
L4 CARRIER REPEATERS MAINTENANCE

REPLACEMENT PROCEDURES AT MAIN STATIONS

This section provides replacement procedures for L4 main station repeater equipment units. Units covered are listed in the chart index.

This section is reissued to add references to the L4S system, to correct errors, to show later equipment arrangements, and to simplify the test procedures. Arrows are used to indicate significant changes. *Equipment Test Lists are affected.*

When a faulty unit is replaced, a performance test is made before the replacement unit is placed in service. Some tests utilize the control center, when provided, to confirm proper operation; other tests require the use of transmission measuring equipment. Pictorial sketches are provided to aid in locating connectors, controls, and subassemblies.

♦**L4** is a general term for both the long-haul L4 and for the L4S (short L4) carrier systems. A long-haul L4 system may include a remote control system for adjusting equalizers and to control the monitoring oscillators *or* may include manually adjustable equalizers and a panel for manual control of monitoring oscillators. Procedures for all three types of L4 systems are included.

For long-haul L4 systems, transmission equipment is provided in three types of bays: a line receiving bay that serves one receive line, a line transmitting bay that serves two transmit lines, and a control connecting bay that serves all the lines in a route; ie, the cable extending in one direction from a main station.

For L4S systems, transmission equipment is provided in two types of bays: a line bay that serves one receive and one transmit line, and a control connecting bay that serves all the lines in a route.♦

CHART	PAGE
<i>Transmit Line Equipment</i>	
1—Transmitting Repeater J68877AM	3
<i>Receive Line Equipment</i>	
2—Receiving Repeater J68877AN	8
3—512-kHz Regulator and Monitoring Oscillator Signal Blocking Panel J68877BW . . .	12
4—512-kHz Regulator J68877BA and Monitoring Oscillator Signal Blocking Panel J68877BD	16

SECTION 359-205-301

CHART

PAGE

5—◆Receiving Amplifier and Monitoring Oscillator Signal Blocking Panel J68877EG◆ . . . 18

6—Monitoring Oscillator Units in Power Separation Filter Shelf 20

Transmit Line and Receive Line Equipment

7—A Equalizer Units 23

A. A Equalizer J68877AP 24

B. Memory J68877AR 27

C. Logic and Test Oscillators J68877AS 29

D. ◆Manual A Equalizer J68877ED◆ 31

8—B Equalizer Units 32

A. B Equalizer J68877AU 32

B. Memory J68877AY 36

C. Logic J68877AZ 37

D. Logic and Memory J68877BY 38

E. ◆Manual B Equalizer J68877EE◆ 40

Control Connecting Bay Equipment

9—B Equalizer Test Oscillators 41

A. B Oscillators and Connecting Assembly J68877BT 41

B. B Oscillators Assembly J68877BB 44

C. B Signals Connecting Assembly J68877BC 46

APPARATUS

Transmission test equipment provided at the L4 main station is required in all charts except Chart 6.

Volt-Ohm-Milliammeter (VOM) KS-14510 List 1 is required in Chart 6.

Digital Passive Scaler ◆(Western Reserve is preferred)◆ is required in Charts 7 and 8.

Adapter 186A (Oscillator Extender Tool) is required in Chart 9.

Extractor KS-19099 List 1 is required in Chart 9.

APPARATUS (Cont)***Charging Current Limiter* ED-52355**

Note: Converter J87334A draws a heavy input current when power is first applied. This heavy surge current can damage the contact lugs of the fuseholder for the input power fuse. Use the following procedure to avoid damage to the fuseholder.

1. Insert charging current limiter ED-52355 in the fuseholder normally occupied by the 0.25-ampere fuse (fuseholder S2, S4, S12, or S10 for converters 1 through 4, respectively).
2. Install a 7.5-ampere AGC fuse in the assigned fuseholder (fuseholder S1, S3, S11, or S9 for converters 1 through 4, respectively).
3. Remove the charging current limiter.
4. Install a 0.25-ampere fuse in fuseholder.

Note: The limiter has a high negative temperature coefficient and the limiter resistance will drop to a low value after carrying the converter input current for more than a few seconds. This low resistance will have a minimum effect on converter performance. The limiter should be allowed to cool for at least one minute before use with another converter.

CHART 1**TRANSMITTING REPEATER J68877AM**

A transmitting repeater (Fig. 1) is tested and prepared for installation as prescribed in Section 359-205-508.

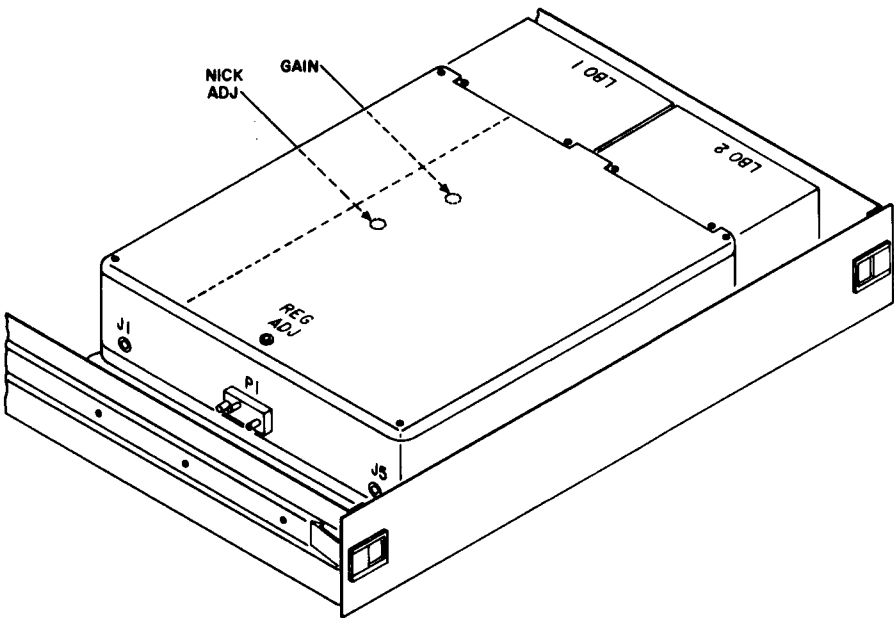
An in-place performance test of the repeater is made by measuring and, if necessary, adjusting the power of the 11.648-MHz pilot. This procedure is the same as the in-service test procedure in Section 359-205-504. A List 2 transmitting repeater includes an adjustable narrowband filter (nick filter) at the 11.648-MHz pilot frequency.

STEP**PROCEDURE**

◆**Note:** Remove deviation equalizer and LBO networks from repeaters to be returned for repair.◆

A. Replacement Procedure

- 1 Ensure that the replacement repeater has been tested and prepared for installation as prescribed in Section 359-205-508.
- 2 Ensure that the line has been removed from service in accordance with established procedures and that all concerned are notified that maintenance is being performed on the line.



INSTALLATION ACCESS: FRONT OF BAY
TEST ACCESS: FRONT OF BAY
WEIGHT: APPROXIMATELY 17 POUNDS

CONNECTIONS:			
TYPE	SHELF		UNIT
COAXIAL	P12	TO	J5
MULTIPIN	J11	TO	P1
COAXIAL	P7	TO	J1

Fig. 1—Transmitting Repeater J68877AM

CHART 1 (Cont)

STEP	PROCEDURE
<i>At line transmitting bay,</i>	
3	Release the repeater mounting shelf latches and pull out the shelf to gain access to the faulty repeater.
4	Remove the cables from the three connectors shown in Fig. 1.
5	Release and remove the faulty repeater from the shelf.
6	Install the replacement repeater on the shelf.
Note: Check if replacement repeater has NICK ADJ control (Fig. 1). A repeater with this control requires a different adjustment procedure than a repeater without this control.	
7	Replace the three connectors removed in Step 4.
Note: Proceed to Part B for a transmitting repeater <i>with</i> a NICK ADJ control. Proceed to Part C for a transmitting repeater <i>without</i> a NICK ADJ control.	

CHART 1 (Cont)

STEP	PROCEDURE
B. Nick Filter Zero Adjustment	
	Note: The nick filter must be adjusted for 0 dB loss so the filter will not affect the 11.648-MHz power during the regulator adjustment in Part C. The nick filter is readjusted in Part D to obtain the required 11.648-MHz power.
8	Measure and record the power of the 11.648-MHz pilot signal at the TRMTG LINE TST jack in the line transmitting bay jack field.
9	Remove the patch plug between the LOOP BACK OUT and LOOP SIG IN jacks in the jack field.
10	Apply an 11.400-MHz test signal at approximately -33.8 dBm to the LOOP SIG IN jack.
11	Adjust the test signal power until the signal at the TRMTG LINE TST jack is at the same power as the 11.648-MHz power recorded in Step 8.
12	Measure and record the 11.400-MHz power at the RPTR OUT TST jack. Note: If the RPTR OUT TST jack is not provided, measure at jack J5 in the power separation filter shelf (Fig. 7).
13	Repeat Steps 10 through 12 for an 11.892-MHz test signal.
14	Determine the average power of the 11.400-MHz and the 11.892-MHz signals at the RPTR OUT TEST jack.
15	Adjust the NICK ADJ control on the transmitting repeater until the 11.648-MHz power at the RPTR OUT TST jack is equal to the average power determined in Step 14. Note: The NICK ADJ control is located on the bottom of the repeater. Withdraw the shelf and tip up the repeater to reach the control. A hole may be made in the shelf bottom to facilitate this adjustment.
C. Regulator Adjustment	
16	Determine from office records the power of the 11.648-MHz pilot at the RPTR OUT TST jack for the time of year that the adjustment is being made.
17	Measure the power of the 11.648-MHz pilot signal at the RPTR OUT TST jack in the jack field. Note: If the RPTR OUT TST jack is not provided, measure at jack J5 in the power separation filter shelf (Fig. 7).
	Requirement: Within ± 0.1 dB of the value determined in Step 16

CHART 1 (Cont)

STEP	PROCEDURE
18	Adjust the REG ADJ control on the repeater, if required, to meet the requirement. <i>Note:</i> The REG ADJ control is accessible through a large hole in the repeater top cover near the power plug end. Slowly adjust the control and wait for the repeater gain to stabilize between adjustments.
19	Remove the test equipment. <i>Note:</i> Proceed to Part D for a transmitting repeater with a NICK ADJ control. Proceed to Step 34 for a transmitting repeater without a NICK ADJ control. D. Nick Filter Loss Adjustment <i>Note:</i> Near main station refers to the main station at which the transmitting repeater is to be tested. Far main station refers to the adjacent main station which is receiving signals from the transmitting repeater to be tested. <i>At far main station,</i>
20	Measure and record the 11.648-MHz power at the RCVG LINE TST jack. <i>Note:</i> Nominal 11.648-MHz power at this jack is -40.0 dBm. <i>At near main station,</i>
21	Measure and record the 11.648-MHz power at the TRMTG LINE TST jack. <i>Note:</i> Nominal 11.648-MHz power at this jack is -52.9 dBm.
22	Remove the patch plug between the LOOP BACK OUT and LOOP SIG IN jacks in the line transmitting bay jack field.
23	Apply an 11.400-MHz test signal at approximately -33.8 dBm to the LOOP SIG IN jack.
24	Adjust the test signal power until the signal at the TRMTG LINE TST jack is at the same power as the 11.648-MHz power recorded in Step 21. <i>At far main station,</i>
25	Measure and record the 11.400-MHz power at the RCVG LINE TST jack.
26	Repeat Steps 23 through 25 for an 11.892-MHz test signal.
27	Determine the average power of the 11.400-MHz and the 11.892-MHz signals at the RCVG LINE TST jack (see Example 1).

CHART 1 (Cont)

STEP	PROCEDURE
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Example 1:

RCVG LINE TST jack at far main station:

- a. Step 25 power at 11.400 MHz = -38.9 dBm
- b. Step 26 power at 11.892 MHz = -39.2 dBm
- c. Step 27 average power measured = $\frac{a + b}{2} = c$ = -39.05 dBm

- 28 Determine the **difference** between this average power and the 11.648-MHz power at the RCVG LINE TST jack measured in Step 20 (see *Example 2*).

Note: This difference is the amount of loss at 11.648 MHz which must be provided by adjusting the NICK ADJ control in the transmitting repeater.

Example 2:

RCVG LINE TST jack at far main station:

- d. Step 20 power at 11.648 MHz = -38.6 dBm
- e. Step 27 average power measured = c = -39.05 dBm
- f. Step 28 difference between average power and 11.648-MHz power = - 0.45 dB

At near main station,

- 29 Measure and record the 11.648-MHz power at the RPTR OUT TST jack in the jack field.

Note: Do **not** remove the receiving test equipment. If the RPTR OUT TST jack is not provided, make this measurement at jack J5 in the power separation filter shelf (Fig. 7).

- 30 Adjust the NICK ADJ control on the transmitting repeater to **reduce** the 11.648-MHz power at the RPTR OUT TST jack by the difference determined in Step 28 (see *Example 3*).

CHART 1 (Cont)

STEP	PROCEDURE
<i>Example 3:</i>	
RPTR OUT TST jack at near main station:	
g.	Step 28 difference between average power and 11.648-MHz power = f = — 0.45 dB
h.	Step 29 original power at 11.648 MHz = <u>—57.2 dBm</u>
i.	Step 30 adjusted power at 11.648 MHz = —57.65 dBm
31	Secure the repeater shelf.
32	Remove the test equipment.
33	Restore the patch plug between the LOOP BACK OUT and LOOP SIG IN jacks in the line transmitting bay.
34	Restore the line to service in accordance with established procedures.

