*TM 1-4931-726-13

TECHNICAL MANUAL

OPERATOR AND MAINTENANCE MANUAL

TADS TURRET CONTINUITY TEST SET 13231232

*This manual supersedes TM 1-4931-726-13, dated 30 September 1992, including all changes.

AH-64A ATTACK HELICOPTER

HEADQUARTERS, DEPARTMENT OF THE ARMY
21 AUGUST 2001

WARNING

HAZARDOUS SOLVENTS

When you use solvents, be sure that the place you work in is well ventilated. WEAR GLOVES AND EYE PROTECTION. If you don't have good ventilation, read TB MED 223 and use the recommended respiratory (breathing) protection.

DON'T USE FLAMMABLE SOLVENTS AROUND HEAT, OPEN FLAME, OR SPARKS.

IF YOU GET SOLVENT IN YOUR EYES OR ON YOUR SKIN, FLUSH THE SOLVENT AWAY WITH WATER FOR 15 MINUTES; THEN GET MEDICAL HELP.

Freon reacts with highly active free metals such as sodium, barium, or potassium, and may produce toxic byproducts, fires, or explosions. Do not use Freon near highly active free metals.

TOXIC AND FLAMMABLE CHEMICALS

Use the same care for toxic and flammable chemicals as you would for hazardous solvents.

CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL CONTAMINATION

Notify your supervisor if you think you have been exposed to chemical, biological, or radiological contamination. TM 9-1300-275/2 gives procedures for decontamination.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGE PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and change pages are:

Original . . . . . 0 . . . . . 21 August 2001

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 117, CONSISTING OF THE FOLLOWING:

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TECHNICAL MANUAL

No. 1-4931-726-13

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 21 AUGUST 2001

OPERATOR AND MAINTENANCE MANUAL, TADS TURRET CONTINUITY TEST SET 13231232

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any errors or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also send in your comments electronically to our e-mail address: 2028@redstone.army.mil or FAX us at (256) 842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the end of this TM immediately preceding the hard copy 2028.

*This manual supersedes TM 1-4931-726-13, dated 30 September 1992, including all changes.

Distribution Statement A: Approved for public release; distribution is unlimited.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

a. Type of Manual. Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM).

b. Model Number and Equipment Name. TADS Turret Continuity Test Set (TTCTS), Part Number 13231232, (hereinafter referred to as test set) designed and manufactured by Lockheed Martin Corporation.

c. Purpose of Equipment. The test set is used to test the integrity of TADS turret assembly wiring harness assembly 1A4W1 part numbers 13076165-019/-519 (also known as "funny harness"). Wiring harness assembly 1A4W1 contains approximately 350 wires to interface the TADS day sensor and night sensor assemblies to other TADS/PNVS components. The test set checks for shorts to chassis ground and verifies continuity of over 95% of wiring harness assembly 1A4W1 wiring.

Wiring harness assembly 1A4W1 flexes during TADS system operation and is subject to intermittent open and short circuits. Troubleshooting, using FD/LS at the AVUM level, isolates faults to suspected line replaceable units (LRU) and is not intended to diagnose or isolate faults between LRUs (such as a shorted or open wiring harness wires). Replacement of wiring harness assembly 1A4W1 is a major maintenance effort. Therefore, verification of a faulty wiring harness assembly 1A4W1 is essential to eliminate the possibility of removing a good (but suspected bad) turret.

1-2. PREPARATION FOR STORAGE OR SHIPMENT

Prepare TTCTS for storage and shipment in accordance with MIL-T-28800E.

1-3. LIST OF ABBREVIATIONS

Table 1-1 contains an alphabetical list of abbreviations and symbols used in this manual, with their meanings.

Table 1-1. List of Abbreviations

Abbreviation or Symbol	Meaning
AC	Alternating Current
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
BE	Bale
CCA	Circuit card assembly
cn	Can
DC	Direct current
FD/LS	Fault Detection/Location System
Hz	Hertz
kt	Kit
LRU	Line Replaceable Unit
mA	Milliampere
oz	Ounce
PMCS	Preventive Maintenance Checks and Services
PNVS	Pilot Night Vision Sensor
SL	Spool
TADS	Target Acquisition Designation Sight
TTCTS	TADS Turret Continuity Test Set

Section II. EQUIPMENT DESCRIPTION AND DATA

1-4. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The test set, shown in figure 1-1, is housed in an aluminum case and consists of:

- Control panel 1A1 and self test panel 1A2
- Rechargable battery module 1A3
- Interface cable W1
- AVUM/AVIM shorting connectors
- Depot Maintenance only shorting connectors
- Battery charger
- Spare rechargeable battery module 1A3

1-5. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

This paragraph contains illustrated descriptions of test set major components. Component descriptions are keyed to figure 1-1.

1 CASE. Contains rechargeable battery module 1A3, component board 1A2A1, and circuits necessary to perform wiring harness assembly 1A4A1 continuity, resistance, shield integrity, and resolver excitation checks.

2 CONTROL PANEL. Contains controls for wiring harness assembly 1A4A1 continuity, resistance, shield integrity, and resolver excitation checks.

3 SELF TEST PANEL. Contains controls for test set self-test.

4 RECHARGEABLE BATTERY PACK 1A3. Provides 28 VDC for test set operation.

5 INTERFACE CABLE W1. Interfaces test set to wiring harness assembly 1A4W1 during continuity, resistance, shield integrity, and resolver excitation checks.

6 AVUM/AVIM SELF-TEST CONNECTOR ASSEMBLIES. During test set self-test, self-test connector assemblies J10, J11, P1, P2, P3, P5, P8, and P9 simulate a known good wiring harness. During wiring harness assembly 1A4W1 continuity, resistance, and resolver excitation checks, they provide continuity through wiring harness assembly 1A4W1 to test set.

7 DEPOT MAINTENANCE SELF-TEST CONNECTOR ASSEMBLIES. Self-test connector assemblies J5, J6, J13, and P7 are used to test wiring harness 1A4W1 outside of TADS turret assembly.

8 DEPOT MAINTENANCE SELF-TEST SWITCH ASSEMBLIES. Self-test switch assemblies J14 and P6 are used to test wiring harness 1A4W1 outside of TADS turret assembly.

9 BATTERY CHARGER. Used to recharge battery pack 1A3.

10 COVER. Case cover and storage location for battery charger, interface cable W1, and self-test connector assemblies J5, J6, J10, J13, and P7, and self-test switch assemblies J14 and P6.

1-5. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

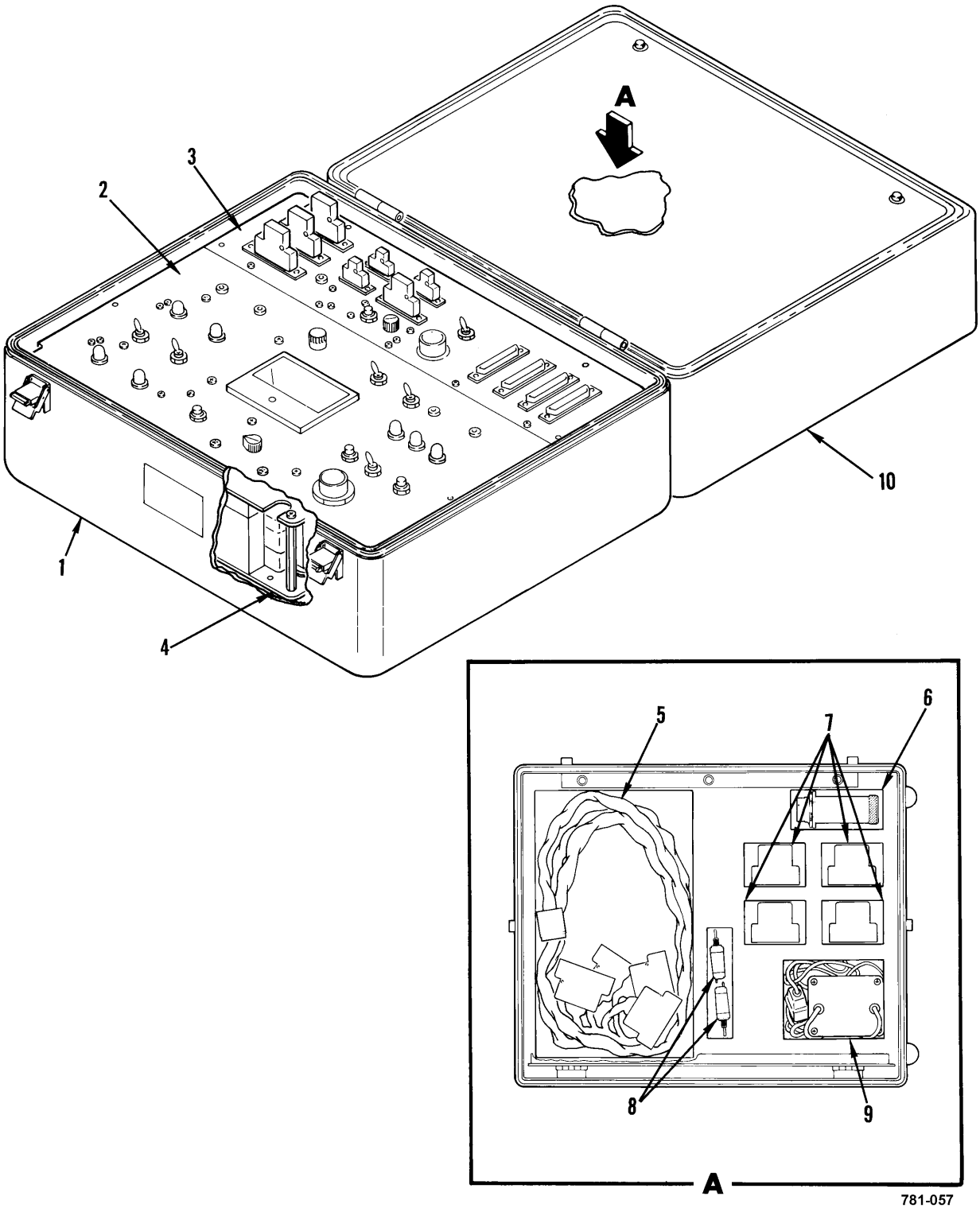


Figure 1-1. TADS Turret Continuity Test Set Major Components

1-6. EQUIPMENT DATA

This paragraph lists test set weight, dimensions, and power and environmental requirements.

Weight and dimensions

Weight	55 lbs.
Length	19.12 in.
Width	15.62 in.
Height	14.50 in.

Power requirements

Voltage	28 VDC (internal batteries)

Operating environmental conditions

Relative humidity	95% maximum
Atmospheric pressure	Local ambient

1-7. EQUIPMENT SUPPLIED

Table 1-2 lists equipment supplied with TADS turret continuity test set. Storage locations are shown in figure 1-1.

Table 1-2. Equipment Supplied

Nomenclature	Part Number
Interface cable W1	13231255-19
Battery charger	13231231
Battery pack 1A3 (spare)	13231241
AVUM/AVIM self-test connector assembly J10	13231252
AVUM/AVIM self-test connector assembly J11	13231253
AVUM/AVIM self-test connector assembly P1	13231245
AVUM/AVIM self-test connector assembly P2	13231246
AVUM/AVIM self-test connector assembly P3	13231247
AVUM/AVIM self-test connector assembly P5	13231248
AVUM/AVIM self-test connector assembly P8	13231249
AVUM/AVIM self-test connector assembly P9	13231250-19
Depot maintenance self-test connector assembly J5	13231234
Depot maintenance self-test connector assembly J6	13231235
Depot maintenance self-test connector assembly J13	13231236
Depot maintenance self-test connector assembly P7	13231237
Depot maintenance self-test switch assembly J14	13231244
Depot maintenance self-test switch assembly P6	13231238

1-8. EQUIPMENT REQUIRED BUT NOT SUPPLIED

Table 1-3 lists equipment required but not supplied with test set, and describes its use. Equipment and expendable supplies required for removal/installation procedures in TM 1-1270-476-20 are not listed.

Table 1-3. Equipment Required But Not Supplied

Nomenclature	Use
Key, socket head screw, 1/16 in hex	Disconnect/connect TADS turret test connector cover (with socket head screwlocks).
Multimeter, digital, HP8842 (or equivalent)	Monitor current during battery pack 1A3 charging procedure; test set meter M1 verification; continuity measurements.

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. SERVICE UPON RECEIPT OF MATERIEL

Upon receipt of materiel, use instructions in this paragraph to ensure that equipment is complete and free of defects before it is operated. Each time a new test set is received, observe instructions in following steps and then perform applicable procedures in service upon receipt checks in table 2-1.

a. Unpacking.

(1) Remove wrappings, protective tape, and preservative material.

(2) Note tags and stencils on equipment since they may contain information related to operation and maintenance.

b. Checking Unpacked Equipment.

(1) Inspect equipment for damage incurred during shipment. If equipment has been damaged, report damage on SF 364, Report of Discrepancy.

(2) Check equipment against packing slip to ensure shipment is complete. Report all discrepancies in accordance with instructions in DA Pam 738-751, The Army Maintenance Management System - Aviation (TAMMS-A).

2-2. SERVICE UPON RECEIPT CHECKS

Table 2-1 lists service upon receipt checks and tests to be performed on test set. The checks and tests are numbered in order they are to be performed. The Item column lists items to be checked, in procedure sequence. The Action column lists inspections and tests to be performed and, in some cases, contains details for procedures. The Reference column contains references, when applicable, for the action to be taken.

2-2. SERVICE UPON RECEIPT CHECKS (cont)

Table 2-1. Service Upon Receipt Checks

Item	Action	Reference
1 Case exterior	Inspect for cleanness and general appearance. Remove light dirt and grease.	Para 4-1 (cleaning)
2 Test set cover	a. Inspect for missing AVUM/AVIM self-test connector assemblies.	
	b. Inspect for missing depot maintenance self-test connector assemblies.	
3 Operational capability	Perform test set operational check.	Para 3-5

Section II. INSTALLATION INSTRUCTIONS

There are no installation instructions for the TADS turret continuity test set.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF CONTROLS AND INDICATORS

3-1. CONTROLS AND INDICATORS

Test set controls and indicators are shown on figure 3-1 and described in table 3-1.

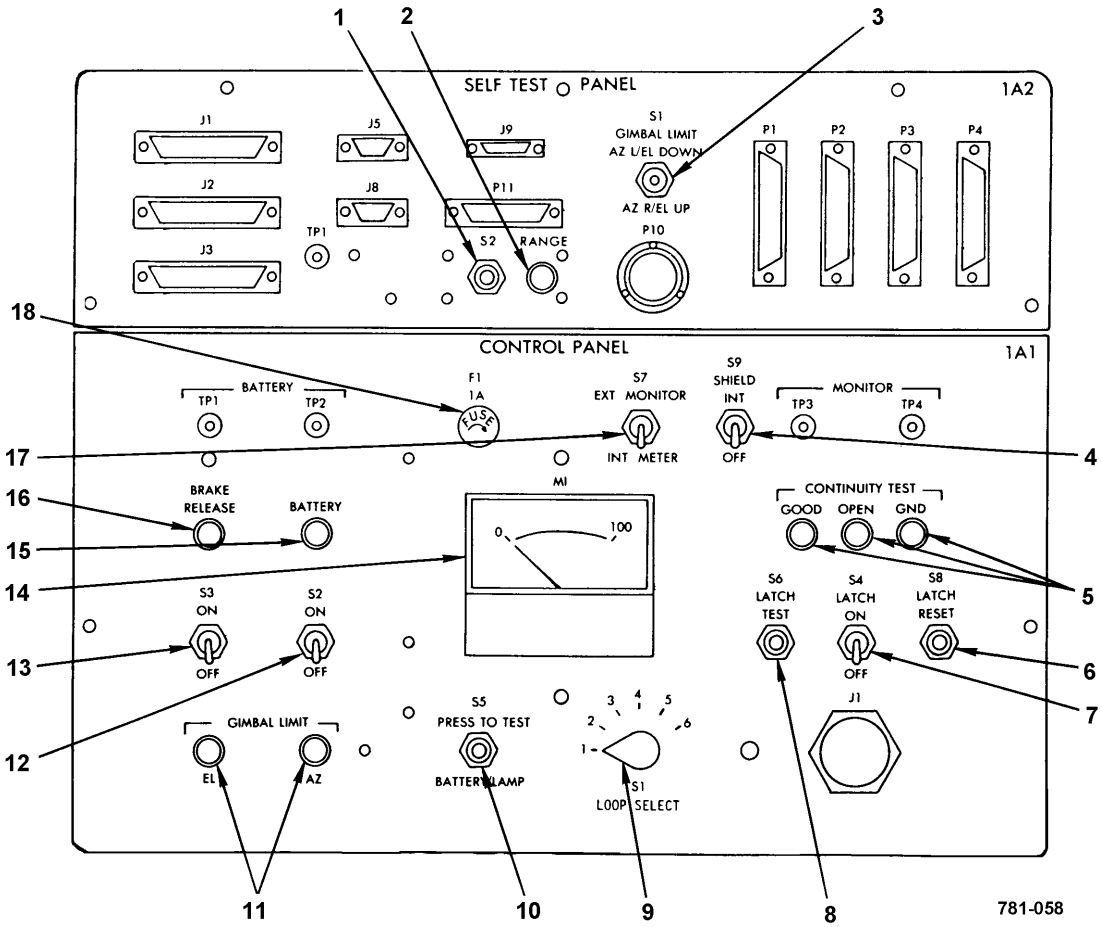


Figure 3-1. TADS Turret Continuity Test Set Controls and Indicators

3-1. CONTROLS AND INDICATORS (cont)

Table 3-1. Controls and Indicators

Key	Control or Indicator	Function
SELF TEST PANEL		
1	**S2/RANGE** switch	When pressed and held, enables self test **RANGE** control.
2	**RANGE** control	Adjusted during test set self test to check test set function.
3	**S1/GIMBAL LIMIT** switch	When set to **AZ L/EL DOWN** position, test set tests **GIMBAL LIMIT EL** and **AZ** indicator function.
		When set to **AZ R/EL UP** position, test **GIMBAL LIMIT EL** and **AZ** indicator function.
CONTROL PANEL		
4	**S9/SHIELD INT** switch	When switch is set to on, test set checks wiring harness shield integrity.
5	**CONTINUITY TEST** indicators	When **GOOD** indicator is on, indicates continuity in circuit under test.
		When **OPEN** indicator is on, indicates a short to ground in circuit under test.
		When **GND** indicator is on, indicates a short to ground in circuit under test.
6	**S8/LATCH RESET** switch	When switch is pressed after malfunction has been corrected, allows test set to continue.
7	**S4/LATCH ON** switch	When switch is set to **ON** and a continuous or intermittent malfunction occurs during testing, **CONTINUITY TEST OPEN** or **CONTINUITY TEST GND** indicator will light and remain lit.
8	**S6/LATCH TEST** switch	When switch is pressed, tests proper operation of latch network.
9	**S1/LOOP SELECT** switch	Switch is set to any of six positions to test various test set and wiring harness circuits.
10	**S5/PRESS TO TEST BATTERY/LAMP** switch	When switch is pressed, checks battery condition and all indicator lamps.
11	**GIMBAL LIMIT EL/AZ** indicators	When **EL** indicator lights, indicates that azimuth gimbal assembly has reached elevation limit.
		When **AZ** indicator lights, indicates that azimuth gimbal assembly has reached azimuth limit.
12	**S2/BATTERY** switch	When set to **ON**, power is applied to test set.
13	**S3/BRAKE RELEASE** switch	When set to **ON**, applies voltage to azimuth and elevation drive motor brakes.

Table 3-1. Controls and Indicators - Continued

Key	Control or Indicator	Function
14	**M1** meter	Monitors test set functions during test.
15	**BATTERY** indicator	When on, indicates that test set batteries are charged.
16	**BRAKE RELEASE** indicator	When on, indicates that azimuth gimbal assembly brake release is engaged.
17	**S7/EXT. MONITOR/INT. METER** switch	When set to **EXT. MONITOR**, selects external ohmmeter usage for measuring sensitive resistance variations.
18	**F1/1A FUSE**	Protects batteries from direct shorts.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-2. INTRODUCTION

PMCS are scheduled maintenance items required to make sure that TADS turret continuity test set is ready for operation at all times. Inspect test set regularly to find any defects and correct them. Follow these rules when performing PMCS:

- Always keep WARNINGs and CAUTIONs in mind.
- Perform before operation, quarterly, and after operation PMCS.
- Perform routine checks as required.
- Cleaning and storage of items not in use are not listed in PMCS and should be performed when necessary.

3-3. PMCS PROCEDURES

PMCS procedures are listed in table 3-2. The Item No. column lists the sequence numbers of all procedures in the table regardless of interval. The interval column tells you when to perform the PMCS: B (before operation) and Q (quarterly). The Item to Be Inspected and Procedure column identifies the equipment area, exact item of equipment, and procedures, including applicable references.

Table 3-2. Preventive Maintenance Checks and Services

Item No.	Interval B	Interval Q	Item to be Inspected Procedure
1			**Control Panel**
	•		a. Check for missing or blown fuse 1A1F1 (18, figure 3-1). Replace fuse 1A1F1 (para 5-4), as required.
	•		b. Check that fuse 1A1F1 is 1 amp, 250 V. Replace incorrect fuse 1A1F1 (para 5-4), as required.
2			**Operational capability**
	•	•	Perform test set operational check (para 3-5).
3			**Battery pack**
		•	Inspect battery pack 1A3 (para 5-2). Replace damaged battery pack 1A3 (para 5-3), as required.

Section III. TEST SET OPERATION

3-4. WARNINGS AND CAUTIONS

The following warnings and cautions apply to all test set operating procedures and should be observed at all times.

WARNING

Accidental actuation of helicopter power plant or hydraulic system, firing of armament, or jettison of canopy or stores may cause severe injury or death. Ensure that helicopter safety procedures (TM 1-1520-238-23) have been performed before beginning this task.

CAUTION

- Wiring harness assembly 1A4W1 and shorting connectors J10, J11, P1 and P3 can be damaged during turret assembly rotation. During wiring harness assembly 1A4W1 continuity test, shorting connectors and wiring harness assembly 1A4W1 should be secured to prevent rubbing against, or snagging other parts, and turret assembly should be rotated slowly when manually driven.
- Exposed surfaces of TADS/PNVS shroud and boresight assembly windows are easily contaminated or damaged. Do not contact window surfaces.
- These procedures should be performed using two persons.

