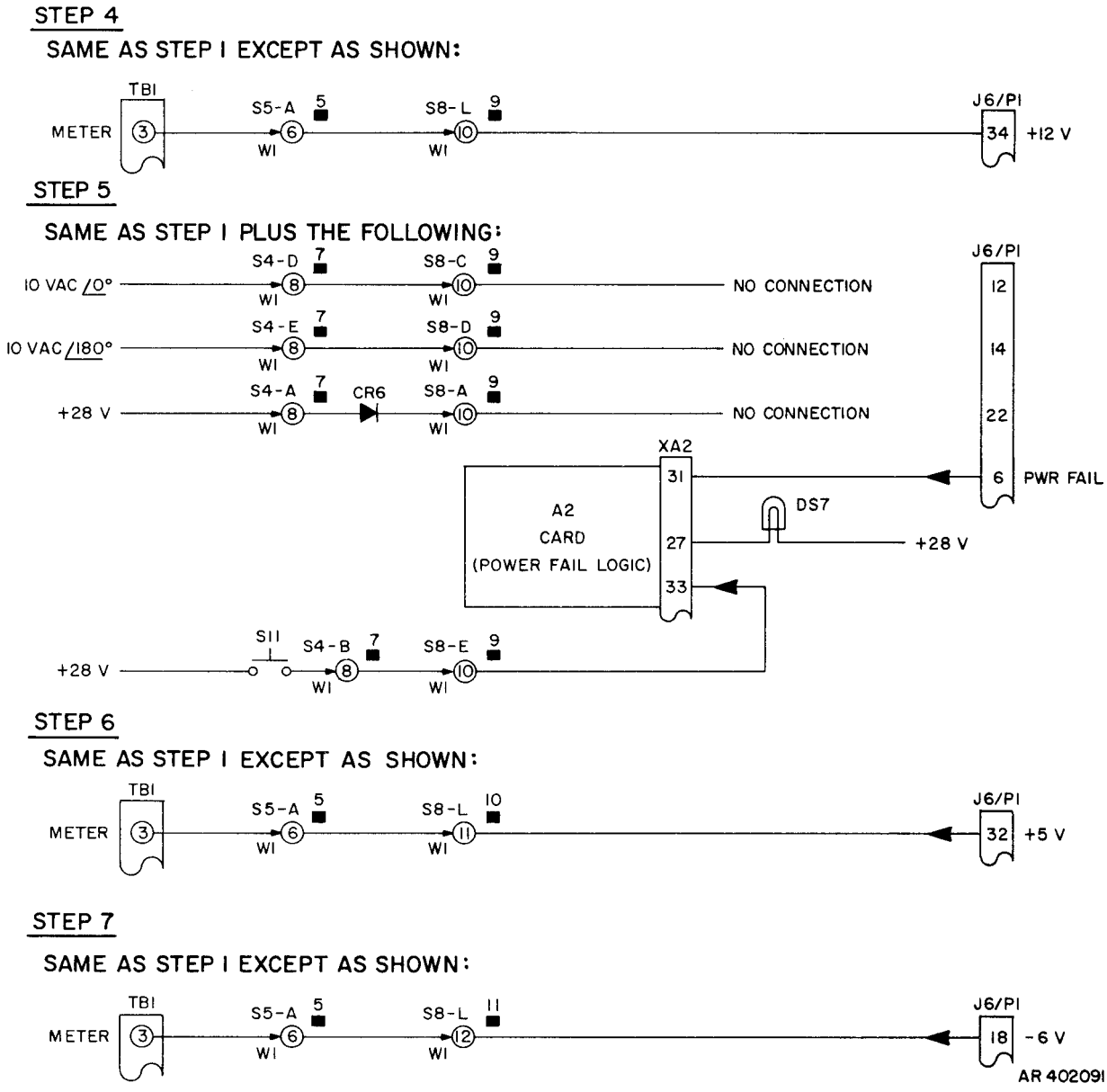


Figure 2-11. Power supply card A12 test functional diagram (sheet 2 of 2)

2-18. Amplifier Card A13 Test Theory.

a. Reference Material. **The** following reference materials are required to support the amplifier card A13 test theory discussion:

(1) Amplifier card A13 test table from TM 9-1270-212-14&P

(2) Amplifier card A13 foldout schematic diagram from TM 9-1270-212-14&P

(3) Amplifier card A13 test functional diagram (fig. 2-12).

b. Theory Discussion.

(1) To prepare for the amplifier card A13 test theory discussion, refer to the troubleshooting procedures for amplifier card A13 in TM 9-1270-212-14&P and mentally perform steps *a* through *e.*

(2) Refer to step 1 in figure 2-12 and in the A13 test table. The A13 amplifier card under testis connected to J9 on the test set. Setting S3 to position 4 connects 5 volts ac from the voltage divider network R3 and R4 associated with T2 through contact 5 and wiper 1 of S3-L, through contact 3 and wiper 1 of S4-1, through contacts 2 and 3 of S9 set to R2, and through S5-A to the meter and A2 card phase detector circuit for readout. This measurement establishes the exact amplitude of the test set signal which is used as a reference in setting the gain of amplifiers on the A13 card.

(3) Refer to step 2 in figure 2-12 and in the A13 test table. Setting S3 to position 6 connects the signal at the wiper of R8 in the voltage divider network associated with T2 through contact 7 and wiper 1 of S3-L, and through the connections described above to the meter and phase detector circuit for readout. This measurement establishes the exact amplitude of the test set reference signal used in setting the gain of the A13 card amplifiers.

(4) Refer to step 3 in figure 2-12 and in the A13 test table. Setting S7 to position 3 connects the ac output from the wiper of R8 through wiper 1 and contact 4 of S7-E to J9-9 and -23 to energize the circuitry associated with AR5-AR6 and AR7-AR8 on the A13 card. Refer to the A13 foldout schematic in TM 9-1270-212-14&P. Setting S8 to position 8 applies a ground to J9-11 and -25 through wiper 1 and contact 9 of S8-K. Card +18-volt dc operating power is connected to J9-2 through wiper 1 and contact 10 of S4-J. Card -18-volt dc operating power is connected to J9-28 through wiper 1 and contact 10 of S4-L. The signal return is provided at J9-41. With S9 set to position R2, the output of AR8 on the A13 card is connected through J9-3, through contact 10 and wiper 1 of S4-1, through contacts 2 and 3 of S9, and through contact 2 and wiper 1 of S5-A to the meter and to the channel B input of the oscilloscope through J11. The oscilloscope channel A input is connected to J14. The oscilloscope external trigger is connected to J13. With a known input signal amplitude to the A13 card, amplifier AR8 is adjusted in phase and amplitude until the signal at J9-3 (oscilloscope channel B) is in phase and equal to the input signal, or unity gain.

(5) Refer to step 4 in figure 2-12 and in the A13 test table. Setting S9 to position R3 connects the output of amplifier AR6 on the A13 card through S9-13 and through contact 10 and wiper 1 of S4-H to the display circuitry described above. In this step, amplifier AR6 is adjusted in phase and amplitude for unity gain.

(6) Refer to step 5 in figure 2-12 and in the A13 test table. Setting S4 to position 8 connects 5 volts ac, out of phase, through wiper 1 and contact 9 of S4-G, and through wiper 2 and contact 11 of S7-E to J9-31 and -37 to energize the circuitry associated with AR1-AR2 and AR3-AR4 on the A13 card. Setting S8 to position 9 applies a ground J9-29 and -35 through contact 10 and wiper 1 of S8-K. Card operating power is connected as previously discussed. With S9 set to position R2, the output of AR4 on the A13 card is connected through J9-27, through contact 9 and wiper 1 of S4-I, and through S9 and S5 previously discussed to the meter and channel B oscilloscope input. The 9-volt ac phase reference signal from the wiper of R8 remains connected through J14 to the channel A oscilloscope input, Thus, by comparison to the step 4 and 5 reference signal, this reference will be about 4 volts larger than the channel B waveform. The A13 test table contains a note advising the operator of this difference. In this step, output amplifier AR4 is adjusted in phase and amplitude for unity gain.

(7) Refer to step 6 in figure 2-12 and in the A13 test table. Setting S9 to position R3 connects the output of amplifier AR2 on the A13 card through J9-33 and through contact 9 and wiper 1 of S4-H to the oscilloscope and meter for readout. In this step, output amplifier AR2 is adjusted in phase and amplitude for unity gain.

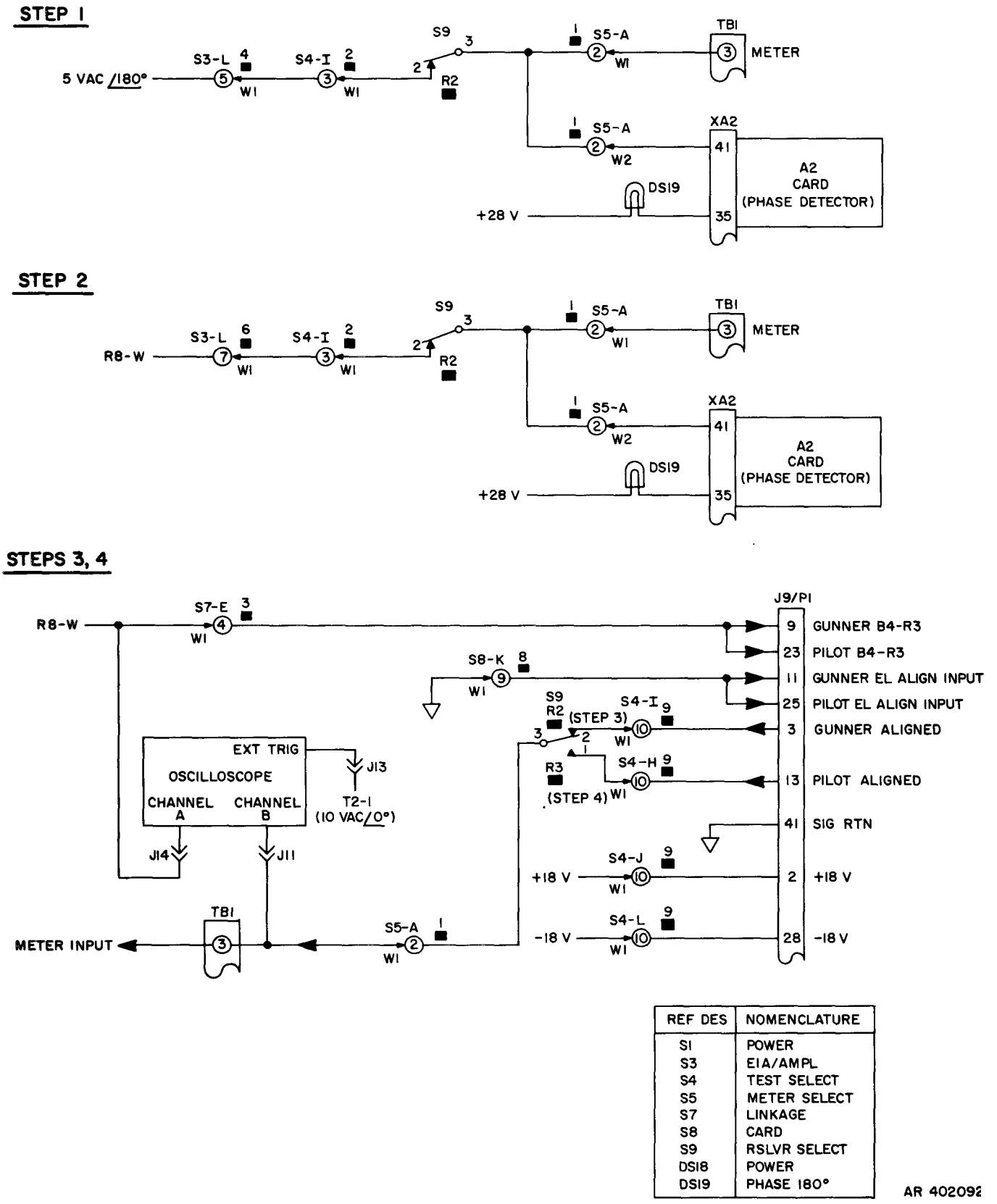
(8) Refer to step 7 in figure 2-12 and in the A13 test table. Setting S7 to position 2 connects 9 volts ac, out of phase, from the wiper of R8 through wiper 1 and contact 3 of S7-E to J9-37 and -31 to energize the noninverting input of AR1 and AR3. Wiper 2 and contact 9 of the same switch connect 5 volts ac, out of phase, to J9-35 and -29 to energize the inverting input of AR1 and AR3. The A13

card will sense the difference between the two signal amplitudes. With S9 set to position R3, the output of AR2 at J9-33 is connected to the meter for readout.

(9) Refer to step 8 in figure 2-12 and in the A13 test table. Setting S9 to position R2 connects the output of AR4 on the A13 card at J9-27 to the meter for readout. Card operating power remains connected as previously discussed.

(10) Refer to step 9 in figure 2-12 and in the A13 test table. Setting S7 to position 1 connects 9 volts ac, out of phase, from the wiper of R8 through wiper 1 and contact 2 of S7-E to J9-9 and -23 to energize the noninverting input of AR5 and AR7. Setting S4 to position 9 connects 5 volts ac, out of phase, through wiper 1 and contact 10 of S4-G, and through wiper 2 and contact 8 of S7-E to J9-11 and -25 to energize the inverting inputs of AR5 and AR7. As in the previous step, AR5 and AR7 will sense the difference between the two signal amplitudes. With S9 set to position R2, the output of AR8 at J9-3 is connected to the meter for readout.

(11) Refer to step 10 in figure 2-12 and in the A13 test table. Setting S9 to position R3 connects the output of AR6 at J9-13 to the meter for readout. Card operating power remains connected as previously discussed.



REF DES	NOMENCLATURE
S1	POWER
S3	EIA/AMPL
S4	TEST SELECT
S5	METER SELECT
S7	LINKAGE
S8	CARD
S9	RSLVR SELECT
DS18	POWER
DS19	PHASE 180°

AR 402092

Figure 2-12. Amplifier card A13 test functional diagram (sheet 1 of 2)

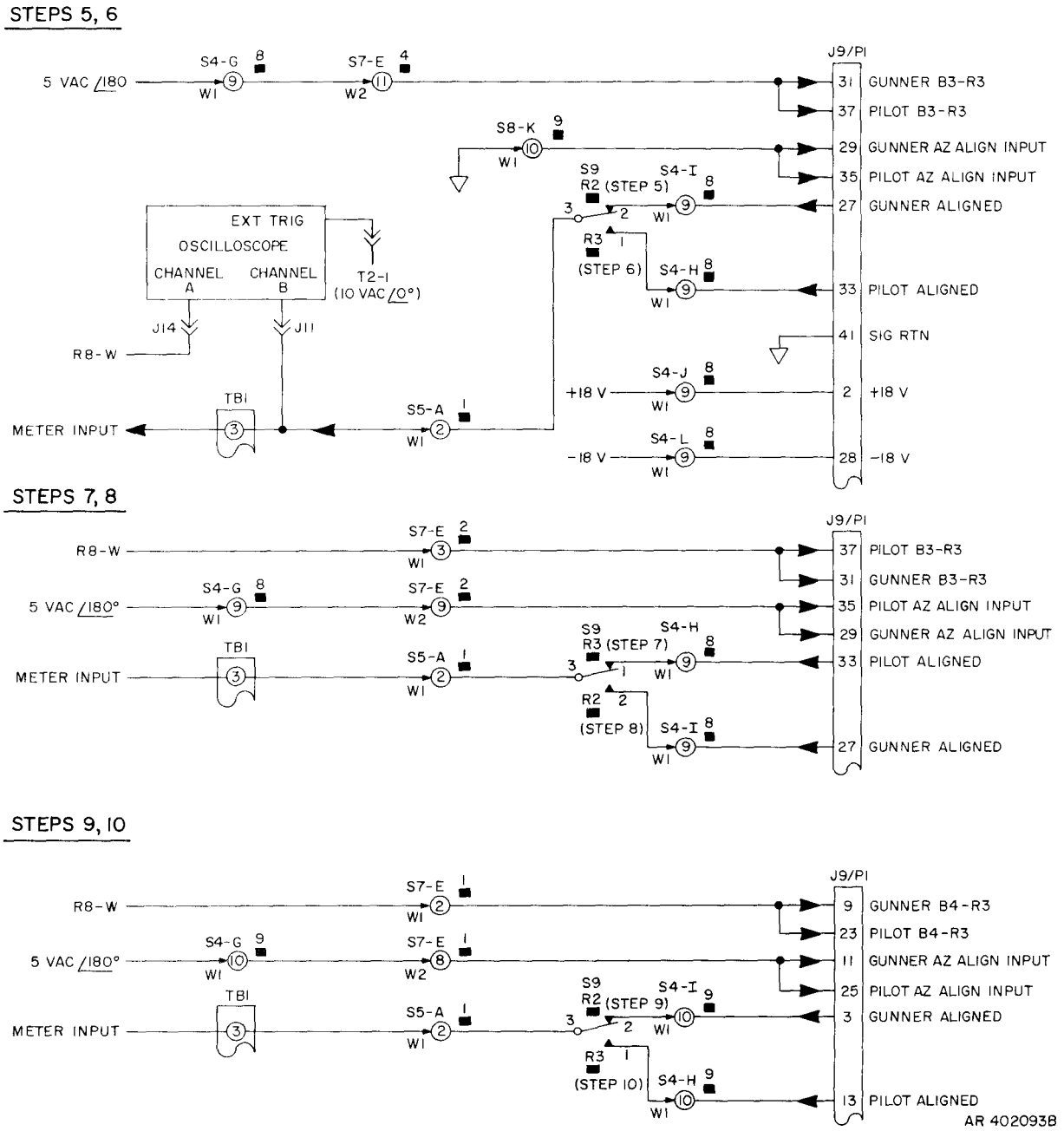


Figure 2-12. Amplifier card A13 test functional diagram (sheet 2 of 2)

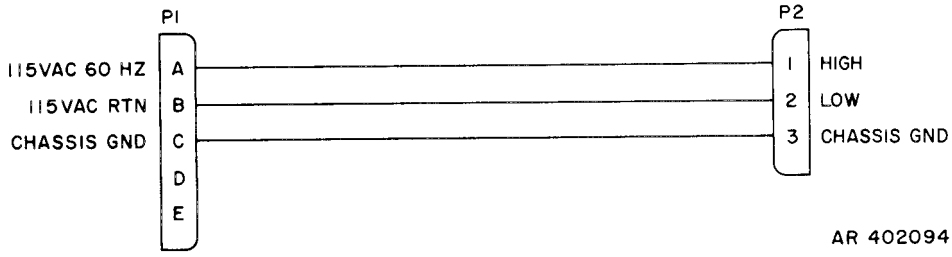


Figure 2-13. 115-volt, 60-Hz power cable W3 – schematic diagram

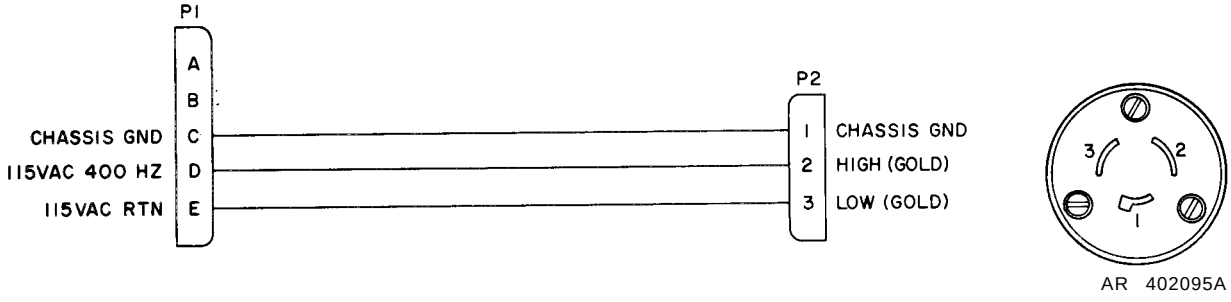


Figure 2-14. 115-volt, 400-Hz power cable W4 – schematic diagram

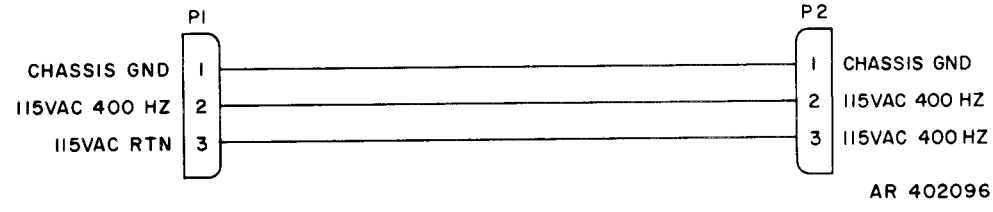


Figure 2-15. Adapter cable W5 - schematic diagram

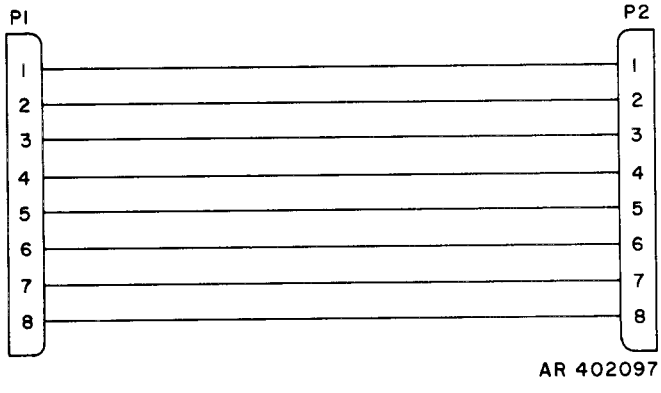


Figure 2-16. Helmet foresight cable

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INDICATORS

3-1. General.

This section contains illustrations of the test set and the linkage orientation device (LOD) and provides the nomenclature, reference designator, and function of each control and indicator.

3-2. Test Set Controls and Indicators.

The test set controls and indicators are illustrated in figure 3-1 and described in table 3-1.

3-3. LOD Controls and Indicators.

The LOD controls and indicators are illustrated in figure 3-2 and described in table 3-2.

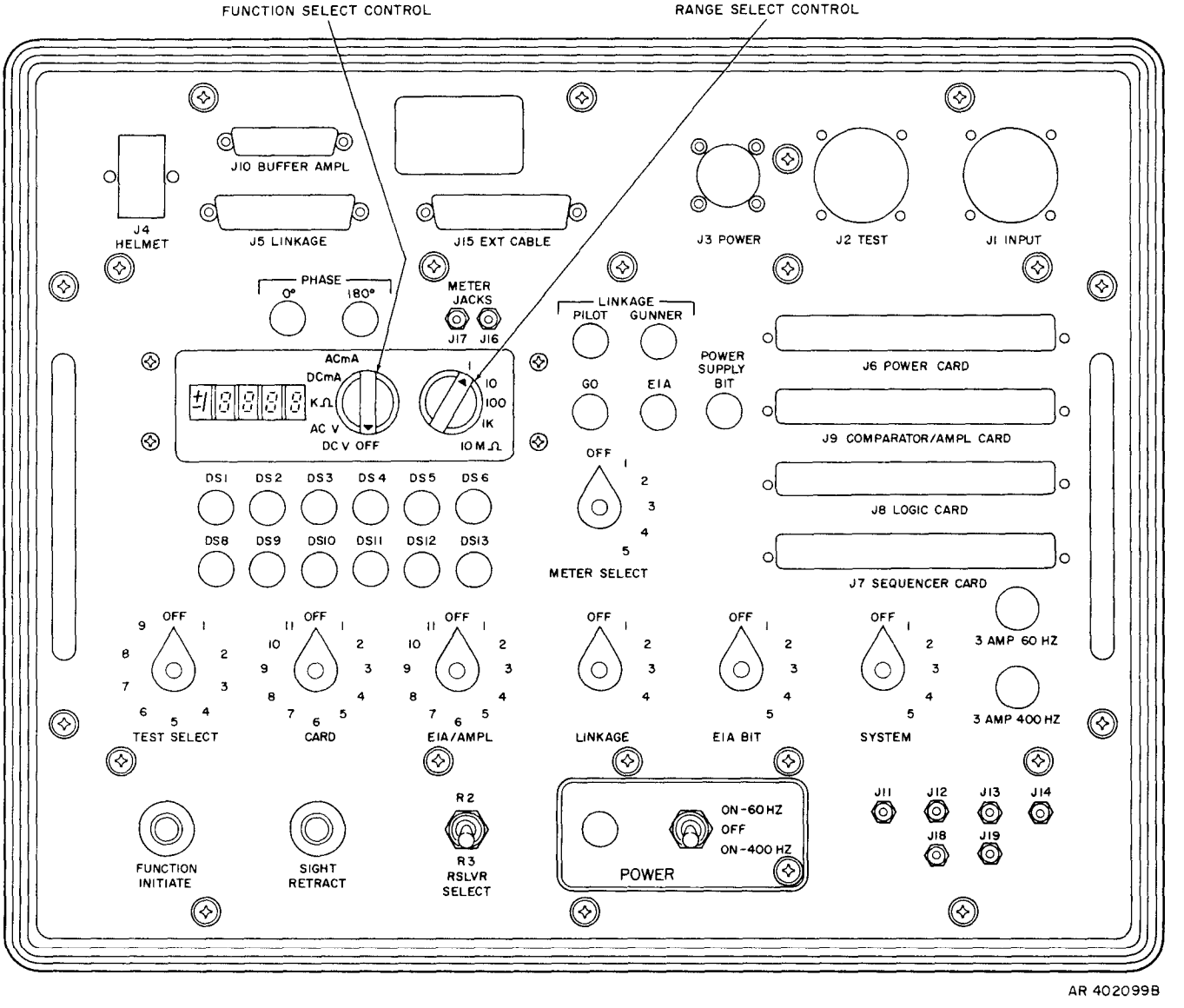


Figure 3-1. Test set control panel

Table 3-1. Test Set Controls and Indicators

Nomenclature	Ref des	Function
J4 HELMET connector	J4	Connects signals and other voltages between test set and helmet sight assembly
J10 BUFFER AMPL connector	J10	Connection for EIA buffer amplifier
J5 LINKAGE connector	J5	Connects signal voltages between test set and linkage assemblies
J15 EXT CABLE connector	J15	Connection for extension cable W1
J3 POWER connector	J3	Connects 115 volts, 60-Hz or 115 volts, 400-Hz power from primary power source to test set
J2 TEST connector	J2	Connects signals and other voltages between test set and units under test
J1 INPUT connector	J1	Connects signals and other voltages between test set and units under test
PHASE 0° indicator	DS20	Lights to indicate ac voltage of selected test is in phase
PHASE 180° indicator	DS19	Lights to indicate ac voltage of selected testis out of phase
Digital multimeter	Ml	Displays multitude of selected voltages during assembly and subassembly tests
METER JACKS J16, J17	J16, J17	Used as external connection when using multimeter for external use. METER SELECT switch must be set to OFF for this operation
PILOT LINKAGE indicator	DS16	Lights when failure occurs in pilot's linkage assembly during HSS test
GUNNER LINKAGE indicator	DS15	Lights when failure occurs in gunner's linkage assembly during HSS test
GO indicator	DS14	Lights upon successful completion of HSS test
EIA indicator	DS17	Lights when failure occurs in EIA during HSS test
POWER SUPPLY BIT indicator	DS7	Lights to indicate proper operation of power fail monitor circuit during system, EIA, and power supply card tests
J6 POWER CARD connector	J6	Connection for EIA power supply card

Table 3-1. Test Set Controls and Indicators – Continued

Nomenclature	Ref des	Function
J9 COMPARATOR/AMPL CARD connector	J9	Connection for EIA comparator card
J8 LOGIC CARD connector	J8	Connection for EIA logic card
J7 SEQUENCER CARD connector	J7	Connection for EIA sequencer card
DS1 indicator	DS1	Lights to indicate proper operation of fail enable circuit during sequencer card test
DS2 indicator	DS2	Lights to indicate proper operation of CR3 comparator during comparator card test
DS3 indicator	DS3	Lights to indicate proper operation of TR2 comparator during comparator card test and of relay drive one and K1 during sequencer card test
DS4 indicator	DS4	Lights to indicate proper operation of eU comparator during comparator card test and of relay drive two and K2 during sequencer card test
DS5 indicator	DS5	Lights to indicate proper operation of eEL comparator during comparator card test and of relay drive three during sequencer card test
DS6 indicator	DS6	Lights to indicate proper operation of RAZ comparator during comparator card test and of relay drive four during sequencer card test
DS8 indicator	DS8	Lights to indicate proper operation of relay drive five during EIA sequencer card test
DS9 indicator	DS9	Lights to indicate proper operation of relay drive six during EIA sequencer card test
DS10 indicator	DS10	Lights to indicate proper operation of relay drive seven during E1A sequencer card test
DS11 indicator	DS1l	Lights to indicate proper operation of relay drive eight during E1A sequencer card test
DS12 indicator	DS12	Lights to indicate proper operation of relay drive nine during EIA sequencer card test
DS13 indicator	DS13	Lights to indicate proper operation of fail-enable circuit during sequencer card test

Table 3-1. Test Set Controls and Indicators - Continued

Nomenclature	Ref des	Function
METER SELECT switch	S5	Connects meter to circuit to be monitored
TEST SELECT switch	S4	Programs test set circuits to provide input voltages and output monitoring for units under test
CARD swtich	S8	Programs test set circuits to apply input voltages and output monitoring for circuit cards. Switches monitored voltages for self-test
EIA/AMPL switch	S3	Selects BIT voltage to be routed to buffer amplifier in EIA. Selects monitored EIA and self-test voltages
LINKAGE switch	S7	Programs test set circuits to connect a buffer amplifier to each linkage resolver in sequence. Applies test voltage during buffer amplifier test. Applies voltages to be monitored for self-test
EIA BIT switch	S2	Selects BIT voltage to be routed to EIA
SYSTEM switch	S6	Programs test set circuits to provide input voltages for testing helmet sight subassembly
3 AMP 60 HZ fuse	F1	Protects 115-volt, 60-Hz power circuit against overload
3 AMP 400 Hz fuse	F2	Protects 115-volt, 400-Hz power circuit against overload
FUNCTION INITIATE switch	S11	Applies +28 volts dc to initiate BIT sequence. Also applies to some self-test functions
SIGHT RETRACT switch	S1	Applies +28 volts dc to retract the sight portion of the helmet sight assembly
RSLVR SELECT switch	S9	Selects linkage resolver rotor output (R2 or R3) to be monitored
POWER indicator	DS18	Lights to indicate internal 28 vdc power supply is operating
POWER switch	S1	Selects 11 5-volt, 60-Hz power or 115-volt, 400-Hz power for internal use
J11 test jack	J11	Provides voltages impressed on meter for display on scope to check amplitude and phase
J12 test jack	J12	Provides enable A and enable B voltages for display on scope to check amplitude and phase during sequencer test
J 13 test jack	J13	Provides time, in-phase, reference voltage for scope synch during circuit card tests

Table 3-1. Test Set Controls and Indicators – Continued

Nomenclature	Ref des	Function
J14 test jack	J14	Provides input amplifier voltage for display on scope to check phase during amplifier test
J18, J19	J18, J19	Common ground connector jacks for attaching return lead of test equipment

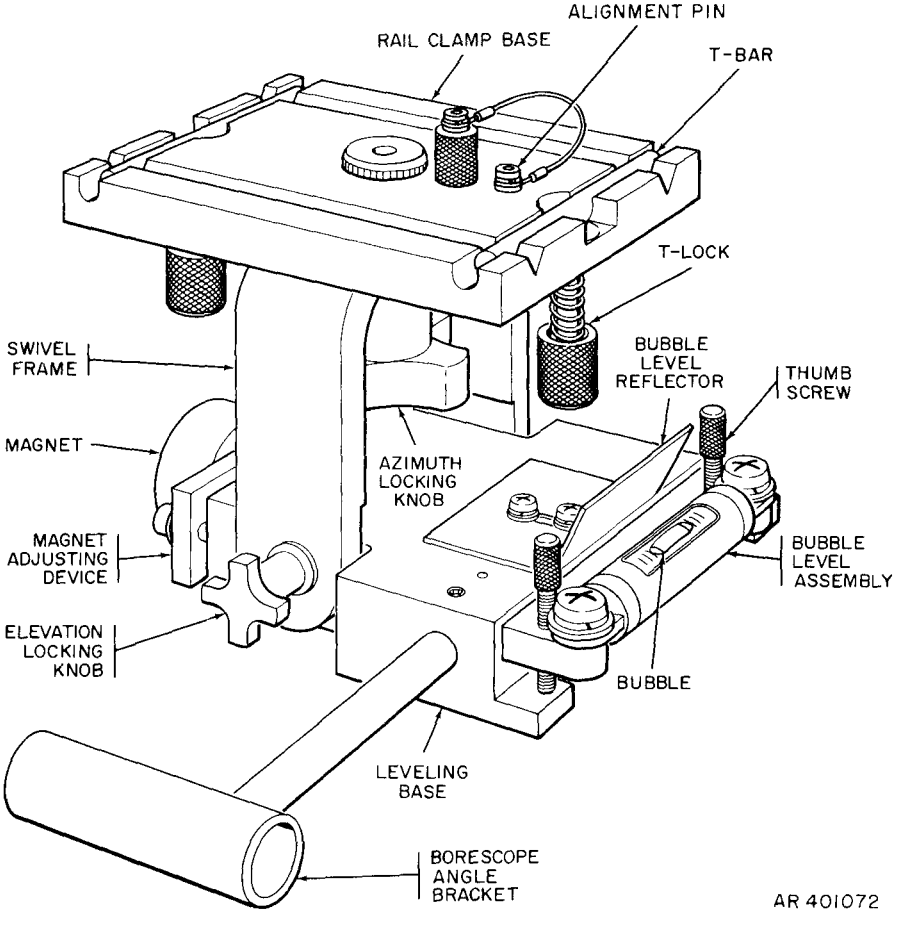


Figure 3-2. Linkage orientation device

Table 3-2. Linkage orientation Device Controls and Indicators

Nomenclature	Function
Bubble level indicator	Provides level indication of LOD. Used to align linkage rails in roll
Bubble level reflector	Provides off-angle view of bubble level
T-lock screw	Secures T-bar over linkage rails where they are resting in grooves of rail clamp base
Elevation locking knob	Secures swivel frame in position when adjusting rail clamp base to desired elevation angle
Azimuth locking knob	Secures rail clamp base in desired azimuth position
Thumb screws	Adjust bubble level assembly
Magnetic adjusting device	Adjusts plane of magnet to be perpendicular to the longitudinal line through the center of the borescope bracket
Alignment pin	Secures rail clamp base in the 0-degree or 5.5-degree position

Section II. OPERATION UNDER USUAL CONDITIONS

3-4. General.