CHART 2

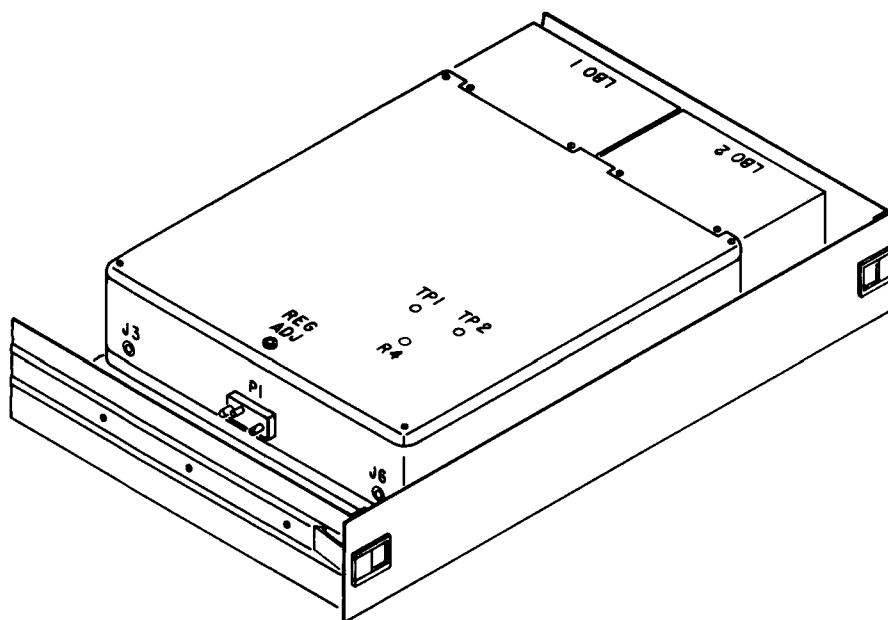
RECEIVING REPEATER J68877AN

A receiving repeater (Fig. 2) is tested and prepared for installation as precribed in Section 359-205-509.

List 2 and List 3 receiving repeaters are equipped with control R4 (Fig. 2) which permits adjusting repeater gain in the pilot-off condition. This adjustment is made to minimize transmission level deviations that could occur with the loss of the 11.648-MHz pilot. This adjustment is made at the time of installation and again during May or November, when the cable is at the annual mean ground temperature. Once the adjustment is made at the mean ground temperature, no further adjustment should be necessary.

STEP	PROCEDURE
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◆**Note:** Remove deviation equalizer and LBO networks from repeaters to be returned for repair.◆



INSTALLATION ACCESS: FRONT OF BAY
 TEST ACCESS: FRONT OF BAY
 WEIGHT: APPROXIMATELY 17 POUNDS

NOTE:
 TP1, TP2, AND R4 ARE NOT PROVIDED
 ON LIST 1 UNIT.

CONNECTIONS:			
TYPE	SHELF	TO	UNIT
COAXIAL	P7	TO	J3
MULTIPIN	J11	TO	P1
COAXIAL	P11	TO	J6

Fig. 2—Receiving Repeater J68877AN

CHART 2 (Cont)

STEP	PROCEDURE
Replacement Procedure	
1	Ensure that the replacement repeater has been tested and prepared for installation as prescribed in Section 359-205-509.
2	Ensure that the line has been removed from service in accordance with established procedures and that all concerned are notified that maintenance is being performed on the line.
At line receiving bay,	
3	Release the repeater mounting shelf latches and pull out the shelf to gain access to the faulty repeater.
4	Remove the cables from the three connectors shown in Fig. 2.
5	Release and remove the faulty repeater from the shelf.

CHART 2 (Cont)

STEP	PROCEDURE
6	Install the replacement repeater on the shelf.
7	Replace the three connectors removed in Step 4.
Performance Test	
Gain Adjustment in Pilot-Off Condition	
<i>Note:</i> Figure 3 shows the test layout for this adjustment.	
8	Ensure that the repeater and the line have been powered at least 30 minutes before proceeding with this test.
<i>Note:</i> Near main station refers to the main station at which the receiving repeater is to be tested. Far main station refers to the adjacent main station which is transmitting signals to the receiving repeater to be tested.	

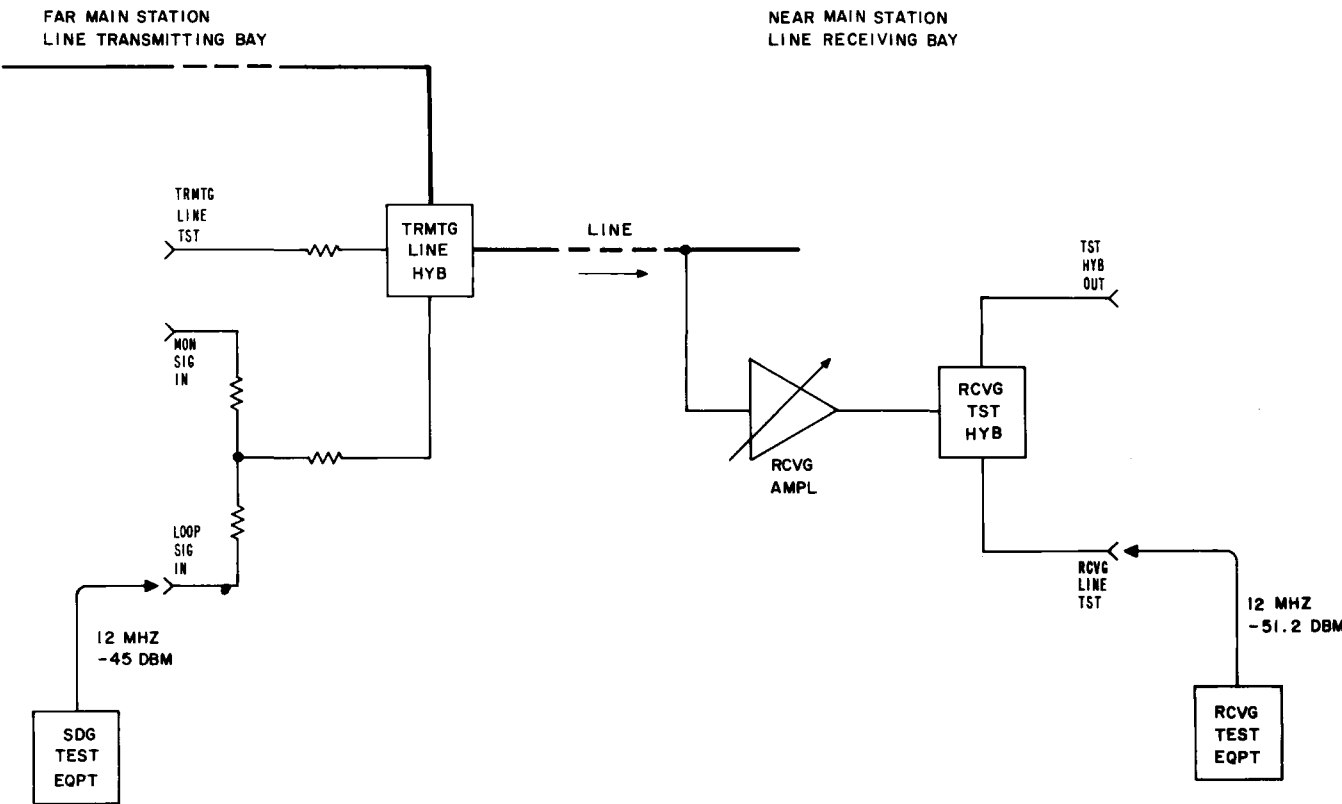


Fig. 3—Test Arrangement For Pilot-Off Gain Adjustment

CHART 2 (Cont)

STEP	PROCEDURE
	<i>At near main station,</i>
9	Record the indication of the 11.648-MHz pilot meter in the line receiving bay.
	<i>At far main station,</i>
10	Remove the patch between the LOOP BACK OUT and LOOP SIG IN jacks in the line transmitting bay jack field.
11	Apply a 12-MHz test signal at approximately -45.0 dBm to the LOOP SIG IN jack and measure the 12-MHz power at the TRMTG LINE TST jack.
	Note: Adjust the 12-MHz test signal power until the signal power at the TRMTG LINE TST jack is -64.1 dBm.
	<i>At near main station,</i>
12	Measure and record the power of the 12-MHz signal at the RCVG LINE TST jack in the line receiving bay jack field.
	Note: Nominal power of the 12-MHz test signal at this jack is -51.2 dBm.
	<i>At far main station,</i>
13	Remove the 11.648-MHz pilot by removing the patch plug between the HYB OUT A and LINE AMPL IN jacks in the line transmitting bay jack field.
	Note: These jacks are not provided in earlier bays. Remove the plug from the IN jack or from the OUT jack on the 266L line amplifier in the hybrid panel. Take care that the coaxial plug does not short the power terminals on the amplifier.
14	Allow 15 minutes for the line to stabilize in the pilot-off condition.
	Note: With the pilot removed from the line, the receiving repeater and each regulating and equalizing repeater in the main section will regulate to the pilot-off gain value.
	<i>At near main station,</i>
15	Measure and record the power of the 12-MHz signal at the RCVG LINE TST jack.
	Requirement: Within ± 5.0 dB of the value recorded in Step 12

CHART 2 (Cont)

STEP	PROCEDURE
16	Adjust control R4 on the receiving repeater, if required, to meet the requirement. <i>Note:</i> Since R4 is a multiturn control, several turns may be required. Allow the signal power to stabilize between adjustments. If the requirement cannot be met, excessive misalignment in the line section is indicated. Investigate and correct this misalignment. <i>At far main station,</i>
17	Restore the 11.648-MHz pilot by restoring the patch plug between the HYB OUT A and LINE AMPL IN jacks or by replacing the plug removed from the amplifier jack.
18	Remove the test equipment at the near and far main stations. <i>At far main station,</i>
19	Restore the patch plug between the LOOP BACK OUT and LOOP SIG IN jacks in the line transmitting bay. <i>At near main station,</i>
20	Note in the office records, if the adjustment is made at a time when the cable is not at mean annual temperature, that this adjustment must be repeated during May or November when the cable is at mean annual temperature.
21	Observe the 11.648-MHz pilot meter. <i>Requirement:</i> Within ± 0.3 dB of the indication recorded in Step 9
22	Restore the line to service in accordance with established procedures.

CHART 3

512-KHZ REGULATOR AND MONITORING OSCILLATOR SIGNAL BLOCKING PANEL J68877BW

This panel (Fig. 4) is provided in later line receiving bays and is mounted above the pilot meter panel. The 512-kHz regulator, controlled by the level of the received 512-kHz pilot, corrects for gain deviations at the low end of the L4 band.

Monitoring oscillator signals are blocked at each main station that includes a control center. A pad is used in place of the blocking filter at a main station that does not include a control center.

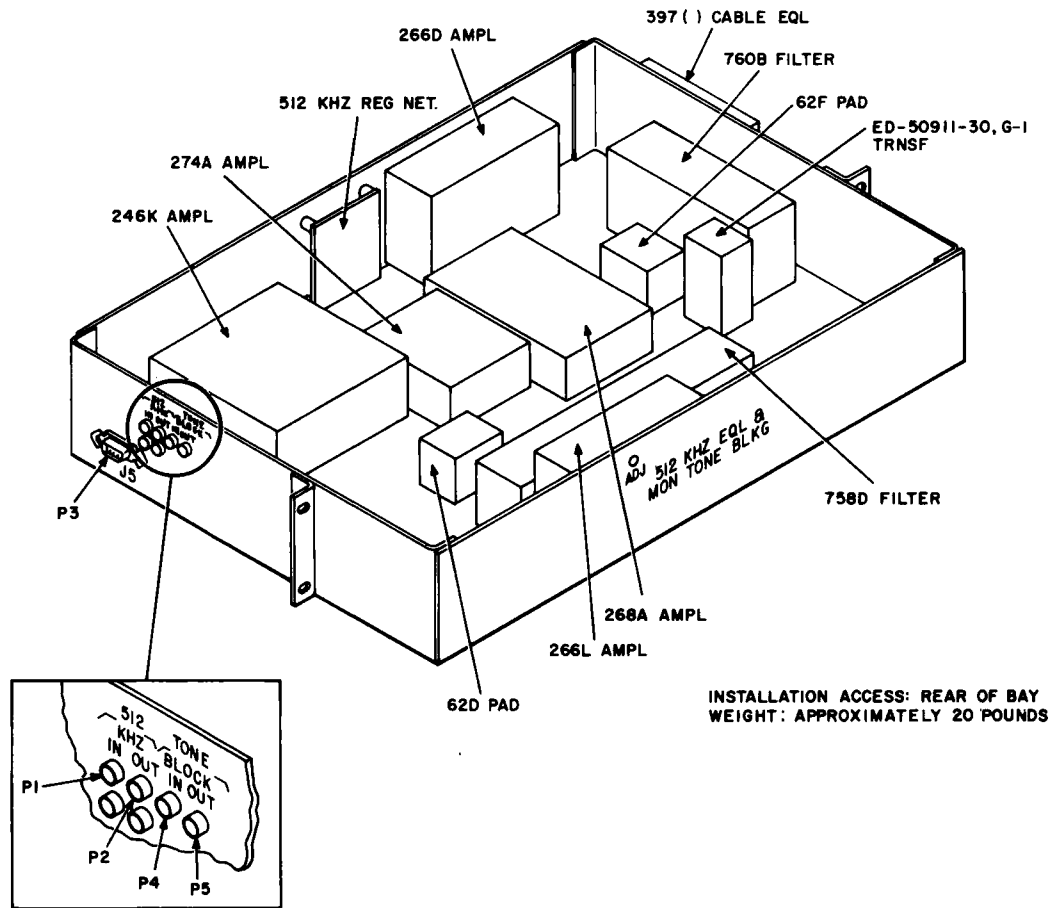


Fig. 4—512-kHz Regulator and Monitoring Oscillator Signal Blocking Panel J68877BW

CHART 3 (Cont)

This chart includes procedures for checking the regulating range of the 512-kHz regulator and for setting the gain in the monitoring oscillator signal blocking circuit.

