

TECHNICAL MANUAL

***OPERATOR'S AND AVIATION
INTERMEDIATE MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)**

FOR

**TEST SET,
ELECTRONIC**

**P/N 29085800
NSN 6625-01-347-8667**

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

*** US Army Test, Measurement, and Diagnostic Equipment Activity (USATA)**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
31 MARCH 1995**

CHANGE

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WASHINGTON, D.C., 8 August 1996

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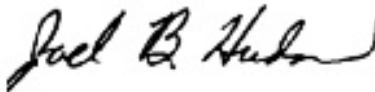
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WARNING

The UTD infrared light gets extremely hot with prolonged use. Personal injury and lamp burn out can occur if the lamp is left on too long a time. Limit lamp operation to 60 seconds or less.

CAUTION

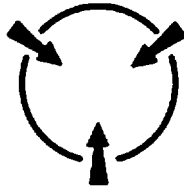
Handle the test set with care as the electronic circuitry it incorporates can be damaged by shock from improper handling.

CAUTION

Install all cables prior to turning on external power.

CAUTION

This assembly contains parts sensitive to damage by ElectroStatic Discharge (ESD)



Use precautionary ESD procedures when touching, removing or inserting. Use static-free material to wrap the assembly for shipment or storage.

CAUTION

Separate the Signal Generator PWA from the Front Panel I/F PWA with care so as to not bend the integrated connecting pins.

CAUTION

Join the Signal Generator PWA and the Front Panel I/F PWA with care so as to not bend the Integrated connecting pins.

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd. , St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

Change 1 i

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**CHAPTER 1
INTRODUCTION**

SECTION I - GENERAL INFORMATION

1-1 SCOPE **1-1**

- a. This manual contains the operation and maintenance procedures for the Electronic Test Set, Part Number 29085800 (figure 1-1).
- b. This unit is a calibrated instrument used to verify calibration of the Aviation Vibration Analyzer (AVA) Test Set, Part Number 29313102.

1-2 MAINTENANCE FORMS, RECORDS AND REPORTS **1-2**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System Aviation (TAMMS-A).

1-3 DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE **1-3**

Procedures for destroying Army Material to prevent enemy use are listed in TM 750-244-1-4.

1-4 PREPARATION FOR STORAGE OR SHIPMENT **1-4**

Instructions are provided in Chapter 4.

1-5 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS **1-5**

If your Electronic Test Set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design.

Put it on a SF368 (Quality Deficiency Report) and mail it to us at:

Commander,
U.S. Army Aviation and Troop Command
ATTN: AMSAT-I-MDO
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

We'll send you a reply.

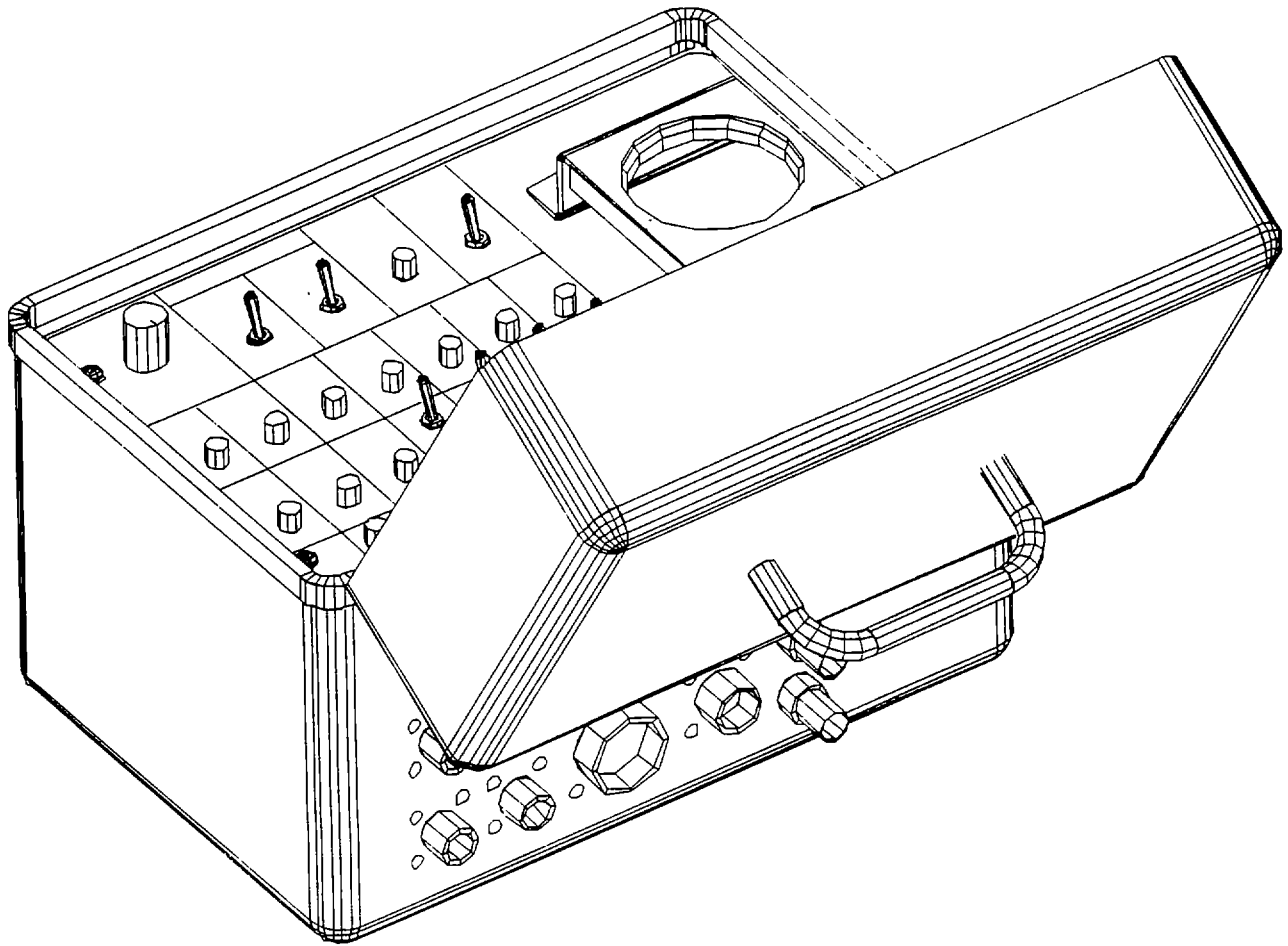


Figure 1-1. Electronic Test Set

1-6	LIST OF ABBREVIATIONS/ACRONYMS	1-6
ACC	Accelerometer	
AGC	Automatic Gain Control	
AGND	Analog Ground	
AVA	Aviation Vibration Analyzer	
BNC	Bayonet N Connector	
CADU	Control and Display Unit	
CALCHK	Calibration Check	
DAU	Data Acquisition Unit	
DOS	Disk Operating System	
DVM	Digital Volt Meter	
EIR	Equipment Improvement Recommendation	
EPT	Enhance Passive Tracker	
EXT	External	
GND	Ground	
GRN	Green	
IBM	International Business Machines	
LED	Light Emitting Diode	
MAG SEN	Magnetic Sensor	
OPRCHK	Operational Check	
PC	Personal Computer	
PWA	Printed Wire Assembly	
PGND	Passive Ground	
RADSCOM	Rotor Analysis Diagnostic System Communication	
SGND	Signal Ground	
TACHO	Tachometer	
TAMMS-A	The Army Maintenance Management System - Aviation	
TRKR	Tracker	
TRKTST	Tracker Test	
USATA	U S Army Test, Measurement and Diagnostic Equipment Activity	
UTD	Universal Tracking Device	

SECTION II - EQUIPMENT DESCRIPTION

1-7 EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

1-7

FUNCTION

- a. General. The Electronic Test Set is intended to generate a set of signals for the Data Acquisition Unit (DAU). The unit provides simulated accelerometer, tachometer, and tracker signals. In addition, an optical simulation of the rotor is provided to functionally test the Universal Tracking Device (UTD).
- b. Electrical System. Primary power is supplied from the DAU through the multi-channel connector located on back of the unit. The power requirement is 24 Vdc.

1-8 EQUIPMENT DATA

1-8

Refer to table 1-1 for summary of capabilities, limitations, and other critical operation and maintenance data.

Table 1-1. Reference Data

UNIT DIMENSIONS

Electronic Test Set	Height inches (mm): 7.56 (192) Width inches (mm): 9.00 (229) Depth inches (mm): 6.00 (152) Weight pounds (kg): 7.30 (3.31)
---------------------	---

POWER REQUIREMENTS

Electronic Test Set	Input power: 24 Vdc
---------------------	---------------------

ENVIRONMENTAL REQUIREMENTS

Electronic Test Set	Operating: -40 to +55°C Storage: -51 to +71°C
---------------------	--

1-9 DESCRIPTION

1-9

The Electronic Test Set verifies the calibration of the Data Acquisition Unit (DAU). The test set simulates the accelerometer, tachometer and tracker signals and contains an optical simulation of the rotor to functionally test the Universal Tracking Device (UTD).

Connections on the rear panel will cause the appropriate Light Emitting Diodes (LEDs) to illuminate indicating the systems connected. These connections are:

- a. Accelerometers 1-4 (ACC 1-4)
- b. Universal Tracking Device/Enhanced Passive Tracker (UTD/EPT)
- c. Magnetic Sensor (MAG SEN)
- d. Tracker 1, 2 (TRKR)
- e. Tachometer 1,2 (TACH)
- f. External Clock (EXT CLK)
- g. External Accelerometer (EXT ACC)

The front panel of the test set contains 28 LEDs, eight switches and the optical tester. Specifically these LEDs are:

- a. Internal Power
- b. Multi-Channel
- c. Tracker 1
- d. Tacho 1
- e. ACC 1-14 GND OK

The eight switches are labeled:

- a. ACC1-4 54mV/g / 100mV/g
- b. Active/Passive
- c. Tacho Control TACH 2
- d. Tacho Control TACH 1
- e. ACC Signal Select

The front panel is protected by a removable cover that is locked in place with a draw latch. A folding handle attached to the top cover allows the unit to be easily transported.

SECTION III- TECHNICAL PRINCIPLES OF OPERATION**1-10 PRINCIPLES OF OPERATION****1-10**

Power for the Electronic Test Set is provided through the multi-channel (MULTI-CH) connector located on the back of the unit. In addition, this connection interfaces ACCELEROMETER channels 5-14, TACHO channel 2 and TRACKER channel 2. Proper connection is obtained when the INTERNAL POWER LED is illuminated.

Calibration of the DAU is performed using a Personal Computer (PC), Control and Display Unit (CADU), the DAU, and the appropriate cables. A printer is optional.

The procedure to verify the calibration of the DAU is achieved by programming the CADU with the supplied software via a PC. Calibration checks are performed automatically by executing the internally stored program downloaded to the CADU. Data from the CADU is then compared with the specifications in this manual. If desired, the user may produce a hard copy of the results if a printer is connected to the system.

CHAPTER 2 OPERATING INSTRUCTIONS

SECTION I - DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

2-1 GENERAL

2-1

This chapter contains instructions for unpacking and using the Electronic Test Set. Preventive maintenance checks and services are included. Also included are descriptions of operator's controls and indicators, operating procedures and unit calibration procedures.

2-2 PRE-OPERATION PROCEDURES

2-2

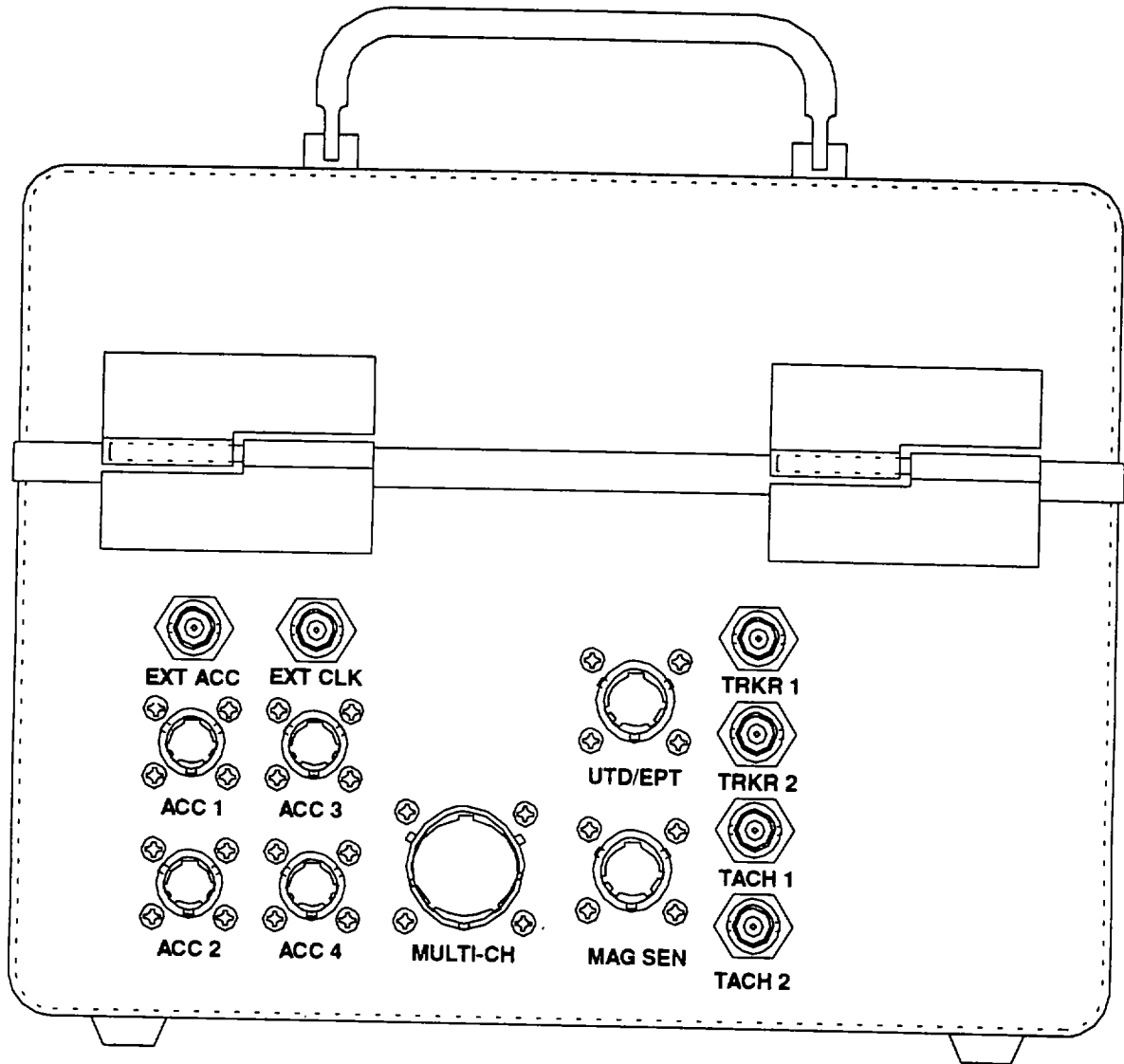
CAUTION

Handle the test set with care as the electronic circuitry it incorporates can be damaged by shock from improper handling.

2-3 CONNECTIONS, SWITCHES AND INDICATOR LIGHTS

2-3

- a. General. This section describes the various connections, switches and indicator lights and furnishes the operator with sufficient information to operate the unit.
- b. Connections (figure 2-1). Connections on the rear panel of the unit will cause the appropriate LEDs to illuminate indicating those systems connected and working. These connections perform the following functions:
 - (1) ACC 1-4
These connections facilitate the testing of the accelerometer cables for functionality. They are connected to the simulated accelerometers inside the unit and to the appropriate connection on the DAU front panel.
 - (2) UTD/EPT
This connection is provided for the UTD cable.
 - (3) MAG SEN
This connection interfaces to a magnetic interrupt cable to provide the channel 1 TACHO input to the DAU "TACH" connector.
 - (4) TRKR 1, 2
Provides the test outputs for synchronizing an oscilloscope to the tracker signals.
 - (5) TACH 1,2
These connections allow synchronization to the tachometer outputs.



5002-002 A

Figure 2-1. Electronic Test Set Connections

- (6) EXT ACC and EXT CLK
 These inputs are used to drive the unit to frequencies and amplitudes which are not calibrated internally. During normal operation these are not used. Inputs to these connectors should not exceed 5V and the external clock input must have a ground reference to the unit through an external loop (not including its BNC connection).

- c. Front Panel (figure 2-2). The front panel of the test set contains 28 LEDs, eight switches and the optical tester. Each switch performs specific functions while each illuminated LED indicates a positive connection to power and ground.

- d. Indicator lights. Each illuminated LED indicates the following:
 - (1) INTERNAL POWER
 This LED indicates the internal power supply is providing the 5V necessary for proper operation of the unit. If this light is not illuminated the unit will not function.

