DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR RADAR INDICATOR TEST SET GROUP OQ-63A/APS-94D (NSN 6625-01-058-7874)

Headquarters, Department of the Army, Washington, DC
27 December 1978

REPORTING OF ERRORS

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Rcc0-i.mended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Communion and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

*This manual supersedes TB 11-6625-1833-35/1, 30 March 1971.

Section I. IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. *a.* This technical bulletin provides calibration procedures for Radar Indicator Test Set Group OQ-63A/APS-94D. The OQ-63A/APS-94D is used for bench testing, alignment, calibration, and troubleshooting the following equipment:

(1) Record-Processor-Viewer, Radar Mapping RO-495/U.

(2) Rack, Electrical Equipment MT-4015/-APS-94D.

(3) Generator, Sweep SG-1 127/APS-94E.

(4) Control, Radar Set C-7645/APS-94D.

b. The OQ-63A/APS-94D contains two components which require calibration: Test Set Subassembly MX-8638A/APS-94D and Test Set Subassembly MX-8639A/APS-94D. When interconnected, the MX-8638A/APS-94D and MX-8639A/APS-94D function as a single operating unit. The MX-8638A/APS-94D is comprised of an upper unit (fig. 1) and a lower unit (fig. 2). It simulates the control signals, signal paths, and loads of the RO-495/U (and several of its subassemblies) and of the MT-4015/APS-94D. The MX-8639A/APS-94D (fig. 3) simulates the control signals and loads of the SG-1127/APS-94E and the C-7645/APS-94D. Additional data is listed below.

Nomenclature.....Test Set Group, Indicator, Radar OQ-63A/APS-94D

Size:

MX-8638A/APS-94D.....19.25 h x 30.38 x 22.25 1 inches

MX-8639A/APS-94D.....19.25 h x 30.38 x 22.25 1 inches

Weight:

MX-8638A/APS-94D.....125 lb

MX-8639A/APS-94D.....190 lb

Reference .....TM 11-6625-1833-12
TM 11-6625-1833-40
TM 11-6625-1833-50

Specifications:

Input power requirements.....Ac: 115 ± 5 vac line-to-neutral, 3 phase, 4 wire, 400 Hz at 690 volt amperes. Dc: 27 ± 0.5 Vdc at 340 watts.

Dc voltage output.....-28 ± 0.5 vdc
+20 ± 0.2 vdc
-20 ± 0.2 vdc
+6.3 ± 0.126 vdc
+ 102 ± 2.04 vdc
+640 ± 40 vdc
+531 ± 5.31 vdc
+15 ± 0.75 vdc
-15 ± 0.75 vdc
+28 ± 0.5 vdc
.....+26.00 ± 0.03 vdc

Ac voltage output .....115 ± 5 vac line-to-neutral 400 Hz, 3 phase. Three selectable 400 Hz film speed voltages:
.....0.825 ± 0.015 vac,
.....3.300 ± 0.010 vac,
.....13.2 ± 0.2 vac.

Video output.....2v peak-to-peak.
6v peak.

Sawtooth waveform output.....- 10v peak amplitude, 500 : 5 mv duration.

Synchro coarse calibration.....Maximum 14 ± 1v at 0 ± 4 dial reading.

Synchro fine calibration.....Minimum 130 mv at 0 ± 1 dial reading.

Time required for calibration.....4 hours (approx).

Calibration technique .....Dc low frequency.

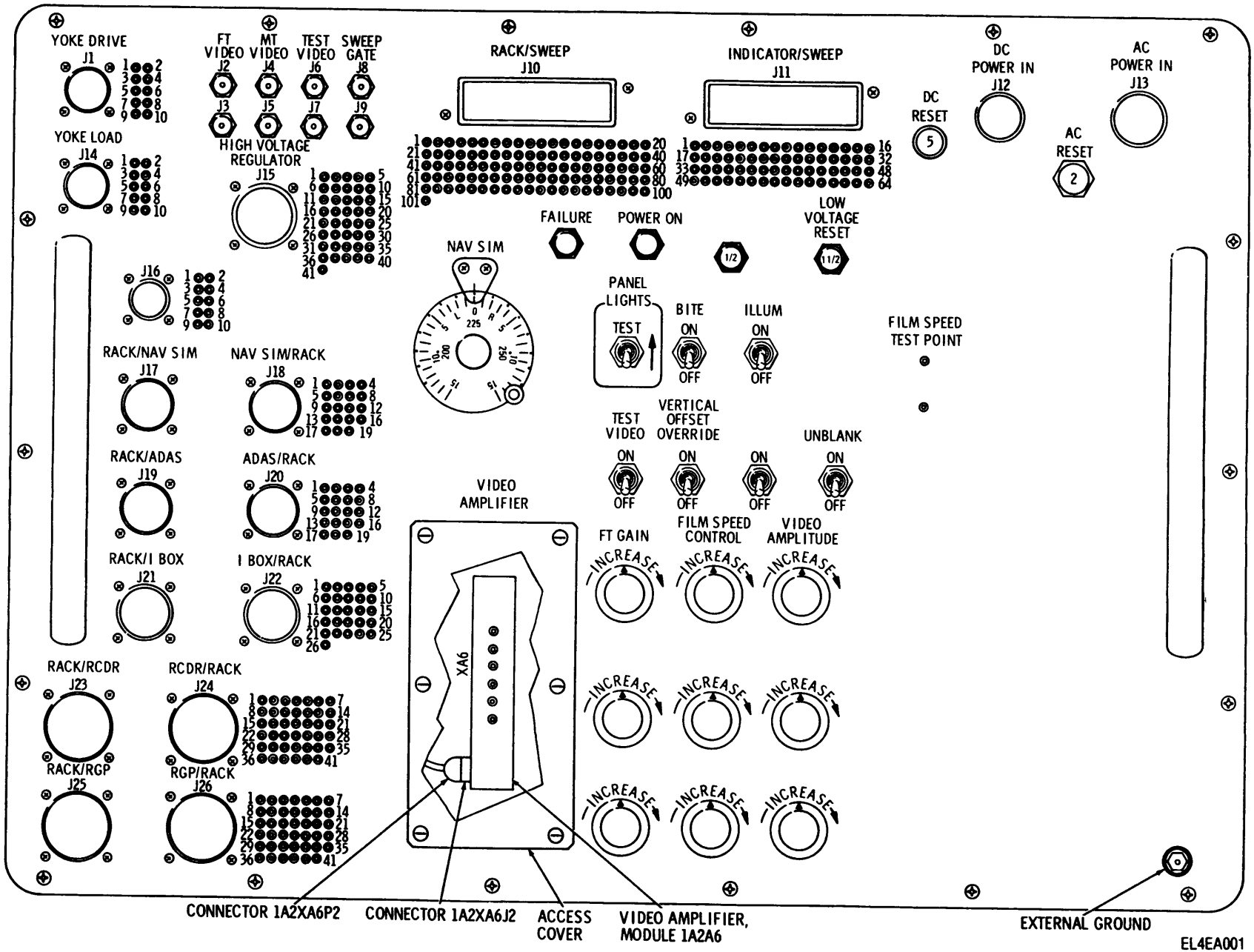


Figure 1. Test Set Subassembly MX-8638A/APS-94D, upper panel.

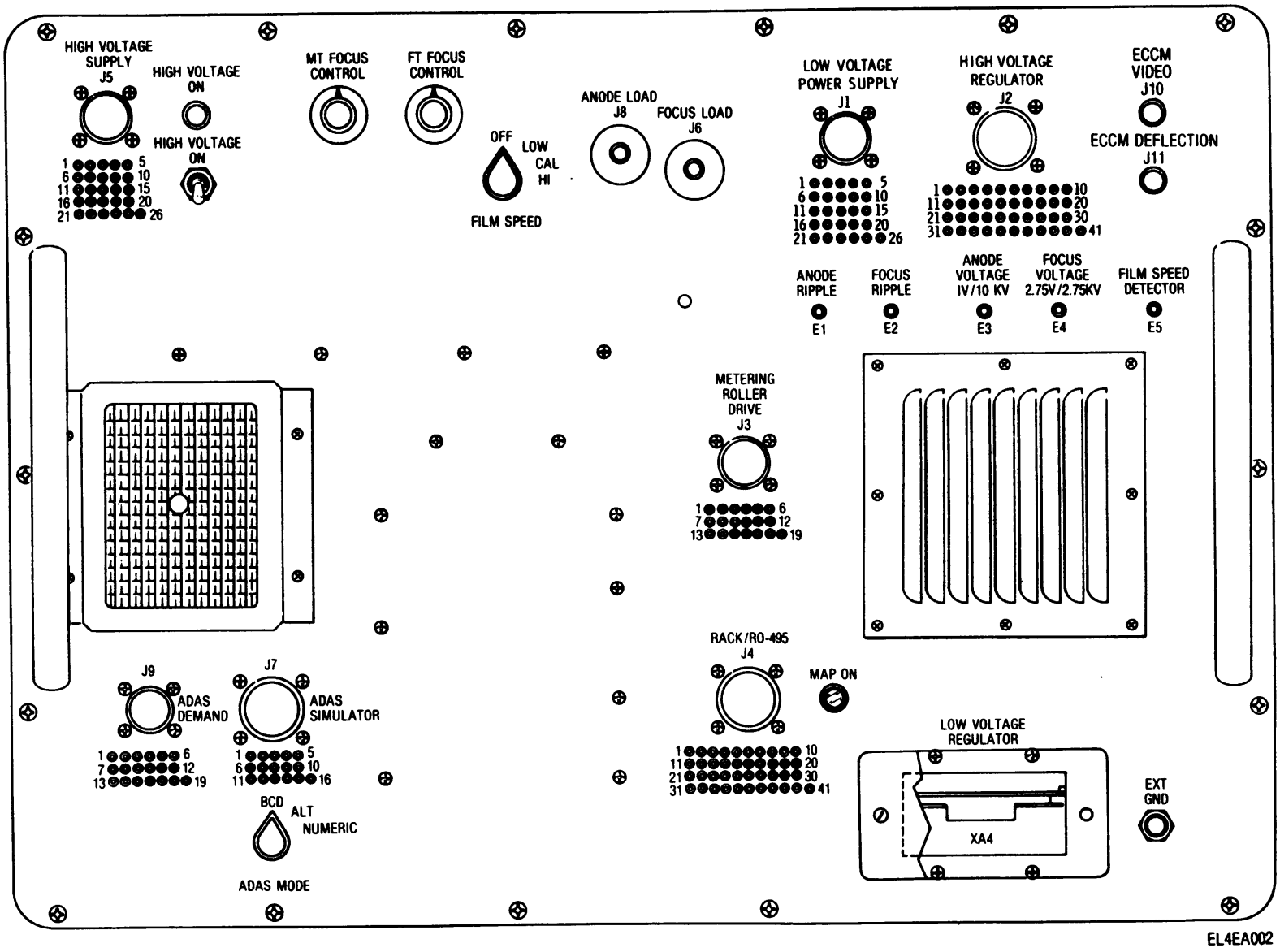


Figure 2. Test Set Subassembly MX-8638A/APS-94D, lower panel (sheet 1 of 2).

