

L MULTIPLEX TERMINALS
MMX-1
OVERALL SYSTEM
GENERAL TEST INFORMATION

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1. GENERAL

1.01 Methods and procedures for performing tests on the MMX-1 mastergroup multiplex terminals are described in this section and associated sections. MMX-1 terminals are used either with L3 coaxial cable carrier systems or with microwave radio systems.

1.02 The information in this section was previously in Section 356-150-500. It is renumbered in the process of reorganizing the 356- division of practices. Information pertaining to the use of solid-state amplifiers in modified MMX-1 terminals is included. *Equipment Test Lists are affected.*

1.03 MMX-1 terminal equipment includes transmitting and receiving submaster and mastergroup equipment panels. The panels are located in equipment bays apart from the patch jack appearance. The transmitting and receiving patch jacks may be provided in separate high-frequency patch bays or in a combined patch bay arrangement.

1.04 MMX-1 maintenance and test procedures are given in the 356-130- through 356-149- series of practices. These sections include all tests

normally performed in the field for the measurement and adjustment of the submaster and mastergroup circuits. Carrier leak tests are not included and ordinarily can be ignored because of the suppression in the bandpass filters.

2. TEST EQUIPMENT AND MAINTENANCE

2.01 External transmission test equipment is required for transmission measurements in the MMX-1 terminal. The information in Section 356-010-500 may be used as a reference for comparing frequency characteristics, impedances, and power measuring capabilities of the various units of test equipment suitable for maintaining the MMX-1 terminal.

2.02 Ordinarily service is removed from the circuit before the test is started by substituting spare equipment. After completion of the test, all test connections are removed, and the equipment is restored to normal service.

2.03 The metal panel covers should not be removed while testing unless adjustments or component replacements are needed. Lack of proper shielding will affect circuit stability and increase crosstalk.

3. ELECTRON TUBE REPLACEMENT

3.01 The J68829A (Fig. 1) and J68829B flat-gain amplifiers are separate units. The amplifiers consists of three 404A electron tubes, three Sensitrol* relays, and three miniature potentiometers.

* Trademark of the Weston Company.

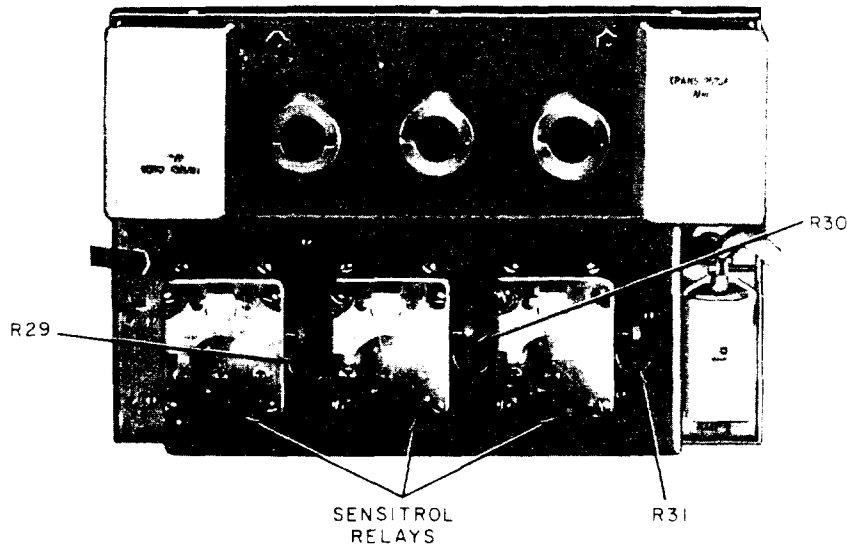


Fig. 1—J68829A Flat Gain Amplifier A

3.02 The Sensitrol relay and miniature potentiometer function as part of an alarm circuit to provide audible and visual indications of deterioration in cathode activity of the associated electron tube. An electron tube is replaced after the plate current has decreased a predetermined amount.