◆**Note:** In earlier line receiving bays, these circuits are provided in two manufacture-discontinued panels: 512-kHz band-edge regulator J68877BA and monitoring oscillator signal blocking J68877BD, which are covered in Chart 4. For L4S systems, a 512-kHz regulator is not provided and the monitoring oscillator signal blocking circuit is in the J68877EG panel, which is covered in Chart 5.◆

STEP

PROCEDURE

Replacement Procedure

- 1 Ensure that the line has been removed from service and that all concerned have been notified that maintenance is being performed on the line.

CHART 3 (Cont)

STEP	PROCEDURE
2	Remove the cables from the 512 kHz IN jack, TONE BLOCK OUT jack, and jack J5 (Fig. 4). Note: Tag these cables as removed for later identification.
3	Remove the four mounting screws and remove the faulty panel from the bay.
4	Install the new panel and secure with mounting screws. Note: Ensure that the correct 397 cable equalizer, as specified in office records, is mounted on the unit.
5	Apply power to the panel by connecting the wiring plug to jack J5. Performance Test A. 512-kHz Regulator Warning: <i>If the 512-kHz regulator fails the performance test, return the panel to the factory or maintenance center for repair. Do not attempt adjustments.</i> Through Gain
6	Apply a 512-kHz test signal at -53.7 dBm to the 512 kHz IN jack on the panel (Fig. 4).
7	Measure and record the power of the 512-kHz signal at the 512 kHz OUT jack on the panel. Requirement: -46.0 dBm
	Regulating Range
8	Increase the 512-kHz test signal power 4 dB to -49.7 dBm at the 512 kHz IN jack.
9	Allow a minimum of two minutes for the regulator to stabilize.
10	Measure and record the power of the 512-kHz signal at the 512 kHz OUT jack. Requirement: -46.2 dBm
11	Decrease the 512-kHz test signal power 8 dB to -57.7 dBm at the 512 kHz IN jack.
12	Allow a minimum of two minutes for the regulator to stabilize.
13	Measure the 512-kHz signal power at the 512 kHz OUT jack. Requirement: -45.8 dBm

CHART 3 (Cont)

STEP	PROCEDURE
Midband Gain	
14	Apply an 11.648-MHz test signal at -30.0 dBm to the 512 kHz IN jack.
15	Measure the 11.648-MHz signal power at the 512 kHz OUT jack.
	Requirement: -22.15 dBm ± 0.5 dB
16	Remove the test equipment.
17	Replace the connectors removed from the 512 kHz IN jack, TONE BLOCK OUT jack, and jack J5; insert a patch plug between the 512 kHz OUT and TONE BLOCK IN jacks.
B. Monitoring Oscillator Signal Blocking Circuit	
18	Observe the 11.648-MHz pilot meter.
	Requirement: 0 ± 1 dB
19	Adjust the ADJ control on the front of the J68877BW panel, if required, to meet the requirement.
20	Restore the line to service in accordance with established procedures.
21	Measure the power of the 11.648-MHz pilot signal at the RCVG TST jack in the line receiving bay jack field.
	Requirement: -41.4 dBm
22	Adjust the ADJ control on the front of the J68877BW panel, if required, to meet the requirement.
23	Observe the 11.648-MHz pilot meter.
	Requirement: 0.0 dB
	Note: If the requirement is <i>not</i> met, refer to Section 359-215-512 for the pilot indicator circuit alignment procedure.
24	Remove the test equipment.

CHART 4

512-KHZ REGULATOR J68877BA AND MONITORING OSCILLATOR SIGNAL BLOCKING J68877BD

These two panels are manufacture discontinued and have been replaced by the J68877BW panel, which is covered in Chart 3.

This chart includes procedures for checking the regulating range of the 512-kHz regulator and for setting the gain in the monitoring oscillator signal blocking circuit.

STEP

PROCEDURE

Replacement Procedure

- 1 Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.

Note: Components such as the amplifier or filter in monitoring oscillator signal blocking panel J68877BD can be removed and replaced on an individual basis.

- 2 Remove P48, P49, and P50 from the connectors on 512-kHz regulator J68877BA shown in Fig. 5.

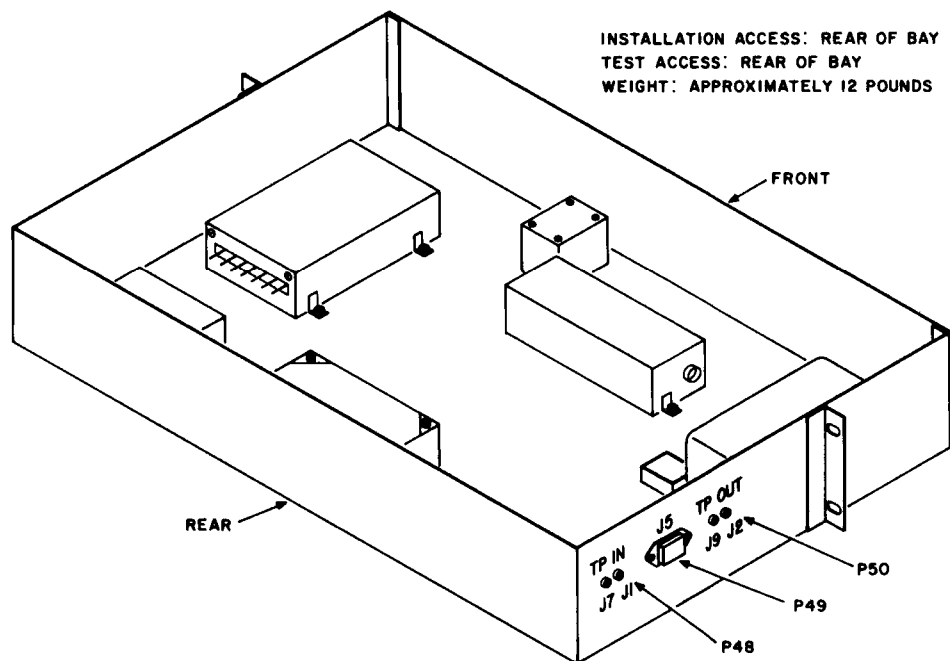


Fig. 5—512-kHz Regulator J68877BA

CHART 4 (Cont)

STEP	PROCEDURE
3	Remove the four mounting screws and remove the faulty J68877BA assembly from the bay.
4	Install the new J68877BA assembly in the bay and secure with mounting screws.
5	Apply power to the assembly by connecting plug P49 to jack J5 on the assembly.
	Performance Test
	A. 512-kHz Regulator
	Warning: <i>If the 512-kHz regulator fails the performance test, return the panel to the factory or maintenance center for repair. Do not attempt adjustments.</i>
	Through Gain
6	Apply a 512-kHz test signal at -53.7 dBm to IN jack J1 on the J68877BA panel (Fig. 5).
7	Measure and record the power of the 512-kHz signal at OUT jack J2 on the panel.
	Requirement: -46.0 dBm
	Regulating Range
8	Increase the 512-kHz test signal power 4 dB to -49.7 dBm at IN jack J1.
9	Allow a minimum of two minutes for the regulator to stabilize.
10	Measure and record the power of the 512-kHz signal power at OUT jack J2.
	Requirement: -46.2 dBm
11	Decrease the 512-kHz test signal power 8 dB to -57.7 dBm at IN jack J1.
12	Allow a minimum of two minutes for the regulator to stabilize.
13	Measure the 512-kHz signal power at OUT jack J2.
	Requirement: -45.8 dBm
	Midband Gain
14	Apply an 11.648-MHz test signal at -30.0 dBm to IN jack J1.
15	Measure the 11.648-MHz signal power at OUT jack J2.
	Requirement: -22.15 dBm ± 0.5 dB

CHART 4 (Cont)

STEP	PROCEDURE
16	Remove the test equipment.
17	Connect plug P48 to IN jack J1 and plug P50 to OUT jack J2.
	B. Monitoring Oscillator Signal Blocking Circuit
18	Observe the 11.648-MHz pilot meter.
	Requirement: 0 ± 1 dB
19	Adjust the ADJ control on the front of the J68877BD panel, if required, to meet the requirement.
20	Restore the line to service in accordance with established procedures.
21	Measure the power of the the 11.648-MHz pilot signal at the RCVG TST jack in the line receiving bay jack field.
	Requirement: -41.4 dBm
22	Adjust the ADJ control on the front of the J68877BD panel, if required, to meet the requirement.
23	Observe the 11.648-MHz pilot meter.
	Requirement: 0.0 dB
	Note: If the requirement is <i>not</i> met, refer to Section 359-215-512 for the pilot indicator circuit alignment procedure.
24	Remove the test equipment.

CHART 5

RECEIVING AMPLIFIER AND MONITORING OSCILLATOR SIGNAL BLOCKING PANEL J68877EG

This panel (Fig. 6) is provided in L4S line bays. A 512-kHz regulator is not provided in L4S lines; an amplifier and pad provide 7.7-dB gain to maintain the same transmission levels as in the long-haul L4 lines.

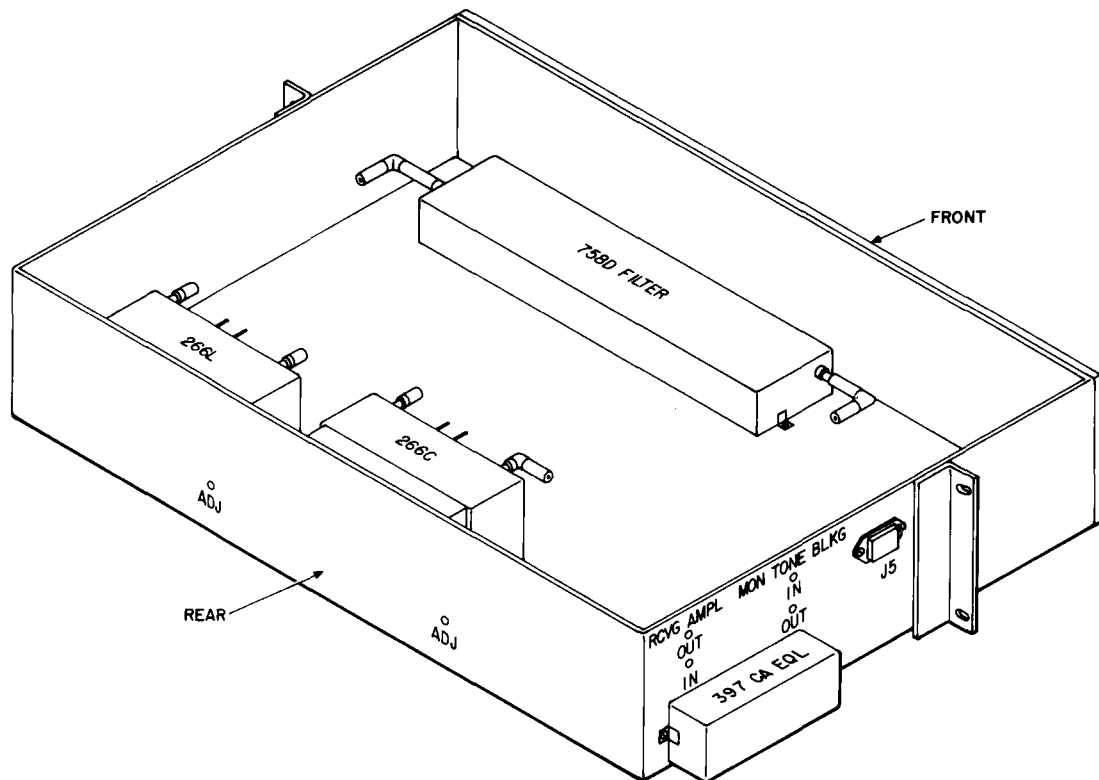


Fig. 6—Receiving Amplifier and Monitoring Oscillator Signal Blocking Panel J68877EG

CHART 5 (Cont)

STEP	PROCEDURE
Replacement Procedure	
1	Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
2	Remove the cables from the RCVG AMPL IN, MON TONE BLKG OUT, and J5 jacks at the left rear of the panel.
	Note: Tag these cables as removed for later identification.
3	Remove the mounting screws and remove the faulty panel from the bay.
4	Install the new panel and secure with mounting screws.
	Note: Ensure that the correct 397 cable equalizer, as specified in office records, is mounted on the panel.
5	Apply power to the panel by connecting the wiring plug to jack J5.