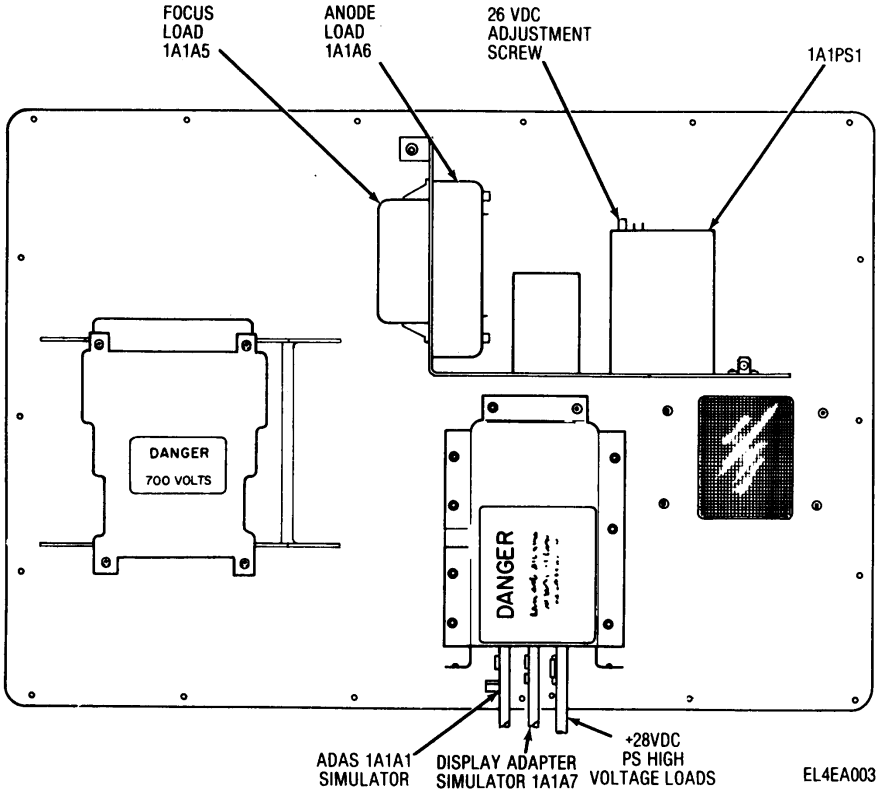


Figure 2. Test Set Subassembly MX-8638A/APS-94D, lower panel (sheet 2 of 2).

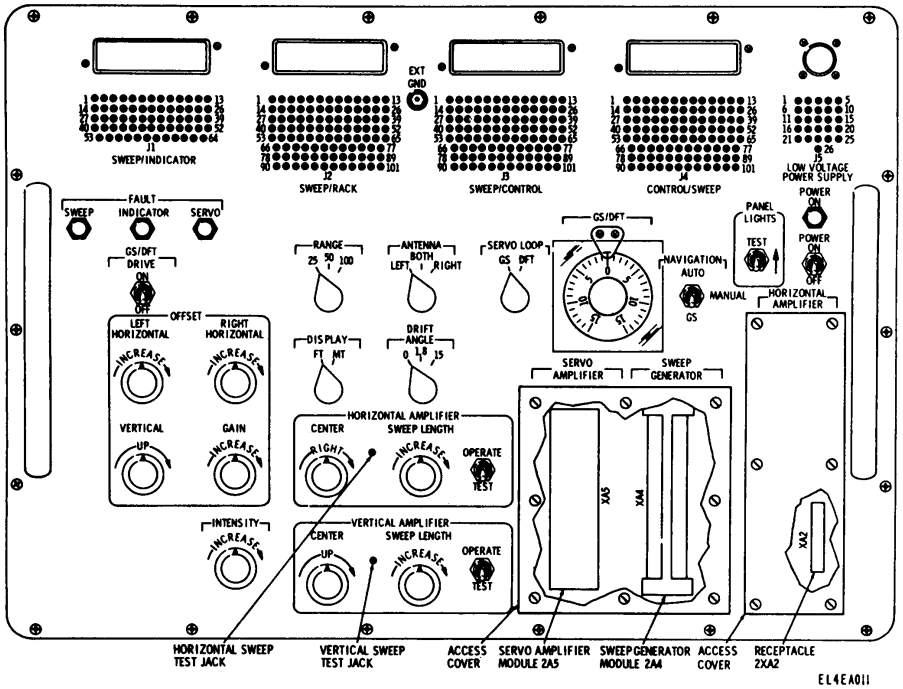


Figure 3. Test Set Subassembly MX-8639A/APS-94D panel.

2. Calibration Description. Table 1 lists the parameters to be calibrated and the performance specifications for the OQ-63A/APS-94D.

Table 1. Calibration Description

Parameters	Performance specifications
Dc voltage output levels	-28 ± 0.5 vdc.
	+26.00 ± 0.03 vdc.
Film speed output levels	LOW: 0825 ± 0.015 vac.
	CAL: 3.300 ± 0.010 vac.
	HIGH: 13.2 ± 0.2 vac.
Servo amplifier ground speed gain	Gain waveform as shown in figure 7.
Servo amplifier drift gain	Gain waveform as shown in figure 7.
Right antenna bias voltage	-10 volt peak level negative-going sawtooth
Servo control synchro coarse	NAV SIM dial indicates 0 ± 4.
Servo control synchro fine	NAV SIM dial indicates 0 ± 1
GS/DFT dial	GS/DFT dial indications 0 ± 1.
Nine-volt reference output	9.0 ± 0.1 vdc.
Sine offset	0.00 ± 0.01 vdc.
ASAS simulator output waveforms	Waveforms as shown in figure 12.
+28vdc power supply output	+28 ± 2 vdc.
Anode and focus loads (isolation amplifiers)	Gain: unity.
	Dc offset: less than +0.05 vdc.

3. Calibration Reporting. *a.* Forms, records, and reports required for calibration personnel at all levels are prescribed in TM 38-750. DA Form 2416 (Calibration Data Card) must be annotated in accordance with TM 38-750 for each calibration performed.

b. Adjustments to be reported on DA Form 2416 are designated (R) at the end of the sentence in which they appear. Report only those adjustments made and designated with (R).

Section II. EQUIPMENT REQUIREMENTS

4. General. Minimum use specifications are the principal parameters required for performance of the calibration, and are included to assist in the selection of alternate equipment, which may be used at the discretion of the calibrating activity. Satisfactory performance of alternate items shall be verified prior to use. All application equipment must bear evidence of current calibration.

5. Minimum Specifications of Equipment Required

Item	Minimum use specifications	Calibration equipment [1]
1. Multimeter	-28 ± 0.5 vdc	AN/USM-223 or
	-28 ± 0.5 vdc	
	115 ± 5 vac, 400 Hz	
	26.0 ± 1.3 vac, 400 Hz	
2. Oscilloscope	Sawtooth waveform with a positive ramp of 500 ± 5 milliseconds (ms).	AN/USM-281C.
3. Digital voltmeter	26.00 ± 0.03 vdc	AN/USM-64B.
4. Pulse generator	20v positive pulse, 1 ms wide, 30 ms between pulses	Hewlett-Packard HP 222A.
5. 25-conductor cable (W1)	None	Cable Assembly, Special Purpose, Electrical CX-12230/U (3 FT).
6. 41-conductor cable (W2)	None	Cable Assembly, Special Purpose, Electrical CX-12230/U (3 FT).
7. 42-conductor cable (W3)	None	Cable Assembly, Special Purpose, Electrical CX-12231/U (3 FT).
8. 18-conductor cable (W4)	None	Cable Assembly, Special Purpose, Electrical CX-12232/U (3 FT).
9. 19-conductor cable (W5)	None	Cable Assembly, Special Purpose, Electrical CX-12232/U (3 FT).
10. 101-conductor cable (W6)	None	Cable Assembly, Special Purpose, Electrical CX-12234/U (3 FT).
11. 66-conductor cable (W7)	None	Cable Assembly, Special Purpose, Electrical CX-12233/U (3 FT).
12. 100-conductor cable (W8)	None	Cable Assembly, Special Purpose, Electrical CX-12335/U (8 FT).