This section contains preliminary setup and self-test procedures.

3-5. Preliminary Setup Procedures.

a. Set all switches having an OFF position to OFF (fig. 3-1).

b. Connect the appropriate power cable from the test set to the power sources as follows:

(1) If a 115-volt, 60-Hz power source is to be used, connect power cable W3 between J3 on the test set and the power source.

(2) If a 115-volt, 400-Hz power source is to be used, connect power cable W4 between J3 on the test set and the power source.

c. If helicopter power is to be used, connect extension cable W5 in series with W4 and connect to helicopter receptacle on left side of gunner's compartment.

d. Set POWER switch to ON-60 Hz if 60-Hz power is used. Set to ON-400 Hz if 400-Hz power is used. Observe that the POWER indicator illuminates.

3-6. Self-Test Procedures.

Perform procedures of table 3-3. If failures occur, refer to troubleshooting procedures in Chapter 4.

3-7. Operating Instructions.

Refer to TM 9-1270-212-14&P for additional operating instructions for the test set.

Table 3-3. Test Set Self-Test

Operation of test set controls	Test set indications
1 Set POWER switch to ON-60 Hz or ON-400 Hz.	POWER indicator lights
2 Set TEST SELECT switch to 2, METER SELECT switch to 1, and RSLVR SELECT switch to R2. Set multimeter range switch to 10 and function to AC V.	PHASE and multimeter indications are as shown below for respective positions of the EIA/AMPL switch. The multimeter readings for switch positions 5 through 10 should be as calculated in Chapter 4, Section VI. Perform the adjustments specified to obtain the values of V5 through V10.
	EIA/AMPL position / PHASE indication / Multimeter indication
	1 / 0° / 10.6 ±0.6 (V1)
	2 / 180° / 10.6 ±0.6 (V2)
	3 / 0° / 5.3 ±0.3 (V3)
	4 / 180° / 5.3 ±0.3 (V4)
	5 / 0° / V5
	6 / 180° / V8
	7 / 180° / V9
	8 / 0° / V10
	9 / 0° / V7
	10 / 0° / V6
3 Set multimeter range switch to 100 and function to DC V. Set METER SELECT switch to 5, CARD switch to 2, and LINKAGE switch to 1.	Multimeter indicates 30 ±3 volts
4 Set CARD switch to 1.	Multimeter indications are as follows for respective positions of LINKAGE switch.
	LINKAGE position / Multimeter indication
	1 / +18 ±l
	2 / -18 ±1
	3 / +12 ±0.7
	4 / -6 ±0.36
	5 / +5 ±0.30
5 Set CARD switch to 2 and LINKAGE switch to 2.	Multimeter indicates -8 ±0.48

Table 3-3. Test Set Self-Test – Continued

Operation of test set controls	Test set indications
6 Set TEST SELECT switch to 8. Press and hold FUNCTION INITIATE pushbutton.	Indicators DS1 through DS17 light (includes GO, EIA, PILOT LINKAGE, GUNNER LINKAGE, and POWER SUPPLY BIT indicators)
7 Set TEST SELECT switch to 2. EIA AMPL switch to 1, METER SELECT switch to 1, and RSLVR SELECT switch to R2.	PHASE 0° indicator lights
8 Set EIA AMPL switch to 2.	PHASE 180° indicator lights

CHAPTER 4

MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-1. General.

Refer to Appendix B for the list of repair parts. Special tools for maintenance and repair of the fire control subsystem test set are listed in table 4-1. Refer to Appendix C, Section III, for tool and test equipment requirements.

Table 4-1. Special Tools and Test Equipment

Item	NSN or reference	Reference		Use
		Figure	Paragraph	
Organizational HSS boresight kit	4931-00-124-5453	1-4	1-20	HSS boresighting and alignment
7.62-mm boresight kit	4933-00-930-1957		4-13	LOD alignment

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-2. General.

Perform the self-test of the test set as described in paragraph 3-6. Remove any dirt, dust, or grime with a soft cloth and cleaning solvent conforming to MIL-A-6091 (diesel fuel, gasoline, and benzine are prohibited).

Section III. INSPECTION AND TEST

4-3. General.

Inspect all mechanical parts to insure they are in good condition and are not bent, cracked, broken, or deteriorated. Inspect electrical parts for obvious damage to insure they are not cracked, broken, or otherwise damaged. Check for frayed or broken wires, loose or badly soldered joints, and shorted terminals or connectors,

4-4. Test Set Electrical Test.

Perform the electrical self-test, paragraph 3-6.

4-5. Helmet Boresight Tool Inspection.

a. Secure the rail clamp base of the linkage orientation device (LOD) in the O-degree position. Clamp the rail clamp base of the LOD (fig. 3-2) securely to a stable base.

b. Attach the boresight tool to the magnet on the LOD.

c. Slightly loosen the elevation and azimuth locks on the LOD.

d. Sight through the boresight tool and align on a distant target (1000 meters minimum) by adjusting the LOD in elevation and azimuth until a target is centered in the field of view of the boresight tool.

e. Tighten the elevation and azimuth locks. Check that the target remains centered in the boresight tool.

f. Rotate the boresight tool on the magnet through an angle of at least 90 degrees while looking through the boresight tool.

g. If the target appears to move from the center of the field of view more than one-half the distance to the edge of the field of view when the boresight tool is rotated through 90 degrees, the boresight tool should not be used.

Section IV. TROUBLESHOOTING

4-6. General.

Troubleshooting procedures for any failure that might occur during self-test or adjustment of the divider network are provided in paragraph 4-7. Detailed supplementary information that may be used in troubleshooting suspected failures is also provided in paragraphs 4-8 and 4-9. Refer to the self-test functional diagram (fig. 2-2) and the schematic diagrams (foldouts FO-1 througt FO-4) as necessary in tracing the circuits and in following instructions for the particular problem or failure. Disassembly/assembly instructions for the test set components are provided in Section V, and the repair parts illustrations are in Appendix B. Figure 4-1 is a terminal location diagram. The tolerance for continuity shall be less than 1 ohm.

4-7. Self-Test and Divider Network Troubleshooting.

a. Self-Test Troubleshooting. If a failure occurs during self-test (table 3-3), perform troubleshooting procedures as prescribed in table 4-2 (see fig. 2-2).

b. Divider Network Troubleshooting. Refer to Section VI for divider network adjustments and voltage calculations. If a failure occurs while making adjustments in the divider network, perform troubleshooting procedures as prescribed in the applicable part of step 4, table 4-2.

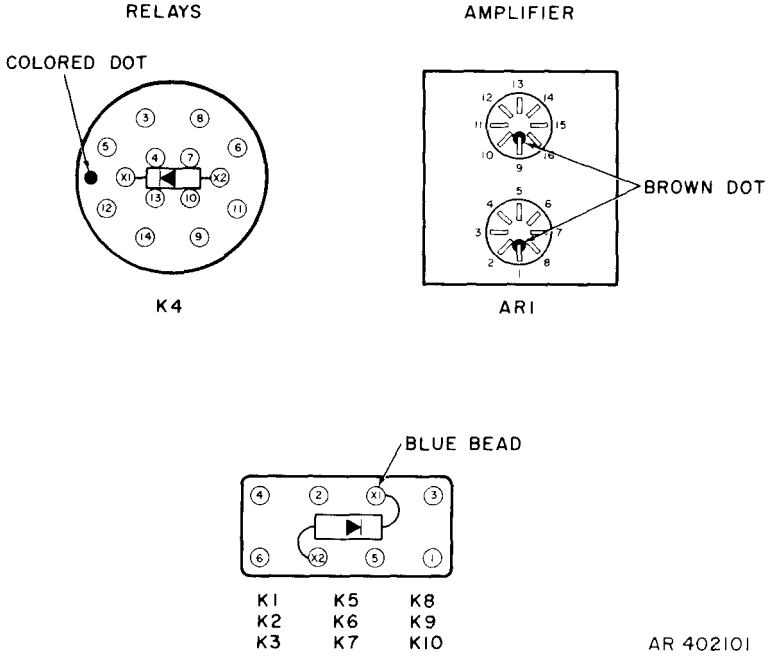


Figure 4-1. Terminal location diagram

Table 4-2. Troubleshooting Procedures

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
1	POWER indicator does not light.	*a.* Remove indicator lamp and check for 30 ±3 volts dc in lamp socket. If voltage is present, install new lamp. If voltage is not present, proceed to *b.* *b.* Check appropriate (60-Hz or 400-Hz) fuse. If fuse is normal, proceed to *c.* If fuse is open, replace and repeat turnon procedure. If fuse burns open, proceed to *e.* *c.* Remove test set from container, isolate, and apply power. Check 115 volts ac at terminals 1 and 2 of 28-volt dc power supply 1. If voltage is normal, proceed to *d.* If voltage is absent, check wiring or replace S1. *d.* Check for 30 ±3 volts dc at terminals 3(+) and 4 of power supply. If voltage is absent, replace power supply. If voltage is normal, check test set wiring to indicator DS18. *e.* Unsolder the lead from line filter FL2-2. Check for 90 ±20 ohms minimum resistance at power supply 1, terminal 3. If resistance is abnormal, proceed to *f.* If resistance is normal, install new fuse, and repeat turnon procedure. If POWER indicator lights, replace inverter power supply 2. If fuse burns open, replace 28-volt dc power supply 1. *f.* Check for FL2 shorted to ground or check for short circuits at items connected to ECP5. Replace shorted items.
2	*a.* The appropriate indicator does not light for any or all of the EIA/AMPL switch positions.	*a.* (1) Replace card A2. (2) Replace the indicator bulb.

Table 4-2. Troubleshooting Procedures – Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
2 – Cont.	*b.* Out-of-tolerance indication for EIA/AMPL position 1.	*b.* Check for 10.6 ±0.6 volts ac at T2-1. If correct voltage is not present, adjust the potentiometer on the static power inverter (paragraph 4-23c (1)). If correct voltage still cannot be obtained, disconnect T2-1 from all other circuits. If correct voltage is still not present, replace T2.
	c. Out-of-tolerance indication for EIA/AMPL position 2.	*c.* Check for 10.6 ±0.6 volts ac at T2-4. If correct voltage is not present, disconnect T2-4 from all other circuits. If correct voltage is still not present, replace T2.
	d. Out-of-tolerance indication for EIA/AMPL position 3.	*d.* (1) Check for continuity between E28 and TB1-3. (2) Insure that 10.6 ±0.6 volts ac exists at E8. If this voltage is present, replace R1. (3) If 10.6 ±0.6 volts ac is not at E8, disconnect T2-1 from all other circuits and check for the voltage at T2-1. If the voltage is still not present, replace T2.
	e. Out-of-tolerance indication for EIA/AMPL position 4.	*e.* (1) Check for continuity between E27 and TB1-3. (2) Insure that 10.6 ±0.6 volts ac exists at E7. If this voltage is present, replace R4. (3) If 10.6 ±0.6 volts ac is not at E7, disconnect T2-4 from all other circuits and check for the voltage at T2-4. If the voltage is still not present, replace T2.
	f. Out-of-tolerance indication for EIA/AMPL position 5.	*f.* (1) Adjust R7 (table 4-5, step 5). (2) Check for continuity between E10 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E8. If this voltage is present, replace R7. If 10.6 ±0.6 volts ac is not at E8, disconnect T2-1 from all other circuits and check for the voltage at T2-1. If the voltage is still not present, replace T2.

Table 4-2. Troubleshooting Procedures – Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
2 – Cont.	*g.* Out-of-tolerance indication for EIA/AMPL position 6.	*g.* (1) Adjust R8 (table 4-5, step 8). (2) Check for continuity between E11 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E7. If this voltage is present, replace R8. (4) If 10.6 ±06 volts ac is not at E7, disconnect T2-4 from all other circuits and check for the voltage at T2-4. If the voltage is still not present, replace T2.
	h. Out-of-tolerance indication for EIA/AMPL position 7.	*h.* (1) Adjust R10 (table 4-5, step 9). (2) Check for continuity between E14 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E7. If this voltage is present, replace R10. (4) If 10.6 ±0.6 volts ac is not at E7, disconnect T2-4 from all other circuits and check for the voltage at T2-4. If the voltage is still not present, replace T2.
	i. Out-of-tolerance indication for EIA/AMPL position 8.	*i.* (1) Adjust R12 (table 4-5, step 10). (2) Check for continuity between E16 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E8. If this voltage is present, replace R12. (4) If 10.6 ±0.6 volts ac is not at E8, disconnect T2-1 from all other circuits and check for the voltage at T2-1. If the voltage is still not present, replace T2.

Table 4-2. Troubleshooting Procedures – Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
2 – Cont.	*j.* Out-of-tolerance indication for EIA/AMPL position 9.	*j.* (1) Adjust R12 (table 4-5, step 7). (2) Check for continuity between E15 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E8. If this voltage is present, replace R11. (4) If 10.6 ±0.6 volts ac is not at E8, disconnect T2-1 from all other circuits and check for the voltage at T2-1. If the voltage is still not present, replace T2.
	k. Out-of-tolerance indication for EIA/AMPL position 10.	*k.* (1) Adjust R9 (table 4-5, step 6). (2) Check for continuity between E12 and TB1-3. (3) Insure that 10.6 ±0.6 volts ac exists at E8. If this voltage is present, replace R9. (4) If 10.6 ±0.6 volts ac is not at E8, disconnect T2-1 from all other circuits and check for the voltage at T2-1. If the voltage is still not present, replace T2.
3	*a.* Out-of-tolerance multimeter indication.	*a.* Replace power supply 1.
	b. No multimeter indication.	*b.* Check continuity through the applicable wipers of the LINKAGE, CARD, and METER SELECT switches. Replace the faulty switch.
4	*a.* Out-of-tolerance multimeter indication for any of the LINKAGE switch positions.	*a.* Replace power supply circuit card A12.
	b. No multimeter indications.	*b.* (1) Insure that transformer T1 is providing inputs to circuit card A12. (2) Check continuity through the applicable wipers of the CARD and METER SELECT switches. If continuity does not exist, replace the faulty switch.

Table 4-2. Troubleshooting Procedures – Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
4 – Cont.		(3) Insure that voltages appear at TB1-3.
		(4) Check for -8 volts dc on TB1-1; if present, replace the multimeter.
5	*a.* No multimeter indication.	*a.* Check continuity through the applicable wiper of the LINKAGE, CARD, and METER SELECT switches. Replace the faulty switch.
	b. Out-of-tolerance multimeter indication.	*b.* (1) Replace circuit card A2.
		(2) If voltage is still out of tolerance, replace T3.
6 (FUNCTION INITIATE pressed)	*a.* Fewer than four of indicators PILOT LINKAGE, GUNNER LINKAGE, GO, and EIA, are off.	*a.* (1) Replace the bulb or bulbs.
		(2) Check continuity from K3-1 to K3-2.
		(3) Check for 28 volts dc at the appropriate pin of connector XA2. If voltage is not present, replace the corresponding diode.
	b. All four of indicators PILOT LINKAGE, GUNNER LINKAGE, GO, and EIA are off.	*b.* (1) Check for 28 volts dc at K3-X1; then at XA2-22 and XA2-28, if necessary, to check K3, CR3, and CR16.
		(2) Check for continuity from K3-1 to K3-2.
		(3) Insure that 28 volts dc exists at XA2-19. If voltage is not present, replace K7.
	c. One or more but not all of DS13 and DS1 through DS6 are off.	*c.* (1) Replace the bulb or bulbs.
		(2) Insure that 5 volts dc is present at the applicable pin (4 or 29) of XA2.

Table 4-2. Troubleshooting Procedures – Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
6 – Cont. (FUNCTION INITIATE pressed)		(3) Insure that 28 volts dc is present at the 28-volt dc terminal of the indicator. (4) Check voltage at the base of the applicable transistor. If 0.7 ±0.3 volt dc or +5 volts dc is present, replace the transistor. If no voltage is present, replace card A2, and if indicator still does not light, replace the transistor.
	d. All of DS1 through DS6 are off.	*d.* Insure that 28 volts dc is present at XA2-4. If the voltage is not present, replace K5.
	e. One or more but not all of DS8 through DS12 are off.	*e.* (1) Replace the bulb or bulbs. (2) Insure that ground exists at the applicable pin of XA2. (3) Insure that 28 volts dc exists on the 28-volt dc terminal of the indicator. (4) Replace the appropriate diode.
	f. All of DS8 through DS12 are off.	*f.* Check for continuity from ground to XA2-8. If continuity is not present, replace K5.
	g. POWER SUPPLY BIT indicator is off.	*g.* (1) Replace the bulb. (2) Insure that 28 volts dc exists at XA2-33. (3) Insure that continuity exists between XA2-27 and the ground terminal of the indicator. (4) Replace card A2.

Table 4-2. Troubleshooting Procedures -- Continued

Self-test step failed (table 3-3)	Condition of failure or probable cause	Corrective action
6 -- Cont. (FUNCTION INITIATE pressed)	*h.* The POWER indicator light is off.	*h.* (1) Replace the bulb. (2) Check 28-volt dc power source and ground connection to the indicator. (3) If 28 volts dc is not present at the indicator, check for 28 volts dc at output terminals 3 and 4 of power supply 1, then check for 115 volts ac across input terminals 1 and 2 of the power supply. If the input voltage is present, replace the power supply.
7	*a.* Circuit card A2 is bad.	*a.* (1) Apply ground to XA2-37. If PHASE 0° indicator lights, replace card A2. (2) If indicator still does not light, check for 28 volts dc at the 28-volt dc terminal of the indicator; then check for continuity through switch wipers of EIA/AMPL, TEST SELECT, RSLVR SELECT, and METER SELECT. Replace the faulty switch or connection.
	b. Faulty bulb.	*b.* Replace the PHASE 0° indicator bulb.
8	*a.* Circuit card A2 is bad.	*a.* (1) Apply ground to XA2-35. If PHASE 180° indicator lights, replace card A2. (2) If indicator still does not light, check for 28 volts at the 28-volt dc terminal of the indicator; then check for continuity through switch wipers of EIA/AMPL, TEST SELECT, RSLVR SELECT, and METER SELECT. Replace the faulty switch or connection.
	b. Faulty bulb.	*b.* Replace the PHASE 180° indicator bulb.

4-8. Resistance and Voltage Checks.

a. Scope of Table 4-3. Table 4-3 provides detailed resistance and voltage checks that may be made in any area of suspected malfunction. Any part of table 4-3 may be performed alone, and the steps may be performed in any sequence desired. If a fully detailed checkout of the test set is desired, the entire test may be performed.

b. Multimeter Connections. Readings identified by an asterisk can be read directly on the test set multimeter without external connections. Other readings can be made by connecting leads from an external multimeter to the connector pins indicated in the "From" and "To" columns of the table.

c. Values of V1 through V10. The voltage values for V1 through V10 will be as calculated and recorded in the divider network adjustment table in Section VI. The step numbers in the table that provide the calculations for V1 through V10 are in corresponding order, as follows:

Voltage	Step numbers of divider network adjustment table
V1	1
V2	2
V3	3
V4	4
V5	5
V6	6
V7	7
V8	8
V9	9
V10	10

d. Using Table 4-3. In using any part of table 4-3, the areas of suspected malfunction can be identified by the connector pin information. For example, if the test set passes the self-test and yet indicates a failure for a replacement sequencer card, use the portion of table 4-3 that checks the pins of J7. If the correct indications occur, the problem is not in the test set. If a faulty indication is found, it will be on the circuit identified by the pin under test. Use the schematic diagrams, functional diagrams, and locator views as necessary to trace the circuit and locate the faulty connection or component. A list of the applicable steps and connectors for components or circuits that are tested in table 4-3 is as follows:

Component or circuit card connector	Applicable steps of table 4-3
Helmet sight subsystem (J1)	205–212,332
Helmet sight assembly (J4)	22,24,25
Linkage assemblies (J5 & J15)	166–197
Boresighting signals (J1)	131–134
EIA (J1 & J2) input test signals during EIA and HSS tests	35–63
EIA input power (Jl)	21,23,27–29, 77–79,2-1,202
Monitor circuits for EIA dc voltages (Jl)	257-262,264,266, 268,270
Monitor circuits for EIA ac voltages (J1 & J2)	26,65,70–76
Grounds (Jl, J4, J6, J7, J8, J9, J10, METER blk)	1-20,64, 149, 165, 203,304
Buffer amplifier (J1 & J2)	80-130,153–163
Buffer amplifier modules (J 10)	79, 135, 148
Sequencer card (J7)	150–152,164, 272–286
Logic card (J8)	213–245,305, 308–310
Comparator card (J9)	32–34,247–256
Power supply card output monitor circuit (J6)	263,265,267,269, 271
Power supply card input and other voltages (J6)	287–289,291–298 306,307
Amplifier card (J9)	300–303,311–331
Amplifier card setup voltage to test jacks	30,31
Power supply logic voltages	198–200,204,246, 290,299

Table 4-3. Resistance and Voltage Checks

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
1	OFF	2	OFF	OFF	OFF	OFF	OFF	R2	J1-K	J18	Less than 1 ohm
2									J1-M		
3									J1-Y		
4									J4-4		
5									J4-6		
6									J4-8		
7									J6-36		
8									J7-20		
9									J7-41		
10									J8-12		
11									J8-4		
12									J9-41		
13									J10-2		
14									J10-9		
15									J10-12		
16									J10-7		
17									J10-13		
18	OFF	2	OFF	OFF	OFF	OFF	OFF	R2	J10-10	J18	Less than 1 ohm

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
19	OFF	2	OFF	OFF	OFF	OFF	OFF	R2	J19	J18	Less than 1 ohm
20		2							METER (blk)		Less than 1 ohm
21		1							J1-J		115 ±12 volts ac
22									J4-1		+30 ±3 volts dc
23									J1-L		+30 ±3 volts dc
24	OFF								J4-7		+30 ±3 volts dc when SIGHT RETRACT is pressed
25	1							R2	J4-5	J18	Less than 1 ohm when FUNCTION INITIATE is pressed
26								R3	J1-H	J11	Less than 1 ohm
27		1							J1-J	J18	115 ±12 vrms 400 Hz
28		2							J1-J		115 ±12 volts ac
29									J1-L		+30 ±3 volts dc
30									J13		V1**
31									J14		V8
32									J9-38		V8
33									J9-39		V9
34						OFF			J9-40		V5
35						1					POWER SUPPLY BIT lights
36	1	2	OFF	OFF	OFF	2	OFF	R3	J2-R	J18	V5

**For computations of V1 through V10, see paragraphs 4-8 and 4-23.

Table 4-3. Resistance and Voltage Checks — Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
37	1	2	OFF	OFF	OFF	2	OFF	R3	J2-z	J18	V5
38									J2-Y		V8
39									J2-GG		V8
40									J2-HH		V9
41									J2-Z		V9
42						2			J1-f		+30 ±3 volts dc when FUNCTION INITIATE is pressed
43						3			J2-z		V5
44									J2-R		V5
45									J2-GG		V8
46									J2-Y		V8
47									J2-HH		0 ±1.5 volts ac
48									J2-Z		V9
49						3			J1-f		+30 ±3 volts dc when FUNCTION INITIATE is pressed
50						4			J2-R		V5
51									J2-z		V5
52									J2-Y		V8
53									J2-GG		V8
54	1	2	OFF	OFF	OFF	4	OFF	R3	J2-HH	J18	V9

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
55	1	2	OFF	OFF	OFF	4	OFF	R3	J2-Z	J18	0 ±1.5 volts ac
56						4			J1-f		+30 ±3 volts dc when FUNCTION INITIATE is pressed
57						5			J2-R		V5
58									J2-Y		V8
59									J2-HH		0 ±1.5 volts ac
60									J2-Z		V9
61									J1-f		+30 ±3 volts dc when FUNCTION INITIATE is pressed
62						5			J1-t		2.4 ±0.24K
63						OFF			J1-V		Less than 1 ohm
64				OFF					J1-Z	J18	
65				1					J1-i	J11	
66				2					J1-j		
67				3					J1-k		
68				4					J1-m		
69				5					J1-n		
70				6					J2-A		
71				7					J2-B		
72				8					J1-EE	J11	Less than 1 ohm
73	1	2	OFF	8	OFF	OFF	OFF	R3	J1-EE	J18	12 ±0.7 ohm

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
74	1	2	OFF	9	OFF	OFF	OFF	R3	J1-HH	J11	Less than 1 ohm
75	↕	↕	↕	10	↕	↕	↕	↕	J2-b	J11	Less than 1 ohm
76	1	2	↕	9	↕	↕	↕	↕	J1-HH	J18	12 ±0.7 ohm*
77	OFF	3	↕	↕	↕	↕	↕	↕	J1-J	↕	115 ±12 vrms
78	↕	↕	↕	↕	↕	↕	↕	↕	J1-L	↕	+30 ±3 volts dc
79	↕	↕	↕	9	↕	↕	↕	↕	J10-1	↕	+30 ±3 volts dc when FUNCTION INITIATE is pressed
80	↕	↕	↕	1	↕	↕	↕	↕	J1-A	↕	V3
81	↕	↕	↕	↕	↕	↕	↕	↕	J1-B	↕	V1
82	↕	↕	↕	↕	↕	↕	↕	↕	J1-S	↕	V3
83	↕	↕	↕	↕	↕	↕	↕	↕	J1-T	J18	V1
84	↕	↕	↕	↕	↕	↕	↕	↕	J1-x	J1-z	550 ±50 ohms
85	↕	↕	↕	↕	↕	↕	↕	↕	J1-y	J1-z	550 ±50 ohms
86	↕	↕	↕	↕	↕	↕	↕	↕	J1-AA	J18	3.0 ±0.5K
87	↕	↕	↕	1	↕	↕	↕	↕	J1-BB	↕	3.0 ±0.5K
88	↕	↕	↕	2	↕	↕	↕	↕	J1-C	↕	V1
89	↕	↕	↕	↕	↕	↕	↕	↕	J1-U	↕	V1
90	↕	↕	↕	↕	↕	↕	↕	↕	J1-CC	J18	V3
91	↕	↕	↕	↕	↕	↕	↕	↕	J2-C	J2-E	550 ±50 ohms
92	↕	↕	↕	↕	↕	↕	↕	↕	J2-D	J2-E	550 ±50 ohms
93	OFF	3	OFF	2	OFF	OFF	OFF	R3	J2-F	J18	3.0 ±0.5K

Table 4-3. Resistance and Voltage Check – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
94	OFF	3	OFF	2	OFF	OFF	OFF	R3	J2-G	J18	3.0 ±0.5K
95				3					J2-H		V1
96									J2-J	J18	V3
97									J2-K	J2-M	550 ±50 ohms
98									J2-L	J2-M	550 ±50 ohms
99									J2-N	J18	3.0 ±0.5K
100				3					J2-P		3.0 ±0.5K
101				4					J1-DD		V1
102									J2-S	J18	V3
103									J2-T	J2-V	550 ±50 ohms
104									J2-U	J2-V	550 ±50 ohms
105									J2-W	J18	3.0 ±0.5K
106				4					J2-X		3.0 ±0.5K
107				5					J1-A		V4
108									J1-B	J18	V2
109									J2-e	J2-p	550 ±50 ohms
110									J2-f	J2-p	550 ±50 ohms
111									J2-h	J18	3.0 ±0.5K
112	OFF	3	OFF	5	OFF	OFF	OFF	R3	J2-i	J18	3.0 ±0.5K

Table 4-3. Resistance and Voltage Check – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
113	OFF	3	OFF	6	OFF	OFF	OFF	R3	J1-C	J18	V2
114									J2-j	J18	V4
115									J1-m	J2-g	550 ±50 ohms
116									J2-n	J2-g	550 ±50 ohms
117									J2-q	J18	3.0 ±0.5K
118				6					J2-r		3.0 ±0.5K
119				7					J2-s		V2
120									J2-t	J18	V4
121									J2-u	J2-w	550 ±50 ohms
122									J2-v	J2-w	550 ±50 ohms
123									J2-x	J18	3.0 ±0.5K
124				7					J2-y		3.0 ±0.5K
125				8					J2-k		V2
126									J2-AA	J18	V4
127									J2-BB	J2-DD	550 ±50 ohms
128									J2-CC	J2-DD	550 ±50 ohms
129									J2-EE	J18	3.0 ±0.5K
130				8					J2-FF		3.0 ±0.5K
131	OFF	3	OFF	9	OFF	OFF	OFF	R3	J1-a	J18	V3

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
132	OFF	3	OFF	9	OFF	OFF	OFF	R3	J1-b	J18	V4
133				10					J1-a		V3
134				10					J1-b		V4
135				11					J10-23		V1
136									J10-17		V2
137									J10-16		V3
138									J10-22		V4
139									J10-14		3.0 ±0.5K
140									J10-15		
141									J10-20		
142									J10-21		3.0 ±0.5K
143									J10-4		30 ±3 volts dc
144									J10-1	J18	30 ±3 volts dc when FUNCTION INITIATE is pressed
145									J10-18	J10-11	550 ±50 ohms
146									J10-19		
147									J10-24		
148				11					J10-25	J10-11	550 ±50 ohms
149	OFF	3	OFF	OFF	OFF	OFF	OFF	R3	J1-V	J18	Less than 1 ohm

Table 4-3. Resistance and Voltage Checks – *Continued*

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
150	2	OFF	OFF	OFF	OFF	OFF	OFF	R3	J7-8	J12	Less than 1 ohm
151	1	OFF							J7-10		
152		3						R3	J7-10	J12	Less than 1 ohm
153								R2			515 ±50 ohms*
154	1							R3			515 ±50 ohms*
155	2										100 ±5K*
156	3										
157	4										100 ±5K*
158								R3	J1-G	J11	Less than 1 ohm
159	4							R2	J1-W		
160	3							R3	J1-F		
161	3							R2	J1-R		
162	2							R3	J1-E		
163								R2	J1-P	J11	
164									J7-8	J12	
165	2	3							J1-V	J18	
166	OFF	4							J5-3		
167									J5-12		
168	OFF	4	OFF	OFF	OFF	OFF	OFF	R2	J5-19	J18	Less than 1 ohm

