TM 9-1425-481-34

TECHNICAL MANUAL

DS AND GS MAINTENANCE MANUAL

UNITS OF DRAGON SYSTEM

TESTED AND REPAIRED BY LCSS

(LAND COMBAT SUPPORT SYSTEM)

This copy is a reprint which includes current pages from Changes 1 through 9.

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DS, AND GS MAINTENANCE MANUAUL:
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By Order of the Secretary of the Army:

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

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
04597

TM 9-1425-481-34, 13 December 1974, is changed as follows:

1. The pages affected by this change, appearing in the following listing, are to be inserted in the manual immediately. Changed material on new pages is indicated by a vertical bar in the page margin. Significantly changed or completely new paragraphs are indicated by a vertical bar by the paragraph number and title-only. Revised illustrations &e indicated by a letter suffix adjacent to the identification number.

Remove pages	Insert pages
8-11 thru 6-14	6-11 thru 6-14

2. File this transmittal sheet in the front of the manual for reference purposes.

Distribution:

To be distributed in accordance with DA Form 12-32-E, Block 2109, requirements for TM 9-1425-481-34.

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Change)
)
No. 10)

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *23 March 1990*

DS and GS Maintenance Manual:
UNITS OF DRAGON SYSTEM
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Remove pages	*Insert pages*
2-5, 2-6	2-5, 2-6
2-21, 2-22	2-21, 2-22
3-19, 3-20	3-19, 3-20
3-21, 3-22	3-21, 3-22
3-22.1, 3-22.2	None
4-3 thru 4-8	4-3 thru 4-8
4-13, 4-14	4-13, 4-14
9-1, 9-2	9-1, 9-2
10-1, 10-2	10-1, 10-2

2. File this transmittal sheet in the front of the manual for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-32, Direct Support and General Support Maintenance requirements for the Land Combat Support System.

PIN: 009730-010

WARNING

TOXIC AND FLAMMABLE MATERIALS

Cleaning compounds, alcohol, paints, primer, and solvents which are toxic, flammable, or irritating to the skin must be used with extreme care. Avoid prolonged or repeated breathing of the toxic vapor. Keep flammable materials away from heat and open flames. Use both types only in a well-ventilated area. Whenever possible, solvent cleaning should be conducted in the preclean area of the AN/TSM-94 shelter with the ventilator fan running. The known toxic and flammable materials used in this manual are listed below.

Name	Remarks
Isopropyl Alcohol (item 7, App. D)	F, T
MEK (item 17, App. D)	F, T
Adhesive (item 4, App. D)	F
Sealing Compound (item 11, App. D)	F
Sealing Compound (item 12, App. D)	F, T
Adhesive (item 3, App. D)	F, T

Other materials used in this TM may be flammable, toxic, or irritating to the skin. Always read container labels and instructions.

"F" indicates flammable, and "T" indicates toxic.

WARNING

SAFE MEASURES FOR HANDLING HIGH-PRESSURE

Personnel who handle the nitrogen purging high-pressure air hoses and compounds shall be thoroughly trained in the use and maintenance of the equipment, and in the application of safety measures to protect againat existing hazards.

Inspect the nitrogen purging system before, during, and after use for leaks, defective air hoses, improperly adjusted valves, malfunctioning regulators and relief valves, and the presence of foreign materials in the system.

Clear all air hoses and valves at regular intervals. Release pressure through bleeder valve before disconnecting any lines or hoses or making any repairs.

When pressurizing a UUT, pcrsonncl operating the nitrogen purging valves shall stand clear of hose connections, and shall turn the valves slowly to prevent shock loading or pressure surges which may damage hoses or components. Close valves manually to prevent overtightening; never tighten with a wrench or tool.

Observe the following precautions pertaining to high-pressure air hoses:

a. The minimum bending radius for flexible air hoses shall be: 4 inches for 1/4 inch ID hose; 6 inches for 3/8 inch ID hose; 7 inches for 1/2 inch ID hose; 9-1/4 inches for 3/4 inch ID hose,

b. Never coat or paint an air hose, because this impairs the normal breathing tendency of the air hose.

c. Depressurize and protect air hoses from the sun when not in use.

d. Do not kink, twist, strike, walk on, run over, jerk, or otherwise abuse air hoses.

Eye protection must be worn during operations where there is a possibility of pressurized nitrogen striking the face.

WARNING

RADIATION

Direct visual exposure to high energy infrared beams may result in permanent injury to eyesight. Ultraviolet (UV) radiation may cause severe burns. The possibility of shattering radiation source envelopes, rcsulting in high velocity propelled envelope material, requires visual and facial protection when working with optical transmitter assemblies and the teat source.

WARNING

DANGEROUS VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there isa another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power haa been turned off, always ground every part before touching it.

Units tested in accordance with this manual contain a maximum voltage of 190 VAC and 69 VDC.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING

Do not be misled by the term “low voltage”. Potentials as low as 50 volts may cause death under adverse conditions. For artificial respiration, refer to FM21-11.

Technical Manual
No. 9-1425-481-34

DS AND GS MAINTENANCE MANUAL:
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HEADQUARTERS,
DEPARTMENT OF THE ARMY
Washington, D.C., 13 December 1974

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

If you find mistakes or if you know of a way to improve this publication, please let us know along with your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, U.S. Army Missile Command, ATTN: AMSMI-LC-ME-PMC, Redstone Arsenal, AL. 35898-5238. A reply will be furnished directly to you.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. The instructions in this manual are published for the guidance of personnel responsible for the maintenance of DRAGON assemblies tested at the Land Combat Support System (LCSS). These assemblies or units are also referred to as units under test (UUT's).

b. These instructions are intended for maintenance specialists who are thoroughly trained in maintenance practices and LCSS test equipment, but are not necessarily familiar with the DRAGON Missile System or the UUT'S.

1-2. Forms, Records, and Reports

Refer to DA PAM 738-750 for instructions on the use and completion of all forms, records, and reports on equipment maintenance.

1-3. Related Publications

a. This manual is one of a series of technical manuals covering the LCSS. The complete library of publications on LCSS is contained in TM 9-1425-550-L.

b. Description, operation, and maintenance of LCSS are covered in TM 9-4935-552-14/1 and TM 9-4935-552-14/2.

c. For an index of Units Under Test (UUTS) tested on LCSS, refer to TM 9-1425-550-10.

d. For a list of repair parts, consult the following:

Tracker	TM 9-1425-480-24P
Monitoring set	TM 9-6920-480-24P-1
Tracker test set	TM 9-4935-480-24P

Section II. TEST PROCEDURES

1-4. General

a. Each UUT requires an individual test procedure which uses a program memory card (PMC) and a communication patching switchboard (patchboard) provided especially for that particular UUT. The PMC provides an individual teat program designed for each UUT tested automatically. Procedures for PMC installation and removal are provided in TM 9-4935-552-14/l.

b. While each UUT test is different, a general pattern of testing applies to all units. This pattern consists of a system survey test, UUT static tests, UUT dynamic tests, and fault isolation tests.

1-5. Preparation for Tests

This portion of the procedure provides the technician with information required to ready the equipment for testing a UUT. The test station is programmed. Manual steps are performed.

1-6. Acceptance Tests

a. To determine if the UUT is operating properly, step by-step tests are made automatically as a program library memory assembly (PLMA) programs the test equipment to examine each circuit of the UUT. Steps are performed sequentially. The technician must be alert for obvious faults.

b. When a step fails and a manual operation is required, automatic programming by the PLMA 1Al5 is interrupted. A message is displayed on the solid state visual display (SSVD) lA1 instructing technician for a manual procedure. The SSVD display message may refer to a TM step (REF TM). Measurement indications are shown on test results display 1A10.

c. When a malfunction is indicated, repairs must be made before continuing the tests. After a component or sub-unit is replaced or other repairs are made, the test program must be rerun from the beginning.

d. Restore the UUT to service only after it has success fully completed a test-program GO-chain.

1-7. Tracker Subassemblies

a. Tracker subassemblies listed below are verified using the tracker test set and procedures in TM 9-4935-484-14.

(1) Firing mechanism (A4)

(2) RFI falter (FL1)

(3) Signal comparator control (A2)

(4) Nutator (A3)

b. Restore these iterns to service only after they pass a Go indication.

1-8. Troubleshooting Aids

a. The cable hookup diagram shows where the test cables are connected to the test equipment and the UUT.

b. A schematic diagram of the UUT is included in each chapter.

c. Locational views are provided to supplement the test procedures as required.

d. When a portable multimeter is required, AN/USM-486 is used if available. If this multimeter, or any other item of test equipment such as an oscilloscope, is not available, equivalent equipment may be used.

1-9. Repair Procedures

Section II of each UUT chapter contains the repair procedures for the UUT. When an instruction directs the removal, replacement, cleaning, or installation of a component or subassembly, refer to section II. The UUT should be disconnected before repairs are made.

1-10. Common Repair Procedures

a. Adhesive sealant is used for bonding and potting.

(1) When adhesive (item 1, App. D) is required, it must be mixed thoroughly with catalyst (item 8, App. D) before it is applied. Use immediately after mixing.

(2) Mix 25 parts adhesive to one part catalyst. This is approximately one tablespoon of adhesive to 1/4-inch bead of catalyst. Working time is approximately 15 minutes before the mixture begins to set-up. If the mixture sets up too quickly, reduce the amount of catalyst or increase the amount of adhesive in the next mixture. Allow to cure at room temperature for four hours.

b. Sealing compound is used on gaskets and the countersunk area of screws and bolts.

(1) When sealing compound (item 12, App. D) is required, it must be mixed thoroughly with catalyst (item 8, App. D) before it is applied.

(2) Mixing instructions are the same as for adhesive sealant in *a.* above.

1-11. Painting

a. Touch up the exterior of the UUT with primer (item 24, App. D) and allow to dry.

b. Apply polyurethane coating (item 9, App. D) a minimum of two hours after primer is applied.

1-12. Packaging

a. When packaging material for shipment, refer to TM 38-230-1 for preservation and TM 38-230-2 for packing. Ensure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

CHAPTER 2

TRACKER

2-1. General

a. This procedure checks detector Al, signal comparator control A2, nutator A3, and firing mechanism A4.

b. Tests include reticle alinement, pressurization, and various circuitry checks.

2-2. Equipment Required

The following equipment is required to test the UUT:

Nomenclature	Description
Program memory card	see TM 9-1425-550-10
Patchboard	PB-402
Multimeter	
Cable (4)	TA-106
Passive probe	TA-108
Digital multimeter prob	TA-109
Cable (needle probe)	TA-208
Electronic Box	TA-403
Tracker test fixture	TA-404
Reticle alinement tool	TA-406
Telescope	TA-407
Telescope mount	TA-415
Spanner wrench	TA-416
Purging valve	TA-418
Tracker repair fixture	TA-419
Cable	CA-9
Cable	CA-34
Cable	CA-35
Cable	CA-36
Cable	CA-127
Cable	CA-135
Cable	CA-408
Cable	CA-409
Cable	CA-410
Cable	CA-420

2-3. Test Instructions

a. If it is necessary to extend the length of probes TA-108 and TA-109, use cable TA-106.

b. When necessary to probe through conformal coating, use TA-208.

c. When the program requires the use of CA-408, clamp the end of CA-408 in clamp (33, fig. 2-3D) before connecting the leads to the UUT, to avoid strain on the UUT test points.

d. When a REF TM requires the removal of tracker test fixture TA-404 from positioning table 2A3A5, disconnect P1 of TA-404 from J1 of TA-403. After removing TA-404, place it on a clean cloth.

e. When a REF TM requires the removal of the U UT from TA-404, disconnect the test leads from the UUT before removal.

f. If random or multiple faults occur during programmed tests, press HALT switch on monitor panel lA11, and perform the following:

(1) Reseat the UUT in TA-404.

(2) Assure that all TA-404 test leads are secure at A2 test pointa on the UUT.

(3) If any test lead cannot be securely seated on its test point, replace the lead jack of TA-404.

(4) Rerun the test program.

(5) If random faults continue, discontinue the UUT test. Remove TA-404 (d. above) with the UUT still mounted. Using a multimeter and TA-208 (needle probe), check continuity as follows: If any check fails, return TA-404 to depot.

TA-404	A2
P1-A	P1-1
P1-B	P1-2
P1-C	P1-3
P1-D	P1-5
P1-E	P1-6
P1-F	P1-7
P1-G	P1-8
P1-H	P1-9
P1-J	P1-10
P1-K	P1-11
P1-L	P1-12
P1-M	P1-13
P1-N	P1-14

TA-404	A2
P1-S	P1-15
P1-V	E5
P1-W	E6
P1-X	E10
P1-Y	E14
P1-Z	El5
P1-a	E7
P1-b	TP3
P1-c	TP5
P1-e	TP4
P1-f	TP6
P1-h	TPl
P1-j	E8

g. When the program requires IR probe TA-437 to be raised or lowered while TA-404 is mounted on positioning table 2A3A5, TA-437 maybe removed from or mounted in its holding fixture to facilitate this operation.

2-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 5100000 into UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

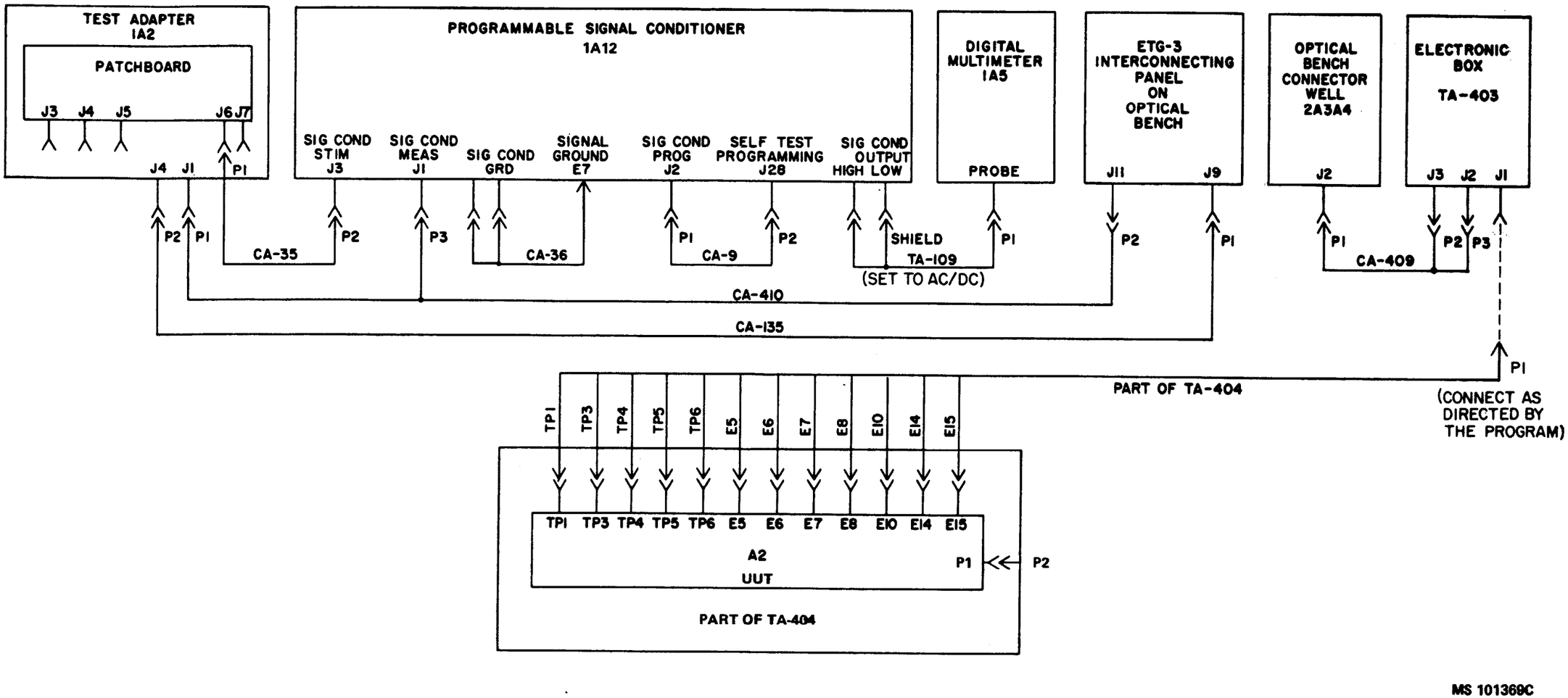
(3) Set CONTROLLER SUBMODE switch to NORMAL.

c. Set 28 VDC, 208 VAC, and LAMP DRIVER circuit breakers on source/detector adapter power supply 2A1A1 to ON.

d. Press the START TEST switch.

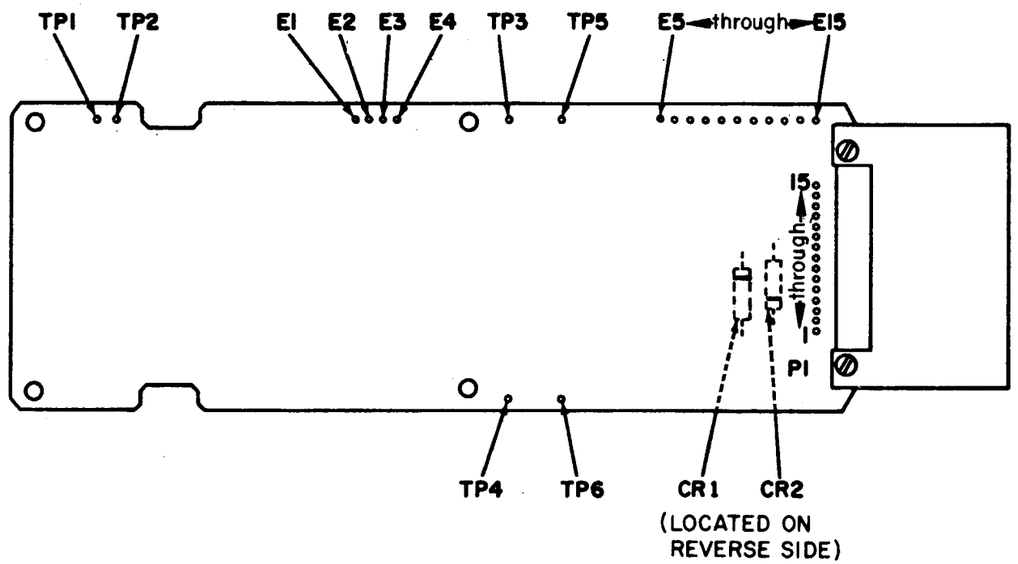
e. Observe message displayed on SSVD and verify that the UUT is the one described in message.

f. Set positioning table 2A3A5 POWER switch to ON Release azimuth and elevation brakes.



MS 101369C

Figure 2-1. Cable hookup diagram.



MS101370A

Figure 2-2. A2 test point location diagram.

Table 2-1. Tracker, Programmed Tests

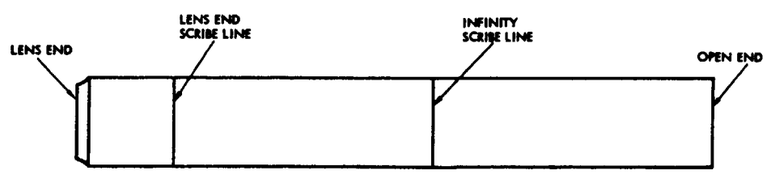
Print message ref no.	Action or instructions
REF TM 1 through REF TM4	Discontinue UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM5	*a.* Install the patchboard. *b.* Set the MS/TR switch on the patchboard to TR. *c.* Place IR probe TA-437 (21, fig, 2-3) in the up position. *d.* Install TA-403 on the reference surface (32, fig. 2-3) just behind the connector well. Set S1 on TA-403 to 28 vdc. Install an expandable pin in the hole in the rear of TA-403 to secure TA-403 to the reference surface. *e.* Perform cable hookup (fig. 2-1). *f.* Press the PROCEED switch.;
REF TM6	*a.* Remove the forward protective cover and the cover from A2P1 on the UUT (1 and 2, fig. 2-8), *b.* Inspect the UUT visually for damage (TM 9-1425-484-10). If A4 (12, fig. 2-8) is damaged, replace it. If A2P1 (14, fig. 2-8) is damaged, replace A2. If the optical lens, mounting pins, or housing is damaged, return the UUT to the depot. *c.* If required, clean the optical lens (TM 9-1425-484-10) and the optical prism (par. 2-17). *d.* Set S1 (22, fig. 2-3) on IR probe TA-437 to 10-7. Place TA-437 (21) in the down position. *e.* Install TA-404 (12, fig. 2-3) on positioning table 2A3A5 (29). Connect P1 of TA-404 to J1 on TA-403. *f.* Open the TA-404 shutter (25D, fig. 2-3) by pulling out the shutter adjust knob to the full extent of its travel. *g.* Observe that DS1 on TA-404 is on. (1) If the lamp is on, proked to step h. (2) If the lamp is off, replace DS1. *h.* Install TA-415 (9A) on TA-404 snd tighten the two thumbscrews (10A) on TA-415. *i.* Remove draw tube lock ring (17C) from telescope TA-407. Thread TA-407 into the aft end telescope mount of TA-415. Tighten the two set screws (34C). Be sure the lens end of draw tube (19C) is in the body of TA-407. Reinstall draw tube lock ring (17C). *j,* Check and adjust TA-407 for telescope use as follows: (1) Aline the infinity scribe line on TA-407 draw tube with the edge of TA-407 body.  (2) Be sure azimuth adjustment screw (36A) is not touching the rack and pinion focusing control (3A) by loosening screw (36A). *k.* Loosen the coarse azimuth adjustment thumbscrew (8A) and position TA-407 to its extreme right position. Tighten the azimuth coarse adjustment thumbscrew. Adjust the x-y axis translation controls (37A and 38A) to the midpoint of their available travel.

Table 2-1. Tracker, Programmed Tests (Continued)

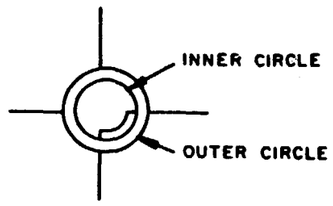
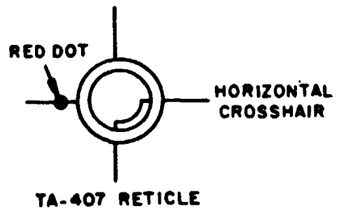
Print message ref no.	Action or instructions
REF TM 6 Continued	*l.* Look into the TA-407 eyepiece (7A) and adjust the TA-407 eyepiece to obtain the clearest and sharpest image of the TA-407 reticle, as shown below. NOTE Disregard the orientation of the TA-407 reticle.  TA-407 RETICLE **NOTE** **Excessive vibration in the sheltermay make it necessary to shut off the air conditioners during the following step. If so, make the adjustment as quickly as possible so the air conditioners may be turned back on.** *m.* Look into the TA-407 eyepiece and position the TA-407 draw tube to obtain the clearest and sharpest image of the red dot. The position of the red dot and the TA-407 reticle should not change when the technician moves his viewing position slightly, Readjust the draw tube and the TA-407 eyepiece, if necessary. Install and tighten the lock ring (17C) on the TA-407 draw tube. *n.* Look into the TA-407 eyepiece and position the red dot, as shown below, by adjusting the elevation fine (5A) and azimuth fine (6A) adjustments on TA-407. If required, use the elevation coarse adjustment screws (2A) on TA-415. Tighten the TA-415 elevation coarse adjustment screws if required. If necessary, adjust the X-Y axis translation controls to bring the red dot within the field of view. If required, after making the above adjustments, use positioning table 2A3A5 controls to position the red dot as shown below. **NOTE** **Disregard the orientation of the TA-407 reticle.**  TA-407 RETICLE *o.* Look into the TA-407 eyepiece and activate the AZIMUTH control on positioning table 2A3A5, so that the red dot moves to the left along the horizontal crosshair on the TA-407 reticle. (1) If the red dot stays on the horizontal crosshair for the complete field of view or the end of 2A3A5 travel, return the red dot to its starting position and proceed to step p, (2) If the red dot is above or below the horizontal crosshair at the end of the field of view or the

Table 2-1. Tracker, Programmed Tests (Continued)

Print message ref no.	Action or instructions
REF TM 6 Continued	end of 2A3A5 travel, loosen the eyepiece adapter lock ring (15C) and slowly rotate the eyepiece adapter (20C) (CW if the red dot is above the crosshair, CCW if the red dot is below the crosshair) so that the crosshair is moved one-half the distance of the error. Repeat step n. *p.* Tighten the eyepiece adapter lock ring, if loosened. *q.* Remove 10 screws (8, fig. 2-9) and cover (9, fig. 2-9). *r.* Remove the insulating caps (39, fig. 2-9) from the test points on A2 (fig. 2-2). s. Disconnect P1 of TA-404 from J1 on TA-403. Remove TA-404 from 2A3A5. *t.* Install the UUT on TA-404. Close UUT retaining lever (23D, fig. 2-3) to mate A2P1 (14, fig. 2-8) with TA-404 connector. *u.* Unclamp the test leads on TA-404 and connect to A2 (figs. 2-1 and 2-2). *v.* Install TA-404 in positioning table 2A3A5. *w.* Observe the white dot displayed on the 2A3A5 POSITION INDICATOR. *x.* Adjust the AZIMUTH and ELEVATION controls on 2A3A5 until the white dot is positioned in the small inner circle on the POSITION INDICATOR *y.* Look into the telescope (30, fig. 2-3) on source/detector adapter base 2A3A4 and adjust the AZIMUTH and ELEVATION controls on positioning table 2A3A5 until the red dot end green dot are superimposed. *z.* Manually reset the AZIMUTH end ELEVATION counters on 2A3A5 to 0000. *aa.* position TA-404 S1 (13B, fig. 2-3) to NOR *ab.* Connect TA-404 P1 to TA-403 J1. *ac.* Close the TA-404 shutter. *ad.* Press the PROCEED switch on monitor panel 1A11.
REF TM 7	*a.* On trigger mechanism A4, press the trigger lever without pressing the trigger safety plunger (fig. 2-9). *b.* If it is possible to press the trigger lever to a point where a click is heard, replace A4. *c.* If the trigger lever cannot be pressed to a point where a click is heard, release the lever and press PROCEED switch on lA11.
REF TM 8	a. Remove TA-404 from 2A3A5. b. Remove the UUT from TA-404, and install it in TA-419 (fig. 2-10). Secure with the retaining straps. **NOTE** Do not disconnect any leads from A2. *c.* Remove A2 from the UUT, and place it in ita retaining position in TA-419 (fig. 2-10). *d.* Measure the resistance between CR-2 anode and terminal E14 with the multimeter (fig. 2-2). (1) If the resistance is greater than 10 ohms, replace A3 (par. 2-13). (2) If the resistance is less than 10 ohms, replace A2 (par. 2-11).
REF TM 9	*a.* While observing 1A10, adjust 2A3A5 in azimuth to obtain a reading between -0.05 and +0.05 VDC. (1) If the adjustment can be made, proceed to step *b.* (2) If the adjustment cannot be made, return 2A3A5 to an AZIMUTH counter reading of 0000, and press the PROCEED switch. *b.* Press the PROCEED switch, and wait for the INTERRUPT lamp to come on. While observing 1A10, adjust 2A3A5 in azimuth to obtain a reading between -0.04 and +0.04 VDC. (1) If the adjustment can be made, verify that the AZIMUTH counter, on 2A3A5, reads between 9435 and 0565 (0000 ± 0565). *(a)* If the AZIMUTH counter reads as specified, manually reset the AZIMUTH counter to 0000, and press the PROCEED switch. *(b)* If the AZIMUTH counter does not read as specified, return the UUT to the depot. (2) If the adjustment cannot be made, return 2A3A5 to an AZIMUTH counter reading of 0000, and press the PROCEED switch.

Table 2-1. Tracker. Programmed Tests -Continued.

Print message ref no.	Action or instructions
REF TM 10	*a.* While observing 1A10, adjust 2A3A5 in elevation to obtain a reading between -0.05 and +0.05 VDC. (1) If the adjustment can be made, proceed to step *b*. (2) If the adjustment cannot be made, return 2A3A5 to an ELEVATION counter rending of 0000, and press the PROCEED switch. *b.* Press the PROCEED switch, and wait for the INTERRUPT lamp to come on. While observing 1A10, adjust 2A3A5 in elevation to obtain a reading between -0.04 and +0.04 VDC. (1) If the adjustment can be made, verify that the ELEVATION counter, on 2A3A5, reads between 9700 and 0300 (0000 ± 0300). *(a)* If the ELEVATION counter reads as specified, manually reset the ELEVATION counter to 0000, and press the PROCEED switch. *(b)* If the ELEVATION counter does not read as specified, return the UUT to the depot (par. 2-24). (2) If the adjustment cannot be made, return 2A3A5 to an ELEVATION counter reading of 0000, and press the PROCEED switch.
REF TM 11	*a.* Connect TA-108 (passive A) between SIG COND OUTPUT HIGH/LOW on TA-19. Press the PROCEED switch. (1) If the reading is less than 30 MS, adjust the AZIMUTH FINE control, on 2A3A5, in the + direction until the reading jumps to approximately 50 MS. Proceed to step c. (2) If the reading is greater than 30 MS, adjust the AZIMUTH FINE control, on 2A3A5, in the - direction until the reading is less than 30 MS. Then adjust the AZIMUTH FINE control in the + direction until the reading jumps to approximately 50 MS. Proceed to step *b*. *b.* Observe the AZIMUTH counter on 2A3A5. (1) If the counter is between 2032 and 2568, press the PROCEED switch. (2) If the counter is not between 2032 and 2568, decrease the AZIMUTH control until 1A10 reads less than 30 MS. Press the PROCEED switch.
REF TM 12	Using a proper adjustment tool, adjust 2A3A8R7, in 1/4 turn increments in a CW direction, until 1A10 reads between 0.289 and 0.258 VAC, as close as possible to 0.274 VAC. *a.* If the adjustment can be made, press the PROCEED switch. *b.* If the adjustment cannot be made, press the PROCEED switch.
REF TM 13	Using a proper adjustment tool, adjust 2A3A8R7, in 1/4 turn increments in a CW direction, until 1A10 reads between 224.0 and 208.0 MVAC, as close as possible to 216.0 MVAC. *a.* If the adjustment can be made, press the PROCEED switch. *b.* If the adjustment cannot be made, proceed to step *c*. *c.* Press the PROCEED switch. *d.* Using a proper adjustment tool, adjust 2A3A8R7, in 1/4 turn increments in a CCW direction, until 1A10 reads between 224.0 and 208.0 MVAC, as close as possible to 216.0 MVAC. *e.* Press the PROCEED switch.
REF TM 14	*a* Connect TA-108 (passive A) between SIG COND OUTPUT HIGH/LOW on 1A12. Press the PROCEED switch. *b.* Observe the reading on 1A10. (1) If the reading is less than 30 MS, adjust the AZIMUTH FINE control, on 2A3A5, in the – direction until the reading jumps to approximately 50 MS. Proceed to step *c*. (2) If the reading is greater than 30 MS, adjust the AZIMUTH FINE control, on 2A3A5, in the + direction until the reading is less than 30 MS. Then adjust the AZIMUTH FINE control in the - direction until the reading jumps to approximately 50 MS. Proceed to step c. *c.* Observe the AZIMUTH counter on 2A3A5. (1) If the counter is between 7413 and 7968, press the PROCEED switch. (2) If the counter is not between 7413 and 7968, decrease the AZIMUTH control until 1A10 read; less than 30 MS. Press the PROCEED switch.

Table 2-1. Tracker. Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 15	Using a proper adjustment tool, adjust 2A3A8R7 until 1A10 indicates as close as possible to the last measured value displayed on SSVD. Press PROCEED switch.
REF TM 16	*a.* Remove TA-404 from 2A3A5. *b.* Remove the UUT from TA-404, and install it in TA-419 (fig. 2-10). Secure with the retaining straps. **NOTE** Do not disconnect any leads from A2. *c.* Remove A2 from the UUT, and place it in ita retaining position on TA-419 (fig. 2-10). *d.* Using a knife and orange stick, carefully remove the adhesive from terminal assembly (21, fig. 2-9). Using a knife, cut the insulation sleeving from the white wire, and disconnect the white wire from the terminal assembly. *e.* Using the multimeter, measure the resistance between the terminal that the white wire was removed from, and the terminal where the green wire is connected. (1) If the meter reading is greater than 90 ohms, replace A2 (par. 2-11). (2) If the meter reading is less than 90 ohms, proceed to step *f*. *f.* Connect the positive lead of the multimeter to P1-2, the negative lead to A2E10, and measure the resistance. (1) If the meter reading is greater than 1 K ohms, slide a length of insulation sleeving (item 38, App. D) over the white lead, and connect the lead to the terminal assembly. Slide the sleeving over the terminal, and heat-shrink, using heat gun. Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) to a thickness of 0.08 inches above the sleeving, and allow to dry. Reinstall A2 in the UUT. Replace A3 (par. 2-13). (2) If the meter reading is less than 1 K ohms, replace A3 (par. 2-13) and A2 (par. 2-11).
REF TM 17	*a.* Remove TA-404 from 2A3A5. *b.* Remove the UUT from TA-404, and install it in TA-419 (fig. 2-10). Secure with the retaining straps. **NOTE** Do not disconnect any leads from A2. *c.* Remove A2 from the UUT, and place it in its retaining position on TA-419 (fig. 2-10). *d.* Using a knife and orange stick, carefully remove the adhesive from terminal assembly (21, fig. 2-9). Using a knife, cut the insulation sleeving fro-m the orange wire, and disconnect the orange wire from the terminal assembly. *e.* Using the multimeter, measure the resistance between the terminal that the orange lead was removed from and the terminal where the green wire is connected. (1) If the meter reading is greater than 1 K ohms, replace A2 (par. 2-11). (2) If the meter reading is less than 1 K ohms, slide a length of insulation sleeving (item 38, App. D) over the orange lead, and connect the lead to the terminal assembly. Slide the sleeving over the terminal and heat-shrink, using heat gun. Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) to a thickness of 0.08 inch above the sleeving, and allow to dry. Reinstall A2 in the UUT. Replace A3 (par. 2-13).
REF TM 18	*a.* Remove TA-404 from 2A3A5. *b.* Remove the UUT from TA-404. Install TA-405 on TA-404. Set TA-404S1 to RES. Connect the multimeter between TA-404 P1-N and P1-S. Measure the resistance. (1) If the meter reading is less than 10 ohms, proceed to step *c*. (2) If the meter reading is greater than 10 ohms TA-404 is faulty. Discontinue testing and replace TA-404S1. *c.* Install the UUT in TA-419 (fig. 2-10). Sesure with the retaining straps. *d.* Remove A4 from the UUT and place it in ita retaining position in TA-419 (fig. 2-10). *e.* Using a knife and orange stick, carefully remove the adhesive from FL1 (7, fig. 2-9) and terminal lug (6). Disconnect and tag the leads to FL1 and the terminal lug.

Table 2-1. Tracker, Programrned Tests – Continued.

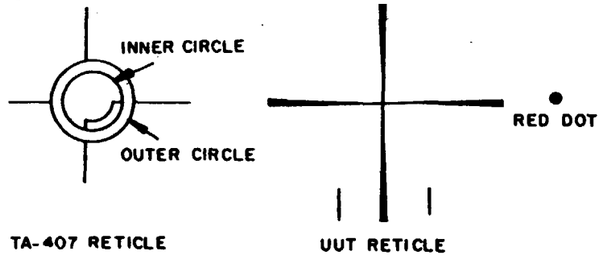
Print messag ref no.	Action **or instructions**
REF TM 18 Continued	NOTE Do not disconnect any leads from A2. *f.* Remove A2 from the UUT, and place it in ita retaining position on TA-419 (fig. 2-10). *g.* Measure the resistance between the terminal of FL1 and terminal lug (6, fig. 2-9) with the multimeter. (1) If the meter reading indicates a short, replace FLl (par. 2-12). (2) If the meter reading indicates FLl to be good, proceed to step k. *h.* Using TA-208, measure the resistance between P1-15 and A2E15. (1) If the meter reading indicates an open, replace A2 (par. 2-11). (2) If the meter reading indicates continuity, proceed to step i. *i.* Using TA-206, measure the resistance between P1-14 and A2E14. (?.) [f the meter reading indicates an open, replace A2 (par. 2-11). (2) If the meter reading indicates continuity, slide a length of insulation sleeving (item 38, App. D) over the blue and black leads, and connect the leads. Slide the sleeving over the terminals, and heat-shink, using heat gun. Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) to a thickness of 0.08 inch above the sleeving, and allow to dry. Replace A4 (par. 2-10).
REF TM 19	*a.* While observing 1A10, adjust 2A3A5 in AZIMUTH to obtain a reading between -0.04 and +0.04 VDC, as close to O VDC as possible. Manually reset the AZIMUTH counter to 0000. *b.* Press the PROCEED switch, and proceed to step c. c. While observing 1A10, adjust 2A3A5 in ELEVATION to obtain a reading between -0.04 and +0.04 VDC, as close to O VDC **as** possible. Manually react the ELEVATION counter to 0000. *d.* Be sure that azimuth adjustment screw (36, fig. 2-3) is not touching the mount (40) by loosening screw (36). Loosen the azimuth coarse adjustment thumbscrew (8) and position TA-407 to its maximum left position. *e.* Look into the TA-407 eyepiece (7) and observe the TA-407 reticle, the UUT reticle, and the red dot IS shown below, but not necessarily in these positions. If required, adjust the TA-407 eyepiece for the :learest image of the TA-407 reticle. If required, adjust the diopter adjustment (35) for the clearest image of the UUT reticle and the red dot. If red dot cannot be observed at this time, dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch.  *f.* Adjust the azimuth adjustment screw (36), until the UUT reticle and the TA-407 reticle are superimposed as close as possible. Tighten the azimuth coarse adjustment thumbscrew (8). *g.* Look into the TA-407 eycpiccc, and adjust the TA-407 reticle fine adjustments (5 and 6) until the TA-407 reticle and the UUT reticle are superimposed as ahown below, (1) If the TA-407 reticle and UUT reticle. can be superimposed, as ahown below, praceed to step *h.* (2) If the TA-407 reticle and UUT reticle cannot be superimposed, as shown below, adjust the *x-y* axis translation controls (37 and 38, fig. 2-3) in conjunction with the azimuth adjustment screw (36) until the UUT reticle is in the center range of fine adjustments (5 and 6).

Table 2-1. Tracker, Programmed Tests – Continued.

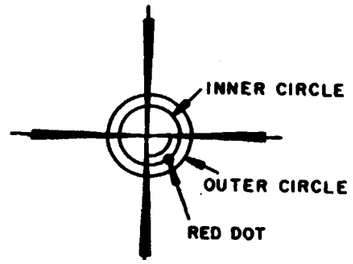
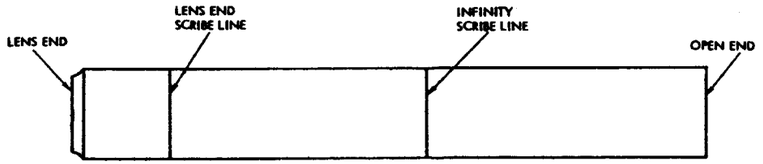
Print message ref no.	Action or instructions
REF TM 19 Continued	 *h.* Look into the TA-407 eyepiece, and note the position of the red dot. (1) If the red dot is positioned anywhere inside the outer circle on the TA-407 reticle, proceed to stcp *i* (2) If red dot is not positioned inside outer circle on TA-407 reticle, dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch. *i* Press the PROCEED switch. *j.* Check the pressurization of the UUT as follows: (1) Remove screw (25, fig. 2-9) and sealing washer (26). (2) Coat the threads of TA-418 with silicone compound (item 13, App. D) and install TA-418 in valve stem (27). (3) Connect the nitrogen purging huae between the quick disconnect in the connector well on 2A3A4, and TA-418. (4) Position the front panel controls on 2A1A2 as follows: *(a)* Set the VACUUM PUMP ON/OFF switch to OFF. *(h)* Turn the N2 PRESSURE SELECTOR fully CCW. (c) Turn the N2 SUPPLY VALVE fully CCW. *(d)* Turn the VACUUM LINE VALVE fully CW. NOTE Be **sure** the valve stem is seated in the UUT. (5) Turn the N2 PRESSURE SELECTOR control CW until the UUT FILL & VACUUM PRESSURE gage reads 11.0 PSIG. (6) Turn the N2 SUPPLY VALVE fully CW. (7) Tum the N2 PRESSURE SELECTOR control fully CCW. (8) While observing the UUT FILL & VACUUM PRESSURE gage, open valve stem (27, fii. 2-9) on the UUT. *(a)* If the prcssure reading drops below 10.5 PSIG, repeat steps (5) through (8) above. Observe the UUT FILL & VACUUM PRESSURE gage for five minute. If the pressure again drops below 10.5 PSIG, return the UUT to the depot (par. 2-24). *(b)* If the pressure reading is greater than 11.0 PSIG, loosen screw (15. fig. 2-9) and allow enough gas to escape until the pressure is between 10.5 and 11.0 PSIG. Tighten the screw and proceed to step (9). (9) Tighten the valve stem on the UUT. (10) Turn the N2 SUPPLY VALVE fully CCW and pull the RELIEF & BLEED VALVE for 10 seconds, or rotate valve cap ccw 1/2 turn for 10 seconds. (11) Disconnect the purging hose from the quick disconnect in the connector well on 2A3A4, and TA-418. Remove TA-418 from the UUT. (12) Coat the screw (25, fig. 2-9) and new sealing washer (26) with silicone compound (item 13, App. D). Install the screw and sealing washer in the valve stem. Wipe away any excess silicone compound.

Table 2-1. Tracker. Programmed Tests – Continued.

Print message ref no.	Action or instructions
REF TM 20	*a.* Replace PB-402A1 and rerun the program. *b.* If REF TM 20 is displayed on SSVD again, the removed PB-402A1 is good. Discontinue the UUT test, and run the source/detector adapter program (see TM 9-1425-550-10). *c.* If REF TM 20 is not displayed on SSVD again, the removed PB-402A1 is faulty.
REF TM 21	*a.* Press the HALT switch and remove TA-404 (12, fig. 2-3) from 2A3A5. *b.* Remove the UUT from TA-404. *c.* Remove the eyepiece (par. 2-15u). *d.* Loosen the lock ring (17) on the TA-407 draw tube and remove the draw tube (19) from the body (16). Reverse the position of the draw tube, so that the lens end, is facing the UUT, and slide the draw tube back into the body. Aline the lens end scribe line on the draw tube with the edge of the TA-407 body.



Tighten the lock ring on the draw tube. Using the rack and pinion focusing control (3, fig. 2-3), aline the scribe line (4) on the eyepiece adapter (20) with the body (16).

e. Reinstall the UUT on TA-404. Close UUT retaining lever (23, fig. 23), mating A2P1 (14, fig. 2-8) with the TA-404 connector. Unclamp the test leads on TA-404, and connect the teat leads from TA-404 to A2 (fig. 2-1).

f. Install TA-404 on 2A3A5. Connect TA-404 P1 to TA-403 J1.

g. Dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, press START TEST switch, and proceed to step *h.*

h. While observing 1A10, adjust 2A3A5 in AZIMUTH, to obtain a reading between -0.04 and +0.04 VDC, as close to 0 VDC as possible. Manually reset the AZIMUTH counter to 0000.

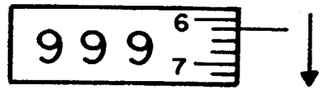
i. Press the PROCEED switch.

j. While observing 1A10, adjust 2A3A5 in ELEVATION, to obtain a reading between -0.04 and +0.04 VDC, as close to 0 VDC as possible. Manually reset the ELEVATION counter to 0000.

k. Loosen the draw tube lock ring on the TA-407 eyepiece and extend the draw tube to obtain a clear image of the red dot and UUT reticle. Tighten the lock ring.

l. Look into the TA-407 eyepiece and adjust the rack and pinion focusing control (3, fig. 2-3) for final focusing of the red dot and UUT reticle.

m. Adjust the AZIMUTH - FINE control on 2A3A5 so the AZIMUTH counter reads 9996.25 as shown below.



n. Look into the TA-407 eyepiece. Using the TA-407 reticle fine adjustments (5 and 6), position the TA-407 horizontal crosshairs over the center of the red dot as shown below.

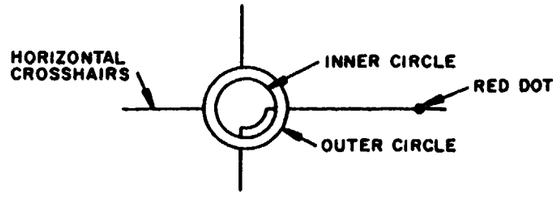
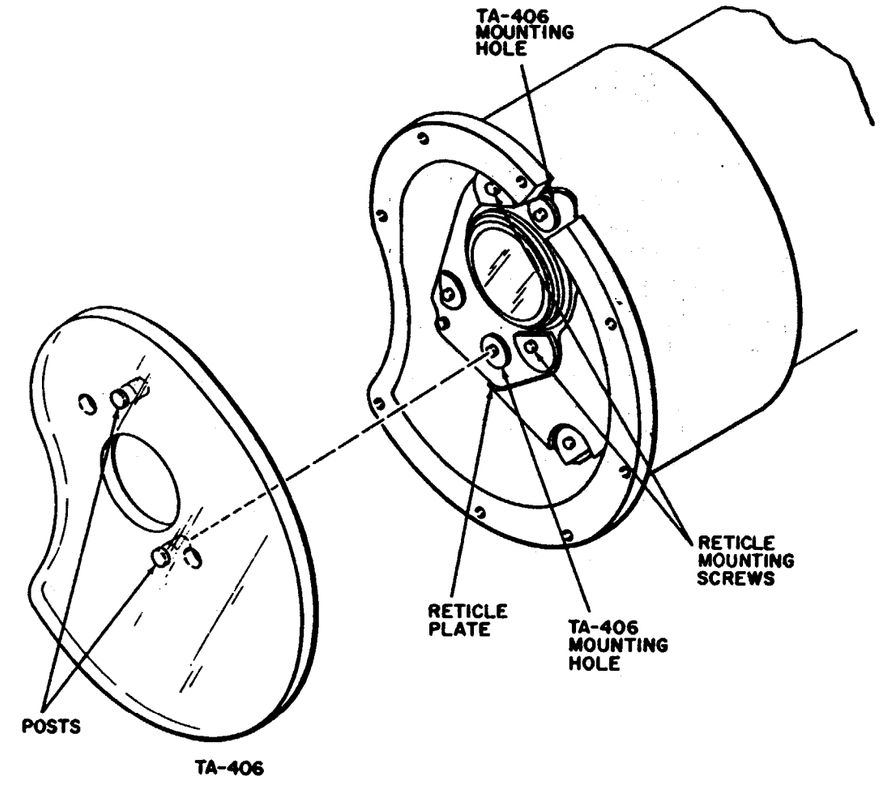


Table 2-1. Tracker, Programmed Tests - Continued.

Print message ref no.	Action or instruction
REF TM 21 Continued	**NOTE** **Do not allow washer (34, fig. 2-9) under the top reticle mounting screw (35) to shift position and prevent adjustment of the reticle plate. It may necessary to hold the washer with your finger.** *o.* Using an allen wench, loosen one of the reticle mounting screws two turns CCW. Slowly turn the screw CW only to a point where the free rotation of the screw stops and it starts to tighten against the reticle plate. Repeat the procedure for the other screw. (1) Place TA-406 over the open end of the UUT housing so that the two posts on TA-406 mate with the two holes in the reticle plate. Hold TA-406 in this position.



(2) Look into the TA-407 eyepiece, Using TA-406, position the reticle plate so that the red dot is exactly superimposed over the center of the UUT crosshairs, and the UUT crosshair is superimposed over the TA-407 horizontal crosshair, as shown below.

Table 2-1. Tracker, Programmed Tests – Continued.

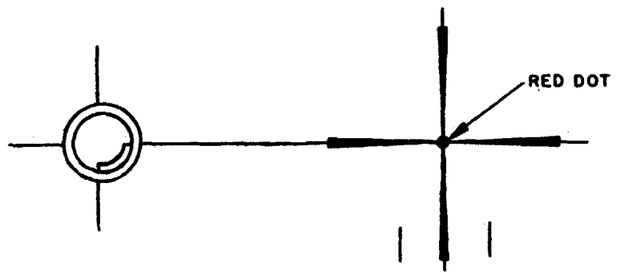
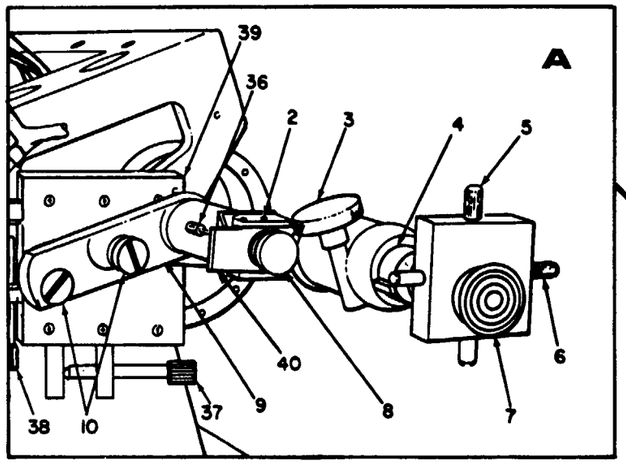
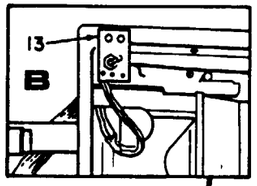
Print message ref no.	Action or instruction
REF TM 21 continued	 *(3)* When the red dot and the horizontal crosshairs are as shown above, carefully tighten the lower reticle mounting screw a sufficient amount to hold the reticle plate secure, when TA-406 is removed. (4) Using l torque screwdriver, torque the two reticle mounting screws to 2 to 3 inch-pounds. *p.* Press the PROCEED switch. *q.* While observing 1A10, adjust 2A3A5 in AZIMUTH to obtain a reading between -0.04 and +0.04 VDC, as close 0 VDC as possible. Manually reset the AZIMUTH counter to 0000. *r.* Press the PROCEED switch. *s.* While oberving 1A10, adjust 2A3A5 in ELEVATION to obtain a reading between -0.04 and +0.04 VDC, as close to 0 VDC as possible. Manually react the ELEVATION counter to 0000. *t.* Adjust the AZIMUTH controls, on 2A3A5, so the AZIMUTH counter reads 9996.25 as shown in step *m.* *u.* Look into the TA-407 eyepiece and verify that the UUT reticle is still positioned as in step *o* (2) above. (1) If UUT reticle is still positioned as in step *o* (2), dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch. (2) If the-UUT reticle is not still positioned as in step *o* (2), repeat steps *o* through *t*, and then proteed to step *v*. *v.* Look into the TA-407 eyepiece, and verify that the UUT reticle is still positioned as shown in step *o* (2). (1) If UUT reticle is still positioned as in step *o* (2), dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch. (2) If the UUT reticle is not still positioned as in step *o* (2), press the PROCEED switch.
REF TM 22	*a.* Remove TA-404 from 2A3A5. *b.* Install the UUT on TA-419 (fig. 2-10). NOTE Do not disconnect any leads in the following step. *c.* Remove AZ from the UUT, and place it on its retaining position on TA-419 (fig. 2-10). *d.* Disconnect the white lead from terminal E10 on A2. *e.* Measure the resistance between terminals E10 and E14 on, A2 with the multimeter. (1) If the meter reading is less than 10 ohms, replace A2 (par. 2-11). (2) If the meter reading is greater than 10 ohms, reconnect the lead, and replace A3 (par. 2-13).

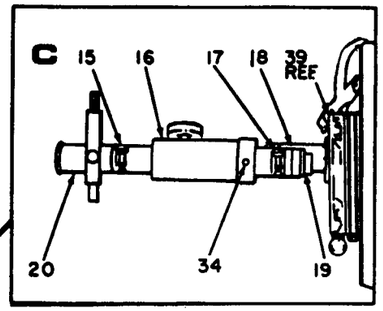
Table 2-1. Tracker, Programmed Tests – Continued.

Print message ref no.	Action or instruction
REF TM 23	The UUT has successfully completed the programmed tests. Proceed as follows: *a.* Remove TA-404 from 2A3A5. *b.* Remove the UUT from TA-404. *c.* Reclamp the leads on TA-404. *d.* Install the eyepiece (par. 2-15b(1) through (5)). *e.* Install insulating caps (39, fig. 2-9) on the A2 test pins, and seal with insulating compound (item 10, App. D). *f.* Install cover (9) with bolts (8). *g.* Dial number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, press START TEST switch, and proceed to step *h* *h.* Purge the UUT (par. 2-14).
REF TM 24	Discontinue programmed tests and return the UUT to the depot for further testing and repair. Proceed as follows: *a.* Remove TA-404 from 2A3A5. *b.* Remove the UUT from TA-404. *c.* Reclamp the leads on TA-404. *d.* Install the eyepiece (par. *2-15b(1)* through (5)). *e.* Install insulating caps (39, fig. 2-9) on the A2 test pins, and seal with insulating compound (item 10, App. D). *f.* Install cover (9) with bolts (8). *g.* Return the UUT to the depot (par. 2-24).
REF TM 25	Discontinue the UUT test, and run the programmable signal conditioner program (see TM 9-1425-550-10).
REF TM 26	Replace A3 (par. 2-13).
REF TM 27	Replace FL1 (par. 2-12).
REF TM 28	Replace A4 (par. 2-10).
REF TM 29	Discontinue the UUT test, and return the UUT to the depot (par. 2-24).
REF TM 30	Replace A2 (par. 2-11).
REF TM 31	Replace Al in TA-403. If REF TM 31 is displayed on SSVD again, the removed Al is good. Reinstall TA-403-A1, discontinue the UUT test, and run the programmable signal conditioner program (see TM 9-1425-550-10).
REF TM 32	*a.* Remove TA-404 from 2A3A5. *b.* Remove UUT from TA-404 and install it in TA-419 (fig. 2-10). Secure with the retaining straps. *c.* Remove A2 from the UUT and place it in its retaining position on TA-419 (fig. 2-10). *d.* Using a knife and orange stick, carefully remove the adhesive from terminal assembly (21, fig. 2-9). Using a knife, cut the insulation sleeving from the gray and white/red wires. Disconnect these wires from the terminal assembly. e. Using the multimeter, connect one lead to the terminal where the white/red wire was connected and one lead to the black or blue wire on the terminal. (1) If the reading is 375 ohms ±50 ohms (between 325 to 425 ohms), replace A2. (2) If the reading is less than 325 ohms, slide a length of insulation sleeving (item 39, App. D) over the white/red and the gray wires. Connect the wires to their terminals. Slide the sleeving over the terminal and heat shrink using heat gun. Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) to a thickness of 0.08 inch above the sleeving, and allow to dry. Reinstall A2 in the UUT. Replace A3 (par. 2-13).

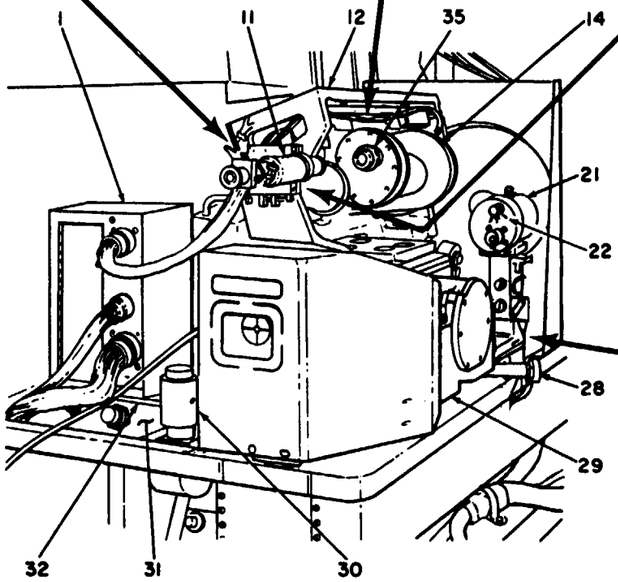


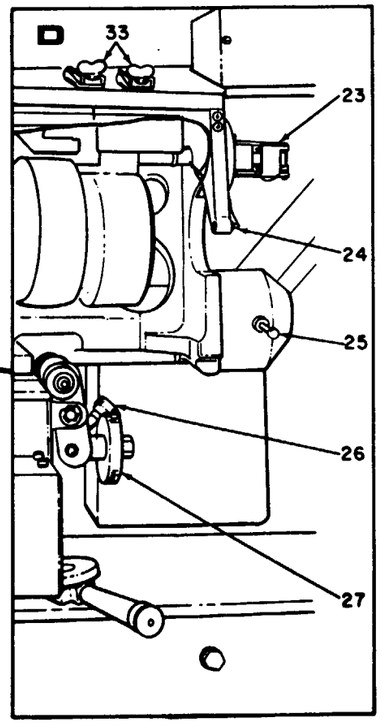
The X-Y axis controls (37 and 38) may be adjusted to center the UUT reticle image and to adjust for the most uniform illumination of the microscope field.





Two lines are scribed on the draw tube (18 and 19), but only one will be visible at a time, depending on which end of the draw tube is installed in the body.





1- TA-403
2- Elevation coarse adjustment screws
3 – Rack and pinion focusing control
4- Scribe line
5- TA-407 reticle elevation fine adjustment
6- TA-407 reticle azimuth fine adjustment
7- Eyepiece
8- Azimuth coarse adjustment thumbscrew
9- TA-415
10- TA-415 thumbscrews
11- TA-407
12- TA-404
13- TA-404 S1
14- UUT
15- Eyepiece adapter locking ring
16- TA-407 body
17- Draw tube lock ring
18- Scribe line
19- Draw tube
20- Eyepiece adapter
21- IR probe
22- IR probe Sl
23 UUT retaining lever
24- TA-404 DS1
25- TA-404 shutter
26- 2A3A5 elevation brake
27- Test fixture retaining knob
28- 2A3A5 azimuth brake
29- 2A3A5
30- Telescope
31- 2A3A4 connector well
32- Reference surface
33- Clamps
34- Set screws
35- Diopter adjustment
36- Azimuth adjustment screw
37- X-axis control
38- Y-axis control
39- Translation stage
40- Mount

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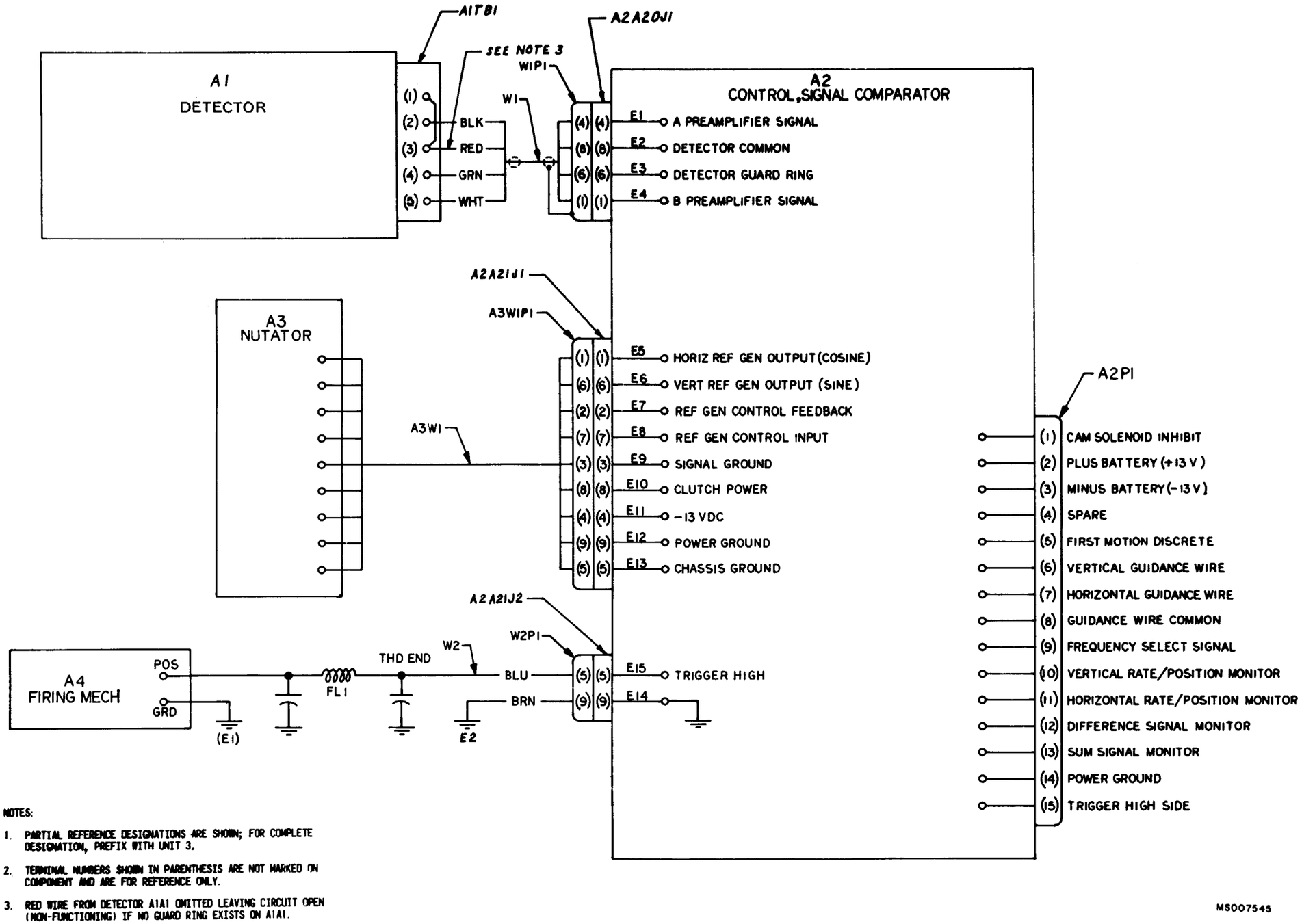
Figure 2-3. Tracker mounted in test fixture.



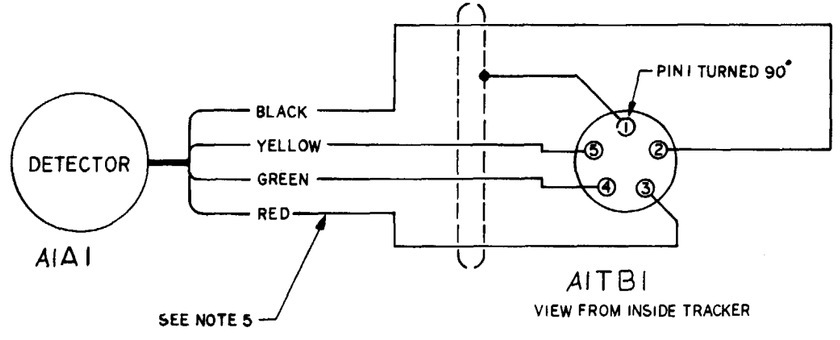
NOTES:

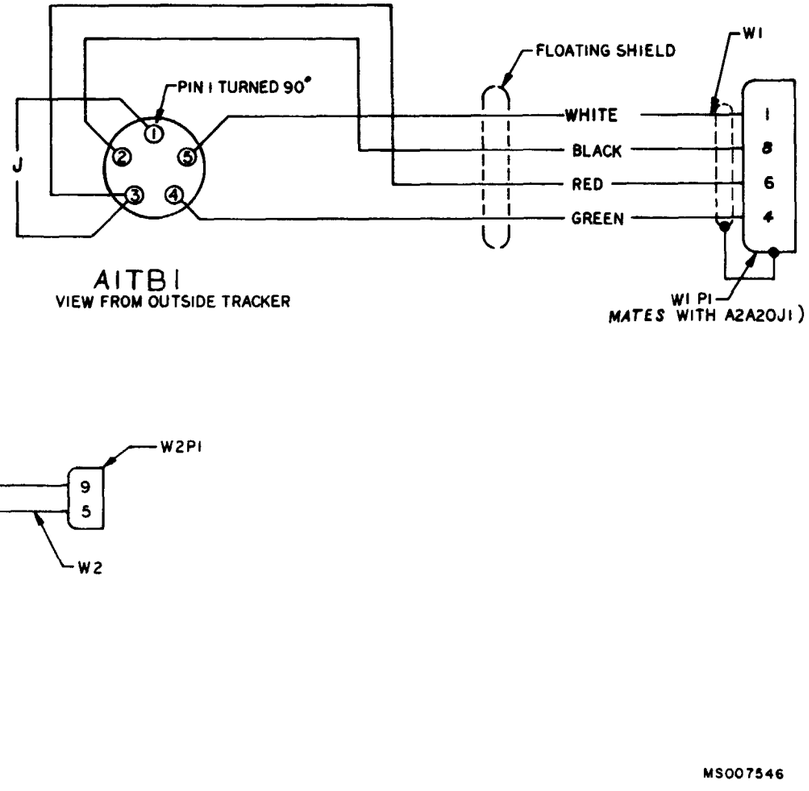
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT 3.
2. TERMINAL NUMBERS SHOWN IN PARENTHESIS ARE NOT MARKED ON COMPONENT AND ARE FOR REFERENCE ONLY.
3. RED WIRE FROM DETECTOR A1A1 OMITTED LEAVING CIRCUIT OPEN (NON-FUNCTIONING) IF NO GUARD RING EXISTS ON A1A1.

Figure 2-5.1. Tracker. schematic diagram- APN 10276500.

Figure 2-6 Deleted

C5





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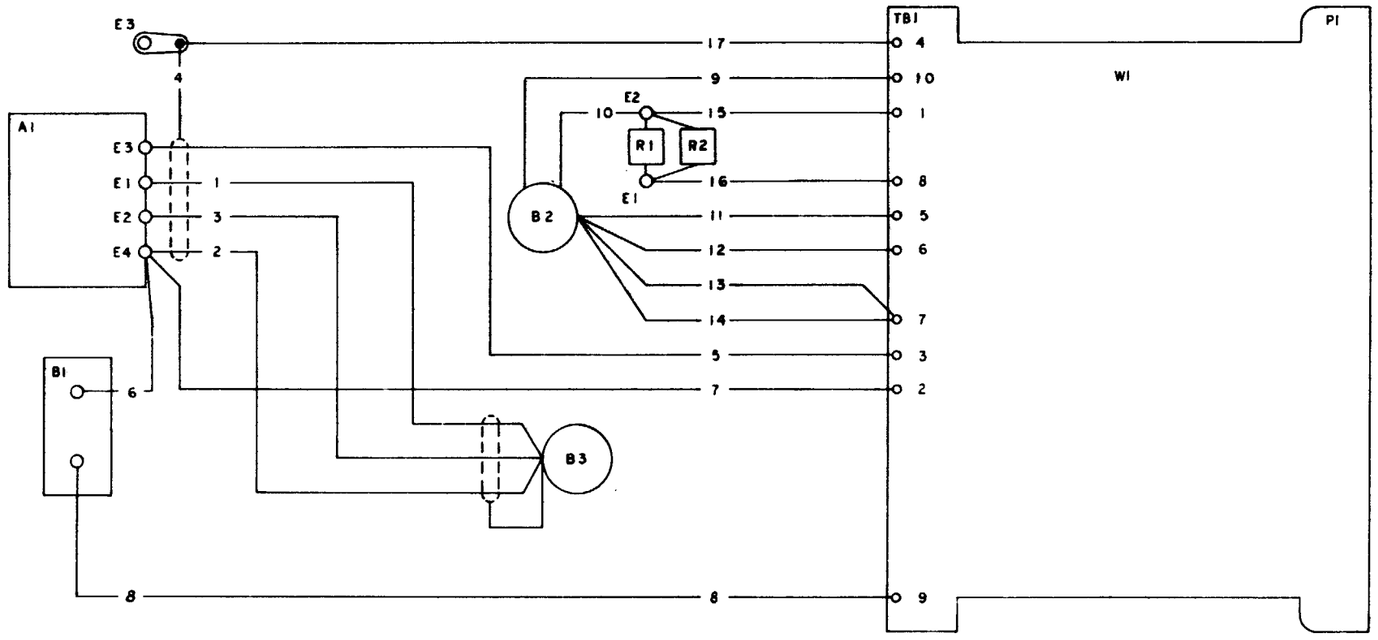
NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER 3.
2. TERMINAL NUMBERS ON A1TB1, W1P1 AND W2P1 ARE SHOWN FOR REFERENCE PURPOSES ONLY AND ARE NOT MARKED ON COMPONENTS.
3. LEADS ARE SUPPLIED WITH COMPONENTS A1A1, W1, W2 & A4.
4. WIRE IDENTIFIED WITH "J" IS 24 GUAGE TIN COATED WIRE PER QQ-W-343.
5. RED WIRE OMITTED IF NO GUARD RING EXISTS ON DETECTOR, A1A1.

Figure 2-6.1. Tracker, wiring diagram-APN 10276500.



WIRE TABLE			
WIRE NUMBER	AWG	COLOR	LENGTH +.2 −.0
1	26	RED	4.0
2	26	BLUE	4.0
3	26	BLACK	4.0
4	26	BRAID	5.5
5	26	ORANGE	12.0
6	26	YELLOW	2.5
7	26	GREEN	12.0
8	26	WHITE	12.0
9	26	WHT/RED	12.0
10	26	WHT/BLK	3.5
11	26	RED	12.0
12	26	YELLOW	12.0
13	26	BLACK	12.0
14	26	BLUE	12.0
15	26	GRAY	12.0
16	26	VIOLET	12.0
17	22	WHT/BLK	13.0

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NOTES
1 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER 3 AND SUBASSEMBLY DESIGNATION A3.

Figure 2-6.2. Nutator, wiring diagram.

Section II. REPAIR PROCEDURES

2-5. General

This section provides repair information for the UUT witbin the scopc of DS and GS maintenance personnel. Figures 2-7 through 2-10 illustrate the disassembly and assembly of the UUT and special tools required. Paragraphs 2-6 through 2-18 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-1425-480-24P contains a list of repair parta and special tools authorized for maintenance personnel.

2-6. Eyeshield Removal and installation Procedure (Fig. 2-8)

a. Removal.

(1) To remove eyeshield, APN 10219332, remove screw (3), clamp (4), and eyeshield (5).

(2) To remove eyeshield. APN 10276587, use retaining ring pliers to remove snap ring, APN 10276588.

b. Installation.

(1) Apply a light coat of castor oil (item 20, App. D) on the surface of the eyeshield (5) that comes in contact with the retainer (15).

(2) Install eyeshield, APN 10219332, with clamp (4) and screw (3). Tighten the screw only far enough to allow the eyeshield to be turned without changing the diopter setting.

(3) To install eyeshield, APN 10276587, insert snap ring, APN 10276588, using retaining ring pliers.

2-7. Forward Shock Absorber Removal and Installation Procedure (Fig. 2-8)

a. Removal.

(1) Using a knife and fine abrasive paper, remove forward shock absorber (7) and any residual adhesive from the UUT.

(2) Clean the shock absorber mounting area with isopropyl alcohol (item 7, App. D).

b. Installation.

(1) Apply primer (item 23, App. D) to the surface of the tracker which contacts forward shock absorber (7). Allow the primer to dry one hour.

(2) Bond the forward shock absorber to the UUT with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D). Wipe off excess adhesive.

2-8. Aft Shock Absorber Removal and Installation Procedure

a Removal.

(1) Using a knife and fine abrasive paper, remove aft shock absorbers (8 and 9, fig. 2-8) and any residual adhesive from the UUT.

(2) Clean the shock absorber mounting area with isopropyl alcohol (item 7, App. D).

b. Installation.

(1) Apply primer (item 23, App. D) to the surface of the tracker which contacts shock absorber (9). Allow the primer to dry one hour.

(2) Bond shock absorber to the tracker body with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D). Wipe off excess adhesive.

(3) Apply primer (item 23, App. D) to the surface of plug (16, fig. 2-9) which contacts shock absorber (8, fig. 2-8). Allow the primer to dry one hour.

(4) Using TA-416 as a guide, aline the holes in shock absorber (8) with the holes in the plug. Bond the shock absorber to the plug with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D). Do not allow any adhesive to enter the holes in the plug. Wipe off excessive adhesive.

2-9. Firing Mechanism Boot Removal and Instal - lation Procedure (Fig. 2-8)

a. Removal.

(1) Using a knife, remove boot (10 or 11) and any residual scaling compound from A4 (12).

(2) Clean the boot mounting area with isopropyl alcohol (item 7, App. D).

b. Installation.

(1) Coat mating surfaces of replacement boot and firing mechanism with primer (item 23, App. D). Wait one hour, then bond boot (10 or 11) to A4 (12), using a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D). Wipe off excess adhesive.

(2) On tracker, APN 10276221, install boot (11) by lifting trigger and sliding the boot over the plunger.

2-10. A4 Removal and Installation Procedure

a. Removal.

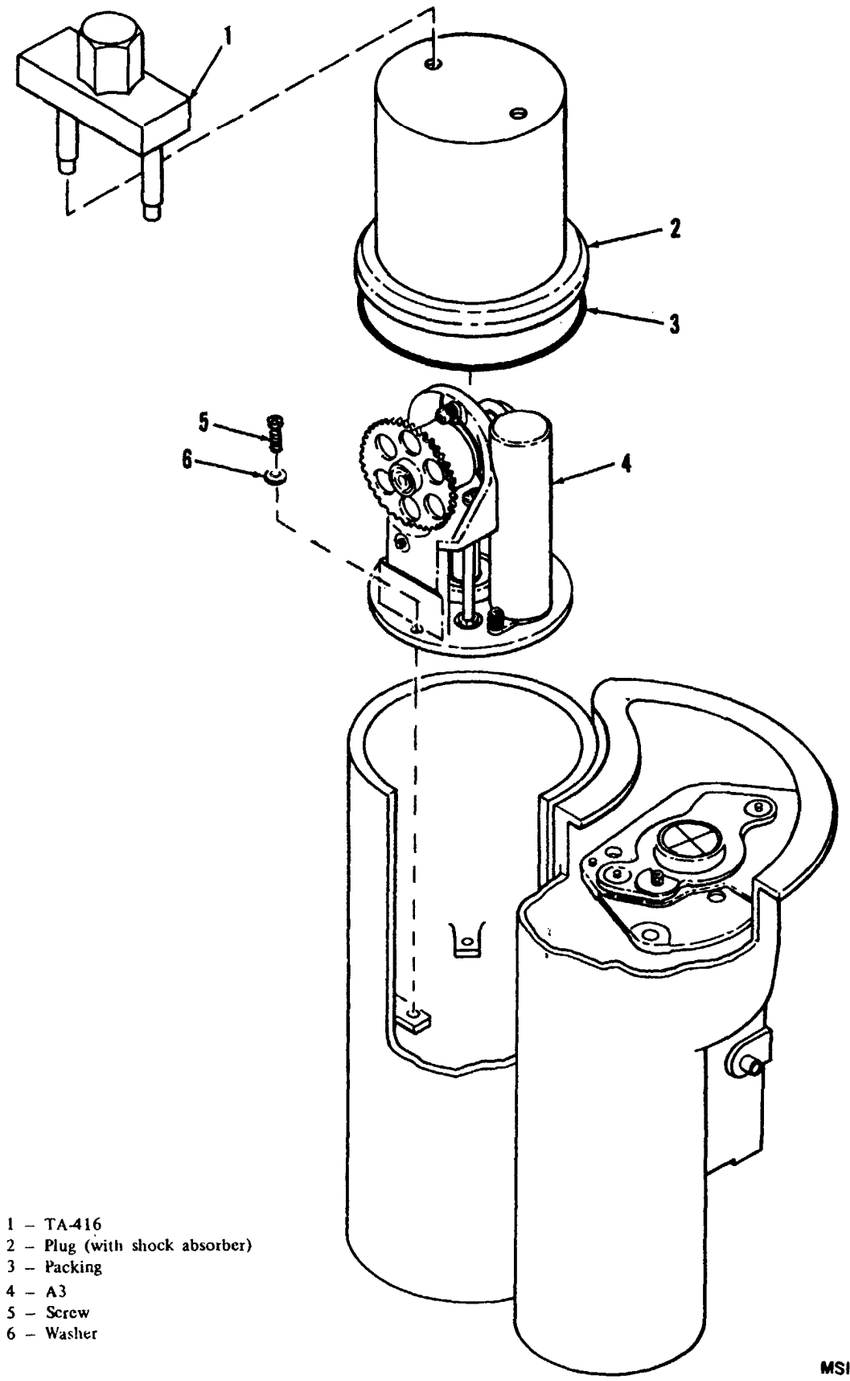
(1) Install the UUT in TA-419, and secure with the retaining straps (fig. 2-10).