[1] See footnote at end of table

5. Minimum Specifications of Equipment Required - Continued

Item	Minimum use specifications	Calibration equipment [1]
13. 4-conductor Cable (W9)	None	Cable Assembly, Special Purpose, Electrical CX-12240/U (6 FT).
14. 2-conductor Cable (W10)	None	Cable Assembly, Special Purpose, Electrical CX-12241/U (6 FT).
15. 10-conductor Cable (W11)	None	Cable Assembly, Special Purpose, Electrical CX-12325/U (8 FT).
16. 26-conductor Cable (W17)	None	Cable Assembly, Special Purpose, Electrical CX-12336/U (4 FT).
17. Coaxial Cable (W19 through W22)	None	Cable Assembly, Radio Frequency, CG-3618/U (4 FT).
18. Standard module extender	None	Adapter, Test MX-8630/APS-94D.
19. Module extender (1A1A4)	None	Adapter, Test MX-8631/APS-94D.
20. Module extender (1A2A6)	None	Adapter, Test MX-8632/APS-94D.
21. Module extender (2A4)	None	Adapter, Test MX-8633/APS-94D.
22. Module extender (2A5)	None	Adapter, Test MX-8634/APS-94D.
23. Transformer, variable power	115 ± 2 vdc, 400 Hz	General Radio M-2G3

[1] See footnote at end of table

[1] The calibration equipment used in this procedure was selected from those known to be available at Department of Defense facilities, and the listing by make or model number carries no implication of preference, recommendation, or approval by the Department of Defense for use by other agencies. It is recognized that equivalent equipment produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

Section III. PRELIMINARY OPERATIONS

6. Familiarization. Be familiar with the entire procedure before performing calibration of the OQ-63A/APS-94D.

7. Preliminary Procedures. *a. Removal.*

(1) Unlatch and remove covers of units under test.

(2) Remove machine screws that secure panels of each unit under test in case.

(3) Carefully lift units under test from case.

(4) Position units under test, in a clean work area, for convenient access to both front and rear of panels.

b. Test Connections.

(1) Deenergize 115 vac and 28 vdc bench power supplies.

(2) Trip AC RESET, DC RESET, and LOW VOLTAGE RESET circuit breakers on MX-8638A/APS-94D upper panel.

(3) Set POWER switch on MX-8639A/APS-94D to OFF.

(4) Connect equipment as shown in figure 4.

NOTE

Do not connect test equipment until instructed to do so.

(5) Energize all test equipment.

(6) Energize 115 vac bench power supply.

(7) Using multimeter, adjust variable transformer for an output of 196 ± 10 vac phase-to-phase.

(8) Deenergize 115 vac bench power supply.

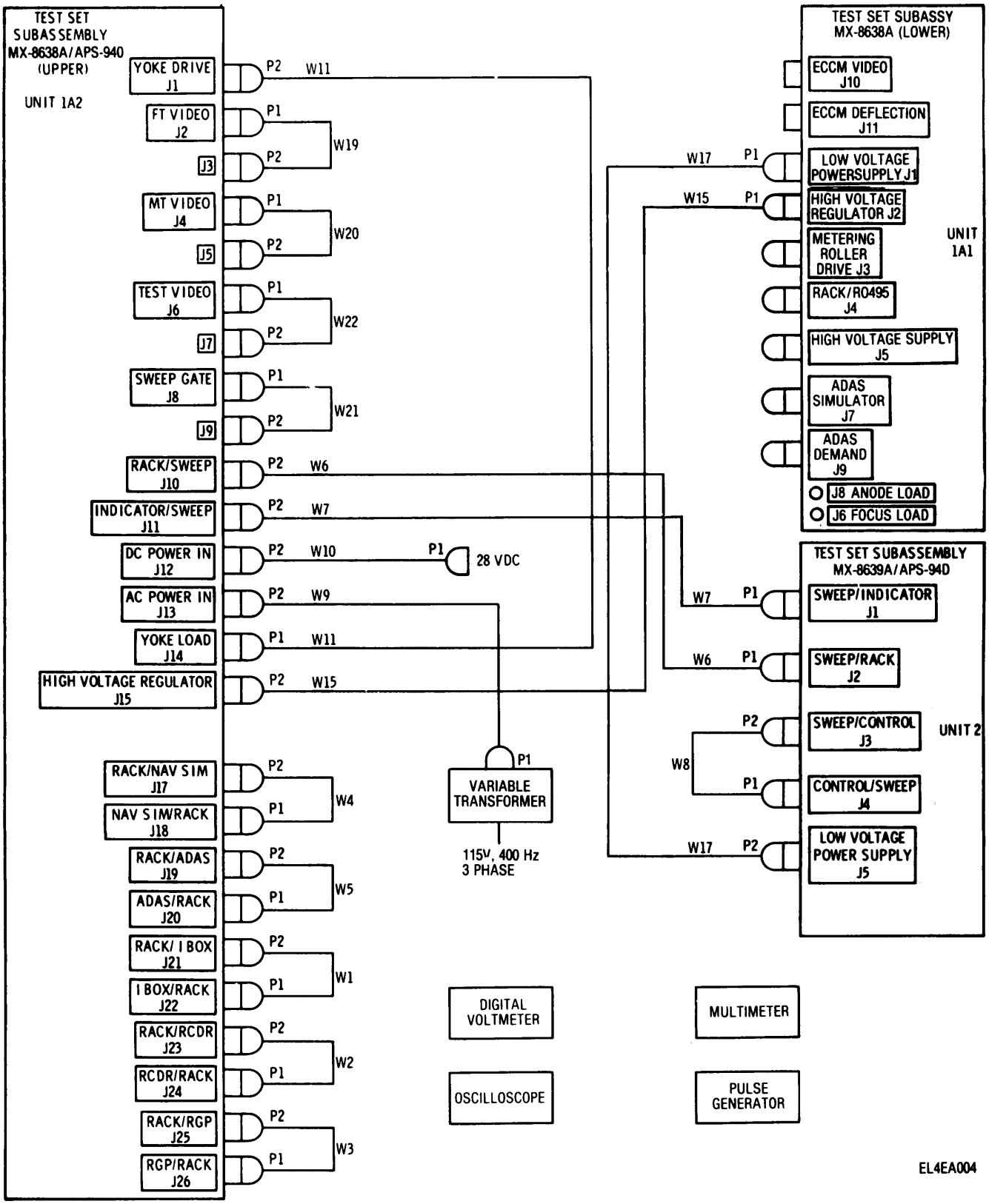


Figure 4. Basic calibration setup.

Section IV. CALIBRATION PROCESS

NOTE

The calibration procedures are divided into performance checks and adjustments. When a performance check is not within tolerance and no adjustment is specified, the deficiency must be corrected before continuing with the procedure.

8. Low Voltage. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Set multimeter to 50 vdc range and connect meter to test jacks 10 (-) and 14 (+) of LOW VOLTAGE POWER SUPPLY connector J1 of the lower MX-8638A/APS-94D.

(3) Set digital voltmeter controls to measure dc and connect meter to test jacks 1 (+) and 2 (-) of HIGH VOLTAGE POWER SUPPLY connector J5 of the lower MX-8638A/APS-94D.

(4) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(5) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(6) Set HIGH VOLTAGE switch on lower MX-8638A/APS-94D to ON.

(7) Observe the voltages indicated on the multimeter and the digital voltmeter. The multimeter should indicate -28.0 $\pm$ 0.5 vdc and the digital voltmeter should indicate 26.00 $\pm$ 0.03 vdc.

b. Adjustment.

(1) Set the POWER switch on the MX-8639A/-APS-94D to OFF and disengage all circuit breakers on the upper MX-8638A/APS-94D.

(2) Loosen the two captive screws that secure the access cover over low voltage regulator 1A1A4 in the lower MX-8638A/APS-94D and remove the cover.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(4) Adjust resistor A1R13 (fig. 5) of 1A1A4 for a voltage indication of - 28.0 $\pm$ 0.5 vdc on the multimeter.

(5) Adjust the voltage adjustment screw on 26 vdc power supply 1A1PS1 (fig. 2) for a voltage indication of +26.00 $\pm$ 0.03 vdc.

(6) Install cover removed in (2) above.

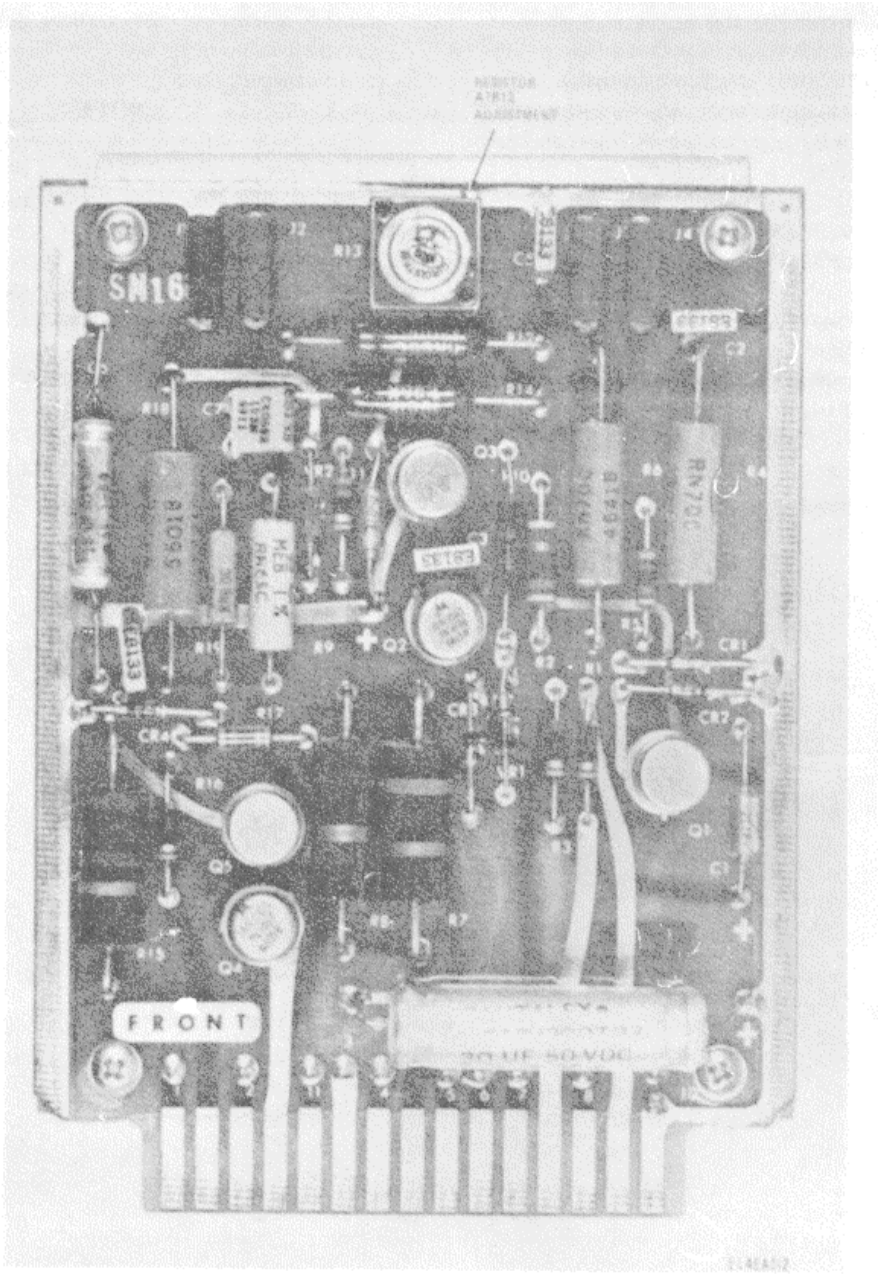


Figure 5. Low voltage regulator 1A1A4.