Table 4-3. Resistance and Voltage Checks — Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
169	OFF	4	OFF	OFF	OFF	OFF	OFF	R2	J5-23	J18	Less than 1 ohm
170									J5-24		
171									J5-31		
172									J5-35		
173	OFF				OFF				J5-36		Less than 1 ohm
174	1				1				J15-8		+30 ±3 volts dc
175								R2	J5-8	J18	+30 ±3 volts dc
176								R3	J15-11	J11	Less than 1 ohm
177								R3	J5-45		
178								R2	J15-21		
179					1				J5-49	J11	Less than 1 ohm
180					2				J15-20	J18	+30 ±3 volts dc
181								R2	J5-20	J18	+30 ±3 volts dc
182								R3	J15-5	J11	Less than 1 ohm
183								R3	J5-44		
184								R2	J15-16		
185					2				J5-48	J11	Less than 1 ohm
186					3				J15-32	J18	+30 ±3 volts dc
187	1	4	OFF	OFF	3	OFF	OFF	R2	J5-32	J18	+30 ±3 volts dc

Table 4-3. Resistance and Voltage Check – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
188	1	4	OFF	OFF	3	OFF	OFF	R3	J15-39	J11	Less than 1 ohm
189	↕	↕	↕	↕	↕	↕	↕	R3	J5-43	↕	↕
190	↕	↕	↕	↕	↕	↕	↕	R2	J15-40	↕	↕
191	↕	↕	↕	↕	3	↕	↕	↕	J5-47	J11	Less than 1 ohm
192	↕	↕	↕	↕	4	↕	↕	↕	J15-10	J18	+30 ±3 volts dc
193	↕	↕	↕	↕	↕	↕	↕	↕	J5-10	J18	+30 ±3 volts dc
194	↕	↕	↕	↕	↕	↕	↕	↕	J15-27	J11	Less than 1 ohm
195	↕	↕	↕	↕	↕	↕	↕	R2	J5-42	↕	↕
196	↕	↕	↕	↕	↕	↕	↕	R3	J15-28	↕	↕
197	1	↕	↕	↕	4	↕	↕	↕	J5-46	J11	Less than 1 ohm
198	OFF	4	OFF	OFF	OFF	OFF	OFF	R3	XA12-22 (A12 card on front bracket, with test set chassis assembly removed from container)	J18	+30 ±3 volts dc when FUNCTION INITIATE is pressed

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
199	2	4	OFF	OFF	OFF	OFF	OFF	R3	XA12-6 (A12 card on front bracket, with test set chassis assembly removed from container)	XA2-31 (A2 card on rear bracket, with test set chassis assembly removed from container)	Less than 1 ohm
200	2	4									POWER SUPPLY BIT lights when FUNCTION INITIATE is pressed
201	1	5							J1-J	J18	115 ±12 vrms
202	OFF								J1-L		+30 ±3 volts dc
203							OFF		J1-V		Less than 1 ohm
204							1				POWER SUPPLY BIT lights when FUNCTION INITIATE is pressed
205							2		J1-f		+30 ±3 volts dc when FUNCTION INITIATE is pressed
206							3		J1-A		V3
207									J1-B		V3
208							3		J1-C		V4
209							4		J1-A		V2
210									J1-B		V4
211	OFF	5	OFF	OFF	OFF	OFF	4	R3	J1-C	J18	V10

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
212	OFF	5	OFF	OFF	OFF	OFF	5	R3	J1-B	J18	V2
213		6	1				OFF		J8-6		+30 ±3 volts dc
214									J8-18		+30 ±3 volts dc
215									J8-33		Less than 1 ohm
216									J8-11		V1
217									J8-8		V2
218									J8-9		+30 ±3 volts dc when FUNCTION INITIATE is pressed
219									J8-1		+5 ±0.30 volts dc
220									J8-16		-6 ±0.36 volts dc
221	OFF							R3	J8-26	J18	Less than 1 ohm
222	1							R2	J8-2	J11	
223			1					R3	J8-3		
224			2					R3	J8-5		
225	1							R2	J8-7	J11	
226	OFF								J8-27	J18	
227									J8-28		Less than 1 ohm
228									J8-6		+30 ±3 volts dc
229	OFF	6	2	OFF	OFF	OFF	OFF	R2	J8-18	J18	+3- ±3 volts dc

Table 4-3. Resistance and Voltage Checks - Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
230	OFF	6	2	OFF	OFF	OFF	OFF	R2	J8-11	J18	V1
231									J8-8		V2
232									J8-9		+30 ±3 volts dc when FUNCTION INITIATE is pressed
233									J8-1		+5 ±0.30 volts dc
234			2						J8-16		-6 ±0.36 volts dc
235			3						J8-6		+30 ±3 volts dc
236									J8-18		+30 ±3 volts dc
237									J8-31		Less than 1 ohm
238	OFF								J8-9	J18	+30 ±3 volts dc when FUNCTION INITIATE is pressed
239	1								J8-15	J11	Less than 1 ohm
240	OFF							R2	J8-24	J18	Less than 1 ohm when FUNCTION INITIATE is pressed
241	1							R3	J8-17	J11	Less than 1 ohm
242	OFF							R2	J8-1	J18	+5 ±0.30 volts dc
243									J8-16		-6 ±0.36 volts dc
244									J8-11		V1
245			3			OFF			J8-8		V2
246			4			1					POWER SUPPLY BIT lights
247						OFF			J9-40		V5
248									J9-39		V9
249									J9-38		V8
250	OFF	6	4	OFF	OFF	OFF	OFF	R2	J9-26	J18	V7

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
251	OFF	6	4	OFF	OFF	OFF	OFF	R2	J9-32	J18	V1
252									J9-24		V6
253									J9-12		V2
254									J9-1		+5 ±0.30 volts dc
255									J9-34		+12 ±0.7 volts dc
256	OFF								J9-36	J18	-6 ±0.36 volts dc
257	5								J1-FF	J11	Less than 1 ohm
258			4						J1-FF	J18	120 ±10 ohms*
259			5						J1-GG	J18	120 ±10 ohms*
260			5						J1-GG	J11	Less than 1 ohm
261			6						J1-w		
262			7						J1-X		
263			7						J6-10		
264			8						J1-D		
265			8						J6-30		
266			9						J1-s		
267			9						J6-34		
268			10						J1-r		
269	5	6	10	OFF	OFF	OFF	OFF	R2	J6-32	J11	Less than 1 ohm

Table 4-3. Resistance and Voltages Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
270	5	6	11	OFF	OFF	OFF	OFF	R2	J1-c	J11	Less than 1 ohm
271	5		11						J6-18	J11	
272	OFF		5						J7-11	J18	
273									J7-13		
274									J7-24		Less than 1 ohm
275									J7-1		+5 ±0.30 volts dc
276									J7-6		+5 ±0.30 volts dc
277			5						J7-6		0 ±0.1 volts dc when FUNCTION INITIATE is pressed
278			6						J7-11		Less than 1 ohm
279									J7-13		Less than 1 ohm
280									J7-1		+5 ±0.30 volts dc
281									J7-6		+5 ±0.30 volts dc
282			6						J7-6		0 ±0.1 volts dc when FUNCTION INITIATE is pressed
283			7						J7-18		+30 ±3 volts dc
284									J7-1		+5 ±0.30 volts dc
285									J7-6		+5 ±0.30 volts dc
286	OFF	6	7	OFF	OFF	OFF	OFF	R2	J7-6	J18	0 ±0.1 volts dc when FUNCTION INITIATE is pressed

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
287	OFF	7	8	OFF	OFF	OFF	OFF	R2	J6-22	J18	+30 ±3 volts dc
288									J6-12		V1
289									J6-14	J18	V2
290											POWER SUPPLY BIT lights when FUNCTION INITIATE is pressed
291									J6-24	J6-16	10 ±2 vrms
292									J6-2	J6-4	20 ±4 vrms
293									J6-26	J6-28	20 ±4 vrms
294									J6-38	J6-40	10 ±2 vrms
295									J6-12	J18	10.6 ±0.6 vrms
296									J6-14		10.6 ±0.6 vrms
297									J6-22		+30 ±3 volts dc
298									J6-36		Less than 1 ohm
299		7							XA2-33 (A2 card on rear bracket, with test set chassis assembly removed from container)		+30 ±3 volts dc when FUNCTION INITIATE is pressed
300	OFF	6	8	OFF	OFF	OFF	OFF	R2	J9-11	J18	Less than 1 ohm

Table 4-3. Resistance and Voltage Checks — Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
301	OFF	6	8	OFF	OFF	OFF	OFF	R2	J9-25	J18	Less than 1 ohm
302			9						J9-29		
303			9						J9-35		
304		6	11						J1-v		Less than 1 ohm
305		7	1						J8-18	J18	+30 ±3 volts dc
306									J6-2	J6-4	20 ±4 vrms
307									J6-26	J6-28	20 ±4 vrms
308									J8-11	J18	V1
309									J8-8		V2
310	OFF	7						R2	J8-9	J18	+30 ±3 volts dc when FUNCTION INITIATE is pressed
311	1	8						R3	J9-33	J11	Less than 1ohm
312	1							R2	J9-27	J11	Less than 1 ohm
313	OFF								J9-2	J18	+18 ±1 volts dc
314					OFF				J9-28		-18 ±1 volts dc
315					1				J9-9		V8
316									J9-23		V8
317									J9-11		V4
318	OFF	8	1	OFF	1	OFF	OFF	R2	J9-25	J18	V4

Table 4-3. Resistance and Voltage Checks – Continued

Step	METER SELECT	TEST SELECT	CARD	EIA/ AMPL	LINK-AGE	EIA BIT	SYSTEM	RSLVR SELECT	From	To (return)	Indication
319	OFF	8	1	OFF	2	OFF	OFF	R2	J9-31	J18	V8
320	↕	↕	↕	↕	↕	↕	↕	↕	J9-37	↕	V8
321	↕	↕	↕	↕	↕	↕	↕	↕	J9-29	↕	V4
322	↕	↕	↕	↕	2	↕	↕	↕	J9-35	↕	V4
323	↕	↕	↕	↕	3	↕	↕	↕	J9-9	↕	V8
324	↕	↕	↕	↕	3	↕	↕	↕	J9-23	↕	V8
325	↕	↕	↕	↕	4	↕	↕	↕	J9-31	↕	V4
326	↕	8	↕	↕	↑	↕	↕	↕	J9-37	↕	↕
327	↕	9	↕	↕	4	↕	↕	↕	J9-37	↕	V4
328	↕	↕	↕	↕	OFF	↕	↕	↕	J9-2	↕	+18 ±1 volts dc
329	OFF	↕	↕	↕	↕	↕	↕	↕	J9-28	J18	-18 ±1 volts dc
330	1	↕	↕	↕	↕	↕	↕	R2	J9-3	J11	Less than 1 ohm
331	1	9	1	↕	↕	↕	↕	R3	J9-13	J11	↕
332	OFF	OFF	10	OFF	OFF	OFF	OFF	R2	J1-a	J18	Less than 1 ohm

4-9. Indicator Circuitry Checks.

a. With the preliminary setup procedures performed as given in paragraph 3-5, individual checks may be made of the indicator circuits listed in table 4-4. This information is provided as a complete checkout of the GO, PILOT LINKAGE, GUNNER LINKAGE, and EIA indicator circuits and for troubleshooting other indicator circuits that could have a continuity problem in the hard wiring that attaches to the connector pins. Steps 33 through 36 cover the continuity problem that could occur at the pins indicated during test of the sequencer card and which would not be detected during self-test, and steps 37 and 38 cover the continuity problem that could occur during test of the comparator card and which would not be detected during self-test.

b. Perform the portion of table 4-4 which applies to the indicator circuit under question. The steps of table 4-4 may be performed independently and in any order desired. If the applicable indicator does not light, replace the bulb. If the indicator still does not light, use the schematic diagrams, functional diagrams, and locator views as necessary to check continuity of the connector pin circuits.

Table 4-4. Indicator Circuitry Detailed Checkout

Step	TEST SELECT	CARD	EIA BIT	SYS-TEM	POWER	FUNCTION INITIATE	Apply 28 vdc		Indicator lights
							From	To	
1	2	OFF	2	OFF	OFF, then ON	Press	J1-L	J1-d	GO
2	↑	↑	↑	↑	↑	↑	↑	J1-h	PILOT LINKAGE
3			↓					J1-g	GUNNER LINKAGE
4			2					J1-e	EIA
5			3					J1-d	GO
6			↑					J1-h	PILOT LINKAGE
7			↓					J1-g	GUNNER LINKAGE
8			3					J1-e	EIA
9			4					J1-d	GO
10			↑					J1-h	PILOT LINKAGE
11			↓					J1-g	GUNNER LINKAGE
12			4					J1-e	EIA
13			5					J1-d	GO
14			↑					J1-h	PILOT LINKAGE
15	↓		↓	↓				J1-g	GUNNER LINKAGE
16	2		5	OFF				J1-e	EIA
17	5		OFF	2				J1-d	GO
18	↑		↑	↑				J1-h	PILOT LINKAGE
19	↓			↓				J1-g	GUNNER LINKAGE
20	5	OFF		2			J1-L	J1-e	EIA
21	6	1		OFF			J8-18	J8-13	GO
22	↑	↑		↑			↑	J8-20	PILOT LINKAGE
23		↓						J8-14	GUNNER LINKAGE
24		1						J8-23	EIA
25		2						J8-13	GO
26		↑						J8-20	PILOT LINKAGE
27		↓						J8-14	GUNNER LINKAGE
28		2						J8-23	EIA
29		3						J8-13	GO
30		↑						J8-20	PILOT LINKAGE
31	↓	↓	↓	↓	↓	↓	↓	J8-14	GUNNER LINKAGE
32	6	3	OFF	OFF	OFF, then ON	Press	J8-18	J8-23	EIA
33	Connect J7-20 to J7-17								DS3
34	Connect J7-20 to J7-16								DS4
35	Connect J7-20 to J7-15								DS5
36	Connect J7-20 to J7-12								DS6
37	Connect J9-1 through 5.1K to J9-6								DS2
38	Connect J9-1 through 5.1K to J9-22, and set CARD switch to position 4								DS1

Section V. DISASSEMBLY/ASSEMBLY

4-10. Scope.

This section provides instructions for disassembly and assembly of the fire control subsystem test set. References are made to illustrations in Appendix B for procedures and sequence of steps.

4-11. Repair Illustrations.

The components in the illustrations in Appendix B (figs. B-1 through B-11) to this manual are numbered in the sequence of disassembly. When assembling, the reverse order of disassembly will be followed unless otherwise instructed. The illustrations should not be construed as authority to disassemble the material beyond the point required to perform operations authorized in the maintenance allocation chart (MAC) in Appendix C or to replace parts other than those authorized in the applicable columns in Appendix B, Repair Parts List.

4-12. Fire Control Subsystem Test Set Disassembly and Assembly (fig. B-1).

Open access cover and remove items (1) through (8), which are contained in the lid of item (9). To reassemble, install items (1) through (8) in corresponding pockets in the lid of item (9). Close access cover.

4-13. Linkage Orientation Device Disassembly and Assembly.

a. Disassemble the LOD in the sequence shown in figure B-2, following the special instructions below:

(1) Break the adhesive when removing screws (1) and (36).

(2) To remove angle bracket (23), drive out spring pin (15) with a 3/32-inch drift pin.

(3) To remove threaded straight pin (17), drive out spring pin (15) with a 3/32-inch drift pin.

b. Disassemble rail clamp base assembly (9, fig. B-2) in the sequence indicated in figure B-3. Bushing (6) must be pressed out.

c. Assemble rail clamp base assembly (9, fig. B-2) in the reverse order of disassembly, referring to figure B-3 and pressing in bushing (6).

d. Assemble the LOD in the reverse order of disassembly, referring to figure B-2 and following the special instructions below:

(1) Before installing screw (36) to secure magnet (37), coat the threads of the screw with a coat of grade T, form R (primer) MIL-S-22473 sealing compound and allow it to air-dry 3 to 5 minutes; then apply a coat of grade H, brown MIL-S-22473 sealing compound.

(2) Install angle bracket (23) as follows:

(a) Insert angle bracket (23) into leveling base assembly (40). The dimension from the centerline of leveling base assembly (40), which is the centerline of the two tapped holes used for securing leveling reflector (21), to the center of the tapered hole in angle bracket (23) should be 4.25 ±0.06 inches. Hold in place with setscrew (22).

(b) To align angle bracket (23) to leveling base assembly (40), place leveling base assembly (40) on a surface plate. Loosen setscrew (22) slightly so that angle bracket (23) can be rotated.

(c) Using feeler gages between angle bracket (23) and the surface plate, adjust angle bracket (23) until it is parallel to the surface plate within ±0.003 inch.

(d) Tighten setscrew (22) securely.

(e) Using a 3/32-inch drill and using the hole in leveling base assembly (40) as a pilot, drill through angle bracket (23).

(f) Drive in spring pin (1 5).

(3) Install threaded straight pin (17) and associated items as follows:

(a) Insert pin (17) through swivel frame (19), using spring tension washers (16), so that end opposite threads is flush with outer surface of swivel frame (19).

(b) Using a 3/32-inch drill and using the hole in swivel frame (19) as a pilot, drill through pin (17).

(c) Fasten pin (17) to swivel frame (19) by driving in pin (15).

(4) Do not use any shims (13) at this time. The number used is determined in e below.

(5) When installing each T-1ock (5) and associated items (4) through (1), coat the threads of screw (1) with the same sealing compound as used for screw (36), as stated in step (1) above.

e. After assembly, check LOD adjustment as follows:

(1) With rail clamp base assembly (9) locked in the O-degree position and aligned approximately parallel to leveling base assembly (40), check the parallelism between the short axis of leveling base assembly (40) and rail clamp base assembly (9) as follows:

(a) Use a pair of 4- to 6-inch calipers (dial or vernier type) to measure the distance between the top of rail clamp base assembly (9) and the bottom of leveling base assembly (40). Measure on each side of the LOD. Hold the calipers in line with the center of the legs of swivel frame (19). Record the reading on each side of the LOD. If the two readings differ by more than 0.005 inch, loosen four screws (10) and insert shim or shims (13) equal in thickness to one-half the difference between the two readings. Insert the shimming on screws (10) between swivel frame (19) and swivel plate (14) on the side having the smallest reading.

(b) Tighten screws (10) and repeat the measurements.

(2) Install the 7.62-mm borescope adapter from the 7.62-mm boresight kit (NSN 4933-00-930-1957) in one of the grooves of rail clamp base assembly (9). Insure that rail clamp base assembly (9) is locked in the 0-degree position. (The grooves in rail clamp base assembly (9) and the line of sight of angle bracket (23) are parallel.)

(3) Use a C-clamp to mount the LOD on a suitable rigid mount, with leveling base assembly (40) down and with the LOD in the line of sight with a target of opportunity at least 1000 meters away.

(4) Mount the borescope in the boresight adapter and sight on the target. Loosen the C-clamp and center the reticle on the target by adjusting the position of the LOD. Tighten C-clamp.

NOTE

If an adjustment must be made in step (5) below and shimming was installed in step (1) above, insure that the shimming is not changed during the adjustment.

(5) Place the boresight in angle bracket (23) and view the same target. The target should be centered on the reticle within 3 roils. If not, loosen four screws (1 O) attaching swivel plate (14) to swivel frame (19) and rotate swivel plate (14) to remove the error. Tighten screws (1 O) and check that the target is centered on the reticle within 3 roils. If the error still exceeds 3 roils, replace angle bracket (23).

f. Check the magnet alignment according to the procedures of paragraph 4-25, linkage orientation device magnet alignment.

4-14. Cable Assembly W2 Disassembly and Assembly (fig. B-4).

a. Remove items (1) through (8) in disassembly sequence. Unsolder and mark leads where necessary. Assemble in reverse disassembly sequence.

b. Disassemble MS connectors in accordance with figure 4-2. Unsolder one wire at a time, withdraw it through the resilient bushing, and tag it. Assemble in reverse disassembly sequence.

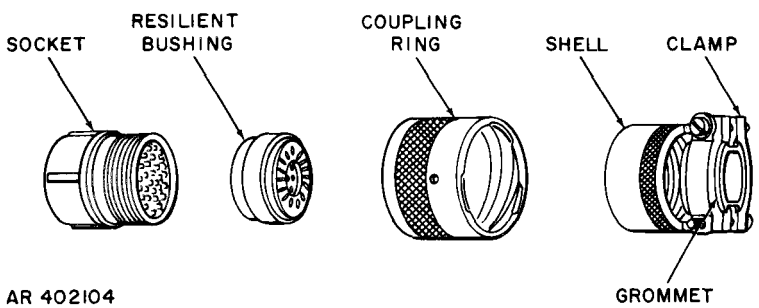


Figure 4-2. MS connector disassembly and assembly – typical

4-15. Test Set Subassembly Disassembly and Assembly (fig. B-5).

Remove items (1) through (5) in disassembly sequence and assemble in reverse disassembly sequence.

4-16. Test Set Container Disassembly and Assembly (fig. B-6).

a. Remove items (1) through (6) in disassembly sequence and assemble in reverse disassembly sequence.

b. Remove hinges by drilling heads of rivets from outside of box, using a 5/32-inch drill. Drill 1/16 to 1/8 inch deep and remove the head of the rivet with a chisel. Punch out the remaining portion of the rivet with a 1/8-inch punch. Install new hinges using new rivets furnished with the hinges.

4-17. Test Set Chassis Assembly Disassembly and Assembly (fig. B-7).

Remove items (1) through (31) in disassembly sequence. Unsolder and mark leads where necessary. Assemble in reverse disassembly sequence.

4-18. Front Bracket Assembly Disassembly and Assembly (fig. B-8).

a. Remove items (1) through (36) in disassembly sequence. Unsolder and mark leads where necessary. Assemble in reverse disassembly sequence.

b. Removal of resolver B1 (item 32) requires readjustment of B1 in accordance with paragraph 4-24.

NOTE

If B1, R18, or R19 require replacement because of a defect in one or more of these components, all three components must be replaced. Resistors R18 and R19 are furnished with the resolver as RT-2 and RT-1, respectively. These resistors are matched and identified with the resolver and must be installed concurrently with replacement of the resolver.

4-19. Rear Bracket Assembly Disassembly and Assembly (fig. B-9).

Remove items (1) through (37) in disassembly sequence. Unsolder and mark leads where necessary. Assemble in reverse disassembly sequence.

4-20. Top Panel Assembly Disassembly and Assembly (fig. B-10).

Caution

The multimeter is fragile. Do not drop it during disassembly and assembly of the top panel.

Remove items (1) through (48) in disassembly sequence. Unsolder and mark leads where necessary. Assemble in reverse disassembly sequence.

4-21. Organizational HSS Boresight Kit Disassembly and Assembly (fig. B-11).

Remove items (1) through (3) from item (4). To reassemble, install items (1) through (3) in item (4).

Section VI. ADJUSTMENTS

4-22. General.

Adjustments to the divider network should be made only if the values recorded during the test set self-test are out of tolerance. Test set resolver B1 should be adjusted whenever the resolver is replaced. Refer to Appendix B for repair parts illustrations and to Section IV for troubleshooting procedures.

4-23. Divider Network Adjustments.

a. Remove the test set chassis assembly from the container.

b. Perform the preliminary setup procedures as given in paragraph 3-5.

c. Perform the divider network adjustments as prescribed in table 4-5, following the special instructions below:

(1) To adjust the potentiometer on static power inverter (11, fig. B-7), proceed as follows:

(a) Set the POWER switch to OFF.

(b) Remove screws (7) and washers (6) securing power-supply mounting plate (16) to bracket assemblies (29 and 30) and carefully lay this plate back on the bench or other working surface, leaving static power inverter (11) and the other items attached to the plate.

(c) Unscrew and remove the cap that covers the potentiometer on the top of the static power inverter. Retain the cap.

NOTE

The only items protruding from the top of the inverter are this cap and the wires from the inverter.

(d) Perform the procedures in paragraph 3-5.

(e) Set the test set switches as follows:

TEST SELECT to 2

EIA/AMPL to 1

RSLVR SELECT to R2

METER SELECT to 1

Multimeter range to 10

Multimeter function to AC V.

(f) Using a small screwdriver, adjust the potentiometer on the top of the inverter until the multimeter indicates 10.6 ±0.6 volts.

(g) Set the POWER switch to OFF.

(h) Screw the cap back over the potentiometer on top of the inverter and, using the screws and washers removed in *(b)*, secure power-supply mounting plate (16) in place.

(2) See figure 4-3 for the locations of potentiometers R7 through R12.

(3) Be sure to record the values of V1 through V10. When calculating the values of V5 through V10, round each value off at the second decimal place.

d. Install the test set chassis assembly in the container.

4-24. Adjustment of Test Set Resolver B1.

a. Remove the test set chassis assembly from the container.

b. Perform the preliminary setup procedures as given in paragraph 3-5.

c. plug a good buffer amplifier module into J10.

d. Set the multimeter to AC V and to the 10-volt scale.

e. Position front panel switches as follows:

(1) METER SELECT to 1

(2) TEST SELECT to 3

(3) EIA/AMPL to 11

(4) RSLVR SELECT to R2.

Table 4-5. Divider Network Adjustments

Step	Operation of test set	Test set indications and adjustments
1	Set the TEST SELECT switch to 2, EIA/AMPL switch to 1, RSLVR SELECT switch to R2, and METER SELECT switch to 1. Set multimeter range switch to 10 and function switch to AC V.	PHASE 0° indicator lights and multimeter indicates 10.6 ±0.6 volts; if indication is not within tolerance, adjust potentiometer on static power inverter (paragraph 4-23*c*(1)). When indication is correct, record the voltage (V1).
2	Set EIA/AMPL switch to 2.	PHASE 180° indicator lights and multimeter indicates 10.6 ±0.6 volts. Record the voltage (V2).
3	Set EIA/AMPL switch to 3.	PHASE 0° indicator lights and multimeter indicates 5.3 ±0.3 volts. Record the voltage (V3).
4	Set EIA/AMPL switch to 4.	PHASE 180° indicator lights and multimeter indicates 5.3 ±0.3 volts. Record the voltage (V4).
5	Set EIA/AMPL switch to 5.	PHASE 0° indicator lights. Adjust R7 to 51.5 percent of V1 ±0.2 volt. Record the voltage (V5).
6	Set EIA/AMPL switch to 10.	PHASE 0° indicator lights. Adjust R9 to 93.3 percent of V1 ±0.2 volt. Record the voltage (V6).
7	Set EIA/AMPL switch to 9.	PHASE 0° indicator lights. Adjust R11 to 61.6 percent of V1 ±0.2 volt. Record the voltage (V7).
8	Set EIA/AMPL switch to 6.	PHASE 180° indicator lights. Adjust R8 to 86.3 percent of V2 ±0.2 volt. Record the voltage (V8).
9	Set EIA/AMPL switch to 7.	PHASE 180° indicator lights. Adjust R10 to 53.2 percent of V2 ±0.2 volt. Record the voltage (V9).
10	Set EIA/AMPL switch to 8.	PHASE 0° indicator lights. Adjust R12 to 25 percent of V1 ±0.2 volt. Record the voltage (V10).
11	Set all test set switches used to OFF.	

f. Loosen the setscrew that holds tile resolver shaft in a fixed position (fig. B-8, sheet 2). (This setscrew is in the top of the bracket upon which the resolver is mounted.)

g. Adjust the resolver shaft (which protrudes horizontally out of the bracket upon which the resolver is mounted) either clockwise or counterclockwise until the multimeter reads 9.8 ±1 vrms and the PHASE 0° indicator is on.

h. Set the RSLVR SELECT switch to R3.

i. Insure that the multimeter reads 6.47 ±0.75 vrms and that the PHASE 0° indicator is on. If reading is not within tolerance, adjust the resolver shaft. Then set the RSLVR SELECT switch to R2 and repeat steps *g* through *i* as necessary until the correct multimeter readings are obtained without movement of the resolver shaft.

j. Lock the shaft in place by tightening the setscrew in the top of the bracket.

k. Check the resolver adjustment and opposite phase function as follows:

(1) With the RSLVR SELECT switch in position R3, press the FUNCTION INITIATE switch and insure that the multimeter reads 6.47 ±0.75 vrms and that the PHASE 180° indicator is on.

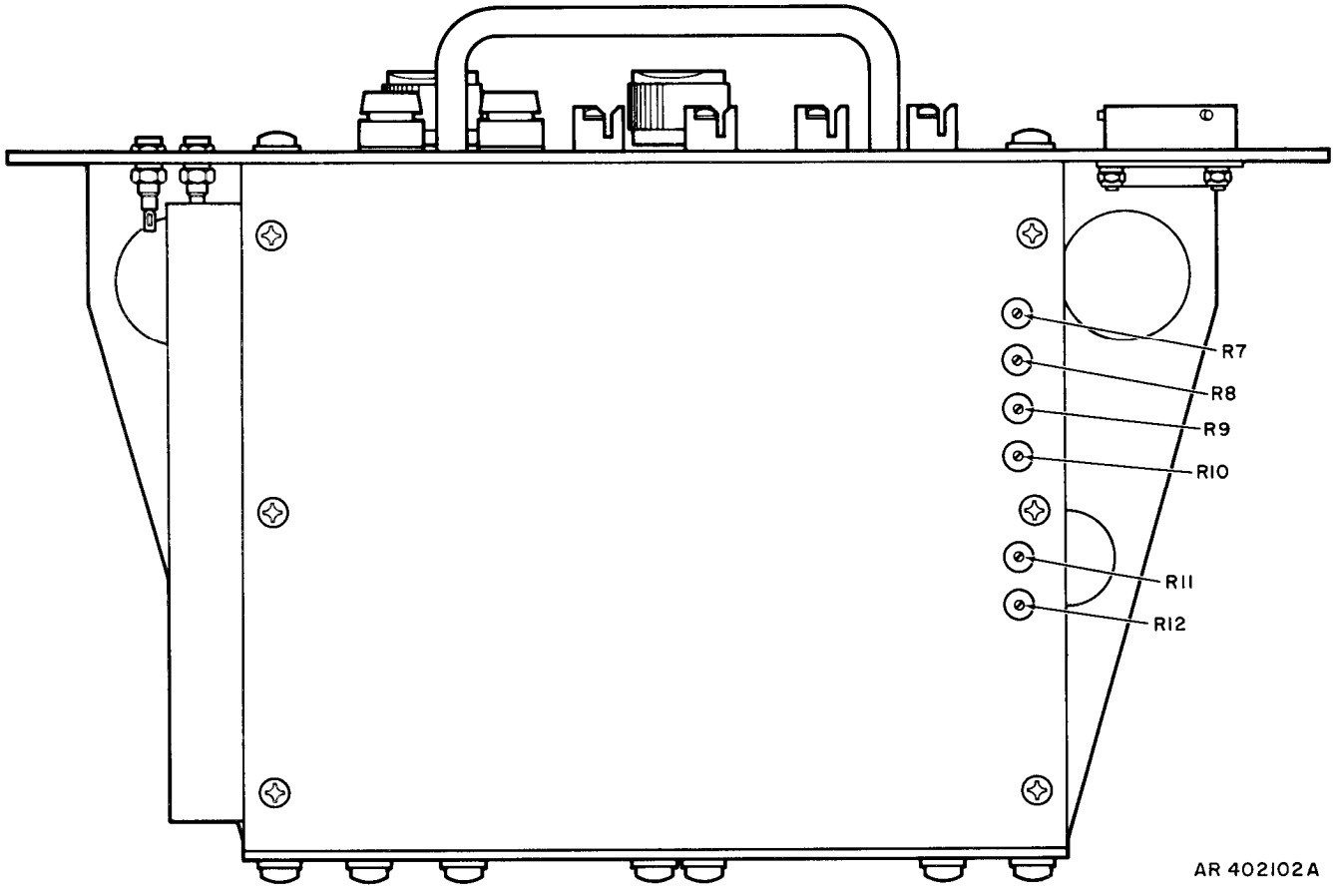


Figure 4-3. Parts locator view, adjustments

(2) Set the RSLVR SELECT switch to position R2, press the FUNCTION INITIATE switch, and insure that the multimeter reads 9.8 ±1 vrms and that the PHASE 180° indicator is on.

l. If either of the step *k* indications is out of tolerance, loosen the setscrew and adjust the resolver shaft until both indicators are within tolerance. Tighten the setscrew. If the voltage readings are within tolerance, but the PHASE 180° indicator does not light when the FUNCTION INITIATE switch is pressed, replace card A2.

m. Install the test set chassis assembly in the container.

4-25. Linkage Orientation Device Magnet Alignment.

a. Performance Check.

(1) Secure the LOD rail clamp base in the 0-degree position. Use a C-clamp to mount the LOD (fig. 4-4) on a suitable rigid mount, with leveling base assembly up, in the line of sight with a target of opportunity, that is, at least 1000 meters away.

