TM 11-6625-1827-40

TECHNICAL MANUAL

GENERAL SUPPORT MAINTENANCE

MANUAL TEST SET, RECORDER-FILM MAGAZINE AN/AAM-32

This copy is a reprint which includes current page from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1970

WARNING

DEATH or SERIOUS INJURY may result from HAZARDS in this equipment. READ and OBSERVE the following WARNING

WARNING

DEATH or SERIOUS INJURY may result from contact with 115-VAC, 400-Hz, 3-PHASE power existing within this equipment

CHANGE } HEADQUARTERS

DEPARTMENT OF THE ARMY

No. 2 WASHINGTON, DC 15 March 1978

General Support Maintenance Manual
TEST SET, RECORDER-FILM MAGAZINE AN/AAM-32
(NSN 6625-00-403-1065)

TM 11-6625-1827-40, 2 November 1970, is changed as follows:

1. Title of the manual is changed as shown above.

2. A vertical bar appears opposite changed material.

3. Remove and insert pages as indicated in the page list below.

Remove	Insert
i and ii	i and ii
1-1	1-1/(1-2 blank)
3-1 through 3-4	3-1 through 3-4
3-13 through 3-28	3-13 through 3-28
3-31 and 3-32	3-31 and 3-32
3-37 and 3-38	3-37 and 3-38
FO-3	FO-3
FO-11	FO-11

4. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

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General. United States Army
Chief of Staff

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Brigadier General, United States Army
The Adjutant General

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To be distributed in accordance with DA Form 12-36A, Direct and General Support maintenance requirements for AN/AAM-32.

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DEPARTMENT OF THE ARMY

No. 11-6625-1827-40

WASHINGTON, DC, 2 November 1970

GENERAL SUPPORT MAINTENANCE MANUAL
TEST SET, RECORDER-FILM MAGAZINE AN/AAM-32
(NSN 6625-00-403-1065)

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CHAPTER 1

INTRODUCTION

1-1. Scope of Manual

a. This manual contains functioning of equipment and general support maintenance for Test Set, Recorder-Film Magazine AN/AAM-32 (recorder test set.) General support maintenance includes troubleshooting, removal and replacement, adjustment and alignment, repair and general support testing.

b. Operator and organizational maintenance procedures are contained in TM 11-6625-1827-40.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA PAM 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

NOTE

Applicable forms and records are covered in TM 11-6625-1828-12.

1-3. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA Q, Fort Monmouth, NJ 07703.

1-3.1. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407, (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-4. Reference Designations

Reference designations for major components of the receiver test set are listed in TM 11-6625-1827 12.

CHAPTER 2

FUNCTIONING OF EQUIPMENT

Section I. BLOCK DIAGRAM DISCUSSION

2-1. Overall Function

The recorder test set performs a bench test of either Recorder, Subassembly MX-8356/AAS24 (recorder) and Magazine, Film MA-26/AAS -24 (film magazine). The recorder is tested for recorder drive, gate generator test, velocity/ height (v/h) mask test, film drive amplifier test, and video test. The film magazine is tested for off test, run test, and marker test. Each unit is tested separately without disturbing Detecting Set, Infrared AN/AAS-24 (detecting set).

2-2. Block Diagram

(fig. FO-2)

a. Ac Power Distribution. The 115-vac, 400-Hz, 3-phase power is applied through the filters (FL) in filter assembly 1A1A12 and through circuit breaker CB2, to the contacts of relay 1A1K1 and to phase sense relay 1A1K5. The phase sensing relay K5 monitors the 3-phase ac and if all phases are correct, operates to provide a path for +6 vdc to power control 1A1A6. When 1A1KI operates, a path is completed to power transformers 1A1T1 through T6, to ELAPSED TIME meter M1, and 'to the contacts of 1A1K2 for application to the unit under test.

b. Dc Power Distribution. The 28-vdc power is applied through the filters in filter assembly 1A1A12 and circuit breaker, CB1 to the contacts of relays 1A1K1 and K4 and to power mode switch 1A1S12. Setting the power mode switch S12 to STBY applies the 28 vdc to relay 1A1K4 contacts to light the STBY lamp. The power mode switch also applies 28 vdc to relay 1A1K1 causing it to operate and apply the 115-vac, 400Hz, 3-phase power to the transformers to provide dc power supplies with input power. Setting the power mode switch to OPR applies 28 vdc to 1A1K4 and if all monitored power to power control 1A1A6 is in tolerance causes K4 to operate extinguishing the STBY lamp and lighting the OPR lamp; applying +6.3 vdc and 26 vac to the unit under test; applying 28 vdc to 1A1K2 and K3 causing them to operate and apply +13 vdc, -13 vdc, +6 vdc, +58 vdc, +28 vdc and 115 vac, 400 Hz, 3 phase to the unit under test and + 6 vdc to RECORDER DRIVE TEST switch 1A1S3.

c. Transformers. 1A1T1 has a 115-vac, 400Hz, phase-A input. The output is 26 vac to the unit under test. 1A1T2 has a 115-vac, 400-Hz, phase-A input. The outputs are 6.3 vac to the unit under test and 28 vac to the 6 vdc regulator 1A1A5. 1A1T3 has a 115-vac, 400-Hz, 3-phase input. The output is 48 vac to rectifier filter 1A1A10. 1A1T4 has a 115-vac, 400-Hz, 3-phase input and an output of 18.4 vac to 13 vdc and -13-vdc regulator 1A1A4 and 10.5 vac to 6-vdc regulator 1A1A5. 1A1T5 has a 115-vac, 400-Hz, 3-phase input and an output of 28 vac to rectifier filter 1A1A10. 1A1T6 has a 115-vac, 400-Hz phase-A input and an output of 26 vac to form tach high to the unit under test.

d. Dc Power Supplies.

(1) The 13-vdc, -13-vdc, and 6-vdc power supplies are applied to heatsinks 1A1A1, A2 and A3 to accomplish heat dissipation. The resulting 13-vdc, -13-vdc and 6-vdc outputs provide operating power to the printed circuit boards and the unit under test.

(2) The rectifier filter 1A1A10 supplies 58 vdc and 32 vdc to the unit under test and 30 vdc to v/h generator and hot target marker 1A1A9.

(3) The 13 vdc, -13 vdc, 6 vdc, 58 vdc and coarse sync sense from sync generator 1A1A7 are monitored for proper tolerance by power control 1A1A6. The 6-vdc monitored signal must first have a path provided through phase sense relay 1A1K5. If all power is within specified tolerances, power control 1A1A6 applies to ground to 1A1K4 to allow it to operate and apply power to the unit under test.

e. Power Control, 1A1A6. Power control 1A1A6 monitors the 13 vdc, -13 vdc, 6 vdc, 58

vdc and coarse sync sense from sync generator 1A1A7. If any of the monitored inputs exceed the upper or lower tolerances, power control 1A1A6 removes the ground from 1A1K4 to remove power from the unit under test and simultaneously lights the FAIL lamp. When 1A1K4 restores, the OPR lamp is extinguished and the STBY lamp lights. To reactivate the recorder test set, the power mode switch is set to RESET and released. The power mode switch is spring loaded in this position to return to the OPR position. If all inputs to power control 1A1A6 are correct, the recorder test set remains in the operate mode as indicated by the lighted OPR lamp. The phase sense relay 1A1K5 operates as long as the input power continues to have the proper phase rotation. If the input fails in this respect, the phase sense relay K5 restores to remove the 6-vdc input power to power control 1A1A6. This condition causes the FAIL lamp to light, the STBY lamp to light and the OPR lamp to extinguish. The recorder test set is reactivated by setting the power mode switch to RESET.

f. V/H Generator and Hot Target Marker, 1A1A9. Inputs to v/h generator and hot target marker 1A1A9, are cal scope signal, fine sync no. 1 and no. 2, coarse sync from the unit under test, 30 vdc from the rectifier filter 1A1A10 and the v/h control signal from V/H SIGNAL potentiometer 1A1R3. Outputs are hot target, auto v/h, manual v/h control, and auxiliary speed control to the unit under test and power for the V/H SIGNAL poentiometer.

g. Video Oscillator and Film Fail Amplifier, 1A1A11. Inputs to video oscillator and film fail amplifier 1A1A11 are 6 vdc, 13 vdc and -13 vdc switched signals and the light sensor emitter and collector from the unit under test. Outputs are counter to a test point, coarse source, fine source no. 1 and no. 2 and video signal to the unit under test.

h. Film Drive Amplifier and Bit Logic Circuit, 1A1A8. Inputs to the film drive amplifier and bit logic circuit 1A1A8 are video test, channels 3 through 8 from the VIDEO TEST switch 1A1S8 and tach high and low and film drive return from the unit under test. Outputs are emitter and base drive to rectifier filter 1A1A10 and channel signals to the unit under test.

i. Sync Generator, 1A1A7. The sync generator 1A1A7 input is from the RECORDER DRIVE TEST switch 1A1S3. Outputs are led gate test, fine sync, coarse sync and film fail inhibit to the unit under test and coarse sync to rectifier filter 1A1A10.

j. Input Power. Input power is shown to all printed circuit boards as a matter of familiarization and as an aid in visualizing complete dc distribution.

Section II. CIRCUIT DISCUSSION

2-3. Equipment Interconnection

(fig. 2-1)

A complete recorder test set is formed by connecting the equipment as shown in figure 2-1.

2-4. Circuit Functioning

(fig. FO-3 (1))

a. Ac Power Distribution.

(1) The 115-vac, 400-Hz, 3-phase power enters the recorder test set through 1A1J2-A, B, C, and D. This input is applied to filter assembly 1A1A12 at FL1-2, FL2-2 FL3-2, and FL4-2. The filter assembly 1A1A12, 115-vac, 400-Hz, 3-phase output power from C2-1, C2-2, C2-3, and C2-4 is applied through circuit breaker (CB2), to relay 1A1K1-A2, B2, and C2 and to phase sensing relay 1A1K5-PH A, PH B and PH C. Phase sensing relay K5 monitors the phase rotation of the input ac power and operates to provide a path from 1A1K5-A1 to 1A1K5-A2 for the +6-vdc power supply to be monitored by power control 1A1A6. A missing or improper phase rotation causes K5 to restore and remove the + 6 vdc from power control 1A1A6-14.

(2) Setting the power mode switch 1A1S12 to STBY causes relay 1A1K1 to operate and apply phase A through contacts Al and A2; phase B through contacts B1 and B2; and phase C through contacts C1 and C2; to transformer 1A1T4, pins 1, 2, and 3 respectively. This ac power is also applied to the open contacts of 1A1K2-A2, B2, and C2 to be applied to test points for monitoring and to the unit under test. The secondaries of transformer 1A1T4 develop 18.5-vac, 400-Hz, 3-phase power for the ±+13 vdc regulator and 10.5-vac, 400-Hz, 3-phase power for the +6-vdc regulator. Primary power of 115 vac, 400 Hz, 3 phase is also applied to transformers 1A1T3 and T5. The secondaries of these transformers develop 48 vac, 400 Hz, 3 phase and 24 vac, 400 Hz, 3 phase respectively, Phase A of the input 116-vac, 400-Hz, 3-phase power is applied to ELAPSED TIME meter 1A1M1 and to

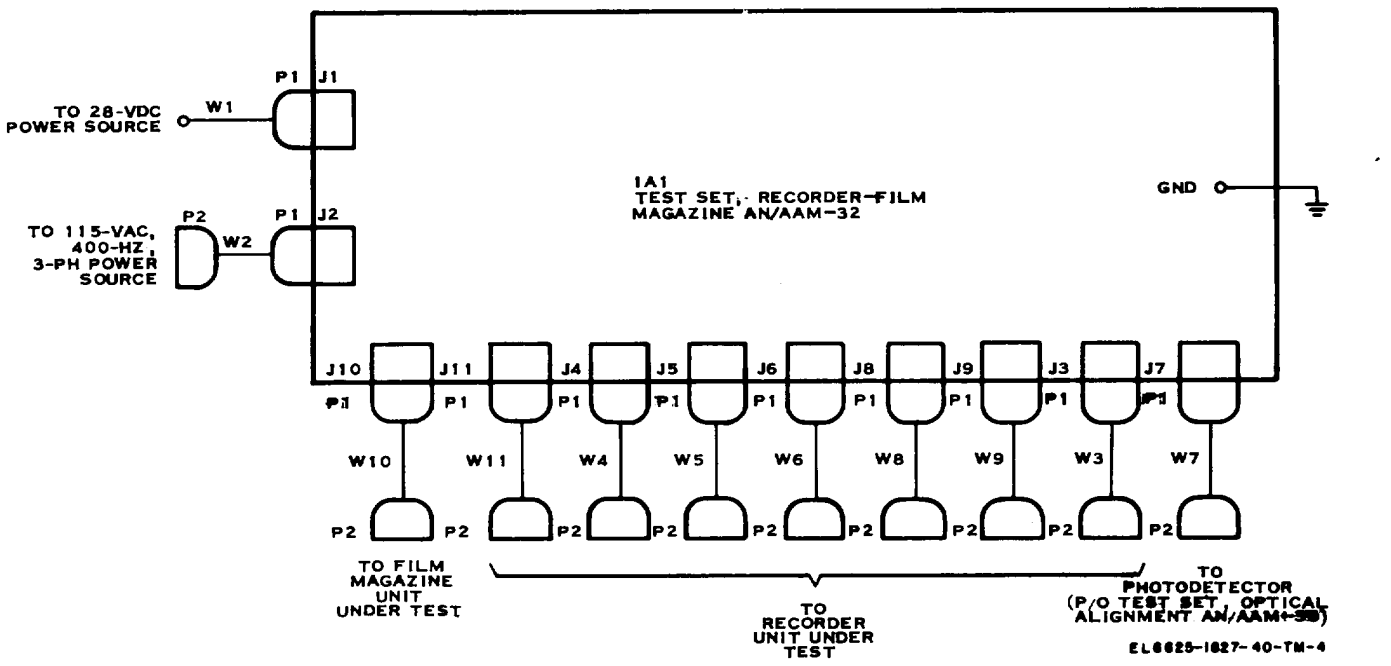


Figure 2-1. Interconnecting diagram.

the primary of 1A1T1, T2, and T6. The secondary of T1 develops 26 vac to apply to FILM SPD ADJ potentiometer 1A1R1 and the unit under test. The secondary of T2 develops 26 vac as an input to + 6 vdc regulator 1A1A5 and 6.3 vac to apply to the unit under test. The secondary of T6 develops 26 vac to apply to TACH SIGNAL potentiometer 1A1R4.

(3) Setting the power mode switch 1A1S12 to OPR causes 1A1K4 to operate and apply the 6.3 vac and 26 vac to the unit under test and to test points for monitoring. Relay K4 causes 1A1K2 and K3 to operate and apply 115-vac, 400-Hz, 3phase power to the unit under test.

b. Dc Power Distribution.

(1) The 28-vdc power enters the recorder test set through 1A1J1-A and B is applied to filter assembly 1A1A12-FL5-2 and FL6-2. The output from the filter assembly is at 1A1A12-E2 with a 28-vdc return established at 1A1A12-E3. The 28-vdc output is applied through CB1 and diode CR1 to relay 1A1K1-D2 and to power mode switch wipers 1A1S12A-C1 and 1A1S12B-C1.

(2) Setting the power mode switch to STBY applies 28 vdc through 1A1S12A-C1 to power control 1A1A6-18 and to relay 1A1K1. K1 operates and 28 vdc is applied to 1A1S12A-C2, to the open contacts of 1A1K4-A2, and through the 1A1K4-D2 and D3 contacts to light STBY lamp 1A1DS2.

(3) Setting the power mode switch to OPR applies 28-vdc from 1A1S12B-C1 to power control 1A1A6-23. The 28 vdc from 1A1S12A-C2 is applied to relay 1A1K4 causing it to operate, if power control 1A1A6 has sensed proper operating voltages and provided the ground return for relay 1A1K4. When relay 1A1K4 operates, the 28 vdc to STBY lamp 1A1DS2 is removed causing it to extinguish and the 28-vdc power is applied through 1A1K4-D2 and D1 contacts to light OPR lamp 1A1DS3. Through closed contacts 1A1K4-A2 and A1, 28 vdc is applied to 1A1K2 and K3. Relay 1A1K2 is not furnished a ground return until MOT PWR switch 1A1S6 is set to the ON position, so only 1A1K3 operates to apply 13 vdc, -13 vdc, 6 vdc, and 58 vdc to the unit under test. The 58 vdc is applied through CB1 before leaving the recorder test set and the 6 vdc is applied also to video oscillator and film fail amplifier 1A1A11-23. When MOT PWR switch 1A1S6 is set to the ON position, relay 1A1K2 operates and applies 115-vac, 400-Hz, 3phase power and 28 vdc to the unit under test and to test points for monitoring.

(4) Setting the power mode switch 1A1S12 to RESET duplicates the standby mode except that when released it returns to the OPR position be cause of the spring loaded RESET position.

(5) The + 13-vdc power supplies are provided to supply power to printed circuit boards for operation. The + 13-vdc outputs are applied

to heatsinks 1A1A1 and 1A1A2 for heat dissipation and regulation. 13 vdc is applied to 1A1A14 and 7. The positive drive for regulation is applied to 1A1A1-5. One 13-vdc output from 1A1A1-2 is applied to power control 1A1A6-16 for monitoring. The other, at A1-9, is applied to 1A1K3-2 to go to the unit under test, to TEST POINTS switch 1A1S14C-5, to film drive amplifier and bit logic 1A1A11, to v/h generator and hot target marker 1A1A9-16, 3; to video oscillator and film fail amplifier 1A1A1116, to TEST switch 1A1S8C-C1, and to sync generator 1A1A7-22. The -13 vdc output from 1A1A4-15 and 16 is applied to heatsink 1A1A27 and 5 for heat dissipation and regulation. The negative drive from 1A1A4-18 is applied to 1A1A2-4. The -13 vdc regulated output is from 1A1A4-14 and 22 and is applied to 6 vdc regulator 1A1A6-, to film drive amplifier and bit logic 1A1A8-2, to TEST POINTS switch 1A1S14C-6, to power control 1A1A6-4, to relay 1A1K3-B2 to go to the unit under test, to v/h generator and hot target marker 1A1A9-14, to TEST switch 1A1S8B-6 and 1A1S8C-C2, to video oscillator and film fail amplifier 1A1A1122, and to sync generator 1A1A7-23.

(6) The 6-vdc power supply is also provided to furnish operating power for the printed circuit boards. The unregulated output from 1A1A5-16 and 23 is applied to heatsink 1A1A34 and 7 for heat dissipation and regulation. The positive drive for regulation from 1A1A5-18 is applied to 1A1A3-5. The 6-vdc regulated output from 1A1A3-2 is applied to phase sensing relay 1A1K3-A1 and if proper ac input power is present, through 1A1K3-A1 and A2 to power control 1A1A6-14, to TEST POINTS switch 1A1S14C-7, to sync generator 1A1A7-9, to video oscillator and film fail amplifier 1A1A11-12, and to v/h generator and hot target marker 1A1A9.

The 6-vdc regulated output from 1A1A3-9 is applied to 1A1K3-C2 for application to the unit under test.

(7) The 58-vdc power supply is provided to drive the recorder motor in the unit under test and to provide input power for the 30-vdc power supply. The output 58 vdc at 1A1A10-21 is applied through 1A1L1 to 1A1A10-10, to power control 1A1A6-8, and to TEST POINTS switch 1A1S14E-2. The output from 1A1A10-21 is also applied to TEST POINTS switch 1A1S14E4; through 1A1R5 to FUNCTION TEST switch 1A1S13A-5, to 1A1J11-T as film drive no. 1, through 1A1R6 to FUNCTION TEST switch 1A1S13B-5 and 1A1J11-U as film drive no. 2, and to the unit under test through 1A1J11-V.

The 58 vdc output at 1A1A10-9 is applied to 1A1K3-D2 for application to the unit under test through RCDR DR switch 1A1S4 to 1A1J8-Y and Z.

(8) The 32-vdc power supply is provided to furnish power to the light emitting diode power supply in the unit under test. The 32-vdc output at 1A1A10-13 is applied to TEST POINTS switch 1A1S14C-1 and to the unit under test through 1A1J8-P and GG.

(9) The 30-vdc power supply provides power for a power amplifier in v/h generator and hot target marker 1A1A9. The output at 1A1A1022 is applied to TEST POINTS switch 1A1S14C8 and to 1A1A9-10.

Section III. PRINTED CIRCUIT BOARD FUNCTIONING

2-5. Heatsink, 1A1A1

(fig. 2-2)

Heatsink 1A1A1 provides heat dissipation and current regulation for ± 13-vdc power supply, 1A1A4. The unregulated, unfiltered, input is applied to J1-7 and 4 and the regulated output is applied to J1-1, 2, and 9. The positive drive to control the regulation enters at J1-5 and is applied to 1A1AQ2 base. The emitter of Q2 is tied to the base of Q1 which in combination with Q2 controls the load current. A decrease in load resistance to cause increased current is sensed in the ±13-vdc power supply and a more negative signal is applied to Q2 base and by emitter follower action to Q1 base to decrease conduction in both for current regulation.

2-6. Heatsink, 1A1A2

Heatsink 1A1A2 is identical to heatsink 1A1A1 in functioning and operation.

2-7. Heatsink, 1A1A3

Heatsink 1A1A3 is identical to heatsink 1A1A1 in functioning and operation.

2-8. 1 3-Vdc Regulator, 1A1A4

(fig. 2-3)

The ± 13-vdc regulator printed circuit board 1A1A4 consists of two identical circuits. Each circuit consists of a full-wave bridge rectifier, constant current generator, comparator amplifier, and a driver circuit.

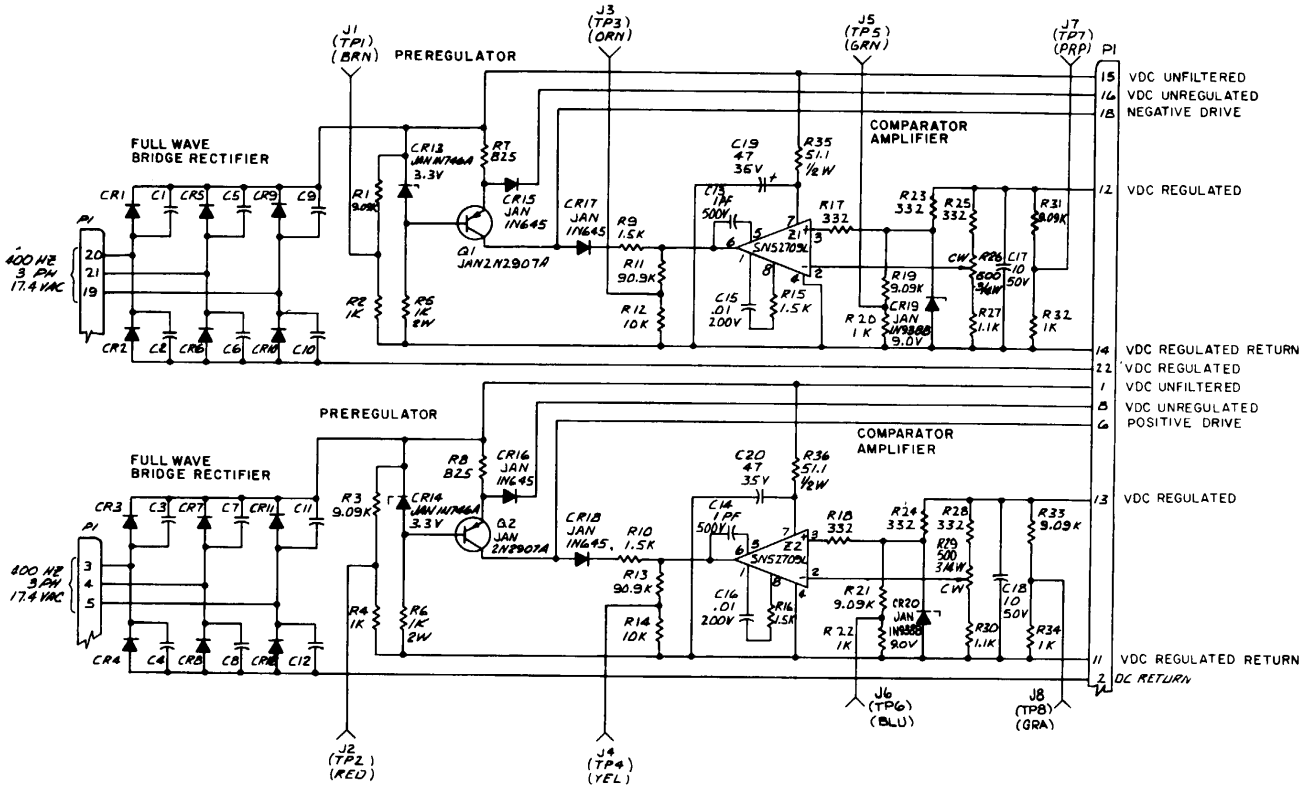


Figure 2-2. Heatsink 1A1A1, 1A1A2, or 1A1A3, schematic diagram.

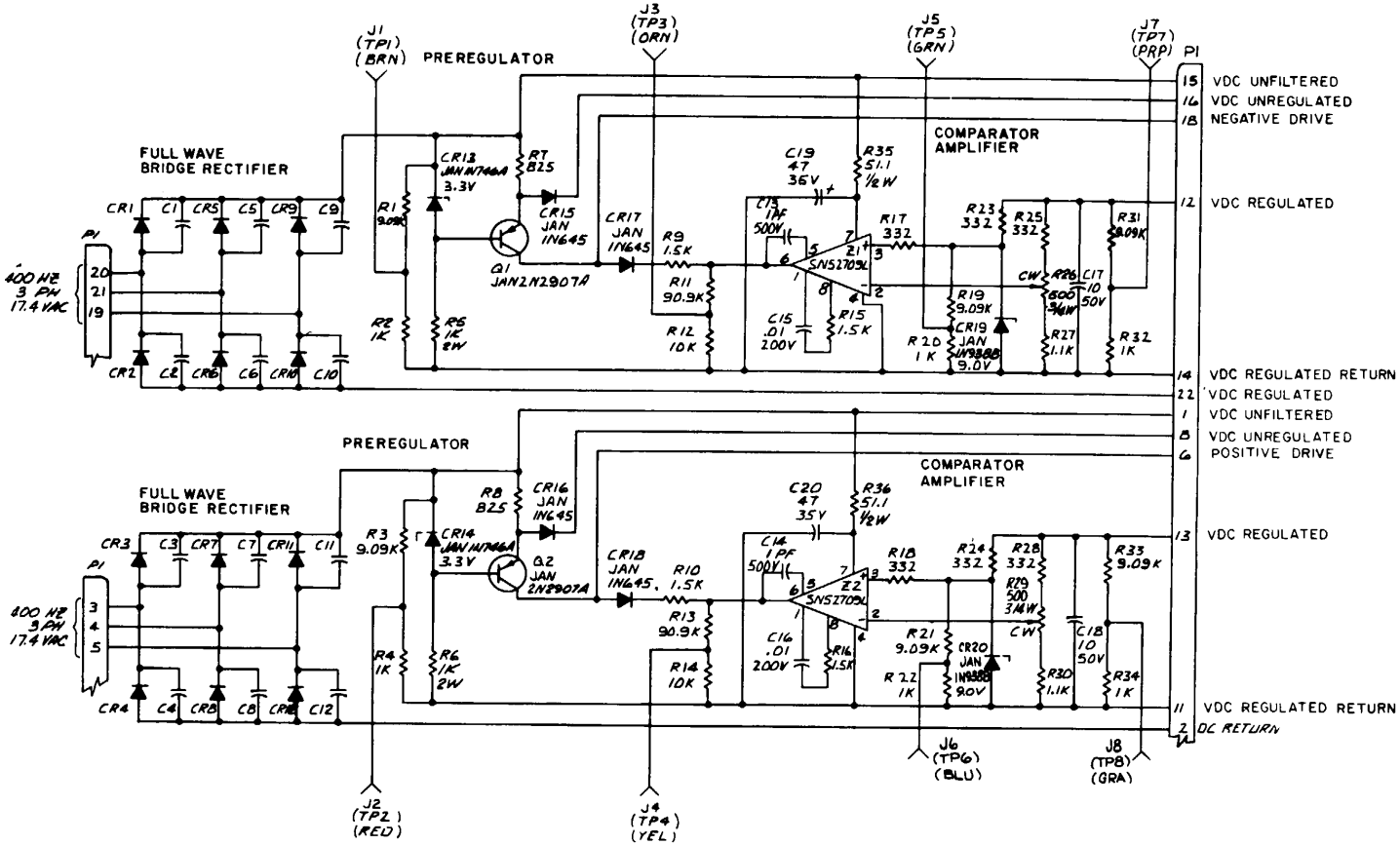
a. -13 Vdc Regulator, 1A1A4. The 17.4-vac, 400-Hz, 3-phase power is applied to fullwave bridge rectifier consisting of diodes 1A1A4CR1, CR2, CR5, CR6, CR9 and CR10. The output voltage from the bridge rectifier is applied through resistor 1A1R5. The resulting dc voltage is applied to constant current generator 1A1AQ1 whose output is controlled by zener diode 1A1A4CR13 and resistor 1A1A4R5. A part of the constant current output is controlled by comparator amplifier 1A1AZ1 while the remaining portion of the current is used to control heatsink assembly driver transistors 1A1A10Q3 and Q4. Comparator amplifier 1A1A4Z1 compares the reference voltage generated by zener diode 1A1A4CR19 with a sample of the power supply output voltage provided by resistors 1A1A4R25, R26 and R27. Voltage regulation is achieved because the comparator amplifier controls the currents in accordance with changing output voltage. The difference current applied to the drivers affects their conduction and the power supply output voltage is stabilized by the series regulating action of the driver. Current sensing resistor 1A1R5 develops a voltage drop proportional to output current. Should the power supply output current exceed safe limits, the voltage across resistor 1A1R5 would exceed the voltage across resistor 1A1A4R7. Under these conditions diode 1A1A4CR16 conducts and reduces the drive current from the constant current source; thereby limiting the output current. The negative voltage is obtained by grounding the positive side of' the circuit and taking the regulated voltage from the negative side of the circuit.

b. +13-Vdc Regulator, 1A1A4. The +13-vdc regulator is identical to the -13-vdc regulator discussed in a above. The 17.4-vac, 400-Hz, 3phase input power is applied to the +13-vdc regulator through 1A1A4P1-3, 4, and 5 of ±13vdc regulator 1A1A4. Rectifier diodes 1A1A4CR3, CR4, CR7, CR8, CR11 and CR12, constant current generator 1A1A4Q2 and comparator amplifier 1A1AZ1 functions in the same manner as those circuits described in a above to produce a regulated output.