9. Servo Amplifier Groundspeed Gain. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Loosen the eight captive screws that secure the access cover (fig. 3) over servo amplifier 2A5 in the MX-8639A/APS-94D and remove the cover.

(3) Connect the oscilloscope probe to terminal A3E1 (fig. 6).

(4) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(5) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch of the MX-8639A/APS-94D to ON.

(6) Adjust the controls of the MX-8639A/- APS-94D.

(a) Set the NAVIGATION switch to AUTO.

(b) Set the GS/DFT DRIVE switch to OFF.

(c) Turn the SERVO LOOP switch to GS.

(7) Turn the NAV SIM dial of the upper MX-8638A/APS-94D to the position indicated by the GS/DFT dial on the MX-8639A/APS-94D.

(8) Set oscilloscope sweep speed to 50 ms/cm.

(9) Obtain a signal display on the oscilloscope and adjust the NAV SIM dial on the upper MX-8638A/-APS-94D for a sawtooth waveform with a positive ramp duration of 500 ms minimum, as shown in figure 7. Adjust the oscilloscope horizontal and vertical gain to place points O and B of the waveform ramp at oscilloscope graticule corners as shown in the illustration.

(10) Compare the waveform displayed on the oscilloscope with that shown in figure 7. The two waveforms should agree.

NOTE

The slope of the waveform ramp (gain) should be linear and point A on the ramp (250 ms horizontal deflection) should be 50 percent ±2.5 percent of the vertical deflection from point B to point C.

b. Adjustments.

NOTE

Perform the following adjustments alternately.

(1) Adjust the NAV SIM dial of the MX-8638A/-APS-94D and the oscilloscope vertical gain to meet the requirements in *a*(9) above.

(2) Adjust resistor A3R17 of video amplifier 2A5 (fig. 6) to meet the requirements specified in the note in *a*(10) above.

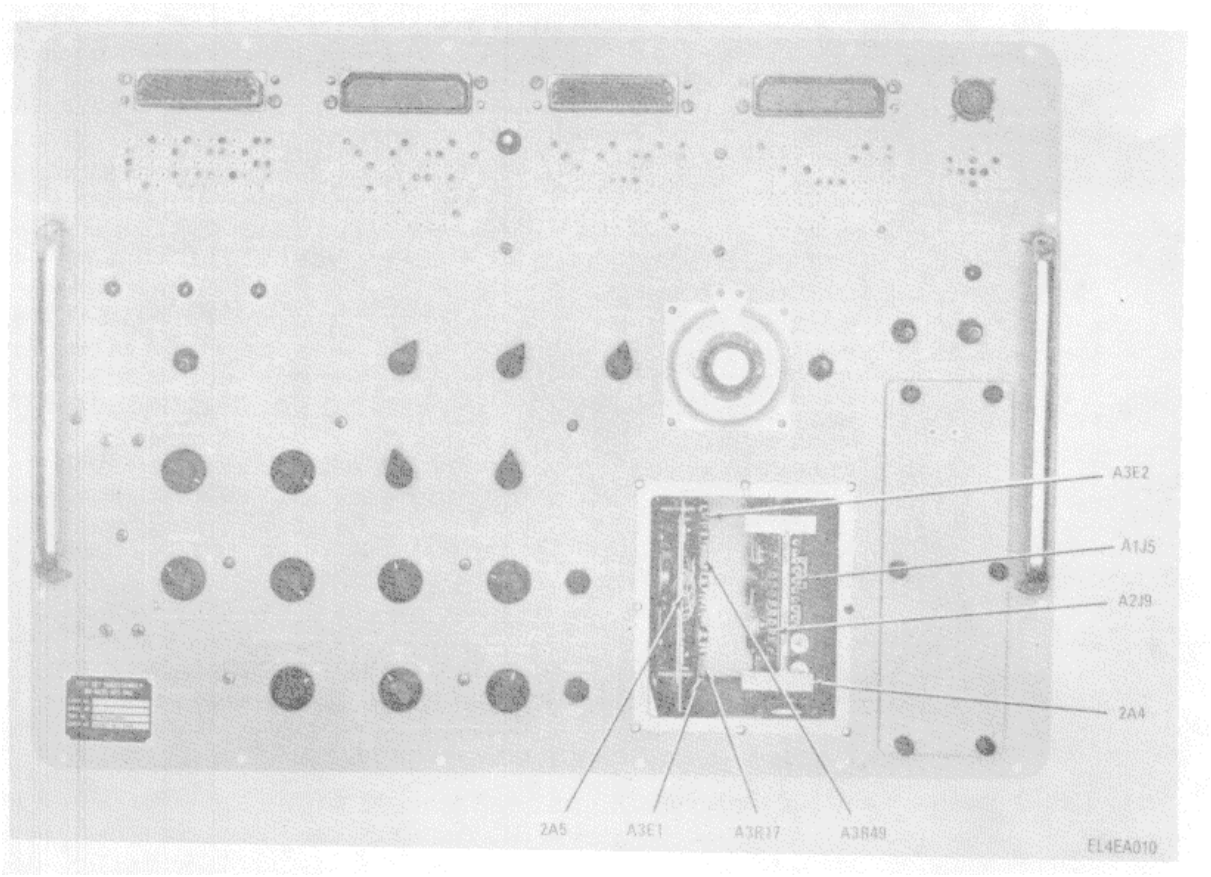


Figure 6. Test Set Subassembly MX-8639A/APS-94D, servo amplifier 2A4 and sweep generator 2A5.

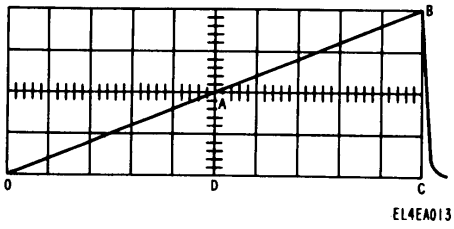


Figure 7. Typical servo amplifier gain waveform.

10. Servo Amplifier Drift Gain. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Perform all instructions in paragraph 9*a*, except (4) and (6)(*c*). Connect the oscilloscope probe to terminal A3E2 (fig. 6) and turn the SERVO LOOP switch to DFT.

b. Adjustment. Perform all instructions in paragraph 9*b*, except (2). Adjust resistor A3R49 (fig. 6) to meet the requirements specified in the note in paragraph 9*a*(10).

11. Right Antenna Bias Voltage. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Loosen the eight captive screws that secure the access cover (fig. 3) over sweep generator 2A4 in the MX-8639A/APS-94D and remove the cover.

(3) Connect the oscilloscope probe to test point A1JS of 2A4 (fig. 6).

(4) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(5) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch of the MX-8639A/APS-94D to ON.

(6) Turn the ANTENNA switch of the MX-8639A/APS-94D to RIGHT and the DRIFT ANGLE switch to 0.

(7) Adjust the oscilloscope for display and observe the waveform. The waveform should be a negative-going sawtooth with a peak level of -10 volts.

b. Adjustment.

(1) Refer to figure 8 and locate terminal board 2TB3 at the rear of the MX-8639A/APS-94D.

(2) Adjust resistor R5 (fig. 8) for a - 10 volt peak level negative-going sawtooth waveform on the oscilloscope.

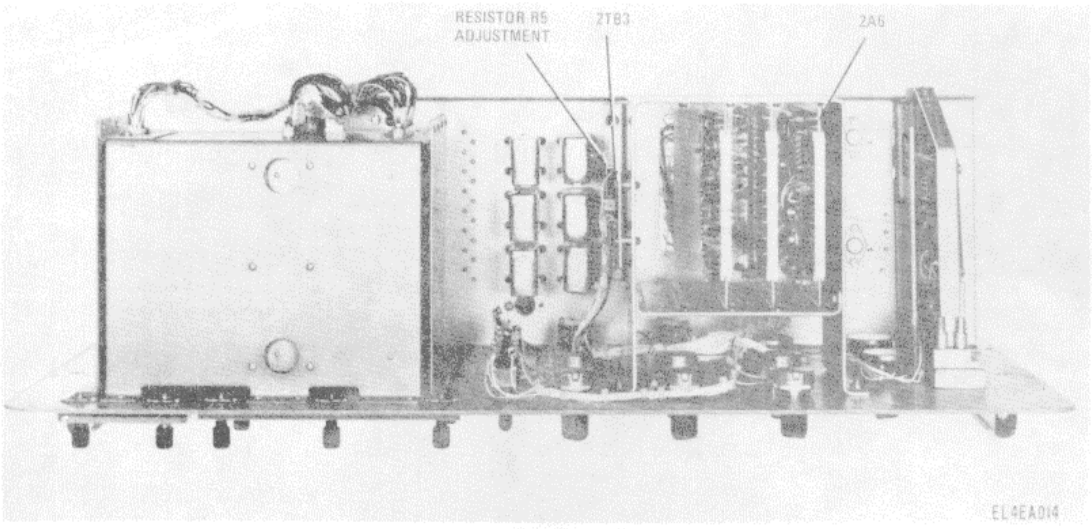


Figure 8. Test Set Subassembly MX-8639A1/APS-94D, terminal board 2TB3.