CAUTION

If A4 is pulled too far away from the UUT when the mounting hardware is removed, a strain will be put on the leads.

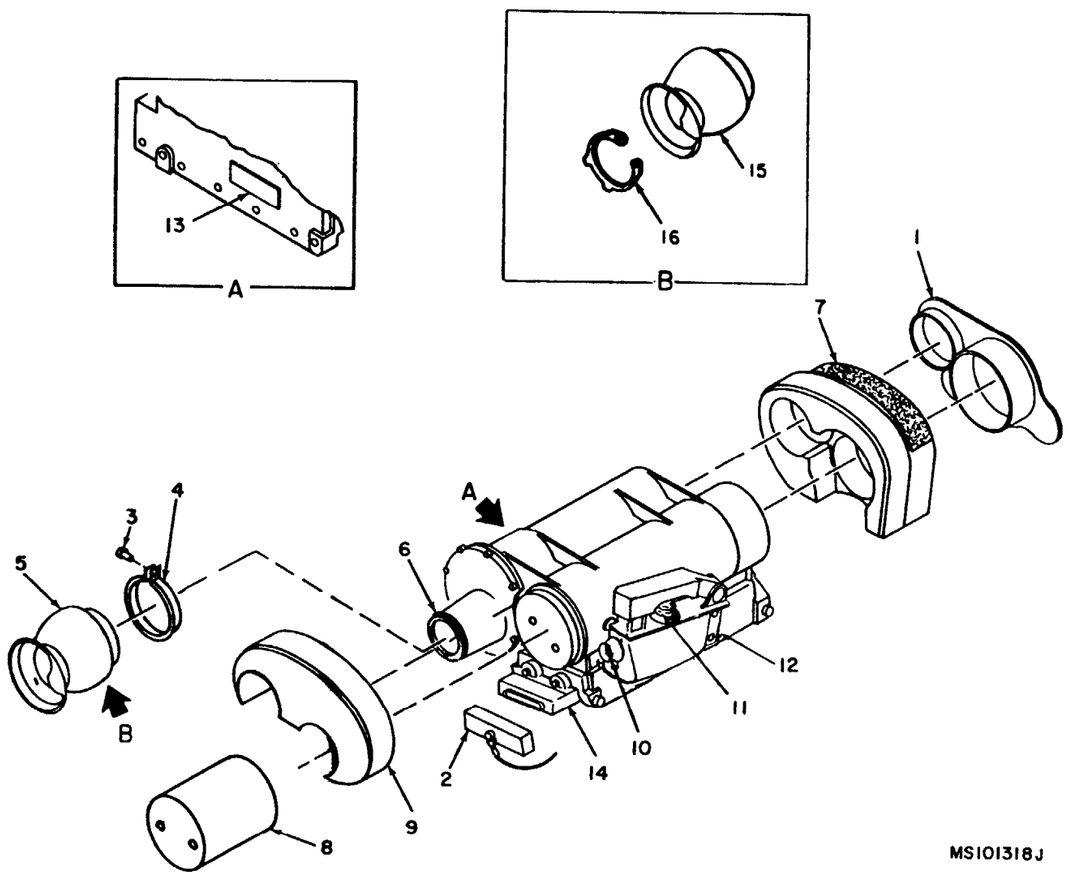
(2) Remove mounting hardware (1 through 4, fig. 2-9), and place A4(5) in its retaining position on TA-419.

(3) Gain access to FL1 terminal (par. 2-12a(3) through (5)).



1 – TA-416
2 – Plug (with shock absorber)
3 – Packing
4 – A3
5 – Screw
6 – Washer

Figure 2-7. Removal and installation of A3.



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1—Cover
2—Cover
3—Screw
4—Clamp
5—Eyeshield
6—Eyepiece assembly and retainer
7—Forward shock absorber
8—Shock absorber
9—Shock absorber
10—Boot
11—Boot
12—A4
13—Identification plate
14—A2P1
15--Eyeshield
16--Snapring

Figure 2-8. Repair of tracker, view 1.

(4) Using a knife, cut the insulation sleeving from the terminal of FL1.

(5) Unsolder the lead from FL1 and the terminal lug, and remove A4.

b. Installation.

(1) Place A4 (5, fig. 2-9) in its retaining position on TA419 (fig. 2-10).

(2) Install insulation sleeving (item 38, App. D) over the blue lead of A4.

(3) Connect the leads to terminal lug (6, fig. 2-9) and FL1 (7). Slide the sleeving over the terminal of FL1, and heat-shrink, using heat gun.

(4) Install FL1 with nut (14).

(5) Pot the area around the terminal lug and FL1 to a thickness of 0.08 inch above the sleeving, with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

(6) Carefully position A2 (13) in the UUT, and install mounting hardware (10, 11, 12, and 36).

(7) Install cover (9) with screws (8). Torque screws to 4 to 5 inch-pounds.

(8) Carefully position A4 on the UUT. Install mounting hardware (1 through 4), and torque bolts (2 and 3) to 12 to 15 inch-pounds.

(9) Remove the UUT from TA-419.

2-11. A2 Removal and Installation Procedure

a. Removal.

NOTE

Remove excess paint and foreign substances from the head of screws (8, fig. 2-9) before removal of the screws.

(1) Remove the screws and cover (9).

CAUTION

If A2 is removed from the UUT when the mounting hardware is removed, a strain will be put on the leads to A2.

(2) Install the UUT in TA-419.

(3) Remove mounting hardware (10, 11, 12, and 36), and place A2 (13) in its retaining position on TA-419 (fig. 2-10), Secure the UUT with the retaining straps.

(4) Disconnect connectors A1W1P1, A4W2P1, and A3W1P1.

b. Installation.

(1) Place a new A2 (13, fig. 2-9) in its retaining position on TA-419 (fig. 2-10).

(2) Install A1W1P1, A4W2P1, and A3W1P1 and torque screws to 32 and 35 inch-ounces.

(3) Carefully position A2 in the UUT and install mounting hardware (10, 11, 12, and 36, fig. 2-9).

(4) If required, install insulating caps (39, fig. 2-9) on the A2 test pins, and seal with insulating compound (item 10, App. D).

(5) Install cover (9) with screws (8). Torque screws to 4 to 5 inch-pounds.

(6) Remove the UUT from TA-419.

2-12. FL 1 Removal and Installation Procedure

a. Removal.

(1) Install the UUT in TA-419, and secure the retain. ing straps (fig. 2-10).

CAUTION

If A4 is pulled too far away from the UUT when the mounting hardware is removed, a strain will be put on the leads.

(2) Remove mounting hardware (1 through 4, fig. 2-9) and place A4 (5) in its retaining position on TA-419.

(3) Remove screws (8, fig. 2-9) and cover (9).

CAUTION

If A2 is removed from the UUT when the mounting hardware is removed, a strain will be put on the leads to A2.

(4) Remove mounting hardware (10, 11, 12, and 36) and place A2 (13) in its retaining position on TA-419 (fig. 2-10).

(5) Using a knife and orange stick, remove the adhesive from terminal lugs (6, fig. 2-9) and FL1 (7).

CAUTION

Be careful not to put a strain on the leads between FL1 and A2.

(6) Remove nut (14) and withdraw FL1 far enough from ita mounting to allow unsoldering.

(7) Using a knife, cut the insulation sleeving from the terminals of FL1.

(8) Unsolder the leads from FL1.

b. Installation

NOTE

Be sure terminal lug (6, fig. 2-9) is located on each side of the housing before installing FL1 (7).

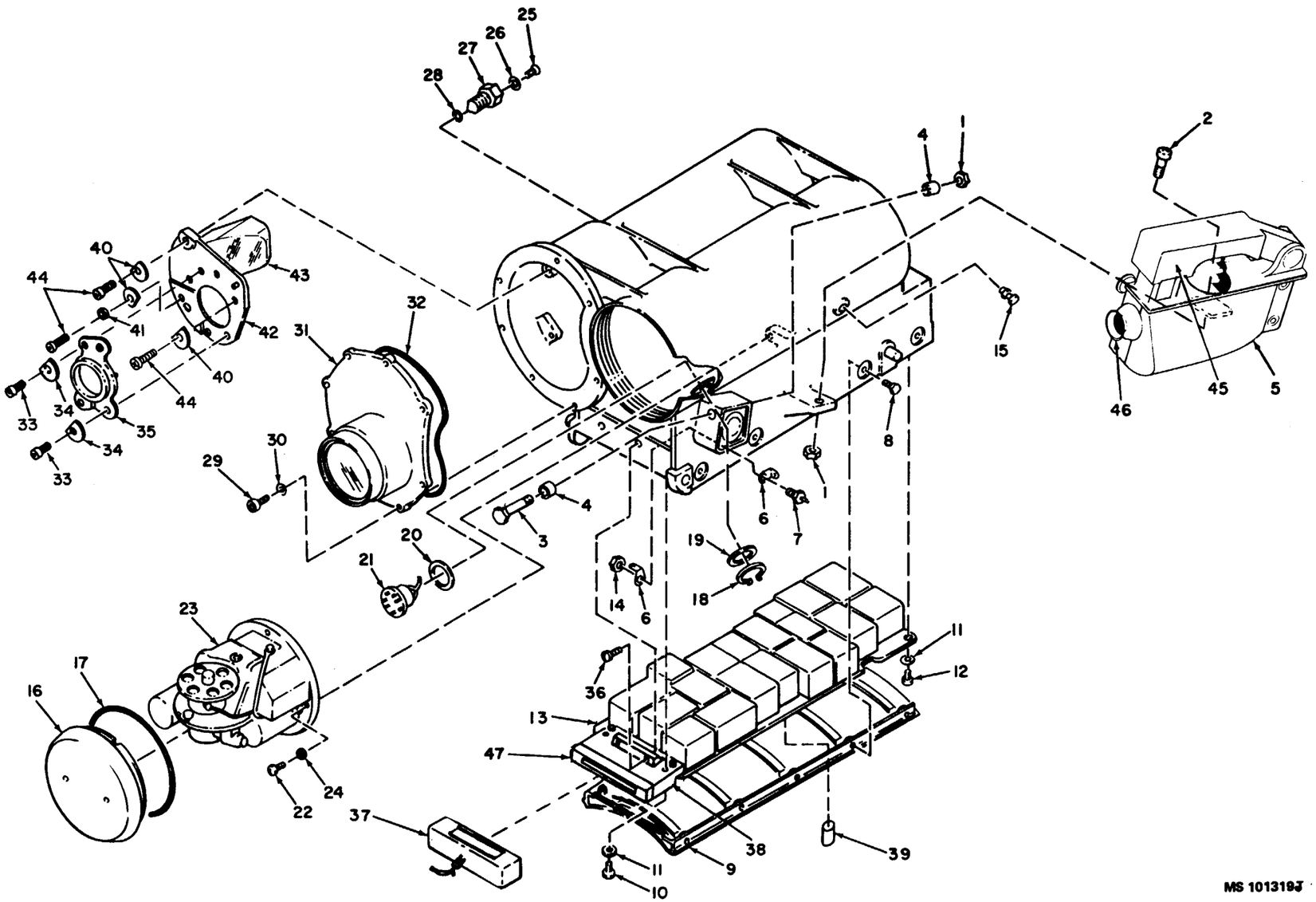
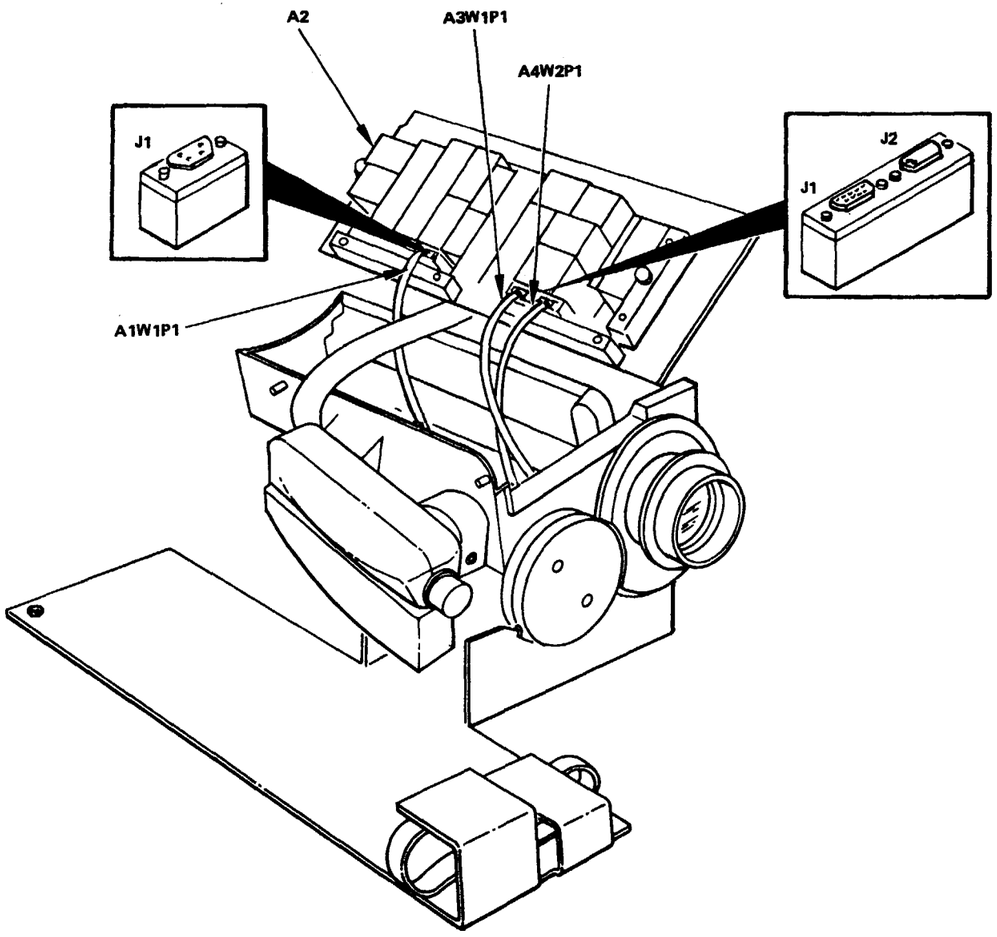


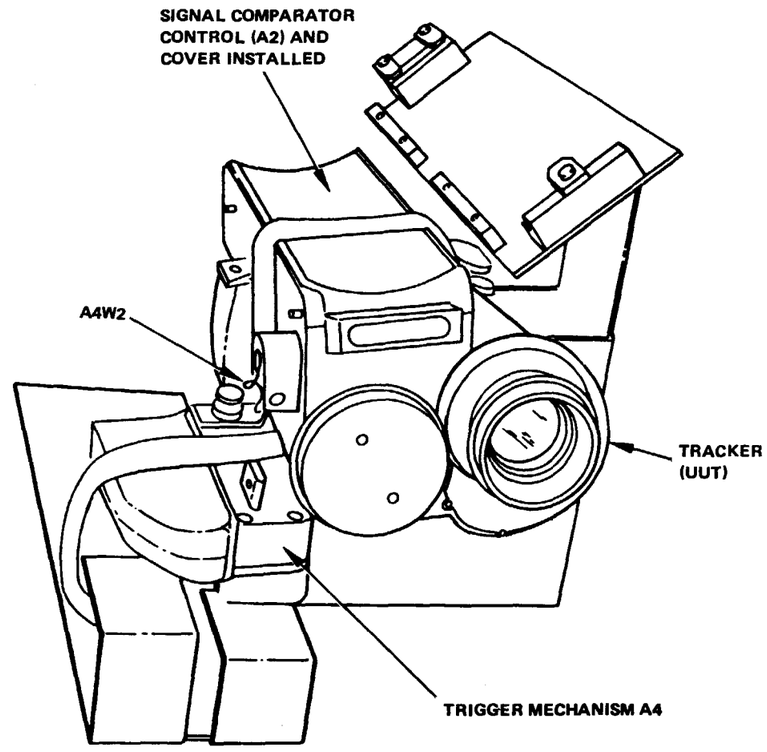
Figure 2-9. Tracker-exploded view.

1–Nut
2–Bolt
3–Bolt
4–Sleeve
5–A4 - firing mechanism
6–Terminal lug
7–FL1
8–Screw
9–Cover
10–Screw
11–Washer
12–Screw
13–A2 - signal comparator control
14–Nut
15–Self-seal screw
16–Plug
17–Packing
18–Retaining ring
19–Washer
20–Packing
21–Terminal assembly
22–Screw
23–A3 - nutator
24–Washer
25–Screw
26–Sealing washer
27–Valve stem
28–Packing
29–Screw
30–Washer
31–Eyepiece assembly
32–Packing
33–Screw
34–Washer
35–Cell assembly
36–Screw
37–Cover
38–A2P1
39–Insulating cap
40–Washer
41–Spring tension washer
42–Prism assembly
43–Prism
44–Screw
45–Trigger lever
46–Trigger safety plunger
47–Cover

Detector A1 not shown
(Depot only)



Tracker mounted (upside down) on TA-419 with bottom cover removed (not shown) and signal comparator control A2 extended on fixture isolator with cables attached.



Tracker mounted (upside down) on TA-419 with trigger mechanism A4 removed and secured on fixture.

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Figure 2-10. Trucker repair fixture (TA-419).

(1) Install insulation sleeving (item 38, App. D) over the blue leads to FL1. Connect the leads to FL1. Slide the sleeving over FL1 terminals, and heat-shrink, using heat gun.

(2) Install FL1 with nut (14), and torque nut to 4 to 5.5 inch-pounds.

(3) Pot the area around the terminal lugs and FL1 to a thickness of 0.08 inch above the sleeving, with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

(4) Carefully position A2 (13) in the UUT and install mounting hardware (10, 11, 12, and 36).

(5) Install cover (9) with screws (8). Torque screws to 4 to 5 inch-pounds.

(6) Carefully position A4 (5) on the UUT. install mounting hardware (1 through 4), and torque bolts (2 and 3) to 12 to 15 inch-pounds.

(7) Remove the UUT from TA-419.

2-13. A3 Removal and Installation Procedure

a. Removal.

NOTE

Do not remove the defective A3 from the tracker until a serviceable replacement is available to insure that a shipping container is available.

WARNING

Be sure the UUT is depressurized before performing A3 removal procedure.

(1) Depressurize the UUT by carefully removing self seal screw (15, fig. 2-9).

(2) Install TA-422 on the connector well on 2A3A4.

NOTE

It is necessary to remove the shock absorber from the plug.

(3) Using TA-416 (1, fig. 2-7) remove plug (2) and packing (3).

NOTE

The forward shock absorber must be on the UUT.

(4) Remove cover (1, fig. 2-8).

(5) Stand the UUT on the forward shock absorber on TA-422 in the clean booth.

NOTE

Remove excess paint and foreign substance from head of screws (8, fig. 2-9) before removal of the screws.

(6) Remove screws and cover (9).

CAUTION

If A2 is removed from the UUT when the mounting hardware is removed, a strain will be put on the leads to A2.

(7) Remove mounting hardware (10, 11, 12, and 36), and pull A2 (13) far enough out of the UUT to gain access to the connector. Protect A2 while working on the UUT.

NOTE

It may be necessary to remove residual adhesive from the A2 side of terminal assembly (21). Remove only enough adhesive to allow removal of the retaining ring and washer.

(8) Loosen screws and disconnect A3W1P1 from A2.

(9) Remove retaining ring (18) and washer (19) (located in the A2 compartment), and slide the washer along the cable and over connector A3W1P1.

CAUTION

Use gloves (item 15, App. D) in performing all steps in handling A3.

(10) Loosen screws (5, fig. 2-7) and carefully remove A3 while pushing terminal assembly (21, fig. 2-9) and connector A3W1P1 into the A3 compartment from the A2 compartment.

(11) Remove and retain screws (5, fig. 2-7) and washers (6).

b. Installation.

CAUTION

Use gloves (item 15, App. D) in performing all steps in handling A3.

(1) Lightly coat the threads of screws (5) with molybdenum disulfide (item 18, App. D) and wipe off excess.

(2) Insert connector A3W1P1 through the terminal assembly hole (21, fig. 2-9) from the A2 compartment into the A3 compartment.

(3) Install new packing (20), coated with silicone compound (item 13, App, D), washer (19), and retaining ring (18) on terminal assembly (21) by sliding over connector (3, fig. 2-10) and cable. Wipe away any excess silicone compound.

(4) Place washers (5) over their respective holes on A3 (7) and insert screws through washers and A3. Carefully place A3 in the UUT and torque screws to 4 to 5.5 inch-pounds.

CAUTION

If A2 is removed from the UUT when the mounting hardware is removed, a strain will be put on the leads to A2.

(5) Remove mounting hardware (10, 11, 12, and 36) and pull A2 (13) far enough out of the UUT, to gain access to the wiring. Protect A2 while working on the UUT.

(6) Install A2 with the mounting hardware (10, 11, 12, and 36).

(7) Install cover (9) with screws (8). Torque screws to 4 to 5 inch-pounds.

(8) Carefully dress the leads to A3 from the terminal assembly.

(9) Install cover (1, fig. 2-8) on the UUT.

(10) Coat a new packing (17, fig. 2-9) with silicone compound (item 13, App. D) and install on plug (16).

NOTE

Be sure TA-416 remains fully mated in the plug white torquing.

(11) Install the plug on the UUT, using TA-416. Torque to 80 to 100 inch-pounds. Wipe away any excess silicone compound.

(12) Install self-seal screw (15).

(13) Remove TA-422 from the connector well on 2A3A4.

(14) Purge the UUT (par. 2-14).

2-14. Purging Procedure (Fig. 2-9)

a. Remove self-seal screw (15).

b. Remove screw (25) and sealing washer (26).

c. Remove valve stem (27), and packing (28).

d. Lightly coat the valve stem and a new packing with silicone compound (item 13, App. D),wipe away any excess silicone compound, and install in the UUT, but do not tighten at this time.

e. Install TA-418 in the valve stem.

f. Connect the purging hose between the quick disconnect in the connector well on 2A3A4 and TA-418.

g. Position the front panel controls on 2A1A2 as follows:

(1) Set the VACUUM PUMP ON/OFF switch to OFF.

(2) Turn the PRESSURE SELECTOR fully CCW .

(3) Turn the NITROGEN SUPPLY VALVE fully CCW.

(4) Turn the VACUUM LINE VALVE fully CW.

NOTE

Be sure the valve stem is not seated in the UUT.

NOTE

Nitrogen will escape from the orifice where self-seal screw (15) was removed.

h. Turn the PRESSURE SELECTOR control on 2A1A2 CW until the UUT gage reads 5 PSIG. Allow nitrogen (item 19, App. D) to flow through the UUT for a period of five minutes.

i. Lightly coat the self-seal screw with silicone compound (item 13, App. D), wipe away any excess silicone compound, and install the self-seal screw while the nitrogen is still escaping.

j. Turn the PRESSURE SELECTOR control on 2A1A2 CW until the UUT gage reads 11.0 PSIG.

k. Turn the NITROGEN SUPPLY VALVE fully CW.

l. Turn the PRESSURE SELECTOR fully CCW.

m. Wait 30 minutes.

(1) If the UUT gage reads 10.5 PSIG or greater, proceed to step *n*.

(2) If the UUT gage reads less than 10.5 PSIG, return the UUT to the depot (par. 2-24).

n. Tighten the valve stem on the UUT. Turn the NITROGEN SUPPLY VALVE fully CCW, and pull out the RELIEF & BLEED VALVE for 10 seconds and then release, or rotate valve cap ccw 1/2 turn for 10 seconds.

o. Disconnect the purging hose from the quick-disconnect in the connector well on 2A3A4 and TA-418.

p. Remove TA-418 from the valve stem on the UUT. Be sure not to loosen the valve stem.

q. Lightly coat the screw (25) and a new sealing washer (26) with silicone compound, (item 13, App. D) and wipe away any excess silicone compound. Install the screw and sealing washer in the valve stem.

2-15. Eyepiece Assembly Removal and Installation Procedure

a. Removal.

(1) Remove the eyeshield (par. 2-6 *a).*

WARNING

Be sure the UUT is depressurized before performing the eyepiece assembly removal proecedures.

(2) Repressurize the UUT by carefully removing self-seal screw (15, fig. 2-9).

(3) Remove mounting hardware (29 and 30), eyepiece assembly (31), and packing (32).

b. Installation.

(1) Lightly coat a new packing (32) with silicone compound (item 13, App. D), wipe away any excess silicone compound, and install on eyepiece assembly (31).

(2) Install the eyepiece assembly with mounting hardware (29 and 30). Torque the screw to 2 to 3 inch-pounds. Wipe away any excess silicone compound.

(3) Install the eyeshield (par. 2-6b).

(4) Install self-seal screw (15, fig. 2-9).

(5) Purge the UUT (par. 2-14).

2-15.1. Retainer Installation Procedure

NOTE

When a new eyepiece assembly APN 10219552 is requisitioned, a new retainer 10276581 , eyeshield 10276587, and snap ring 10276588 must atso be requisitioned for installation on the new eyepiece assembly (fig. 2-8).

Clean the retainer mounting area on the eyepiece assembly. Apply locking compound (item 11, App. D) to the threads of the retainer. Thread the retainer on the eyepiece assembly (6, fig. 2-8). Remove any excess locking compound.

2-16. Cell Assembly Removal and Installation Procedure

a. Removal.

WARNING

Be sure the UUT is depressurized before performing the eyepiece assembly removal procedures.

(1) Repressurize the UUT by carefully removing self-seal screw (15, fig. 2-9).

(2) Remove mounting hardware (29 and 30), eyepiece assembly (31), and packing (32).

CAUTION

Use gloves (item 15, App. D) when handling the cell assembly.

(3) Remove mounting hardware, two each (33 and 34), and carefully remove cell assembly (35).

b. Installation

CAUTION

Use gloves (item 15, App. D) when handling the cell assembly.

(1) Carefully position cell assembly (35, fig. 2-9) in the UUT, and install mounting hardware (33 and 34). Torque the screws to 2 to 3 inch-pounds.

(2) lightly coat a new packing (32) with silicone compound, and install on eyepiece assembly (31).

(3) Install the eyepiece assembly with mounting hardware (29 and 30). Torque the screw to 2 to 3 inch-pounds. Wipe away any excess silicone compound.

(4) Install self-seal screw (15).

(5) Purge the UUT (par. 2-14).

2-17. Prism Removal, Cleaning, and Installation Procedure (Fig. 2-9)

a. Remove eyepiece assembly (31) in accordance with paragraph 2-15.

CAUTION

In the following steps, care should be taken not to scratch or touch the prism. Use gloves (item 15, App. D) when handling the prism assembly.

b. Remove prism assembly (42) with cell assembly (35) attached by removing three screws (44), three flat washers (40), and one spring tension washer (41),

c. Clean the prism (43) by wetting a cotton swab (item 14, App. D) with ethyl alcohol (item 6, App. D), starting at one end of the prism and draw the cotton swab straight across the prism surface and completely off the opposite end of the prism in one stroke, repeat this procedure, slightly overlapping each stroke until the prism is cleaned. Keep alcohol off of blackened area and adhesive portions of prism.

d. Install prism by replacing prism assembly (42) in tracker housing (fig. 2-9) using three flat washers, one expansion washer, and socket head screws.

e. Install eyepiece assembly (31) in accordance with paragraph 2-15.

2-18. Identification Plate Removal and Installation Procedure (Fig. 2-8)

a. Removal.

(1) Using a knife, remove identification plate (13), and any residual adhesive.

(2) Clean the identification plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Mark new identification plate (13) with the same information that appeared on the old plate.

(2) Bond the identification plate to the UUT, using a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

2-19. Connector Cover Removal and Installation Procedure (Fig. 2-9)

a. Removal. Remove cover (37) from P1 (38).

b. Installation. Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. B) to the surface of cover (47) which contacts P1 (38), and install the cover on P1.

2-20. A3W1 Lead Assembly Removal and installation Procedures

a. Removal.

(1) Remove A3 (par. 2-13).

(2) Using a knife, cut the insulation sleeving from the terminals of TB1.

(3) Unsolder the leads from TB1.

b. Installation

NOTE

When soldering wires to TB1, insure that no more than 50 ± .20 inch of unshielded wire is exposed after soldering.

(1) Install insulation sleeving (item 38, App. D) over the leads of A3W1.

(2) Solder the leads of new A3W1 to TB1 (fig. 2-6).

(3) Slide the sleeving over the terminals, and heat-shrink, using heat gun.

(4) Install A3 (par. 2-13).

2-21. W1 Lead Assembly Removal and Installation Procedure

a Removal.

(1) Remove A2 (par. 2-11).

(2) Using a knife and orange stick, remove the adhesive from A1TB1.

(3) Using a knife, cut the insulation sleeving from the terminals of TB1.

(4) Unsolder the leads from TB1.

b. Installation.

NOTE

When soldering wires to TB1, insure that no more then .50 ± .20 inch of unshielded wire is exposed after soldering.

(1) Install insulation sleeving (item 38, App. D) over the leads of W1.

(2) Solder. the leads of new W1 to the terminals of TB1 (fig. 2-6).

(3) Slide the sleeving over the terminals and heat-srink, using heat gun.

(4) Pot the area around TB1 to a thickness of 0.08 inch above the sleeving with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

2-22. W2 Lead Assembly Removal and Installation Procedure

a. Removal.

(1) Remove A2 (par. 2-11).

(2) Using a knife and orange stick, remove the adhesive from terminal lug (6, fig. 2-9) and FL1 (7).

(3) Using a knife, cut the insulation sleeving from the terminals of FL1.

(4) Unsolder W2 leads from FL1.

b. Installation.

(1) Install insulation sleeving (item 38, App. D) over the leads of W2.

(2) Solder the leads of new W2 to the terminals of FL1 (fig. 2-6).

(3) Slide the sleeving over the terminals and heat-shrink, using heat gun.

(4) Pot the area around FL1 to a thickness of 0.08 inch above the sleeving with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

(5) Install A2 (par. 2-11).

2-23. Painting

Touch up the exterior of the tracker as follows:

a. Apply primer (item 24, App. D). Allow to dry.

b. Apply enamel (item 21, App. D) 2 hours after primer is applied.

2-24. Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Ensure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

CHAPTER 3

MONITORING SET (1A1)

Section I. PROGRAMMED TESTS

3-1. General

This chapter provides the information necessary to isolate and repair a fault in the monitoring set (UUT) to a faulty subassembly or chassis installed component. Figures 3-3 through 3-6 are provided as an aid in troubleshooting the UUT.

3-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT.

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB-402
c. Multimeter	
d. Deleted	
e. Passive probe	TA-108
f. Digital multimeter probe	TA-109
g. Lead	TA-205
h. Cable (needle probe)	TA-208
i. Lead	TA-216
j. Cable	TA-232
k. Extender board	TA-408
l. Extender board	TA-410
m. Extender board	TA-411
n. Extender board	TA-412
o. Extender board	TA-413
p. Extender board	TA-414
q. Shorting plug	TA-440
r. Cable	CA-9
s. Cable	CA-34
t. Cable	CA-35
u. Cable	CA-39 (2 required)
v. Cable	CA-411
w. Cable	CA-412
x. Cable	CA-413
y. Cable	CA-414

3-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care when performing the manual procedures

a. Before performing the programmed tests, ensure that batteries in the UUT have been charged in accordance with TM 9-6920-480-12-1, At programmed test completion, or if the WT is to be shipped to the depot for further testing or repair, recharge the batteries.

b. Before performing the programmed tests, remove the cover from the lower case by releasing the eight latches. Remove the 24 screws and sealing washers and remove the monitoring set panel from the lower case. Visually inspect the front panel for damage to the meters, switches, indicators, connectors, humidity indicators, and plate assembly, Replace any damaged components. Also visually inspect the wiring for disconnected wires and obvious short circuits. Repair as required. At the programmed test completion, or if the UUT is to be shipped to the depot for further testing or repair, install the monitoring set panel in the lower case with 24 screws and sealing washers. Install the top cover on the lower case and fasten the eight latches.

c. After a successful programmed test completion, perform a continuity test of the UUT cables (see TM 9-4935-484-14).

d. When a UUT component is called out by its reference designator in a REF TM, that reference designator should be prefixed with 1A1 to be complete. The following chart gives the name and reference designator of the UUT and its major subcomponents.

Name	Ref. Desig.
UUT	1A1
Battery charger	(1A1)A1
UUT electronics	(1A1)A2
Relay-diode assembly	(1A1)A3

e. When removal of A2A1 through A2A7 (3 through 9, fig. 3-3) is required, use extraction tool (2).

f. When the program or a REF TM requirea probing and/or adjustments to A2A1 through A2A7, remove the two screws and the circuit board extraction tool and open the door to A2.

g. Disregard the indicator lights on the UUT, unless otherwise directed by the program.

h. When the program or REF TM requires probing through the conformal coating on A2Al through A2A7, use TA-208. Use TA-205 when the program or REF TM requires a probe connection to a small component,

i. At the completion of programmed tests, unless directed by the program, remove any extender boards and reinstall A2A1 through A2A7 and connect P1 to A3.

j. When the program or REF TM requires probing R1, R2, S1, S3 through S8, refer to figure 3-4 for probing locations.

k. When the program or REF TM requires probing of TB2-2 or TB2-8, use CA-39 to extend TA-109.

l. Before beginning the programmed tests, remove and test the fuses in the UUT. Replace any faulty fuses.

m. When required, use TA-216 to extend the length of TA-108.

3-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

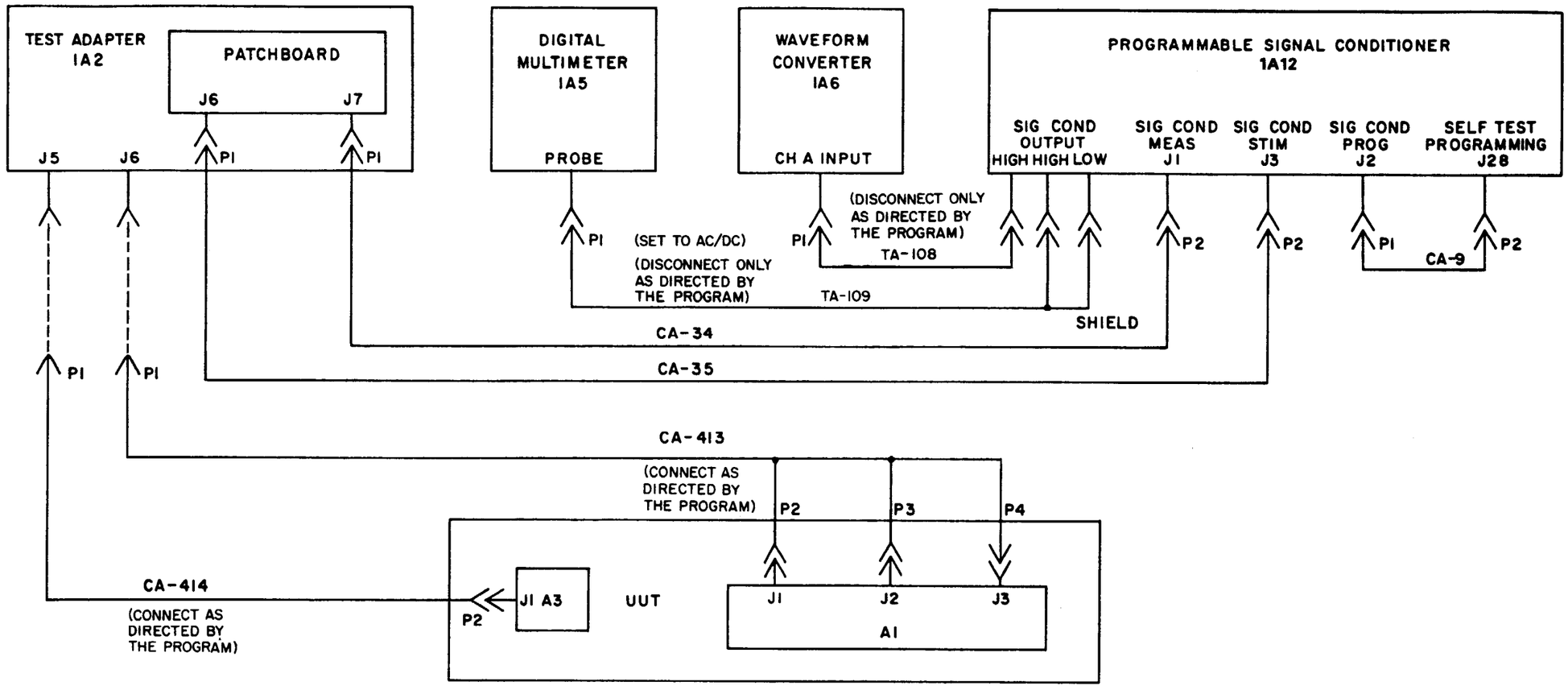
(1) Dial 5200000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUBMODE switch to NORMAL.

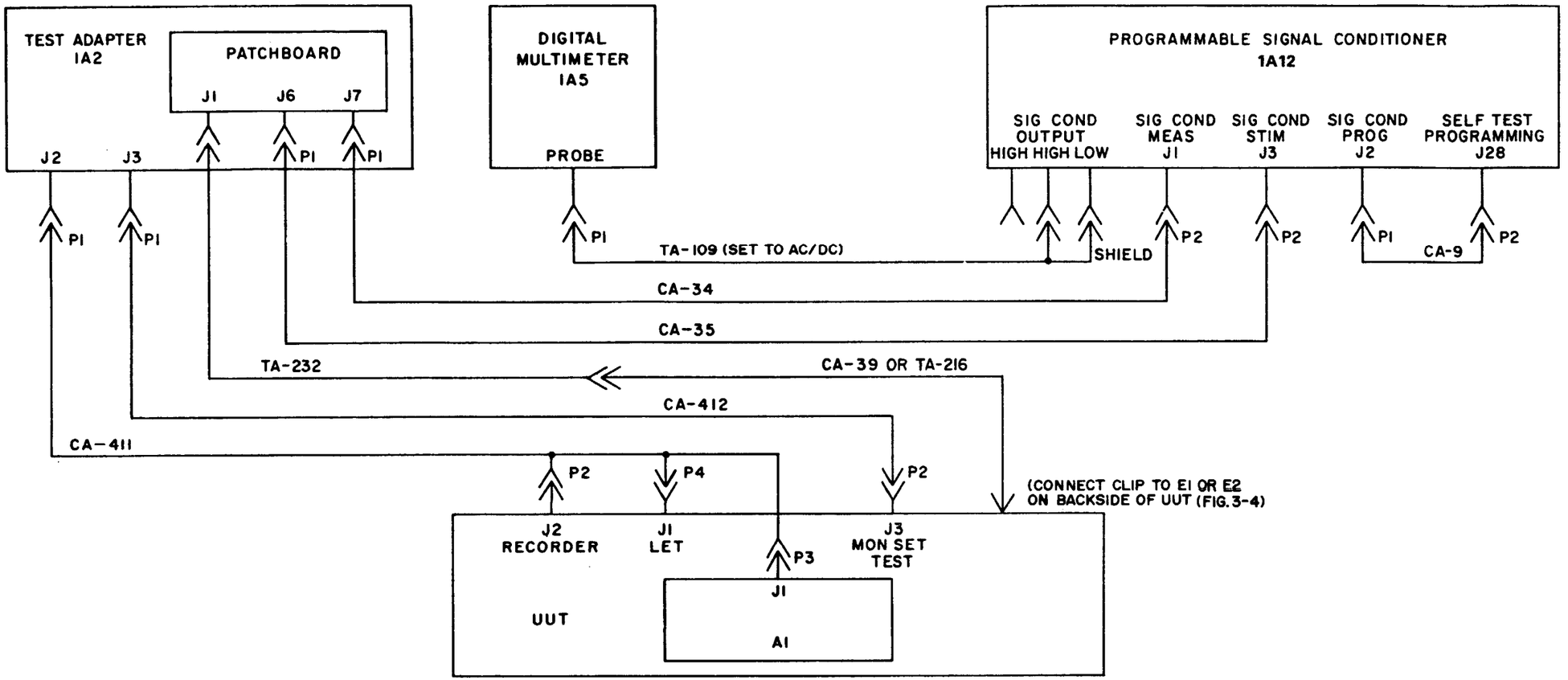
(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in message.



MS 101316D

Figure 3-1. Cable hookup diagram.



MS 101317D

Figure 3-2. Cable hookup diagram.

Table 3-1. Monitoring Set (1A1), Programmed Tests.

Print message ref no.	Action or instructions
REF TM 1 through REF TM 4	Discontinue UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 5	*a.* Install the patchboard. *b.* Set the MS/TR switch, on the patchboard, to MS. **NOTE** Do not connect CA-413 or CA-414 to A2 or the UUT at this time. *c.* Perform the cable hookup (fig. 3-1). *d.* Press the PROCEED switch.
REF TM 6	*a.* Disconnect CA-414 from 1A2 and A3J1. *b.* Connect P3, in the UUT, to A3J1. *c.* Disconnect P2 from A1J2. *d.* Connect CA-413 to 1A2 and the UUT (fig. 3-1). *e.* Position the switches on A1 as follows: (1) Set the EXTERNAL POWER switch to OFF. (2) Set the INTERNAL POWER switch to OFF. (3) Position the METER switch to OFF. *f.* Press the PROCEED switch.
REF TM 7	*a.* Observe both the needles on the TRACKER INDICATOR SCORE meter on the UUT. (1) If both the needles are visible and centered at 100, proceed to step *b.* (2) If either of the needles is missing or not centered over 100, replace M1 (par. 3-10). *b.* Turn the HORIZ BIAS ADJ and VERT BIAS ADJ controls fully CCW. *c.* Perform the cable hookup (fig. 3-2). *d.* Position the switches on the UUT as follows: (1) Set the TRACKER BIAS switch to MANUAL. (2) Set the TARGET SIZE switch to STATIONARY. (3) Position the TARGET RANGE switch to 1. (4) Set the TRACKER RANGE switch to (R) 1-3. (5) Set the RECORDER switch to CAL 1. (6) Set the EXTERNAL POWER switch to OFF. (7) Set the INTERNAL POWER switch to OFF, (8) Position the METER switch to OFF. (9) Disconnect TA-108. **NOTE** Be sure P2 is not connected to UUT A1J2. *f.* Press the PROCEED switch.
REF TM 8	Replace A1 (par. 3-6).
REF TM 9	*a* If required, reinstall the removed A2A1 through A2A7. *b.* AN/TSM-93 resistance measurements indicated that an open wire or faulty connector exists in the UUT wiring harness. Use standard troubleshooting procedures to isolate the fault. When the fault has been corrected, rerun the program.

Table 3-1. Monitoring Set (1A1), Programmed Tests - Continued.

Print message ref. no.	Action or instruction
REF TM 10	*a.* If the HIT or MISS lamp is off, dial the number for that lamp, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch. If both lamps are off, dial the number for the HIT lamp into the UUT TEST NUMBER switches and press the START TEST switch. *b.* If any of the other lamps are off, press the HALT switch and proceed to step *c.* *c.* Position the controls on the UUT as follows: (1) Set the TRACKER BIAS switch to MANUAL. (2) Set the TARGET SIZE switch to STATIONARY. (3) Position the TARGET RANGE switch to 1. (4) Set the TRACKER POWER switch to (R) 1-3. (5) Position the RECORDER switch to CAL 1. (6) Set the EXTERNAL POWER switch to OFF. (7) Set the INTERNAL POWER switch to OFF. *d.* Set the INTERNAL POWER switch to ON and press the RESET switch. Set and hold the LIGHTS TEST switch in the ON position and record the lamp(s) that is out. Release the LIGHTS TEST switch. **NOTE** It may be necessary to reverse the leads of the multimeter to obtain a meter reading. *c.* Remove the screws, bezel, and lamp of the indicator that is out. Set and hold the LIGHTS TEST switch in the ON position and measure the voltage across the exposed contacts. Perform the corrective action given in the following chart. **NOTE** After the voltage measurement has been performed, release the LIGHTS TEST switch and set the INTERNAL POWER switch to OFF.

Lamp	Reference designator	Voltage measurement	Corrective action
TRIG	DS14	Greater than 10 VDC	Replace lamp.
		Less than 10 VDC	Proceed to step *g.*
XMTR	DS15	Greater than 10 VDC	Replace lamp.
		Less than 10 VDC	Replace A2A4.
TARGET RANGE 1 2 3 4 5 6	 DS1 DS2 DS3 DS4 DS5 DS6	 Greater than 10 VDC Less than 10 VDC	 Replace lamp (par. 3-19). Replace A2A5.

Table 3-1. Monitoring Set (1A1). Programmed Tests -Continued.

Print Message ref no.	Action or instructions			
	Lamp	Reference designator	**Voltage measurement**	**Corrective action**
REF TM 10 Continued	TARGET RANGE			
	7	DS7	Gteater than	Replace lamp
	8	DS8	10 VDC	(par. 3-19).
	9	DS9	Less than	Replace A2A6.
	10	DS10	10 VDC	
	UP	DS13	Greater than	Replace lamp.
	L	DS16	10 VDC	
	DN	DS17	Less than	Proceed to
	R	DS18	10 VDC	step *f*.

NOTE

Be sure the INTERNAL POWER switch is set to OFF.

f. While holding the LIGHTS TEST switch in the ON position, measure the resistance between S8-5 **and** S8-6 with the multimeter.

(1) If the meter reading is greater than 10 ohms, replace S8.
(2) If the meter reading is less than 10 ohms, replace A2A4.

NOTE

Ee sure the INTERNAL POWER switch is set to OFF.

g. While holding the LIGHTS TEST switch in the ON position, measure the resistance between S8-2 **and** S8-3 with the multimeter.

(1) If the meter reading is greater than 10 ohms, replace S8.
(2) If the meter reading is less than 10 ohms, replace A2A4.

REF TM 11 Disconnect P1 from M1 and verify that M1 is centered at 100.

a. If M1 is centered at 100, reconnect P1 to M1 and replace A2A3.

b. If M1 is not centered at 100, replace M1 (par. 3-10).

REF TM 12 *a.* Using standard troubleshooting techniques, check A2C1, W1C1, W1C2, W1C6, W1C7, and W1C10 for a short. If a short is found, replace the shorted component. If no short is found, proceed to step *b.*

b. A line short or faulty connector exists in the +13V REG line, in the UUT wiring harness. Use standard troubleshooting procedures to isolate the fault. When the fault has been corrected, rerun the program.

REF TM 13 *a.* Using standard troubleshooting techniques, check A2C2, W1C3, W1C4, W1C5, W1C8, and W1C9 for a short. If a short is found, replace the shorted component. If no short is found, proceed to step *b.*

b. A line short or faulty connection exists in the -13V REG line in the UUT wiring harness. Use standard troubleshooting procedures to isolate the fault. When the fault is corrected, rerun the program.

REF TM 14 Using standard troubleshooting procedures test between the following points in the UUT for an open.

A1J3-E/XA7-K
XA7-K/XA2-7

Table 3-1. Monitoring Set (1A1). Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 14 Continued	*a.* If an open is found, replace the faulty wire and rerun the program. *b.* If no open is found, replace A2A2.
REF TM 15	Discontinue UUT test, and run cofidence and maintenance test program in accordance with TM 9-4935-552-14/2. If an ALL TESTS GO is displayed on SSVD, run the programmable signal conditioner program (see TM 9-1425-550-10).
REF TM 16	*a.* If the TARGET RANGE switch is set to position 1 through 6, remove A2A4 and A2A5 and install TA-411 in XA4 and TA-412 in XA5. Note the position of the TARGET RANGE switch, and proceed to step *c.* *b.* If the TARGET RANGE switch is set to position 7 through 10, remove A2A4 and A2A6 and install TA-411 in XA4 and TA-413 in XA6. Note the position of the TARGET RANGE switch, and proceed to step *c.* *c.* Set TA-109 to RES and connect TA-109 to the UUT, in accordance with the following chart. After TA-109 is connected, press the PROCEED switch.

Position of target range switch as noted above	Connect TA-109 to
1	XA4-8/XA5-2
2	XA4-8/XA5-F
3	XA4-8/XA5-L
4	XA4-8/XA5-T
5	XA4-8/XA5-x
6	XA4-8/XA5-B
7	XA4-8/XA6-20
8	XA4-8/XA6-19
9	XA4-8/XA6-9
10	XA4-8/XA6-10

REF TM 17 *a.* If the TARGET RANGE switch is set to position 1 through 6, remove A2A4 and A2A5 and install TA-411 in XA4 and TA-412 in XA5. Note the position of the TARGET RANGE switch, and proceed to step *c.*

b. If the TARGET RANGE switch is set to position 7 through 10, remove A2A4 and A2A6 and install TA-411 in XA4 and TA-413 in XA6. Note the position of the TARGET RANGE switch, and proceed to step *c.*

c. Set TA-109 to RES and connect TA-109 to the UUT, in accordance with the following chart. After TA-109 is conneeted, press the PROCEED switch.

Position of target range switch as noted above	Connect TA-109 to
1	XA4-X/XA5-B
2	XA4-X/XA5-E
3	XA4-X/XA5-K
4	XA4X/XA5-S
5	XA4-X/XA5-w
6	XA4-X/XA5-A
7	XA4-X/XA6-25
8	XA4-X/XA6-23
9	XA4-X/XA6-5
10	**XA4-X/XA6-6**

Table 3-1. Monitoring Set (1A1), Programmed Tests - continued

Print message ref no.	Action or instructions
REF TM 18	*a.* If the TARGET RANGE switch is set to position 1 through 6, remove A2A4 and A2A5 and install TA-411 in XA4 and TA-412 in XA5. Note the position of the TARGET RANGE switch, and proceed to step c. *b.* If the TARGET RANGE switch is set to position 7 through 10, remove A2A4 and A2A6 and install TA-411 in XA4 and TA-413 in XA6. Note the position of the TARGET RANGE switch, and proceed to step *c.* *c.* Set TA-109 to RES and connect TA-109 to the UUT, in accordance with the following chart. After TA-109 is connected, press the PROCEED switch.

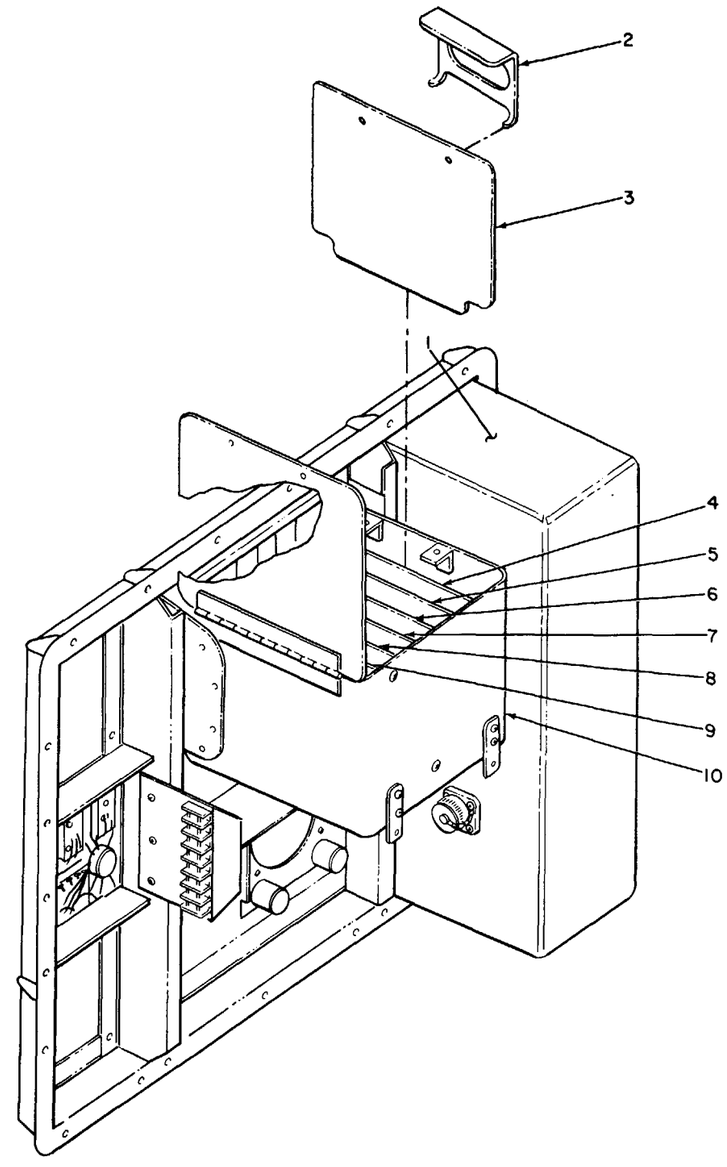
Position of target range switch as noted above	Connect TA-109 to
1	XA4-11/XA5-C
2	XA4-11/XA5-H
3	XA4-11/XA5-M
4	XA4-11/XA5-U
5	XA4-11/XA5-y
6	XA4-11/XA5-C
7	XA4-11/XA6-13
8	XA4-11/XA6-15
9	XA4-11/XA6-11
10	XA4-11/XA6-12

REF TM 19	*a.* If the TARGET RANGE switch is set to position 1 through 6, remove A2A4 and A2A5 and install TA-411 in XA4 and TA-412 in XA5. Note the position of the TARGET RANGE switch, and proceed to step *c.* *b.* If the TARGET RANGE switch is set to position 7 through 10, remove A2A4 and A2A6 and install TA-411 in XA4 and TA-413 in XA6. Note the position of the TARGET RANGE switch, and proceed to step *c.* *c.* Set TA-109 to. RES and connect TA-109 to the UUT, in accordance with the following chart. After TA-109 is connected, press the PROCEED switch.

Position of target range switch as noted above	Connect TA-109 to
1	XA4-23/XA5-A
2	XA4-23/XA5-D
3	XA4-23/XA5-J
4	XA4-25/XA5-R
5	XA4-23/XA5-V
6	XA4-23/XA5-Z
7	XA4-23/XA6-28
8	XA4-23/XA6-26
9	XA4-23/XA6-B
10	XA4-23/XA6-J

Table 3-1. Monitoring Set (1A1), Programmed Tests - continued.

Print message ref no.	Action or insturction
REF TM 20	*a.* Replace batteries called out in the program. *b.* Rerun the program. *c.* If the failure occurs again, use standard troubleshooting procedures and check for an opening between the following points in the UUT with the multimeter: A1P2B/BT4- A1P2-A/BT1+ A1P2-D/TB1-8 A1J3-P/TB1-4 A1J3-R/TB1-8 TB1-4/TB1-8 A1J3Q/TB2-7 TB2-8/A1P2-F A1P2-C/BT3+ TB1-4/A1P2-E *d.* Repair the open and rerun the program.
REF TM 21	Replace the S2 wafer (par. 3-8), indicated in the print message.
REF TM 22	Replace M1 (par. 3-10).
REF TM 23	Replace S6 (par. 3-13).
REF TM 24	Replace S2 (par. 3-11).
REF TM 25	Replace R1 or R2 (par. 3-12).
REF TM 26	Using standard troubleshooting procedures, check for an open between J3-J/XA2-E in the UUT with the multimeter. *a.* If an open is found, replace the wire and rerun the program. *b.* If no open is found, replace A2A7.
REF TM 27	Measure the resistance between S5-2 and S5-3 with the multimeter. *a.* If the meter reading is greater than 10 ohms, replace S5. *b.* If the meter reading is less than 10 ohms, an open exists in the wiring between J1-C and TB1-6 or between J1-E and TB2-1. Use standard troubleshooting procedures to locate the open. Repair the open, and rerun the program.
REF TM 28	Replace PCB A2A7. If A2A7 has previously been replaced, replace PCB A2A1.



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1 – A1
2 – Extraction tool
3 – A2A7
4 – A2A6
5 – A2A5
6 – A2A4
7 – A2A3
8 – A2A2
9 – A2A1
10 – A2

Figure 3-3. Printed circuit board extraction tool in use.

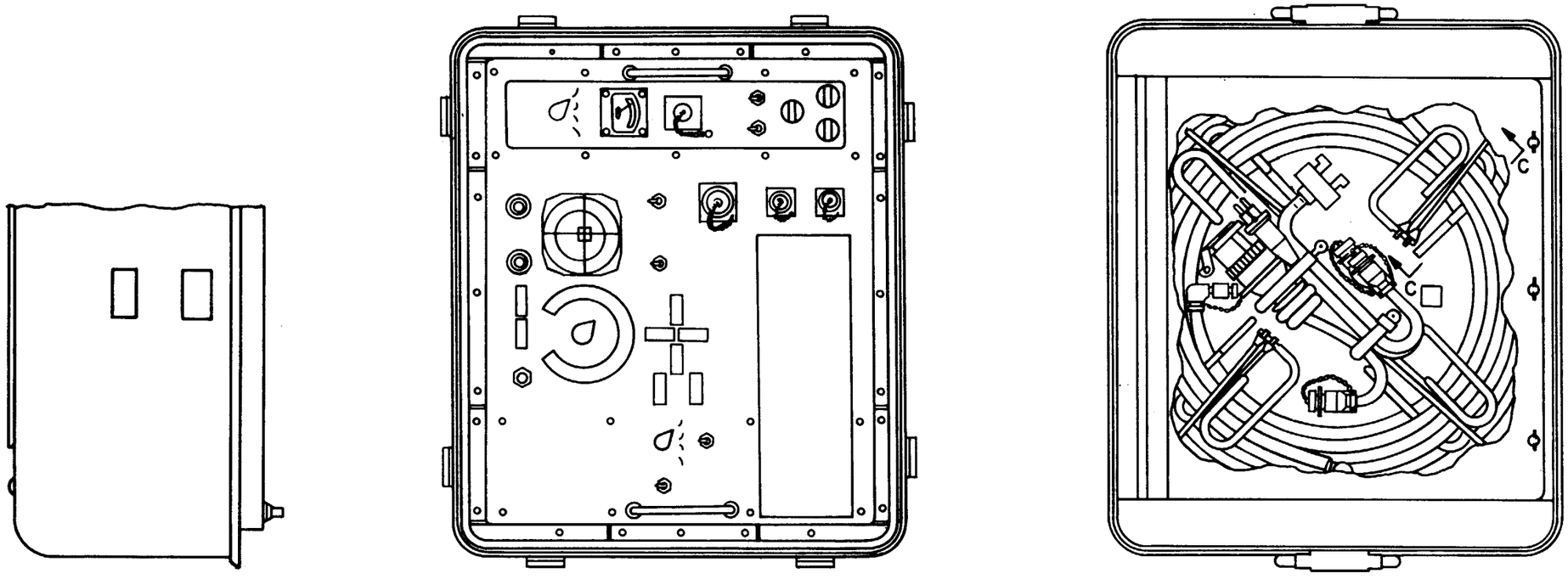
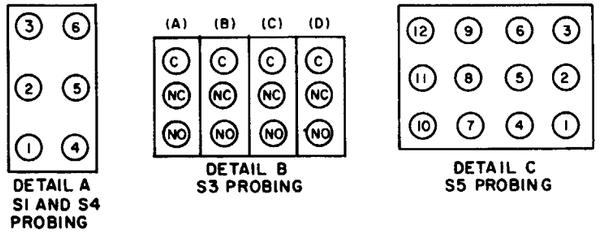
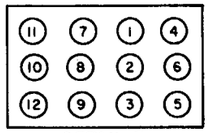
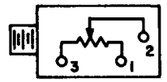
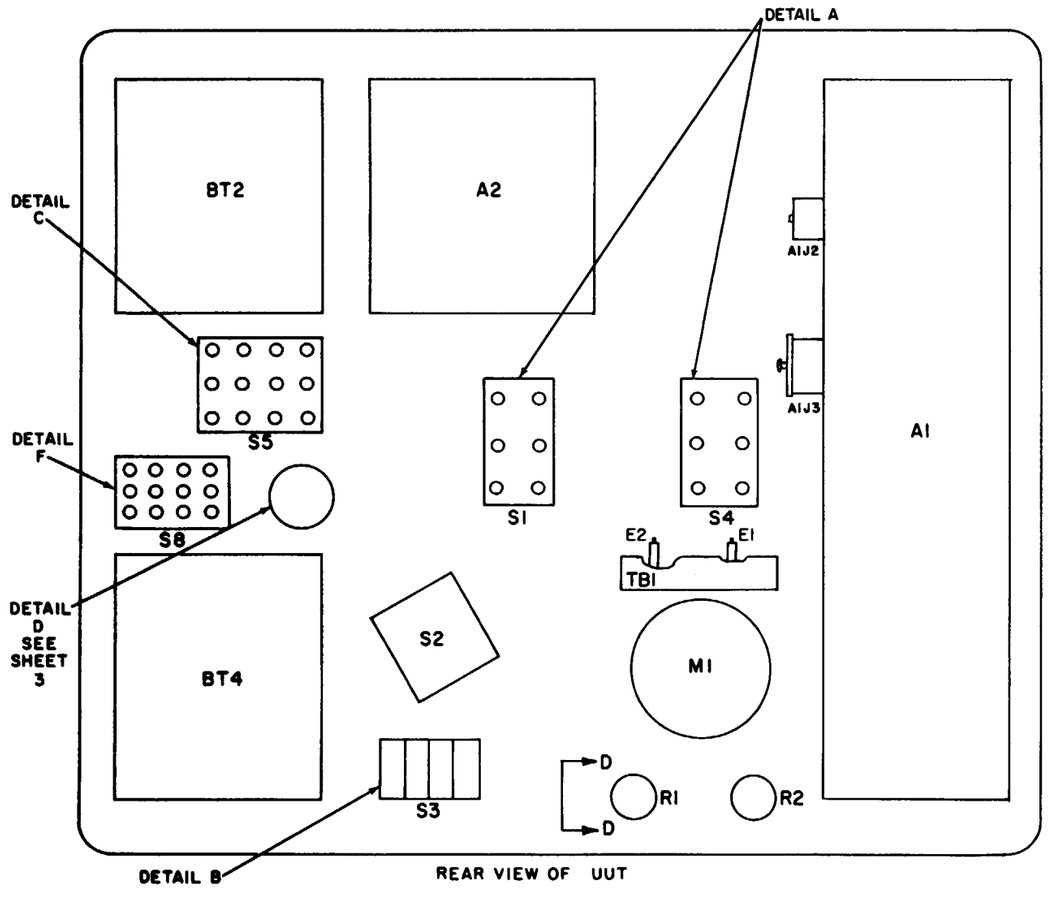


Figure 3-4. Monitoring set (1A1), parts location diagram (sheet 1 of 3).









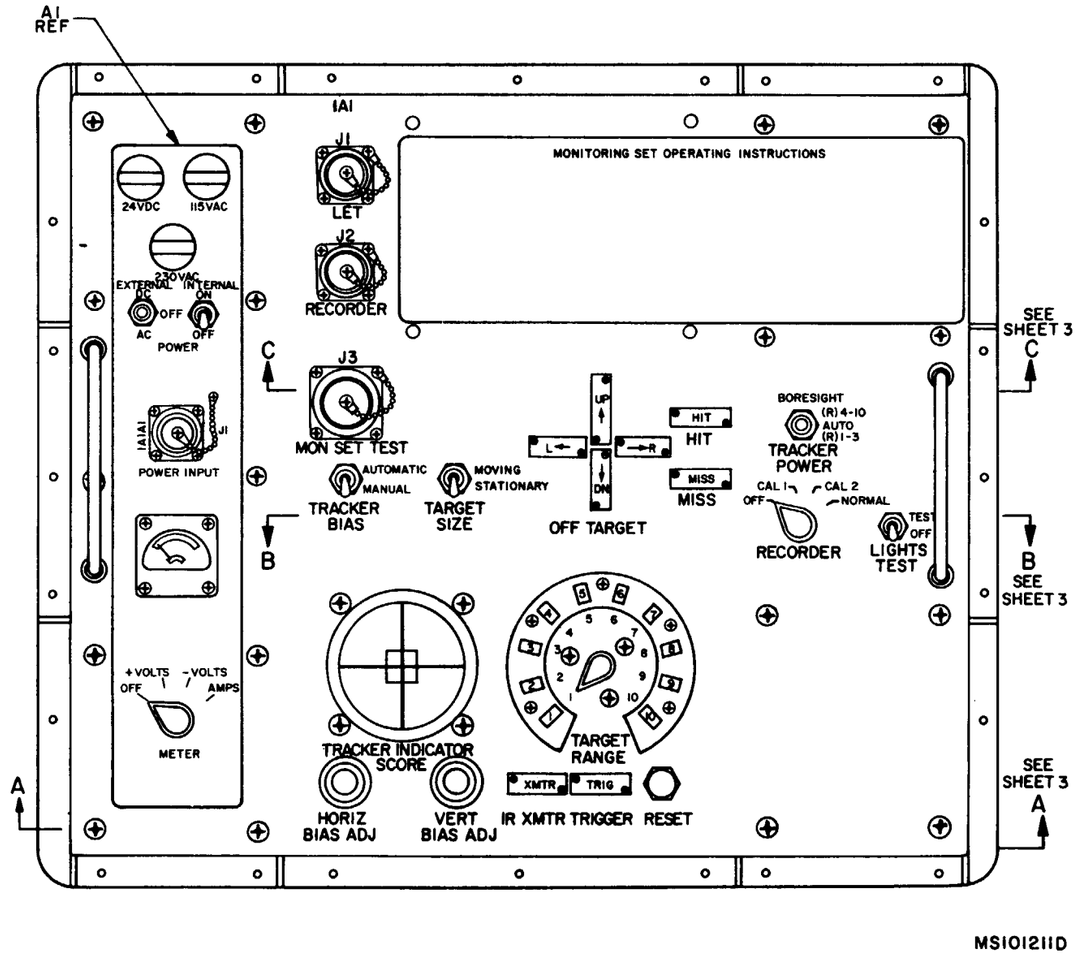
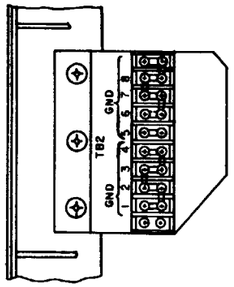


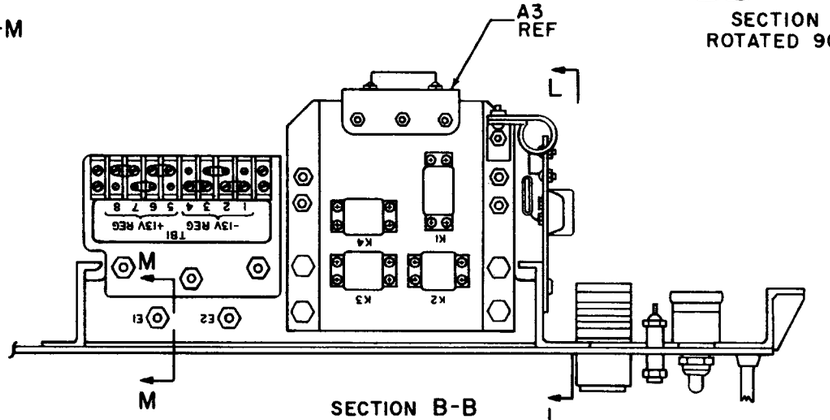
Figure 3-4. (sheet 2 of 3).

SECTION N-N
-2 ASSY

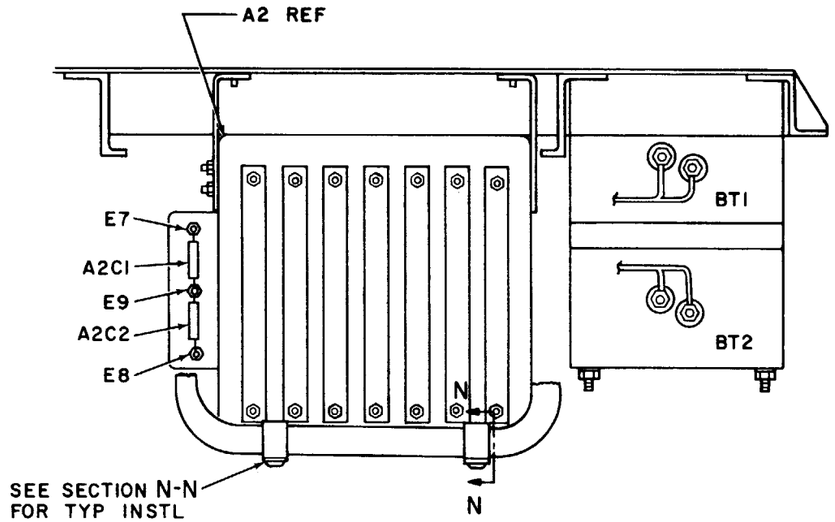
SECTION M-M
2 PLACES



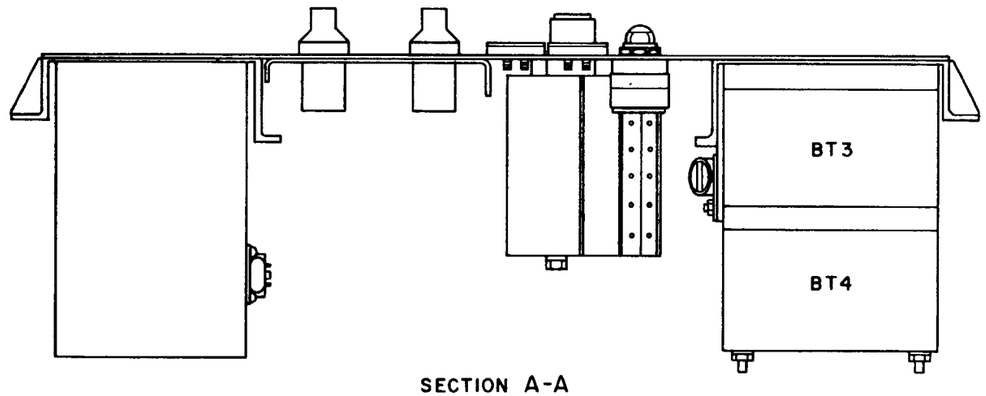
SECTION L-L
ROTATED 90° CW



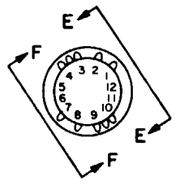
SECTION B-B
SEE SHEET 2



SECTION C-C
SEE SHEET 2

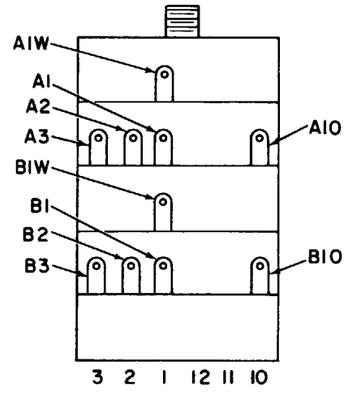


SECTION A-A
SEE SHEET 2

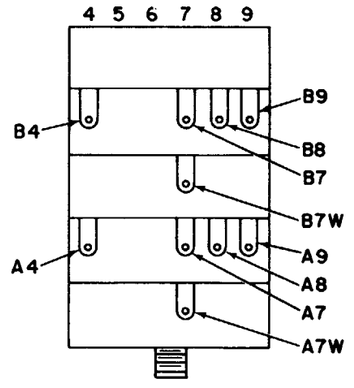


DETAIL D
SEE SHEET 2

S6 PROBING



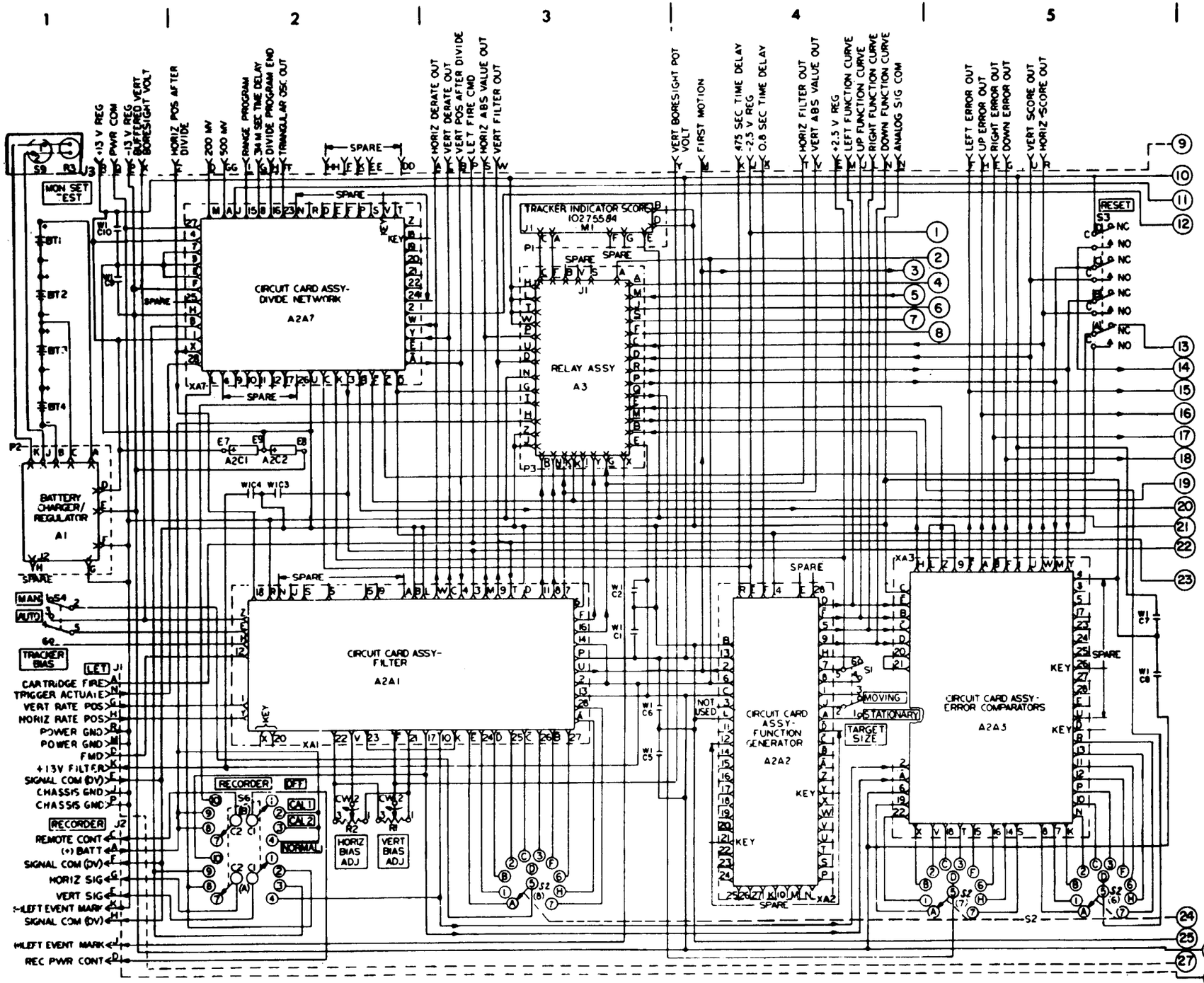
VIEW E-E
ROTATED 180°



VIEW F-F

MS 101210A

Figure 3-4. (sheet 3 of 3).