CHART 5 (Cont)

STEP	PROCEDURE
Performance Test	
A. Receiving Amplifier	
6	Apply a 512-kHz test signal at -53.7 dBm to the RCVG AMPL IN jack on the panel.
7	Measure the power of the 512-kHz signal at the RCVG AMPL OUT jack.
	Requirement: -46.0 dBm ± 0.5 dB
8	Adjust the ADJ control on the 266C amplifier, if required, to meet the requirement.
	Note: There are two ADJ controls, on the rear of the panel, for the 266L and 266C amplifiers. The 266C amplifier is located nearer the jacks on the panel.
B. Monitoring Oscillator Signal Blocking Circuit	
9	Connect the receiving test equipment to the MON TONE BLKG OUT jack.
10	Insert a patch plug between the RCVG AMPL OUT and MON TONE BLKG IN jacks.
11	Measure the power of the 512-kHz signal at the MON TONE BLKG OUT jack.
	Requirement: -34.1 dBm ± 0.5 dB
12	Adjust the ADJ control on the 266L amplifier, if required, to meet the requirement.
	Note: See Note in Step 8.
13	Remove the test equipment.
14	Replace the connectors removed from the RCVG AMPL IN and MON TONE BLKG OUT jacks.
15	Restore the line to service in accordance with established procedures.

CHART 6

MONITORING OSCILLATOR UNITS IN POWER SEPARATION FILTER SHELF

Monitoring oscillator units (Fig. 7) are provided in the power separation filter shelf in a line receiving bay. These units serve four lines: two receive lines and two transmit lines in a cable.

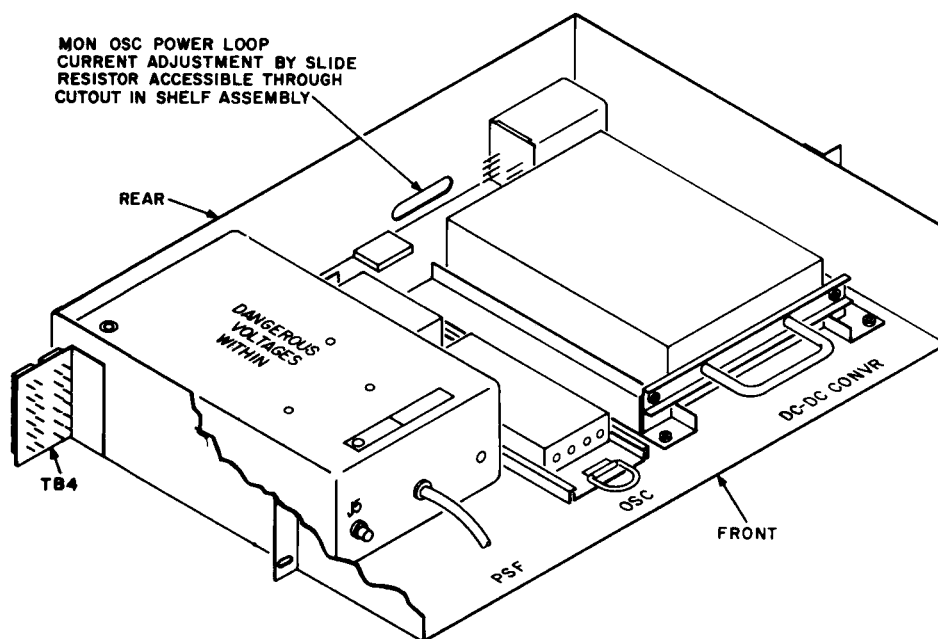


Fig. 7—Power Separation Filter Shelf Including Monitoring Oscillator Units

CHART 6 (Cont)

STEP	PROCEDURE
	Monitoring oscillators at a number of adjacent repeater locations are powered in response to a command from a control center or, in L4 systems without a remote control system, by depressing a pushbutton on the line protection patch and monitoring oscillator control panel in the control connecting bay. Monitoring oscillator signals are applied to four lines at a time, two lines in each direction.
STEP	PROCEDURE
A. Dc-Dc Converter	
Power is supplied to monitoring oscillators by a plug-in dc-dc converter J87290A-1. Maintenance consists of replacing the dc-dc converter and adjusting a slide-wire resistor to obtain the proper current in the monitoring oscillator power loop.	
Replacement Procedure	
1	Inform the two control center attendants involved <i>not</i> to turn on the monitoring oscillators in the power loop.

CHART 6 (Cont)

STEP	PROCEDURE
2	Release the clamps and remove the dc-dc converter J87290A-1 from the bay.
3	Install the new converter and secure in place.
	Performance Test
4	Prepare the meter for a 15-mA dc measurement.
5	Locate terminals 27 and 28 on terminal strip TB4 at the left rear corner of the power separation filter shelf (Fig. 7) at the top of the line receiving bay. <i>Note:</i> It may be more convenient to place the meter in the monitoring oscillator power loop at some other point in the office, such as the paper-pair patch panel. Paper pairs and associated monitoring oscillator power loops are as follows: pair 48 for lines 1 through 4, pair 49 for lines 5 through 8, pair 50 for lines 9 through 12, pair 51 for lines 13 through 16, and pair 52 for lines 17 through 20.
6	Remove the lead from terminal 27 of TB4.
7	Connect the <i>negative</i> lead of the meter to terminal 27 and the <i>positive</i> lead to the lead removed from terminal 27.
8	Request the control center attendant to power the monitoring oscillators or depress the appropriate monitoring oscillator control pushbutton in the control connecting bay.
9	Measure the direct current in the power loop. <i>Requirement:</i> 15 mA direct current
10	Adjust resistor R6, if required, to meet the requirement. <i>Note:</i> Slide-wire resistor R6 is accessible from the back of the bay through an elongated hole in the back of the power separation filter shelf (Fig. 7).
11	Request the control center attendant to turn off the monitoring oscillators or depress the monitoring oscillator control pushbutton.
12	Remove the meter.
13	Reconnect the lead to terminal 27 on TB4.
14	Request the control center attendant to test operation of the monitoring oscillator power loop.
	B. Monitoring Oscillator Assembly
	The monitoring oscillator assembly consists of a 66-type oscillator and a 4103A distribution network.

CHART 6 (Cont)

STEP	PROCEDURE
Replacement Procedure	
15	Ensure that the replacement monitoring oscillator assembly has been tested and prepared for installation as prescribed in Section 359-205-510.
16	Inform the two control center attendants involved <i>not</i> to power the group including this monitoring oscillator assembly.
17	Remove the plugs from the 4103A output jacks. <i>Note:</i> Tag each plug as it is removed so that it can be replaced in the correct jack.
18	Remove the faulty monitoring oscillator assembly from the power separation filter shelf.
19	Install the replacement assembly.
20	Connect each plug removed to the appropriate 4103A network output jack.
Performance Test	
21	Request the control center attendant to power the monitoring oscillators. ◆ <i>Note:</i> For an L4 system without a remote control system, check that the monitoring oscillators can be controlled from either main station.◆
22	Measure the monitoring oscillator signal power at the MON OSC OUT jack in the jack field in each line bay served by the monitoring oscillator assembly. <i>Note:</i> Consult office records for the required output power at these jacks. If powers are not correct, refer to Section 359-200-503.

CHART 7

A EQUALIZER UNITS

◆An A equalizer is provided for each line, except for some short L4S systems. For L4 systems with a remote control system, the A equalizer shelf includes the A equalizer, memory, and logic units. The shelf can be pulled forward to gain access to these units. For other L4 systems, the manual A equalizer is provided.◆

CHART 7 (Cont)

STEP

PROCEDURE

◆**Note:** Proceed to Part D for manual A equalizer J68877ED.◆

A. Equalizer J68877AP (Fig. 8)

Maintenance consists of replacing a faulty equalizer and then checking the performance of the new equalizer by means of a control center.

Replacement Procedure

- 1 Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.

- 2 Locate the A equalizer shelf containing the A equalizer to be replaced.

Note: A line transmitting bay includes an A equalizer shelf for each of the two lines served by the bay.

- 3 Remove the cables from jacks J1 through J5 on the A equalizer.

Note: Access to jacks J2, J4, and J5 is via a piano-hinged flap on the left side of the A equalizer shelf (Fig. 8).

Caution: *The A equalizer weighs approximately 22 pounds. Prepare for handling this unit before removing.*

- 4 Release and remove the faulty unit from the shelf.
- 5 Place the new A equalizer on the shelf and secure in place.
- 6 Reconnect the cables removed from jacks J1 through J5.

Performance Test

Note: Up to two hours warm-up time may be required for the equalizer circuits to stabilize at required operating temperature.

- 7 Measure the resistance between test points TP1 and TP2 (OVEN 1) and between test points TP3 and TP4 (OVEN 2) shown in Fig. 8, using ◆a Western Reserve digital passive scaler.

Note: A false indication may be obtained if another digital passive scaler is used.◆

Requirement: Within 0 and -15 ohms of the value stamped near the test points for each oven

Note: If the resistances are within the requirements, the equalizer networks are stabilized at the required operating temperature.

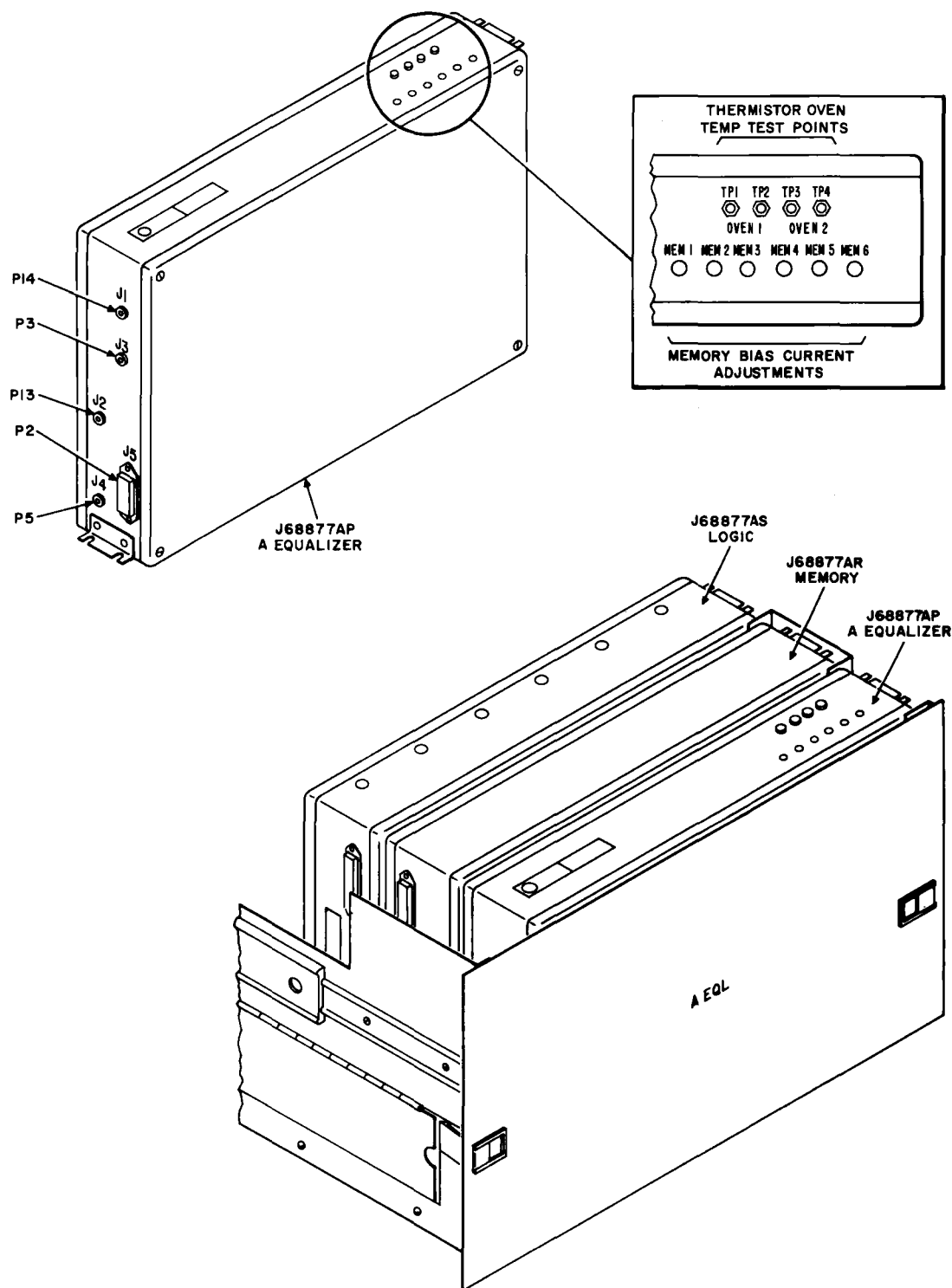


Fig. 8—A Equalizer J68877AP

CHART 7 (Cont)

STEP	PROCEDURE
8	Request the control center attendant to initiate the following commands: (a) Reset the A equalizer to midrange. (b) Apply the A equalizer test signals at the A equalizer output.
9	Remove plug P13 from jack J2 on the A equalizer.
10	Measure and record the power of the 0.544-MHz test signal at jack J2. Note: Nominal power for this test signal is -57.7 dBm.
11	Request the control center attendant to apply the equalizer test signals at the A equalizer input.
12	Measure the power of the 0.544-MHz test signal at jack J2. Note: The A equalizer is reset to the zero-gain condition at this time. Requirement: Within ± 0.5 dB of the power recorded in Step 10
13	Adjust the MEM 1 control, if required, to meet the requirement. Note: Adjusting the MEM 1 control changes the amount of current applied to an equalizer network control thermistor. After each adjustment, allow time for the thermistor to stabilize before readjusting.
14	Request the control center attendant to apply the equalizer test signals at the A equalizer output.
15	Repeat Steps 10 through 14 for each of the other frequencies to obtain the power at jack J2 as listed in Table A, column 1.
16	Remove the test equipment.
17	Connect plug P13 to jack J2.
18	Request the control center attendant to exercise each equalizer network to assure proper operating range in both the up and down directions.
19	Request the control center attendant to equalize the line.
20	Restore the line to service in accordance with established procedures.