12. Servo Control Synchro Coarse. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Disconnect cable W4 from NAV SIM/RACK connector J18 of the upper MX-8638A/APS-94D.

(3) Make the equipment connections shown in A, figure 9.

(4) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(5) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch of the MX-8639A/APS-94D to ON.

(6) Turn the SERVO LOOP switch of theMX-8639A/APS-94D to DFT and set the ILLUM switch of the upper MX-8638A/APS-94D to ON.

(7) Observe the digital voltmeter and carefully turn the NAV SIM dial of the upper MX-8638A/APS-94D to produce maximum reading on the meter. Maximum reading will occur between 13 and 15 vac.

(8) Check the NAV SIM dial indication. The dial indication should be 0 ± 4.

b. Adjustment.

(1) Loosen the setscrews in the NAV SIM dial hub and slide the dial off the dial shaft.

(2) Align 0 on the dial with the indexing line on the indication reference for the dial.

(3) Slide the dial back onto the dial shaft and tighten the setscrews in the dial hub.

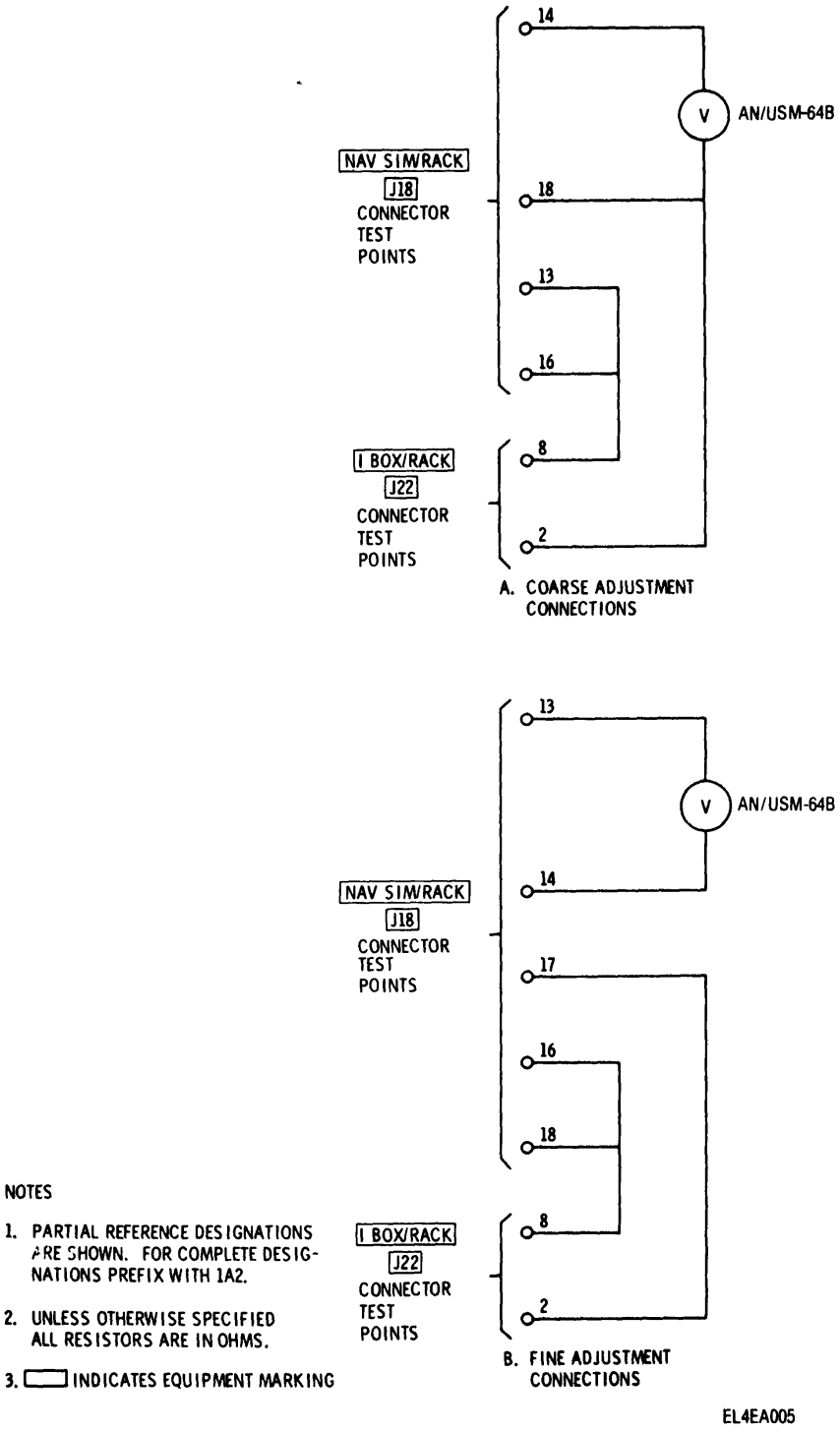


Figure 9. Servo control synchro connections for adjustment.

13. Servo Control Synchro Fine. *a. Performance Check.*

(1) Perform instructions in paragraph 12*a*(1) and (2).

(2) Make the equipment connections shown in B, figure 9.

(3) Perform instructions in paragraph 12*a*(4), (5), and (6).

(4) Observe the digital voltmeter and slowly turn the NAV SIM dial of the upper MX-8638A/APS-94D to produce minimum reading on the meter, which should occur at approximately 130 mv ac or less.

(5) Check the NAV SIM dial indication. The dial indication should be 0 ± 1.

b. Adjustment.

(1) Loosen the screws for the indication reference of the NAV SIM dial.

(2) Align the indexing line on the indication reference with 0 on the dial.

(3) Tighten the indication reference mounting screws.

14. GS/DFT Dial. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch of the MX-8639A/APS-94D to on.

(4) Wait 5 minutes for the equipment to warm up and stabilize.

(5) Make the following control adjustments on the MX-8639A/APS-94D.

(a) Turn the SERVO LOOP switch to DFT.

(b) Set the GS/DFT DRIVE switch to ON.

(c) Set the NAVIGATION switch to AUTO.

(6) Observe the GS/DFT dial indication. The indication should be 0 ± 1.

b. Adjustment.

CAUTION

Do not attempt to turn the GS/DFT dial manually while the dial is secured to the dial shaft. Equipment damage may result.

(1) Remove the indication reference for the GS/DFT dial and the dial plastic cover.

(2) Install the indication reference for the dial.

(3) Loosen the setscrews in the dial hub and slide the dial off the dial shaft.

(4) Align 0 on the dial and the indexing line on the indication reference for the dial; then slide the dial back onto the dial shaft and tighten the setscrews in the dial hub.

(5) Remove the indication reference for the dial.

(6) Install the dial plastic cover and indication reference for the dial, taking care to align the indication reference index line with the dial 0.

15. Nine-Volt Reference. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch of the MX-8639A/APS-94D to ON.

(4) Connect the digital voltmeter to test point A2J9 (fig. 6) of servo amplifier 2A4 of the MX-8639A/-APS-94D.

(5) Observe the voltage level indicated on the voltmeter. The voltage level should be $+9.0 \pm 0.1$ vdc.

b. Adjustment.

(1) Set the POWER switch of the MX-8639A/-APS-94D to OFF.

(2) Extend sweep generator 2A4 with Adapter, Test MX-8633/APS-94D.

(3) Set the POWER switch of the MX-8639A/-APS-94D to ON.

(4) Adjust resistor A2R2 (fig. 10) for a $+9.0 \pm 0.1$ vdc indication on the voltmeter.