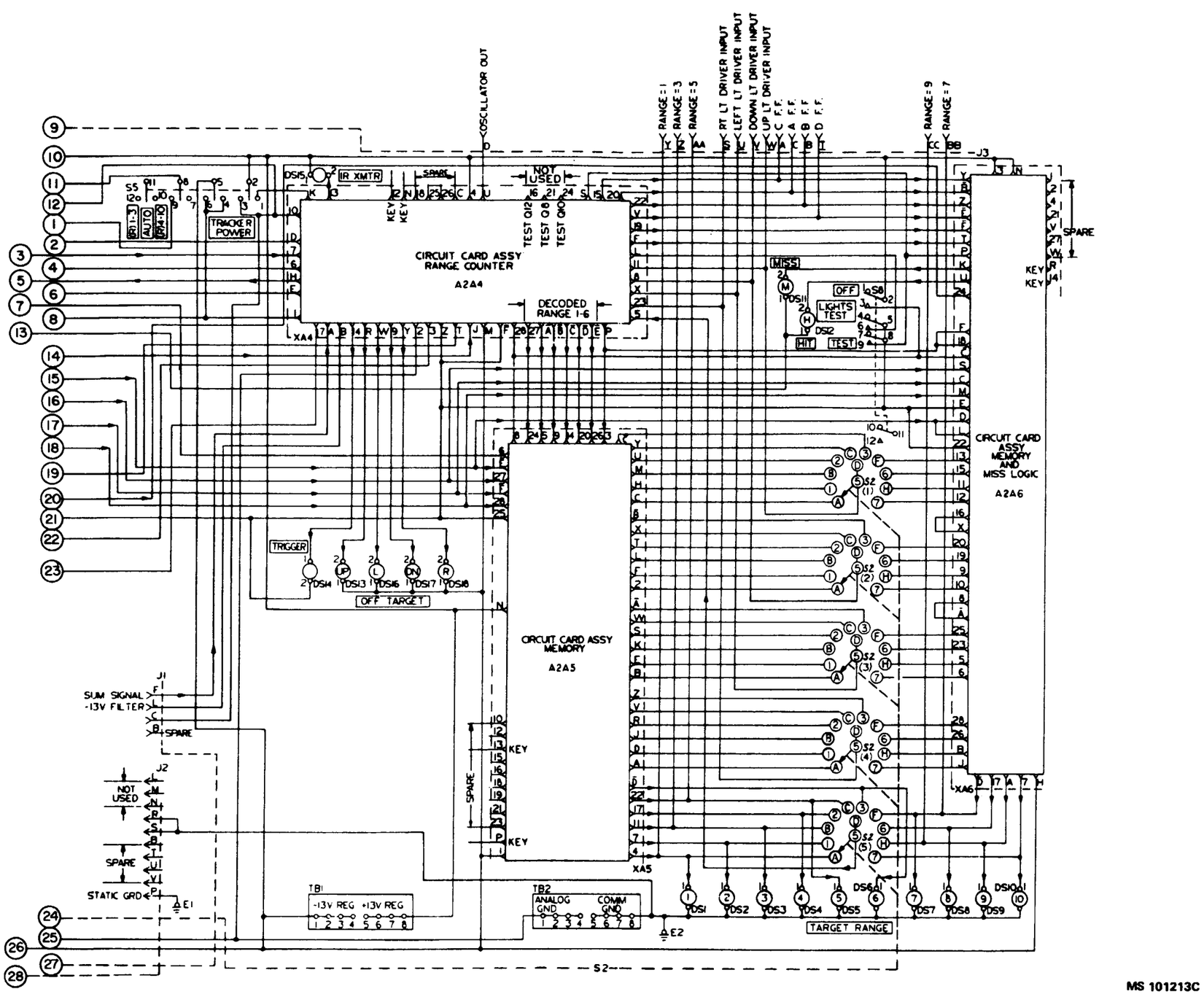


NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION.
2. LOWER CASE PIN LETTERS ARE SHOWN AS UNDERLINED UPPER CASE LETTERS.
3. TERMINAL NUMBER ASSIGNMENT FOR S1, S4, S8, DS-1 THRU DS-8 ARE FOR REFERENCE ONLY ON THIS DIAGRAM AND WILL NOT BE MARKED ON THE HARDWARE.
4. PINS MARKED "NOT USED" MEAN FUNCTIONS AVAILABLE BUT NOT IN USE.
5. WIRE CONTINUATION NUMBERS 1 THRU 28 REFER TO FOLLOWING PAGE.

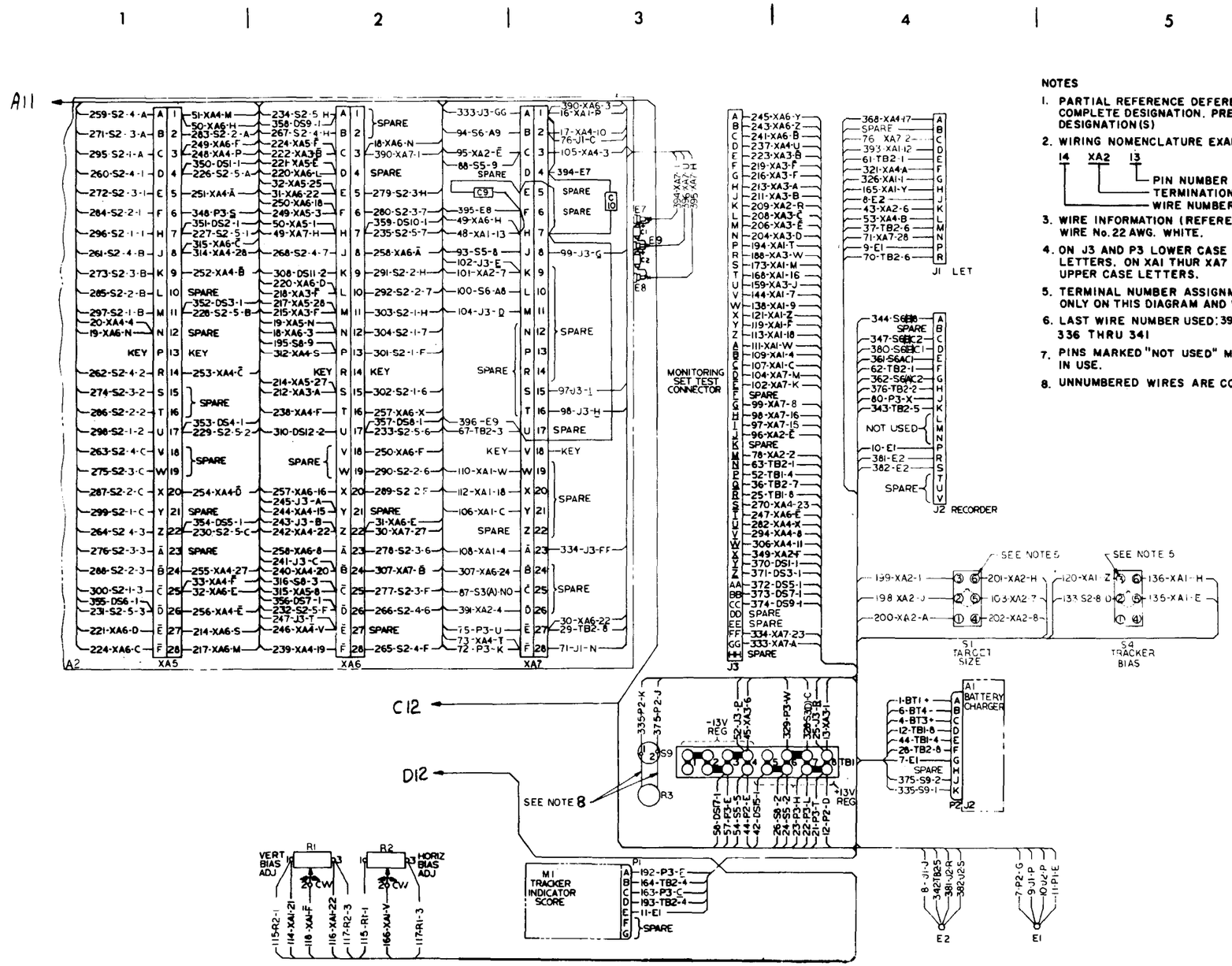
MS 101212D

Figure 3-5. Monitoring set (1A1), schematic diagram (sheet 1 of 2).



MS 101213C

Figure 3-5 (sheet 2 of 2).



NOTES

1. PARTIAL REFERENCE DEFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION. PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION(S)
2. WIRING NOMENCLATURE EXAMPLE.

   14 XA2 13
   - 13 — PIN NUMBER
   - XA2 — TERMINATION
   - 14 — WIRE NUMBER
3. WIRE INFORMATION (REFERENCE) WIRE No.22 AWG. WHITE.
4. ON J3 AND P3 LOWER CASE LETTERS ARE SHOWN AS UNDERLINED UPPER CASE LETTERS. ON XA1 THUR XA7 LOWER CASE LETTERS ARE SHOWN AS OVERLINED UPPER CASE LETTERS.
5. TERMINAL NUMBER ASSIGNMENT FOR S1, S4, S8, DS1 THRU DS18 ARE FOR REFERENCE ONLY ON THIS DIAGRAM AND WILL NOT BE MARKED ON THE HARDWARE.
6. LAST WIRE NUMBER USED: 396. WIRE NUMBERS NOT USED 27,40,60,323,324,325,327, 336 THRU 341
7. PINS MARKED "NOT USED" MEAN FUNCTIONS AVAILABLE BUT NOT PRESENTLY IN USE.
8. UNNUMBERED WIRES ARE COMPONENT LEADS.

MS 101214D

Figure 3-6. Monitoring set (1A1), wiring diagram (sheet 1 of 3).

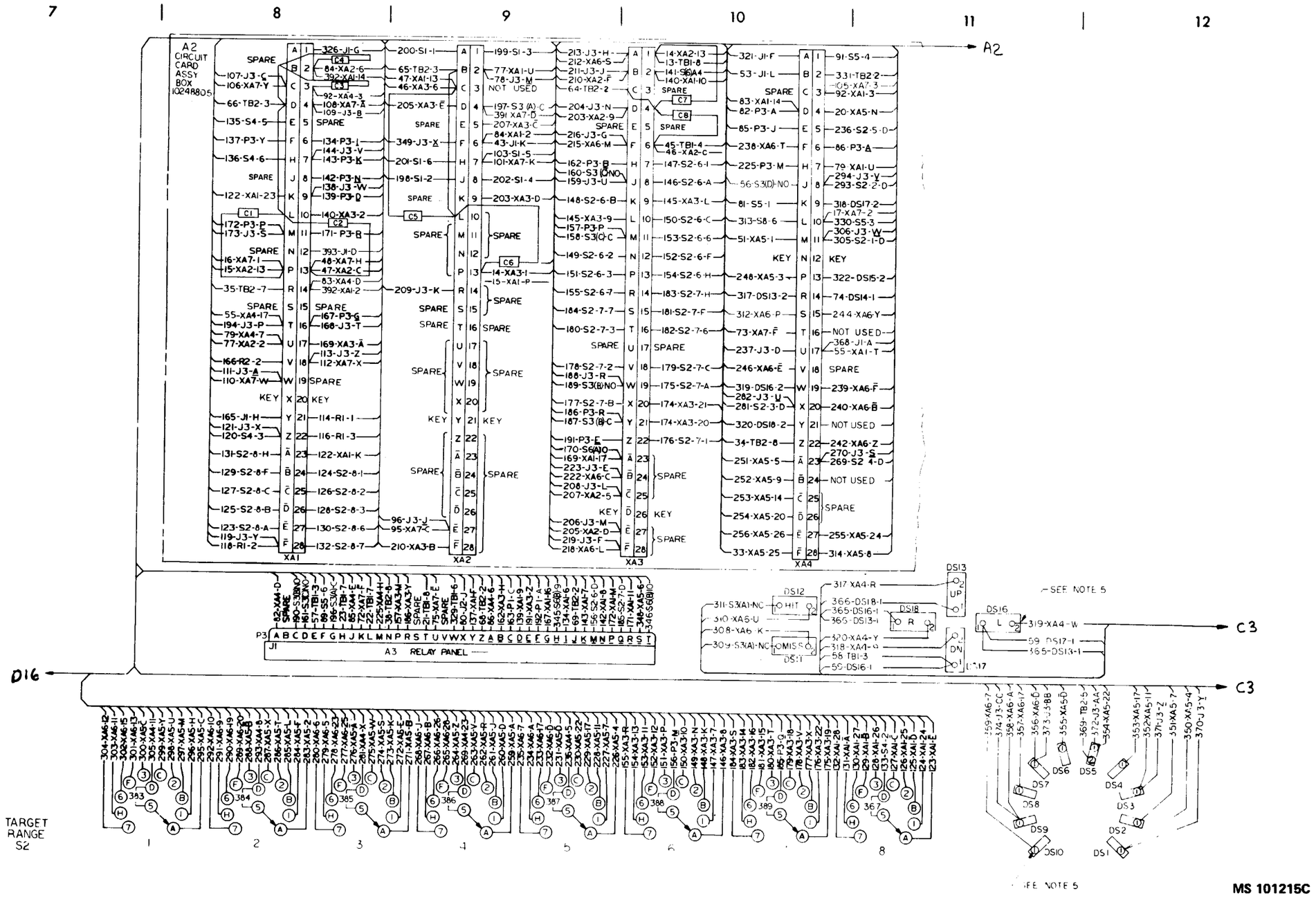
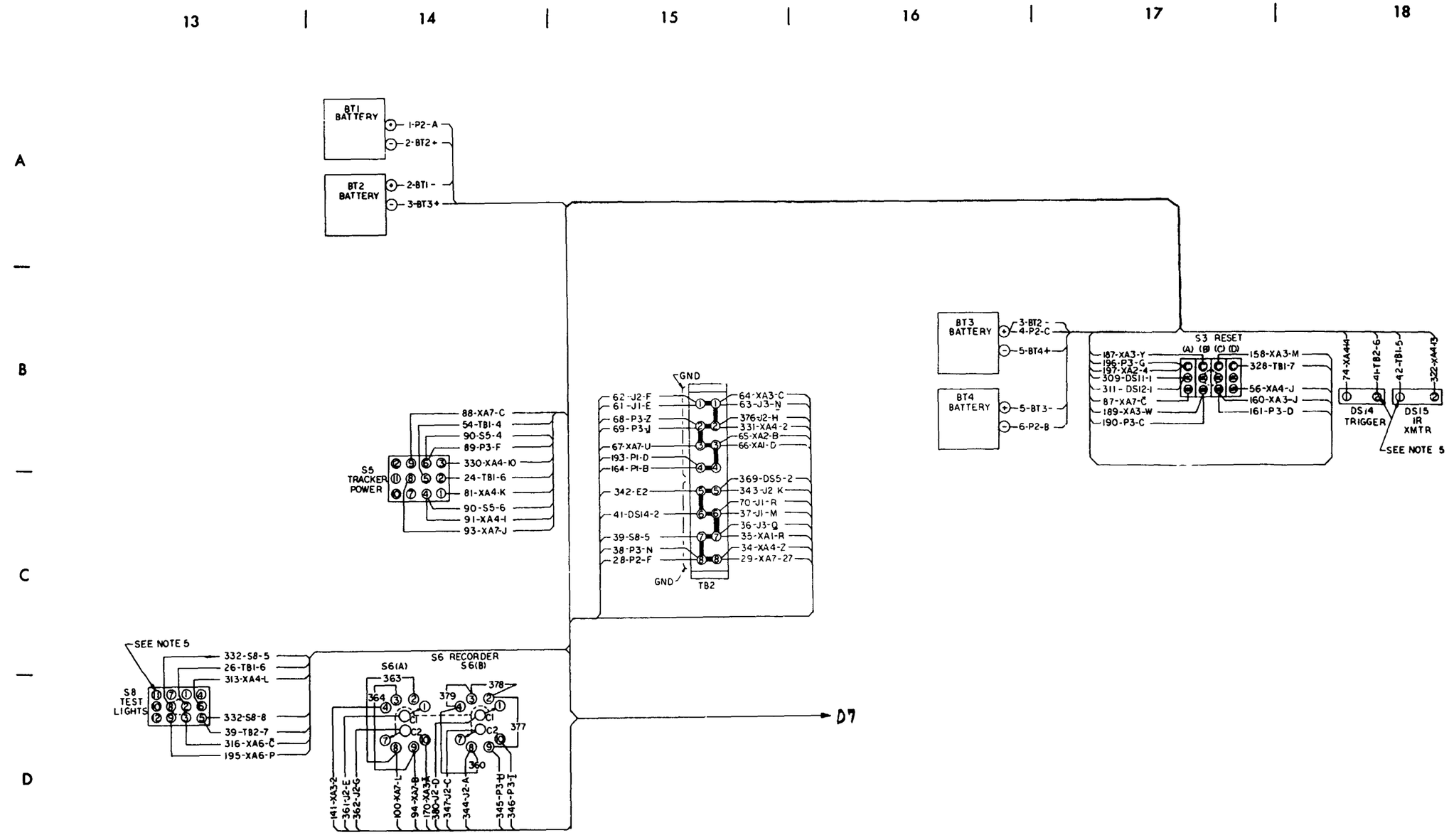


Figure 3-6. (sheet 2 of 3).



MS 101216C

Figure 3-6. (sheet 3 of 3).

Section II. REPAIR PROCEDURES

3-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 3-7 through 3-9 illustrate the disassembly and assembly of the UUT and special tools required. Paragraphs 3-6 through 3-23 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-6920-480-24P-1 contains a list of repair parts and special tools authorized for maintenance personnel.

3-6. A1 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Disconnect P2 from A1J2 (fig. 3-4).

(3) Remove screws (5, fig. 3-7) and A1 (6).

b. Installation

(1) Apply a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the countersunk area of screws (5, fig. 3-7). Install A1 with the screws. Fill the void above the exposed A1 gasket with the sealing compound. Clean any excess compound from the heads of the screws and panel. Touch up the screw heads with polyurethane coating (item 9, App. D).

(2) Connect P2 to A1J2.

(3) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-7. BT1 Through BT4 Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

CAUTION

Insulate the battery terminals with electrical tape (item 40, App. D) prior to battery insulation.

(2) Disconnect P2 from A1J2 (fig. 3-4). Remove mounting hardware (41 and 42). Tape and tag terminals (43) of the battery to be removed (fig. 3-7).

(3) Remove mounting hardware (7 through 9) and BT1, TB2, TB3, or BT4(10).

b. Installation.

(1) Apply a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the countersunk area of bolts (7).

CAUTION

Insulate the battery terminals with electrical tape (item 40, App. D) prior to battery insulation.

Ensure that batteries are installed properly (not upside down) to prevent damage to the monitoring set.

(2) Install BT1, BT2, BT3, or BT4 (10) with mounting hardware (7 through 9). Clean any excess compound from the heads of the bolts and panel. Touch up the bolt heads with polyurethane coating (item 9, App. D).

(3) Remove the insulating tape and connect the leads that were disconnected in step *a(2)* above with the mounting hardware (41 and 42). Connect P2 to A1J2.

(4) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-8. S2 Wafer Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove thumbscrew (71, fig. 3-8) and S2 cover (72).

(3) Position the TARGET RANGE switch to 1.

(4) Insert the prongs, on the S2 cover, into wafer (73) to be removed, and pull the wafer out of S2 (37).

b. Installation.

NOTE

Be sure the TARGET RANGE switch is positioned to 1.

(1) Install a new S2 wafer (73, fig. 3-8) into S2 (37).

(2) Install S2 cover (72) with thumbscrew (71).

(3) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-9. Rubber Pad Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

(2) Remove screws (11) and circuit card extraction tool (12) and open the door of A2 (13).

(3) Using a knife, remove rubber pad (39) and any residual adhesive from the door of A2.

b. Installation

(1) Clean the rubber pad mounting area with MEK (item 17, App. D).

(2) Cut a new pad (39) from rubber sheet (item 26, App. D).

(3) Bond the rubber pad to the door using adhesive (item 5, App. D).

(4) Close the door of A2 (13) and install screws (11) and circuit card extraction tool (12).

(5) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-10. M1 Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

(2) Disconnect P1 (40) from M1 (18).

(3) Remove mounting hardware (14 through 17) and M1.

(4) Using a knife, remove any residual sealing compound from the monitoring set panel.

b. Installation.

(1) Clean mounting area with MEK (item 17, App. D).

(2) Apply a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the areas where M1 (18) mounts to the monitoring set panel.

NOTE

Install sealing washers (15) under the heads of screws (14) before installing M1.

(3) Install M1 with mounting hardware (14 through 17). Clean any excess rubber compound from monitoring set panel (3).

(4) Connect P1 (40) to M1.

(5) Install the monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-11. S2 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Position TARGET RANGE switch to position 1.

(3) Remove the adhesive from the screw holes, loosen two set screws, and remove knob (67).

(4) Remove boot (70, fig. 3-8), flatwasher (74), and sealing washer (75) from S2 (37).

(5) Remove mounting hardware (68 and 69) and carefully push S2 out of panel.

(6) Position S2 for easy access to cable clamp (82) and remove mounting hardware (79 through 81).

(7) Remove screw (71) and extractor cover (72) from S2.

NOTE

Individual wafers may be removed and replaced without removing the entire rotary switch.

CAUTION

When removing wafer, be sure the switch shaft is set in line with the wafer opening. Do not touch contacts. Handle wafers by the edge.

(8) Using extractor cover (72), remove the eight wafers.

(9) The individual wafer connectors may then be slid out of S2 housing.

b. Installation.

(1) Slide wafer connectors into S2 housing (37).

NOTE

When installing wafers, be sure that the wafer rotary terminal is alined correctly with the wafer and the switch position selector shaft is in the proper position to receive the wafers.

(2) Slide the eight wafers into S2 housing (37).

(3) Install extractor cover (72) on S2 using screw (71).

(4) Install cable clamp (82) on S2 housing (37) using mounting hardware (79 through 81).

(5) Position S2 in panel opening and secure using mounting hardware (68 and 69).

(6) Install sealing washer (75), flatwasher (74), and boot (70).

(7) Be sure switch is rotated to position 1 on TARGET RANGE indicator. Install knob (67) and tighten the set screws in the knob. Fill the void above the set screws with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

3-12. R1 and R2 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Using a knife, cut the insulation sleeving from the terminals of R1 (24, fig. 3-9) or R2 (1).

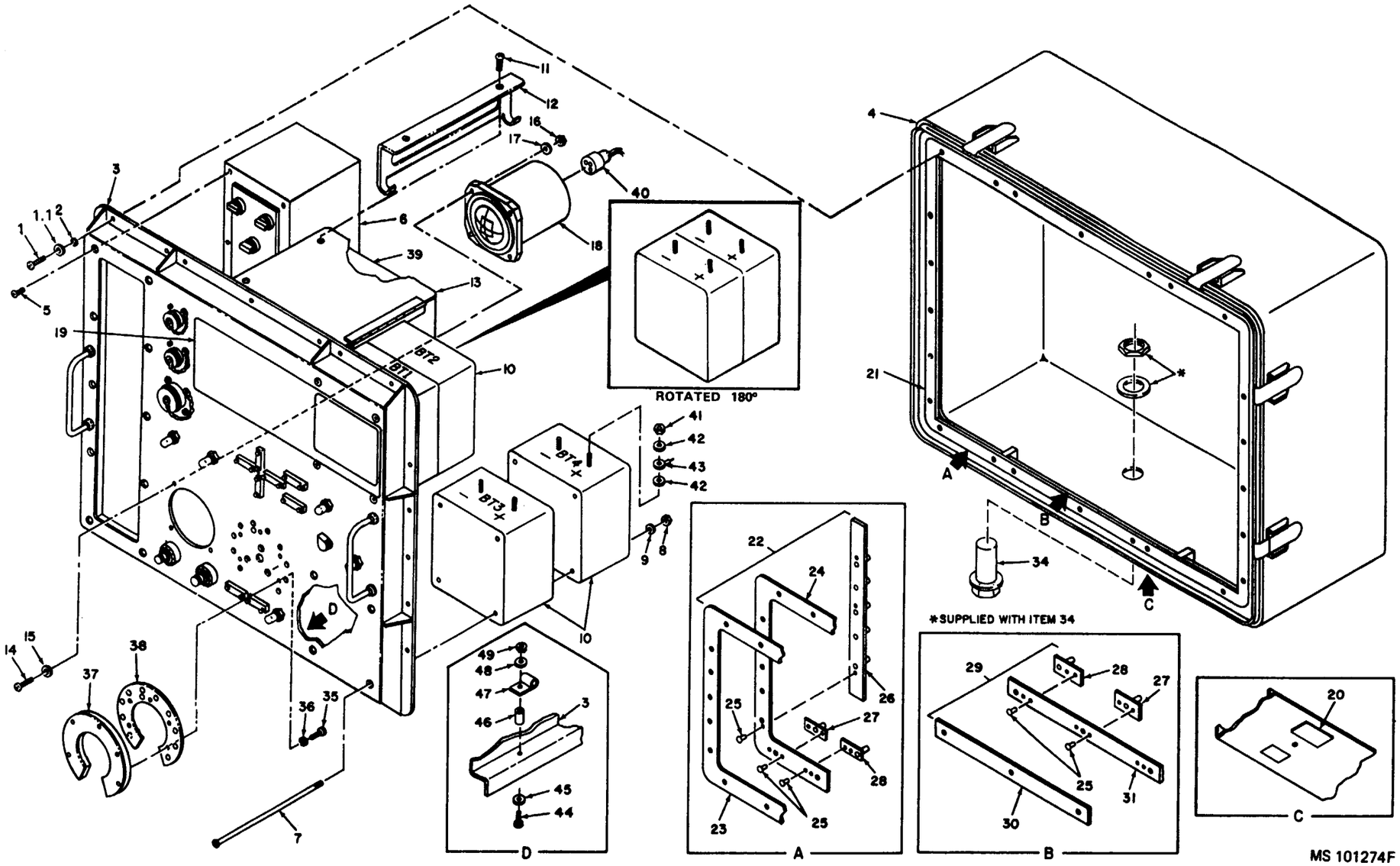
(3) Disconnect and tag the leads to R1 or R2.

(4) Unlock the knob lock (25), and loosen the set screw in knob (2).

(5) Remove the knob lock and R1 or R2.

b. Installation.

(1) Discard the nut and washer furnished with the new R1 (24, Fig. 3-9) or R2 (1). Coat the threads of the resistor with a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) and install the resistor in the panel.



1 – Screw
1.1 – Washer
2 – Sealing washer
3 – Monitoring set panel
4 – Monitoring set
5 – Screw
6 – A1
7 – Bolt
8 – Nut
9 – Washer
10 – BT1 through BT4
11 – Screw
12 – Extraction tool
13 – A2
14 – Screw
15 – Sealing washer
16 – Nut
17 – Washer
18 – M1
19 – Instruction plate
20 – Identification plate
21 – Gasket
22 – Side shock assembly
23 – Gasket
24 – Retainer
25 – Rivet
26 – Channel nut
27 – Plate nut
28 – Plate nut
29 – Center shock assembly
30 – Gasket
31 – Retainer
32 – Deleted
33 – Deleted
34 – Humidity indicator
35 – Screw
36 – Washer
37 – DS1 through DS10
38 – Gasket
39 – Rubber pad
40 – P1
41 – Nut
42 – Washer
43 – Terminal
44 – Screw
45 – Sealing washer
46 – Spacer
47 – Clamp
48 – Washer
49 – Nut

Figure 3-7. Repair of monitoring set panel, view 1.

1 – Nut
2 – Washer
3 – Screw
4 – Washer
5 – Clamp
6 – Screw
7 – Nut
8 – Washer
9 – Bracket
10 – A3
11 – Screw
12 – Nut
13 – Washer
14 – Bracket
15 – S9
16 – R3
17 – Screw
18 – Nut
19 – Washer
20 – Plate assembly
21 – Screw
22 – Washer
23 – Retaining ring
24 – Fastener
25 – Rivet
26 – Fastener
27 – Nut
28 – Valve
29 – Packing
30 – Screw
31 – Washer
32 – Screw
33 – Washer
34 – Nut
35 – Bolt
36 – Washer
37 – S2
38 – Nut
39 – Washer
40 – Washer
41 – Screw
42 – Clamp
43 – A2
44 – Screw
45 – Washer
46 – Washer
47 – Nut
48 – XA1 through XA7
49 – Key
50 – Grommet
51 – C1 and C2
52 – Nut
53 – Washer
54 – E7, E8, and E9
55 – Clamp
56 – Nut
57 – Screw
58 – Washer
59 – Nut
60 – TB2
61 – Clamp
62 – Screw
63 – Nut
64 – Washer
65 – Washer
66 – Bracket
67 – Knob
68 – Screw
69 – Washer
70 – Boot
71 – Screw
72 – Cover/wafer removal tool
73 – Wafer
74 – Washer
75 – Sealing washer
76 – Screw
77 – Washer
78 – Nut
79 – Screw
80 – Washer
81 – Nut
82 – Clamp
83 – Screw
84 – Washer

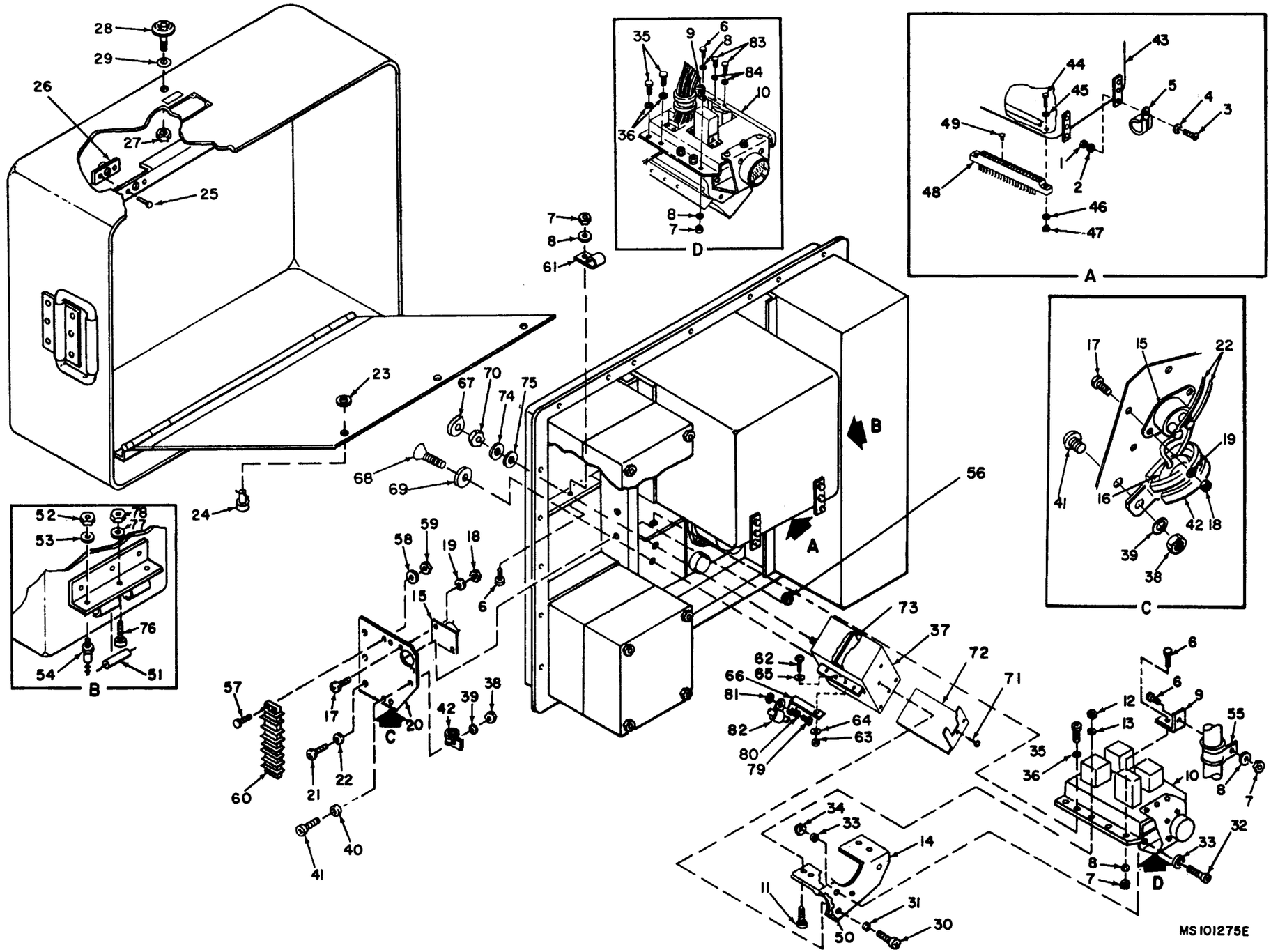
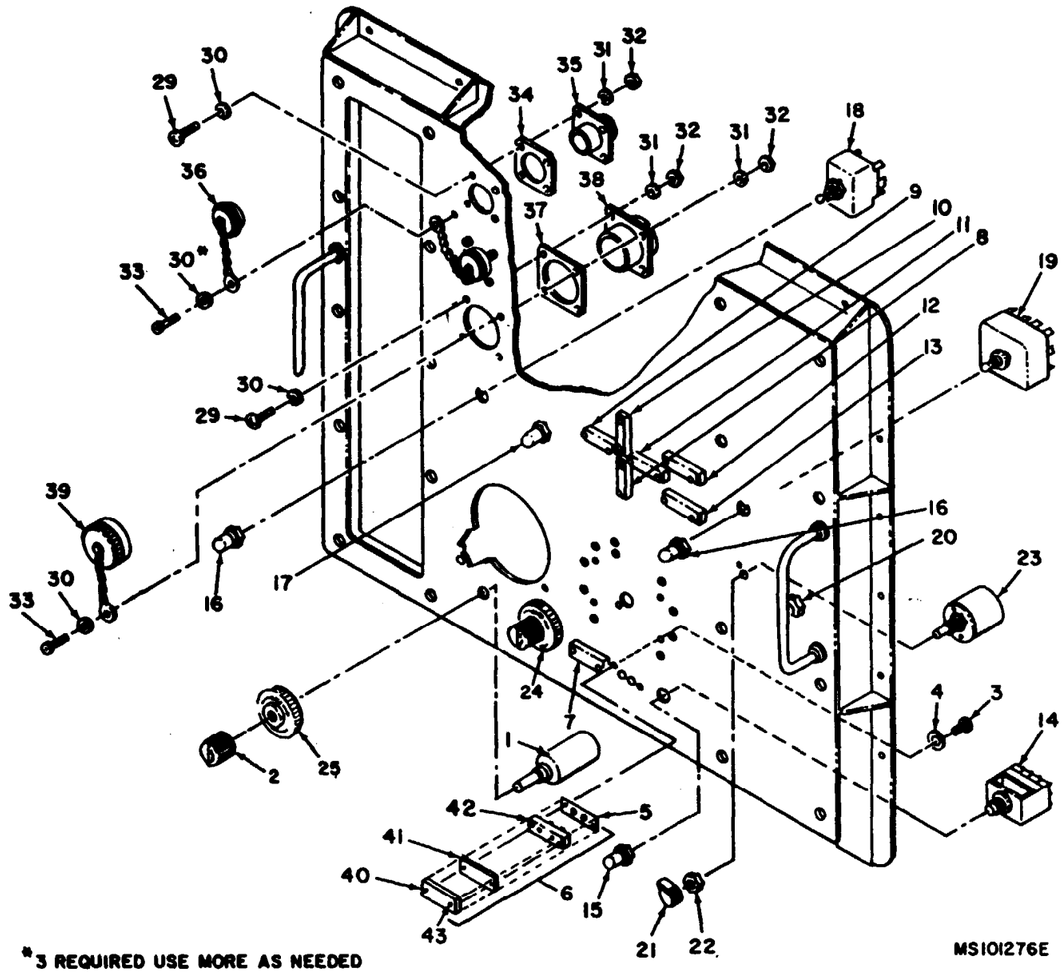


Figure 3-8. Repair or monitoring set panel, view 2.



1 – R2	12 – DS12	23 – S6	34 – Gasket
2 – Knob	13 – DS11	24 – R1	35 – J1 and J2 (Depot only)
3 – Screw	14 – S3	25 – Knob lock	36 – Cover
4 – Washer	15 – Boot	26 – Deleted	37 – Gasket
5 – Gasket	16 – Boot	27 – Deleted	38 – J3 (Depot only)
6 – DS14	17 – S1	28 – Deleted	39 – Cover
7 – DS15	18 – S4	29 – Screw	40 – Cover
8 – DS17	19 – S5	30 – Washer	41 – Lamp
9 – DS16	20 – S8	31 – Washer	42 – Socket
10 – DS13	21 – Knob	32 – Nut	43 - Captive Screw
11 – DS18	22—Nut	33 – Screw	

Figure 3-9. Repair of monitoring set panel, view 3.

(2) Thread knob lock (25) onto the base resistor and tighten securely. Unlock the knob lock.

(3) Position knob (2) on the shaft of the resistor and tighten set screw.

(4) Fill the void above the set screw with a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(5) Install insulation sleeving (item 34, App. D) over each lead disconnected from R1 or R2 in step a(3) above, and connect the leads to R1 or R2.

(6) Slide the sleeving over each of the terminals of R1 or R2 and heat-shrink using heat gun.

(7) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-13. S6 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove the adhesive from the screw holes, loosen the set screws, and remove knob (21, fig. 3-9).

CAUTION

Use care when S6 (23) is removed from the panel so that no strain is put on the leads of S6.

(3) Remove nut (22) and S6.

(4) Using a knife, cut the insulation sleeving from the terminals of S6.

(5) Disconnect and tag the leads to S6.

b. Installation.

(1) Install insulation sleeving (item 34, App. D) over each of the leads disconnected from S6 (23, fig. 3-9) and connect the leads to S6.

(2) Slide the sleeving over the terminals of S6 and heat-shrink using heat gun.

(3) Install S6 with nut (22).

(4) Install knob (21) and tighten the two set screws in the knob. Fill the void area above the set screws with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D).

(5) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-14. S9 and R3 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove mounting hardware (38 through 41, fig. 3-8) and clamp (42).

(3) Push R3 (16) out of clamp.

(4) Remove mounting hardware (17 through 19) and S9.

(5) Unsolder and tag leads from S9 and R3.

b. Installation

(1) Using diagonal pliers, cut R3 leads to 1/2 inch.

(2) Cut insulation sleeving to 5/16 inch and slip over leads.

(3) Solder leads (22) and R3 (16) to S9 (15).

(4) Slide R3 (16) into clamp (42).

(5) Install S9 (15) with mounting hardware (17 through 19).

(6) Install clamp (42) with mounting hardware (38 through 41).

3-15. Instruction Plate or Identification Plate Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Using a knife, remove instruction plate (19) or identification plate (20).

(2) Clean the instruction or identification plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Be sure that the information on the new instruction plate or identification plate is the same as the information on the old plate.

(2) Bond instruction plate (19) to mounting set panel (3) or identification plate (20) to the monitoring set (4) with adhesive (item 5, App. D).

3-16. Gasket Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

(2) Using a knife, remove gasket (21) and any residual adhesive from the case.

(3) Clean the gasket mounting area with MEK (item 17, App. D).

b. Installation.

(1) Apply primer (item 23, App. D) to gasket (21) and to the gasket mounting area and allow to dry one hour.

(2) Bond the gasket to the case using a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(3) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-17. Side Shock Assembly Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

(2) Using a knife, remove side shock assembly (22).

(3) Using a knife, remove gasket (23).

(4) Remove rivets (25), channel nuts (26), and plate nuts (27 and 28).

b. Installation.

(1) Clean retainer (24) with MEK (item 17, App. D).

(2) Install channel nut (26) and plate nuts (27 and 28) with rivets (25).

(3) Apply primer (item 23, App. D) to gasket (23) and to the retainer surface.

(4) Bond the gasket to the retainer using a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(5) Clean the surface of the case using MEK (item 17, App. D) where side shock assembly (22) is to be installed.

(6) Apply primer (item 23, App. D) to the side shock assembly and the case and allow to dry.

(7) Bond the side shock assembly to the case with a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(8) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-18. Center Shock Assembly Removal and Installation Procedure (Fig. 3-7)

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2) and monitoring set panel (3).

(2) Using a knife, remove center shock assembly (29).

(3) Using a knife, remove gasket (30).

(4) Remove rivets (25) and plate nuts (27 and 28).

b. Installation.

(1) Clean retainer (31) with MEK (item 17, App. D).

(2) Install plate nuts (27 and 28) with rivets (25).

(3) Apply primer (item 23, App. D) to gasket (30) and to the retainer and allow to dry.

(4) Bond the gasket to the retainer with a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(5) Clean the surface of the case, using MEK (item 18, App. D) where center shock assembly (29) is to be installed.

(6) Apply primer (item 23, App. D) to the center shock assembly and the case, and allow to dry.

(7) Bond the center shock assembly to the case with a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D).

(8) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-19. DS1 through DS10 Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) As necessary, remove S2 (par. 3-11a(2) through (6).

(3) Disconnect and tag the leads to DS1 through DS10 (37, fig. 3-7).

(4) Remove mounting hardware (35 and 36), gasket (38), and DS1 through DS10.

(5) Clean the light-mounting area with MEK (item 17, App. D).

b. Installation.

(1) Fabricate new gasket (38, fig. 3-7) from cork and rubber sheet (item 42, App. D). Apply a light coat of a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the back of the new light. Install DS1 through DS10 (37) and gasket (38) with mounting hardware (35 and 36). Clean away any excess compound on monitoring set panel (3).

(2) Connect the leads to DS1 through DS10.

(3) Install S2 (par. 3-11b(3) through (7), if it was removed in step a(2) above.

(4) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-20. XA1 through XA7 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove screws (11) and extraction tool (12). Remove A2A1 through A2A7 (fig. 3-3).

(3) Remove mounting hardware (44 through 47, fig. 3-8) and pull faulty connector (48) away from A2(43).

(4) Using a knife, cut the insulation sleeving from the terminals of the faulty connector.

(5) Disconnect and tag the leads to the faulty connector.

(6) Record the position of key (49), and remove the key from the faulty connector.

b. Installation.

(1) Install key (49, fig. 3-8) in connector (48) in the position where it was removed in step *a* (6), above.

(2) Install insulation sleeving (item 34, App. D) over each of the leads from the connector and connect the leads to the connector.

(3) Slide the sleeving over the terminals of the connector and heat-shrink using heat gun.

(4) Install the connector with mounting hardware (44 through 47).

(5) Install A2A1 through A2A7 and secure extraction tool (12, fig. 3-7) with screws (11).

(6) Install monitoring set panel (3) with mounting hardware (1, 1.1 and 2).

3-21. Grommet Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Using a knife, remove grommet (50, fig. 3-8), and any residual adhesive, from bracket (14).

(3) Clean the grommet-mounting area with MEK (item 17, App. D).

b. Installation.

(1) Bond grommet (50, fig. 3-8) to bracket (14) with adhesive (item 5, App. D).

(2) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-22. DS11 through DS18 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

NOTE

It may be necessary to remove mounting hardware (3 and 4, fig. 3-9) to faulty light DS11, DS12, DS13, DS16, DS17, or DS18, and pull the leads through the front panel to disconnect them.

(2) Disconnect and tag the leads to DS1l (13, fig. 3-9), DS12 (12), DS13 (10), DS14 (6), DS15 (7), DS16 (9), DS17 (8), or DS18 (11).

(3) Remove mounting hardware (3 and 4), gasket (5), and the faulty light.

(4) Clean the light-mounting area with MEK (item 17, App. D).

b. Installation.

(1) Fabricate new gasket (5, fig. 3-9) from cork and rubber sheet (item 42, App. D). Apply a thin coat of a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the back of the new light.

(2) Install DS1l (13), DS12 (12), DS13 (10), DS14 (6), DS15 (7), DS16 (9), DS17 (8), or DS18 (11), and gasket (5) with mounting hardware (3 and 4). Wipe away any excess sealing compound from monitoring set panel (3, fig. 3-7).

(3) Connect the leads that were disconnected in step *a* (2), above.

(4) Install the monitoring set panel, with mounting hardware (1, 1.1 and 2).

3-23. Cover and Gasket Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove mounting hardware (30 through 33, fig. 3-9) and covers (36 or 39).

(3) Remove mounting hardware (29 through 32) and pull J1 or J2 (35) or J3 (38) out of the monitoring set panel.

(4) Using a knife, remove gaskets (34 or 37) and any excess adhesive from the monitoring set panel.

(5) Clean the gasket-mounting area with MEK (item 17, App. D).

b. Installation

(1) Fabricate new gasket (34 or 37, fig. 3-9) from rubber sheet (item 29, App. D). Apply a thin coat of a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to one side of the new gasket.

(2) Install the gasket with the sealing compound towards monitoring set panel (3, fig. 3-7).

(3) Apply a thin coat of adhesive (item 5, App. D) to the thread, and under the head of screws (29 and 33, fig. 3-9).

(4) Install J1 or J2 (35) or J3 (33) with mounting hardware (29 through 32). Wipe away any excess adhesive.

(5) Install covers (36 or 39) with mounting hardware (30 through 33). Wipe away any excess adhesive.

(6) Install monitoring set panel (3, fig. 3-7) with mounting hardware (1, 1.1 and 2).

3-24. Rubber Seal Removal and Installation Procedure

a. Removal.

(1) Using a craftsman knife (1, fig. 3-10), pry the rubber seal (2) out of the monitoring set lid groove (3). Once the rubber seal gets started out, carefully pull the remainder of it out by hand.

(2) Using a dry, clean rag and orange stick, clean the groove in the monitoring set lid.

b. Installation

(1) Using a steel ruler, measure a piece of synthetic rubber tubing (item 32, App. D) 72 inches ± 1/4 inches long.

WARNING

The adhesive, used for bonding synthetic rubber, bonds instantly. Be careful not to get it on your skin or fingers because it will bond them together and will peel the skin when being removed.

(2) Lay the synthetic rubber on a flat surface with end extending off the edge of the surface. Now, carefully apply a light coat of adhesive (item 2, App. D) to both ends of the rubber tubing.

(3) Carefully grasp the rubber tubing near the ends, keeping your fingers away from the adhesive and place the ends together. Remember bonding occurs immediately.

(4) Set the bonded rubber tubing aside and allow excess adhesive to dry.

(5) Apply a light coat of silicone compound (item 13, App. D) to the bonded gasket seal.

(6) Lay the gasket seal in the groove of the monitoring set lid (fig. 3-10) and using your thumb, press the gasket into the groove completely around the lid.

3-25. Latch Removal and Installation Procedure

a. Removal.

(1) Rotate the handle and latch (1, fig. 3-11, detail A) until the pin (2) becomes visible in notch of bracket (3). Using the punch and hammer, remove the pin (2).

(2) Place the blade of the screwdriver (4, fig. 3-11, detail B) between the handle (5) and bracket (6). Apply pressure on the handle with the screwdriver until the pin (7) clears the mounting bracket.

(3) Remove the latch handle.

b. Installation.

(1) Place the pin (1, fig. 3-12, detail A) on one side of the handle (2) in the hole (3) on one side of the bracket (4).

(2) With one of the handle pins (1) in position, slide the other side of the handle (2) between the bracket (4). Now squeeze the handle together and work it until the other pin (1) slips into the hole (3) in the bracket (4).

(3) Place the latch (5, fig. 3-12, detail B) inside the handle (4) and line up the holes on the latch and handle with the notches (6) on both sides of the bracket. Insert the pin (7) through the notch (6) handle (4) and latch (5) using the hammer and drift punch.

c. Adjustments and Safety Wiring

(1) Place the monitoring set lid on the base and secure the latch(es).

(2) If the latch and/or handle are loose, unhook the latch (3).

(3) Screw the latch (3) down a few turns and secure the latch to the lid. Check for a snug fit with no loose parts.

(4) Repeat steps 1 and 2 until the latch is snug.

(5) Now, unhook the latch and allow the handle (4) to swing down to the verticle position.

(6) Holding the latch in one hand, take a piece of lock wire (5) and feed it through the hole (6) in the threaded portion of the latch (3).

(7) Lock wire the latch.

(8) Tuck the lock wire down inside the latch out of the way.

3-26. DS11 Through DS18 Indicator Lights Removal and Installation Procedure

a. Removal.

NOTE

Removal procedures for DS11 through DS18 indicator tights are identical. Therefore, only removal of DS14 indicator light is shown.

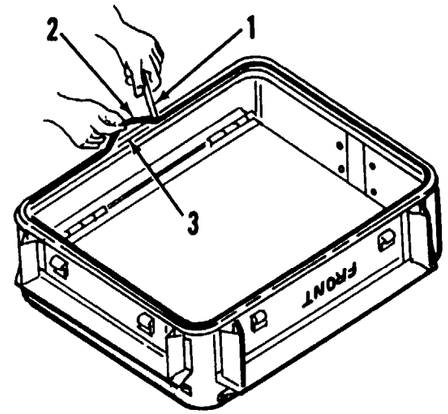
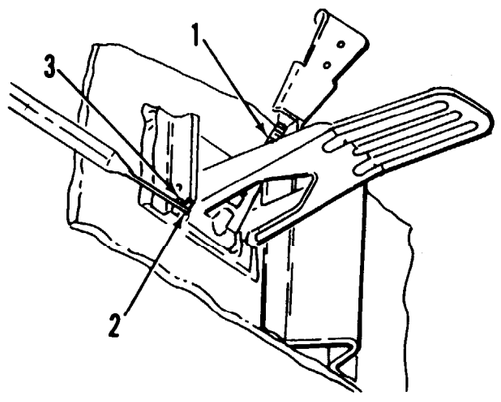
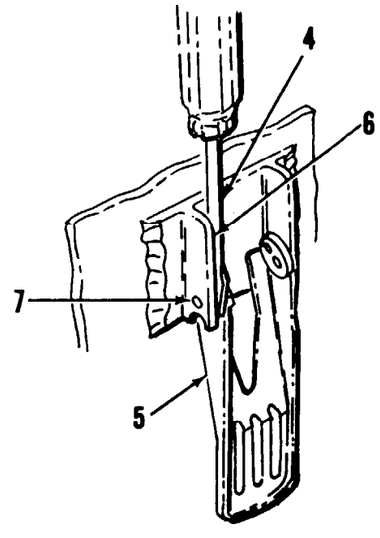


Figure 3-10. Monitoring set lid.



DETAIL A



DETAIL B

Figure 3-11. Latch removal.

NOTE

Two screws (43, fig. 3-9) in light assembly (40) are captive screws. Do not back screws all the way out. Just loosen screws enough to permit removal of light assembly.

(1) Using screwdriver, loosen two screws (43) and remove light assembly (40).

(2) Remove faulty indicator light (41).

b. Installaion.

NOTE

Installation of all eight indicator tights is identical: therefore, the procedure for only one is given.

Install indicator light (41) and light assembly (40), and using screwdriver, tighten two screws (43).

3-27. A3 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 1.1 and 2, fig. 3-7) and monitoring set panel (3).

(2) Remove mounting hardware (32 and 33, fig. 3-8).

(3) Remove mounting hardware (83 and 84).

(4) Remove mounting hardware (35 and 36) and lift A3 (10) clear of panel.

(5) Remove mounting hardware (6 through 8) securing wire harness to A3 (10).

(6) Remove A3.

b. Installation.

(1) Position A3 in place and install mounting hardware (83 and 84).

(2) Install mounting hardware (32 and 33).

(3) Install mounting hardware (35 and 36).

(4) Secure wire harness to A3 (10) using mounting hardware (6 through 8).

3-28. Painting

Touch up the exterior of the monitoring set panel or case as follows:

a. Apply primer (item 24, App. D) and allow to dry.

b. Apply polyurethane coating (item 9, App. D) two hours after primer is applied.

3-29. Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Insure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

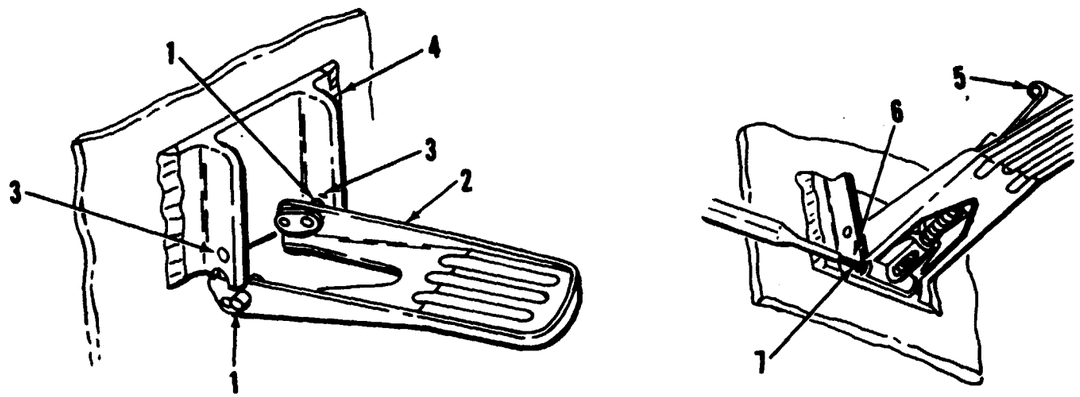


Figure 3-12. Latch installation.

CHAPTER 4

BATTERY CHARGER (1A1A1)

Section I. PROGRAMMED TESTS

4-1. General

This chapter provides the information necessary to isolate and repair a fault in the battery charger (UUT) to a faulty subassembly or chassis installed component. Figures 4-2 through 4-4 are provided as aids in troubleshooting the UUT.

4-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT.

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB-402
c. Multimeter	
d. Deleted.	
e. Passive probe	TA-108
f. Digital multimeter probe	TA-109
g. Cable	CA-9
h. Cable	CA-34
i. Cable	CA-35
j. Cable	CA-413

4-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care when performing manual procedures.

a. Before beginning the programmed test, remove the cover. At programmed test completion, or when the UUT is to be shipped to the depot for further testing or repair, install the cover.

b. When the program or a REF TM requires adjustments to A1R8, A1R10, or A1R1l, refer to figure 4-2 for adjustment locations.

c. When the program or a REF TM requires probing of S2, XA2, XA3, XA4, or XA5, refer to figure 4-2 for pin locations.

4-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

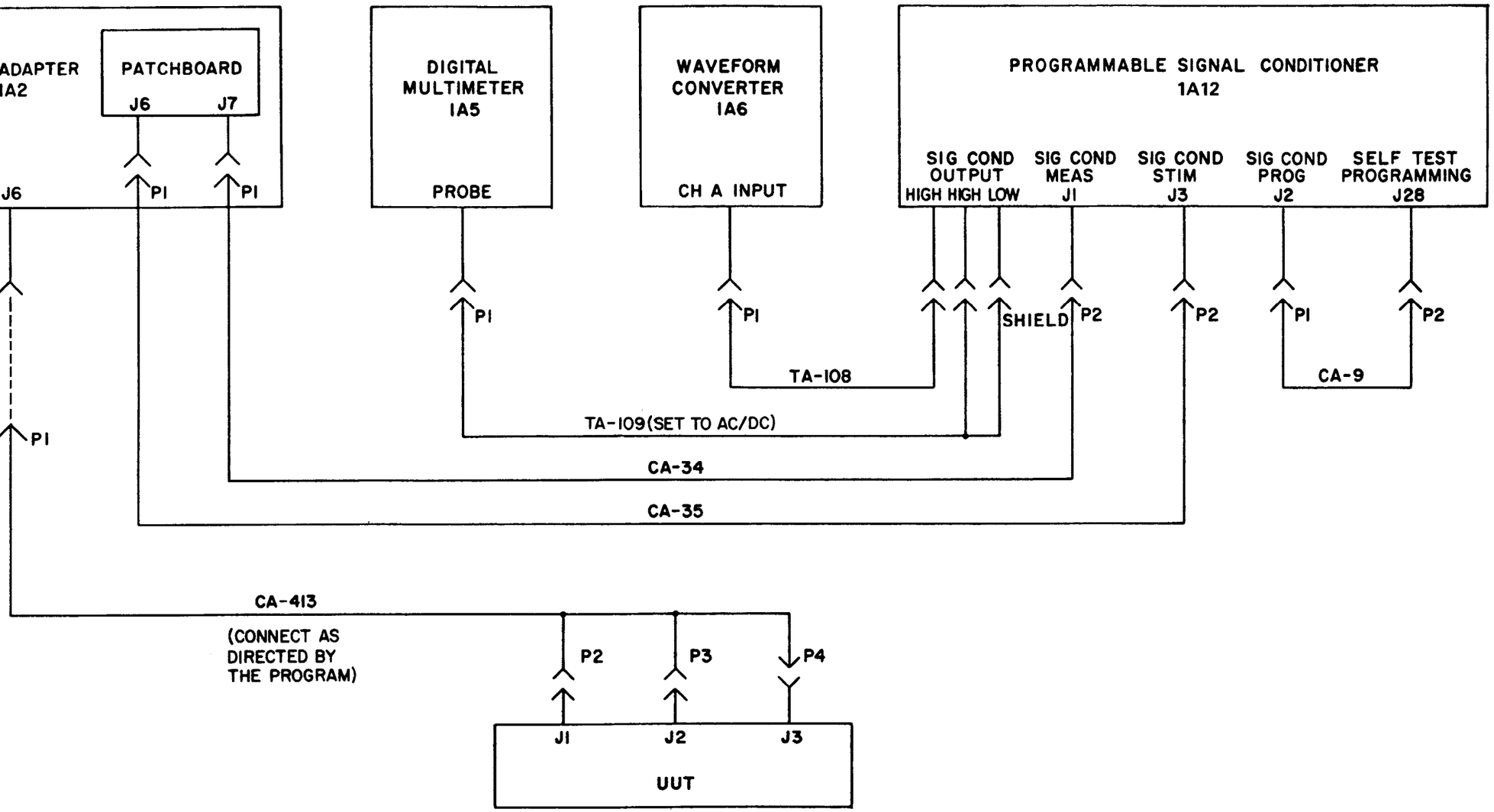
(1) Dial 5220000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUB MODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in message.



MS 101291B

Figure 4-1. Cable hookup diagram.

Table 4-1. Battery Charger (1A1A1), Programmed Tests

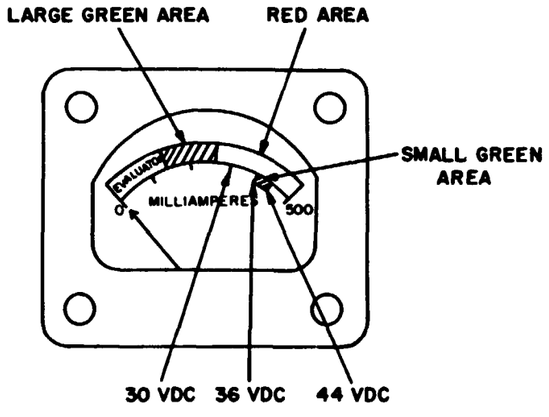
Print message ref no.	Action or instructions
REF TM 1 through REF TM 4	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 5	*a* Install the patchboard. *b.* Set the MS/TR switch on the patchboard to MS. **NOTE** Do not connect the UUT at this time. *c.* Perform the cable hookup (fig. 4-1). *d.* On 1A4, turn the voltage control fully CCW, and set the ON/OFF circuit breaker to OFF. *e.* Press the PROCEED switch.
REF TM 6	*a.* Position the controls on the UUT as follows: (1) Set the EXTERNAL POWER switch to OFF. (2) Position the METER switch to OFF. (3) Set the INTERNAL POWER switch to OFF. *b.* Connect CA-413 (fig. 4-1). *c.* Press the PROCEED switch.
REF TM 7	Ship the UUT to the depot (par. 4-14).
REF TM 8	Verify that the voltage indicated on the METER is in accordance with the displayed value. *a.* A voltage equal to 40 VDC is indicated when the needle is positioned in the center of the small green area shown below.  *b.* A voltage equal to 36 VDC is indicated when the needle is positioned at the left edge of the small green area shown above. *c.* A voltage equal to 44 VDC is indicated when the needle is positioned at the right edge of the small green area shown above. *d.* A voltage between 36 and 44 VDC is indicated when the needle is positioned proportionally in the small green area shown above. *e.* If the METER indicates a voltage in accordance with the displayed value, press the PROCEED switch.

Table 4-1. Battery Charger (1A1A1), Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 8 Continued	*f.* If the METER indicates zero, follow the instructions contained in the message displayed on SSVD. *g.* If the reading, indicated on the METER is higher or lower than the displayed voltage, but not zero, proceed to step *h.* **WARNINC** Dangerous voltages may be present in the UUT. Use care when performing manual procedures. *h.* Adjust A1R8 (fig. 4-2) until the METER indicates a voltage in accordance with the displayed voltage. (1) If the adjustment can be made, press the PROCEED switch. (2) If the adjustment cannot be made, follow the instructions contained in the message displayed on SSVD.
REF TM 9	Replace the front panel.
REF TM 10	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. If ALL TESTS GO is displayed on SSVD, run the programmable signal conditioner program (see TM 9-1425-550-10).
REF TM 11	*a.* Remove F3 from XF3, and test F3 for an open with the multimeter. (1) If F3 tests open, replace F3. (2) If F3 tests good, proceed to step *b*. *b.* Remove the four screws, and separate the front panel from the chassis. Test XF3 with the multimeter. (1) If the meter reading indicates a faulty XF3, replace XF3. (2) If the meter reading indicates XF3 to be good, reinstall F3. Proceed to step *c.* *c.* Position the EXTERNAL POWER switch to DC, and measure the resistance between S1-A1 and S1-A3 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *d.* (2) If the meter reading is greater than 10 ohms, replace S1. *d.* Position the front panel on the chassis, and install the four screws. Replace A2.
REF TM 12	*a.* Remove F1 from XF1, and test F1 for an open with the multimeter. (1) If F1 tests open, replace F1. (2) If F1 tests good, proceed to step *b.* *b.* Remove the four screws, and separate the front panel from the chassis. Test XF1 with the multimeter. (1) If the meter reading indicates a faulty XF1, replace XF1. (2) If the meter reading indicates XF1 to be good, reinstall F1. Proceed to step *c.* *c.* Position the EXTERNAL POWER switch to AC, and measure the resistance between S1-C1 and S1-C2 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *d.* (2) If the meter reading is greater than 10 ohms, replace S1. *d.* Position the front panel on the chassis, and install the four screws. Remove the cover from the UUT. Disconnect one lead from L2, and measure the resistance with the multimeter. (1) If the meter reading is greater than 10 ohms, replace L2. (2) If the meter reading is less than 10 ohms, reconnect the lead to L2, and replace T1.
REF TM 13	*a.* Remove F2 from XF2, and test F2 for an open with the multimeter. (1) If F2 tests open, replace F2. (2) If F2 tests good, proceed to step *b.* *b.* Remove the four screws, and separate the front panel from the chassis. Test XF2 with the multimeter. (1) If the meter reading indicates a faulty XF2, replace XF2. (2) If the meter reading indicates XF2 to be good, reinstall F2. Proceed to step *c.*

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions
REF TM 13 Continued	*c.* Position the EXTERNAL POWER switch to AC, and measure the resistance between S1-D1 and S1-D2 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *d.* (2) If the meter reading is greater than 10 ohms, replace S1. *d.* Position the panel on the chassis, and install the four screws. Replace T1.
REF TM 14	*a.* Remove the cover. *b.* Remove A3. *c.* Test Q4 in accordance with steps *d* through *i* in the following chart. (1) If the meter readings indicate Q4 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q4 to be good, proceed to step *j.*

Step	Positive lead	Negative lead	Meter reading	Action
d.	XA3-F	XA3-9	Less than 100 K ohms	Proceed to step *e.*
			Greater than 100 K ohms	Q4 faulty
e.	XA3-9	XA3-F	Greater than 1000 K ohms	Procced to step *f.*
			Less than 1000 K ohms	Q4 Faulty
f.	XA3-F	XA3-L	Less than 100 K ohms	Proceed to step *g.*
			Greater than 100 K ohms	Q4 Faulty
g.	XA3-L	XA3-F	Greater than 1000 K ohms	Proceed to step *h.*
			Less than 1000 K ohms	Q4 Faulty
h.	XA3-L	XA3-9	Greater than 1000 K ohms	Proceed to step *i.*
			Less than 1000 K ohms	Q4 Faulty
i.	XA3-9	XA3-L	Greater than 1000 K ohms	Proceed to step *j.*
			Less than 1000 K ohms	Q4 Faulty

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions
REF TM 14 Continued	*j.* Replace A3, and rerun the test program. (1) If REF TM 14 is not displayed on SSVD again, the removed A3 was faulty. (2) If REF TM 14 is displayed on SSVD again, the removed A3 was good. Install the cover and return the UUT to the depot (par. 4-14).
REF TM 15	*a.* Remove the cover. *b.* Disconnect one lead to L1, and measure the resistance of L1 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *c.* (2) If the meter reading is greater than 10 ohms, replace L1. *c.* Remove A2. Measure the resistance between XA2-N and XA2-R with the multimeter. (1) If the meter reading is greater than 1000 K ohms, proceed to step *d.* (2) If the meter reading is less than 1000 K ohms, reinstall A2, install the cover, and return the UUT to the depot (par. 4-14). *d.* Measure the resistance between XA2-R and XA2-N with the multimeter. (1) If the meter reading is less than 100 K ohms, proceed to step *e.* (2) If the meter reading is greater than 100 K ohms, reinstall A2, install the cover, and return the UUT to the depot (par. 4-14). *e.* Test Q1 in accordance with steps *f* through *k* in the following chart. (1) If the meter readings indicate Q1 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q1 to be good, proceed to step *l.*

Step	Positive lead	Negative lead	Meter reading	Action
f.	XA2-L	XA2-N	Less than 100 K ohms	Proceed to step *g.*
			Greater than 100 K ohms	Q1 Faulty
g.	XA2-N	XA2-L	Greater than 1000 K ohms	Proceed to step *h.*
			Less than 1000 K ohms	Q1 Faulty
h.	XA2-L	XA2-9	Less than 100 K ohms	Proceed to step *i.*
			Greater than 100 K ohms	Q1 Faulty
i.	XA2-9	XA2-L	Greater than 1000 K ohms	Proceed to step *j.*
			Less than 1000 K ohms	Q1 Faulty

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions				
	Step	Positive lead	Negative lead	Meter reading	Action
REF TM 15 Continued	*j.*	XA2-9	XA2-N	Greater than 100 K ohms [1]	Proceed to step *k.*
				Less than 100 K ohms [1]	Q1 Faulty
	k.	XA2-N	XA2-9	Greater than 1000 K ohms	Proceed to step *l.*
				Less than 1000 K ohms	Q1 Faulty
	[1] Use X10K range *l.* Reconnect the lead to L1. Replace A2, and rerun the test program. (1) If REF TM 15 is not displayed on SSVD again, the removed A2 was faulty. (2) If REF TM 15 is displayed on SSVD again, the removed A2 was good. Install the cover and return the UUT to the depot (par. 4-14).				
REF TM 16	*a.* Remove the cover. *b.* Remove A4. *c.* Test Q5 in accordance with steps *d* through *i* in the following chart. (1) If the meter readings indicate Q5 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q5 to be good, proceed to step *j.*				
	d.	XA4-F	XA4-15	Less than 100 K ohms	Proceed to step *e.*
				Greater than 100 K ohms	Q5 Faulty
	e.	XA4-15	XA4-F	Greater than 1000 K ohms	Proceed to step *f.*
				Less than 1000 K ohms	Q5 Faulty
	f.	XA4-F	XA4-7	Less than 100 K ohms	Proceed to step *g.*
				Greater than 100 K ohms	Q5 Faulty
	g.	XA4-7	XA4-F	Greater than 1000 K ohms	Proceed to step *h.*
				Less than 1000 K ohms	Q5 Faulty
	h.	XA4-7	XA4-15	Greater than 1000 K ohms	Proceed to step *i.*
				Less than 1000 K ohms	Q5 Faulty
	i.	XA4-15	XA4-7	Greater than 1000 K ohms	Proceed to step *j.*
				Less than 1000 K ohms	Q5 Faulty
	j. Replace A4, and rerun the test program. (1) If REF TM 16 is not displayed on SSVD again, the removed A4 was faulty. (2) If REF TM 16 is displayed on SSVD again, the removed A4 was good. Install the cover and return the UUT to the depot (par. 4-14).				
REF TM 17	*a.* Remove the cover. *b.* Remove A5. *c.* Test Q6 in accordance with steps *d* through *i* in the following chart. (1) If the meter readings indicate Q6 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q6 to be good, proceed to step *j.*				
	d.	XA5-13	XA5-11	Less than 100 K ohms	Proceed to step *e.*
				Greater than 100 K ohms	Q6 Faulty
	e.	XA5-11	XA5-13	Greater than 1000 K ohms	Proceed to step *f.*
				Less than 1000 K ohms	Q6 Faulty

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions				
	Step	Positive lead	Negative lead	Meter reading	Action
REF TM 17 Continued	*f.*	XA5-13	XA5-15	Less than 100 K ohms	Proceed to step *g.*
				Greater than 100 K ohms	Q6 Faulty
	g.	XA5-15	XA5-13	Greater than 1000 K ohms	Proceed to step *h.*
				Less than 1000 K ohms	Q6 Faulty
	h.	XA5-15	XA5-11	Greater than 1000 K ohms	Proceed to step *i.*
				Less than 1000 K ohms	Q6 Faulty
	i.	XA5-11	XA5-15	Greater than 1000 K ohms	Proceed to step *j.*
				Less than 1000 K ohms	Q6 Faulty
REF TM 18	*j.* Replace A5, and rerun the test program. (1) If REF TM 17 is not displayed on SSVD again, the removed A5 was faulty. (2) If REF TM 17 is displayed on SSVD again, the removed A5 was good. Install the cover and return the UUT to the depot (par. 4-14). *a.* Remove the four screws, and separate the front panel from the chassis. *b.* Set the INTERNAL POWER switch to ON, and measure the resistance between S3-B1 and S3-B3 with the multimeter. (1) If the meter reading is less than 10 ohms, position the front panel on the chassis, and install the four screws. Proceed to step *c.* (2) If the meter reading is greater than 10 ohms, replace S3. *c.* Remove the cover. *d.* Remove A4. *e.* Test Q5 in accordance with steps *f* through *k* in the following chart. (1) If the meter readings indicate Q5 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q5 to be good, proceed to step *l.*				

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions				
	Step	Positive lead	Negative lead	Meter reading	Action
REF TM 18 Continued	*f.*	XA4-F	XA4-15	Less than 100 K ohms	Proceed to step *g.*
				Greater than 100 K ohms	Q5 Faulty
	g.	XA4-15	XA4-F	Greater than 1000 k ohms	Proceed to step *h.*
				Less than 1000 K ohms	Q5 Faulty
	h.	XA4-F	XA4-7	Less than 100 K ohms	Proceed to step *i.*
				Greater than 100 K ohms	Q5 Faulty
	i.	XA4-7	XA4-F	Greater than 1000 K ohms	Proceed to step *j.*
				Less than 1000 K ohms	Q5 Faulty
	j.	XA4-7	XA4-15	Greater than 1000 K ohms	Proceed to step *k.*
				Less than 1000 K ohms.	Q5 Faulty
	k.	XA4-15	XA4-7	Greater than 1000 K ohms	Proceed to step *l.*
				Less than 1000 K ohms	Q5 Faulty
REF TM 19	*l.* Replace A4, and rerun the test program. (1) If REF TM 18 is not displayed on SSVD again, the removed A4 was faulty. (2) If REF TM 18 is displayed on SSVD again, the removed A4 was good. Install the cover, and return the UUT to the depot (par. 4-14). *a.* Remove the four screws, and separate the front panel from the chassis. *b.* Set the INTERNAL POWER switch to ON, and measure the resistance between S3-A1 and S3-A3 with the multimeter. (1) If the meter reading is less than 10 ohms, position the front panel on the chassis, and install the four screws. Proceed to step *c.* (2) If the meter reading is greater than 10 ohms, replace S3.				

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

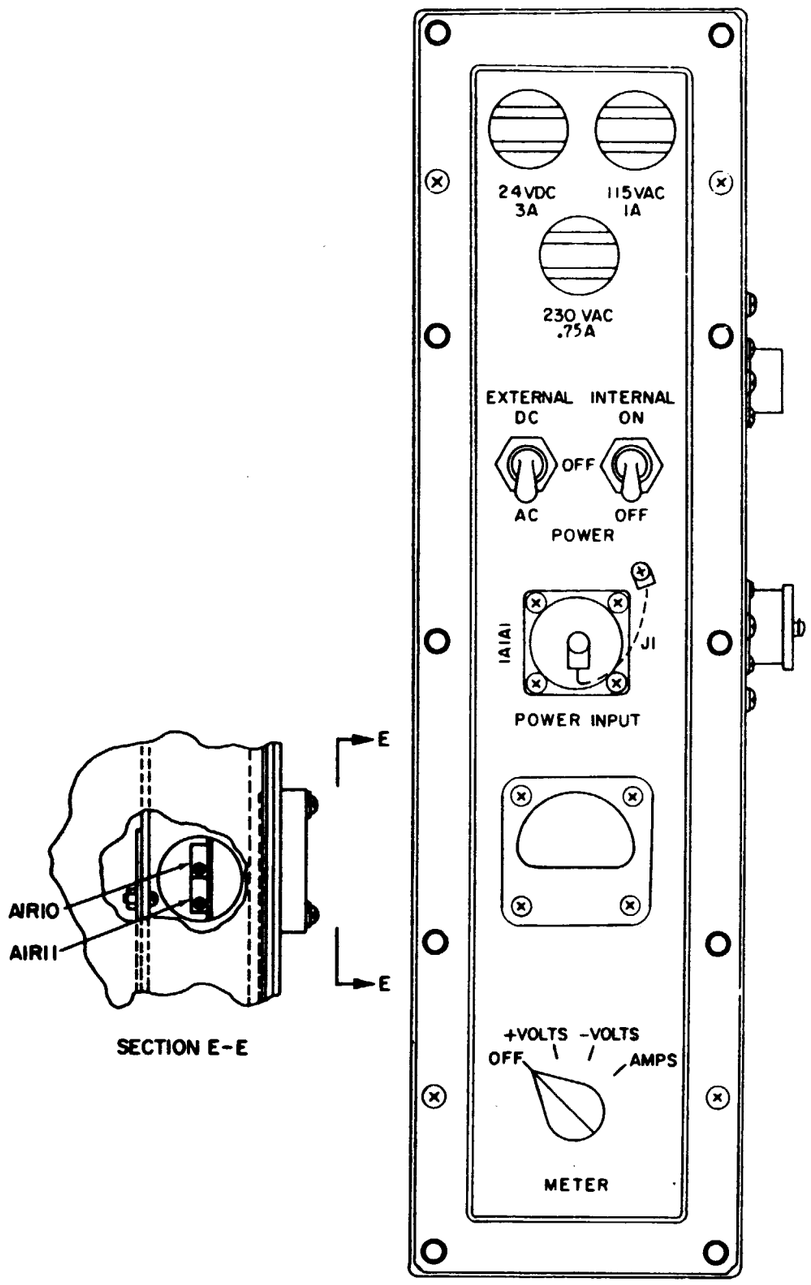
Print message ref no.	Action or instructions
REF TM 19 Continued	*c.* Remove the cover. *d.* Remove A5. *e.* Test Q6 in accordance with steps *f* through *k* in the following chart. (1) If the meter readings indicate Q6 to be faulty, install the cover and return the UUT to the depot (par. 4-14). (2) If the meter readings indicate Q6 to be good, proceed to step *l.*

Step	Positive lead	Negative lead	Meter reading	Action
f.	XA5-13	XA5-11	Less than 100 K ohms	Proceed to step *g.*
			Greater than 100 K ohms	Q6 Faulty
g.	XA5-11	XA5-13	Greater than 1000 K ohms	Proceed to step *h.*
			Less than 1000 K ohms	Q6 Faulty
h.	XA5-13	XA5-15	Less than 100 K ohms	Proceed to step *i.*
			Greater than 100 K ohms	Q6 Faulty
i.	XA5-15	XA5-13	Greater than 1000 K ohms	Proceed to step *j.*
			Less than 1000 K ohms	Q6 Faulty
j.	XA5-15	XA5-11	Greater than 1000 K ohms	Proceed to step *k.*
			Less than 1000 K ohms	Q6 Faulty
k.	XA5-11	XA5-15	Greater than 1000 K ohms	Proceed to step *l.*
			Less than 1000 K ohms	Q6 Faulty

l. Replace A5, and rerun the test program.
(1) If REF TM 19 is not displayed on SSVD again, the removed A5 was faulty.
(2) If REF TM 19 is displayed on SSVD again, the removed A5 was good. Install the cover and return the UUT to the depot (par. 4-14).

Table 4-1. Battery Charger (1A1A1), Programmed Tests – Continued.

Print message ref no.	Action or instructions
REF TM 20	*a.* Remove the four screws, and separate the front panel from the chassis. *b.* Press the PROCEED switch.
REF TM 21	*a.* Remove the cover. *b.* Disconnect one lead from L1, and measure the resistance of C1 with the multimeter. (1) If the meter reading is less than 1 K ohm, reconnect the lead to L1 and replace C1. (2) If the meter reading is greater than 1 K ohm, reconnect the leads to L1. Install the cover and return the UUT to the depot (par. 4-14).
REF TM 22	*a.* Replace C1. *b.* Rerun test. If test fails again, replace BR1.