 - (2) MULTICHANNEL
 Five LEDs in this group indicate a positive connection of 24V, PGND (24 V rtn), $\pm 15V$ and AGND (analog ground).

 - (3) TRACKER 1
 Similar to the MULTICHANNEL section these LEDs indicate a positive connection from the unit to the DAU. Illumination of these LEDs are not required to operate the unit.

 - (4) TACHO 1
 If using a magnetic interrupter only the SGND LED will illuminate.

 - (5) ACC 1-14
 Whenever an accelerometer is connected to the unit the GND OK LED for that accelerometer should illuminate. Failure of illumination for a given ACC channel indicates a broken connection or cable.

- e. Eight switches on the front panel perform the following functions:
 - (1) ACC 1-4
 These switches connect the signal to the proper connector pins and allows for proper interfacing with the correct accelerometer type. Connectors on each type are identical but internal wiring is different. This switch permits proper interfacing and prevents an 'UACCELEROMETER FAULT' error message on the Control and Data Unit (CADU).

 - (2) ACTIVE/PASSIVE
 Generates the simulated signals for the UTD.

 - (3) TACHO CONTROL TACH 2
 Generates a monopulse (unipolar) or bipulse (bipolar) on the channel 2 tachometer input.

 - (4) TACHO CONTROL TACH 1
 The switch position determines if a single bipulse drives Tacho Channel 1 or if a double bipulse marks the target blade, with the rest of the blades generating a single bipulse.

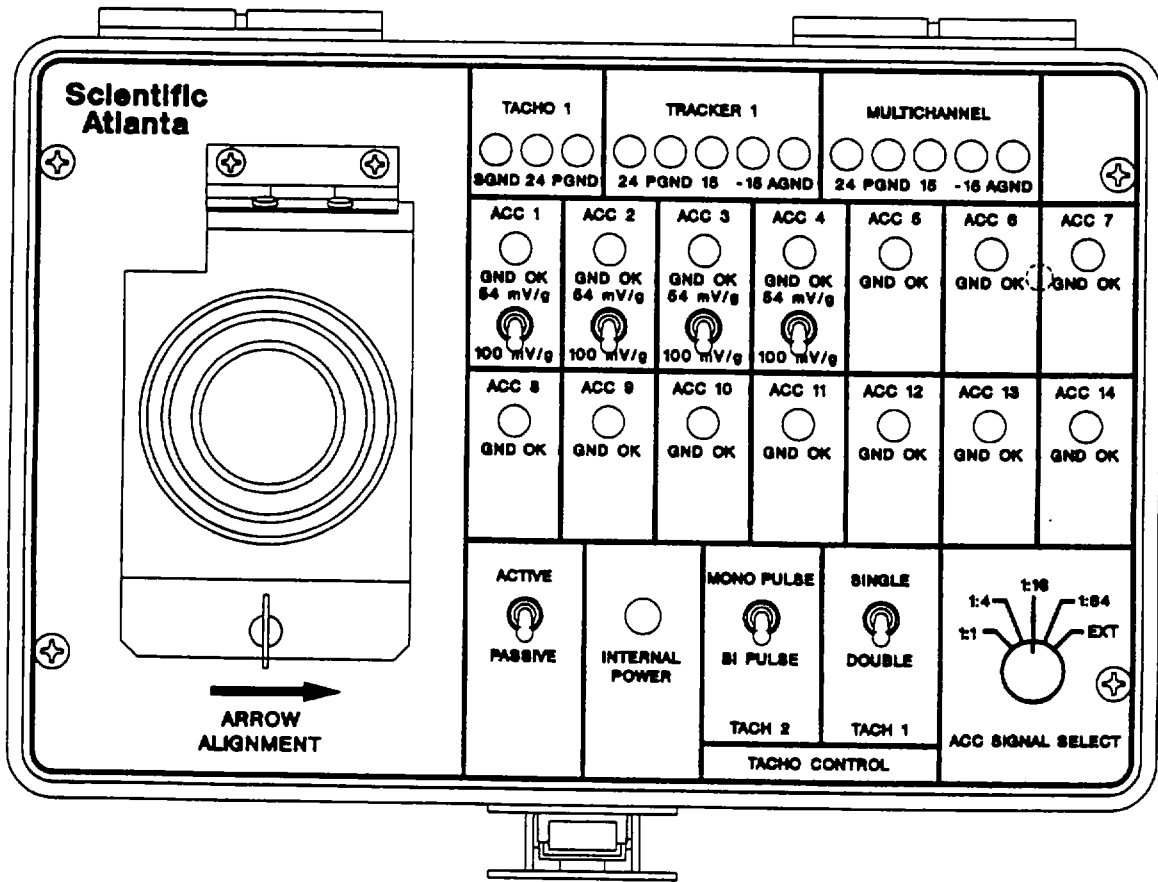


Figure 2-2. Electronic Test Set Front Panel

(5) ACC SIGNAL SELECT

Provides a calibrated attenuation of the accelerometer signal. This function checks the Automatic Gain Control (AGC) of the Electronic Test Set. In EXT position the external accelerometer BNC connector is selected. This allows the user to route a signal from a second source (such as a synthesizer) to the accelerometer interface. When using EXT mode be aware that the 54 mV/g accelerometers require about a 5V offset on the signal to meet bias requirements.

SECTION II OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-4 BEFORE YOU OPERATE **2-4**

Always keep in mind CAUTIONs and WARNINGs. Handle the test set like you would any other delicate piece of electronic equipment. Follow instructions and procedures for proper operation.

2-5 PERFORMANCE CHECKS **2-5**

Ensure the Electronic Test Set has a current calibration tag.

SECTION III OPERATION UNDER NORMAL CONDITIONS

2-6 GENERAL PROCEDURES **2-6**

This section includes unpacking instructions, installation instructions and operating procedures.

2-7 UNPACKING **2-7**

The Electronic Test Set is a self-contained unit.

2-8 INSTALLATION **2-8**

No installation is required for the Electronic Test Set.

SECTION IV OPERATION UNDER UNUSUAL CONDITIONS

2-9 UNUSUAL CONDITIONS **2-9**

There are no requirements for unusual operating conditions.

2-10 EXTREME ENVIRONMENTAL MAINTENANCE **2-10**

There are no requirements for extreme environmental maintenance for the Electronic Test Set.

SECTION V-CAUBRATION

2-11 CAUBRATION PROCEDURE FOR AVA TEST SET (P/N 29313102)**2-11**

The Electronic Test Set generates a set of signals which correspond to an imaginary four bladed helicopter. The rotor description and setup files are contained in the script files INITCAL. The CAL scripts can be modified by the user to support any particular combination of accelerometers, trackers and tachos.

To verify calibration of the DAU the following hardware is required:

- a. DAU (P/N 29328201)
- b. CADU (PIN 29314102)
- c. Electronic Test Set (PIN 29085800)
- d. External 28 Vdc power source
- e. IBM PC (or compatible) with DOS Version 3.3 or higher and an RS-232 port
- f. RS-232 cable (P/N 28130802) with adapter (PIN 28130801) (supplied with the AVA)
- g. RADSCOM diskette (PIN 29725200) (supplied with the AVA)
- h. INITCAL diskette (PIN 29304200) (supplied with the Electronic Test Set)
- i. Printer (Recommended)

(1) PROGRAM THE CADU

- (a) Connect the CADU to the PC using the RS-232 cable (P/N 28130802) from CADU RS-232 port (9-pin connector) to the PC RS-232 port. You may or may not need the gender changer (DB25F to DB25F, part number 28130800) and/or the RS-232 adapter (DB25M to DB9F, part number 28130801) depending upon the configuration of your PC.
- (b) Install RADSCOM program from the RADSCOM diskette (PIN 29725200) (supplied with AVA) on C-Drive. On the PC execute the program RCOM. Create a subdirectory within the director C. called aircraft. EX: C:\RADSCOM\AIRCRAFT. Then copy the disc labeled INITCAL to that new subdirectory.
- (c) Reboot the CADU by pressing the OFF key. Turn the CADU back on by pressing the ON key while pressing and holding the HELP key. The following message will display for a few seconds:

CADU System Bootstrap V 3.10
Please wait...

When the above message goes away, the start-Up Selection Menu will appear (refer to figure 2-3).

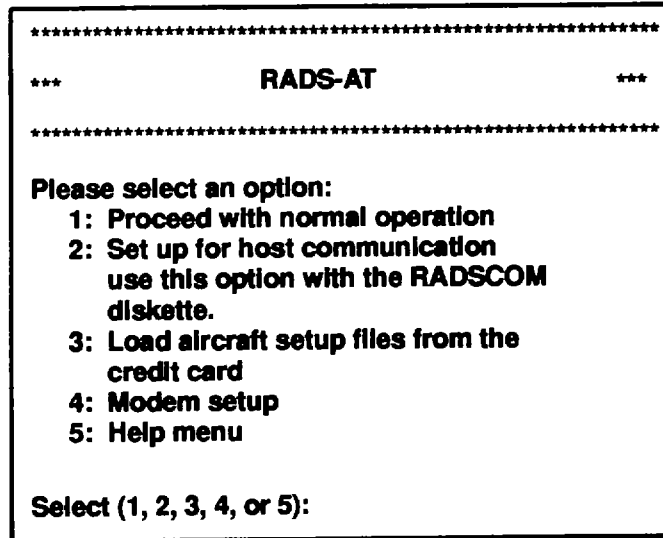


Figure 2-3. CADU Start-Up Selection Menu

- (d) Select option 2, "Set up for host communication".
 - (e) From the PC main menu, select "Load Data or Aircraft Setup File from PC to CADU".
 - (f) Install INITCAL program from the INITCAL diskette (P/N 29304200). When prompted for a file name enter: **INITCAL**. CMD. EX: Initial. CMD. ■
 - (g) When the system has completed transferring files, the message "Press any key. . . ' will appear. Press any key on the PC to return to the main menu and select **QUIT** from the available options to re-boot the CADU. When the re-booting process is completed you will be returned to the main menu on the PC. Select **EXIT** to end the program and return to the DOS prompt.
 - (h) On the CADU, select option 1. This will place the CADU in the Operational Mode. Allow the CADU to stabilize, then disconnect from the computer and continue with SETUP.
- (2) SETUP

Establish connections between the DAU, CADU, Electronic Test Set, and external power as follows:

CAUTION

Install all cables prior to turning on external power.

NOTE

Calibration of the DAU will be conducted in a two part process. Test States 1 : XX_1 will test ACC ports 1 and 2. Test States 1 :XX_2 will test ACC ports 3 and 4. Procedures for each process is identical.

- (a) Ensure external power and both the DAU and CADU power switches are OFF. Connect the DAU to an external bench power source of 28 Vdc. : (+28 VDC to pin B and -to pin A).
- (b) Establish a connection from the DAU jack labeled TRACKER 1 to the UTD/EPT jack on the Electronic Test Set using the UTD Cable, part number 29325701.
- (c) Connect the MULTI-CH connection on the DAU to the MULTI-CH connection on the Electronic Test Set using cable part number 29283200.
- (d) Connect TACHO1 on the DAU to the MAG SEN connection on the Electronic Test Set using the Magnetic RPM Sensor Cable, part number 29105403.
- (e) For Test States 1: 4_1,, 1: 16_1 and 1: 64_1, connect ACC1 on the DAU to the connector ACC1 on the Electronic Test Set using the 25-ft 54 mv/g Accelerometer Cable, part number 29105605.
- (f) For Test States 1: 4_1, 1: 16_1 and 1: 64_1, connect ACC2 on the DAU to the connector ACC2 on the Electronic Test Set using the 50-ft 54 rv/g Accelerometer Cable, part number 29105600.
- (g) Connect the CADU to the DAU using cable part number 29325601. This connection is made from the front panel of the DAU to the back panel of the CADU.
- (h) Position TRACKER MODE selector switch on the DAU to DAY.
- (i) If a printer is desired refer to TM 1-6625-724-1 3&P for directions on how to connect the printer to the CADU.
- (j) Turn on external power source.

(3) PROCEDURE TO VERIFY CALIBRATION OF THE DAU

NOTE

Failure to position the switches in the following order will result in erroneous calibration readings.

- (a) Set the switches on the Electronic Test Set to the following positions:
 - (1) 54 mV/g 100 mV/g switches to 54 mV/g.
 - (2) Active/Passive switch to PASSIVE (3) TACH 2 Mono pulse/Bi pulse switch to BI PULSE.
 - (4) TACH 1 Single/Double switch to SINGLE.
 - (5) ACC Signal Select switch to 1: 4.
- (b) Turn the DAU power switch to ON.
- (c) Turn the CADU power switch to ON.

NOTE

A maximum of 21 of the 28 LEDs should illuminate during calibration of the DAU. Only those accelerometer channels (ACC 1-4) connected to power and the ground (ACC 5-14) should illuminate.

- (d) Check for LED illumination on the Electronic Test Set.
 - (1) TACHO 1: SGND
 - (2) TRACKER 1: 24, PGND
 - (3) MULTICHANNEL: 24, PGND, 15,-15, AGND
 - (4) ACC1 through ACC14
 - (5) INTERNAL POWER
- (e) Using the CADU press FI on the keypad.
- (f) Select **CAL** from the menu selections. Press DO. If there is not a CAL option on your menu, then you must upgrade the AVA software.

NOTE

Perform this procedure only if your CADU does not have the CAL option on the menu.

- (1) On a 386 or 486 computer make a directory called RADSCOM.
- (2) While you are in that directory make a subdirectory called aircraft.
- (3) Install the INITCAL floppy into the computer and copy the files to C: .
- (4) Install credit card (P/N 28131220) into CADU and then reboot the CADU by turning CADU OFF then hold down the HELP key while turning ON.
- (5) On CADU choose #2 communicate with computer.
- (6) On computer choose maintenance utilities.
- (7) On computer choose credit card format.
- (8) Return to main menu.
- (9) Choose load data or aircraft setup file from PC to CADU.
- (10) Enter file name to be loaded: INITCAL. CMD 11 on CADU choose load. FILE: INITCAL. CMD 12. Return to main menu and proceed with the calibration.

- (g) Select **NEW**. Press **DO**. When **DO** is pressed, an Entry Form will appear in the display allowing entry of a new tail number. When calibrating the DAU with the Electronic Test Set, enter the alphanumeric serial number of the CADU using the **F1** and **F2** function keys. The **F1** and **F2** keys scroll through the allowed characters set. That set is the blank character, 0 - 9, A - Z, and a - z. **F1** scrolls forward through the list and **F2** scrolls backward. Selection of a character is accomplished by scrolling to characters and moving to a different position using the **LEFT** and **RIGHT** keys. The rightleft arrow keys move the cursor to the next character or previous character in the serial number. After the desired serial number has been entered, press **DO** to store the new serial number and return to the Main Operations Menu. The **QUIT** key can be employed at any time to cancel the serial number entry and return to the Main Operations Menu.
- (h) Select **CAL**. Press **DO**.

NOTE

The 1: 1 attention range on the Electronic Test Set is not used for 54 mV/g accelerometer testing.

- (i) Verify Test State **1:4_1** on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to **1:4**. Press **DO** twice on the CADU.
- (j) The CADU will transfer to the MEASURING screen and automatically process the signals to the DAU. Successful completion of the measurement data results in a screen that reads:

Processing Data ...
-- Pilot Trnsltion -*
Next Test State: (selected test state)
Standby... While data is loading.

No key presses are required. The CADU will automatically progress to the next screen.

NOTE

If channel errors occur you will be transferred to the ERRORS REPORTED screen to view the error message(s). Press QUIT to exit and return to the Test State screen. If some, but not all of the channels measured, "partial" will appear to the right of Test State.

If no data was acquired due to channel errors, 'failed' will appear to the right of Test State.

If the measurement was successful, a 'done' will appear to the right of the selected Test State.

If an unsuccessful test occurs, refer to the Troubleshooting section in chapter 4.

Proceed to the next Test State.

- (k) Verify Test State 1: 16_1 on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to 1: 16. Press DO twice on the CADU.
 - (2) The procedure will repeat as per step (a).
- (l) Verify Test State 1: 64_1 on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to 1: 64. Press DO twice on the CADU.
 - (2) The procedure will repeat as per step (j).
- (m) For Test States 1: 4_2, 1: 16_2 and 1: 64_2, connect ACC3 on the DAU to the connector ACC3 on the Electronic Test Set using the 25-ft 54 mv/g Accelerometer Cable, part number 29105605.
- (n) For Test States 1: 4_2, 1: 16_2 and 1: 64_2, connect ACC4 on the DAU to the connector ACC4 on the Electronic Test Set using the 50-ft 54 mv/g Accelerometer Cable, part number 29105600.
- (o) Verify Test State 1: 4_2 on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to 1: 4. Press DO twice on the CADU.
 - (2) The procedure will repeat as per step (1).

