

**SUPERGROUP CARRIER SUPPLIES**  
**TROUBLE LOCATION PROCEDURES**  
**LMX-2 CARRIER AND PILOT SUPPLY**  
**ANALOG MULTIPLEX TERMINAL EQUIPMENT**

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The trouble location procedures described herein are to be performed when trouble is encountered while performing tests as prescribed in the following sections:

- 356-270-501            Drive Amplifier Tests
- 356-270-502            Modulator Performance Test
- 356-270-503            Output Power Tests
- 356-270-504            Adjustment of Tuned Distribution Circuit

This section is reissued to add cautions and to clarify the test procedures. Arrows are used to indicate major changes. **Equipment Test Lists are not affected.**

All tests of the J68857( ) supergroup carrier supply unit (Fig. 1), as prescribed in the 356-270 series, are interdependent in that the proper operation of each individual module is dependent upon the correct signals being received from the preceding modules.

The tests must be performed in the sequence given. The voltage and power measurements in Chart 1 are a prerequisite to the tests in Charts 2 and 3. Chart 2 is intended for locating troubles affecting supergroups 3 through 18. Chart 3 is intended for locating troubles affecting supergroups D25 through D28.

Figure 2 shows the locations of the modules and indicates the signal paths.

Pin jacks COM1, Q14, Q15, and Q16 (shown in Fig. 1, 5, 6, and 7) have been omitted in later models of the distribution amplifier and do not apply to tests in this section.

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3—Trouble Location Associated With Supergroups D25 Through D28 . . . . .	7