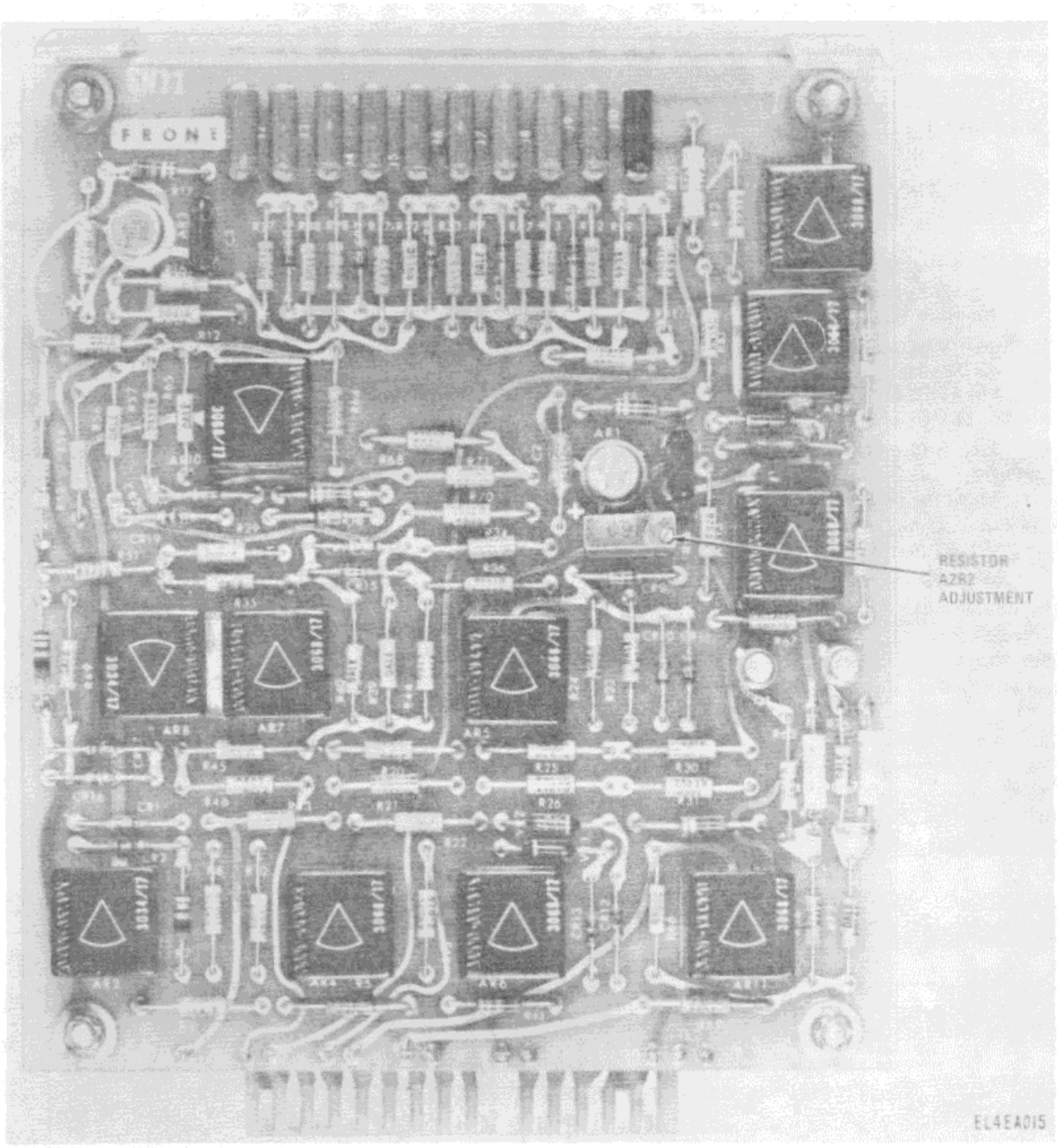


Figure 10. Sweep generator 2A4, front of card.

16. Sine Offset. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Energize the 115 vac, 400 Hz and +28 vdc bench power circuits.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(4) Connect the digital voltmeter to test point 58 (+) and 101 (-) of CONTROL/SWEEP connector J4 of the MX-8639A/APS-94D.

(5) Turn the ANTENNA switch of the MX-8639A/APS-94D to BOTH, RANGE switch to 25, and the DRIFT ANGLE switch to 0.

(6) Observe the voltage level indicated on the voltmeter. The voltage level should be 0.00 ± 0.01 vdc.

b. Adjustment.

(1) Set the POWER switch of the MX-8639A/-APS-94D to OFF.

(2) Refer to figure 8 for the location of offset amplifier 2A6 at the rear of the MX-8639A/APS-94D.

(3) Extend offset amplifier 2A6 with Adapter, Test MX-8630/APS-94D.

(4) Set the POWER switch of the MX-8639A/-APS-94D to ON.

(5) Adjust resistor A1R26 (fig. 11) for a 0.00 ± 0.01 vdc indication on the digital voltmeter.

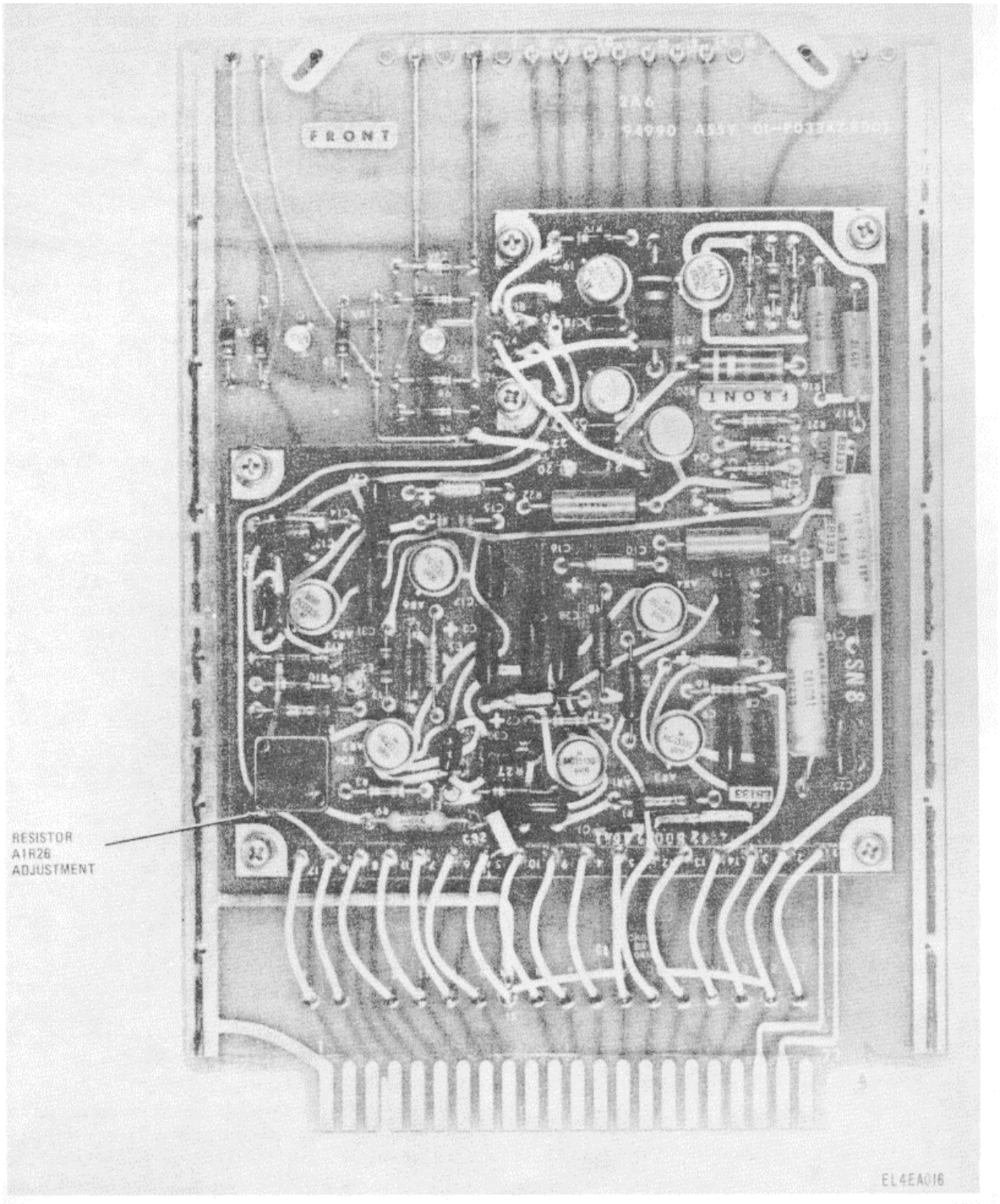


Figure 11. Offset amplifier 2A6, front of card.

17. ADAS Simulator. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Energize the 115 vac, 400 Hz and the +28 vdc bench power circuits.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(4) Adjust the pulse generator for a positive pulse output of approximately 15 volts with a pulse width of 1 ms and a pulse repetition frequency of approximately 20 pps.

(5) Connect the pulse generator output to test jacks 1 (signal) and 11 (signal ground) of ADAS DEMAND connector J9 in the lower MX-8638A/APS-94E.

(6) On the lower MX-8638A/APS-94E, set the ADAS MODE switch to BCD.

(7) Connect the oscilloscope input to test jacks 1 (signal) and 3 (signal ground) of ADAS SIMULATOR connector J7 in the lower MX-8638A/APS-94E.

(8) Connect the oscilloscope sync input to the pulse generator sync output and sync the oscilloscope on the positive edge of the pulse generator output. The oscilloscope display should be as shown in A, figure 12.

(9) On the lower MX-8638A/APS-94D, set the ADAS MODE switch to ALT. The oscilloscope display should be as shown in B, figure 12.

(10) Set the ADAS MODE switch to NUM. The oscilloscope display should be as shown in C, figure 12.

(11) Connect the oscilloscope input to test jacks 12 (signal) and 15 (signal return) of ADAS SIMULATOR connector J7 in the lower MX-8638A/APS-94D. The oscilloscope display should be as shown in D, figure 12.

(12) On the lower MX-8638A/APS-94D, set the ADAS MODE switch to ALT, then to BCD. In both modes, the oscilloscope display should be as shown in D, figure 12.

(13) Expand the oscilloscope display to observe the beginning of a pulse train. The display should be as shown in E, figure 12.

(14) Using the delayed sweep on the oscilloscope, match the pattern of the pulse train with the data shown in figure 13. Start at the top of the left column and read the bits from left to right. A dot represents a logic 1 (positive pulse displayed on oscilloscope). Read one line of six bits, then drop to the next line. At the end of the last word in columns 1 and 2, a blank bit (logic 0) will be present.

b. Adjustment.

(1) Set the POWER switch on the MX-8639A/-APS-94D to OFF and trip all circuit breakers on the upper MX-8638A/APS-94D.

(2) Refer to figure 2 and locate ADAS simulator 1A1A1.

(3) Extend ADAS simulator 1A1A1 with Adapter, Test MX-8630/APS-94D.

(4) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94 to ON.

(5) Perform *a*(6), (7), and (8) above.