- (p) Verify Test State **1:16_2** on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to **1:16**. Press **DO** twice on the CADU.
 - (2) The procedure will repeat as per step a).
- (q) Verify Test State **1:64_2** on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to **1:64**. Press **DO** twice on the CADU.
 - (2) The procedure will repeat as per step (j).
- (r) Verify Test State **TEST** on the CADU is selected.
 - (1) On the Electronic Test Set position ACC Signal Select to **1:64**. Press **DO** twice on the CADU.
 - (2) The procedure will repeat as per step 0).
- (s) Select **Finish** and press **DO**.
- (t) Select **Main Menu** and press **DO**.
- (u) Press **F2**.
- (v) Select **Summary Displays**. Press **DO**.
- (w) Proceed to CALIBRATED DATA.

(4) CALIBRATED DATA

- (a) Compare the Summary Display for system under test with figure 2-4 (the values in parentheses are the allowable tolerances). If the DAU exhibits faulty tolerance readings refer to the Troubleshooting section in chapter 4.

NOTE

Recommend using printer to print out summary displays to assist in summary data review.

- (b) Press **QUIT** twice to return to main menu.

(5) UTD Test

- (a) The UTD test is limited on the Electronic Test Set. Calibration is limited to:
 - (1) Ensuring the UTD infrared light illuminates.
 - (2) Ensuring the UTD registers measurement.

Available Summary Displays

1st Harmonics
 3rd Harmonics
 5th Harmonics
 PRINT ALL DISPLAYS

CAL 77 CAL
 FLOWN 15:57:00

28 SEP 94

N
 N
 N
 N

SYNCHRONOUS VIBRATION

1st Harmonics			(ips / deg)	
STATE	CH1	deg	CH2	deg
1:4_1	(34.4 ±2.0)	(343 ±5)	(34.4 ±2.0)	(343 ±5)
1:16_1	(8.4 ±0.5)	(343 ±5)	(8.4 ±0.5)	(343 ±5)
1:64_1	(2.2 ±0.2)	(343 ±5)	(2.2 ±0.2)	(343 ±5)
1:4_2	?	?	?	?
1:16_2	?	?	?	?
1:64_2	?	?	?	?

1st Harmonics			(ips / deg)	
STATE	CH3	deg	CH4	deg
1:4_1	?	?	?	?
1:16_1	?	?	?	?
1:64_1	?	?	?	?
1:4_2	(34.4 ±2.0)	(343 ±5)	(34.4 ±2.0)	(343 ±5)
1:16_2	(8.4 ±0.5)	(343 ±5)	(8.4 ±0.5)	(343 ±5)
1:64_2	(2.2 ±0.2)	(343 i5)	(2.2 ±0.2)	(343 ±5)

CAL 777 CAL
 FLOWN 15:57:00

28 SEP 94

N
 N
 N
 N

SYNCHRONOUS VIBRATION

3rd Harmonics			(ips / deg)	
STATE	CH1	deg	CH2	deg
1:4_1	(3.8 ±0.4)	(314 ±5)	(3.8 ±0.4)	(314 ±5)
1:16_1	(0.92 ±0.1)	(314 ±5)	(0.92 ±0.1)	(314 ±5)
1:64_1	(0.24 ±0.04)	(314 ±5)	(0.24 ±0.04)	(314 ±5)
1:4_2	?	?	?	?
1:16_2	?	?	?	?
1:64_2	?	?	?	?

Figure 2-4. Summary Displays Printout (Sheet 1 of 2)

3rd Harmonics			(ips / deg)	
STATE	CH3	deg	CH4	deg
1:4_1	?	?	?	?
1:16_1	?	?	?	?
1:64_1	?	?	?	?
1:4_2	(3.8 ±0.4)	(314 ±5)	(3.8 ±0.4)	(314 ±5)
1:16_2	(0.92 ±0.1)	(314 ±5)	(0.92 ±0.1)	(314 ±5)
1:64_2	(0.24 ±0.04)	(314 ±5)	(0.24 ±0.04)	(314 ±5)
CAL 777 CAL				N
FLOWN 15:57:00		28 SEP 94		
SYNCHRONOUS VIBRATION				
5th Harmonics			(ips / deg)	
STATE	CH1	deg	CH2	deg
1:4_1	(1.37 ±0.2)	(298 ±5)	(1.37 ±0.2)	(298 ±5)
1:16_1	(0.33 ±0.1)	(298 ±5)	(0.33 ±0.1)	(298 ±5)
1:64_1	(N/A)	(N/A)	(N/A)	(N/A)
1:4_2	?	?	?	?
1:16_2	?	?	?	?
1:64_2	?	?	?	?
5th Harmonics			(ips / deg)	
STATE	CH3	deg	CH4	deg
1:4_1	?	?	?	?
1:16_1	?	?	?	?
1:64_1	?	?	?	?
1:4_2	(1.37 ±0.2)	(298 ±5)	(1.37 ±0.2)	(298 ±5)
1:16_2	(0.33 ±0.1)	(298 ±5)	(0.33 ±0.1)	(298 ±5)
1:64_2	(N/A)	(N/A)	(N/A)	(N/A)

Figure 2-4. Summary Displays Printout (Sheet 2 of 2)

(b) Test the infrared light

- (1) Ensure DAU power is **OFF**. Connect the UTD to the DAU.
- (2) Disconnect UTD cable from Electronic Test Set and reconnect to UTD.

WARNING

The UTD infrared light gets extremely hot with prolonged use. Personal injury and lamp burn out can occur if the lamp is left on too long a time. Limit continuous lamp operation to 60 seconds or less.

- (3) Turn DAU power **ON**. Position TRACKER MODE test switch to **TEST**. Ensure the infrared lamp illuminates. If the lamp fails to work refer to TM 1-6625-724-13&P for repair or troubleshooting procedures. Turn the TRACKER MODE switch to **DAY** mode, turn DAU power **OFF** and allow the lamp to cool for a few seconds before proceeding.

(c) Ensure the UTD registers a measurement.

NOTE

Failure to position the UTD properly on the Electronic Test Set will result in a measurement error. No data will be taken and can lead to erroneous conclusions. If no data is obtained during the test, clean the UTD clear lens with a lint free cloth, reposition the UTD on the test set, hold in place and retest.

- (1) Position the UTD on the Electronic Test Set so the lens assembly on the UTD sits into the lens assembly of the test set. Make sure the direction of rotation arrow on the UTD matches the direction of rotation arrow on the Electronic Test Set.
- (2) Position the TRACKER MODE selection switch to **NIGHT**.
- (3) On the Electronic Test Set, position the ACTIVE/PASSIVE switch to **ACTIVE**.
- (4) Select Flight Plan and press **DO**. Select CAL and press **DO**. Next select OPRCHK and press **DO**. Then press F1.

NOTE

For instructions on how to take a measurement using the CADU refer to TM 1-6625-724-13&P.

(d) Press **QUIT**. Next select SAVE and EXIT. Then press **DO**.

(1) Select MAIN MENU. Press **DO**.

(2) Press **F2** for DISPLAY.

(3) Select One Test State. Press **DO**.

(4) Select TRKTST. Press **DO**.

(5) Select CHANNEL 1 TRACK. Press **DO**.

(6) Press the right arrow once to target the green blade by setting the reference block from MEAN to GRN. Press **F3** for TABLE.

NOTE

All limits described in table 2-1 are referenced to the GRN blade. The values in parentheses are the allowable limits in millimeters. Ensure CADU track DISPLAY is in the same scale. If CADU track DISPLAY scale is in inches, multiply displayed track value by 25.4 or change the scale with the MANAGER menu (refer to TM1-6625-724-13&P).

(e) Examine the values given in the display and compare to table 2-1. If values are outside the tolerance given, open UTD, inspect and replace the Printed Wire Assembly (PWA) in accordance with TM1-6625-724-13&P.

(f) Exit the TABLE screen by pressing **QUIT** three times.

(g) Select **DAY** on the DAU Tracker Mode switch.

(h) Repeat steps (c)(4)-(f).

Table 2-1. UTD Expected Output

Blade	Track	Lag
GRN	(0 ± 2 mm)	(0 ± 2 mm)
YEL	(2 ± 2 mm)	(-0.4 ± 2 mm)
RED	(5 ± 2 mm)	(-0.7 ± 2 mm)
BLU	(8 ± 2 mm)	(-1.0 ± 2 mm)

**CHAPTER 3
AVIATION UNIT MAINTENANCE (AVUM) INSTRUCTIONS**

3-1 GENERAL

3-1

Aviation Unit Maintenance (AVUM) is not applicable for the Electronic Test Set.

CHAPTER 4 AVIATION INTERMEDIATE MAINTENANCE (AVIM) INSTRUCTIONS

4-1 GENERAL

4-1

This chapter contains maintenance procedures that are the responsibility of the Aviation Intermediate Maintenance Technician as authorized by the Maintenance Allocation Chart (MAC) and Source Maintenance and Recoverability (SMR) coded items in the Repair Parts and Special Tools Lists (RPSTL). The maintenance procedures in this chapter are prepared in the form of summary and detailed procedures.

4-2 MAINTENANCE OPERATIONS

4-2

These instructions provide the proper technique and detailed procedures required to perform the maintenance operations. Each maintenance operation provides step-by-step instructions in the order in which the work is most logically accomplished. Any unusual or critical steps are covered in detail.

SECTION I-REPAIR PARTS, SPECIAL TOOLS, AND SUPPORT EQUIPMENT

4-3 TOOLS AND TEST EQUIPMENT LIST

4-3

Tools and test equipment required for maintenance of the Electronic Test Set are identified in Appendix B.

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-4 SPECIAL TOOLS AND SUPPORT EQUIPMENT

4-4

Refer to TB 9-6625-2310-35 for special tools and support equipment.

4-5 REPAIR PARTS

4-5

Repair parts are listed in the RPSTL, Appendix C of this manual.

SECTION II-SERVICE UPON RECEIPT

4-6 GENERAL

4-6

- a. Visually check exterior surfaces of the Electronic Test Set for apparent damage. Check exterior connectors for damage. Check Top Plate Assembly (C-1-1) for broken switches, missing or broken collar link, missing or damaged selector knob and broken or damaged lens.

- b. If the unit has been damaged, report the damage on SF368, (Report of Discrepancies).

SECTION III-PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-7 GENERAL

4-7

Inspect the Electronic Test Set for missing or damaged components. Check for physical damage such as breaks, cracks, wear, etc.

4-8 LUBRICATION

4-8

There are no lubrication tasks required.

4-9 CLEANING

4-9

Use spray cleaner (Item 1, App. D) to clean the outside surfaces of the test set. Wipe clean and dry with a soft cloth. Clean the lens with lens cleaner (Item 2, App. D).

4-10 ELECTRONIC TEST SET CALIBRATION

4-10

a. GENERAL

Calibration is required to verify the outputs of the Electronic Test Set comply with a set of specifications established by the National Bureau of Standards. Verification requires it be tested with calibrated test equipment.

b. REQUIRED EQUIPMENT

Table 4-1 identifies the specific equipment required. Connect equipment as shown in figure 4-1.

c. PROCEDURE

NOTE

Allow any test equipment requiring warm up to reach operational temperature before continuing.

- (1) Ensure external power and DAU power switches are **OFF**. Connect DAU **28VDC** connector to an external bench power source of 28 V dc; positive (+) to pin B and negative (-) to pin A.
- (2) Connect the **MULTI-CH** connection on the DAU to the **MULTI-CH** connection on the Electronic Test Set using cable part number 29283200.
- (3) Position switches on the Electronic Test Set as follows:
 - (a) 54 mV/g / 100 mV/g switches to **100 mV/g**.
 - (b) ACC Signal Select to **1:1**.

Table 4-1. Minimum Specifications of Equipment Required

Common Name	Minimum Use Specifications	Manufacturer and Model (part number)
Aviation Vibration Analyzer (AVA) Test Set ¹	Range: N/A Accuracy: N/A	Scientific-Atlanta, Inc., (29313102)
Cable, Electronic Test Set	N/A	Scientific-Atlanta, Inc., (29283200)
28 Vdc power supply	N/A	N/A
Digital Multimeter ²	Range: 3 to 6 V dc	John Fluke, Model 8506A/OT (p/o MIS-35947)
Frequency Counter ²	Range: 4,7683 Hz (209.7183 mS) Accuracy: ±0.0025%	Hewlett-Packard, Model 5345A (MIS-28754/1 Type 1) with converter, frequency plug-in, 5355A (5355A)
Signal Generator ²	Range: 5.0 V pk-pk, 50 kHz Accuracy: Nominal	(SG-1288/G)

¹The Data Acquisition Unit (DAU) (29328201) from the AVA Test Set is required. Evidence of current calibration is not required.

²Evidence of current calibration is required.

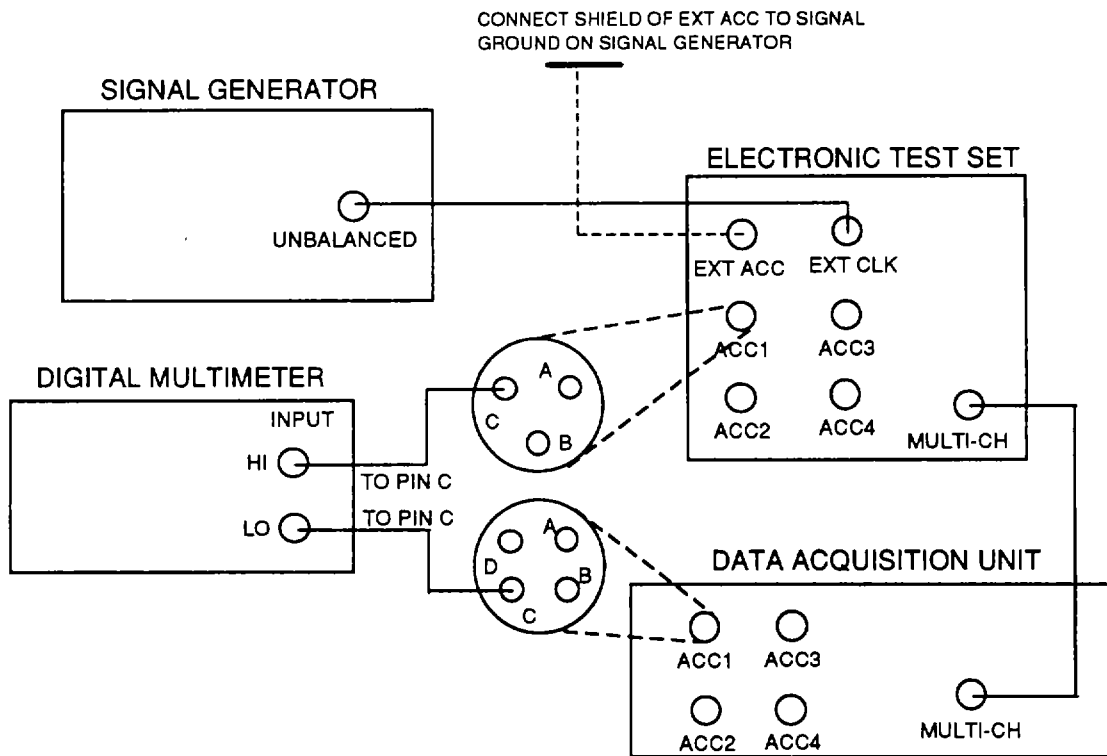


Figure 4-1. Test Equipment Interconnections

- (4) Turn on external power source.
- (5) Turn DAU power switch **ON**.
- (6) Set signal generator to produce an approximate square wave at 50 KHz and 5V amplitude.
- (7) Select range on the DVM to most accurately display 5Vdc.
- (8) Connect 50KHz output of signal generator to **EXT CLK** input of the Electronic Test Set.
- (9) Connect shield of **EXT ACC** input on the Electronic Test Set to signal generator signal ground.
- (10) Connect negative (-) lead of DVM to ANALOG GROUND on DAU Acquisition board, or pin **C** of **ACC 1** input on DAU front panel.
- (11) Connect positive (+) lead of DVM to pin **C** of **ACC 1** output on the Electronic Test Set.

d. SIGNAL OUTPUT LEVEL

NOTE

The absolute value of the output signals is not critical (within a few tenths of a volt) but the difference between them is important. Therefore record the high and low voltages seen on the DVM.

At this point with the gain select on 1:1, the output of the DVM should stabilize on about 5.000 V for approximately 6 seconds, then stabilize on approximately 4.000 V for 6 seconds. If the meter does not have sufficient time to stabilize, reduce the input frequency on the **EXT CLK** input.

- (1) Select 1:4 gain range on the Electronic Test Set. Record high and low DVM readings.
- (2) Select 1:16 gain range on the Electronic Test Set. Record high and low DVM readings.
- (3) Select 1:64 gain range on the Electronic Test Set. Record high and low DVM readings.
- (4) Repeat steps 1 to 3 for accelerometer channels 2, 3 and 4. Do this by measuring the output voltage at the appropriate rear panel connector.
- (5) Select 54 mV/g on the Electronic Test Set.
 - (a) Connect negative (-) lead of DVM to ANALOG GROUND on DAU Acquisition board, or pin **B** of **ACC 1** input on DAU front panel.
 - (b) Connect positive (+) lead of DVM to pin **B** of **ACC 1** output on the Electronic Test Set.
 - (c) Select 1:4 gain range on the Electronic Test Set. Record high and low DVM readings.
 - (d) Select 1:16 gain range on the Electronic Test Set. Record high and low DVM readings.
 - (e) Select 1:64 gain range on the Electronic Test Set. Record high and low DVM readings.