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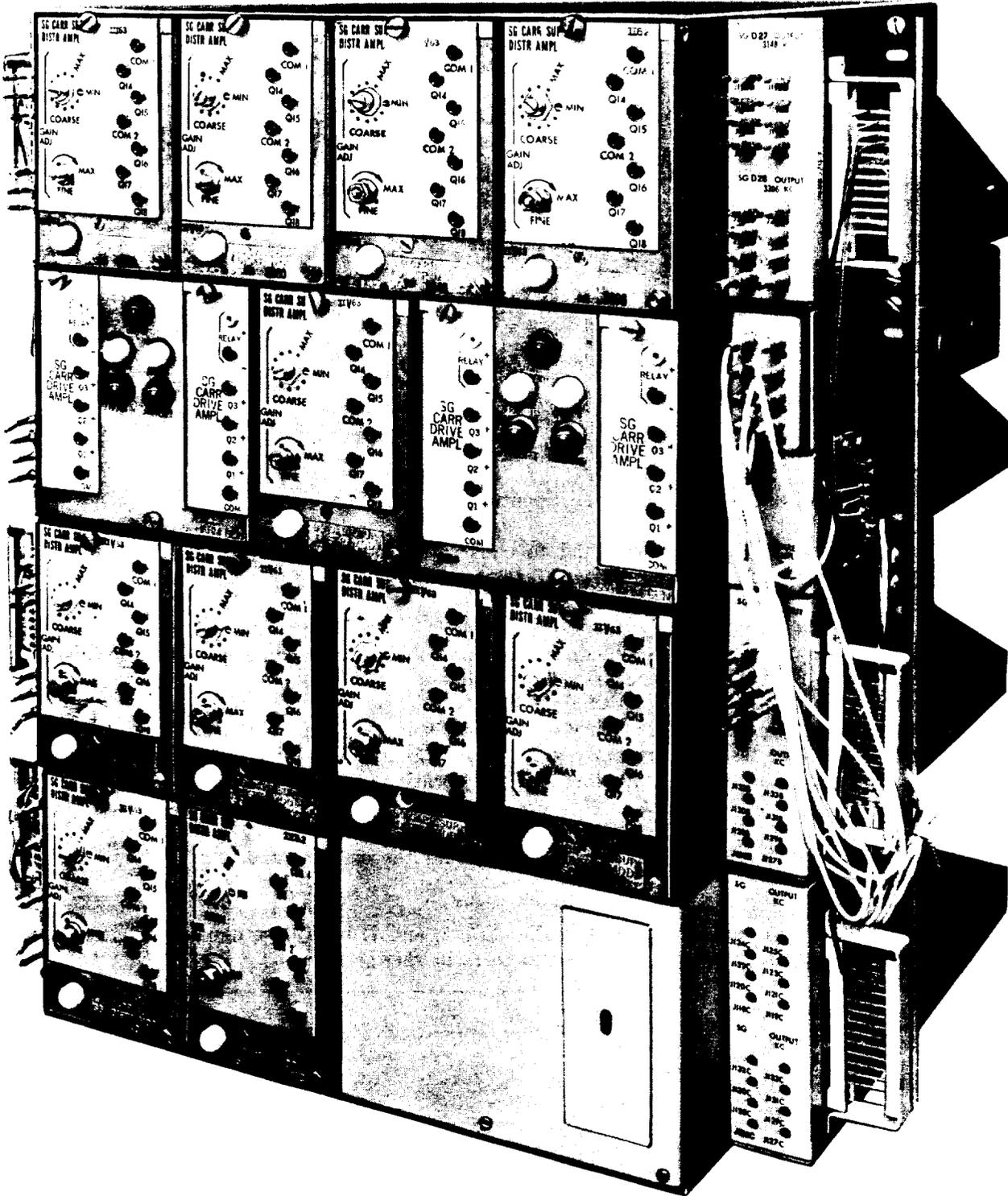
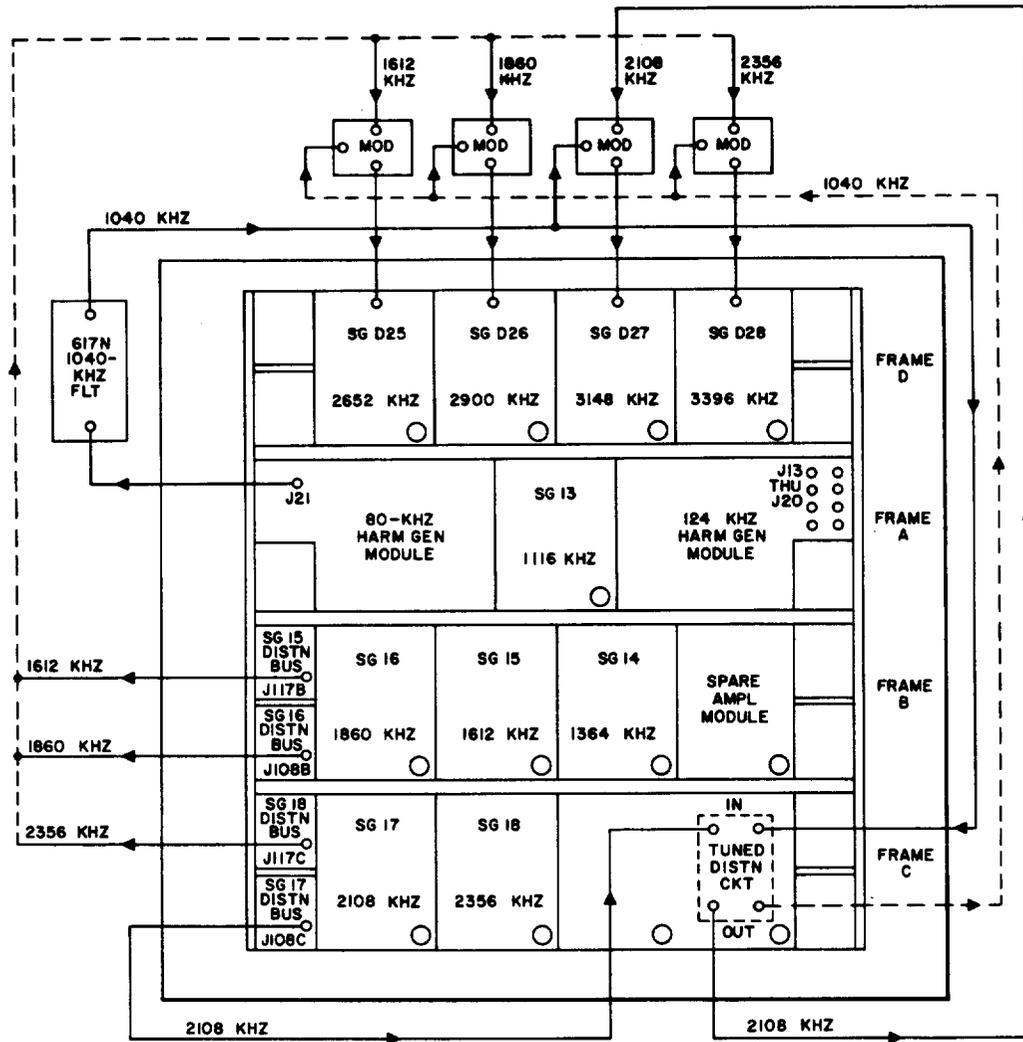