(2) Mount the borescope from the 7.62-mm boresight kit (NSN 4933-00-930-1957) in the borescope angle bracket and sight on the target. Adjust the C-clamp to center the target in the borescope.

(3) Mount the boresight tool to the magnet of the LOD with the sighting tube below the LOD.

(4) Sight the target through the sighting tube of the boresight tool. The target should be centered in the field of view of the boresight tool simultaneously with centering in the field of the borescope. If the target is not centered in the field of the boresight tool, adjust the magnet.

(5) When magnet alignment is completed, remove the borescope and the boresight tool, and dismount the LOD by removing the C-clamp.

b. Adjustment.

(1) If alignment of the boresight tool does not coincide with that of the borescope, determine whether the boresight tool is offset in azimuth or elevation, or both.

(2) Slightly loosen the righthand azimuth adjusting screw, using a standard 9/64 hexhead wrench.

(3) If azimuth alignment is required, loosen one azimuth adjusting screw and tighten the other until the magnet is brought into azimuth alignment.

(4) If elevation adjustment is required, loosen one elevation setscrew and tighten the other until the magnet is brought into elevation alignment. Use a standard 5/64-inch hexhead wrench.

(5) Azimuth adjusting screws and elevation setscrews are interacting, and the above adjustments may have to be repeated to accomplish final alignments. All adjusting screws may be securely tightened when alignment is completed.

(6) Remove the borescope and the boresight tool, and dismount LOD by removing the C-clamp.

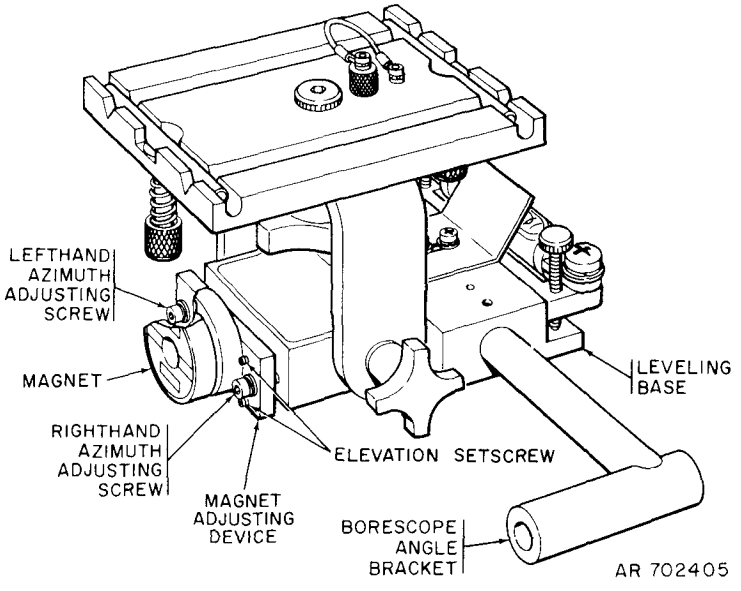


Figure 4-4. Linkage orientation device magnet alignment

Section VII. GENERAL REPAIR PROCEDURES

4-26. Scope.

This section provides general instructions for repair that is authorized at direct and general support levels. No lubrication instructions are required. After maintenance and repair, perform final inspection as instructed in Chapter 5.

4-27. General Repair and Replacement Instructions.

TM 9-254 presents general maintenance procedures that are often encountered in preparing fire control material.

a. Use of Tools.

(1) Care must be exercised to use tools that are suitable for the task to avoid mutilation of parts and/or damage to tools.

(2) Keep tools clean and work with clean parts. The rules of good housekeeping must be observed.

b. Replacement of Parts.

(1) During assembly of components, replace all small parts, such as springs, pins, screws, bolts, and nuts, that show signs of wear or damage and which might fail before the next scheduled maintenance.

(2) If a required new part is not available, reconditioning of the old part is necessary. Such parts should be examined carefully after reconditioning to determine that they will function properly.

(3) Replace metal components that cannot be made serviceable by cleaning, fitting, or refinishing.

(4) Replace damaged wiring and connectors. Correct faulty soldered connections.

4-28. Cleaning.

a. Cleaning Mechanical Components. Wipe metal components with a cloth moistened with solvent conforming to MIL-A-6091; then dry with a clean, dry cloth.

b. Cleaning Electrical Components. Clean all electrical parts in accordance with TM 9-254.

4-29. In-Process Inspections.

a. Inspect all metal components for dirt, grease, or oil, metal filings, solder waste, or other foreign matter. Check all mating parts for fit and/or damage which would cause faulty operation.

b. Inspect wiring for fraying, cracked insulation, and signs of hot spots. Examine connectors for loose, missing, or bent pins. Check soldered connections.

4-30. Painting.

The container is the only component of the test set which is painted. The paint finish can be touched up and/or repainted when frequent handling and exposure to the elements have caused deterioration. Apply paint only as required. Use wash primer per MIL-P-15328, zinc chromate prime per MIL-P-8585. Final finish is light-gray semi-gloss enamel, type III, class 2, per MIL-E-15090.

CHAPTER 5

FINAL INSPECTION

5-1. General.

References to tests and procedures for final inspection of the fire control subsystem test set after repairs have been completed are provided in this chapter. If no deficiencies are found, the test set is ready to be returned to the user or to stock.

5-2. Test Set Subassembly.

a. Visually inspect the test set subassembly in accordance with the procedures in paragraph 4-3.

b. Perform the divider network adjustments (paragraph 4-23) and the test set self-test procedures (paragraph 3-6).

c. Inspect the test set container to insure that the clasp fasteners secure the lid firmly to the bottom section and that the seal between the two sections is undamaged.

5-3. Other Components.

In accordance with the procedures of paragraph 4-3, inspect the LOD, the helmet boresight tool, the circuit card extractor, the connector shorting assembly, and the four cables, all of which are stored in the lid of the test set container. Give special attention to the borescope angle bracket of the LOD to insure that it is not bent or twisted out of alignment.

5-4. Organizational HSS Boresight Kit.

Inspect in accordance with the procedures of paragraph 4-3.

APPENDIX A

REFERENCES

A-1. Supply Catalogs.

The following Department of the Army Supply Publications pertain to repair of this materiel:

Brushes, Paints, Sealers, and Adhesives	C8000-IL-A
Fire Control Maintenance and Repair Shop Specialized Equipment Tool Set, DS, GS, and Depot Maintenance, General Purpose Tools (493 1-00-574-6433)	SC4931-95-CL-J51
Fuels, Lubricants, Oils, and Waxes	C6800-IL
Tool Set, Aircraft Armament Repairman: Basic (4933-00-987-981 6)	SC4933-95-CL-A13
Tool Set, Aircraft Armament Repairmen: Supplemental (493340-994-9242)	SC4933-95-CL-A14

A-2. Other Publications.

a. General

Accident Reporting and Records	AR 385-40
Direct Support Maintenance Activities	FM 29-23
First Aid for Soldiers	FM 21-11
General Support Maintenance Activities	FM 29-24
The Army Maintenance Management System (TAMMS)	TM 38-750
Procedures for Destruction of Aviation Ground Support Equipment (FSC 4920) to Prevent Enemy Use	TM 750-244-1-4

b. Maintenance.

General Maintenance Procedures for Fire Control Materiel	TM 9-254
Operator, Organizational, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List and Depot Maintenance Repair Parts and Special Tools) for Fire Control Subsystem, Helmet-Directed, XMl28, and Fire Control Subsystem, Helmet-Directed, XMl36	TM 9-1270-212-14&P
Calibration of Fire Control Subsystem Test Set AN/GSM-249	TB 9-4931-363-50

c. Shipment and Storage.

Administrative Storage and Equipment	TM 740-90-1

APPENDIX B
ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST (INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS)

Section I. INTRODUCTION

B-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 organizational, direct support, and general support maintenance of Fire Control Subsystem Test Set AN/GSM-249 and Organizational HSS Boresight Kit. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

B-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. Not applicable.

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.

B-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 minimum quantity be available in the supply system.
PC	Item procured and stocked and which otherwise would be coded PA except that it 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 outfitting. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.

Code	Definition
PF	Support equipment which will not be stocked but which wi1l be centrally procured on demand.
PC	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 seperateiy. Depot kit defined as a kit that provides items required at the time of overhual 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 organizational or 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 organizational level.
MF	Item to be manufactured or fabricated at the direct support maintenance level.
MH	Item to be manufactured or fabricated at the general support maintenance level.
MD	Item to be manufactured or fabricated at the depot maintenance level.
AO	Item to be assembled at organizational level.
AF	Item to be assembled at direct support maintenance level.
AH	Item to be assembled at general support maintenance level.
AD	Item to be assembled at depot maintenance level.
XA	item is not procured or stocked because the requirements for the item wiil 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 manufacture'rs 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 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 organizational maintenance.
O	Support item is removed, replaced, used at the organizational level.
F	Support item is removed, replaced, used at the direct support level.
H	Support item is removed, replaced, used at the general support 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 organizational level.
F	The lowest maintenance level capable of complete repair of the support item is the direct support level.
H	The lowest maintenance level capable of complete repair of the support item is the general support level.
D	The lowest maintenance level capable of complete repair of the support item is the depot level.
L	Repair restrioted 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 Codes	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 organizational level.
F	Reparable item. When uneconomically reparable, condemn and dispose at the direct support level.
H	Reparable item. When uneconomically reparable, condemn and dispose at the general support 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 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 SB 708-42 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. The physical security classification of the item is indicated by the parenthetical entry (insert applicable physical security classification abbreviation, e.g., Phy Sec C1 (C) – Confidential, Phy Sec C1 (S) – Secret, Phy Sec C1 (T) – Top Secret). 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.).

B-4. Special Information.

a. Bulk materials required to manufacture items are listed in the Bulk Material Group of this manual.

b. Detailed assembly instructions for items source coded to be assembled are found in TM 9-4931-363-14&P. Assembly components are listed immediately following the item to be assembled.

c. National stock numbers (NSN'S) omitted in this appendix were not available at the time of printing. These items will be requisitioned by their resigned part number. Changes will be issued to the manual upon receipt of the applicable NSN'S by ARMCOM.

NOTE

New NSN'S now entering the Federal Supply system are carrying an "01" rather than "00" for the country code identification. An NSN with "00" as the first two digits of the National Item Identification Number (NIIN) is not the same as an NSN with "01" even though the Federal Supply Class (FSC) and the last seven digits are the same. "The NIIN that is published is the NIIN that should be used." An item of supply has been assigned one unique NIIN and changing one digit of the NIIN will result in the receipt of the wrong item.

d. Action change codes indicated in the left-hand margin of the listing page denote the following:

N - Indicates an added item

C - Indicates a change in data

R - Indicates a change in NSN only

B-5. How to Locate Repair Parts.

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

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

(2) Second. Find the illustration covering the functional group 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 or 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 alphanumeric 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.

B-6. Abbreviations.

Abbreviations	Explanation
FIG.	Figure
HSS	Helmet sight subsystem
NHA	Next higher assembly

Section II. REPAIR PARTS LIST

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B- 1		PEFDD		2201736-05	06401	TEST SET,FIRE CONTROL SUBSYSTEM	EA	1
B- 1	1	PAFFD		2202202-00	06401	LINKAGE ORIENTATION DEVICE FOR BREAKDOWN,SEE FIG. B-2	EA	1
B- 1	2	PAFHH		2202209-00	06401	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL, BRANCHED FOR BREAKDOWN,SEE FIG. B-4	EA	1
B- 1	3	PAFZZ	4931-01-007-6879	2278898-00	06401	CABLE ASSEMBLY,POWER,ELECTRICAL	EA	1
B- 1	4	PAFZZ	4931-01-007-6878	2277778-00	06401	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL	EA	1
B- 1	5	PAFZZ	4931-01-007-6877	2277777-00	06401	CABLE ASSEMBLY,SPECIAL PURPOSE,ELECTRICAL	EA	1
B- 1	6	PAFZZ	4931-01-007-0135	2278553-00	06401	SHORTING ASSEMBLY,CONNECTOR	EA	1
B- 1	7	PAFZZ	4931-01-005-2827	2277708-00	06401	HELMET BORESIGHT TOOL ASSEMBLY	EA	1
B- 1	8	PAFZZ	5999-01-012-9179	4093028-00	90536	EXTRACTOR,ELECTRICAL CARD	EA	1
B- 1	9	XADZZ		2202201-00	06401	TEST SET SUBASSEMBLY FOR BREAKDOWN,SEE FIG. B-5	EA	1

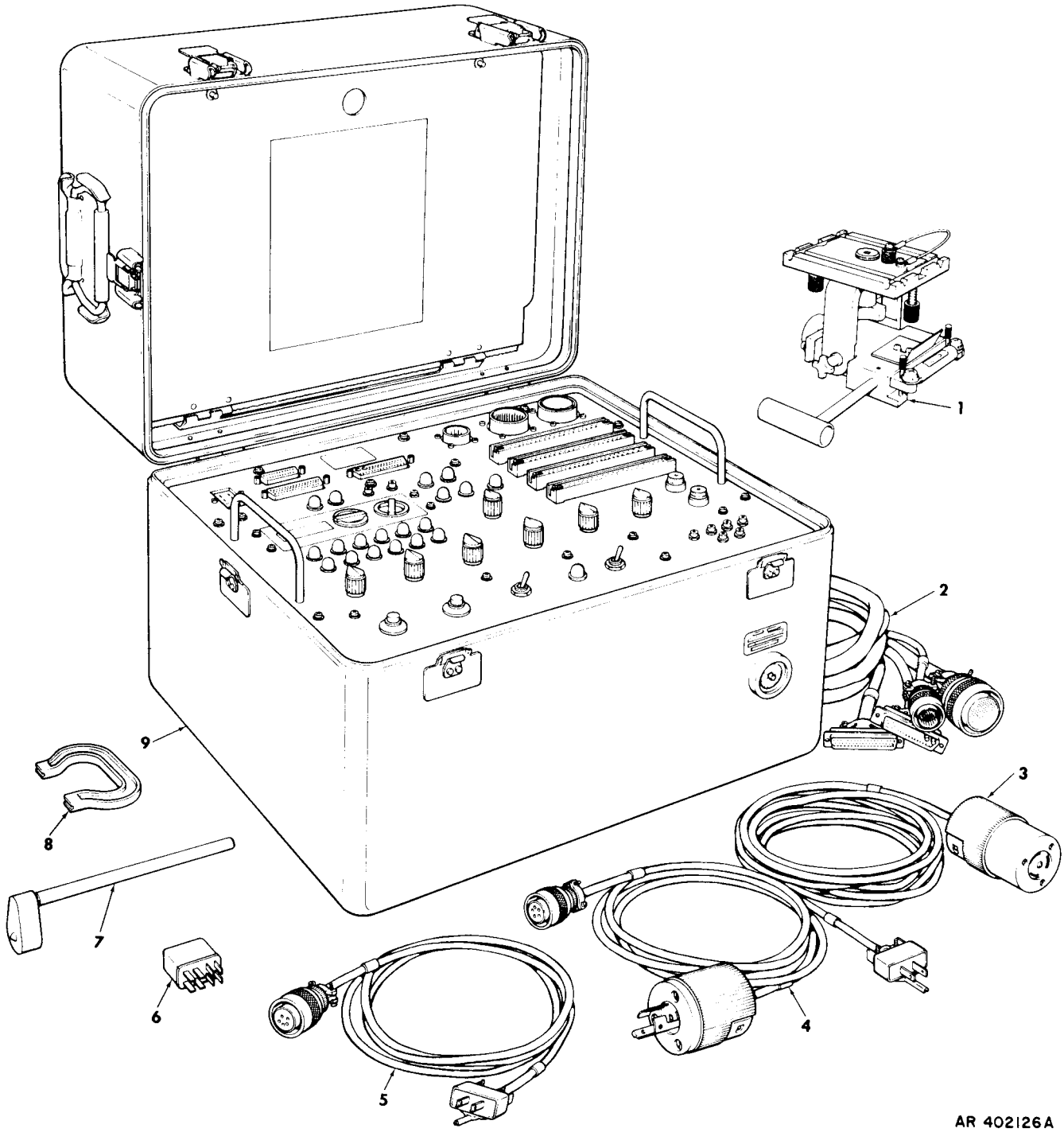


Figure B-1. Fire control subsystem test set

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B- 2						GROUP: 2276.1 LINKAGE ORIENTATION DEVICE FOR NHA,SEE FIG. B-1		
B- 2	1	PAFZZ	5305-00-054-5647	MS51957-13	96906	SCREW,MACHINE	EA	2
B- 2	2	PAFZZ	5310-00-595-6211	MS15795-803	96906	WASHER,FLAT	EA	2
B- 2	3	PAFZZ	4931-01-009-3796	2215717-00	06401	CUP	EA	2
B- 2	4	PAFZZ		MS24585C165	96906	SPRING,HELICAL,COMPRESSION	EA	2
B- 2	5	PAFZZ	4931-01-007-0132	2278717-00	06401	LOCK,T	EA	2
B- 2	6	XBFZZ		SC8-5	29440	SETSCREW	EA	4
B- 2	7	XBFZZ		2278719-01	06401	KNOB	EA	1
B- 2	8	XBFZZ		ST6	29440	WASHER,SPRING TENSION	EA	1
B- 2	9	XAFZZ		2202211-00	06401	RAIL CLAMP BASE ASSEMBLY FOR BREAKDOWN,SEE FIG. B-3	EA	1
B- 2	10	XBDZZ		MS16995-18	96906	SCREW,MACHINE	EA	4
B- 2	11	XBFZZ	5310-00-929-6395	MS35338-136	96906	WASHER,LOCK	EA	6
B- 2	12	PAFZZ	5310-00-722-5998	MS15795-805	96906	WASHER,FLAT	EA	6
B- 2	13	PADZZ	5365-00-598-7868	B6-24	00141	SHIM,0.002 IN. THICK	EA	2
B- 2	14	XAFZZ		2202210-00	06401	PLATE,SWIVEL	EA	1
B- 2	15	PADZZ	5315-00-058-9731	MS16562-213	96906	PIN,SPRING	EA	2
B- 2	16	XBDZZ		ST5	29440	WASHER,SPRING TENSION	EA	4
B- 2	17	XBDZZ		2278419-00	06401	PIN,STRAIGHT,THREADED	EA	1
B- 2	18	XBFZZ		2278719-00	06401	KNOB	EA	1
B- 2	19	XADZZ		2278409-00	06401	FRAME,SWIVEL.	EA	1
B- 2	20	XBFZZ	5305-00-054-6651	MS51957-27	96906	SCREW,MACHINE	EA	2
B- 2	21	XBFZZ		2278404-00	06401	REFLECTOR,LEVELING	EA	1
B- 2	22	PADZZ	5305-00-719-5346	MS51963-35	96906	SETSCREW	EA	1
B- 2	23	PADZZ		2278405-00	06401	BRACKET,ANGLE	EA	1
B- 2	24	XBFZZ		PZ19-3	29440	SCREW,SHOULDER	EA	1
B- 2	25	PAFZZ	5305-01-010-9937	PQ31	29440	THUMBSCREW	EA	2
B- 2	26	PAFZZ	5305-00-059-3659	MS51958-63	96906	SCREW,MACHINE	EA	2
B- 2	27	PAFZZ	5310-00-933-8120	MS35338-138	96906	WASHER,LOCK	EA	2
B- 2	28	PAFZZ	5310-00-619-1148	MS15795-808	96906	WASHER,FLAT	EA	2
B- 2	29	PAFZZ	4931-01-010-4005	3-5884-94DB4	76883	LEVEL,FIRE CONTROL INSTRUMENT	EA	1
B- 2	30	XBFZZ		2278718-00	06401	BRACKET,LEVEL ADJUSTMENT	EA	1
B- 2	31	XBFZZ		MS18064-48	96906	SETSCREW	EA	2
B- 2	32	PAFZZ	5305-00-988-7604	MS16995-28	96906	SCREW,CAP,SOCKET HEAD	EA	2
B- 2	33	PAFZZ	5310-00-933-8119	MS35338-137	96906	WASHER,LOCK	EA	2
B- 2	34	PAFZZ	5310-00-880-5978	MS15795-807	96906	WASHER,FLAT	EA	2
B- 2	35	PAFZZ	5310-01-010-2415	ST4	29440	WASHER,SPRING TENSION	EA	4
B- 2	36	PAFZZ	5305-00-051-0227	MS24693C272	96906	SCREW,MACHINE	EA	1

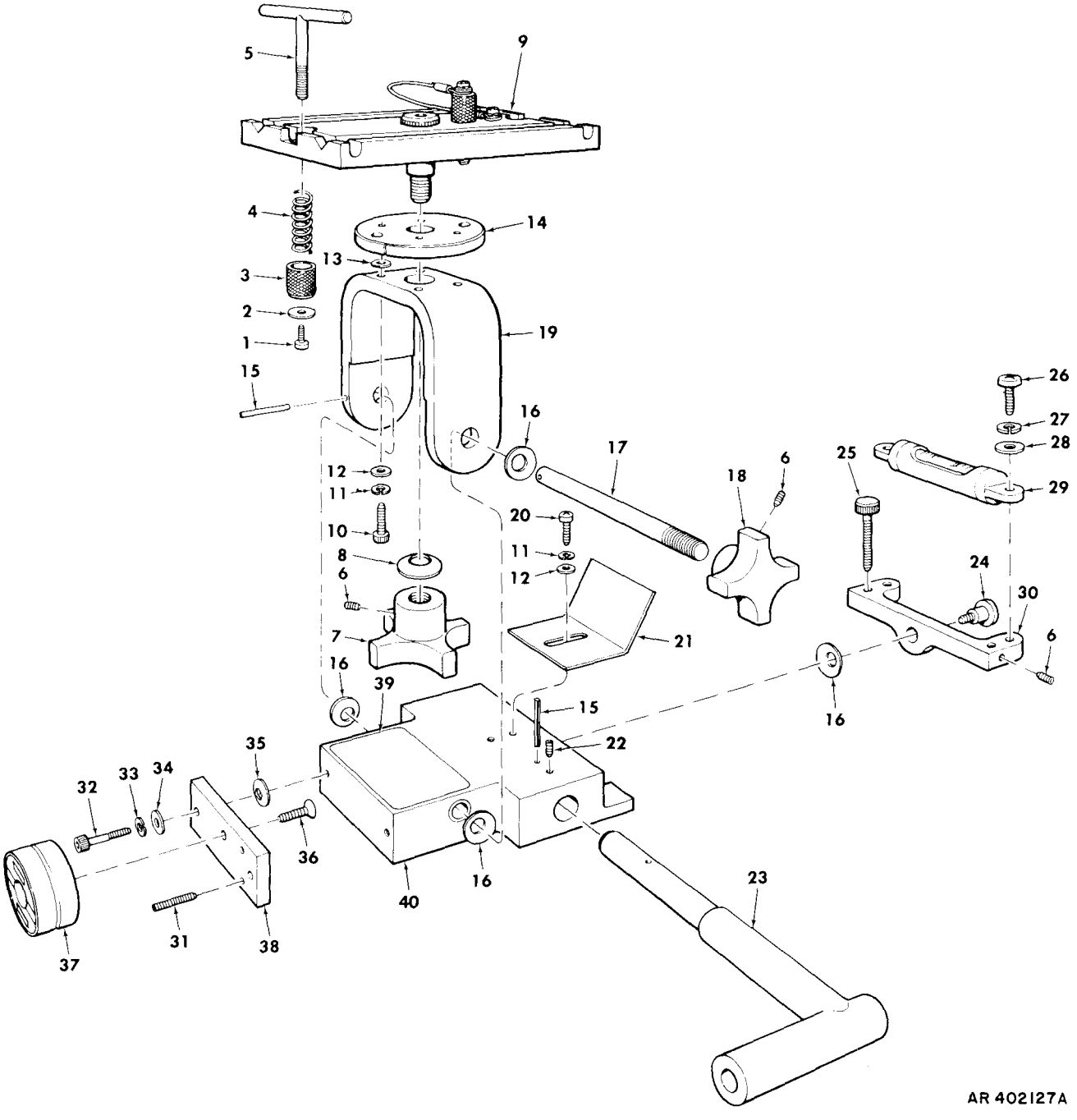


Figure B-2. Linkage orientation device

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *Usable On Code*	(7) U/M	(8) QTY INC IN UNIT
8- 2	37	PAFZZ	1270-00-573-5197	2251720-02	06401	MAGNET	EA	1
8- 2	38	XBFZZ		2278403-00	06401	MAGNET ADJUSTMENT DEVICE	EA	1
8- 2	39	PADZZ		2278373-19	06401	PLATE,IDENTIFICATION	EA	1
8- 2	40	XADZZ		2278408-00	06401	LEVELING BASE ASSEMBLY	EA	1

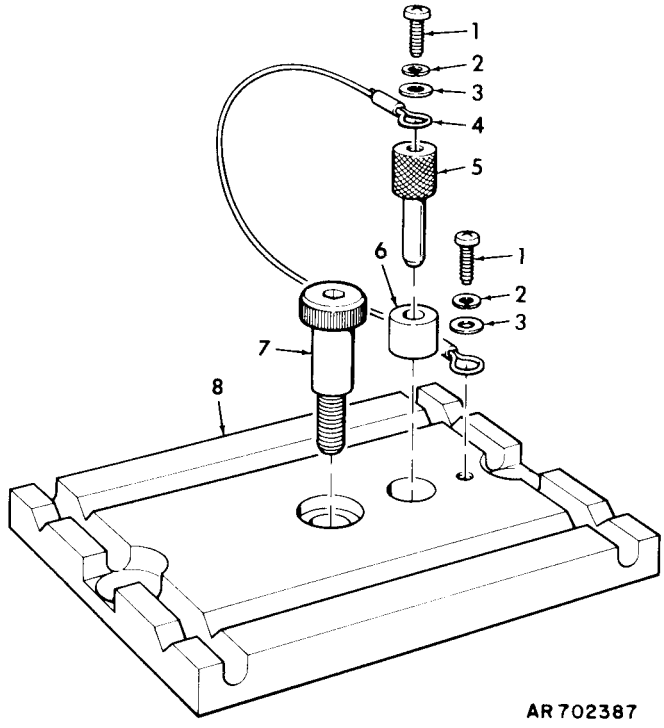


Figure B-3. Rail clamp base

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
8- 3		XAFZZ				GROUP:2276,11 RAIL CLAMP BASE FOR NHA:SEE FIG. 8-2		
8- 3	1	PAFZZ	5305-00-054-5648	MS51957-14	96906	SCREW,MACHINE	EA	2
8- 3	2	XBFZZ	5310-00-933-8118	MS35338-135	96906	WASHER,LOCK	EA	2
8- 3	3	PAFZZ	5310-00-595-6211	MS15795-803	96906	WASHER,FLAT	EA	2
8- 3	4	PAFZZ		7650331-00	06401	CABLE,RETAINER	EA	1
8- 3	5	PAFZZ		7650330-00	06401	PIN,ALIGNMENT	EA	1
8- 3	6	PADZZ		P26-5-1875	02064	BUSHING,DRILL JIG	EA	1
8- 3	7	XBDZZ		2278720-00	06401	SCREW,SHOULDER	EA	1
8- 3	8	XBDZZ		2202211-51	06401	BASE	EA	1

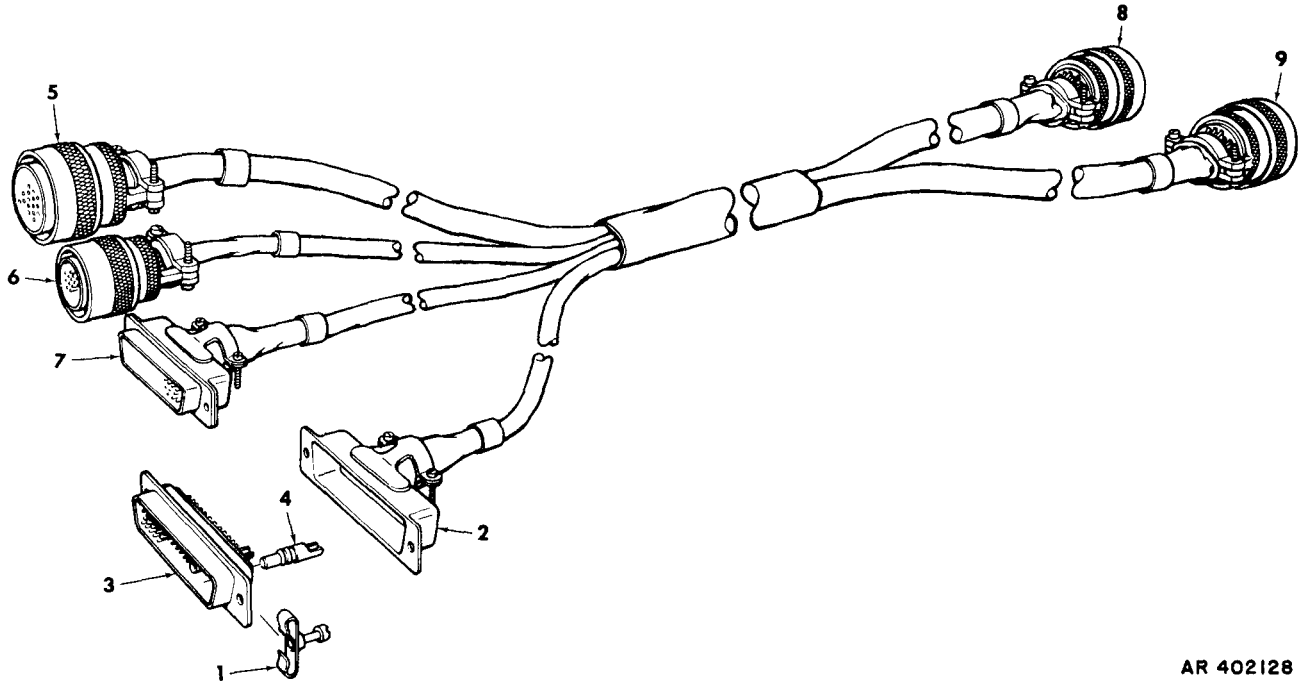


Figure B-4. Branched electrical special purpose cable assembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *Usable On Code*	(7) U/M	(8) QTY INC IN UNIT
B- 4						GROUP: 2276.2 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY FOR NHA:SEE FIG. B-1		
B- 4	1	PAFZZ	5305-00-073-8885	D20420-12	71468	SCREWLOCK ASSEMBLY	EA	4
B- 4	2	XBHZZ	5935-00-804-5267	DD20964	71468	SHIELD,ELECTRICAL CONNECTOR	EA	2
B- 4	3	PAHZZ	5935-00-161-9101	DDMM43W2P	71468	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B- 4	4	PAHZZ	5999-00-520-6145	DM53745-25	71468	CONTACT,ELECTRICAL	EA	2
B- 4	5	PAHZZ	5935-00-892-9332	MS3116F22-55S	96906	CONNECTOR,PLUG,ELECTRICAL	EA	1
B- 4	6	PAHZZ	5935-00-772-9261	MS3116F16-26P	96906	CONNECTOR,PLUG,ELECTRICAL	EA	1
B- 4	7	PAHZZ	5935-00-493-0466	M24308-3-5	81349	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B- 4	8	PAHZZ	5935-00-892-9330	MS3116F22-55PW	96906	CONNECTOR,PLUG,ELECTRICAL	EA	1
B- 4	9	PAHZZ	5935-00-892-9333	MS3116F22-55SW	96906	CONNECTOR,PLUG,ELECTRICAL	EA	1