- (f) Repeat steps (c) to (e) for accelerometer channels 2, 3 and 4.
- (6) For each measurement recorded, take the difference between the high and low data points. The signal level measured should be within the .expected tolerance values as stated in table 4-2.

Table 4-2. Expected Signal Output

GAIN RANGE	HI-LO MEASUREMENT
1:1	0.983V ± 2%/
1:4	0.245 V ± 2%
1:16	0.060 V ± 2 digits
1:64	0.016 V ± 2 digits

e. FREQUENCY OUTPUT

Disconnect the DVM and signal generator from the Electronic Test Set. It is important the **EXT ACC** be disconnected. Perform the following:

- (1) Select **MONO PULSE** on the TACH 2 TACHO CONTROL on the Electronic Test Set.
- (2) Connect the frequency counter to the **TACH 2** BNC output on the rear panel of the Electronic Test Set.
- (3) Measure either the frequency output or the period. Compare the results with table 4-3.

Table 4-3. Expected Frequency Output

FREQUENCY OUTPUT	OUTPUT PERIOD
4.7683 Hz ± 0.01%	209715000 nS ± 0.01%

SECTION IV-TROUBLESHOOTING

4-11 GENERAL

4-11

Troubleshooting at the AVIM level is limited to checking for normal operation. For information on Error Messages and troubleshooting the DAU and/or CADU refer to TM1 -6625-724-13&P.

4-12 ELECTRONIC TEST SET

4-12

THIS TASK COVERS: INSPECTION

INITIAL SETUP:

Personnel Required:

Technician 35H

Parts:

Electronic Test Set, PN 29085800

Equipment Condition:

No power applied

- a. Check exterior of unit for damage.
- b. Check knobs, switches, latches and lights for damage.
- c. Inspect locking collar for damage.
- d. Inspect lens for scratches or cracks.
- e. Inspect connectors on rear panel for damage and/or bent pins.
- f. Inspect bottom of unit for serial number.

END OF TASK

THIS TASK COVERS: FAULT LOCATION

- Procedure 1: LEDs do not illuminate
- Procedure 2: DAU exhibits faulty tolerance readings
- Procedure 3: Partial or Failed Test States reported
- Procedure 4: Test Set fails to Calibrate/Malfunctions

Initial Setup:

Personnel Required:

Technician 35H

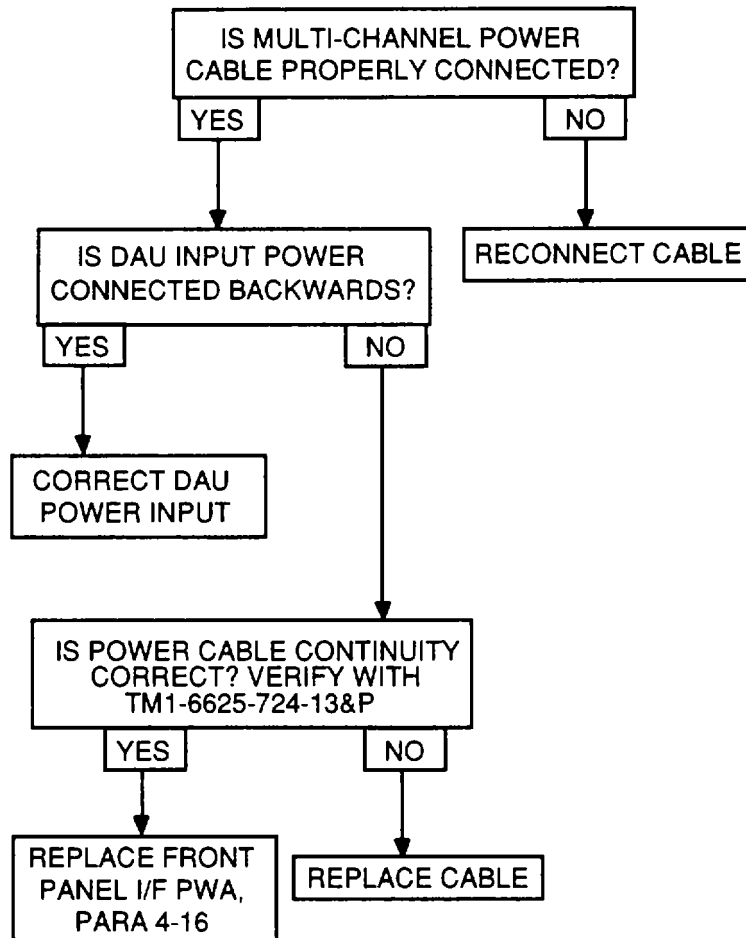
Parts:

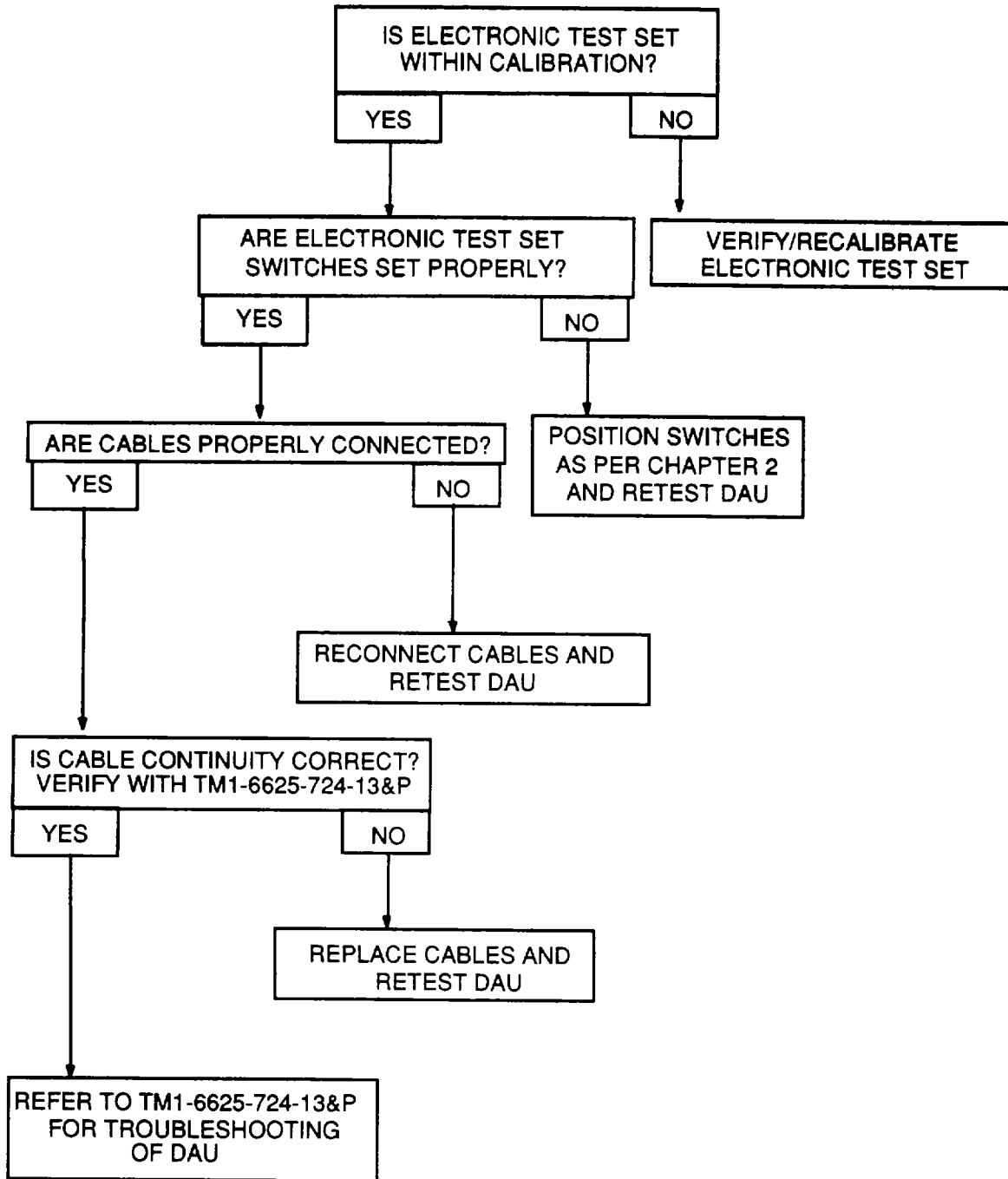
Electronic Test Set

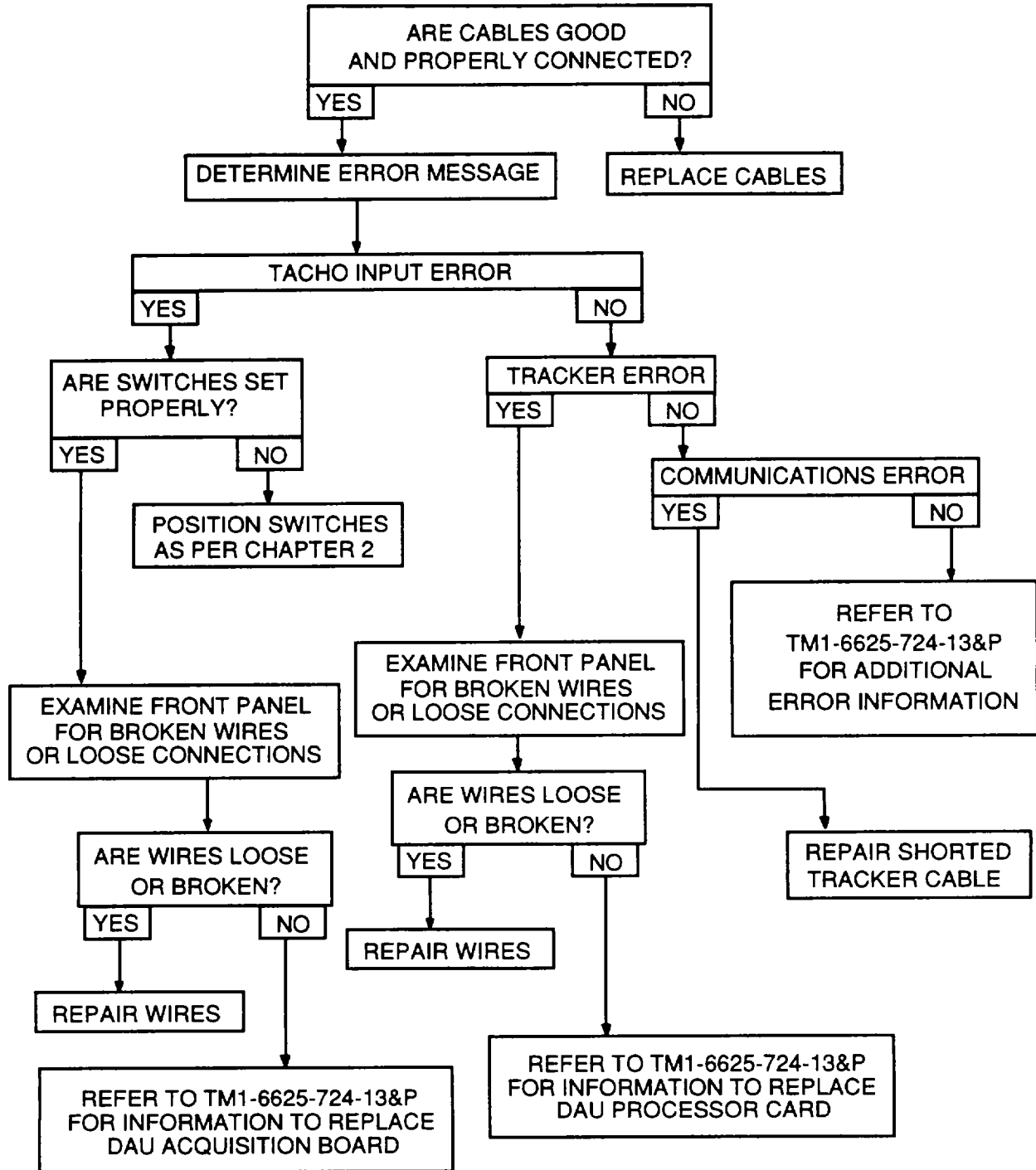
Equipment Condition:

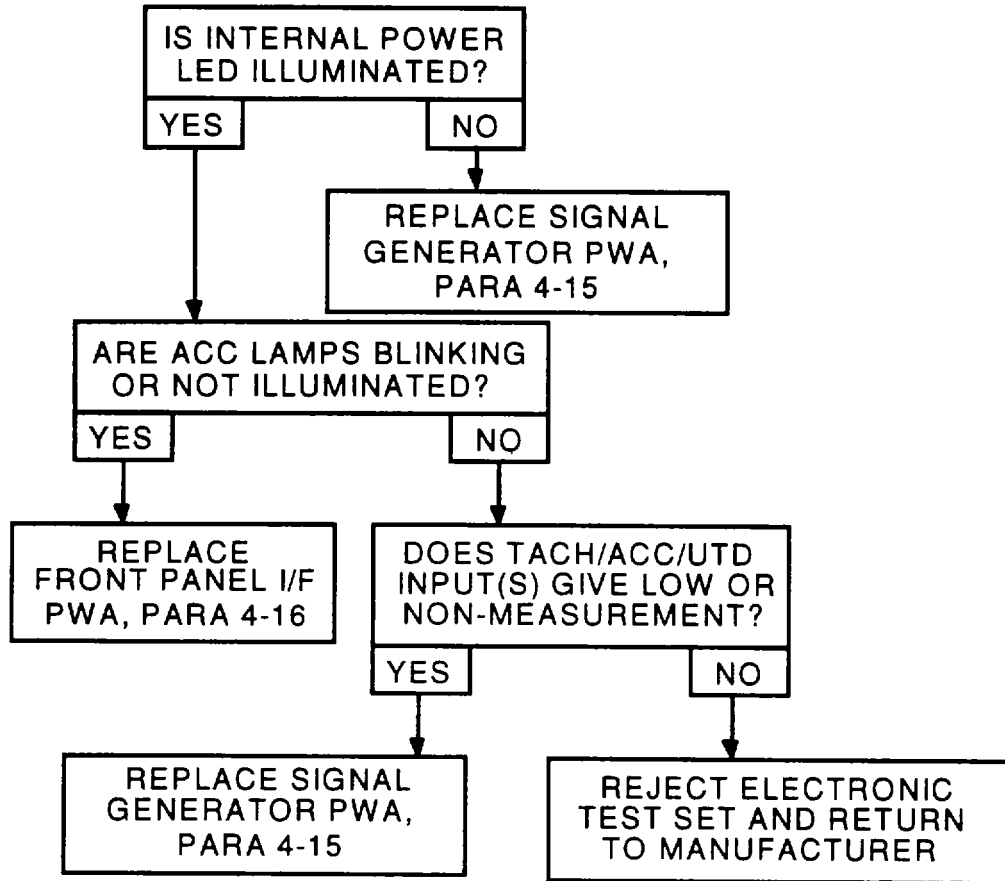
Connected for operation normal

4-13 Troubleshooting Procedure 1: LEDs do not illuminate









SECTION V-MAINTENANCE PROCEDURES

4-14 MAINTENANCE PROCEDURES-GENERAL

4-14

When a maintenance procedure is required, it will usually involve removal of the part being repaired or replaced. Removal procedures are given only to the extent necessary to repair or replace authorized parts.

4-15 SIGNAL GENERATOR PRINTED WIRING ASSEMBLY (PWA)

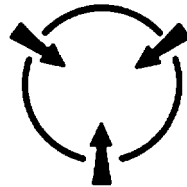
4-15

THIS TASK COVERS: REMOVAL AND INSTALLATION

<u>Initial Setup:</u>	Workbench with ESD capability
<u>Personnel Required:</u>	TMDE Support Specialist
<u>Tools and Equipment:</u>	Tool Kit, Electricians
<u>Parts/Materials:</u>	Anti-static pad
<u>Equipment Condition:</u>	Unit disconnected, cover removed, Top Plate facing up on workbench

CAUTION

This assembly contains parts sensitive to damage by ElectroStatic Discharge (ESD)



Use precautionary ESD procedures when touching, removing or inserting. Use static-free material to wrap the assembly for shipment or storage.

GO TO NEXT PAGE

1. REMOVAL:

- a. Remove seal (1) by pulling up until seal is free of the enclosure (17).
- b. Remove four screws (2) from the Top Plate (7).
- c. Pull Top Plate assembly up and to the left to free from enclosure (17) being careful not to damage cable assembly (15).
- d. Remove two screws (14), two flatwashers (13) and two lockwashers (12) from cable assembly (15). Disconnect cable assembly from Front Panel I/F PWA (20).
- e. Place Top Plate assembly on anti-static pad, face down.
- f. Remove four screws (8), four flatwashers (9) and four lockwashers (10) from the Signal Generator PWA (18).