3-5. TEST SET OPERATIONAL CHECK

This paragraph provides procedures for testing test set indicator lamps, latch circuitry, meter/monitor circuitry, self-test connector and switch assemblies, and interface cable W1, using HP8842 digital multimeter, before testing wiring harness assembly 1A4W1. If test set fails operational check (table 3-3), replace lamps and fuse, or have test set repaired, as indicated.

3-5. TEST SET OPERATIONAL CHECK (cont)

Table 3-3. Test Set Operational Check

Step	Task	Results
1	Position test set switches as follows: Switch — Setting **S1/LOOP SELECT** — **1** **S2/BATTERY** — **OFF** **S3/BRAKE RELEASE** — **OFF** **S4/LATCH ON** — **OFF** **S7/EXT. MONITOR/ INT. METER** — **INT. METER** **S9/SHIELD INT** — **OFF** Ensure that meter M1 indicates zero.	
2	Set **S2/BATTERY** switch to ON.	Meter **M1** indicates 48 to 52.
3	Press and hold **S5/BATTERY/LAMP** test switch.	All indicators on and meter **M1** indicates greater than 82.
4	Release S5/BATTERY/LAMP test switch.	
5	Set **S4/LATCH ON** switch to **ON**.	**GOOD** indicator on and **OPEN** and **GND** indicators off.
6	Press and release **S6/LATCH TEST** switch.	**GOOD**, **OPEN**, and **GND** indicators on.
7	Press and release **S8/LATCH RESET** switch.	**GOOD** indicator on and **OPEN** and **GND** indicators off.
8	Set **S4/LATCH ON** switch to **OFF**.	
9	Set **S7/EXT. MONITOR/INT. METER** switch to **EXT. MONITOR**.	**GOOD** indicator off and meter M1 indicates approximately zero.
10	Set **S7/EXT. MONITOR/INT. METER** switch to **INT. METER**.	**GOOD** indicator on and meter M1 indicates 48 to 52.
11	Set **S2/BATTERY** switch to **OFF**.	

Table 3-3. Test Set Operational Check - Continued

Step	Task	Results
12	Connect interface cable W1 connectors to test set connectors as follows: W1 — Test Set W1P1 — 1A1J1 W1J1 — 1A2P1 W1J2 — 1A2P2 W1J3 — 1A2P3 W1J4 — 1A2P4	
13	Connect self-test connector assemblies to test set connectors as follows: Self Test — Test Set P1 — 1A2J1 P2 — 1A2J2 P3 — 1A2J3 P5 — 1A2J5 P8 — 1A2J8 J1 — 11A2P11 P9 — 1A2J9 J10 — 1A2P10	
14	Set **S2/BATTERY** switch to **ON**.	**BATTERY** and **GOOD** indicators on and meter **M1** indicates 48 to 52.
15	Set **S3/BRAKE RELEASE** switch to **ON**.	**BRAKE RELEASE** indicator on.
16	Set **S3/BRAKE RELEASE** switch to **OFF**.	**BRAKE RELEASE** indicator off.
17	Set **S1/LOOP SELECT** switch to **2**.	**GOOD** indicator on and meter **M1** indicates 48 to 52.
18	Set **S1/LOOP SELECT** switch to **3**.	**GOOD** indicator on and meter **M1** indicates 48 to 52.
19	Set **S1/LOOP SELECT** switch to **4**.	**GOOD** indicator on and meter **M1** indicates 48 to 52.
20	Set **S1/LOOP SELECT** switch to **5**.	**GOOD** indicator on and meter **M1** indicates 48 to 52.
21	Set **S1/LOOP SELECT** switch to **6**.	**GOOD** indicator on and meter **M1** indicates 48 to 52.
22	Push and hold **S1/GIMBAL LIMIT** switch to **AZ L/ EL DOWN**.	**AZ** and **EL** indicators on.

Table 3-3. Test Set Operational Check - Continued

Step	Task	Results
23	Release **S1/GIMBAL LIMIT** switch to center position.	**AZ** and **EL** indicators off.
24	Push and hold **S1/GIMBAL LIMIT** switch to **AZ R/ EL UP**.	**AZ** and **EL** indicators on.
25	Release S1/GIMBAL LIMIT switch to center position.	**AZ** and **EL** indicators off.
26	Set **S1/LOOP SELECT** switch to **2**.	
27	Set multimeter to read DC voltage and connect multimeter leads between test set test points 1A2TP1 (high) on self test panel and 1A1TP2 (low) on control panel.	Multimeter indicates 0.6 to 1.0 VDC and meter **M1** indicates 48 to 52.
28	Adjust **RANGE** control fully counterclockwise.	
29	Press and hold **S2/RANGE** switch until step 30 has been completed.	Multimeter indicates less than 2 VDC, meter **M1** indicates less than 40, and **GOOD** indicator off.
30	Slowly rotate **RANGE** control clockwise while observing results.	**GOOD** indicator just on. Multimeter indicates 1.96 to 2.16 VDC, and meter **M1** indicates 40 to 44; **GOOD** indicator just off. Multimeter indicates 2.73 to 2.93 VDC, and meter **M1** indicates 54 to 58; **OPEN** indicator just on. Multimeter indicates 3.48 to 3.78 VDC, and meter **M1** indicates 71 to 75.
31	Release **S2/RANGE** switch.	Meter **M1** indicates 48 to 52.
32	Set **S1/LOOP SELECT** switch to **4**.	
33	Set multimeter to read DC voltage and connect multimeter leads between test set control panel test points 1A1TP3 (high) and 1A1TP2 (low).	
34	Press and hold **S8/LATCH RESET** switch.	Multimeter indicates 2.3 to 2.7 VDC.
35	Release S8/LATCH RESET switch.	
36	Disconnect multimeter leads from test set control panel test points 1A1TP3 and 1A1TP2.	
37	Set S2/BATTERY switch to OFF.	

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS

This paragraph provides procedures for wiring harness assembly 1A4W1 continuity, resistance, and resolver excitation tests.

INITIAL SETUP

Tools:

Nomenclature	Part Number
Multimeter, digital	HP8842 (or equivalent)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

References:

TM 1-1270-476-T
TM 1-1270-476-20
TM 1-1270-476-30
TM 1-1520-238-23

Equipment Conditions:

Ref	Condition
Para 3-5	Test set operational check performed
TM 1-1520-238-23	Helicopter safed

PROCEDURE

1. Access pilot station (TM 1-1520-238-23).
2. Make sure that **ELEC PWR** panel **BATT/OFF/EXT PWR** switch is set to **OFF**.
3. Access copilot gunner station.
4. Open auxiliary circuit breaker panel No. 2 **TADS DC** and **TADS AC** circuit breakers.
5. Loosen two captive screws (1, fig. 3-2) and open left side fairing assembly (2).
6. Remove access cover (3) (TM 1-1270-476-20).

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)

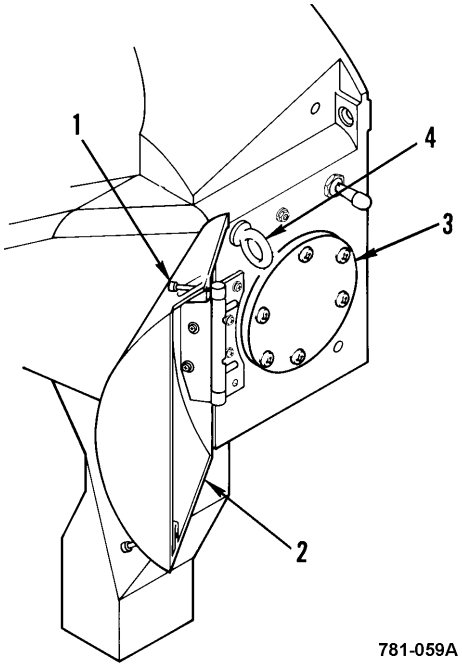


Figure 3-2. Left Side Fairing Assembly

7. Disconnect wiring harness assembly 1A4W1 connectors from aircraft interface assembly wiring harness 1A1W2 (fig. 3-3) as follows:

1A4W1	1A1W2
P3	J9
P1	J10
P2	J11
P4	J7

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)

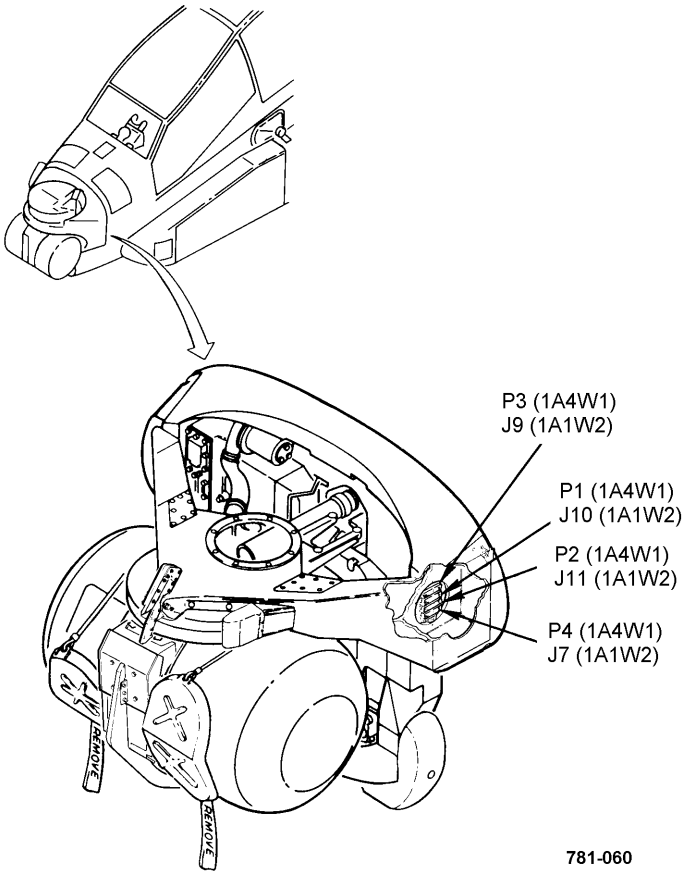


Figure 3-3. Aircraft Interface Assembly 1A1W2 Connector Locations

8. Attach test set interface cable W1 hook to aircraft interface assembly eyebolt (4, fig. 3-2) and connect interface cable W1 connectors to wiring harness assembly 1A4W1 connectors as follows:

W1	1A4W1
J1	P1
J2	P2
J3	P3
J4	P4

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)

CAUTION

To avoid damage, shorting connectors J10, J11, P1, and P3, and wiring harness assembly 1A4W1 must be secured and turret assembly rotated slowly when manually driven.

NOTE

The TADS turret can be rotated by hand using the test set to release gimbal brakes during the following procedure. Brake release voltage is routed to the azimuth and elevation motor brakes through W1J4/1A4W1P4 connectors. The turret is turned by hand after test set **BATTERY** and **BRAKE RELEASE** switches are set to **ON**. To conserve battery power, set **BRAKE RELEASE** switch to **OFF** after turning the turret to the desired position.

9. Remove day sensor shroud assembly (TM 1-1270-476-20).

10. Remove night sensor shroud assembly (TM 1-1270-476-20).

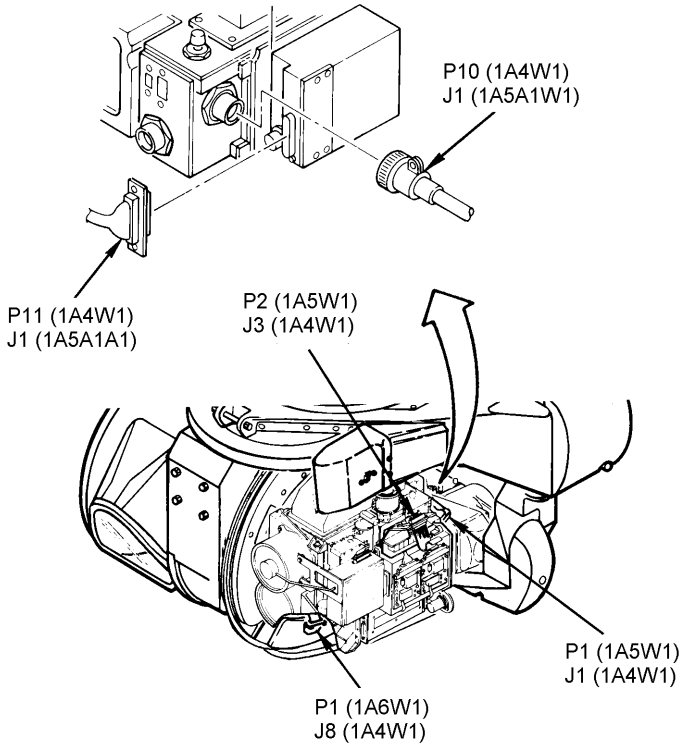
11. Disconnect wiring harness assembly 1A4W1 connectors from day sensor assembly 1A5 and night sensor assembly 1A3 connectors (fig. 3-4) as follows:

1A4W1	Sensor
J1	DSA 1A5W1P1
J3	DSA 1A5W1P2
P10	DSA 1A5W1J1
P11	DSA 1A5W1J1
J2	NSA 1A3W10P1

12. Remove aft ice fairing (TM 1-1270-476-20).

13. Disconnect test connector cover from connector 1A4W1J9 (fig. 3-5). If test connector cover has socket head screwlocks, use 1/16 inch hex key.

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)



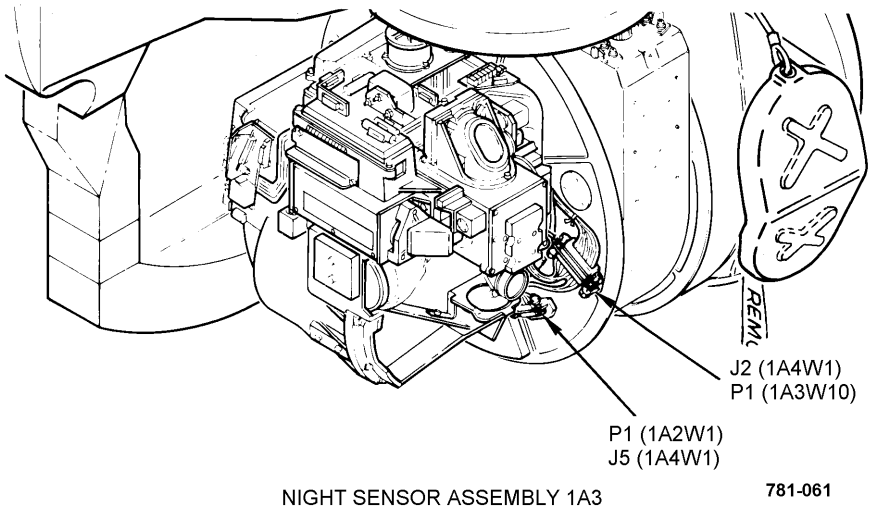


Figure 3-4. Day Sensor Assembly 1A5 and Night Sensor Assembly 1A3 Connector Locations

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)

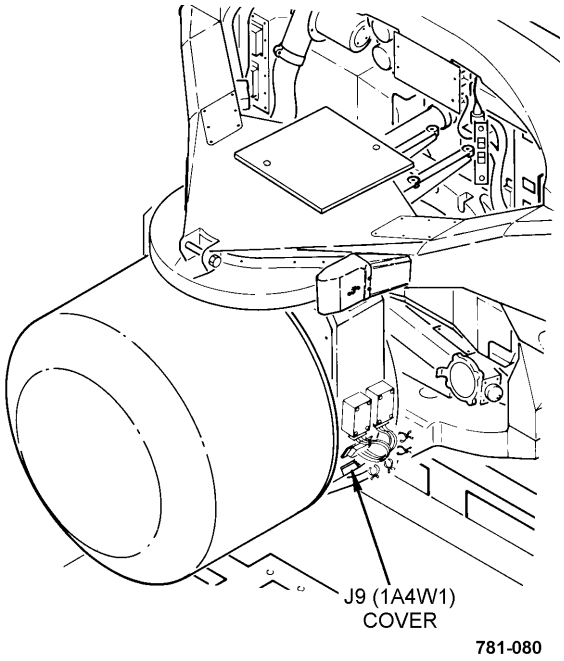


Figure 3-5. Azimuth Gimbal Assembly Connector Locations

14. Connect test set AVUM/AVIM self-test connector assemblies to wiring harness assembly 1A4W1 as follows:

Self Test	1A4W1
P9	J9 (TEST)
P1	J1 (DSA)
P3	J3 (DSA)
J10	P10 (DSA)
J11	P11 (DSA)
P8	J8 (DSA SHROUD)
P2	J2 (NSA)
P5	J5 (NSA SHROUD)

15. Set test set switches as follows:

Switch	Setting
S1/LOOP SELECT	**2**
S7/EXT. MONITOR/ INT. METER	**INT. METER**
S2/BATTERY	**ON**
S3/BRAKE RELEASE	**ON**
S4/LATCH ON	**ON**
S9/SHIELD INT	**OFF**

3-6. WIRING HARNESS ASSEMBLY 1A4W1 TESTS (cont)

16. Perform wiring harness assembly 1A4W1 test procedures in table 3-4 while observing test set indications listed below. If an indication is other than that listed below, check for damaged wires on accessible parts of wiring harness. If damage is seen, note areas where damage has occurred for later repair, and replace turret assembly (TM 1-1270-476-30).

    GOOD indicator is on
    OPEN indicator is off
    GND indicator is off
    AZ indicator lights as turret assembly reaches azimuth limits
    EL indicator lights as turret assembly reaches elevation limits

17. Perform test set operational check (table 3-3) steps 1 thru 25.

18. Set test set S2/BATTERY switch to OFF.

19. Disconnect interface cable W1 and self test connector J10 from test set and store in case cover.

20. Install access cover (3, fig. 3-2) (TM 1-1270-476-20).

21. Close left side fairing assembly (2) and tighten two captive screws (1). Do not overtighten screws.

Table 3-4. Wiring Harness Assembly 1A4W1 Tests

Step	Action	Indication
CONTINUITY TESTS		
1	Rotate turret left in azimuth.	**AZ** indicator lights.
2	Rotate turret right in azimuth.	**AZ** indicator lights.
3	Repeat steps 1 and 2 above with **S1/LOOP SELECT** switch set to **3**, **4**, **5**, and **6**.	
4	Rotate turret in azimuth until forward position is reached.	
5	Set **S1/LOOP SELECT** switch to **2**.	
6	Rotate turret up in elevation.	**EL** indicator lights.
7	Rotate turret down in elevation.	**EL** indicator lights.
8	Repeat steps 6 and 7 with **S1/LOOP SELECT** switch set to **3**, **4**, **5**, and **6**.	
RESISTANCE TESTS		
9	Set **S1/LOOP SELECT** switch to **2**.	
10	Set **S7/EXT. MONITOR/INT. METER** switch to **EXT. MONITOR.**	

Table 3-4. Wiring Harness Assembly 1A4W1 Tests - Continued

Step	Action	Indication
11	Set multimeter to read resistance and connect multimeter leads between test set control panel test points 1A1TP3 and 1A1TP4. Rotate turret in azimuth (left/right) and elevation (up/down). Stop at approximately 20 degree increments and note multimeter resistance indication. Record highest indication.	Multimeter indicates 631 to 771 ohms.
12	Set **S1/LOOP SELECT** switch to **3**. Record highest indication.	Multimeter indicates 140 to 233 ohms.
13	Set **S1/LOOP SELECT** switch to **4**. Record highest indication.	Multimeter indicates 3 to 9 ohms.
14	Set **S1/LOOP SELECT** switch to **5**. Record highest indication.	Multimeter indicates 226 to 276 ohms.
15	Set **S1/LOOP SELECT** switch to **6**. Record highest indication.	Multimeter indicates 633 to 773 ohms.
RESOLVER EXCITATION TEST		
16	Set **S1/LOOP SELECT** switch to **5**.	
17	Press and hold **S8/LATCH RESET** switch.	Multimeter indicates 25 to 40 ohms.
18	Press and hold S8/LATCH RESET switch and rotate turret in azimuth from left to right gimbal stop. Stop at approximately every 20° increment and note multimeter resistance indication. Record highest resistance reading.	Multimeter indicates 25 to 40 ohms when turret is not moving.
19	Press and hold S8/LATCH RESET switch and rotate turret in elevation from up to down gimbal stop. Stop at approximately every 20° increment and note multimeter resistance indication. Record highest resistance indication.	Multimeter indicates 25 to 40 ohms when turret is not moving.
20	Disconnect multimeter leads from test set control panel test points 1A1TP3 and 1A1TP4.	

Table 3-4. Wiring Harness Assembly 1A4W1 Tests - Continued

Step	Action	Indication
21	Set test set switches as follows: Switch — Setting **S1/LOOP SELECT — 2** **S7/EXT. MONITOR/ INT. METER — INT. METER** **S2/BATTERY — OFF** **S3/BRAKE RELEASE — OFF** **S4/LATCH ON — OFF** **S9/SHIELD INT. — OFF**	
22	Disconnect test set AVUM/AVIM self-test connector assemblies from wiring harness assembly 1A4W1 connectors as follows: Self Test — 1A4W1 P9 — J9 (TEST) P1 — J1 (DSA) P3 — J3 (DSA) J10 — P10 (DSA) J11 — P11 (DSA) P8 — J8 (DSA SHROUD) P2 — J2 (NSA) P5 — J5 (NSA SHROUD)	
23	Connect AVUM/AVIM self-test connector assemblies to test set connectors as follows: Self Test — Test Set P1 — J1 P2 — J2 P3 — J3 P5 — J5 P8 — J8 J11 — P11 P9 — J9 J10 — P10	

Table 3-4. Wiring Harness Assembly 1A4W1 Tests - Continued

Step	Action	Indication
24	Connect wiring harness assembly 1A4W1 connectors to day sensor assembly 1A5 and night sensor assembly 1A3 connectors (fig. 3-4) as follows: 1A4W1 — Sensor J1 — DSA 1A5W1P1 J3 — DSA 1A5W1P2 P10 — LTU 1A5A1W1J1 P11 — LTR 1A5A1A1J1 J2 — NSA 1A3W10P1	
25	Connect test connector cover to wiring harness assembly 1A4W1J9(fig. 3-5). **NOTE** If wiring harness assembly 1A4W1 is being tested as part of TADS turret troubleshooting in TM 1-1270-476-T, ensure that no further testing is required before performing steps 26 through 31.	
26	Reinstall aft ice fairing (TM 1-1270-476-20).	
27	Reinstall day sensor shroud assembly (TM 1-1270-476-20).	
28	Reinstall night sensor shroud assembly (TM 1-1270-476-20).	
29	Move turret assembly to stow.	
30	Disconnect test set interface cable W1 connectors from wiring harness assembly 1A4W1 connectors as follows: W1 — 1A4W1 J1 — P1 J2 — P2 J3 — P3 J4 — P4	
31	Detach test set interface cableW1 hook from aircraft interface assembly eyebolt (4, fig. 3-2).	