Fig. 1—Supergroup Carrier Supply J68857C



## NOTES:

1. ARROWS INDICATE DIRECTION OF SIGNAL FLOW.
2. THE 1040-KHZ FILTER AND THE D SUPERGROUP MODULATORS ARE PHYSICALLY LOCATED IN THE D FRAME BEHIND THE D SUPERGROUP DISTRIBUTION MODULES.

Fig. 2— Supergroup Carrier Supply J68857C —Front Panel Layout and Signal Flow

## APPARATUS:

**34A TMS or suitable receiving test equipment**, per Section 356-010-500, capable of detecting, from 75-ohm circuits, signals between 1116 and 3396 kHz at approximately 0 dBm.

In addition, the following are required:

**KS-14510 VOM** (or suitable volt-ohm-milliammeter with a sensitivity of at least 20,000 ohms per volt)

*Attenuator* such as KS-13964, 14A, or Siemens Rel 3D 111b

*P43R350 Cable Assembly*

*P2BJ Cord.*

CHART 1

PRELIMINARY TESTS

STEP	PROCEDURE
1	Prepare the VOM for the dc voltages listed in Table A.
2	Make VOM test connections indicated in Table A for the supergroup distribution amplifier to be tested [patches (1), (2), and (3), Fig. 3].
3	Measure the voltage at the Q17 and Q18 test jacks.  <b>Requirement:</b> See Table A.
4	Proceed to Step 7 if the requirements are met. Otherwise, proceed to Step 5.
5	Replace the distribution amplifier under test with a spare amplifier.
6	Repeat Steps 1 through 5, as required.
7	Remove the VOM test connections.
8	Inspect the distribution bus of the supergroup under test and verify that all unused bus taps are terminated with 75-ohm terminating plugs.
9	Prepare the RTE (receiving test equipment) for a 75-ohm terminated measurement of the supergroup carrier frequency to be tested at approximately 0.0 dBm.  <b>Note:</b> The carrier frequencies for all supergroups are listed in Table B.
10	♦Remove a 75-ohm terminating plug from an unused bus tap of the supergroup distribution module to be tested.  <b>Note:</b> If all bus taps are in use to provide carrier signals, remove the cable connected to a tap <b>not</b> providing a carrier signal to a working supergroup.  <b>Caution:</b> <i>Do not remove the cable for any working supergroup.</i> ♦
11	Set the selected variable attenuator for 19-dB loss.
12	Make patches (4) and (5) in Fig. 3.