CAUTION

Separate the Signal Generator PWA from the Front Panel I/F PWA with care so as to not bend the integrated connecting pins.

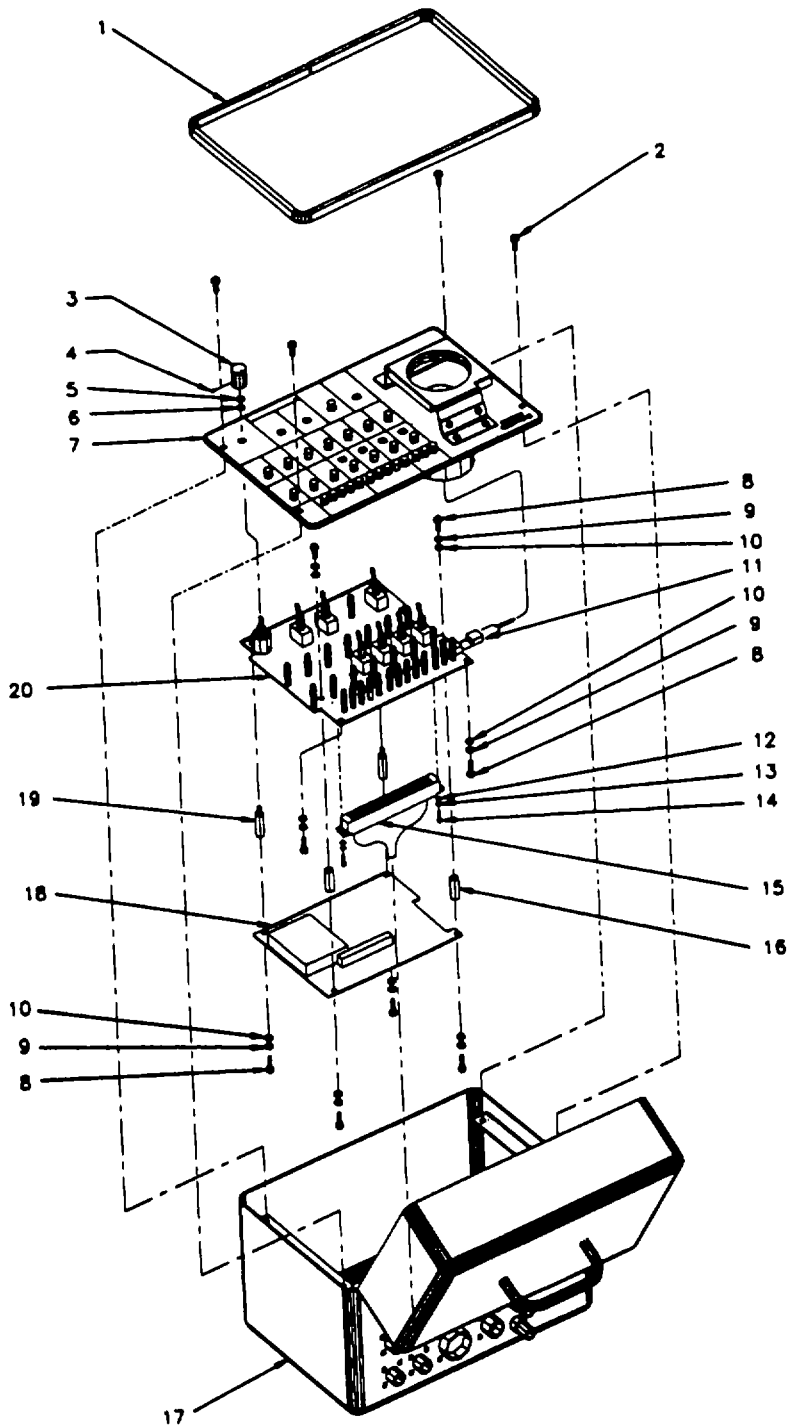
- g. Remove Signal Generator PWA (18) from Front Panel I/F PWA (20).

2. INSTALLATION:**CAUTION**

Join the Signal Generator PWA and the Front Panel I/F PWA with care so as to not bend the integrated connecting pins.

- a. Join the Signal Generator PWA (18) and the Front Panel I/F PWA (20) by pressing the integrated pins on the Signal Generator PWA board into the female connector on the Front Panel I/F PWA (20).
- b. Install four screws (8), four flatwashers (9) and four lockwashers (10).
- c. Connect cable assembly (15) onto Front Panel I/F PWA (20). Install two screws (14), two flatwashers (13) and two lockwashers (12).
- d. Position Top Plate (7) of Top Plate assembly on enclosure (17). Install four screws (2).
- e. Start at one corner and press seal (1) into position until flush on enclosure (17).
- f. Install top cover.

GO TO NEXT PAGE



END OF TASK

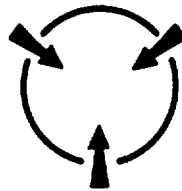
4-13/4-14 Blank

THIS TASK COVERS: REMOVAL AND INSTALLATION

<u>Initial Setup:</u>	Workbench with ESD capability
<u>Personnel Required:</u>	TMDE Support Specialist
<u>Tools and Equipment:</u>	Tool Kit, Electricians
<u>Parts/Materials:</u>	Anti-static pad
<u>Equipment Condition:</u>	Unit disconnected, cover removed, Top Plate facing up on workbench

CAUTION

This assembly contains parts sensitive to damage by ElectroStatic Discharge (ESD)



Use precautionary ESD procedures when touching, removing or inserting. Use static-free material to wrap the assembly for shipment or storage.

GO TO NEXT PAGE

4-16 FRONT PANEL I/F PWA (CONTINUED)

4-16**1. REMOVAL:**

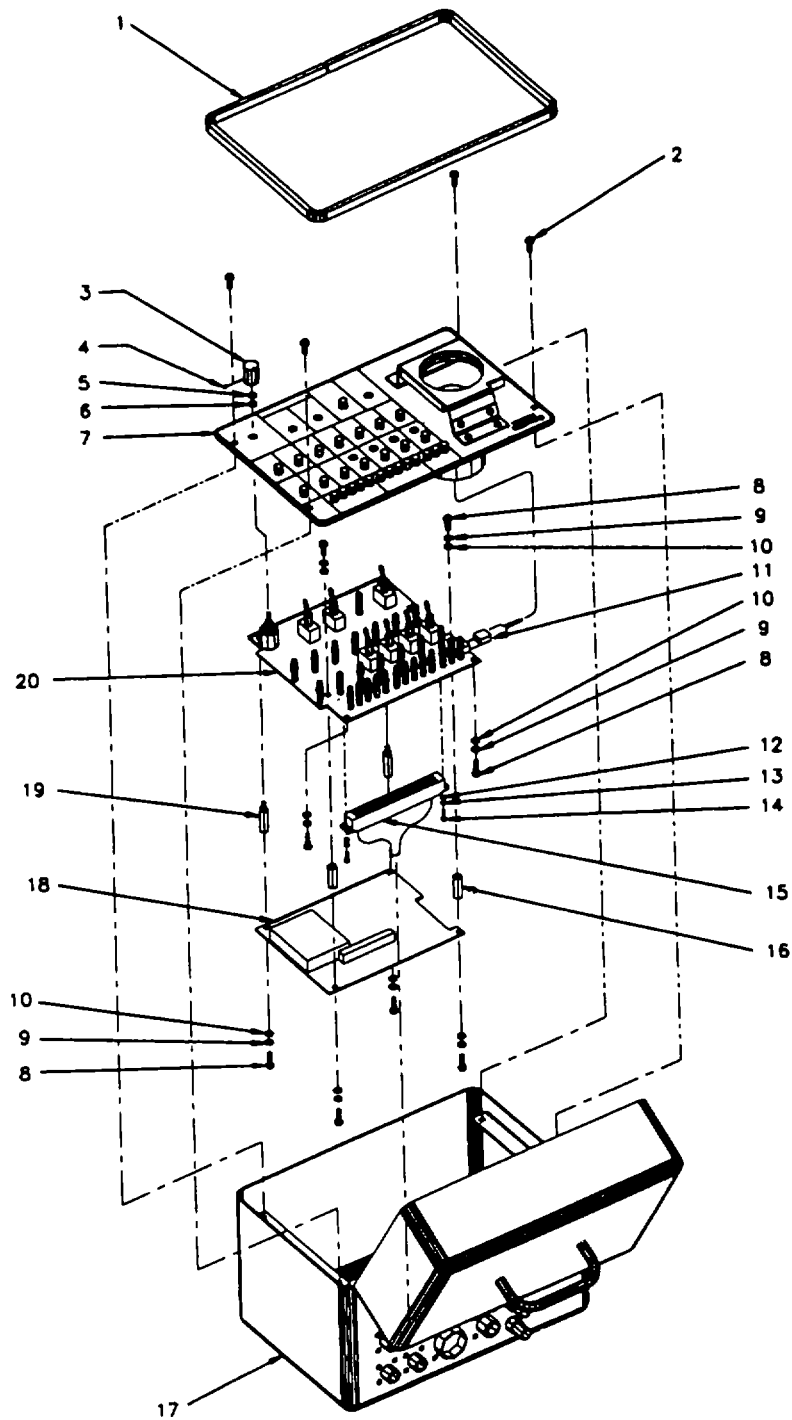
- a. Remove seal (1) by pulling up until seal is free of the enclosure (17).
- b. Remove four screws (2) from the Top Plate (7).
- c. Pull Top Plate assembly up and to the left to free from enclosure (17) being careful not to damage cable assembly (15).
- d. Remove two screws (14), two flatwashers (13) and two lockwashers (12) from cable assembly (15). Disconnect cable assembly from Front Panel I/F PWA (20).
- e. Place Top Plate assembly on anti-static pad, face down.
- f. Remove four screws (8), four flatwashers (9) and four lockwashers (10) from the Signal Generator PWA (18).

CAUTION

Separate the Signal Generator PWA from the Front Panel I/F PWA with care so as to not bend the integrated connecting pins.

- g. Remove Signal Generator PWA (18) from Front Panel I/F PWA (20).
 - h. Loosen set screw (4) on knob (3). Remove knob. Remove retaining nut (5) and flatwasher (6).
 - i. Remove two stand offs (19) from Front Panel I/F PWA (20).
 - j. Disconnect the four pin UTD test housing/Front Panel I/F PWA connector (P1) (11).
 - k. Carefully separate Top Plate (7) from Front Panel I/F PWA (20).
 - l. Remove two stand offs (16) from the Front Panel I/F PWA (20) by removing two screws (8), two flatwashers (9) and two lockwashers (10).
- 2. INSTALLATION**
- a. Install two stand offs (16) on the Front Panel I/F PWA (20) using two screws (8), two flatwashers (9) and two lockwashers (10).
 - b. Carefully join the Front Panel I/F PWA (20) with the Top Plate (7).
 - c. Connect the four pin UTD test housing/Front Panel I/F PWA connector (P1) (11).
 - d. Install two stand offs (19) to Front Panel I/F PWA (20).
 - e. Install flatwasher (5) and retaining nut (6). Position knob (3) on Top Plate (7) and secure with set screw (4). Ensure pointer on knob coincides with number settings on Top Plate.

GO TO NEXT PAGE



GO TO NEXT PAGE

CAUTION

Join the Signal Generator PWA and the Front Panel I/F PWA with care so as to not bend the integrated connecting pins.

- f. Join the Signal Generator PWA (18) and the Front Panel I/F PWA (20) by pressing the integrated pins on the Signal Generator PWA board into the female connector on the Front Panel I/F PWA board.
- g. Install four screws (8), four flatwashers (9) and four lockwashers (10).
- h. Connect cable assembly (15) onto Front Panel I/F PWA (20). Install two screws (14), two flatwashers (13) and two lockwashers (12).
- i. Position Top Plate (7) of Top Plate assembly on enclosure (17). Install four screws (2).
- j. Start at one corner and press seal (1) into position until flush on enclosure (17).
- k. Install top cover.

END OF TASK

SECTION VI-PREPARATION FOR STORAGE AND SHIPMENT

4-17 GENERAL

4-17

- Information on preparation for storage and shipment is included in TM-1-1500-204-23 (Series).
- Regulatory requirements pertaining to administrative storage will be found in AR 750-1.

**APPENDIX A
REFERENCES**

A-1	DICTIONARIES OF TERMS AND ABBREVIATIONS	
	AR	310-25 Dictionary of United States Army Terms
	AR	310-50 Authorized Abbreviations and Brevity Codes
A-2	PUBLICATIONS INDEXES	
	DA PAM	25-30 Consolidated Index of Army Publications and Blank Forms
A-3	LOGISTICS AND STORAGE	
	TM	1-1500-204-23 (Series) General Aircraft Maintenance Manual
	TM	743-200-1 Storage and Materials Handling
A-4	MAINTENANCE OF SUPPLIES AND EQUIPMENT	
	AR	750-1 Army Material Maintenance Concepts and Policies
	DA PAM	738-751 Functional Users Manual for The Army Maintenance Management System-Aviation (TAMMS)
	TM	43-0139 Painting Operations Instructions for Field Use
	TB	43-180 Calibration and Repair Requirements for the Maintenance of Army Material
	TB	9-6625-2310-35 Calibration Procedure for AVA Calibration Test Set
A-5	OTHER PUBLICATIONS	
	AR	420-90 Fire Prevention and Protection
	AR	55-38 Reporting of Transportation Discrepancies in Shipments
	AR	700-58 Packaging Improvement Report
	DA PAM	310-13 Military Publications Posting and Filing
	FM-21-11 First Aid for Soldiers
	TM	750-244-1-4 Procedures for the Destruction of Aviation Ground Support Equipment (FSC 6625) to Prevent Enemy Use

A-1/(A-2 Blank)

APPENDIX B MAINTENANCE ALLOCATION CHART

SECTION I-INTRODUCTION

B-1. GENERAL

- a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.
- b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.
- c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.
- d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS

- a. Inspect-To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g. -by sight, sound or feel).
- b. Replace-To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.
- c. Repair-The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
- d. Calibrate-To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment's used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- e. Test-To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

- a. Column 1, Group Number-Column 1 lists functional group code numbers, the purposes of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".
- b. Column 2, Component/Assembly-Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

- c. Column 3, Maintenance Function-Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2).
- d. Column 4, Maintenance Category -
 - (1) AVUM-Aviation Unit Maintenance. AVUM activities will be staffed and equipped to perform high frequency "On-Equipment" maintenance tasks required to retain or return equipment to a serviceable condition.
 - (2) USATA-United States Army TMDE Activity provides Aviation Intermediate Maintenance. (AVIM) support. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available skills, tools, and equipment. USATA inspects, troubleshoots, test, diagnoses, repairs, adjust, calibrates, and aligns system modules and components.
 - (3) Depot-The printed wiring assemblies (PWAs) are sent back to the depot/factory for repairs.
- e. Column 5, Tools and Equipment-Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.
- f. Column 6, Remarks-This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

- a. Column 1, Reference Code-The code recorded in column 5, Section II.
- b. Column 2, Maintenance Category-This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.
- c. Column 3. Nomenclature
- d. Column 4, National Stock Number (NSN)

SECTION II - MAINTENANCE CHART ELECTRONIC TEST SET NSN: 6625-01-347-8667

GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY			TOOLS AND EQUIPMENT	REMARKS
			AVUM	AVIM*	DEPOT		
00	Electronic Test Set						
01	Electronic Test Set Calibrate	Inspect	0.1 1.0		2-9		A B
		Replace	0.5		1		
	Repair		1.0	X	1		

* U.S. Army Test, Measurement and Diagnostic Equipment Support Activity (USATA)

SECTION III - TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIP REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER
1	AVIM	Tool Kit, Electricians	5180-01-195-0855
2	AVIM	Cable, Test Set (29283200)	6150-01-356-5825
3	AVIM	Digital Volt Meter, Four Digit	
4	AVIM	Frequency/Interval Counter, 0.001 Hz res.	
5	AVIM	Oscilloscope, 1 MHz bandwidth or better	
6	AVIM	IBM Compatible Computer	
7	AVIM	Signal Generator, 10 uS at 50KHz rep	
8	AVIM	DAU (29328201)	6695-01-325-3391
9	AVIM	28 Vdc Power Supply	

SECTION IV - MAC REFERENCE CODE AND REMARKS

REFERENCE CODE	REMARKS / NOTES
A	Visual inspection without disassembly
B	Verify unit operates within tolerance/specifications

**APPENDIX C
REPAIR PARTS AND SPECIAL TOOLS LIST**

SECTION I - INTRODUCTION**C-1. SCOPE**

This RPSTL-lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of AVIM/AVUM maintenance of the AVA Calibration Test Set. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

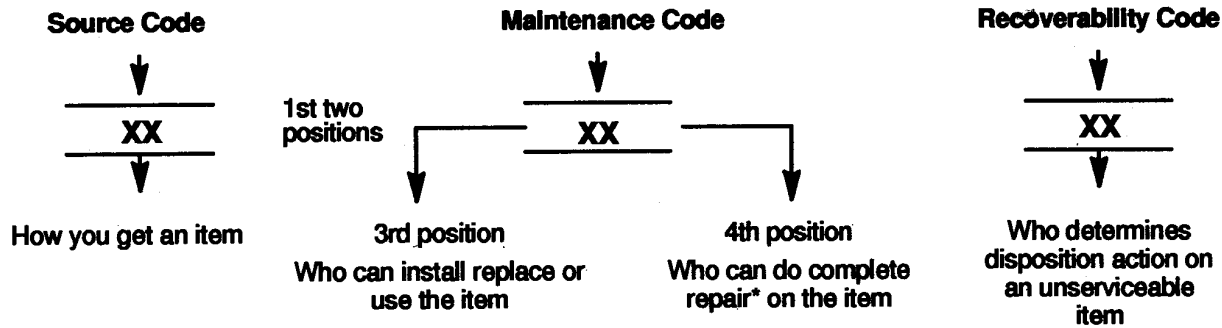
C-2. GENERAL

In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

- a. Section II. Repair Parts List - A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts for repairable special tools are also listed in this illustration(s)/figure(s).
- b. Section III. Special Tools List - A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.
- c. Section IV. National Stock Number and Part Number Index - A list, in National Item Identification Number (NIIN) sequence of all National stock numbering items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

C-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

- a. ITEM NO. (Column (1)) - Indicates the number used to identify items called out in the illustration.
- b. SMR CODE (Column (2)) - The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



* Complete Rear: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) **Source Code.** The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow.