3.03 A decrease in cathode activity is indicated by contact closure in the associated Sensitrol relay. The operated relay causes a VTA lamp

(Fig. 2) associated with the particular submaster or mastergroup panel to light, to activate minor office alarms, and to light a corresponding VTA lamp at the mastergroup jack panel in the high-frequency patch bay.

3.04 Electron tubes may be replaced only on an out-of-service basis. Procedures for replacing electron tubes in the MMX-1 terminal are given in Chart 1.

VTA LAMP ACO KEY

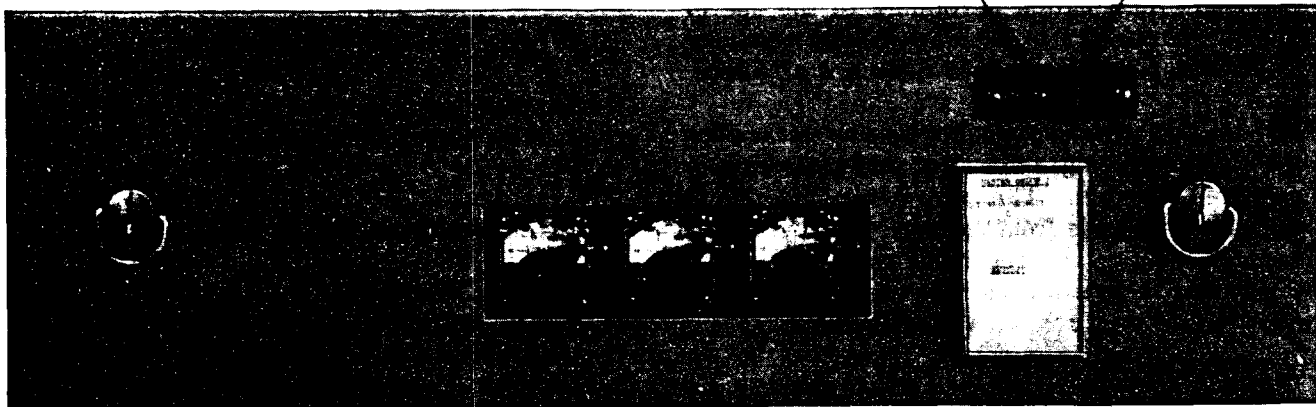


Fig. 2—J68829E Mastergroup 1 Panel—Front View with Panel Cover in Place

CHART 1	
ELECTRON TUBE REPLACEMENT	
STEP	PROCEDURE
1	At the mastergroup equipment bay, locate the equipment panel containing the lighted VTA (green) lamp (Fig. 2).
2	Deactivate the audible alarm by operating the associated ACO turnbutton (Fig. 2) to the clockwise position (white bar vertical).
3	At the mastergroup high-frequency patch bay, remove the affected submaster bank or mastergroup circuit from service.
4	Remove the front cover from the equipment panel containing the lighted VTA lamp.
5	Inspect the pointers of the Sensitrol meter relays (K1, K2, or K3) to determine which one is resting against the reset plunger.
6	At the electron tube socket associated with the Sensitrol meter relay, remove the tube shield and the 404A electron tube.
7	Insert a replacement 404A electron tube in the vacant tube socket and replace the tube shield. Allow ten minutes for the replacement tube to stabilize before proceeding to Step 8.
8	Depress the reset plunger on the Sensitrol relay.
9	Adjust the corresponding monitoring adjust potentiometer R() to obtain a Sensitrol meter reading of exactly 1.1 mA. <i>Note:</i> Parentheses () denote R29 through R31 of the A amplifier and R31 to R33 of the B amplifier.
10	Operate the ACO turnbutton to the counterclockwise position (white bar horizontal). <i>Requirement:</i> The VTA lamp is extinguished and the audible and visual office alarms are retired.
11	Replace the front panel cover of the affected unit.
12	Make out-of-service transmission measurements as prescribed in the appropriate sections for the circuit under test.

4. SOLID-STATE AMPLIFIER REPLACEMENT

4.01 The solid-state conversion of the MMX-1 submaster group and mastergroup equipment panels replaced the J68829 vacuum-tube amplifiers (3.01) with individual solid-state units. The solid-state amplifiers are mounted in the space formerly occupied by the vacuum-tube amplifiers.