## CHART 1 (Contd)

STEP

PROCEDURE

TABLE A

## SUPERGROUP DISTRIBUTION AMPLIFIERS – VOLTAGE CHECKS

TEST CONNECTIONS		DC VOLTAGE REQUIREMENTS	
VOM	SG DISTR AMPL	8-TAP DISTRIBUTION BUS	16-TAP DISTRIBUTION BUS
NEG (–)	COM 2	—	—
POS (+)	Q17	0.4 ± 0.25	0.6 ± 0.25
POS (+)	Q18	0.4 ± 0.25	0.6 ± 0.25

- 13 Observe the RTE meter indication.

**Note:** The meter indication plus the value of attenuation equals the output at the distribution bus. (**Example:** 0 dBm + 19 dB = +19 dBm at distribution bus.)

**Requirement:** Meter indication is 0.0 dBm.

- 14 Proceed to Step 15 if the requirement is met. Otherwise, proceed to Chart 2 or Chart 3, as applicable.
- 15 ♦ Measure the output power for the supergroup carrier frequency under test at the carrier supply test panel per Section 356-270-503.
- 16 Compare the **measured** output power with the **posted** reference output power value.
- 17 Perform the following steps if the measured and posted output power values differ significantly.
- At carrier supply test panel,**
- 18 Check the wired connections at TB1 from the distribution module per SD-50095-01.
- At frame of distribution module,**
- 19 Check the wired connections to the carrier supply panel per SD-50101-02.
- 20 Post the output power value measured in Step 15 as the new reference output power value if Steps 18 and 19 reveal no trouble and if the requirement in Step 13 is not suspiciously contrary to the measured output power.♦