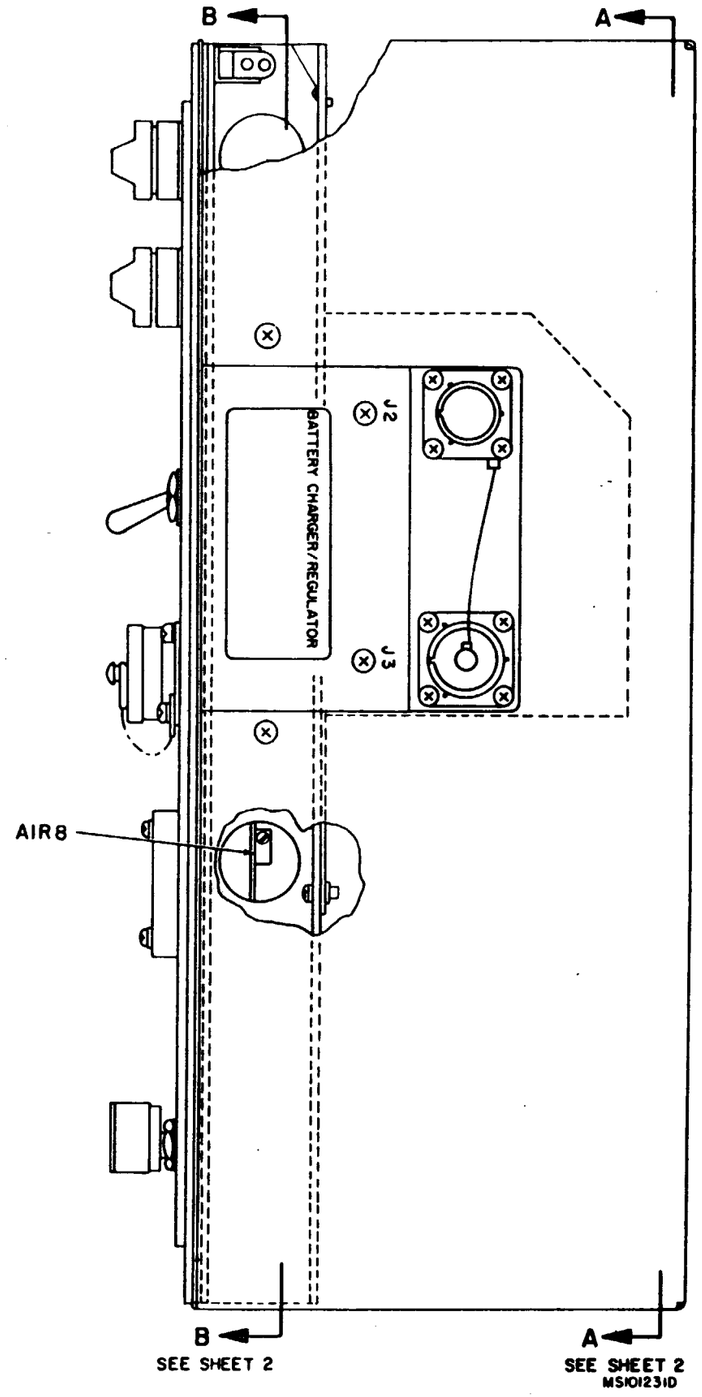


Figure 4-2. Battery charger (1A1A1), puts location diagram (sheet 1 of 2).

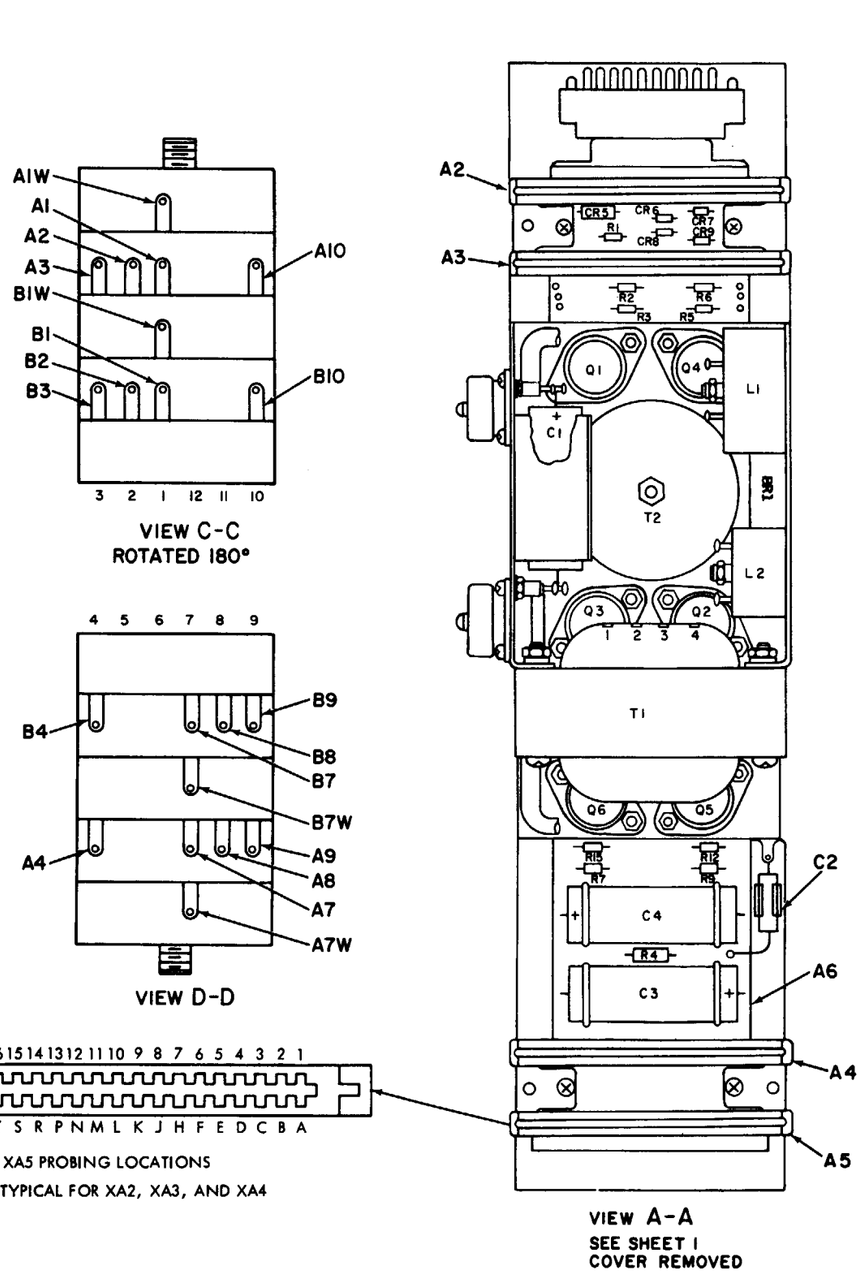
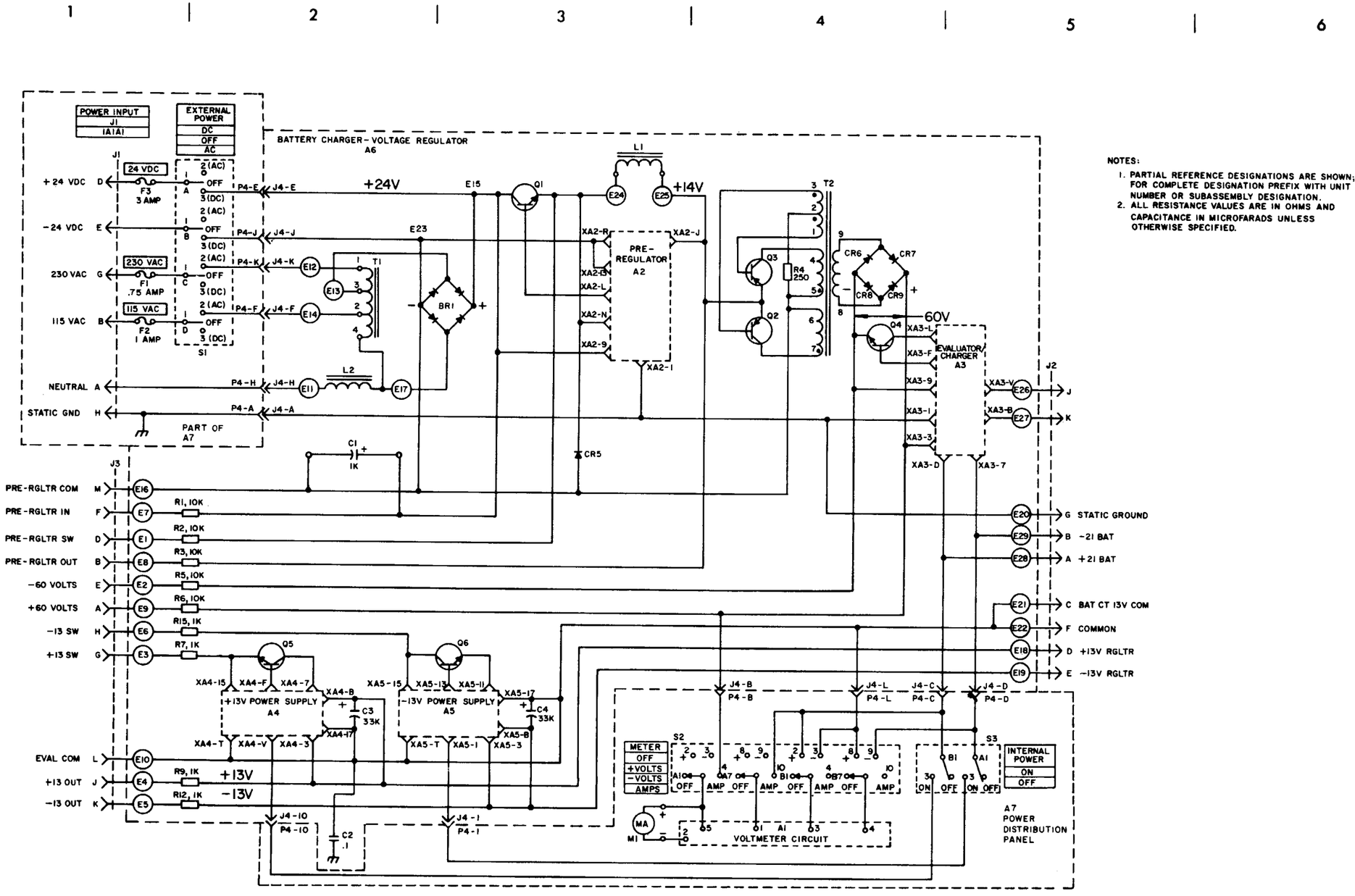


Figure 4-2. (sheet 2 of 2).



NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION.
2. ALL RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

Figure 4-3. Battery charger (1A1A1), schematic diagram.

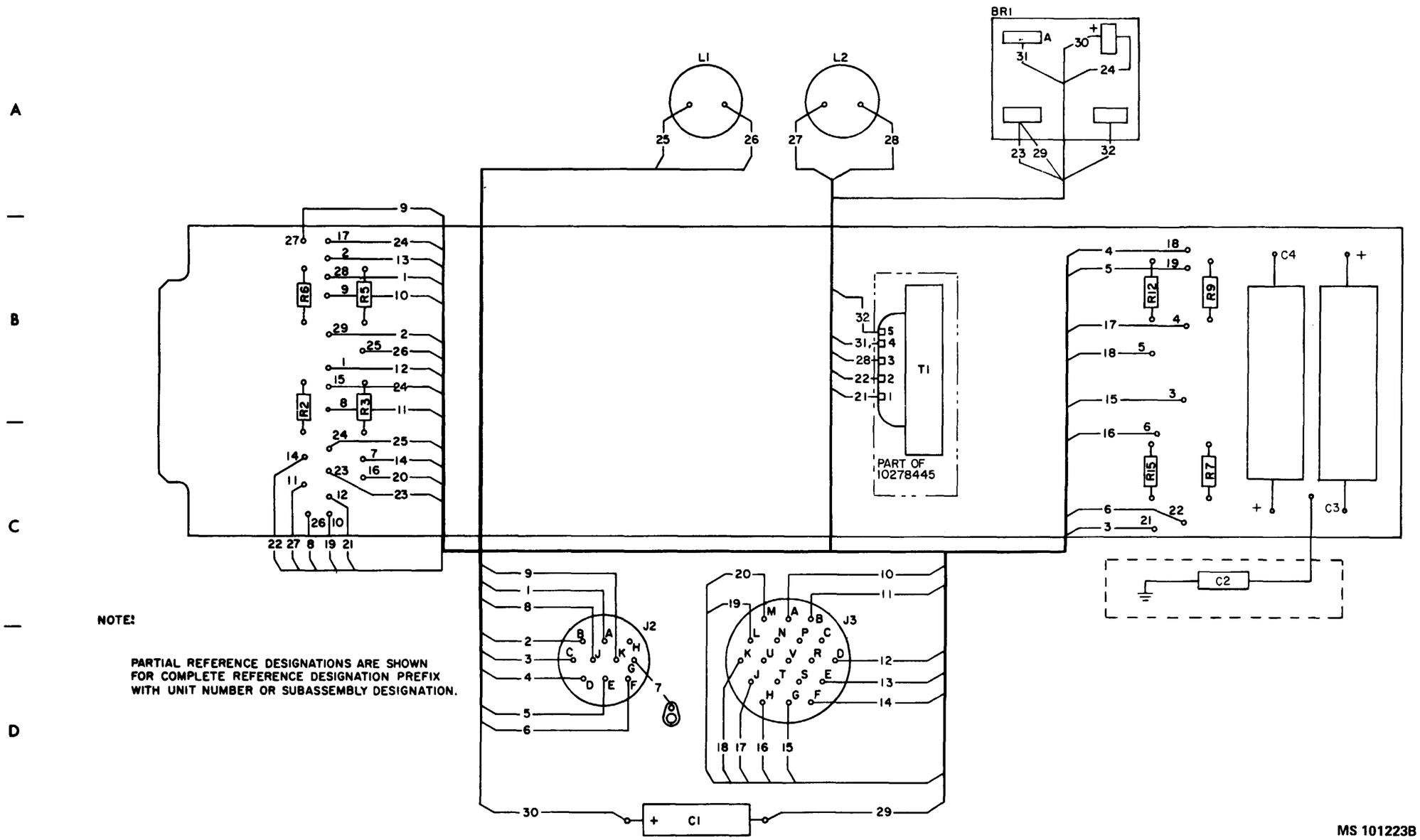
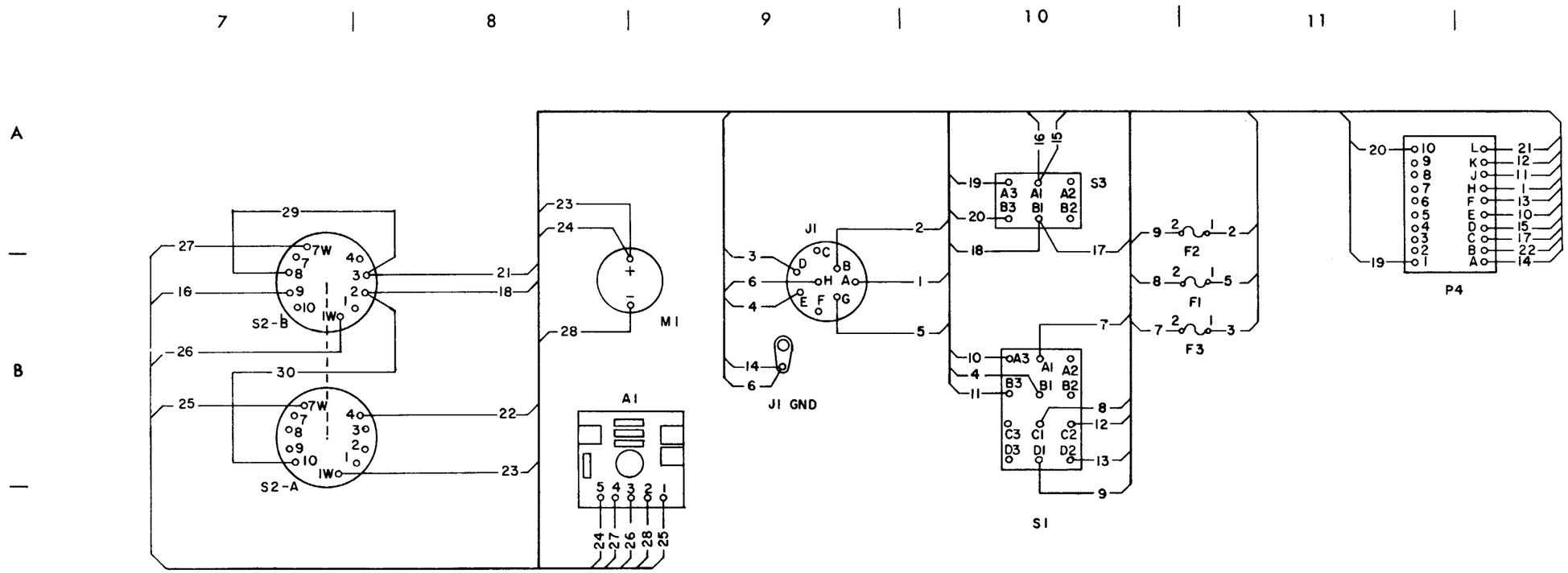


Figure 4-4. Battery charger (1A1A1), wiring *diagram (sheet 1 of 2).*



NOTE:

PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.
FOR COMPLETE REFERENCE DESIGNATION PREFIX
WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION.

RUNNING LIST			
WIRE NO.	BODY	FROM	TO
29	INSUL	S2-B8	S2-B3
30	INSUL	S2-B3	S2-A10

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Figure 4-4. (sheet 2 of 2).

Section II. REPAIR PROCEDURES

4-5. General

This section providcs repair information for the UUT within the scope of DS and GS maintenance personnel. Figure 4-5 illustrates the disasscmbly and assembly of the UUT and special tools required. Paragraphs 4-6 through 4-12 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-6920-480-24P-1 contains a list of repair parta and special tools authorized for maintenance personnel.

4-6. Gasket Removal and Installation Procedure (Fig. 4-5)

a. *Removal.* Using a knife, remove gasket (5) and any residual adhesive from panel (6).

b. Installation.

(1) Clean the gasket mounting area with MEK (item 17, App. D).

NOTE

Be sure the screw-holes in the gasket are alined with the holes in the panel before the gaskct is **positioned on the panel.**

(2) Fabricate a new gasket (5) from sponge rubber (item 30, App. D). Bond the gasket to panel (6) with a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D). Wipe off excess adhesive.

4-7. Nameplate Removal and Installation Procedure (Fig. 4-5)

a. *Removal.* Using a knife, remove nameplate (7) and any residual adhesive, from the cover (8).

b. Installation.

(1) Clean the nameplate mounting area with MEK (item 17, App. D).

(2) Mark the new nameplate (7) with the same information that appeared on the old nameplate.

(3) Remove the protective backing from the nameplate and install the nameplate to cover (8).

4-8. J1 Removal and Installation Procedure (Fig. 4-5)

a. *Removal.*

(1) Remove screws (19), and separate panel (6) from chassis (20).

(2) Using a knife, cut the insulation sleeving from the terminals of J1 (28).

(3) Disconnect and tag the leads to J1.

(4) Remove mounting hardware (29 through 32), Jl, and gasket (34).

b. Installation.

(1) Clean the J1 mounting area with MEK (item 17, App. D). Apply a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the area where J1 mounts to panel (6). Position gasket (34) on J1 (28) and install J1 in the panel. Position terminal lug (17) and install mounting hardware (29 through 32).

(2) Install electrical insulation (item 16, App. D) on the leads, disconnected from J1.

(3) Connect the leads to J1 that were disconnected in step *a* (3) above. Slide the insulation over each of the terminals of J1.

(4) Position the panel on chassis (20), and install screws (19).

4-9. M1 Removal and Installation Procedure (Fig. 4-5)

a. Removal.

(1) Remove screws (19), and separate panel (6) from chassis (20).

(2) Disconnect and tag the leads to Ml (35).

NOTE

When removing the mounting hardware for M1, support A1 (36) with one hand.

(3) Remove mounting hardware (37 through 39), gasket (40), and Ml.

b. Installation.

(1) Clean the Ml mounting area with MEK (item 17, App. D). Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) to the area where Ml mounts to panel (6). Wipe off excess adhesive. Position gasket (40) on M1 (35).

(2) Position Al (36) behind panel (6), and install Ml with mounting hardware (37 through 39).

(3) Connect the leads that were disconnected in step a (2) above.

(4) Position the panel on chassis (20), and install screws (19).

4-10. Cap Removal and Installation Procedure (Fig. 4-5)

a. *Removal.*

(1) Remove screws (19), and separate panel (6) from chassis (20).

(2) Remove mounting hardware (69 through 71) and cap (33).

b. Installation.

(1) Clean the area where screw (69) mounts through panel (6) with MEK (item 17, APP. D).

(2) Apply a mixture of sealing compound (item 12, App. D) and catalyst (item 8, App. D) to the screw.

(3) Install cap (33) with mounting hardware (69 through 71).

(4) Position the panel on chassis (20), and install screws (19).

4-11. BR1 Removal and Installation Procedure (Fig. 4-5)

a. Removal.

(1) Remove cover assembly (4) by removing screws (1) and (2), and washer (3).

(2) Unsolder and tag leads connected to BR1 (75).

(3) Remove screw (72), washer (73), nut (74), and BR1 (75).

b. Installation.

(1) Install BR1 (75), screw (72), washer (73), and nut (74).

(2) Solder leads to BR1 (75).

(3) Install cover assembly (4) by installing screws (1) and (2), and washers (3).

4-12. S1 and S3 Installation Precautions

CAUTION

New switches (S1 and S3) come with captive screws mounted in the contact lugs. These screws must be removed by holding the lugs individually with long nose pliers and exerting enough force on each screw with a screwdriver to release it from the lug without damaging the switch internally.

When soldering wires to the new or replacement switch, care should be taken not to overheat switch terminals (heat sink).

4-13. Painting

Touch up the panel of the battery charger as follow:

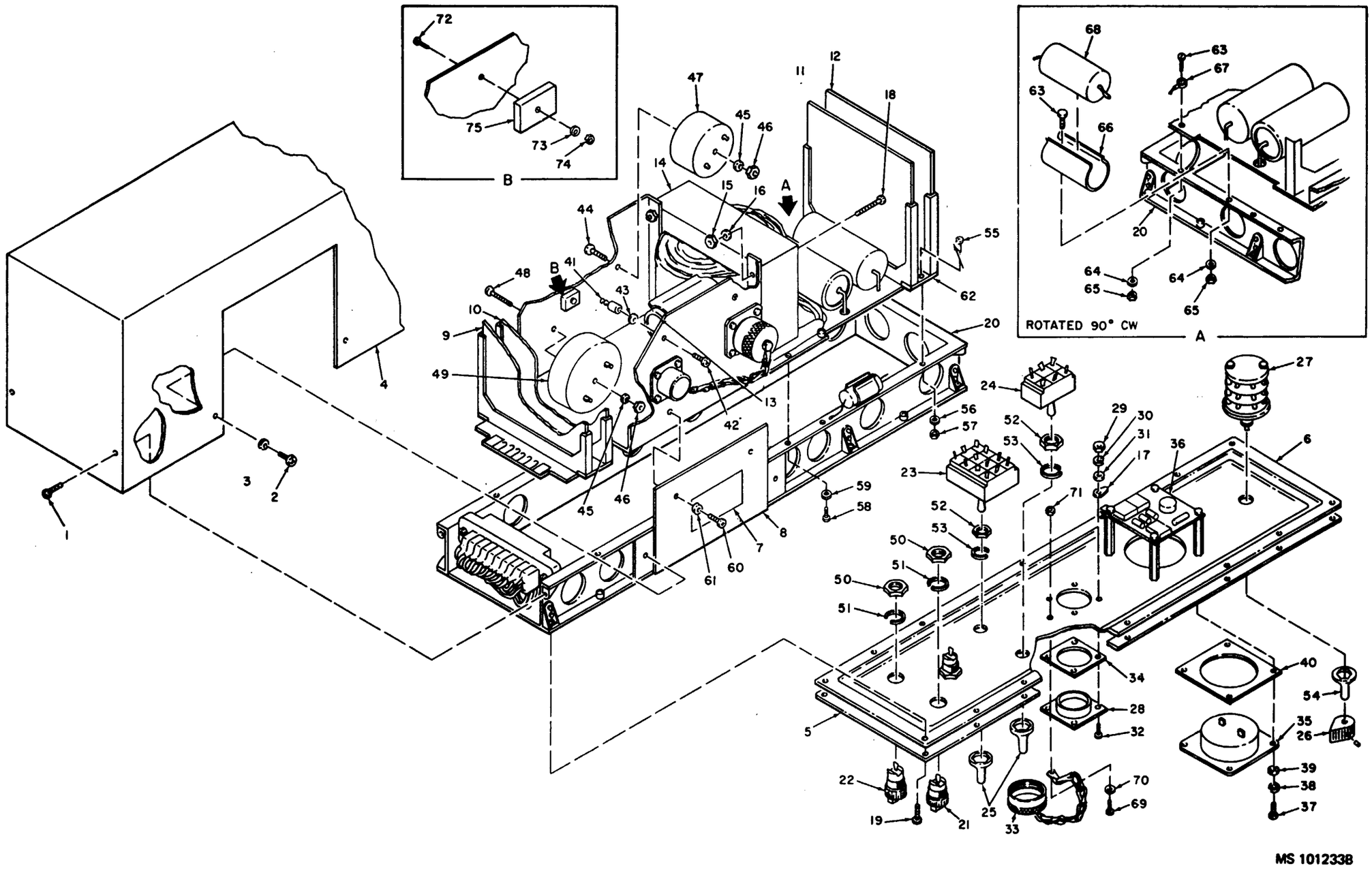
a. Apply primer (item 24, App. D) and allow to dry.

b. Apply polyurethane coating (item 9, App. D) two hours after primer is applied.

4-14, Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Ensure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.



1 – Screw
2 – Screw
3 – Washer
4 – Cover
5 – Gasket
6 – Panel
7 – Nameplate
8 – Cover
9 – A2
10 – A3
11 – A4
12 – A5
13 – C1
14 – T1
15 – Nut
16 – Washer
17 – Terminal lug
18 – Screw
19 – Screw
20 – Chassis
21 – XF1 and XF2
22 – XF3
23 – S1
24 – S3
25 – Boot
26 – Knob
27 – S2
28 – J1
29 – Nut
30 – Washer
31 – Washer
32 – Screw
33 – Cap
34 – Gasket
35 – M1
36 – A1 (depot only)
37 – Screw
38 – Washer
39 – Washer
40 – Gasket
41 – E15 and E23
42 – Screw
43 – Washer
44 – Screw
45 – Washer
46 – Nut
47 – L1
48 – Screw
49 – L2
50 – Nut
51 – Washer
52 – Nut
53 – Washer
54 – Boot
55 – Screw
56 – Washer
57 – Nut
58 – Screw
59 – Washer
60 – Screw
61 – Washer
62 – A6
63 – Screw
64 – Washer
65 – Nut
66 – Clip
67 – Terminal
68 – C2
69 – Screw
70 – Washer
71 – Nut
72 – Screw
73 – Washer
74 – Nut
75 – BR1

Figure 4-5. Repair of battery charger.

CHAPTER 5

RELAY-DIODE ASSEMBLY (1A1A3)

Section 1. PROGRAMMED TESTS

5-1. General

This chapter provides the information necessary to isolate and repair a fault in the relay-diode assembly (UUT) to a faulty chassis-installed component. Figures 5-2 through 5-4 are provided as an aid in troubleshooting the UUT.

5-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT:

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB402
c. Multimeter	
d. Digital multimeter probe	TA-109
e. Cable	CA-414

5-3. Test Instructions

There are no special test instructions for this UUT.

5-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT as installed in PLMA 1A15.

b. Set monitor panel lA15 switches as follows:

(1) Dial 5240000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUB MODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

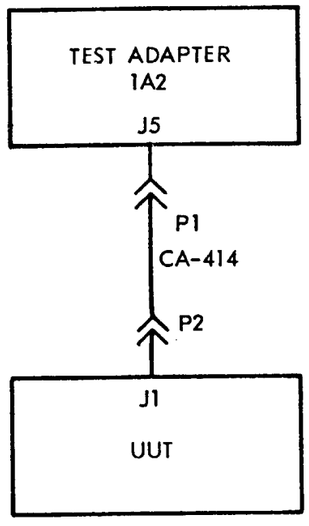


Figure 5-1. Cable hookup diagram.

Table 5-1. Relay-Diode Assembly (1A1A3), Programmed Tests

Print message ref no.	Action or instructions
REF TM 1 through REF TM 4	Discontinue UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 5	a. Install the patchboard. *b.* Set the MS/TR switch, on the patchboard, to MS. c. Connect the RES probe between J1 and J2, on the patchboard. *d* Press the PROCEED switch.
REF TM 6	a Connect CA-414 (fig. 5-1). *b.* Press the PROCEED switch.
REF TM 7	Disconnect one lead of CR1, and test the diode with the multimeter. *a.* If the meter reading indicates CR1 to be faulty, replace CR1 (par. 5-7). *b.* If the meter reading indicates CR1 to be good, replace K1, CR1, and CR2 (par. 5-6).
REF TM 8	Disconnect one lead of CR2, and test the diode with the multimeter. *a.* If the meter reading indicates CR2 to be faulty, replace CR2 (par. 5-7). *b.* If the meter reading indicates CR2 to be good, replace K1, CR1, and CR2 (par. 5-6).
REF TM 9	Disconnect one lead of CR3, and test the diode with the multimeter. *a.* If the meter reading indicates CR3 to be faulty, replace CR3 (par. 5-7). *b.* lf the meter reading indicates CR3 to be good, replace K2 and CR3 (par. 5-6).
REF TM 10	Disconnect one lead of CR4, and test the diode with the multimeter. *a.* If the meter reading indicates CR4 to be faulty, replace CR4 (par. 5-7). *b.* If the meter reading indicates CR4 to be good, replace K3 and CR4 (par. 5-6).
REF TM 1l	Disconnect one lead of CR5, and test the diode with the multimeter. *a.* If the meter reading indicates CR5 to be faulty, replace CR5 (par. 5-7). *b.* If the meter reading indicates CR5 to be good, replace K4 and CR5 (par. 5-6).

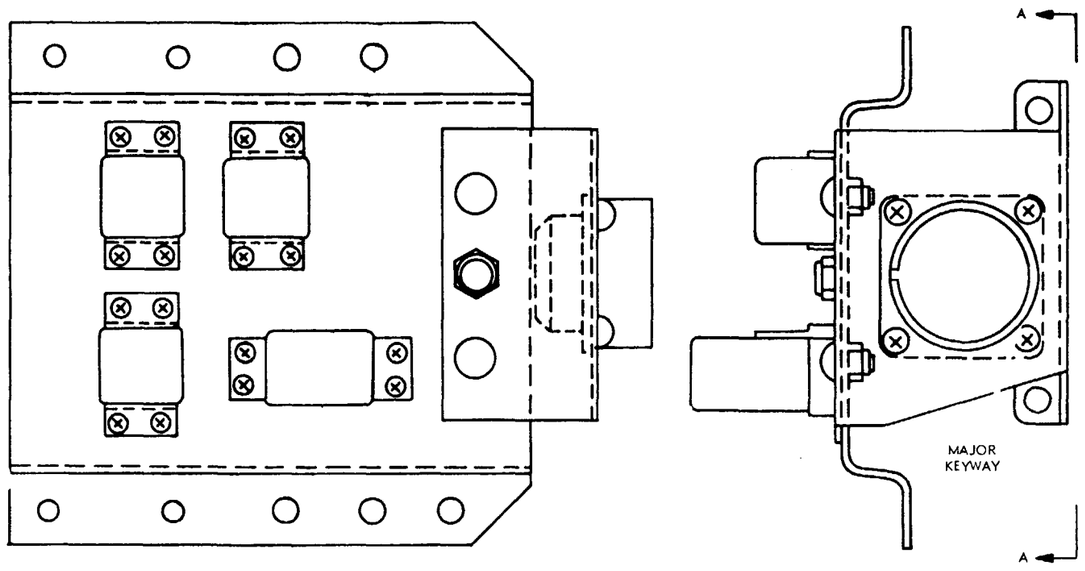


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Figure 5-2. Relay-diode *assembly (1A1A3), parts location diagram.*

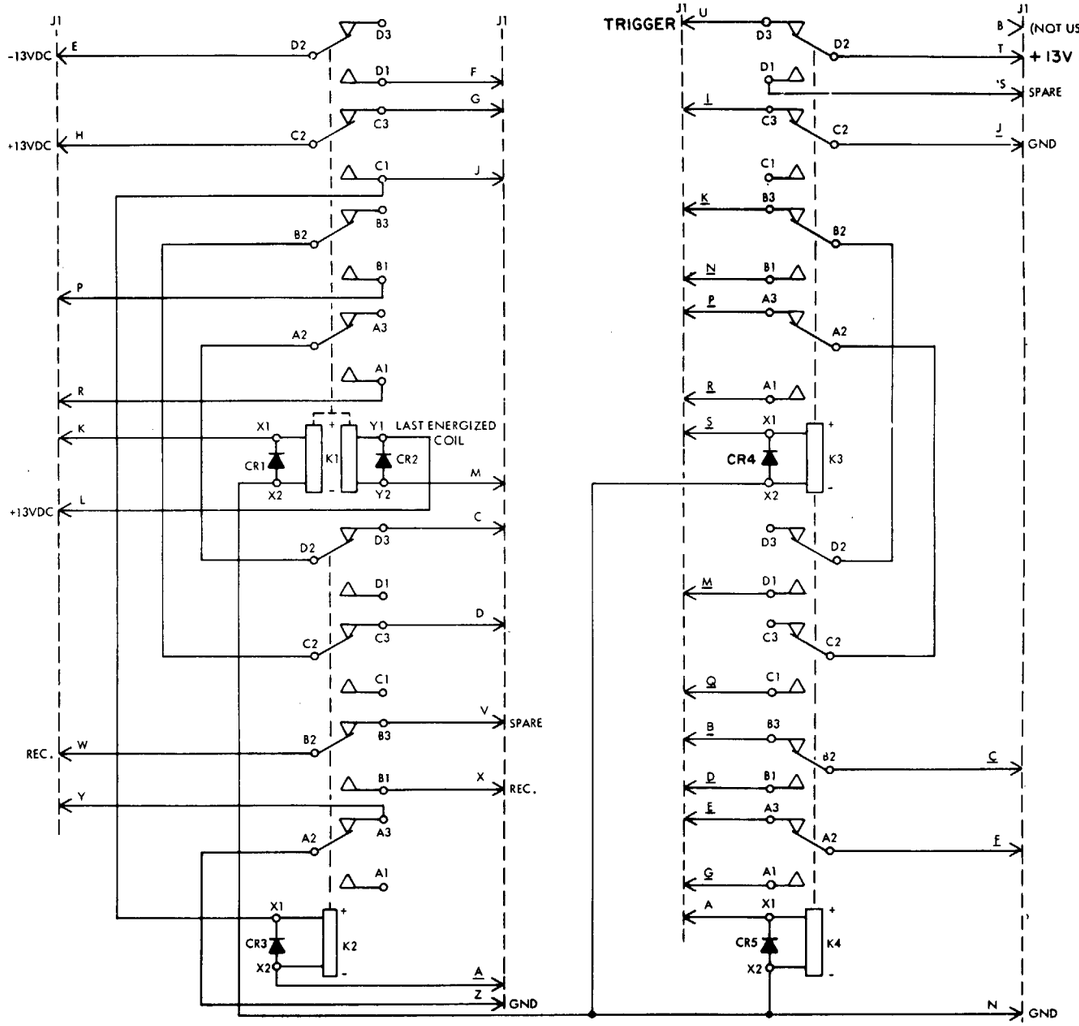

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Figure 5-3. Relay-diode assembly (1A1A3), schematic diagram.

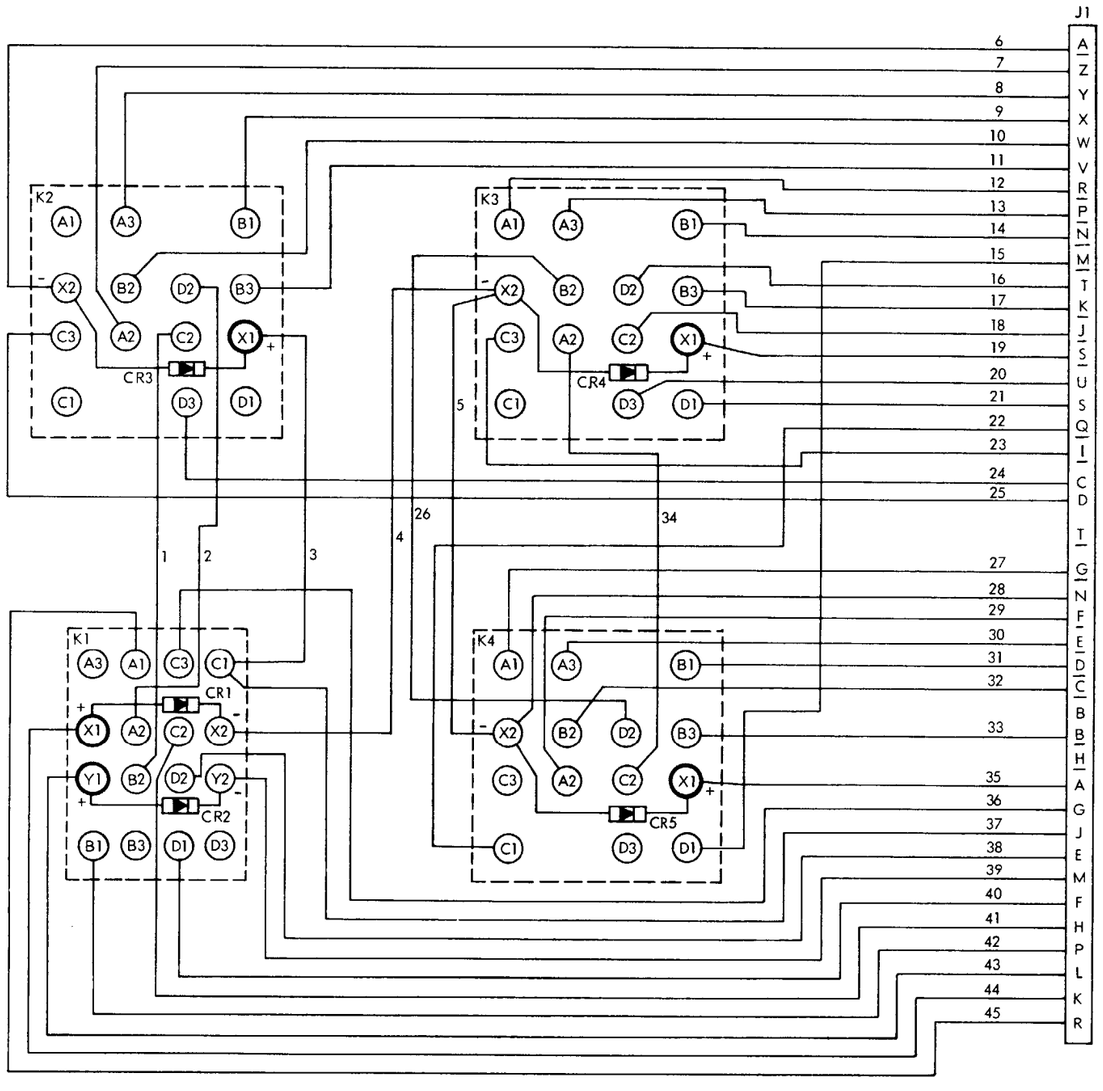

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Figure 5-4. Relay-diode assembly (1A1A3), wiring diagram.

Section II. REPAIR PROCEDURES

5-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figure 5-5 illustrates the disassembly and assembly of the UUT and special tools required. Paragraphs 5-6 through 5-7 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-6920-480-24P-1 contains a list of repair parts and special tools authorized for maintenance personnel.

5-6. K 1 through K4 Removal and Installation Procedure (Fig. 5-5)

a. Removal.

(1) Cut sleeving and disconnect and tag the leads to the relay to be removed.

(2) Remove mounting hardware (1 through 4 for K1 or 6 through 9 for K2-K4), and remove K1 (5) or K2-K4 (10).

b. Installation.

(1) Install insulation sleeving (item 34, App. D) on the leads of CR1-CR5 (11), and install the diode to the relay terminals.

(2) Install K1 (5) or K2-K4 (10) with mounting hardware (1 through 4, for K1 or 6 through 9 for K2-K4).

(3) Install insulation sleeving (item 34, App. D) on the leads removed in step *a* (1) above, and connect the leads to the relay. Heatshrink the sleeving over the terminals of the relay and on the diode leads, using heat gun.

5-7. CR 1 through CR5 Removal and Installation Procedure (Fig. 5-5)

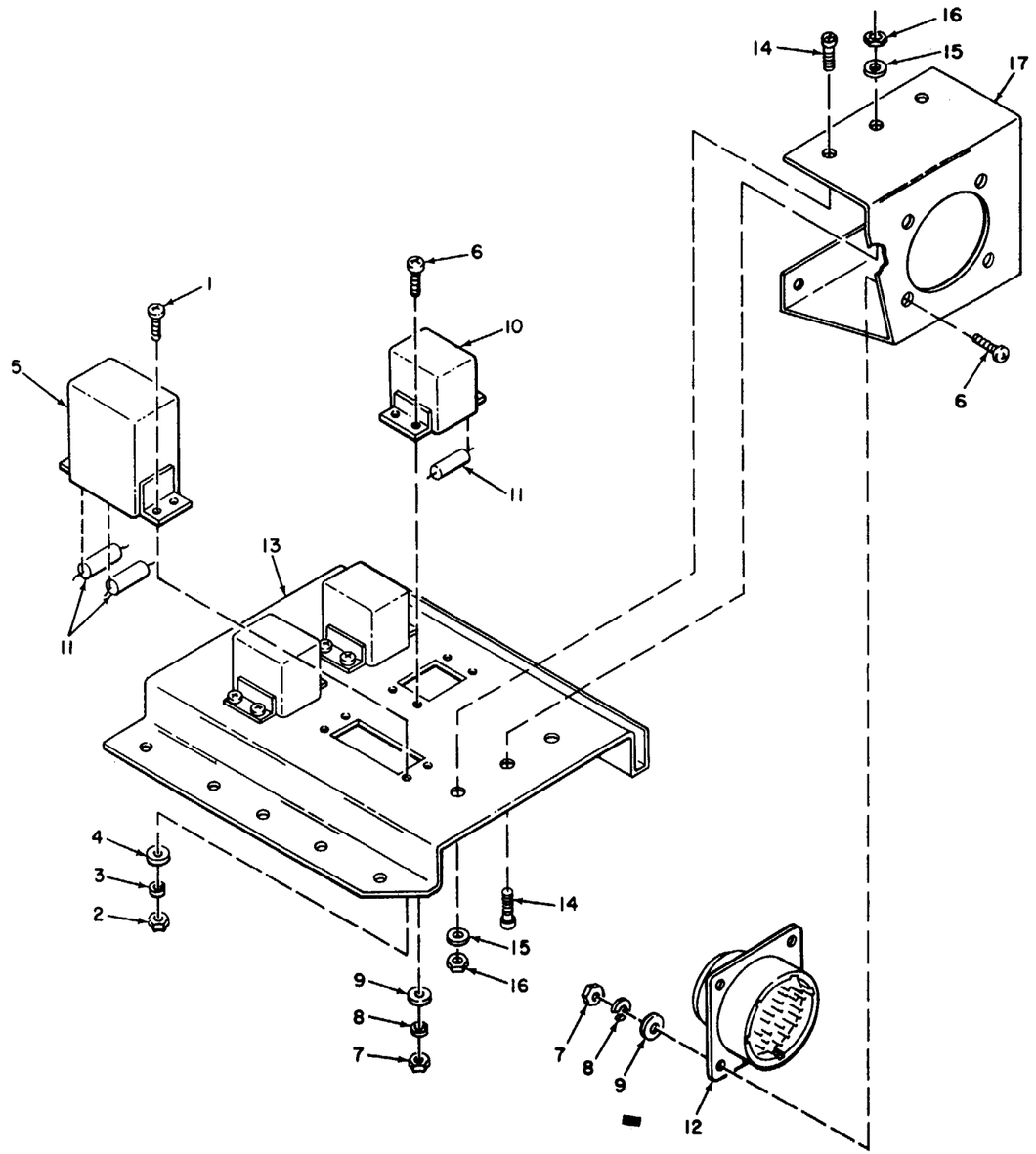
a. Removal. Disconnect and remove CR1-CR5 (11).

b. Installation. Install insulation sleeving (item 34, App. D) on the leads of CR1-CR5 (11), and install the diode to the relay terminals. Heatshrink the sleeving using heat gun.

5-8. Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Insure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.



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1 – Screw
2 – Nut
3 – Washer
4 – Washer
5 – K1
6 – Screw
7 – Nut
8 – Washer
9 – Washer
10 – K2-K4
11 – CR1 – CR5
12 – J1
13 – Chassis
14 – Screw
15 – Washer
16 – Nut
17 – Bracket

Figure 5-5. *Repair of relay-diode assembly.*

CHAPTER 6

TRACKER TEST SET

Section I. PROGRAMMED TESTS

6-1. General

This chapter provides the information necessary to isolate and repair a fault in the tracker test set (UUT) to a faulty assembly, subassembly or chassis-installed component. Figures 6-8 through 6-11 are provided as an aid in trouble-shooting the UUT.

6-2. Equipment Required for Programmed Tests

The following equipment is required to teat the UUT.

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB-401 and PB-402
c. Multimeter	
d. Deleted	
e. Passive probe	TA-108
f. Digital multimeter probe	TA-109
g. Cable (needle probe)	TA-208 (2 required)
h. Lead	TA-216
i. Cable	TA-232
j. Tracker test fixture	TA-404
k. Fixture	TA-405
l. Telescope	TA-407
m. Telescope. mount	TA-415
n. Light shield	TA-424
o. OAC test fixture	TA-430
p. IR probe assembly	TA-437
q. Cable	CA-9
r. Cable	CA-10
s. Cable	CA-34
t. Cable	CA-35
u. Cable	CA-36
v. Cable	CA-39 (3 required)
w. Cable	CA-127
x. Cable	CA-135
y. Cable	CA-401
z. Cable	CA402
aa. Cable	CA-403
a b. Cable	CA-404
ac. Cable	CA-405
ad. Cable	CA-406
ae. Cable	CA-410
af. Cable	CA-419
ag. Cable	CA-421

6-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care when performing manual procedures.

a. After a successful programmed test completion, perform a continuity test of UUT cables (see TM 94935-484-14). These tests represent UUT maintenance calibration.

b. Before performing programmed tests, ensure that batteries in the MU have been charged (See TM 9-4935-484-14). If batteries cannot be charged in accordance with TM 9-4935484-14, test in accordance with Chapter 7. Place the tracker test set in the AN/TSM-93 (test shelter) and wait a minimum of four (4) hours (for temperature stabilization) before testing. At programmed test completion, recharge batteries. After the charging cycle completion, set MU charge switch to OFF.

c. Before performing the programmed tests, remove the cover from the lower case by releasing the ten latches. Invert the cover and place on the shelter floor. Visually inspect the MU for damage to the meter, switches, indicators, and connectors. Visually inspect the Monitor Unit MONITOR meter for mechanical zero. If the MONITOR meter indicator is not on 0, loosen the captive screws securing the panel to the chassis and raise the panel to gain access to the MONITOR meter adjustment screw (fig 7-4). Adjust the screw so that the indicator is on 0. Position the panel on the chassis and tighten the captive screws. If any items require replacement, make the necessary repairs (chapter 8). At programmed test completion, or if the UUT is to be shipped to the depot for further testing or repair, install cover on lower case and fasten the ten latches.

d. When the program or REF TM requires a probe connection to GND, in the MU, connect the probe to the point on A9 marked GND (A9A1J2).

e. When the program or REF TM requires probing of the OAC, refer to figure 6-8 for probing locations. Refer to figure 6-9 for probing and adjustment locations on the Al board in the OAC.

f. The following chart gives the name, abbreviation, and reference designator, of the units contained in the UUT.

Name	Abbreviation	Ref. Desig.
Monitor Unit	MU	A1
Optical Alignment Fixture	OAF	A2
Optical Alignment Collimator	OAC	A3
Trainer Adapter Cable		A4

When the program refers to the module boards in the monitor unit, the reference designators listed in message displayed on SSVD should be prefixed with Al to give the complete reference designation.

g. Before performing programmed tests, remove cover (4, fig. 6-13) from the OAC. At programmed test completion, install cover on the OAC.

6-4. Preparation for Programmed Tests

NOTE

This UUT requires two (2) patch-boards. Patchboard interface is called out in REF TM's.

a. Ensure that PMC for this ULJT is installed in PLMA 1A15.

b. Set monitor panel lA11 switches as follows:

(1) Dial 5300000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUBMODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

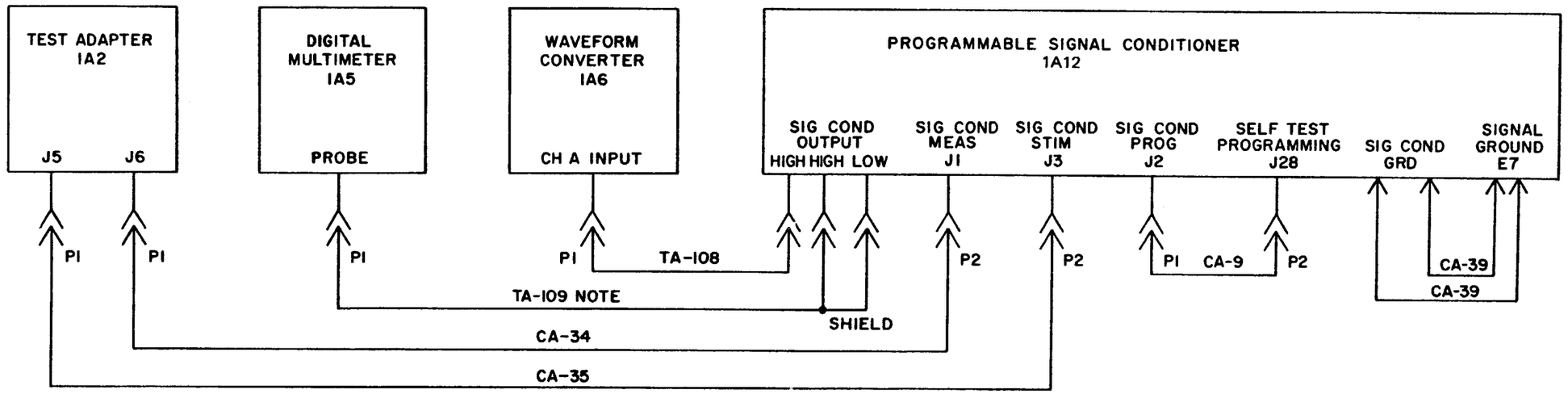


Figure 6-1. Cable hookup diagram.

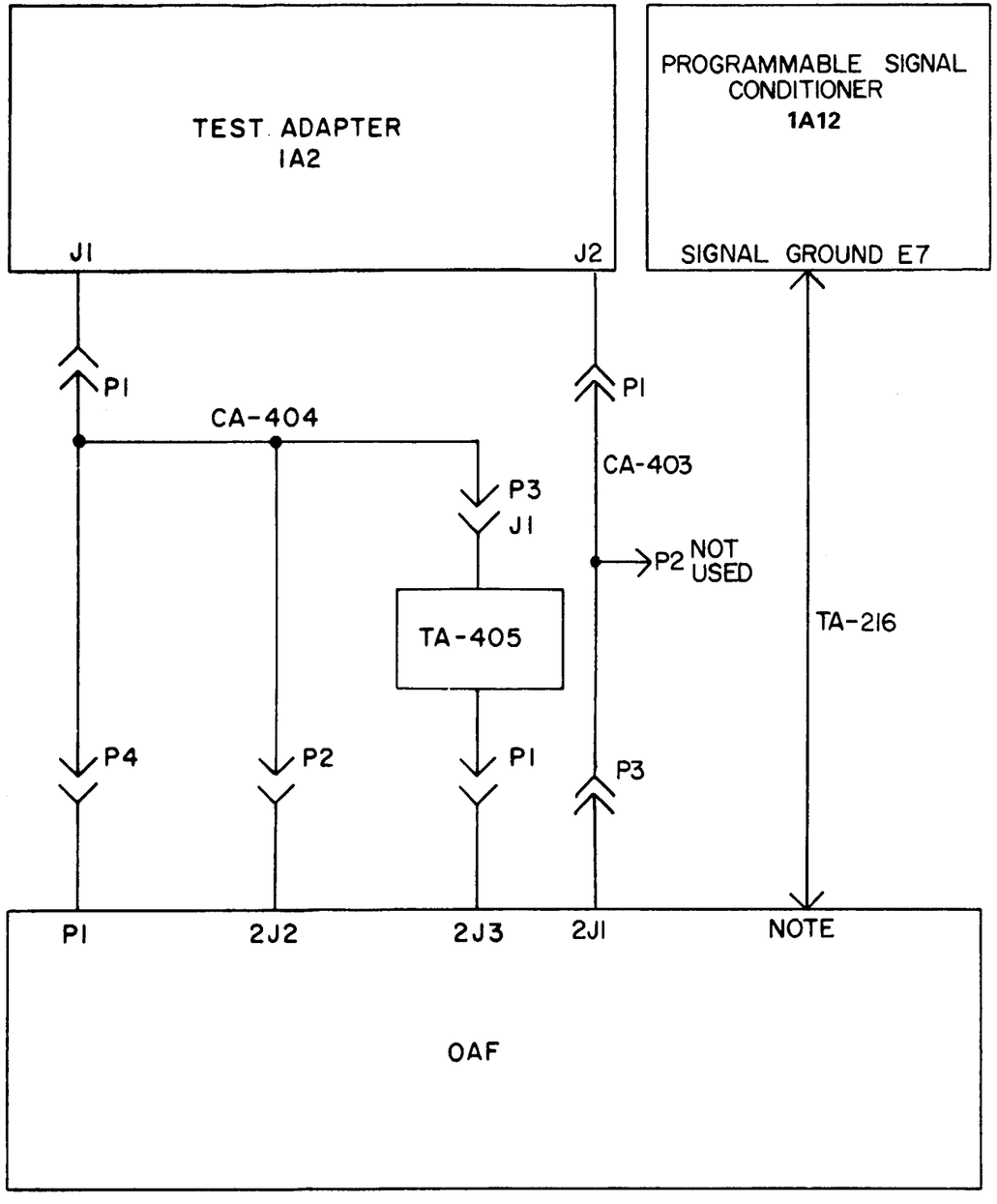


Figure 6-2. Cable hookup diagram.

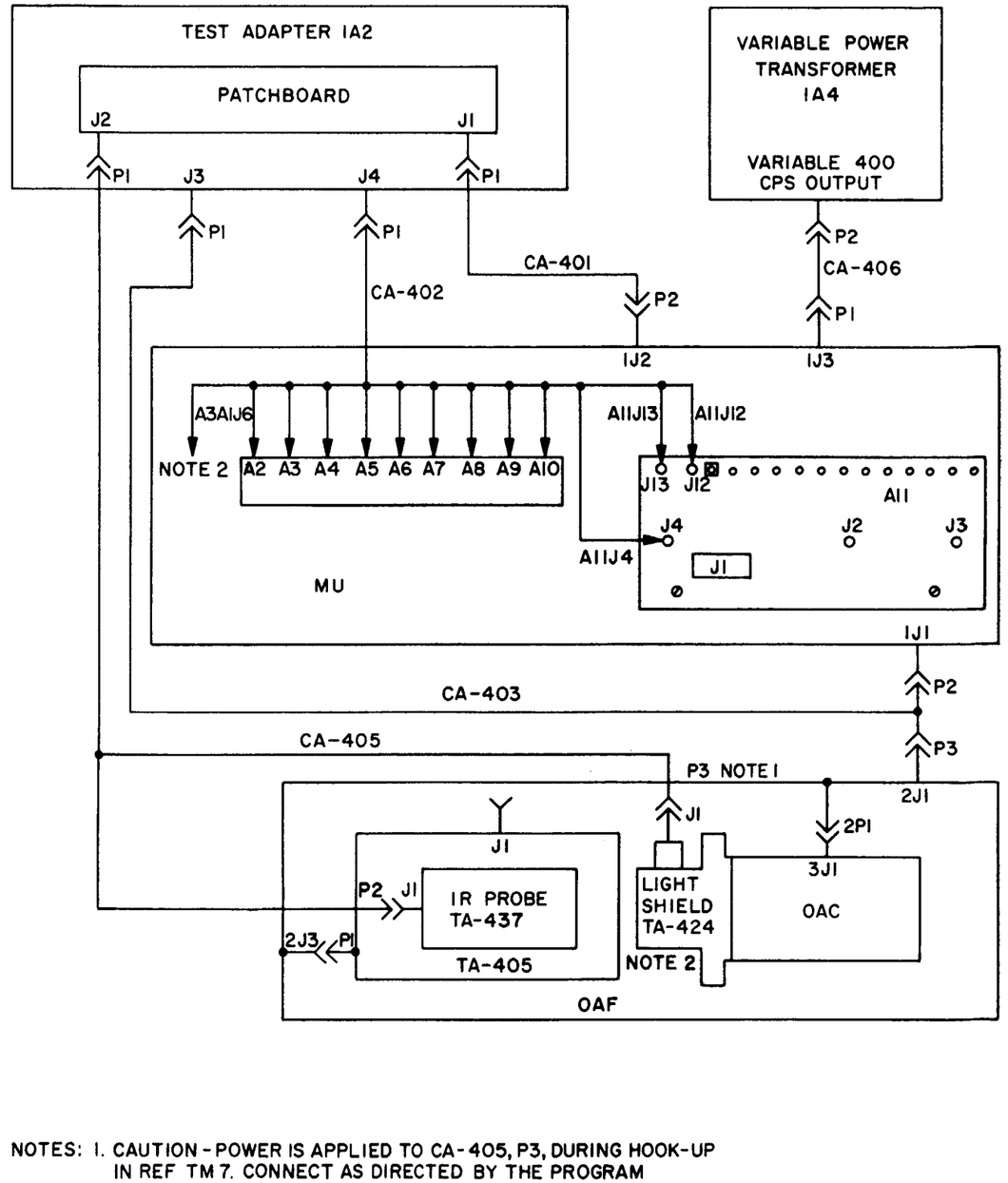


Figure 6-3. Cable hookup diagram.

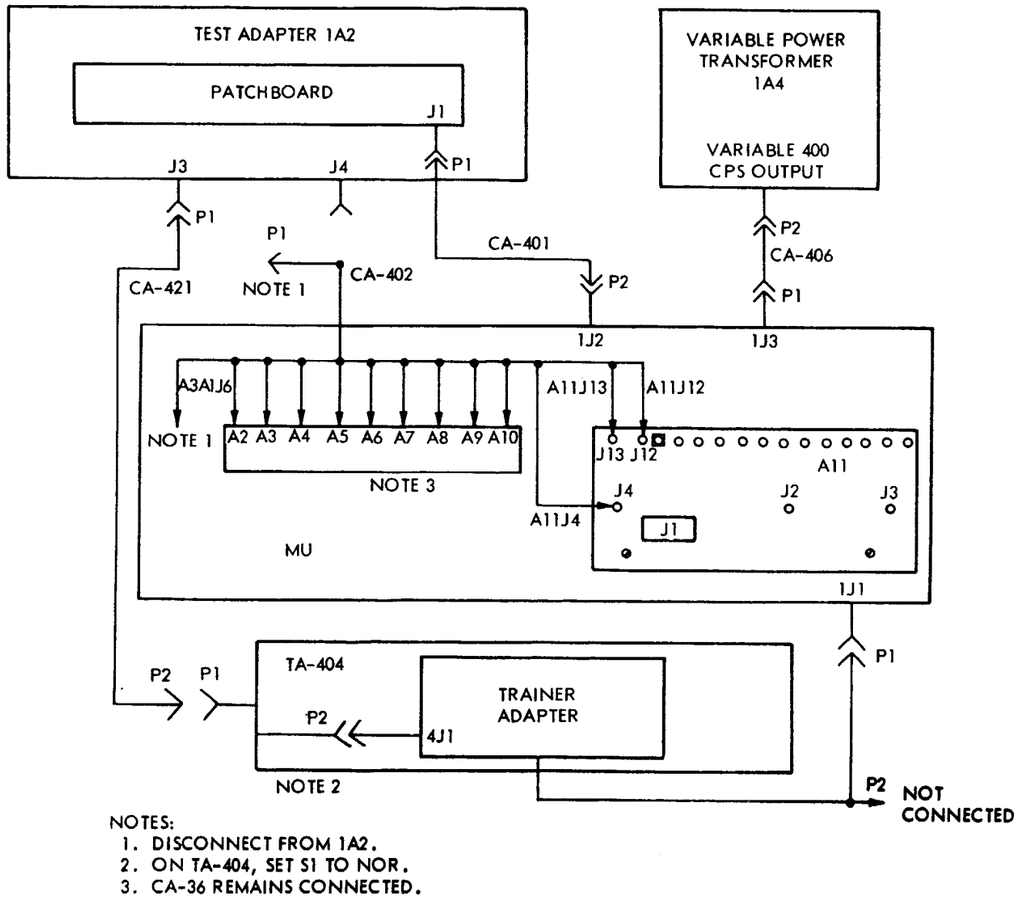


Figure 6-4. *Cable hookup diagram.*

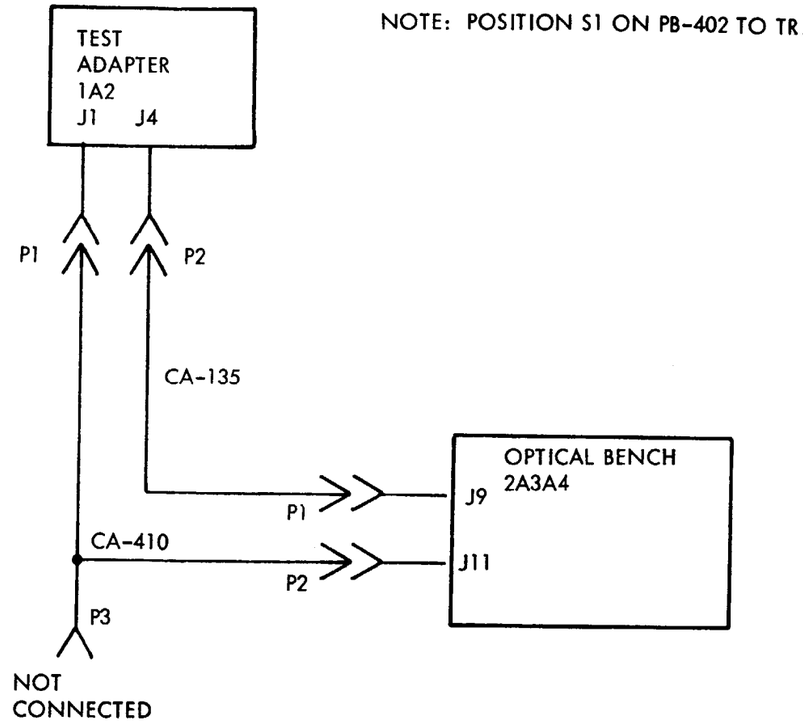
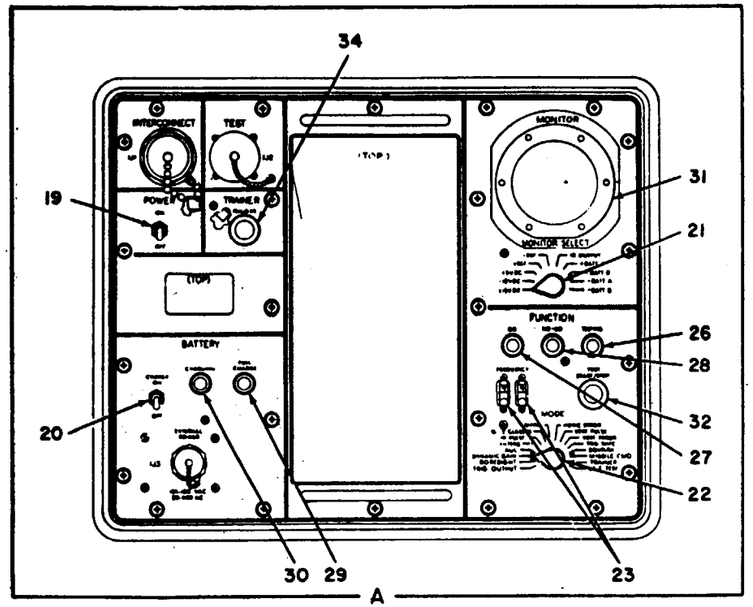
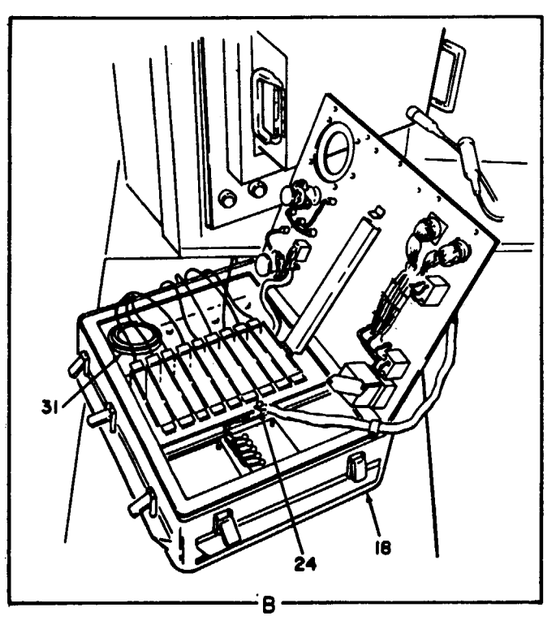
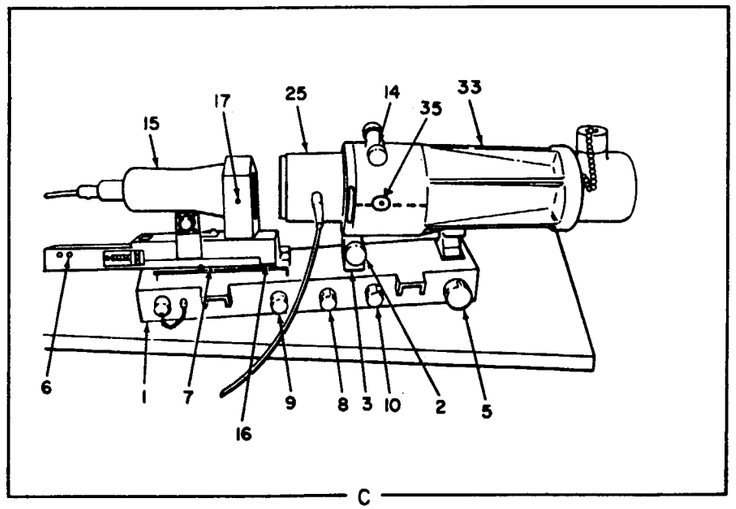
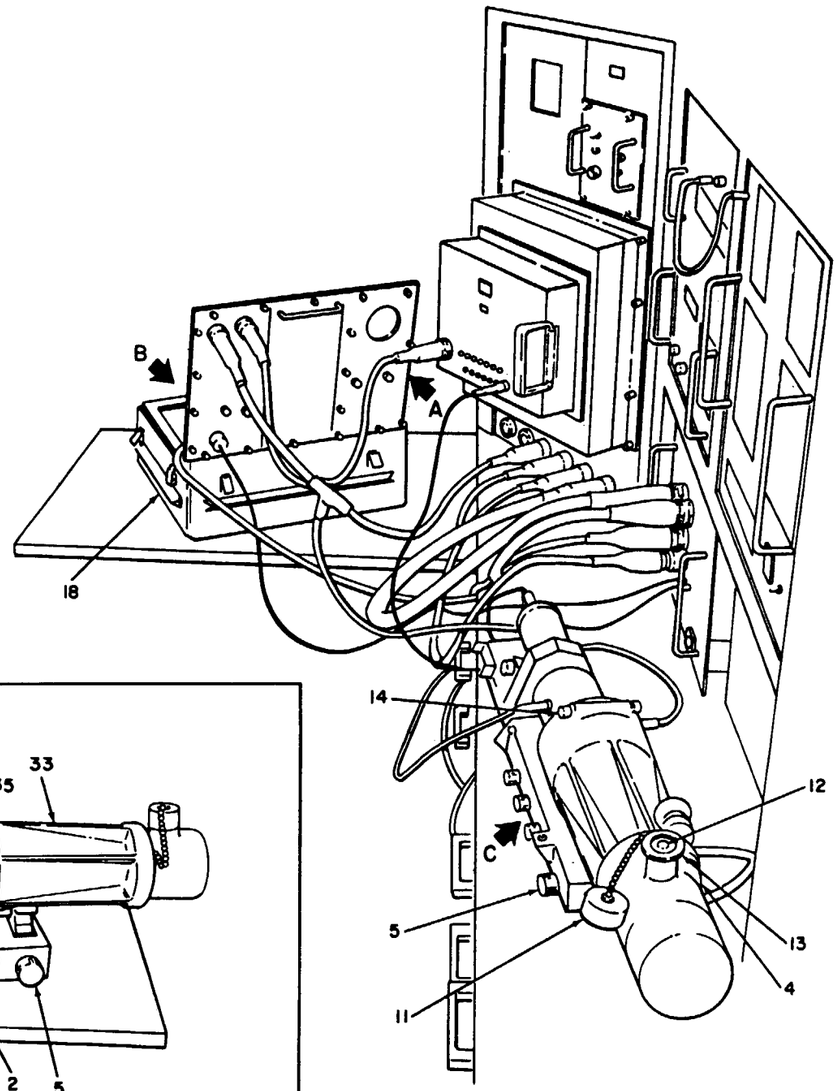


Figure 6-5. Cable hookup diagram.









1 – OAF
2 – OAC locking thumbscrews
3 – OAC mount
4 – AZIMUTH control
5 – ELEVATION control
6 – Connector (2J3)
7 – Tracker mounting area
8 – SELF TEST LIGHT control
9 – TRACKER RETICLE LIGHT control
10 – COLLIMATOR RETICLE LIGHT control
11 – Cover
12 – Eyelens
13 – Focusing ring
14 – Focus control
15 – TA-437
16 – TA-405
17 – Set screws
18 – MU
19 – POWER switch
20 – CHARGE switch
21 – MONITOR SELECT switch
22 – MODE switch
23 – FREQUENCY switches
24 – Chassis ground screw and washer
25 – TA-424
26 – TESTING lamp
27 – GO lamp
28 – NO-GO lamp
29 – FULL CHARGE lamp
30 – CHARGING lamp
31 – MONITOR meter
32 – TEST START/STOP switch
33 – OAC
34 – TRAINER TRIGGER switch
35 – Lens holding screw

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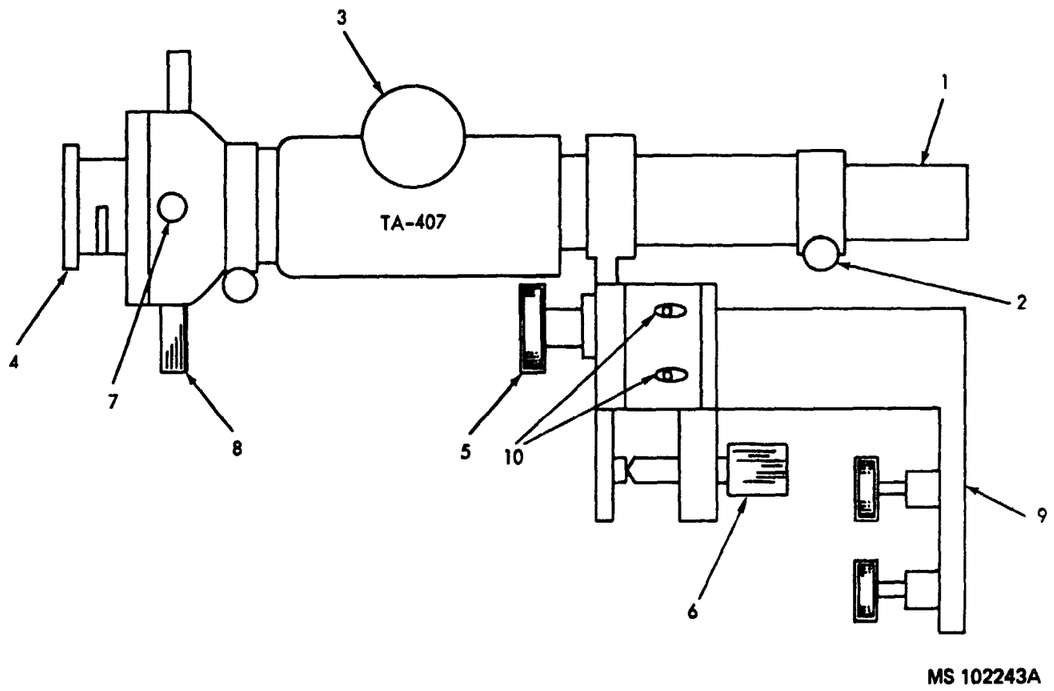
Figure 6-6. Equipment location and cable layout diagram.



1 – Draw tube
2 – Draw tube lock ring
3 – Rack and pinion focusing control
4 – Eyepiece
5 – Azimuth coarse adjustment
6 – Azimuth adjustment screw
7 – Reticle elevation fine adjustment
8 – Reticle azimuth fine adjustment
9 – TA-415
10 – Elevation adjustment screws

Figure 6-7. TA-407 adjust location.

Table 6-1. Tracker Test Set, Programmed Tests.