2-9. +6-Vdc Regulator, 1A1 A5

(fig. 2-4)

The + 6-vdc regulator printed circuit board 1A1A5 consists of a full-wave bridge rectifier, constant



NOTE : UNLESS OTHERWISE SPECIFIED

1. DIODES ARE UT4020.
2. RESISTORS ARE 1/4 WATT.
3. CAPACITORS ARE 0. 1 UF, 100 VOLTS.
4. RESISTANCE VALUES ARE IN OHMS.
5. CAPACITANCE VLAUES ARE IN MICROFARADS.
6. VARIABLE RESISTORS VIEWED FROM SHAFT END.
7. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A3 OR 1A1A4

Figure 2-3. +.1-vdc regulator A1AA4, schematic diagram.

current generator, comparator amplifier, and a driver circuit.

a. +6-Vdc Regulator, 1A1A5. The +6-vdc regulator receives 10.7-vac, 400-Hz, 3-phase input power 'through regulator connector 1A1A5P1-19, 20, and 21. The fullwave bridge rectifier consists of diodes 1A1A5CR1, CR2, CR5, CR6, CR9 and CR10, constant current generator 1A1A5Q1 and comparator amplifier 1A1A5Z1 performs the same current and voltage regulation as the circuits described in paragraph 2-8a. The primary difference in the +6-vdc regulator circuit is the use of additional circuits associated with comparator amplifier 1A1A5Z1. Diode CR18 drives comparator amplifier 1A15Z1 into the voltage comparator mode of operation when power is first turned on. Resistor 1A1A5R2 and 1A1A5C20 form an RC network to provide additional filtering of the positive supply voltage applied to comparator amplifier 1A1A5Z1 and the voltage reference circuit consisting of resistor 1A1A5R11 and zener diode 1A1A5CR22. Comparator amplifier 1A1A5Z1 also receives a negative voltage from the series combination of zener diode 1A1A5CR23 and resistor 1A1A5R18.

b. 30-Vdc Unregulated, 1 A1A5. The -30vdc unregulated power consists of a fullwave bridge rectifier. The 25.5-vac, 400-Hz, 3-phase input power is applied to the rectifier through connector 1A1A5P1-3, 4, and 5 of the +6-vdc regulator 1A1A5. The rectifier circuit consists of diodes 1A1A5CR3, CR4, CR7, CR8, CR11 and CR12 with capacitors 1A1A5C3, C4, C7, C8, C11 and C12 acting as noise suppressors. The output voltage from the rectifier may be monitored at test point 1A1A5J2 through voltage divider resistors 1A1A5R3 and R4. The output voltage from the rectifier is sent through 1A1A5P1-7 and 8 of the +6-vdc regulator 1A1A5 to the test set circuits and the unit under test.

2-10. Power Control, 1A1A6

(fig. FO-4)

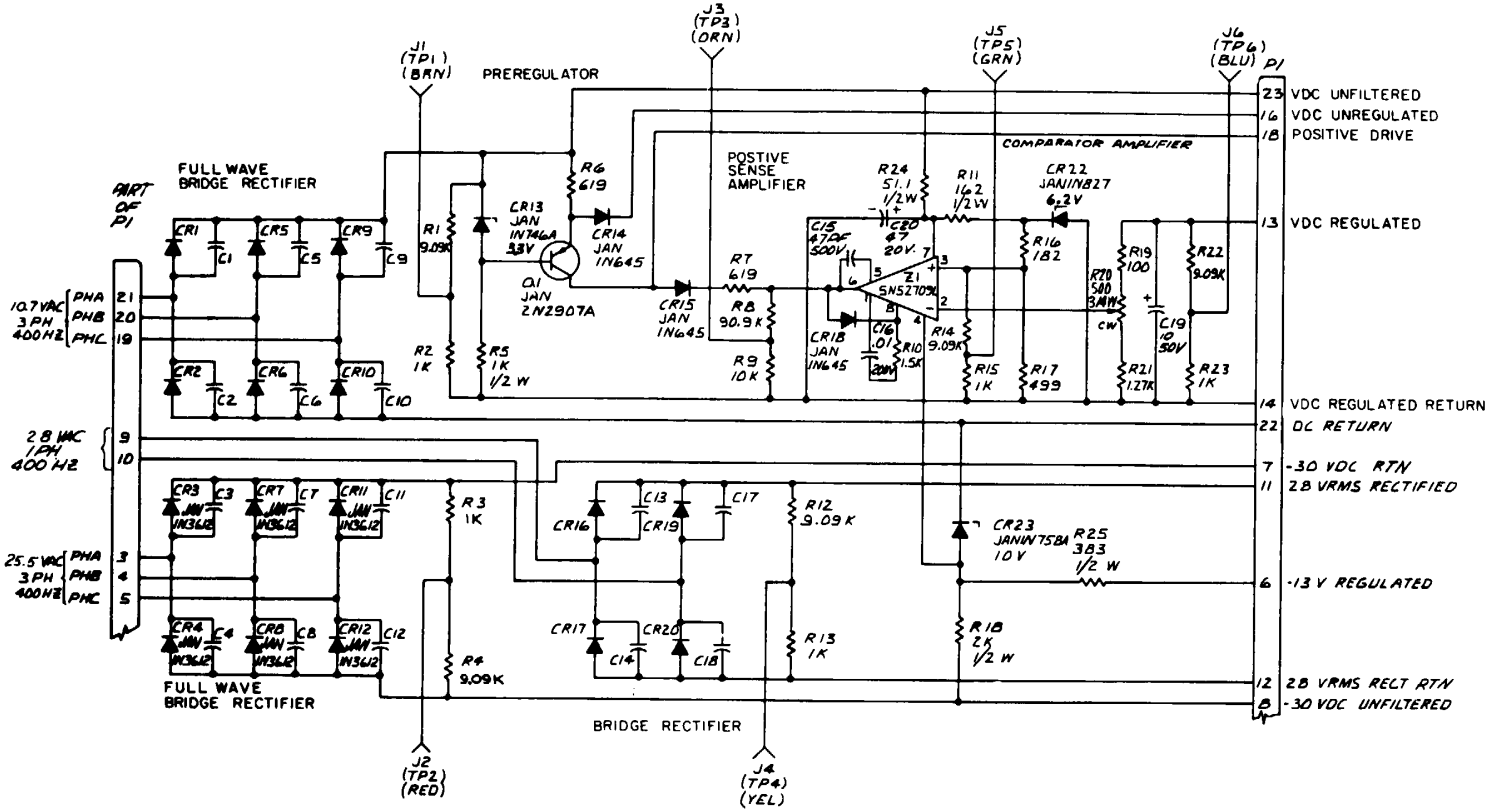
a. The outputs of the +13-vdc, -13-vdc, +6-vdc, and 58-vdc regulated power supplies-and the coarse sync sense from sync generator 1A1A7 are applied to 1A1A6P1-16, 14, 6, 8, and 4 as sense voltages. If any of the five voltages sensed by the power control circuitry exceeds the overvoltage or undervoltage limits, the dc return to 1A1K4 is removed causing 1A1K2 and K3 to restore and remove power from the unit under test. The five sense voltages are applied to five voltage dividers consisting of R1, R2, R5, R6, R7, R8, R9, and R16, which reduce each of the applied voltages to three volts. The divided voltage from the -13-vdc power supply is applied through R15 and inverted by unity-gain amplifier Z1. The five +3-vdc levels are applied through R11, R12, R13, R14, and R22 to the level detectors as an OR function and deviations in any one of the sensed voltages will appear at C3. The OR function is applied to noninverting input Z2-3 and to inverting input Z3-2. A reference voltage for overvoltage detector Z2 is developed by R4, R10, potentiometer R21 and the two zener diodes CR1 and CR5. The reference level for undervoltage detector Z3 is ,developed by R4, R10, potentiometer R19 and the two zener diodes CR1 and CR5. If the OR function input is either higher than the overvoltage reference level or lower than the undervoltage reference level, the output at Z2-6 or Z3-6 is high, biasing transistor Q1 on, increasing the voltage drop across R26 and biasing Q2 off. When transistor Q2 is cut off, relay 1A1A6-K2 restores to remove the 28-vdc return circuit. 28-vdc FAIL power is applied from 1A1A6 -18 through relay contacts 1A1A6K2-A2 and A3 to light FAIL lamp 1A1DS2. The power switch input to 1A1A6-23 applies latch power to relay 1A1A6-K1 to latch K1 in the operate condition and maintain the FAIL lamp even if proper operating power returns. It is necessary to set the power mode switch to RESET or STBY to remove the latch power furnished by the power mode switch 1A1S12B-3 to 1A1A6-23. This action allows 1A1A6-K1 to restore before reapplying the latch power to 1A1A6K1. Resistors R23, R24, and R25 provide failsafe protection against failure of amplifiers Z2 and Z3.

b. The syncadas trigger signal is developed by R28 and C8 and applied to 1A1A6-19. The film mag switch signal is developed by R29 and C9 and applied to 1A1A6-5.

2-11. Sync Generator, 1A1A7

(fig. 2-5)

The sync generator produces fine and coarse servo motor control and motor speed reference voltages used to operate recorder drive motor. An internal oscillator modulates the fine and coarse sync outputs when the dynamic drive test (TM 11-5850-241-34/1) is performed on the recorder. The sync generator consists of an operational amplifier oscillator circuit, an oscillator, a multifunction buffer integrated circuit, a rectifier, a transistor inverter and five integrated circuit frequency dividers. The multifunction integrated circuits contains the circuitry required to buffer three separate signals.



NOTE : UNLESS OTHERWISE SPECIFIED

1. DIODES ARE UT4020.
2. RESISTORS ARE 1/4 WATT.
3. CAPACITORS ARE 0. 1 UF, 100 VOLTS.
4. RESISTANCE VALUES ARE IN OHMS.
5. CAPACITANCE VALUES ARE IN MICROFARADS.
6. VARIABLE RESISTORS VIEWED FROM SHAFT END.
7. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A3 OR 1A1A4

Figure 2-4. + 6-vdc regulator 1A1A5, schematic diagram.

a. Operational amplifier Z1 operates as an oscillator. Capacitor C14 couples regenerative feedback from Z1-7 and through R19 to the oscillator tank circuit consisting of capacitor C12, variable inductor L4, and varactor diode CR3. L3 is adjusted to provide an oscillator frequency output of 360 kHz. The capacitance of varactor diode CR1 varies in proportion to a 1 Hz, 2-volt, peak to-peak input signal applied by oscillator 1A1A7Q3 and Q4. This change in capacitance varies the frequency of the fine sync output +40 Hz. The 360 kHz oscillator output is applied to input pin 12 of multifunction integrated circuit Z2 for isolation. The buffered oscillator output is taken from output pin 11 of Z2 and applied to input pin 1 of integrated circuit frequency divider Z5.

b. Z5 divides the buffered oscillator output by 10 to produce 36 kHz fine sync at output pin 12.
The 36 kHz feeds external circuits and input pin 1 of divide by 10 integrated circuit Z6. Output pin 12 of Z6 feeds input pin 1 of divide by 2 integrated circuit Z7. Z7 produces an 1800 Hz signal at output pin 12. Integrated circuit Z3 divides the 1800 Hz Z7 output by 9 to produce a 200 Hz unsymmetrical coarse sync output with a duty cycle of 44.4 percent.

c. The coarse sync output of Z3 feeds external circuits pin 1 of divide by 10 integrated circuit Z4 and input pin 9 of multifunction integrated circuit Z2 for isolation. The buffered coarse sync is produced at output pin 1 of Z2. Capacitor C17 couples the buffered coarse sync to the rectifier and filter consisting of diodes CR4, CR5 and capacitor C15. Diode CR6 determines the amount of dc bias required to turn on ac switch Q5.

d. When the rectified and filtered coarse sync is present at the Q5, base, Q5 conducts and provides an effective ground input to another buffer inverter stage in multifunction integrated circuit Z2 pin 1. The buffered output at Z2-3 is the coarse sync sense voltage level monitored by power control 1A1A6.

e. Divide by ten integrated circuit Z4 produces 20 Hz at P1-7 and 8.

2-12. Film Drive Amplifier and Sit Logic Circuit, 1A1 A8
(fig. 2-6)

a. The video signal is applied through the diode matrix to the unit under test. The diodes are forward biased facing the input. The input to P1-22 is applied to CR-15 through CR-20 to P1-16, 9, 19, 5, 7, and 17. The input to P1-21 is applied to CR-10 through CR14 to P1-16, 9, 19, 5, and 7. The input to P1-23 is applied to CR-6 through CR9 to P1-16, 9, 19, and 5. The input to P1-20 is applied to CR-3 through CR-5 to P1-16, 9, and 19. The input to P1-11 is applied to CR-1 and CR-2 to P1-16 and 9.

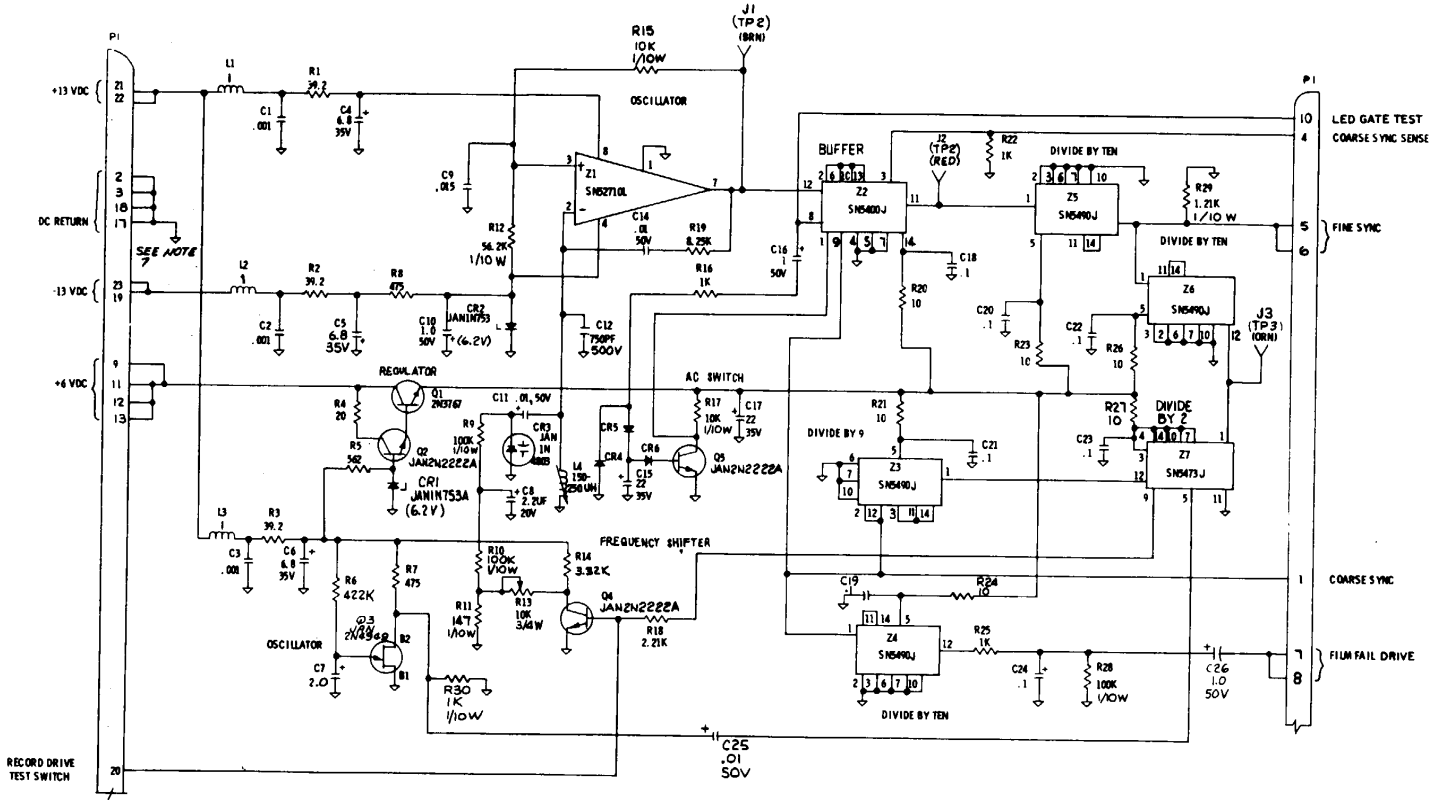
b. The film drive amplifier develops the base drive signals for power amplifiers 1A1A10Q1 and Q2. The film drive amplifier consists of an operational amplifier preamplifier stage, a transistor paraphase amplifier, and four transistor drivers. The output drive signals feed power amplifiers 1A1A10Q1 and 1A1A10Q2 mounted on the rectifier filter 1A1A10. The input signal applied to operational amplifier 1A1A8Z1-2 is the voltage difference between the 23.5 vac v/h signal applied to 1A1A8P1-10 and the tach high signal from the film magazine applied to 1A1A8P1-12. This signal is developed across diodes CR22 and CR23. Resistor R31 and capacitor C12 couple the Z1-6 output to the base of paraphase amplifier transistor Q1. Two opposing phases of approximately equal amplitude are coupled from the emitter and collector circuits of Q1 to the bases of the pairs of driver transistors Q2 and Q3. Base drive no. 1 is developed in the emitter circuit of Q4 and applied to output pin 3. Base drive no. 2 is developed in the emitter circuit of Q5 and applied to output pin 4.

2-13. V/H Generator and Hot Target Marker, 1A1A9
(fig. 2-7)

The v/h generator and hot target marker 1A1A9, generates the supply voltage for auxiliary speed control voltage, excitation for the V/H SIGNAL potentiometer, manual and automatic v/h, and the hot target signal. Inputs to this printed circuit board are calibration scope signal, ,fine sync no. 1 and no. 2 and coarse sync from the unit under test. These signals are furnished with loads R3 through R6 for proper level viewing at test points. The v/h wiper return is used as an input to the auto v/h circuitry.

a. Auxiliary Speed Control. The auxiliary speed control voltage is developed from the 13 vdc and -13-vdc through resistors R18 and R19 to P1-22 and 18.

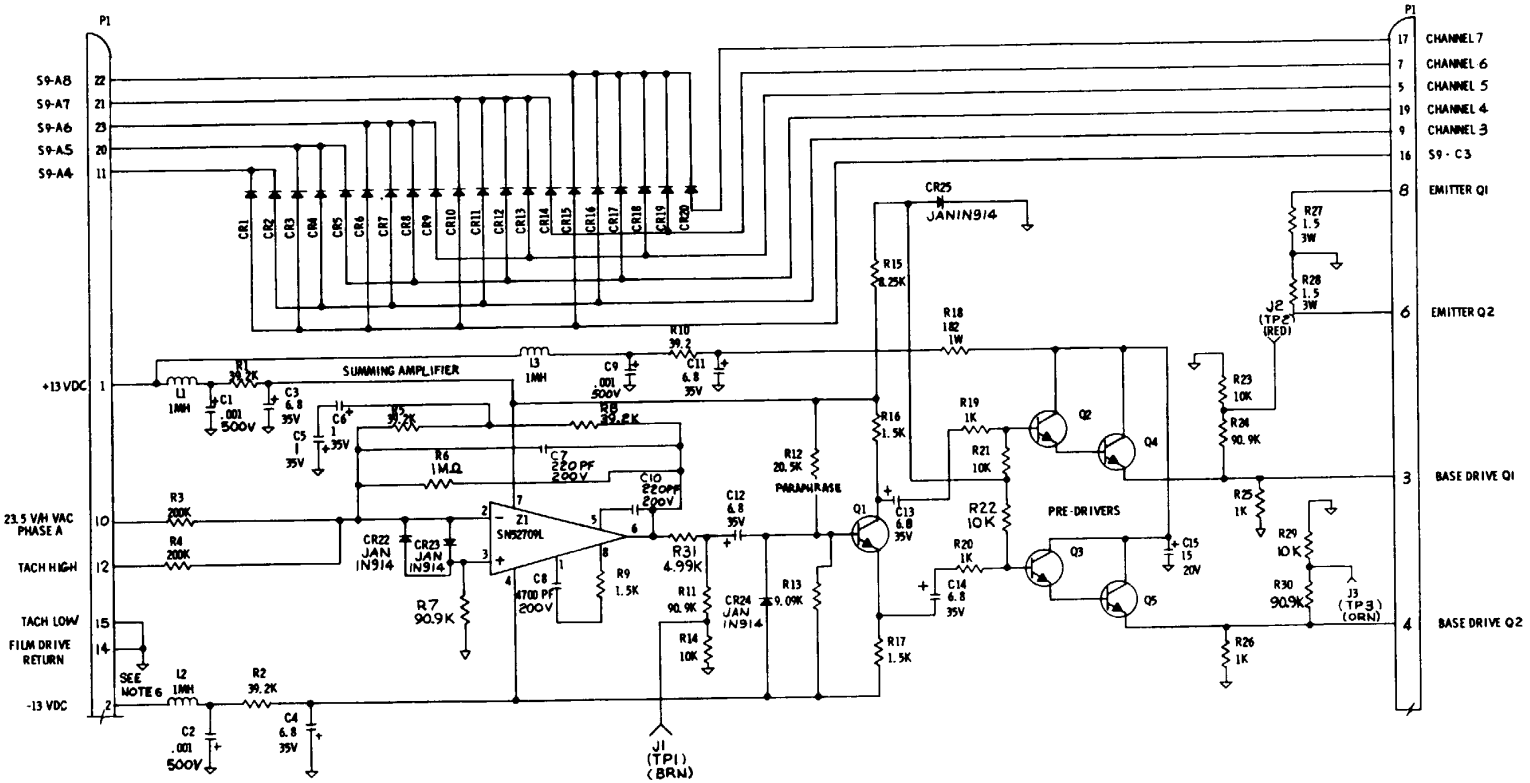
b. V/h Manual, Automatic and Control Excitation. The v/h generator receives a de control voltage from V/H SIGNAL potentiometer 1A1R3 in manual and a set 29.7 vdc in automatic and produces both automatic and manual v/h compensation voltages for use in the recorder. The v/h generator consists of integrated circuit operational amplifiers Z1 and Z2. Z1 produces



NOTE : UNLESS OTHERWISE SPECIFIED

1. DIODES ARE JANIN914
2. RESISTORS ARE 1/4 WATT.
3. CAPACITORS ARE 200 VDC.
4. RESISTANCE VALUES ARE IN OHMS.
5. INDUCTANCE VALUES ARE IN MICROHENRIES.
6. CAPACITANCE VALUES ARE IN MICROFARADS.
7. DESIGNATES DC RETURN
8. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A7

Figure 2-5. Sync generator 1A1A7, schematic diagram



NOTE : UNLESS OTHERWISE SPECIFIED

1. DIODES ARE JANIN914
2. TRANSISTOR ARE JAN2N2222A
3. RESISTORS ARE 1/4 WATT.
4. RESISTANCE VALUES ARE IN OHMS.
5. CAPACITANCE VALUES ARE IN MICROFARADS.
6. DESIGNATES DC RETURN
7. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A8

Figure 2-6. Film drive amplifier and bit logic circuit 1A1A8, schematic diagram.

manual v/h and Z2 produces automatic v/h. Both operational amplifiers receive the control voltage applied to input pin 21, but each amplifier has unique gain characteristics as determined by associated potentiometers and other circuit components. Potentiometer R10 adjusts the gain of Z1 to -33.7 with a + 1 vdc input and potentiometer R17 adjusts the gain of Z2 to 10 with a +1 vdc input. Emitter follower Q1 amplifies the Z2 output current. A + 6 vdc enters the v/h generator at P1-4, resistors 1A1A6R1 and R8 divide the voltage. This voltage is applied to P1-5 and connects to pin 3 of V/H SIGNAL potentiometer 1A1R3.

c. Hot Target Signal. The hot target generator produces 12-volt pulses of 0.8 to 1.0 ms duration at approximately 7 ms intervals to light the hot target lamp. Unijunction oscillator Q2 produces a 0.8 to 1.0 ms pulse about every 7 ms as capacitor C12 charges through resistor R23 and discharges through resistor R27, the emitter-base of Q3, and resistor R24. These pulses turn Q4 on and off. The Q4 output is applied to the recorder-film magazine test set hot target marker switch.

2-14. Rectifier Filter, 1A1A10

(fig. FO-5)

The rectifier filter 1A1A10 has two 400-Hz, 3-phase inputs of 48 and 24 vac. Four dc drive voltages are received from film drive amplifier and bit logic circuit 1A1A8. Outputs are 32 vdc, 58 vdc, 30 vdc and two film drives to the unit under test.

a. 32 Vdc, 58 Vdc, and 30 Vdc. The 28-vac, 400-Hz, 3-phase input at P1-1, 2, and 14 is applied to a conventional three-phase rectifier circuit. The 32-vdc output is at P1-13. The 58-vdc circuit is the same as above with a 48-vac, 400-Hz, 3-phase input at P1-3, 4, and 16 and an output at P1-21. The 30-vdc output is developed across a zener diode voltage divider network with a 58-vdc unregulated voltage as an input. Capacitor 1A1A10C13 filters the unregulated input and 1A1A10R1 drops the excess voltage to regulate 30 vdc at P1-22.

b. Film Drive No. 1 and No. 2 . The base and emitter drive applied to 1A1A10 Q1 and Q2 control the output developed at P1-5 and 7.

2-15. Video Oscillator and Film Fail Amplifier, 1AA11

(fig. FO-6)

Inputs to the video oscillator and film fail amplifier 1A1A11 are a switched +6 vdc, -13 vdc, and a dc return. The light sensor emitter and collector come from the unit under test. Outputs are fine source no. 1 and no. 2, coarse source, and video signal; all to the unit under test and counter to test point CTR.

a. Fine Source No. 1 and No. 2 and Coarse Source. An input of +6 vdc is applied through resistors R24, R25, and R26 to form these outputs.

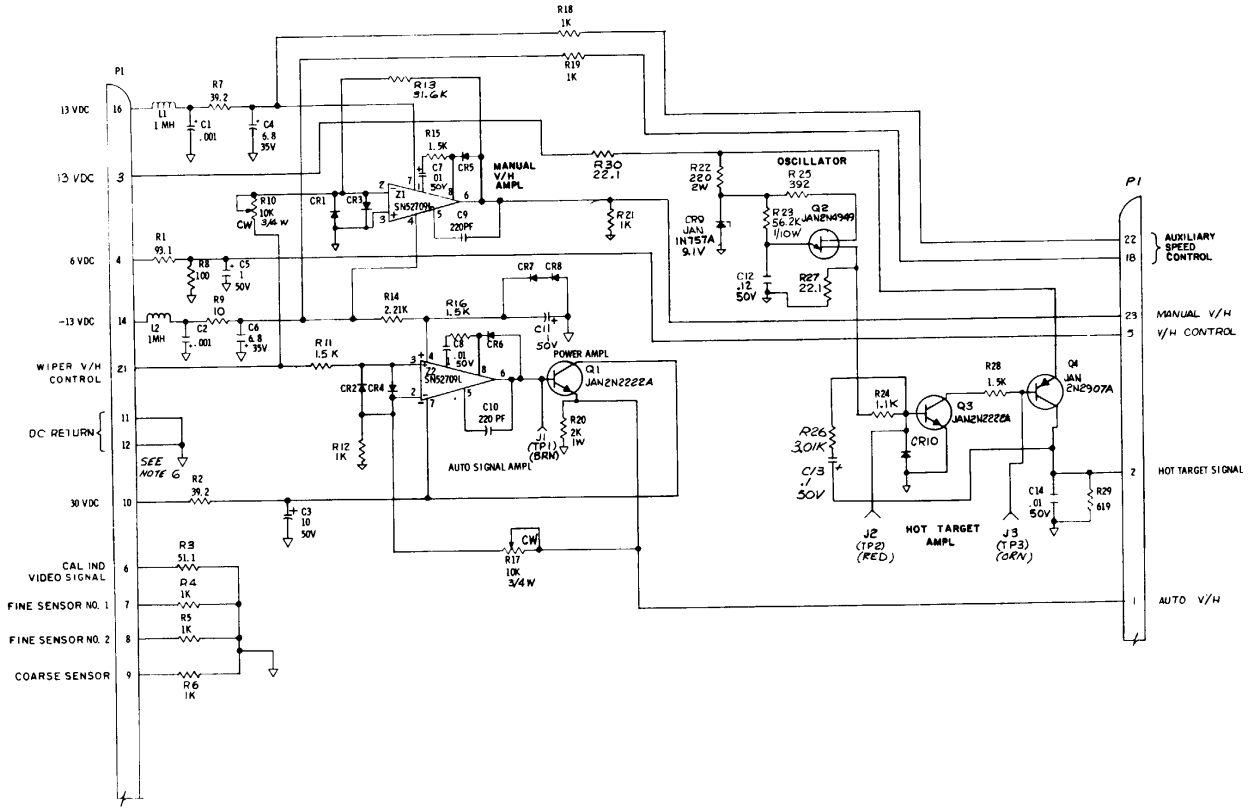
b. Counter. The light sensor inputs are interrupted signals caused by the film sprocket. The output pulses of 1A1A11Z1 are proportional to the film speed. The counter output is monitored at test point CTR.

c. Video Signal. Differential amplifier 1A1A11Z2 is employed as a regenerative feed amplifier. The noninverting input Z2-3 is grounded so any positive input is amplified. C17, C18 and L6 form the tank circuit to determine the frequency. A shifted frequency is obtained by the switched dc return input which operates 1A1A11K1 cutting C18 out of the circuit to change the tank frequency. Transistor Q2 is a buffer; Q3 and Q4 complementary power amplifiers; Q5 and Q6 degenerative feedback differentials for symmetry with R33, R35, R39 and C22 providing high frequency compensation, Q7 a buffer; and Q8 and Q9 complementary amplifiers to give the sine-wave video output at P1-3.