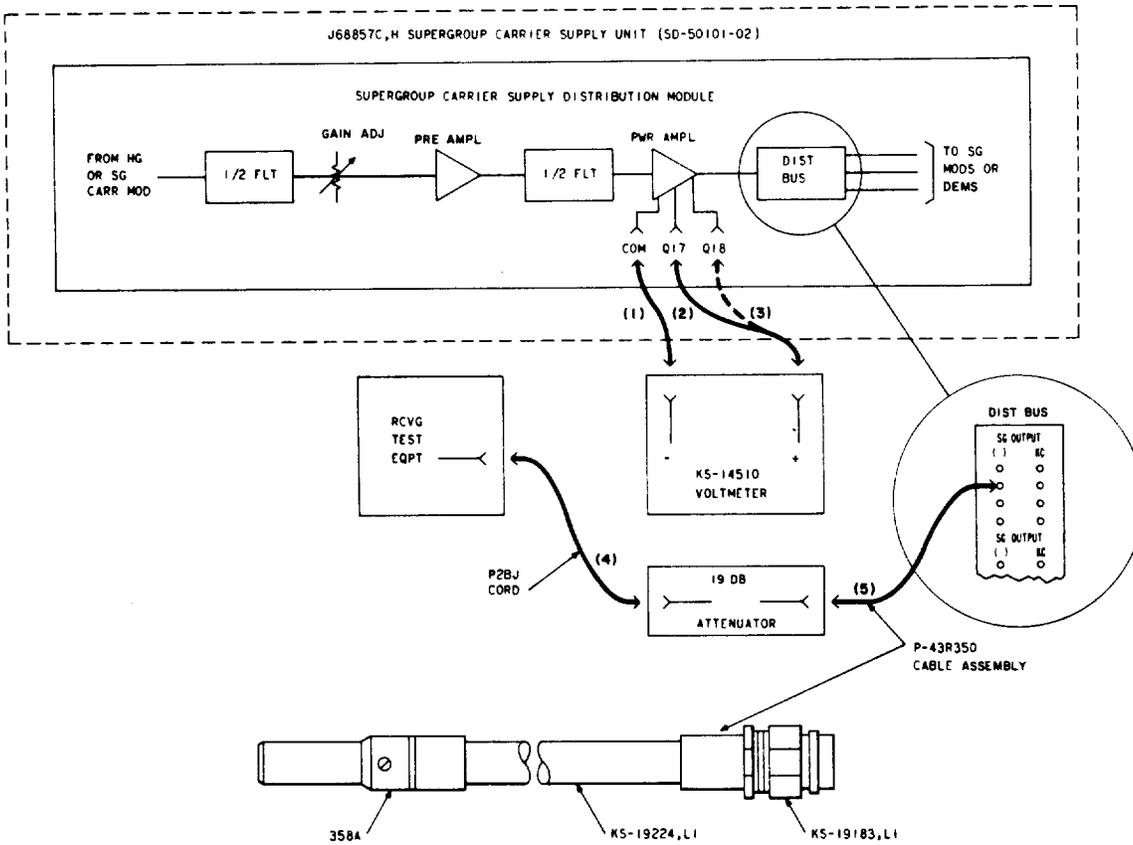


Fig. 3—Supergroup Carrier Supply—Distribution Amplifier Output Power and Voltage Measurements

TABLE B  
SUPERGROUP CARRIER FREQUENCIES (KHZ)

L600A										
SG	3	4	5	6	7	8	9	10		
FREQUENCY	11161	1364	1612	1860	2108	2356	1860	3100		
L1860A										
SG	13	14	15	16	17	18	D25	D26	D27	D28
FREQUENCY	1116	1364	1612	1860	2108	2356	2652	2900	3148	3396

## CHART 2

## TROUBLE LOCATION ASSOCIATED WITH SUPERGROUP 3 THROUGH 18

STEP	PROCEDURE
1	Determine if the trouble is common to all supergroups by performing output power tests as prescribed in Section 356-270-503.
2	Proceed to Step 5 if the trouble is not common. Otherwise, perform the following steps.
3	Test the 124-kHz drive amplifier output as prescribed in Section 356-270-501.
4	Remove the 124-kHz drive amplifiers (Fig. 4), <b>one</b> at a time, and inspect the plug-in connections to the harmonic generator.
5	◆Perform the following steps if the trouble is not common.  <i>At right side of frame A,</i>
6	Verify that the 124-kHz harmonic generator output jacks J13 through J20 (Fig. 2) are properly connected.  <b>Caution: Do not remove a distribution amplifier or distribution module unless a transmission outage has occurred.</b>
7	Remove the affected distribution amplifier(s) and inspect the plug-in connections to the distribution module (Fig. 5 and 6).
8	Remove the affected distribution module and inspect the plug-in connections to the frame.
9	◆Repeat the procedure in Chart 1.◆

## CHART 3

## TROUBLE LOCATION ASSOCIATED WITH SUPERGROUPS D25 THROUGH D28

STEP	PROCEDURE
1	Determine if the trouble is common to all supergroups by performing output power tests as prescribed in Section 356-270-503.
2	Proceed to Step 7 if the trouble is not common. Otherwise, perform the following steps.

## CHART 3 (Contd)

STEP	PROCEDURE
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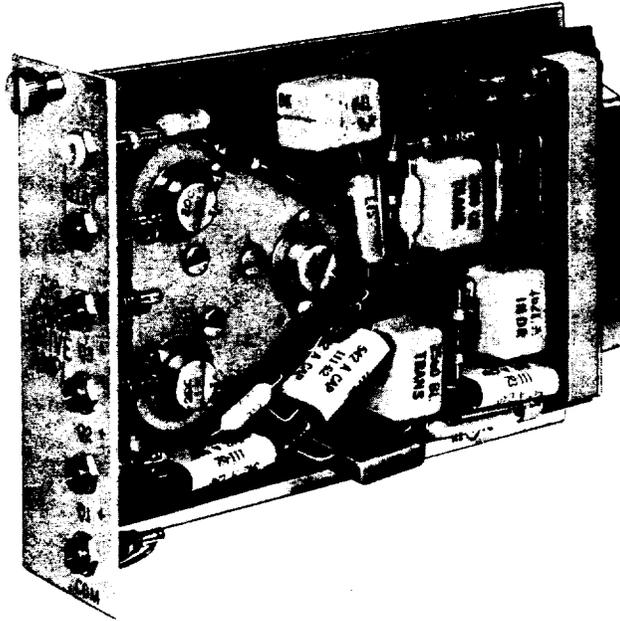


Fig. 4—Supergroup Drive Amplifier Module

*At left side of frame A,*

- 3 Verify that the 80-kHz harmonic generator output jack J21 (Fig. 2) is properly connected.