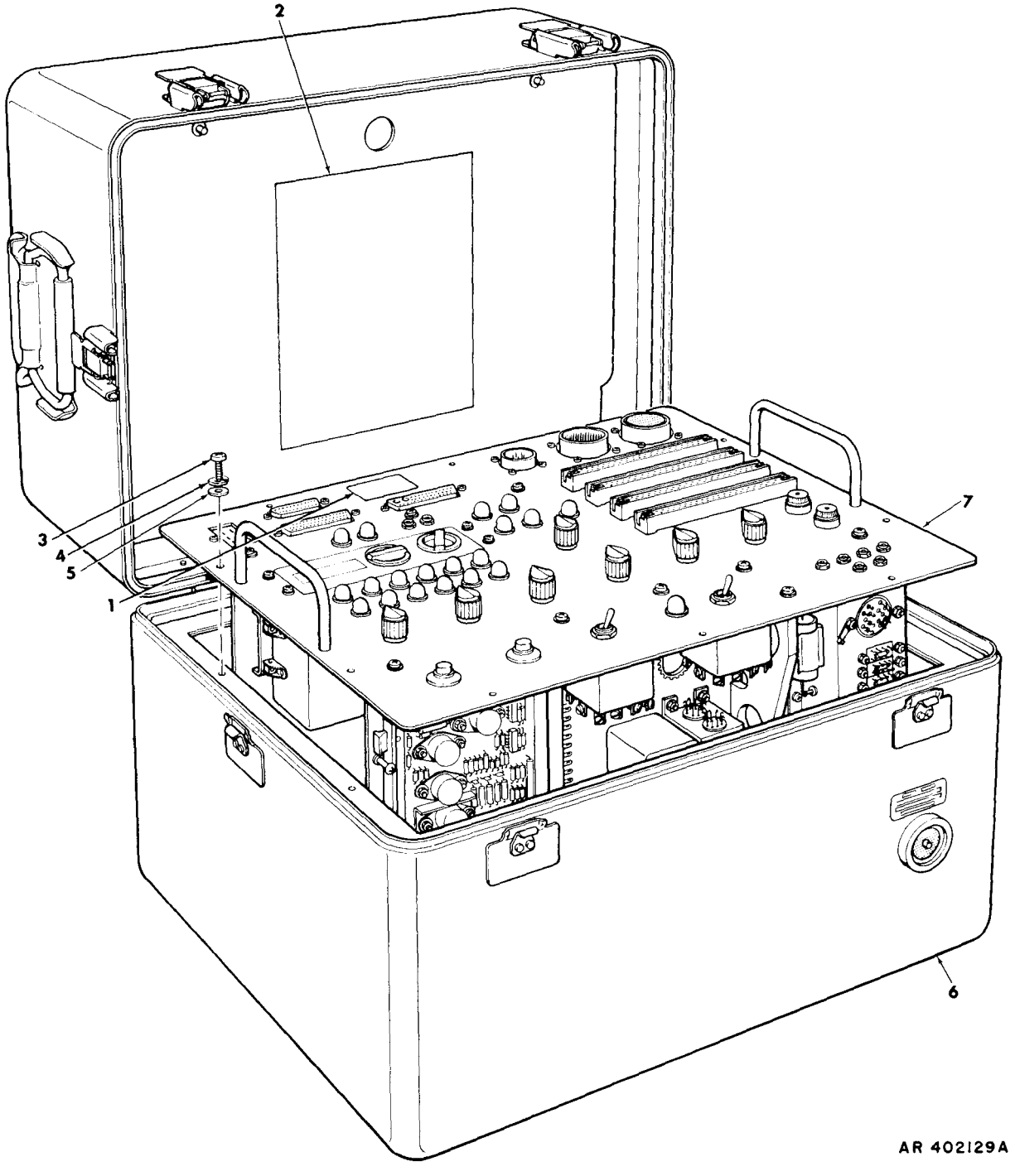


Figure B-5. Test set subassembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B-5						GROUP: 2276.3 TEST SET SUBASSEMBLY FOR NHA,SEE FIG. B-1		
B-5	1	PADZZ		2278373-18	06401	PLATE,IDENTIFICATION	EA	1
B-5	2	PAFZZ		2279399-02	06401	PLATE,INSTRUCTION	EA	1
B-5	3	PAFZZ	5305-00-059-3661	MS51958-65	96906	SCREW,MACHINE	EA	10
B-5	4	PAFZZ	5310-00-933-8120	MS35338-138	96906	WASHER,LOCK	EA	10
B-5	5	PAFZZ	5310-00-619-1148	MS15795-808	96906	WASHER,FLAT	EA	10
B-5	6	XADZZ		D26479	98376	CONTAINER,TEST SET FOR BREAKDOWN,SEE FIG. B-6	EA	1
B-5	7	XADZZ		2278903-01	06401	CHASSIS ASSEMBLY,TEST SET FOR BREAKDOWN,SEE FIG. B-7	EA	1

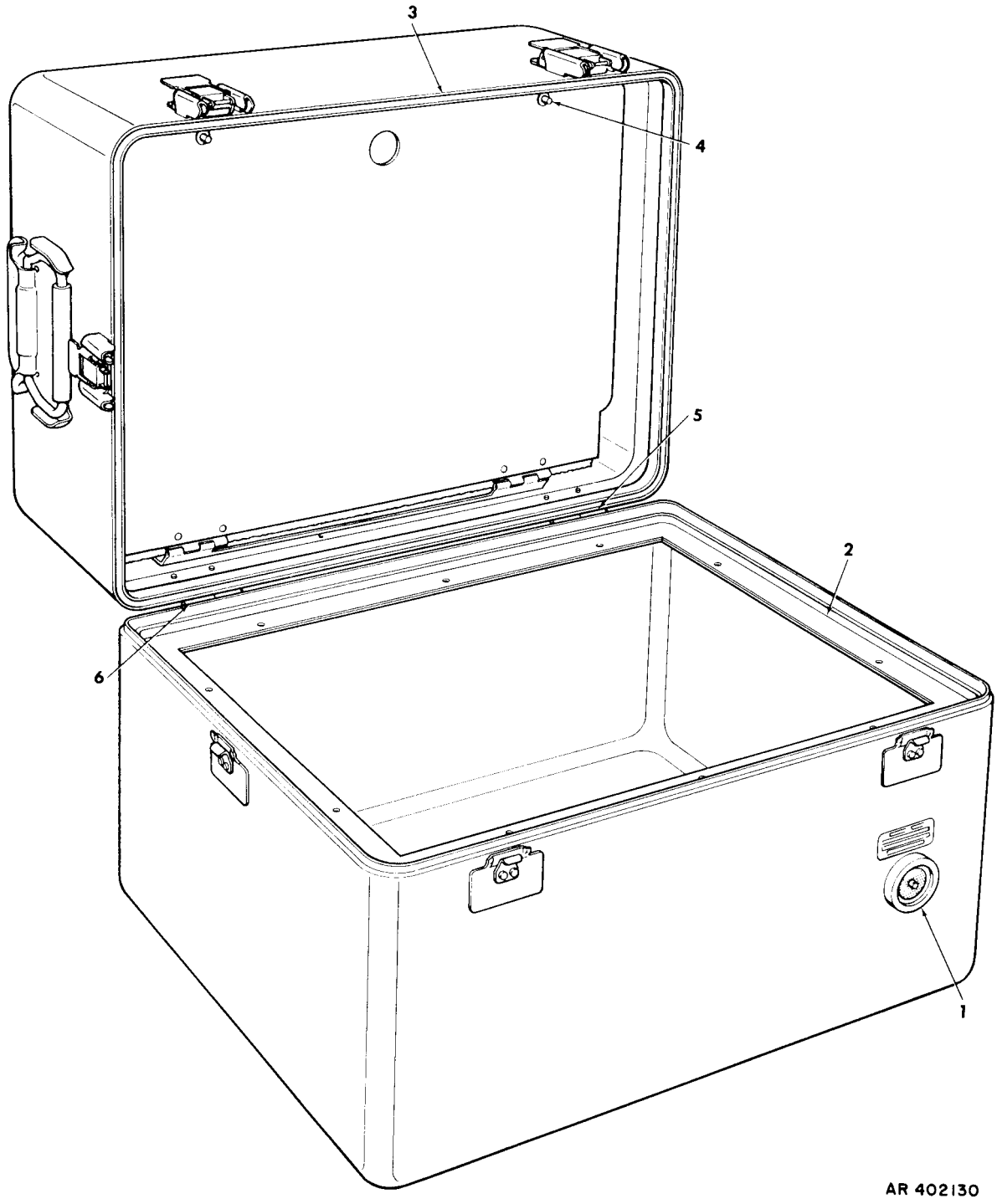


Figure B-6. Test set container

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B- 6						GROUP: 2276,31 TEST SET CONTAINER FOR NHA,SEE FIG. B-5		
B- 6	1	PAFZZ	4820-00-898-3003	ZSP6-037-4	98376	VALVE,VACUUM BREAKING	EA	1
B- 6	2	PAFZZ		D26479D1	98376	GASKET	EA	1
B- 6	3	PAFZZ	5330-00-937-5345	ZSP5-504-65	98376	SEAL,RUBBER,SPECIAL,SHAPED SECTION	EA	1
B- 6	4	PAFZZ	5340-00-993-0879	ZSP2-2004	98376	LATCH,PUSH BUTTON	EA	2
B- 6	5	PAFZZ	5340-00-182-5381	ZSP4-4001-2	19178	HINGE ASSEMBLY	EA	1
B- 6	6	PAFZZ	5340-00-126-5232	ZSP4-4001-1	98376	HINGE,BUTT	EA	1

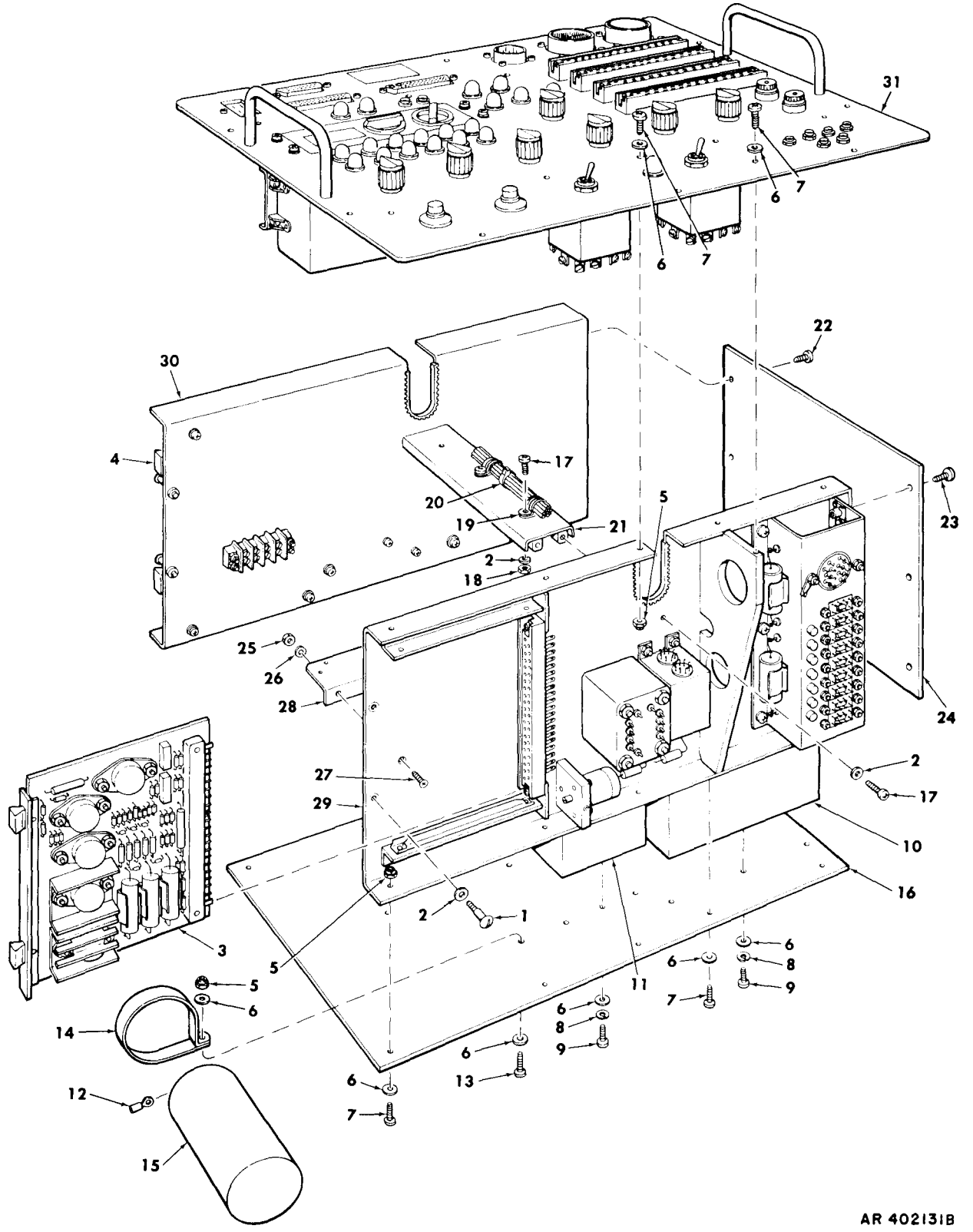


Figure B-7. Test set chassis assembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *Usable On Code*	(7) U/M	(8) QTY INC IN UNIT
B- 7						GROUP: 2276.32 TEST SET CHASSIS ASSEMBLY FOR NHA,SEE FIG. B-5		
B- 7	1	PAFZZ	5305-00-442-4073	NAS1298-06-7	80205	SCREW,SHOULDER	EA	4
B- 7	2	PAFZZ	5310-00-722-5998	MS15795-805	96906	WASHER,FLAT	EA	11
B- 7	3	PAFDD	1270-00-578-0757	2278340-00	06401	CIRCUIT CARD ASSEMBLY	EA	1
B- 7	4	PAFDD	4931-01-007-6882	2278915-00	06401	CIRCUIT CARD ASSEMBLY	EA	1
B- 7	5	PAFZZ	5310-00-208-9255	MS21044C3	96906	NUT,SELF-LOCKING,HEXAGON	EA	18
B- 7	6	XBFZZ		MS15795-808	96906	WASHER,FLAT	EA	40
B- 7	7	PAFZZ	5305-00-059-3660	MS51958-64	96906	SCREW,MACHINE	EA	22
B- 7	8	XBFZZ	5310-00-933-8120	MS35338-138	96906	WASHER,LOCK	EA	14
B- 7	9	PAFZZ	5305-00-059-3658	MS51958-62	96906	SCREW,MACHINE	EA	14
B- 7	10	PAHZZ	4931-01-007-6881	HL12D27-6	15755	POWER SUPPLY	EA	1
B- 7	11	PAHZZ	6130-00-168-3732	S6D115A400	15755	INVERTER,POWER,STATIC	EA	1
B- 7	12	XBHZZ	5940-00-143-4771	MS25036-103	96906	TERMINAL,LUG	EA	2
B- 7	13	PAFZZ	5305-00-059-3661	MS51958-65	96906	SCREW,MACHINE	EA	2
C B- 7	14	PAFZZ	5340-00-336-8163	MP32N	09922	CLAMP,LOOP	EA	2
B- 7	15	PAFZZ	5910-00-889-4412	CE71C561G	81349	CAPACITOR,FIXED,ELECTROLYTIC	EA	1
B- 7	16	XBFZZ		2277265-00	06401	PLATE,MOUNTING,POWER SUPPLY	EA	1
B- 7	17	XBFZZ	5305-00-054-6652	MS51957-28	96906	SCREW,MACHINE	EA	7
B- 7	18	PAFZZ	5310-00-982-6813	MS21044C06	96906	NUT,SELF-LOCKING,HEX	EA	3
B- 7	19	XBFZZ		TC92	59730	CLAMP,LOOP,SADDLE	EA	3
B- 7	20	XBFZZ	5975-00-074-2072	MS3367-1-9	96906	STRAP,CABLE TIE DOWN	EA	3
B- 7	21	XA		2277267-00	06401	BRACKET ASSEMBLY,CABLE SUPPORT	EA	1
B- 7	22	PAFZZ	5305-00-079-5835	MS24693C50	96906	SCREW,MACHINE	EA	3
B- 7	23	PAFZZ	5305-00-088-9666	MS24693C51	96906	SCREW,MACHINE	EA	3
B- 7	24	XBFZZ		2277266-00	06401	PANEL,SIDE	EA	1
B- 7	25	PAHZZ	5310-00-982-4999	MS21044C04	96906	NUT,SELF-LOCKING,HEXAGON	EA	2
B- 7	26	PAFZZ	5310-00-595-6211	MS15795-803	96906	WASHER,FLAT	EA	2
B- 7	27	PAFZZ	5305-00-056-9961	MS24693C4	96906	SCREW,MACHINE	EA	2
B- 7	28	XBHZZ		2279066-00	06401	BRACKET,SWITCH SUPPORT	EA	1
B- 7	29	XA		2278906-00	06401	FRONT BRACKET ASSEMBLY FOR BREAKDOWN,SEE FIG. B-8	EA	1
B- 7	30	XA		2278908-00	06401	REAR BRACKET ASSEMBLY FOR BREAKDOWN,SEE FIG. B-9	EA	1
B- 7	31	XA		2278904-00	06401	TOP PANEL ASSEMBLY FOR BREAKDOWN,SEE FIG. B-10	EA	1

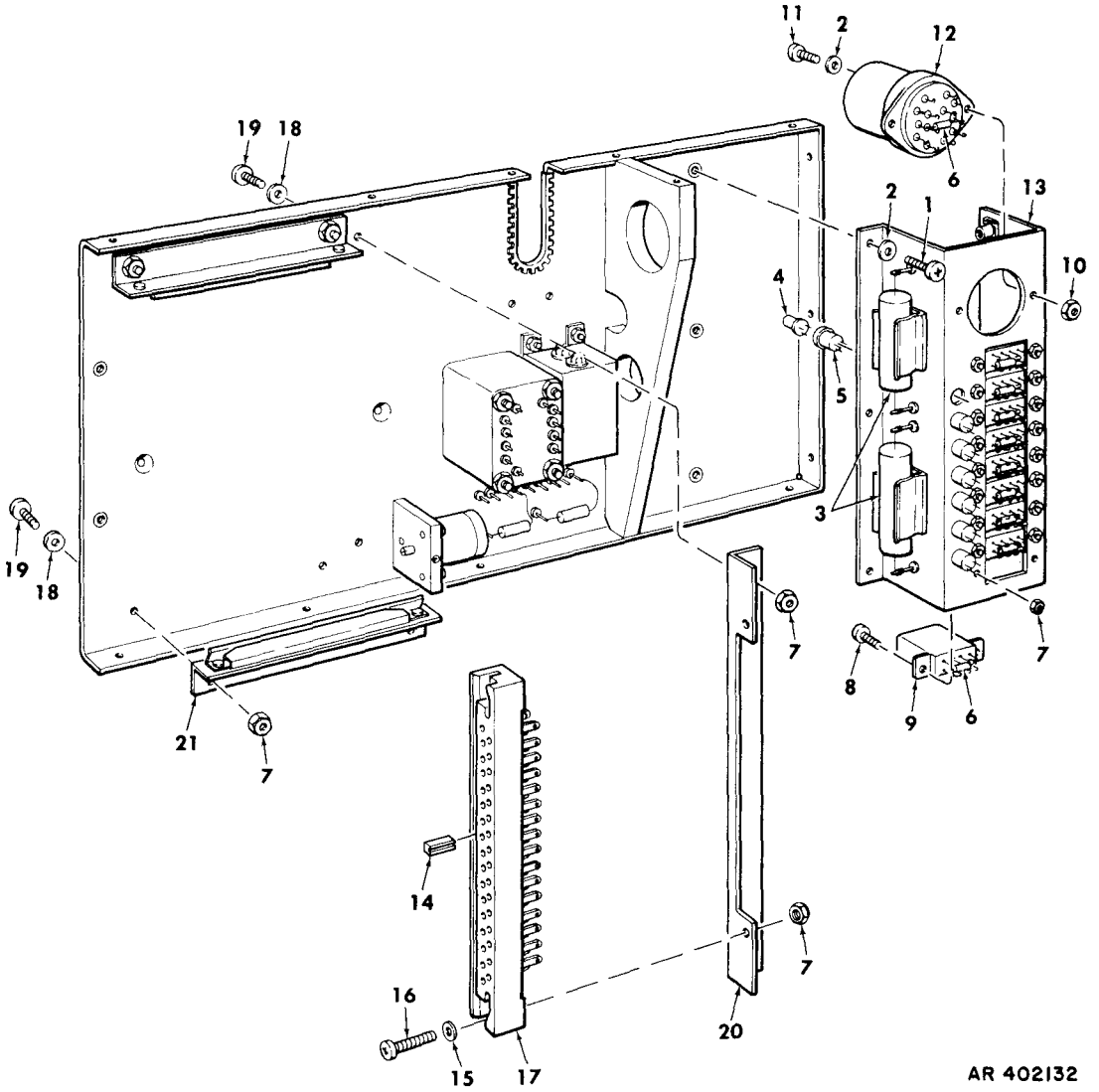


Figure B-8. Front bracket assembly (sheet 1 of 2)

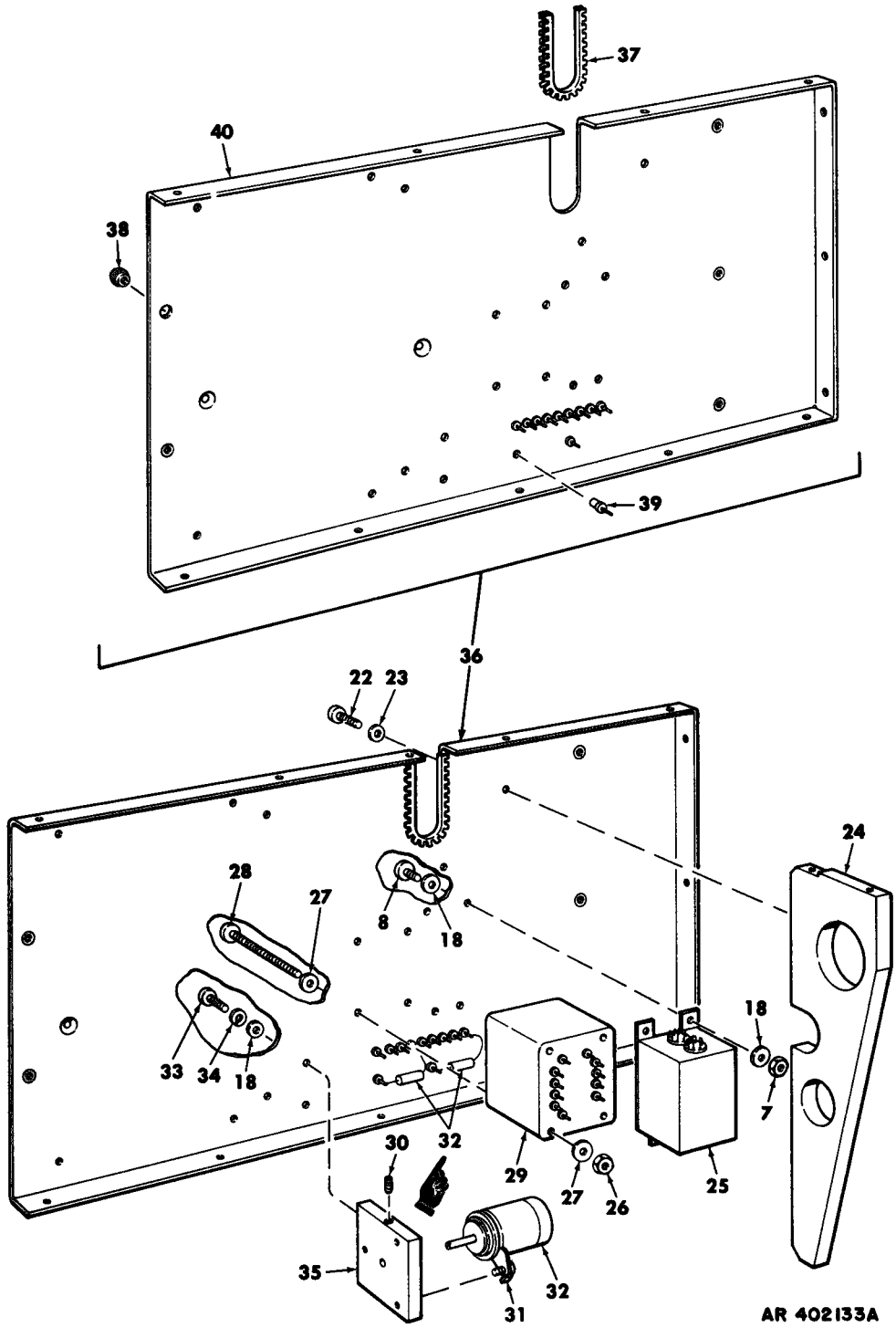


Figure B-8. Front bracket assembly (sheet 2 of 2)

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B- 8						GROUP: 2276,321 FRONT BRACKET ASSEMBLY FOR NHA;SEE FIG. B-7		
B- 8	1	PAHZZ	5305-00-054-6651	MS51957-27	96906	SCREW,MACHINE	EA	3
B- 8	2	PAHZZ	5310-00-722-5998	MS15795-805	96906	WASHER,FLAT	EA	5
B- 8	3	PAHZZ		M39022-01-1674	81349	CAPACITOR,FIXED,METALLIZED PAPER	EA	2
B- 8	4	PAFZZ	5961-00-951-8757	JAN2N2222A	81349	TRANSISTOR	EA	7
B- 8	5	XBHZZ		8060-1GS	91506	SOCKET,PLUG-IN,ELECTRICAL	EA	7
B- 8	6	PAHZZ	5961-00-451-7408	JAN1N5617	81349	SEMICONDUCTOR DEVICE,DIODE	EA	10
B- 8	7	PAHZZ	5310-00-982-4999	MS21044C04	96906	NUT,SELF-LOCKING,HEXAGON	EA	30
B- 8	8	PAHZZ	5305-00-054-5648	MS51957-14	96906	SCREW,MACHINE	EA	22
B- 8	9	PAHZZ	5945-00-105-1844	MS757-10-039	81349	RELAY,ARMATURE	EA	9
B- 8	10	PAHZZ	5310-00-982-6813	MS21044C06	96906	NUT,SELF-LOCKING,HEXAGON	EA	2
B- 8	11	PAHZZ	5305-00-054-6653	MS51957-29	96906	SCREW,MACHINE	EA	2
B- 8	12	PAHZZ	5945-00-060-5278	MS757-7-001	81349	RELAY,ARMATURE	EA	1
B- 8	13	XBFZZ		2277269-00	06401	BRACKET ASSEMBLY,RELAY MOUNTING	EA	1
B- 8	14	XBHZZ		M21097-11-3	81349	KEY,POLARIZING	EA	1
B- 8	15	PAHZZ	5310-00-057-0573	NAS620C4	80205	WASHER,FLAT	EA	2
B- 8	16	PAHZZ	5305-00-054-5653	MS51957-19	96906	SCREW,MACHINE	EA	2
B- 8	17	PAHZZ	5935-00-926-7522	M21097-4-33	81349	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B- 8	18	PAHZZ	5310-00-595-6211	MS15795-803	96906	WASHER,FLAT	EA	16
B- 8	19	XBFZZ	5305-00-054-5650	MS51957-16	96906	SCREW,MACHINE	EA	6
B- 8	20	XBHZZ		2277270-00	06401	BRACKET,ELECTRICAL CONNECTOR	EA	1
B- 8	21	XBHZZ		2277271-00	06401	BRACKET ASSEMBLY	EA	2
B- 8	22	XBFZZ	5305-00-059-3659	MS51958-63	96906	SCREW,MACHINE	EA	2
B- 8	23	XBFZZ		MS15795-808	96906	WASHER,FLAT	EA	2
B- 8	24	XBFZZ		2277264-00	06401	BRACKET ASSEMBLY	EA	1
B- 8	25	PAHZZ	1270-00-107-2499	C703183009	88818	AMPLIFIER,ELECTRONIC CONTROL	EA	1
B- 8	26	PAHZZ		L79NM408-832	27687	NUT,SELF-LOCKING,HEXAGON	EA	4
B- 8	27	PAHZZ	5310-00-069-9521	NAS620C8	80205	WASHER,FLAT	EA	8
B- 8	28	PAHZZ	5305-00-054-6680	MS51957-53	96906	SCREW,MACHINE	EA	4
B- 8	29	PAHZZ		2278339-00	06401	TRANSFORMER,POWER,STEP DOWN	EA	1
B- 8	30	XBFZZ	5305-01-015-3348	MS51029-102	96906	SETSCREW	EA	1
B- 8	31	XBHZZ	5340-00-871-9071	MS17183-1	96906	CLAMP,RIM CLENCHING	EA	3
C B- 8	32	PAHZZ	5990-00-573-4731	CM41084025	88818	RESOLVER,ELECTRICAL (WITH MATCHED RESISTORS)	EA	1
B- 8	33	XBFZZ	5305-00-054-5647	MS51957-13	96906	SCREW,MACHINE	EA	2
B- 8	34	XBFZZ	5310-00-933-8118	MS35338-135	96906	WASHER,LOCK	EA	2
B- 8	35	XBHZZ		2277268-00	06401	BRACKET,RESOLVER	EA	1
B- 8	36	XA		2278907-00	06401	BRACKET ASSEMBLY,FRONT	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
8- 8	37	XBFZZ	5325-00-074-3301	MS21266-2N	96906	GROMMET,PLASTIC	EA	1
8- 8	38	XBFZZ		M45938-6-6C	81349	NUT,SELF-LOCKING,CLINCH	EA	5
8- 8	39	XBFZZ	5940-00-901-1405	SE089801	81349	TERMINAL,STUD	EA	11
8- 8	40	XAFZZ		2278907-51	06401	BRACKET,ANGLE	EA	1

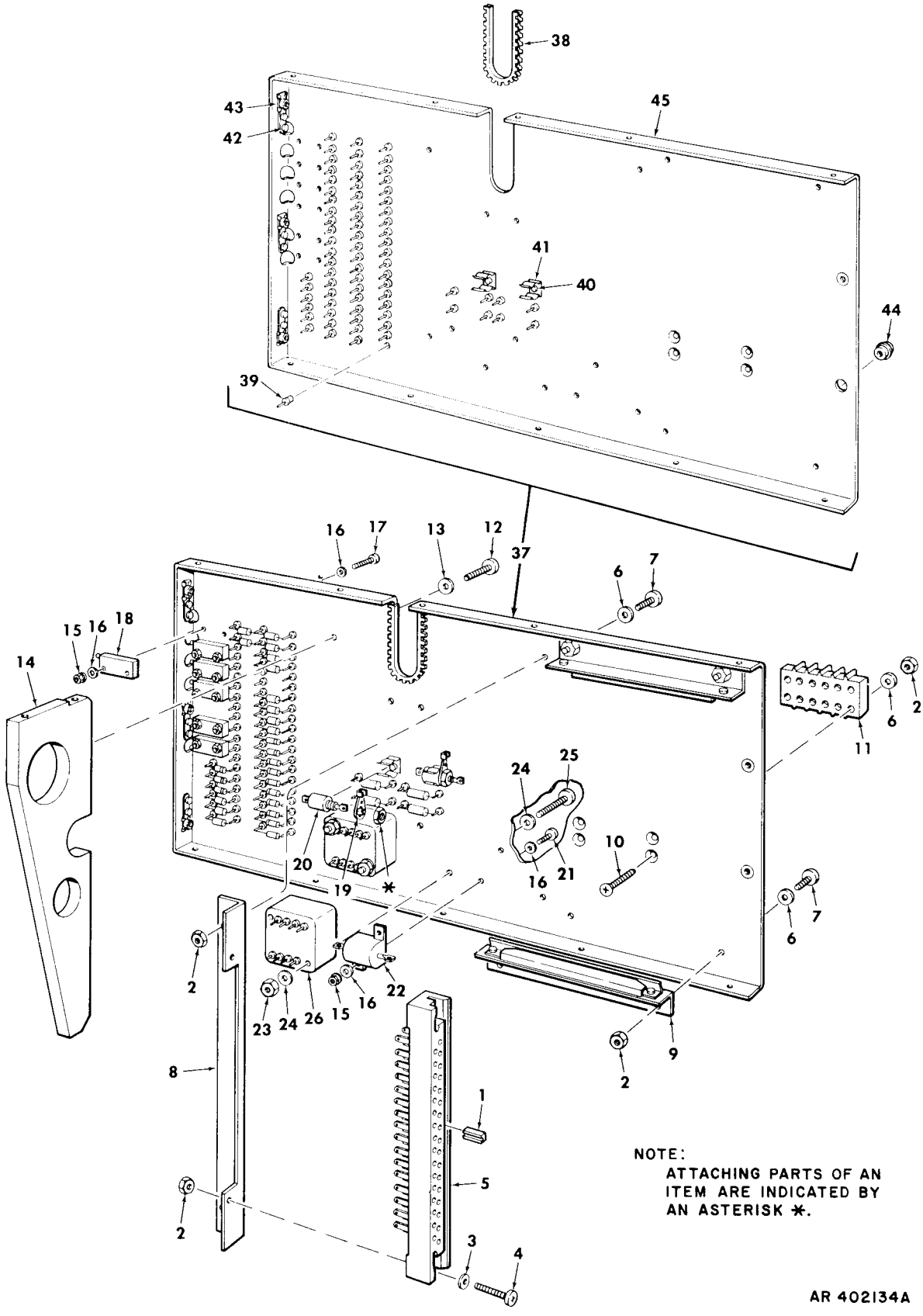


Figure B-9. Rear bracket assembly (sheet 1 of 2)