Table 3-4. Wiring Harness Assembly 1A4W1 Tests - Continued

Step	Action	Indication
32	Connect wiring harness assembly 1A4W1 connectors to aircraft interface assembly wiring harness1A1W2 (fig. 3-3) connectors as follows:	
	1A4W1 — 1A1W2	
	P3 — J9	
	P1 — J10	
	P2 — J11	
	P4 — J7	

CHAPTER 4

GENERAL MAINTENANCE

4-1. CLEANING

INITIAL SETUP

Materials:

Detergent (item 3)
Rag, wiping (item 6)

PROCEDURE

Using water and detergent (item 3, appendix C), remove light dirt and grease from exterior of case. Rinse and dry, using wiping rag (item 6, appendix C).

4-2. ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES

The test set contains ESDS devices that are exposed when the test set control panel is open. An ESDS device is an electronic component which can be damaged by an electrostatic charge or discharge through its conductors. These parts and their assemblies are identified by the ESDS symbol shown below.

Refer to TM 1-1270-476-30, DOD-STD-1686, and DOD-HDBK-263 for information and instructions for handling ESDS devices.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE

Section I. BATTERY CHARGER MAINTENACE

5-1. PLUG CONNECTOR REPLACEMENT

INITIAL SETUP

Materials (Appendix C):

Solder (item 7)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

REMOVAL

1. Unscrew barrel (1, fig. 5-1) from plug connector (2) and slide back on wire.
2. Remove contact (3) from plug connector (2).
3. Unsolder wire from contact (3).

INSTALLATION

4. Solder wire to replacement contact (3).
5. Install contact (3) on plug connector (2).
6. Install barrel (1) on plug connector (2).

5-1. PLUG CONNECTOR REPLACEMENT (cont)

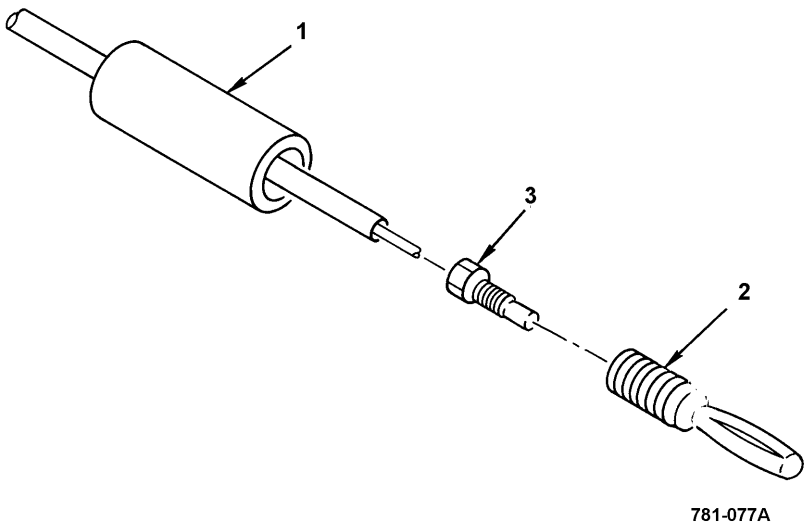


Figure 5-1. Plug Connector Removal and Installation

Section II. BATTERY PACK 1A3 MAITENANCE

5-2. BATTERY PACK 1A3 INSPECTION AND CHARGING

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman supplemental tool set	SC4933-95-CL-A14-HR
Battery charger	13231231
Goggles, safety, acid-type	GGG-531CL1
Multimeter, digital	HP8842 (or equivalent)
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials:

Vinegar

Personnel Required:

68X Aircraft Armament/Electrical Repairer

INSPECTION

WARNING

BATTERY ELECTROLYTE

Battery electrolyte is highly caustic. Do not get it in your eyes or on your skin. Wear acid-type safety goggles, rubber gloves, sleeves, and apron when handling contaminated items. If you get it in your eyes, get medical aid at once. If you get it on your skin, wash immediately with running water.

5-2. BATTERY PACK 1A3 INSPECTION AND CHARGING (cont)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

1. Remove battery pack 1A3 (para 5-3).

2. Check that battery cases are not swelled, cracked, ruptured, or discolored. If one battery case is damaged, replace batteries 1A3BT1 thru 1A3BT4 (para 6-1) and dispose of removed batteries 1A3BT1 thru 1A3BT4 in accordance with local standard operating procedures.

3. Check that connector 1A3J1 is not corroded. If connector 1A3J1 is corroded, replace connector 1A3J1 (para 6-2).

4. Check for signs of electrolyte leakage. If battery pack 1A3 does not show signs of electrolyte leakage, reinstall battery pack 1A3 (para 5-3). If battery pack 1A3 shows signs of electrolyte leakage, replace batteries 1A3BT1 thru 1A3BT4 (para 6-1) and dispose of removed batteries 1A3BT1 thru 1A3BT4 in accordance with local standard operating procedures; then do the following:

   a. Check test set electronic components for electrolyte contamination. If electronic components are contaminated, identify and note contaminated components for subsequent replacement.

   b. Flush contaminated areas of test set with vinegar and water solution. Allow solution to remain on contaminated areas for 5 minutes to neutralize electrolyte.

   c. Flush contaminated areas with clean water and allow to air dry. Hot air gun can be used to speed drying.

   d. If contaminated electronic components are noted, replace noted contaminated electronic components (chapter 6), then go to step e.

   e. Obtain replacement battery pack 1A3 and inspect it. See steps 2 through 4.

   f. Install replacement battery pack 1A3 (para 5-3).

5-2. BATTERY PACK 1A3 INSPECTION AND CHARGING (cont)

CHARGING

NOTE

- If battery pack 1A3 has been severely discharged, charging current may remain very low (1-3 mA) for the first two hours of recharging. If charging current does not increase after two hours, battery pack 1A3 must be replaced (para 5-3).
- Do not short battery terminals of suspected dead battery pack 1A3. Shorting battery terminals will significantly reduce battery life expectancy. Under normal charge (discharge to 60% capacity) battery pack 1A3 can last up to 500 recharge cycles (250 cycles average).

1 Set multimeter to read DC milliamperes (150 mA minimum initial setting).

2. Connect multimeter positive lead to battery charger red (+) lead.

3. Connect multimeter negative lead to battery pack test point 1A3TP1 (red).

4. Connect battery charger black (-) lead to battery pack test point 1A3TP2 (black).

5. Connect battery charger to 115 VAC, 60 Hz outlet. Current monitored on multimeter should be less than 150 milliamperes.

6. Allow battery pack 1A3 to charge until multimeter indicates steady current between 60 and 90 milliamperes (97% charge in 3 to 8 hours). Battery pack 1A3 will charge to 100% capacity in 16 hours (average).

7. Disconnect battery charger from 115 VAC, 60 Hz outlet.

8. Disconnect multimeter and battery charger leads from battery pack 1A3.

9. Using multimeter, measure DC voltage between battery pack test points 1A3TP1 (+) and 1A3TP2 (-). Voltage should be 24 to 27 VDC.

10. Perform test set operational check (para 3-5).

5-3. BATTERY PACK 1A3 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

CAUTION

- The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.
- When removing or installing battery pack 1A3, use care to avoid damaging wires and components inside test set.

REMOVAL

1. Remove two screws (1, fig. 5-2) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Disconnect connector 1A1P1 (7) from connector 1A3J1 (8).
5. Remove four hex spacers (9) securing battery pack 1A3 (10) to four posts (11).
6. Remove battery pack 1A3 (10) from four posts (11) and carefully lift out of chassis (4). Inspect battery pack 1A3 (para 5-2).

5-3. BATTERY PACK 1A3 REPLACEMENT (cont)

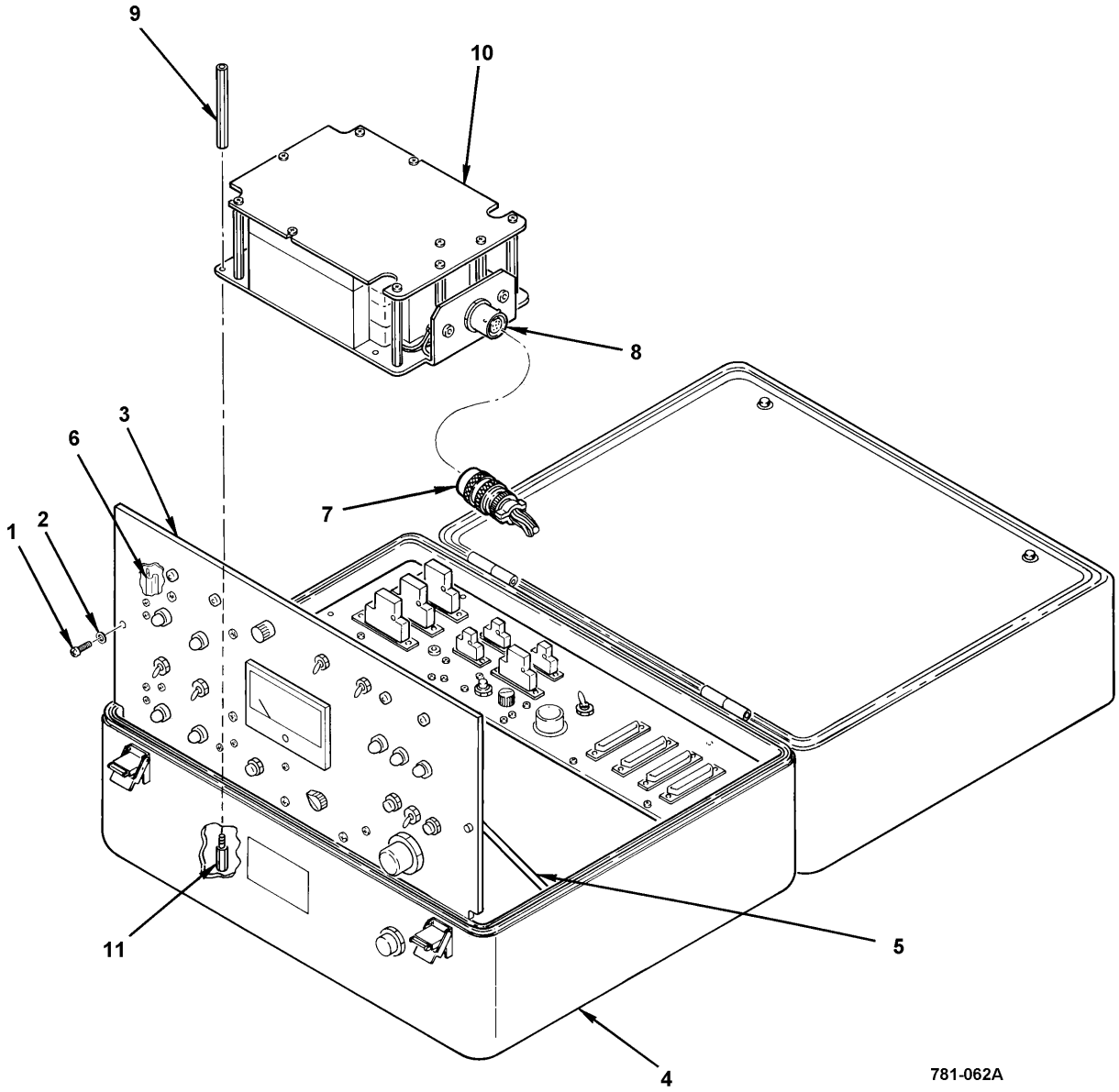


Figure 5-2. Battery Pack 1A3 Removal and Installation

5-3. BATTERY PACK 1A3 REPLACEMENT (cont)

INSTALLATION

7. Carefully position replacement battery pack 1A3 (10, figure 5-2) on four posts (4) and install four hex spacers (9).

8. Connect connector 1A1P1 (7) to connector 1A3J1 (8).

9. Remove support rod (5) and install in two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3).

10. Install two washers (2) and screws (1) to secure control panel 1A1 (3) to chassis (4).

Section III. CONTROL PANEL 1A1 MAINTENANCE

5-4. FUSE 1A1F1 REPLACEMENT

INITIAL SETUP

Personnel Required:

68X Aircraft Armament/Electrical Repairer

REMOVAL

1. Remove cap (1, fig. 5-3) and fuse 1A1F1 (2) from fuseholder 1A1XF1 (3).

INSTALLATION

2. Insert fuse 1A1F1 (2) into cap (1) and install on fuse holder 1A1XF1 (3).

5-4. FUSE 1A1F1 REPLACEMENT (cont)

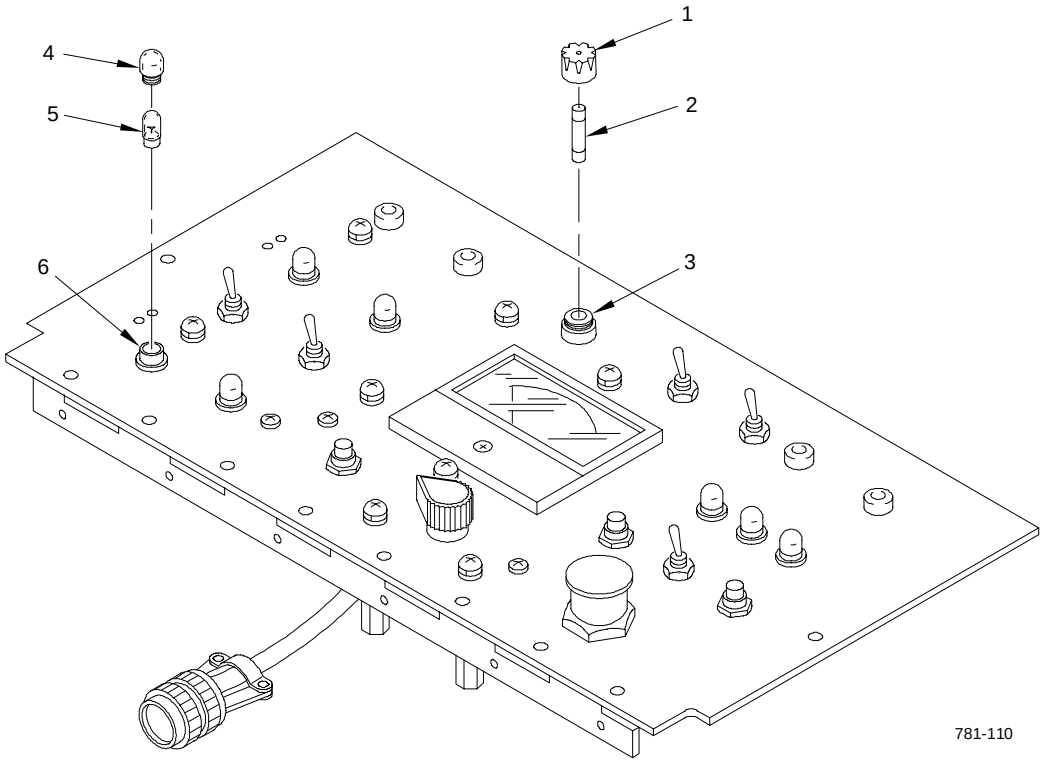


Figure 5-3. Control Panel 1A1 Fuse F1 and Lamps DS1 thru DS7 Replacement

5-5. LAMPS 1A1DS1 THRU 1A1DS7 AND LENSES REPLACEMENT

INITIAL SETUP

Personnel Required:

68X Aircraft Armament/Electrical Repairer

NOTE

Replacement procedures for lenses and lamps 1A1DS1 thru 1A1DS7 are the same. Lamp 1A1DS4 is shown.

REMOVAL

1. Remove lens (4, figure 5-3) and lamp 1A1DS4 (5) from lampholder 1A1XDS4 (6).

INSTALLATION

2. Install lamp 1A1DS4 (5) and lens (4).

CHAPTER 6

INTERMEDIATE MAINTENANCE

Section I. BATTERY PACK 1A3 MAITENANCE

6-1. BATTERIES 1A3BT1 THRU 1A3BT4 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman supplemental tool set	SC4933-95-CL-A14-HR

Materials:

Sealing compound (item 1 or 2)
Solder (item 7)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

References:

TM 1-1270-476-30

Equipment Conditions:

Ref	Condition
5-3	Battery pack 1A3 removed

6-1. BATTERIES 1A3BT1 THRU 1A3BT4 REPLACEMENT (cont)

REMOVAL

1. Remove four screws (1, fig. 6-1) and washers (2), six screws (3) lockwashers (4), and washers (5), and plate (6).

2. Remove four screws (7) and two brackets (8) from two side brackets (9).

3. Remove four screws (10) and two brackets (11) from two end brackets (12).

4. Tag and unsolder wires from batteries 1A3BT1 thru 1A3BT4 (13 thru 16).

5. Note polarity of batteries 1A3BT1 thru 1A3BT4; then remove batteries 1A3BT1 thru 1A3BT4 (13 thru 16) from battery holder (17).

INSTALLATION

CAUTION

Batteries arrive from vendor fully charged. Do not short battery terminals.

6. Remove sealing compound from four screws (10 and 7), six screws (3), and four screws (1) (TM 1-1270-476-30).

7. Position batteries 1A3BT1 thru 1A3BT4 (13 thru 16) in battery holder (17) in polarity noted. For batteries 1A3BT2 and 1A3BT3 (14 and 15), install fuse 1A3F1 (para 6-4).

8. Solder wires to batteries 1A3BT1 thru 1A3BT4 (13 thru 16) as tagged; then remove tags.

9. Apply sealing compound to four screws (10) (TM 1-1270-476-30); then position two brackets (11) on two end brackets (12) and install four screws (10).

10. Apply sealing compound to four screws (7) (TM 1-1270-476-30); then position two brackets (8) on two side brackets (9) and install four screws (7).

11. Apply sealing compound to six screws (3) and four screws (1) (TM 1-1270-476-30); then position plate (6) on two end brackets (12) and side brackets (9), and six spacers (18).

12. Install six washers (5), lockwashers (4), and screws (3), and four washers (2) and screws (1).

6-1. BATTERIES 1A3BT1 THRU 1A3BT4 REPLACEMENT (cont)

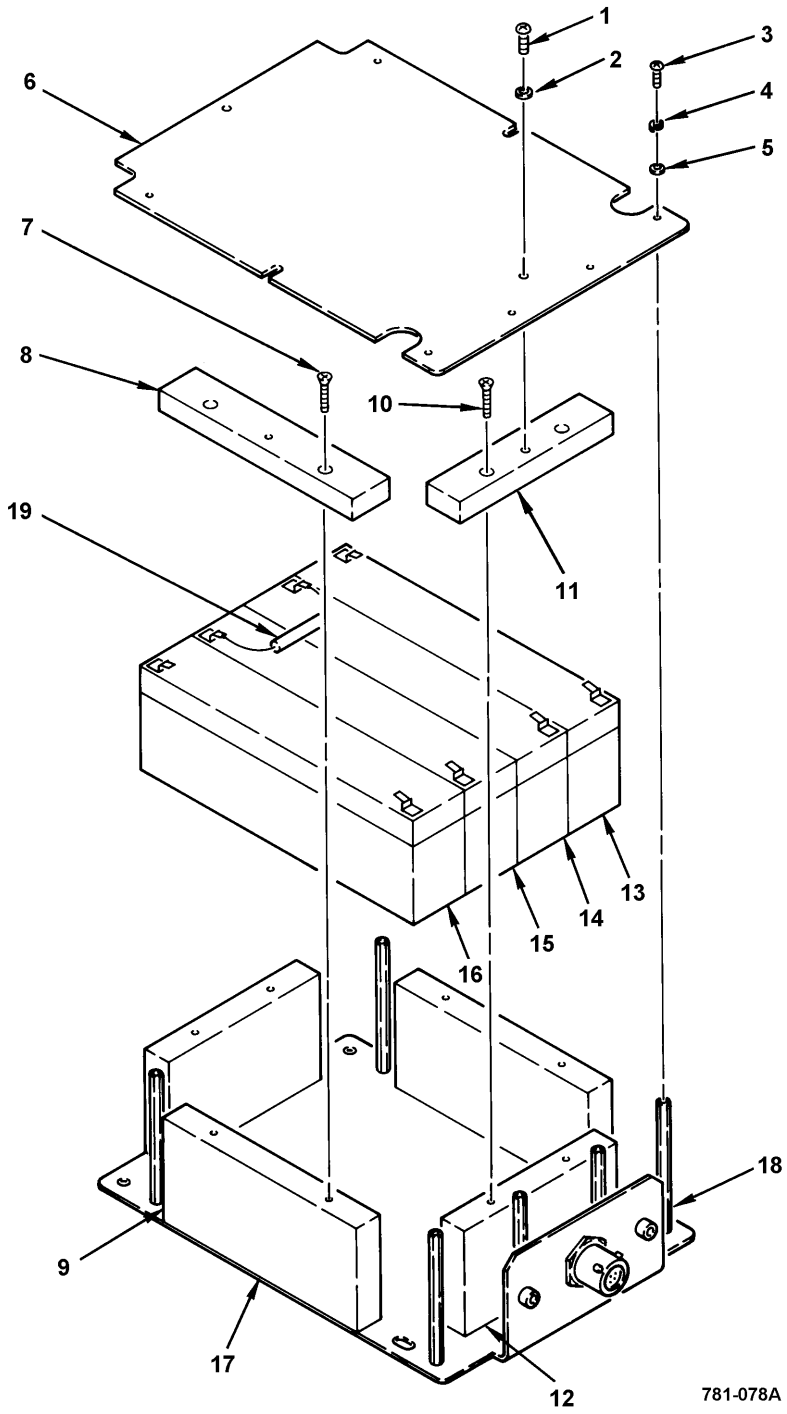


Figure 6-1. Battery Pack 1A3 Component Replacement

6-2. CONNECTOR 1A3J1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Materials (Appendix C):

Sealing compound (item 1 or 2)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

References:

TM 1-1270-476-30

Equipment Conditions:

Ref	Condition
Para 6-1	Batteries 1A3BT1 thru 1A3BT4 removed

REMOVAL

1. Remove two screws (1, fig. 6-2) and washers (2), and end bracket (3) from battery holder (4).
2. Tag and remove connector contacts from connector 1A3J1 (para 6-13).
3. Remove jamnut (5) and connector 1A3J1 (6) from battery holder (4).