**Note:** Jack J21 is the 80-kHz input to the 1040-kHz filter located on frame D.

- 4 Test the 80-kHz drive amplifier output as prescribed in Section 356-270-501.
- 5 ♦Remove the 80-kHz drive amplifiers (Fig. 4), **one** at a time, and inspect the plug-in connections to the harmonic generator.

**Caution:** *Do not remove a distribution module unless a transmission outage has occurred.*♦

- 6 Remove the D25 and D26 distribution modules and inspect the 1040-kHz filter 617N to verify proper soldered connections at the input and output terminals (Fig. 7).
- 7 Perform the following steps if the trouble is not common to all supergroups.

CHART 3 (Contd)

STEP	PROCEDURE
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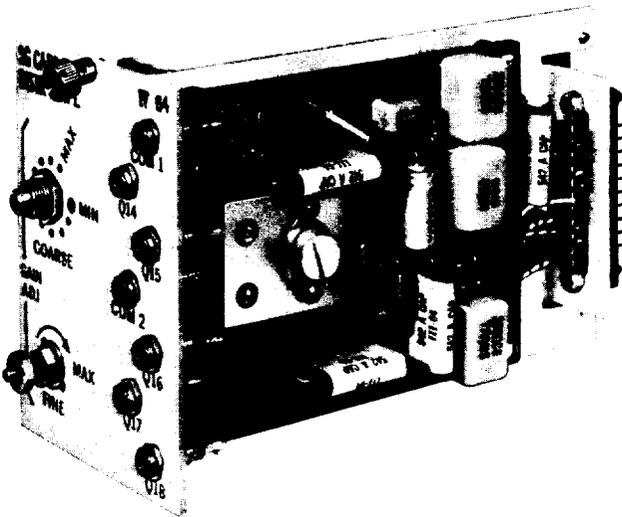


Fig. 5—Old Model Supergroup Carrier Distribution Amplifier Module Having COARSE and FINE GAIN ADJ Controls



Fig. 6—New Model Supergroup Carrier Distribution Amplifier Module Having Continuous "T" Pad GAIN ADJ Control

## CHART 3 (Contd)

STEP	PROCEDURE
	<i>At left side of frames B and C,</i>
8	Verify that the supergroup 15 through supergroup 18 distribution jacks (Fig. 2) listed in Table C are properly connected.
9	Perform the output power tests for supergroups 15 through 18 as prescribed in Section 356-270-503.
	<i>At right side of frame C,</i>
10	Remove the tuned distribution coverplate and inspect all connections to and from the tuned distribution circuit printed wiring board (Fig. 8).
	<b>⚠Caution: Do not remove a supergroup modulator unless a transmission outage has occurred.⚠</b>
11	Replace the affected D supergroup modulator (Fig. 2).
12	⚠Repeat the procedure in Chart 1.⚠

