L MULTIPLEX TERMINAL
LMX-2 (L60A/L120A)
TRANSMITTING CIRCUITS
SUPERGROUP MODULATOR
LOSS TESTS

PURPOSE OF TESTS

(a) To measure and, if necessary, adjust the loss of each supergroup modulator circuit

(b) To determine that each supergroup modulator circuit meets its passband requirements.

REASON FOR REISSUE

To differentiate between 92-kHz and 104.08-kHz pilot operation. Arrows are used to indicate significant changes. ***Equipment Test Lists are not affected.***

SYNOPSIS (SEE FIG. 1)

Only one supergroup modulator circuit is required in each L60A multiplex terminal while two are required in each L120A multiplex terminal. Any of ten supergroups (1 through 10) may be selected.

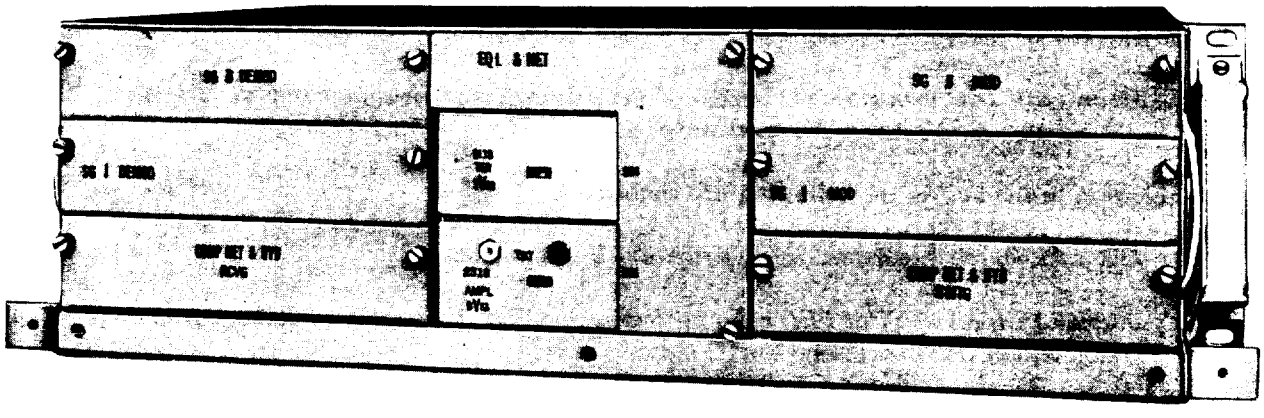


Fig. 1—Supergroup Modem Panel

SYNOPSIS (Cont)

Each supergroup modulator:

(a) Accepts the 312- to 552-kHz supergroup frequency band, at a level of −25 dBm, from the output of either a group bank or a supergroup connector

(b) Translates this band into its proper frequency allocation for transmission to a distant terminal.

The translated output of the supergroup modulator circuit is combined with the output of the second supergroup modulator circuit, ***when used,*** and is delivered to the supergroup bank output jacks at −43.4 dBm. Thus, a loss of 18.4 dB exists between the SG MOD IN jacks and the SG BK OUT jacks.

Note: Supergroups 1 and 3 of earlier manufacture, ***when used,*** require amplification to maintain the correct loss.

CHART **PAGE**

APPARATUS:

The tests in this section require suitable 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 capable of delivering, into 75-ohm circuits, signals between 300 kHz and 600 kHz at a level of −25 dBm

Receiving test equipment capable of detecting, from 75-ohm circuits, signals between 60 kHz and 2788 kHz at levels between −43.4 dBm and −73.4 dBm.

In addition to the above, the following are required:

Out-of-Service Transmitting Group Bank (Chart 2 only)

J58858AT (58AT) Pilot Filter Set for measuring SG2 if the selected receiving test equipment is other than the 49A TMS (Chart 2 only)