Code	Explanation
PA, PB, PC**, PD PE, PF, PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code.
	**NOTE : Items coded PC are subject to deterioration.
KD, KF, KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
KO (made at org/AVUM Level) MF (made at DS/AVIM Level) MH (made at Specialized Repair Act [SRA]) MD (made at Depot)	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by part number in the DESCRIPTION AND USABLE ON CODE-(UOC) column and listed in the Bulk Material group of the repair parts lists in this RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Code	Explanation
AO (assembled at org/AVUM Level) AF (assembled at DS/AVIM Level) AH (assembled at GS Level) AL (assembled at Specialized Repair Act [SRA]) AD (assembled at Depot)	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA-	Do not requisition an "XA" coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB-	If an "XB" item is not available for salvage, order it using the Commercial and Government Entity (CAGE) and part number given.
XC-	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD-	Item is not stocked. Order an "XD" coded item through normal supply channels using the CAGE and part number given if no NSN is available.
	NOTE: Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance code tells you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

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

Code	Application/Explanation
C	- Crew or operator maintenance done within organizational or aviation unit maintenance.
O	- Organizational or aviation unit category can remove, replace, and use the item.
F	- Direct support or aviation intermediate level can remove, replace, and use the item.
H	- General support level can remove, replace, and use the item.
L	- Specialized repair activity can remove, replace, and use the item.
D	- Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.)

NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

This portion will contain one of the following maintenance codes.

Code	Explanation
O	- Organizational or (aviation unit) is the lowest level that can do complete repair of the item.
F	- Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H	- General support is the lowest level that can do complete repair of the item.
L	- Specialized repair activity (designates the specialized repair activity) is the lowest level that can do complete repair of the item.
D	- Depot is the lowest level that can do complete repair of the item.
Z	- Non repairable. No repair is authorized.
B	- No repair authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

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

Code	Explanation
Z	- Non repairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3rd position of SMR Code.
O	- Repairable item. When uneconomical repairable, condemn and dispose of the item at organizational or aviation unit level.
F	- Repairable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
H	- Repairable item. When uneconomically repairable, condemn and dispose of the item at the general support level.

Code	Explanation
D	- Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	- Repairable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	- Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.
c.	<u>CAGE (Column (3))</u> - The Commercial and Government Entity (CAGE) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item. CAGE consolidates the former H5 Federal Supply Code for Manufacturers (FSCM) and H8 Federal Supply Code for Non-Manufacturers (FSCNM).
d.	<u>PART NUMBER (Column (4))</u> - Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE: When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered.

- e. DESCRIPTION AND USABLE ON CODE (Column (5)) - This column includes the following information:
- (1) The Federal item name and, when required, a minimum description to identify the item.
 - (2) The physical security classification of the item is indicated by the parenthetical entry (insert applicable physical security classification abbreviation, e.g. Phy Sec C1 (C) Confidential, Phy Sec C1 (S) Secret, Phy Sec C1 (T) Top Secret).
 - (3) Items that are included in kits and sets are listed below the name of the kit or set.
 - (4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
 - (5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.
 - (6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line of the description (before UOC).

- (7) The usable on code, when applicable (see paragraph C-5, Special information).
 - (8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipment's supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.
 - (9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.
- f. QTY (Column (6)) The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, sub functional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

C-4. EXPLANATION OF COLUMNS (SECTION IV)

a. -NATIONAL STOCK NUMBER (NSN) INDEX

- (1) STOCK NUMBER Column - This column lists the NSN by National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN.

example: 5305-01-674-1467 - NIIN

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

- (2) FIG. Column- This column lists the number of the figure where the item is identified/ located. The figures are in numerical order in Section II and Section III.
- (3) ITEM Column - The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. PART NUMRER INDEX - Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the number 0 through 9 and each following letter or digit in like order).

- (1) CAGE Column - The Commercial and Government Entity (CAGE) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item. CAGE consolidates the former H5 Federal Supply Code for Manufacturers (FSCM) and H8 Federal Supply Code for Non-Manufacturers (FSCNM).
- (2) PART NUMBER - Column Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

- (3) STOCK NUMBFR Column This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and FSCM columns to the left.
- (4) FIG. Column This column lists the number of the figure where the item is identified/ located in Section II and Section III.
- (5) ITEM Column The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

C-5. SPECIAL INFORMATION - Use the following subparagraphs as applicable:

- a. USABLE ON CODE - The usable on code appears in the lower left corner of the Description column heading. Usable on codes are shown as "UOC....." in the Description Column (justified left) on the first line applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes used in the RPSTL are:

<u>Code</u>	<u>Used On</u>
N/A	N/A

- b. FABRICATION INSTRUCTIONS - Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part number for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated.
- c. ASSEMBLY INSTRUCTION - N/A
- d. KITS - Line item entries for repair parts kits appear in a group in Section II.
- e. INDEX NUMBERS - Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.
- f. ASSOCIATED PUBLICATIONS- N/A

C-6. HOW TO LOCATE REPAIR PARTS

A. When National Stock Number or Part Number is not known:

- STEP 1 Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly and subassembly groups, and listings are divided into the same groups.
- STEP 2 Find the figure covering the assembly group or subassembly group to which the item belongs.
- STEP 3 Identify the item on the figure and note the item number.
- STEP 4 Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

STEP 5 Refer to the Part Number Index to find the NSN, if assigned.

B. When National Stock Number or Part Number is known:

STEP 1 Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification (NIIN) sequence (see C-4.a.(1)). The part numbers in the Part Number Index are listed in ascending alphanumeric sequence (see C-4.b). Both indexes cross-reference you to the illustration figure and Item Number of the item you are looking for.

STEP 2 After finding the figure and item number, verify that the item is the one you are looking for, then locate the item number in the repair parts list for the figure.

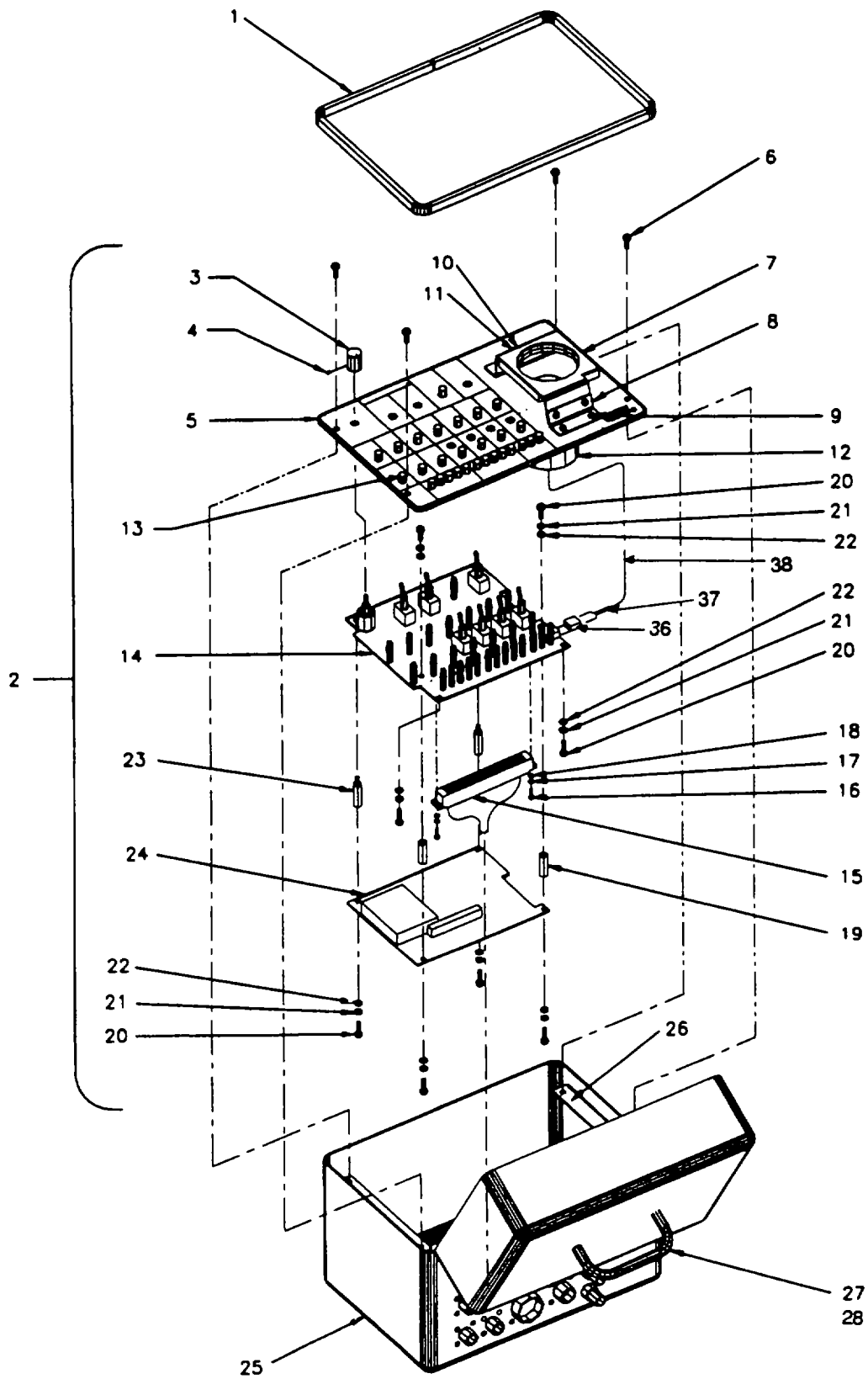
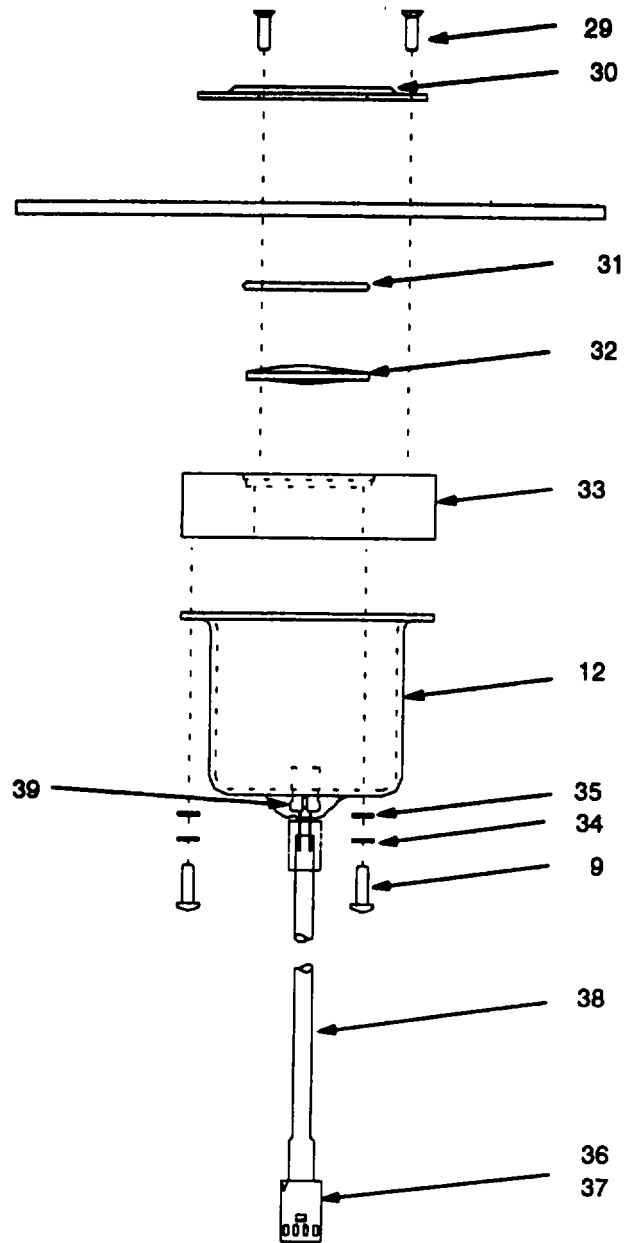


Figure C-1. Electronic Test Set (Sheet 1 of 2)



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Figure C-1. Electronic Test Set (Sheet 2 of 2)

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 01					
FIGURE C-1 ELECTRONIC TEST SET					
	PBFFF	20227	29085800	Electronic Test Set	1
1	XDFZZ	58993	ZPS-5-511-1	.Seal	1
2	XDFZZ	20227	29726700	.Top Plate Assembly.....	1
3	XDFZZ	20227	28120000	..Knob	1
4	XDFZZ	96906	MS51021-10	...Set Screw	1
5	XDFZZ	20227	29726300	..Top Plate	1
6	XDFZZ	12324	42918900	..Screw	4
7	XDFZZ	20227	29332000	...Bracket, Alignment	1
8	XDFZZ	20227	29332600	...Hinge, Support	1
9	XDFZZ	96906	MS51957-14	...Screw, Pan Head	7
10	XDFZZ	20227	28134303	...Stud, Wing Head	1
11	XDFZZ	20227	28134301	...Ring, Retaining	1
12	XDFZZ	20227	29332400	...Support Tube	1
13	XDFZZ	20227	28126100	...Lens Mount, Green.....	28
14	PBFFL	20227	29248500	..PWA, Front Panel I/F	1
15	PAFFF	20227	29250200	..Wiring Harness, Test Set (REF C-2).....	1
16	XDFZZ	96906	MS51957-3	..Screw, Pan Head.....	2
17	XADZZ	96906	MS15795-802	..Washer, Flat	2
18	XADZZ	96906	MS35338-134	..Washer, Lock.....	2
19	XDFZZ	20227	28030704	..Standoff	2
20	XDFZZ	96906	MS51957-28	..Screw, Pan Head.....	8
21	XDFZZ	80205	NAS620C6	..Washer, Flat	8
22	XADZZ	96906	MS35338-136	..Washer, Lock.....	8
23	XDFZZ	20227	28109902	..Standoff, Male/Female	2
24	PBFFL	20227	29248000	..PWA, Signal Generator	1
25	XDFZZ	20227	29726000	..Enclosure	1
26	XDFZZ	20227	29726400	..Bracket, Support	2
27	XDFZZ	20227	28120400	..Handle	1
28	XADZZ	96906	MS35335-62	..Washer, External Tooth	2

C-1-1

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC) GROUP 01 FIGURE C-1 ELECTRONIC TEST SET (Continued)	(6) QTY
29	XDFZZ	96906	MS51959-15	...Screw, Flat Head.....	3
30	XDFZZ	20227	29332300	...Plate, Alignment, Lower	1
31	XDFZZ	20227	28111906	...O Ring	1
32	XDFZZ	20227	28126000	...Lens	1
33	XDFZZ	20227	29332200	...Retainer, Lens	1
34	XADZZ	96906	AN960-C4	...Washer, Flat	3
35	XADZZ	96906	MS35338-135	...Washer, Lock	3
36	XDFZZ	20227	28091210	...Connector (P1).....	1
37	XDFZZ	20227	28091203	...Contact	4
38	XDFZZ	20227	M22759/11- 22-9	...Wire, 22 AWG.....	Ref
39	XDFZZ	20227	28126101	...Lens Mount, Clear	2