TABLE A

A EQUALIZER TEST SIGNALS

(1) NOMINAL POWER AT JACK J2 ON A EQUALIZER (dBm)	(2) MEMORY BIAS CURRENT CONTROL	(3) EQUALIZER TEST SIGNAL FREQUENCY (MHz)	(4) REQUIRED POWER AT JACK J8 AND/ OR J9 ON LOGIC UNIT (dBm)	(5) TEST SIGNAL LEVEL CONTROL ON LOGIC UNIT
-57.7	MEM 1	0.544	-37.7	0.544 MHZ ADJ
-56.2	MEM 2	3.200	-36.2	3.200 MHZ ADJ
-55.1	MEM 3	5.888	-35.1	5.888 MHZ ADJ
-54.0	MEM 4	8.768	-34.0	8.768 MHZ ADJ
-52.5	MEM 5	14.784	-32.5	14.784 MHZ ADJ
-51.3	MEM 6	19.296	-31.3	19.296 MHZ ADJ

CHART 7 (Cont)

STEP	PROCEDURE
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B. Memory J68877AR (Fig. 9)

Maintenance consists of replacing a faulty memory and then checking the performance of the new memory by means of a control center.

Replacement Procedure

- 21 Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
- 22 Locate the A equalizer shelf containing the memory to be replaced.
- 23 Remove the cables from jacks J10 and J11 on the memory.

Note: Access to jack J10 is via a piano-hinged flap on the left side of the A equalizer shelf (Fig. 9).

Caution: The memory weighs approximately 26 pounds. Prepare for handling this unit before removing.

- 24 Release and remove the faulty unit from the shelf.

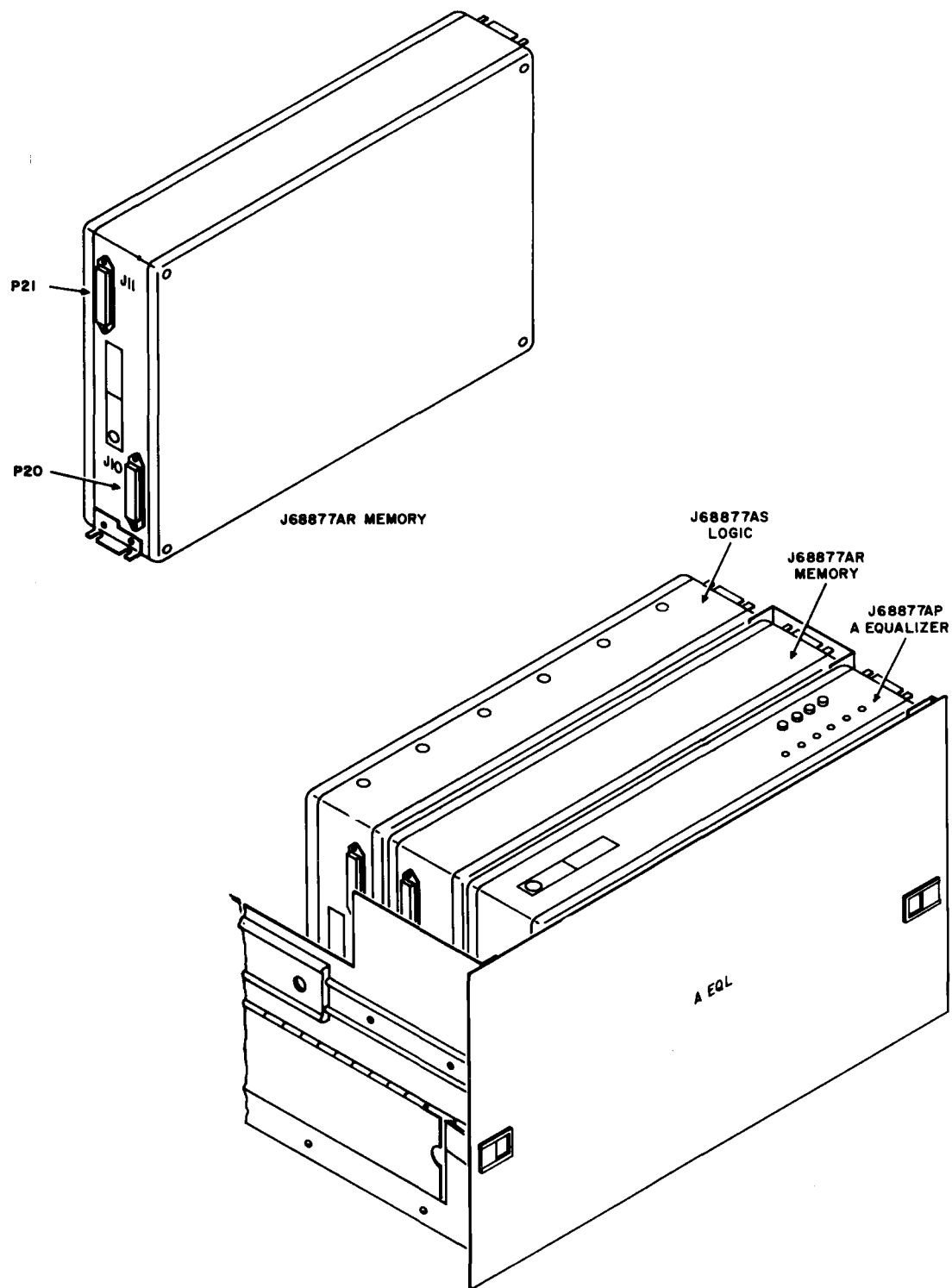


Fig. 9—A Equalizer Memory J68877AR

CHART 7 (Cont)

STEP	PROCEDURE
25	Place the new memory on the shelf and secure in place.
26	Reconnect the cables removed from jacks J10 and J11.
	Performance Test
27	Request the control center attendant to make a performance test of the assembly by stepping each equalizer network through a complete range while monitoring the equalizer adjust meters on the control center.
28	Request the control center attendant to equalize the line.
29	Restore the line in service in accordance with established procedures.
	C. Logic and Test Oscillators J68877AS (Fig. 10)
	Maintenance consists of replacing a faulty unit, adjusting the equalizer test signal powers, and checking for correct logic response to commands from a control center.
	Replacement Procedure
30	Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
31	Locate the A equalizer shelf containing the logic and test oscillator unit to be replaced.
32	Remove the cables from jacks J6 through J9 on the logic unit.
	Note: Access to jacks J7, J8, and J9 is via a piano-hinged flap on the left side of the A equalizer shelf (Fig. 10).
	Caution: <i>The logic weighs approximately 22 pounds. Prepare for handling this unit before removing.</i>
33	Release and remove the faulty unit from the shelf.
34	Place the new logic unit on the shelf and secure in place.
35	Reconnect the cables removed from jacks J6 through J9.

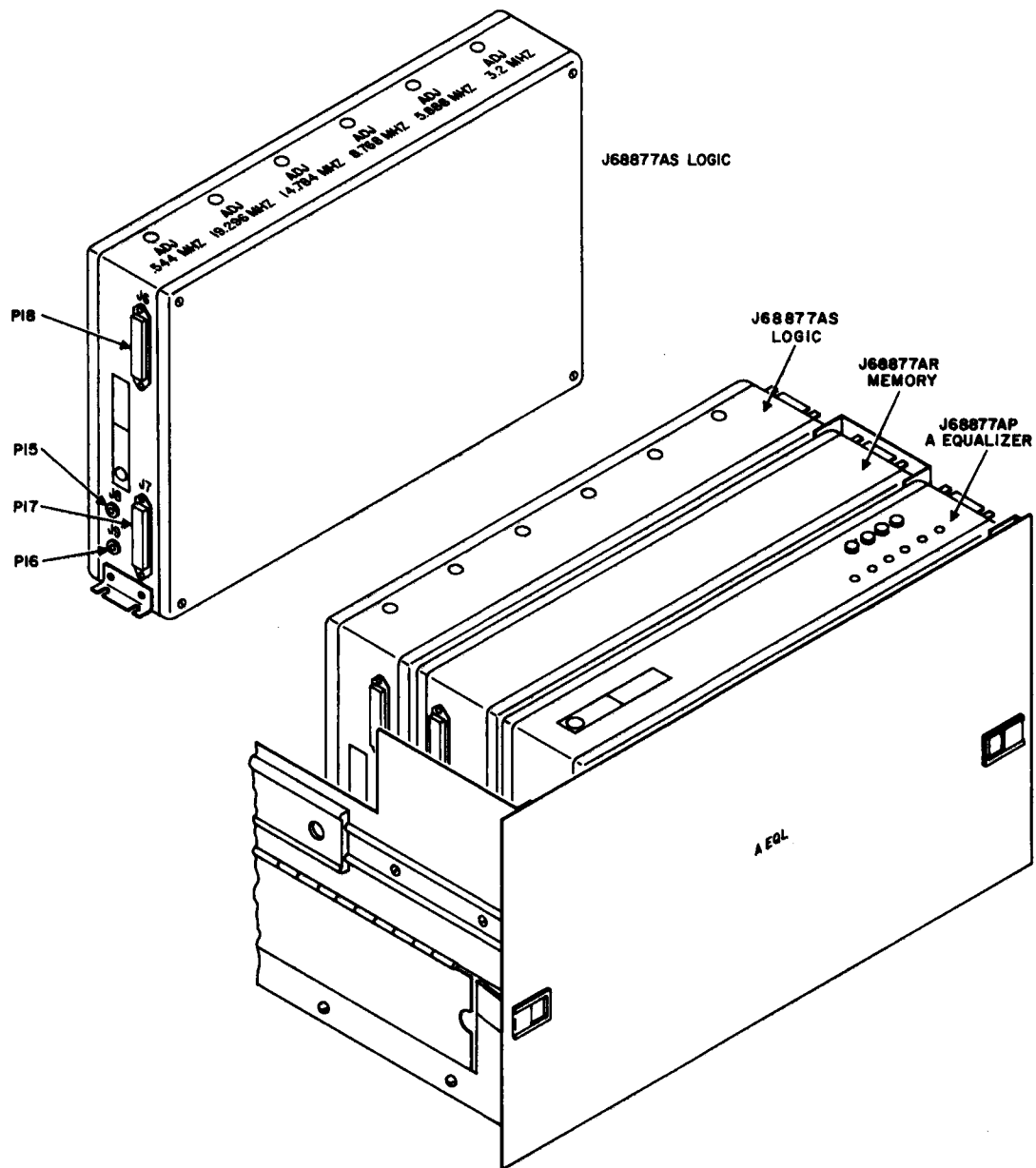


Fig. 10—A Equalizer Test Oscillator and Logic J68877AS

CHART 7 (Cont)

STEP**PROCEDURE****Performance Test**

- 36 Request the control center attendant to check the ability of the logic to respond to the following commands:
- (a) Apply equalizer test signals at the A equalizer input and at the output.
 - (b) Adjust the gain and reset each of the six equalizer networks.
 - (c) Power the monitoring oscillators.
- 37 Request the control center attendant to apply the equalizer test signals at the A equalizer input.
- 38 Remove plug P15 from jack J8 on the logic unit.
- 39 Measure the power of the 0.544-MHz test signal at jack J8.
- Requirement:** $-37.7 \text{ dBm} \pm 0.1 \text{ dB}$
- 40 Adjust the ADJ 0.544 MHz control, if required, to meet the requirement.
- 41 Repeat Steps 39 and 40 for each of the other frequencies to obtain the power listed in Table A, column 4.
- 42 Disconnect the test equipment.
- 43 Connect plug P15 to jack J8.
- 44 Restore the line to service in accordance with established procedures.

D. Manual A Equalizer J68877ED (Fig. 11)**Replacement Procedure**

- 45 Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
- 46 Remove the cables from IN jack J1 and PWR IN jack J5 at the left rear and from OUT jack J2 at the right rear.
- 47 Remove the four mounting screws and remove the faulty panel from the bay.
- 48 Install the new panel and secure with mounting screws.
- 49 Replace the connectors removed from the IN, PWR IN, and OUT jacks.