2-16. Filter Assembly, 1A1A12

(fig. 2-8)

The 115-vac, 400-Hz, 3-phase is applied through connector 1A1AJ2. All three ac phases and neutral are applied to filters 1A1A12F-1 through FL-4 with only minor attenuation. The filter network attenuates only those frequencies, which might be conducted out of the recorder test set to the power source. Resistors 1A1A12R1 through R4 provide a path to ground for discharging capacitors 1A1A12C2-1, 2, 3 and 4. Filters 1A1A12FL-1 through FL-4 are pi-networks in series swcith 1A1A12L2, L3 and 1A1A12C2. Each of the filter networks in the filter assembly 1A1A12 by-passes all conducted electro-magnetic interference (emi) to ground. Each series network attenuates all frequencies above 10 kHz generated in the recorder test set. The attenuation of conducted emi below a minimum acceptable standard is accomplished by the filter networks. Filters 1A1A12FL-5 and FL-6, coil 1A1A121, and capacitor 1A1A12C1 perform the same functions for the 28-vdc input applied through connector 1A1J1.



NOTE : UNLESS OTHERWISE SPECIFIED
1. DIODES ARE JANIN914
2. RESISTORS ARE 1/4 WATT.
3. CAPACITORS ARE 500 VDC
4. RESISTANCE VALUES ARE IN OHMS.
5. CAPACITANCE VALUES ARE IN MICROFARADS.
6. DESIGNATES DC RETURN
7. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A9

Figure 2-7. V/h generator and hot target marker 1A1A9, schematic diagram.

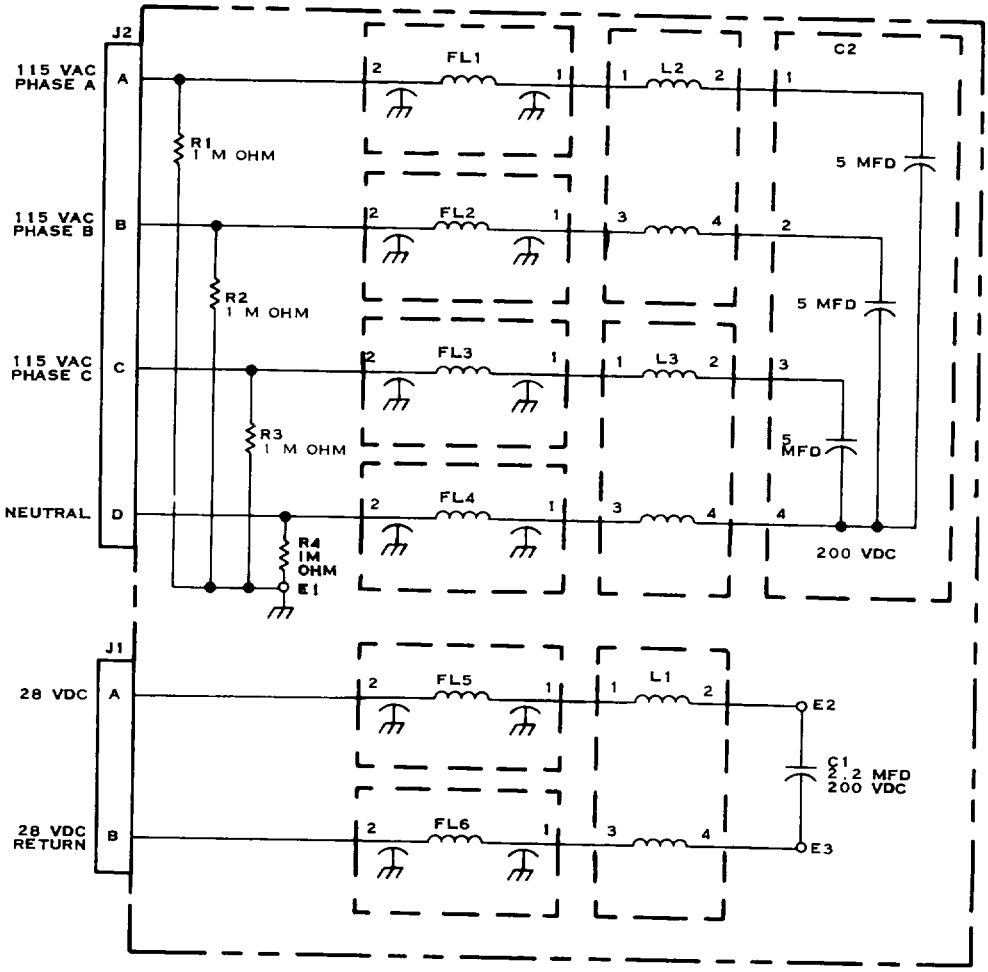


Figure 2-8. Filter assembly 1A1A12, schematic diagram

Section IV. INTEGRATED CIRCUITS

2-17. Decade Counter SN5490J

(fig. 2-9)

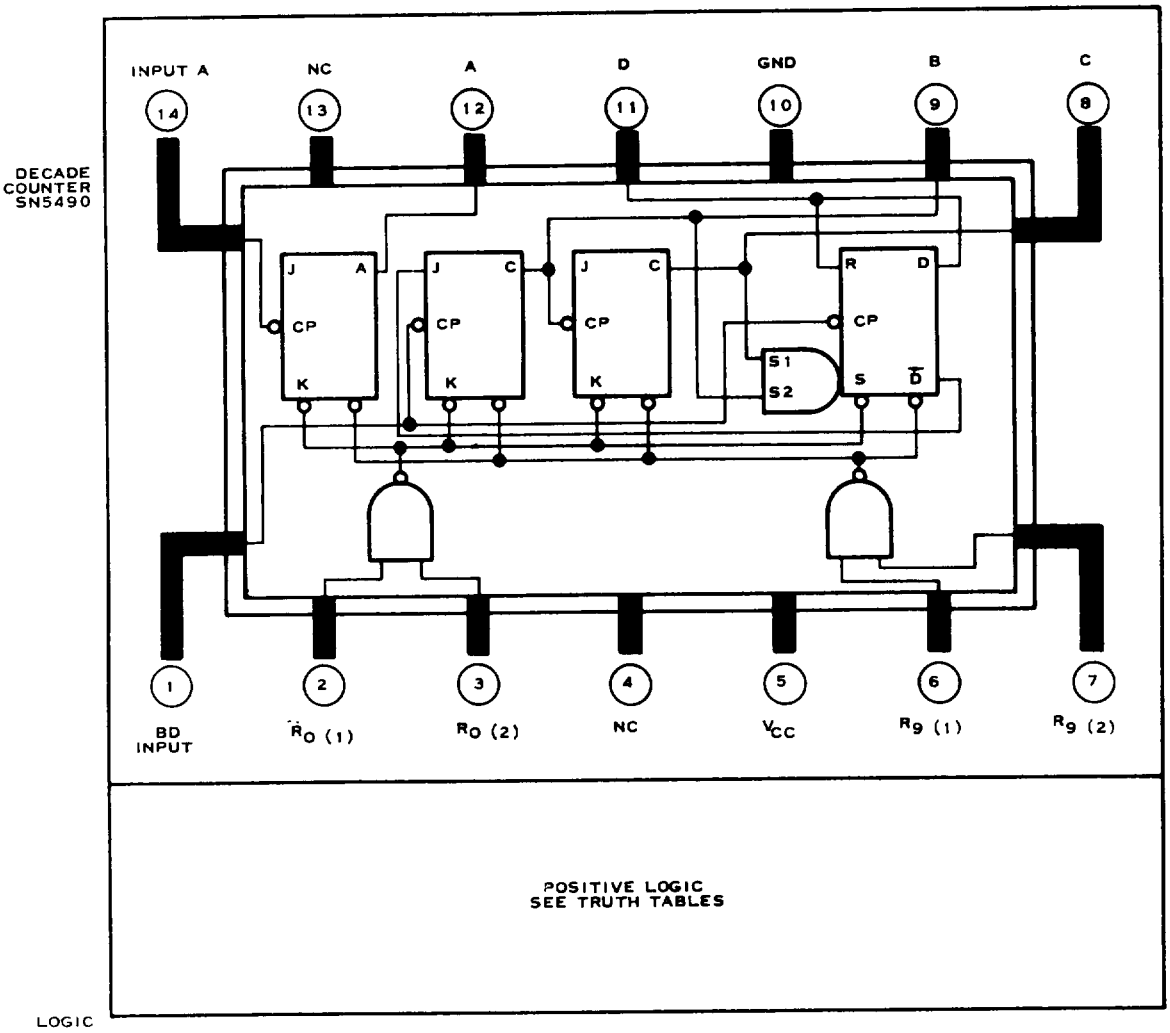
The SN5490J integrated circuit includes the basic gates, flip-flop elements and complex logic and storage elements needed to perform all functions of general-purpose digital systems. The SN5490J is a highspeed decade counter, consisting of four dual-bank, master-slave flipflops. When used as a binary coded decimal decade counter, the BD input is externally connected to the A output. The A input receives the incoming count, and a count sequence is obtained in accordance with the BCD count sequence truth table shown in figure 2-9. When a symmetrical divide-by-ten count is desired, requiring division of a binary count by ten, the D output is externally connected to the A input. The input count is then applied at the BD input and a divide-by-ten square wave is obtained at output A.

2-18. Operational Amplifier SN52709L

Operational amplifier SN52709L is identical to the integrated circuits used in Detecting Set, Infrared AN/AAS-24. Refer to TM 11-5850-24134/1 for a general description of this integrated circuit.

2-19. Operational Amplifier SN52710 and SN52710L

Operational amplifier SN52710 and SN52710L is identical to the integrated circuits used in Detecting Set, Infrared AN/AAS-24. Refer to TM



TRUTH TABLES

BCD COUNT SEQUENCE

COUNT	OUTPUT			
	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

RESET = COUNT (SEE NOTE 2)

RESET INPUTS				OUTPUT			
R_{O} (1)	R_{O} (2)	R_{9} (1)	R_{9} (2)	D	C	B	A
1	1	0	X	0	0	0	0
1	1	X	0	0	0	0	0
X	X	1	1	1	0	0	1
X	0	X	0	COUNT			
0	X	0	X	COUNT			
0	X	X	0	COUNT			
X	0	0	X	COUNT			

NOTES: UNLESS OTHERWISE SPECIFIED

1. OUTPUT A CONNECTED TO INPUT BD FOR BDC COUNT.
2. X INDICATES THAT EITHER A LOGICAL 1 OR 0 MAY BE PRESENT.

EL6625-1825-40-TM-13

Figure 2-9. Decade Counter SN5490J, schematic diagram and truth tables.

11-5850-241-34/1 for a general description of this integrated circuit.

2-20. Positive Nand Gate SN5400

Positive nand gate SN5400 is identical to the integrated circuits used in Detecting Set, Infrared AN/AAS-24. Refer to TM 11-5850-241-34/1 for a general description of this integrated circuit.

2-21. Dual J-K Master-Slave Flip-Flop SN5473J

Dual J-K master-slave flip-flop SN5473J is identical to the integrated circuits used in Detecting Set, Infrared AN/AAS-24. Refer to TM 115850-241-34/1 for a general description of this integrated circuit.

CHAPTER 3

GENERAL SUPPORT MAINTENANCE

Section I. GENERAL

3-1. Level of Maintenance

This chapter provides general support maintenance procedures for the recorder test set. Included in this chapter are sections covering: troubleshooting; removal and replacement; adjustment and alignment; repair; and general support testing.

3-2. Maintenance Forms and Records

Maintenance forms, records and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 37560.

3-3. Tools and Test Equipment

Tools and test equipment required for maintenance of the recorder test set, other than those listed in TM 11-6625-1827-12, are as follows:

a. Tools. Tool Kit, Electronic Equipment TK-105/G.

b. Test Equipment. Test equipment is listed in table 3-1.

Table 3-1. Test Equipment

Nomenclature	*Common names*
Oscilloscope AN/USM-281A	Oscilloscope
Digital Voltmeter (Non-Linear Systems Model X-2)	Dvm
Multimeter TS-352B/U	Multimeter
Tool Kit, Electronic Equipment TK-105/G	Tool Kit, TK-105/G

c. Digital Voltmeter Preparation for Use. To prepare the digital voltmeter (dvm) for use, connect the power plug to a 115-vac power source (fig. 3-4). Connect the red lead to the HI connector on the dvm panel and the black lead to the LO connector on the dvm panel. Set the power switch to ON. Set the range scale to AUTO.

d. Oscilloscope Preparation for Use. To prepare the oscilloscope for use, connect the power lead to 115-vac power source (fig. 3-4). Connect the oscilloscope test probe to INPUT CH 1 and make a connection between ground on the oscilloscope and GND on the recorder test set. Set the POWER ON switch to the ON position. Position remaining controls as indicated in chart 3-1.

Chart 3-1. Oscilloscope AN/USM-281A Control Settings

FIND BEAM	Released.
INTENSITY	As required.
ASTIGMATISM	Use in conjunction with FOCUS to adjust for round beam.
FOCUS	Adjust beam for aharpest trace
TRACE ALIGN	Adjusts vertical centering.
SCALE	Adjust for scale illumination.
POWER (indicator)	Signifies POWER switch closed.
POWER (switch)	ON (applies ac power to oscilloscope).
HORIZONTAL POSITION	Adjusts horizontal position of display.
DISPLAY	INT.
AC DC	DC.
A POSITION	As require.
POLARITY	+UP U
DISPLAY	A.
VOLTS/DIV U	
MAGNIFIER	X1.
CH 1 AC AND DC INPUT	DC.
MAIN VERNIER	CAL
RESET	Released.
TRIGGER LEVEL	0.
EXT ÷ 10, EXT, INT, LINE	INT.
-SLOPE+	+.
ACS, ACF, AC, DC	DC.
TIME/CM	
SWEEP MODE	AUTO.
DELAY (DIV)	0.
VERNIER	CAL.
TRIGGER LEVEL	0.
INT, AUTO, EXT, EXT ÷ 10	AUTO.
-SLOPE+	+.
ACS, ACF, AC, DC	DC.

Section II. TROUBLESHOOTING

3-4. General Troubleshooting Instructions

Troubleshooting at the general support maintenance level of the recorder test set includes all the techniques outlined for organizational maintenance, and any special or additional techniques required to isolate a defective part. The maintenance procedures are not complete in themselves, but supplement those described in TM 11-66251827-12. The systematic troubleshooting procedure, which begins with the operational and sectionalization checks that are performed at an organizational level, must be completed by means of localizing and isolating techniques. The paragraphs that follow provide procedures for sectionalizing troubles to a particular functional unit of the test set, and then to localize the trouble to a component of the functional unit unless the functional unit is replaced and later repaired at a higher level maintenance facility. Waveforms are provided in figure 3-1. Parts location information is provided in figure 3-2. Wiring diagram information and cable diagrams are provided in figures FO-7 and FO-8. Color codes for resistors, inductors, and capacitors is provided in figure FO-1. The wire color code shown on wiring diagrams is the same numerical code explained in figure FO-1.

3-5. Organization of Troubleshooting

a. General. The first step in troubleshooting the recorder test set is to sectionalize the fault (tracing the fault to a major functional unit). The second step is to localize the fault (tracing the fault to a defective part within that unit) Some faults, such as burned-out resistors, arcing, and shorted transformers can often be located by sight, smell, and hearing. The majority of faults, however, must be isolated by checking voltages and resistances, or by checking the equipment against the general support test procedure contained in section VI of this chapter.

b. Sectionalization. For ease of troubleshooting, the equipment may be thought of as consisting of functional entities, each related electrically but categorized separately by the function performed. The first step in troubleshooting is to locate the function, or functions, at fault by the following methods:

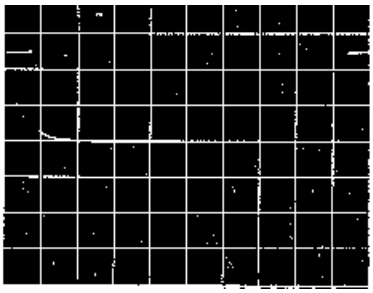
(1) *Visual inspection*. The purpose of the visual inspection is to locate faults without testing or measuring the -circuits. All visual signs should be observed and an attempt made to sectionalize the fault to a particular function.

(2) *Operational test.* Operational test frequently indicate the general location of trouble.
In many instances the tests will help in determining the exact nature of the fault. The organizational quarterly preventive maintenance checks and service chart (TM 11-6625-1827-12) contains an operational test.

c. Localization. The tests listed in the following paragraphs will aid in localizing the trouble. First, localize the trouble to a single function, and then isolate the trouble within that circuit by waveform, voltage, resistance, and continuity measurements.

(1) Troubleshooting chart. When used with the associated general support test procedure, voltage, resistance, and continuity tables and the waveform diagram, the troubleshooting information in chart 3-2 will aid the technician in localizing troubles to a component part. Defective components identified by performing corrective action are replaced with a known reliable component unless repair or other disposition is noted The corrective action column references data tables, if required, for checking components; otherwise, refer to schematics and wiring diagrams when performing checks. The parenthetical reference in the Malfunction column is intended to be used only when performing the general support test procedure. The referenced data items and test procedure steps will allow malfunction symptoms discovered during performance of the test procedure to be easily referenced in the troubleshooting chart.

(2) Waveform measurements (fig. 3-1). Oscilloscope AN/USM-281A is used for observing waveforms at appropriate test points. The waveform chart on figure 3-1 illustrates the waveforms obtained at various points on the chassis.

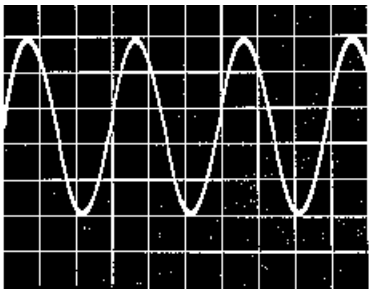


A

FINE SYNC SIGNAL

1A 1A7-5
OSCILLOSCOPE:

SWEEP - 5 US/CM
SENSITIVITY - 1V/CM
AMPLITUDE - 3.4±1.0V
PERIOD -27.8 ±0.5 US

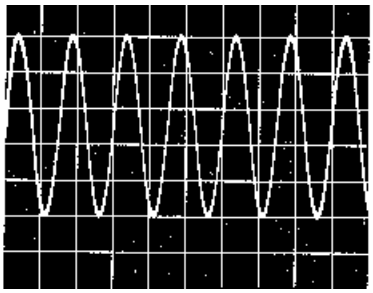


B

COARSE SYNC SIGNAL

1A1A7-1
OSCILLOSCOPE:

SWEEP -1 MS/CM
SENSITIVITY - 1V/CM
AMPLITUDE - 3.4±1.0V
PERIOD - 5.0 ±0.2 MS

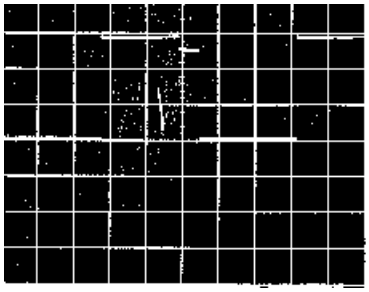


C

FILM FAIL DRIVE

1A1A7-8
OSCILLOSCOPE:

SWEEP -10 MS/CM
SENSITIVITY - 1V/CM
AMPLITUDE - 3.4±1.0V
PERIOD -50 ±2 MS

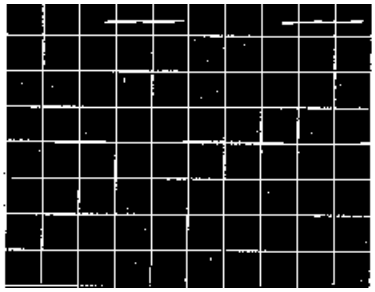


D

HOT TARGET SIGNAL

1A1A9-2
OSCILLOSCOPE:

SWEEP - 1 MS/CM
SENSITIVITY - 5V/CM
AMPLITUDE - 10.5±2.0V
PERIOD - 9.4 ±1.0 MS

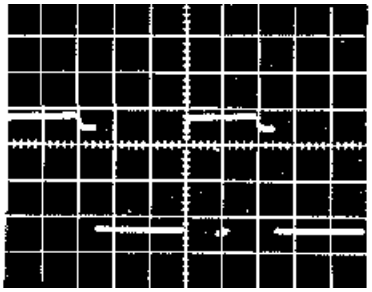


E

VIDEO SIGNAL (LED: LOW)

1A1A11-3
OSCILLOSCOPE:

SWEEP -1 US/CM
SENSITIVITY - 0.2V/CM
AMPLITUDE - 1.0 ±0.3V
PERIOD - 3.0 ±0.1 US



F

VIDEO SIGNAL (LED: HIGH)

1A1A11-3
OSCILLOSCOPE:

SWEEP -1 US/CM
SENSITIVITY - 0.2V/CM
AMPLITUDE - 1.0.±0.3V
PERIOD -1.5 ±0.1 US

Figure 3-1. Waveforms.

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Chart 3-2. Troubleshooting Procedure

Malfunction	***Probable cause***	***Corrective action***
1. STBY lamp 1A1DS2 does not light when power mode switch 1A1S12 is set to STBY.	*a.* Defective lamp.	*a*. Remove lamp and check continuity.
	b. Defective relay 1A1K4.	*b*. Check relay 1A1K4 (table 3-4, item 1).
	c. Defective switch 1A1S12.	*c*. Check switch 1A1S12 (table 3-4, item 2).
	d. Defective relay 1A1K1.	*d*. Check relay 1A1K1 (table 3-3, item 1).
	e. Defective diode 1A1CR1.	*e*. Check diode 1A1CR1 (table 3-3, items 2 and 3).
	f. Defective circuit breaker 1A1CB1	*f.* Check circuit breaker 1A1CR1 (table 3-4, item 3).
	g. Defective filter assembly 1A1A11.	*g*. Check filter assembly 1A1A11 (table 3-4, item 5 through 16).
	h. Defective cable assembly W1.	*h*. Check cable assembly W1, figure FO-7.
	i. Broken wiring.	*i.* Check wiring.
2. OPR lamp 1A1DS3 does not light when power mode switch 1A1S12 is set to OPR.	*a*. Defective lamp.	*a*. Remove lamp from 1A1DS3 and check for continuity.
	b. Defective relay coil 1A1K4.	*b*. Check relay coil 1A1K4 (table 3-3, item 4).
	c. Defective switch 1A1S12.	*c*. Check switch 1A1S12 (table 3-4, item 17).
	d. Refer to steps 1*c* through 1*i.*	*d*. Refer to steps 1c through 1*i.*
3. FAIL lamp 1A1DS1 does not light when either regulator board is removed or an over or under voltage condition exists in the test set.	*a*. Defective lamp.	*a*. Remove lamp from 1A1DS1 and check for continuity.
	b. Defective power control 1A1A6.	*b*. Replace power control board 1A1A6.
	c. Broken wiring.	*c*. Check wiring.
4. FAIL lamp 1A1DS1 does not light when loss of either phase A, B, C or neutral occurs.	*a*. Defective phase sensing relay 1A1K5.	*a*. Check phase sensing relay 1A1K5. Disconnect wire connecting 1A1K5-A1 to 1A1TB1-5. Check for continuity between 1A1K5-A2 and 1A1K5-A1. If continuity is present with test set power removed.

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	*Probable cause*	*Corrective action*
4-Continued		*a*. Continued relay 1A1K5 is defective. Replace 1A1K5 and associated wiring when checking is completed.
	b. Defective power control 1A1A6.	*b*. Replace power control board 1A1A6.
5. Circuit breaker 1A1CB1 trips and removes power from the test set when the power mode switch is set to STBY.	*a*. Defective relay 1A1K1.	*a*. Check relay 1A1K1 (table 3-3, item 1).
	b. Shorted STBY circuit.	*b*. Remove 1A1A6 from 1A1XA6. Check the 28-vdc STBY circuit for a short circuit (table 3-4, item 22).
	c. Defective or shorted 58-vdc circuit.	*c*. Check the 58-vdc circuit (table 3-4, items 19 through 21).
6. Circuit breaker 1A1CB1 trips and removes power from the test set when the power mode switch is set to OPR.	*a*. Defective switch 1A1S12 or wiring.	*a*. Remove indicator lamp from 1A1DS2. Check switch 1A1S12 and associated wiring (table 3-4, item 23). Replace the indicator lamp in 1A1DS2 when the circuit check is completed.
	b. Defective relay 1A1K4.	*b*. Check relay 1A1K4 (table 3-3, item 4).
7. Circuit breaker 1A1CB2 trips when the power mode switch 1A1S12 is set to OFF.	*a*. Defective phase sending relay 1A1K5.	*a*. Disconnect the wires connected to 1A1K5-ϕA, ϕB and ϕC. CAUTION Insulate the bare wires disconnected from relay 1A1K5 before applying power. Reset circuit breaker 1A1CB2. If 1A1CB2 does not trip, phase sensing relay 1A1K5 is defective.
	b. Shorted wiring.	*b*. Check wiring for shorts.
8. Circuit breaker 1A1CB2 trips when the power mode switch 1A1112 is set to STBY. FAIL and STBY lamps light.	*a*. Defective transformer, 1A1T1 through T6, heatsink assemblies 1A1A1, A2, A3 or printed circuit boards 1A1A4 through 1A1A11.	*a*. Remove regulator boards 1A1A4 and 1A1A5 and disconnect 1A1A10P1 from 1A1J13. Reset circuit breaker 1A1CB2. If 1A1CB2 trips heatsink assemblies 1A1A1, A2, A3 and printed circuit boards, 1A1A4 through 1A1A11 are not defective.
	(1) Defective transformers 1A1T1, T2, T3, T4 or T5.	(1) Check transformers 1A1T1, T2, T3, T4 and T5 (table 3-3, items 5 through 30).
	(2) Defective ELAPSED TIME meter 1A1M1.	(2) Check ELAPSED TIME meter 1A1M1 (table 3-3, item 33).
	(3) Defective wiring between 1A1CB2 and transformer primaries.	(3) Check wiring for short circuit.
	b. Defective -+13 vdc regulator 1A11A4 or heatsink assemblies 1A1A1 or 1A1A2.	*b*. Remove +13-vdc regulator board 1A1A4 from 1A1XA4 and reset circuit breaker 1A1CB2. If 1A1CB2 does not trip, the +13-vdc or -13-vdc power supply is defective. Replace the regulator board 11AA4 in 1A1XA4.
	(1) Defective +13-vdc regulator 1A1A4.	(1) Disconnect 1A1P1 from 1A1A1J1 and 1A1P2 from 1A1A2J1. Reset circuit breaker 1A1CB2. If 1A1CB2 trips, regulator board 1A1A4 is defective.
	(2) Defective heatsink assembly 1AA11.	(2) Connect 1A1P1 to 1A1A1J1; part of the +13-vdc power supply. Reset circuit breaker

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	***Probable cause***	***Corrective action***
8-Continued		*b.* Continued 1A1CB2. If 1A1CB2 trips, heatsink assembly 1A1A1 or associated printed circuit boards are defective.
	(3) Defective printed circuit boards 1A1A5, A6, A7 , A8, A9, or A11.	(3). Remove printed circuit boards 1AA5, A6 , A7, AB, A9, and All. Reset circuit breaker 1A1CB2. If 1A1CB2 trips, heatsink assembly 1A1A1 or associated circuits are defective.
	(4) Defective +13-vdc circuits shorted to ground (El).	(4) Remove 1A1P1 from 1A1J1. Check the +13-vdc circuit (table 3-4, items 24 through 26).
	(5) Defective heatsink assembly 1A1A1 part of the +13-vdc power supply.	(5) Replace heatsink assembly 1A1A1.
	(6) Defective printed circuit board (or boards) 1A1A5, A6, A7, A8, A9, or A11.	(6) Check each printed circuit board internal shorts before replacing in the control unit 1A1.
	(7) Defective -13-vdc circuits.	(7) Check the -13-vdc circuits (table 3-4, items 27 through 31).
	(8) Defective heatsink assembly 1A1A2.	(8) Connect 1A1A2P2 to 1A1A2J1 and reset circuit breaker 1A1CB2. If 1A1CB2 trips, heatsink assembly 1A1A2 is defective. Replace all printed circuit boards in control unit 1A1. Connect 1A1P1 to 1A1J1
	c. Defective +6-vdc regulator or heatsink assembly 1A1A3.	*c.* Disconnect 1AP3 from 1A1A3J1 and reset circuit breaker 1A1CB2. If 1A1CB2 trips, +6-vdc regulator 1A1A5 is defective.
	(1) Defective +6-vdc regulator 1A1A5.	(1) Remove regulator 1AA5 and reset circuit breaker 1A1CB2. If 1ACB2 trips, 1A1A5 is not defective.
	(2) Defective heatsink assembly 1A1A3 or associated printed circuit board 1A1A6, A7, A9, A10 and All.	(2) Connect 1A1P3 to 1A1A3J1. Remove printed circuit boards 1A1A6, A7, A9, A10, All. If 1A1CB2 trips, heat-sink assembly or associated circuits are defective.
	(3) Defective +6-vdc power supply circuits.	(3) Remove 1A1P3 from 1A1A3J1. Check the +6-vdc power supply circuits (table 3-4, items 32 through 34).
	(4) Defective heatsink assembly 1A1A3; part of the 6-vdc power supply.	(4) Replace defective heatsink assembly 1A1A3; part of the +6-vdc power supply.
	d. Defective 28-vdc rectified power supply part of +6-vdc regulator 1A1A5.	*d.* Remove + 6-vdc regulator board, 1A1A5. Reset circuit breaker 1A1CB2. If 1A1CB2 does not trip, the +6-vdc regulator or associated circuits is defective.
	(1) Defective 28-vdc rectified circuits.	(1) Check 28-vdc rectified circuits (table 3-4, items 35 and 36).
	(2) Defective +6-vdc regulator board.	(2) Replace defective +6-vdc regulator 1A1A5.
	e. Defective rectifier filter assembly 1A1A10.	*e.* Remove 1A1P4 from 1A1A10J13. Reset circuit breaker 1A1CB2. If 1A1CB2 does not trip, 1A1A10 is defective.