C-1-2

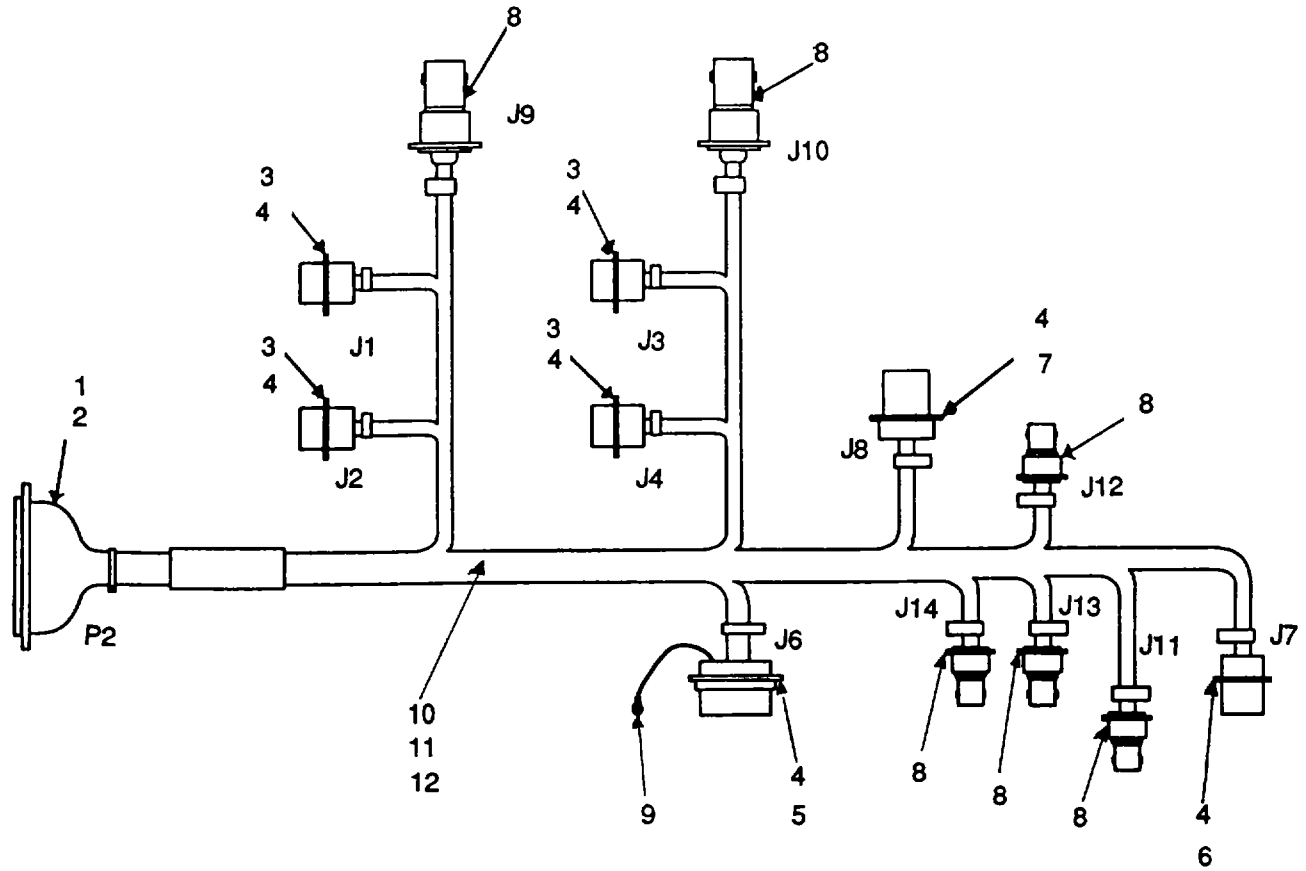


Figure C-2. Test Set Wiring Harness

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
GROUP 0101					
FIGURE C-2 Wiring Harness, Test Set					
	PAFFF	20227	29250200	Wiring Harness, Test Set.....	1
1	PAFZZ	20227	28034210	.Connector (P2).....	1
2	PAFZZ	20227	28034211	.Contact	63
3	PAFZZ	96906	MS3112 E8-3P	.Connector (J1-J4).....	4
4	XDFZZ	96906	MS51959-15	.Screw, Flat Head.....	28
5	PAFZZ	96906	MS27508E16B55P	.Connector (J6)	1
6	PAFZZ	96906	MS3112E10-6P	.Connector (J7)	1
7	PAFZZ	96906	MS3102A10SL-4P	.Connector (J8)	1
8	PAFZZ	20227	28003301	.Connector (J9-J14)	6
9	PAFZZ	96906	MS25036-144	.Ground Lug	1
10	MFDZZ	20227	M22759/32-24-9	.Wire, 24 AWG	A/R
11	MFDZZ	20227	M27500-24TG2U00	.Wire, 24 AWG (Twisted Pair)	A/R
12	MFDZZ	20227	28046801	.Cable, Coax, RG188.....	A/R

C-2-1

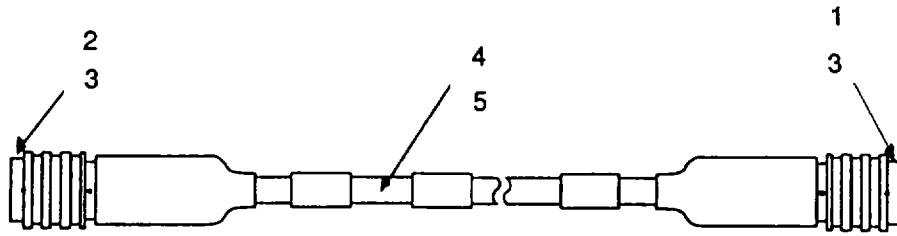


Figure C-3. Test Set Cable Assembly

(1)	(2)	(3)	(4)	(5)	(6)
ITEM NO	SMR CODE	CAGE	PART NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 02

FIGURE C-3 Test Set Cable Assembly

	PAFFF	20227	29283200	Cable Assembly, Test Set.....	1
1	PAFZZ	96906	MS27473T16B55P	.Connector (P1).....	1
2	PAFZZ	96906	MS27473T16B55S	.Connector (P2)	1
3	PAFZZ	20227	28125700	.Adapter, Connector Backshell.....	2
4	MFDZZ	20227	M27500-24SB2U00	.Cable, 24 AWG (Twisted Pair)	A/R
5	MFDZZ	20227	M22759/32-24-9	.Wire, 24 AWG (White)	A/R

C-3-1

SECTION III

SPECIAL TOOLS LIST

Not applicable for the Electronic Test Set

C-III-1

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG	ITEM
5998-01-347-8637	C-1	
6625-01-347-8667	C-1	14
5998-01-348-0209	C-1	24
6150-01-356-5825	C-3	

SECTION IV
CROSS-REFERENCE INDEXES
PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG	ITEM
96906	AN960-C4		C-1	34
96906	MS15795-802		C-1	17
96906	MS25036-144		C-2	8
96906	MS27473T1 6B55P		C-3	1
96906	MS27473T1 6B55S		C-3	2
96906	MS27508E16B55P		C-2	4
96906	MS3102A10SL-4P		C-2	6
96906	MS3112 E8-3P		C-2	3
96906	MS3112 E10-6P		C-2	5
96906	MS35335-62		C-1	28
96906	MS35338-134		C-1	18
96906	MS35338-135		C-1	35
96906	MS35338-136		C-1	22
96906	MS51021-10		C-1	4
96906	MS51957-14		C-1	9
96906	MS51957-3		C-1	16
96906	MS51957-28		C-1	20
96906	MS51959-15		C-1	29
20227	28003301		C-2	7
20227	28034210		C-2	1
20227	28034211		C-2	2
20227	28046801		C-2	11
20227	M22759/11-22-9		C-1	38
80205	NAS620C6		C-1	21
58993	ZPS-5-511 -1		C-1	1
20227	28030704		C-1	19
20227	28091203		C-1	37
20227	28091210		C-1	36
20227	28109902		C-1	23
20227	28111906		C-1	31
20227	28120000		C-1	3
20227	28120400		C-1	27
20227	28125700		C-3	3
20227	28126000		C-1	32
20227	28126100		C-1	13
20227	28126101		C-1	39
20227	28134301		C-1	11
20227	28134303		C-1	10
20227	29085800	6625-01-347-8667	C-1	
20227	29248000	5998-01-348-0269	C-1	24
20227	29248500	5998-01-347-8637	C-1	14
20227	29250200		C-1	15
20227	29250200		C-2	
20227	29283200	6150-01-356-5825	C-2	

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CROSS-REFERENCE INDEXES

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CAGE	PART NUMBER	STOCK NUMBER	FIG	ITEM
20227	29283200		C-3	
20227	29332000		C-1	7
20227	29332200		C-1	33
20227	29332300		C-1	30
20227	29332400		C-1	12
20227	29332600		C-1	8
20227	29726000		C-1	25
20227	29726300		C-1	5
20227	29726400		C-1	26
20227	29726700		C-1	2
12324	429189000		C-1	6

I-3/(I-4 Blank)

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I- INTRODUCTION

D-1 SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the AVA Calibration Test Set. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/ Durable Items (except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D-2 EXPLANATION OF COLUMNS

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

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

(enter as applicable) -

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

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

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

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

SECTION II - EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) Part Number	(4) Description	(5) U/M
1 2	F F	7930-01-064-5179 Chemtronics CSP120	Cleaner (Spray) Lens Cleaner	Can Roll

APPENDIX E

MANUFACTURED ITEMS LIST

E-1 GENERAL

E-1

This appendix contains the procedures for fabricating the manufactured items you are authorized to make.

E-2 WIRING - MANUFACTURE

E-2

This task covers:
Fabrication

INITIAL SETUP**Personnel Required**

TMDE Support Specialist

FABRICATION:**NOTE**

Be sure the wire you cut is the same gage as the wire you are replacing. Identify wire by using color coded tape, the same color as the wire you are replacing.

- (1) Cut a suitable length of wire from a spool of bulk wire.
- (2) Note what type and size of connector the old wire had and match them for the new wire.
- (3) Measure the length of the old wire. When cutting the new wire, add 6 in. to this length.

NOTE

If splicing a wire, use heat shrink tubing over spliced area.

- (4) Fasten the first connector splice to one end of the wire.

NOTE

Check new wire for continuity before installation.

- (5) Install the wire, following the path of the old wire as much as possible.

- (6) Fasten the wire in place with tape, nylon ties or shrink wrap.
- (7) If wire is spliced and heat shrink tubing is used, shrink tubing using a suitable heat source.

APPENDIX F

TORQUE LIMITS

Table F-1 gives the standard torque values for studs, nuts, bolts, and screws. Exceptions to the following values are given in the maintenance task where appropriate.

Table F-1. Standard Torque Limits

THREAD DIAMETER SCREW SIZE NO.	THREADS PER INCH	STANDARD TORQUE 1 lb ft.
--------------------------------------	---------------------	-----------------------------

Use these torques for bolts and nuts with standard threads.

<table> <tr> <td>8</td> <td></td> </tr> <tr> <td>2</td> <td>56</td> </tr> <tr> <td>10</td> <td>24</td> </tr> </table>	8		2	56	10	24	17 Max
8							
2	56						
10	24						

Use these torques for bolts and nuts on hydraulic valve bodies with standard threads.

<table> <tr> <td>6</td> <td>32</td> </tr> <tr> <td>2</td> <td>32</td> </tr> </table>	6	32	2	32	2.0
6	32				
2	32				

NOTE

To determine breakaway torque, thread nut onto screw or bolt until at least two threads stick out. Nut shall not make contact with a mating part. Stop the nut. Torque necessary to begin turning nut again is the breakaway torque. Do not reuse self-locking nuts that do not meet minimum breakaway torque.

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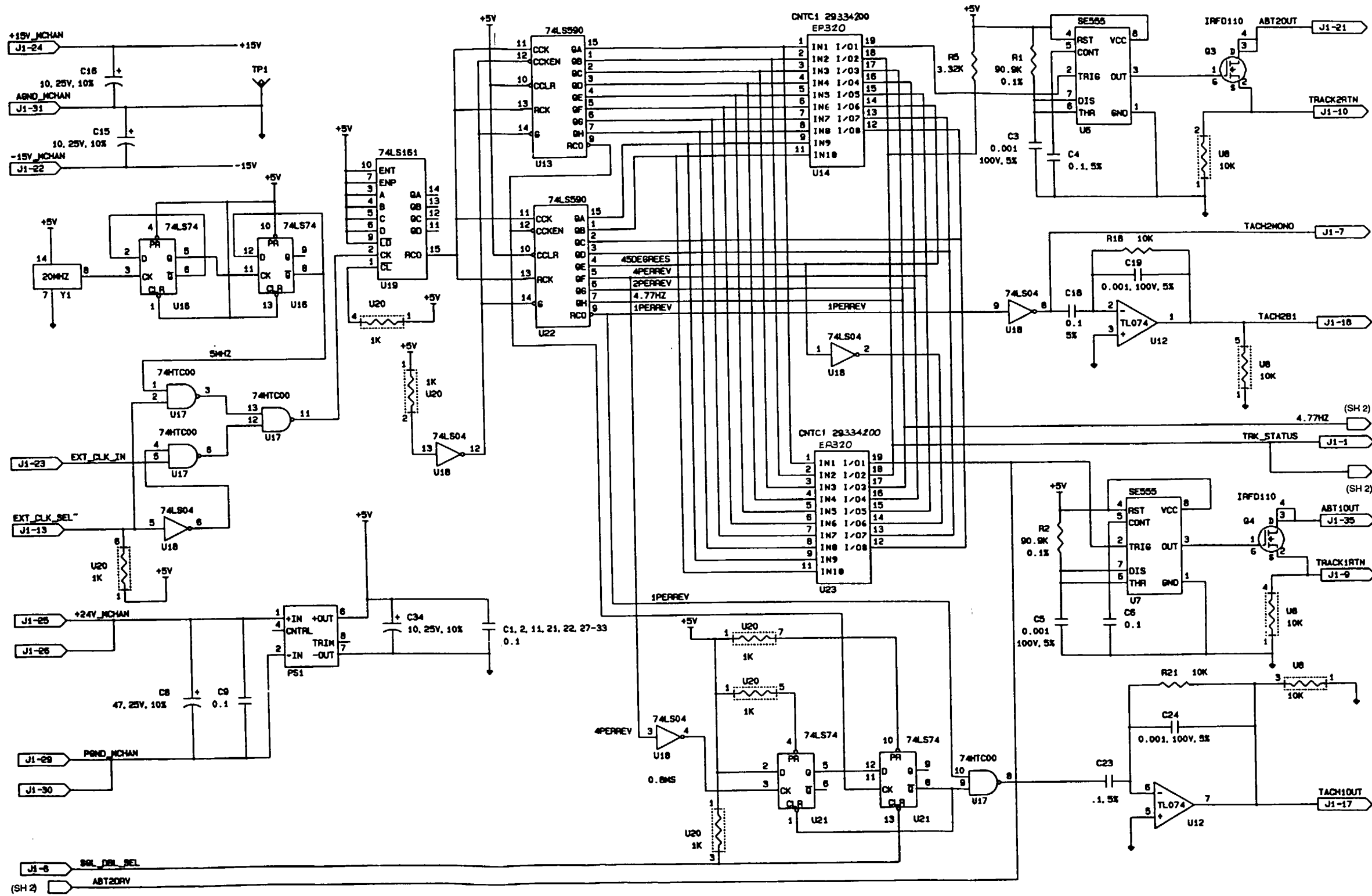
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Chief of Staff*