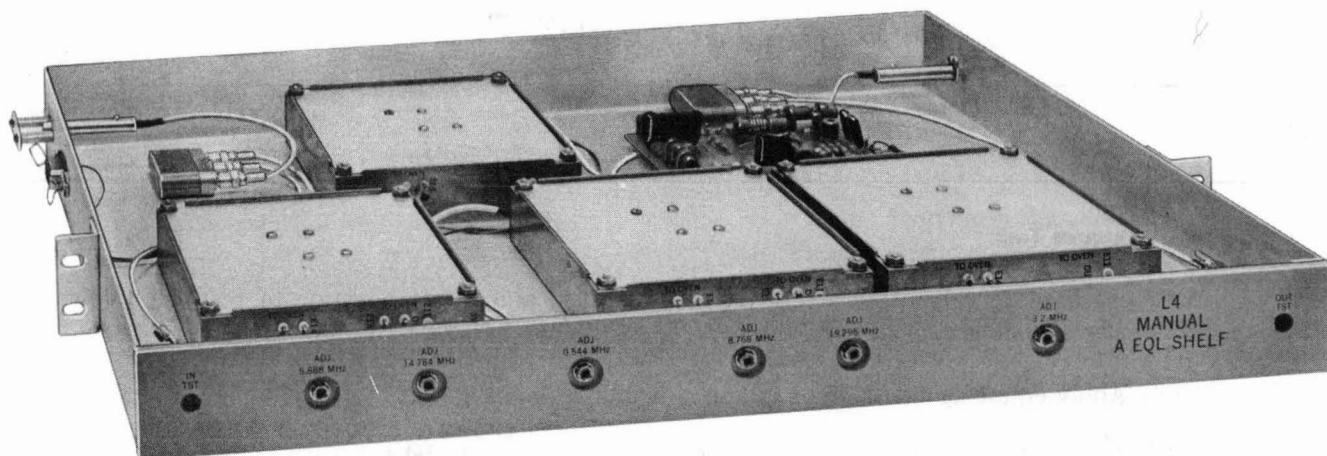


Fig. 11—Manual A Equalizer J68877ED

CHART 7 (Cont)

STEP	PROCEDURE
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Performance Test

- | | |
|----|---|
| 50 | Equalize the line in accordance with Section 359-200-505. |
| 51 | Restore the line to service in accordance with established procedures.♦ |

CHART 8

B EQUALIZER UNITS

STEP	PROCEDURE
------	-----------

♦**Note:** Proceed to Part E for manual B equalizer J68877EE.♦

A. B Equalizer J68877AU (Fig. 12)**Replacement Procedure**

Note: Removal and replacement of the individual drawers in the equalizer should **not** be attempted.

- | | |
|---|---|
| 1 | Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line. |
|---|---|

INSTALLATION ACCESS: REAR OF BAY
WEIGHT: 24 POUNDS

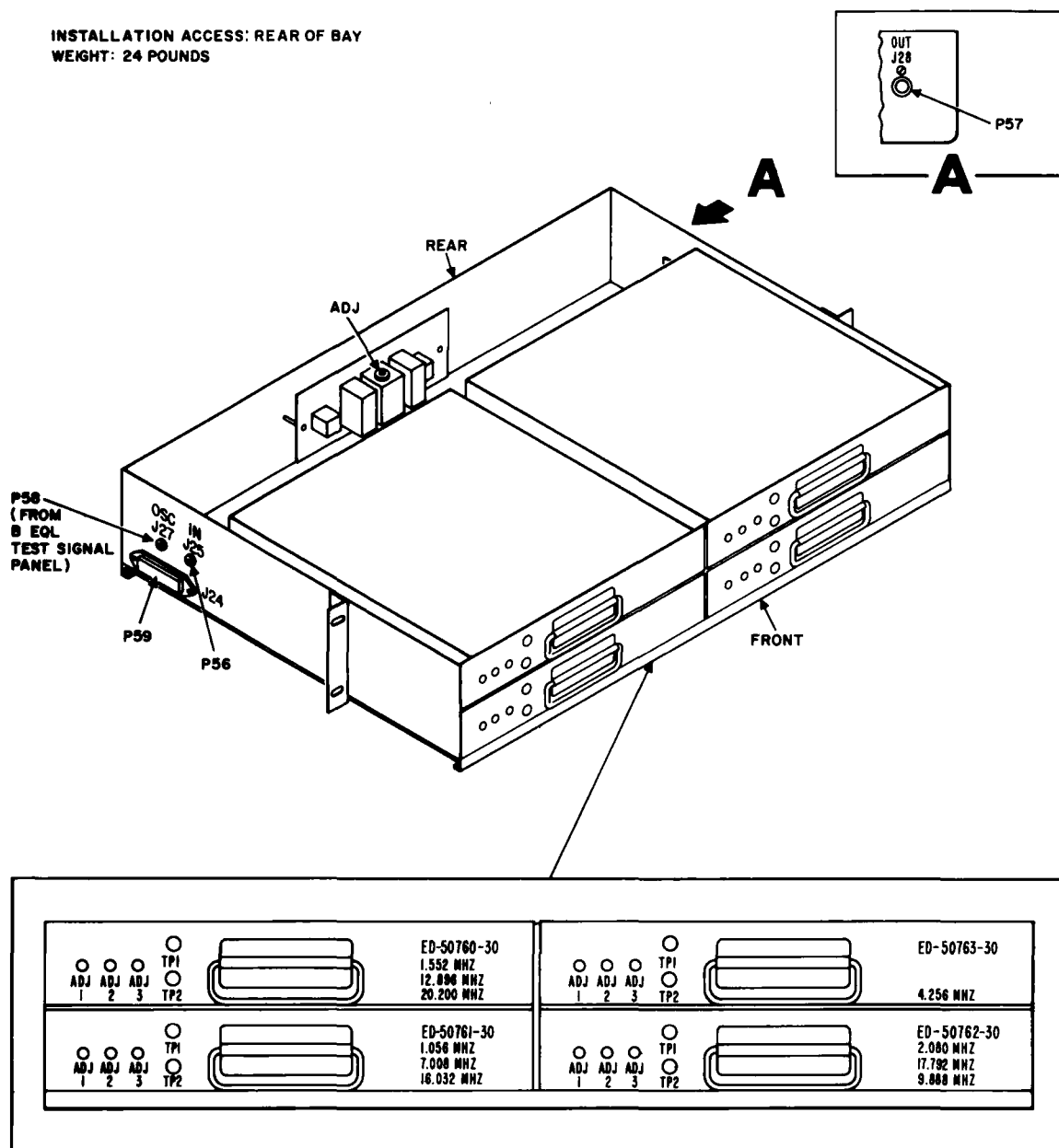


Fig. 12—B Equalizer J68877AU

CHART 8 (Cont)

STEP	PROCEDURE
2	Remove the cables from jacks J24, IN J25, OSC J27, and OUT J28. <i>Note:</i> Jack J28 is on the right side; the other jacks are on the left side.
3	Remove the mounting screws and remove the faulty unit from the bay.
4	Place the new unit in the bay and secure to the bay framework with mounting screws.
5	Reconnect the cables removed from jacks J24, J25, J27, and J28. Performance Test
6	Measure the resistance between test points TP1 and TP2 on each of the four drawers (Fig. 12) using a Western Reserve digital passive scaler. <i>Note:</i> A false indication may be obtained if another digital passive scaler is used. <i>Requirement:</i> Within 0 and -15 ohms of the value stamped near the test points on each drawer <i>Note:</i> If the resistances are within the requirements, the equalizer networks are stabilized at the required operating temperature.
7	Request the control center attendant to initiate the following commands: (a) Reset the B equalizer to midrange. (b) Apply the equalizer test signals at the B equalizer output.
8	Remove plug P57 from OUT jack J28.
9	Measure and record the power of the 12.896-MHz signal at jack J28. <i>Requirement:</i> As listed in Table B, column 4
10	Proceed to Step 14 if the requirement is met. Otherwise, proceed to Step 11.
11	Remove the B equalizer mounting screws and slide the B equalizer back far enough to gain access to the ADJ control (Fig. 12).
12	Adjust the control to meet the requirement of Step 9.
13	Secure the B equalizer in the bay.
14	Measure and record the power of the 1.056-MHz signal at jack J28. <i>Note:</i> The equalizer test signals are applied at the B equalizer output at this time.

◆ TABLE B ◆

B EQUALIZER BIAS CURRENT ADJUSTMENTS

(1) DRAWER	(2) CONTROL	(3) FREQUENCY (MHz)	(4) REQUIRED POWER AT JACK J28 ON B EQUALIZER (dBm)
ED-50760 (upper left)	ADJ 1 or ADJ 12.89	12.896	-52.6
	ADJ 2 or ADJ 20.20	20.200	-51.1
	ADJ 3 or ADJ 1.55	1.552	-56.9
ED-50761 (lower left)	ADJ 1 or ADJ 7.00	7.008	-54.3
	ADJ 2 or ADJ 16.03	16.032	-51.9
	ADJ 3 or ADJ 1.05	1.056	-57.3
ED-50762 (lower right)	ADJ 1 or ADJ 9.88	9.888	-53.3
	ADJ 2 or ADJ 17.79	17.792	-51.5
	ADJ 3 or ADJ 2.08	2.080	-56.6
ED-50763 (upper right)	ADJ 1 or ADJ 4.25	4.256	-55.4
	ADJ 2 or ADJ	—	—
	ADJ 3 or ADJ	—	—

CHART 8 (Cont)

STEP	PROCEDURE
15	Request the control center attendant to apply the equalizer test signals at the B equalizer input.
16	Measure the power of the 1.056-MHz signal at jack J28. Note: The B equalizer is reset to the zero-gain condition at this time. Requirement: Within ± 0.5 dB of the power recorded in Step 14
17	Proceed to Step 18 if the requirement is met. Otherwise, adjust the appropriate memory bias control on the front of the drawer to meet the requirement. Note: Memory bias controls are listed in Table B. Adjustment of a memory bias control varies the amount of current applied to an equalizer network control thermistor. After each adjustment, allow time for the network to stabilize before readjusting the control.

CHART 8 (Cont)

STEP	PROCEDURE
18	Request the control center attendant to apply the equalizer test signals at the B equalizer output.
19	Repeat Steps 14 through 18 for each of the other frequencies to obtain the power listed in Table B, column 4.
20	Remove the test equipment.
21	Connect plug P57 to OUT jack J28.
22	Request the control center attendant to exercise each equalizer network to ensure proper operating range in both the up and down directions.
23	Request the control center attendant to equalize the line, if required.
24	Restore the line to service in accordance with established procedures.
B. Memory J68877AY (Fig. 13)	
Replacement Procedure	
25	Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
26	Locate the faulty 18A memory unit(s).
Note: The memory (Fig. 13) contains an individual plug-in 18A memory unit for each of the ten B equalizer networks. Normally, only the faulty 18A memory unit is replaced. After replacement, a test is made via the control center.	
27	Remove the two mounting screws holding the faulty 18A memory unit(s) in place.
Note: To gain access to the plug-in 18A memory units, it may be necessary to remove the mounting screws holding the memory in the bay and to slide the memory to the rear.	
28	Remove the faulty 18A memory unit(s).
29	Install the new 18A memory unit(s) and secure in place.
Performance Test	
30	Request the control center attendant to exercise the new memory unit(s) to ensure satisfactory performance by stepping each new memory through the range including up, down, and reset.
31	Request the control center attendant to equalize the line.
32	Restore the line to service in accordance with established procedures.

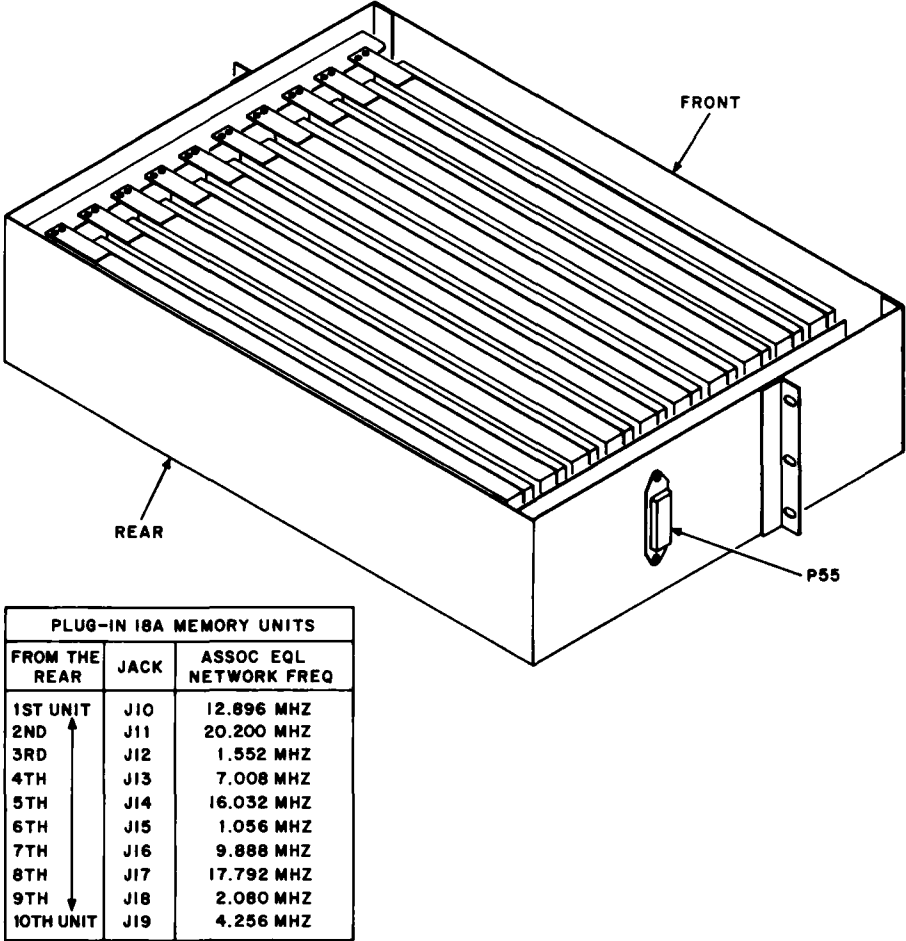


Fig. 13—B Equalizer Memory J68877AY

CHART 8 (Cont)

STEP	PROCEDURE
C. Logic J68877AZ (Fig. 14)	
Replacement Procedure	
33	Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
34	Remove plug P54 from jack J8.
35	Remove the four mounting screws and remove the assembly from the bay.