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	***Probable cause***	***Corrective action***
8-Continued		*e.* Continued
	(1) Defective +58-vdc power supply part of 1A1A10.	(1) Check +58-vdc circuits (tables 3-4, item 36).
	(2) Defective +30-vdc circuit part of 1A1A10.	(2) Check +30-vdc circuit (table 3-4, item 37).
	(3) Defective 32-vdc power supply part of 1A1A10.	(3) Check the 32-vdc power supply part of 1A1A10 (table 3-4, item 38).
9. STBY and FAIL lamps light when the power mode switch 1A1S12 is setting in the OPR position.	*a.* Over-voltage or under-voltage condition is present at power control 1A1A6-4, 8, 14, or 6.	*a.* Check 1A1A6-4, 8, 14 and 6 to determine which power supply is defective (table 3-2, items 21 through 24). If all power supplies check within operating tolerances, proceed to step 10.
	b. Defective +6-vdc power supply.	*b.* Check heatsink assembly 1A1A3; part of the +6-vdc power supply (table 3-2, item 25).
	(1) Defective heatsink assembly 1A1A3.	(1) Replace heatsink assembly 1A1A3.
	(2) +6-vdc power supply out of adjustment.	(2) Refer to adjustment procedures paragraph 3-9.
	(3) Defective +6-vdc regulator 1A1A5. 1A1A5	(3) Check +6-vdc regulator (table 3-2, item 26).
	(4) Ac voltage not present at 1A1T4 secondary.	(4) Check transformer voltages 1A1T4 (table 3-2, items 27 through 29).
	(5) Defective transformer 1A1T4.	(5) Check transformer 1A1T4 (table 3-3, items 34 through 36).
	(6) Defective wiring between 1A1A5 and 1A1A3.	(6) Check wiring.
	c. Defective +.13-vdc power supply.	c. Check heatsink assembly 1A1A1; part of +13-vdc power supply (table 3-2, item 35).
	(1) Defective heatsink assembly 1A1A1.	(1) Replace heatsink assembly 1A1A1.
	(2) +13-vdc power supply out of adjustment.	(2) Refer to adjustment procedure, paragraph 3-9.
	(3) Defective +13-vdc regulator 1A1A4.	(3) Check +13-vdc regulator 1A1A4 (table 3-2, item 33).
	(4) Ac voltage not present at 1A1T4 secondary.	(4) Check transformer 1A1T4 voltages (table 3-2, items 11 through 13).
	(5) Defective transformer 1A1T4.	(5) Check transformer 1A1T4 (table 3-3, items 22 through 24).
	(6) Defective wiring between 1A1A4 and 1A1A1.	(6) Check wiring.
	d. Defective -13-vdc power supply.	*d.* Check heatsink assembly 1A1A2, part of the -13-vdc power supply (table 3-2, item 36).
	(1) 13-vdc power supply out of adjustment.	(1) Refer to adjustment procedures, paragraph 3-9.
	(2) Defective -13-vdc regulator 1A1A4.	2) Check -13-vdc regulator 1A1A4 (table 3-2, item 34).
	(3) Defective heatsink assembly 1A1A1.	(3) Replace heatsink assembly 1A1A2.
	(4) Ac voltage not present at 1A1T4 secondary.	(4) Check transformer 1A1T4 voltage (table 3-2, items 14 through 16).
	(5) Defective transformer 1A1T4.	(5) Check transformer 1A1T4 (table 3-3, items 19 through 21).
	(6) Defective wiring between 1A1A4 and 1A1A2.	(6 Check wiring.

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	*Probable cause*	*Corrective action*
9-Continued	*e*. Defective +58-vdc power supply.	*e.* Check rectifier filter assembly 1A1A10 (table 3-2, item 30).
	(1) Ac voltage not present at transformer 1A1T3 secondary.	(1) Check transformer 1A1T3 voltage (table 3-2, items 5 through 7).
	(2) Defective transformer 1A1T3.	(2) Check transformer 1A1T3 (table 3-3, items 13 through 15).
10. Incorrect dc voltage at J9-L when the power mode switch S12 is set to OPR (table 3-2, item 37).	*a.* Defective relay 1A1K3.	*a.* Check relay 1A1K3 (table 3-3, item 40).
	b. Broken wiring.	*b.* Check wiring.
	c. ± 13-vdc regulator 1A1A4 out of adjustment.	*c.* Refer to adjustment procedure (para 3-9).
11. Incorrect dc voltage at J9-T when the power mode switch S9 is set to OPR and a VIDEO MODE switch S10 is in the NORMAL position (table 3-2, item 38).	*a.* Defective relay 1A1K3.	*a.* Check relay 1A1K3 (table 3-3, item 40).
	b. Defective switch 1A1S10.	*b.* Check switch 1A1S10 (table 3-4, item 42).
	c. ±13-vdc regulator 1A1A4 out of adjustment.	*c.* Refer to adjustment procedure (para 3-9).
	d Broken wiring.	*d.* Check wiring.
12. Incorrect dc voltage at J4-G, F and J8-H when the power mode switch S12 is set to OPR (table 3-2, items 39 through 41).	*a*. Defective relay 1A1K3.	*a.* Check relay 1A1K3 (table 3-3, item 40).
	b. ±13-vdc regulator 1A1A4 out of adjustment.	*b.* Refer to adjustment procedures (para 3-9).
	c. Broken wiring.	*c.* Check wiring.
13. Incorrect dc voltage at J7-A when the power mode switch S12 is set to OPR (table 3-2, item 4).	*a*. Defective switch 1A1S8. item 45).	*a.* Check switch 1A1S8 (table 3-4,
	b. Broken wiring.	*b.* Check wiring.
	c. ±13-vdc regulator out of adjustment. (para 3-9).	*c.* Refer to adjustments procedure
14. Incorrect dc voltage at J7-D when the power mode switch S8 is set to OPR (table 3-2, item 43).	*a*. Defective switch 1A1S8.	*a.* Check switch 1A1S8 (table 3-4, item 46).
	b. Broken wiring.	*b.* Check wiring.
	c. ±13-vdc regulator out of adjustment. (para 3-9).	*c*. Refer to adjustment procedures
15. Incorrect dc voltage at J8-J when the power mode switch S12 is set to OPR (table 3-2, item 44).	*a*. Defective relay 1A1K3.	*a*. Check relay 1A1K3 (table 3-3, item 40).
	b. ±13-vdc regulator 1A1A4 out of adjustment.	*b*. Refer to adjustments procedure (para 3-9).
	c. Broken wiring.	*c*. Check wiring.
16. Incorrect dc voltage at J9-N when the power mode switch S12 is set to OPR (table 3-2, item 46).	*a.* Defective relay 1A1K3.	*a*. Check relay 1A1K3 (table 3-3, item 40).
	b. +13-vdc regulator 1A1A4 out of adjustment.	*b*. Refer to adjustments procedure (para 3-9).
	c. Broken wiring.	*c*. Check wiring.
17. Incorrect de voltage at J7-B when the power mode switch S12 is set to OPR and VIDEO TEST switch S8 is set to BIT (table 3-2, item 46).	*a*. ± 13-vdc regulator 1A1A4 out of adjustment.	*a.* Refer to adjustments procedures (para 3-9).
	b. Defective switch 1A1S8.	*b*. Check switch 1A1S8 (table 3-4, item 47).
	c. Broken wiring.	*c*. Check wiring.
18. Incorrect dc voltage at J7-E when the control unit switches are set as follows: Power mode switch S12: OPR. VIDEO TEST switch S8: VID (table 3-2, item 47).	*a*. ±13-vdc regulator 1A1A4 out of adjustment.	*a*. Refer to adjustment procedures (para 3-9).
	b. Defective switch 1A1S8.	*b*. Check switch 1A1S8 (table 3-4, item 48).
	c. Broken wiring.	*c*. Check wiring.

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	Probable cause	Corrective action
19. Incorrect dc voltage at J8-K when the power mode switch S12 is set to OPR (table 3-2, item 48).	*a.* Defective relay 1A1K3.	*a.* Check relay 1A1K3 (table 3-3, item 40).
	b. +6-vdc regulator out of adjustment.	*b.* Refer to adjustment procedures (para 3-9).
	c. Broken wiring.	*c.* Check wiring.
20. Incorrect dc voltage at J8-Y or Z when the control unit 1A1 switches on set as follows: Power mode switch S12: OPR. RCDR DR switch S4: ON (table 3-2, item 49).	*a.* Defective switch 1A1S4.	*a.* Check switch 1A1S4 (table 3-4, items 49 and 50).
	b. Defective circuit breaker 1A1CB1.	*b.* Check circuit breaker 1A1CB1 (table 3-4, item 51).
	c. Defective relay 1A1K3.	*c.* Check relay 1A1K3 (table 3-3, item 40).
	d. Defective choke coil 1A1L1.	*d.* Check choke coil 1A1L1 for continuity.
	e. Broken wiring.	*e.* Check wiring.
21. Incorrect dc voltage at J8-GG and J8-P when the power mode switch S12 is set to OPR (table 3-2, items 61 and 52). defective.	*a.* Defective 32-vdc power supply. port of heatsink assembly 1A1A10.	*a.* Check transformer 1A1T5 secondary voltage (table 3-2, item 17 through 19). If transformer secondary voltage is present then the 32-vdc power supply is
	b. Broken wiring.	*b.* Check wiring.
22. Incorrect de voltage at J-M or J10-F when the power mode switch S12 is set to OPR (table 3-2, items 53 and 54).	*a.* Defective relay 1A1K4	*a.* Check relay 1A1K4 (table 3-3, item 41).
	b. Defective relay ,1A1K1.	*b.* Check relay 1A1K1 (table 3-3, item 1).
		c. Check wiring.
23. Incorrect de voltage at J10-Z or C when power mode switch S12 is set to OPR (table 3-2, items 55 and 56).	*a.* Broken wiring.	*a.* Check wiring.
	b. Defective power control 1A1A6.	*b.* Check power control 1A1A6 (table 3-2, items 70 and 71).
24. Incorrect de voltage at J-X or J10-V when the power mode switch S12 is set to OPR (table 3-2, items 57 and 58).	*a.* Defective relay 1A1K2.	*a.* Check relay 1A1K2 (table 3-3, item 39).
	b. Broken wiring.	*b.* Check wiring.
	c. Defective +28-vdc rectified power supply part of 1A1A5.	*c.* Check transformer 1A1T2 secondary voltage (table 3-2, item 3). If the transformer secondary voltage is present 1A1AS is defective.
	d. Defective transformer 1A1T2	*d.* Check transformer 1A1T2 (table 3-3, items 7 through 9).
25. Incorrect ac voltage at J8-DD, V, or J10-A, B, and C when the power mode switch S12 is set to OPR (table 3-2, items 59 through 61).	*a.* Defective relay 1A1K2	*a.* Check relay 1A1K2 (table 3-3, item 39).
	b. Broken wiring.	*b.* Check wiring.
26. Incorrect ac voltage at J8-z when the power mode switch S12 is set to OPR (table 3-2, item 65).	*a.* Defective relay 1A1K4.	*a.* Check relay 1A1K2 (table 3-3, item 39).
	b. Broken wiring.	*b.* Check wiring.
	c. Defective transformer 1A1T1.	*a.* Check transformer 1A1T1 (table 3-2 item 2).
27. Incorrect ac voltage at test point DVM when control unit 1A1 switches are set as follows: Power mode switch S12: OPR; DVM-CTR SELECT switch S15: A; FILM SPD ADJ potentiometer RI:	*a.* Broken wiring.	*a.* Check wiring.
	b. Defective FILM SPD ADJ control 1A1R1.	*b.* Check potentiometer 1A1R1 (table 3-3, item 93).
	c. Check transformer 1A1T1.	*c.* Check transformer 1A1T1 (table 3-2, item 2).

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	*Probable cause*	*Corrective action*
27-Continued turned fully clockwise (table 3-2, item 66).		
28. Incorrect ac voltage at J11-Y when the control unit switches are set as follows: Power mode switch 512: OPR; TACH HIGH potenteiometer R4: Fully cw (table 3-2, item 68).	*a*. Broken wiring. *b*. Defective TACH SIGNAL control 1A1R4. *c*. Defective transformer 1A1T6.	*a*. Check wiring. *b*. Check potentiometer 1A1R4 (table 3-3, item 96). *c*. Check transformer 1A1T6 (table 3-2, item 20).
29. Incorrect ac voltage at J8-BB when the power mode switch is set to OPR (table 3-2, item 69).	*a*. Broken wiring. *b*. Defective relay 1A1K4.	*a*. Check wiring. *b*. Check relay 1A1K4 (table 3-3, item 41).
30. Incorrect resistance at J3-A, B, 'C, D, E, F and G when the control unit switches are set as follows: Power mode switch S12: OFF; CHANNEL switch S9: to positions 4 through 8 (table 3-3, items 42 through 91).	*a*. Defective channel lines. *b*. Defective bit circuit diodes part of 1A1A8 bit logic circuits.	*a*. Check channel lines 1 through 8 (table 3-4, items 52 through 58). *b*. Replace 1A1A8.
31. Incorrect resistance at J13-17 and 18 to test point 9 when the power mode switch S12 is set to OFF (table 3-3, items 37 and 38).	*a*. Defective emitter resistor; part of 1A1A8. *b*. Broken wiring.	*a*. Replace 1A1A8. *b*. Check wiring.
32. Incorrect resistance at J3-A through G when CHANNEL switch S9 ,is set to position 4 through 8 (table 3-3, items 42 through 91).	*a*. Broken wiring. *b*. Incorrect switch settings or test connection. *c*. Defective power control board 1A1A6.	*a*. Check wiring. *b*. Check switch settings and test connections. *c*. Replace power control board 1A1A6.
33. Incorrect fine sync waveform A, figure 3-1, at test point 1 and J9-P.	*a*. +13 vdc not present at 1A1XA7-22. *b*. -13 vdc not present at 1A1XA7-23. *c*. +6 vdc not present at 1A1XA7-9 • *d*. Broken wiring. *e*. Defective sync generator 1A1A7.	*a*. Check +13 vdc at 1A1XA7 (table 3-2, item 73). *b*. Check -13 vdc at 1A1XA7 (table 3-2, items 75). *c*. Check +6 vdc at 1A1XA7 (table 3-2, items 76). *d*. Check wiring. *e*. Replace sync generator 1A1A7.
34. Incorrect waveform B, figure 3-1, at J3-n and test point CTR.	Refer to step 33.	Perform the corrective action listed in step 33.
35. Incorrect coarse sync waveform B, figure 3-1, at test point 1 and J9-M.	Refer to step 33.	Perform the corrective action listed in step 33.
36. Incorrect film fail drive waveform C, figure 3-1, at point 1 and J11-f.	Refer to step 33.	Perform the corrective actions listed in step 33.
37. This step deleted.		
38. Incorrect hot target waveform D, figure 3-1, at test point 6 and J10-i.	*a*. +13 vdc not present at 1A1XA9-16 or 3. *b*. -13 vdc not present at 1A1XA9-14. *c*. +30 vdc not present at -A1XA9-10. *d*. Defective v/h generator and hot target marker 1A1A9.	*a*. Check +13 vdc at 1A1XA8-16 and 3 (table 3-2, items 79). *b*. Check -13 vdc at 1A1XA8-14 (table 3-2, item 80). *c*. Check +30 vdc at 1A1XA9-10 (table 3-2, item 81). *d*. Replace defective printed circuit board 1A1A9.

Chart 3-2. Troubleshooting Procedure-Continued

Malfunction	Probable cause	Corrective action
39. Incorrect video waveform E, figure 3-1, at J9-A through H or test point CTR.	*a*. +13 vdc not present at 1A1XA11-2.	*a*. Check +13 vdc at 1A1A11-2 (table 3-2, item 83).
	b. -13 vdc not present at 1A1XA11-6.	*b*. Check -13 vdc at 1A1XA11-6 (table 3-2, item 84).
	c. Broken wiring.	*c*. Check wiring.
	d. Defective video oscillator and film fail amplifier 1A1A11.	*d*. Replace video oscillator and film fail amplifier 1A1A11.
40. Video waveform E, figure 3-1, does not shift in frequency when the LED TEST switch is set to HIGH.	*a*. Broken wiring.	*a*. Check wiring.
	b. Defective LED TEST switch 1A1S11.	*b*. Check switch 1A1S11 for continuity between 1A1XA11-1 and test point 9 where 1A1S11 is set to HIGH.
	c. Defective relay circuit the video oscillator and film fail amplifier 1A1A11.	*c*. Replace video oscillator and film fail amplifier 1A1A11.
41. Incorrect dc voltage at test point 2 when the RCDR DR switch is set to ON.	*a*. Broken wiring.	*a*. Check wiring.
	b. Defective AUX RCDR DR SPD control 1A1R2.	*b*. Check control 1A1R2 (table 3-3, item 94).
	c. +13 vdc not present at LA1XA9-16.	*c*. Check +13 vdc at 1A1XA9-16 (table 3-2, item 79).
	d. -13 vdc not present at 1A1XA9-14.	*d.* Check -13 vdc at 1A1XA9-14 (table 3-2, item 80).
	e. Defective v/h generator and hot target marker 1A1A9.	*e*. Replace v/h generator and hot target marker 1A1A9.
42. Incorrect dc voltage level at test point 2 when the V/H SIGNAL control R3 is set to 0 or 10 and the power mode switch is set to OPR.	*a*. Defective V/H SIGNAL control 1A1R3.	*a*. Check V/H SIGNAL control 1A1R3 (table 3-3, item 95).
	b. Broken wiring.	*b*. Check wiring.
	c. Defective v/h generator and hot target marker 1A1A9.	*c*. Replace 1A1A9.
43. Incorrect dc voltage at 1A1A7-4 when the power mode switch is set to OPR.	*a*. +6 vdc not present at 1A1XA7-11.	*a.* Check +6 vdc at 1A1A7-11 (table 3-2, item 82).
	b. Broken wiring.	*b*. Check wiring.
	c. Defective sync generator 1A1A7.	*c*. Replace 1A1A7.
44. Incorrect dc voltage at test point CTR when the power mode -switch is set to OPR.	*a*. Broken wiring.	*a*. Check wiring.
	b. +13 vdc not present at 1A1XA11-16.	*b*. Check +13 vdc at 1A1XA11-16 (table 3-2, item 85) •
	c. -13 vdc not present at 1A1XA11-22.	*c*. Check -13 vdc at 1A1XA11-22 (table 3-2, item 86).•
	d. Defective video oscillator and film fail amplifier 1A1A11.	*d*. Replace 1A1A11.
45. Filter assembly 1A1A12 does not have continuity from 1A1J1-A and B to 1A1A12-E2 and E3 nor from 1A1J2-A, B, C and D to 1A1A12C2-1, 2, 3, and 4.	*a*. Defective filters 1A1A12-FL-1, 2, 3, 4, 5, and 6.	*a*. Check filters 1A1A1FL-1, 2, 3, 4, 5, and 6 for continuity.
	b. Defective choke coils 1A1A12-L1, L2 and L3.	*b*. Check filters 1A1A12-L1, L2 and L3.
	c. Broken wiring.	*c*. Check wiring.
	d. Test connection incorrect.	*d*. Check test connections.
46. Continuity is present between connector pins 1A1J2-A, B, C or D and 1A1J1-A to 1A1E1 or 1A1A12-E3.	Shorted wiring or defective components	Check wiring and components.
47. Incorrect resistance between 1A1A12J2-A, B, C, or D and 1A1A12-El (table 3-4, items 10, 12, 14 and 16).	Defective resistors 1A1A12-R1, R2, R3 and R4.	Check resistors 1A1A2-R1, R2, R3 and R4 (table 3-4, items 10, 12, 14, and :16).

(3) *Voltage and resistance measurements.* The digital voltmeter, Non-Linear Systems, model X-2, is used for taking voltage and resistance measurements on the chassis. Multimeter TS-352 B/U is available if required. Voltage measurements are listed in table 3-2 and resistance measurements are listed in table 3-3. The Item column is provided so specific measurements can be easily referenced. The Component Checked column designates which component can be checked by using the data provided for that item. The dvm probe connections LO and HI columns specify where the HI probe and LO probe are connected to check the corresponding item component. The

Test set control setting Control and Position columns designate test unit control settings which must be made prior to observing the dvm indication for the item checked. The *Dvm indication (volts) Dc and Ac* column on the voltage measurement table (table 3-2) contains the dvm dc or ac voltage obtained for the item component checked. The Dvm indication (ohms) on the resistance measurement table (table 3-3) contains the resistance obtained for the item checked. Unless otherwise specified, tolerances are ± 10 percent. Chassis mounted components requiring resistance checks must be isolated from associated circuitry to avoid erroneous readings.

CAUTION

When making voltage measurements of transistors, use tape or sleeving to insulate the test probe except for the extreme tip, to prevent accidental shorting of the test probe to the chassis (even a momentary short circuit can damage the transistor).

Table 3-2. Voltage Measurements

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (volts)	
		LO	HI	Control	Position	AC	Dc
1	A6	Test point 9	XA6-16	Power mode switch S12	OPR		13.0 ±0.1
2	T1	T1-4	T1-3	S12	OPR	26.0 ±4.0	
3	T2	1A1A5-9	1A1A5-10	S12	OPR	28.0 ±4.0	
4	T2	K4-C1	1A1A5-22	S12	OPR	6.3 ±0.7	
5	T3	T3-5	T3-6	S12	OPR	47 8	
6	T3	T3-5	T3-7	S12	OPR	47 8	
7	T3	T3-	T3-7	S12	OPR	47+8	
8	T4	T4-4	T4-5	S12	OPR	10.7 ±2. 0	
9	T4	T4-5	T4-6	S12	OPR	10.7 ±2. 0	
10	T4	T4-6	T4-4	S12	OPR	10.7 ±2.0	
11	T4	T4-7	T48	S12	OPR	18.5 ± 4.0	
12	T4	T4-7	T4-9	S12	OPR	18.5 ± 4.0	
13	T4	T4-8	T4-9	S12	OPR	18.5 ± 4.0	
14	T4	T4-10	T4-11	S12	OPR	18.5 ± 4.0	
15	T4	T4-10	T4-12	S12	OPR	18.5 ± 4.0	
16	T4	T11	T4-12	S12	OPR	18.5 ± 4.0	
17	T5	T5-5	T5-6	S12	OPR	19.5 ± 4.0	
18	T5	T5-4	T5-6	S12	OPR	19.5 ± 4.0	
19	T5	T-4	T5-5	Power mode switch S12	OPR	19.5 ± 4.0	
20	T6	T6-4	T6-3	S12	OPR	26.0 ± 5.0	
21	AS	Test point 9	XA6-14	S12	OPR		6.0 ±0.1
22	A4	Test point 9	XA6-4	S12	OPR		-13.0 ±0.1
23	A4	Test point 9	XA6-16	S12	OPR		13.0 ±0.1
24	A10	Test point 9	XA6-8	S12	OPR		62 ± 10
25	AS	Test point 9	Test point 3	TEST POINTS switch S14	7		6.0 _0.1
26	A5	Test point 9	XA5-23	Power mode switch S12	OPR		12.0 3.0
27	T4	T4-4 T4-5		S12	OPR	10.7 ±1.5	
28	T4	T4-4	T4-6	S12	OPR	10.7 ±1.5	
29	T4	T4-5	T4-6	S12	OPR	10.7 ±1.5	
30	A10	Test point 9	Test point 4	TEST POINTS switch S14	2		
				S12	OPR		62.0± 10
31	A10	Test point 9	Test point 3	S14	8		
				S12	OPR		33.0±3.0
32	A1	Test point 4	Test point 3	S14	1		
				S12	OPR		33.0±6.0
33	A4	Test point 9	XA4-1	Power mode switch S12	OPR		23.±4
34	A4	Test point 9	XA4-14	S12	OPR		-13.0 ±0.1
35	Al	Test point 9	Test point 3	S14	5		
				S12	OPR		+13.0 ±0.1

Table 3-2. Voltage Measurements-Continued

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (volts)	
		LO	HI	Control	Position	AC	Dc
36	A2	Test point 9	Test point 3	S14	6		
				S12	OPR		-13.0 ±0.1
37	K3	Test point 9	J9-L	Power mode switch S12	OPR		13.0 ±0.1
38	S10	Test point 9	J9-T	S12	OPR		
				VIDEO MODE switch S10	HOT TGT		13.0 ±0.1
39	K3	Test point 9	J8-H	S12	OPR		13.0 ±0.1
40	K3	Test point 9	J4-G	S12	OPR		13.0 ±0.1
41	K3	Test point 9	J4-F	S12	OPR		13.0 ±0.1
42	S8	Test point 9	J 7-A	S12	OPR		
				VIDEO TEST switch S8	BIT		13.0 ±0.1
43	S8	Test point 9	J7-D S8	VID			
				S12	OPR		13.0 ±0.1
44	K3	Test point 9	J8-J	S12	OPR		-13.0 ±0.1
45	K3	Test point 9	J9-N	S12	OPR		-13.0 ±0.1
46	S8	Test point 9	J7-B	S12	OPR		
				S8	BIT		-13.0 ±0.1
47	S8	Test point 9	J7-E	S8	VID		-13.0 ±01
48	K3	Test point 9	J8-K	S12	OPR		6.0 ±0.1
49	K3	Test point 9	J8-Y	RCDR DR switch S4	ON		
				Power mode switch S12	OPR		62. 0±10. 0
50	K3	Test point 9	J8-Z S4		ON		
				S12	OPR		62.0 ±10. 0
51	A10	J8-HH	J8-GG	S12	OPR		32.0 ±6.0
52	A10	J8-R	J8-P	S12	OPR		32.0 ±6.0
53	K4	Test point 8	J10-F	S12	OPR		27.0 ±2.0
54	K4	Test point 8	J8-M	S12	OPR		27.0 ±2.0
55	A6	Test point 9	J10-C	S12	OPR		11 0±1.0
56	A6	Test point 9	J10-Z	S12	OPR		11.0±1.0
57	K2	Test point 9	J8-x	MOT PWR S6	ON		32.0±3.2
58	K2	Test point 9	J10-V	S12	OPR		32.0±3.2
59	K2	Test point 7	JS-DD	S12	OPR	115.0 ±11.5	
60	K2	Test point 7	J8-v	S12	OPR	115.0 ±11.5	
61	K2	Test point 7	JS-w	S12	OPR	115.0 ±11.5	
62	K2	Test point 7	J10-A	Power mode switch S12	OPR	115.0 ±11.5	
63	K2	Test point 7	J10-B	S12	OPR	115.0 ±+11.5	
64	K2	Test point 7	J10-C	S12	OPR	115.0 ±11.5	
65	K4	Test point 9	J8-z	S12	OPR	26.0 ± 4-0	
66	R1	Test point 9	DVM				
				DVM-CTR SELECT switch S15	A		
				S12	OPR		
				FILM SPD ADJ R1	Fully ccw to	0.0±0.5 to	
67	R4	J11--X	DVM	FUNCTION S13	fully cw.	26.0±4.0	
				TEST S12	OPR		
				S15	A		
				TACH SIGNAL R4	Fully cw to fully ccw.	0.0±0.5 to 26.0±4.0	
68	R4	J11--X	J11-Y	Power mode switch S12	OPR	0.0 ± +0.5	
				TACH SIGNAL R4	Fully ccw to fully cw.	to 26.0 ±4.0	
69	K4	J8-CC	J8-BB	S12	OPR	6.3 ±.0.6	
70	A6	Test point 9	XA6-7	S12	OPR		11±1
71	A6	Test point 9	XA6-19	S12	OPR		11±1
72	A7	Test point 9	XA7-22	S12	OPR		13.0±0.1

Table 3-2. Voltage Measurements-Continued

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (volts)	
		LO	HI	Control	Position	AC	Dc
73	A7	Test point 9	XA7-22	S12	OPR		13.0 ±0.1
74	MEASUREMENT DELETED.						
75	A7	Test point 9	XA7- 23	S12	OPR		-13.0 ±0.1
76	A7	Test point 9	XA7- 9	S12	OPR		6.0 ±0.1
77	A8	Test point 9	XA8-1	S12	OPR		13.0 ±0.1
78	A8	Test point 9	XA8-2	S12	OPR		-13.0 ±0.1
79	A9	Test point 9	XA9-16	S12	OPR		13.0 ±0.1
80	A9	Test point 9	XA9-14	S12	OPR		-30.0 ±0.1
81	A9	Test point 9	XA9-10	S12	OPR		33.0 ±3.3
82	A10	Test point 9	Test point 3	S12	OPR		33.0 ±3.3
				S14	8		
83	A11	Test point 9	XA11-2	Power mode switch S12	OPR		13.0 ±0.1
84	All	Test point 9	XA11-6	S12	OPR		-13.0 ±0.1
85	All	Test point 9	XA11-16	S12	OPR		13.0 ±0.1
86	All	Test point 9	XA11-22	S12	OPR		-13.0 +0.1

(4) *Continuity checks.* Routine continuity checks between various points in the circuitry can be made using the digital voltmeter or the multimeter and the wiring diagrams; however, a list of continuity checks is provided in table 3-4 to ensure a complete continuity check of the circuity without reference to wiring diagrams. The continuity measurements table Item column is provided to specific measurements can be easily referenced. The Dvm probe connections LO and HI columns specify where the dvm HI probe and LO probe are connected to check the corresponding item continuity measurements. The Test unit control settings Control and Position columns designate test unit control settings which must be made prior to observing the dvm indication for the item circuitry checked. The Remarks column contains information of a special nature pertinent to checking continuity for the specific corresponding item.