INSTALLATION

4. Remove sealing compound from threads of two screws (1) (TM 1-1270-476-30).
5. Position replacement connector 1A3J1 (6) on battery holder (4) and install jamnut (5).
6. Install connector contacts in connector 1A3J1 as tagged (para 6-13). Remove tags.
7. Apply sealing compound to threads of two screws (1) (TM 1-1270-476-30); then position end bracket (3) on battery holder (4) and install two washers (2) and screws (1).
8. Install batteries 1A3BT1 thru 1A3BT4 (para 6-1).

6-2. CONNECTOR 1A3J1 REPLACEMENT (cont)

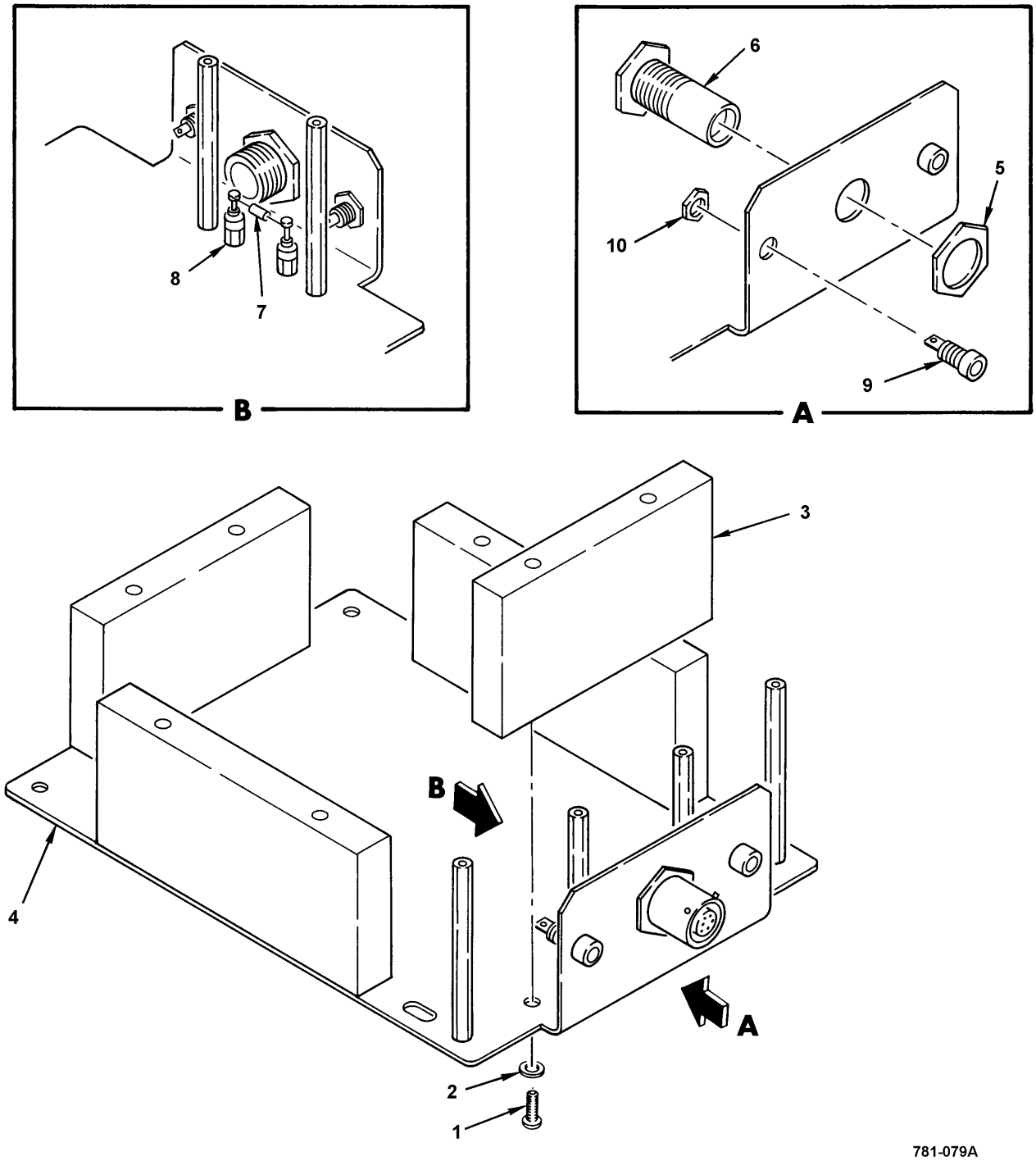


Figure 6-2. Battery Pack 1A3 Component Replacement

6-3. DIODE 1A3CR1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Materials (Appendix C):

Sealing compound (item 1 or 2)
Solder (item 7)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

References:

TM 1-1270-476-30

Equipment Condition:

Ref	Condition
Para 6-1	Batteries 1A3BT1 thru 1A3BT4 removed

REMOVAL

1. Remove two screws (1, fig. 6-2) and washers (2), and end bracket (3) from battery holder (4).
2. Note polarity of diode 1A3CR1 (7); then unsolder diode 1A3CR1 (7) leads from two stud terminals (8).

INSTALLATION

3. Remove sealing compound from threads of two screws (1) (TM 1-1270-476-30).
4. Position replacement diode 1A3CR1 (7) in polarity noted; then solder diode 1A3CR1 (7) leads to two stud terminals (8).
5. Apply sealing compound to threads of two screws (1) (TM 1-1270-476-30); then position end bracket (3) on battery holder (4) and install two washers (2) and screws (1).
6. Install batteries 1A3BT1 thru 1A3BT4 (para 6-1).

6-4. FUSE 1A3F1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool kit	SC5180-95-CL-B09-HR

Materials (Appendix C):

Insulation sleeving (item 4)
Sealing compound (item 1 or 2)
Solder (item 7)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

References:

TM 1-1270-476-30

Equipment Conditions:

Ref	Condition
Para 5-3	Battery pack 1A3 removed

REMOVAL

1. Remove four screws (1, fig. 6-1) and washers (2), six screws (3), washers (4), and lockwashers (5), and plate (6).
2. Unsolder leads of fuse 1A3F1 (19) from terminals of batteries 1A3BT2 and 1A3BT3 (14 and 15).

INSTALLATION

3. Cut length of insulation sleeving same length as fuse 1A3F1 (19).
4. Slide insulation sleeving over lead of fuse 1A3F1 (19) and position so that fuse 1A3F1 (19) is covered. Heat shrink into place.
5. Solder leads of replacement fuse 1A3F1 (19) to terminals of batteries 1A3BT2 and 1A3BT3 (14 and 15).
6. Remove sealing compound from six screws (3) and four screws (1) (TM 1-1270-476-30).
7. Apply sealing compound to threads of six screws (3) and four screws (1); then position plate (6) and install six lockwashers (5), washers (4), and screws (3), and four washers (2) and screws (1).

6-5. TEST POINTS 1A3TP1 AND 1A3TP2 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool kit	SC5180-95-CL-B09-HR

Materials (Appendix C):

Sealing compound (item 1 or 2)
Solder (item 7)

References:

TM 1-1270-476-30

Equipment Conditions:

Ref	Condition
Para 6-1	Batteries 1A3BT1 thru 1A3BT4 removed

NOTE

Replacement procedures for test points 1A3TP1 and 1A3TP2 are the same. Test point 1A3TP2 is shown.

REMOVAL

1. Remove two screws (1, fig. 6-2) and washers (2), and end bracket (3) from battery holder (4).
2. Unsolder wire from test point 1A3TP2 (9).
3. Remove test point 1A3TP2 (9) by removing nut (10).

INSTALLATION

4. Install test point 1A3TP2 (9) on battery holder (4), using nut (8).
5. Solder wire to test point 1A3TP2 (9).
6. Remove sealing compound from threads of two screws (1) (TM 1-1270-476-30).
7. Apply sealing compound to threads of two screws (1) (TM 1-1270-476-30).
8. Position end bracket (3) on battery holder (4) and install two washers (2) and screws (1).
9. Install batteries 1A3BT1 thru 1A3BT4 (para 6-1).

Section II. CONTROL PANEL 1A1 MAINTENANCE

6-6. CONTROL PANEL 1A1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Disconnect connector 1A1P1 (7) from connector 1A3J1 (8).
5. Remove six screws (9) securing hinge (10) to chassis (4).
6. Remove support rod (5); then remove control panel 1A1 (3) from chassis (4).
7. Install support rod (5) into two clips (6) on underside of control panel 1A1 (3).

6-6. CONTROL PANEL 1A1 REPLACEMENT (cont)

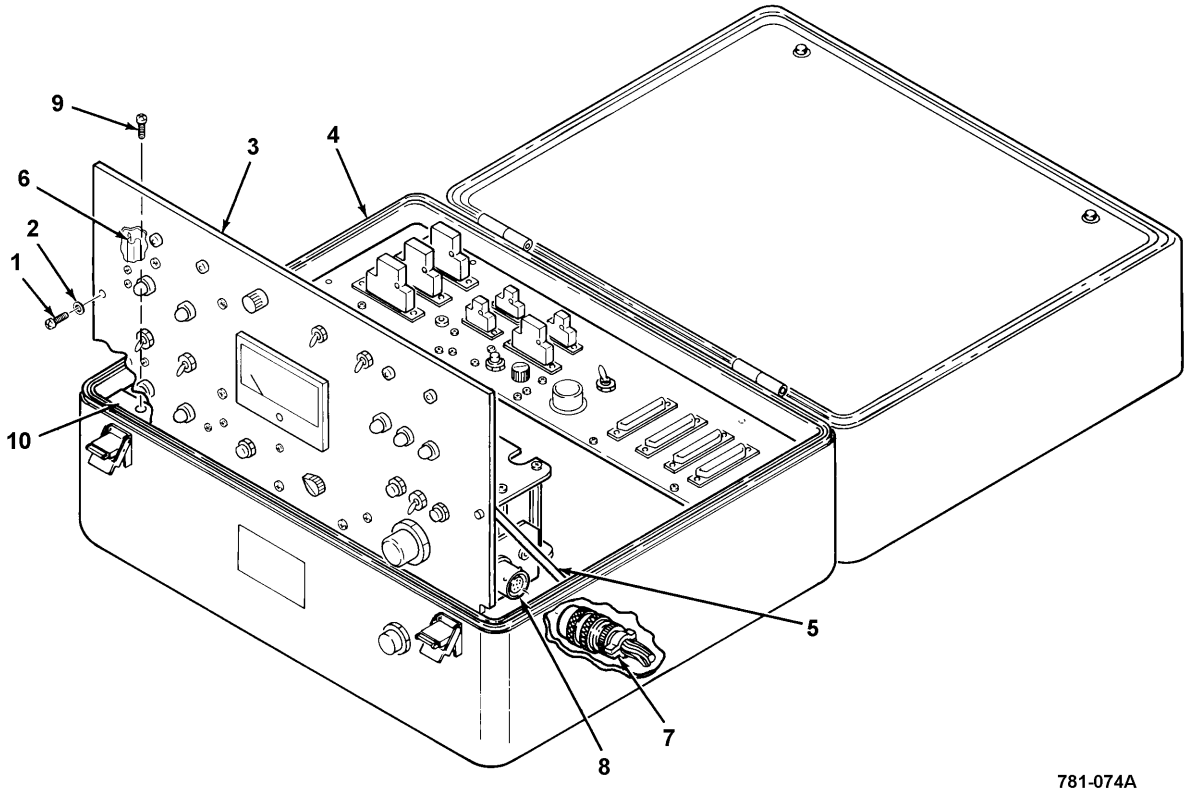


Figure 6-3. Control Panel 1A1 Removal and Installation

INSTALLATION

8. Remove support rod (5) from two clips (6) on underside of replacement control panel 1A1 (3).

9. Position control panel 1A1 (3) on chassis (4) and aline hinge (10) and chassis (4) mounting holes.

10. Secure control panel 1A1 (3) in the vertical position, using support rod (5); then install six screws (9).

11. Connect connector 1A1P1 (7) to connector 1A3J1 (8).

12. Remove support rod (5) and install into two clips on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

13. Perform test set operational check (para 3-5).

6-7. FUSEHOLDER 1A1XF1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Remove cap (1, fig. 6-4) and remove fuse 1A1F1 (2).
5. Tag and unsolder wires from fuseholder 1A1XF1 (3).
6. Remove fuseholder 1A1XF1 (3) and gasket (4) by removing nut (5) and lockwasher (6).

6-7. FUSEHOLDER 1A1XF1 REPLACEMENT (cont)

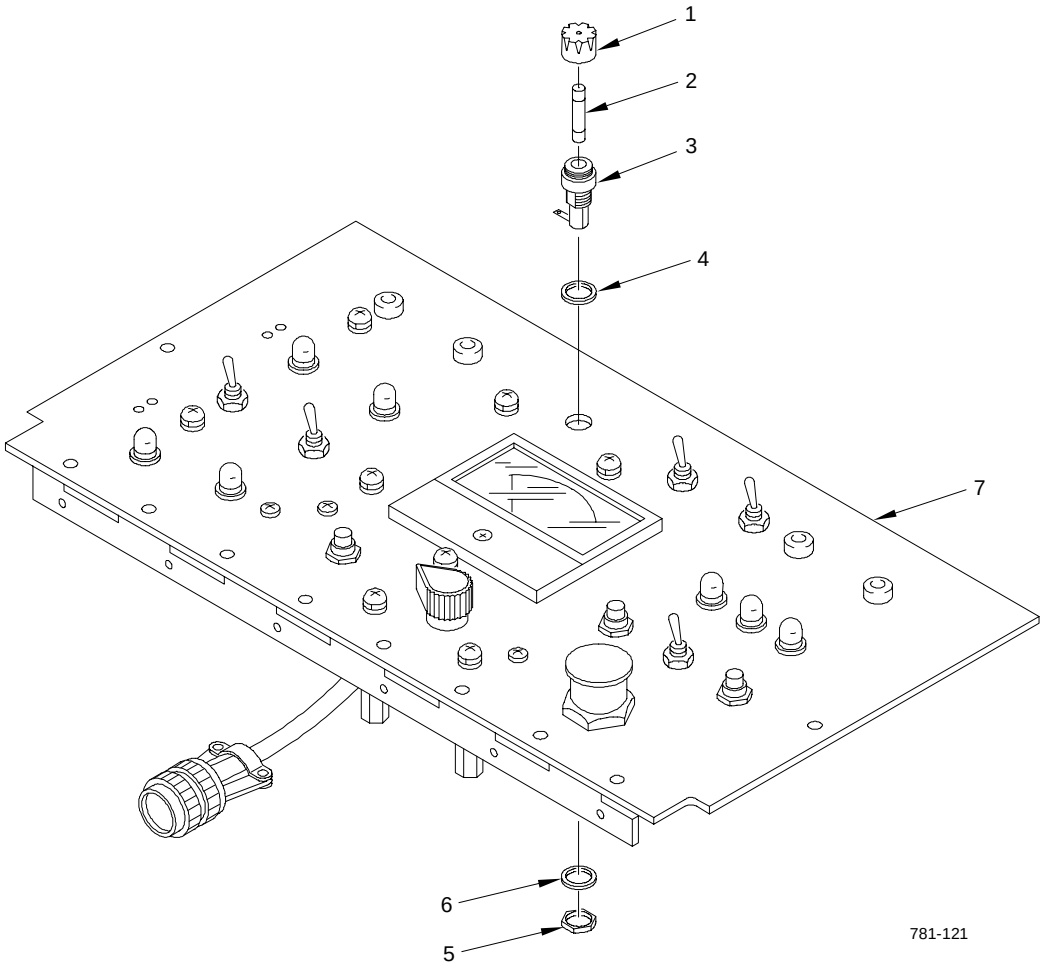


Figure 6-4. Fuseholder 1A1XF1 Replacement

6-7. FUSEHOLDER 1A1XF1 REPLACEMENT (cont)

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

7. Clean area on control panel 1A1 (7) where fuseholder 1A1XF1 (3) is to be installed, using wiping rag moistened with trichloroethane.

8. Position gasket (4) on fuseholder 1A1XF1 (3) and install on control panel 1A1 (7), using lockwasher (6) and nut (5).

9. Solder wires to fuseholder 1A1XF1 (3) as tagged; then remove tags.

10. Install fuse 1A1F1 (2) and cap (1).

11. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

12. Perform test set operational check (para 3-5).

6-8. LAMPHOLDERS 1A1XDS1 THRU 1A1XDS7 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

NOTE

Replacement procedures for lenses, and lampholders 1A1XDS1 thru 1A1XDS7 are the same. Lampholder 1A1XDS4 is shown.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Remove lens (1, fig. 6-5) and lamp (2) from lampholder (3).
5. Tag and unsolder wires from lampholder (3).
6. Remove lampholder (3) by removing nut (4) and lockwasher (5).

6-8. LAMPHOLDERS 1A1XDS1 THRU 1A1XDS7 REPLACEMENT (cont)

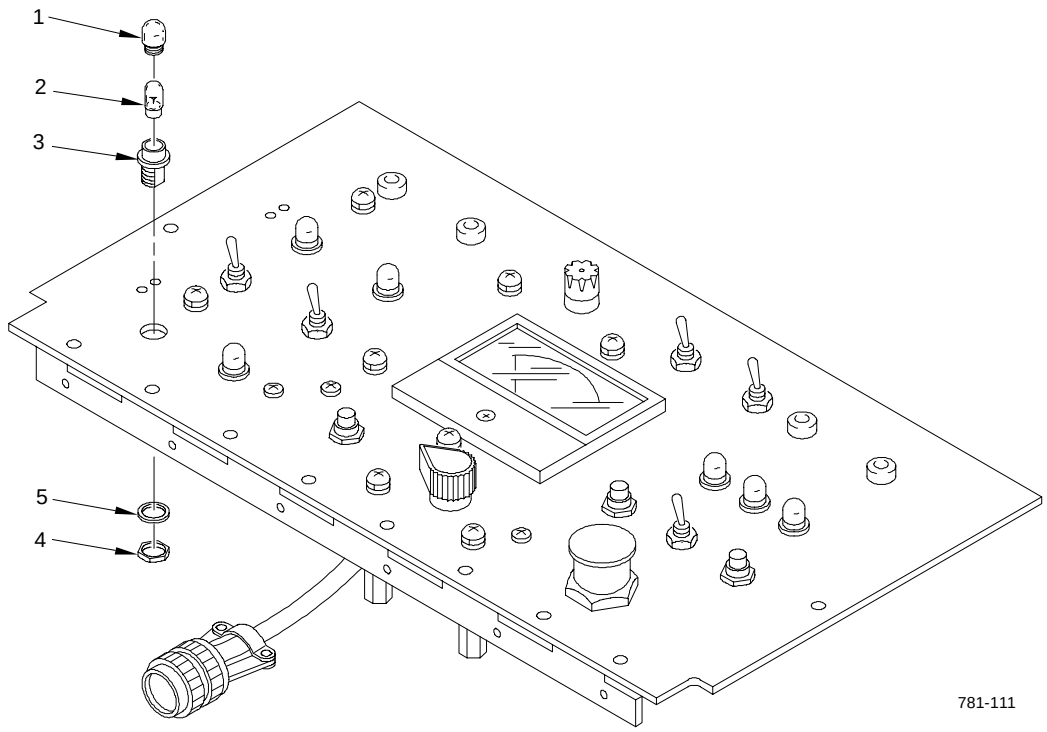


Figure 6-5. Lampholders 1A1XDS1 thru 1A1XDS7

6-8. LAMPHOLDERS 1A1XDS1 THRU 1A1XDS7 REPLACEMENT (cont)

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

7. Clean area on control panel 1A1 (6) where lampholder (3) is to be installed, using wiping rag moistened with trichloroethane.

8. Install lampholder (3) on control panel 1A1 (6), using lockwasher (5) and nut (4).

9. Solder wires to lampholder (3) as tagged; then remove tags.

10. Install lamp (2) and lens (1).

11. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

12. Perform test set operational check (para 3-5).

6-9. METER 1A1M1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Remove four screws (1, fig. 6-6), lockwashers (2), washers (3), and terminal lug (4) securing circuit card assembly 1A1A1 (5) to four posts (6).

CAUTION

When moving circuit card assembly 1A1A1, use care to avoid damaging attached wiring.

5. Move circuit card assembly 1A1A1 (5) to gain access to meter 1A1M1 (7) terminals.
6. Tag and remove wires from meter 1A1M1 (7) + and - terminals by removing two nuts (8), lockwashers (9), and washers (10).
7. Remove meter 1A1M1 (7) by removing two nuts (11).