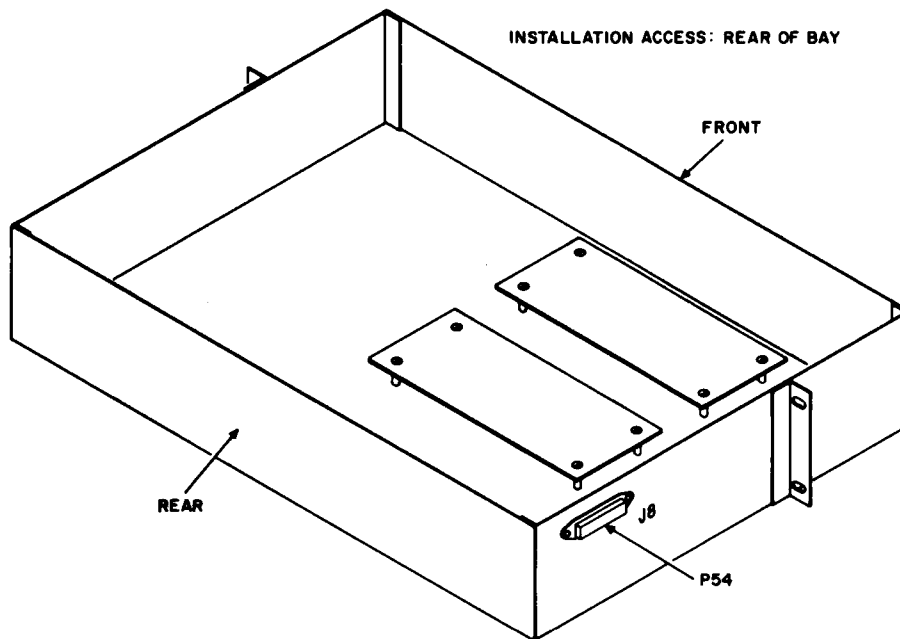


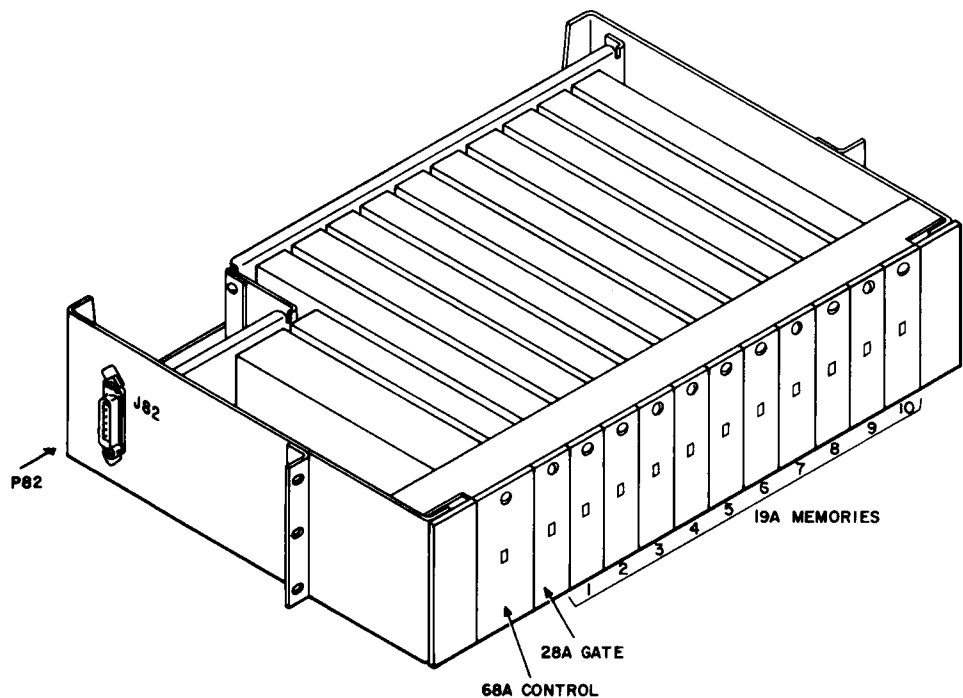
Fig. 14—B Equalizer Logic J68877AZ

CHART 8 (Cont)

STEP	PROCEDURE
36	Place the new assembly in the bay and secure in place.
37	Connect plug P54 to jack J8.
	Performance Test
38	Request the control center attendant to check the ability of the logic to respond to the following commands: (a) Apply equalizer test signals at the B equalizer input and at the output (b) Adjust the gain and reset each of the ten equalizer networks.
39	Restore the line to service in accordance with established procedures.

D. Logic and Memory J68877BY (Fig. 15)

Note: This unit is associated with B equalizer J68877AU List 2. The logic and memory panel contains 12 plug-in units.



PLUG-IN 19A MEMORY UNITS	
UNITS	ASSOCIATED EQUALIZER NETWORK FREQ (MHZ)
1	1.056
2	1.552
3	2.080
4	4.256
5	7.008
6	9.888
7	12.896
8	16.032
9	17.792
10	20.200

Fig. 15—B Equalizer Logic and Memory J68877BY

CHART 8 (Cont)

STEP	PROCEDURE
Replacement Procedure	
40	Ensure that the line has been removed from service and that all concerned have been notified that maintenance is being performed on the line.
41	Remove the faulty plug-in unit using extractor tool KS-19099 List 1.
42	Install the good plug-in unit and ensure that the connector is properly mated.

CHART 8 (Cont)

STEP	PROCEDURE
Performance Test	
43	Request the control center attendant to check the ability of the logic and memory to respond to the following commands: (a) Apply equalizer test signals at the B equalizer input and at the output (b) Adjust the gain and reset each of the ten equalizer networks.
44	Request the control center attendant to equalize the line.
45	Restore the line to service in accordance with established procedures.
E. Manual B Equalizer J68877EE (Fig. 16)	
Replacement Procedure	
46	Ensure that the line has been removed from service and that all concerned are notified that maintenance is being performed on the line.
47	Remove the cables from IN jack J25 and power input jack J24 at the left rear and from OUT jack J28 at the right rear.
48	Remove the four mounting screws and remove the faulty panel from the bay.

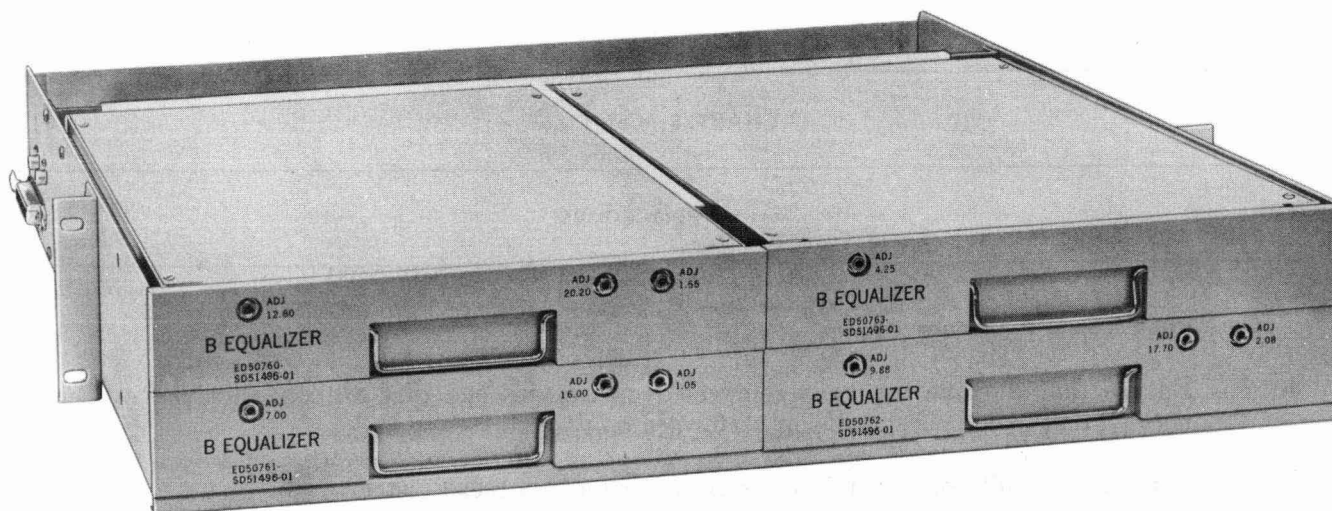


Fig. 16—Manual B Equalizer J68877EE

CHART 8 (Cont)

STEP	PROCEDURE
49	Install the new panel and secure with mounting screws.
50	Replace the connectors removed from the IN, power input, and OUT jacks.
Performance Test	
51	Equalize the line in accordance with Section 359-200-505.
52	Restore the line to service in accordance with established procedures.

CHART 9
B EQUALIZER TEST OSCILLATORS

A control connecting bay for an L4 system with a remote control system includes ten B equalizer test oscillators and a connecting circuit for distributing test signals to all the lines in the route served by the control connecting bay.

Both the test oscillators and the connecting circuit are included in B equalizer test signal panel J68877BT. In earlier control connecting bays, these circuits are provided in two panels: B oscillators assembly J68877BB and B signals connecting assembly J68877BC, which are manufacture discontinued. All three panels are covered in this chart.

STEP	PROCEDURE
A. B Equalizer Test Signal Panel J68877BT (Fig. 17)	
1	Advise all concerned that maintenance is being performed on the assembly.
Replacement Procedure for Oscillator	
2	Remove the faulty oscillator using extractor tool KS-19099 List 1.
3	Install the good oscillator and ensure that the unit is properly seated.
Performance Test for Oscillator	
4	Request the control center attendant to apply equalizer test signals at either the input or the output of the B equalizer in receive line 10 in the route served by the J68877BT panel.

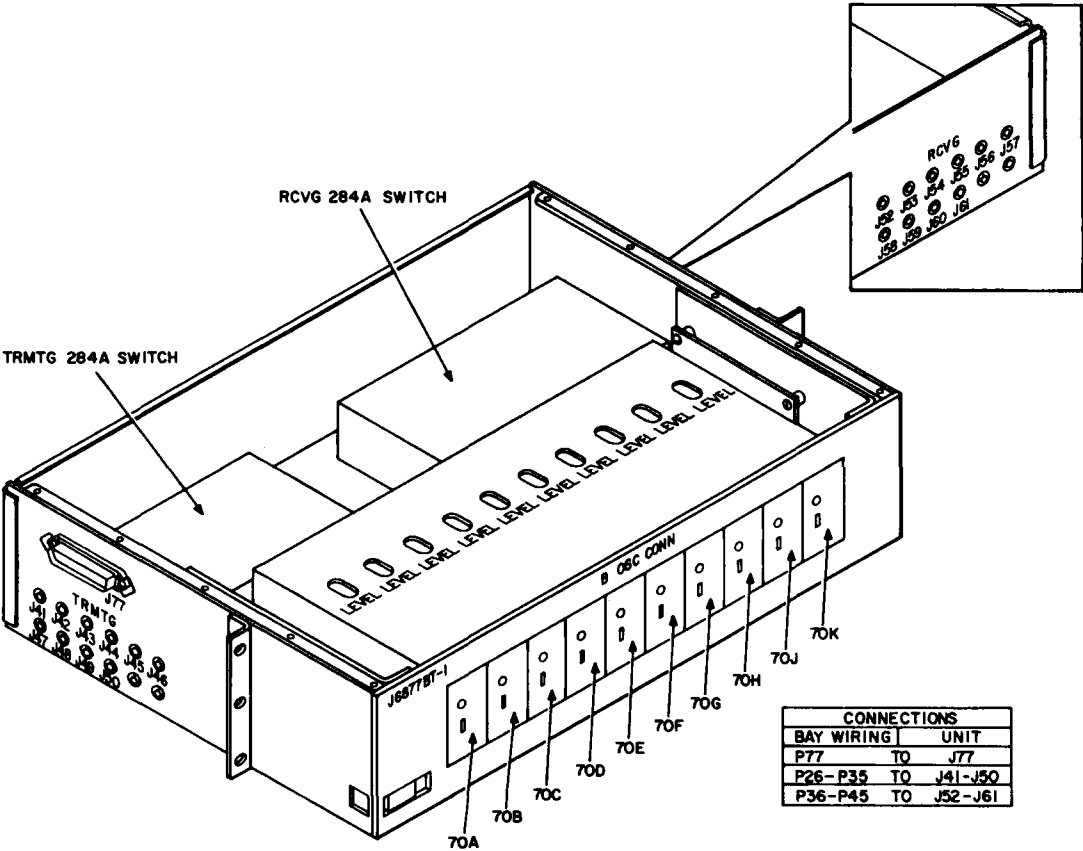


Fig. 17—B Equalizer Test Signal Panel J68877BT

CHART 9 (Cont)

STEP	PROCEDURE
	Note: When receive line 10 is selected, the B equalizer test signals appear at output jack J61 on the panel.
5	Measure the power of the appropriate B equalizer test signal at jack J61 on the right side of the panel. Requirement: As listed in Table C, column 3
6	Adjust the appropriate LEVEL control, if required, to meet the requirement. Note: Unlatch the drawer and pull forward to gain access to the LEVEL controls.
7	Request the control center attendant to turn off the equalizer test oscillators.