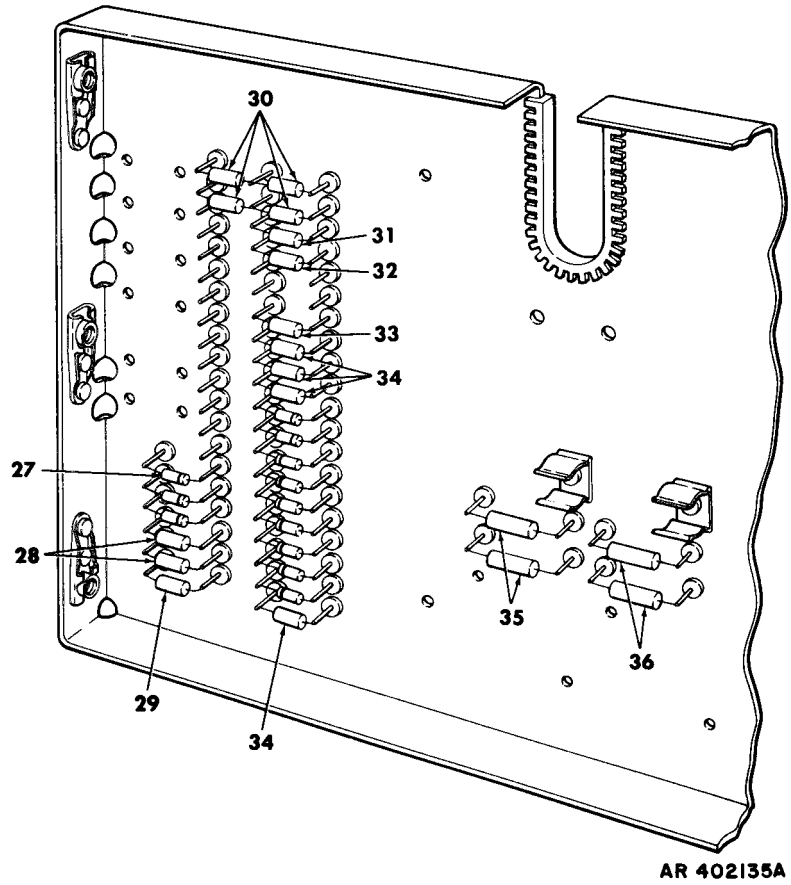


Figure B-9. Rear bracket assembly (sheet 2 of 2)

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B- 9						GROUP: 2276,322 REAR BRACKET ASSEMBLY FOR NHA,SEE FIG. B-7		
B- 9	1	XBHZZ		M21097-11-3	81349	KEY,POLARIZING	EA	1
B- 9	2	XBHZZ	5310-00-982-4999	MS21044C04	96906	NUT,SELF-LOCKING,HEXAGON	EA	12
B- 9	3	PAHZZ	5310-00-057-0573	NAS620C4	80205	WASHER,FLAT	EA	2
B- 9	4	PAHZZ	5305-00-054-5653	MS51957-19	96906	SCREW,MACHINE	EA	2
B- 9	5	PAHZZ	5935-00-926-7522	M21097-4-33	81349	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B- 9	6	XBFZZ	5310-00-595-6211	MS15795-803	96906	WASHER,FLAT	EA	10
B- 9	7	XBFZZ	5305-00-054-5650	MS51957-16	96906	SCREW,MACHINE	EA	6
B- 9	8	XBHZZ		2277270-00	06401	BRACKET,ELECTRICAL CONNECTOR	EA	1
B- 9	9	XBFZZ		2277271-00	06401	BRACKET ASSEMBLY	EA	2
B- 9	10	XBFZZ	5305-00-780-8454	MS24693C7	96906	SCREW,MACHINE	EA	4
B- 9	11	XBHZZ		MS5164-1837T84	81349	TERMINAL BOARD	EA	1
B- 9	12	XBFZZ	5305-00-059-3659	MS51958-63	96906	SCREW,MACHINE	EA	2
B- 9	13	XBFZZ		MS15795-808	96906	WASHER,FLAT	EA	2
B- 9	14	XBFZZ		2277264-00	06401	BRACKET ASSEMBLY	EA	1
B- 9	15	PAHZZ	5310-00-058-1823	MS21042-02	96906	NUT,SELF-LOCKING,HEXAGON	EA	14
B- 9	16	PAHZZ	5310-00-595-6761	MS15795-802	96906	WASHER,FLAT	EA	28
B- 9	17	PAHZZ	5305-00-054-5640	MS51957-6	96906	SCREW,MACHINE	EA	12
B- 9	18	PAHZZ	5905-00-763-5369	RT10C2L202	81349	RESISTOR,VARIABLE,WIREWOUND	EA	6
B- 9	19	XBHZZ		MS77074-7	96906	TERMINAL,LUG	EA	2
B- 9	20	PAHZZ	5915-00-946-6906	11728792	19200	FILTER,RADIO FREQUENCY	EA	2
B- 9	21	PAHZZ	5305-00-054-5638	MS51957-4	96906	SCREW,MACHINE	EA	2
B- 9	22	PAHZZ	5905-00-306-1110	RER45F1100R	81349	RESISTOR,FIXED,WIREWOUND	EA	1
B- 9	23	PAHZZ	5310-00-982-6813	MS21044C06	96906	NUT,SELF-LOCKING,HEXAGON	EA	4
B- 9	24	PAHZZ	5310-00-722-5998	MS15795-805	96906	WASHER,FLAT	EA	8
B- 9	25	PAHZZ	5305-00-054-6660	MS51957-36	96906	SCREW,MACHINE	EA	4
B- 9	26	PAHZZ	5950-00-603-6938	2201707-00	06401	TRANSFORMER,POW	EA	2
B- 9	27	PAHZZ	5961-00-451-7408	JANIN5617	81349	SEMICONDUCTOR DEVICE,DIODE	EA	12
B- 9	28	PAHZZ	5905-00-111-1679	RCR07G512JS	81349	RESISTOR,FIXED,COMPOSITION	EA	2
B- 9	29	PAHZZ	5905-00-228-5506	RCR07G622JS	81349	RESISTOR,FIXED,COMPOSITION	EA	1
B- 9	30	PAHZZ	5905-00-432-0420	RNC55K4990FS	81349	RESISTOR,FIXED,FILM	EA	4
B- 9	31	PAHZZ	5905-00-116-8562	RCR20G361JS	81349	RESISTOR,FIXED,COMPOSITION	EA	1
B- 9	32	PAHZZ	5905-00-104-8349	RCR20G511JS	81349	RESISTOR,FIXED,COMPOSITION	EA	1
B- 9	33	PAHZZ	5905-00-136-8406	RCR07G242JS	81349	RESISTOR,FIXED,COMPOSITION	EA	1
B- 9	34	PAHZZ	5905-00-136-7103	RCR07G204JS	81349	RESISTOR,FIXED,COMPOSITION	EA	4
B- 9	35	PAHZZ	5905-00-782-4554	RW69V121	81349	RESISTOR,FIXED,WIREWOUND	EA	2
B- 9	36	PAHZZ	5905-00-988-3019	RW69V120	81349	RESISTOR,FIXED,WIREWOUND	EA	2

ILLUSTRATION (a) FIG NO	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) /h	(8) QTY INC IN JNIT
- 9	37	(AFZZ		!278909-00	)6401	}RACKET ASSEMBLY,REAR	:A	1
- 9	38	(BFZZ	)325-00-074-3301	!S21266-2N	)6906	GROMMET,PLASTIC	:A	1
- 9	39	(BHZZ	)940-00-901-1405	;E089801	)1349	TERMINAL,STUD	:A	74
- 9	40	(BFZZ	)320-00-117-6815	!S20470AD3-4	)6906	RIVET,SOLID	:A	2
- 9	41	(BFZZ		!S17160-108	)6906	CLIP,SPRING TENSION	:A	2
- 9	42	(BFZZ	)320-00-117-6931	!S20426AD3-4	)6906	RIVET,SOLID	:A	6
- 9	43	(BFZZ		!S21062L08	)6906	NUT,SELF-LOCKING,PLATE	:A	3
- 9	44	(BFZZ		!45938-6-6C	)1349	NUT,SELF-LOCKING,CLINCH	:A	2
- 9	45	(AFZZ		!278909-51	)6401	BRACKET,ANGLE	:A	1

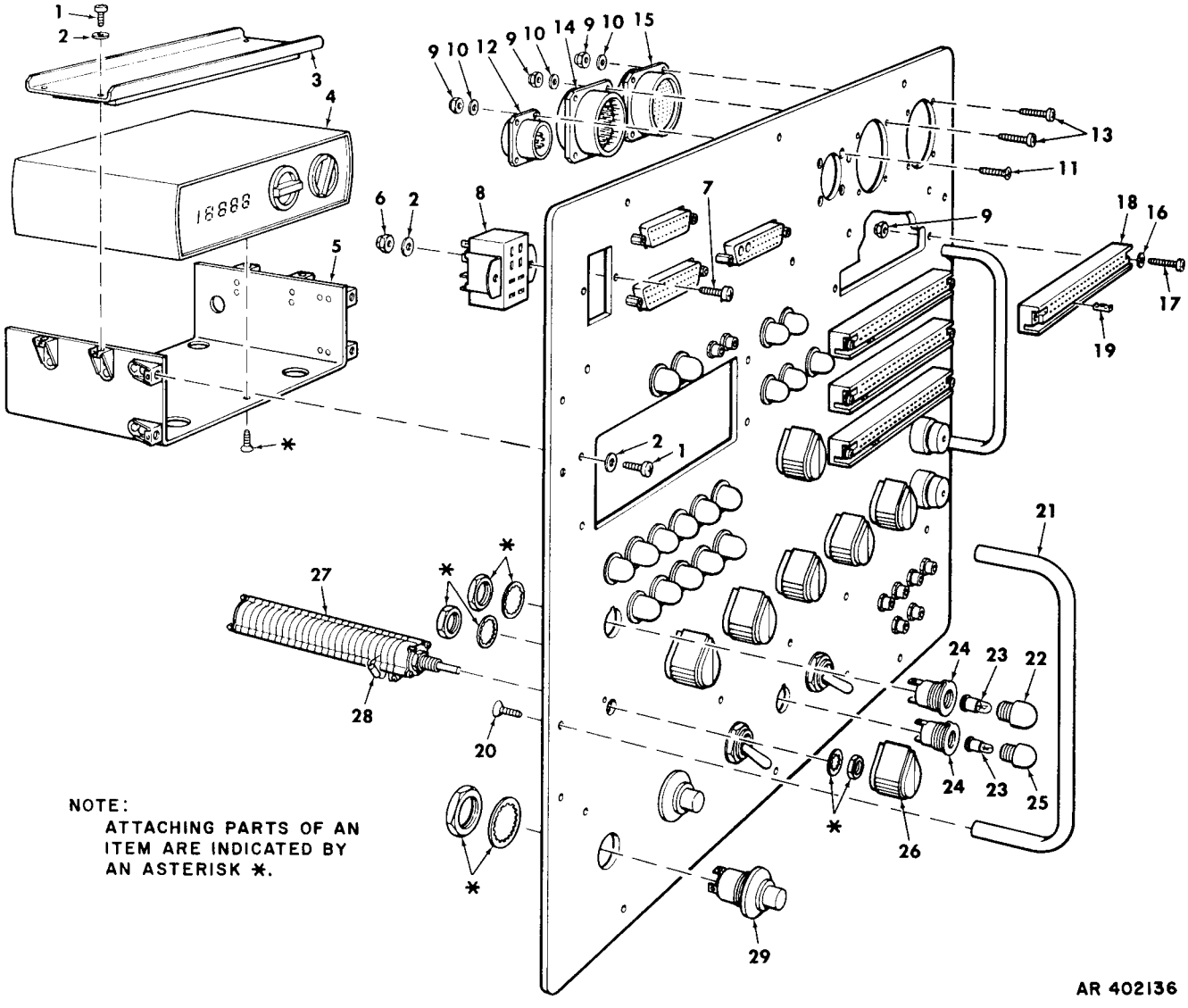


Figure B-10. Top panel assembly (sheet 1 of 2)

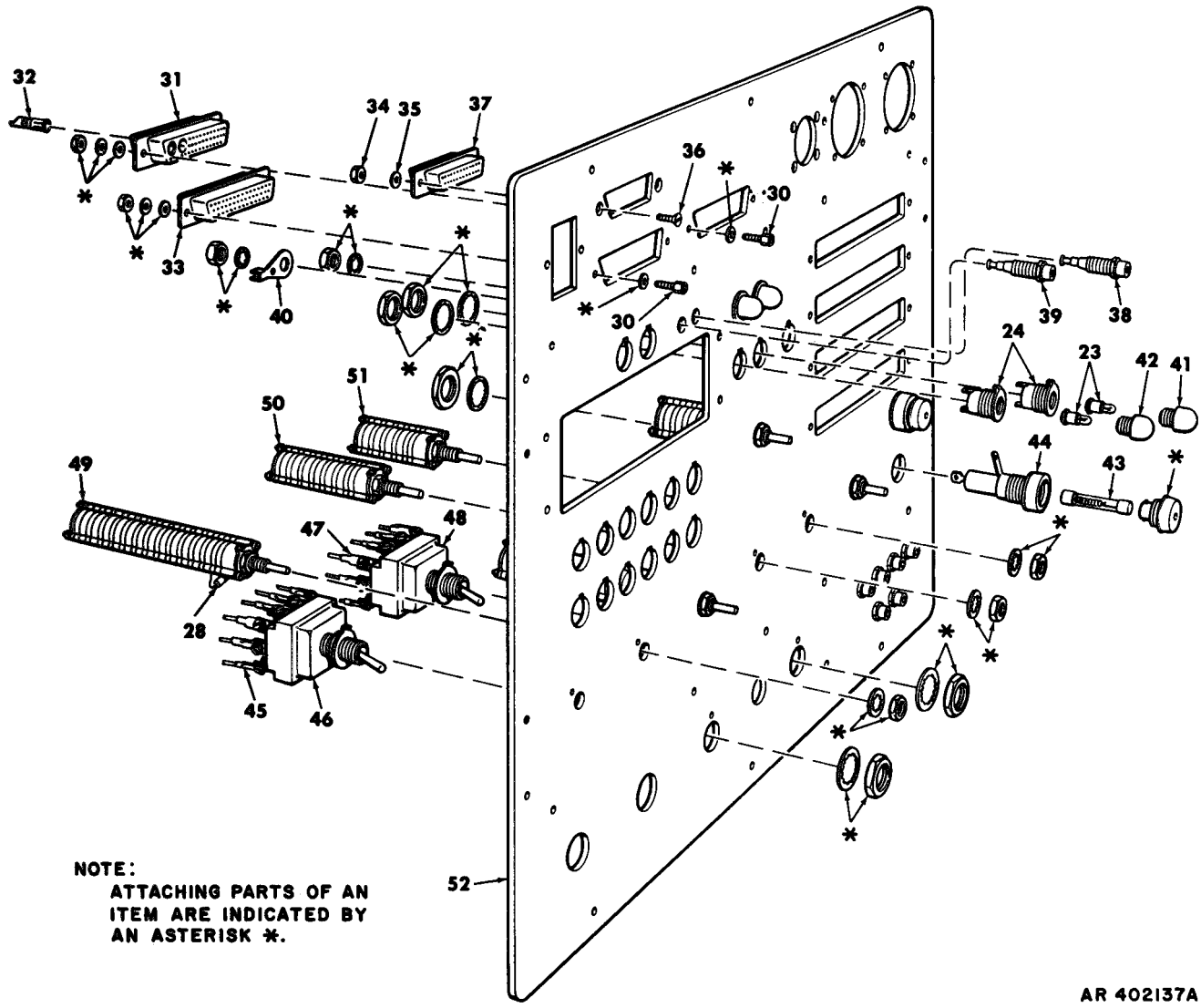


Figure B-10. Top panel assembly (sheet 2 of 2)

(1) ILLUSTRATION (a) FIG NO.	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) U/M	(8) QTY INC IN UNIT
B-10						GROUP: 2276,323 TOP PANEL ASSEMBLY FOR NHA;SEE FIG. B-7		
B-10	1	PAHZZ	5305-00-054-6653	MS51957-29	76906	SCREW,MACHINE	EA	
B-10	2	PAHZZ	5310-00-722-5998	MS15795-805	76906	WASHER,FLAT	EA	
B-10	3	XBHZZ		2277262-00	06401	BRACKET ASSEMBLY,TOP	EA	
B-10	4	PAHDL	4931-01-007-0136	2278918-00	06401	MULTIMETER ASSEMBLY	EA	
B-10	5	XBHZZ		2277263-00	06401	BRACKET ASSEMBLY,LOWER	EA	
B-10	6	PAHZZ	5310-00-982-6813	MS21044C06	76906	NUT,SELF-LOCKING,HEXAGON	EA	
B-10	7	PAHZZ	5305-00-054-6655	MS51957-31	76906	SCREW,MACHINE	EA	
B-10	8	PAHZZ	5935-00-149-2888	S308AB	71785	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	
B-10	9	PAHZZ	5310-00-982-4999	MS21044C04	76906	NUT,SELF-LOCKING,HEXAGON	EA	
B-10	10	PAHZZ	5310-00-595-6211	MS15795-803	76906	WASHER,FLAT	EA	
B-10	11	PAHZZ	5305-00-068-6605	MS24693C6	76906	SCREW,MACHINE	EA	
B-10	12	PAHZZ	5935-00-850-6522	MS3112E14-5P	76906	CONNECTOR,RECEPTACLE,ELECTR CAL	EA	
B-10	13	PAHZZ	5305-00-054-5651	MS51957-17	76906	SCREW,MACHINE	EA	
B-10	14	PAHZZ	5935-00-822-5675	MS3112E22-55PW	76906	CONNECTOR,RECEPTACLE,ELECTR CAL	EA	
B-10	15	PAHZZ	5935-00-826-0845	MS3112E22-55SW	76906	CONNECTOR,RECEPTACLE,ELECTR CAL	EA	
B-10	16	PAHZZ	5310-00-057-0573	NAS620C4	80205	WASHER,FLAT	EA	
B-10	17	PAHZZ	5305-00-054-5653	MS51957-19	76906	SCREW,MACHINE	EA	
B-10	18	PAHZZ	5935-00-926-7522	M21097-4-33	81349	CONNECTOR,RECEP ACLE,ELECTRICAL	EA	
B-10	19	XBHZZ		M21097-11-3	81349	KEY,POLARIZING	EA	
B-10	20	XBFZZ	5305-00-051-0227	MS24693C272	76906	SCREW,MACHINE	EA	
B-10	21	XBFZZ		103525S1032	06540	HANDLE,BOW	EA	
B-10	22	PAFZZ	6210-00-957-7828	LC12CN2	81349	LENS,LIGHT	EA	
B-10	23	PAFZZ	6240-00-763-7744	MS25237-387	76906	LAMP,INCANDESCENT	EA	
B-10	24	PAHZZ	6210-00-813-8265	LH73-1	81349	LIGHT,INDICATOR	EA	
B-10	25	PAFZZ	6210-00-990-4637	LC12RN2	81349	LENS,LIGHT	EA	1
B-10	26	PAFZZ	5355-00-552-1810	MS91528-1K1B	76906	KNOB	EA	7
B-10	27	PAHZZ	5930-01-012-9014	M3786-13-0591	81349	SWITCH,ROTARY	EA	1
B-10	28	PAHZZ	5961-00-451-7408	JAN1N5617	81349	SEMICONDUCTOR DEVICE,DIODE	EA	3
B-10	29	PAHZZ	5930-00-578-2353	MS25089-4CR	76906	SWITCH,PUSH	EA	2
B-10	30	PAFZZ	5935-00-898-0494	D20418-2	71468	SCREWLOCK ASSEMBLY	EA	4
B-10	31	PAHZZ	5935-00-161-9100	DDMM43W2S	71468	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B-10	32	PAHZZ	5999-00-520-9972	DM53744-24	71468	CONTACT,ELECTRICAL	EA	2
B-10	33	PAHZZ	5935-00-493-0465	M24308-1-5	81349	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
B-10	34	PAHZZ	5310-00-926-5868	L79NM26	17687	NUT,SELF-LOCKING,HEXAGON	EA	2
B-10	35	PAFZZ	5310-00-595-6761	MS15795-802	76906	WASHER,FLAT	EA	2
B-10	36	PAHZZ	5305-00-814-1709	NAS662C2R7	80205	SCREW,MACHINE	EA	2

ILLUSTRATION (a) FIG NO	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7) UN	(8) QTY INC IN UNIT
-10	37	PAHZZ	5935-00-351-6135	124308-1-3	81349	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1
-10	38	PAHZZ	5935-00-702-4191	139024-10-02	81349	JACK,TIP	EA	5
-10	39	PAHZZ	5935-00-762-0312	139024-10-03	81349	JACK,TIP	EA	3
-10	40	XBHZZ		1S77074-7	96906	TERMINAL,LUG	EA	3
-10	41	PAFZZ	6210-00-080-1041	MC12YN2	81349	LENS,LIGHT	EA	3
-10	42	PAFZZ	6210-00-079-8941	MC12GN2	81349	LENS,LIGHT	EA	1
-10	43	PAFZZ	5920-00-221-8371	FM03-250V3A	81349	FUSE,CARTRIDGE	EA	2
-10	44	PAHZZ	5920-00-892-9311	FHN26G1	81349	FUSEHOLDER,EXTRACTOR	EA	2
-10	45	XBHZZ		1S25036-145	96906	TERMINAL,LUG	EA	21
-10	46	PAHZZ	5930-00-655-1581	1S25068-23	96906	SWITCH,TOGGLE	EA	1
-10	47	XBHZZ		1S25036-101	96906	TERMINAL,LUG	EA	10
-10	48	PAHZZ	5930-00-615-7881	1S25068-21	96906	SWITCH,TOGGLE	EA	1
-10	49	PAHZZ	5930-00-197-3881	13786-13-0217	81349	SWITCH,ROTARY	EA	2
-10	50	PAHZZ	5930-01-012-7981	13786-13-0128	81349	SWITCH,ROTARY	EA	1
-10	51	PAHZZ	5930-01-012-9011	13786-13-0086	81349	SWITCH,ROTARY	EA	3
-10	52	XA		1278905-00	06401	PANEL,TOP	EA	1

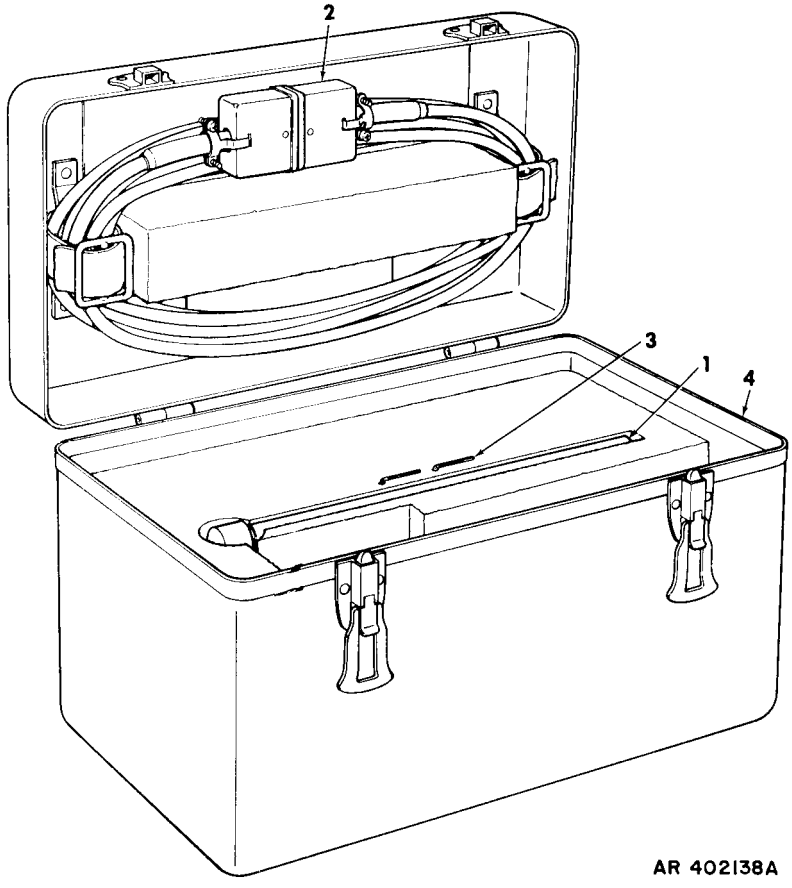


Figure B-11. Organizational HSS boresight kit

ILLUSTRATION (a) FIG NO	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable On Code	(7)	(8) QTY INC IN UNIT
-11		PDOZZ	4931-00-124-545:	!277279-00	)6401	ORESIGHT KIT,HSS,ORGANIZATIONAL		
-11	1	KDOZZ		!277708-00	)6401	ELMET BORESIGHT TOOL ASSEMBLY	A	1
-11	2	KDOZZ		!279348-00	)6401	ABLE ASSI MBLY,SPECIAL PURPOSE,ELECTRICAL	A	1
-11	3	DOZZ	;120-00-198-5391	;GGK00275	31348	EY,SOCKE HEAD SCREW,1/16 HEX	A	2
-11	4	DOZZ		!279685-00	)6401	ONTAINER ASSEMBLY,BORESIGHT KIT	A	1

Section IV. NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
5305-00-051-0227	B- 2	36
5305-00-051-0227	B-10	20
5305-00-054-5638	B- 9	21
5305-00-054-5640	B- 9	17
5305-00-054-5647	B- 2	1
5305-00-054-5647	B- 8	33
5305-00-054-5648	B- 3	1
5305-00-054-5648	B- 8	8
5305-00-054-5650	B- 8	19
5305-00-054-5650	B- 9	7
5305-00-054-5651	B-10	13
5305-00-054-5653	B- 8	16
5305-00-054-5653	B- 9	4
5305-00-054-5653	B-10	17
5305-00-054-6651	B- 2	20
5305-00-054-6651	B- 8	1
5305-00-054-6652	B- 7	17
5305-00-054-6653	B- 8	11
5305-00-054-6653	B-10	1
5305-00-054-6655	B-10	7
5305-00-054-6660	B- 9	25
5305-00-054-6680	B- 8	28
5305-00-056-9961	B- 7	27
5310-00-057-0573	B- 8	15
5310-00-057-0573	B- 9	3
5310-00-057-0573	B-10	16
5310-00-058-1823	B- 9	15
5315-00-058-9731	B- 2	15
5305-00-059-3658	B- 7	9
5305-00-059-3659	B- 2	26
5305-00-059-3659	B- 8	22
5305-00-059-3659	B- 9	12
5305-00-059-3660	B- 7	7
5305-00-059-3661	B- 5	3
5305-00-059-3661	B- 7	13
5945-00-060-5278	B- 8	12
5305-00-068-6605	B-10	11
5310-00-069-9521	B- 8	27
5305-00-073-8885	B- 4	1
5975-00-074-2072	B- 7	20
5325-00-074-3301	B- 8	37
5325-00-074-3301	B- 9	38
5305-00-079-5835	B- 7	22
6210-00-079-8943	B-10	42
6210-00-080-1048	B-10	41
5305-00-088-9666	B- 7	23
5905-00-104-8349	B- 9	32
5945-00-105-1844	B- 8	9
1270-00-107-2499	B- 8	25
5905-00-111-1679	B- 9	28
5905-00-116-8562	B- 9	31
5320-00-117-6815	B- 9	40
5320-00-117-6938	B- 9	42
4931-00-124-5453	B-11	
5340-00-126-5232	B- 6	6
5905-00-136-7103	B- 9	34
5905-00-136-8406	B- 9	33
5940-00-143-4771	B- 7	12
5935-00-149-2888	B-10	8
5935-00-161-9100	B-10	31
5935-00-161-9101	B- 4	3
6130-00-168-3732	B- 7	11
5340-00-182-5381	B- 6	5
5930-00-197-3883	B-10	49
5120-00-198-5398	B-11	3

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
5920-00-221-8377	B-10	43
5905-00-228-5506	B- 9	29
5905-00-306-1110	B- 9	22
5340-00-336-8163	B- 7	14
5935-00-351-6135	B-10	37
5905-00-432-0420	B- 9	30
5305-00-442-4073	B- 7	1
5961-00-451-7408	B- 8	6
5961-00-451-7408	B- 9	27
5961-00-451-7408	B-10	28
5935-00-493-0465	B-10	33
5935-00-493-0466	B- 4	7
5999-00-520-6145	B- 4	4
5999-00-520-9972	B-10	32
5355-00-552-1810	B-10	26
5990-00-573-4731	B- 8	32
1270-00-573-5197	B- 2	37
1270-00-578-0757	B- 7	3
5930-00-578-2353	B-10	29
5310-00-595-6211	B- 2	2
5310-00-595-6211	B- 3	3
5310-00-595-6211	B- 7	26
5310-00-595-6211	B- 8	18
5310-00-595-6211	B- 9	6
5310-00-595-6211	B-10	10
5310-00-595-6761	B- 9	16
5310-00-595-6761	B-10	35
5365-00-598-7868	B- 2	13
5950-00-603-6938	B- 9	26
5930-00-615-7883	B-10	48
5310-00-619-1148	B- 2	28
5310-00-619-1148	B- 5	5
5930-00-655-1581	B-10	46
5935-00-702-4199	B-10	38
5305-00-719-5346	B- 2	22
5310-00-722-5998	B- 2	12
5310-00-722-5998	B- 7	2
5310-00-722-5998	B- 8	2
5310-00-722-5998	B- 9	24
5310-00-722-5998	B-10	2
5935-00-762-0312	B-10	39
5905-00-763-5369	B- 9	18
6240-00-763-7744	B-10	23
5935-00-772-9261	B- 4	6
5305-00-780-8454	B- 9	10
5905-00-782-4554	B- 9	35
5935-00-804-5267	B- 4	2
6210-00-813-8265	B-10	24
5305-00-814-1709	B-10	36
5935-00-822-5675	B-10	14
5935-00-826-0845	B-10	15
5935-00-850-6522	B-10	12
5340-00-871-9071	B- 8	31
5310-00-880-5978	B- 2	34
5910-00-889-4412	B- 7	15
5920-00-892-9311	B-10	44
5935-00-892-9330	B- 4	8
5935-00-892-9332	B- 4	5
5935-00-892-9333	B- 4	9
5935-00-898-0494	B-10	30
4820-00-898-3003	B- 6	1
5940-00-901-1405	B- 8	39
5940-00-901-1405	B- 9	39
5310-00-926-5868	B-10	34
5935-00-926-7522	B- 8	17

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
5935-00-926-7522	8- 9	5
5935-00-926-7522	8-10	18
5310-00-929-6395	8- 2	11
5310-00-933-8118	8- 3	2
5310-00-933-8118	8- 8	34
5310-00-933-8119	8- 2	33
5310-00-933-8120	8- 2	27
5310-00-933-8120	8- 5	4
5310-00-933-8120	8- 7	8
5330-00-937-5345	8- 6	3
5915-00-946-6906	8- 9	20
5961-00-951-8757	8- 8	4
6210-00-957-7828	8-10	22
5310-00-982-4999	8- 7	25
5310-00-982-4999	8- 8	7
5310-00-982-4999	8- 9	2
5310-00-982-4999	8-10	9
5310-00-982-6813	8- 7	18
5310-00-982-6813	8- 8	10
5310-00-982-6813	8- 9	23
5310-00-982-6813	8-10	6
5905-00-988-3019	8- 9	36

STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER
5305-00-988-7604	8- 2	32
6210-00-990-4637	8-10	25
5340-00-993-0879	8- 6	4
4931-01-005-2827	8- 1	7
4931-01-007-0132	8- 2	5
4931-01-007-0135	8- 1	6
4931-01-007-0136	8-10	4
4931-01-007-6877	8- 1	5
4931-01-007-6878	8- 1	4
4931-01-007-6879	8- 1	3
4931-01-007-6881	8- 7	10
4931-01-007-6882	8- 7	4
4931-01-009-3796	8- 2	3
5310-01-010-2415	8- 2	35
4931-01-010-4005	8- 2	29
5305-01-010-9937	8- 2	25
5930-01-012-7984	8-10	50
5930-01-012-9014	8-10	27
5930-01-012-9015	8-10	51
5999-01-012-9179	8- 1	8
5305-01-015-3348	8- 8	30