Print message ref no.	Action or instructions
REF TM 1	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 2	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. If an ALL TESTS GO is displayed on SSVD, run the programmable signal conditioner program (see TM 9-1425-550-10).
REF TM 3	Remove and install a new A2 in the patchboard. Rerun the program. If REF TM 3 is not displayed on SSVD again, the removed A2 from the patchboard is faulty. If REF TM 3 is displayed on SSVD again, the removed A2 from the patchboard is good. Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 4	*a.* Verify the cable hookup (fig. 6-1). *b.* If hookup is correct, discontinue UUT test and run confidence and maintenance test program in accordance with TM 9-4935-552-14/2. *c.* If the cable hookup is not correct, make the necessary correction, and rerun the program.
REF TM 5	*a.* On 1A4, set the ON/OFF circuit breaker to ON. *b.* Perform the cable hookup (fig. 6-1). *c.* Install PB-401. *d.* Press the PROCEED switch.
REF TM 6	*a.* Remove the OAF (1, fig. 6-6) from the cover. *b.* Check the OAF for the following: (1) Condition and operation of the OAC locking thumbscrews (2). (2) OAC mount (3) rotates freely without binding and is not loose. (3) No binding or looseness exists when the AZIMUTH (4) and ELEVATION (5) controls are operated in both directions. (4) Connector 2J3 (6) and the tracker mounting area (7) are free of damage. If any of the above conditions exist, make the necessary repairs (chapter 8). If no damage exists, proceed to step *c.* NOTE Extend the tracker mount on the OAF. *c.* Install TA-405 (16) in 2J3 on the OAF. *d.* Perform the cable hookup (fig. 6-2). *c.* If required, position the controls on the OAF as follows: (1) Position the SELF TEST LIGHT control (8, fig. 6-6) fully CCW and OFF. (2) Position the TRACKER RETICLE LIGHT control (9) fully CCW, and OFF. (3) Position the COLLIMATOR RETICLE LIGHT control (10) fully CCW, and OFF. *f.* Press the PROCEED switch.
REF TM 7	*a.* If required, install the cover on the OAF (1, fig. 6-6). *b.* Disconnect CA-403, CA-404, and TA-216. *c.* Remove the OAC (33) from the cover, and check for the following: (1) No damage to the connectors. (2) The front lens is not damaged. (3) The eyelens (12) is not damaged, and the focusing ring (13) rotates freely. (4) The focus control (14) is not damaged, and turns freely. If any of the above conditions exist, return the OAC to the depot. If no damage exists, proceed to step *c.1.*

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 7 Continued	*c.1.* Visually check for moisture on the interior optical surfaces of the OAC. If there is no moisture, proceed to step *d.* If there is moisture, purge the OAC (par. 6-26). *d.* Mount the OAC in the OAF, and tighten the OAC locking thumbscrews (2). *e.* Connect P1 from the OAF to 3J1 on the OAC. *f.* Install TA-437 (15) in TA-405 (16) and tighten the two set screws (17). *g.* On the MU (18), loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel. *h.* Position the controls on the MU as follows: (1) Set the POWER switch (19, fig. 6-6) to OFF. (2) Set the CHARGE switch (20) to OFF. (3) Position the MONITOR SELECT switch (21) to +13 VDC. (4) Position the MODE switch (22) to SELF TEST. (5) Press the FREQUENCY switches (23) to 00. NOTE When performing the hookup of cable CA-402, plug each leg of CA-402 into the respective printed circuit card in the MU. *i.* Perform the cable hookup (fig. 6-3). The cable hookup shown in figure 6-1 remains untouched. *j.* Position the controls on the OAF as follows: (1) Position the SELF TEST LIGHT control (8) fully CCW and OFF. (2) Position the TRACKER RETICLE LIGHT control (9) fully CCW and OFF. (3) Position the COLLIMATOR RETICLE LIGHT control (10) fully CCW and OFF. *k.* Position TA-437 S1 to 10^{-9}. *l.* Press the PROCEED switch.
REF TM 8	*a.* Connect one end of CA-10 and one end of CA-36 to the captive screw insert (used as chassis ground) between BT1 and A3. The cables are connected to the insert by one screw (36, fig. 7-8) and washers (37 and 38). Thread the unused spacer (58) onto the other screw of retainer (1). Connect the other end of CA-10 to E7 SIGNAL GROUND on TA-19. (The other end of CA-36 is used in a later test.) *b.* Press the PROCEED switch and proceed to step *c.* *c.* Remove the cover from the eyelens (12, fig. 6-6) on the OAC (37). *d.* Remove the prism (4, fig. 6-12) from the cover and install on the front of the OAC. *e.* While looking in the eyelens, on the OAC, turn COLLIMATOR RETICLE LIGHT control (9, fig. 6-6) on the OAF (1), approximately 1/2 turn CW and observe that the OAC reticle light comes on. (1) If the OAC reticle light comes on, proceed to step *r.* (2) If the OAC reticle light does not come on, proceed to step *f.* *f.* Turn the COLLIMATOR RETICLE LIGHT control, on the OAF, fully CCW and OFF. Disconnect P1, of the OAF, from 3J1 on the collimator. *g.* Replace DS1 (par. 6-15). *h.* Reconnect P1, from the OAF, to 3J1 on the OAC. *i.* Repeat step *e,* above. (1) If the OAC reticle light comes on, proceed to step *r.* (2) If the OAC reticle light still does not come on, proceed to step *j.* *j.* Turn the COLLIMATOR RETICLE LIGHT control, on the OAF, fully CCW and OFF. Disconnect P1, of the OAF, from 3J1 on the OAC.

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

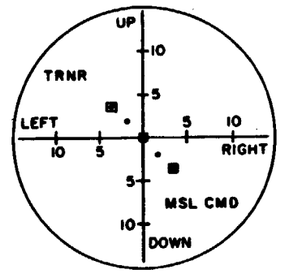
Print message ref no.	Action or instructions
REF TM 8 Continued	*k.* Remove the cover (4, fig. 6-13) from the OAC. *l.* Measure the resistance between 3J1-P and E3 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *m.* (2) If the meter reading is greater than 10 ohms, replace the wire between 3J1-P and E3. *m.* Measure the resistance between E3 and the white/orange/green wire to DS1 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *o.* (2) If the meter reading is greater than 10 ohms, replace the wire between E3 and DS1. *n.* Measure the resistance of the white/orange/green wire between DS1 and DS2 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace the wire from DS1 to DS2. (2) If the meter reading is less than 10 ohms, replace the wire between E3 and DS2. *o.* Measure the resistance between 3J1-S and E2 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *p.* (2) If the meter reading is greater than 10 ohms, replace the wire between 3J1-S and E2. *p.* Measure the resistance between E2 and the white/green/gray wire to DS1 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *q.* (2) If the meter reading is greater than 10 ohms, replace the wire between E2 and DS1. *q.* Measure the resistance between the terminals of DS1 with the multimeter. (1) If the meter reading is between 30 and 60 ohms, replace the OAC. (2) If the meter reading is not between 30 and 60 ohms, replace DS1 (par. 6-15). *r.* While looking in the eyelens on the OAC, adjust the focusing ring (13, fig. 6-6) for a sharp presentation of the OAC reticle, as shown below:  (1) If unable to focus the OAC reticle pattern, or if the pattern is not as shown above, replace the OAC. (2) If the OAC reticle pattern is as shown above, and can be focused, proceed to step *s.* *s.* While looking in the eyelens on the OAC, turn the COLLIMATOR RETICLE LIGHT control, on the OAF, fully CW and then fully CCW, and OFF. The OAC reticle light should vary in intensity from maximum in the fully CW position, to off in the fully CCW and OFF position. (1) If the OAC reticle light does not vary in intensity, replace the OAF. (2) If the OAC reticle light does vary in intensity, proceed to step *t.* NOTE When viewing the self test light in the OAC, there may be more than one red dot visible.

Table 6-1. Tracker Test Set, Programmed Tests - Continued

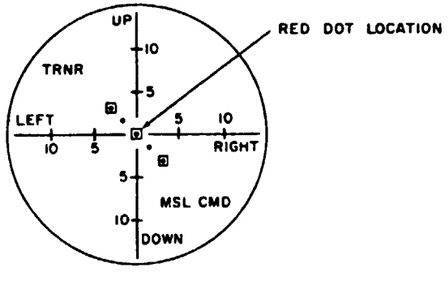
Print message ref no.	Action or instructions
REF TM 8 Continued	*t.* Turn the COLLIMATOR RETICLE LIGHT control fully CW. While looking in the eyelens on the OAC, turn the SELF TEST LIGHT control (8), on the OAF, approximately, 1/2 turn CW and observe a red dot. (1) If there is no red dot visible, proceed to step *u.* (2) If there is a red dot visible, proceed to step *ad.* *u.* Turn the SELF TEST LIGHT control, in the OAF, fully CCW and OFF. Disconnect P1, of the OAF, from 3J1 on the OAC. *v.* Replace DS2 (par. 6-15). *w.* Reconnect P1, from the OAF, to 3J1 on the OAC. *x.* Repeat step *t.* above. (1) If there is a red dot visible, proceed to step *ad.* (2) If there still is no red dot visible, proceed to step *y.* *y.* Turn the SELF TEST LIGHT control, on the OAF, fully CCW and OFF. Disconnect P1, of the OAF, from 3J1 on the OAC. *z.* Remove the cover (4, fig. 6-13) from the collimator. *aa.* Measure the resistance between 3J1-T and E1 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *ab.* (2) If the meter reading is greater than 10 ohms, replace the wire between 3J1-T and E1. *ab.* Measure the resistance between E1 and the white/blue/purple wire to DS2 with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *ac.* (2) lf the meter reading is greater than 10 ohms, replace the wire between E1 and DS2. *ac.* Measure the resistance between the terminals of DS2 with the multimeter. (1) If the meter reading is between 30 and 60 ohms, replace the collimator. (2) If the meter reading is not between 30 and 60 ohms, replace DS2 (par. 6-15). *ad.* While looking in the eyelens on the OAC, adjust the focus control (14, fig. 6-6) for a sharp and clear red dot. (1) lf unable to focus the red dot, replace the OAC. (2) If the red dot can be focused, using the focus control, proceed to step *ae.* *ae.* While looking in the eyelens on the collimator, turn the SELF TEST LIGHT control, on the OAF, fully CW, and then fully CCW, and OFF. The red dot should vary in intensity from maximum in the fully Cw position, to off in the fully CCW and OFF position. (1) If the red dot does not vary in intensity, replace the OAF. (2) If the red dot does vary in intensity, turn the SELF TEST LIGHT control approximately 1/2 turn CW, and proceed to step *af.* *af.* While looking in the eyelens, on the OAC, observe that a red dot is located in the center of the reticle pattern as shown below: 

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

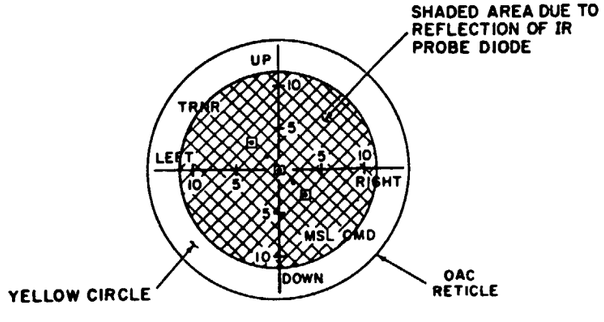
Print message ref no.	Action or instructions
REF TM 8 Continued	(1) If the red dot is as shown above, proceed to step *ag.* (2) If the red dot is not as shown above, replace the OAC. *ag.* Turn the SELF TEST LIGHT control fully CCW and OFF. Remove the cap from OAF 2J2. Remove the reticle light (31, fig. 6-12) from the cover, and connect P1 to 2J2. *ah.* While looking at the reticle light, turn the TRACKER RETICLE LIGHT control (9, fig. 6-6), on the OAF, approximately 1/2 turn CW and observe that the reticle light comes on. (1) If the reticle light comes on, proceed to step *al.* (2) If the reticle light does not come on, proceed to step *ai.* *ai.* Turn the TRACKER RETICLE LIGHT control on the OAF fully CCW and OFF. Disconnect P1 of the reticle light from 2J2 on the OAF. *aj.* Replace the lamp in the reticle light (par. 6-13). *ak.* Repeat step *ag* and *ah.* (1) If the reticle light comes on, proceed to step *al.* (2) If the reticle light does not come on, replace the reticle light. *al.* While looking at the reticle light, turn the TRACKER RETICLE LIGHT control, on the OAF fully CW and then fully CCW, and OFF. The reticle light should vary in intensity from maximum, in the fully CW position to off, in the fully CCW and OFF position. (1) If the reticle light does not vary in intensity, replace the OAF. (2) If the reticle light does vary in intensity, proceed to step *am.* *am.* Disconnect the reticle light from 2J2 on the OAF. *an.* Remove the prism from the OAC, and install it in the cover. Install TA-424 (25) on the front of the OAC. Correct rotational alinement of TA-124 is achieved by alining the white line on the outside rim of TA-424 with the lens holding screw (35, fig. 6-6) on the OAC. The cutout portion of TA-424 should be located astride the OAC mount (3) on the OAF. **CAUTION** **Power is applied to CA-405 P3.** *ao.* Connect P3 of CA-405 to J1 on TA-424. On TA-424, push in the light holder. *ap.* Look in the end of TA-424 and verify that the light is on. (1) If the light is on, pull the light shield out of TA-424 and proceed to step *aq.* (2) If the light is not on, replace the light. **NOTE** **Head motion is to be at a minimum during boresighting.** *aq.* Verify that the OAC can be boresighted. Proceed as follows: (1) If required, turn the COLLIMATOR RETICLE LIGHT control (9), on the OAF, fully CW. (2) While looking in the eyelens, on the OAC, adjust the AZIMUTH (4) and ELEVATION (5) controls, on the OAF until the yellow circle is centered on the OAC reticle as shown below: 

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 8 Continued	*(a).* If the yellow circle can be centered on the OAC reticle, proceed to step *ar*. *(b).* If the yellow circle cannot be centered on the reticle, or the yellow circle cannot be located within the range of the AZIMUTH and ELEVATION controls on the OAF, replace the OAF. *ar*. Pull out the light holder on TA-424. Disconnect P3 of CA-405 from J1 on TA-424. *as*. Turn the COLLIMATOR RETICLE LIGHT control, on the OAF, fully CCW and OFF. Place the cover over the eyelens. *at*. Press the PROCEED switch.
REF TM 9	*a.* Connect either end of CA-36 to A7A2J1 and A7A1J8 in the MU. *b.* Verify that the TESTING (26, fig 6-6), GO (27), and NO GO (28) lamps on the MU are on. (1) If all the lamps are on, proceed to step *c*. (2) If all or any ot the lamps are off, proceed to step *d*. *c.* Press and hold the outer ring of the TESTING, GO, and NO GO lamps. (1) If the lamp flickers off when the outer ring is depressed and comes on in the fully depressed position, release the outer ring, and proceed to step *e*. (2) If the lamp does not go out when the outer ring is depressed, or does not come on in the fully depressed position, release the outer ring and replace the MU. *d.* Press and hold the outer ring of the lamp that is off. (1) If the lamp comes on when the outer ring is depressed, release the outer ring and replace the MU. (2) If the lamp does not come on when the outer ring is depressed, replace the lamp and repeat step *b.* If the lamp still does not come on, run the MU program (see TM 9-1425-550-10, or replace the MU. *e.* Position the MODE switch (22) to TRIG OUTPUT. *f.* Press the PROCEED switch.
REF TM 10	*a.* Verify that the TESTING (26, fig 6-6) and GO (27) lamps on the monitor unit are off, and the NO-GO lamp (28) is on. (1) If the lamps areas specified, proceed to step *b*. (2) If the lamps are not as specified, replace the MU. NOTE Do not position the MODE switch (22) to SELF TEST. *b.* Rotate the MODE switch from the BORESIGHT position through the MISSILE COMMAND position while observing the GO, NO-GO lamps in each position. In each position, the GO lamp must be on and the NO-GO lamp must be off. (1) If the GO lamp comes on in each position, proceed to step *c.* (2) If the NO-GO lamp comes on in any position, replace the MU. *c.* Position the MODE switch, on the MU, to TRAINER and verify that the NO-GO lamp is on and the GO lamp is off. (1) If the NO-GO lamp is on, proceed to step *d.* (2) If the GO lamp is on, run the MU program (see TM 9-1425-550-10), or replace the MU. *d.* Position the MODE switch, on the MU, to TRIG OUTPUT. *e.* Press the PROCEED switch.
REF TM 11	*a.* Observe the FULL CHARGE lamp (29, fig 6-6), on the MU, to be on. (1) If the lamp is on, proceed to step *b*. (2) In the lamp is not on, proceed to step *c*. *b.* Press and hold the outer ring of the FULL CHARGE lamp on the MU. (1) If the lamp flickers off when the outer ring is depressed, and comes on in the fully depressed position, release the outer ring, and proceed to step *d.* (2) If the lamp does not go out when the outer ring is depressed, or does not come on in the fully depressed position, release the outer ring, and replace the MU.

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 11 Continued	*c.* Press, and hold the outer ring of the FULL CHARGE lamp on the MU. (1) If the lamp comes on in the fully depressed position, release the outer ring, and replace the MU. (2) If the lamp does not come on in the fully depressed position, release the outer ring, and replace the lamp. Repeat step *a* above. If the lamp still does not come on, run the MU program (see TM 9-1425-550-10), or replace the MU. *d.* Press, and hold the outer ring of the CHARGING lamp (30) on the MU. (1) If the lamp comes on in the fully depressed position, release the outer ring, and proceed to step *e.* (2) If the lamp does not come on in the fully depressed position, release the outer ring, and replace the lamp. Repeat step *d.* If the lamp still does not come on in the fully depressed position, run the MU program (see TM 9-1425-550-10), or replace the MU. *e.* Press the PROCEED switch.
REF TM 12	*a.* Position the MONITOR SELECT switch (21, fig 6-6), on the MU, to each of the positions given in the following chart, and verify each meter reading on the MONITOR meter (31).

Switch position	Meter reading	Test No.
+13 VDC	11.7 to 14.3	1
-13 VDC	11.7 to 14.3	2
+5 VDC	4.5 to 5.5	2
+REF	4.70 to 5.30	1
-REF	4.70 to 5.30	1
IR OUTPUT	5.5 to 9.5 (the IR OUTPUT green area)	2

(1) If the meter reading was within the given range for each switch position, proceed to step *b*.
(2) If any of the meter readings were not within the given range for each switch position, dial the number in accordance with the chart and display into the UUT TEST NUMBER switches, and press the START TEST switch.
b. Press the PROCEED switch.

REF TM 13

a. Remove cover (4, fig 6-13) from the OAC.
b. Press the PROCEED switch.

REF TM 14

a. Position the controls in the MU (18, fig 6-6) as follows:
(1) Set the POWER switch (19) to OFF.
(2) Set the CHARGE switch (20) to OFF.
(3) Position the MONITOR SELECT switch (21) to +13 VDC.
(4) Position the MODE switch (22) to SELF TEST.
(5) Press the FREQUENCY switches (23) to 00.
b. On 1A4, set the ON/OFF circuit breaker to OFF.
c. If required, install cover (4, fig 6-13) on the OAC.

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 14 Continued	*d.* If required, install the cover on the trainer adapter cable. *e.* Remove the screw and washers securing CA-10 and CA-36 to the captive insert in the MU. Unthread the spacer from the other spacer and install it on the printed circuit board retainer, in the MU, with the screw and washers.
REF TM 15	*a.* Disconnect CA-401 through CA-45 from the UUT and AN/TSM-93. *b.* Perform the cable hookup (fig. 6-2). *c.* Press the PROCEED switch.
REF TM 16	*a.* Position the MODE switch (22, fig. 6-6), on the MU (18) to TRAINER. *b.* Remove the OAC, TA-424, TA-437 and TA-405 from the OAF. *c.* Disconnect CA-403 and CA-405. *d.* Perform the cable hookup (fig. 6-4). *e.* Press the PROCEED switch.
REF TM 17	NOTE Only partially remove the cover so no strain is put on the leads. *a.* Remove the 12 screws and cover from the OAF (1, fig. 6-6). *b.* Press the PROCEED switch.
REF TM 18	*a.* Disconnect P1 of the OAF (1, fig. 6-6) from 3J1 on the OAC (33). *b.* Remove the cover (4, fig. 6-13) from the OAC. *c.* Measure the resistance between E8 and A1-12, on the OAC (33, fig. 6-6), with the multimeter. (1) If the meter reading is greater than 10 ohms, replace the wire between E8 and A1-12. (2) If the meter reading is less than 10 ohms, replace the OAC.
REF TM 19	*a.* If required, remove cover (4, fig. 6-13) from the OAC. *b.* Measure the resistance between J1-A and A1-7, in the OAC, with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *c*. (2) If the meter reading is greater than 10 ohms, replace the OAC. *c.* Measure the resistance between A1-2 and E10, in the OAC, with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *d*. (2) If the meter reading is greater than 10 ohms, replace the wire between A1-2 and E10. *d.* Measure the resistance between A1-10 and J1-D, in the OAC, with the multimeter. (1) If the meter reading is less than 10 ohms, replace A1 (par. 6-14). (2) If the meter reading is greater than 10 ohms, replace the OAC.
REF TM 20	*a.* Remove cover (4, fig. 6-13) from the OAC. *b.* Adjust A1R13 (fig. 6-9), in the OAC, 20 turns CW. *c.* Measure the resistance between A1-3 and A1-1, in the OAC, with the multimeter. (1) If the meter reading is between 820 and 900 ohms, proceed to step *d*. (2) If the meter reading is not between 820 and 900 ohms, replace the OAC. *d.* Adjust A1R13, in the OAC, 20 turns CCW. *e.* Measure the resistance between A13 and A1-1, in the OAC, with the multimeter. (1) If the meter reading is between 1800 and 2400 ohms, proceed to step *f*. (2) If the meter reading is not between 1800 and 2400 ohms, replace the OAC. *f.* Measure the resistance between A1-9 and A1-8, in the OAC, with the multimeter. (1) If the meter reading is greater than 10 ohms, replace A1F1 (fig. 6-9), in the OAC. (2) If the meter reading is less than 10 ohms, proceed to step *g*.

Table 6-1. Tracker Test Set, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 20 Continued	*g.* Measure the resistance between E4 and A1-8, in the OAC, with the multimeter. (1) If the meter reading is greater than 10 ohms, replace the wire between E4 and A1-8. (2) If the meter reading is less than 10 ohms, proceed to step *h*. *h.* Measure the resistance between E4 and the cathode terminal of CR1 (fig. 6-8), with the multimeter. (1) If the meter reading is greater than 10 ohms, replace the wire between E4 and the cathode terminal of CR1. (2) If the meter reading is less than 10 ohms, proceed to step *i*. *i.* Measure the resistance between E5 and the anode terminal of CR1 (fig. 6-8), with the multimeter. (1) If the meter reading is greater than 10 ohms, replace the wire between E5 and the anode terminal of CR1. (2) If the meter reading is less than 10 ohms, proceed to step *j*. *j.* Check the wiring to the A1 board in the OAC (fig. 6-11). (1) If the wires are properly connected, replace the OAC. (2) If any of the wires are not properly connected, make the necessary repairs and rerun the program.
REF TM 21	*a.* Disconnect P1 of the OAF (1, fig. 6-6) from 3J1 on the OAC (33). *b.* Measure the resistance between E11 and A1-6, in the OAC, with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *c*. (2) If the meter reading is greater than 10 ohms, replace the wire between E11 and A1-6. *c.* Measure the resistance between E11 and the cathode terminal of CR3 (fig. 6-8), with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *d*. (2) If the meter reading is greater than 10 ohms, replace the wire between E11 and the cathode terminal of CR3. *d.* Measure the resistance between E10 and A1-2, in the OAC, with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *e*. (2) If the meter reading is greater than 10 ohms, replace the wire between E10 and A1-2. *e.* Measure the resistance between E10 and the anode terminal of CR3 (fig. 6-8), with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *f*. (2) If the meter reading is greater than 10 ohms, replace the wire between E10 and anode terminal of CR3. *f.* Measure the resistance between A1-5 and A1-6, on the OAC, with the multimeter. (1) If the meter reading is less than 20K ohms, replace A1 (par. 6-14). (2) If the meter reading is greater than 20K ohms, proceed to step *g*. *g.* Check the wiring to the A1 board in the OAC (fig. 6-11). (1) If the wires are properly connected, replace the OAC. (2) If any of the wires are not connected properly, make the necessary repairs and rerun the program.
REF TM 22	*a.* Remove cover (4, fig. 6-13) from the OAC. *b.* Adjust A1R17 (fig. 6-9), in the OAC, 20 turns CW. *c.* Measure the resistance between A1-3 and A1-4, with the multimeter. (1) If the meter reading is between 8 and 12 ohms, proceed to step *d*. (2) If the meter reading is not between 8 and 12 ohms, replace A1 (par. 6-14). *d.* Adjust A1R17 20 turns CCW, and measure the resistance between A1-3 and A14 with the multimeter. (1) If the meter reading is between 25 and 45 ohms, proceed to step *e*. (2) If the meter reading is not between 25 and 45 ohms, replace A1 (par. 6-14). *e.* Check the wiring 10 the A1 board in the OAC (fig. 6-11). (1) If the wires are properly connected, replace the OAC. (2) If any of the wires are not connected properly, make the necessary repairs and rerun the program.

Table 6-1. Tracker Test Set, Programmed Tests - Continued

Print message ref no.	Action or instructions
REF TM 23	*a.* Remove cover (4, fig. 6-13) from OAC. *b.* Measure the resistance between the cathode terminal of CR1 and the cathode terminal of CR2 (fig. 6-8), with the multimeter. (1) If the meter reading is less than 10 ohms, proceed to step *c*. (2) If the meter reading is greater than 10 ohms, replace the wire between the cathode terminal of CR1 and the cathode terminal of CR2. *c.* Measure the resistance between E6 and the anode terminal of CR2, with the multimeter. (1) If the meter reading is less than 10 ohms, replace the OAC. (2) If the meter reading is greater than 10 ohms, replace the wire between E6 and the anode terminal of CR2.
REF TM 24	*a.* Remove cover (5, fig. 6-14) from the trainer adapter cable. *b.* Press the PROCEED switch.
REF TM 25	Discontinue the UUT test, and run the MU program (see TM 9-1425-550-10).
REF TM 26	Discontinue the UUT test, and run the OAF program (see TM 9-1425-550-10), or replace the OAF.
REF TM 27	Replace the OAC A1 board (par. 6-14).
REF TM 28	Replace the trainer adapter.
REF TM 29	Remove and install a new A3 in the patchboard. Rerun the program. If REF TM 29 is not displayed on SSVD again, the removed A3, from the patchboard is faulty. If REF TM 29 is displayed on SSVD again, the removed A3, from the patch is good. Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-1425-552-14/2.
REF TM 30	*a.* Remove the OAC (33, fig. 6-6), from the cover and check for the following conditions in accordance with TM 9-1425-484-14: (1) No damage to the connectors. (2) The front lens is not damaged. (3) The eyelens (12, fig. 6-6) is not damaged, and the focusing ring (13) rotates freely. If any of the above conditions exist, return the OAC to the depot. If no damage exists, proceed to step *b*. *b.* Mount the OAC on TA-430, and mount TA-430 on the positioning table, 2A3A5. Connect P1 of CA-419 to J1 on TA-430. Connect P2 of CA-419 to the 120 vat, 400 Hz convenience outlet located on the shelter wall between the clean booth and storage rack No. 1. Be sure the UTILITY circuit breaker on power distribution box No. 1 is set to ON. Check DS1 on TA-430 to be on. (1) If the lamp is ON, proceed to step *c*. (2) If the lamp is not on, discontinue the UUT test. Test and repair TA-430 (see TM 9-1425-550-10). *c.* Install patchboard PB-402. Set S1 on PB-402 to TR. Connect the cables (fig. 6-5). *d.* On 2A1A1, set the 28 VDC circuit breaker to ON and observe the indicator lamps. (1) If all the lamps are on, proceed to step *e*. (2) If one or more of the lamps are off, discontinue the UUT test and run the source/detector adapter power supply program (see TM 9-1425-550-10). *e.* On 2A1A1, set the 208 VAC and LAMP DRIVER circuit breakers to ON. *f.* Place the IR probe, (TA-427) on 2A3A4, in the operating position. Set S1 to 10^{-7}. Disengage the azimuth and elevation brakes in 2A3A5. *g.* Press the PROCEED switch.

Table 6-1. Tracker Test Set, Programmed Tests - Continued

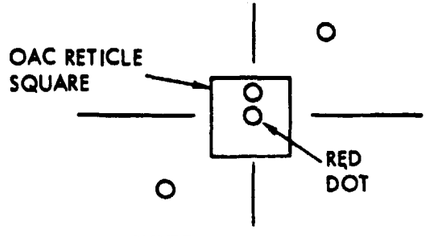
Print message ref no.	Action or instructions
REF TM 31	NOTE In the following test, the instructions should be read and understood before attempting any adjustments or manual procedures. All adjustments should be made slowly so that any change can be seen before the point of adjustment is passed. *a.* Loosen the aperture plate locking thumbscrew, and remove the small aperture plate (the plate closest to the OAC) from TA-430. *b.* Dial the number, in accordance with message displayed on SSVD for the ND 2.477 filter listed for #COL 3, into UUT TEST NUMBER switches and press START TEST switch. NOTE Loosen the shutter control thumbscrew before adjusting the shutter. Pulling the shutter control out of TA-430 allows more light to pass through the shutter control. Position the TA-430 shutter control for the lowest light level possible to prevent multiple images and low contrast. *c.* Look into the OAC eyelens (12, fig. 6-6) and adjust the shutter control on TA-430 until the OAC reticle is visible. NOTE It may be necessary to turn the OAC focusing ring through its full range before the sharpest focus of the reticle is found. *d.* Adjust the OAC focusing ring (13) until the OAC reticle square is sharply focused. *e.* Using the 2A3A5 elevation and azimuth controls, place the white dot in the center of the POSITION INDICATOR on 2A3A5. NOTE Be sure the TA-430 shutter control is set to a low light level position but not so low the OAC reticle is not visible in the OAC eyelens. *f.* Look into the OAC eyelens and observe a red dot somewhere in the field of view. *g.* Using the 2A3A5 elevation and azimuth controls, center the red dot as shown below while looking into the OAC eyelens.  NOTE When the red dot approaches best focus, use smaller movements of the focus control to obtain the sharpest focus. *h.* While looking at the red dot in the OAC eyelens, focus the red dot using the OAC focus control (14). (1) Manually reset the azimuth and elevation counters on 2A3A5 to 0000.

Table 6-1. Tracker Test Set, Programmed Tests - Continued

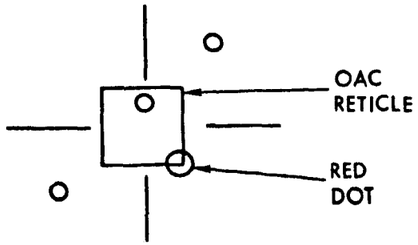
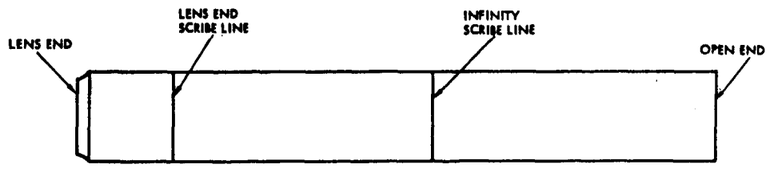
Print message ref no.	Action or instructions
REF TM 31 Continued	(2) Adjust 2A3A5 azimuth to obtain a reading of 0250. (3) If necessary, adjust 2A3A5 elevation control until the red dot touches the OAC horizontal crosshair. (4) Observe the elevation counter on 2A3A5. The counter should indicate a reading between 9985 and 0015 (0000 0015). (a) If the elevation counter reads between 9985 and 0015 (0000 0015), proceed with step *i*. (b) If the elevation counter is not between 9985 and 0015 (0000 0015), discontinue the OAC test and return the OAC to the depot. *i.* Using the 2A3A5 elevation and azimuth controls, position the red dot on the OAC reticle, view through the OAC eyelens, as shown below.  *j.* Repeat steps *d* and *h* to be sure that the OAC reticle and the red dot, as viewed through the OAC eyelens, are focused as sharply as possible. The shutter control on TA-430 should be set for the lowest level of light with the OAC reticle still visible. NOTE Be sure the lens end of the draw tube is in the body of TA-407. *k.* Assemble TA-415 (9, fig. 6-7) and TA-407, and mount assembly on TA-430. Align the infinity scribe line with the edge of the TA-407 body.  NOTE The TA-407 will invert the OAC reticle and the red dot. If visible, disregard the TA-407 reticle. *l.* Look into the TA-407 eyepiece (4) and observe if OAC reticle and red dot are as shown below. If required, adjust the azimuth course adjustment (6), azimuth adjustment screw (6) and the elevation adjustment screws (10) on TA-407 so the OAC reticle and red dot is located in the center of the TA-407 field of view. If the red dot is not located as shown below, position the red dot using the 2A3A5 FINE elevation and azimuth controls.

Table 6-1. Tracker Test Set, Programmed Tests - Continued

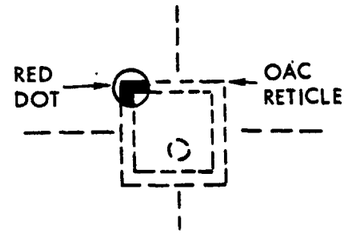
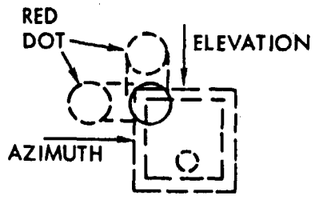
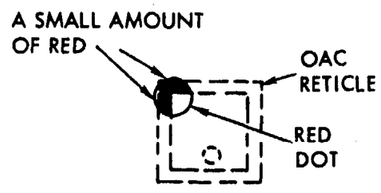
Print message ref no.	Action or instructions
REF TM 31 Continued	 NOTE. THE AREA OF THE OAC RETICLE LINES MAY NOT BE VISIBLE WITH A LOW LIGHT LEVEL SETTING OF THE TA-430 SHUTTER CONTROL. *m.* Verify that the red dot and OAC reticle are focused as sharp as possible. If the red dot requires refocusing, adjust the focus control (14, fig. 6-6). If the OAC reticle required refocusing, adjust the focusing ring (13). Verify that the red dot appears to behind the OAC reticle. (1) If the red dot can be focused and appears to be round, proceed to step *o*. (2) If the red dot cannot be focused and is not round, return the OAC to the depot (par. 6-25). *n.* Position the TA-430 shutter control to the closed position. NOTE Do not make any adjustments to TA-407 or the OAC. Use only the FINE elevation and azimuth controls on 2A3A5. The motor controls move the red dot at too fast a rate for good positioning. *o.* While looking through the TA-407 eyepiece, position the red dot as shown below using the 2A3A5 FINE elevation and azimuth controls. The red dot should be moved to the outside of the OAC reticle and then moved slowly back to the position shown below both in elevation and azimuth with just a very small amount of the red dot showing on the outside of the OAC reticle.   POSITIONING THE RED DOT *p.* When the red dot is positioned as shown in step *o,* manually reset the elevation and azimuth counters on 2A3A5 to 0000. *q.* Remove the large aperture plate from TA-430 and insert the small aperture plate into its position (closest to the OAC). *r.* Dial the number, in accordance with the displayed value on the SSVD for ND 2.000 filter listed for #COL 2, into the WT TEST NUMBER switches and press the START TEST switch. NOTE The red dot as viewed through the TA-407 eyepiece will be reduced in intensity. *s.* Offset the 2A3A5 FINE elevation and azimuth controls 10 to 20 counts and repeat the instructions of step *o.* Proceed to step *t.*

Table 6-1. Tracker Test Set, Programmed Tests - Continued

Print message ref no.	Action or instructions
REF TM 31 continued	*t.* Observe the reading in the elevation and azimuth counters on 2A3A5. Both counters should indicate a reading between 0004 and 9996. (1) If the reading on both counters is between 0004 and 9996, press the PROCEED switch. (2) If either counter is not between 0004 and 9996, discontinue the OAC test and return the OAC to the depot (par. 6-25).
REF TM 32	*a.* Loosen the screws on TA-415 and unthread TA-407 from TA-415. *b.* Remove TA-415 from TA-430. *c.* Install the removed aperture plate in TA-430 and tighten the aperture plate locking thumbscrew. *d.* Push in the shutter control and tighten the locking thumbscrew. *e.* Disconnect P2 of CA-419 from the convenience outlet located on the shelter wall. Disconnect P1 of CA-419 from TA-430. *f.* Remove the OAC from TA-430. *g.* Remove TA-430 from 2A3A5. *h.* Disconnect cables CA-135 and CA-410. *i.* Set 28 VDC, 208 VAC, and LAMP DRIVER circuit breakers on 2A1A1 to OFF. *j.* Remove PB-402 from 1A2. *k.* Press the PROCEED switch.
REF TM 33	*a.* Set TA-109 to AC/DC. Connect one TA-208 between TA-405 J1-A and the high side of TA-109. Connect the other TA-208 between TA-405 J1-P and the low side of TA-109. *b.* Press the PROCEED switch. NOTE Before any adjustments are made, allow 15 seconds for machine setting time.
REF TM 34	*a.* Press the PROCEED switch. *b.* Record the first volts peak-to-peak value printed following the REF TM 34 printout. *c.* After the completion of the OAC adjustments and measurements (#2MPB, #2MO2, and #MO3), readjust A1R8 in the OAC when instructed by the printout (during #2MRA) to the value recorded in step *b* above.
REF TM 35	*a.* Perform printed instructions in REF TM 8, paragraph *an* through *aq.* Proceed to step *b*. *b.* Operator is to adjust elevation control on the OAF 1/2 turn CCW. Proceed to step *c*. *c.* Operator is to adjust azimuth control on the OAF 4 1/2 turns CW. Press the PROCEED switch.
REF TM 36	*a.* Position the MONITOR SELECT switch on the MU to the + BATT A position. *b.* Observe the meter reading on the MONITOR meter. Find the corresponding value on TTS MONITOR INDICATION - UNITS (fig. 6-16). *c.* Observe the reading on the LCSS TEST RESULTS DISPLAY. Find the corresponding value on BATTERY STACK VOLTAGE (VDC) (fig. 6-16). *d.* Extend both line values until they intersect (coordinate). (1) If the coordinate is in the field of MAXIMUM VALUE and MINIMUM VALUE, proceed to step *e*. (2) If the coordinate is not in the field of MAXIMUM VALUE and MINIMUM VALUE, proceed to step *f*. *e.* Position the MONITOR SELECT switch on the MU to the + BATT B, - BATT A and - BATT B position. (1) Repeat steps *b*, *c*, and *d* for each position. (2) After completing step *d* for - BATT B position, position the MONITOR SELECT switch to +13 VDC position and press the PROCEED switch. *f.* Terminate testing and replace the failed unit in accordance with paragraph 7-16 or paragraph 7-17.

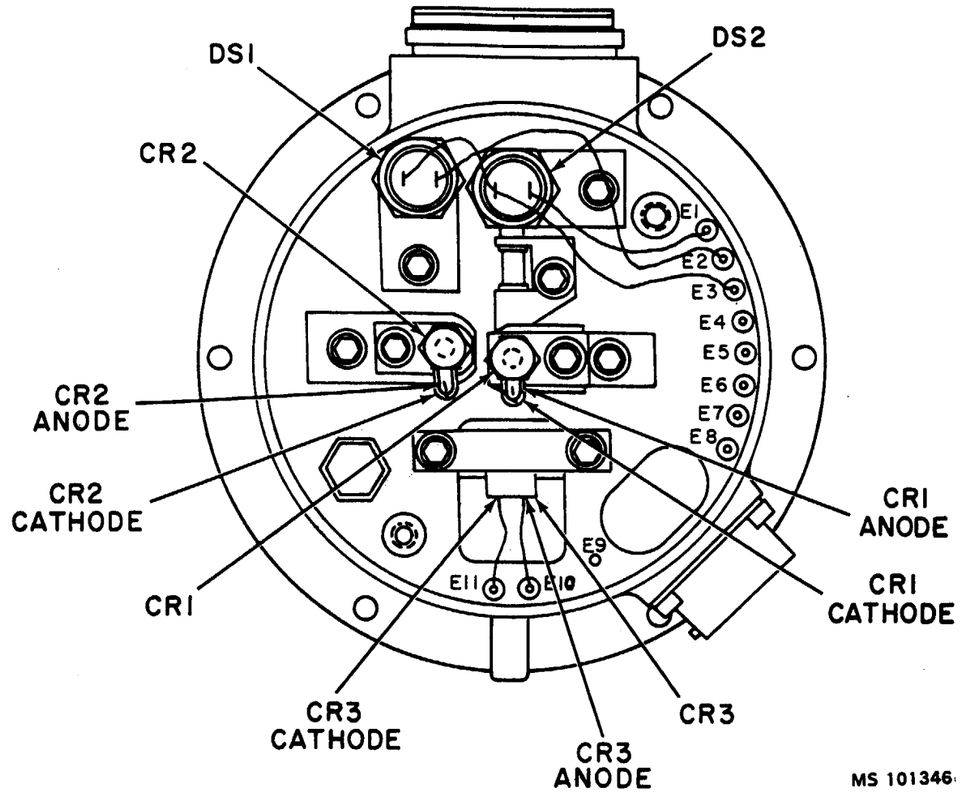


Figure 6-8. Collimator probing diagram.

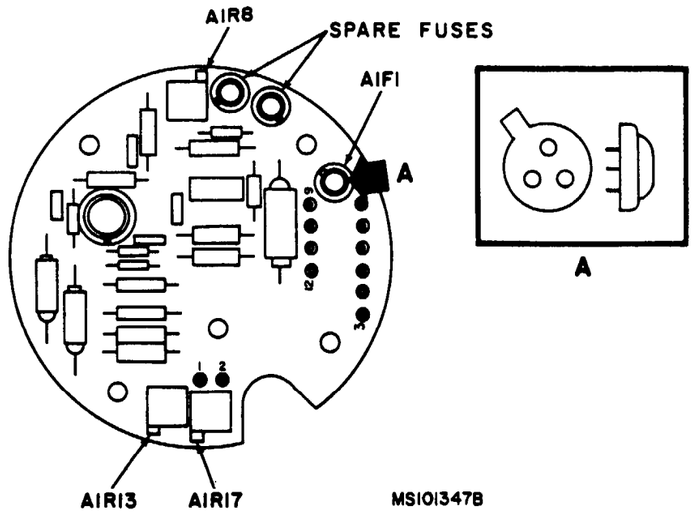
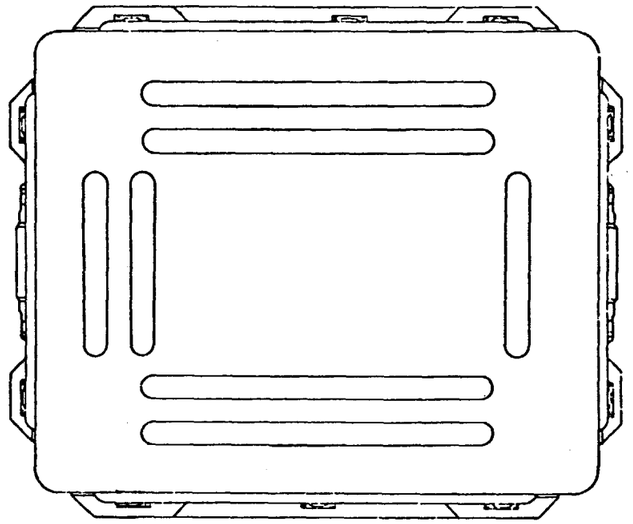
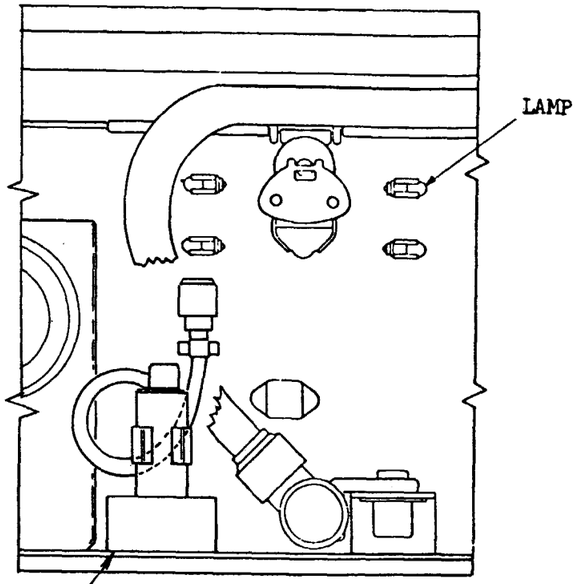
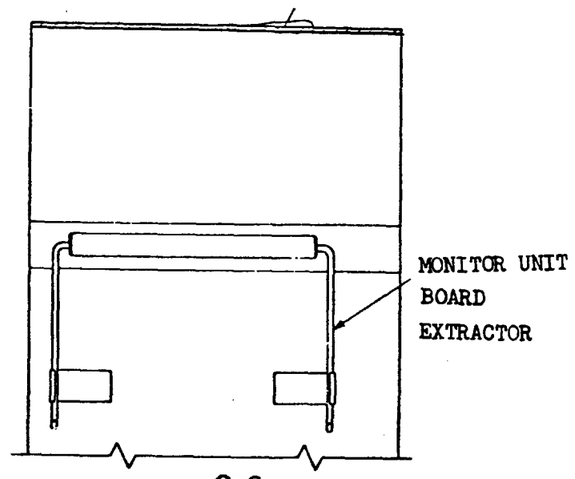


Figure 6-9. Collimator A1 board probing and adjustment location diagram.

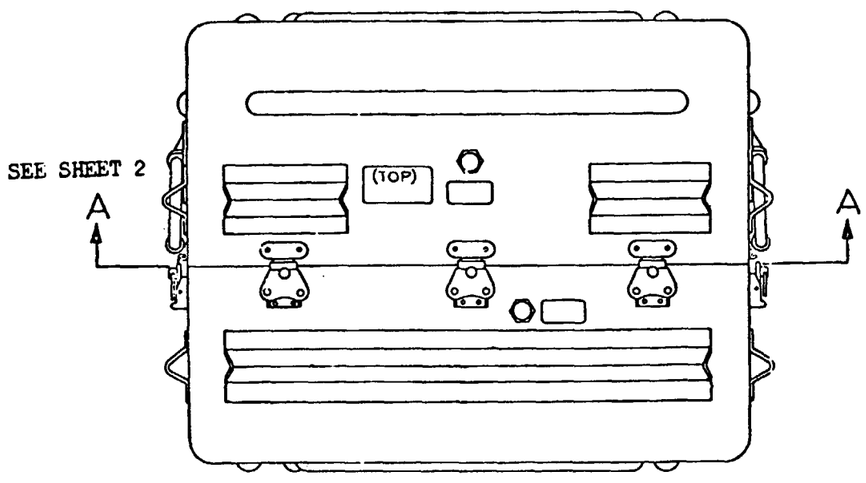




VIEW B-B
SEE SHEET 2



VIEW C-C
SEE SHEET 2



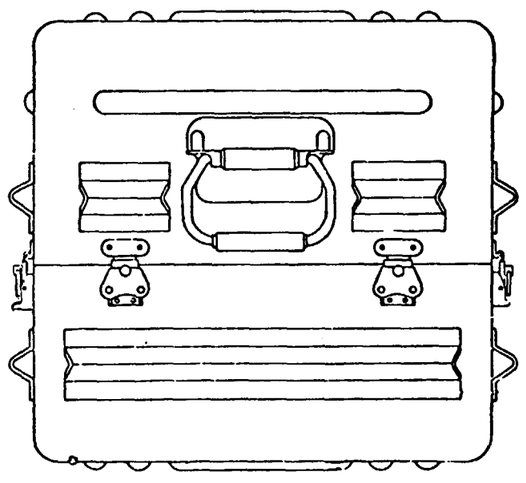


Figure 6-10. Tracker test set, parts location diagram (sheet 1 of 2).

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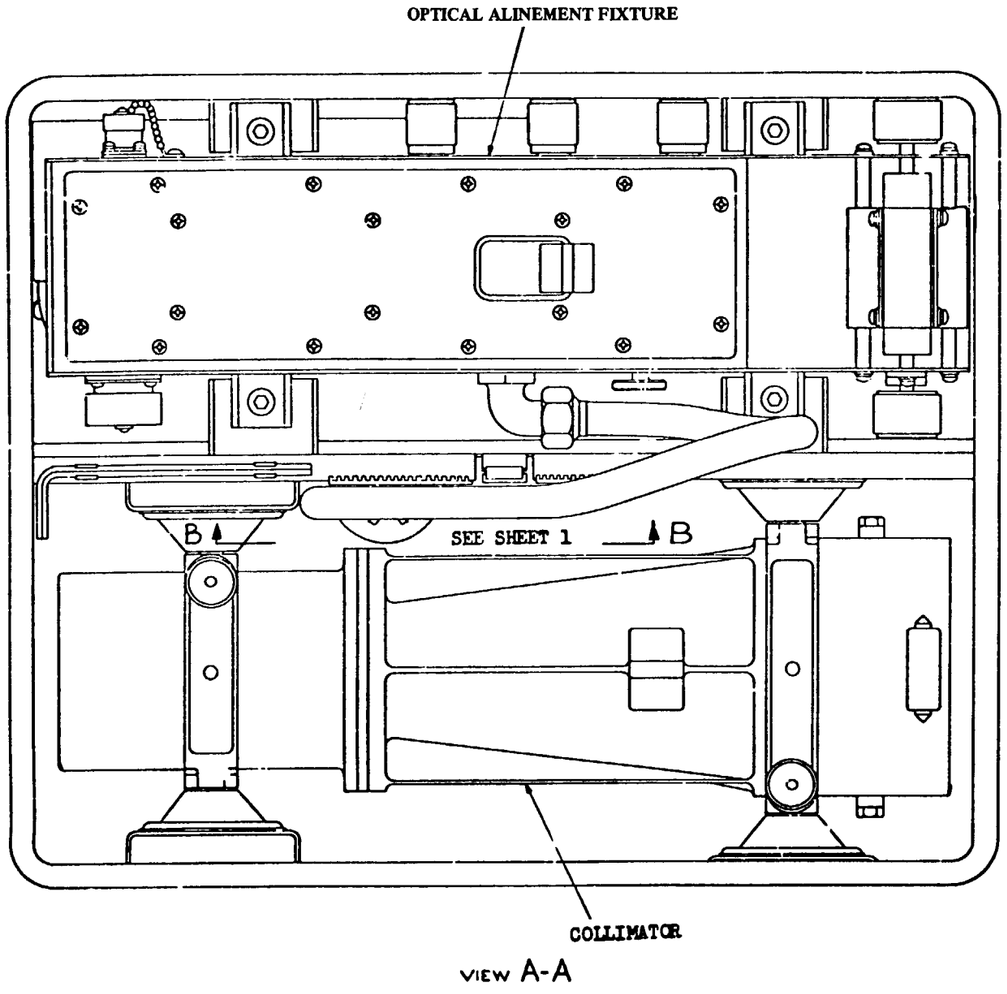

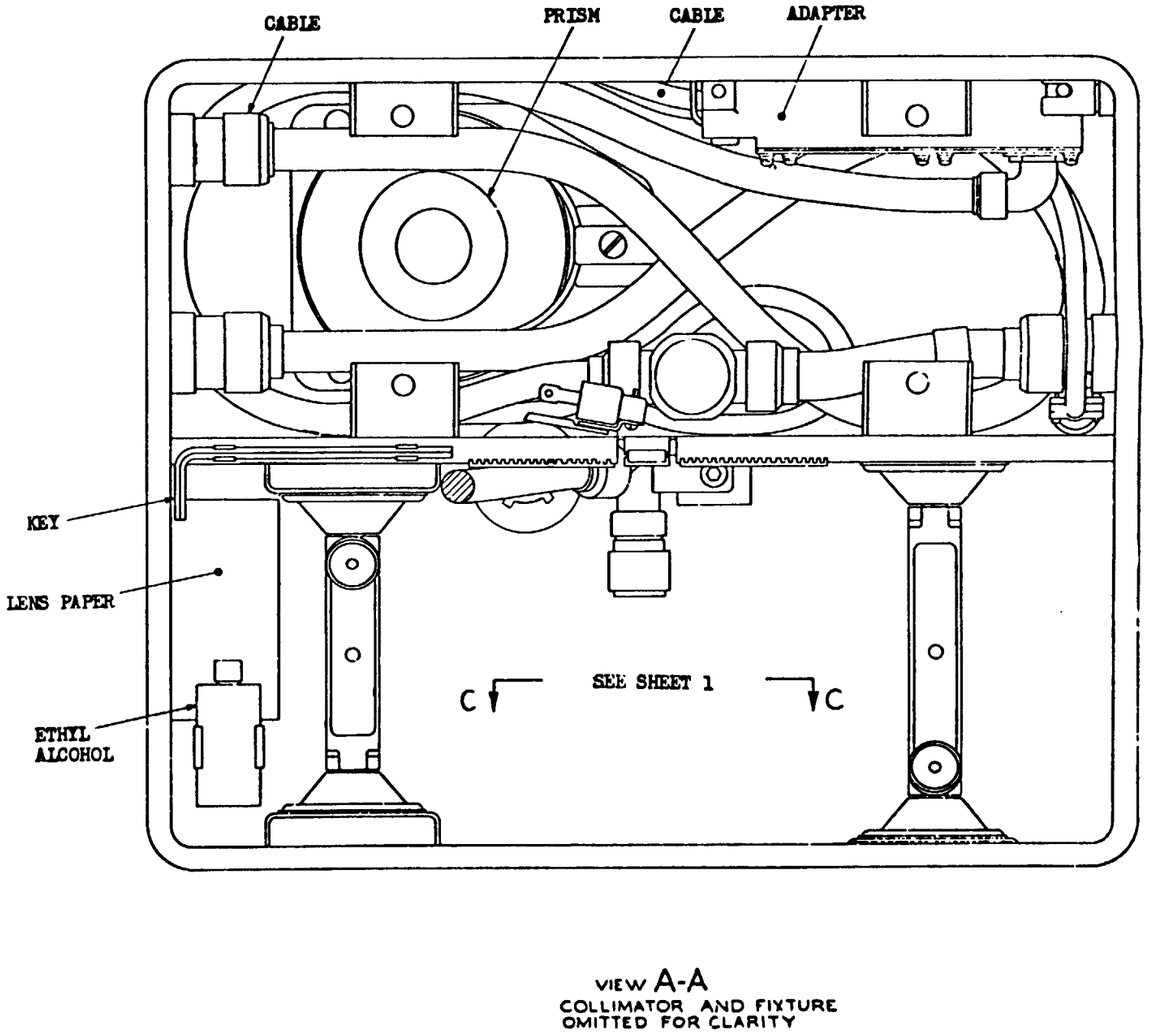

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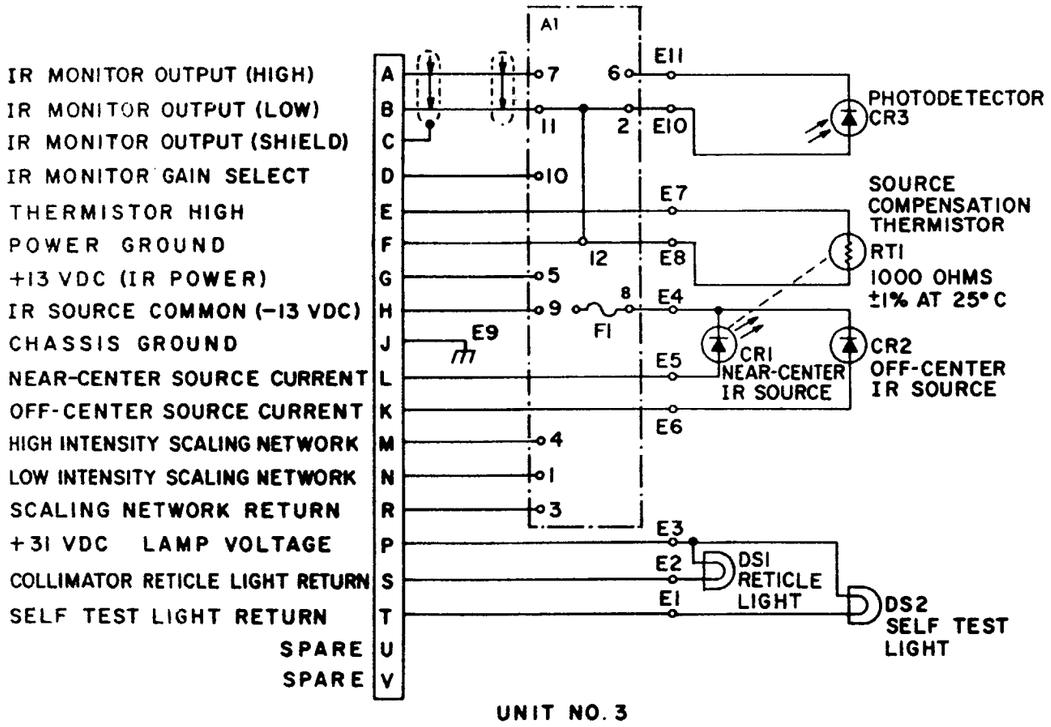
Figure 6-10. (sheet 2 of 2).



NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATIONS.
2. GROUND SYMBOLS TO BE USED ARE AS SHOWN

CHASSIS GROUND

WIRE COLOR	CONNECTED TO
WHITE/YELLOW/BLUE	A1-1
BLACK	A1-2
WHITE/YELLOW/VIOLET	A1-3
WHITE/BROWN/RED	A1-4
WHITE/YELLOW	A1-5
WHITE WIRE FROM E11	A1-6
WHITE	A1-7
WHITE/ORANGE/YELLOW	A1-8
WHITE/ORANGE/VIOLET	A1-9
WHITE/RED	A1-10
BLUE	A1-11
BLACK	A1-12

MS 101487B

Figure 6-11. Collimator, schematic diagram.

Section II. REPAIR PROCEDURES

6-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 6-12 through 6-15 illustrate the disassembly and assembly of the UUT and special tools required. Paragraphs 6-6 through 6-23 contain only those procedures peculiar to the UUT or not obvious to a trained technician. Repair procedures for the lower case and the monitor unit are contained in chapter 7 of this TM. TM 9-4935-480-24P contains a list of repair parts and special tools authorized for maintenance personnel.

6-6. Identification Plate Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Using a knife, remove identification plate (5), and any residual adhesive from the case.

(2) Clean the identification plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Be sure that the information on the new identification plate is the same as the information on the old identification plate.

(2) Peel the backing from the new identification plate (5), and apply plate to the case. Apply a coat of varnish (item 43, App. D) over the new identification plate.

6-7. Decal Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Using a knife, remove decal (6) and any residual adhesive from the case.

(2) Clean the decal mounting area with MEK (item 17, App. D).

b. Installation. Remove the protective backing from the new decal (6) and install on the case.

6-8. Retainer Pad Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Using a knife, remove retainer pad (12 or 13), and any residual adhesive from retainer (19 or 20).

(2) Clean the retainer pad mounting area with MEK (item 17, App. D).

b. Installation.

(1) Cut a new retainer pad (12 or 13) to the proper size from rubber sheet (item 27, App. D).

(2) Install the retainer pad on retainer (19 or 20) with adhesive (item 4, App. D).

6-9. Pad Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) If required, remove OAC (1).

(2) Using a knife, remove pad (10 or 11) and any residual adhesive from bracket (16 or 17).

(3) Clean the pad mounting area with MEK, TT-M-261.

b. Installation.

(1) Cut a new pad (10 or 11) to the proper size from plastic sheet (item 22, App. D).

(2) Install pad (10 or 11) to bracket (16 or 17), using adhesive (item 5, App. D).

(3) Install OAC (1), if removed in step *a* (1) above.

6-10. Shock Mount Removal and Installation Procedure (Fig. 6-12).

a. Removal.

(1) If required, remove OAC (1).

(2) Remove mounting hardware (14 and 15), and bracket (16 or 17).

(3) Using a knife, remove shock mount (26 or 27), and any residual adhesive from the shock mount mounting area.

b. Installation.

(1) Install shock mount (26 or 27) with adhesive, (item 4, App. D) and allow to dry.

(2) Apply locking compound (item 11, App. D) to the threads of screws (14).

(3) Install bracket (16 or 17) with mounting hardware (14 and 15).

(4) Install OAC (1), if removed in step *a* (1) above.

6-11. Prism Pad Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) If required, remove OAF (2), and prism (4).

(2) Using a knife, remove prism pad (29), and any residual adhesive from the pad mounting area.

(3) Clean the prism pad mounting area with MEK (item 17, App. D).

b. Installation.

(1) Fabricate new prism pad (29) from rubber sheet (item 27, App. D). Install prism pad with adhesive (item 4, App. D).

(2) Install prism (4) and OAF (2), if removed in step *a* (1) above.

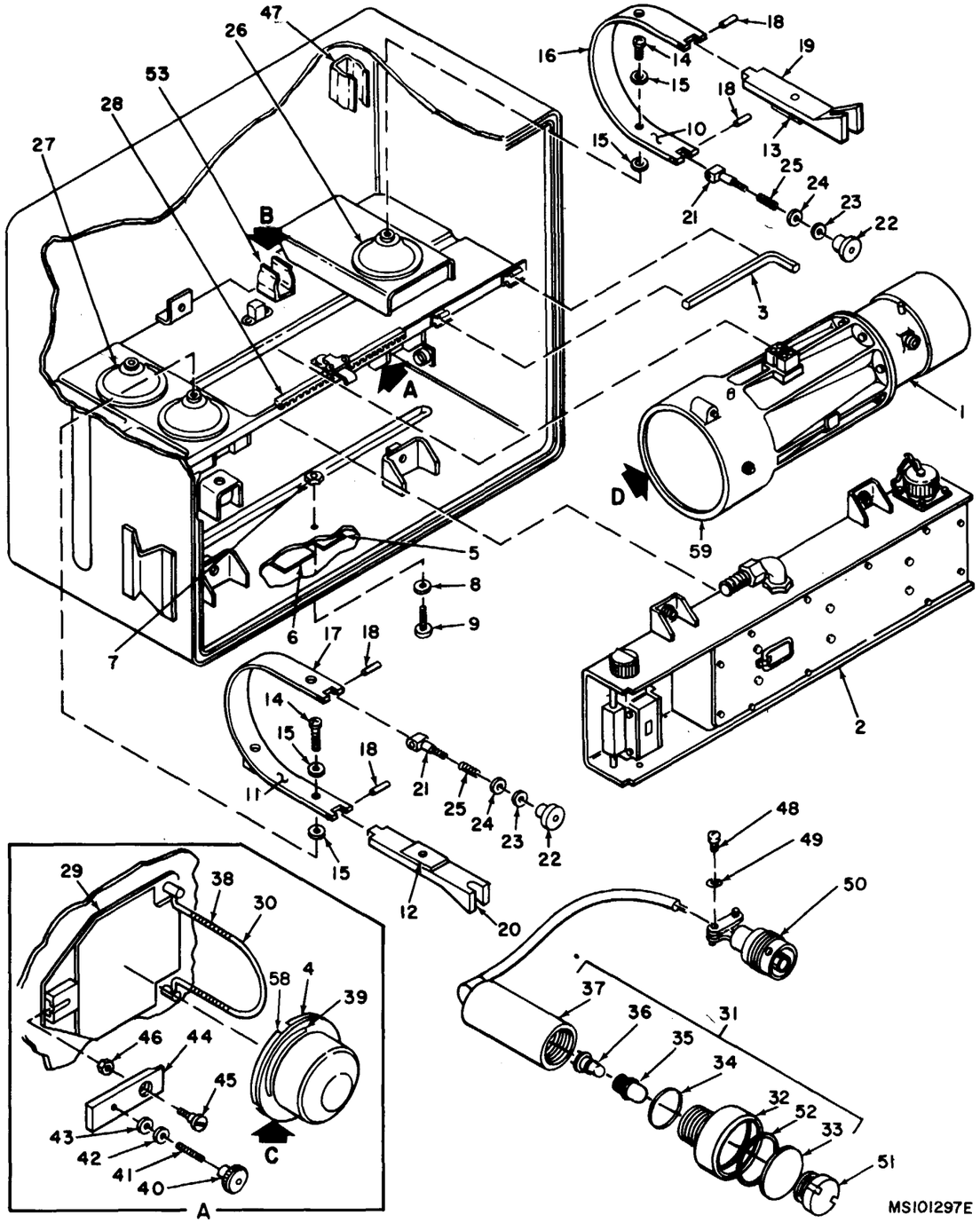
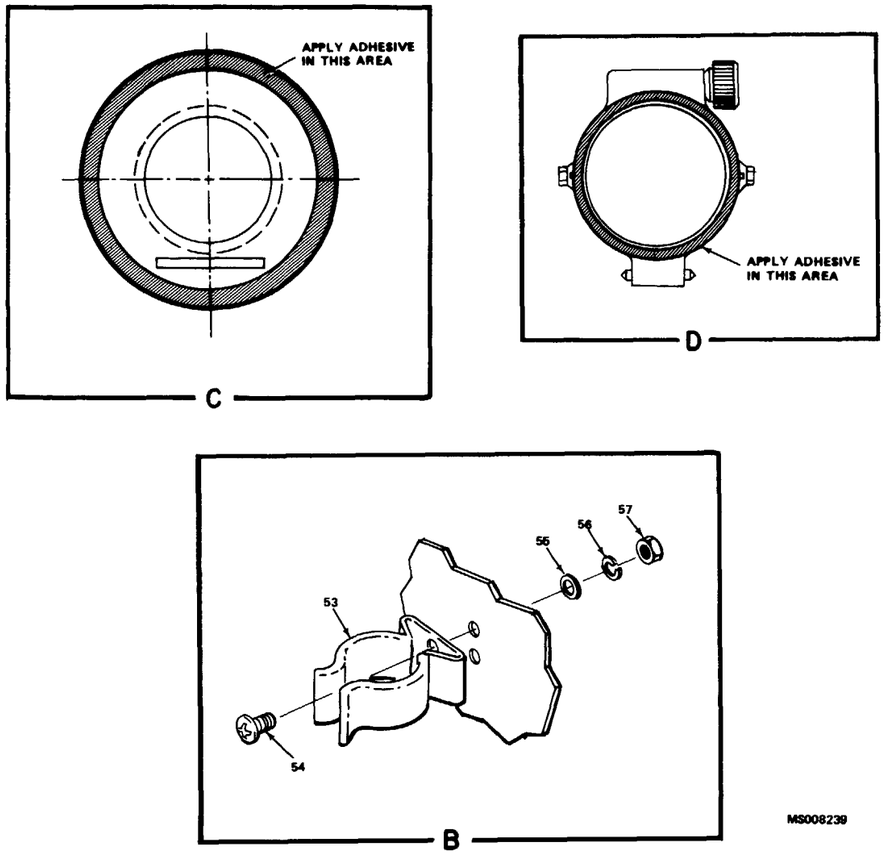
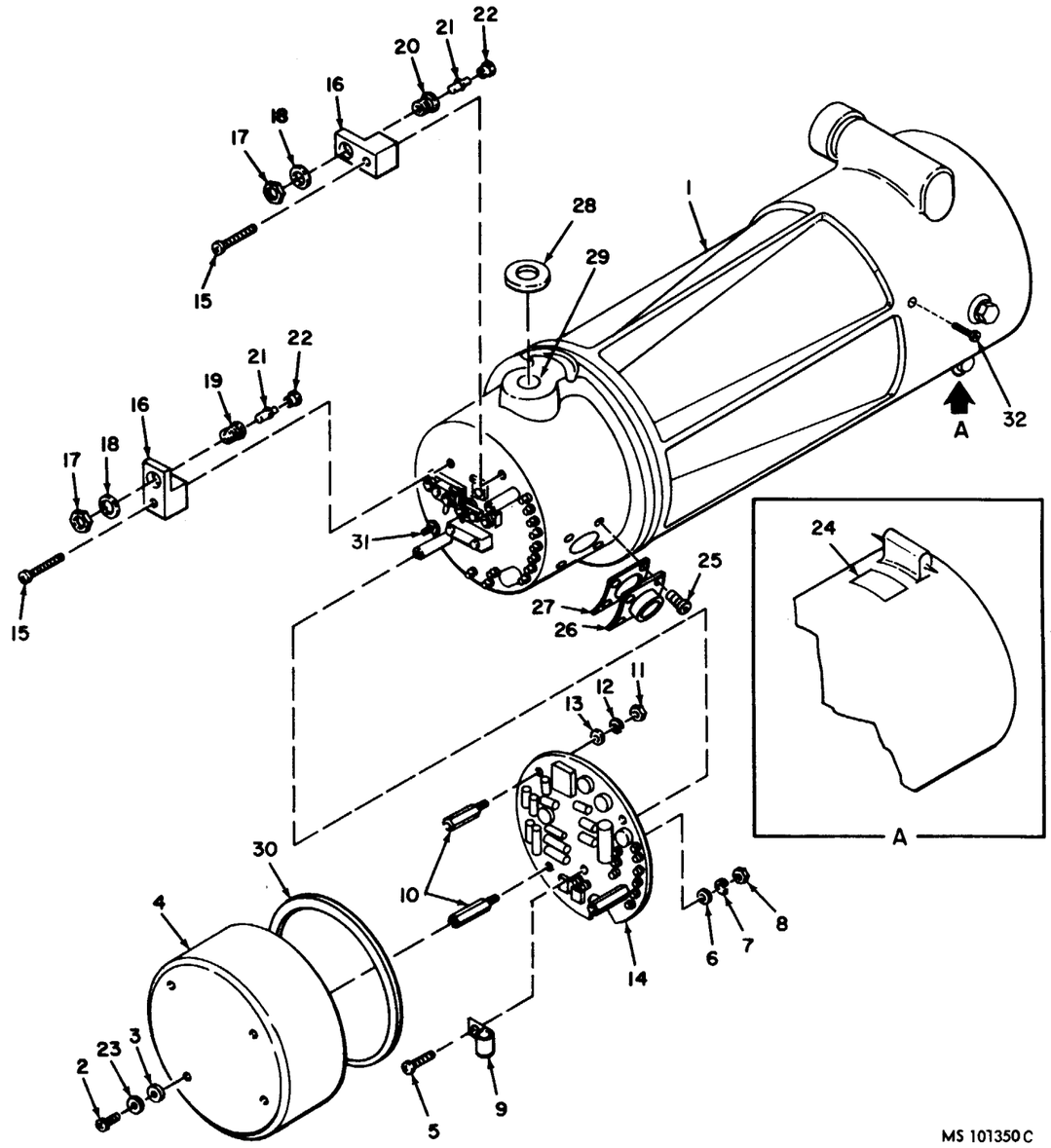


Figure 6-12. Repair of tracker test set.

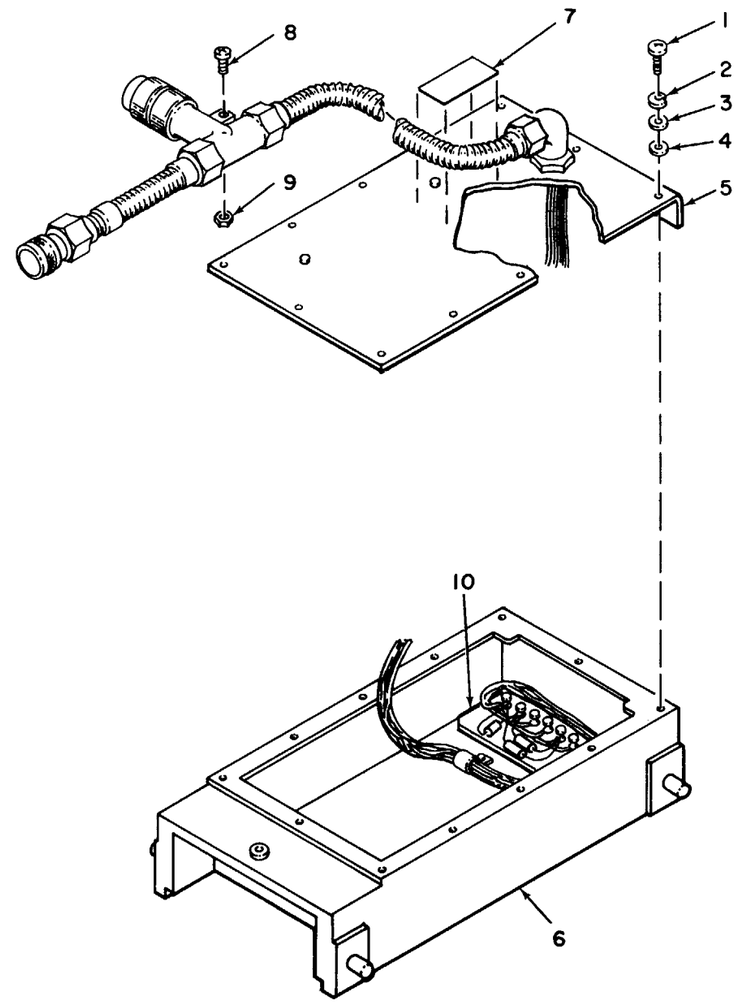


1–OACT
2–OAF
3–Key
4–Prism
5–Identification plate
6–Decal
7–Nut
8–Gasket
9–Valve
10–Pad
11–Pad
12–Retainer pad
13–Retainer pad
14–Screw
15–Washer
16–Bracket
17–Bracket
18–Pin
19–Retainer
20–Retainer
21–Bolt
22–Nut
23–Washer
24–Washer
25–Spring
26–Shockmount
27–Shockmount
28–Grommet
29–Prism pad
30–Retainer
31–Reticle light
32–Mount
33–Filter
34–Packing
35–Lens cap
36–Lamp
37–Adapter
38–Sleeving
39–Identification plate
40–Nut
41–Screw
42–Washer
43–Washer
44–Clamp
45–Screw
46–Nut
47–Clip
48–Screw
49–Washer
50–Connector
51–Filter retainer
52–Packing
53–Clip
54–Screw
55–Washer
56–Washer
57–Nut
58–Hook fastener
59–Pile fastener



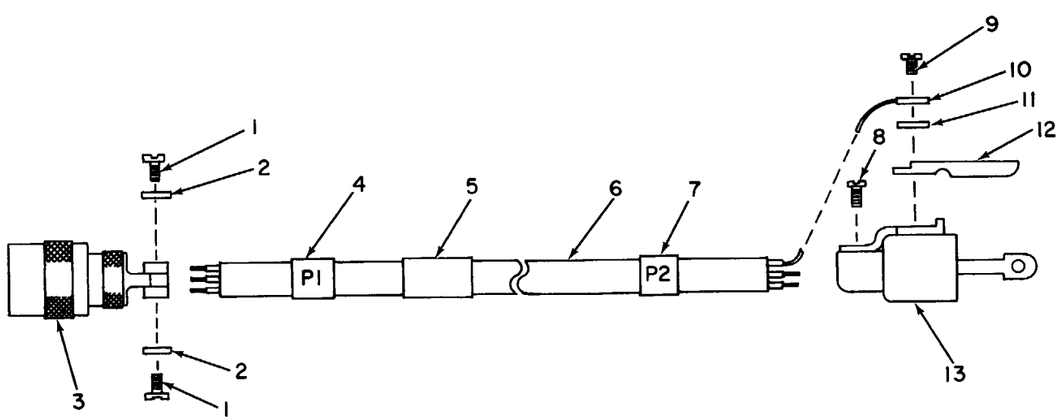
1 – OAC
2 – Screw
3 – Sealing washer
4 – Cover
5 – Screw
6 – Washer
7 – Washer
8 – Nut
9 – Clamp
10 – Spacer
11 – Nut
12 – Washer
13 – Washer
14 – A1
15 – Screw
16 – Bracket
17 – Nut
18 – Washer
19 – DS1
20 – DS2
21 – Lamp
22 – Retainer
23 – Washer
24 – Identification plate
25 – Screw
26 – Connector
27 – Shielding gasket
28 – Pad
29 – Eyepiece
30 – Shielding gasket
31 – Purging valve
32 – Self-sealing screw

Figure 6-13. Repair of OAC.



1 – Screw
2 – Washer
3 – Washer
4 – Sealing washer
5 – Cover
6 – Base assembly
7 – Identification plate
8 – Stud
9 – Retainer
10 – TB1

Figure 6-14. Repair of trainer adapter.



1–Screw
2–Washer
3–Connector
4–Band marker
5–Band marker
6–Cable
7–Band marker
8–Screw
9–Screw
10–Lug
11–Washer
12–Lug
13–Connector

Figure 6-15. Repair of power cable assembly.

6-12. Retainer Sleeving Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) If required, remove OAF (2) and prism (4).

(2) Remove retainer (30).

(3) Using a knife, cut sleeving (38) from the retainer.

b. Installation.

(1) Install a 3-inch length of sleeving (38) (item 36, App. D) on retainer (30) and heatshrink, using heat gun.

(2) Install the retainer.

(3) Install the prism (4), and OAF (2), if removed in step *a* (1) above.

6-13. Reticle-Light Components Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Unthread mount (32) from adapter (37).

(2) Remove packing (34) from the mount.

(3) Unthread filter retainer (51), and remove filter (33). Remove packing (52) from the mount.

(4) Unthread lens cap (35) from the adapter.

(5) Remove lamp (36) from the lens cap.

b. Installation.

(1) Install lamp (36) into lens cap (35).

(2) Install the lens cap in adapter (37).

(3) Install new packing (52) in mount (32). Install filter (33) with filter retainer (51).

(4) Install new packing (34) on the mount, and thread the mount into the adapter.

6-14. OAC A1 Board Removal and Installation Procedure (Fig. 6-13)

a. Removal

(1) Remove mounting hardware (2, 3, and 23), cover (4), and shielding gasket (30). Clean the gasket mounting area.

(2) Remove mounting hardware (5 through 8), and clamp (9).

(3) Disconnect and tag the leads to A1(14).

(4) Remove two spacers (10), that mount A1 to the OAC, and remove A1.

(5) Remove mounting hardware (11, 12, and 13), and the two remaining spacers from A1.

b. Installation.

(1) Install two spacers (10) (removed in *a* (5) above) to A1(14), with mounting hardware (11, 12, and 13).

(2) Coat the threads of the two remaining spacers with locking compound (item 11, App. D).

(3) Install A1 in OAC (1) with the two remaining spacers, and connect the leads to A1.

(4) Install clamp (9) with mounting hardware (5 through 8).

(5) Place a small amount of adhesive (item 4, App. D) under the screw head.

(6) Install shielding gasket (30) and cover (4).