◆ TABLE C ◆

B EQUALIZER TEST SIGNALS

(1) OSCILLATOR	(2) FREQUENCY (MHz)	REQUIRED POWER IN dBm ± 0.1 dB	
		(3) JACK J61 ON J68877BC OR J68877BT	(4) JACK J36 ON J68877BB
70A	1.056	-33.95	-19.33
70B	1.552	-33.58	-18.92
70C	2.080	-33.21	-18.52
70D	4.256	-31.95	-17.22
70E	7.008	-30.85	-16.06
70F	9.888	-29.81	-14.95
70G	12.896	-29.02	-14.05
70H	16.032	-28.28	-13.16
70J	17.792	-27.92	-12.73
70K	20.200	-27.46	-12.21

CHART 9 (Cont)

STEP	PROCEDURE
8	Remove the test equipment.
9	Reconnect the plug to jack J61.
	Replacement Procedure for 284A Switch
10	Remove power from the panel by removing plug P77 from jack J77 (Fig. 17).
11	Unlatch the drawer and pull forward to gain access to the unit to be replaced.
12	Disconnect leads and tag if not otherwise identified.
13	Remove faulty unit.
14	Install good unit and connect all leads.
15	Close the drawer.
16	Reconnect plug P77 to jack J77.

CHART 9 (Cont)

STEP	PROCEDURE
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Performance Test for 284A Switch

- 17
- Request the control center attendant to ensure satisfactory performance by initiating commands to apply the B equalizer test signals at the input and output of each B equalizer served.

B. B Oscillators Assembly J68877BB (Fig. 18)

Note: This assembly produces the ten B equalizer test signals. These signals are connected to the proper B equalizer via the J68877BC panel (Fig. 19). Maintenance consists of either removing and replacing the entire assembly or replacing one or more of the plug-in 70-type crystal oscillators. A performance test includes measurement and, if necessary, adjustment of each of the ten equalizer test signals.

LOCATION: CONTROL CONNECTING BAY
INSTALLATION ACCESS: REAR OF BAY
TEST ACCESS: REAR OF BAY

CONNECTIONS:	
BAY WIRING	UNIT
COAXIAL P46 TO	J36
MULTIPIN P47 TO	J38

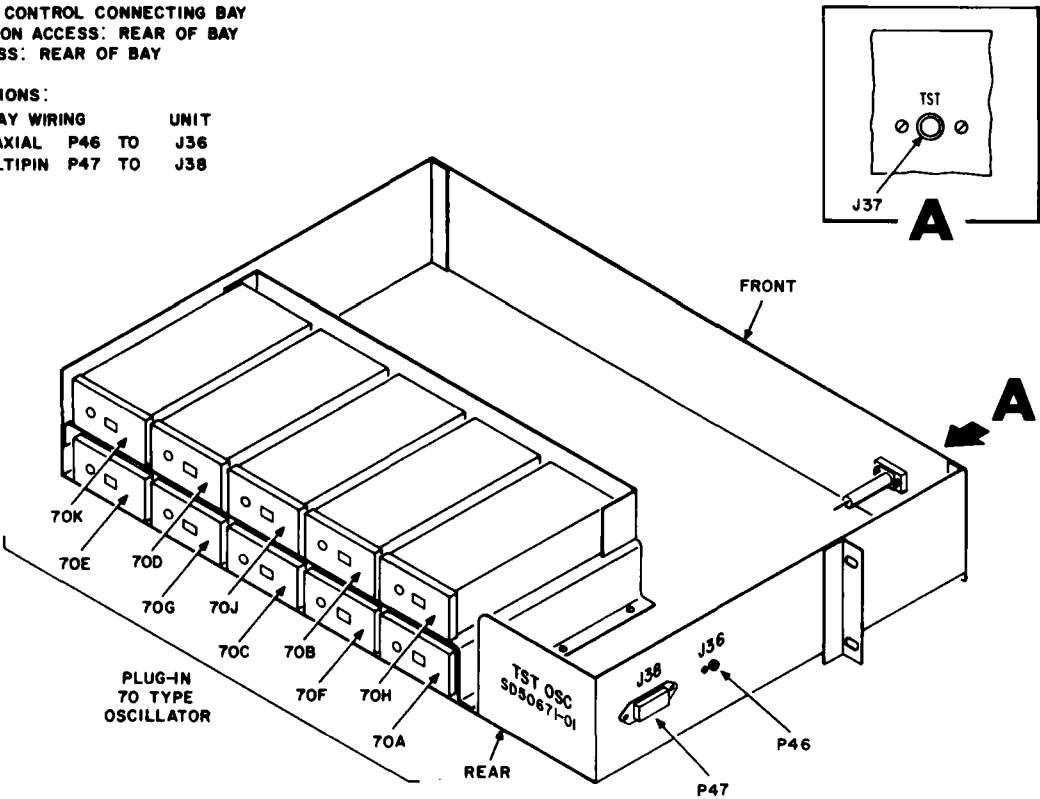


Fig. 18—B Equalizer Test Oscillator Panel J68877BB

CHART 9 (Cont)

STEP	PROCEDURE
Replacement Procedure	
18	Remove the faulty oscillator using extractor tool KS-19099 List 1.
	Note: If the entire assembly is to be removed: disconnect P47 from J38, disconnect P46 from J36, remove the mounting screws, and remove the assembly from the bay.
19	Install the new oscillator.
	Note: If the entire assembly is being replaced: install the new assembly, secure with screws, and connect P47 to J38.
Performance Test	
20	Request the control center attendant to apply equalizer test signals at either the input or the output of the B equalizer in one of the receive lines in the route served by the J68877BB panel.
	Note: When a <i>receive</i> line is selected, the B equalizer test signals appear at output jacks J52 through J61 on the J68877BC panel.
21	Measure the power of the appropriate B equalizer test signal at jack J61 on the rear of the J68877BC panel.
	Note: B equalizer test signal frequencies are listed in Table C.
	Requirement: As listed in Table C, column 3
22	Proceed to Step 28 if the requirement is met. Otherwise, proceed to Step 23 to adjust the oscillator.
23	Remove the appropriate plug-in oscillator using extractor tool KS-19099 List 1.
24	Insert this oscillator in the 186A adapter and insert the 186A adapter with oscillator in the oscillator mounting position.
25	Adjust the oscillator LEVEL ADJ control to obtain the required output power.
	Requirement: As listed in Table C, column 3
	Note: The oscillator LEVEL ADJ control is on the side and is accessible through a hole in the side of the 186A adapter.
26	Remove the adapter with oscillator.
27	Reinstall the oscillator in the assembly.

CHART 9 (Cont)

STEP	PROCEDURE
28	Repeat Steps 21 through 27 for each of the other oscillators, as required.
29	Request the control center attendant to turn off the equalizer test oscillators.
30	Remove the test equipment.
31	Reconnect plug P46 to jack J36.
C. B Signals Connecting Assembly J68877BC (Fig. 19)	
<i>Note:</i> This assembly receives the B equalizer test signals from the J68877BB panel. Relays in this assembly operate, upon command from a control center, to turn on the oscillators and to connect the test signals at the input or output of the selected B equalizer.	
Replacement Procedure	
32	Remove P24 from J39 and remove P25 from J40 at the side of the panel.
<i>Note:</i> Tag each of the following plugs as it is removed so that it can be reconnected to the correct jack.	
33	Remove the plugs from output jacks J41 through J61 at the rear of the panel.
<i>Note:</i> Jacks J41 through J50 serve the ten transmit lines and jacks J52 through J61 serve the ten receive lines in the route.	
34	Remove the mounting screws and remove the faulty assembly from the bay.
35	Install the new assembly and secure with mounting screws.
36	Replace all plugs removed from the side and rear of the panel.
Performance Test	
<i>Note:</i> To minimize any alignment error introduced by the new assembly, the power of a B equalizer test signal is checked at the output of each B equalizer served by this assembly. If necessary, the power of the test signal is adjusted at the associated B equalizer (Fig. 12).	
37	Remove from service one line served by the B signals connecting assembly.
38	Request the control center attendant to apply equalizer test signals at the output of the B equalizer in the line removed from service.
39	Remove plug P57 from OUT jack J28 on the B equalizer in the line removed from service.

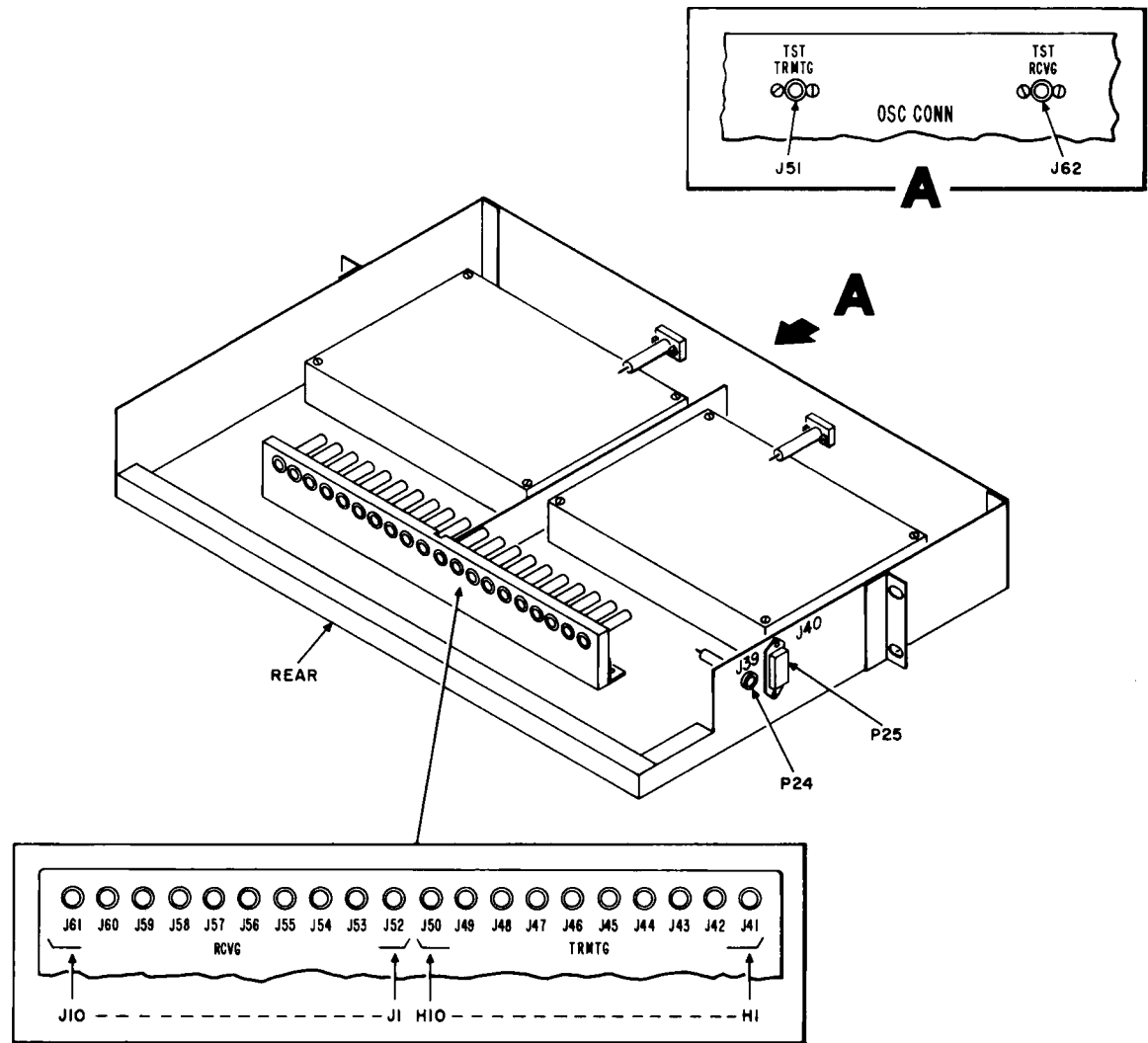


Fig. 19—B Equalizer Test Signal Connecting Panel J68877BC

CHART 9 (Cont)

STEP	PROCEDURE
40	Measure the power of the 12.896-MHz test signal at OUT jack J28. Requirement: -52.6 dBm
41	Proceed to Step 45 if the requirement is met. Otherwise, proceed to Step 42.
42	Remove the mounting screws holding the B equalizer in the bay and slide the unit back far enough to gain access to the ADJ control. Note: This control is located inside the equalizer frame (Fig. 12).

CHART 9 (Cont)

STEP	PROCEDURE
43	Adjust the control to meet the requirement of Step 40.
44	Secure the B equalizer in the bay with the mounting screws removed in Step 42.
45	Disconnect the test equipment.
46	Connect plug P57 to jack J28.
47.	Restore the line to service in accordance with established procedures.
48	Repeat Steps 37 through 47 for each of the remaining B equalizers served by the B test signals connecting assembly.