PART NUMBER	FSCM	FIGURE NUMBER	ITEM NUMBER
B6-24	00141	B- 2	13
CE71C561G	81349	B- 7	15
CM41084025	88818	B- 8	32
C703183009	88818	B- 8	25
DDMM43W2P	71468	B- 4	3
DDMM43W2S	71468	B-10	31
DD20964	71468	B- 4	2
DM53744-24	71468	B-10	32
DM53745-25	71468	B- 4	4
D20418-2	71468	B-10	30
D20420-12	71468	B- 4	1
D26479	98376	B- 5	6
D26479D1	98376	B- 6	2
FHN26G1	81349	B-10	44
FM03-250V3A	81349	B-10	43
GGGK00275	81348	B-11	3
HL12D27-6	15755	B- 7	10
HP32N	09922	B- 7	14
JAN1N5617	81349	B- 8	6
JAN1N5617	81349	B- 9	27
JAN1N5617	81349	B-10	28
JAN2N2222A	81349	B- 8	4
LC12CN2	81349	B-10	22
LC12GN2	81349	B-10	42
LC12RN2	81349	B-10	25
LC12YN2	81349	B-10	41
LH73-1	81349	B-10	24
L79NM26	27687	B-10	34
L79NM408-832	27687	B- 8	26
MS15795-802	96906	B- 9	16
MS15795-802	96906	B-10	35
MS15795-803	96906	B- 2	2
MS15795-803	96906	B- 3	3
MS15795-803	96906	B- 7	26
MS15795-803	96906	B- 8	18
MS15795-803	96906	B- 9	6
MS15795-803	96906	B-10	10
MS15795-805	96906	B- 2	12
MS15795-805	96906	B- 7	2
MS15795-805	96906	B- 8	2
MS15795-805	96906	B- 9	24
MS15795-805	96906	B-10	2
MS15795-807	96906	B- 2	34
MS15795-808	96906	B- 2	28
MS15795-808	96906	B- 5	5
MS15795-808	96906	B- 7	6
MS15795-808	96906	B- 8	23
MS15795-808	96906	B- 9	13
MS16562-213	96906	B- 2	15
MS16995-18	96906	B- 2	10
MS16995-28	96906	B- 2	32
MS17160-108	96906	B- 9	41
MS17183-1	96906	B- 8	31
MS18064-48	96906	B- 2	31
MS20426AD3-4	96906	B- 9	42
MS20470AD3-4	96906	B- 9	40
MS21042-02	96906	B- 9	15
MS21044C04	96906	B- 7	25
MS21044C04	96906	B- 8	7
MS21044C04	96906	B- 9	2
MS21044C04	96906	B-10	9
MS2 044C06	96906	B- 7	18
MS2 044C06	96906	B- 8	10
MS2 044C06	96906	B- 9	23
MS2 044C06	96906	B-10	6

PART NUMBER	FSCM	FIGURE NUMBER	ITEM NUMBER
MS21062L08	96906	B- 9	43
MS21266-2N	96906	B- 8	37
MS21266-2N	96906	B- 9	38
MS24585C165	96906	B- 2	4
MS24693C272	96906	B- 2	36
MS24693C272	96906	B-10	20
MS24693C4	96906	B- 7	27
MS24693C50	96906	B- 7	22
MS24693C51	96906	B- 7	23
MS24693C6	96906	B-10	11
MS24693C7	96906	B- 9	10
MS25036-101	96906	B-10	47
MS25036-103	96906	B- 7	12
MS25036-145	96906	B-10	45
MS25068-21	96906	B-10	48
MS25068-23	96906	B-10	46
MS25089-4CR	96906	B-10	29
MS25237-387	96906	B-10	23
MS3112E14-5P	96906	B-10	12
MS3112E22-55PW	96906	B-10	14
MS3112E22-55SW	96906	B-10	15
MS3116F16-26P	96906	B- 4	6
MS3116F22-55PW	96906	B- 4	8
MS3116F22-55S	96906	B- 4	5
MS3116F22-55SW	96906	B- 4	9
MS3367-1-9	96906	B- 7	20
MS35338-135	96906	B- 3	2
MS35338-135	96906	B- 8	34
MS35338-136	96906	B- 2	11
MS35338-137	96906	B- 2	33
MS35338-138	96906	B- 2	27
MS35338-138	96906	B- 5	4
MS35338-138	96906	B- 7	8
MS51029-102	96906	B- 8	30
MS51957-13	96906	B- 2	1
MS51957-13	96906	B- 8	33
MS51957-14	96906	B- 3	1
MS51957-14	96906	B- 8	8
MS51957-16	96906	B- 8	19
MS51957-16	96906	B- 9	7
MS51957-17	96906	B-10	13
MS51957-19	96906	B- 8	16
MS51957-19	96906	B- 9	4
MS51957-19	96906	B-10	17
MS51957-27	96906	B- 2	20
MS51957-27	96906	B- 8	1
MS51957-28	96906	B- 7	17
MS51957-29	96906	B- 8	11
MS51957-29	96906	B-10	1
MS51957-31	96906	B-10	7
MS51957-36	96906	B- 9	25
MS51957-4	96906	B- 9	21
MS51957-53	96906	B- 8	28
MS51957-6	96906	B- 9	17
MS51958-62	96906	B- 7	9
MS51958-63	96906	B- 2	26
MS51958-63	96906	B- 8	22
MS51958-63	96906	B- 9	12
MS51958-64	96906	B- 7	7
MS51958-65	96906	B- 5	3
MS51958-65	96906	B- 7	13
MS51963-35	96906	B- 2	22
MS77074-7	96906	B- 9	19
MS77074-7	96906	B-10	40
MS91528-1K1B	96906	B-10	26

PART NUMBER	FSCM	FIGURE NUMBER	ITEM NUMBER
M21097-11-3	81349	B- 8	14
M21097-11-3	81349	B- 9	1
M21097-11-3	81349	B-10	19
M21097-4-33	81349	B- 8	17
M21097-4-33	81349	B- 9	5
M21097-4-33	81349	B-10	18
M24308-1-3	81349	B-10	37
M24308-1-5	81349	B-10	33
M24308-3-5	81349	B- 4	7
M3786-13-0086	81349	B-10	51
M3786-13-0128	81349	B-10	50
M3786-13-0217	81349	B-10	49
M3786-13-0591	81349	B-10	27
M39022-01-1674	81349	B- 8	3
M39024-10-02	81349	B-10	38
M39024-10-03	81349	B-10	39
M45938-6-6C	81349	B- 8	38
M45938-6-6C	81349	B- 9	44
M55164-1B37TB4	81349	B- 9	11
M5757-10-039	81349	B- 8	9
M5757-7-001	81349	B- 8	12
NAS1298-06-7	80205	B- 7	1
NAS620C4	80205	B- 8	15
NAS620C4	80205	B- 9	3
NAS620C4	80205	B-10	16
NAS620C8	80205	B- 8	27
NAS662C2R7	80205	B-10	36
PQ31	29440	B- 2	25
PZ19-3	29440	B- 2	24
P26-5-1875	02064	B- 3	6
RCR07G204JS	81349	B- 9	34
RCR07G242JS	81349	B- 9	33
RCR07G512JS	81349	B- 9	28
RCR07G622JS	81349	B- 9	29
RCR20G361JS	81349	B- 9	31
RCR20G511JS	81349	B- 9	32
RER45F1100R	81349	B- 9	22
RNC55K4990FS	81349	B- 9	30
RT10C2L202	81349	B- 9	18
RW69V120	81349	B- 9	36
RW69V121	81349	B- 9	35
SC8-5	29440	B- 2	6
SE089B01	81349	B- 8	39
SE089B01	81349	B- 9	39
ST4	29440	B- 2	35
ST5	29440	B- 2	16
ST6	29440	B- 2	8
S308AB	71785	B-10	8
S6D115A400	15755	B- 7	11
TC92	59730	B- 7	19
ZSP2-2004	98376	B- 6	4
ZSP4-4001-1	98376	B- 6	6
ZSP4-4001-2	19178	B- 6	5
ZSP5-504-65	98376	B- 6	3
ZSP6-037-4	98376	B- 6	1
10352SS1032	06540	B-10	21
11728792	19200	B- 9	20
2201707-00	06401	B- 9	26
2201736-05	06401	B- 1	
2202201-00	06401	B- 1	9
2202202-00	06401	B- 1	1
2202209-00	06401	B- 1	2
2202210-00	06401	B- 2	14
2202211-00	06401	B- 2	9
2202211-51	06401	B- 3	8

PART NUMBER	FSCM	FIGURE NUMBER	ITEM NUMBER
2251720-02	06401	B- 2	37
2277262-00	06401	B-10	3
2277263-00	06401	B-10	5
2277264-00	06401	B- 8	24
2277264-00	06401	B- 9	14
2277265-00	06401	B- 7	16
2277266-00	06401	B- 7	24
2277267-00	06401	B- 7	21
2277268-00	06401	B- 8	35
2277269-00	06401	B- 8	13
2277270-00	06401	B- 8	20
2277270-00	06401	B- 9	8
2277271-00	06401	B- 8	21
2277271-00	06401	B- 9	9
2277279-00	06401	B-11	
2277708-00	06401	B- 1	7
2277708-00	06401	B-11	1
2277777-00	06401	B- 1	5
2277778-00	06401	B- 1	4
2278339-00	06401	B- 8	29
2278340-00	06401	B- 7	3
2278373-18	06401	B- 5	1
2278373-19	06401	B- 2	39
2278403-00	06401	B- 2	38
2278404-00	06401	B- 2	21
2278405-00	06401	B- 2	23
2278408-00	06401	B- 2	40
2278409-00	06401	B- 2	19
2278419-00	06401	B- 2	17
2278553-00	06401	B- 1	6
2278717-00	06401	B- 2	5
2278718-00	06401	B- 2	30
2278719-00	06401	B- 2	18
2278719-01	06401	B- 2	7
2278720-00	06401	B- 3	7
2278898-00	06401	B- 1	3
2278903-01	06401	B- 5	7
2278904-00	06401	B- 7	31
2278905-00	06401	B-10	52
2278906-00	06401	B- 7	29
2278907-00	06401	B- 8	36
2278907-51	06401	B- 8	40
2278908-00	06401	B- 7	30
2278909-00	06401	B- 9	37
2278909-51	06401	B- 9	45
2278915-00	06401	B- 7	4
2278918-00	06401	B-10	4
2279066-00	06401	B- 7	28
2279348-00	06401	B-11	2
2279399-02	06401	B- 5	2
2279685-00	06401	B-11	4
3-5884-94DB4	76883	B- 2	29
4093028-00	90536	B- 1	8
7650330-00	06401	B- 3	5
7650331-00	06401	B- 3	4
8060-165	91506	B- 8	5

REFERENCE DESIGNATOR	FIGURE NUMBER	ITEM NUMBER
A5	8- 1	9
A5A1	8- 8	25
A5A12	8- 7	3
A5A2	8- 7	4
A5B1	8- 8	32
A5CR1	8- 8	6
A5CR10	8- 8	6
A5CR11	8- 9	27
A5CR12	8- 9	27
A5CR13	8- 9	27
A5CR14	8- 9	27
A5CR15	8- 9	27
A5CR16	8-10	28
A5CR17	8- 9	27
A5CR18	8- 9	27
A5CR19	8- 8	6
A5CR2	8- 8	6
A5CR20	8- 8	6
A5CR21	8- 8	6
A5CR22	8- 8	6
A5CR23	8- 9	27
A5CR24	8- 9	27
A5CR25	8- 8	6
A5CR3	8- 9	27
A5CR4	8- 9	27
A5CR5	8- 9	27
A5CR6	8-10	28
A5CR7	8-10	28
A5CR8	8- 8	6
A5CR9	8- 8	6
A5C1	8- 8	3
A5C2	8- 8	3
A5C3	8- 7	15
A5DS1	8-10	23
A5DS10	8-10	23
A5DS11	8-10	23
A5DS12	8-10	23
A5DS13	8-10	23
A5DS14	8-10	23
A5DS15	8-10	23
A5DS16	8-10	23
A5DS17	8-10	23
A5DS18	8-10	23
A5DS19	8-10	23
A5DS2	8-10	23
A5DS20	8-10	23
A5DS3	8-10	23
A5DS4	8-10	23
A5DS5	8-10	23
A5DS6	8-10	23
A5DS7	8-10	23
A5DS8	8-10	23
A5DS9	8-10	23
A5FL1	8- 9	20
A5FL2	8- 9	20
A5F1	8-10	43
A5F2	8-10	43
A5J1	8-10	15
A5J10	8-10	37
A5J11	8-10	38
A5J12	8-10	38
A5J13	8-10	38
A5J14	8-10	38
A5J15	8-10	31
A5J16	8-10	39

REFERENCE DESIGNATOR	FIGURE NUMBER	ITEM NUMBER
A5J18	8-10	39
A5J19	8-10	39
A5J2	8-10	14
A5J3	8-10	12
A5J4	8-10	8
A5J5	8-10	33
A5J6	8-10	18
A5J7	8-10	18
A5J8	8-10	18
A5J9	8-10	18
A5K1	8- 8	9
A5K10	8- 8	9
A5K2	8- 8	9
A5K3	8- 8	9
A5K4	8- 8	12
A5K5	8- 8	9
A5K6	8- 8	9
A5K7	8- 8	9
A5K8	8- 8	9
A5K9	8- 8	9
A5M1	8-10	4
A5PS1	8- 7	10
A5PS2	8- 7	11
A5Q1	8- 8	4
A5Q2	8- 8	4
A5Q3	8- 8	4
A5Q4	8- 8	4
A5Q5	8- 8	4
A5Q6	8- 8	4
A5Q7	8- 8	4
A5Q8	8- 8	4
A5R1	8- 9	30
A5R10	8- 9	18
A5R11	8- 9	18
A5R12	8- 9	18
A5R13	8- 9	22
A5R14	8- 9	28
A5R15	8- 9	28
A5R16	8- 9	33
A5R17	8- 9	29
A5R2	8- 9	30
A5R20	8- 9	34
A5R21	8- 9	34
A5R22	8- 9	34
A5R23	8- 9	35
A5R24	8- 9	35
A5R25	8- 9	36
A5R26	8- 9	36
A5R27	8- 9	34
A5R3	8- 9	30
A5R4	8- 9	30
A5R5	8- 9	32
A5R6	8- 9	31
A5R7	8- 9	18
A5R8	8- 9	18
A5R9	8- 9	18
A5S1	8-10	46
A5S10	8-10	29
A5S11	8-10	29
A5S2	8-10	50
A5S3	8-10	48
A5S4	8-10	27
A5S5	8-10	50
A5S6	8-10	50
A5S7	8-10	49

REFERENCE DESIGNATOR	FIGURE NUMBER	ITEM NUMBER
A5S8	8-10	48
A5TB1	8- 9	11
A5T1	8- 8	29
A5T2	8- 9	26
A5T3	8- 9	26
A5XA1	8- 8	17
A5XA2	8- 9	5
A5XDS1	8-10	24
A5XDS10	8-10	24
A5XDS11	8-10	24
A5XDS12	8-10	24
A5XDS13	8-10	24
A5XDS14	8-10	24
A5XDS15	8-10	24
A5XDS16	8-10	24
A5XDS17	8-10	24
A5XDS18	8-10	24
A5XDS19	8-10	24
A5XDS2	8-10	24
A5XDS20	8-10	24

REFERENCE DESIGNATOR	FIGURE NUMBER	ITEM NUMBER
A5XDS3	8-10	24
A5XDS4	8-10	24
A5XDS5	8-10	24
A5XDS6	8-10	24
A5XDS7	8-10	24
A5XDS8	8-10	24
A5XDS9	8-10	24
A5XF1	8-10	44
A5XF2	8-10	44
W2	8- 1	2
W2P1	8- 4	8
W2P2	8- 4	9
W2P3	8- 4	5
W2P4	8- 4	6
W2P5	8- 4	7
W2P6	8- 4	3
W3	8- 1	5
W4	8- 1	4
W5	8- 1	3

APPENDIX C

MAINTENANCE ALLOCATION CHART (MAC)

Section I. INTRODUCTION

C-1. General.

This Maintenance Allocation Chart designates overall responsibility for the performance of maintenance functions for the fire control subsystem test set. The implementation of field maintenance tasks upon this test set will be consistent with the assigned maintenance operations.

C-2. Maintenance FunctionsC

Maintenance functions will be limited to and defined as follows:

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 end item in proper operating condition, i.e., to clean, to preserve, to drain, to paint, or 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 test measuring and diagnostic equipments 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) in a manner to allow the proper functioning of an equipment/system.

i. Repair. The application of maintenance services (input, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, disassembly, module/component/assembly end item or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., DMWR) in pertinent 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 material 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.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Format.

Purpose and use of the format are as follows.

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. Functional Group. Column 2, lists the next higher assembly group and the item names of components, assemblies, subassemblies, and modules within the group for which maintenance is authorized.

c. Column 3. Maintenance Functions. Column 3, lists the twelve maintenance functions defined in C-2 above. Each maintenance function required for an item shall be specified by the symbol among those listed in *d* below which indicates the level responsible for the required maintenance. Under this symbol there shall be listed an appropriate work measurement time value determined as indicated in *e* below.

d. Use of Symbols. The following symbols will be used:

C - Operator/crew
O - Organizational
F - Direct support (intermediate)
H - General support
D - Depot

e. Work Measurement Time. The active repair time required to perform the maintenance function will be included directly below the symbol identifying the category of maintenance. The manpower figures will be developed under conditions (real or simulated) corresponding to those that would be considered normal for TOE units operating in the field. The skill levels used to obtain the measurement times will approximate those found in typical TOE units. Active repair time specified is the average aggregate time to restore an item (subassembly, assembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, fault isolation/diagnostic time, and quality assurance/quality control time in addition to the time required to perform specific maintenance functions identified for the tasks authorized in the maintenance allocation chart. This time may be the established time standard developed through maintenance engineering analysis, or can be derived from the calculation of a statistically weighted time estimate incorporating the optimistic (a), most likely (m), and pessimistic (b) estimated for the work to be accomplished using the formula:

$$t = \frac{a+4m+b}{6}$$

This time will be expressed in man-hours and carried to one decimal place (tenths of hours).

f. Column 4. Tools and Equipment. This column will be used to specify, by code, those tools and test equipment required to perform the designated function. A table of tool, test, and support equipment required by the level to perform the maintenance functions is contained in section III.

g. Column 5. Remarks. A table of remarks is contained in section IV.

Section II. MAINTENANCE ASSIGNMENT

Nomenclature of End Item or Component: Test Set, Fire Control Subsystem: AN/GSM-249

(1) Group number	(2) Functional group Component assembly nomenclature	(3) Maintenance function										(4) Tools and equipment	(5) Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	
2276	Fire control subsystem test set AN/GSM-249	F 0.1	F 0.1	F 0.1			F 0.5		F 0.1	F 0.3			1,2,3,4	A,C
2276.1	Linkage orientation device	F 0.1		F 0.1		F 0.3			F 0.1	F 0.2			1,6,7,8	
2276.2	Cable assembly (4)	F 0.1	F 0.2	F 0.1					F 0.1	D 0.4			1,3	F
2276.3	Test set subassembly	F 0.1	F 0.1	F 0.1			F 0.5			F 0.4			1,2,3,4	A,E
2276.31	Test set container	F 0.1		F 0.1						F 0.3			1	
2276.32	Test set chassis subassembly	F 0.1	F 0.3	F 0.1						F 0.4			1,2,3,4	B
2276.321	Front bracket assembly	F 0.1	F 0.3	F 0.1	F 0.3					F 0.4			1,2,3	B,D
2276.322	Rear bracket assembly	F 0.1	F 0.3	F 0.1	F 0.3					D 0.4			1,2,3	B,G
2276.323	Top panel assembly	F 0.1	F 0.3	F 0.1						F 0.3			1,2,3	B,C

Section II. MAINTENANCE ASSIGNMENT – Continued

Nomenclature of End Item or Component: Test Set, Fire Control Subsystem: AN/GSM-249

(1) Group number	(2) Functional group Component assembly nomenclature	(3) Maintenance function											(4) Tools and equipment	(5) Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
2276.3231	Multimeter assembly	F 0.1	F 0.3	F 0.1	F 0.1		F 0.4		D 0.3	D 0.5			1,3	E,H
2276.324	Circuit card assembly (2)	F 0.1	F 0.3	F 0.1					F 0.2	D 0.5			1,2,3,4,5	B,C
2276.4	Helmet boresight tool assembly	F 0.1		F 0.1					F 0.1				9	I
2276.5	Shorting assembly	F 0.1	F 0.1	F 0.1					F 0.1				3	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Nomenclature of End Item or Component: Test Set, Fire Control Subsystem: AN/GSM-249

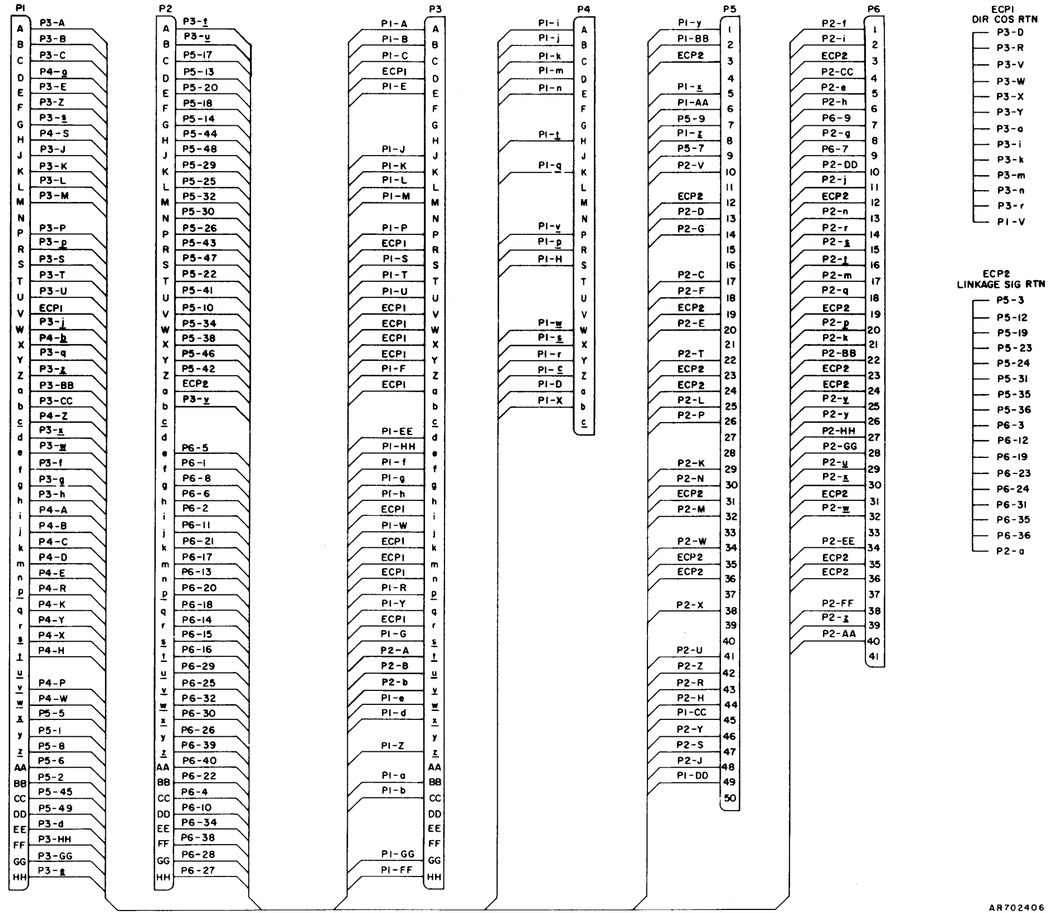
Tool or test equipment reference code	Maintenance category	Nomenclature	NSN	Tool number
1	F	Tool Set, Aircraft Armament Repairman; (Basic and Supplemental)	4933-00-987-9816 (B) 4933-00-994-9242 (S)	
2	F	Oscilloscope, Dual Channel AN/USM-281	6625-00-228-2201	
3	F	Multimeter, TS-352 B/U or Equivalent	6625-00-553-0142	
4	F	Circuit Board Extractor		P/N 4093028-00
5	D	Console, Electronics, Assembly and Subassembly Test		P/N 2279034-01
6	F	Helmet Boresight Tool		2277708-00
7	F	Borescope	4933-00-867-6607	
8	F	Boresight Adapter Assembly	4933-00-930-8951	
9	F	Linkage Orientation Device		2278336-00

Section IV. REMARKS

Nomenclature of End Item or Component: Test Set, Fire Control Subsystem: AN/GSM-249

Ref code	Remarks
A	Test refers to the self-test check of the test set.
B	Test refers to the static or dynamic checkout of the component or assembly.
C	Repair of the circuit card assemblies will be accomplished at depot level only, supported by DMWR 9-4931-363.
D	Test resolver is preset and may require adjustment.
E	Calibration of the test set will be performed by the mobile calibration transfer team at a 6-month interval.
F	Test cable W2 is the only cable authorized for repair.
G	Variable resistors R7 through R12 may require adjustment during self-test procedure.
H	Repair of the multimeter assembly will be accomplished at the manufacturer's facility.
I	Accuracy of the helmet boresight tool will be verified by the procedure in Chapter 4, Section III.

ALPHABETICAL INDEX



Foldout FO-1. Test cable W2 - schematic diagram

LOCATION TABLE

REF DES	ZONE LOCATION PG. LT. NO.	REF DES	ZONE LOCATION PG. LT NO.	REF DES	ZONE LOCATION PG. LT. NO.	REF DES	ZONE LOCATION PG. LT. NO.
J1	2 D 8	K3	2 C 5	CR13	6 D 7	R14	7 C 7
J2	5 D 8	K4	4 C 7	CR14	6 C 7	R15	7 C 7
J3	4 B 5	K5	2 B 5	CR15	6 C 3	R16	4 A 6
J4	2 A 8	K6	3 C 7	CR16	6 C 6	R17	7 B 6
J5	3 C 8	K7	2 B 6	CR17	6 B 7	R18	5 B 3
J6	7 B 8	K8	7 B 6	CR18	6 A 7	R19	5 C 3
J7	7 D 8	K9	7 B 3	CR19	7 B 3	R20	4 C 3
J8	6 D 8	K10	7 B 3	CR20	7 B 6	R21	4 C 3
J9	6 B 8	Q1	7 C 7	CR21	2 B 5	R22	4 C 3
J10	5 B 7	Q2	6 B 7	CR22	2 B 6	R23	6 B 1
J11	4 C 1	Q3	6 B 7	CR23	4 C 7	R24	6 B 1
J12	4 B 3	Q4	6 A 7	CR24	2 B 7	R25	5 B 4
J13	4 C 4	Q5	6 A 7	CR25	7 B 3	R26	5 B 4
J14	4 D 5	Q6	7 D 7	TBI	5 B 3	DS1	7 D 6
J15	3 C 1	Q7	7 D 7	PSI	4 B 3	DS2	7 D 6
J16	5 B 2	MI	5 B 2	PS2	4 A 2	DS3	7 D 6
J17	5 B 2	ARI	3 D 7	C1	4 B 3	DS4	7 D 6
J18	4 C 1	B1	5 D 3	C2	4 A 2	DS5	7 D 6
J19	4 B 3	T1	7 B 4	FL1	4 B 3	DS6	7 C 6
XA12	7 C 2	T2	4 C 5	FL2	4 B 3	DS7	5 A 3
XA2	5 C 1	T3	5 C 2	R1	4 D 5	DS8	7 C 5
S1	4 B 4	CR1	2 C 5	R2	4 D 5	DS9	7 C 5
S2	4 B 7	CR2	2 C 5	R3	4 D 5	DS10	7 C 5
S3	5 D 6	CR3	2 C 6	R4	4 D 5	DS11	7 C 5
S4	2 C 4	CR4	2 C 5	R5	4 C 5	DS12	7 C 5
S5	4 C 2	CR5	2 C 5	R6	4 C 5	DS13	7 C 5
S6	2 D 4	CR6	2 C 5	R7	4 D 5	DS14	2 C 7
S7	3 D 5	CR7	2 B 4	R8	4 D 5	DS15	2 C 6
S8	6 D 5	CR8	2 A 6	R9	4 C 5	DS16	2 C 6
S9	4 C 3	CR9	4 C 7	R10	4 C 5	DS17	2 C 6
S10	2 A 5	CR10	3 C 7	R11	4 C 5	DS18	4 A 3
S11	2 B 5	CR11	6 D 7	R12	4 C 5	DS19	5 A 3
K1	2 C 5	CR12	6 D 7	R13	2 B 6	DS20	5 A 3
K2	2 A 6			R27	5 A 1		
				C3	4 B 3		

NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. WHEN IDENTIFYING COMPONENTS PREFIX THE COMPONENT DESIGNATION WITH THE UNIT DESIGNATION. THE UNIT DESIGNATION FOR THIS DRAWING IS A5.
2. ALL DIODES ARE IN5617 UNLESS SPECIFIED OTHERWISE.
3. ALL VALUES ARE EXPRESSED IN HENRIES, OHMS, OR MICROFARADS UNLESS OTHERWISE SPECIFIED.
4. AC VOLTAGES FROM THE DIVIDER NETWORK ARE AS FOLLOWS ±.2 VRMS:
   - R7 – .515XV1
   - R8 – .863XV2
   - R9 – .933XV1
   - R10 – .532XV2
   - R11 – .616XV1
   - R12 – .250XV1
5. RESISTORS R18 (RT-2) AND R19 (RT-1) ARE TRIMMING RESISTORS SUPPLIED WITH THE RESOLVER.
6. CR6 AND CR7 ARE MOUNTED ON S4, AND CR16 IS MOUNTED ON S8.
7. THE VOLTAGES AND TOLERANCES OF V1,V2,V3, AND V4 ARE AS FOLLOWS:
   - V1 – 10.6 ± .6 VRMS
   - V2 – 10.6 ± .6 VRMS
   - V3 – 5.3 ± .3 VRMS
   - V4 – 5.3 ± .3 VRMS

ECP TABLE

SYSTEM GROUND ECP1		SIGNAL RTN ECP2	LINKAGE RTN SIGNAL ECP3	400HZ 115 VAC ECP4	+28 VDC ECP5	115V RTN ECP6	28VDC RTN ECP7	VAC 0° (V1) ECP8	VAC 180° (V2) ECP9	VAC 0° (V3) ECP10	VAC 180° (V4) ECP11
S4-K-W1	K5-5	J1-V	AR1-1	K1-2	DS1-2-DS13-2	J1-K	K6-3	J13	T2-4	K6-4	E27(R3)
J1-Y	E53(R16)	J1-Z	AR1-5	S4-C-W1	K1-5	T1-2	J1-M	K6-1	S4-E-W1	E28(R1)	E27(R4)
J6-36	E54(R20)	S4-K-3	AR1-7	S1-7	PS1-3(+)	T2-7	J4-8	S3-L-2	S3-L-3	E28(R2)	S4-G-W1
J7-20	E56(R22)		AR1-9	S1-9	S10-1	ECP1	K1-X2-K10-X2	XA12-12	XA12-14	S3-L-4	S3-L-5
J7-41	E55(R21)		AR1-13		S11-1	PS2-3	K2-2	XA2-34	E7(R4,R6,	S4-F-W1	
E66 (R27)	J3-C		AR1-15		DS19-2	T3-7	K6-6	S4-D-W1	R8, R10)		
J8-4	E50(R5)		J5-3		DS20-2	E89 (C2)	DS18-2	T2-1			
J9-41	E49(R6)		J5-12		S7-F-8		PS1-4(-)	E8(R1,R5,R7,			
J10-2	K8-1		J5-19		K7-5		K3-2	R9, R11, R12)			
J10-9	ECP6		J5-23		S3-J-W1		Q4-E				
J10-12	S8-B-W1		J5-24		S4-A-W1		Q6-E				
J10-13	S8-K-W1		J5-31		DS18-1		Q7-E				
J17	E75(B1-R1)		J5-35		C3+		Q1-E				
J18	E75(B1-S7,S8)		J5-36				ECP1				
J19	T2-2		S4-K-5				Q5-E				
J15-41	T2-3		J15-3				Q2-E				
FL1-3	ECP7		J15-12				Q3-E				
FL2-3	K8-4		J15-19				E81(R23)				
AR1-12	XA2-39		J15-23				E83(R24)				
TB1-4(M1-RET)	XA12-36		J15-24				J8-12				
E47(R2,R3,R5,	E85(R25)		J15-31				FL1-1				
	E87(R26)		J15-35				C3-				