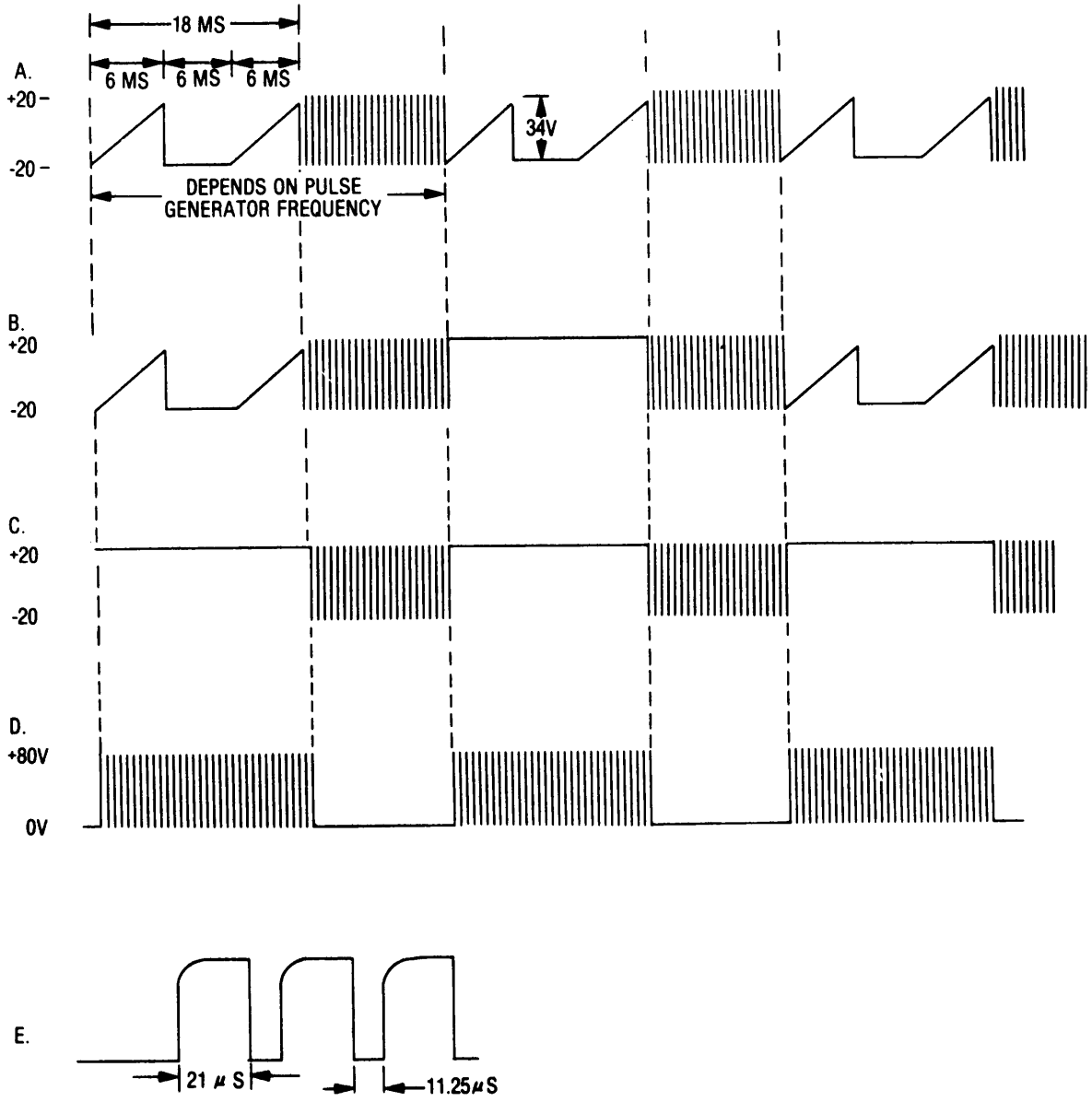
(6) Adjust 1A1AR15 (fig. 14) to obtain the 34-volt peak-to-peak sawtooth ramp as shown in A, figure 12.

(7) Perform *a*(11) and (13) above.

(8) Adjust 1A1A1R8 (fig. 14) to obtain the 11.25-microsecond pulse downtime as shown in E, figure 12.

(9) Set POWER switch on the MX-8639A/-APS-94D to OFF and trip all circuit breakers on the upper MX-8638A/APS-94D.

(10) Remove Adapter, Test MX-8630/APS-94D and reinstall ADAS simulator 1A1A1.



EL4EA006

Figure 12. Typical ADAS simulator waveforms.

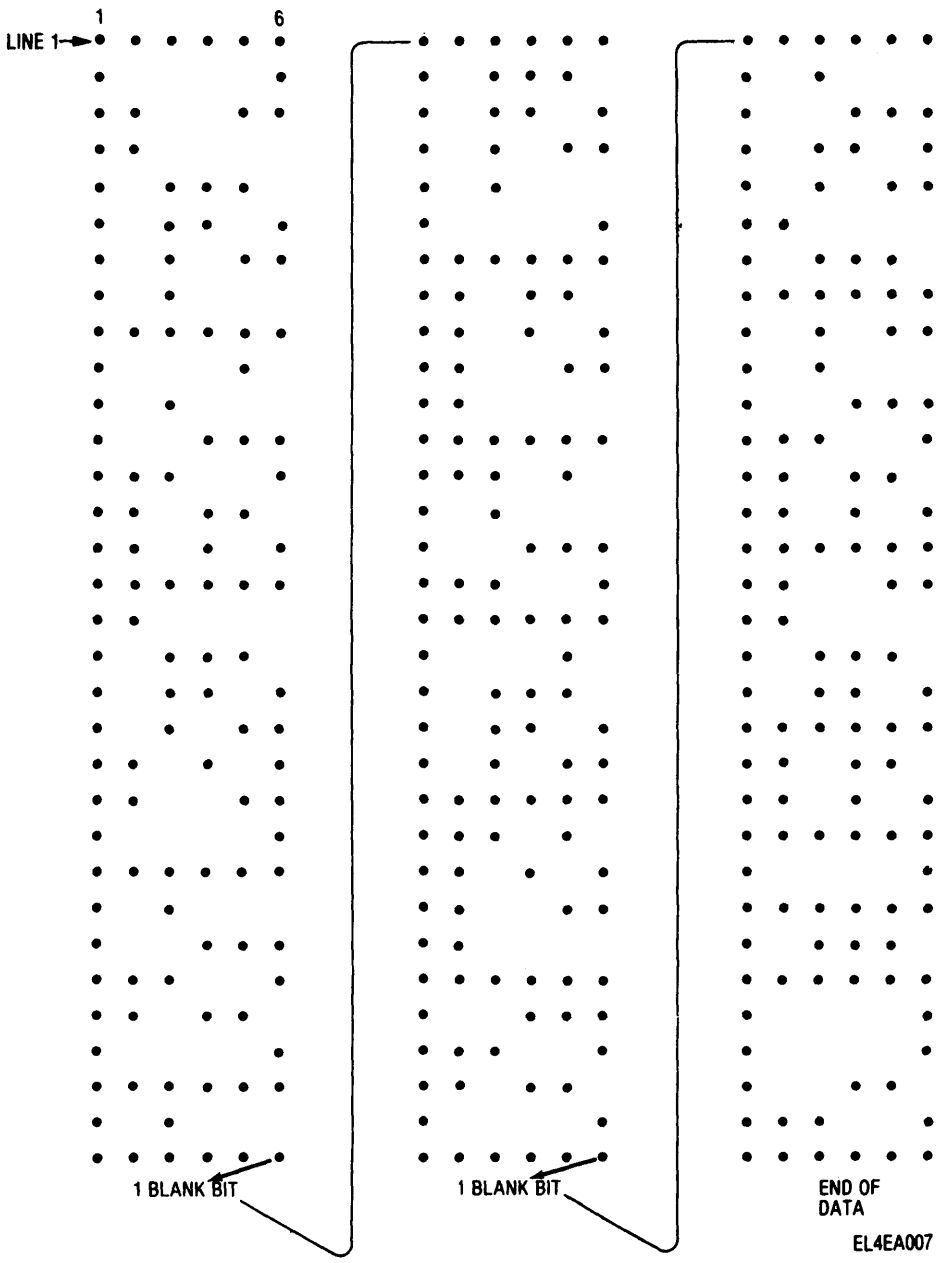


Figure 13. ADAS BCD data.