(7) Install the cover with mounting hardware (2, 3, and 24).

6-15. OAC Lamp, DS1, and DS2 Removal and Installation Procedure (Fig. 6-13)

a. Removal.

(1) If only the lamp is to be removed, perform steps (2) through (4). If DS1 or DS2 is to be replaced, perform steps (2), (3), and (5) through (8).

NOTE

When the screw is removed, a strain will be put on the leads if the bracket is pulled too far away from the OAC.

(2) Remove mounting hardware (2, 3, and 23) and cover (4).

NOTE

When the spacers are removed, a strain will be put on the leads if A1 is pulled too far away from the OAC.

(3) Remove two spacers (10), that mount A1(14) to OAC (1), and swing A1 out of the way enough to gain access to the rear of the OAC.

NOTE

Scribe a line around bracket (16), where it mounts to the OAC, to be used as a reference mark for installation.

(4) Remove screw (15), and pull bracket (16) just far enough away from the OAC to unthread retainer (22) and remove lamp (21).

(5) Disconnect and tag the leads to DS1 (19) or DS2 (20).

NOTE

Scribe a line around bracket (16), where it mounts to the OAC, to be used as a reference mark for installation.

(6) Remove screw (15) and remove bracket (16) from the OAC.

(7) Remove retainer (22) and lamp (21).

(8) Remove mounting hardware (17) and (18), and DS1 or DS2.

b. Installation.

(1) If only the lamp is to be installed, perform steps (6) through (9). If DS1 or DS2 is to be installed, preform steps (2) through (5), and steps (7) and (9).

(2) Install lamp (21) into DS1 (19) or DS2 (20) with retainer (22).

(3) Install DS1 or DS2 into bracket (16) with mounting hardware (17) and (18).

(4) Using the scribe marks on the OAC as a guide, install the bracket on OAC (1) with screw (15).

(5) Connect the leads to DS1 or DS2.

(6) Install lamp (21) into DS1 (19) or DS2 (20) with retainer (22). Using the scribe marks on the OAC as a guide, install bracket (16) to OAC (1) with screw (15).

(7) Coat the threads of the spacer (10) with locking compound (item 11, App. D). Install A1(14) in OAC (1) with the spacers.

(8) Place a small amount of adhesive (item 4, App. D) under the screw head.

(9) Install cover (4) with mounting hardware (2, 3, and 23).

6-16. Prism Identification Plate Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Using a knife, remove identification plate (39), and any residual adhesive from prism (4).

(2) Clean the idetification-plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Be sure that the information on the new identification plate is the same as the information on the old identification plate.

(2) Bond identification plate (39) to the prism (4) with adhesive (item 5, App. D).

(3) Using a brush, apply a coat of varnish (item 43, App. D) over the identification plate.

6-17. Prism Clamp Components Removal and Installation Procedure (Fig. 6-12)

a. Removal.

(1) Remove mounting hardware (45 and 46), and clamp (44).

(2) Remove hardware (40 through 43) from the clamp.

b. Installation.

(1) Coat the threads of screw (41), where nut (40) mounts, with locking compound (item 11, App. D).

(2) Thread the nut on the screw, until the screw is flush with the end of the nut.

(3) Thread the nut and screw, with washers (42 and 43), on clamp (44).

(4) Deform the threads of the screw to retain the screw on the clamp.

(5) Install the clamp with mounting hardware (45 and 46).

6-18. Reticle Light Storage Clip Removal and Installation Procedure (Fig. 6-12)

a. Removal. Remove clip (53) by removing mounting hardware.

b. Installation. Position clip on the case cover and secure with mounting hardware.

6-19. Prism Hook Fastener Removal and Installation Procedure

a. Removal.

(1) Using a knife, remove hook fastener and any residual adhesive from prism (4, fig. 6-12).

(2) Clean the hook fastener mounting area with MEK (item 17, App. D).

b. Installation.

(1) Apply a thin coat of contact adhesive (item 3, App. D) to the mounting area on the prism and to the back of hook fastener, 10276204. Allow 10 minutes minimum dry time.

(2) Position hook fastener, 10276204, to the mounting area and press firmly in place.

(3) Allow to cure for 4 hours.

6-20. OAC Pile Fastener Removal and Installation Procedure

a. Removal.

(1) Using a knife, remove pile fastener and any residual adhesive from OAC (fig. 6-13).

(2) Clean the pile fastener mounting area with MEK (item 17, App. D).

b. Installation.

(1) Apply a thin coat of contact adhesive (item 3, App. D) to the mounting area on the OAC and to the back of pile fastener, 10276517. Allow 10 minutes minimum dry time.

(2) Insuring that the pile fastener does not overlap the glass on the OAC, position pile fastener, 10276517, to the mounting area and press firmly in place. Wipe off any excess adhesive.

(3) Allow to cure for 4 hours.

(4) After the cure period, trim the outside edge of the fastener to match the OAC contour as required.

6-21. Grommet Removal and Installation Procedure (Fig. 6-12)

a. Removal. Using a knife, remove grommet (28) and any residual adhesive from the case.

b. Installation.

(1) Clean the grommet-mounting area with MEK (item 17, App. D).

(2) Bond grommet (28) to the case with adhesive (item 4, App. D).

6-22. OAC Identification Plate Removal and Installation Procedure (Fig. 6-13)

a. Removal.

(1) Using a knife, remove identification plate (24) and any residual adhesive.

(2) Clean the identification-plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Be sure that the information on the new identification plate is the same as the information on the old identification plate.

(2) Peel the backing off the new identification plate (24) and apply plate to OAC (1).

6-23. OAC Retainer Components Removal and Installation Procedure (Fig. 6-12)

a. Removal. Remove hardware (22 through 25).

b. Installation.

(1) Install hardware (22 through 25).

(2) Thread nut (22) down until the threads of bolt (21) are exposed.

(3) Deform the thread of the bolt to retain the nut on the bolt.

6-24. OAC Connector Removal and Installation Procedure (Fig. 6-13)

a. Removal.

(1) Remove screws (25) and pull connector (26) away from OAC (1).

(2) Using a knife, cut the insulation sleeving from the soldered pins of connector (26).

(3) Tag and disconnect the leads to the connector.

(4) Remove the connector and shielding gasket (27).

b. Installation.

(1) Cut a new shielding gasket (27) from rubber sheet (item 28, App. D).

(2) Install the shielding gasket over the leads to connector (26).

(3) Install insulation sleeving (item 35, App. D) over the leads. The sleeving must be long enough to cover the soldered connections.

(4) Connect the leads and remove the tags.

(5) Slide the sleeving over the soldered connections and heat-shrink, using heat gun.

(6) Apply locking compound (item 11, App. D) to the threads of screws (25), and secure the connector to OAC (1) with the screws.

6-25. Eyepiece Pad Removal and Installation Procedure (Fig. 6-13)

a. Removal. Remove eyepiece pad (28) from eyepiece (29). Clean the mounting area.

b. Installation.

(1) Cut a new eyepiece pad (28) from rubber sheet (item 27, App. D).

(2) Apply adhesive (item 4, App. D) to the eyepiece pad and install the pad on the eyepiece (29).

6-26. Purging Procedure for OAC (Fig. 6-13)

a. Remove self-seal screw (32).

b. Connect the purging hose between the quick disconnect in the connector well on 2A3A4 and purging valve (31).

c. Position the front panel controls on 2A1A2 as follows:

(1) Set the VACUUM PUMP ON/OFF switch to OFF.

(2) Turn the PRESSURE SELECTOR fully CCW.

(3) Turn the NITROGEN SUPPLY VALVE fully CCW.

(4) Turn the VACUUM LINE VALVE fully CW.

NOTE

Nitrogen will escape from the orifice where self-seal screw (32) was removed.

d. Turn the PRESSURE SELECTOR control on 2A1A2 CW until the UUT gage reads 5 PSIG. Allow nitrogen (item 19, App. D) to flow through the UUT for a period of five minutes.

e. Lightly coat the self-seal screw with silicone compound (item 13, App. D), wipe away any excess silicone compound, and install the self-seal screw while the nitrogen is still escaping.

f. Turn the PRESSURE SELECTOR control on 2A2A2 CW until the UUT gage reads 11.0 PSIG.

g. Turn the NITROGEN SUPPLY VALVE fully CW.

h. Turn the PRESSURE SELECTOR fully CCW.

i. Wait 30 minutes.

(1) If the UUT gage reads 10.5 PSIG or greater, proceed to step *j*.

(2) If the UUT gage reads less than 10.5 PSIG, return the UUT to the depot (par. 6-28).

j. Disconnect the purging hose from the purging valve and then from the quick disconnect in the connector well on 2A3A4.

6-27. Painting

a. Apply primer (item 24, App. D) and allow to dry.

b. Apply polyurethane coating (item 9, App. D) 2 hours after primer is applied.

6-28. Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Ensure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

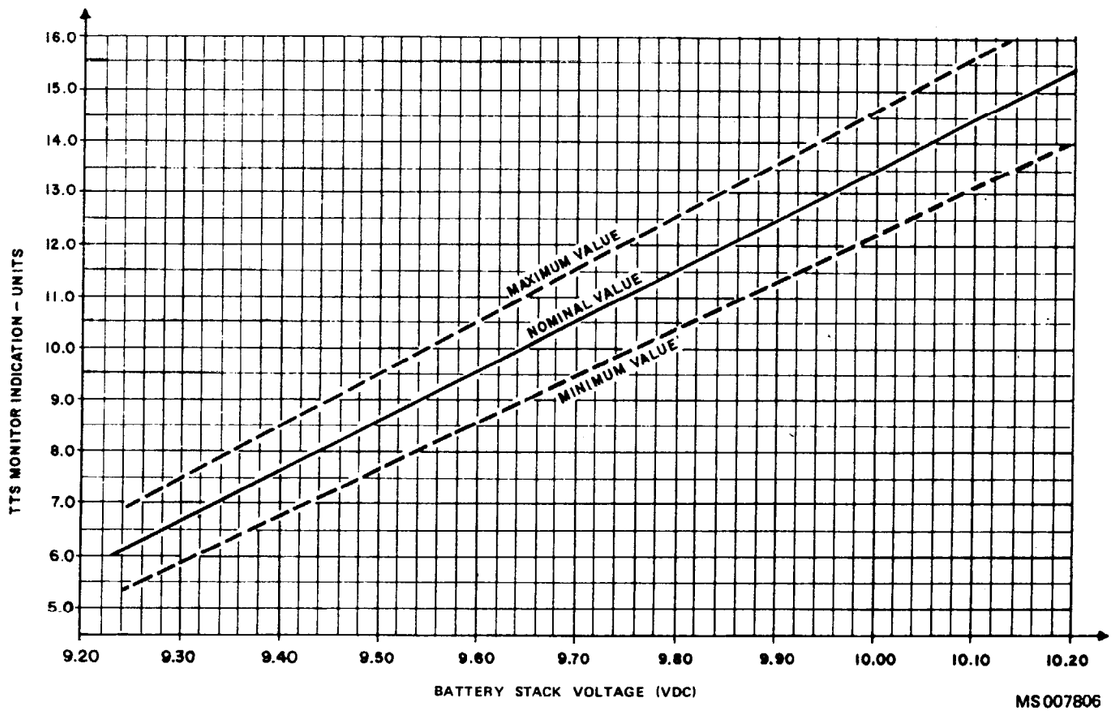


Figure 6-16. LCSS test results display.

CHAPTER 7

MONITOR UNIT (1A1)

Section I. PROGRAMMED TESTS

7-1. General

This chapter provides the information necessary to isolate and repair a fault in the monitor unit (UUT) to a faulty subassembly or chassis mounted component. Figures 7-3 through 7-6 are provided as an aid in troubleshooting the UUT.

7-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT.

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB-401
c. Multimeter	
d. Programmable signal conditioner	1A12
e. Passive probe	TA-108 (2 required)
f. Digital multimeter probe	TA-109
g. Cable (needle probe)	TA-208
h. Cable	TA-232
i. Extender board	TA-401
j. Cable	CA-9
k. Cable	CA-10
l. Cable	CA-34
m. Cable	CA-35
n. Cable	CA-36
o. Cable	CA-39
p. Test lead	CA-40
q. Cable	CA-127
r. Cable	CA-401
s. Cable	CA-42
t. Cable	CA-403
u. Cable	CA-406

7-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care when performing manual procedures.

a. Before performing programmed tests, ensure that batteries in the monitor unit have been charged in accordance with TM 9-4935-484-14. If batteries cannot be charged in accordance with TM 9-4935-484-14, test on LCSS in accordance with this chapter. If 1A1 must be replaced, perform self-test in accordance with TM 9-4935-484-14 prior to retesting on LCSS. After charging cycle completion, set MU charge switch to OFF. Place the monitor unit in the AN/TSM-93 (test shelter) and wait a minimum of 4 hours, to ensure temperature stabilization. At programmed test completion, recharge batteries.

b. Before performing the programmed tests, remove the cover from the lower case by releasing the ten latches. Invert the cover and place on the shelter floor. Visually inspect the monitor unit for damage to the meter, switches, indicators, and connectors. Visually inspect the Monitor Unit MONITOR meter for mechanical zero. If the MONITOR meter indicator is not on 0, loosen the captive screws securing the panel to the chassis and raise the panel to gain access to the MONITOR meter adjustment screw (fig 7-4). Adjust the screw so that the indicator is on 0. Position the panel on the chassis and tighten the captive screws. At programmed test completion, install cover on lower case and fasten the ten latches.

c. When the program or REF TM requires probing through conformal coating, use TA-208.

d. When the program or REF TM requires a probe connection to GND, connect the probe to the point on A9 marked GND (A9A1J2).

e. If the UUT is repaired or replaced, run the tracker test set program (see TM 9-1425-550-10) for maintenance calibration.

f. When removal of A2 through A10 is required, use extraction tool (1, fig. 7-3).

g. Deleted.

7-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 5320000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUBMODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in message.

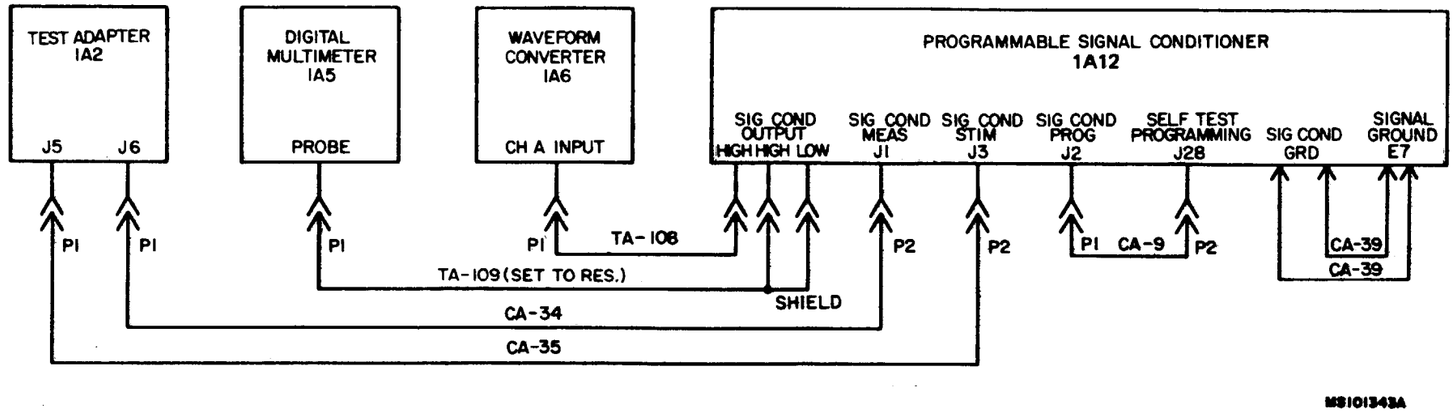


Figure 7-1. Cable hookup diagram.

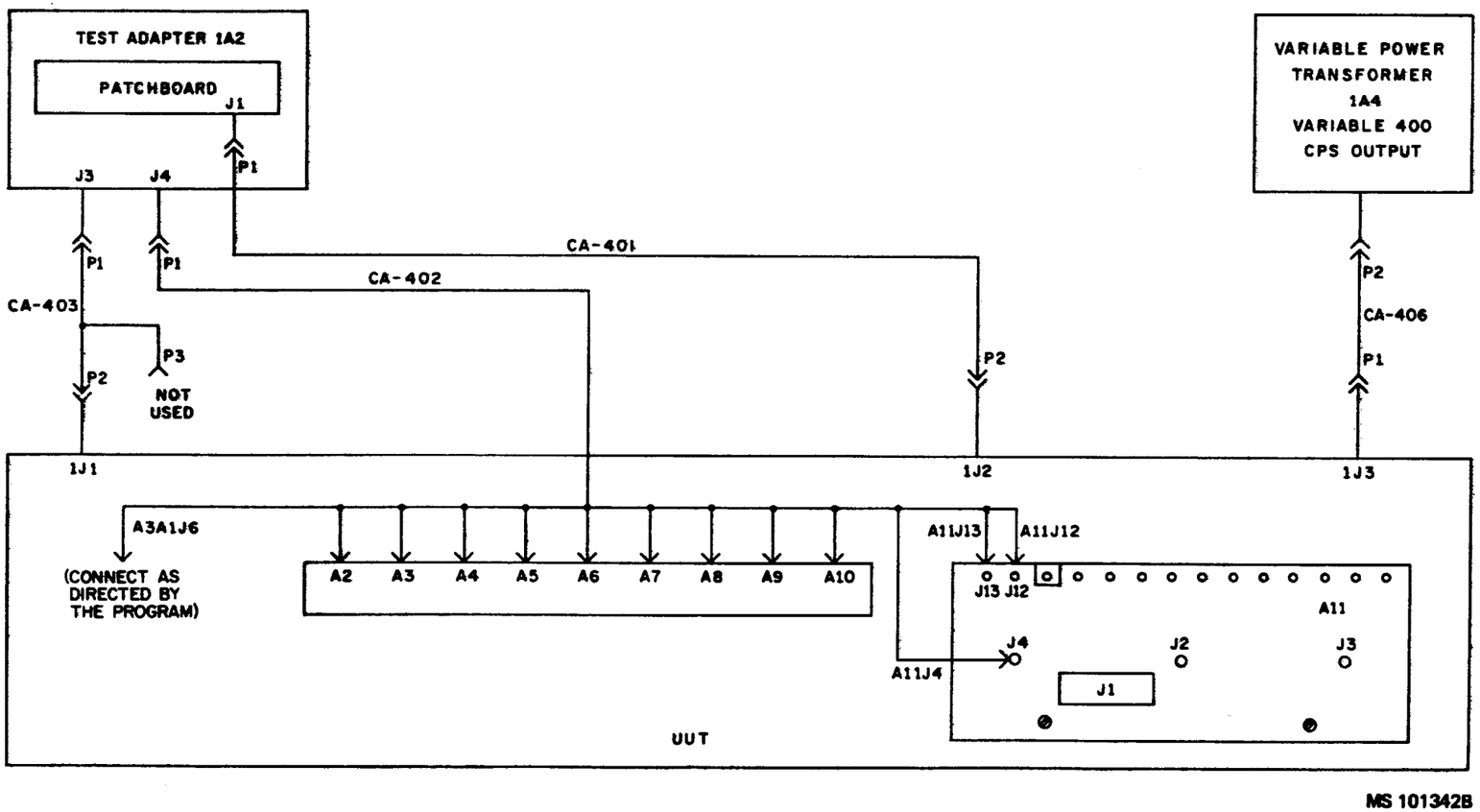


Figure 7-2. Cable hookup diagram.

Table 7-1. Monitor Unit, Programmed Tests.

Print message ref no.	Action or instructions
REF TM 1	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 2	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. If a ALL TESTS GO is displayed on SSVD, run programmable signal conditioner program (see TM-9-1425-550-10).
REF TM 3	Remove and install a new A2 in the patchboard. Rerun the program. If REF TM 3 is not displayed on SSVD again, the removed A2 (from the patchboard) is faulty. If REF TM 3 is displayed on SSVD again, the removed A2 (from the patchboard) is good. Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 4	NOTE Ensure that no connections are made to UUT. Verify the cable hookup (fig. 7-1). *a.* If the hookup is correct, discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. *b.* If the cable hookup is not correct, make the necessary corrections and rerun the program.
REF TM 5	*a.* Perform the cable hookup (fig. 7-1). *b.* Adjust 1A4 fully CCW, and set the ON/OFF circuit breaker to ON. *c.* Install the patchboard. *d.* Press the PROCEED switch.
REF TM 6	*a.* On the UUT, loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel. *b.* Visually inspect the wiring for disconnected wires and obvious short circuits. Repair as required. *c.* Perform the cable hookup (fig. 7-2). The existing cable hookup (fig. 7-1) remains untouched. *d.* Position the controls on the UUT as follows: (1) Set the POWER switch to OFF. (2) Set the CHARGE switch to OFF. (3) Position the MONITOR SELECT switch to +13 VDC. (4) Position the MODE switch to SELF TEST. (5) Press the FREQUENCY switches to 00. *e.* Press the PROCEED switch.
REF TM 7	AN/TSM-93 resistance measurements indicate a wiring fault in the ground lines in the UUT. Use standard troubleshooting procedures to isolate the fault. When the fault is corrected, rerun the program.
REF TM 8	*a.* Connect one end of CA-10 and one end of CA-36 to the captive screw insert (to be used as chassis ground) located between BT1 and A3. The cables are connected to the insert by one screw (36, fig. 7-8) and washers (37 and 38). Thread the unused spacer (58) onto the other screw of retainer (1). Connect the other end of CA-10 to E7 SIGNAL GROUND on TA-19. (The other end of CA-36 is used in a later test). *b.* Press the PROCEED switch.
REF TM 9	*a.* Disconnect both leads from XDS1-3, and measure the resistance between XDS1-3 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the leads to XDS1-3, and proceed to step *b*. (2) If the meter reading is less than 10K ohms, replace XDS1 (par. 7-9).

Table 7-1. Monitor Unit Programmed Test - Continued.

Print message ref no.	Actions or instructions
REF TM 9 Continued	*b.* Disconnect both leads from XDS2-3, and measure the resistance between XDS2-3 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the leads to XDS2-3, and proceed to step *c.* (2) If the meter reading is less than 10K ohms, replace XDS2 (par. 7-9). *c.* Disconnect the lead from XDS3-3, and measure the resistance between XDS3-3 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the leads to XDS3-3, and proceed to step *d.* (2) If the meter reading is less than 10K ohms, replace XDS3 (par. 7-9). *d.* A wiring fault exists in the +13 volt bus in the UUT. Use standard troubleshooting procedures to isolate the fault. When the fault is corrected, rerun the program.
REF TM 10	*a.* Disconnect both leads from XDS1-1, and measure the resistance between XDS1-1 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the leads to XDS1-1, and proceed to step *b.* (2) If the meter reading is less than 10K ohms, replace XDS1 (par. 7-9). *b.* Disconnect both leads from XDS2-1, and measure the resistance between XDS2-1 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the leads to XDS2-1, and proceed to step *c.* (2) If the meter reading is less than 10K ohms, replace XDS2 (par. 7-9). *c.* Disconnect the lead from XDS3-1, and measure the resistance between XDS3-1 and (GND) with the multimeter. (1) If the meter reading is greater than 10K ohms, reconnect the lead to XDS3-1, and proceed to step *d.* (2) If the meter reading is less than 10K ohms, replace XDS3 (par. 7-9). *d.* A wiring fault exists in the -13 volt bus in the UUT. Use standard troubleshooting procedures to isolate the fault. When the fault is corrected, rerun the program.
REF TM 11	*a.* Connect either end of CA-36 to A7A2J1 and A7A1J8. *b.* Verify that the TESTING, GO, and NO-GO lamps on the UUT are on. (1) If all the lamps are on, proceed to step *c*. (2) If all or any of the lamps are off, proceed to step *d*. *c.* Press and hold the outer ring of the TESTING, GO, and NO-GO lamps. (1) If the lamp flickers off when the outer ring is depressed and comes on in the fully depressed position, release the outer ring, and proceed to step *f*. (2) If the lamp does not go out when the outer ring is depressed, or does not come on in the fully depressed position, release the outer ring, and replace that lamp assembly (par. 7-9). *d.* Press and hold the outer ring of the lamp that is off. (1) If the lamp comes on when the outer ring is depressed, release the outer ring, and proceed to step *c.* (2) If the lamp does not come on when the outer ring is depressed, replace the lamp, and repeat step *b* above. If the lamp still fails to come on, replace the lamp assembly (par. 7-9). *e.* Using the multimeter, measure the resistance between terminals 1 and 2 of the lamp assembly tested in step *d* above. (1) If the meter indication is greater than 50 ohms, replace the lamp assembly (par. 7-9). (2) If the meter indication is less than 50 ohms, dial the number, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch.

Table 7-1. Monitor Unit, Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 11 Continued	*f.* Position the MODE switch to TRIG OUTPUT. *g.* Press the PROCEED switch.
REF TM 12	*a.* Verify that the TESTING and GO lamps are off and the NO-GO lamp is on. (1) If the lamps are as specified, proceed to step *b*. (2) If the lamps are not as specified, replace A3. *b.* While observing the GO, NO-GO lamps in each position, rotate the MODE switch from the BORESIGHT position through the MISSILE COMMAND position. In each position, the GO lamp should be on and NO-GO lamp should be off. (1) If the GO lamp comes on in each position, proceed to step *c*. (2) If the NO-GO lamp comes on in any position, replace S6 (par. 7-10). NOTE Do not position the MODE switch to SELF TEST. *c.* Position the MODE switch to TRAINER, and verify that the NO-GO lamp is on and the GO lamp is off. (1) If the NO-GO lamp is on, proceed to step *d*. (2) If the GO lamp is on, replace A3. *d.* Position the MODE switch to TRIG OUTPUT. *e.* Press the PROCEED switch.
REF TM 13	*a.* Verify that the FULL CHARGE lamp is on. (1) If the lamp is on, proceed to step *b*. (2) If the lamp is not on, proceed to step *c*. *b.* Press and hold the outer ring of the FULL CHARGE lamp. (1) If the lamp flickers off when the outer ring is depressed and comes on in the fully depressed position, release the outer ring, and proceed to step *d*. (2) If the lamp does not go out when the outer ring is depressed, or does not come on in the fully depressed position, release the outer ring and replace XDS4 (par. 7-9). *c.* Press and hold the outer ring of the FULL CHARGE lamp. (1) If the lamp comes on in the fully depressed position, release the outer ring and replace XDS4 (par. 7-9). (2) If the lamp does not come on in the fully depressed position, release the outer ring and replace the lamp. Repeat step *a* above. If the lamp still does not come on, replace XDS4 (par. 7-9). *d.* Press and hold the outer ring of the CHARGING lamp. (1) If the lamp comes on in the fully depressed position, release the outer ring and proceed to step *e*. (2) If the lamp does not go on when the outer ring is released, replace XDS5 (par. 7-9). (3) If the lamp does not come on in the fully depressed position, release the outer ring, and replace the lamp, Repeat step *d* above. If the lamp still does not come on, replace XDS5 (par. 7-9). *e.* Observe the FULL CHARGE lamp. (1) If the lamp is on, proceed to step *f*. (2) If the lamp is not on, wait until the lamp comes on, and then proceed to step *f*. *f.* Press the PROCEED switch.
REF TM 14	Position the MONITOR SELECT switch to each of the positions given in the following chart, and verify each meter reading.

Table 7-1. Monitor Unit, Programmed Tests - Continued.

Print message ref no.	Action or instructions		
REF TM 14 Continued	Switch position	Meter reading	Test no.
	+13 VDC	between 11.7 and 14.3	1
	-13 VDC	between 11.7 and 14.3	2
	+5 VDC	between 4.5 and 5.5	2
	+REF	between 4.70 and 5.30	1
	-REF	between 4.70 and 5.30	1
	IR OUTPUT	between 5.5 and 9.5 (the IR OUTPUT green area)	2
	a. If meter indication was within given range for each switch position, press PROCEED switch. *b.* If meter indication was not within given range for each switch position, dial the number, in accordance with chart and message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch. If, after making an adjustment, REF TM 14 is displayed on SSVD again, and either the +REF or -REF meter indications are not within range, dial test no. 2, in accordance with message displayed on SSVD, into UUT TEST NUMBER switches, and press START TEST switch.		
REF TM 15	Remove and install a new A11. Rerun the program. If REF TM 15 is not displayed on SSVD again, the removed A11 is faulty. If REF TM 15 is displayed on SSVD again, the removed A11 is good. Replace CB2 (par. 7-6).		
REF TM 16	This completes the testing of the UUT. Position the controls on the UUT as follows: *a.* Set the POWER switch to OFF. *b.* Set the CHARGE switch to OFF. *c.* Position the MONITOR SELECT switch to +13 VDC. *d.* Position the MODE switch to SELF TEST. *e.* Press the FREQUENCY switches to 00. *f.* On 1A4, set the ON/OFF circuit breaker to OFF. *g.* Remove the screw and washers securing CA-10 and CA-36 to the captive insert. Remove the spacer installed on spacer (58, fig. 7-8), and install it on the retainer with the removed screw (36) and washers (37 and 38).		
REF TM 17	Remove and install a new A11. Rerun the program. If REF TM 17 is not displayed on SSVD again, the removed A11 is faulty. If REF TM 17 is displayed on SSVD again, the removed A11 is good. Replace A9.		
REF TM 18	Replace CB1 or CB2 (par. 7-6).		
REF TM 19	Replace FL1 (par. 7-7).		
REF TM 20	Replace S1 or S3 (par. 7-8).		
REF TM 21	Replace XDS1, XDS2, XDS3, XDS4, or XDS5 (par. 7-9).		
REF TM 22	Replace S2 or S6 (par. 7-10).		
REF TM 23	Replace S4 or S5 (par. 7-11).		
REF TM 24	Replace M1 (par. 7-15).		
REF TM 25	Rplace BT1, BT2, BT3 (par. 7-16), and BT4 (par. 7-17).		
REF TM 26	Rplace T1 (par. 7-19).		
REF TM 27	Remove and install a new A3 in the patchboard. Rerun the program. If REF TM 27 is not displayed on SSVD again, the removed A3 (from patchboard) is faulty. If REF TM 27 is displayed on SSVD again, the removed A3 (from patchboard) is good. Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.		

Table 7-1. Monitor Unit, Programmed Tests - Continued

Print message ref no.	Action or Instructions
REF TM 28	Replace C1 (par. 7-25).
REF TM 29	Replace R1 (par. 7-25).
REF TM 30	*a.* Position the MONITOR SELECT switch on the MU to the + BATT A position. *b.* Observe the meter reading on the MONITOR meter. Find the corresponding value on TTS MONITOR INDICATION - UNITS (fig. 7-2.1). *c.* Observe the reading on the LCSS TEST RESULTS DISPLAY. Find the corresponding value on BATTERY STACK VOLTAGE (VDC) (fig. 7-2.1). *d.* Extend both line values until they intersect (coordinate). (1) If the coordinate is in the field of MAXIMUM VALUE and MINIMUM VALUE, proceed to step *e.* (2) If the coordinate is not in the field of MAXIMUM VALUE and MINIMUM VALUE, proceed to step *f.* *e.* Position the MONITOR SELECT switch on the MU to the + BATT B, - BATT A, and - BATT B position. (1) Repeat steps *b*, *c*, and *d* for each position. (2) After completing step *d* for - BATT B position, position the MONITOR SELECT switch to +13 VDC position and press the PROCEED switch. *f.* Terminate testing and replace A9 in the MU.

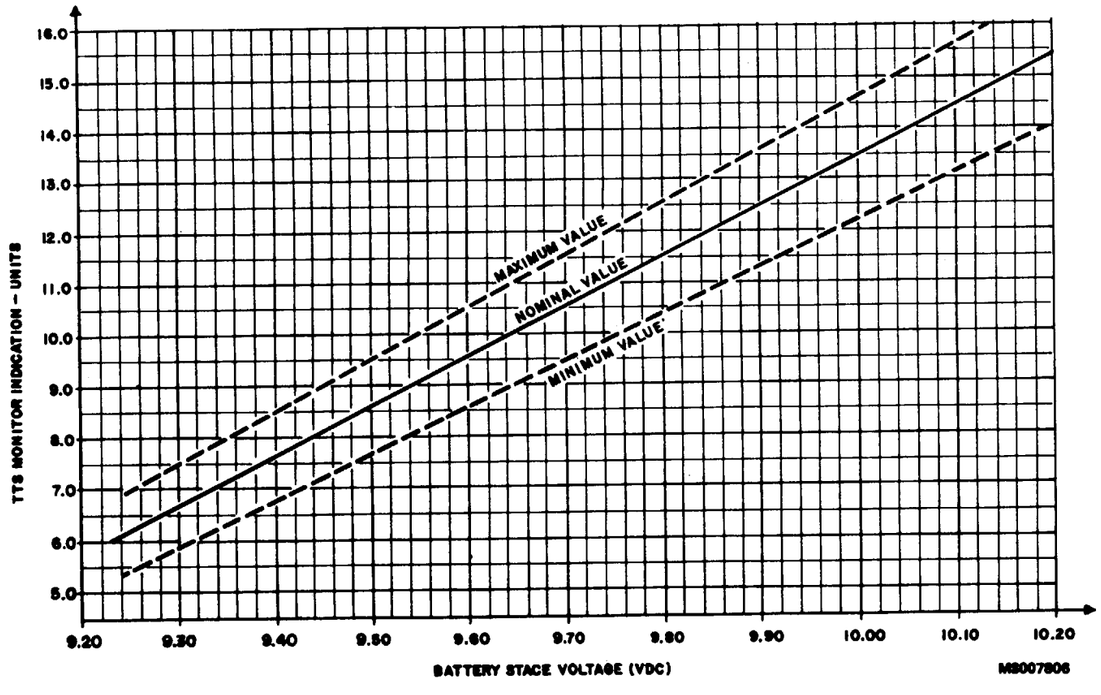
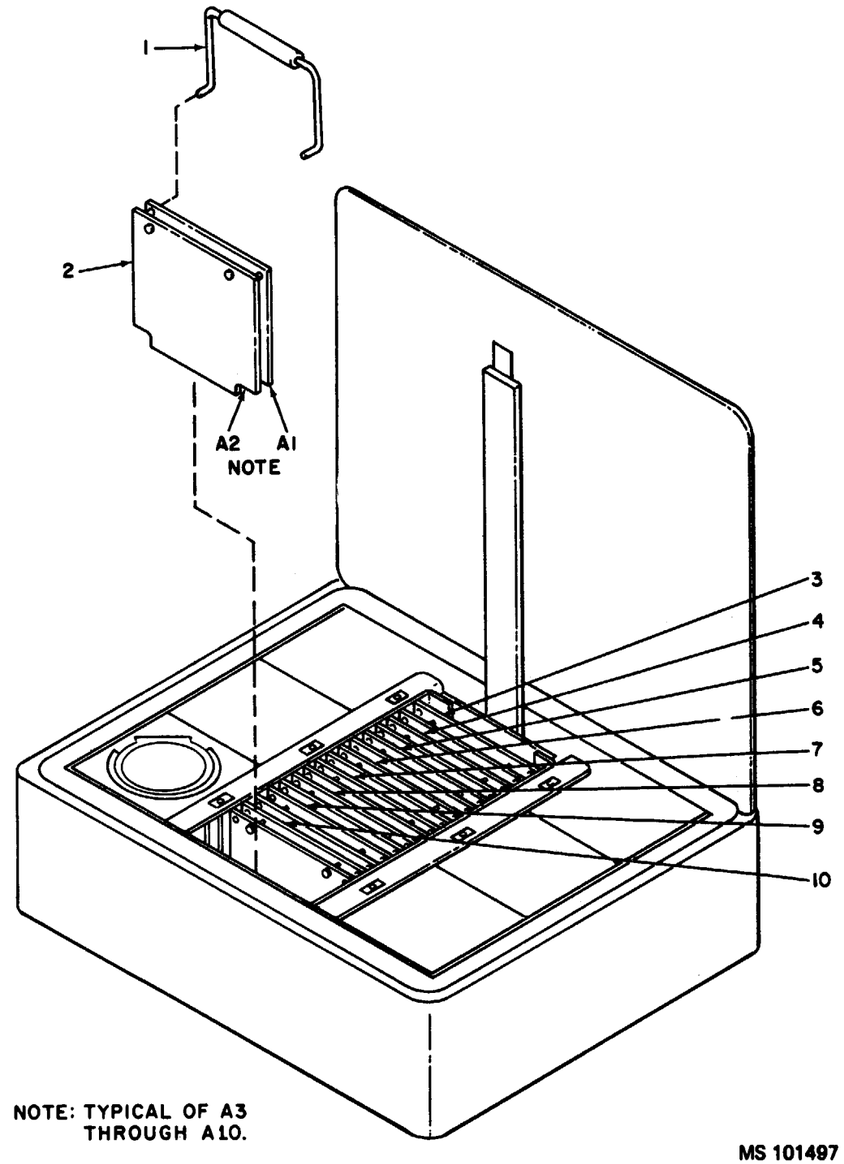
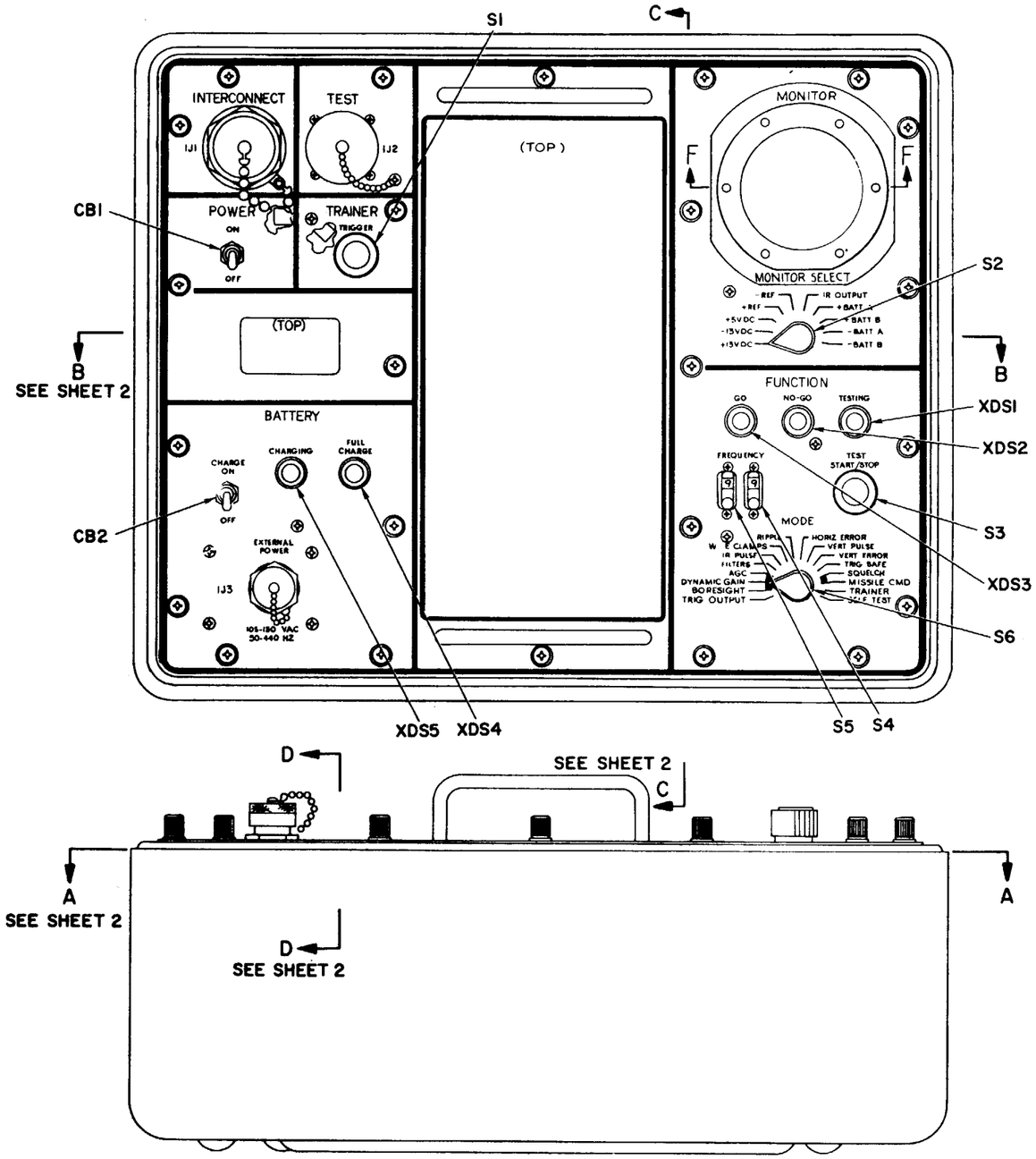


Figure 7-2.1. LCSS test results display.



1 – Extraction tool
2 – A2
3 – A10
4 – A9
5 – A8
6 – A7
7 – A6
8 – A5
9 – A4
10 – A3

Figure 7-3. Module board extraction tool in use.

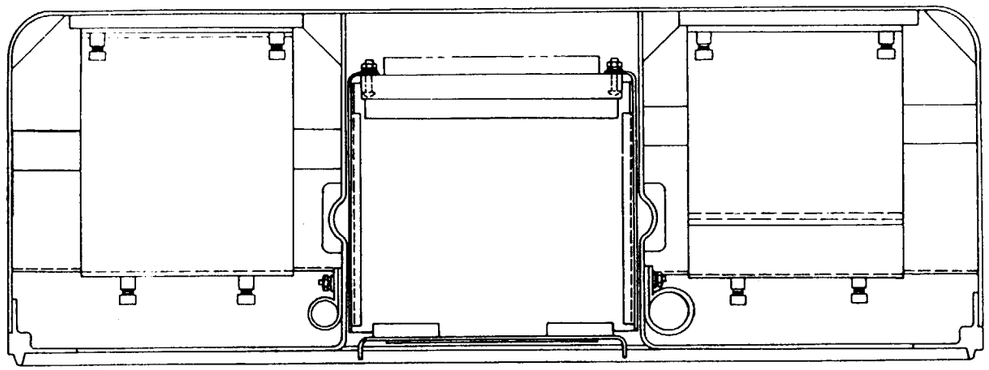


SECTION FF

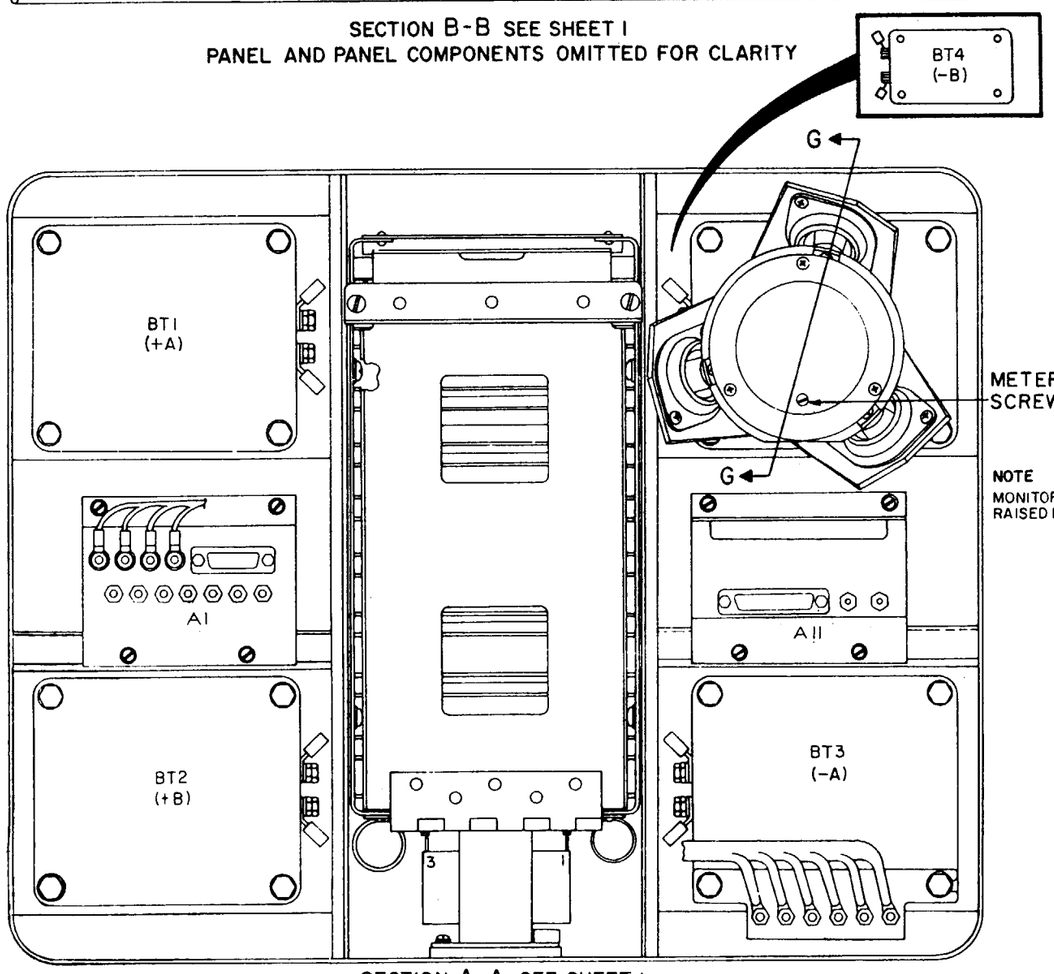
MS 101298

Figure 7-4. Monitor unit, parts location digram (sheet 1 of 2).

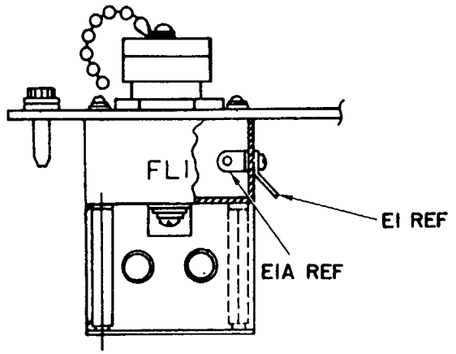
C9



SECTION B-B SEE SHEET 1
PANEL AND PANEL COMPONENTS OMITTED FOR CLARITY



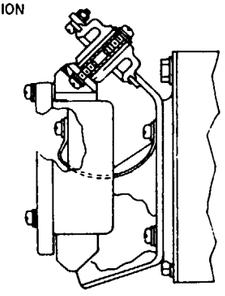
SECTION A-A SEE SHEET 1
CASE FLANGE OMITTED FOR CLARITY SEE SHEET 1



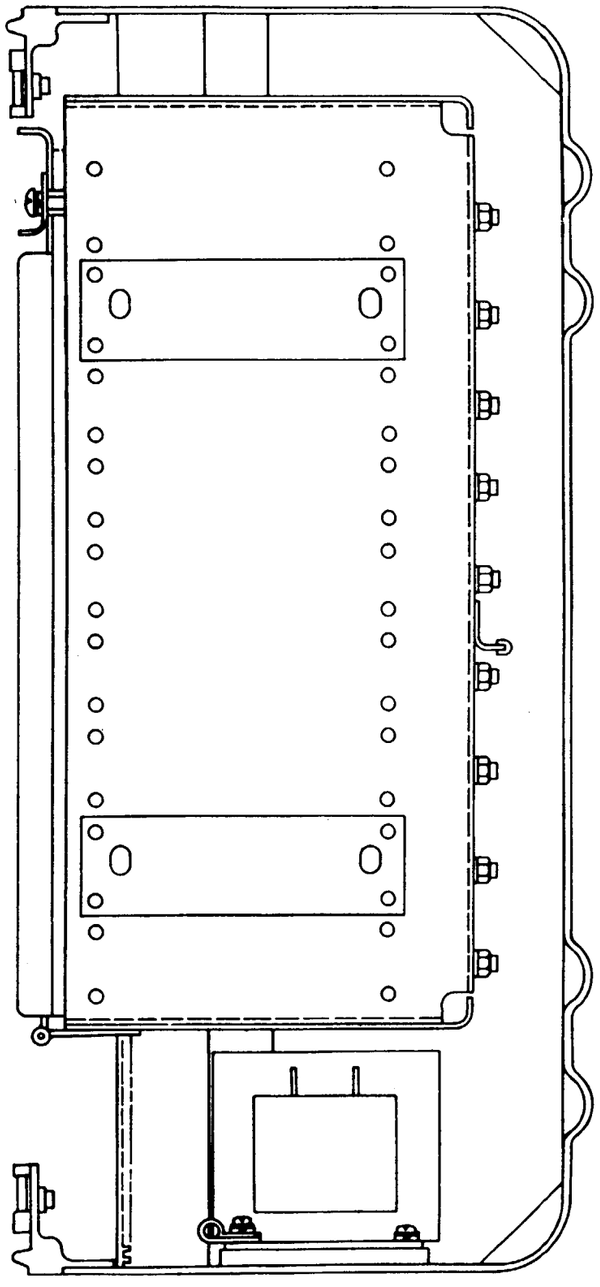
SECTION D-D SEE SHEET 1
CASE OMITTED FOR CLARITY

METER ADJUSTMENT SCREW

NOTE
MONITOR PANEL IN RAISED POSITION



SECTION G-G
CASE OMITTED FOR CLARITY



SECTION C-C
SEE SHEET 1

MS101299E

Figure 7-4. (sheet 2 of 2).

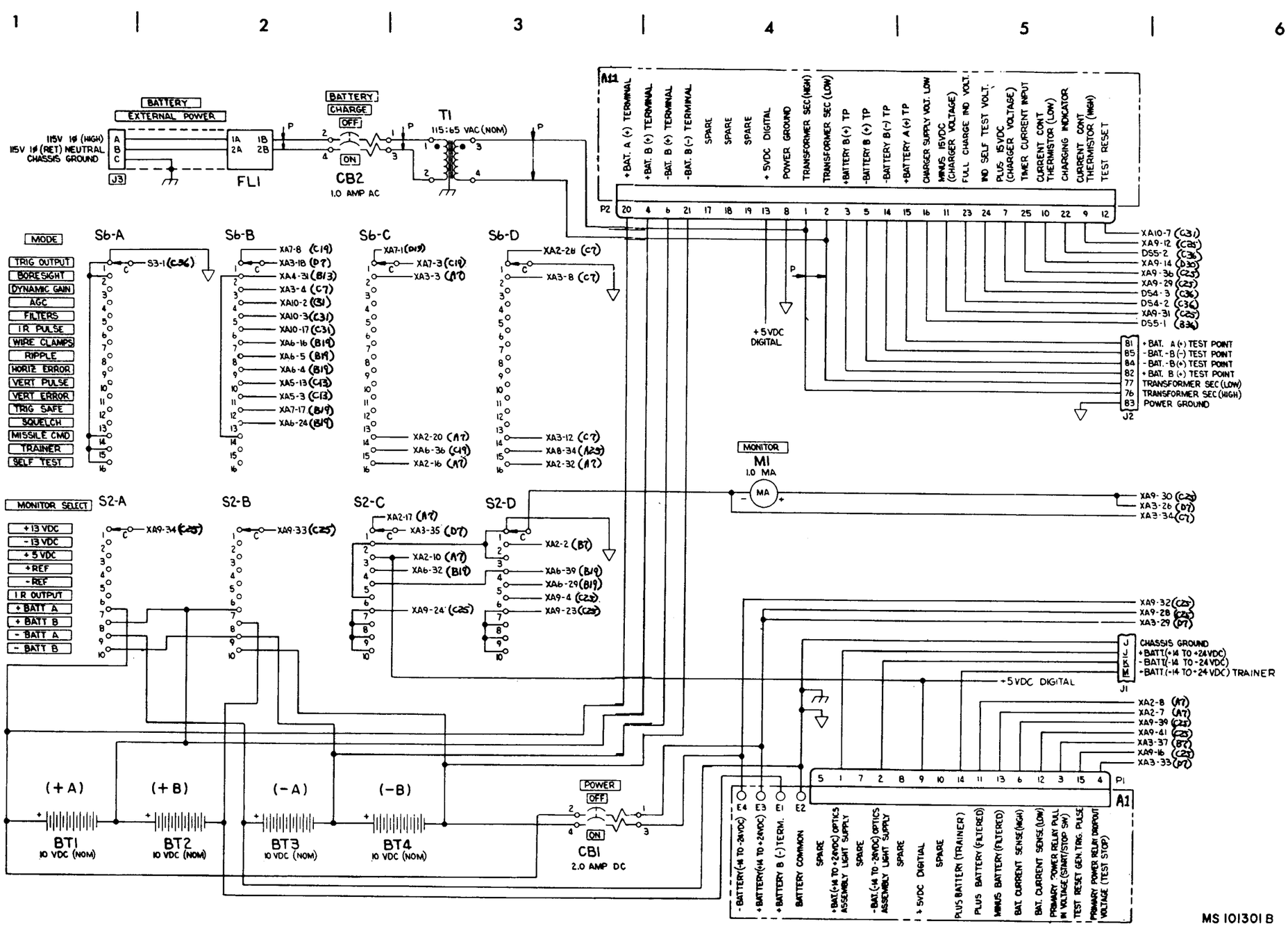


Figure 7-5. Monitor unit, schematic diagram (sheet 1 of 6).

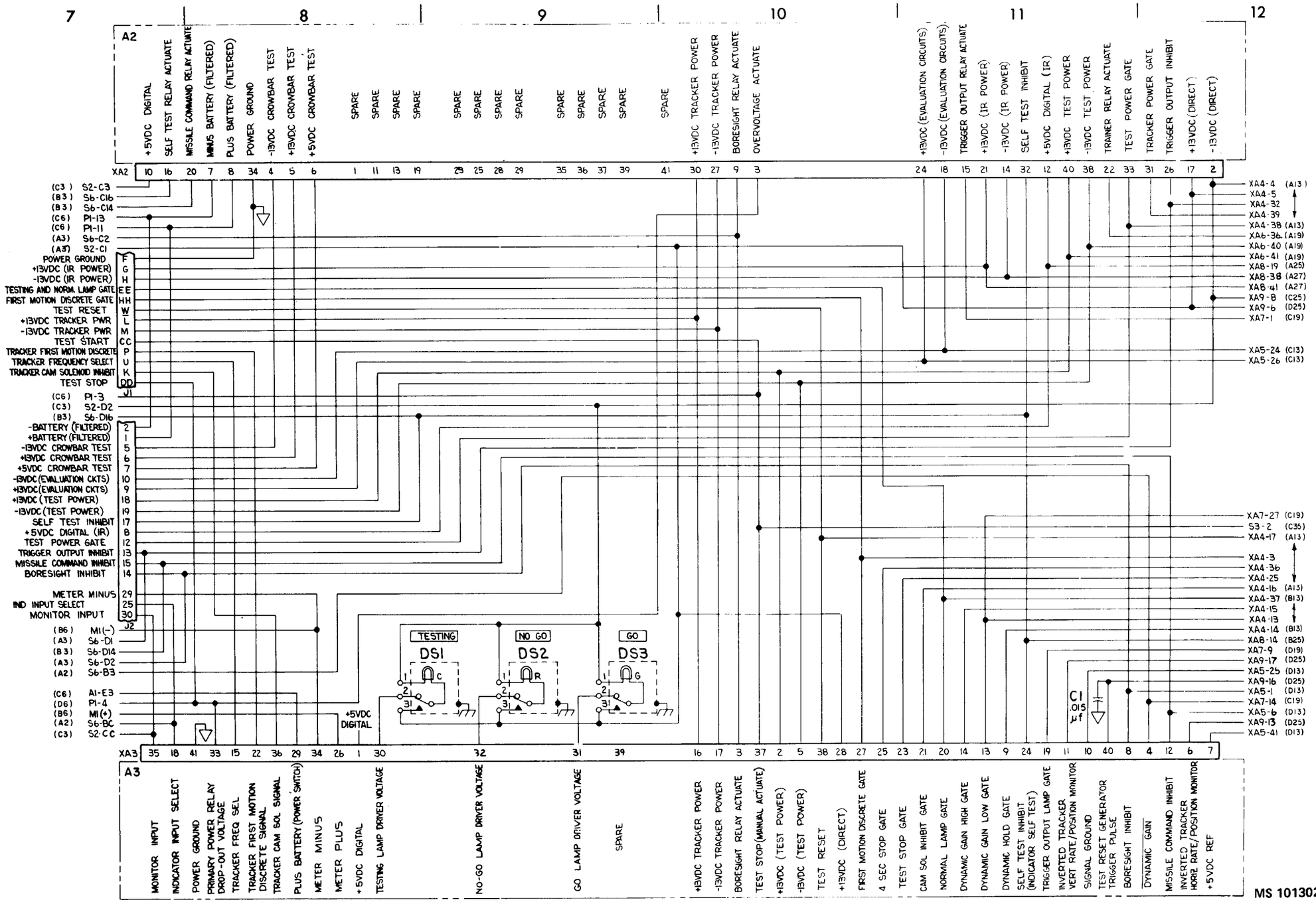


Figure 7-5. (sheet 2 of 6).

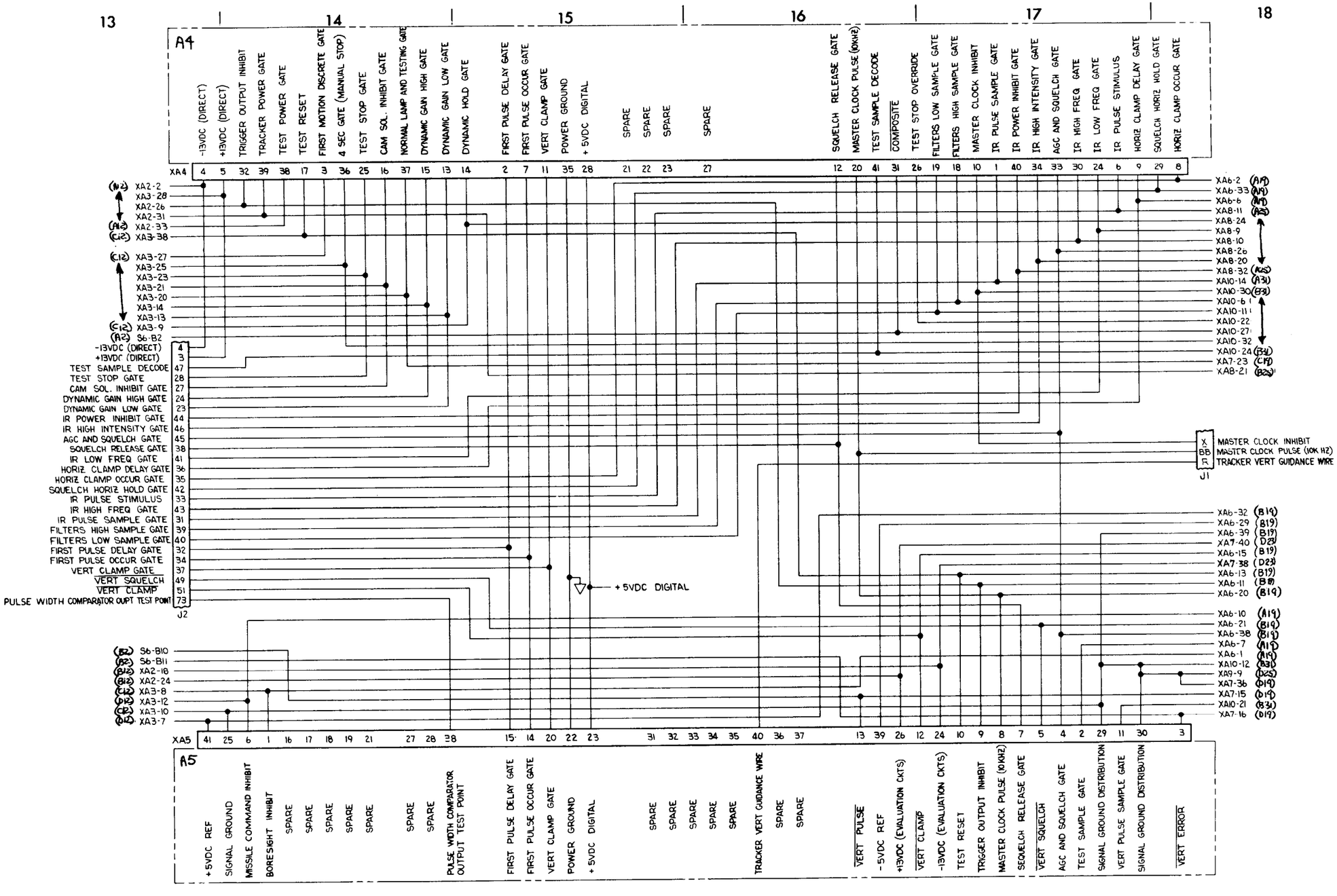


Figure 7-5. (sheet 3 of 6).

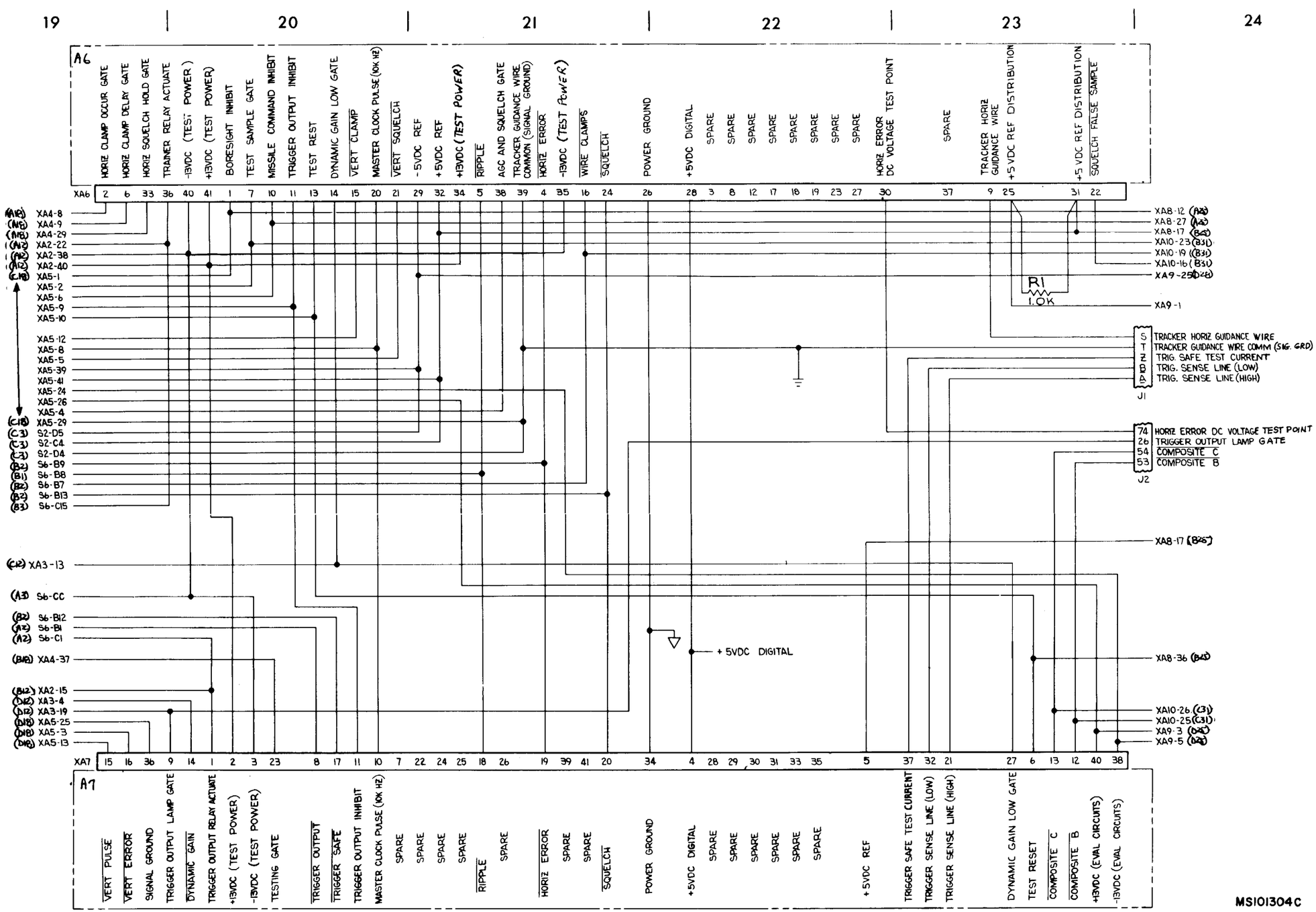


Figure 7-5. (sheet 4 of 6).

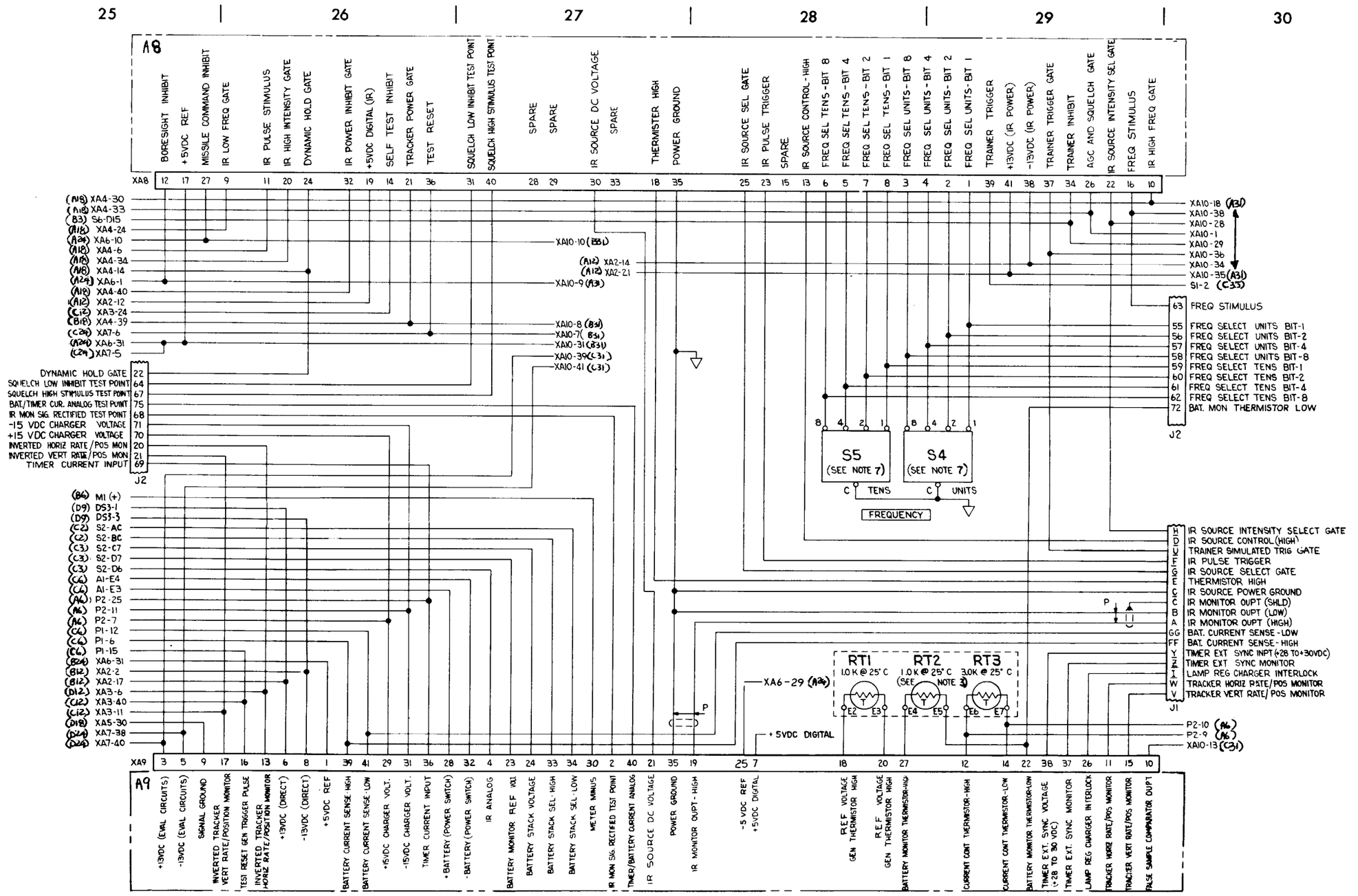
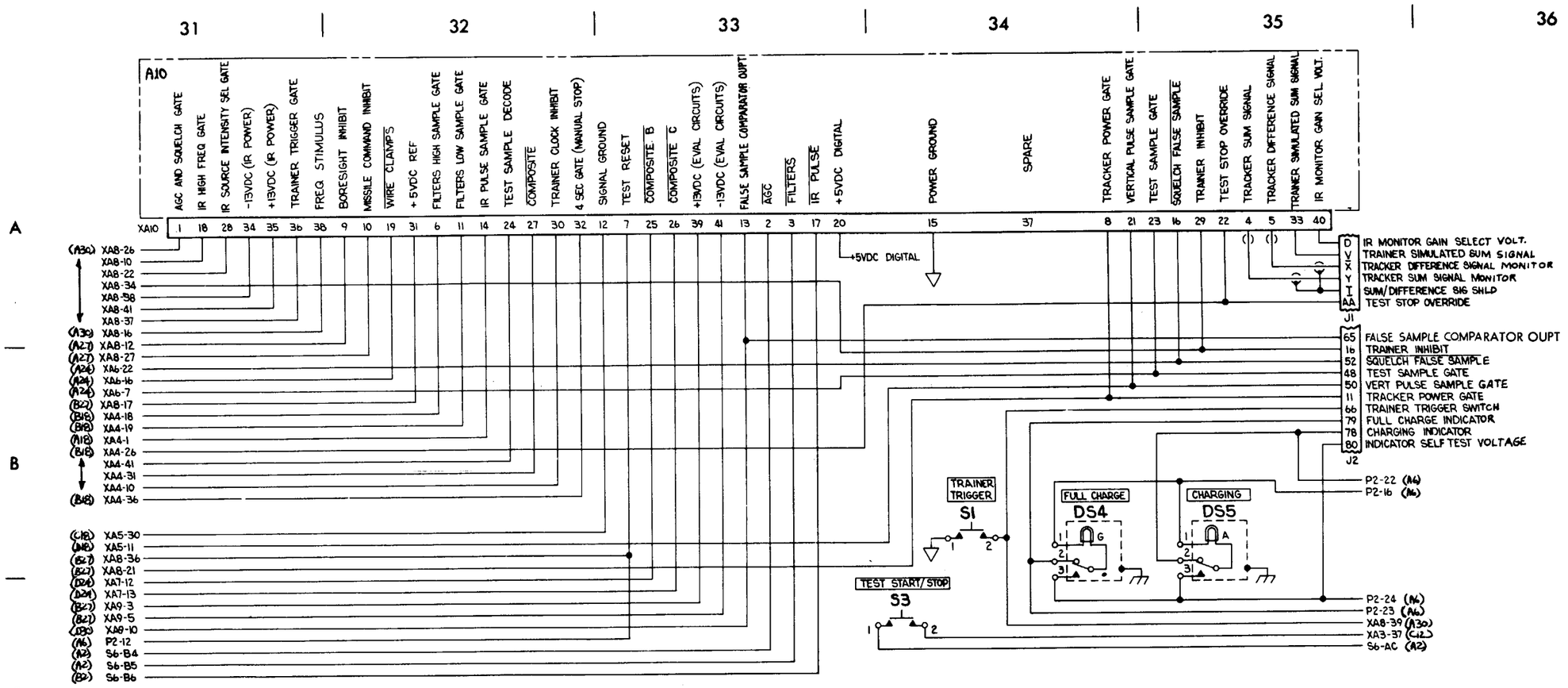


Figure 7-5. (sheet 5 of 6).



NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER, OR SUBASSEMBLY DESIGNATION OR BOTH.
2. GROUND SYMBOLS TO BE USED ARE:

   POWER GROUND — CHASSIS GROUND — SIGNAL GROUND

3. RT1, RT2 AND RT3 SENSE THE TEMPERATURE OF AND ARE ATTACHED TO BT 3.
4. INTERCONNECTION INFORMATION LEDGEND:

   XA9-39 (C7)
   - ZONE
   - TERMINATION POINT OF PART
   - COMPONENT REFERENCE DESIGNATION OF PART AT OPPOSITE END.

5. EACH BATTERY STACK (BT1, BT2, BT3 AND BT4) CONSISTS OF EIGHT (8) SERIES CONNECTED 'D' SIZE NICKEL-CADMIUM, SEALED CELLS, 1.25 V NOMINAL, 3.0 AMP-HOUR (NOMINAL) SERVICE RATING.
6. RESISTANCE VALUES ARE IN OHMS, ±5% AND 1/4 W AND CAPACITANCE VALUES ARE IN PICOFARADS, ±10% AND 200 VDCW.
7. DECADE TO BCD DECODE SWITCH

DIAL READS	DIAL POS.	COMMON 'C' CONNECTED TO: 1	2	4	8
0	0				
1	1	●			
2	2		●		
3	3	●	●		
4	4			●	
5	5	●		●	
6	6		●	●	
7	7	●	●	●	
8	8				●
9	9	●			●

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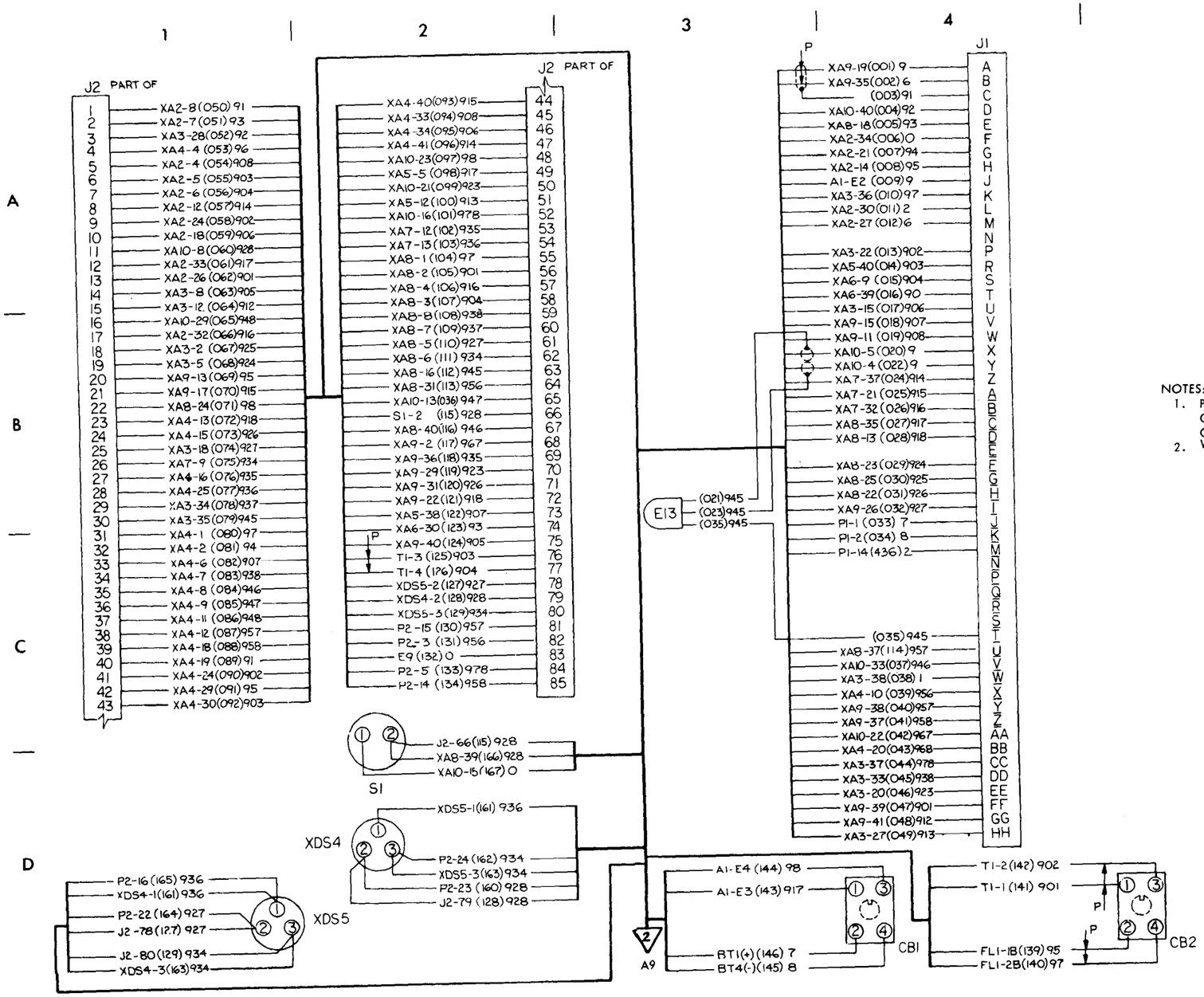
Figure 7-5. (sheet 6 of 6).



NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION.
2. WIRING LEGEND

XA8-20(267)904
- COLOR NUMBER (PER MIL-STD-681)
- WIRE NUMBER
- COMPONENT REFERENCE DESIGNATION AND TERMINAL NUMBER OF PART AT THE OPPOSITE END. (FOR SHORT WIRING THIS AREA MAY BE OMITTED).

MS 101307

Figure 7-6. Monitor unit wiring diagram (sheet 1 of 5).

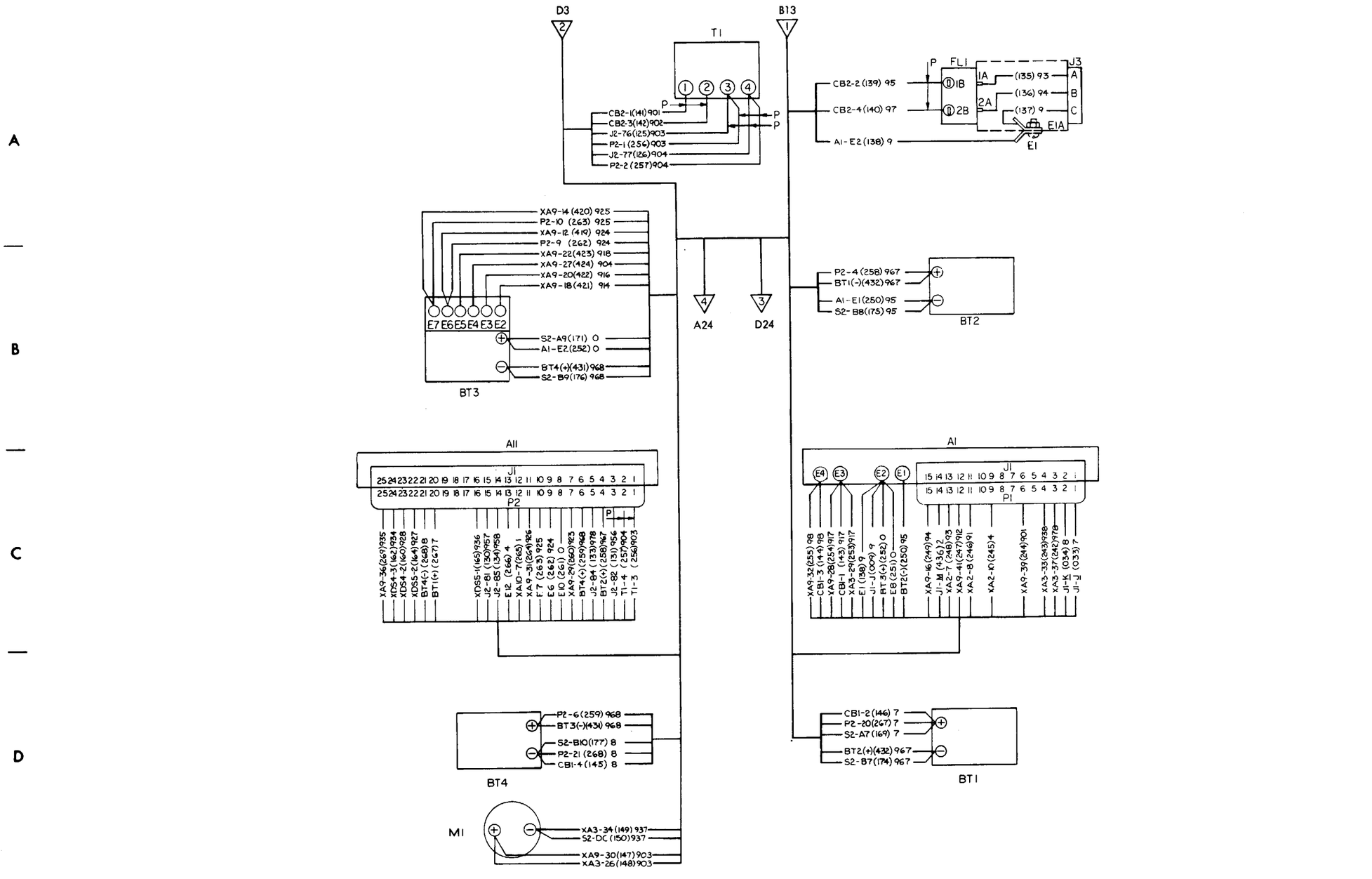


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Figure 7-6. (sheet 2 of 5)

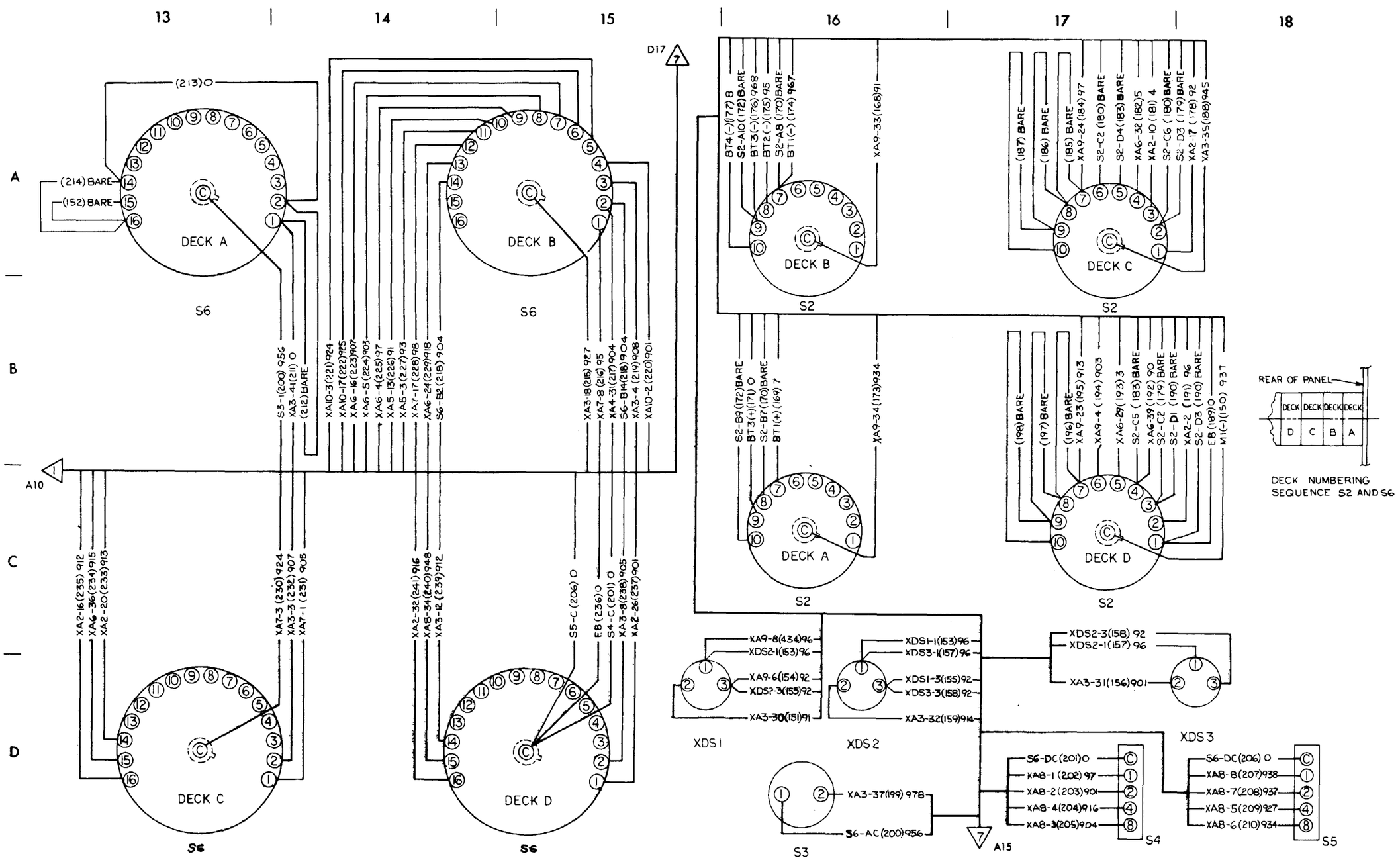
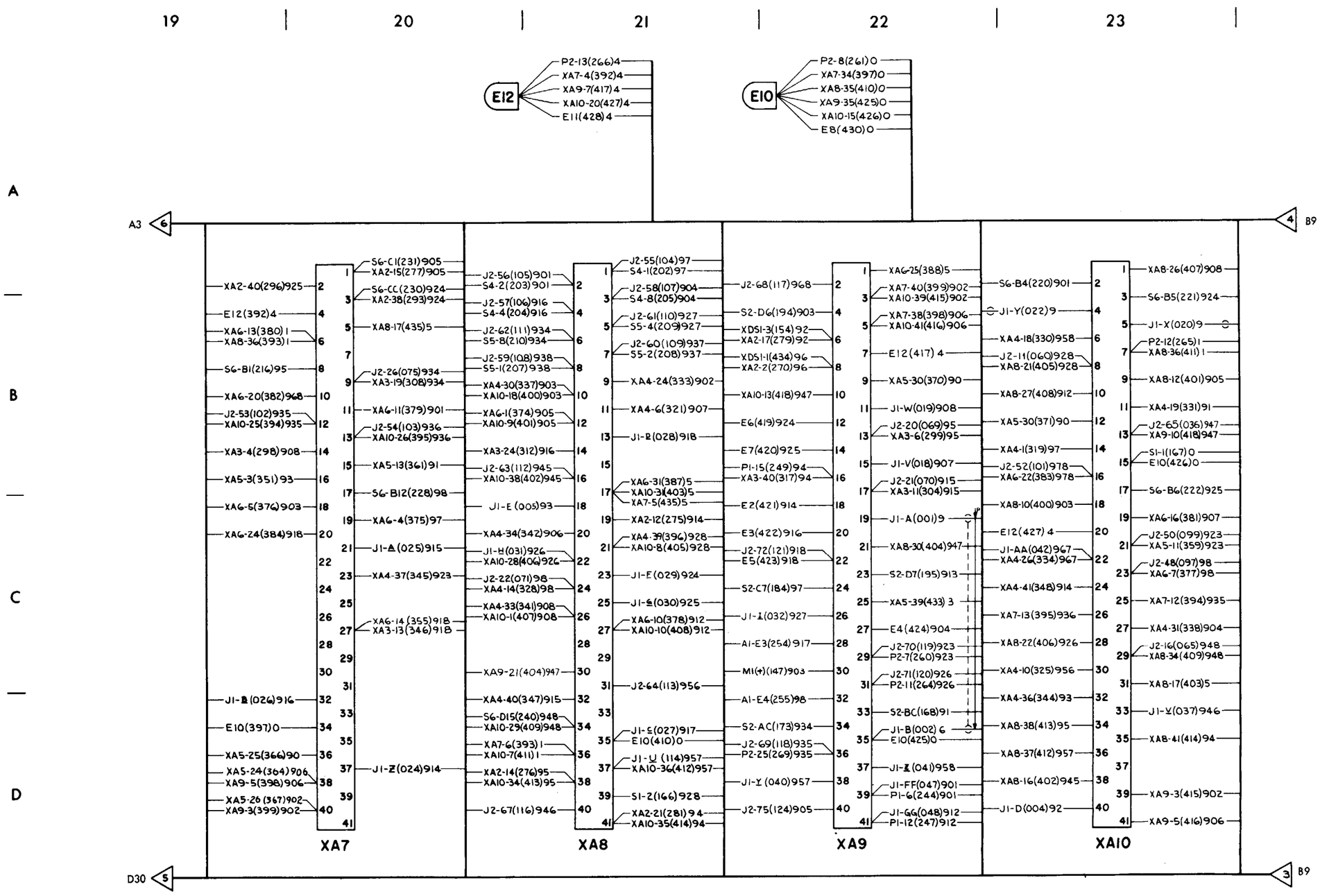


Figure 7-6. (sheet 3 of 5)



MS 101310A

Figure 7-6. (sheet 4 of 5).

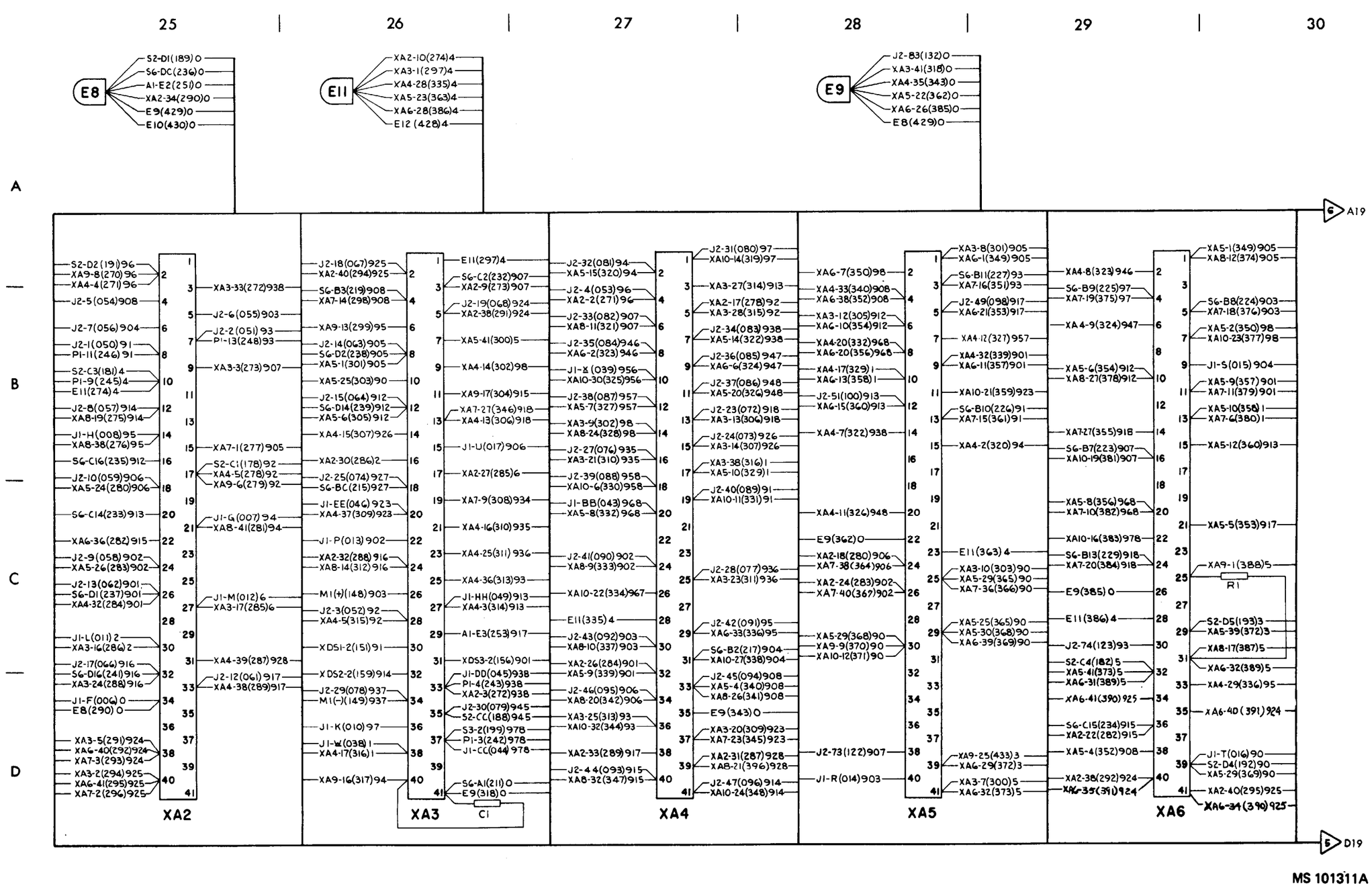


Figure 7-6. (sheet 5 of 5).

Section II. REPAIR PROCEDURES

7-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 7-7 through 7-10 illustrate the disassembly and assembly of the UUT and special tools required. Paragraphs 7-6 through 7-27 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-480-24P contains a list of repair parts and special tools authorized for maintenance personnel.

CAUTION

While work is being done with panel (2, fig. 7-7) in an open position, use masking tape (item 41, App. D) to hold gasket (41) to panel.

7-6. CB1 and CB2 Removal and Installation Procedure

a. Removal.

WARNING

CB1-2 and CB1-4 are connected to 20 VDC. Use care not to ground any tools when disconnecting the leads from CB1. Insulate the leads with tape (item 40, App. D) after they are disconnected.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Using a knife, cut the insulation sleeving from the terminals of CB1 (3, fig. 7-7) or CB2 (4).

(3) Disconnect and tag the leads to CB1 or CB2.

(4) Remove nut (31 or 32) and CB1 or CB2.

b. Installation.

WARNING

The leads to CB1-2 and CB1-4 are connected to 20 VDC. Use care not to ground any tools when connecting the leads to CB1.

(1) Install CB1 (3, fig. 7-7) or CB2 (4) with nut (31 or 32).

(2) Install insulation sleeving (item 36, App. D) on the leads disconnected from CB1 or CB2.

(3) Connect the leads to CB1 or CB2. Slide the sleeving over each of the terminals, and heat-shrink, using heat gun.

(4) Lower retainer (1, fig. 7-8) over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

7-7. FL1 Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Remove mounting hardware (5, 56, and 57, fig. 7-7) and retainer (6). NOTE

Use care when FL1 (7) is pulled away from the shield, so no strain is exerted on the remaining leads to FL1.

(3) Remove mounting hardware (8, 9, and 58) and pull FL1 away from shield (55), so access can be made to the leads.

(4) Using a knife, cut the insulation sleeving from terminals of FL1.

(5) Disconnect and tag the leads to FL1.

b. Installation.

(1) Install insulation sleeving (item 35, App. D) over each of the leads disconnected from FL1 (7, fig. 7-7). Connect the leads to FL1. Slide the sleeving over each of the terminals, and heat-shrink, using heat gun.

(2) Install FL1 with mounting hardware (8, 9, and 58).

(3) Apply locking compound (item 11, App. D) to the threads of screws (5).

(4) Install retainer (6) with mounting hardware (5, 56, and 57).

(5) Lower retainer (1, fig. 7-8) over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

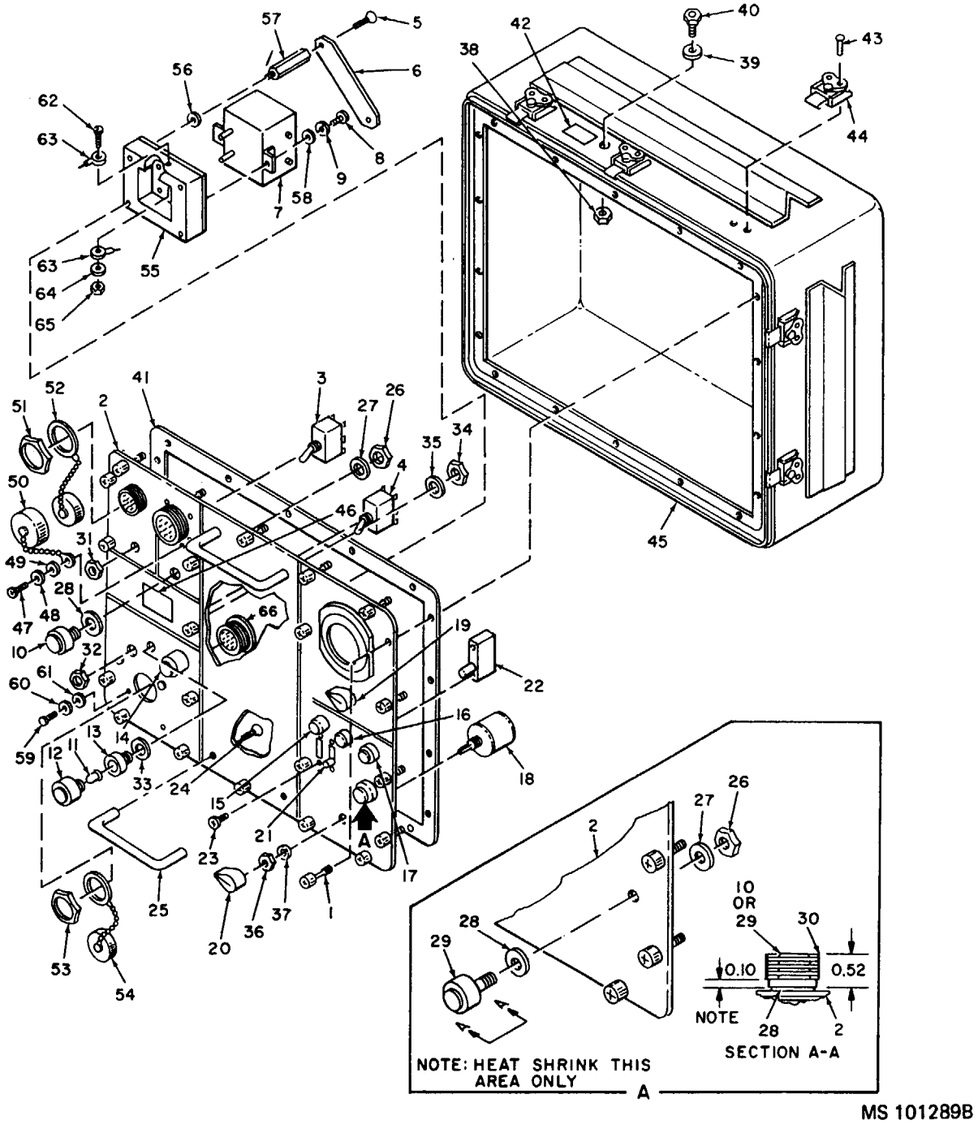
7-8. S1 and S3 Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

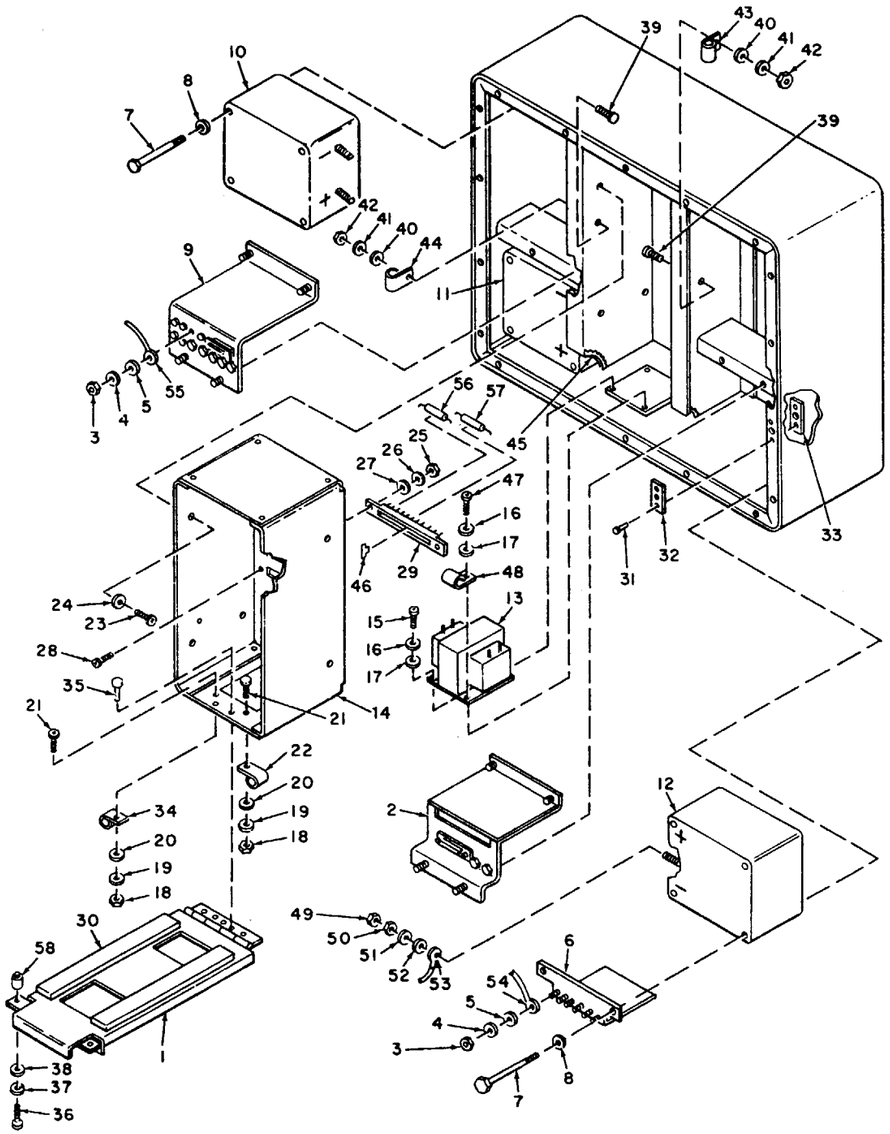
(2) Using a knife, cut the insulation sleeving from the terminals of S1 (10, fig. 7-7) or S3 (29).

(3) Disconnect and tag the leads to S1 or S3.



1 – Captive screw
2 – Monitor unit panel
3 – CB1
4 – CB2
5 – Screw
6 – Retainer
7 – FL1
8 – Screw
9 – Washer
10 – S1
11 – DS1 through DS5
12 – Front cap
13 – XDS5
14 – XDS4
15 – XDS3
16 – XDS2
17 – XDS1
18 – S6
19 – S2
20 – Knob
21 – S4
22 – S5
23 – Screw
24 – Screw
25 – Handle
26 – Nut
27 – Washer
28 – Gasket
29 – S3
30 – Sleeving
31 – Nut
32 – Nut
33 – Gasket
34 – Nut
35 – Washer
36 – Nut
37 – Washer
38 – Nut
39 – Gasket
40 – Valve
41 – Gasket
42 – Decal
43 – Rivet
44 – Latch
45 – Lower case
46 – Identification plate
47 – Screw
48 – Washer
49 – Washer
50 – Cap
51 – Nut
52 – Cover
53 – Nut
54 – Cover
55 – Shield
56 – Washer
57 – Post
58 – Washer
59 – Screw
60 – Washer
61 – Washer
62 – Screw
63 – Terminal
64 – Washer
65 – Nut
66 – J3

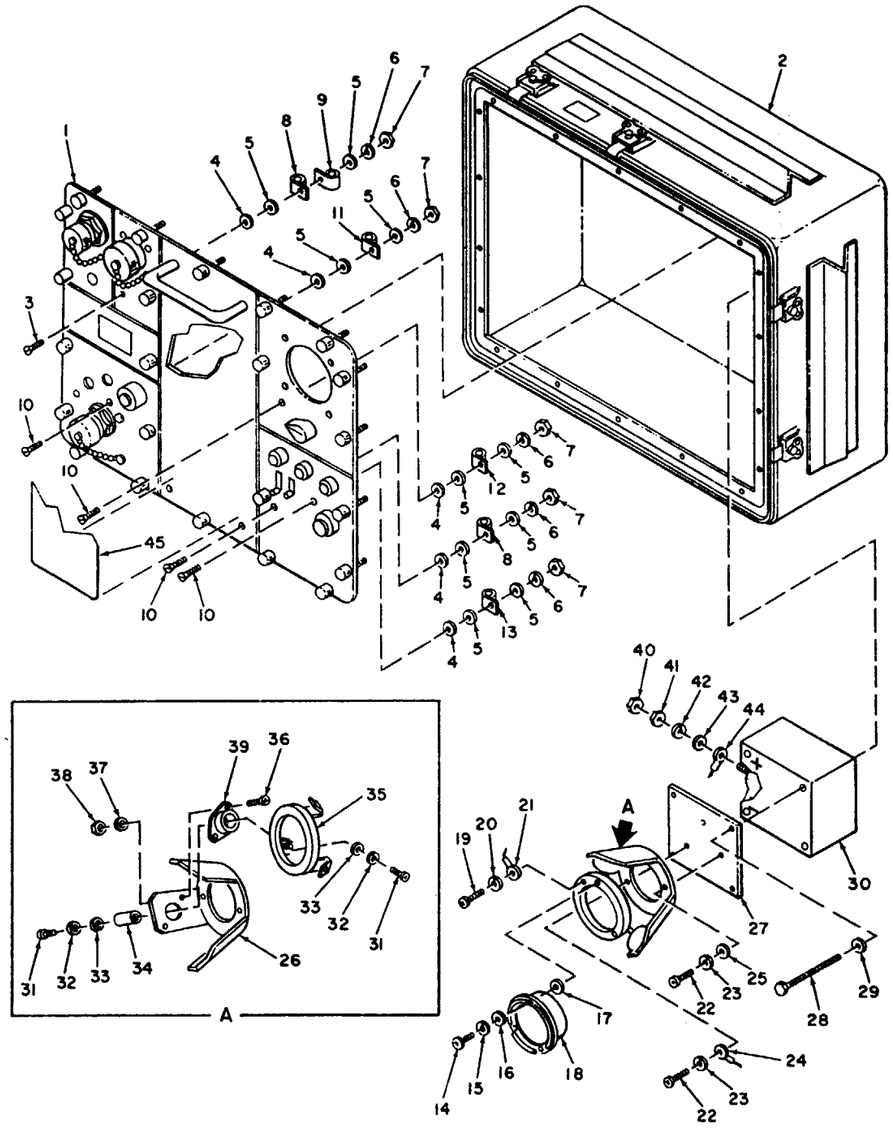
Figure 7-7. Repair of monitor unit, view 1.



MS 101290

1 – Retainer
2 – A11
3 – Nut
4 – Washer
5 – Washer
6 – Thermistor assembly
7 – Bolt
8 – Washer
9 – A1
10 – BT1
11 – BT2
12 – BT3
13 – T1
14 – Circuit card assembly rack
15 – Screw
16 – Washer
17 – Washer
18 – Nut
19 – Washer
20 – Washer
21 – Screw
22 – Cable clamp
23 – Screw
24 – Washer
25 – Nut
26 – Washer
27 – Washer
28 – Screw
29 – XA2-XA10 (Depot only)
30 – Rubber pad
31 – Rivet
32 – Plate
33 – Nut plate
34 – Clamp
35 – Rivet
36 – Screw
37 – Washer
38 – Washer
39 – Screw
40 – Washer
41 – Washer
42 – Nut
43 – Clamp
44 – Clamp
45 – Grommet
46 – Key
47 – Screw
48 – Clamp
49 – Nut
50 – Nut
51 – Washer
52 – Washer
53 – Terminal
54 – Terminal
55 – Terminal
56 – R1
57 – C1
58 – Spacer

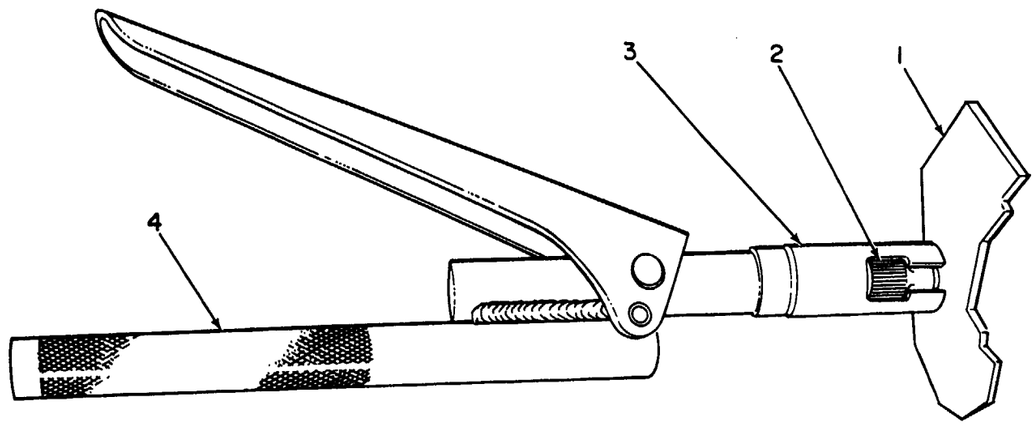
Figure 7-8. Repair of monitor unit, view 2.



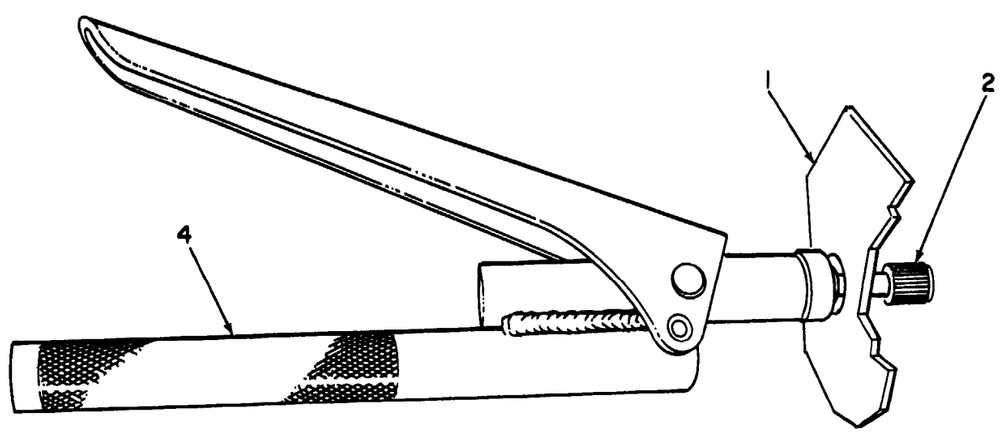
MS 101498B

1 – Monitor unit panel
2 – Lower case
3 – Screw
4 – Sealing washer
5 – Washer
6 – Washer
7 – Nut
8 – Clamp
9 – Clamp
10 – Screw
11 – Clamp
12 – Clamp
13 – Clamp
14 – Screw
15 – Washer
16 – Washer
17 – Packing
18 – M1
19 – Screw
20 – Washer
21 – Terminal
22 – Screw
23 – Washer
24 – Terminal
25 – Washer
26 – Meter mount
27 – Plate
28 – Bolt
29 – Washer
30 – BT4
31 – Screw
32 – Washer
33 – Washer
34 – Post
35 – Ring
36 – Screw
37 – Washer
38 – Nut
39 – Mount
40 – Nut
41 – Nut
42 – Washer
43 – Washer
44 – Terminal
45 – Instruction plate

Figure 7-9. Repair of monitor unit, view 3.



A-REMOVAL



B-INSTALLATION

MS 101499

1 – Monitor unit panel
2 – Captive screw
3 – Removal tool TA-426
4 – Installation tool TA-425

Figure 7-10. Captive screw removal and installation tool in use.

(4) Remove mounting hardware (26 and 27), S1 or S3, and gasket (28).

b. Installation.

(1) Install gasket (28, fig. 7-7) on S1 (10) or S3 (29).

(2) Install S1 or S3 with mounting hardware (26 and 27).

(3) Install insulation sleeving (item 36, App. D) over each of the leads disconnected from S1 or S3.

(4) Connect the leads to S1 or S3. Slide the sleeving over each of the terminals, and heat-shrink, using heat gun.

(5) Lower retainer (1, fig. 7-8) over A2 through A10 and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

(6) Install insulation sleeving (30) (item 25, App. D) over S1 or S3. Heat-shrink only in the area shown (fig. 7-7) with resoldering and soldering kit.

7-9. DS1 through DS5 and XDS1 through XDS5 Removal and Installation Procedure

a. Removal.

NOTE

If only DS1 through DS5 (11, fig. 7-7) are to be replaced, perform step (1), and proceed to step *b* (5).

(1) Unthread front cap (12), and remove DS1 through DS5.

(2) Loosen captive screws (1) and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(3) Using a knife, cut the insulation sleeving from the terminals of XDS1 (17, fig. 7-7) XDS2 (16), XDS3 (15), XDS4 (14), or XDS5 (13). Disconnect and tag the leads.

(4) Remove mounting hardware (34 and 35), XDS1, XDS2, XDS4, or XDS5, and gasket (33).

b. Installation.

(1) Install gasket (33, fig. 7-7) on XDS1 (17), XDS2 (16), XDS3 (15), XDS4 (14), or XDS5 (13).

(2) Install XDS1 through XDS5 with mounting hardware (34 and 35).

(3) Install insulation sleeving (item 36, App. D) over each of the leads disconnected from XDS1 through XDS5. Connect the leads to XDS1, XDS2, XDS3, XDS4, or XDS5. Slide the sleeving over each of the terminals, and heat-shrink, using heat gun.

(4) Lower retainer (1, fig. 7-8) over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

(5) Install DS1 through DS5 (11) in front cap (12), and install the cap.

7-10. S2 and S6 Removal and Installation Procedure

a. Removal.

WARNING

The following pins on S2 are connected to 10 VDC.

S2A-7 and S2B-7
S2A-8 and S2B-8
S2A-9 and S2B-9
S2A-10 and S2B-10

Use care not to ground any tools when disconnecting the leads from S2. Insulate the leads with tape after they are disconnected.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Using a knife, cut the insulation sleeving from the terminals of S2 (19, fig. 7-7) or S6 (18).

(3) Disconnect and tag the leads to S2 or S6.

(4) Loosen the two set screws and remove knob (20).

(5) Remove mounting hardware (36 and 37) and S2 or S6.

b. Installation.

WARNING

The leads to the following S2 terminals are connected to 10 VDC.

S2A-7 and S2B-7
S2A-8 and S2B-8
S2A-9 and S2B-9
S2A-10 and S2B-10

Use care not to ground any tools when connecting the leads to S2.

NOTE

If a new switch is installed, discard the keyway washer and one nut supplied with the switch.

(1) Install S2 (19, fig. 7-7) or S6 (18) with mounting hardware (36 and 37).

(2) Install knob (20) and tighten the two set screws in the knob.

(3) Install insulation sleeving (item 36, App. D) over each of the leads of S2 or S6. Connect the leads to S2 or S6. Slide the sleeving over each of the terminals, and heat-shrink, using heat gun.

(4) Lower retainer (1, fig. 7-8) over A2 and A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (l).

7-11. S4 and S5 Removal and Installation Procedure

a. Removal

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point, When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear panel.

(2) Disconnect and tag the leads to S4 (21, fig. 7-7) or S5 (22).

(3) Remove screw (23) and S4 or S5.

b. Installation.

(1) Apply locking compound (item 11, App. D) to the threada of screws (23, fig. 7-7).

(2) Install S4 (21), or S5 (22) with the screws.

(3) Connect the leads to S4 or S5, that were disconnected in step a (2), above.

(4) Lower retainer (1, fig. 7-8) over A2 through Al0, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (l).

7-12. Captive Screw Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Thread TA-426 (3, fig. 7-10) on TA-425 (4).

(3) Position TA-426 over captive screw (2), and squeeze TA-425 handle until the captive screw ia removed from monitor unit panel (l).

b. Installation.

(1) Unthread TA-426 (3, fig. 7-10) from TA-425 (4).

(2) Position a new captive screw (2) in monitor unit panel (l).

(3) Holding the TA-425 behind the monitor unit panel, thread the captive screw into TA-425.

(4) Squeeze TA-425 handle until the captive screw is mounted in the monitor unit panel.,

(5) Unthread TA-425 from the captive screw.

(6) Lower retainer (1, fig. 7-8) over A2 through Al0, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (l).

7-13. Handle Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Remove screws (24, fig. 7-7) and handle (25),

b. Installation.

(1) Apply locking compound (item 11, App, D) to the threads of screws (24, fig. 7-7). Install handle (25) with the screws.

(2) Lower retainer (1, fig. 7-8) over A2 through AlO, and close monitor unit panel (2, fig. 7-7). Tighten captive screw (l).

7-14. Instruction Plate Removal and Installation Procedure (Fig. 7-9)

a. Removal. Remove instruction plate (45) from monitor unit panel (l), and clean the mounting area with MEK (item 17, App. D).

b. Installation. Install instruction plate (45) on monitor unit panel (1) wit h adhesive (item 4, App. D)

7-15. M1 and Meter Mount Components Removal and Installation Procedure

a. Removal.

(1) Loosen captive screw (1, fig. 7-7) and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

CAUTION

Use care when Ml (18, fig. 7-9) is removed from meter mount (26), so no damage is done to the attached leads.

(2) Remove mounting hardware (14 through 17) and Ml.

(3) Remove the mounting hardware and the leads from Ml.

(4) Remove mounting hardware (19, 20, 22, and 23) and terminals (21 and 24).

(5) Remove mounting hardware (22, 23, and 25) and meter mount.

(6) Remove mounting hardware (31 through 34) and ring (35).

(7) Remove mounting hardware (36, 37 and 38) and mount (39).

b. Installation.

(1) Install mount (39, fig. 7-9) with mounting hard. ware (36, 37, and 38).

(2) Install ring (35) with mounting hardware (31 through 34).

(3) Install meter mount (26) with mounting hardware (22, 23, and 25).

(4) Install terminals (21 and 24) with mounting hard. ware (19, 20,22, and 23),

(5) Connect the leads to Ml (18) with mounting hardware supplied with M1. Remove and discard the remaining panel mounting hardware supplied with Ml.

(6) Install mounting hardware (14, 15, and 16) on M1 and retain with packing (17).

(7) Install Ml and tighten the mounting hardware.

(8) Lower retainer (1, fig. 7-8) over A2 through Al0, and close monitor panel (2, fig. 7-7). Tighten captive screws (l).

7-16. BT1 through BT3 Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

CAUTION

Insulate the battery terminal and leads with insulating tape (item 40, App. D) before battery removal. Use care when removing the battery from the case, so no strain is put on the leads to the battery.

CAUTION

If BT3 is to be removed, use care in the placement of thermistor assembly (6) when removing BT3.

(2) Set S2 MONITOR SELECT to IR OUTPUT, disconnect P2 of Al1 (2), remove mounting hardware (7 and 8), and remove BT1 (10), BT2(11), or BT3 (12).

(3) Remove insulation tape and mounting hardware (49 through 52), Tag, remove, and insulate the leads of the removed battery.

b. Installation.

(1) Connect the leads to BT1 (10, fig. 7-8), BT2(11), or BT3 (12) with mounting hardware (49 through 52).

CAUTION

Insulate battery terminals and leads with insulating tape (item 40, App. D) before installing battery. Use care when placing the battery in the case, so no strain is put on the leads to the battery.

If BT3 is being installed, be sure thermistor assembly (6) is installed before installing the mounting hardware.

(2) Set S2 MONITOR SELECT to IR OUTPUT, and install BT1, BT2, or BT3 (and thermistor assembly) with mounting hardware (7 and 8) and insulating tape. Connect P2 to Al1 (2).

(3) Lower retainer (1) over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

7-17. BT4 Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Remove Ml (18, fig. 7-9) and meter mount (26) (par. 7-1 5a).

CAUTION

Insulate BT4 terminals and leads with insulating tape (item 40, App. D) before BT4 removal. Use care when removing BT4 from the ease, so no strain is put on the leads to BT4.

(3) Set S2 MONITOR SELECT to IR OUTPUT, disconnect P2 of Al1 (2, fig. 7-8), and remove mounting hardware (28 and 29, fig. 7-9), mounting plate (27), and BT4 (30).

(4) Remove insulating tape (item 40, App. D) and mounting hardware (40 through 44). Tag, remove, and insulate the leads to BT4.

b. Installation.

(1) Remove the insulating tape, and connect the leads to BT4 (30, fig. 7-9) with mounting hardware (40 through 44).

CAUTION

Insulate BT4 terminals and leads with insulating tape (item 40, App. D) before BT4 installation, Use care when placing BT4 in the case so no strain is put on the leads to BT4.

(2) Set S2 MONITOR SELECT to IR OUTPUT, install BT4 and mounting plate (27) with mounting hardware (28 and 29), and remove insulating tape. Connect P2 to A11 (2, fig. 7-8.).

(3) Install M1 (18, fig. 7-9), and meter mount (26) (par. 7-15b).

7-18. Circuit Card Assembly Rack Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Using extraction tool (1, fig. 7-3), remove A2 through A 10.

CAUTION

When removing the circuit card assembly rack (14) from the case, be sure no strain is put on the leads to XA2 through XA10.

(3) Remove mounting hardware (23 and 24), and lift the circuit card assembly rack out of the case.

(4) Remove mounting hardware (18 through 21, fig. 7-8) and cable clamps (22 and 34).

(5) Remove mounting hardware (25 through 28), and XA2 through XA10 (29).

b. Installation.

(1) Apply locking compound (item 11, App. D) to the threads of screws (21, 23, and 28, fig. 7-8).

(2) Install XA2 through XA10 (29), with mounting hardware (25 through 28).

(3) Install cable clamps (22 and 34) with mounting hardware (18 through 21).

(4) Install circuit card assembly rack with mounting hardware (23 and 24).

(5) Install A2 through A10.

(6) Lower retainer (1) over A2 through A 10, and close monitor unit panel (2, fig. 7-7). Tightcn captive screws (1).

7-19. T1 Removal and Installation Procedure

a. Removal.

(1) Remove circuit card assembly rack (par. 7-18a (1) through (4)).

(2) Remove mounting hardware (15, 16, 17, and 47, fig. 7-8) and clamp (48). Remove T1 (13) from the case.

(3) Disconnect and tag the leads to T1,

b. Installation.

(1) Connect the leads to T1 (13, fig. 7-8) that were removed in step a (3) above.

(2) Apply locking compound (item 11, App. D) to the threads of screws (15 and 47).

(3) Install T1 and clamp (48) with mounting hardware (15, 16,17, and 47).

(4) Install the circuit card assembly rack (par. 7-18b (2) through (6)).

7-20. Retainer Rubber Pad Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7), and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place a support on both sides of the panel.

(2) Using a knife, remove rubber pad (30, fig. 7-8) and any residual adhesive from retainer (l).

b. Installation.

(1) Clean the rubber pad mounting area with MEK (item 17, App. D).

(2) Fabricate new rubber pad (30, fig. 7-8) from rubber sheet (item 27, App. D). Bond rubber pad to retainer (1) using adhesive (item 5, App. D).

(3) Lower the retainer over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (l).

7-21. Grommet Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7) and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retanincr (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Using a knife, remove grommet (45) and any residual adhesive from the case.

(3), Clean the grommet-mounting area with MEK (item 17, App. D).

b. Installation.

(1) Install grommet (45, fig. 7-8) with adhesive (item 4, App. D).

(2) Lower retainer (1) over A2 through A10 and close monitor panel (2, fig. 7-7). Tighten captive screws (1).

7-22. Decal Removal and Installation Procedure (Fig. 7-7)

a. Removal. Using a knife, remove decal (42) and any residual adhesive.

b. Installation.

(1) Clean the decal-mounting area with MEK (item 17, App. D).

(2) Install decal (42) with adhesive (item 4, App. D).

7-23. Identification Plate Removal and Installation Procedure (Fig. 7-7)

a. Removal.

(1) Using a knife, remove identification plate (46) and any residual adhesive.

(2) Clean the identification-plate mounting area with MEK (item 17, App. D).

b. Installation.

(1) Mark new identification plate (46) with the same information that appeared on the old plate.

(2) Install the identification plate with adhesive (item 4, App. D).

7-24. J3 Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7) and open monitor unit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

NOTE

Use care when shield (55, fig. 7-7) is removed from the panel, so no strain is put on the leads to J3 (66).

(2) Remove mounting hardware (59, 60, and 61) and pull the shield away from the panel, just far enough, to gain access to the leads of J3.

(3) Using a knife, cut the insulation sleeving from the terminals of J3.

(4) Disconnect and tag the leads to J3.

(5) Remove nut (53), cover (54), and J3.

b. Installation.

(1) Install J3 (66, fig. 7-7), cover (54), with nut (53), and torque to 75 to 80 inch-pounds.

(2) Apply locking compound (item 11, App. D) to the threads of screw (59).

(3) Install shield (55) with mounting hardware (59, 60, and 61).

(4) Lower retainer (1, fig. 7-8) over A2 through A10, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

(5) Lower retainer (1, fig. 7-8) over A2 through A10 and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

7-25. R1 and C1 Removal and Installation Procedure

a. Removal.

(1) Remove the circuit card assembly rack (par. 7-18a (1) through (4)).

(2) Disconnect R1 (56, fig. 7-8) from XA6 (29) or C1 (57) from XA3.

b. Installation.

(1) Connect a new R1 (56, fig. 7-8) between XA6-25 and XA6-31 (29) or Cl (57) bet wcen XA3-40 and XA3-41.

(2) Install the circuit card assembly rack (par. 7-18b (2) through (6)).

7-26. Cover Removal and Installation Procedure (Fig. 7-7)

a. Removal. Remove nut (51) and cover (52),

b. Installation. Install cover (52) with nut (51), and torque to 75 to 80 inch-pounds.

7-27. Cable Clamp Removal and Installation Procedure

a. Removal.

(1) Loosen captive screws (1, fig. 7-7) and open monitor circuit panel (2) from the top, using the bottom of the panel as a pivot point. When the panel is approximately at 90°, place retainer (1, fig. 7-8) into the bracket on the rear of the panel.

(2) Remove mounting hardware (3 through 7, and 10, fig. 7-9) and cable clamps (8, 9, 11,12, and 13).

b. Installation.

(1) Apply a mixture of adhesive (item 1, App. D) and catalyst (item 8, App. D) under the head of screws (3 and 10, fig. 7-9).

(2) Install cable clamps (8, 9, 11, 12, and 13) with mounting hardware (3 through 7, and 10). Wipe off any excess adhesive.

(3) Lower retainer (1, fig. 7-8) over A2 through AlO, and close monitor unit panel (2, fig. 7-7). Tighten captive screws (1).

7-28. Painting

Touch up the exterior of the UUT as follows:

a. Apply primer (item 24, App. D) and allow to dry. dry.

b. Apply polyurethane coating (item 9, App. D) 2 hours after primer is applied.

7-29. Packaging

a. When the UUT is shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Insure that adequate cushioning material an d bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

CHAPTER 8

OPTICAL ALINEMENT FIXTURE (1A2)

Section I. PROGRAMMED TESTS

8-1. General

This chapter provides the information necessary to isolate and repair a fault in the optical alinement fixture (UUT) to a faulty subassembly or chassis installed component. Figures 8-2 through 8-4 are provided as aids in trouble-shooting the UUT.

8-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT.

a. Program memory card	See TM 9-1425-550-10
b. Patchboard	PB-401
c. Multimeter	
d Lead	TA-205
e. Cable (needle probe)	TA-208 (2)
f. Lead	TA-216
g. Fixture	TA-405
h. Cable	CA-403
i. Cable	CA-KM

8-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care when performing the manual procedures.

a. The UUT is on-bench tested.

b. When the program or REF TM requires an adjustment to R6, refer to figure 8-2 for the adjustment location. Remove cover (4, fig. 8-6) for access to R6. At programmed test completion, or when the UUT is to be shipped to depot for further testing or repair, install the cover.

c. Perform the following mechanical inspection pro-; cedures before running the programmed tests.

Step	Procedure
1	Inspect the collimator locking control thumbscrews (27, fig. 8-5) in mount (30) for the following *a.* Cross-threads. *b.* Burred or darnaged collimator installation points. If both thumbscrews check good, proceed to step 2. If any of the conditions listed above exist, replace the thumbscrews bar. 8-16).
2	Inspect mount (30, fig. 8-5) for the following: *a.* Damaged insert threads for the collimator locking control thumbscrews. If damaged, replace collimator mount. *b.* Loose mount-to-shouldered shaft installation hardware. If loose, tighten as required. *c.* Rotate the mount and check the bearings for looseness or binding. If any binding or looseness exists, replace the bearing shaft.
3	Rotate the ELEVATION UP control from the fully down position until the support is fully extended and check for binding or looseness. If any binding or looseness exists, replace the azimuth-elevation control (par. 8-17).
4	Rotate the AZIMUTH RIGHT control from the fully left to the fully right position and check for binding or looseness. If any binding or looseness exists, replace the azimuth- elevation control (par. 8-17).

8-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 5340000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUBMODE switch to NORMAL

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

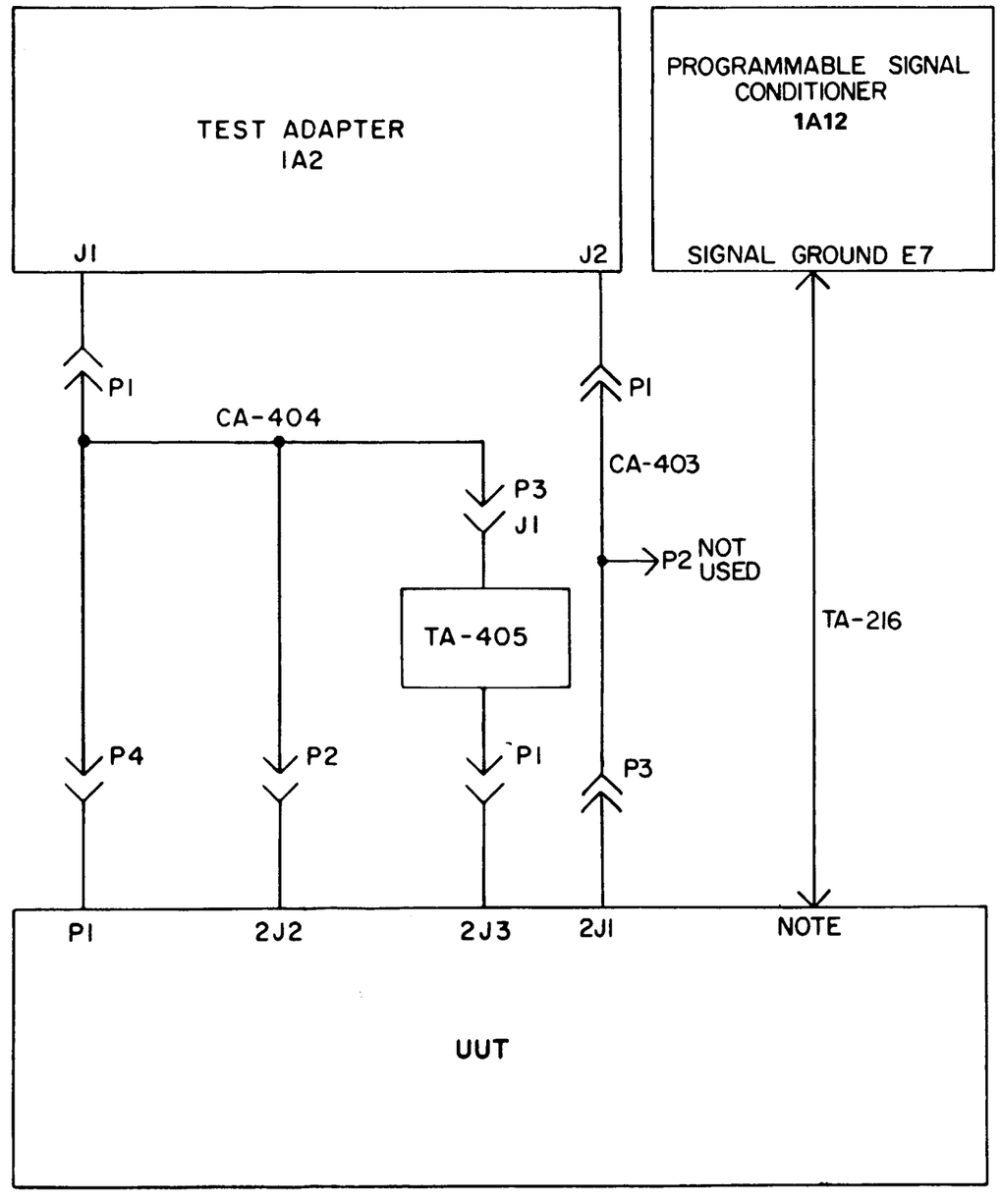


Figure 8-1. Cable hookup diagram.

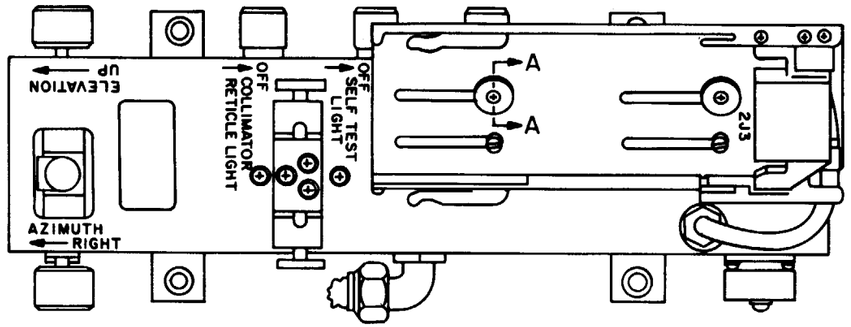
Table 8-1. Optical Alinement Fixture, Programmed Tests.

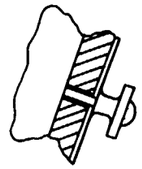
Print message ref no.	Action or instruction
REF TM 1 through REF TM 4	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 5	*a.* Install the patchboard. *b.* Press the PROCEED switch.
REF TM 6	*a.* Install TA-405 in 2J3 on the UUT. *b.* Perform the cable hookup (fig. 8-1). *c.* Position the U UT controls as follows: (1) Position the SELF TEST LIGHT control fully CCW, but not off. (2) Position the TRACKER RETICLE LIGHT control fully CCW, but not off. (3) Position the COLLIMATOR RETICLE LIGHT control fully CCW, but not off. *d.* Press the PROCEED switch.
REF TM 7	Deleted
REF TM 8	AN/TSM-93 resistance measurements indicate that an open line exists in the UUT. Return the UUT to the depot (par. 8-19).
REF TM 9	Deleted
REF TM 10	Deleted
REFTM 11	For SSVD displayed codes A through Z, return the UUT to the depot (par. 8-19).
REF TM 12	*a.* Remove Al (par. 8-6a). *b.* Test for a line short to ground between the following points in the UUT. Use standard troubleshooting procedures to isolate the fault. (1) J1-G to TB2-10 (2) P1-G to TB2-10 (3) J4-17 to TB2-10 If a fault is found, reinstall A1 (par. 8-6b), and return the UUT to the depot (par. 8-19). If no fault is found, replace A1 (par. 8-6).
REF TM 13	*a.* Remove A1 (par. 8-6a). *b.* Test for a Iine short to ground between the following points in the UUT. Use standard troubleshooting procedures to isolate the fault. (1) J1-H to J4-16 (2) P1-ll to J4-23 If a fault is found, reinstall Al (par. 8-6b), and return the UUT to the depot (par. 8-19). If no fault is found, replace A1 (par. 8-6).
REF TM 14	*a.* Remove A1 (par. 8-6a). *b.* Measure the resistance between J2-B and chassis ground with the multimeter. (1) If the meter reading is less than 100 ohms, replace FL2 (par. 8-10), and reinstall A1 (par. 8-6b). (2) If the meter reading is greater than 100 ohms, replace A1 (par. 8-6).
REF TM 15	*a.* Remove A1 (par. 8-6a). *b.* Measure the resistance between J2-C and chassis ground with the multimeter. (1) If the meter reading is less than 100 ohms, replace FL1 (par. 8-10), and reinstall A1 (par. 8-6b). (2) If the meter rending is greater than 100 ohms, replace A1 (par. 8-6).
REF TM 16	Replace A1 (par. 8-6).
REF TM 17	Replace R1 (par. 8-8).
REF TM 18	Replace R2 (par. 8-8).
REF TM 19	*a.* Remove the cover from the U UT. *b.* Measure the resistance between J2-C the the exposed and of FL1 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace FL1 (par. 8-10). (2) If the meter reading is less than 10 ohms, proceed to step c.

Table 8-1. Optical Alinement Fixture, Programmed Tests – Continued

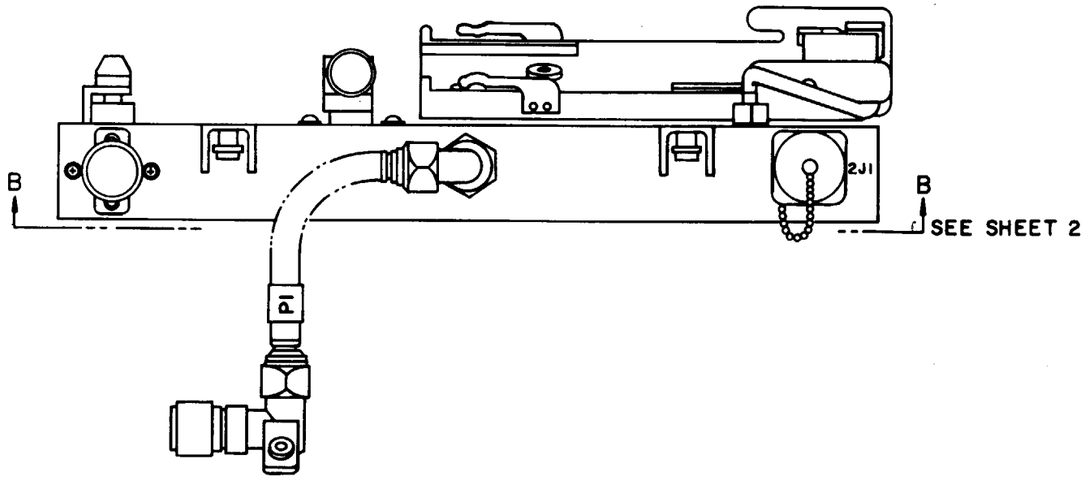
Print message ref no.	Action or instructions
REF TM 19 Continued	*c.* Measure the resistance between J2-B and the exposed end of FL2 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace FL2 (par. 8-10). (2) If the meter reading is less than 10 ohms, replace R3 (par. 8-8).
REF TM 20	*a.* Remove the cover from the UUT. Position the TRACKER RETICLE LIGHT control the COLLIMATOR RETICLE LIGHT control fully CCW and OFF. *b.* Measure the resistance between R1-B and R1-A with the multimeter. (1) If the meter reading is less than 10 ohms, replace R1 (par. 8-8). (2) If the meter reading is greater than 10 ohms, proceed to step c. *c.* Measure the resistance between R2-B and R2-A with the multimeter. (1) If the meter reading is less than 10 ohms, replace R2 (par. 8-8). (2) If the meter reading is greater than 10 ohms, replace R3 (par. 8-8).
REF TM 21	Replace R3 (par. 8-8).
REF TM 22	*a.* Remove the cover from the UUT. *b.* Press the PROCEED switch.
REF TM 23	Deleted
REF TM 24	An open ground connection exists in the UUT. Examine E1 (51, fig. 8-6) or screw (45) for a good ground. Repair as required.
REF TM 25	*a.* Disconnect CA-404P3 from TA-405J1. *b.* Set TA-109 to RES. Connect a TA-208 between TA-405J1-A and the high side of TA-109. Connect snother TA-208 between TA-405J1-P and the low side of TA-109. *c.* Press the PROCEED switch.
REF TM 26	*a.* Disconnect the TA-208 connected between TA-405J1-A and the high side of TA-109. Disconnect the TA-208 connected between TA-405J1-P and the low aide of TA-109. Remove the probes from TA-405J1. *b.* Connect CA-404P3 to TA-405J1. *c.* Switch S1 on PB-401 to OFF. *d.* Press the PROCEED switch.

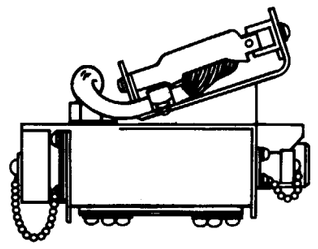
Table 8-2. Deleted.





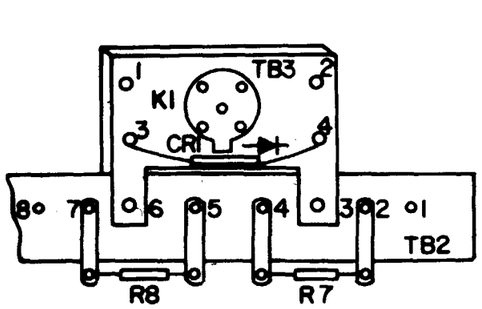
SECTION A-A



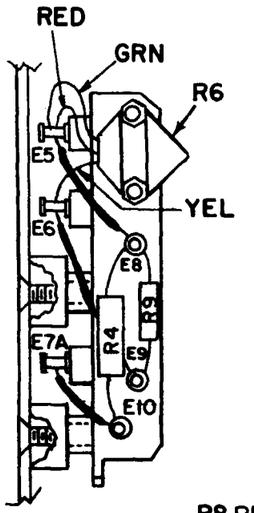


MS101206B

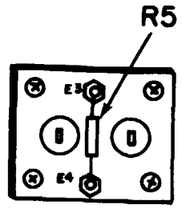
Figure 8-2. Optical alignment, fixture, parts location diagram (sheet 1 of 2).



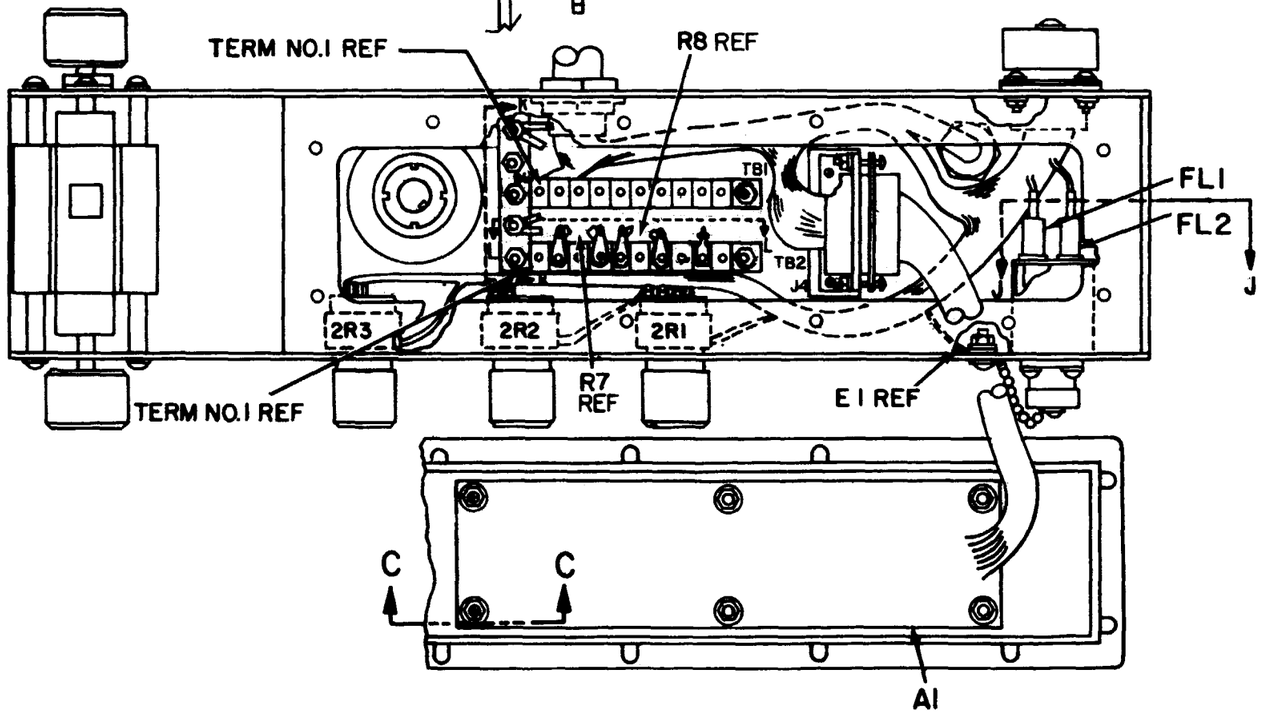
SECTION L-L



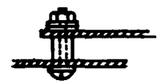
SECTION K-K



SECTION J-J



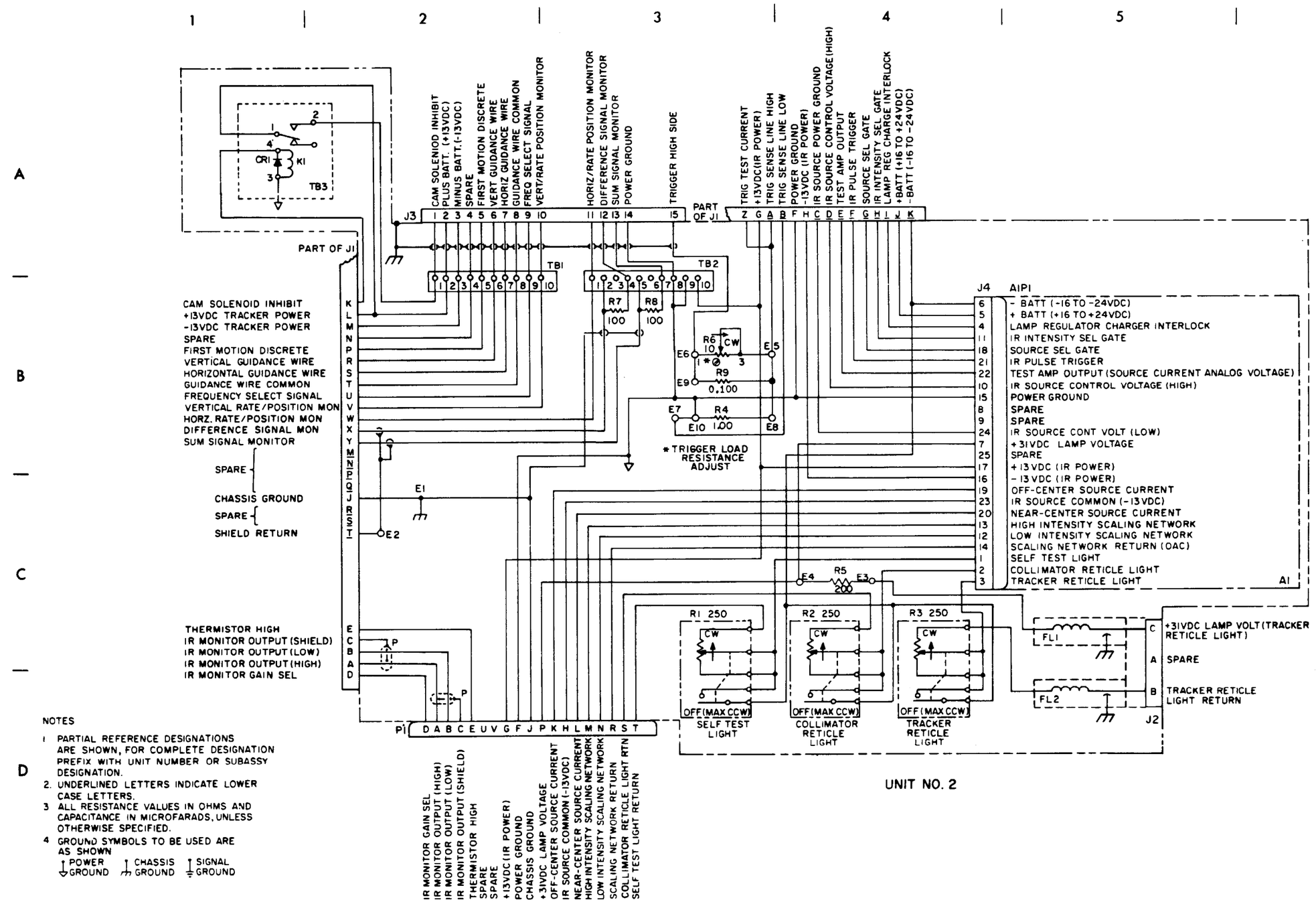
VIEW B-B
WITH COVER OPEN
SEE SHEET 1



SECTION C-C
TYPICAL 2 PLACES

MS 101250E

Figure 8-2. (duet 2 of 2).



NOTES

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR SUBASSY DESIGNATION.
2. UNDERLINED LETTERS INDICATE LOWER CASE LETTERS.
3. ALL RESISTANCE VALUES IN OHMS AND CAPACITANCE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
4. GROUND SYMBOLS TO BE USED ARE AS SHOWN

POWER GROUND | CHASSIS GROUND | SIGNAL GROUND

Figure 8-3. Optical alignment fixture, schematic diagram.

WIRE NO	GA.	COLOR	REMARKS
001	22	WHT	DOUBLE TWISTED SINGLE SHIELDED
002	22	WHT-ELU	
003	22	WHT-BRN	
004	22	WHT-RED	
005	22	WHT-GRN	
006	20	BLK	
007	20	WHT-YEL	
008	20	WHT-GRN	
009	20	WHT	
010	22	WHT-VIO	
011	20	RED	
012	20	BLUE	
013	22	WHT-GRY	
014	22	WHT-BLK-RED	
015	22	WHT-BLK-ORN	
016	22	WHT-BLK-YEL	
017	22	WHT-BLK	
018	22	WHT-BLK-BLU	
019	22	WHT-BLK-VIO	
020	22	WHT-BLK-GRY	
021	22	WHT	SHIELDED
022	22	WHT	SHIELDED
023	22	WHT-BRN-YEL	SEE NOTE 7
024	22	WHT-BRN-GRN	SEE NOTE 7
025	22	WHT-BRN-BLU	SEE NOTE 5
026	20	WHT-BRN-VIO	
027	22	WHT-BRN-GRY	
028	22	WHT-RED-ORN	
029	22	WHT-RED-YEL	
030	22	WHT-RED-GRN	
031	22	WHT-RED-BLU	
032	20	WHT-RED-VIO	
033	20	VIO	
034	20	GRY	
035	22	WHT-BLU-GRY	
036	22	WHT-ORN-GRN	
037	26	WHT	
038	26	WHT	
039	26	WHT	
040	26	WHT	
041	26	WHT	
042	26	WHT	
043	26	WHT	
044	26	WHT	
045	26	WHT	
046	26	WHT	
047	26	WHT	
048	26	WHT	
049	26	WHT	
050	26	WHT	
051	26	WHT	
052	20	GRY	
054	22	WHT-ORN-YEL	
055	22	WHT-YEL-GRN	
056	22	WHT-ORN-GRN	
057	20	WHT-YEL	
058	20	WHT-ORN-BLU	
059	20	WHT-ORN-VIO	
060	20	WHT-ORN-GRY	
061	20	WHT-BRN-RED	
062	20	WHT-YEL-BLU	
063	20	WHT-YEL-VIO	
064	22	WHT-YEL-GRY	
065	22	WHT-GRN-BLU	
066	22	WHT-ORN-VIO	
067	22	WHT-BLK-ORN	
068	20	WHT-YEL	
069	20	BLK	
070	20	WHT	
071	22	WHT-ORN-GRN	
072	22	WHT-ORN-GRY	
073	22	WHT-BLU-YEL	
074	20	GRY	
075	20	GRY	
076	22	WHT-YEL-GRY	
077	22	WHT-YEL-GRY	
078	22	WHT-ORN-BLU	
079	22	WHT-GRN-BLU	
080	22	WHT-ORN-VIO	
081	22	WHT-GRN-VIO	
082	22	WHT-BLU-GRY	
084	20	BLK	
086	22	WHT	
087	22	WHT	
088	22	WHT-YEL-BLU	
089	22	WHT-YEL-GRN	
090			
091	22	BARE	SEE NOTE 6
092	22	BARE	SEE NOTE 6
093	22	BARE	SEE NOTE 6
094	20	BLK	SEE NOTE 5
095	22	BLK	
096	22	RED	
097	22	WHT-BLU	

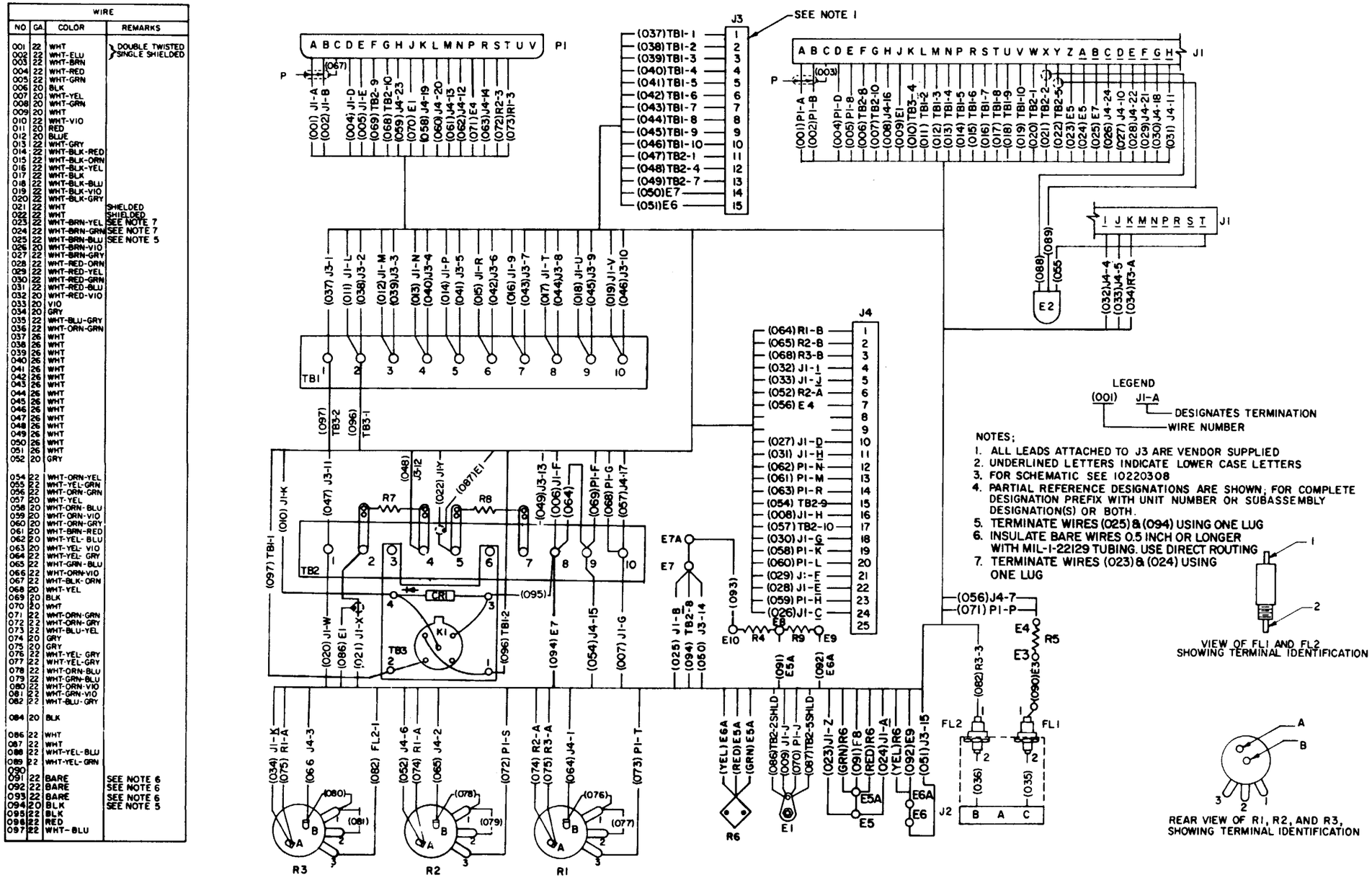


Figure 8-4. Optical alignment fixture, wiring diagram.