Table 3-3. Resistance Measurements-Continued

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (ohms)
		LO	HI	Control	Position	
1	K1	X2	X1	Power mode switch S12	OFF	290.0 ±29.0
2	CR1	Cathode	Anode	S12	OFF	63.7 ±20.0
3	CR1	Anode	Cathode	S12	OFF	Inf
4	K4	X2	X1	S12	OFF	290.0 ±29.0
5	T1	T1-1	T1-2	S12	OFF	185.0 ±9.0
6	T1	T1-3	T1-4	S12	OFF	11.6 ± 2.0
7	T2	T2-1	T2-2	S12	OFF	1.9 ± 0.1
8	T2	T2-3	T2-4	S12	OFF	0.16 ±0.1
9	T2	T2-5	T2-6	S12	OFF	0.08 + 0.01
10	T3	T3-4	T3-1	S12	OFF	1.95 ±0.4
11	T3	T3-4	T3-2	S12	OFF	1.95 ± 0.4
12	T3	T3-4	T3-3	S12	OFF	1.95 ±0.4
13	T3	T3-5	T3-6	S12	OFF	0.28 ±0.1
14	T3	T3-5	T3-7	S12	OFF	0.2 ±0.1
15	T3	T3-6	T3-7	S12	OFF	0.2 ±0.1
16	T4	T3-N	T3-1	S12	OFF	9.4 ±0.4
17	T4	T3-N	T3-2	S12	OFF	9.4 ± 0.4
18	T4	T3-N	T3-3	S12	OFF	9.4 ±0.4
19	T4	T4-10	T4-11	Power mode switch S12	OFF	0.4 ±0.1
20	T4	T4-10	T4-12	S12	OFF	0.4 ±0.1
21	T4	T4-11	T4-12	S12	OFF	0.4 ±0.1
22	T4	T4-7	T4-8	S12	OFF	0.4 ±0.1
28	T4	T4-8	T4-9	S12	OFF	0.4 ±0.1

Table 3-3. Resistance Measurements-Continued

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (ohms)
		LO	HI	Control	Position	
24	T4	T4-7	T4-9	S12	OFF	0.4 ±0.1
25	T5	T5-N	T5-1	S12	OFF	5.75 ±0.1
26	T5	T5-N	T5-2	S12	OFF	5.75 ±0.1
27	T5	T5-N	T5-	S12	OFF	5.75 ±0.1
28	T5	T5-4	T5-6	S12	OFF	0.4 ±0.1
29	T5	T5-4	T5-5	S12	OFF	0.4 ±0.1
30	T5	T5-5	T6-6	S12	OFF	0.4 ±0.1
31	T6	T6-1	T2	S12	OFF	185.0 ±9.0
82	T6	T6-3	T6-4	S12	OFF	11.6 ±0.5
33	M1	M1-2	M1-1	S12	OFF	8.2 ±0.5k
34	T4	T4-4	T4-5	S12	OFF	0.24 ±0.1
35	T4	T4-4	T4-6	S12	OFF	0.24 ±0.1
36	T4	T4-5	T4-6	S12	OFF	0.24 ±0.1
37	A8	Test point 9	1A1J13- 20	Power mode switch S12	OFF	0.0 ±0.5
38	A8	Test point 9	1A1J13-18	S12	OFF	0.0 ±0.5
39	K2	X2	X1	S12	OFF	290.0 ±29.0
40	K3	X2	X1	S12	OFF	290.0 ±29.0
41	K4	X2	X1	S12	OFF	290.0 ±29.0
42	A8	Test point 8	J3-A	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	4	7 0.0 ±20.0
43	A8	Test point 8	J3-A	S8	BIT	
				S9	5	7 0.0 ±20.0
44	A8	Test point 8	J3-A	S8	BIT	
				S9	6	70.0 ±20.0
45	A8	Test point 8	J3-A	S8	BIT	
				S9	7	70.0 ±20.0
46	A8	Test point 8	J3-A	VIDEO TEST switch S8 BIT		
				CHANNEL switch S9	8	7 0.0 ± 20.0
47	A8	J3-A	Test point 8	S8	BIT	
				S9	4	Inf
48	A8	J3-A	Test point 8	S8	BIT	
				S9	5	Inf
49	A8	J3-A	Test point 8	S8	BIT	
				S9	6	Inf
50	A8	J3-A	Test point 8	S8	BIT	
				S9	7	Inf
51	A8	J3-A	Test point 8	S8	BIT	
				S9	8	Inf
52	A8	Test point 8	J3-B	S8	BIT	
				S9	4	70.0 ±20.0
53	A8	Test point 8	J3-B	S8	BIT	
				S9	6	70.0 ±20.0
54	A8	Test point 8	J3-B	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	6	70.0 ±20.0
55	A8	Test point 8	J3-B	S8	BIT	
				S9	7	70.0 ±20.0
56	A8	Test point 8	JS-B	S8	BIT	
				S9	8	70.0 ±20.0
57	A8	J3-B	Test point 8	S8	BIT	
				S9	4	Inf
58	A8	J3-B	Test point 8	S8	BIT	
				S9	5	Inf
59	A8	J3-B	Test point 8	S8	BIT	
				S9	6	Inf

Table 3-3. Resistance Measurements-Continued

Item	Component checked	Dvm probe connection		Test set control settings		Dvm indication (ohms)
		LO	HI	Control	Position	
60	A8	J3-B	Test point 8	S8	BIT	
				S9	7	Inf
61	A8	J3-B	Test point 8	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	8	Inf
62	A8	Test point 8	J3-C	S8	BIT	
				S9	4	7 0.0 ±20.0
63	A8	Test point 8	J3-C	S8	BIT	
				S9	5	7 0.0 ±20.0
64	A8	Test point 8	J3-C	S8	BIT	
				S9	6	7 0.0 ±20.0
65	A8	Test point 8	J3-C	S8	BIT	
				S9	7	7 0.0 ±20.0
66	A8	Test point 8	J3-C	S8	BIT	
				S9	8	7 0.0 ±20.0
67	A8	J3-C	Test paint 8	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	4	Inf
68	A8	J3-C	Test point 8	S8	BIT	
				S9	6	Inf
69	A8	J3-C	Test point 8	S8	BIT	
				S9	6	Inf
70	A8	J3-C	Test point 8	S8	BIT	
				S9	7	Inf
71	A8	J3-C	Test point 8	S8	BIT	
				S9	8	Inf
72	A8	Test point 8	J3-D	S8	BIT	
				S9	6	7 0.0 ±20.0
73	A8	Test point 8	J3-D	S8	BIT	
				S9	6	7 0.0 ±20.0
74	A8	Test point 8	J3-D	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	7	70.0 ± 20.0
75	A8	Test point 8	J3-D	S8	BIT	
				S9	8	70.0±20.0
76	A8	J3-D	Test point 8	S8	BIT	
				S9	5	Inf
77	A8	J3-D	Test point 8	S8	BIT	
				S9	6	Inf
78	A8	J3-D	Test point 8	S8	BIT	
				S9	7	Inf
79	A8	J3-D	Test point 8	S8	BIT	
				S9	8	Inf
80	A8	Test point 8	J3-E	S8	BIT	
				S9	6	70.0 ± 20.0
81	A8	Test point 8	J3-E	VIDEO TEST switch S8 BIT		
				CHANNEL switch S9	7	70.0 ±20.0
82	A8	Test point 8	J3-E	S8	BIT	
				S9	8	70.0 ±20.0
83	A8	J3-E	Test point 8	S8	BIT	
				S9	6	Inf
84	A8	J3-E	Test point 8	S8	BIT	
				S9	7	Inf
85	A8	J3-E	Test point 8	S8	BIT	
				S9	8	Inf
86	A8	Test point 8	J3-F	S8	BIT	
				S9	7	70.0 ± 20.0

Table 3-3. Resistance Measurements-Continued

Item	Component checked	Dvm probe connection LO	Dvm probe connection HI	Test set control settings Control	Test set control settings Position	Dvm indication (ohms)
87	A8	Test point 9	J3-F	S8	BIT	
				S9	8	70.0 ±20.0
88	A8	J3-F	Test point 8	VIDEO TEST switch S8	BIT	
				CHANNEL switch S9	7	Inf
89	A8	JS-F	Test point 8	S8	BIT	
				S9	8	Inf
90	A8	Test point 8	J3-G	S8	BIT	
				S9	8	70.0 ±20.0
91	A8	J3-G	Test point 8	Power mode S12	OFF	Inf
92	R5	J11-U	Test point 4	Test POINTS	4	100±1
	R6	J11-T	Test point 4	Test POINTS	4	100±1
93	R1	R1-3	R1-1	S12	OFF	* 1000.0 ±20.0
94	R2	R2-3	R2-1	S12	OFF	* 500.0 ± 25.0
95	R3	R3-3	R3-1	S12	OFF	* 1000.0 ± 10.0
96	R4	R4-3	R4-1	S12	OFF	* 10k ±0.5k

* Isolate from circuit when measuring.

(5) *Intermittent troubles*. When troubleshooting, the possibility of intermittent troubles should not be overlooked. This trouble can often be made to appear by tapping or jarring the equipment. Check wiring and connections.

3-6. Interunit Troubleshooting

a. Defective Signal Monitoring. Failure to monitor a selected voltage or signal may be caused by defective external test equipment. If an operational check fails to sectionalize trouble to a defective unit or a defective major functional area, follow the procedures given in (1), (2), and (3) below.

(1) *External test equipment check*. All external test equipment should function properly. Perform operational checks on each unit of external test equipment as described in the applicable test equipment manual.

(2) *Control unit check.* All major functional areas of the control units should function properly, including the active circuits (semi-conductor circuits) and controls.

(a) Active circuits. If any of the transistor or diode circuits are suspected of causing a malfunction, isolate the trouble by using voltage and resistance measurements with external test equipment.

(b) Controls. To verify that all controls are functioning properly, perform continuity measurements (table 3-4) while the controls are rotated through each position.

(*3) Control unit connectors check.* The continuity measurements will aid in determining whether a connector is contributing to the malfunction.

b. Checking Cable Assemblies. All interconnecting cable assemblies should be checked for signs of insulation deterioration and for opens or shorts near the connectors. Check connectors for bent or deformed pins and for signs of arcing.

Table 3-4. Continuity Measurements-Continued

Item	Component checked	Dvm probe connection LO	Dvm probe connection HI	Test set control settings Control	Test set control settings Position	Dvm indication (ohms)
	1	K4-D2	K4-D3	Power mode switch S12	OFF	Less than two ohms
	2	S12A-C1	S12A-2	S12	STBY	Less than two ohms
				CB1	ON	
	3	CB1-1	CB1-2	S12	OFF	Less than two ohms
				CB1	ON	
	4	CB1-3	CB1-4	S12	OFF	Less than two ohm.
	5	J1-A	1A12E2	S12	OFF	Less than two ohms
	6	J1-A	1A12E1	S12	OFF	Inf
	7	J1-B	1A12E3	S12	OFF	Less than two ohms
	8	J1-B	1A12E1	S12	OFF	Inf
	9	J2-A	1A12E4	S12	OFF	Less than two ohms
				CB2	ON	

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
10	J2-A	1A12E1	S12	OFF	1 megohm
11	J2-B	1A12E6	S12	OFF	Less than two ohms.
12	J2-B	1A12E1	S12	OFF	1 megohm
18	J2-C	1A12E8	S12	OFF	Less than two ohms.
14	J2-C	1A12E1	S12	OFF	1 megohm
15	J2-D	1A12E5, 7 & 9	S12	OFF	Less than two ohms.
16	J2-D	1A12E1	S12	OFF	1 megohm.
17	S12A-C1	S12A-3	S12	OFF	Less than two ohms.
18	S12B-3	S12B-C1	S12	OPR	Less than two ohms.
19	Test point 9	S4-5	RCDR DR S4	OFF	Inf
20	Test point 9	K3-D1	28 VDC circuit breaker CB1	ON	Inf
			RCDR DR S4	OFF	
21	Test point 4	L1 -2	TEST POINTS switch S14	2	Less than two ohms.
22	Test point 8	K1- X1	Power mode switch S12	STBY	Dvm should indicate relay 1A1K1 coil resistance unless a short or open circuit is present on the line.
23	Test point 8	S12A-C2	S12	OPR	Dvm should indicate relay 1A1K4 coil resistance unless a short or open circuit is present on the line.
24	Test point 8	Test point 3	Power mode switch S12	OFF	The dvm should read infinity.
			VIDEO TEST S8	BIT	
			TEST POINTS S14	5	
25	Test point 8	Test point 3	S12	OFF	The dvm should read infinity.
			S8	VID	
			S14	5	
			LED TEST S11	HIGH	
26	Test point 8	K3-A1	S12	OFF	The dvm should read infinity.
			VIDEO MODE S10	NORMAL	
27	Test point 8	Test point 3	S14	6	The dvm should read infinity.
			S12	OFF	
			S8	OFF	
28	Test point 8	Test point 3	S14	6	The dvm should read infinity.
			S12	OFF	
			S8	BIT	
29	Test point 8	Test point 3	TEST POINTS S14	6	The dvm should read infinity.
			Power mode switch S12	OFF	
			VIDEO TEST S8	VID	
			LED TEST S11	HIGH	

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
30	Test point 8	J9-N	S12	OFF	The dvm should read infinity
31	Test point 8	J8-J	S12	OFF	The dvm should read infinity
32	Test point 8	Test point 8	TEST POINTS switch S14 Power mode S12	7 OFF	Dvm should read infinity.
33	Test point 9	K5-A2	S12	OFF	Dvm should read infinity.
34	Test point 8	K3-C1	S12 RCDR DR TEST switch S3	OFF ALIGN	Dvm should read infinity.
35	Test point 9	X2-D2	S12	OFF	Dvm should read infinity.
36	Test point 8	Test point 6	S14 S12	7 OFF	Dvm should read infinity.
37	Test point 8	Test point 8	TEST POINTS Switch S14 Power mode switch S12	8 OFF	Dvm should read infinity.
38	Test point 8	Test point 3	S12 S14	OFF 1	Dvm should read infinity .
39	S10-3	J8-H	S12	OFF	Less than two ohms
40	S10-3	J4-G	S12	OFF	Less than two ohms
41	S10-3	J4-F	S12	OFF	Less than two ohms
42	S10-3	J9-T	S12 VIDEO MODE switch B10	OFF OFF	Less than two ohms
43	K3-A1	J9-L	S12	OFF	Less than two ohms
44	S11-8	XA11-2	LED TEST switch S11 VIDEO TEST switch S8	HIGH VID	Less than two ohms
45	S8C-C1	J7-A	S8 S12	BIT OFF	Less than 100 ohms.
46	S8C- C1	J7-D	VIDEO TEST switch 8 Power mode switch S12	VID OFF	Less than two ohms
47	S8C-C2	J7-B	S8 S12	BIT OFF	Less than two ohms
48	S8C-C2	J7-E	S8 S12	VID OFF	Less than two ohms
49	E1	J8-y	S12 RCDR DR switch S4	OPR ON	Less than two ohms
50	S4-4	J8-Z	S12 S4	OPR ON	Less than two ohms
	CB1-3	CB1-4	28 VDC circuit breaker CB1	ON	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
52	S9-A2	J3-A	CHANNEL switch S9	2	
			S12	OFF	Less than two ohms
53	S9-A3	J3-B	S9	3	
			S12	OFF	Less than two ohms
54	S9-A4	J3-C	CHANNEL switch S9	4	
			Power mode switch S12	OFF	70+20 ohms.
55	S9-A5	J3-D	S9	5	
			S12	OFF	70+20 ohms.
56	S9-A6	J3-E	S9	6	
			S12	OFF	70+20 ohms.
57	S9-A7	J3-F	S9	7	
			S12	OFF	70±20 ohms.
58	S9-A8	J3-G	S9	8	
			S12	OFF	70+20 ohms.
59	OSCP-1	S1A-C3	Power mode switch S12	OFF	
			FUNCTION TEST switch		
			S13	FILM MAG	Less. than two ohms
60	OSCP-1	S3B-C1	S12	OFF	
			S13	RCDR DR	Less than two ohms
61	OSCP-1	S13-F2	Power mode switch S12		
			FUNCTION TEST switch		
			S13	GATE GEN	Less than two ohms
62	OSCP-1	S13-A4	S12	OFF	
			S13	V/H MASK	Lees than two ohms
63	OSCP-1	J11-T	S12	OFF	
			S13	FILM DR	Less than two ohms
64	OSCP-1	S8B-C1	S12	OFF	
			S13	VIDEO	Less than two ohms
65	OSCP-1	S1-C4	S12	OFF	
			S13	FILM MAG	Less than two ohms
66	OSCP-2	S3B-C2	S12	OFF	
			S13	RCDR DR	Less than two ohms
67	OSCP-2	J9-K	S12	OFF	
			S13	GATE GEN	Less than two ohms
68	OSCP-2	S13-B4	S12	OFF	
			S13	V/H MASK	Less than two ohms
69	OSCP-2	J11-U	Power mode switch S12	OFF	
			FUNCTION TEST switch		
			S13	FILM DR	Less than two ohms
70	OSCP-2	J3-K	S12	OFF	
			S13	VIDEO	Less than two ohms
71	DVM	S13-C1	DVM-CTR SELECT switch S15	A	
			S12	OFF	
			S13	FILM MAG	Less than two ohms
72	DVM	J8-d	S15	A	
			S12	OFF	
			S13	RCDR DR	Less than two ohms
73	DVM	J3-z	S15	A	
			S12	OFF	
			S13	GATE GEN	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
74	DVM	S13-C4	DVM-CTR SELECT switch S15	A	
			Power mode switch S12	OFF	
			FUNCTION TEST switch S13	V/H MASK	Less than two ohms
75	DVM	S14-F8	S15	A	
			S12	OFF	
			S13	FILM DR	Less than two ohm
76	DVM	S1A-C2	S81	B-	
			S12	OFF	
			S13	FILM MAG	Less than two ohms
77	DVM	S3A-C1	S15	B	
			S12	OFF	
			S13	RCDR DR	Less than two ohms
78	DVM	J9-J	S15	B	
			S12	OFF	
			S13	V/H MASK	Less than two ohms
79	DVM	S7-5	DVM-CTR SELECT switch S15	B	
			Power mode switch S12	OFF	
			FUNCTION TEST switch S13	FILM DR	Less than two ohms
80	DVM	J9-J	S15	B	
			S12	OFF	
			S13	VIDEO	Less than two ohms
81	CTR	J10-Z	S12	OFF	
			S15	A	
			S13	FILM MAG	Less than two ohm
82	CTR	J3-a	S12	OFF	
			S15	A	
			S13	RCDR DR	Less than two ohms
83	CTR	J3-y	S12	OFF	
			S15	A	
			S13	GATE GEN	Less than two ohms
84	CTR	J8-q	Power mode switch S12	OFF	
			DVM-CTR SELECT switch S15	B	
			FUNCTION TEST switch S13	FILM DR	Less than two ohms
85	CTR	S13-A6	S12	OFF	
			S15	A	
			S13	VIDEO	Less than two ohms
86	CTR	XA11-18	S12	OFF	
			S15	B	
			S13	FILM MAG	Less than two ohms
87	CTR	J3-c	S12	OFF	
			S15	B	
			S13	RCDR DR	Less than two ohms
88	CTR	J3-q	S12	OFF	
			S15	B	
			S13	FILM DR	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
89	CTR	S8A-C2	Power mode switch S12	OFF	
			DVM-CTR SELECT switch S16 B		
			FUNCTION TEST switch S13	VIDEO	Less than two ohms
90	Test point 1	J9-P	S12	OFF	
			TEST POINTS switch S14	1	Lees than two ohms
91	Test point 1	J9-P	S12	OFF	
			S14	2	Less than two ohms
92	Test point 1	J11-f	S12	OFF	
			S14	3	Less than two ohms
93	Test point 1	E7	Power mode switch S12	OFF	
			TEST POINTS switch S14	4	Less than two ohms
94	Test point 1	J8-i	S12	OFF	
			S14	5	Less than two ohms
95	Test point 1	J3-AA	S12	OFF	
			S14	6	Less than two ohms
96	Test point 1	J11-e	S12	OFF	
			S14	7	Less than two ohms
97	Test point 1	J3-g	S12	OFF	
			S14	8	Less than two ohms
98	Test point 2	J5-d	S12 S14	OFF 1	Less than two ohms
99	Test point 2	J3-CC	Power mode switch S12	OFF	
			TEST POINTS switch S14	2	Less than two ohms
100	Test point 2	S14-B3	S12	OFF	
			S12	4	Less than two ohms
101	Test point 2	J6-M	S12	OFF	
			S14	4	Lees than two ohms
102	Test point 2	J8-j	S12	OFF	
			S14	5	Less than two ohms
103	Test point 2	J3-t	S12	OFF	
			S14	6	Less than two ohms
104	Test point 2	J3-u	S12	OFF	
			S14	7	Less than two ohms
106	Test point 2	JS-k	S12	OFF	
			S14	8	Less than two ohms
106	Test point 3	J8-GG	S12	OFF	
			S14	1	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
107	Test point 3	J10-A	S12 S14	OFF 2	Less than two ohms
108	Test point 3	J10-B	Power mode witch S12 TEST POINTS switch S14	OFF 3	Less than two ohms
109	Test point 3	J10-C	S12 S14	OFF 4	Less than two ohms
110	Test point 3	TB1-3	S12 S14	OFF 6	Less than two ohms
111	Test point 3	TB1-1	S12 S14	OFF 6	Less than two ohms
112	Test point 3	TB1-5	S12 S14	OFF 7	Less than two ohms
113	Test point 3	J13-22	S12 S14	OFF 8	Less than two ohms
114	Test point 4	J8-HH	S12 S14	OFF 1	Less than two ohms
115	Test point 4	J1-10	S12 S14	OFF 2	Less than to ohms
116	Test point 4	J10-F	S12 S14	OFF 8	Less than two ohms
117	Test point 4	J11-V	Power mode switch S12 TEST POINTS switch S14	OFF 4	Less than two ohms
118	Test point 4	J11-A	S12 S14	OFF 5	Less than two ohms
119	Test point 4	J11-B	S12 S14	OFF 6	Less than two ohms
120	Test point 4	J11-C	S12 S14	OFF 7	Less than two ohms
121	Test point 4	J8-BB	S12 S14	OFF 8	Less than two ohms
122	Test point 5	J3-A	S12 S14	OFF 1	Less than two ohms
123	Test point 5	J3-B	S12 S14	OFF 2	Less than two ohms
124	Test point 5	J3-C	S12 S14	OFF 3	Less than two ohms
125	Test point I 5	J3-D	S12 S14	OFF 4	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
126	Test point 5	J3-E	Power mode switch S12	OFF	
			TEST POINTS switch S14	5	Less than two ohms
127	Test point 5	J3-F	S12	OFF	
			S14	6	Less than two ohms
128	Test point 5	J3-G	S12	OFF	
			S14	7	Less than two ohms
129	Test point 5	J3-H	S12	OFF	
			S14	8	Less than two ohms
130	Test point 6	S2-2	S12	OFF	
			S14	1	Loess than two ohms
131	Test point 6	J8-z	S12	OFF	
			S14	2	Less than two ohms
132	Test point 6	J3-DD	S12	OFF	
			S14	3	Less than two ohms
133	Test point 6	J10-R	S12	OFF	
			S14	4	Less than two ohms
134	Test point 6	J10-S	S12	OFF	
			S14	5	Less than two ohms
135	Test point 6	J10-c	Power mode switch S12	OFF	
			TEST POINTS switch S14	6	Less than two ohms
136	Test point 6	J10-V	S12	OFF	
			S14	7	Less than two ohms
137	Test point 6	S13-5	S12	OFF	
			S14	8	Less than two ohms
138	Test point 8	J6-Y	FILM DR switch S7	ON	
			S12	OFF	Less than two ohms
139	Test point 8	J5-b	S7	OFF	
			S12	OFF	Less than two ohms
140	S13-DS	J8-m	S5	ON	
			S12	OFF	Less than two ohms
141	Test point 8	J5-Z	S7	OFF	
			S12	OFF	Less than two ohms
142	S13-D5	J8-p	S5	OFF	
			S12	OFF	Less than two ohms
143	S5-A4	J5-q	Power mode switch S12	OFF	Less than two ohms
144	S14-B1	J5-d	S12	OFF	Less than two ohms
145	S5A-C4	J5-a	S12	OFF	Less than two ohms
146	Test point 9	J8-L	S12	OFF	Less than two ohms
147	Test point 9	J8-U	S12	OFF	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
148	Test point 9	J8-a	S12	OFF	Less than two ohms
149	Test point 9	J8-b	S12	OFF	Less than two ohms
150	S13-C2	J8-d	S12	OFF	Less than two ohms
151	Test point 9	J8-e	S12	OFF	Less than two ohms
152	Test point 9	J8-f	S12	OFF	less than two ohms
153	S14-A5	J8-i	S12	OFF	Less than two ohms
154	S14-B5	J8-j	S12	OFF	Less than two ohms
155	S74	J8-m	S12	OFF	Less than two ohms
156	S17-6B3	J8-n	S12	OFF	Less than two ohms
157	S7-6	J8-P	S12	OFF	Less than two ohms
158	S13-F5	J8-g	S12	OFF	Less than two ohms
159	S3-A3	J8-t	S12	OFF	Less than two ohms
160	S4-5	J8-Y	S12	OFF	Less than two ohms
161	Test point 9	J11-AA	S12	OFF	Less than two ohms
162	S14-D5	J11-A	Power mode switch S12	OFF	Less than two ohms
163	S14-D6	J11-B	S12	OFF	Less than two ohms
164	S14-D7	J11-C	S12	OFF	Less than two ohms
165	S14-A7	J11-e	S12	OFF	Less than two ohms
166	S14-A3	J11-f	S12	OFF	Less than two ohms
167	S14-F4	J10-R	S12	OFF	Less than two ohms
168	S14-F6	J10-S	S12	OFF	Less than two ohms
169	S13-E1	J10-Z	S12	OFF	Less than two ohms
170	S14-F6	J10-c	S12	OFF	Less than two ohms
171	Test point 9	J10-d	12	OFF	Less than two ohms
172	S13-B6	J3-K	S12	OFF	Less than two ohms
173	S13-A2	J3-W	RECORDER DRIVE TEST switch S3	NORMAL	
			S12	OFF	Less than two ohms
174	S13-B2	J8-Y	S3	NORMAL	
			S12	OFF	Less than two ohms
175	S13-F2	J3-a	S12	OFF	L than two ohms
176	S13-F2	J3-e	Power mode switch S12	OFF	Less than two ohms
177	S13-A2	J3-e	S12	OFF	Less than two ohms
			RECORDER DRIVE TEST switch S3	DYN	Less than two ohms
178	S14-A8	J3-g	S12	OFF	Less than two ohms
179	S13-B2	J3-i	S3	DYN	
			S12	OFF	Less than two ohm
180	S14-B8	J3-k	S12	OFF	Less than two ohms
181	S14-B6	J3-t	S12		Less than two ohms
182	S14-B7	J3-u	S12	OFF	Less than two ohms
183	S5-A2	J3-w	S12	OFF	Less than two ohms
184	S8-B8	J3-x	S12	OFF	Less than two ohms
185	S18-E8	J3-y	S12	OFF	Less than two ohms
186	S1-C	J3-z	S12	OFF	Less than two ohms
187	S14-A6	J3-AA	S12	OFF	Less than two ohms
188	S14-B2	J3-CC	S12	OFF	Less than two ohms
189	S14-F3	J3-DD	S12	OFF	Less than two ohms
190	S18-2	J4-H	RECORDER DRIVE TEST switch S3	ALIGN	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control settings		Remarks
	LO	HI	Control	Position	
190 (cont)	S13-A2	J4-K	Power mode switch S12	OFF	Less than two ohms
191	S13-B2	J4-M	S3	ALIGN	
			S12	OFF	Less than two ohms
192	S13-D6	J94	S12	OFF	Less than two ohms
193	S13-B3	J9-K	S12	OFF	Less than two ohms
194	Test point 9	J8-L	S12	OFF	Less than two ohms
195	Test point 9	J8-U	S12	OFF	Less than two ohms
196	Test point 9	J8-y	S12	OFF	Less than two ohms
197	Test point 9	J8-a	S12	OFF	Less than two ohms
198	Test point 9	J8-b	S12	OFF	Less than two ohms
199	Test point 9	J8-AA	S12	OFF	Less than two ohms
200	Test point 9	J8-e	S12	OFF	Less than two ohms
201	Test point 9	J8-f	S12	OFF	Less than two ohms
202	Test point 9	J10-d	S12	OFF	Less than two ohms
203	Test point 9	J9-V	S12	OFF	Less than two ohms
204	Test point 9	J7-C	Power mode switch S12	OFF	Less than two ohms
205	Test point 9	J6-M	S12	OFF	Less than two ohms
206	Test point 9	XA4-2	S12	OFF	Less than two ohms
207	Test point 9	XA4-11	S12	OFF	Less than two ohms
208	Test point 9	XA6-9	S12	OFF	Less than two ohms
209	Test point 9	XA5-12	S12	OFF	Less than two ohms
210	Test point 9	XA5-14	S12	OFF	Less than two ohms
211	Test point 9	XA6-22	S12	OFF	Less than two ohms
212	Test point 9	XA7-17	S12	OFF	Less than two ohms
213	Test point 9	XA8-14	S12	OFF	Less than two ohms
214	Test point 9	E7	S12	OFF	Less than two ohms.
215	Test point 9	XA11-7	S12	OFF	Less than two ohms
216	Test point 9	J13-23	S12	OFF	Less than two ohms
217	Test point 9	S3C-C2	S12	OFF	Less than two ohms
218	Test point 9	R1-1	S12	OFF	Lees than two ohms
219	Test point 9	R3-1	S12	OFF	Less than two ohms
220	Test point 8	S2-5	S12	OFF	Less than two ohms

Table 3-4. Continuity Measurements-Continued

Item	Dvm probe connection		Test unit control setting*		Remarks
	LO	HI	Control	Position	
221	Test point 9	S4-1	S12	OFF	Less than two ohms
222	Test point 8	S7-2	S12	OFF	Less than two ohms
223	Test point 9	S11-2	Power mode switch S12	OFF	Less than two ohms
224	Test point 9	T14	S12	OFF	Less than two ohms
225	Test point 9	T2-6	S12	OFF	Less than two ohms
226	Test point 9	S10-1	S12	OFF	Less than two ohms
227	Test point 9	XA9-12	S12	OFF	Less than two ohms

Section III. REMOVAL AND REPLACEMENT

3-7. Removal

All parts may be removed using standard tools and maintenance procedures. Refer to parts location diagram, figure 3-2, when removing parts and subassemblies.

a. The control unit is removed by disengaging the 20 screws along the edge of the control unit and sliding the chassis from the case. Loosen the six modified captive screws (fig. 3-2 (1)).