6-9. METER 1A1M1 REPLACEMENT (cont)

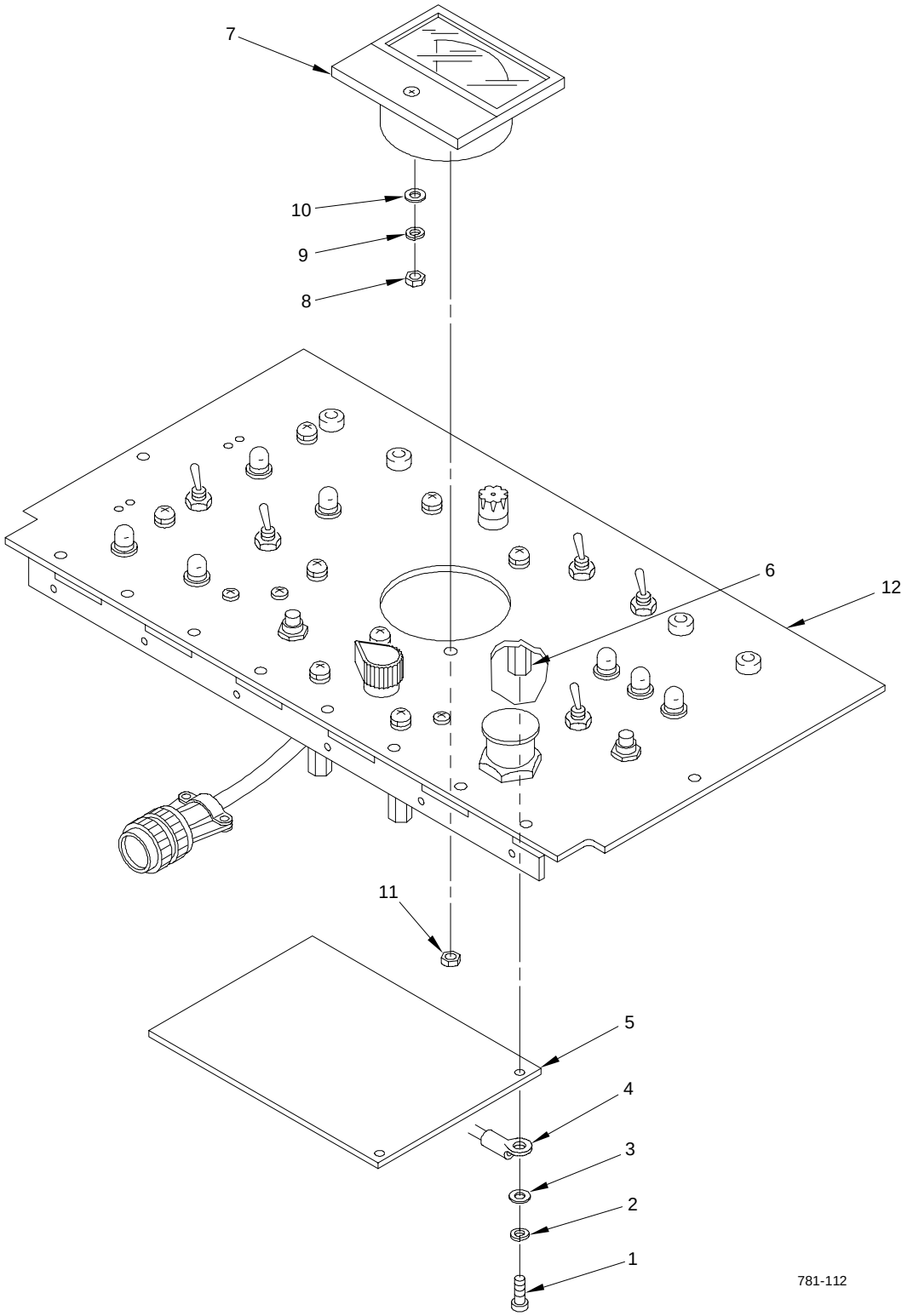


Figure 6-6. Meter 1A1M1 Replacement

6-9. METER 1A1M1 REPLACEMENT (cont)

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

8. Clean area on control panel 1A1 (12) where meter 1A1M1 (7) is to be installed, using wiping rag moistened with trichloroethane.

9. Install meter 1A1M1 (7) on control panel 1A1 (12), using two nuts (11).

10. Install wires on meter 1A1M1 (7) - and + terminals as tagged, using two washers (10), lockwashers (9), and nuts (8). Remove tags.

CAUTION

When moving circuit card assembly 1A1A1, use care to avoid damaging attached wiring.

11. Install circuit card assembly 1A1A1 (5, fig. 6-6) on four posts (6), using terminal lug (4), four washers (3), lockwashers (2), and screws (1).

12. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

13. Perform test set operational check (para 3-5).

6-10. SWITCHES 1A1S2 THRU 1A1S4, 1A1S7, AND 1A1S9 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

6-10. SWITCHES 1A1S2 THRU 1A1S4, 1A1S7, AND 1A1S9 REPLACEMENT (cont)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

NOTE

Replacement procedures for switches 1A1S2 thru 1A1S4, 1A1S7, and 1A1S9 are the same. Switch 1A1S9 is shown.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Tag and remove three wires from switch 1A1S9 (1, fig. 6-7) by removing three screws (2) and lockwashers (3).
5. Remove switch 1A1S9 (1) and keyway washer (4) by removing nut (5) and lockwasher (6).

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don’t: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

6. Clean area on control panel 1A1 (7) where switch 1A1S9 (1) is to be installed, using wiping rag moistened with trichloroethane.

6-10. SWITCHES 1A1S2 THRU 1A1S4, 1A1S7, AND 1A1S9 REPLACEMENT (cont)

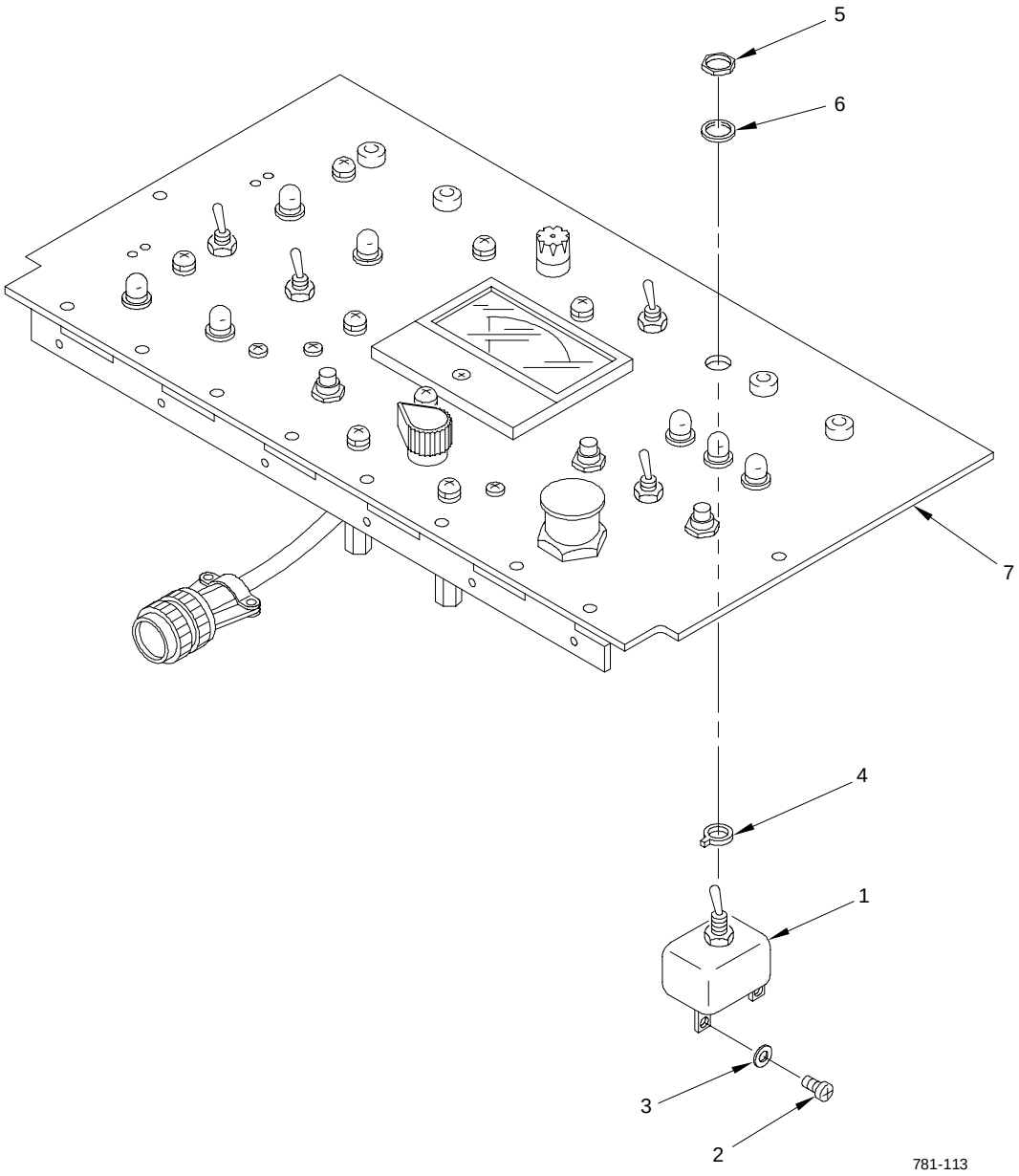


Figure 6-7. Switches 1A1S2 thru 1A1S4, 1A1S7, and 1A1S9

6-10. SWITCHES 1A1S2 THRU 1A1S4, 1A1S7, AND 1A1S9 REPLACEMENT (cont)

7. Position keyway washer (4) on switch 1A1S9 (1) and install on control panel 1A1 (7), using lockwasher (6) and nut (5).

8. Install three wires on switch 1A1S9 (1) as tagged, using three lockwashers (3) and screws (2). Remove tags.

9. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

10. Perform test set operational check (para 3-5).

6-11. SWITCHES 1A1S5, 1A1S6, AND 1A1S8 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

6-11. SWITCHES 1A1S5, 1A1S6, AND 1A1S8 REPLACEMENT (cont)

NOTE

Replacement procedures for switches 1A1S5, 1A1S6, and 1A1S8 are the same. Switch 1A1S8 is shown.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Tag and unsolder four wires from switch 1A1S8 (1, fig. 6-8).
5. Remove switch 1A1S8 (1) and keyway washer (2) by removing nut (3) and lockwasher (4).

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

6. Clean area on control panel 1A1 (5) where switch 1A1S8 (1) is to be installed, using wiping rag moistened with trichloroethane.
7. Position keyway washer (2) on switch 1A1S8 (1) and install on control panel 1A1 (5), using lockwasher (4) and nut (3).
8. Solder four wires on switch 1A1S8 (1) as tagged; then remove tags.
9. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).
10. Perform test set operational check (para 3-5).

6-11. SWITCHES 1A1S5, 1A1S6, AND 1A1S8 REPLACEMENT (cont)

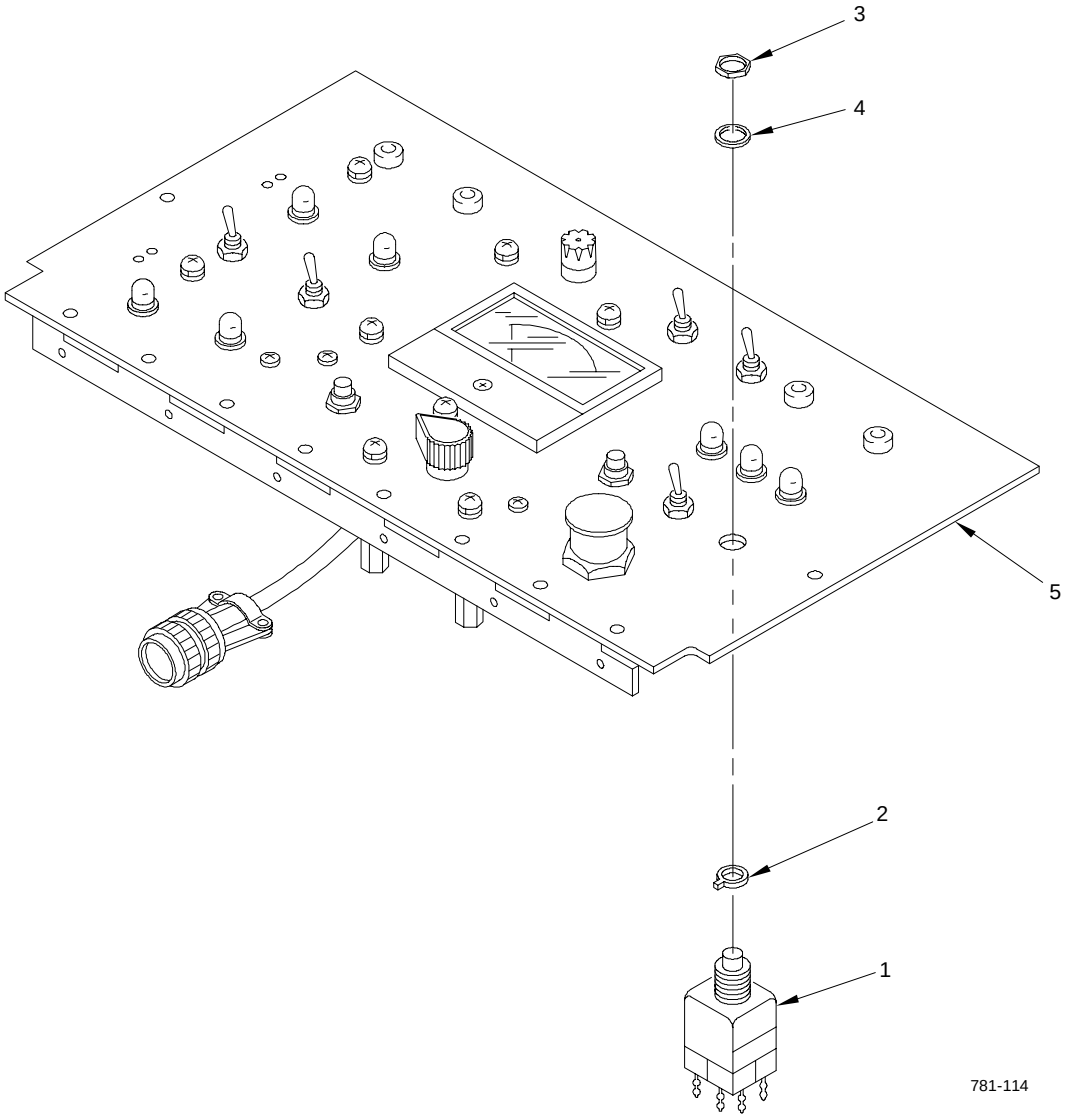


Figure 6-8. Switches 1A1S5, 1A1S6, and 1A1S8

6-12. TEST POINTS 1A1TP1 THRU 1A1TP4 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

NOTE

Replacement procedures for test points 1A1TP1 thru 1A1TP4 are the same. Test point 1A1TP4 is shown.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Unsolder wire from test point 1A1TP4 (1, fig. 6-9) terminal.
5. Remove test point 1A1TP4 (1) by removing nut (2).

6-12. TEST POINTS 1A1TP1 THRU 1A1TP4 REPLACEMENT (cont)

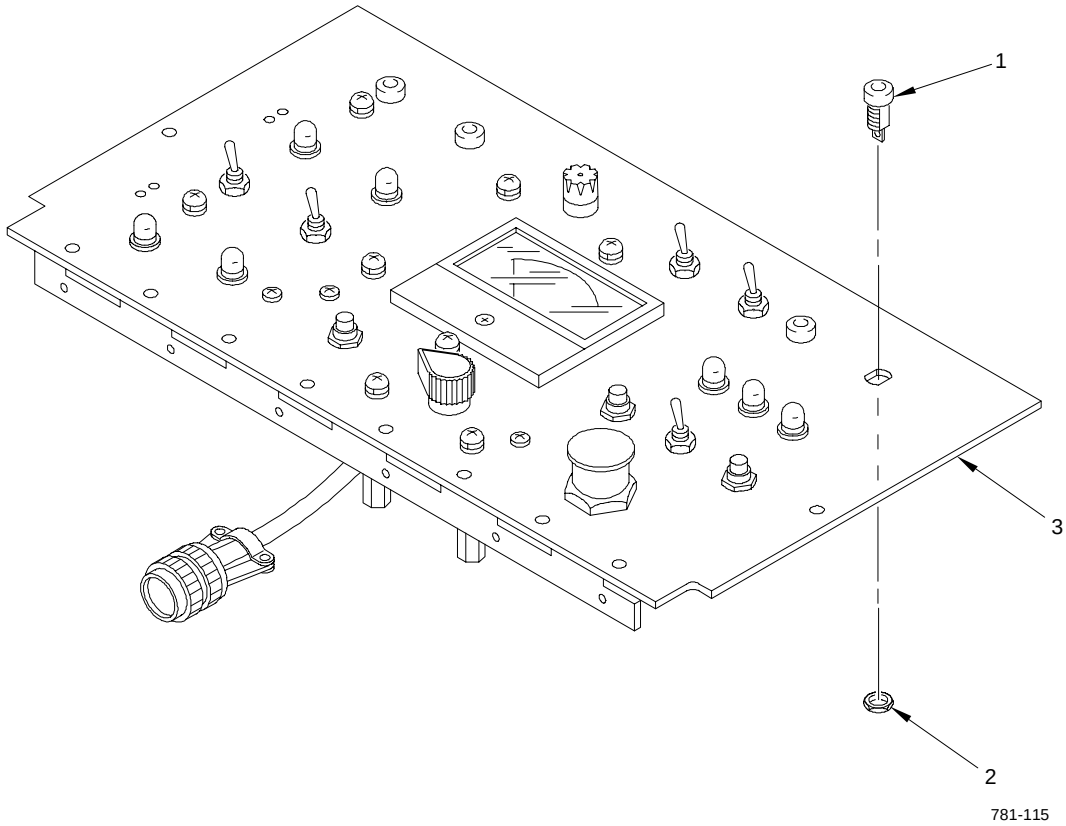


Figure 6-9. Test Points 1A1TP1 thru 1A1TP4

6-12. TEST POINTS 1A1TP1 THRU 1A1TP4 REPLACEMENT (cont)

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

6. Clean area on control panel 1A1 (3) where test point 1A1TP4 (1) is to be installed, using wiping rag moistened with trichloroethane.

7. Install test point 1A1TP4 (1) using nut (2).

8. Solder wire to test point 1A1TP4 (1) terminal.

9. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).

10. Perform test set operational check (para 3-5).

Section III. SELF TEST PANEL 1A2 MAINTENANCE

6-13. CONNECTOR CONTACT REPLACEMENT

This paragraph covers connector contact removal and installation. Table 6-1 lists connector reference designators in alphanumeric order with connector part numbers, replacement contact part numbers, and part numbers of tools required to replace contacts.

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

6-13. CONNECTOR CONTACT REPLACEMENT (cont)

NOTE

Self test panel 1A2 removal is not required for control panel 1A1 and battery pack 1A3 connector pin removal and installation tasks.

REMOVAL

1. Tag wire attached to contact to be replaced.
2. See table 6-1 and determine extraction tool required.
3. Using extraction tool, remove contact from connector.
4. Cut contact from wire as close to contact as possible.

INSTALLATION

5. Strip insulation from wire to expose conductor as follows:
   a. For contact with insulation support barrel, strip wire insulation to length of contact crimp barrel plus 1/32 inch.
   b. For contact without insulation support barrel, strip wire insulation to length of contact crimp barrel plus 1/16 inch.
6. See table 6-1 and determine crimping tool required.
7. Insert contact into crimping tool until fully seated in crimping die.
8. Squeeze crimping tool handles until die engages contact. Do not complete crimp.
9. Insert wire conductor into contact as follows:
   a. For contact with insulation support barrel, insert wire completely into contact until conductor is seated in contact crimp barrel.
   b. For contact without insulation support barrel, insert wire into contact leaving 1/16 inch of conductor exposed between wire insulation and contact crimp barrel.
10. Hold wire in position and squeeze crimping tool handles until ratchet releases. Remove contact from crimping tool.
11. Hold contact in one hand and slightly pull wire with other hand to ensure secure crimp.
12. See table 6-1 and determine insertion tool required.
13. Using insertion tool, insert contact into connector.

6-13. CONNECTOR CONTACT REPLACEMENT (cont)

14. Slide insulation tubing over contact crimp barrel. Do not allow insulation tubing to overlap wire insulation more than 1/4 inch.

15. Remove tag from wire.

16. Install self test panel 1A2 (para 6-18).

17. Perform test set operational check (para 3-5).

Table 6-1. Connector Part Numbers and Replacement Contact Part Numbers

Connector			Tools		
Ref Des	Part Number	Contact Part Number	Crimper	Extract/Insert	Positioner
1A1P1	MS27467T11B98P	MS27493-20	MS3198-1	MS27534-20	MS3198-9P
1A2J1	M24308/2-15F	M39029/57-354	M22520/2-01	M81969/14-01	M22520/2-06
1A2J2	M24308/2-15F	M39029/57-354	M22520/2-01	M81969/14-01	M22520/2-06
1A2J3	M24308/2-15F	M39029/57-354	M22520/2-01	M81969/14-01	M22520/2-06
1A2J5	M24308/2-1F	M39029/63-368	M22520/2-01	M81969/14-02	M22520/2-08
1A2J8	M24308/2-1F	M39029/63-368	M22520/2-01	M81969/14-02	M22520/2-08
1A2J9*	MDM51PSB				
1A2P1	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-02
1A2P2	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-02
1A2P3	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-02
1A2P4	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-02
1A2P10	M83723/77R183IN	M39029/4-110	M22520/2-01	M81969/14-02	M22520/2-02
1A2P11	DBMM-21W1S	DM51155-7	-	-	-
		M39029/64-369	M22520/2-01	M81964/14-02	M22520/2-08
1A3J1	MS27468T11F98S	M39029/56-348	M22520/2-01	M81964/14-01	M22520/2-07
J5	M24308/4-3F	M39029/64-369	M22520/2-01	M81964/14-02	M22520/2-08
J6	M24308/4-3F	M39029/64-369	M22520/2-01	M81964/14-02	M22520/2-08
J10	M83723/74R183IN	M39029/5-115	M22520/2-01	M81969/8-05	M22520/2-02
				M81969/8-06	

Table 6-1. Connector Part Numbers and Replacement Contact Part Numbers (Continued)

Connector			Tools		
Ref Des	Part Number	Contact Part Number	Crimper	Extract/Insert	Positioner
J11	DBMM-21W1P	DM51157-8	-	-	-
		M39029/63-368	M22520/2-01	M81964/14-02	M22520/2-08
J13	M24308/4-3F	M39029/64-369	M22520/2-01	M81969/14-02	M22520/2-08
J14*	JF2SP45AB				
P1	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-09
P2	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-09
P3	M24308/4-15F	M39029/58-360	M22520/2-01	M81969/14-01	M22520/2-09
P5	M24308/4-1F	M39029/64-369	M22520/2-01	M81969/14-02	M22520/2-08
P6*	JF3S1P45ABD				
P7	M24308/4-3F	M39029/64-369	M22520/2-01	M81969/14-02	M22520/2-08
P8	M24308/4-1F	M39029/64-369	M22520/2-01	M81969/14-02	M22520/2-08
P9*	M83513/02-GC				

* Non-repairable connector.