4.02 The J68829A amplifier is replaced by 231D and 231E individual amplifier units mounted on the ED-50769 amplifier assembly shown in Fig. 3. The J68829B amplifier is replaced by two 266G amplifier units mounted on the ED-51510 amplifier assembly shown in Fig. 4. When the solid-state units are employed, the Sensitrol relays (3.02) serve no purpose and ordinarily are removed from the equipment panel.

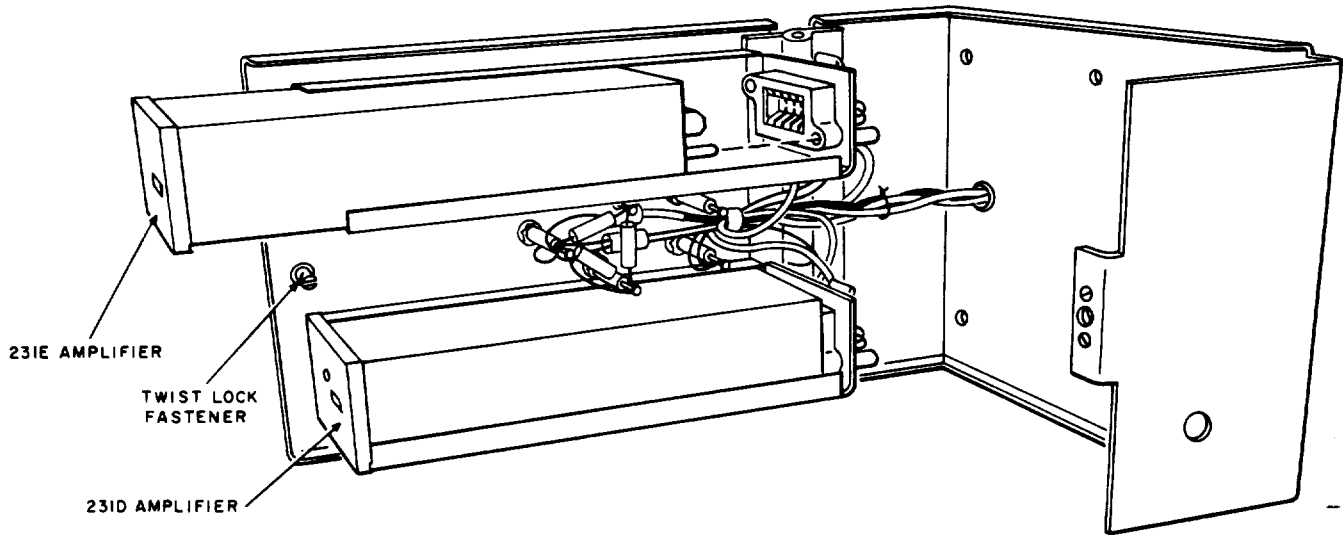


Fig. 3—ED-50769 Amplifier Assembly—Front Cover Plate Open

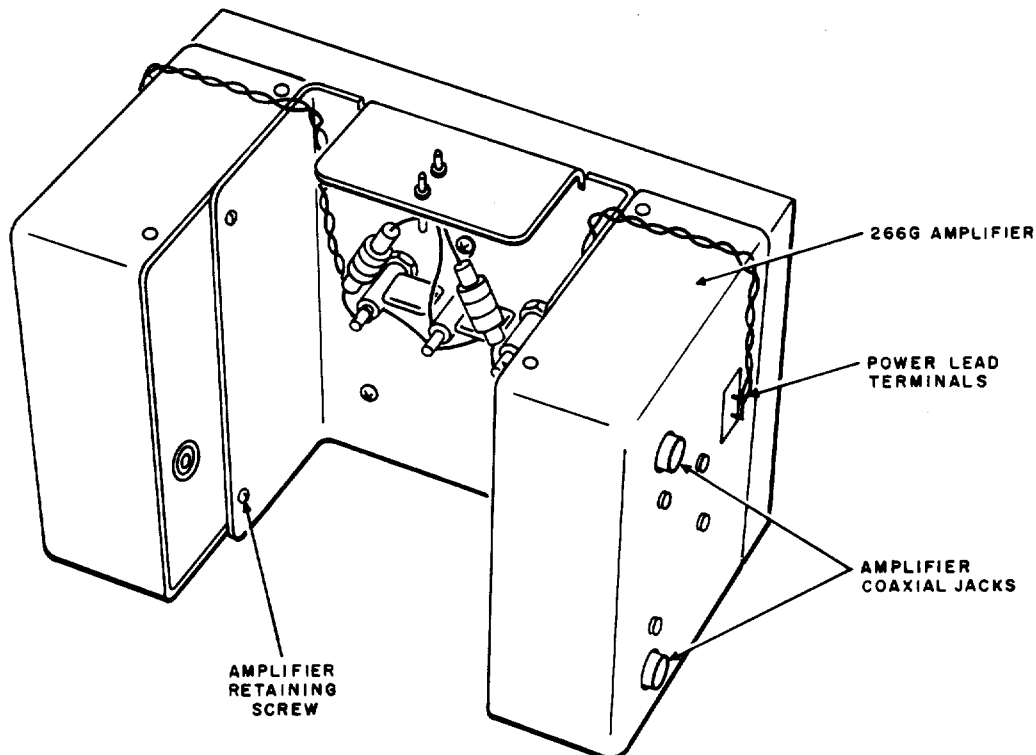


Fig. 4—ED-51510 Amplifier Assembly

4.03 The replacement procedure for the solid-state amplifiers (Chart 2) is relatively straight forward, including removal of the panel from

service, substitution of a known good amplifier for the faulty amplifier, and return of the panel to service.

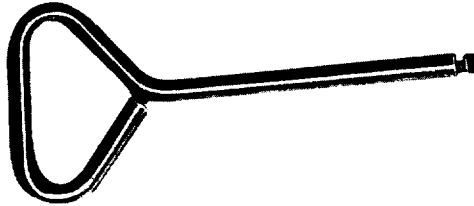
CHART 2	
SOLID-STATE AMPLIFIER REPLACEMENT	
STEP	PROCEDURE
	<p>231D AND 231E AMPLIFIERS</p> <p>1 Remove the front cover from the panel under test and locate the ED-50769 amplifier assembly.</p> <p>2 Disengage the twist-lock fastener and expose the 231-type amplifier units.</p> <p>3 Using the amplifier extraction tool (Fig. 5), remove the 231-type amplifier unit to be replaced from the amplifier socket assembly.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Fig. 5—Extraction Tool</p> <p>4 Install the replacement 231-type amplifier in the vacated amplifier position.