Swing the hinged chassis out from the control unit as shown in figure 3-2 (2).

b. Access to the printed circuits boards is gained by removing the three captive screws securing the hinged cover and swinging it open.

c. To gain access to the remaining chassis mounted components, remove the six modified captive portions of the chassis and swing open as shown in figure 3-2 (2).

d. Access to the filter assembly is gained by removing the two retaining nuts securing 1A1J1 and 1A1J2 to the panel and removing the eight panhead screws (fig. 3-2 (1)) securing the filter assembly case to the control unit panel. Refer to parts location diagram, figure 3-3, when removing parts and subassemblies.

3-8. Replacement

All parts may be replaced using standard tools and maintenance procedures. Refer to part location diagram, figure 3-2, when replacing parts and subassemblies.

a. Secure the printed circuit board hinged cover with the three captive screws.

b. To replace the filter assembly, secure J1 and J2 to the control unit panel with the two retaining nuts; secure the filter assembly case to the control unit panel with the eight panhead screws (fig. 3-2 (1)). Refer to the part location diagram, figure 3-3, when replacing parts and subassemblies.

c. The control unit is replaced by closing up the hinged chassis of the control unit as shown in figure 3-2 (2). Tighten down each of the six modified captive screws as shown in figure 3-2 (1). Observe that the hinged chassis is firmly attached to the control unit. Slide the chassis back into the case and secure the 20 screws along the edge of the control unit. Refer to part location diagrams (fig. 3-2) when replacing parts and subassemblies.

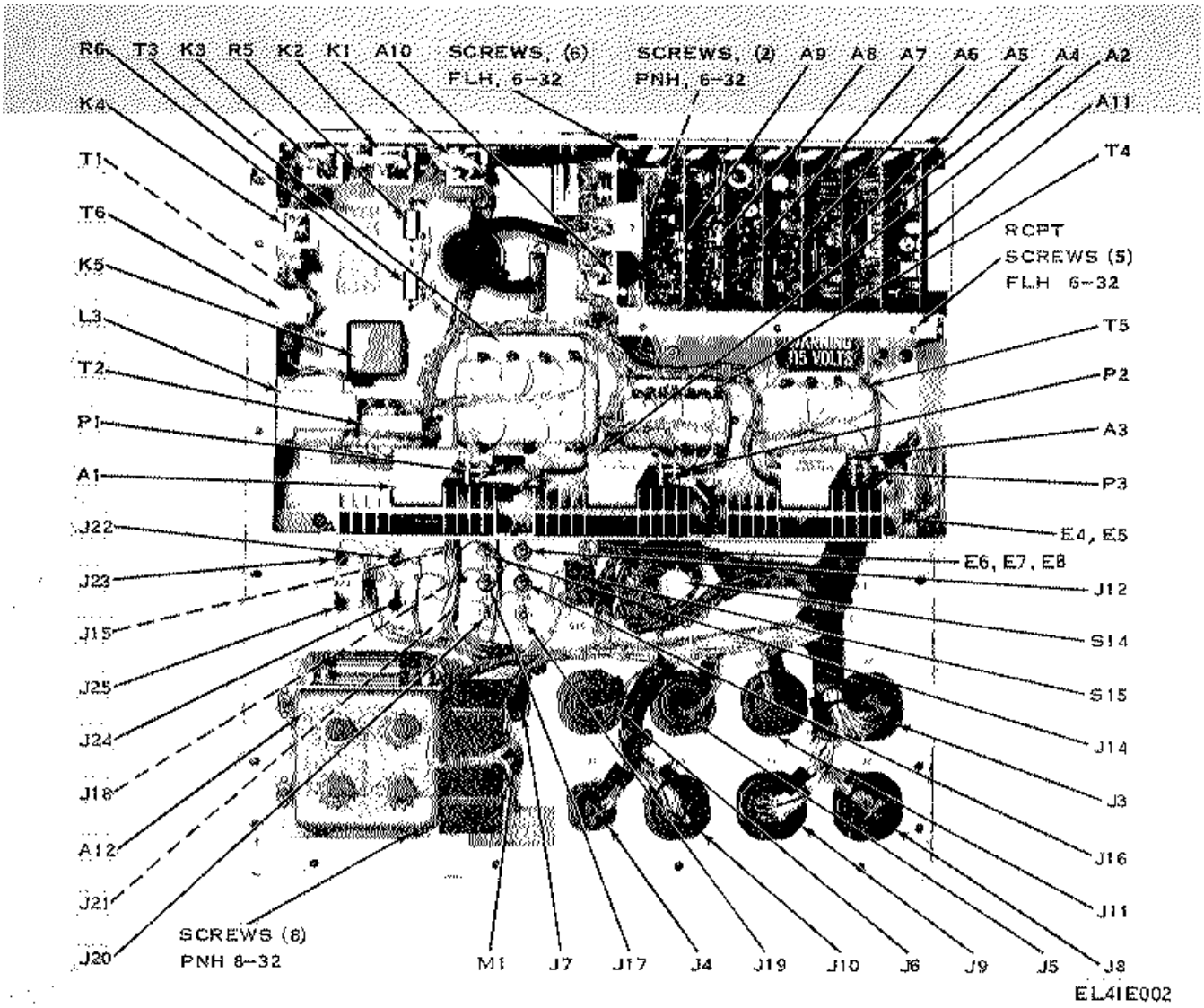

Figure 3-2(1). Control unit 1A1, parts location. (part 1 of 2).

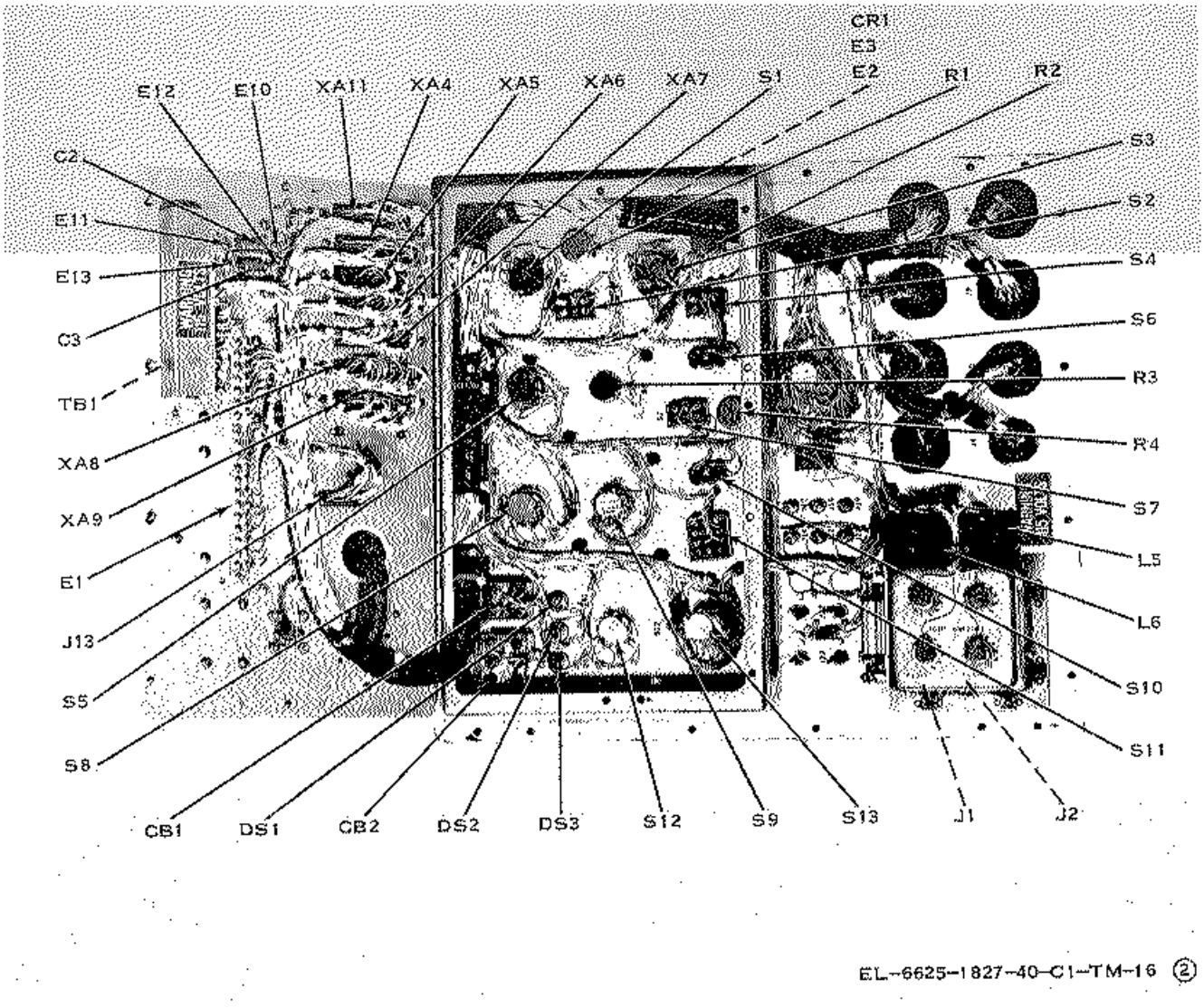

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Figure 3-2(2). Control unit 1A1, parts location (part 2 of 2).

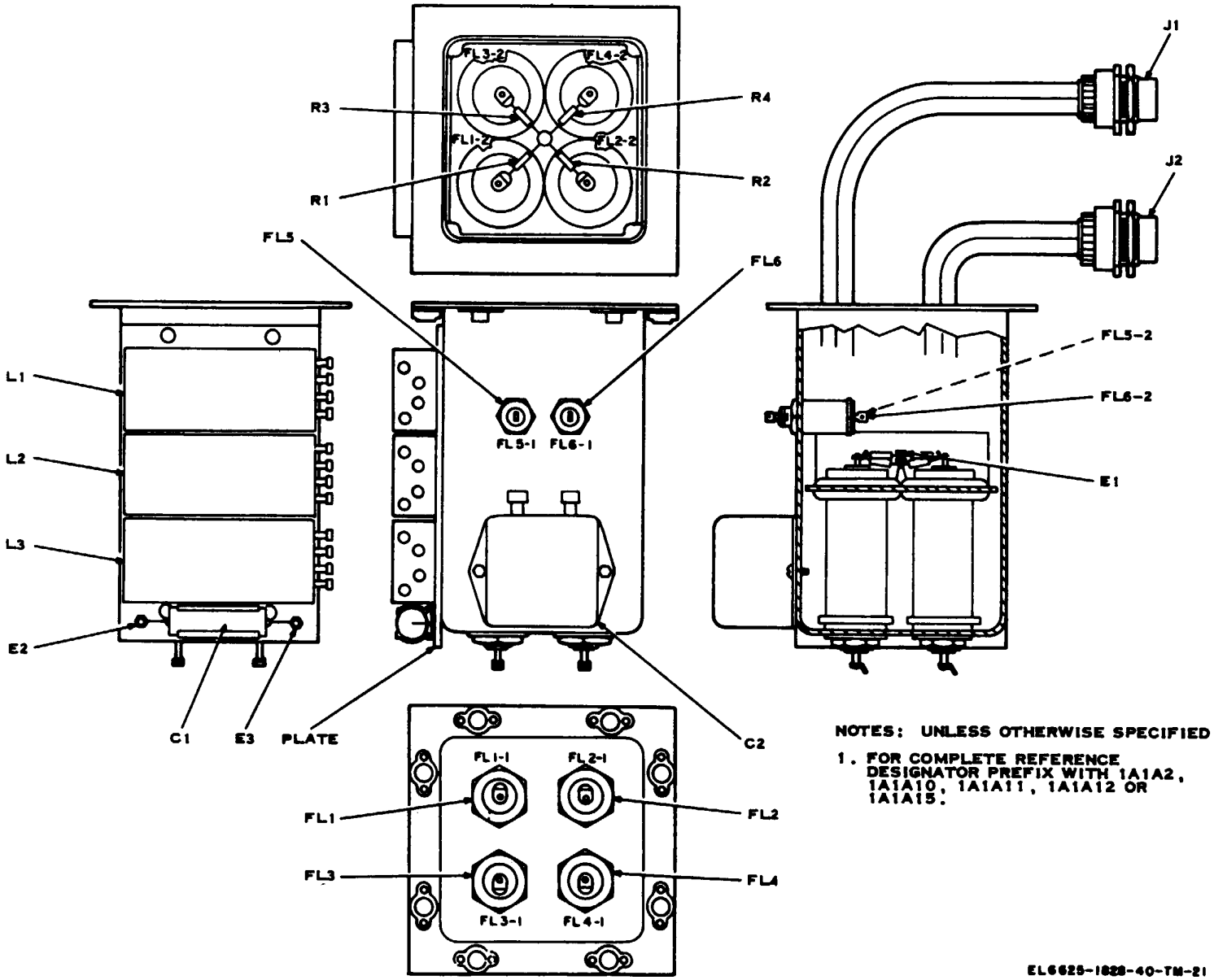

Figure 3-3. Filter assembly 1A1A12, parts location.

Section IV. ADJUSTMENT AND ALIGNMENT

3-9. Adjustment Procedures

a. Initial Preparation.

(1) Perform the removal procedure (para 3-7) to remove control unit 1A1 from the carrying case and gain access to the printed circuit boards.

(2) Use extender boards supplied with the electronic maintenance kit as necessary for gaining access to board test points and variable resistors.

(3) Perform the starting procedure as outlined in TM 11-6625-1827-12.

(4) Remove power from the recorder test set when removing or replacing boards or extender boards.

(5) Exercise caution as terminals with voltages are exposed during the procedure.

(6) Perform preparation for use procedures as outlined in paragraph 3-3. Refer to test setup for dvm and oscilloscope, figure 3-4.

b. Test Equipment.

(1) Oscilloscope AN/USM-281A.

(2) Digital Voltmeter, Non-Linear System Modex X-2.

(3) Tool Kit, Electronic Equipment TK-100/G.

c. +1S-Vdc Regulator 1A1A4.

(1) Refer to table 3-2, item 35, for dvm probe connection and recorder test set switch settings.

(2) Locate ± 13-vdc regulator board 1A1A4, figure 3-2 (1).

(3) Adjust 1A1A4R29 until dvm indicates +13.0 ± 0.1 vdc.

(4) Remove dvm probes.

d. -13-Vdc Regulator, 1A1A4.

(1) Refer to table 3-2, item 36, for dvm probe connection and receiver test set switch settings.

(2) Locate ± 13-vdc regulator board 1A1A4, figure 3-2 (1).

(3) Adjust 1A1A4R26 until dvm indicates -13.0 ± 0.1 vdc.

(4) Remove dvm probes.

e. +6-Vdc Regulator, 1A1A5.

(1) Refer to table 3-2, item 25, for dvm probe connection and switch settings.

(2) Locate +6-vdc regulator board 1A1A5, figure 3-2 (1).

(3) Adjust 1A1A5R20 until dvm indicates +6.0 ±0.1 vdc.

(4) Remove dvm probes.

f. Sync Generator, 1A1A7.

(1) Set TEST POINTS switch S14:1.

(2) Connect oscilloscope probe to test point 1.-Slope+: -

(3) Adjust 1A1A7L4 for a time delay of 13.9 ± 0.1 µsec before the pulse occurs (A, fig. 3-1).

(4) Place the RECORDER DRIVE TEST switch to DYN.

(5) Set oscilloscope for 2 µsec/cm and X10 horizontal sweep. Trigger the oscilloscope on the trailing edge of the fine sync waveform (A. fig. 3-1) and observe the leading edge. Adjust 1A1A7R13 for a horizontal deviation of leading edge of 30 ± 10 nanoseconds.

(6) Remove the oscilloscope probe from the recorder test set.

g. Video Oscillator and Film Fail Amplifier, 1A1A11.

(1) Set the TEST POINTS switch S14 to 4.

(2) Connect the oscilloscope probe to test point 1. Set VIDEO TEST to VID.

(3) Set the LED TEST switch S11 to LOW.

(4) Adjust A1A11L6 such that the sine-wave signal (E, fig. 3-1) has a period of 3.18 ± 0.05 µsec.

(5) Set the LED TEST switch S11 to HIGH.

(6) Adjust 1A1A11C18 such that the sine-wave signal (E, fig. 3-1) has a period of 1.59 ± 0.02 µsec.

(7) Place the LED TEST switch to OFF.

(8) Remove the oscilloscope probe from the recorder test set.

h. Video Generator and Hot Target Marker, 1A1A9.

(1) Connect the dvm HI probe to test point 2 and LO to test point 9.

(2) Set V/H SIGNAL to 4.00 and TEST POINTS switch S14 to 4.

(3) Adjust 1A1A9R17 for a dvm indication of -11.'75 ± 0.1 vdc.

(4) Set the TEST POINTS switch S14 to position 1.

(5) Adjust 1A1A9R10 for a dvm indication of -4.0 ± 0.02 vdc.

(6) Remove dvm probes from the test points.

3-10. Alignment

Alignment procedures are not required.

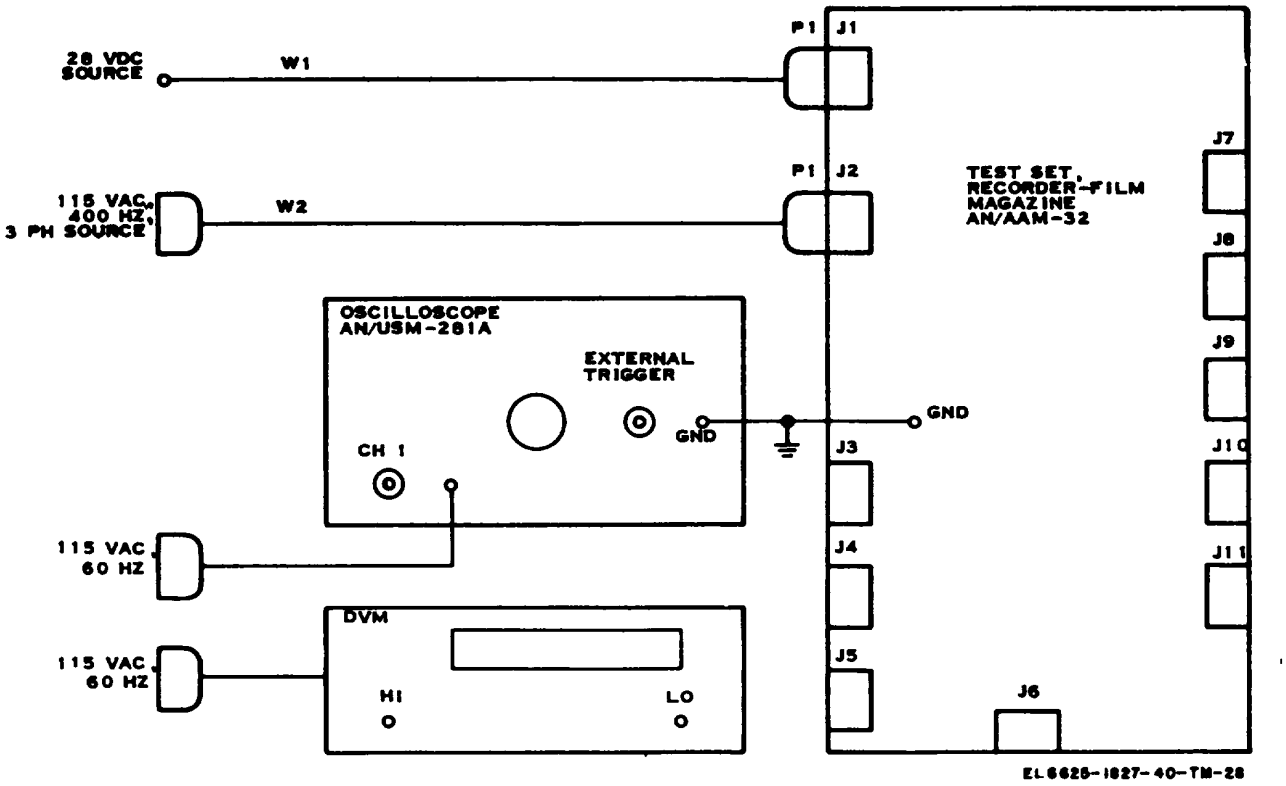

Figure 3-4. Test setup for dvm and oscilloscope.

Section V. Repair

3-11. Parts Replacement Techniques

All parts are easily accessible and can be replaced without special procedures. The following general precautions apply to the equipment.

a. Use the pencil type 55-watt soldering iron supplied with Tool Kit, Electronic Equipment TK-100/G for removal and repair of chassis mounted components. If the iron is to be used with alternating current, use an isolating transformer between the soldering iron and the line. Do not use a soldering gun; damaging voltages can be induced in components.

b. When soldering transistor or diode leads, solder quickly; whenever wiring permits, use a heatsink (such as long-nosed pliers) between the soldered joint and the transistor or diode. Use approximately the same lead length and dress as used originally.

c. Wiring diagram information and cable diagrams in figure FO-7 and 8 should be referred to as required to ensure correct part replacements.

3-12. Parts Substitution

Do not substitute parts indiscriminately. Substitute parts only when the trouble has been isolated to a specific state and the defective part had been localized.

Section VI. GENERAL SUPPORT TEST PROCEDURES

3-13. Purpose and Instructions

a. Test procedures contained in this section are to be used for general support maintenance to determine the acceptability of repaired equipment. These procedures set forth specific requirements that repaired equipment must meet before it is returned to the using organization.

b. Perform each test in sequence; do not vary the sequence. For each step, perform all the actions required in the Control settings column;

then perform each specific test procedure and verify it against the performance standard.

3-14. Test Equipment Required for Testing

All test equipment required to perform the testing procedures of this section is listed in table 3-1.

3-15. Test Procedure

General support test procedures are contained in chart 3-3.

Chart 3-3. General Support Test Procedures

Step no.	Control settings: Test equipment	Control settings: Unit under test	Test procedure	Performance standard
1		Controls may be in any position	*a.* Inspect all controls and mechanical assemblies for loose or missing screws, nuts, and bolts.	*a.* Screws, nuts, and bolts must be tight; none missing.
			b. Inspect all connectors, sockets, and receptacles for looseness and damage.	*b.* No looseness or damage evident.
			c. Inspect plugs, connectors, control knobs and control unit for cleanliness.	*c.* All items must be free of dust or dirt. If cleaning is required, refer to TM 11-6625-1827-12.
			d. Inspect all cable assemblies for signs of mechanical damage, such as chafed, cracked or frayed insulation.	*d.* All items must be free of chafed, cracked and frayed insulation. Defective cables should be repaired or replaced as described in TM 11-6625-1827-12.
			e. Inspect gaskets of control unit case for looseness, deterioration or damage.	*e.* Observe that all gaskets are tight, resilient and free from cuts or tears.
2			*a.* Set the 28 VDC circuit breaker and the 115 VAC circuit breaker ON then to OFF.	*a.* Observe the circuit breakers operate freely in both positions.
			b. Set the power mode switch to STY, OP and RESET positions and then back to OFF position.	*b.* Observe the switch operates smoothly with no evidence of binding or looseness.
			c. Set FUNCTION TEST switch S13 to all six positions FILM MAG through VIDEO and back -to FILM MAG.	*c.* Observe the switch operates smoothly with no evidence of binding or looseness.
			d. Set VIDEO TEST switch S8 to all four positions OFF through VID and back to OFF.	*d.* Observe the switch operates smoothly with no evidence of binding or looseness.
			e. Set CHANNEL switch S9 to position 1 through 8 and back to 1.	*e.* Observe the switch operates smoothly with no evidence of binding or looseness.
			f. Set VIDEO MODE switch S10 to HOT TGT and NORMAL. binding or looseness.	*f.* Observe the switch operates smoothly with no evidence of
			g. Set LED TEST to HIGH, LOW then back to OFF. binding or looseness.	*g.* Observe the switch operates smoothly with no evidence of
			h. Set V/H MASK TEST switch to MANUAL then back to AUTO.	*h.* Observe the switch operates smoothly with no evidence of binding or looseness.

Chart 3-3. General Support Test Procedures--Continued

Step no.	Control settings: Test equipment	Control settings: Unit under test	Test procedure	Performance standard
2 (cont.)			*i.* Turn the V/H SIGNAL control potentiometer R3 from 0 to 10 and back to 0.	*i.* Observe the control operates smoothly with no evidence of binding or looseness.
			j. Set MOT PWR switch S6 ON and then OFF.	*j.* Observe the switch operates smoothly with no evidence of binding or looseness.
			k. Set the FILM DR switch S7 to ON then OFF.	*k*. Observe the switch operates with no evidence of binding or looseness.
			l. Turn the TACH SIGNAL control from extreme ccw to extreme cw then back to ccw.	*l.* Observe the control operates with no of binding or looseness.
			m. Set FILM MAGAZINE TEST switch S1 to RUN then back to OFF.	*m*. Observe the switch operates with no evidence of binding or looseness.
			n. Turn FILM SPD ADJ control potentiometer R1 from extreme ccw to cw and back to ccw	*n*. Observe the control operates with no evidence of binding or looseness.
			o. Set the MARKER TEST switch S2 to HOT TGT, EVENT then back to OFF.	*o*. Observe the switch operates with no evidence of binding or looseness.
			p. Set RECORDER DRIVE TEST switch S3 to NORMAL, DYN then back to ALIGN.	*p*. Observe the switch operates with no evidence of binding or looseness.
			q. Turn AUX RCDR DR SPD control potentiometer R2 from extreme ccw to extreme cw then back to extreme ccw.	*q*. Observe the control operates with no evidence of binding or looseness.
			r. Set RCDR DR switch S4 to ON, CAL then to OFF.	*r.* Observe the switch operates with no evidence of binding or looseness.
			s. Set the TEST POINTS switch S14 to positions 1 through 8 then back to 1.	*s*. Observe the switch operates with no evidence of binding or looseness.
			t. Set DVM-CTR SELECT switch S15 to A then B.	*t.* Observe the switch operates with no evidence of binding or looseness.
3	Dvm		Prepare dvm for use.	Paragraph 3-3.
4	Oscilloscope		Prepare oscilloscope for use.	Paragraph 3-3.
5		FILM MAGAZINE TEST switch S1: OFF. FILM SPD ADJ potentiometer R1: Fully ccw.		

Chart 3-3. General Support Test Procedures--Continued

Step no.	Control settings: Test equipment	Control settings: Unit under test	Test procedure	Performance standard
5 (co t)		MARKER TEST switch S2: OFF. RECORDER DRIVE TEST switch S3: NORMAL. AUX RCDR DR SPD potentiometer R2: Fully ccw. RCDR DR switch S4: OFF. V/H MASK TEST switch S5: AUTO. V/H SIGNAL potentiometer R3: Fully ccw. MOT PWR switch S6: OFF. FILM DR switch S7: OFF. TACH SIGNAL potentiometer R4: Fully ccw. VIDEO TEST switch S8: OFF. CHANNEL switch S9: 1. VIDEO MODE switch S10: NORMAL. LED TEST switch S11: OFF. 28 VDC circuit breaker CB1: OFF. 115 VAC 30 circuit breaker CB2: OFF. Power mode switch S12: OFF. FUNCTION TEST switch S13: FILM MAG. TEST POINTS switch S14: 1. DVM-CTR SELECT switch S15: A.		
6			Connect cable W1 to 1A1J1 and the 28-vdc power source.	
7			Connect cable W2 to 1A1J2 and the 115-vac, 400-Hz, 3-phase power source.	
8		28 VDC circuit breaker CB1: ON. 115 VAC 30 circuit breaker CB2: ON. Power mode switch S12: STY.		STY lamp lights No other lamps light.
9		Power mode switch S12: OP.		OP lamp lights. STY lamp extinguishes. No other lamp lights
10	Dvm Power switch: ON Function switch: DC then AC.		Perform the voltage measurements in table 3-2, items 37 trough 69.	Observe dvm indication.
11	Dvm Power switch: ON Function switch: Kn.		Perform the resistance measurements in table 3-3, items 37 through 38 and 42 through 92.	Observe dvm indication.