Section II. REPAIR PROCEDURES

8-5. General

This section provides repair information for the UUT within the scope of DS and CS maintenance personnel. Figures 8-5 through 8-7 illustrate the disassembly and assembly of the UUT and special tools required. Paragraphs 8-6 through 8-17 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-480-24P contains a list of repair parts and special tools authorized for maintenance personnel.

8-6. A1 Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1 through 5, fig, 8.5) and mount (6).

(2) Remove mounting hardware (1,2, and 3, fig. 8-6) and cover (4).

(3) Remove screws (7, fig. 8-5), This frees J4 mounting bracket (5, fig. 8-6) so the screws on A1P1 (6) are easier to Ioosen

(4) Loosen the captive screws on A1P1 and disconnect A1P1 from J4 (7).

(5) Remove mounting hardware (8, 9, 10, 15, 16, and 17) and A1 (23).

(6) Remove clamp (22) from the wiring harness on A1.

b. Installation.

(1) Install clamp (22, fig. 8-6) on A1 wiring harness in the same location where it was removed in step a (6), above.

(2) Install A1 (23) with mounting hardware (15, 16, 17,8,9, and 10).

(3) Connect A1P1 (6) to J4 (7), and tighten the captive screws on A1P1.

(4) Coat the under side of the heads of screws (7, fig. 8-5) with adhesive (item 5, App. D). Install J4 mounting bracket (5, fig. 8-6) with the screws. Wipe any excess adhesive from the screw heads.

(5) Install cover (4) with mounting hardware (1, 2, and 3).

(6) Coat the threads of screws (1, fig. 8-5) with locking compound (item 11, App. D) and install mount (6) with the screws.

(7) Install thumbnut (3) on screw (2). Coat the exposed threads of the screw with locking compound (item 11, App. D). Install the screws with washers (4 and 5). Tighten the screw against the mount. While holding the thumbnut, back off the screw until a clearance of 0.03 inches exist between the bottom of the screwhead and the top of the thumbnut.

8-7. Gasket Removal and Installation Procedure

a. Removal.

(1) Remove the cover (par. 8-6a (1) through (4)),

(2) Using a knife, remove gasket (24, fig. 8-6) and any residual adhesive from the cover.

b. Installation.

(1) Clean the gasket-mounting area with MEK (item 17, App. D).

(2) Cut a ncw gasket (24, fig. 8-6) from closed synthetic rubber (item 31, App. D),

NOTE

Be sure the screw holes in the gasket are alined with the screw holes in the cover before positioning the gasket on the cover,

(3) Bond the gasket to the cover using adhesive (item 4, App. D).

(4) Install the cover (par. 8-6b (3) through (7)).

8-8. RI through R3 Removal and Installation Procedure (Fig. 8-6)

a. Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

(2) Loosen the two set screws and remove knob (25).

(3) Using a knife, cut the insulation sleeving from the terminals of R1, R2, or R3 (29).

(4) Disconnect and tag the leads to the faulty resistor-switch.

(5) Remove mounting hardware (26, 27, and 28) and the faulty resistor-switch.

b. Installation.

NOTE

Be sure the locating pin on R1, R2, or R3 (29) is positioned in the hole in base (30) before tightening the hardware.

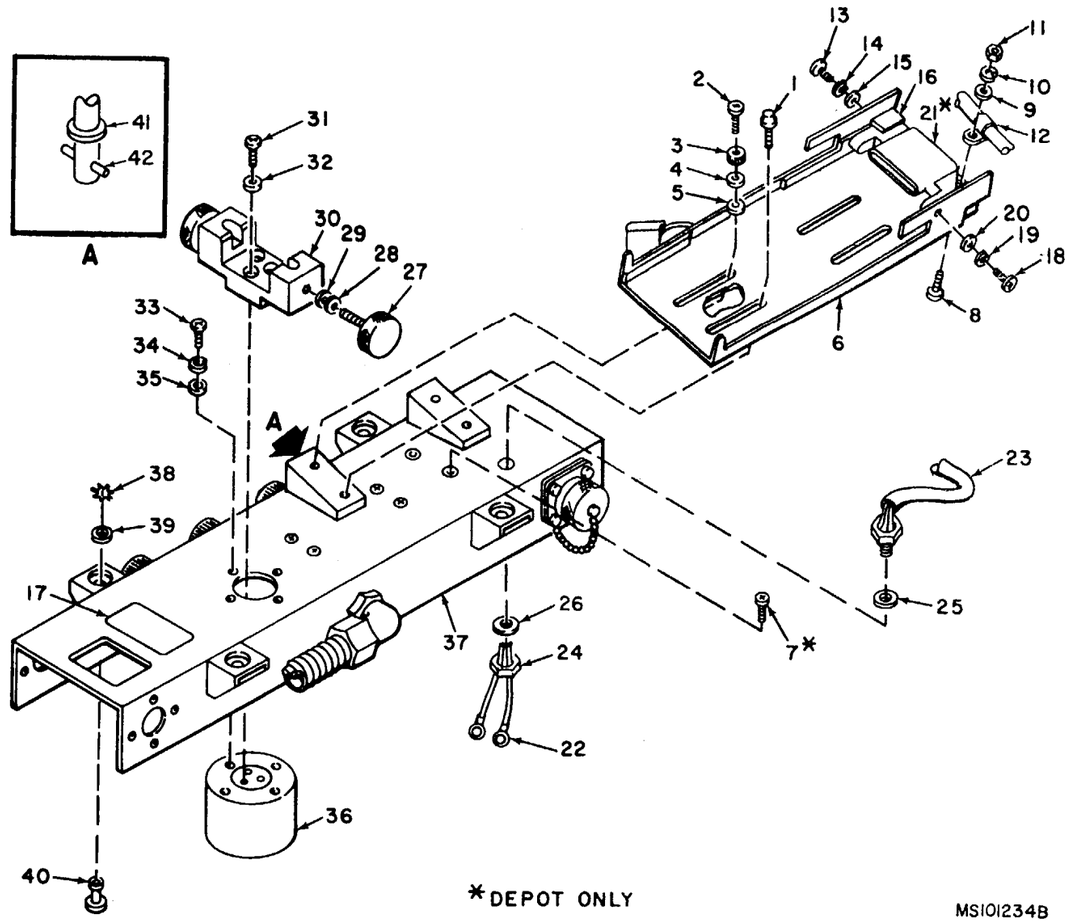
NOTE

Discard the lockwasher supplied with the new resistor-switch.

(1) Apply locking compound (item 11, App. D) to the threads of R1, R2, or R3. Install the resistor-switch with mounting hardware (26, 27, and 28).

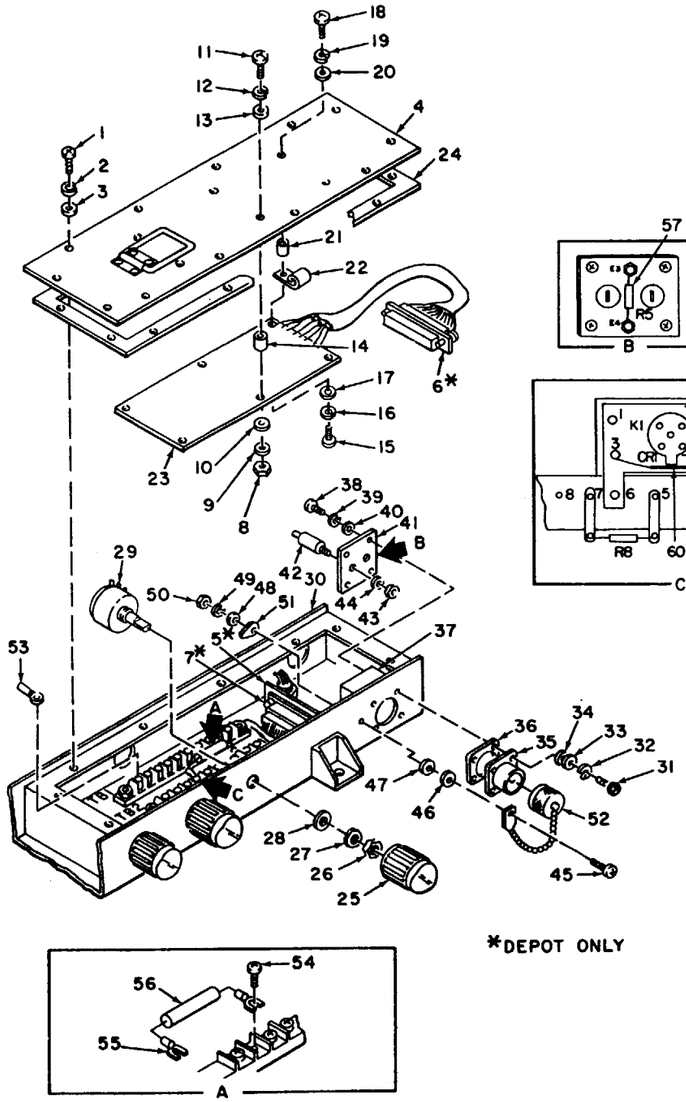
(2) Install a length of insulation sleeving (item 35, App. D) over the leads disconnected in step a (4) above.

(3) Connect the leads to R1, R2, or R3.



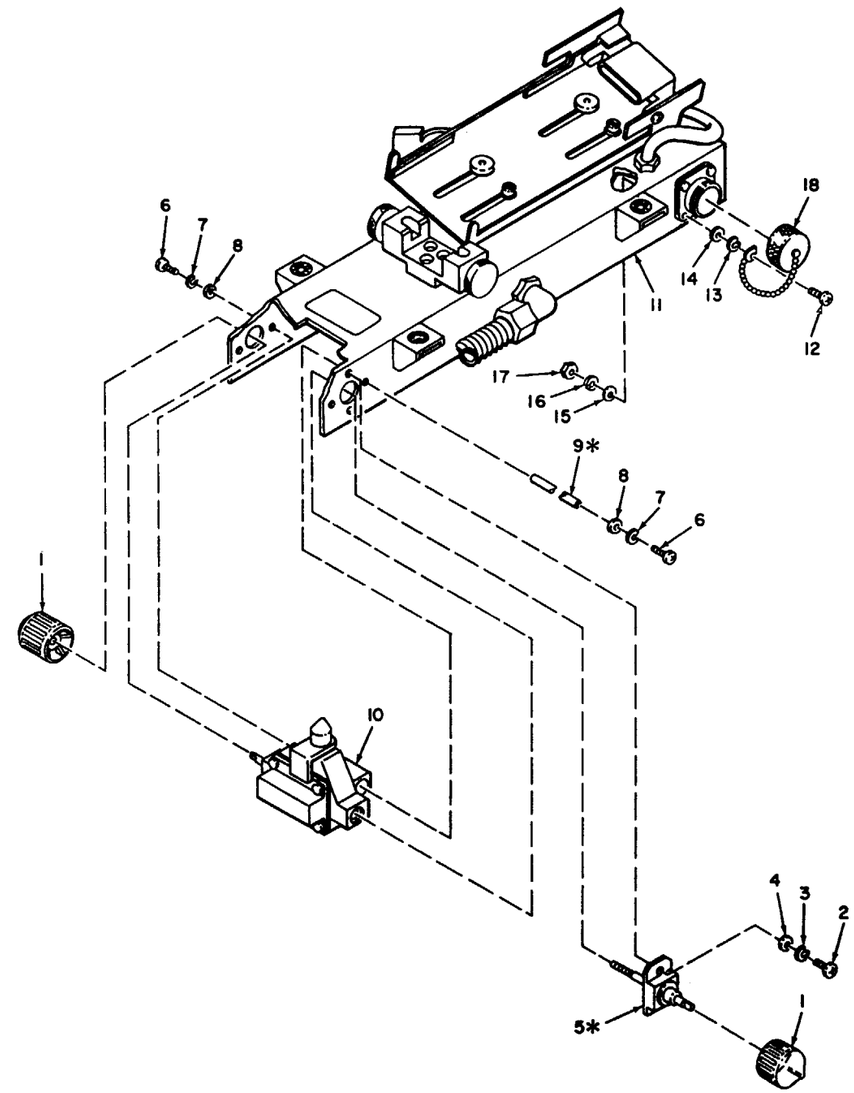
1 – Screw	11 – Nut	21 – J3 (Depot only)	31 – Screw
2 – Screw	12 – Clamp	22 – Terminal	32 – Washer
3 – Thumbnut	13 – Screw	23 – Cable assembly	33 – Screw
4 – Washer	14 – Washer	24 – Nut	34 – Washer
5 – Washer	15 – Washer	25 – Sealing washer	35 – Washer
6 – Mount	16 – Retainer	26 – Washer	36 – Bearing shaft
7 – Screw (Depot only)	17 – Identification plate	27 – Thumbscrew	37 – Base
8 – Screw	18 – Screw	28 – Washer	38 – Retainer
9 – Washer	19 – Washer	29 – Washer	39 – Washer
10 – Washer	20 – Washer	30 – Mount	40 – Stud

Figure 8-5. Repair of optical alignment fixture, view 1.



1 – Screw
2 – Washer
3 – Sealing washer
4 – Cover
5 – J4 mounting bracket (Depot only)
6 – A1P1 (Depot only)
7 – J4 (Depot only)
8 – Nut
9 – Washer
10 – Washer
11 – Screw
12 – Washer
13 – Sealing washer
14 – Spacer
15 – Screw
16 – Washer
17 – Washer
18 – Screw
19 – Washer
20 – Sealing washer
21 – Spacer
22 – Clamp
23 – A1
24 – Gasket
25 – Knob
26 – Nut
27 – Washer
28 – Sealing washer
29 – R1, R2, and R3
30 – Base
31 – Screw
32 – Washer
33 – Washer
34 – Sealing washer
35 – J2
36 – Gasket
37 – Shield
38 – Screw
39 – Washer
40 – Washer
41 – Plate
42 – FL1 or FL2
43 – Nut
44 – Washer
45 – Screw
46 – Washer
47 – Sealing washer
48 – Washer
49 – Washer
50 – Nut
51 – E1
52 – Cap
53 – Terminal
54 – Screw
55 – Terminal
56 – R7, R8
57 – R5
58 – TB3
59 – K1
60 – CR1

Figure 8-6. *Repair of optical alignment fixture, view* 2.



1 – Knob
2 – Screw
3 – Washer
4 – Washer
5 – Azimuth shaft assembly (Depot only)
6 – Screw
7 – Washer
8 – Washer
9 – Shaft (Depot only)
10 – Azimuth-elevation control
11 – Base
12 – Screw
13 – Washer
14 – Sealing washer
15 – Washer
16 – Washer
17 – Nut
18 – Cap

Figure 8-7. *Repair of optical alignment fixture,* view 3.

(4) Slide the sleeving over the terminals, and heat-shrink using heat gun.

(5) Install knob (25) and tighten the two set screws,

(6) Install cover (4) with mounting hardware (1, 2, and 3).

8-9. J2 Removal and Installation Procedure (Fig. 8-6)

a. Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

(2) Remove mounting hardware (31 through 34).

(3) Carefully pull J2 (35) and the leads to J2 out of shield (37).

(4) Slide the insulation sleeving from the terminals of J2 and disconnect and tag the leads.

(5) Remove gasket (36) from J2.

b. Installation.

(1) Fabricate new gasket (36) from gasket sheet (item 28, App. D). Install gasket on J2 (35).

(2) Install insulation sleeving (item 33, App. D) over the leads to J2.

(3) Connect the leads to J2 and slide the sleeving over the terminals of J2.

(4) Carefully push the leads of J2 into shield (37) until J2 can be inserted through base (30).

(5) Hold the shield on the inside of the base, with one hand, and install J2 in the shield with mounting hardware (31 through 34).

(6) Install cover (4) with mounting hardware (1, 2, and 3).

8-10. FL1 and FL2 Removal and Installation Procedure (Fig. 8-6)

a Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

NOTE

Do not pull J2 (35) out of base (30).

(2) Remove mounting hardware (31 through 34).

(3) Carefully remove and position shield (37), until access can be made to screws (38).

(4) Remove mounting hardware (38, 39, and 40).

(5) Slide the shield down the leads toward J2.

(6) Slide the insulation sleeving from the terminal of FL1 or FL2 (42) leading to J2.

(7) Disconnect the lead from FL1 or FL2.

(8) Using a knife, cut the insulation sleeving from the remaining terminal of FL1 or FL2, and disconnect the lead.

(9) Remove mounting hardware (43 and 44) and FL1 or FL2 from plate (41).

b. Installation.

(1) Install FL1 or FL2 (42) to plate (41) with mounting hardware (43 and 44).

(2) Install a length of insulation sleeving, (item 35, App. D) over the leads that connect to the exposed terminal of FL1 or FL2. Connect the lead to FL1 or FL2. Slide the sleeving over the terminal of FS1 or FL2, and heat-shrink, using heat gun.

(3) Install a length of insulation sleeving (item 35, App. D) over the lead from J2. Connect the lead to FL1 or FL2 and slide the sleeving over the terminal.

(4) Install the plate and the shield with mounting hardware (38, 39, and 40).

(5) Pull J2 (35) out of base (30), while the shield is positioned back in its location in the base.

(6) Carefully push the leads of J2 back into the shield, until J2 can be inserted through the base.

(7) Hold the shield on the inside of the base, with one hand, and install J2 in the shield with mounting hardware (31 through 34).

(8) Install cover (4) with mounting hardware (1, 2, and 3).

8-11. E1 and Cap Removal and Installation Procedure (Fig. 8-6)

a. Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

(2) Using a knife, cut the insulation sleeving from E1 (51).

(3) Disconnect the leads to E1.

(4) Remove mounting hardware (45 through 50), E1, and cap (52).

b. Installation.

(1) Apply adhesive (item 5, App. D) under sealing washer (47).

(2) Install cap (52) and E1 (51) with mounting hardware (45 through 50). Wipe off any excess adhesive.

(3) Bend the terminal of E1 up approximately 45 degrees.

(4) Install a length of insulation sleeving (item 37, App. D) over the leads to E1. Connect the leads to E1. Slide the sleeving over E1 and heat-shrink, using heat gun.

(5) Install cover (4) with mounting hardware (1, 2, and 3).

8-12. Cap Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1, 2, and 3, fig. 8-6, and cover (4).

(2) Remove mounting hardware (12 through 17, fig. 8-7) and cap (18).

b. Installation

(1) Apply adhesive (item 5, App. D) under the head of screw (12, fig. 8-7).

(2) Install cap (18) with mounting hardware (12 through 17). Wipe off any excess adhesive.

(3) Install cover (4, fig. 8-6) with mounting hardware (1, 2, and 3).

8-13. Cable Assembly Removal and Installation Procedure

a. Removal.

(1) Slide mount (6, fig. 8-5) to its extended position.

(2) Remove mounting hardware (8 through 11) and clamp (12).

(3) Remove mounting hardware (13, 14, and 15) and retainer (16).

(4) Remove mounting hardware (18, 19, and 20), and remove J3 (21) from the mount.

(5) Remove mounting hardware (1, 2, and 3, fig. 8-6) and cover (4).

(6) Remove terminals (22, fig. 8-5) from TB1 and TB2 marked 1 through 15.

(7) Cut and remove enough cable straps so the leads to cable assembly (23) are free.

(8) Remove nut (24), and slide it over the leads of the cable assembly.

(9) Remove the cable assembly from base (37).

(10) Slide mounting hardware (25 and 26) over the leads of the cable assembly.

(11) Cut the faulty terminals from the leads of the cable assembly.

b. Installation.

(1) Install mounting hardware (25 and 26, fig. 8-5) on cable assembly (23).

(2) Carefully insert the leads of the cable assembly through base (37).

(3) Slide nut (24) over the leads of the cable assembly, and tighten the nut,

(4) Strip the insulation from the leads on the cable assembly where the faulty terminals were removed, and install terminal (22), using crimping tool from kit.

(5) Dress the leads, and install cable straps in the locations where they were removed in step a (7), above.

(6) Connect the leads of the cable assembly to TB1 and TB2 where they were removed in step a (6), above.

(7) Install cover (4, fig. 8-6) with mounting hardware (1, 2, and 3).

(8) Install J3 (21, fig. 8-5) on mount (6) with mounting hardware (18, 19, and 20).

(9) Install retainer (16) with mounting hardware (13, 14, and 15).

(10) Install clamp (12) with mounting hardware (8 through 11).

(11) Return the mount to its closed position.

8-14. Terminal Removal and Installation Procedure (Fig. 8-6)

a. Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

(2) Remove terminal (53) from TB2 or TB3.

(3) Cut the terminal from the lead.

b. Installation.

(1) Strip the insulation of the lead where the terminal was removed in step a (3), above.

(2) Install terminal (53) using crimping tool, DMC 87.

(3) Install cover (4) with mounting hardware (1, 2, and 3).

8-15. R7 and R8 Removal and Installation Procedure (Fig. 8-6)

a. Removal.

(1) Remove mounting hardware (1, 2, and 3) and cover (4).

(2) Disconnect and tag the leads to terminals (55).

(3) Using a knife, remove the adhesive from the resistor to be removed.

(4) Remove screws (54) from TB2, and remove the terminals, and R7, or R8 (56).

b. Installation.

(1) Clean the area on TB2 where the resistor was removed with isopropyl alcohol (item 7, App. D).

(2) Install terminals (55) on a new R7 or R8 (56).

(3) Install the resistor on TB2 with screws (54).

(4) Connect the Ieads to the terminals disconnected in step a (2), above.

(5) Bond the resistor to TB2 using adhesive (item 5, App. D).

(6) Install cover (4) with mounting hardware (1,2, and 3).

8-16. Thumbscrew Removal and Installation Procedure (Fig. 8-5)

a. Removal. Remove thumbscrew (27) and mounting hardware (28 and 29).

b. Installation.

(1) Install a now thumbscrew (27) with mounting hardware (28 and 29).

(2) Deform the threads on the end of the thumbscrew, to retain the thumbscrew in mount (30).

8-17. Azimuth-Elevation Control Removal and Installation Procedure (Fig. 8-7)

a. Removal.

(1) Loosen the two setscrews and remove knobs (1).

(2) Remove mounting hardware (2, 3, and 4).

(3) Unthread azimuth shaft assembly (5) from azimuth-elevation control (10).

(4) Remove mounting hardware (6, 7, and 8) and shafts (9).

(5) Remove the azimuth-elevation control from base (11).

b. Installation.

(1) Unthread azimuth shaft assembly (5) from azimuth-elevation control (10).

(2) Position the azimuth-elevation control in base (11).

(3) Install shafts (9) through the base and into the azimuth-elevation control until the shaft is flush with each side of the base.

(4) Install mounting hardware (6, 7, and 8).

(5) Thread the azimuth shaft assembly into the azimuth-elevation control until the surface of the retainer is flush with the base. It may be necessary to slide the azimuth-elevation control on the shafts, in order to place the retainer on the azimuth shaft assembly flush with the base.

(6) Install mounting hardware (2,3, and 4).

(7) Install knobs (1) and tighten the two setscrews.

8-18. Painting

Touch up the exterior of the optical alinement fixture as follows:

a. Apply primer (item 24, App. D) and allow to dry.

b. Apply polyurethane coating (item 9, App. D) approximately 2 hours after primer is applied.

8-19. Packaging

a. When the UUT is to be shipped to the depot for further testing and repair, package the unit in accordance with TM 38-230-1. Insure that adequate cushioning material and bracing are used to prevent damage to the unit during shipment.

b. Packages should be marked in accordance with local directives.

CHAPTER 9

OPTICAL ALINEMENT FIXTURE (1A6)

Section I. PROGRAMMED TESTS

9-1. General

a. This procedure checks circuit cards Al and A2, and electronic assemblies A3 and A4.

b. Tests include operation of indicator lights, variable resistors, switches S1 and S2, digital voltmeter M1, and continuity checks.

9-2. Equipment Required

The following equipment is required to test the UUT:

Nomenclature	Description
Program memory card	see TM 9-1425-550-10
Patchboard	PB-403
Multimeter	
Passive probe	TA-108
Digital multirneter probe	TA-109
Cable (needle probe)	TA-208
Lead	TA-216
Connector plate	TA-405
Thermistor	TA-441
Cable	CA-9
Cable	CA-34
Cable	CA-35
Cable	CA-36
Cable	CA-422
Cable	CA423
Cable	CA424
Cable	CA425

WARNING

Dangerous voltages may be present in the UUT. Use care in performing the manual procedures.

9-3. Teat Instructions

a. The UUT is on-bench tested.

b. When the program requires probing a connector, use TA-208.

c. When the program directs that an adjustment be performed, refer to figures 9-4 and 9-5 for the adjustment location.

d. At programmed test completion, or when the UUT is to be shipped to depot for further testing or repair, install the cover.

e. Perform the mechanical inspection procedures below, before beginning the programmed tests.

Step	Procedure	Corrective Action
1	Inspect control knobs, switches, connectors, and meter for damage.	Replace if required.
2	Inspect the collimator locking control thumb-screws in tracker collimator mounts for the following	
	a. Cross-threads	
	b. Burred or damaged collimator mounting points.	If any of the conditions listed exist, replace the thumbscrews.
3	Inspect the tracker collimator mounts for the following:	
	a. Damaged insert threads for the collimator locking control thumbscrews.	Replace the collimator mounts.
	b. Rotate the mounts and check the bearings for excessive looseness or binding.	If any binding or looseness exists, replace the bearing shaft.
4	Inspect the UUT for damaged insert threads for the tracker collimator mounts.	
5	Rotate the ELEVATION UP controls from the fully down position until the support is fully extended and check for excessive binding or looseness.	If any binding or looseness exists, replace the azimuth-elevation control.
6	Rotate the AZIMUTH RIGHT control from the fully left to the fully right position and check for excessive binding or looseness.	If any binding or looseness exists, replace the azimuth-elevation control.

9-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 5350000 into the UUT TEST NUMBER switches.

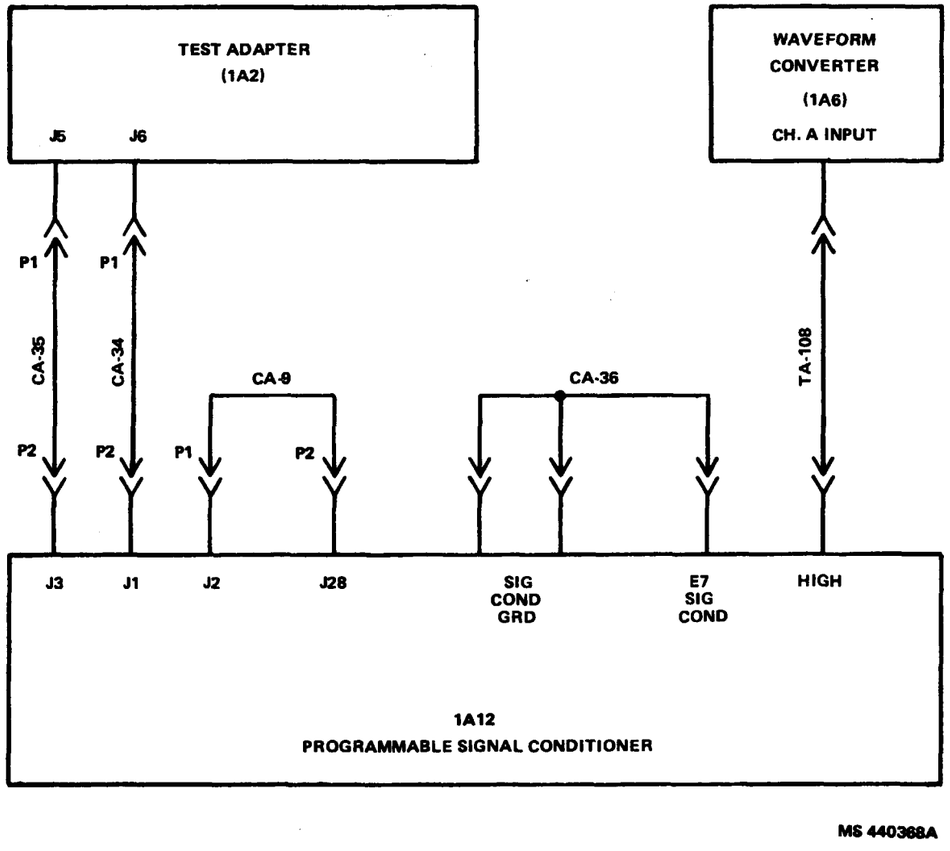


Figure 9-1. 1A12 cable hookup diagram

(2) Set TEST MODE switch to TAPE.

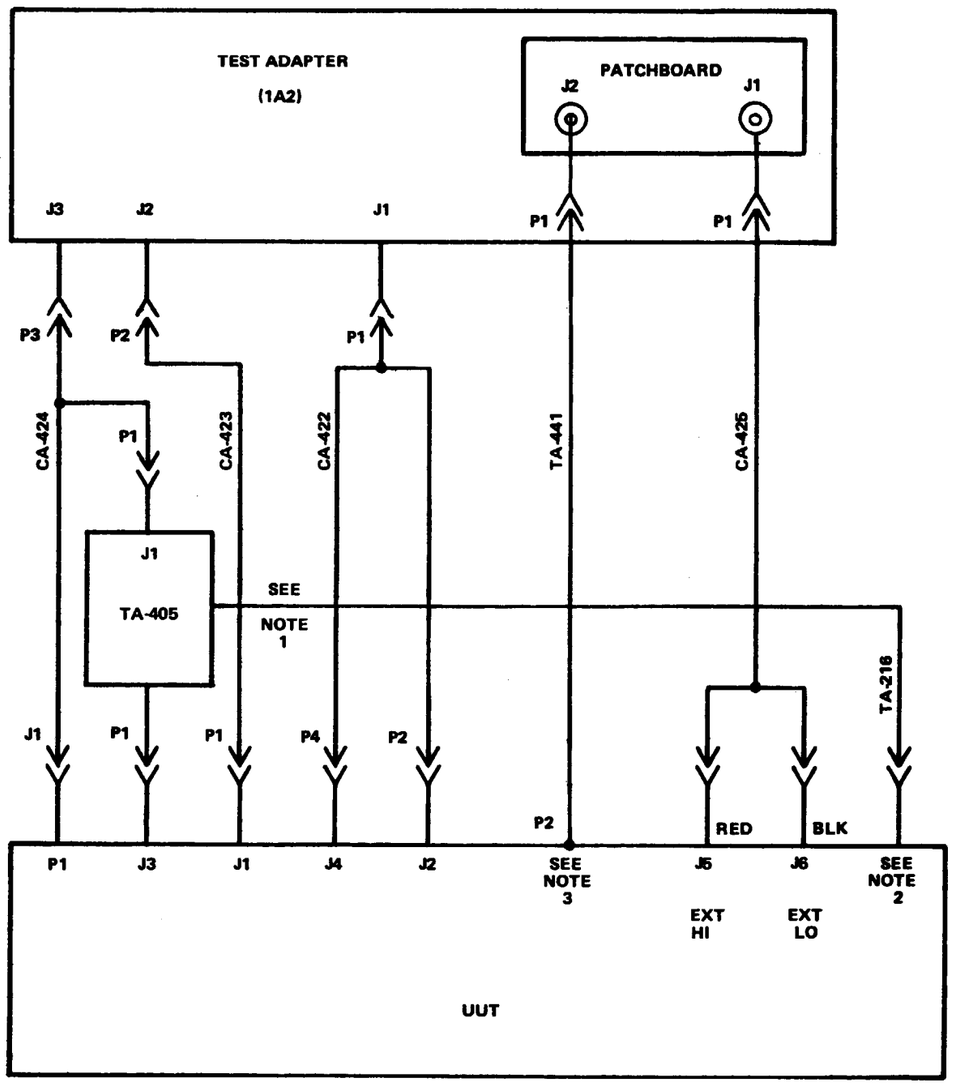
(3) Set CONTROLLER SUBMODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

CAUTION

When the test program in a PROCRAM lNTERRUPT calls for the disconnection of a lead, do not allow the disconnected lead to contact any part of the UUT or damage to the UUT may result.



NOTES: 1. Connect to TA-405/J1 bracket.
2. Connect to screw holding the OAF J1 mounting cap chain.
3. Insert under center screw located under the UUT digital voltmeter (1A6M1).

MS440364A

Figure 9-2. UUT cable hook-up diagram.

9-5. Acceptance Test

Perform the following steps:

Print messages ref no.	Action or instructions
REF TM1 through REF TM4	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM5	*a* Install the patchboard. *b.* Perform cable hookup (fig. 9-1). *c.* Ress PROCEED switch.
	CAUTION **When SSVD displays "DO NOT INTERRUPT THIS TEST", instructions must be followed or equipment will be damaged.**
REF TM6	*a.* Install connector plate TA-405 in J3 on the UUT. *b.* Perform cable hookup (fig. 9-2). Retain connections shown in figure 9-1. *c.* Connect AC/DC probe to 1A12 HI/LO. *d.* Set UUT controls as follows: (1) SELF TEST LIGHT control fully CCW to off position. (2) TRACKER RETICLE LIGHT control fully CCW to off position. (3) COLLIMATOR RETICLE LIGHT control fully CCW to off position. (4) NIGHT COLLIMATOR LIGHT control fully CCW to off position. (5) METER SELECT switch to OFF. (6) MODE SELECT switch to OFF. *e.* Press PROCEED switch.
REF TM7	Terminate testing. The SSVD will indicate failure codes A through AS. The code is interpreted below as either an open or short with location points for troubleshooting. Refer to figure 9-6 and use standard troubleshooting procedures to repair as required.

Code	Fault	Fault exists between following points
A	Open	J3-12 and 1A6A3-E14 or J1-X and 1A6A3-E30
B	Open	J3-5 and J1-P
C	Open	J1-S and J3-7
D	Open	J3-6 and J1-R
E	Open	J3-9 and J1-U

Print message ref no.	Action or instructions

Code	Fault	Fault exists between following points
F	Open	J3-2 and J1-L
G	Short	J3-12 or J1-X to chassis
H	Short	J3-5 and J1-P to chassis
I	Short	J1-S and J3-7 to chassis
J	Short	J3-6 and J1-R to chassis
K	Short	J3-13 to chassis
L	Short	J3-2 and J1-L to chassis
M	Short	J1-D and P1-D to chassis
N	Short	P1-A and J1-A to chassis
o	Short	J1-B and P1-B to chassis
P	Short	P1-E and J1-E to chassis
Q	Short	J1-Y to chassis
R	Short	J3-9 and J1-U to chassis
S	Open	J1-D and P1-D
T	Open	P1-A and J1-A
U	Open	J1-B and P1-B
V	Open	P1-E and J1-E
W	Open	J1-Y and 1A6A3-E29 or J3-13 and 1A6A3-E13
X	Open	1A6A4TB 1-2 and 1A6S2-A or 1A6A4TB 1-9 and 1A6S2-C or 1A6A4TB 1-3 and 1A6S2-B
Y	Open	1A6A4TB1-3 and 1A6S2-B
Z	Open	J3-8 and 1A6TB1-8 or J1-T and 1A6TB1-8
AA	Open	J1-M and J3-3
AB	Open	Power ground connections J3-14, J1-c, J1-b, J1-F, or P1-F.
AC	Open	J1-t, PI-J, J1-J or J4-8 and chassis ground or P1-C and J1-C.
AD	Open	J1-V and J3-10
AE	Open	J1-W and J3-11
AF	Open	P1-G or P1-F
AG	Short	J1-AA and J1-F
AH	Short	J1-BB and J1-F
AI	Short	J1-EE and J1-F

Print message ref no.	Action or instructions

Code	Fault	Fault exists between following points
AJ	Open	J1-Z and 1A6A3-E18 or J3-15 and 1A6A3-E1
AK	Open Short	1A6A3-E24 and 1A6A3-E8 or J1-U and 1A6A3-E24
AL	Open or Short	1A6A3-E22 and 1A6A3-E6 or J1-w and 1A6A3-E22
AM	Open Short	1A6A3-E23 and 1A6A3-E7 or J1-v and 1A6A3-E23
AN	Open or short	1A6A3-E27 and 1A6A3-E11 or J1-m and 1A6A3-E27
AO	Open or Short	1A6A3-E26 and 1A6A3-E10 or J1-n and 1A6A3-E26
AP	Open Short	1A6A3-E25 and 1A6A3-E9 or 1A6A3-E27 and J1-q
AQ	Open or Short	1A6A3-E28 and 1A6A3-E12 or J1-e and 1A6A3-E28
AR	Open	1A6A3-E2 and 1A6A3-E18, or 1A6A3-E2 and 1A6A3-E1 or 1A6A3-E18 and 1A6A3-E1
AS	Open	1A6A3-15 and 1A6A3-E31, or 1A6A3-17 and 1A6A3-E31, or a defective 1A6A3-K1 or 1A6A3-CR1

REF TM8

a. Verify that the digital voltmeter reads 8.8XX where XX can be any number between 00 and 99. If the meter reads as specified, proceed to steb b. If the meter does not read as specified, proceed to step d.

b. Press and release PROCEED switch. Verify that the center segment of the seven-segment display of the last two least significant digits (XX) illuminates some time during the test sequence. Proceed to step c.

c. If the meter reads as specified during the test sequence, press PROCEED. If the meter does not read as specified, proceed to step d.

d. Repeat test sequence by starting test (A). If test fails a second time, terminate testing and replace 1A6M1.

Print message ref no.	Action or instructions
REF TM9	*a.* Position the UUT controls as follows: (1) SELF TEST LIGHT control fully CCW, but not off. (2) TRACKER RETICLE LIGHT control fully CCW, but not off. (3) COLLIMATOR RETICLE LIGHT control fully CCW, but not off. (4) NIGHT COLLIMATOR LIGHT control fully CCW, but not off. (5) METER SELECT switch to OFF. (6) MODE SELECT switch OFF. *b.* Press PROCEED switch.
REF TM 10	*a.* Verify THERMAL SOURCE lamp (DSl) is off. (1) If lamp is off, proceed to step b. (2) If lamp is on, press HALT. Dial TEST (A) and press START TEST switch. *b.* Press and hold lamp assembly and verify lamp is on. (1) If lamp is on, proceed to step c. (2) If lamp is off, replace bulb, and repeat step b. If lamp still does not come on, replace DS1. *c.* Release lamp assembly and verify lamp is off. (1) If lamp is off, proceed to step d. (2) If lamp is on, replace DS1. *d.* Press PROCEED switch.
REF TM 1l	*a.* Deleted. *b.* Deleted. *c.* Connect VDM test adapter P1 to connector plate TA-405. *d.* Connect CA-424 as follows: (1) P3 to LCSS test adapter 1A2-J3. (2) P1 to TA-405 J1. (3) J1 not connected. *e.* Enter test program at step APL EP9. *f.* Press START TEST switch. *g.* Observe dispay+essage on SSVD lA1: (1) Position the VDM test adapter rotary switch to position 7. (2) Press PROCEED switch.
REF TM 12	Check wiring to METER SELECT switch S2. (1) If a fault is found, repair as required. (2) If no fault is found, replace S2.
REFTM 13	Terminate testing. An open connection exists in the UUT. Examine El for good ground. Repair as required.
REF TM 14	Check wiring to MODE SELECT switch S1. (1) If a fault is found, repair as required. (2) If no fault is found, replace S1.
REF TM 15	*a.* Position the UUT controls as follows: (1) SELF TEST LIGHT control fully CCW to off position. (2) TRACKER RETICLE LIGHT control fully CCW to off position. (3) COLLIMATOR RETICLE LIGHT control fully CCW to off position. (4) NIGHT COLLIMATOR LIGHT control fully CCW to off position. (5) METER SELECT switch to OFF. (6) MODE SELECT switch to OFF. *b. Press* PROCEED switch.

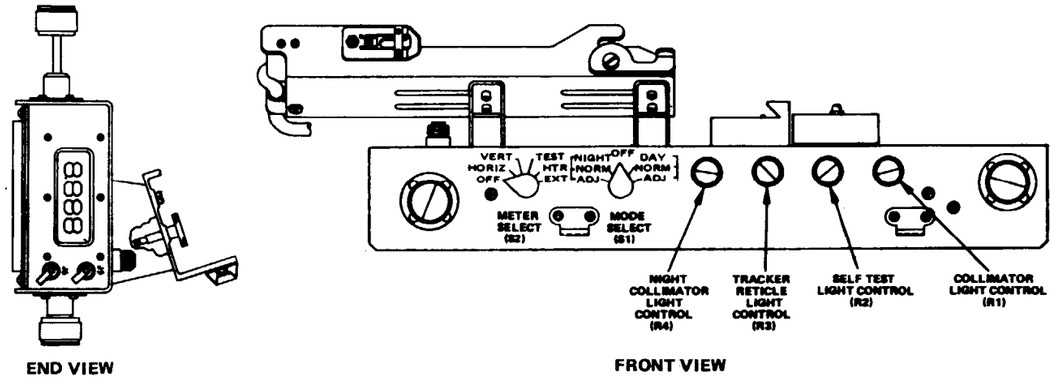


Figure 9-3. OAF controls – front and end views.

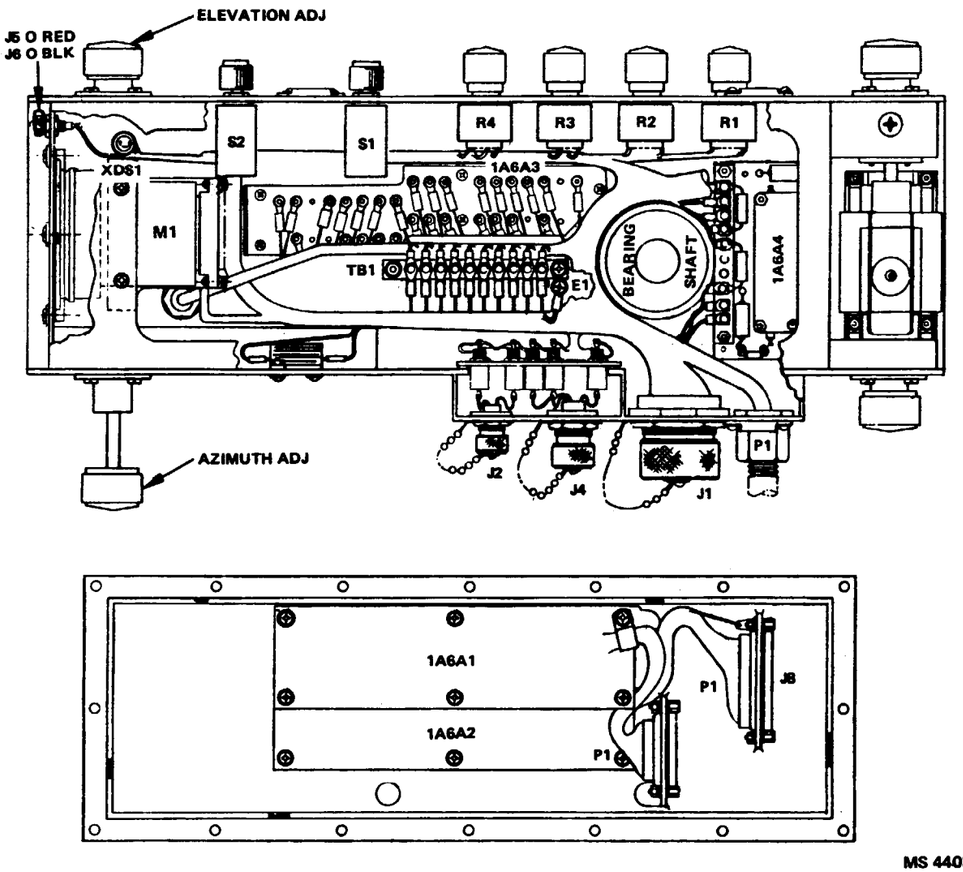
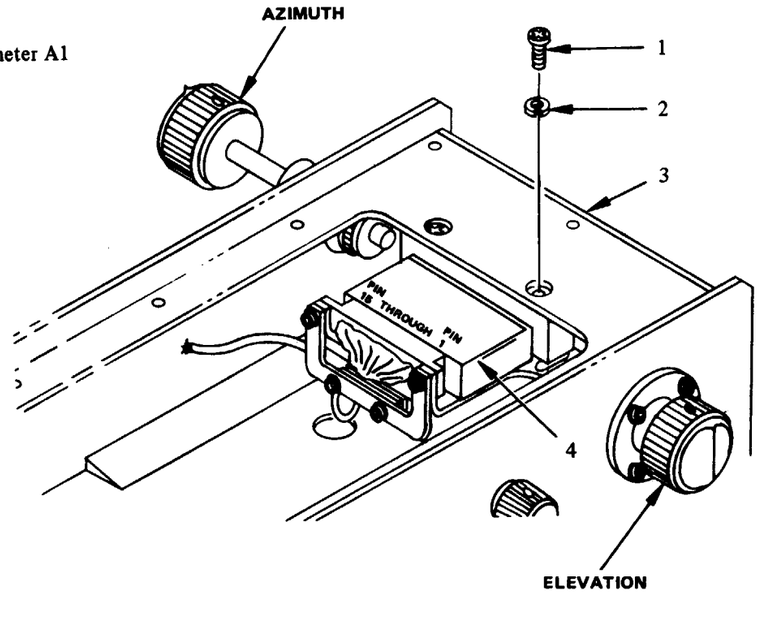
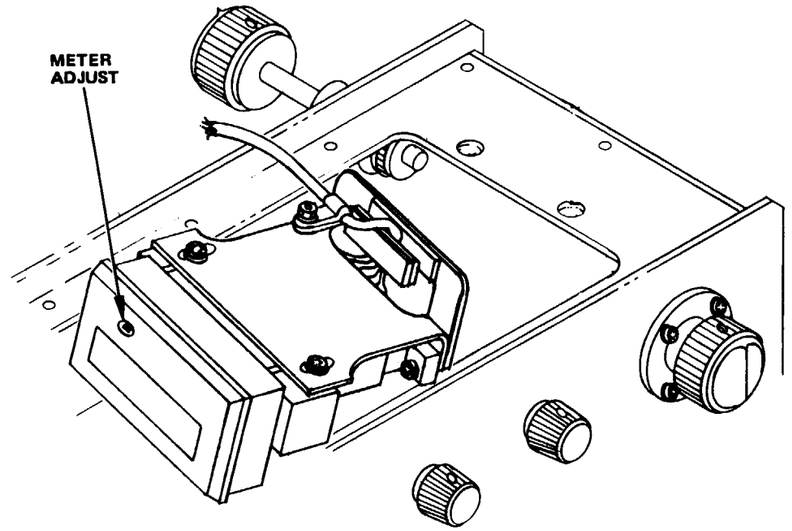


Figure 9-4. OAF subassemblies, controls and indicators - bottom view, cover removed.

1-Screw
2-Washer
3-Chassis
4-Digital voltmeter A1



View A – Test Point Location



View B – Adjustment Location

Digital voltmeter adjustment:

a. Remove two screws (1) and washers (2).
b. Carefully slide meter (4) back until it clears chassis (3).
c. Turn meter over as shown in view B.
d. Adjust digital voltmeter as directed by program.

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Figure 9-5. Digital voltmeter – adjustment and test point location diagram

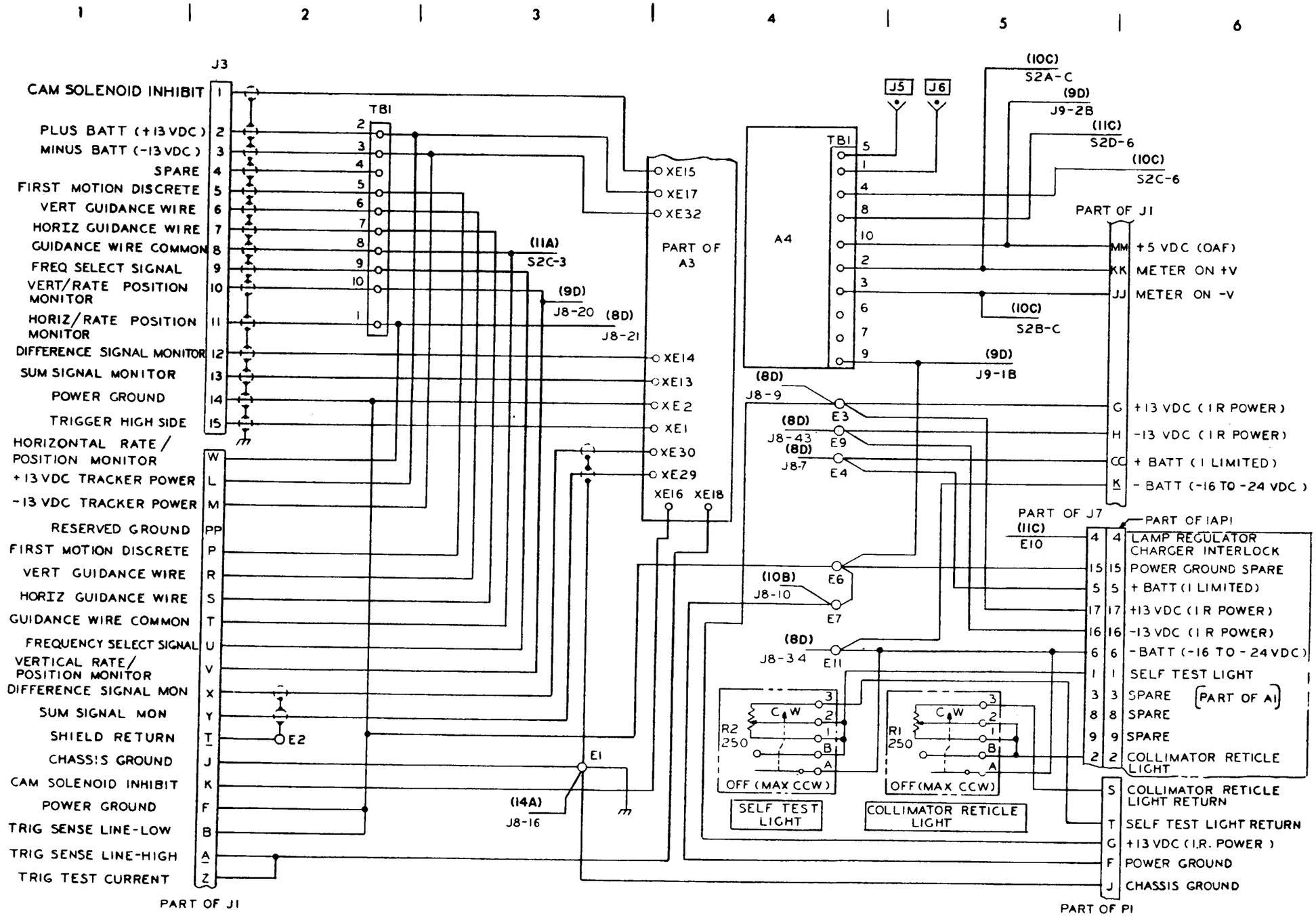

Figure 9-6. OAF, schematic diagram (sheet 1 of 3).

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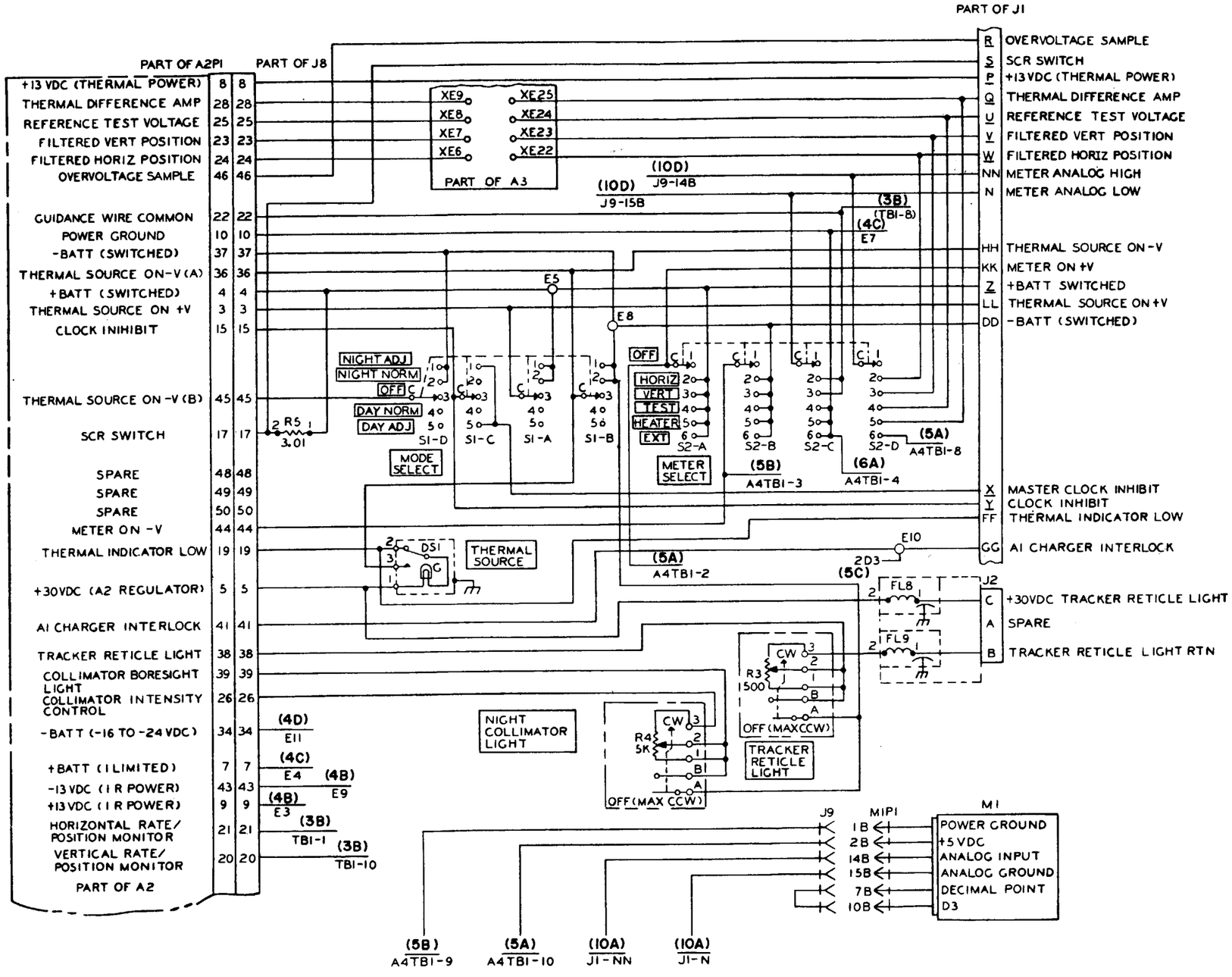

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Figure 9-6. OAF, schematic diagram (sheet 2 of 3).

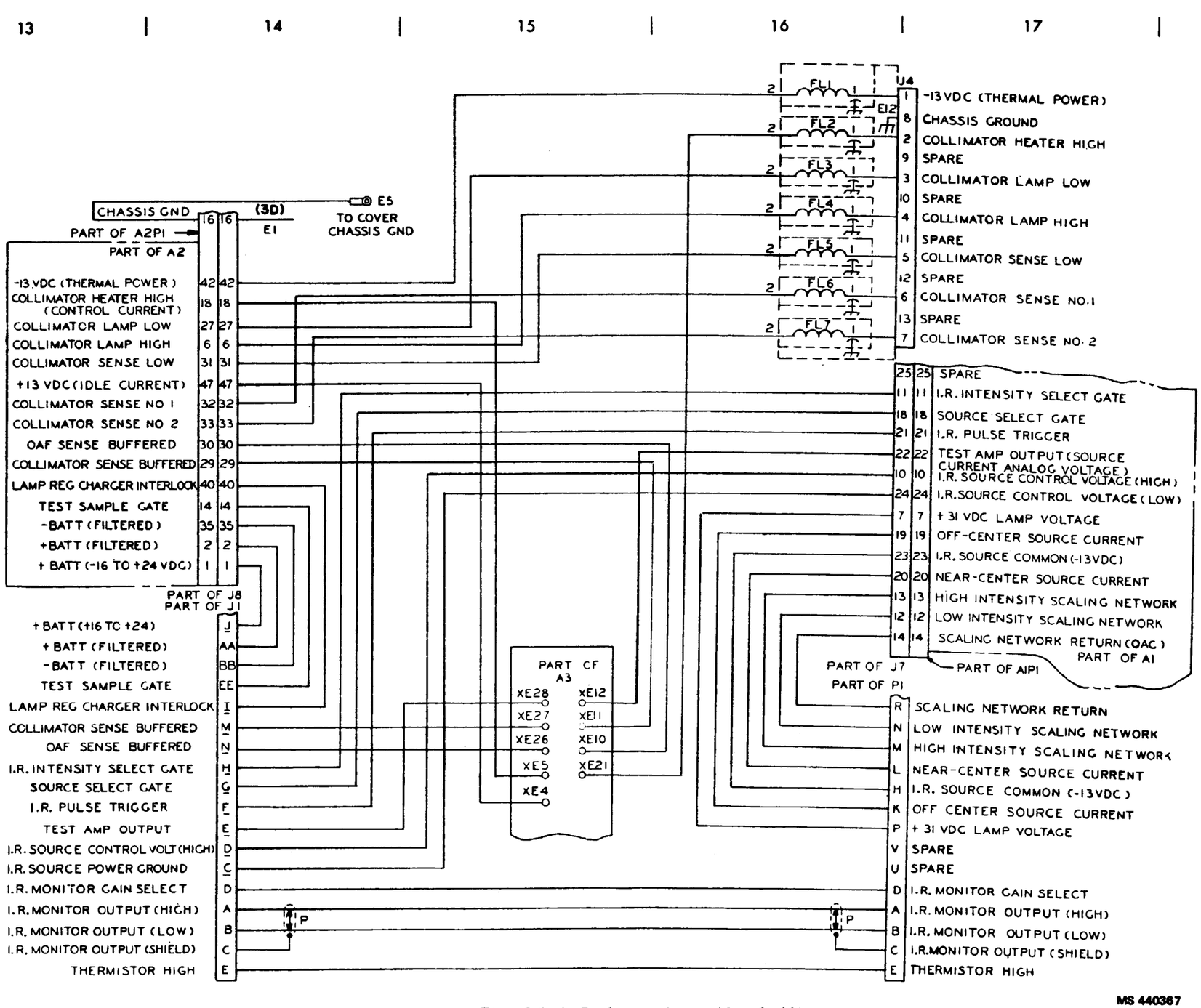


Figure 9-6. OAF, schematic diagram (sheet 3 of 3).

CHAPTER 10
M175 MOUNT, TEST ADAPTER

10-1. General

This test procedure checks UUT continuity, operation of S1, and circuit card A1. The test of A1 includes the adjustment of A1R3.

10-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT.

a.	Program memory card	See TM 9-1425-550-10
b.	Patchboard	PB-403
c.	Multimeter probe	TA-109
d.	Connector plate	TA-405
e.	Electronic box	TA-403
f.	Tracker test fixture	TA-404
g.	Adapter connector	11154534
h	Cable	CA-424
i	Cable	CA-135
j.	Cable (located in UUT case)	1W1
k.	Test probe tip	9998843

10-3. Test Instructions

WARNING

Dangerous voltages may be present in the UUT. Use care in performing the manual pro. cedures.

a. Visually inspect the UUT for damage before testing.

b. When the program directs that an adjustment be performed, refer to figure 10-2 for the adjustment location.

c. Upon completion of tests and repairs, install the UUT cover.

d. A successful completion of programmed test represents UUT maintenance calibration.

10-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

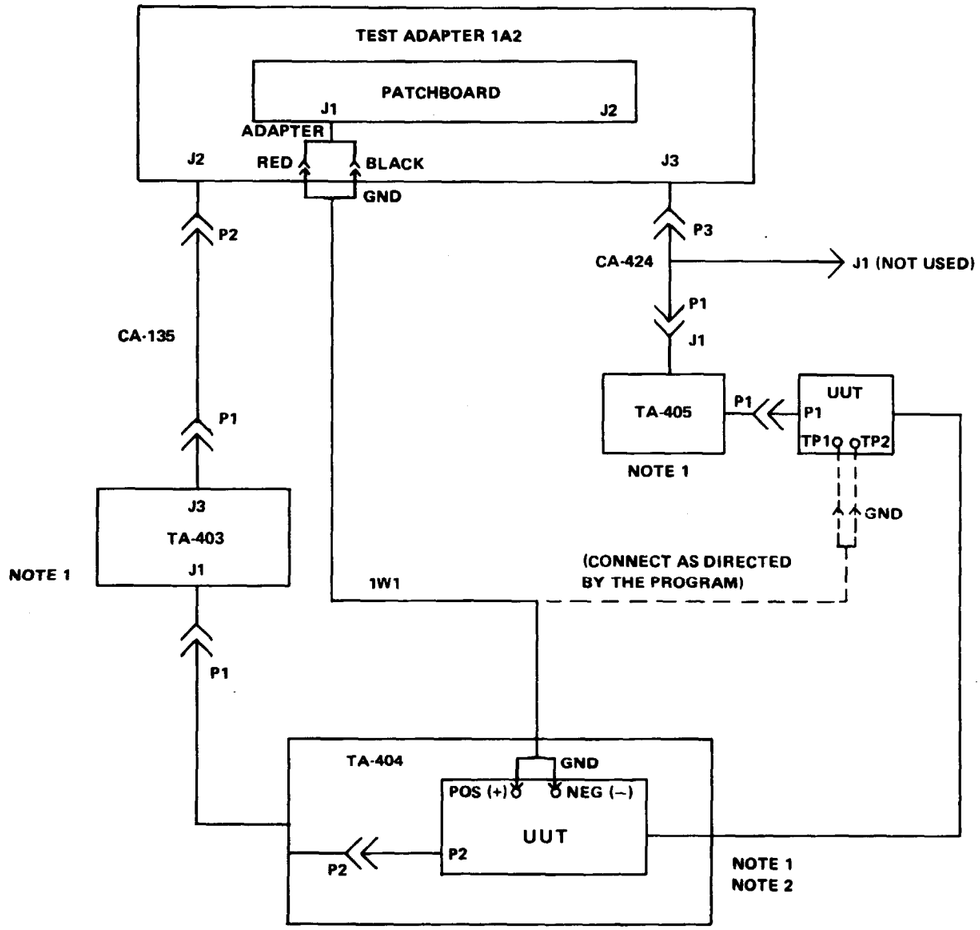
(1) Dial 5400000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE.

(3) Set CONTROLLER SUBMODE switch to **NORMAL.**

(4) Press and release the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.



NOTES: 1. DO NOT ALLOW TA-403, TA-404 AND TA-406 TO TOUCH EACH OTHER.

2. ON TA-404, SET S1 TO NOR.

Figure 10-1. UUT Cable hookup diagram.

Table 10-1. Ml 75 Mount, Test Adapter Programmed Tests

Print message ref. no.	Action or instruction
REF TM 1 through REF TM 4	Discontinue the UUT test, and run the confidence and maintenance program in accordance with TM 9-4935-552-14/2.
REF TM 5	*a.* Install the patchboard. *b.* Press and release the PROCEED switch.
REF TM 6	*a.* Perform equipment hookup (fig 10-1). *b.* Position S1 on the UUT to position 1. *c.* Press and release the PROCEED switch.
REF TM 7	Refer to SSVD displayed value and figure 10-3. Use standard troubleshooting procedures to isolate and repair the fault. When the fault is corrected, rerun the program. If the same fault occurs a second time, manually test cable 1W 1.

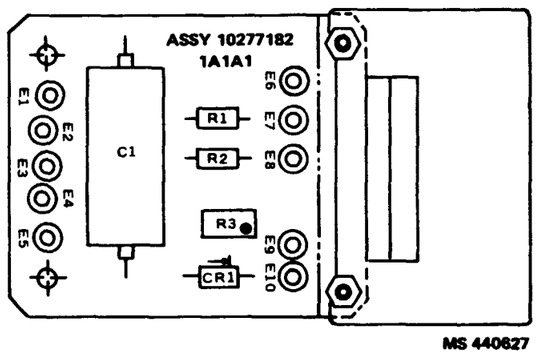


Figure 10-2. Circuit board A1 - locational view

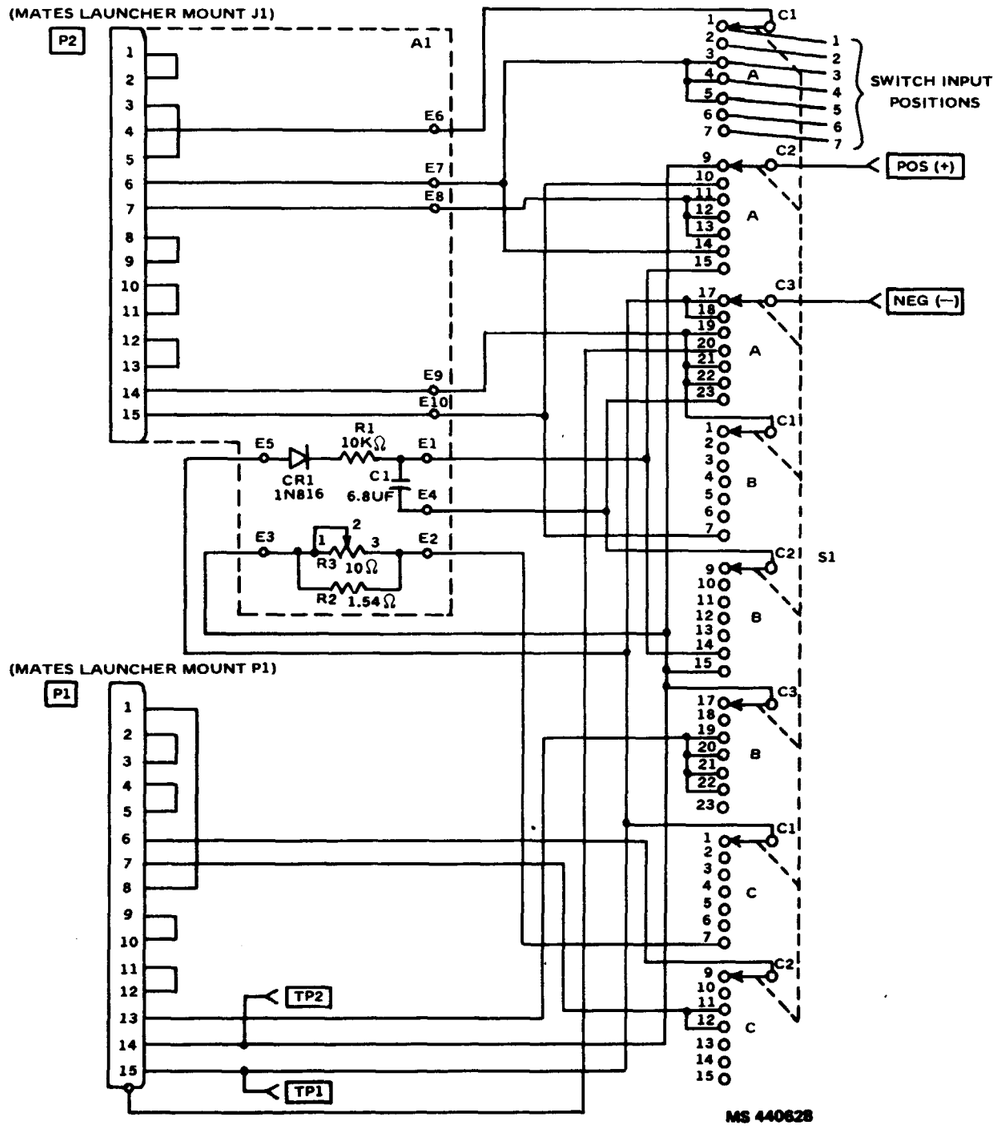


Figure 10-3. M175 Mount Test Adapter - schematic diagram.

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APPENDIX B
REFERENCES

General. Refer to TM9- 1425 -550-L for a List of Applicable Publications.

APPENDIX C
REPAIR PARTS LIST

General. Refer to TM9-1425-480-24P for repair parts list.

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists expendable supplies and materials you will need to test and repair the UUTs covered in this TM. These items are authorized to you by CTA 50-970, Expendable items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation of columns

a. Column 1- Item Number. This number is assigned to the entry in the listing.

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

C – Operator/Crew

O – Organizational Maintenance

F – Direct Support Maintenance

H – General Support Maintenance

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

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

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

Section II. TABULAR LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	F	8030-00-761-4040	ADHESIVE RTV 88 (01	QT
2	F	8040-00-142-9193	ADHESIVE MIL-A-46050 (81349)	BT
3	F	8040-00-779-9595	ADHESIVE, CONTACT MMM-A-130 (81348)	PT
4	F	8040-00-262-9011	ADHESIVE, RUBBER BASE MMM-A-1617, TYPE III (81348)	PT
5	F	8040-01-147-7865	ADHESIVE, SILICONE MIL-A-46106 (80244)	OZ
6	F	6810-00-205-6790	ALCOHOL, DENATURED O-E-760 (81348)	OZ
7	F	6860-00-753-4993	ALCOHOL, ISOPROPYL TT-I-735 (81348)	QT
8	F	6850-00-910-8667	CATALYST DBT (01139)	OZ
9	F	8030-00-213-0919	COATING, POLYURETHANE MIS-19377 (18876)	PT
10	F	5970-01-136-7101	COMPOUND, INSULATING MIL-I-46058, TYPE UR (81349)	QT
11	F	8030-00-081-2340	COMPOUND, LOCKING MIL-S-22473, GRADE AA (81349)	QT
12	F	8030-01-060-4645	COMPOUND, SEALING MIL-S-23586, TYPE 1, CLASS 1, GRADE B1 (8	PT
13	F	6850-00-880-7616	COMPOUND, SILICONE MIL-S-8660 (81349)	PT
14	F	8305-00-205-3496	COTTON, BLEACHED CCC-C-440 (81348)	YD
15	F	6515-00-226-7692	GLOVES, PLASTIC, DISPOSABLE MIL-G-36339 (81349)	BX
16	F	5970-00-686-7002	INSULATION, ELECTRICAL MIL-I-631-F-UUA-A-I-AWG 13 (81349)	FT
17	F	6810-00-823-8052	METHYL ETHYL KEYTONE (MEK) TT-M-261 (81348)	QT
18	F	6810-00-264-6715	MOLYBDENUM DISULFIDE MIL-M-7866	LB
19	F		NITROGEN, DRY BB-N-411 (81348)	
20	F	9150-00-270-0047	OIL, CASTOR, TECHNICAL JJJ-C-86 (81348)	PT
21	F		PAINT (ENAMEL), ALKYD MIL-E-52798, COLOR 34083 FOREST GREEN (81349	QT
22	F	9330-00-531-3568	PLASTIC SHEET L-P-410, NYLON 6/6, 0.032 IN. THICK (81348)	SH

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
23	F	8030-00-083-8403	PRIMER, RUBBER SS4004 (01139)	PT
24	F	8010-00-935-7080	PRIMER COATING, EPOXY-POLYAMIDE MIL-P-23377, TYPE I 81349	KT
25	F	5970-01-013-5835	RUBBER, SYNTHETIC, HEAT SHRINKABLE MIL-R-46846, TYPE I, CLASS I (81349)	FT
26	F	9320-00-580-6836	RUBBER SHEET, CELLULAR AMS3197, 0.18 IN. THICK (81343)	SH
27	F	9320-00-442-3502	RUBBER SHEET, CELLULAR MIL-R-6130, TYPE 2, GRADE A, FIRM, 0.05 IN. THICK (81349)	SH
28	F	5999-00-414-3307	RUBBER SHEET, GASKET 11207544 (17773)	SH
29	F	9320-00-069-2802	RUBBER SHEET, SOLID MIL-R-3065, TYPE S, GRADE 612A (81349)	SH
30	F	9320-01-070-1835	RUBBER SHEET, SPONGE AMS3195 (81343)	SH
31	F	5330-01-157-9393	RUBBER SHEET, SYNTHETIC MIL-R-6855, CLASS 2, GRADE 40 (81349)	SH
32	F	4720-00-835-4572	RUBBER TUBING, SYNTHETIC MIL-S-6855 (81349)	FT
33	F	5970-00-990-7048	SLEEVING, INSULATION, FLEXIBLE MIL-I-7444, TYPE III, CLASS 2, 15 AWG (81349)	FT
34	F	5970-00-819-9569	SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/5-103-9 (81349)	FT
35	F	5970-00-088-2975	SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/5-104-9 (81349)	FT
36	F	5970-00-082-3942	SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/5-105-9 (81349)	FT
37	F	5970-00-814-2878	SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/5-106-9 (81349)	FT
38	F	5970-00-724-1915	SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/6-104-2 (81349)	FT
39	F		SLEEVING, INSULATION, HEAT SHRINKABLE MIL-I-23053/6-104-9	FT
40	F	5970-00-543-1154	TAPE, ELECTRICAL MIL-I-15126 (81349)	RL
41	F		TAPE, MASKING NO. 471 (20999) OR EQUIVALENT	RL
42	F	9320-00-257-3636	TAPE AND SHEET, RUBBER AND CORK MIL-T-6841 (81349)	SH
43	F	5970-00-548-5920	VARNISH MIL-V-173, TYPE 1, CLEAR (81349)	QT
44	F	9525-00-618-0257	WIRE, SAFETY MS20995NC20 (96906)	FT

By Order of the Secretary of the Army:

Official:

FREDERICK C. WEYAND
General, United States Army
Chief of Staff

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

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