</p> <p>5 Return the hinged door to the closed position and engage the twist-lock fastener.</p> <p>6 Replace the front-panel cover.</p> <p>7 Make out-of-service transmission measurements as prescribed in the appropriate sections for the circuit under test.</p> <p>266G AMPLIFIER</p> <p>8 Remove the front cover from the panel under test and locate the ED-51510 amplifier assembly unit.</p> <p>9 Remove the input and output coaxial plug-ended cables from the jacks of the 266G amplifier to be replaced.</p>

CHART 2 (Cont)

STEP	PROCEDURE
10	<p>Unsolder the two power leads from terminals on the amplifier module.</p> <p>Caution 1: The accidental shorting or grounding of the power leads will result in a blown distribution fuse.</p> <p>Caution 2: Tag the power leads to avoid polarity reversal when replacing leads.</p>
11	<p>Remove the two machine screws that secure the amplifier module to the mounting bracket and remove the amplifier module.</p>
12	<p>Secure the replacement amplifier to the mounting bracket using the two machine screws removed in Step 11.</p>
13	<p>Resolder the power leads to the replacement amplifier module.</p>
14	<p>Reconnect the input and output coaxial plug-ended cables to the jacks of the replacement 266G amplifier.</p>
15	<p>Replace the front cover of the panel under test.</p>
16	<p>Make out-of-service transmission measurements as prescribed by the appropriate sections for the circuit under test.</p>