Chart 3-3. General Support Test Procedures--Continued

Step no.	Control settings: Test equipment	Control settings: Unit under test	Test procedure	Performance standard
12	Dvm		Perform the continuity measurements in table 3-4, items 1 through 227	Observe dvm indication.
13			Remove + 6-vdc regulator board 1A1A5.	FAIL lamp light. OP lamp extinguishes
14			Replace + 6-vdc regulator board 1A1A5 and set power mode switch S12 to RESET and release.	FAIL lamp extinguishes. OP lamp lights.
15	Oscilloscope VOLTS/CM: 1 V/CM. TIME/CM: 5 µS/CM.	TEST POINTS switch S14: 1.	Disconnect dvm probes. Connect oscilloscope probe to test point 1.	Observe fine sync waveform A, figure 3-1.
16			Connect oscilloscope probe to J9-P.	Observe fine sync waveform A, figure 3-1.
17	Oscilloscope TIME/CM: 1MS/CM.	VIDEO TEST switch S8: VID.	Connect oscilloscope probe to J3-n.	Observe noninverted waveform B, figure 3-1.
18		FUNCTION TEST switch S13. VIDEO DVM-CTR SELECT switch S16: B.	Connect oscilloscope probe to test point CTR.	Observe noninverted waveform B, figure 3-1 (the waveform observed at test point CTR is the same signal inverted).
19		TEST POINTS switch S14: 2.	Connect oscilloscope to test point 1	Observe coarse sync waveform B, figure 3-1.
20			Connect oscilloscope probe to J9-M.	Observe coarse sync waveform B, figure 3-1.
21	Oscilloscope VOLTS/CM: .1 V/CM. TIME/CM: 10 MS/CM	TEST POINTS switch S14: 3. RECORDER DRIVE TEST switch S3: NORMAL.	Connect oscilloscope to test point 1.	Observe film fail drive waveform C, figure 3-1.
22			Connect oscilloscope probe to J11-f.	Observe film fail drive waveform C, figure 3-1.
23	Step deleted.			
24	Oscilloscope VOLTS/CM: .5 V/CM. TIME/CM: 1 MS/CM.	MARKER TEST switch S2: HOT TGT.	Connect oscilloscope probe to J10-i	Observe hot target waveform D, figure 3-1.
25		TEST POINTS switch S14: 1.	Connect oscilloscope to test point 6.	Observe hot target waveform D, figure 3-1.
26	Oscilloscope VOLTS/CM .2V/CM. TIME/CM: 1 US/CM. VID.	LED TEST switch S11: LOW. VIDEO TEST switch S8:	Connect oscilloscope to connector pins J9-A through J9-H.	Observe video waveform E, figure 3-1.
27		LED TEST switch S11: LOW TEST POINTS switch LED TEST switch 11: HIGH.	Connect oscilloscope to test point 1.	Observe video waveform E, figure 3-1. Observe waveform F shifts in frequency.

Chart 3-3. General Support Test Procedures

Step no.	Control settings: Test equipment	Control settings: Unit under test	Test procedure	Performance standard
28	Dvm Power switch: ON Function switch: DC. Range Switch: AUTO.	RCDR DR witch 54: ON. TEST POINTS Switch 814:	Remove oscilloscope probe. Connect dvm LO probe to test point 9; TURN AUX RCDR DR SPD potentiometer R2 fully	-2.5 ± 0.5 vdc.
29		RDCR DR switch S4: OFF.	Clockwise.	0.0 ± 0.1 vdc
30		TEST POINTS switch S14:4. V/H SIGNAL potentiometer R3: 0.0 ± 0.002. V/H SIGNAL potentiometer R3: 10.0 ± 0.002.		0.0 ± 0.1 vdc. 30.0± 0.5 vdc.
31				
32			Connect dvm HI probe to 1A1A7-4 and LO probe to test point 8.	Observe coarse sync sense level +3.17 ± 0.3 vac.
33		FUNCTION TEST switch S13: VIDEO. DVM-CTR SELECT switch S15: B.	Connect dvm HI probe to test point CTR and LO probe to test point 9.	Observe dc +1.93 ± 0.2 vdc.

APPENDIX

REFERENCES

The following publications contain information applicable to the general support maintenance of Test Set, Recorder-Film Magazine AN/AAM-32.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins Supply Manuals (types 7, 8, and 9), Supply Bulletins and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
TM 11-5850-241-34/1 (Volume 1 of 2).	DS and GS Maintenance Manual for Detecting Set, Infrared AN/AAS-24(U)
TM 11-5850-241-34/2(C) (Volume 2 of 2).	DS and GS Maintenance Manual for Detecting Set, Infrared AN/AAS-24(U)
TM 11-6625-366-15	Organizational, DS, GS, and Depot Maintenance Manual for Multimeter TS-352B/U.
TM 11-6625-1703-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual for Oscilloscope AN/USM-281A (Including Repair Parts and Special Tools Lists).
TM 11-6625-1827-12	Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists, Test Set, Recorder-Film Magazine AN/AAM-32.
TB SIG 222	Solder and Soldering (TO 31-3-64).
TM 38-750	The Army Maintenance Management System (TAMMS)

By Order of the Secretary of the Army:

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General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
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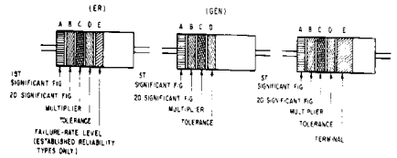


COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM.
BLACK	0	BLACK	0	BLACK	1			BROWN	M	
BROWN	1	BROWN	1	BROWN	10			RED	P	
RED	2	RED	2	RED	100			ORANGE	R	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	T	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP TYPE ONLY)	WHITE		SOLDERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL. ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

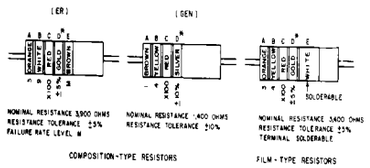
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED.)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS 1R00 = 1.00 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED. IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1400 OHMS
RESISTANCE TOLERANCE ±10%

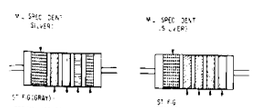
NOMINAL RESISTANCE 3400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS.



(A) 8.2 UH ± 10%

(B) 330 UH ± 5%

COLOR CODING FOR TUBULAR ENCAPSULATED RF CHOKES. AT A, AN EXAMPLE OF THE CODING FOR AN 8.2 UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED

TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED RF CHOKES

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0		
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB

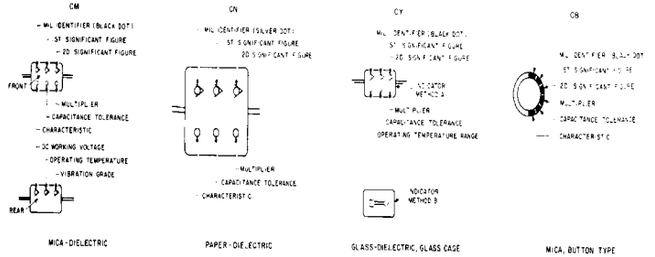


TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL C	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE			CHARACTERISTIC			DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CK, CM	CM
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A				-55°C to +70°C	10-55 c/s
BROWN		1		10					B	F	B			
RED		2	2	100	±2%		±2%	±2%	C				-55°C to +85°C	
ORANGE		3	3	1,000		±30%			J		D	300		
YELLOW		4	4	10,000					E				-55°C to +125°C	10-2,000 c/s
GREEN		5	5		±5%				F			500		
BLUE		6	6										-55°C to +90°C	
PURPLE (VIOLET)		7	7											
GREY		8	8											
WHITE		9	9											
GOLD				0.1	±5%	±5%								
SILVER	CN				±10%	±20%	±10%	±10%						

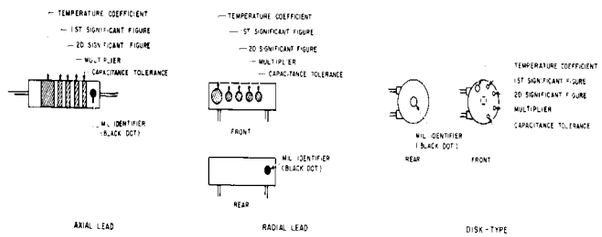


TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC.

COLOR	TEMPERATURE COEFFICIENT [4]	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		±2.0 UUF	CC
BROWN	-30	1		10	±1%		
RED	-80	2	2	100	±2%	±0.25 UUF	
ORANGE	-150	3	3	1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		±5%	±0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	±10%		
GOLD	+100					±1.0 UUF	
SILVER							

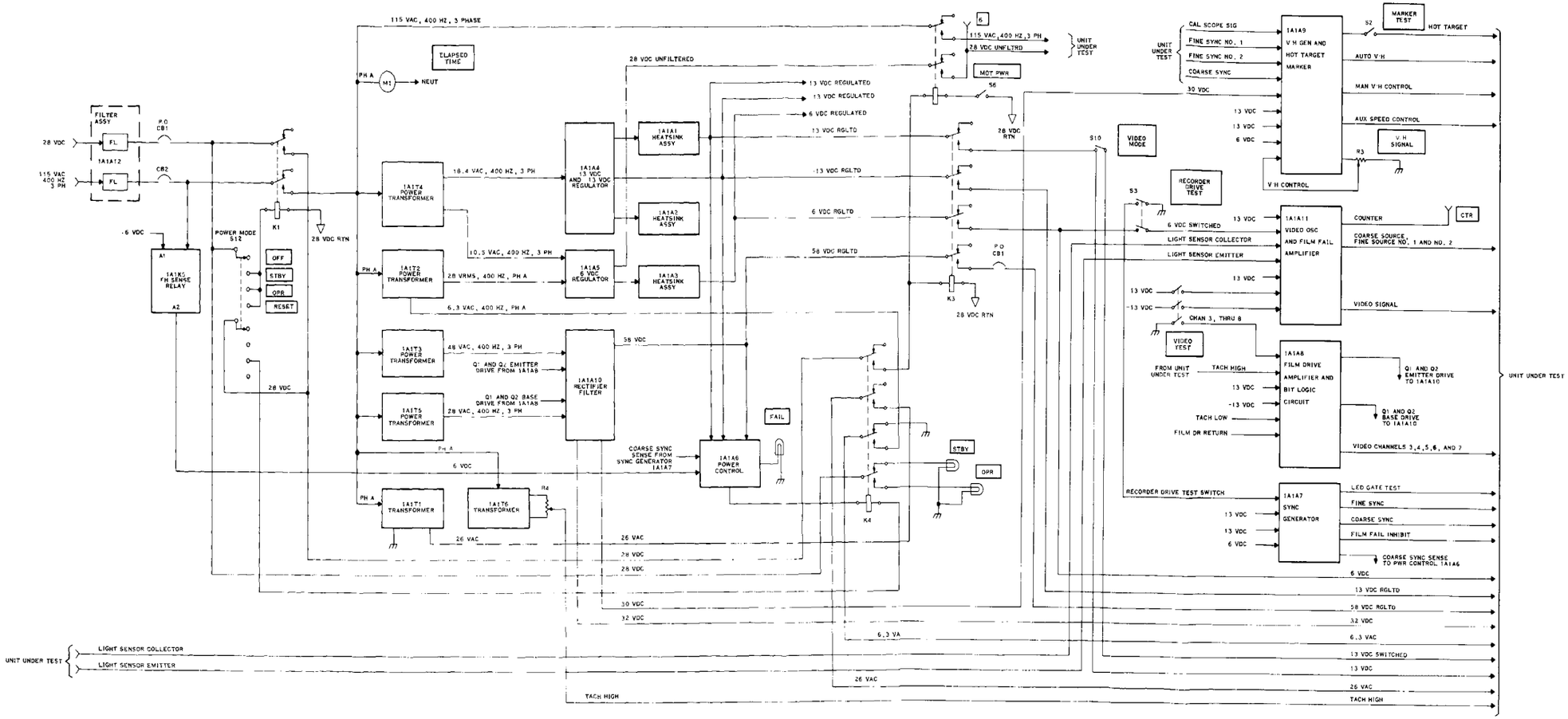
1 THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE, IN UUF.

2 LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS MIL-C-5, MIL-C-250, MIL-C-11272, AND MIL-C-0950C RESPECTIVELY.

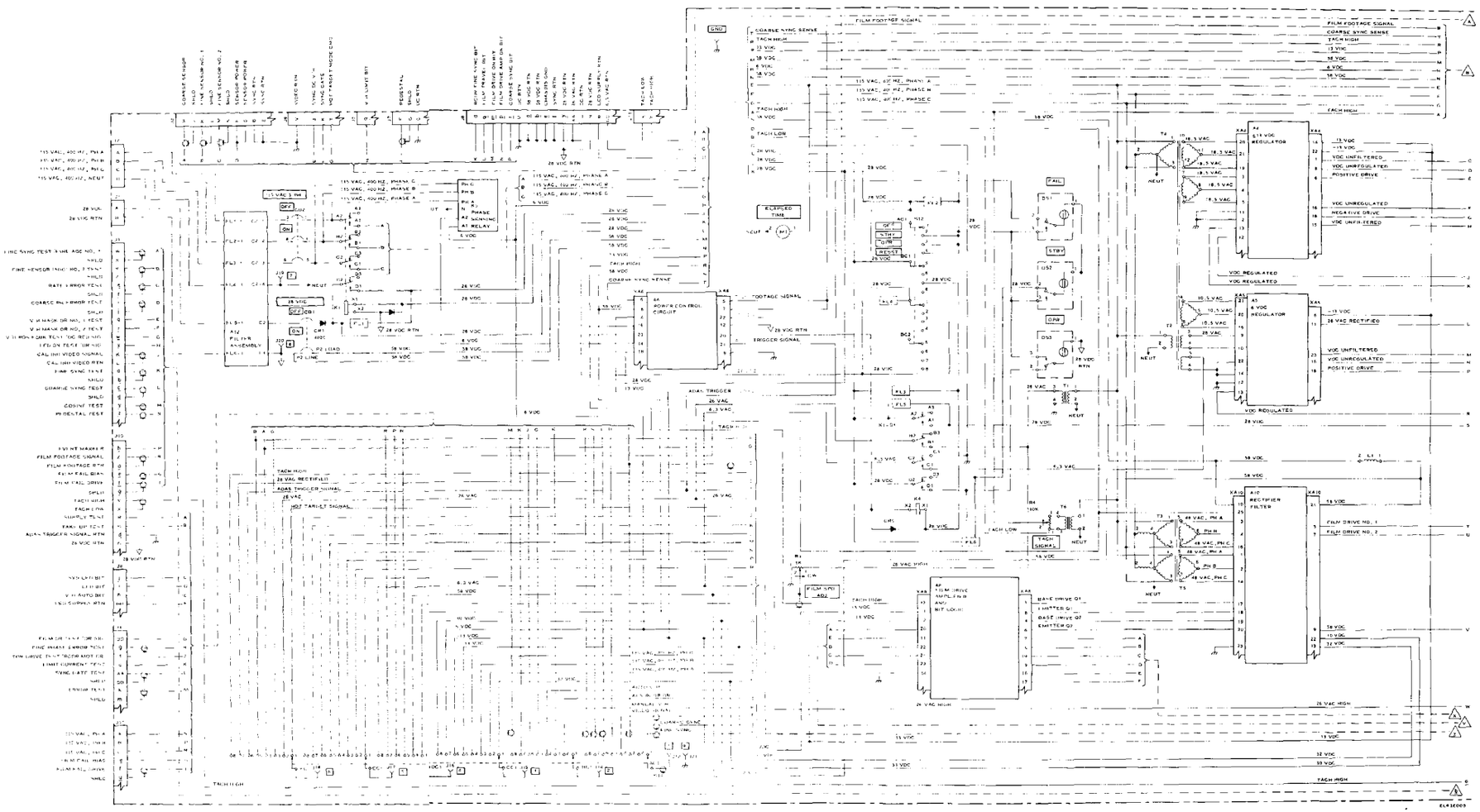
3 LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.

4 TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.

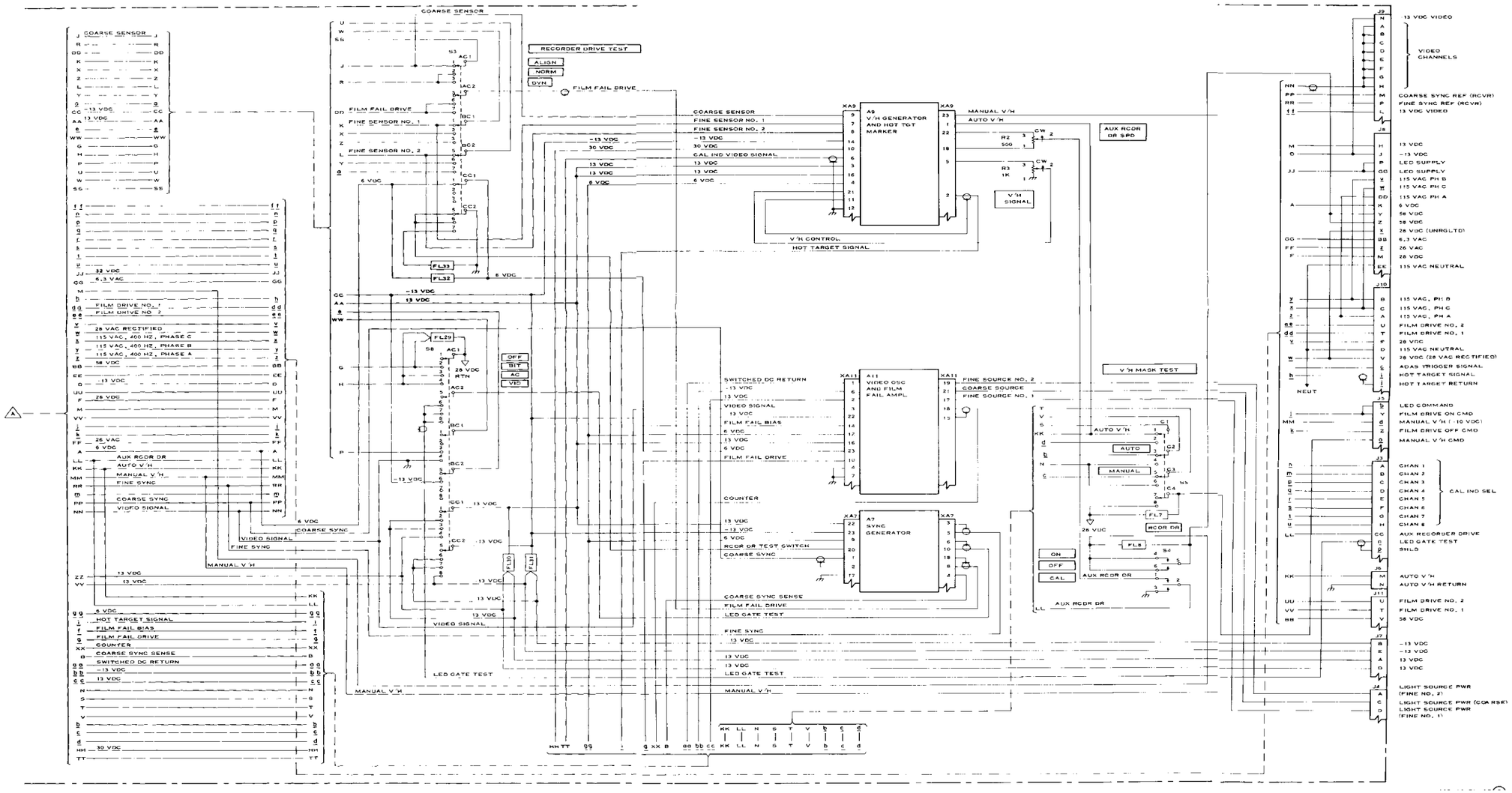
FO-1. Color code for military standard resistors, inductors, and capacitors.



FO-2. Block diagram.



FO-3(1). Overall schematic diagram (part 1 of 3)



FO-3(3). Overall schematic diagram (part 3 of 3).

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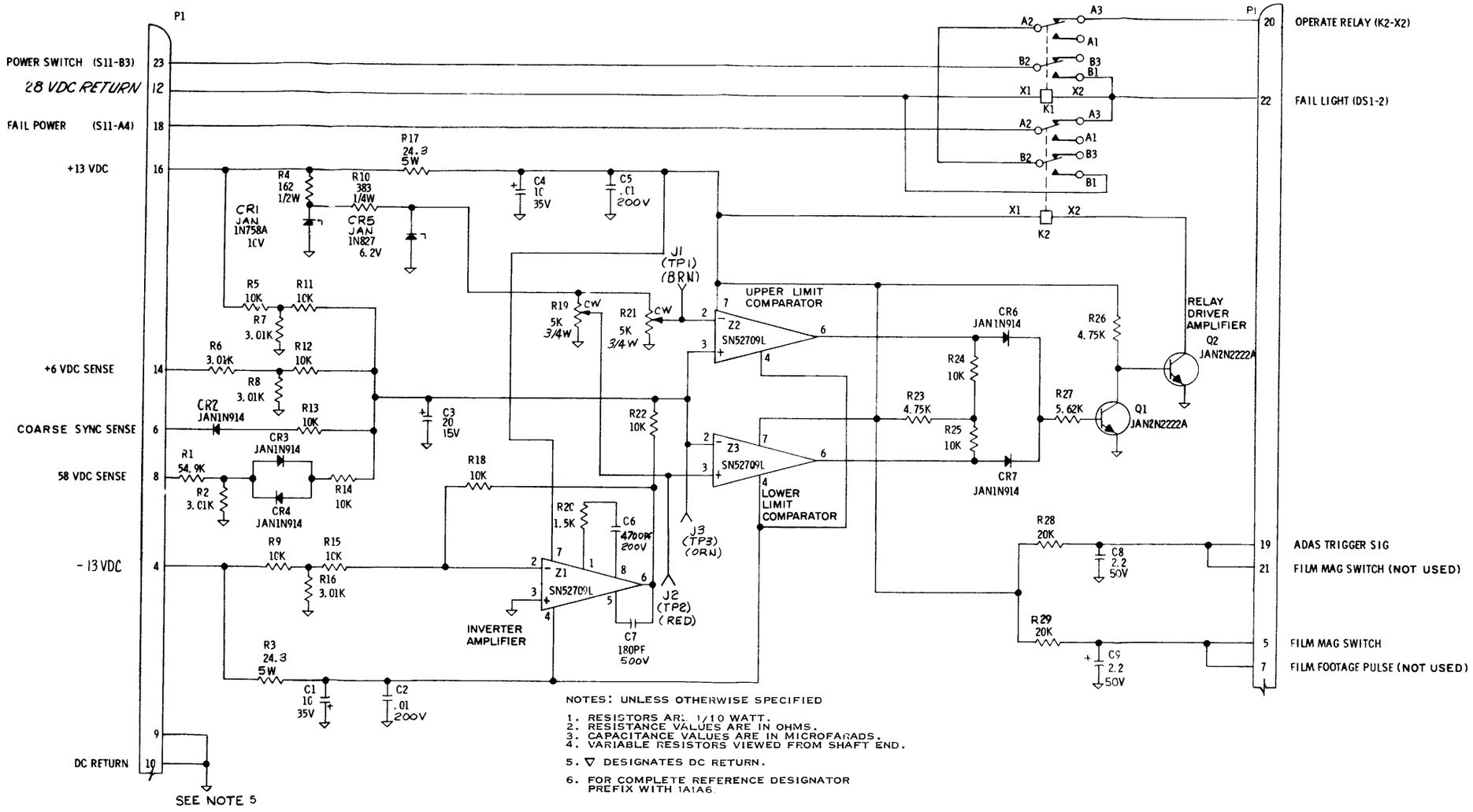
FO-3(3). Overall schematic diagram (part 3 of 3)



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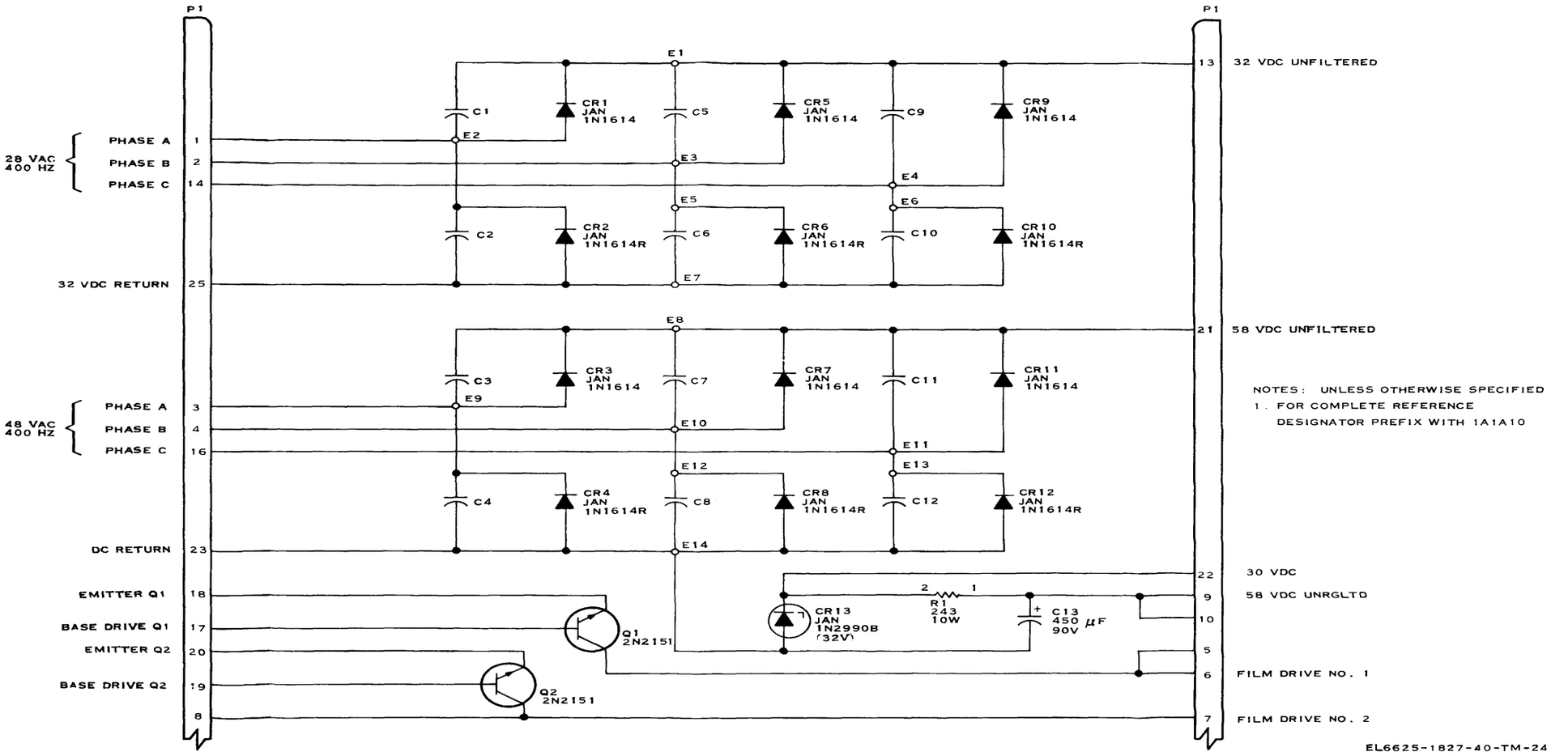
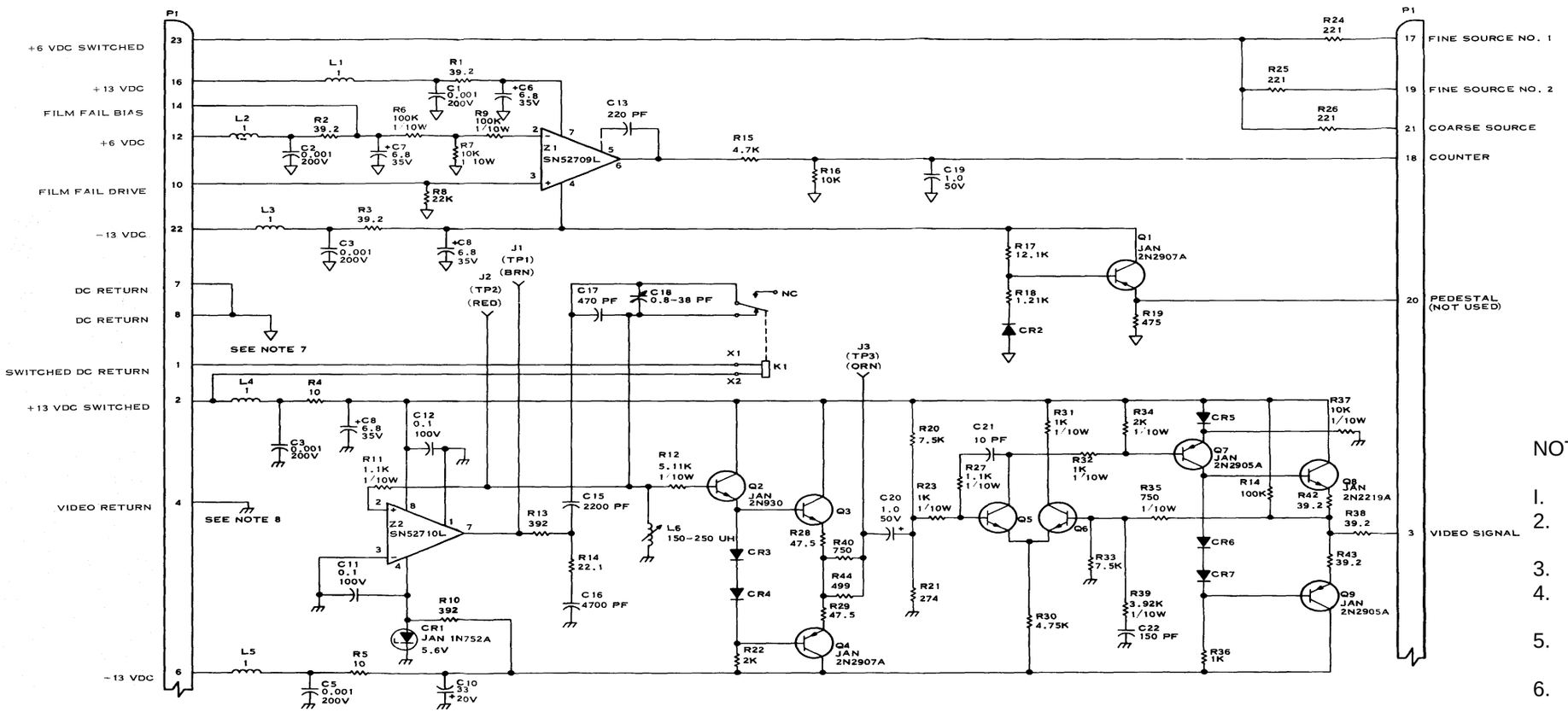
FO-4. Power control 1A1A6, schematic diagram.