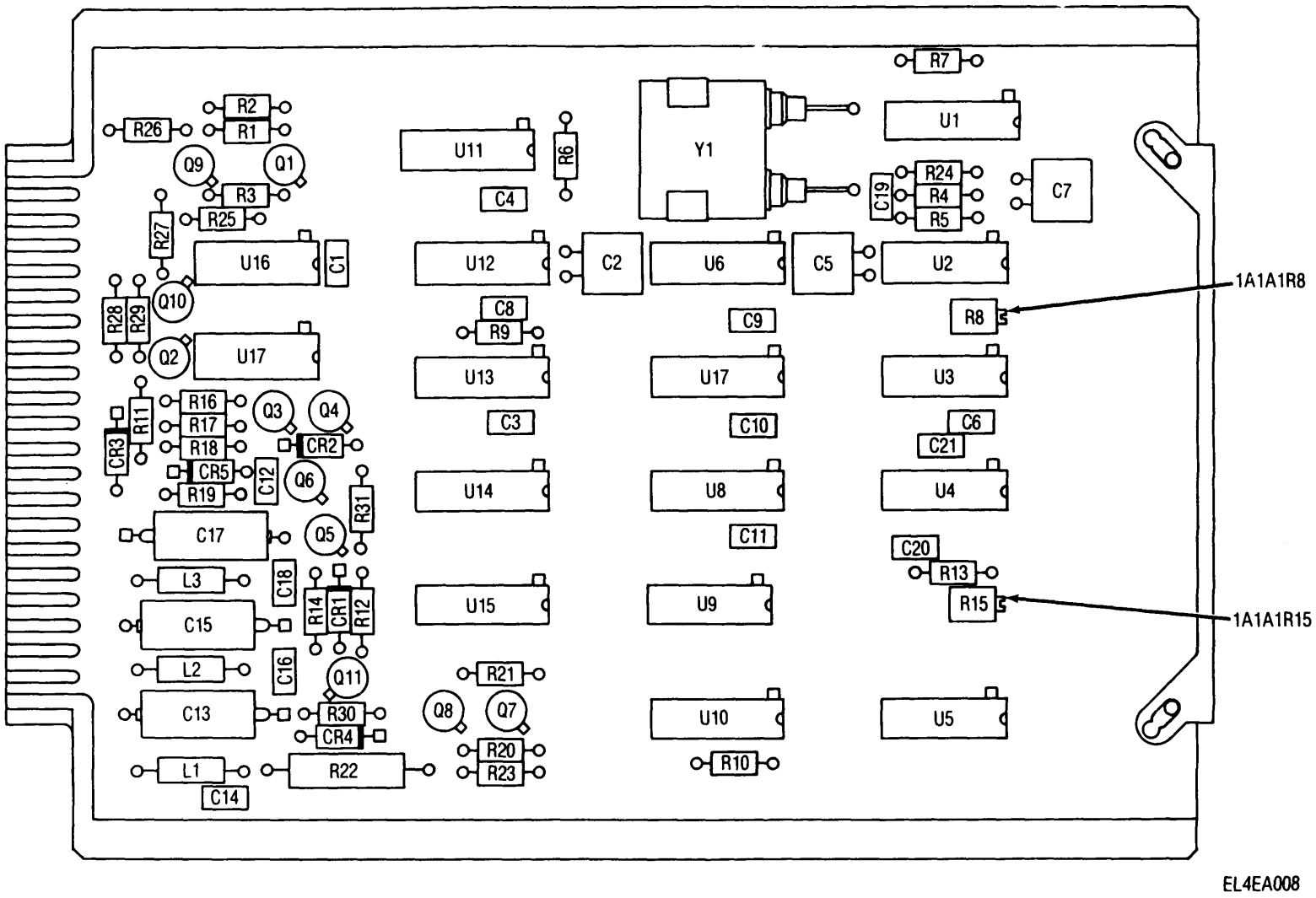


Figure 14. ADAS simulator 1A1A1.

18. +28 Vdc Power Supply. *a. Performance Check.*

(1) Perform all instructions in paragraph 7.

(2) Energize the 115 vac, 400 Hz and the +28 vdc bench power circuits.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(4) Set multimeter to 50 vdc range.

(5) Connect multimeter between test jacks 6(+) and 7(-) of RACK/RO-495 connector J4 of the lower MX-8638A/APS-94D. The multimeter should indicate +28.0 ± 2.0 vdc.

(6) Temporarily connect a jumper wire between test jacks 1 and 2 of METERING ROLLER DRIVE connector J3 of the lower MX-8638A/APS-94D. The multimeter should indicate approximately 0 vdc after the jumper is removed.

(7) Set the POWER switch on the MX-8639A/APS-94D to OFF, then return the switch to ON. The multimeter should indicate +28.0 ± 2.0 vdc.

(8) Set the digital voltmeter controls for ac measurement and connect the voltmeter between test jacks 3 and 4 of METERING ROLLER DRIVE connector J3 of the lower MX-8638A/APS-94D.

(9) Adjust variable transformer for 115.0 ± 0.2 vac as indicated on digital voltmeter.

(10) Connect digital voltmeter between test jacks 5 and 6 of METERING ROLLER DRIVE connector J3 of the lower MX-8638A/APS-94D.

(11) On the lower MX-8638A/APS-94D, set the FILM SPEED switch to CAL. The digital voltmeter should indicate 3.300 ± 0.010 vac.

(12) Set the FILM SPEED switch to LOW. The digital voltmeter should indicate 0.825 ± 0.015 vac.

(13) Set the FILM SPEED switch to HIGH. The digital voltmeter should indicate 13.2 ± 0.2 vac.

(14) Set the pulse generator controls for a positive pulse output of approximately 1 volt with a pulse width of 300 microseconds and a frequency of approximately 750 pps.

(15) Connect the pulse generator and one channel of the oscilloscope to terminals E4 (signal) and E5 (ground) of anode load 1A1A6 (fig. 2). Connect the other oscilloscope channel to ANODE VOLTAGE 1V/10 KV terminal E3 on the lower MX-8638A/APS-94D.

(16) Compare the amplitudes of the two oscilloscope channels. Both channels should be the same amplitude.

(17) Check for dc offset of the oscilloscope channel connected to ANODE VOLTAGE 1V/10 KV terminal E3. The offset should be less than ± 0.05 vdc.

(18) Connect the pulse generator and one channel of the oscilloscope to terminals E4 (signal) and E5 (ground) of focus load 1A1A5 (fig. 2). Connect the other oscilloscope channel to FOCUS VOLTAGE 2.75 V/2.75 KV terminal E4 of the lower MX-8638A/APS-94D.

(19) Compare the amplitudes of the two oscilloscope channels. Both channels should be the same amplitude.

(20) Increase the pulse generator output to 3 volts and repeat (19) above.

(21) Check for dc offset of the oscilloscope channel connected to FOCUS VOLTAGE 2.75 V/2.75 KV terminal E4. The offset should be less than ± 0.05 vdc.

b. Adjustment.

(1) Set the POWER switch on the MX-8639A/-APS-94D to OFF and trip all circuit breakers on the upper MX-8638A/APS-94D.

(2) Refer to figure 2 and locate +28 vdc regulated power supply 1A1A2.

(3) Close all circuit breakers on the upper MX-8638A/APS-94D and set the POWER switch on the MX-8639A/APS-94D to ON.

(4) On the lower MX-8638A/APS-94D, set the FILM SPEED switch to CAL.

(5) Adjust 1A1A2R18 (fig. 15) to obtain an indication of 3.300 ± 0.010 vac on the digital voltmeter.

(6) Set the POWER switch on the MX-8639A/-APS-94D to OFF and trip all circuit breakers on the upper MX-8638A/APS-94D.

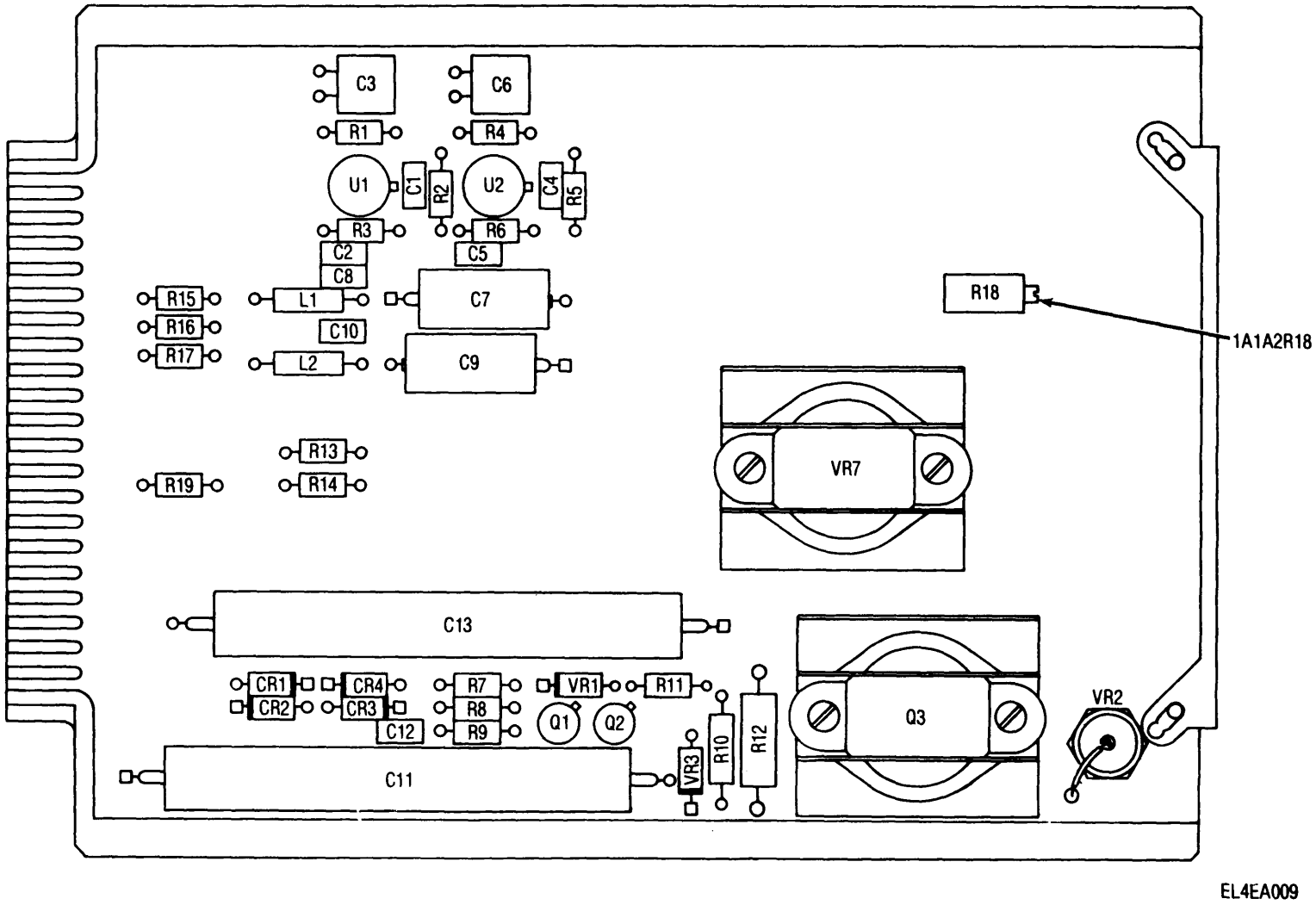


Figure 15. +28 vdc regulated power supply and high voltage loads 1A1A2.

19. Final Procedure. *a.* Deenergize and disconnect all equipment and reinstall protective cover on test instrument (TI).

b. In accordance with TM 38-750, annotate and affix DA Label 80 (US Army Calibrated Instrument). When the TI receives limited or special calibration, annotate and affix DA Label 163 (US Army Limited or Special Calibration). When the TI cannot be adjusted within tolerance, annotate and affix DA Form 2417 (US Army Calibration System Rejected Instrument).

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