6-14. CONNECTOR 1A2P10 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

FOLLOWUP:

Install self test panel (para 6-18)
Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Note position of master keyway on connector 1A2P10 (1, fig. 6-10).
2. Tag wires and remove contacts from connector 1A2P10 (para 6-13).
3. Remove connector 1A2P10 (1, fig. 6-10) by removing jamnut (2) and spacer (3).

INSTALLATION

4. Install connector 1A2P10 (1) on self test panel 1A2 (4) with master keyway in position noted, using spacer (3) and jamnut (2).
5. Install contacts on replacement connector 1A2P10 (1) as tagged (para 6-13).
6. Install self test panel 1A2 (para 6-18).
7. Perform test set operational check (para 3-5).

6-14. CONNECTOR 1A2P10 REPLACEMENT (cont)

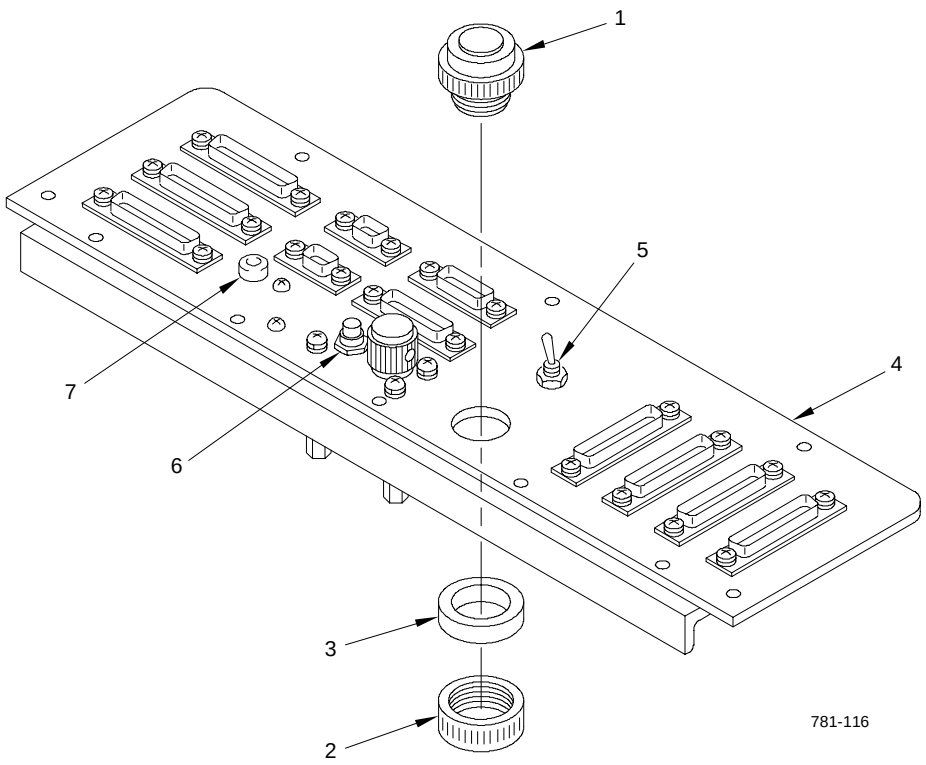


Figure 6-10. Self Test Panel 1A2 Component Replacement

6-15. CONNECTORS 1A2J1 THRU 1A2J3, 1A2J5, 1A2J8, 1A2J9, 1A2P1 THRU 1A2P4, AND 1A2P11 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

FOLLOWUP:

Install self test panel (para 6-18)
Perform test set operational check (para 3-5)

CAUTION

The test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

NOTE

Replacement procedures for connectors 1A2J1 thru 1A2J3, 1A2J5, 1A2J8, 1A2J9, 1A2P1 thru 1A2P4, and 1A2P11 are the same. Connector 1A2P4 is shown.

REMOVAL

1. Remove connector (1, fig. 6-11) by removing two locknuts (2), lockwashers (3), washers (4), screws (5), and washers (6).

2. Tag wires and remove contacts from connector (para 6-13).

INSTALLATION

3. Install contacts on replacement connector as tagged (para 6-13).

4. Install connector (1) on self test panel 1A2 (7), using two washers (6), screws (5), washers (4), lockwashers (3), and locknuts (2).

5. Install self test panel 1A2 (para 6-18).

6. Perform test set operational check (para 3-5).

6-15. CONNECTORS 1A2J1 THRU 1A2J3, 1A2J5, 1A2J8, 1A2J9, 1A2P1 THRU 1A2P4, AND 1A2P11 REPLACEMENT (cont)

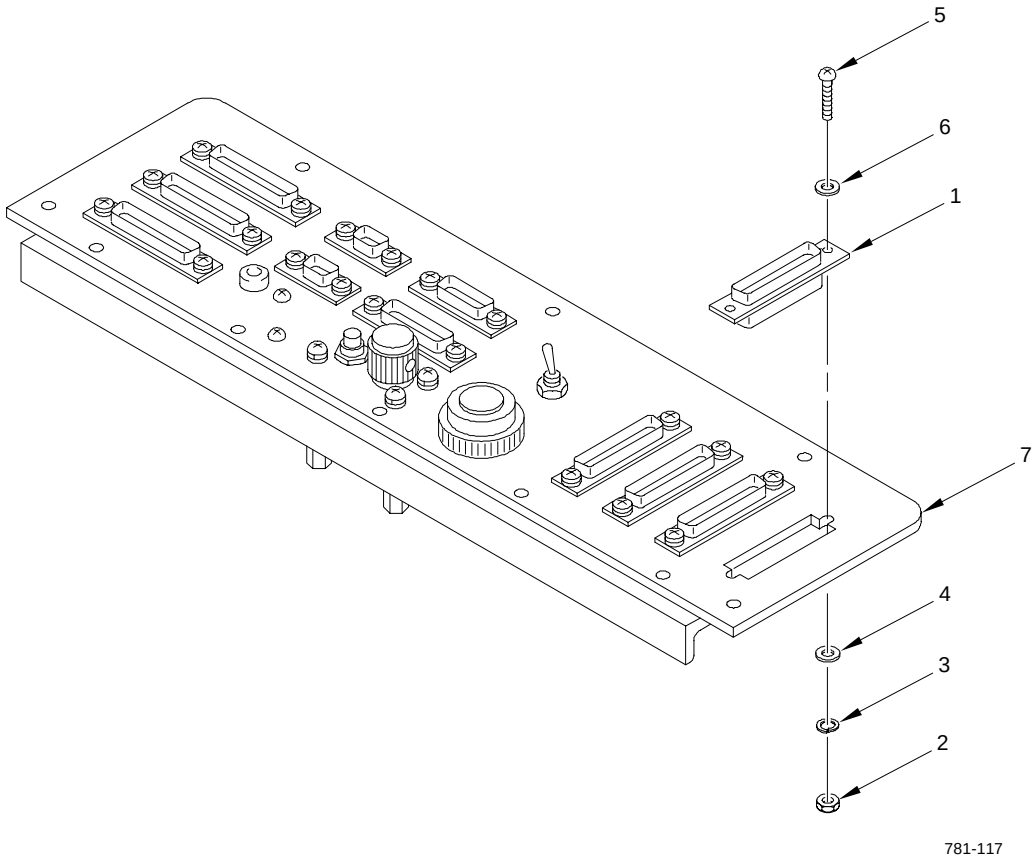


Figure 6-11. Connector 1A2J1 thru 1A2J3, 1A2J5, 1A2J8, 1A2J9, 1A2P1 thru 1A2P4 and1A2P11

6-16. ELECTRONIC COMPONENTS ASSEMBLY 1A2A1 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Solder (item 7)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

FOLLOWUP:

Install self test panel (para 6-18)
Perform test set operational check (para 3-5)

CAUTION

Test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Tag and unsolder wires from electronic components assembly 1A2A1 (1, fig. 6-12).
2. Remove electronic components assembly 1A2A1 (1) by removing four screws (2), lockwashers (3), and washers (4).

INSTALLATION

3. Install electronic components assembly 1A2A1 (1) on four posts (5), using four washers (4), lockwashers (3), and screws (2).
4. Solder wires to electronic components assembly 1A2A1 (1). Remove tags.
5. Install self test panel 1A2 (para 6-18).
6. Perform test set operational check (para 3-5).

6-16. ELECTRONIC COMPONENTS ASSEMBLY 1A2A1 REPLACEMENT (cont)

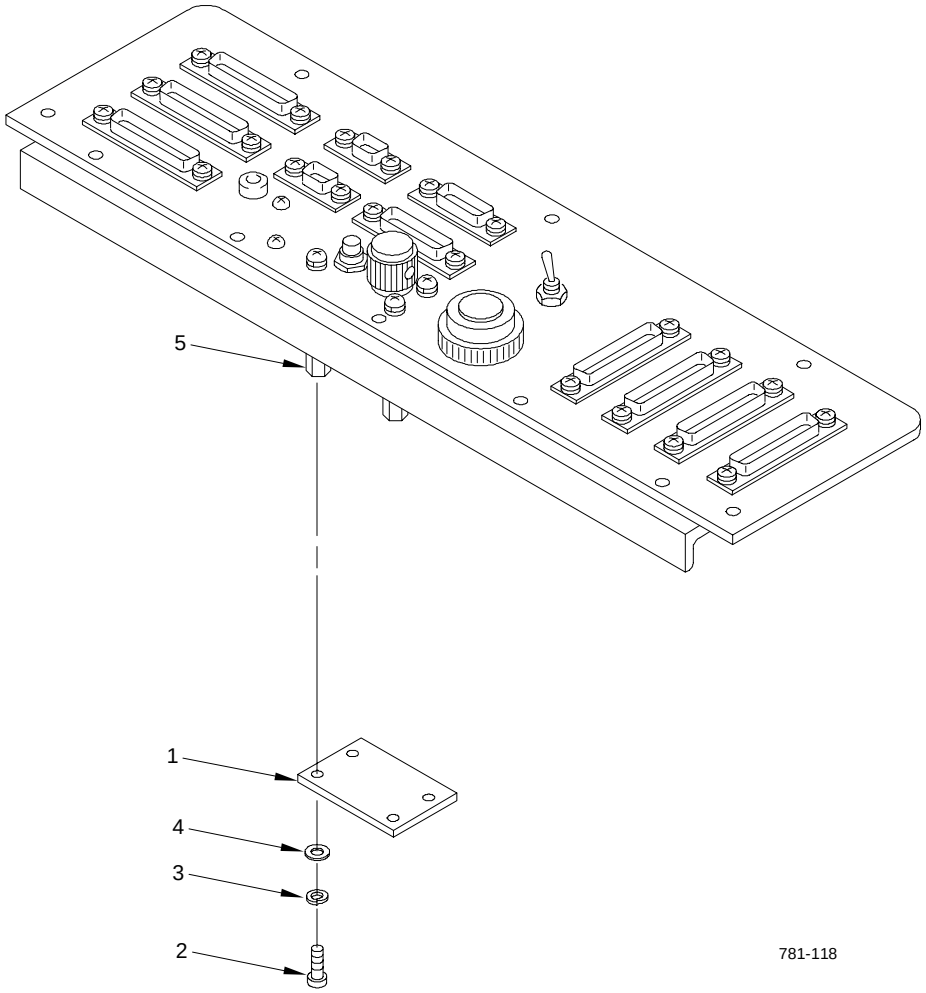


Figure 6-12. Electronic Components Assembly 1A2A1

6-17. RESISTOR 1A2R6 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

FOLLOWUP:

Install self test panel (para 6-18)
Perform test set operational check (para 3-5)

CAUTION

Test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Tag and unsolder wires from resistor 1A2R6 (1, fig. 6-13) terminals.

2. Remove resistor 1A2R6 (1) by removing two locknuts (2), lockwashers (3), washers (4), and screws (5).

6-17. RESISTOR 1A2R6 REPLACEMENT (cont)

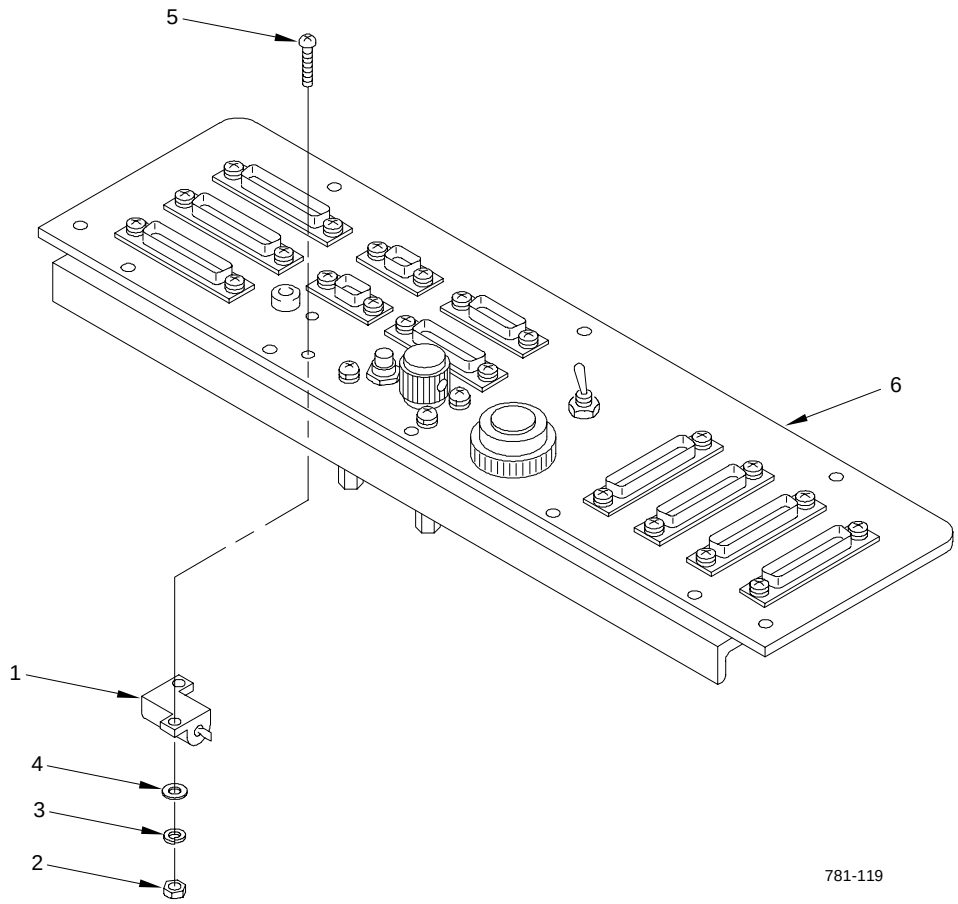


Figure 6-13. Resistor 1A2R6 Replacement

6-17. RESISTOR 1A2R6 REPLACEMENT (cont)

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

3. Clean area on self test panel 1A2 (6) where resistor 1A2R6 (1) is to be installed, using wiping rag moistened with trichloroethane.

4. Install resistor 1A2R6 (1) on self test panel 1A2 (6), using two screws (5), washers (4), lockwashers (3), and locknuts (2).

5. Solder wires to resistor 1A2R6 (1) terminals as tagged; then remove tags.

6. Install self test panel 1A2 (para 6-18).

7. Perform test set operational check (para 3-5).

6-18. SELF TEST PANEL 1A2 REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR

Personnel Required:

68X Aircraft Armament/Electrical Repairer

FOLLOWUP:

Perform test set operational check (para 3-5)

6-18. SELF TEST PANEL 1A2 REPLACEMENT (cont)

CAUTION

Test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Remove two screws (1, fig. 6-3) and washers (2) securing control panel 1A1 (3) to chassis (4).
2. Remove support rod (5) from two clips (6) securing it to underside of control panel 1A1 (3).
3. Raise control panel 1A1 (3) to vertical position and secure, using support rod (5).
4. Remove self test panel 1A2 (1, fig. 6-14) by removing five screws (2) and washers (3).

INSTALLATION

5. Install self test panel 1A2 (1, fig. 6-14) on chassis (4), using five washers (3) and screws (2).
6. Remove support rod (5, fig. 6-3) and install into two clips (6) on underside of control panel 1A1 (3); then lower control panel 1A1 (3) onto chassis (4) and install two washers (2) and screws (1).
7. Perform test set operational check (para 3-5).

6-18. SELF TEST PANEL 1A2 REPLACEMENT (cont)

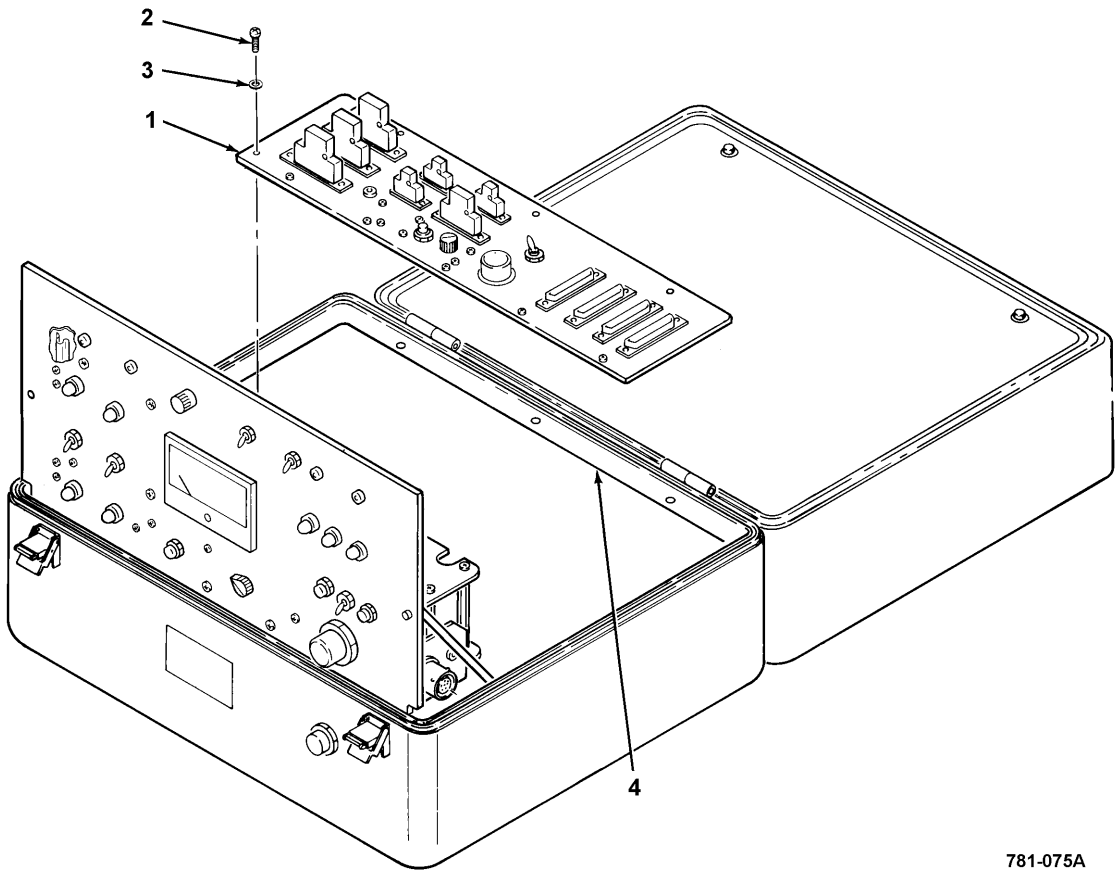


Figure 6-14. Self Test Panel 1A2 Removal and Installation

6-19. SWITCH 1A2S1 REPLACEMENT

Except for the removal of self test panel 1A2 (para 6-18), replacement procedures for switch 1A2S1 (5, fig. 6-10) are the same as those shown for switch 1A1S9 (para 6-10).

6-20. SWITCH 1A2S2 REPLACEMENT

Except for the removal of self test panel 1A2 (para 6-18), replacement procedures for switch 1A2S2 (6, fig. 6-10) are the same as those shown for switch 1A1S8 (para 6-11).

6-21. TEST POINT 1A2TP1 REPLACEMENT

Except for the removal of self test panel 1A2 (para 6-18), replacement procedures for test point 1A2TP1 (7, fig. 6-10) are the same as those shown for test point 1A1TP4 (para 6-12).

