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**L3 AND L4 CARRIER  
COMMON EQUIPMENT  
J68820 AUTOMATIC LINE SWITCHING  
TESTS  
SWITCHING SIGNAL AMPLIFIER**

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**PURPOSE OF TESTS**

- (a) To measure the heater voltages and cathode activity of the amplifier tubes.
- (b) To measure the amplifier gain.

**REASON FOR ISSUE**

This section is reissued to change the switching signal amplifier gain measurement requirements. The changes in requirements are necessary because a pad was added to the amplifier input to attenuate incoming signals which could cause amplifier overload and suppress switching tones. Arrows are used to indicate significant changes. *Equipment Test Lists are affected.*

**SYNOPSIS**

The J68820E switching signal amplifier is used at each end of a switching section to amplify the switching signals. The amplifier has three stages and provides flat gain over a frequency range of 280 to 296 kHz.

**Caution:** *Before performing the following tests, notify the personnel at the distant end of the associated switching section.*

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**CHART 1**

**TUBE TESTS**

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**APPARATUS**

*KS-14510, L( ) Volt-Ohm-Milliammeter (VOM)*

**Note:** No substitute should be used.

## CHART 1 (Cont)

| STEP               | PROCEDURE                                                                                                                                                                                                                                                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>HEATER TEST</b> |                                                                                                                                                                                                                                                                                                                                                        |
| 1                  | Set the selector switch on the VOM to the 0.3 DC VOLT position.                                                                                                                                                                                                                                                                                        |
| 2                  | Connect the VOM to the HTR V + and - test jacks (Fig. 1).<br><br><b>Note:</b> A series resistor in the switching signal amplifier circuit makes the full-scale reading equal to 30 volts.                                                                                                                                                              |
| 3                  | Measure the heater voltage.<br><br><b>Requirement:</b> 20 volts maximum<br>19.5 volts minimum                                                                                                                                                                                                                                                          |
| 4                  | If the requirement of Step 3 is met, proceed to Step 9. If it is <b>not</b> met, resistor strapping may be incorrect. Proceed to Step 5.<br><br><b>Note:</b> Before attempting to change the strapping on the resistors, <b>the switching system under test must be locked normal at the L3 miscellaneous bay or at the L4 control connecting bay.</b> |
| 5                  | At the rear of the switch control bay, remove the switching signal amplifier rear cover.                                                                                                                                                                                                                                                               |
| 6                  | Locate resistors R17 through R22.<br><br><b>Note:</b> The resistors are located on the left side of the unit.                                                                                                                                                                                                                                          |

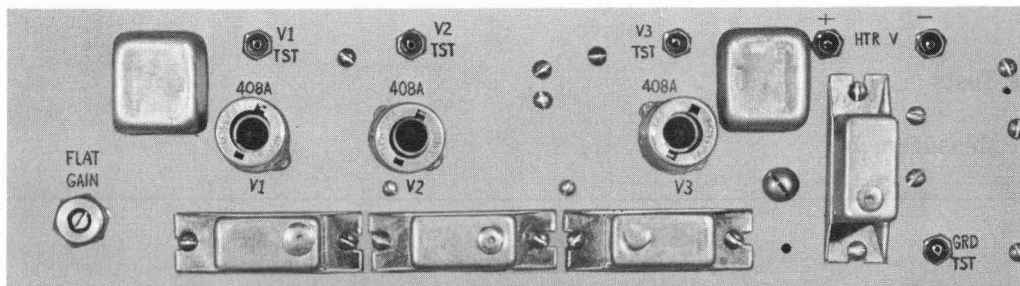


Fig. 1—Switching Signal Amplifier (J68820E)

## CHART 1 (Cont)

| STEP | PROCEDURE                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 7    | Add or remove straps on the resistors to meet the requirement of Step 3.<br><br><i>Note:</i> Refer to SD-59461-01 for additional information. |
| 8    | Replace the switching signal amplifier rear cover.                                                                                            |
| 9    | Disconnect the VOM from the HTR V jacks.                                                                                                      |

**CATHODE ACTIVITY TESTS*****Aged-Tube Test***

- 10 With the VOM remaining in the 0.3 DC VOLT position, connect the leads to the test points shown in Table A.

*Note:* Meter will now read up to 3.0 volts.

TABLE A

CATHODE ACTIVITY REQUIREMENTS FOR THE  
SWITCHING SIGNAL AMPLIFIER

| GROUP   | TEST JACKS       | NEW TUBE<br>MINIMUM REQUIREMENTS |
|---------|------------------|----------------------------------|
| A,AA,AB | V1 TST (and GND) | 0.5 Volt                         |
| A,AA,AB | V2 TST (and GND) | 0.5 Volt                         |
| A,AA,AB | V3 TST (and GND) | 0.5 Volt                         |

- 11 Measure the bias voltage (cathode activity).

**Requirements:** (a) ***Aged tube without value:*** The tube requirement is 80 percent of the new tube minimum requirement in Table A.

(b) ***Aged tube with recorded value:*** The tube requirement is equal to or greater than the associated recorded value.

- 12 If the requirement of Step 11 is met, proceed to Chart 2. If it is **not** met, proceed to Step 13.

***Tube Replacement***

- 13 Lock the associated switching section out of service.