P2BJ Cords, as required

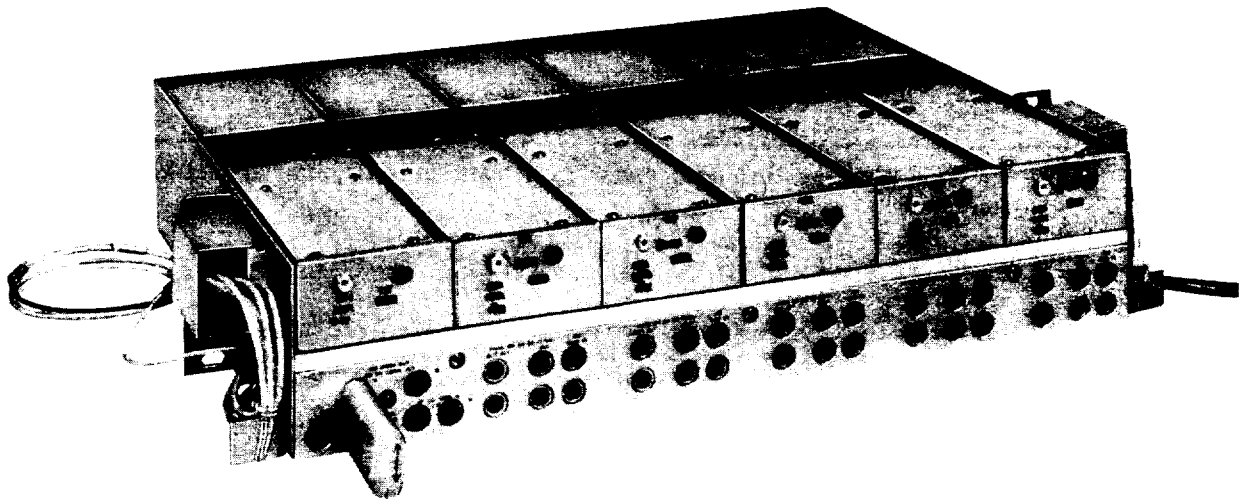


Fig. 2—Transmitting Group Bank Shelf Assembly

CHART 1

92-KHZ GROUP PILOT OPERATION

STEP	PROCEDURE
	LOSS TEST
1	Verify that the equipment to be tested is out of service.
2	Prepare the RTE (receiving test equipment) for a 75-ohm terminated measurement of the translated 421-kHz test signal at −43.4 dBm for the supergroup being tested. ***Note:*** All translated test frequencies are listed in Table A.

TABLE A

FREQUENCY TRANSLATION (SUPERGROUP MODULATORS)					
INPUT TEST FREQUENCY (KHZ)	OUTPUT TEST FREQUENCY (KHZ) FOR SUPERGROUPS 1 THROUGH 10				
	1	2	3	4	5
313	299	313	803	1051	1299
421	191	421	695	943	1191
549	63	549	567	815	1063
	6	7	8	9	10
313	1547	1795	2043	2173	2787
421	1439	1687	1935	2281	2679
549	1311	1559	1807	2409	2551

CHART 1 (Cont)

STEP	PROCEDURE
3	Prepare the STE (sending test equipment) to deliver, into 75 ohms, a 421-kHz test signal at −25 dBm.
4	Connect the STE to the SG MOD IN jack [patch (1), Fig. 3].