FO-5. Rectifier filter 1A1A10, schematic diagram.



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIODES ARE JAN IN914.
2. TRANSISTORS ARE JAN 2N2222A.
3. RESISTORS ARE 1/4 WATT.
4. RESISTANCE VALUES ARE IN OHMS.
5. INDUCTANCE VALUES ARE IN MICRO HENRIES.
6. CAPACITANCE VALUES ARE IN MICROFARADS
7. DESIGANATES DC RETURN.
8. DESIGNATES VIDEO RETURN.
9. FOR COMPLETE REFERENCE DESIGNATOR PREFIX WITH 1A1A11

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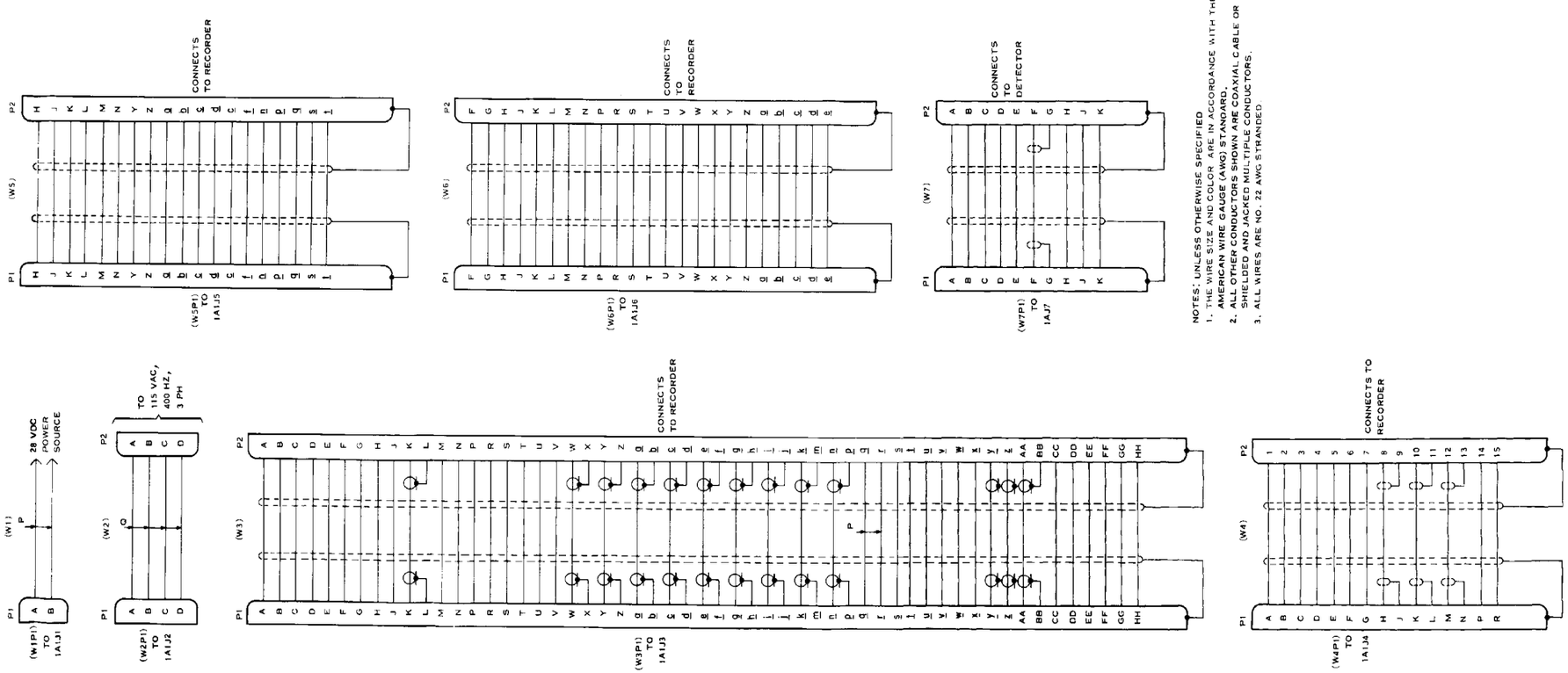
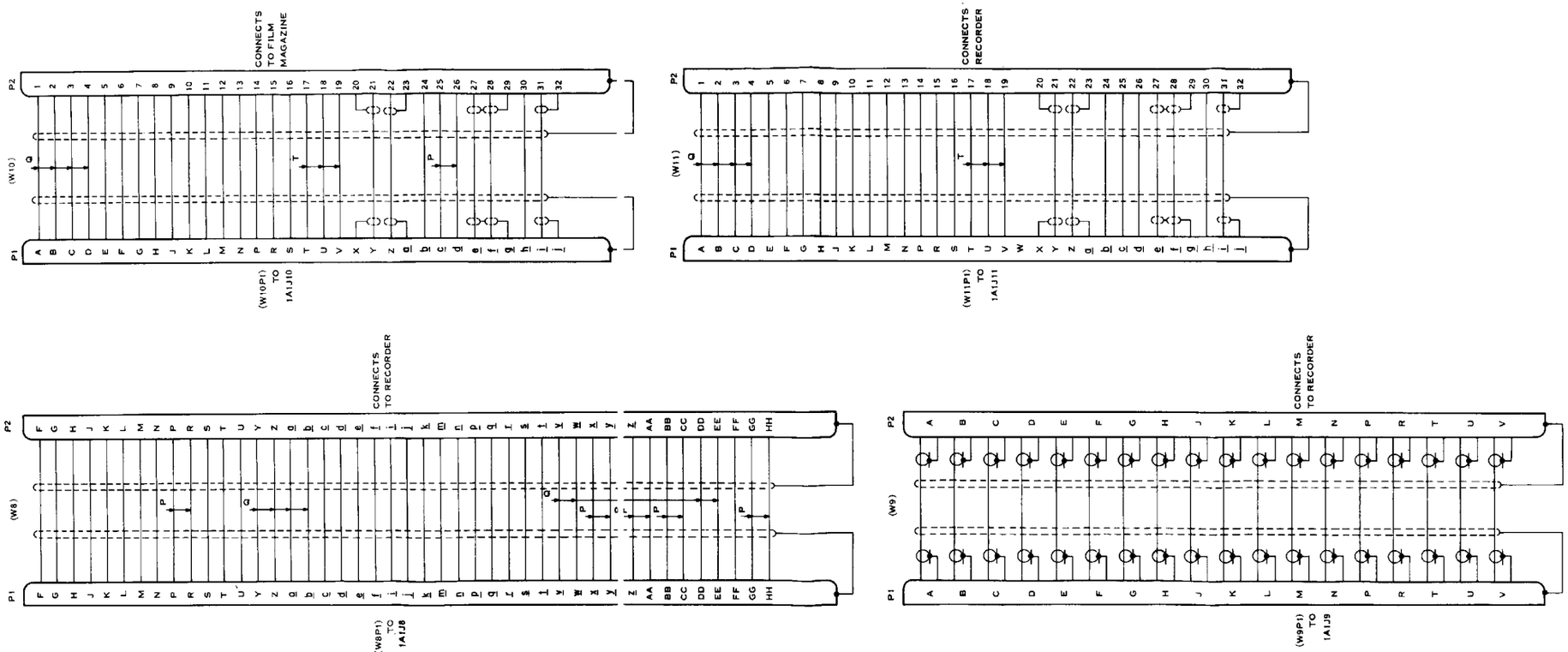
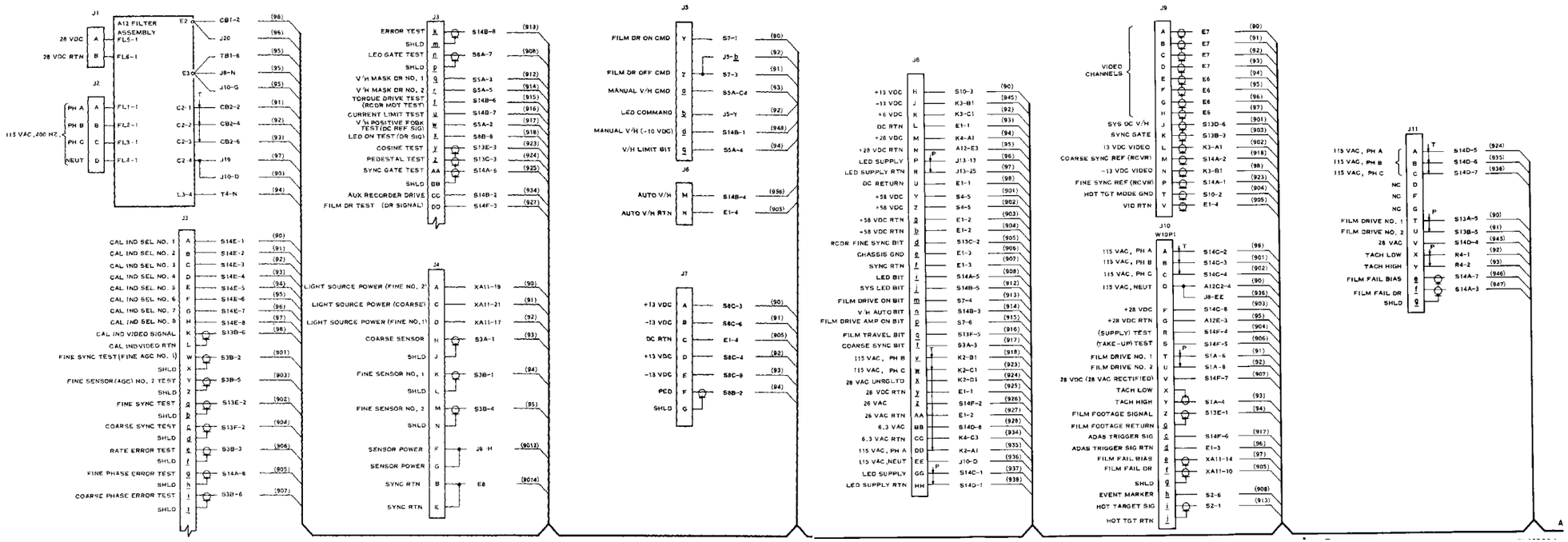
FO-6. Video oscillator and film fail amplifier 1A1A11, schematic diagram.



FO-7(1). Cable assemblies W1 through W11 (part 1 of 2.)

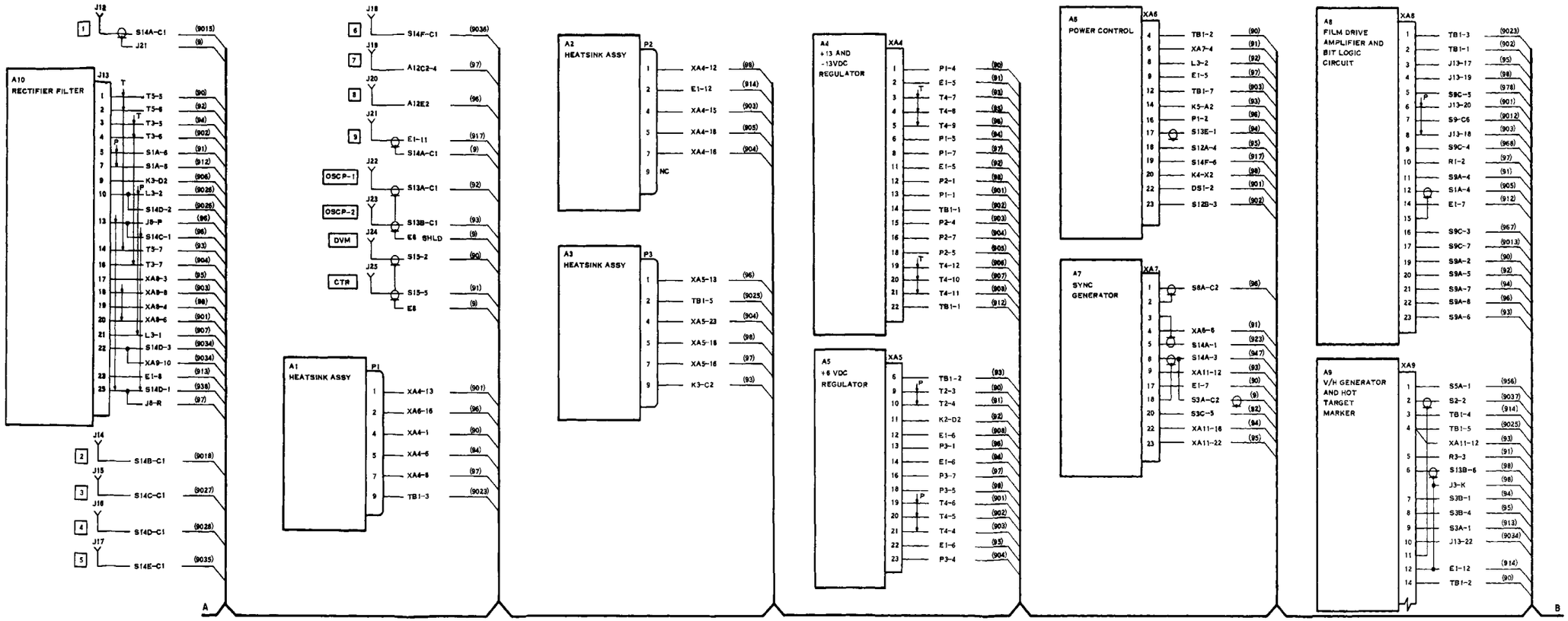


FO-7(2). Cable assemblies W1 through W11 (part 2 of 2.)



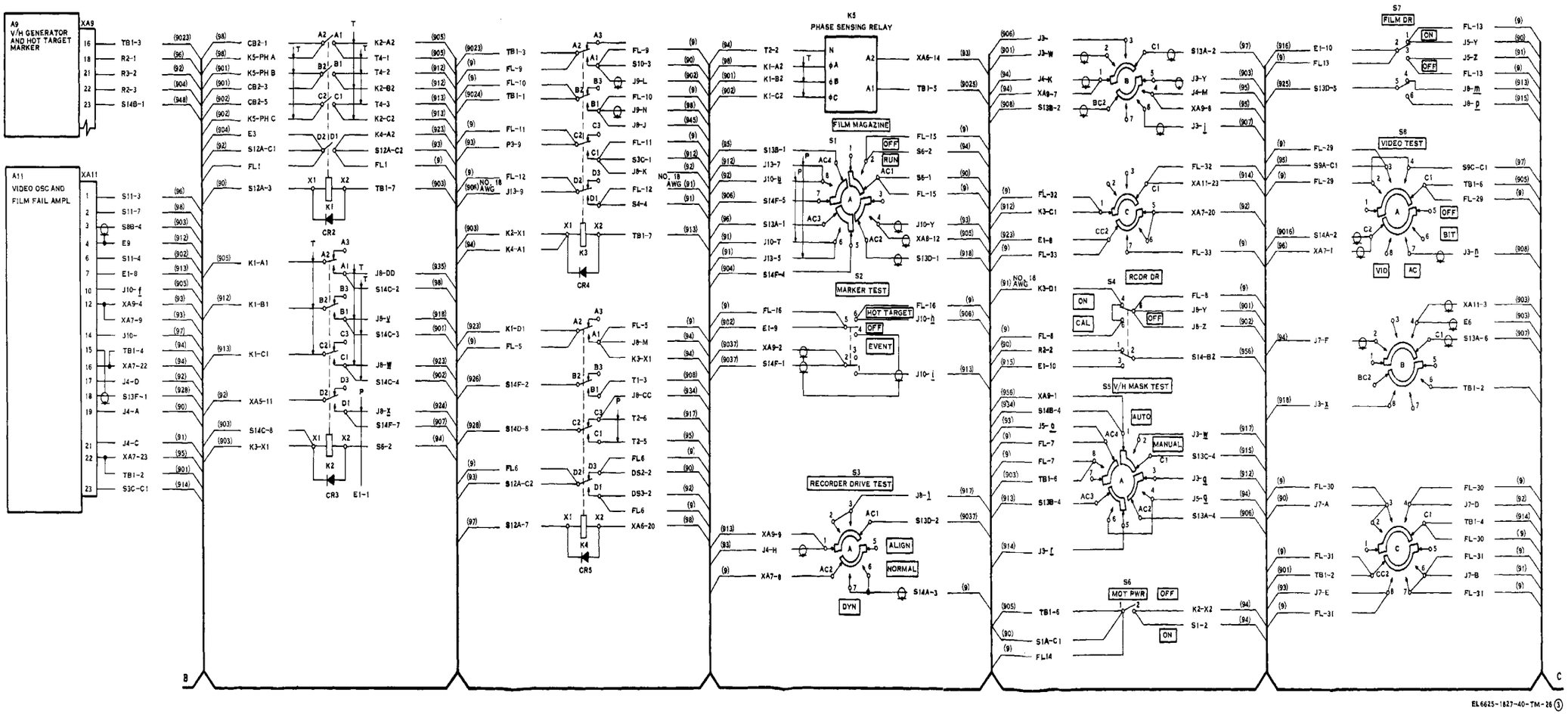
EL4IE004

FO-8(1) Wiring diagram (part 1 of 6.)



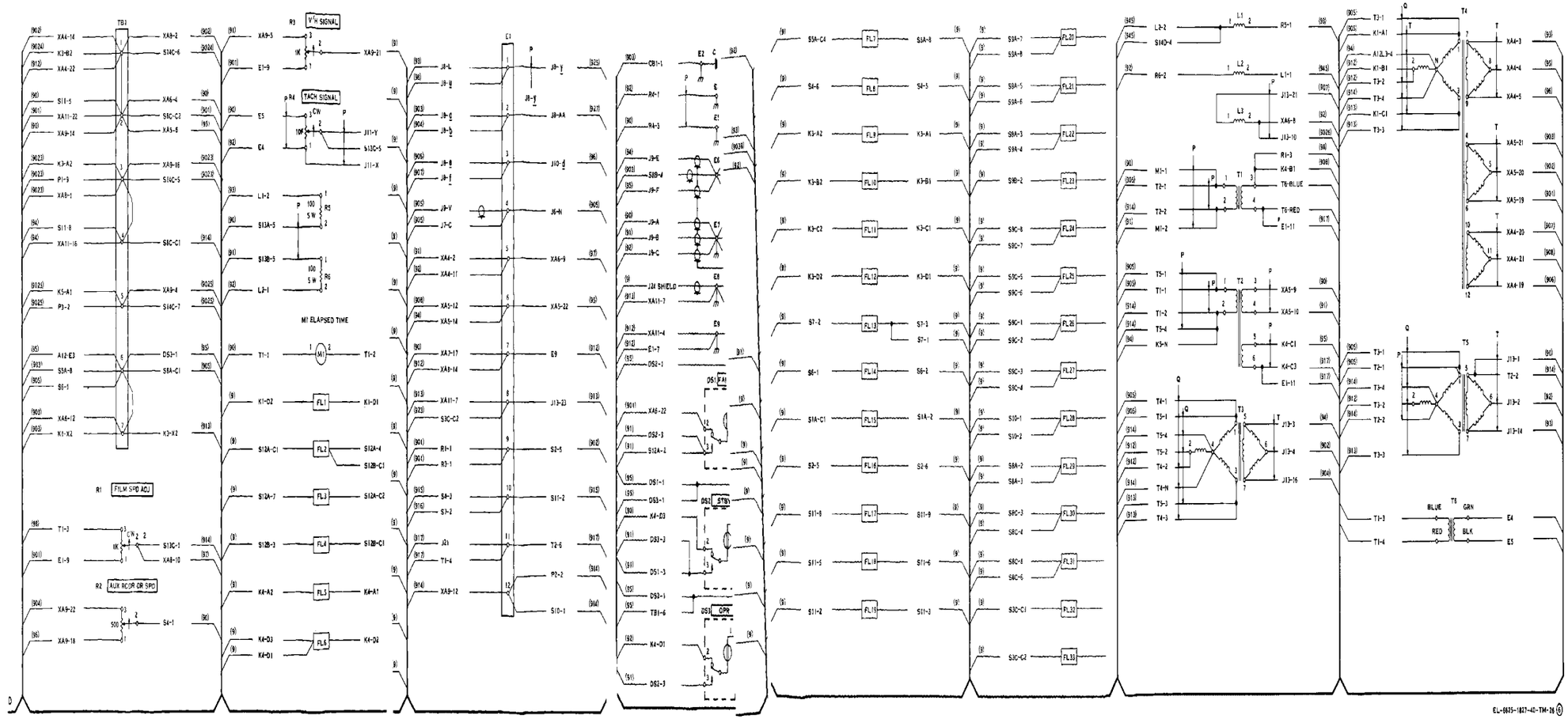
EL6625-1827-40-TM-26(2)

FO-8(2). Wiring diagram (part 2 of 6).



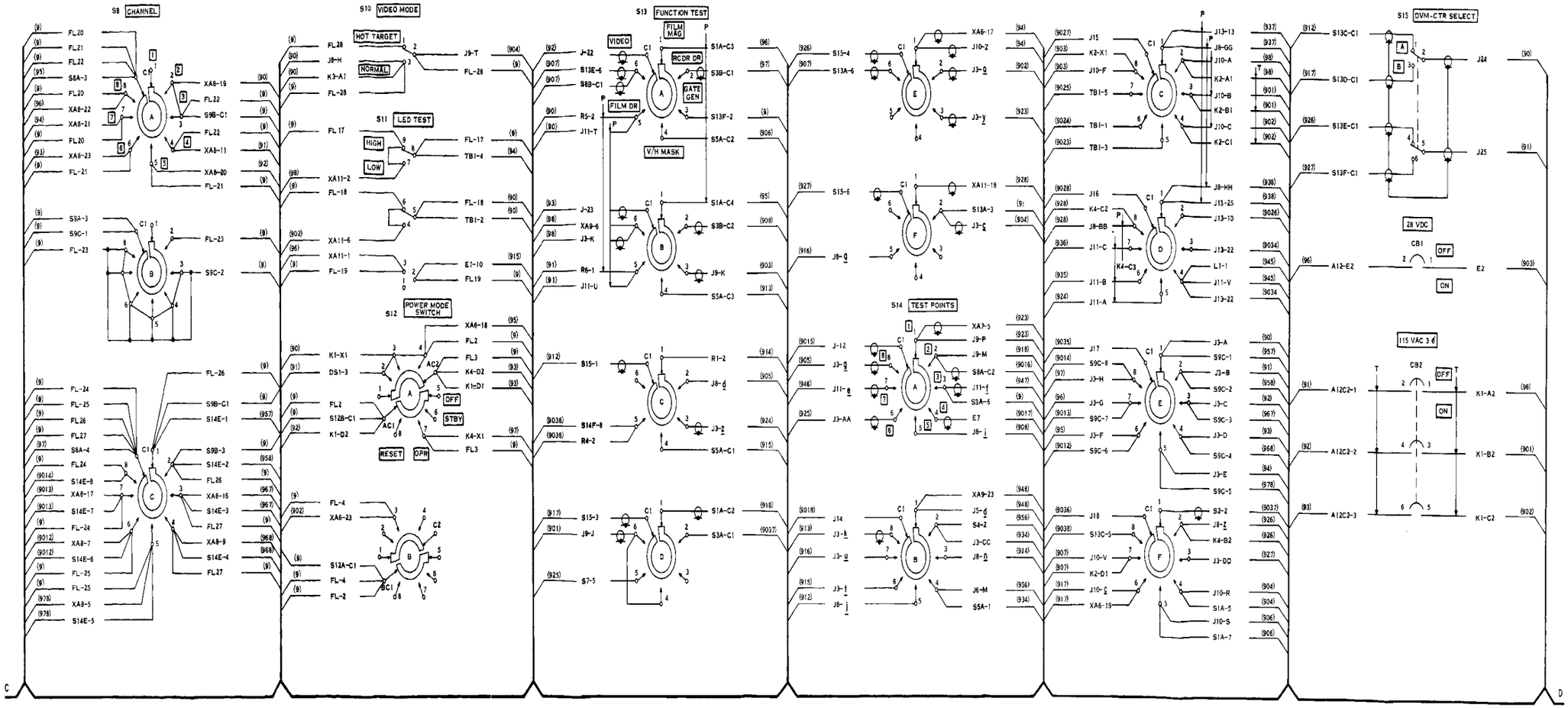
EL6625-1827-40-TM-26(3)

FO-8(3). Wiring diagram (part 3 of 6.)



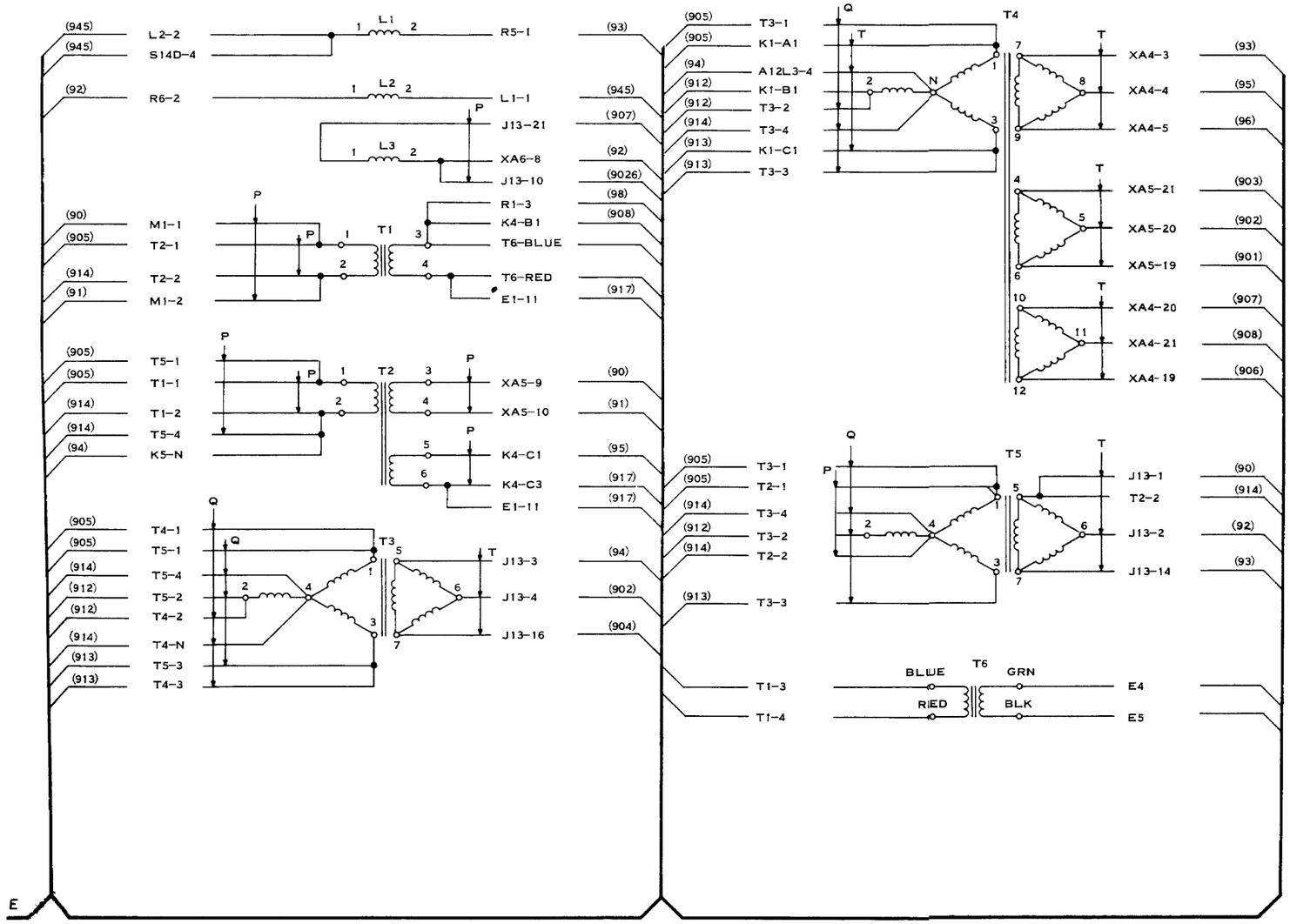
EL6625-1827-40-TM-26(4)

FO-8(4). Wiring diagram (part 4 of 6).



EL6625-1827-40-TM-26(5)

FO-8(5). Wiring diagram (part 5 of 6).



EL-6625-1827-40-TM-26 (6)
FO-8(6). Wiring diagram (part 6 of 6).

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