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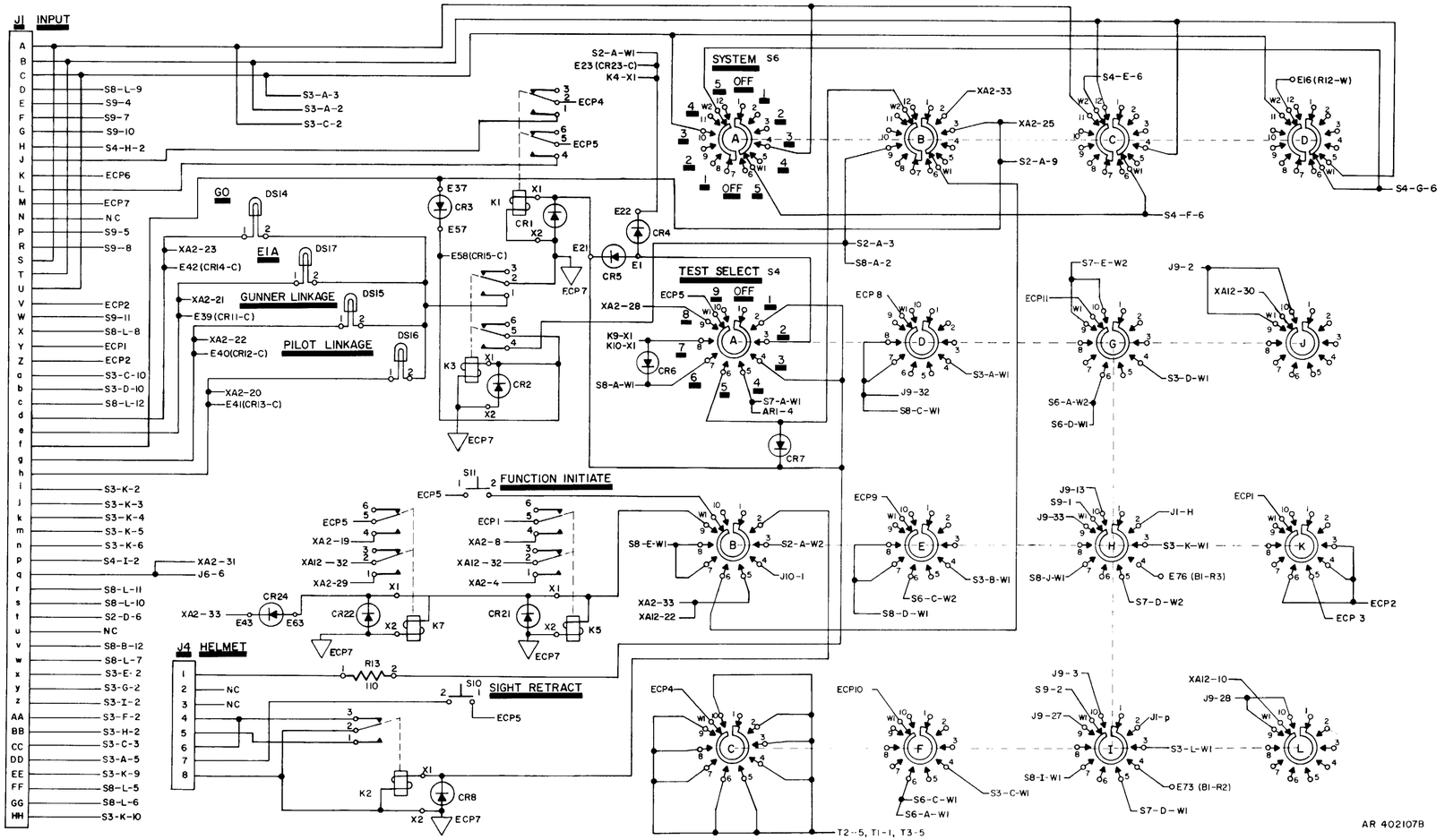
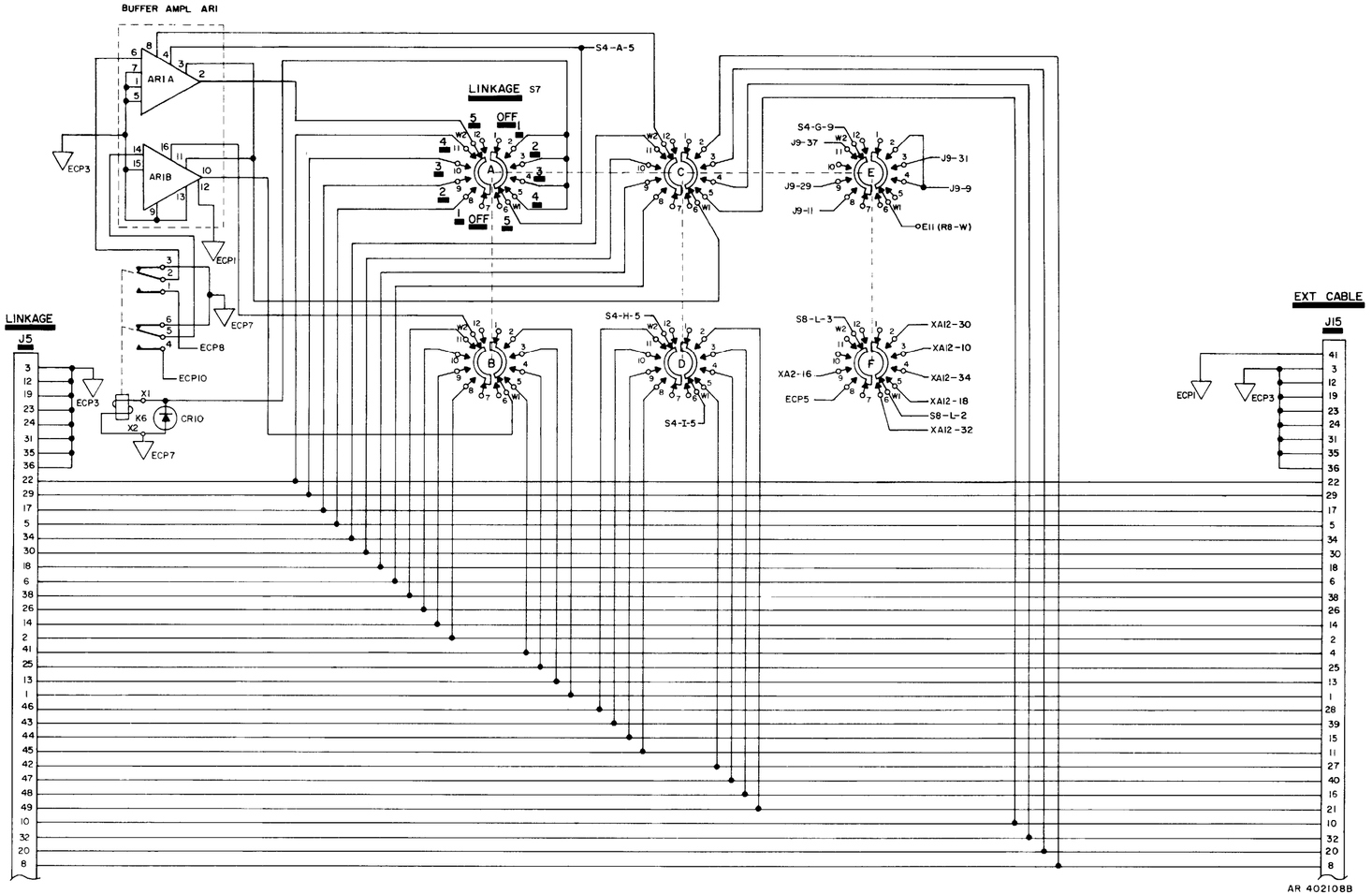
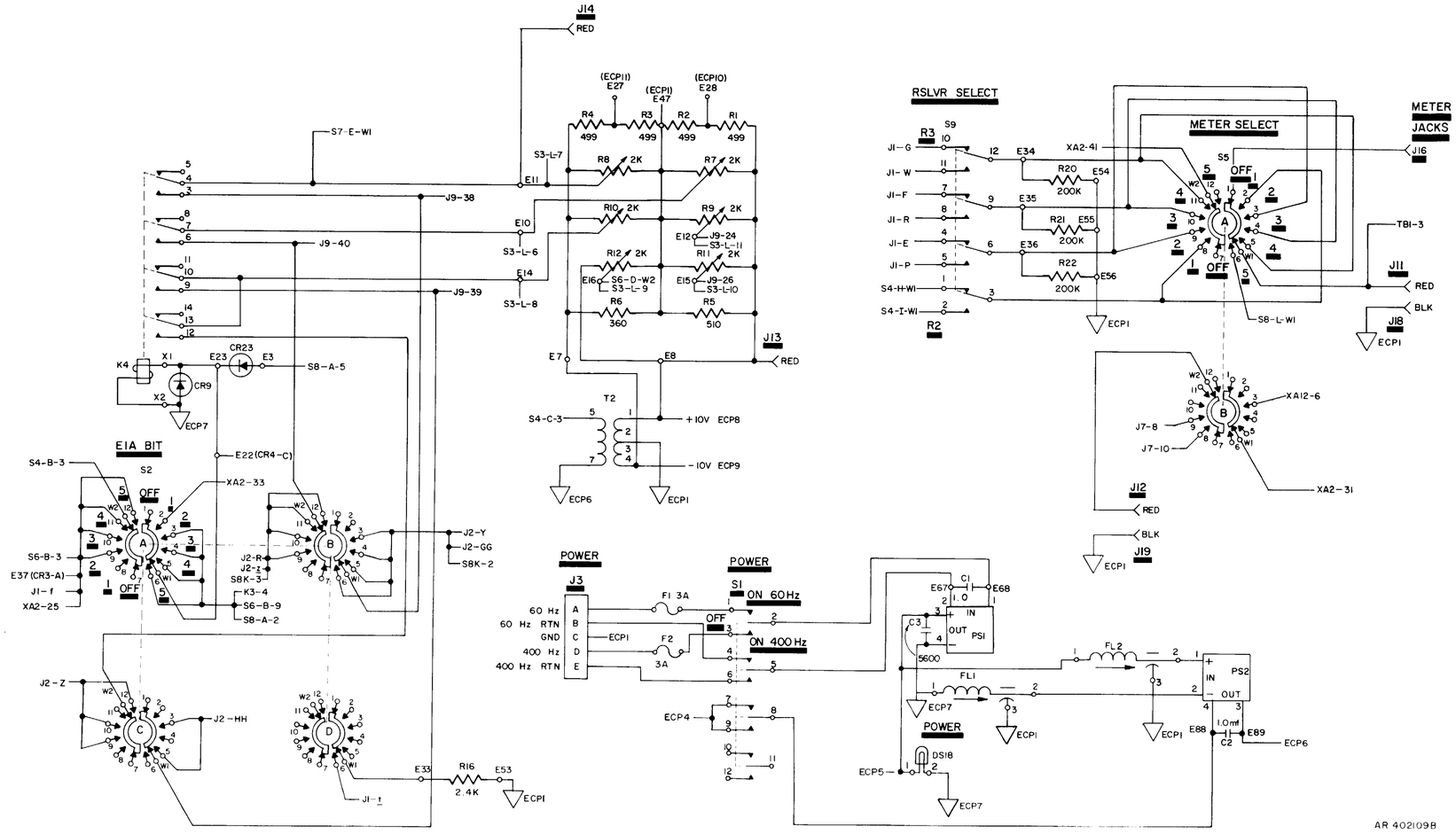
Foldout FO-2. Test set – schematic diagram (sheet 1 of 7)



Foldout FO-2. Test set - schematic diagram (sheet 2 of 7)

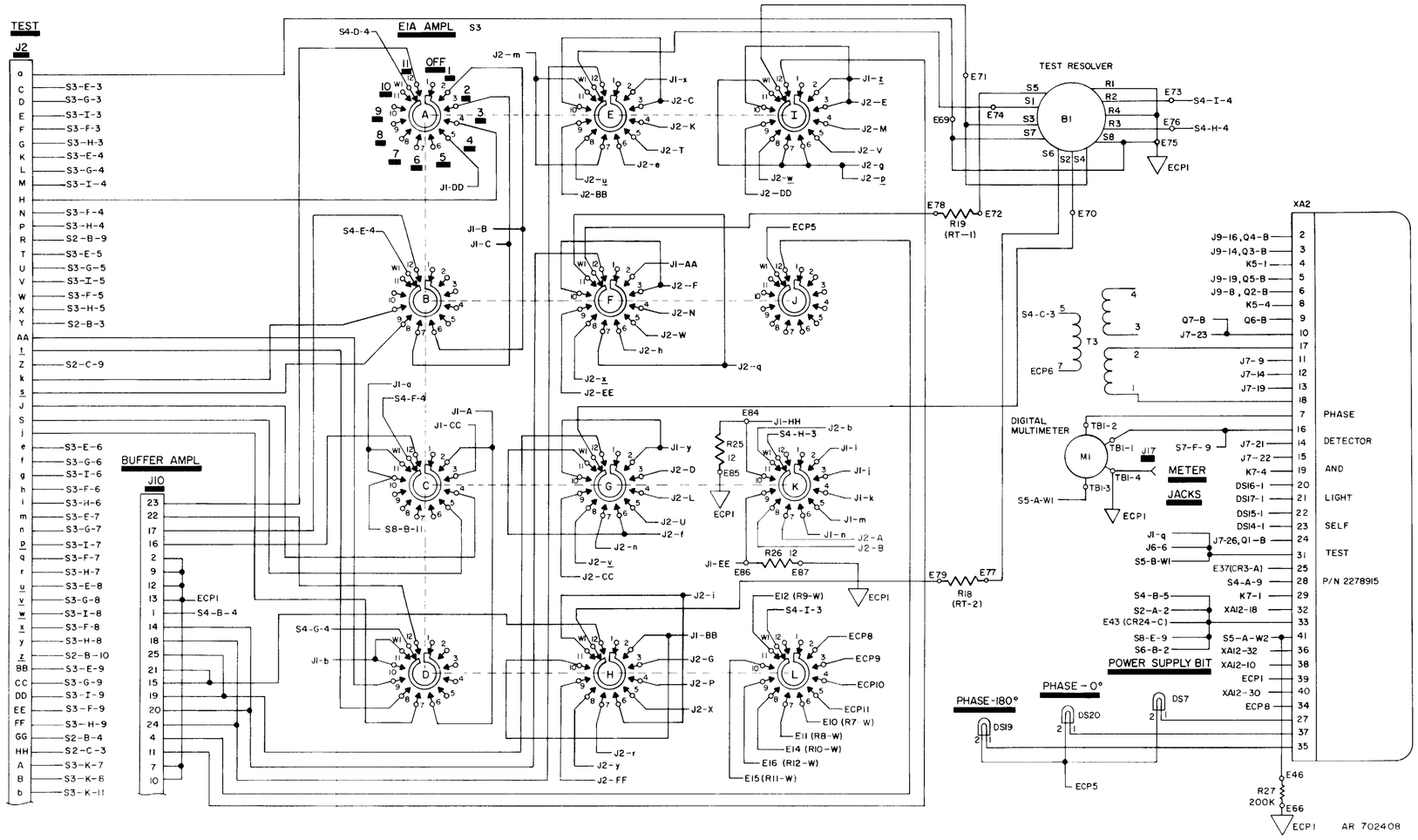


Foldout FO-2. Test set - schematic diagram (sheet 3 of 7)

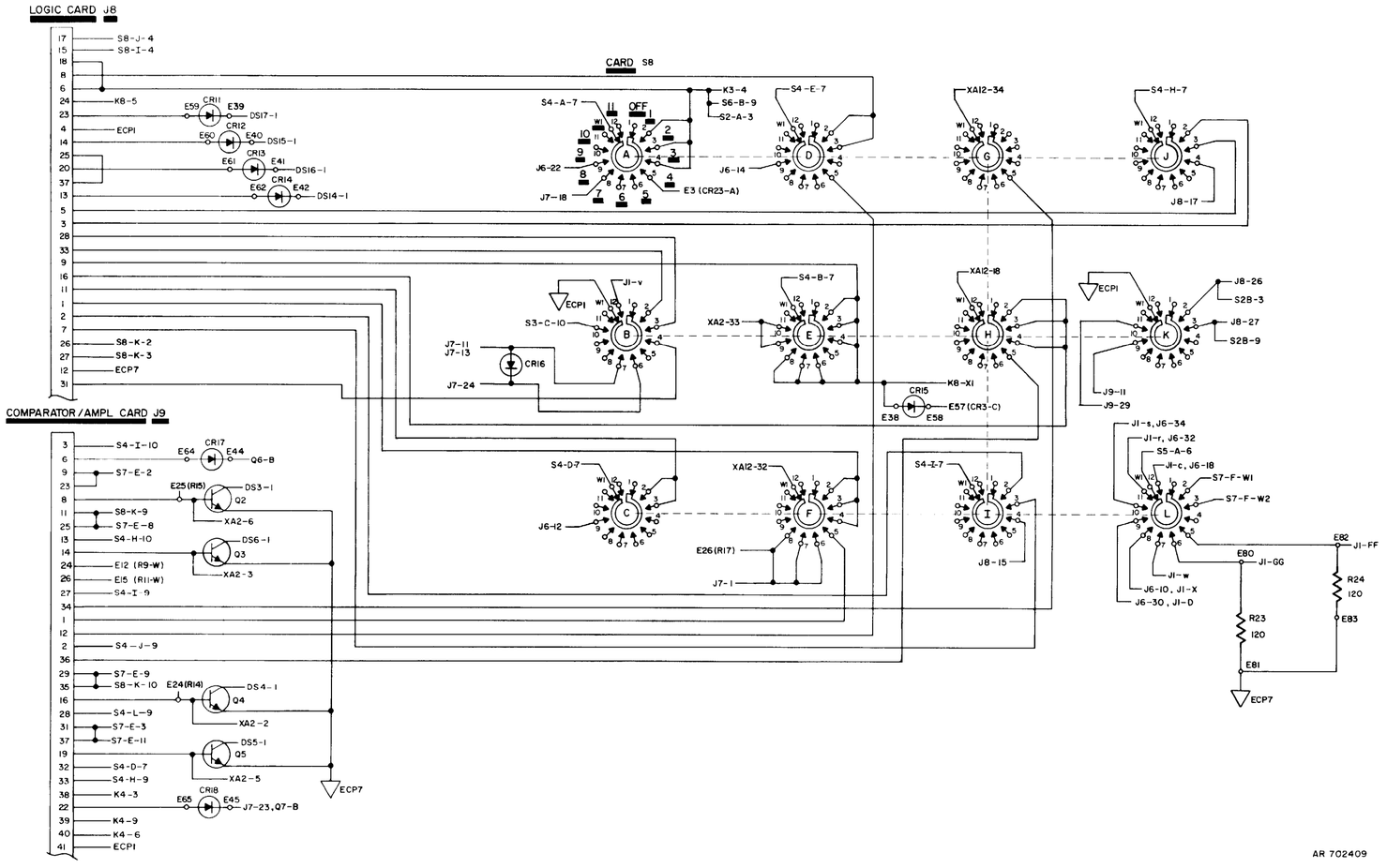


AR 402109B

Foldout FO-2. Test set - schematic diagram (sheet 4 of 7)

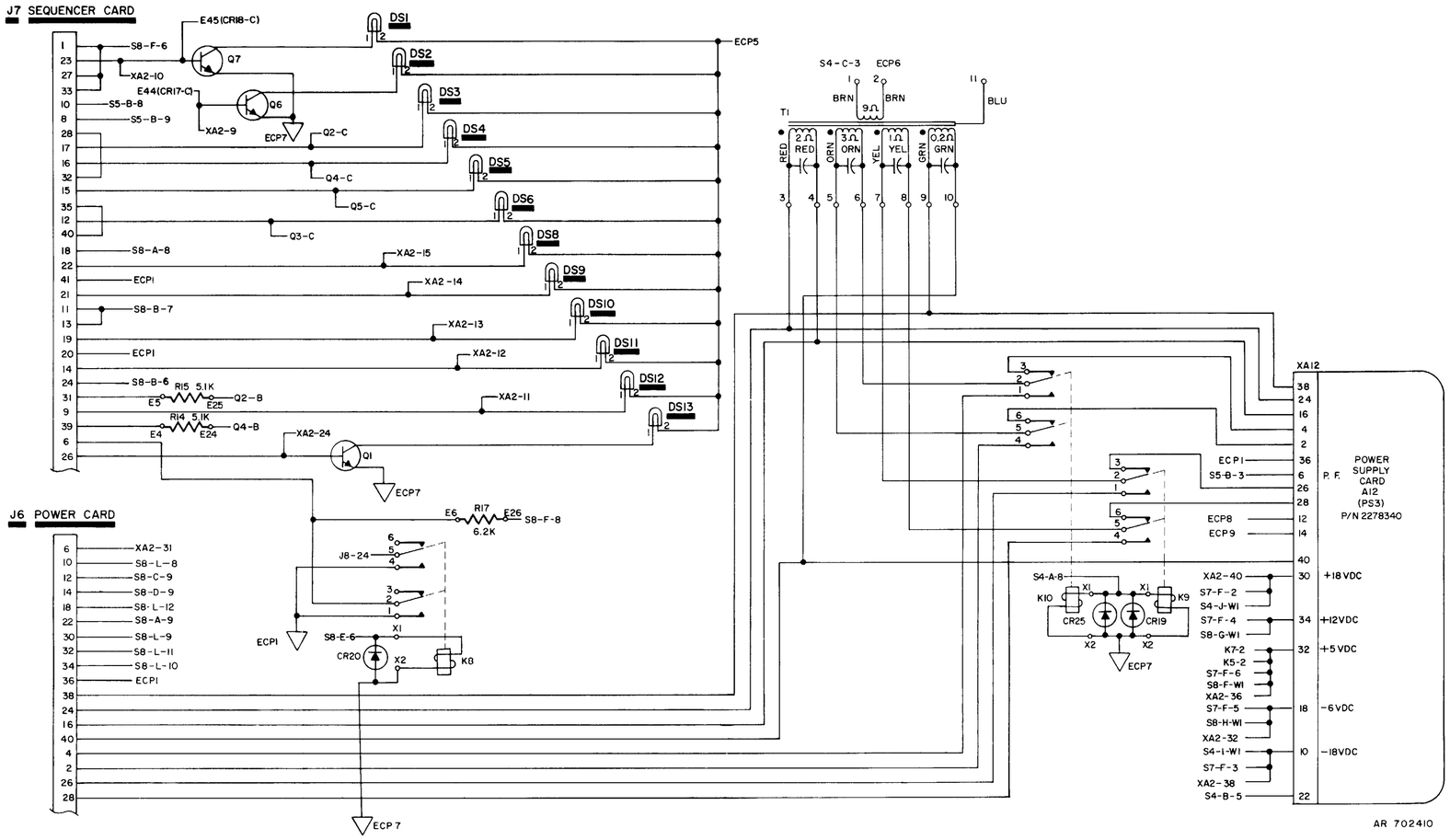


Foldout FO-2. Test set - schematic diagram (sheet 5 of 7)

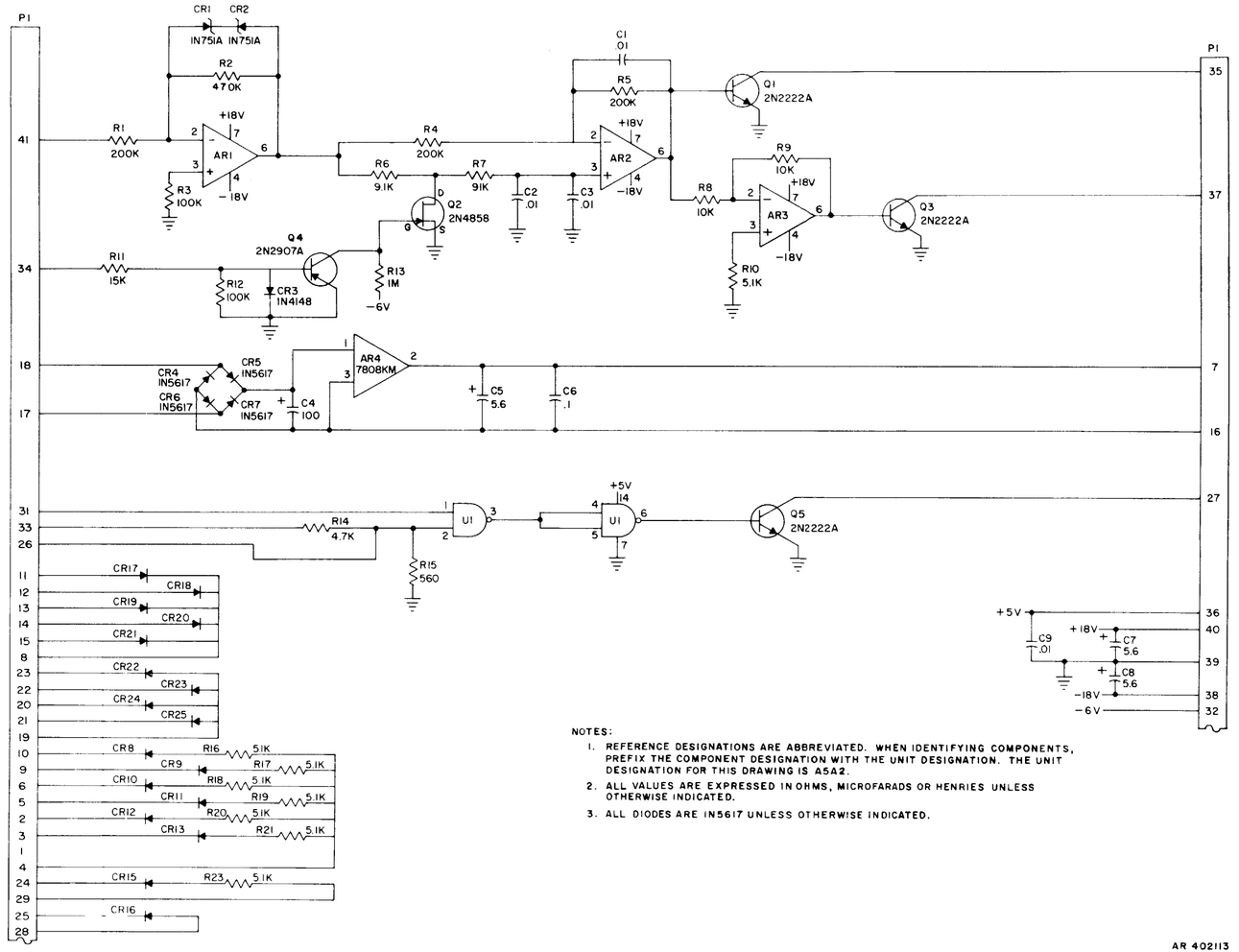


AR 702409

Foldout FO-2. Test set - schematic diagram (sheet 6 of 7)



Foldout FO-2. Test set - schematic diagram (sheet 7 of 7)

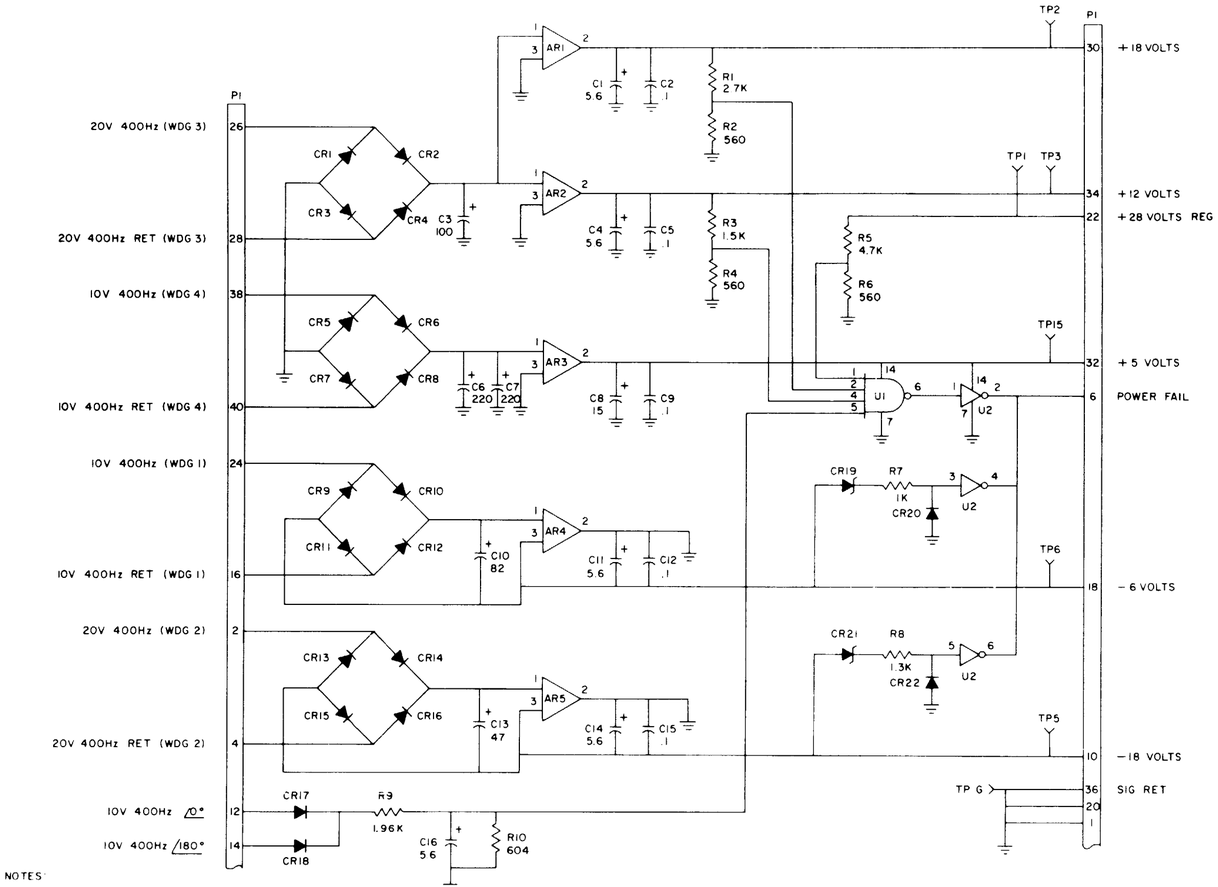


NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. WHEN IDENTIFYING COMPONENTS, PREFIX THE COMPONENT DESIGNATION WITH THE UNIT DESIGNATION. THE UNIT DESIGNATION FOR THIS DRAWING IS A5A2.
2. ALL VALUES ARE EXPRESSED IN OHMS, MICROFARADS OR HENRIES UNLESS OTHERWISE INDICATED.
3. ALL DIODES ARE IN5617 UNLESS OTHERWISE INDICATED.

AR 402113

Foldout FO-3. Phase detector and light self-test card A2 - schematic diagram



NOTES:

1. REFERENCE DESIGNATIONS ARE ABBREVIATED. WHEN IDENTIFYING COMPONENTS, PREFIX THE COMPONENT DESIGNATION WITH THE UNIT DESIGNATION. THE UNIT DESIGNATION FOR THIS DRAWING IS A5A12.
2. ALL VALUES ARE EXPRESSED IN OHMS, MICROFARADS OR HENRIES UNLESS OTHERWISE INDICATED.

AR 702411

Foldout FO-4. Power supply circuit card A12 (PS3) - schematic diagram

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-4931-363-14&P	11 May 1981	Fire Control Subsystem Test Set, AN/GSM-249, P/N 2201736-05, NSN 4931-00-121-8707

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
B-19		B-7	

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

Item 24 (Side Panel) listed on page B-19, is not shown in the illustration on page B-18.

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Chief of Staff

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J. C. PENNINGTON
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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
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 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
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 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

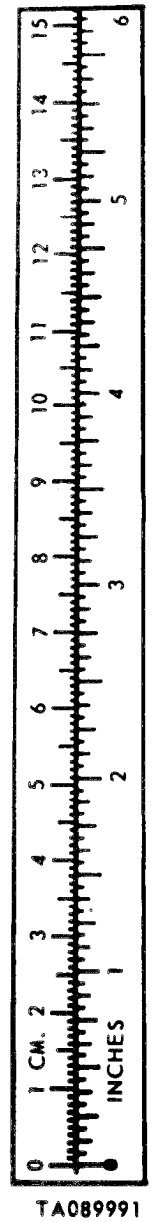
TEMPERATURE

$5/9\ (^0F - 32) = {}^0C$
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
$9/5\ C^0 + 32 = F^0$

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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