6-22. VARIABLE RESISTOR 1A2R12 AND KNOB REPLACEMENT

INITIAL SETUP

Tools:

Nomenclature	Part Number
Aircraft armament repairman tool set	SC5180-95-CL-B09-HR
Goggles, safety, acid-type	GGG-531CL1
Rubber apron	MIL-A-41829
Rubber gloves	ZZG381TY1CL2

Materials (Appendix C):

Rag, wiping (item 6)
Solder (item 7)
Trichloroethane (item 8)

Personnel Required:

68X Aircraft Armament/Electrical Repairer

Equipment Conditions:

Ref	Condition
Para 6-18	Self test panel removed

FOLLOWUP:

Install self test panel (para 6-18)
Perform test set operational check (para 3-5)

6-22. VARIABLE RESISTOR 1A2R12 AND KNOB REPLACEMENT (cont)

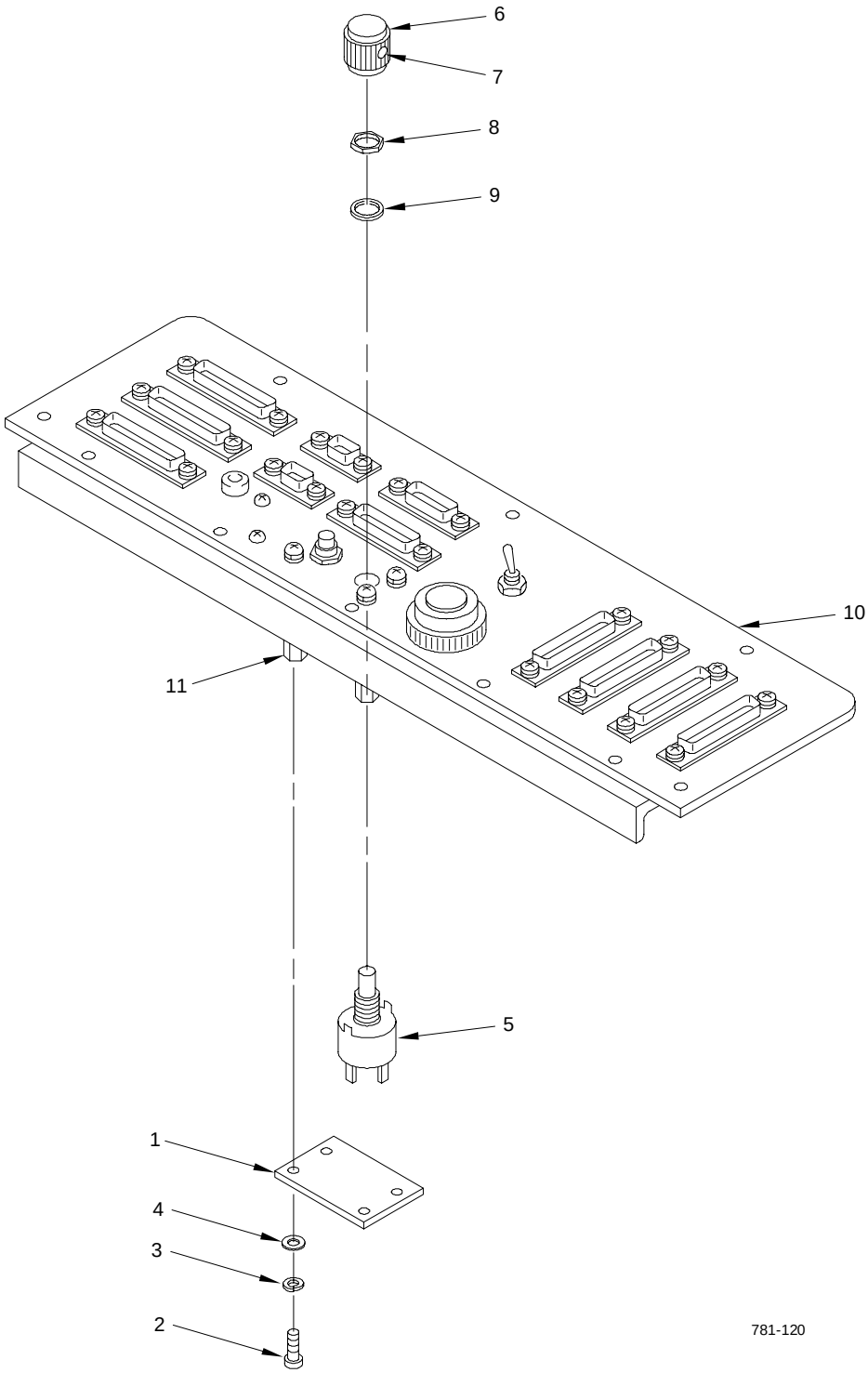


Figure 6-15. Self Test Panel 1A2 Component Replacement

6-22. VARIABLE RESISTOR 1A2R12 AND KNOB REPLACEMENT (cont)

CAUTION

Test set contains electrostatic discharge sensitive (ESDS) devices that can be damaged if special handling procedures are not used. Refer to paragraph 4-2.

REMOVAL

1. Remove electronic components assembly 1A2A1 (1, fig. 6-15) by removing four screws (2), lockwashers (3), and washers (4).

2. Tag and unsolder wires from variable resistor 1A2R12 (5) terminals.

3. Remove knob (6) by loosening two setscrews (7).

4. Remove variable resistor 1A2R12 (5) by removing nut (8) and lockwasher (9).

INSTALLATION

WARNING

TRICHLOROETHANE

- Flammable, toxic, irritating. Can cause breathing problems, eye damage.
- At 325°F (162.7°C), gives off phosgene gas, which can cause death or serious injury.
- Don't: Use near flames or sparks, let it get on skin, or breathe vapors.
- Do: Use in well-ventilated area, close containers when not using. Wear acid-type safety goggles, rubber gloves, and rubber apron.
- If it contacts skin or eyes, wash affected areas with running water. Get medical help at once.
- If you experience any breathing problems, get to fresh air at once.

5. Clean area on self test panel 1A2 (10) where variable resistor 1A2R12 (5) is to be installed, using wiping rag moistened with trichloroethane.

6. Install resistor 1A2R12 (5) on self test panel 1A2 (10), using lockwasher (9) and nut (8).

7. Install knob (6) on resistor 1A2R12 (5) and tighten two setscrews (7).

8. Solder wires to resistor 1A2R12 (5) as tagged; then remove tags.

9. Install electronic components assembly 1A2A1 (1) on four posts (11), using four washers (4), lockwashers (3), and screws (2).

10. Install self test panel 1A2 (para 6-18).

11. Perform test set operational check (para 3-5).

APPENDIX A

WIRES NOT TESTED

A-1. SCOPE

This appendix lists wiring harness assembly 1A4W1 wires that are not tested by the test set.

Table 1-1. Wires Not Tested

From	To	Signal Name
J2-23	E6	CHASSIS GROUND
P2-64	J5-2	115 VAC SHROUD PHASE C (SEE NOTE)
P2-45	J5-3	SHROUD HEATER 115 VAC RTN (SEE NOTE)
P7-A	A1-1	+15 VDC
P7-C	P4-55	-15 VDC
P7-B	A1-3	+ 15V RTN ANGLE ACCL
P7-D	P3-64	PITCH (HI) ANGLE ACCL
P7-B	P3-65	PITCH (LO) ANGLE ACCL
J7-3	J7-16	AZ MOTOR /-90°
J7-3	P5-4	AZ MOTOR /-90°
J7-5	J7-18	AZ MOTOR /+90°
J7-4	J9-7	TEST AZ MOTOR CT
J7-17	J7-3	AZ MOTOR CT
J7-1	E5	CASE GROUND
J7-8	P6-4	EL MOTOR /-90°
J7-8	J7-21	EL MOTOR /-90°
J7-6	J7-19	EL MOTOR /+90°
J7-6	P6-5	EL MOTOR /+90°
J7-20	P6-3	EL MOTOR CT
J7-7	P6-6	EL MOTOR CT
J7-20	J9-10	TEST EL MOTOR CT

NOTE: J5-2 AND J5-3 ARE TESTED ON PARALLEL WIRES
IN LOOP SELECT SWITCH POSITIONS 2 AND 4.

APPENDIX B

SPECIAL REPAIR ACTIVITIES

B-1. SCOPE

This appendix lists Lockheed Martin Corporation Special Repair Activities authorized to repair the test set.

Killeen Special Repair Activity
Lockheed Martin Corporation
4601 Jacobs Lane
Killeen, TX 76543-4263

Enterprise Special Repair Activity
Lockheed Martin Corporation
4790 Rucker Blvd.
Enterprise, AL 36330

Fayetteville Special Repair Activity
Lockheed Martin Corporation
168 Wilkes Road
Fayetteville, NC 28306

Coleman Barracks - Mannheim
Lockheed Martin Corporation
Unit 29719 Box 361
APO AE 09028

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

C-1. SCOPE

This appendix lists expendable supplies and materials needed to perform testing on wiring harness assembly 1A4W1. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS

a. Column 1 - Item Number. Number assigned to the entry in the listing and references in Initial Setup under Materials to identify the material.

b. Column 2 - National Stock Number. National stock number assigned to the item; use it to order a new item.

c. Column 3 - Description. Federal item name and, if required, a description to identify the item.

d. Column 4 - Unit of Measure. Measure used to perform maintenance. The measure is expressed by a two-letter alphabetical abbreviation. (OZ for ounce, KT for kit, CN for can, BE for bale, SL for spool RO for roll). If the unit measure differs from the unit of issue, order the lowest unit of issue that will do the job.

Table C-1. Expendable Supplies and Materials List

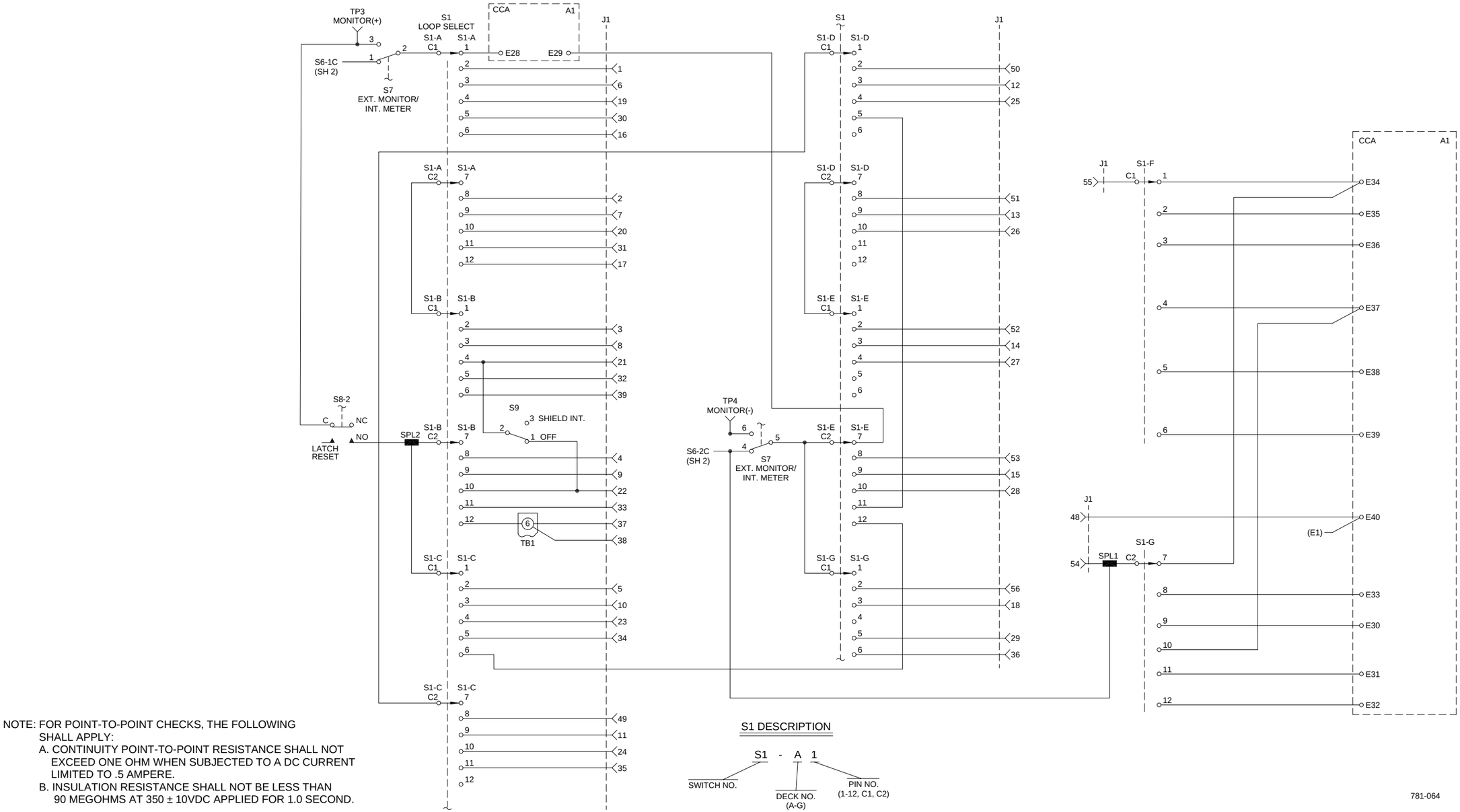
(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
1	8030-00-871-8489	Compound, corrosion inhibitive sealing and coating, type III-1, PR-1436-G, MIL-S-81733	KT
2	8030-00-762-8807	Compound, corrosion inhibitive sealing and coating, MIL-S-81733, TY 1-2, PRO-SEAL 870	KT
3	7930-00-985-6945	Detergent, general purpose, P-D-225	CN
4	5970-00-954-1624	Insulation sleeving, heat-shrinkable, M23053/5-107-0	RO
5	---	Insulation sleeving, heat-shrinkable, M23053/18-205-C	RO
6	7920-00-205-3570	Rag, wiping, DDD-R-30, class 2, grade A	BE
7	---	Solder, tin alloy, SN63PB37WRMAP2, class 3	SL
8	6810-00-664-0387	Trichloroethane, technical, 0-T-620, type 1	CN

APPENDIX D

WIRING DIAGRAMS

D-1. SCOPE

This appendix contains wiring harness assembly 1A4W1 and test set LOOP SELECT switch position related wiring connections. Refer to wiring harness assembly 1A4W1 schematic diagram for details.



NOTE: FOR POINT-TO-POINT CHECKS, THE FOLLOWING SHALL APPLY:

A. CONTINUITY POINT-TO-POINT RESISTANCE SHALL NOT EXCEED ONE OHM WHEN SUBJECTED TO A DC CURRENT LIMITED TO .5 AMPERE.

B. INSULATION RESISTANCE SHALL NOT BE LESS THAN 90 MEGOHMS AT 350 ± 10VDC APPLIED FOR 1.0 SECOND.

S1 DESCRIPTION

S1 - A 1

SWITCH NO.

DECK NO. (A-G)

PIN NO. (1-12, C1, C2)

Figure D-1. Control Panel 1A1 Schematic (Sheet 1 of 2)

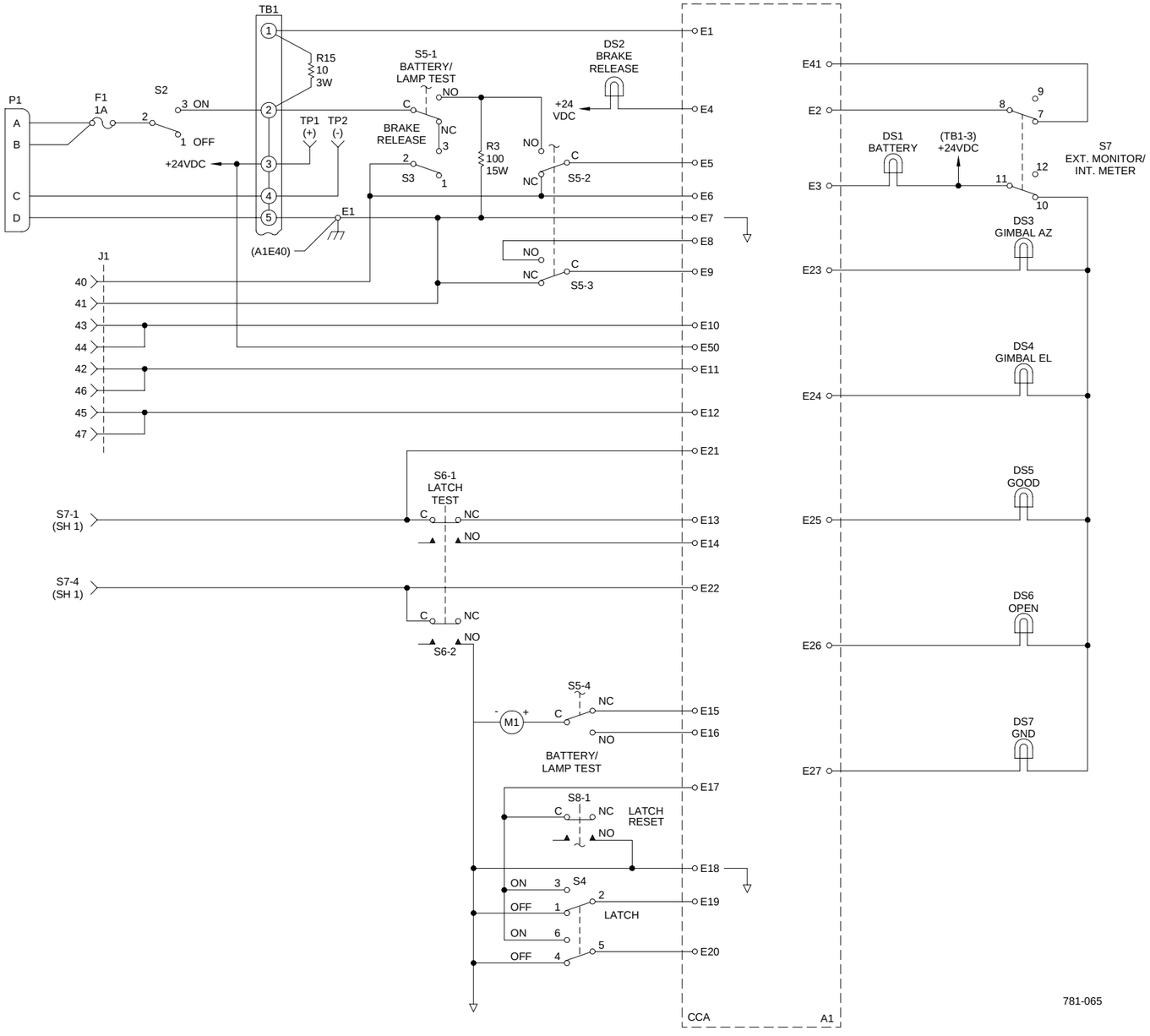
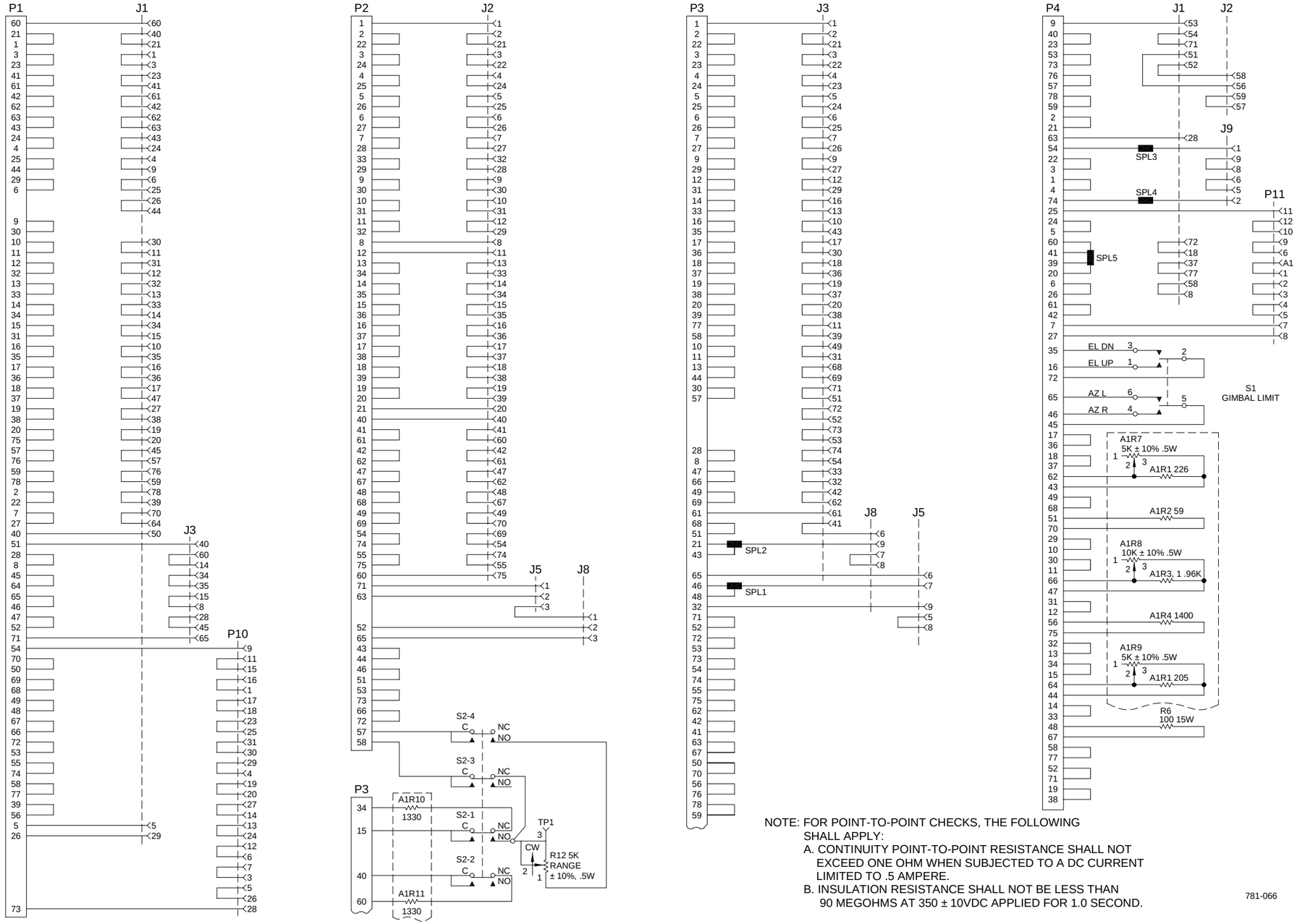


Figure D-1. Control Panel 1A1 Schematic
(Sheet 2 of 2)



NOTE: FOR POINT-TO-POINT CHECKS, THE FOLLOWING SHALL APPLY:

A. CONTINUITY POINT-TO-POINT RESISTANCE SHALL NOT EXCEED ONE OHM WHEN SUBJECTED TO A DC CURRENT LIMITED TO .5 AMPERE.

B. INSULATION RESISTANCE SHALL NOT BE LESS THAN 90 MEGOHMS AT 350 ± 10VDC APPLIED FOR 1.0 SECOND.

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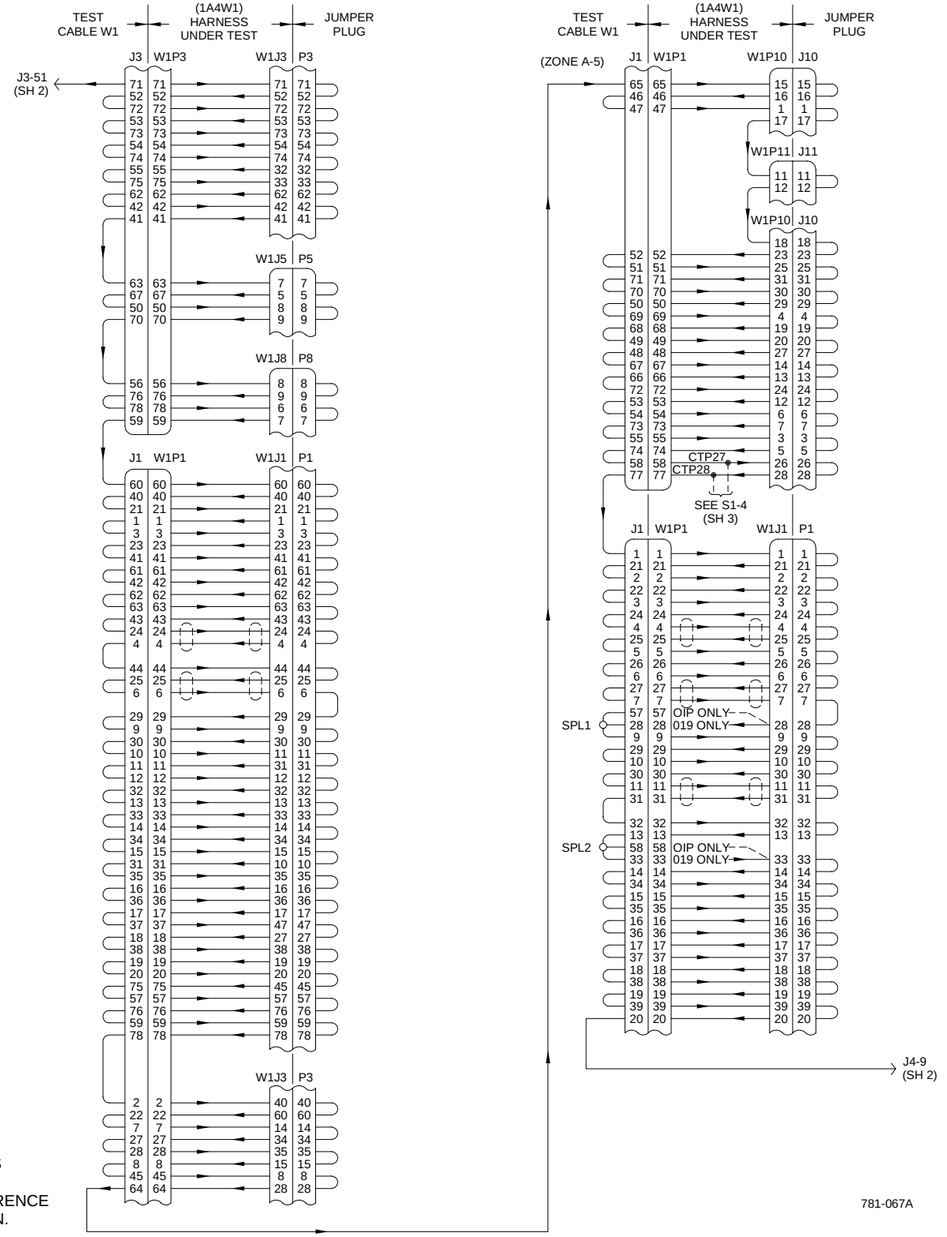
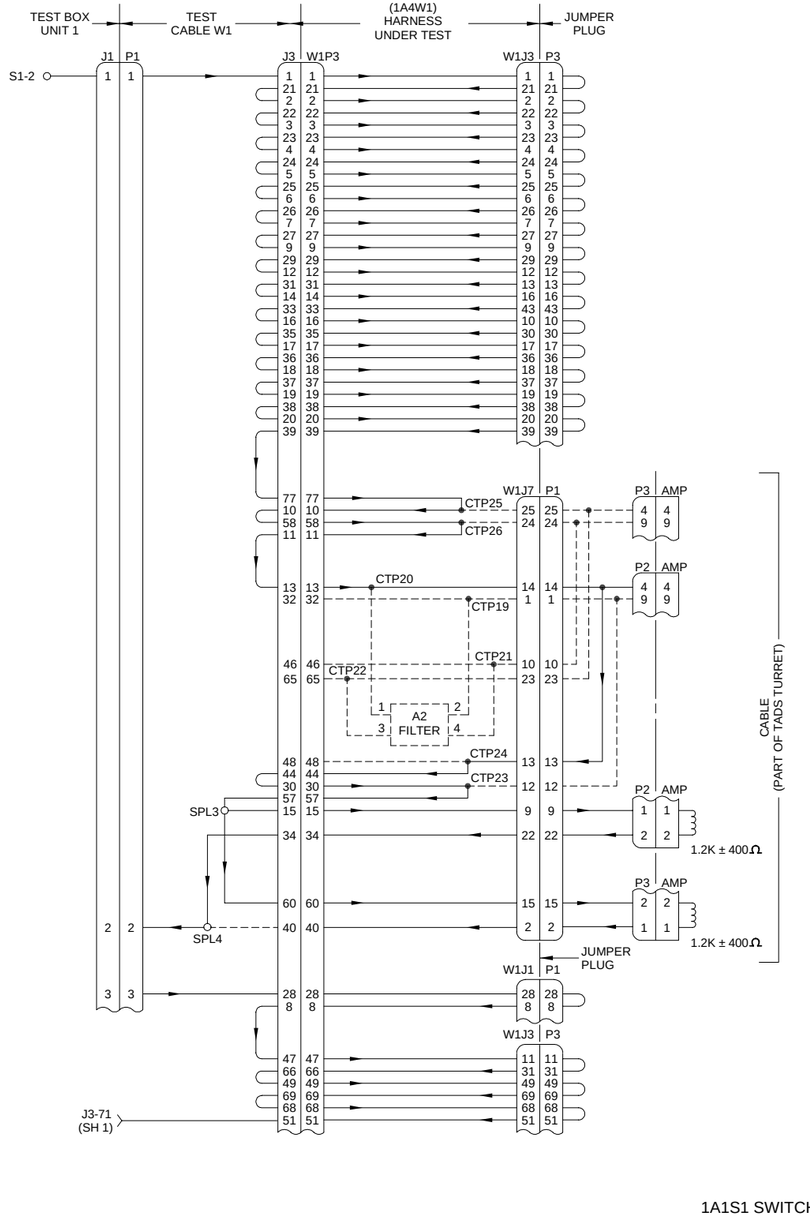
Figure D-2. Self Test Panel 1A2 Schematic



NOTES:
1. THIS WIRING DIAGRAM DEPICTS THE 1A4W1 WIRING HARNESS INSTALLED.
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE ± 1%, 25W.
3. DOTTED LINES INDICATE WIRES SHOWN FOR REFERENCE ONLY AND ARE NOT TESTED IN THE SWITCH SHOWN.

Figure D-3. Test Set Wiring Diagram (Sheet 1 of 4)



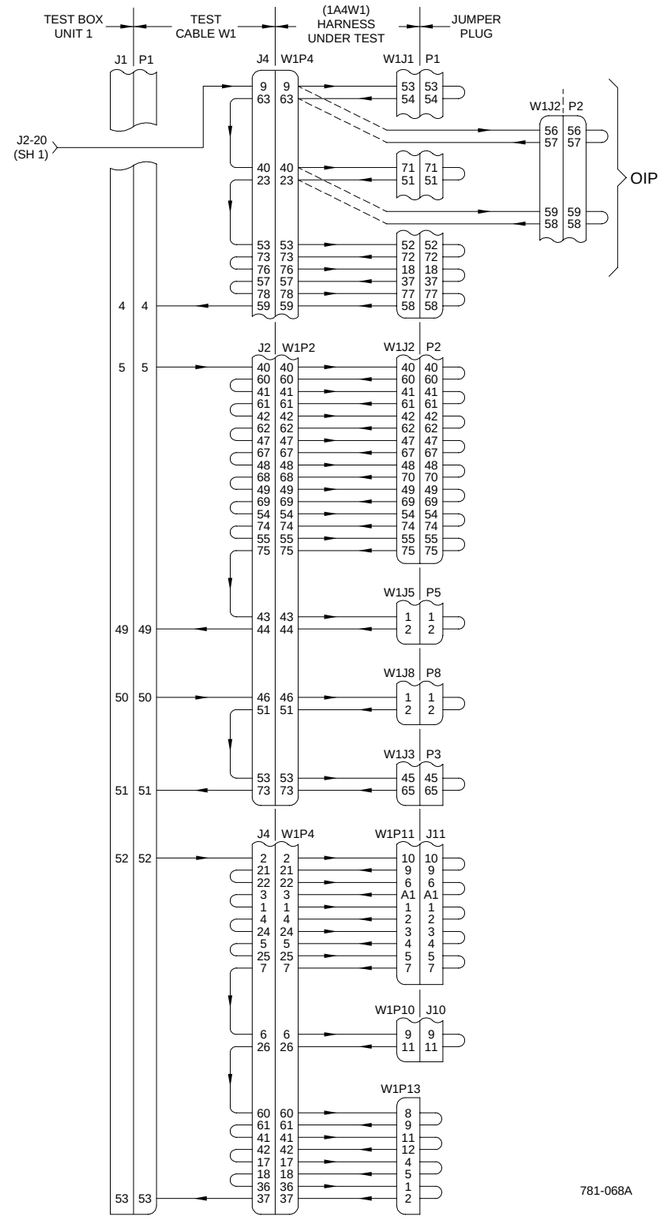
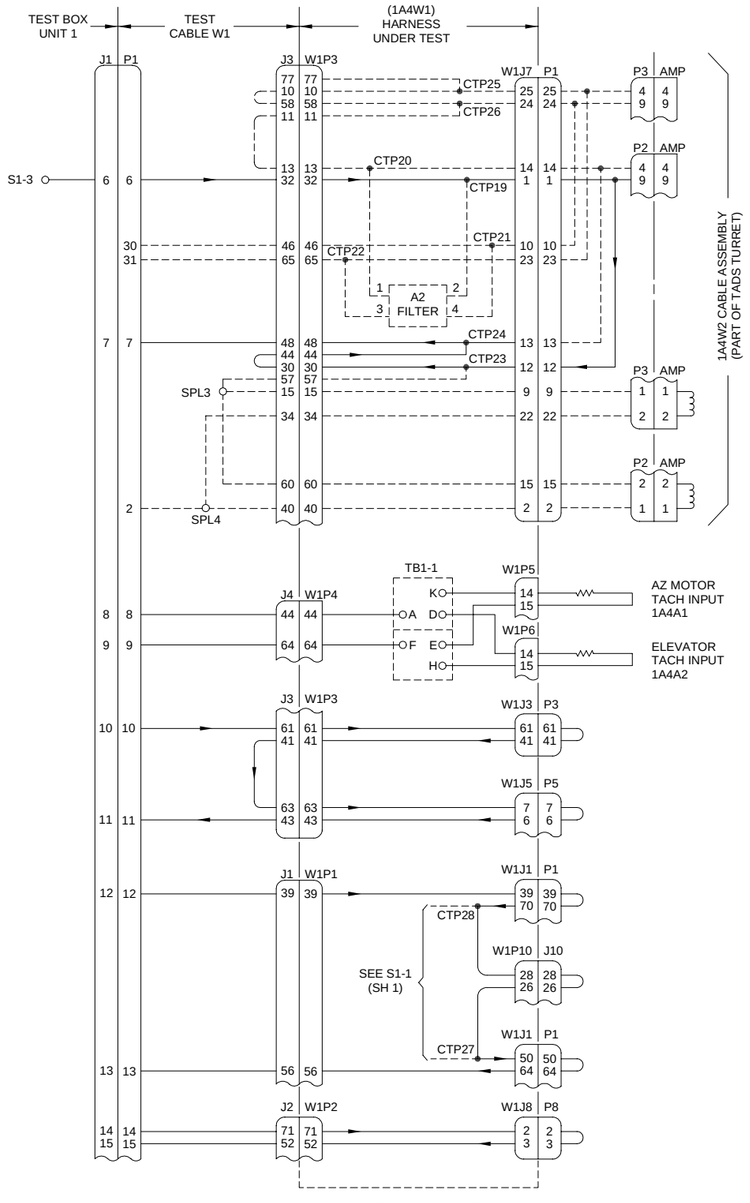
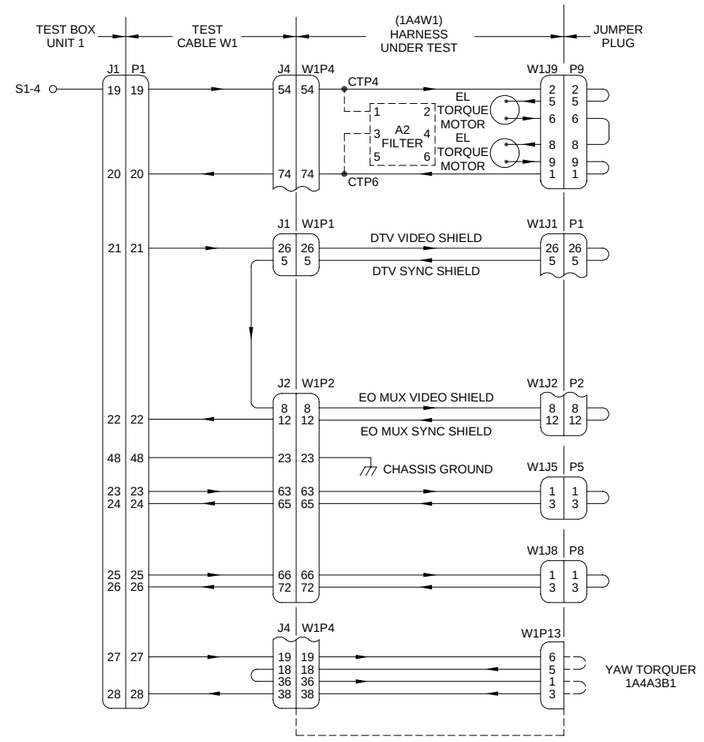


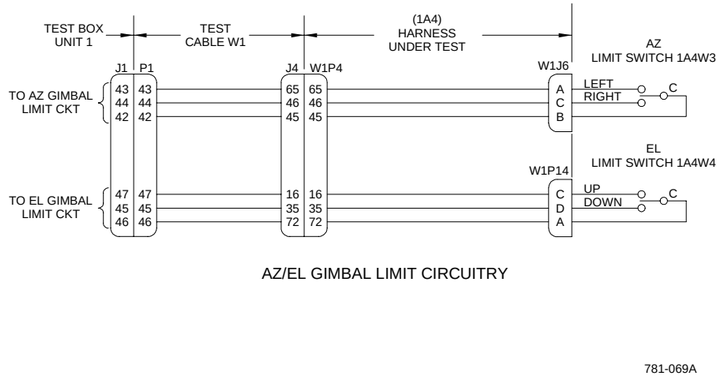
Figure D-3. Test Set Wiring Diagram
(Sheet 2 of 4)



1A1S1 SWITCH IN POSITION 3



1A1S1 SWITCH IN POSITION 4



AZ/EL GIMBAL LIMIT CIRCUITRY

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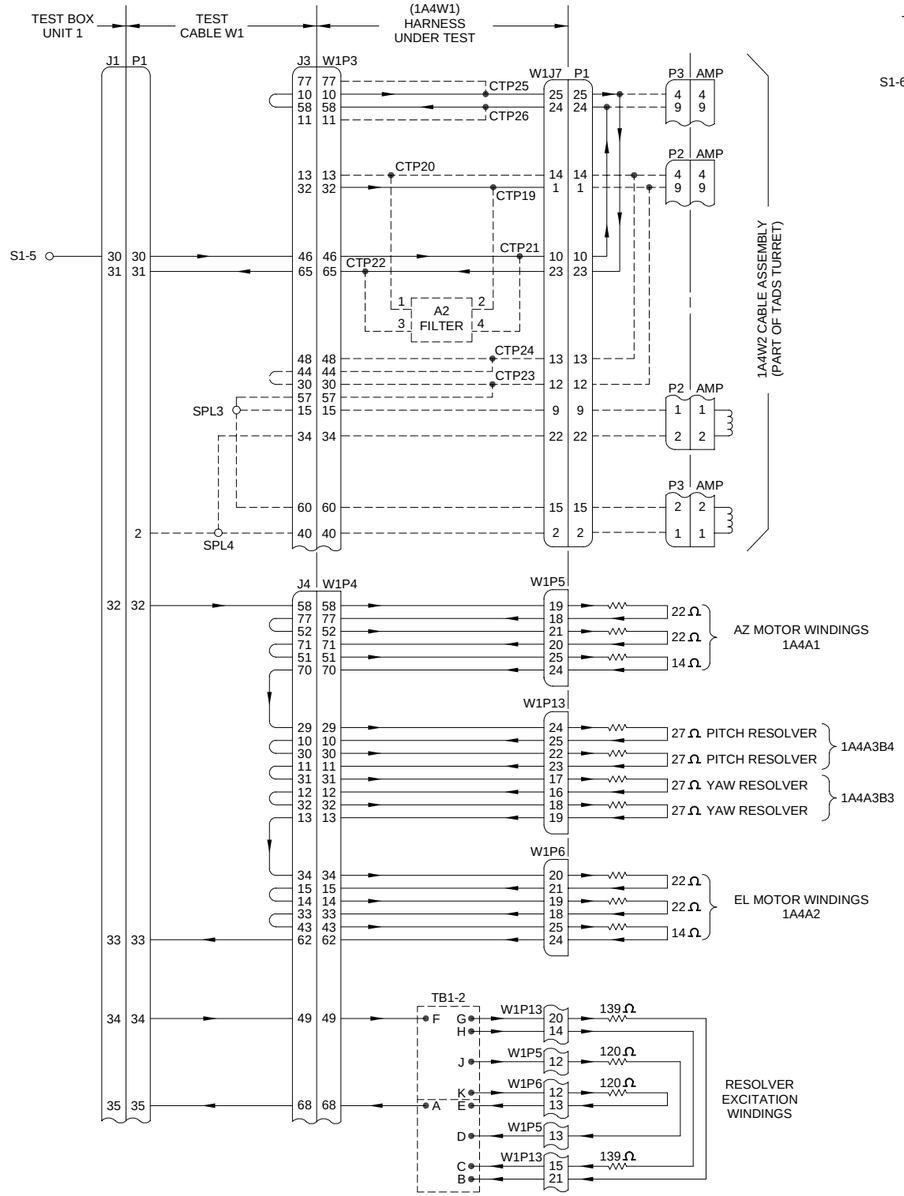
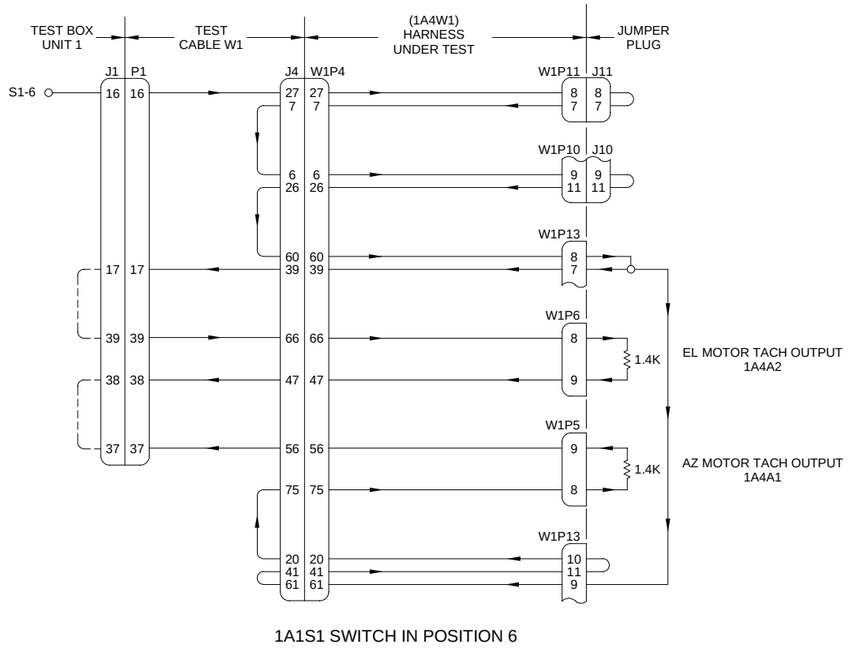
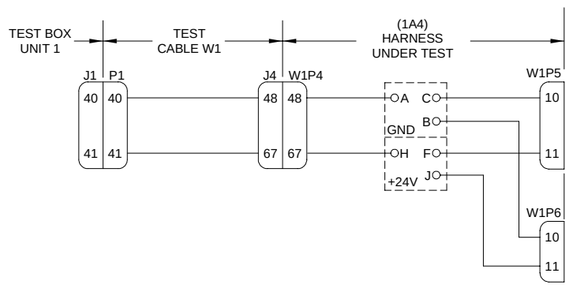
Figure D-3. Test Set Wiring Diagram (Sheet 3 of 4)



1A1S1 SWITCH IN POSITION 5



1A1S1 SWITCH IN POSITION 6



BRAKE RELEASE CIRCUITRY

781-070A

Figure D-3. Test Set Wiring Diagram
(Sheet 4 of 4)

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

E-1. GENERAL

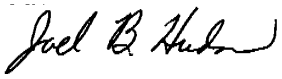
Refer to Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List, TM 1-1270-476-23P for parts for the TADS Turret Continuity Test Set.

TM 1-4931-726-13

By Order of the Secretary of the Army:

Official:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0117805

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Should be changed to (Stauffer SWS-1001 Insulating primer)

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U.S. Army Aviation and Missile Command
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Redstone Arsenal, AL 35898-5230

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = 0.39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hect.ometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = 0.15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = 0.035 ounce
1 dekagram = 10 grams = 0.35 ounce
1 hectogram = 10 dekagrams 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Temperature

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

Liquid Measure

1 centiliter = 10 milliliters = 0.34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = 0.155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = 0.386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = 0.06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by
inches	centimeters	2.540
feet	meters	0.305
yards	meters	0.914
miles	kilometers	1.609
square inches	square centimeters	6.451
square feet	square meters	0.093
square yards	square meters	0.836
square miles	square kilometers	2.590
acres	square hectometers	0.405
cubic feet	cubic meters	0.028
cubic yards	cubic meters	0.765
fluid ounces	milliliters	29,573
pints	liters	0.473
quarts	liters	0.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilograms	0.454
short tons	metric tons	0.907
pound-feet	newton-meters	1.356
pound-inches	newton-meters	0.11296

To change	To	Multiply by
ounce-inches	newton-meters	0.007062
centimeters	inches	0.394
meters	feet	3.280
meters	yards	1.094
kilometers	miles	0.621
square centimeters	square inches	0.155
square meters	square feet	10.764
square meters	square yards	1.196
square kilometers	square miles	0.386
square hectometers	acres	2.471
cubic meters	cubic feet	35.315
cubic meters	cubic yards	1.308
milliliters	fluid ounces	0.034
liters	pints	2.113
liters	pints	1.057
liters	quarts	0.264
grams	ounces	0.035
kilograms	pounds	2.205
metric tons	short tons	1.102
Newton-meters	pound-feet	0.738
Kilo pascals	pounds per square inch	0.145

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