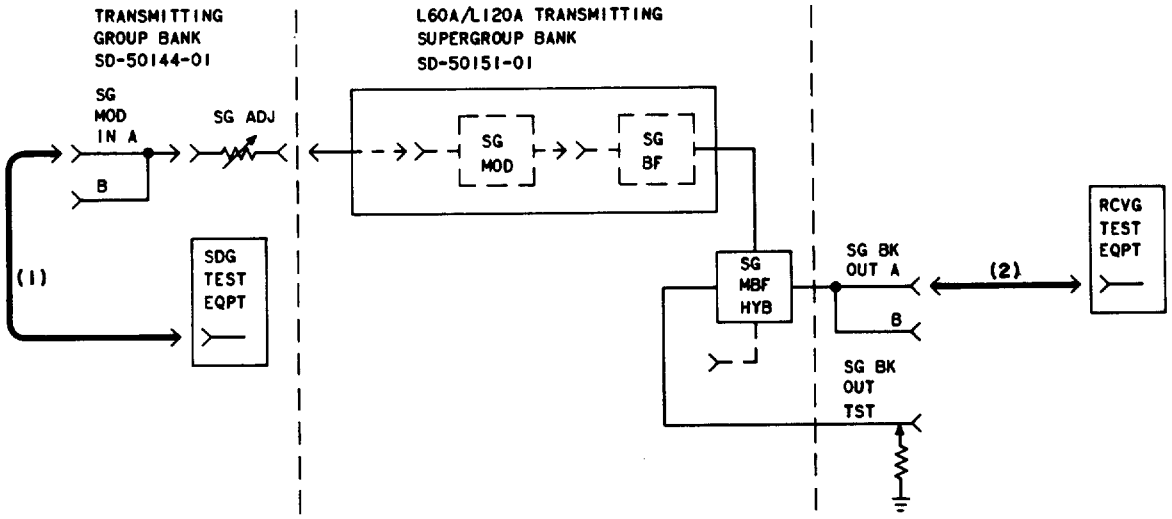


Fig. 3—Test Connections—92-KHZ Group Pilot Operation

5	Connect the RTE to the SG BK OUT A jack [patch (2), Fig. 3] .
6	Measure and record the level of the translated 421-kHz signal.
	Requirement: −43.4 dBm ±0.05 dB.
7	If the requirement of Step 6 is met, proceed to Step 8. If it is not met, adjust the SG PAD control (see Fig. 2) on the associated group bank shelf to meet the requirement.
	PASSBAND TEST
8	Adjust the STE to deliver 313 kHz at −25 dBm.
9	Adjust the RTE to measure the translated 313-kHz signal.
10	Measure the level of the translated 313-kHz signal.
	Requirement: Between +1.0 dB and −0.2 dB of the value recorded in Step 6.
11	Adjust the STE to deliver 549 kHz at −25 dBm.
12	Adjust the RTE to measure the translated 549-kHz signal.

CHART 1 (Cont)

STEP	PROCEDURE
13	Measure the level of the translated 549-kHz signal. ***Requirement:*** Between +1.0 dB and −0.2 dB of the value recorded in Step 6.
14	If the requirements of Steps 6, 10, and 13 are met, proceed to Step 16. If any of the requirements are not met, trouble is indicated.
15	Locate and clear the trouble and repeat Steps 6 through 14. ***Note:*** The associated SG MBF or COMP NET may be defective.
16	Repeat Steps 1 through 14 for each supergroup modulator circuit to be tested.
17	Remove patches (1) and (2) and restore service to normal.

CHART 2

104.08-KHZ GROUP PILOT OPERATION

STEP	PROCEDURE
	INPUT PILOT LEVEL CHECK
1	Select an out-of-service transmitting group bank.
2	Prepare the RTE (receiving test equipment) for a 75-ohm terminated measurement of 315.92 kHz at −45 dBm (−55 dBm if the 58AT pilot filter set is used).
3	Make patch (1) in Fig. 4.
4	Measure the level of the 315.92-kHz pilot. ***Requirement:*** −45 dBm ±0.05 dB. −55 dBm ±0.05 dB if the 58AT pilot filter set is used.
5	If the requirement of Step 4 is met, proceed to Step 6. If it is not met, perform out-of-service tests on the group bank as prescribed in Section 356-281-503.
6	Remove patch (1) in Fig. 4.
	LOSS TEST
7	Connect the out-of-service transmitting group bank to the SG MOD IN jack [patch (2), Fig. 4].

CHART 2 (Cont)

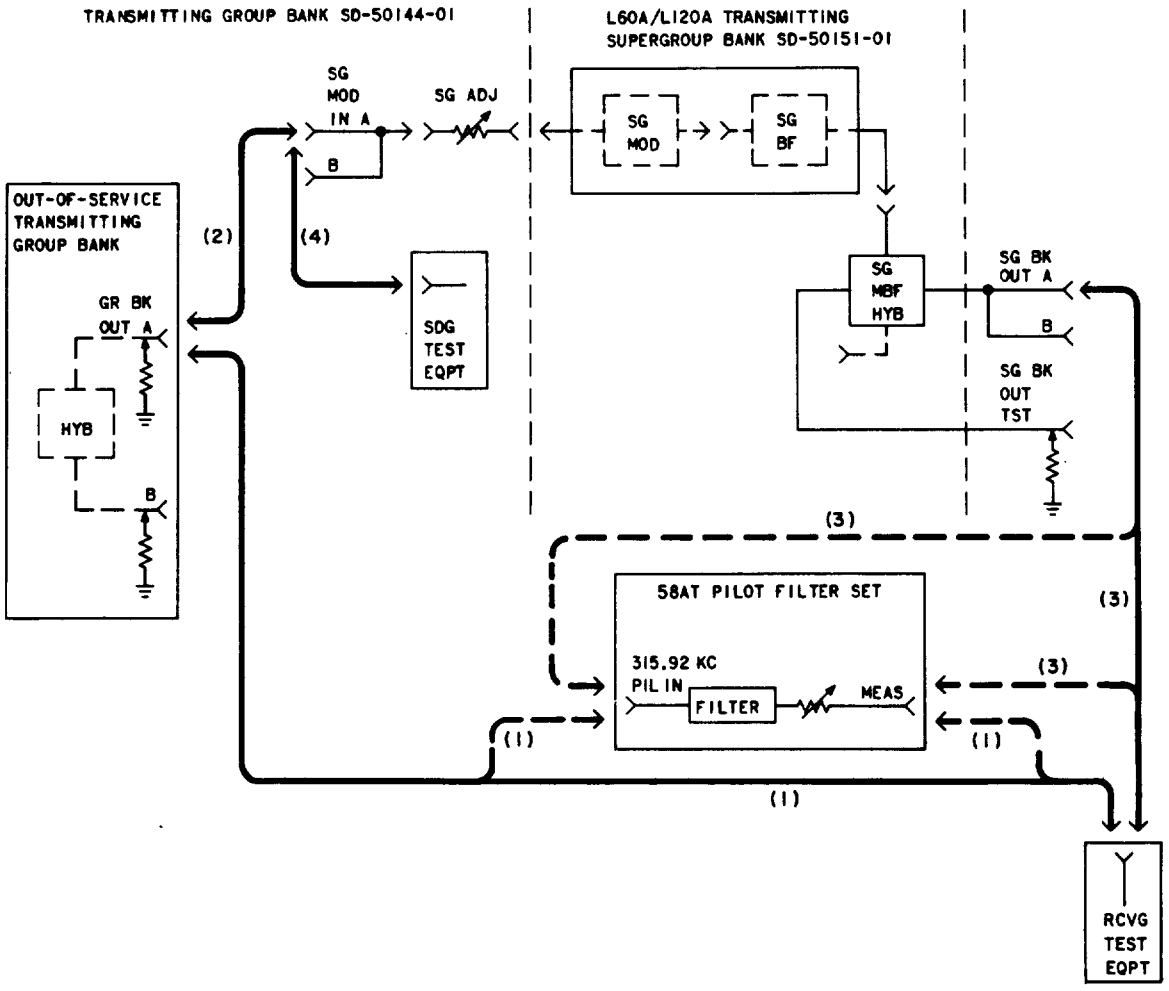
STEP	PROCEDURE
	 **Fig. 4—Test Connections—104.08-KHZ Group Pilot Operation**
8	Adjust the RTE to measure the translated 315.92-kHz pilot at −63.4 dBm (−73.4 dBm if the 58AT pilot filter set is used). ***Note:*** The translated pilot and test frequencies are listed in Table B.