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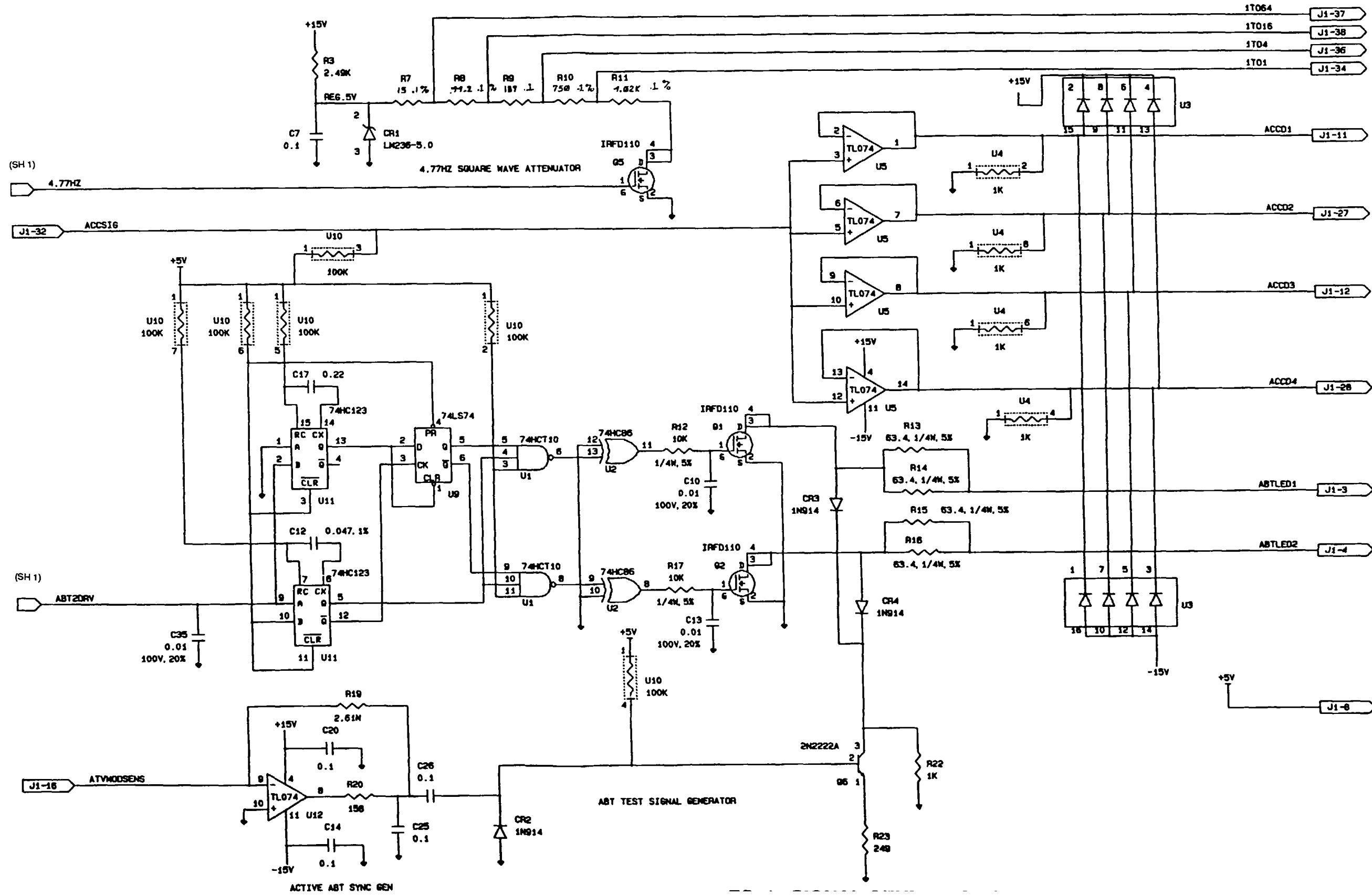
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- NOTES: UNLESS OTHERWISE SPECIFIED
 1. (A). RESISTANCE VALUES ARE IN OHMS.
 (B). RESISTORS ARE 1/8 W, 1%
 (C). CAPACITOR VALUES ARE IN MICROFARADS.
 (D). CAPACITORS ARE 50V, 20%

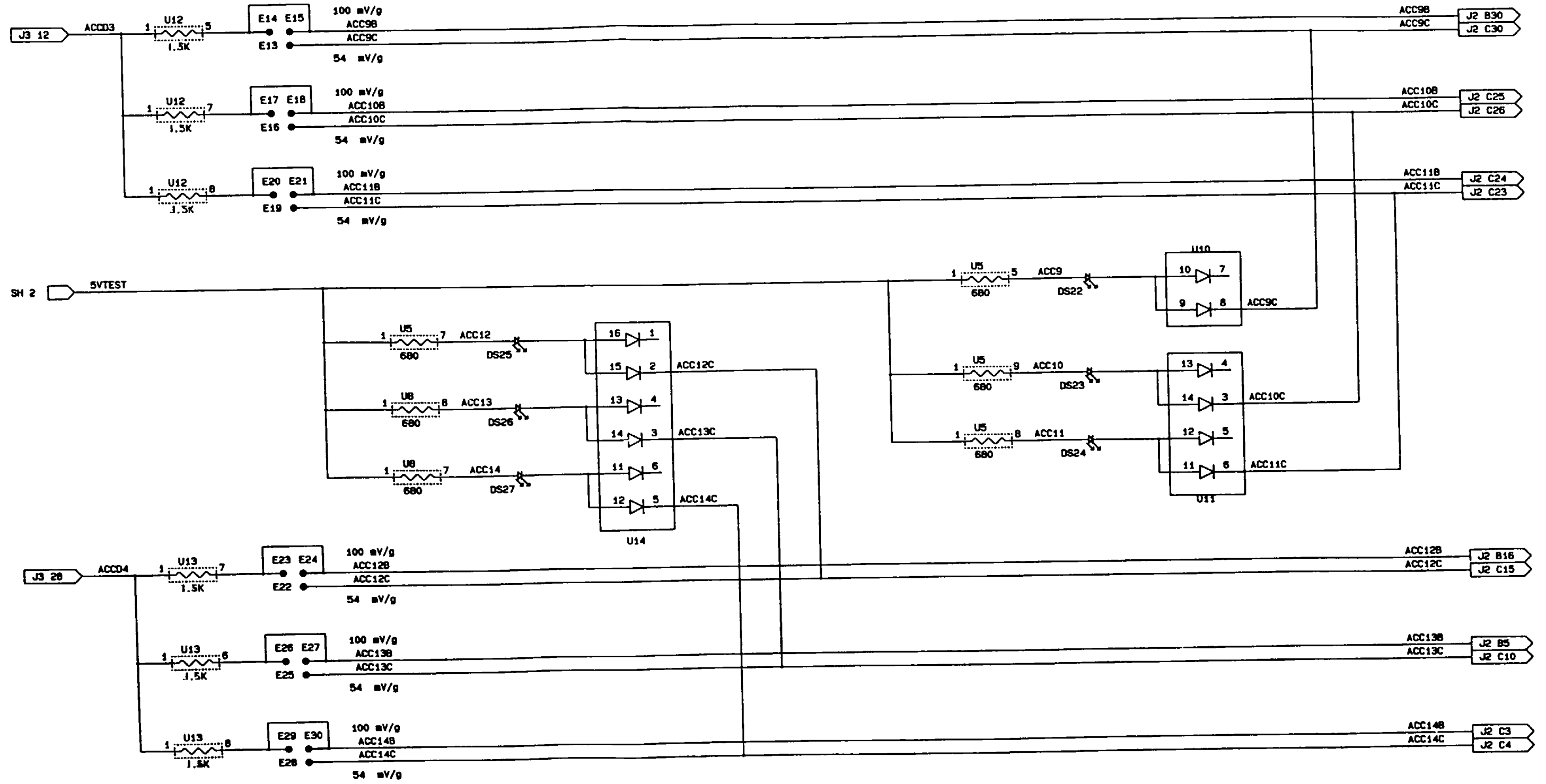


FO-1. SIGNAL GENERATOR SCHEMATIC DIAGRAM (SHEET 1 OF 4)



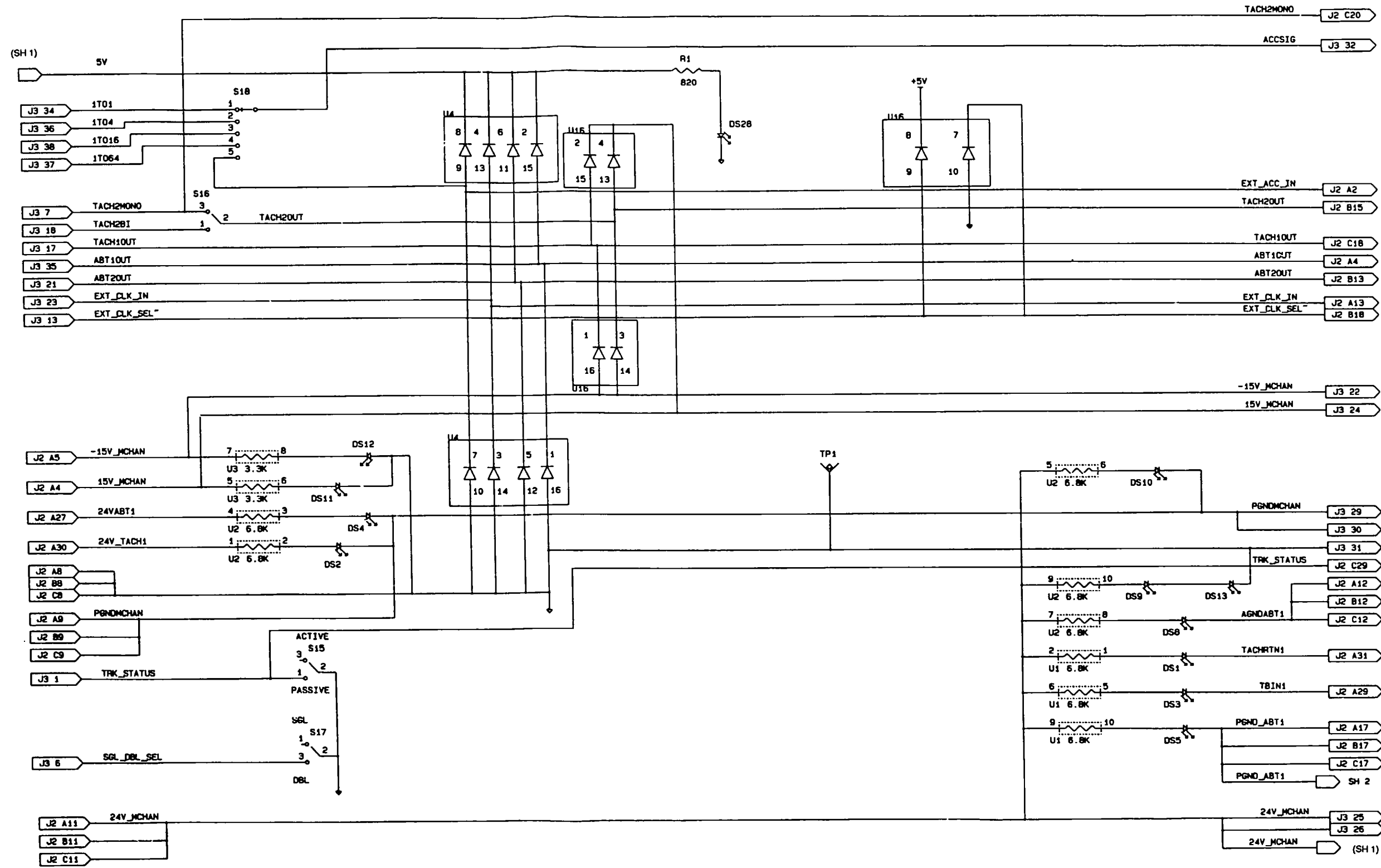
FO-1. SIGNAL GENERATOR SCHEMATIC DIAGRAM (SHEET 2 OF 4)

FP-3/(FP-4 Blank



FO-1. SIGNAL GENERATOR SCHEMATIC DIAGRAM (SHEET 3 OF 4)

FP-5/(FP-6 Blank

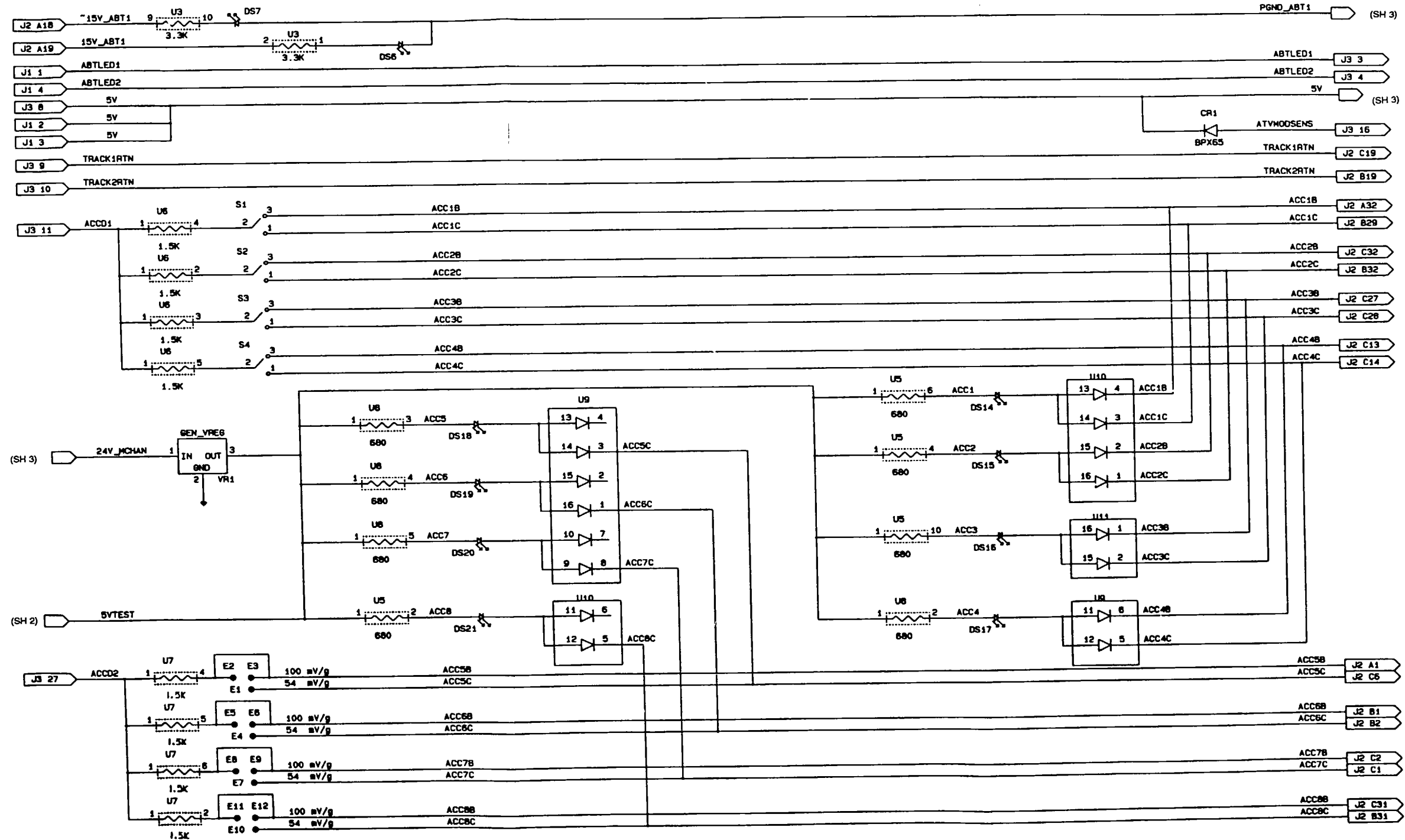


FO-1. SIGNAL GENERATOR SCHEMATIC DIAGRAM (SHEET 4 OF 4)

FP-7/(FP-8 Blank

FO-3. FRONT PANEL INTERFACE SCHEMATIC DIAGRAM
(Sheet 1 of 3)

- NOTES: UNLESS OTHERWISE SPECIFIED
 1. (A). RESISTANCE VALUES ARE IN OHMS.
 (B). RESISTORS ARE 1/4 W, 5%



FO-2. FRONT PANEL INTERFACE SCHEMATIC DIAGRAM

FP-9/(FP-10 Blank)

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever"<whomever@avma27.army.mil>
To: mpmt%avma28@st-louis-emh7.army.mil

Subject: DA form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 05-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter Fname:** Joe
14. **Submitter Mname:** T
15. **Submitter Lname:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH PUBLICATION



THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.

PARA-GRAPH

FIGURE NO.

TABLE NO.

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

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

THE METRIC SYSTEM AND EQUIVALENTS

Linear Measure

1 centimeter = 10 millimeters = .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 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .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

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. in.
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Square measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. in.
 1 sq. decimeter = 100 sq. centimeters = 15.5 inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. ft.
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 hectometers = .386 sq. miles

Liquid Measure

1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 metric ton = 10 quintals = 1.1 short tons

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce inches	newton-meters	.0070062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
sq. inches	sq. centimeters	6.451	kilometers	miles	.621
sq. feet	sq. meters	.093	sq. centimeters	sq. inches	.155
sq. yards	sq. meters	.836	sq. meters	sq. yards	10.764
sq. miles	sq. kilometers	2.590	sq. kilometers	sq. miles	1.196
acres	sq. hectometers	.405	sq. hectometers	acres	2.471
cubic feet	cubic meters	.028	cubic meters	cubic feet	35.315
cubic yards	cubic meters	.765	milliliters	fluid ounces	.034
fluid ounces	milliliters	29.573	liters	pints	2.113
pints	liters	.472	liters	quarts	1.057
quarts	liters	.946	grams	ounces	.035
gallons	liters	3.785	kilograms	pounds	2.205
ounces	grams	28.349	metric tons	short tons	1.102
pounds	kilograms	.454	pound-feet	newton-meters	1.356
short tons	metric tons	.907			
pound inches	newton-meters	.11296			

Temperature (Exact)

°F Fahrenheit temperature

5/9 (after subtracting 32)

Celsius Temperature °C

PIN NUMBER: 073748