## CHART 1 (Cont)

| STEP | PROCEDURE                                                                                                                                                                                                     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14   | Replace the aged tube.<br><br><i>Caution: Allow sufficient time for the tube to reach a stable operating temperature.</i>                                                                                     |
| 15   | Unlock the associated switching section.<br><br><i>New Tube Test</i>                                                                                                                                          |
| 16   | Measure the bias voltage.<br><br><i>Requirement:</i> Minimum value as shown in Table A                                                                                                                        |
| 17   | If the requirement of Step 16 is met, leave the tube in service for two days and remeasure the voltage.<br><br><i>Requirement:</i> Same minimum requirement as shown in Table A                               |
| 18   | Temporarily record the value measured in Step 17.                                                                                                                                                             |
| 19   | Multiply the recorded value of Step 18 by 80 percent and permanently record the calculated voltage.<br><br><i>Note:</i> This is the minimum voltage requirement used when the tube is tested at a later date. |

## CHART 2

## GAIN MEASUREMENT

## APPARATUS

**Transmission test equipment.** Refer to Section 356-010-500 and select, from available equipment, sending and receiving units having the following capabilities:

**Sending test equipment (STE)** capable of delivering, into 75-ohm circuits, signals between 200 and 300 kHz at a level from 0 to -90 dBm.

**Receiving test equipment (RTE)** capable of detecting, from 75-ohm circuits, signals between 200 and 300 kHz at a level from 0 to -30 dBm.

In addition, the following are required:

**11B Attenuator** (used for bridging measurements)

**P2BJ Cords**, as required

## CHART 2 (Cont)

| STEP | PROCEDURE                                                                                                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Lock the associated switching section out of service.                                                                                                                                                                         |
| 2    | Prepare the RTE for a bridging-type measurement of 290 kHz at $\downarrow$ -29 dBm. $\downarrow$                                                                                                                              |
| 3    | Prepare the STE to send 290 kHz at $\downarrow$ -79 dBm. $\downarrow$                                                                                                                                                         |
|      | <b>Caution:</b> Do not connect the STE to the circuit until the $\downarrow$ -79 dBm $\downarrow$ level is set.                                                                                                               |
| 4    | Operate the TRSC SW key on each transmitting switch control panel to the DISC position.                                                                                                                                       |
| 5    | Operate the REC L SW key on each regular line initiator to the DISC position.                                                                                                                                                 |
| 6    | Remove the patch plug from the jack field in the associated switch control bay as follows:<br><br><b>L3:</b> SW FIL OUT and SW AMP IN<br><b>L4:</b> LVL COM OUT and SW AMP IN <i>or</i> SW FIL OUT and SW AMP IN, as provided |
| 7    | Connect the STE to the SW AMP IN jack [patch (1), Fig. 2 ].                                                                                                                                                                   |
| 8    | Connect the RTE through the 11B attenuator to the SW AMP MON jack on the mounting strip in the associated J68820 bay [patch (2), Fig. 2].                                                                                     |

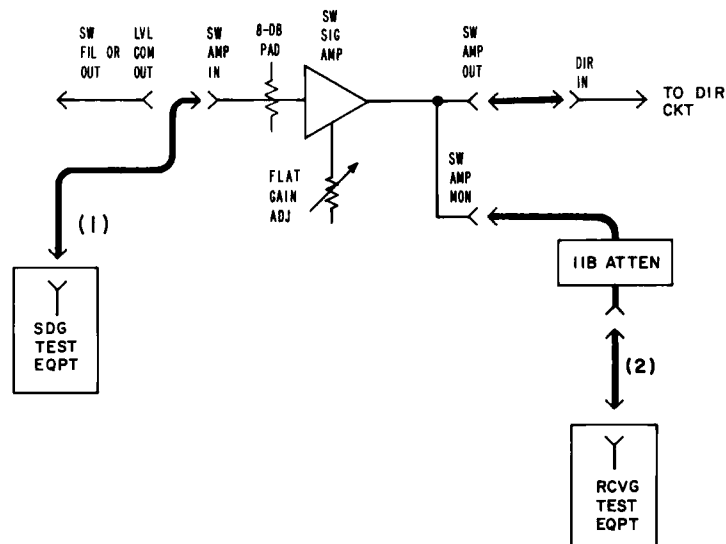


Fig. 2—Patching Arrangement to Test Switching Signal Amplifier Gain

## CHART 2 (Cont)

| STEP | PROCEDURE                                                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9    | Read the indication on the RTE.<br><br><b>Requirement:</b> $\blacktriangleright$ -29 dBm $\blacktriangleleft$                                                             |
| 10   | If the requirement of Step 9 is met, proceed to Step 11. If it is <b>not</b> met, adjust the FLAT GAIN control on the switching signal amplifier to meet the requirement. |
| 11   | Remove patches (1) and (2).                                                                                                                                               |
| 12   | Replace the patch plug as follows:<br><br><b>L3:</b> SW FIL OUT and SW AMP IN<br><b>L4:</b> LVL COM OUT and SW AMP IN <b>or</b> SW FIL OUT and SW AMP IN.                 |
| 13   | Restore the TRSG SW and REC L SW keys to normal.                                                                                                                          |
| 14   | Unlock the associated switching section.                                                                                                                                  |