CHART 2 (Cont)

STEP	PROCEDURE

TABLE B

FREQUENCY TRANSLATION (SUPERGROUP MODULATORS)					
INPUT FREQUENCY (KHZ)	OUTPUT TEST FREQUENCY (KHZ) FOR SUPERGROUPS 1 THROUGH 10				
	1	2	3	4	5
315.92 (PIL)	296.08	315.92*	800.08	1048.08	1296.08
433 (TST)	179	433	683	931	1179
549 (TST)	63	549	567	815	1063
	6	7	8	9	10
315.92 (PIL)	1544.08	1792.08	2040.08	2175.92	2784.08
433 (TST)	1427	1675	1923	2293	2667
549 (TST)	1311	1559	1807	2409	2551

* The 58AT Pilot Filter Set must be used when measuring SG2 if the selected receiving test equipment is other than the 49A TMS.

9 Connect the RTE to the SG BK OUT A jack [patch (3), Fig. 4].

10 Measure the level of the translated 315.92-kHz pilot.

Requirement: −63.4 dBm ±0.05 dB.
−73.4 dBm ±0.05 dB if the 58AT pilot filter set is used.

11 If the requirement of Step 10 is met, proceed to Step 12. If it is not met, adjust the SG PAD control (see Fig. 2) on the associated group bank shelf to meet the requirement.

PASSBAND TEST

12 Adjust the STE (sending test equipment) to deliver, into 75-ohms, a 433-kHz signal at −25 dBm.

13 Adjust the RTE to measure the translated 433-kHz signal.

14 Remove patch (2) in Fig. 4 and the 58AT pilot filter set if used.

15 Make patch (4) in Fig. 4.

16 Measure and record the translated 433-kHz signal.

Requirement: −42.4 dBm to −44.1 dBm (−43.4 dBm is nominal).

17 Adjust the STE to deliver 549 kHz.

CHART 2 (Cont)

STEP	PROCEDURE
18	Adjust the RTE to measure the translated 549-kHz signal.
19	Measure the translated 549-kHz signal.
	Requirement: ◗Within −1.0 dB to +0.7 dB of the value recorded in Step 16.◖
20	If the requirement of Steps 10, 16, and 19 are met, proceed to Step 22. If any of the requirements cannot be met, trouble is indicated.
21	Locate and clear the trouble and repeat Steps 10 through 20.
	Note: The associated SG MBF or COMP NET may be defective.
22	Repeat Steps 7 through 20 for each supergroup modulator circuit to be tested.
23	Remove patches (3) and (4) and restore service to normal.