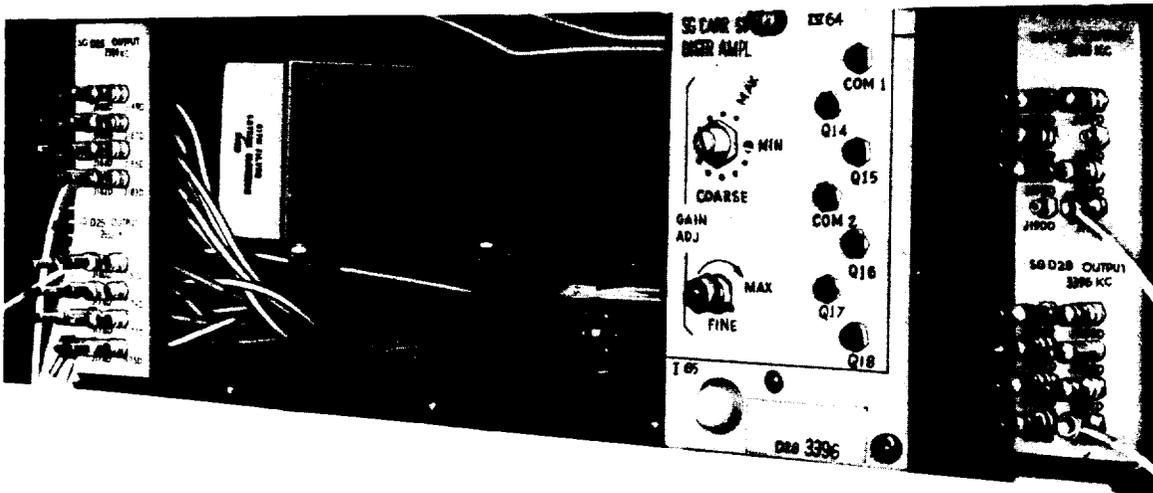


Fig. 7—Supergroup Carrier Supply J68857C—Location of 1040-KHZ Filter 617N (D Frame)

TABLE C

## D SUPERGROUP MODULATOR INPUTS FROM SUPERGROUPS 15 THROUGH 18

FREQUENCY (KHZ)	FROM SUPERGROUP	DISTRIBUTION BUS		TO SUPERGROUP MODULATOR
		OUTPUT JACK	FRAME	
1612	15	J117B	B	D25
1860	16	J108B	B	D26
2108	17	J108C	C	D27
2356	18	J117C	C	D28

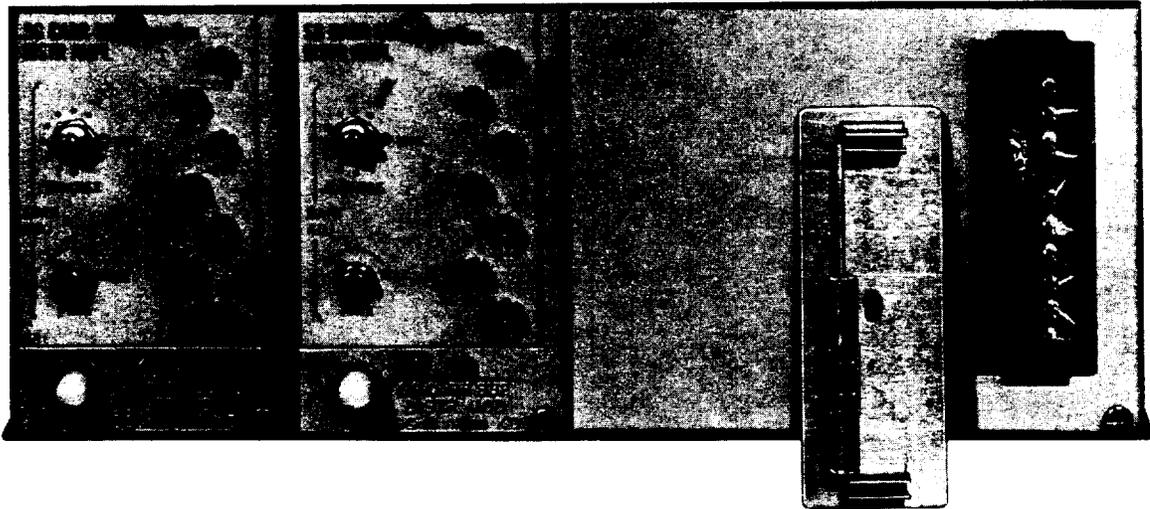


Fig. 8—Supergroup Carrier Supply J68857C—D Supergroup Tuned Distribution Circuit