
BASIC REPEATER J68877AA

TESTS

REPEATERS

L4 CARRIER

◆This section explains procedures for gain and preinstallation tests for basic repeater J68877AA (SD-50668). Gain tests are performed to ensure that repeaters received from the manufacturer operate correctly and to check that repeaters suspected of being faulty are actually defective. Preinstallation tests are performed to prepare a repeater for a specific location in the L4 system.◆

This section is reissued to correct errors, to provide revised gain values for the list 2 basic repeater, and to delete procedures for test set J68899A (Section 103-457-000) which is manufacture discontinued. Arrows are used to indicate significant changes. **Equipment Test Lists are not affected.**

Note: ◆Those L4 main stations using test set J68899A should retain Issue 3 of this section for reference.◆

The basic repeater (Fig. 1) provides gain over the L4 spectrum to compensate for the loss of two miles of coaxial line. The repeater gain is measured at five frequencies in the L4 band.

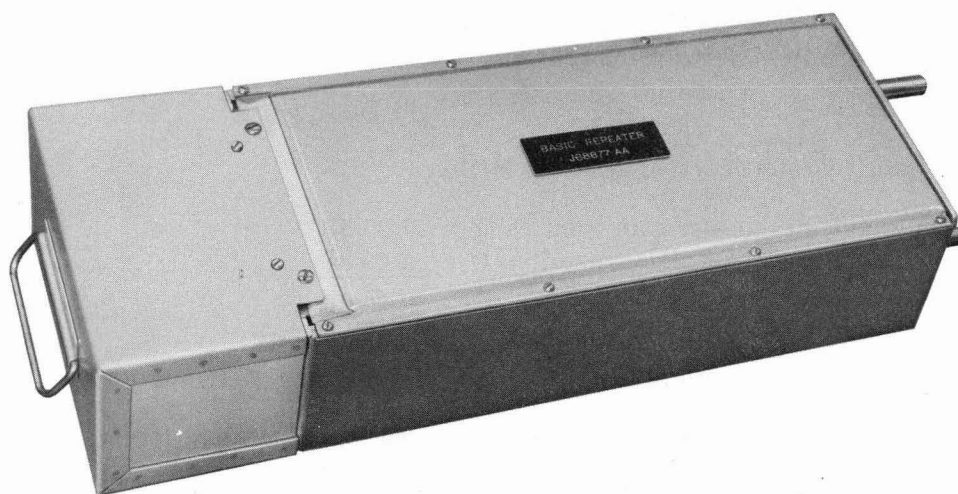


Fig. 1—Basic Repeater J68877AA

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

CHART	PAGE
1 — Tests Using Test Set J68906B	2

CHART 1
TESTS USING TEST SET J68906B

APPARATUS:

- L4 Line Repeater Test Set J68906B* (Section 103-458-100)
- Precision Attenuator*, adjustable from 0.0 to 50.0 dB in 0.1-dB steps
- Sending and Receiving Transmission Test Equipment* (provided at L4 main station)
- 4100A Line Building-Out (LBO) Network*

STEP	PROCEDURE
	A. Gain
1	Obtain, from the calibration records for test set J68906B, the test set insertion loss (dB value) at each of the frequencies listed in Table A.
2	Compute the required test attenuator settings (minimum and maximum) for each frequency listed in Table A per the following example, and record the computed values. Example 1: A list 1 basic repeater is tested at 20.448 MHz. Required minimum repeater gain from Table A: 35.35 dB Less test set loss at 20.448 MHz from Step 1: <u>-4.05 dB</u> Minimum setting of test attenuator: 31.30 dB.
3	Plug the test set power cord into a source of 110 to 125 volts, 60 Hz.
4	Operate the power switch on the back of the test set to the ON position. Requirement: The red pilot lamp associated with the power switch lights.
5	Make the following control settings on the repeater power supply located at the top front of the test set (Fig. 2).

CHART 1 (Contd)

STEP**PROCEDURE****TABLE A****GAIN TEST DATA**

TEST FREQUENCY (MHZ)	REPEATER GAIN (DB)				LOSS OF TEST SET J68906B* (DB)	TEST ATTEN SETTING (DB) (RPTR GAIN MINUS TEST SET LOSS)	
	LIST 1		LIST 2			MIN	MAX
	MIN	MAX	MIN	MAX			
20.448	35.35	36.55	34.62	35.62			
17.500	33.03	34.03	32.37	33.17			
11.648†	26.90	27.60	26.37	26.97			
4.000	16.08	16.68	15.84	16.36			
0.512‡	5.75	6.35	5.40	5.90			

* Test set loss values obtained from test set calibration records (Section 103-458-100).

† Make a note of test attenuator settings obtained at 11.648 MHz. These may be used in Part B.

‡ The gain of the repeater is affected by temperature, especially at the lower frequencies. Allow sufficient time for a cold repeater to reach room temperature before making a gain check at this frequency.

-
- 6 Ensure that all patch cords and plugs are removed from the test set jack field.
Note: Switch and control settings and patches not previously mentioned either have no effect on this test or will be referred to later in this section.
 - 7 Equip the basic repeater under test with a 4100A (0-loss) LBO network.
 - 8 Install the basic repeater in the adapter (J68877AA TST ADPT).
 - 9 Install the repeater and test adapter assembly in the test set mounting position marked J68877AB or J68877AC.
-

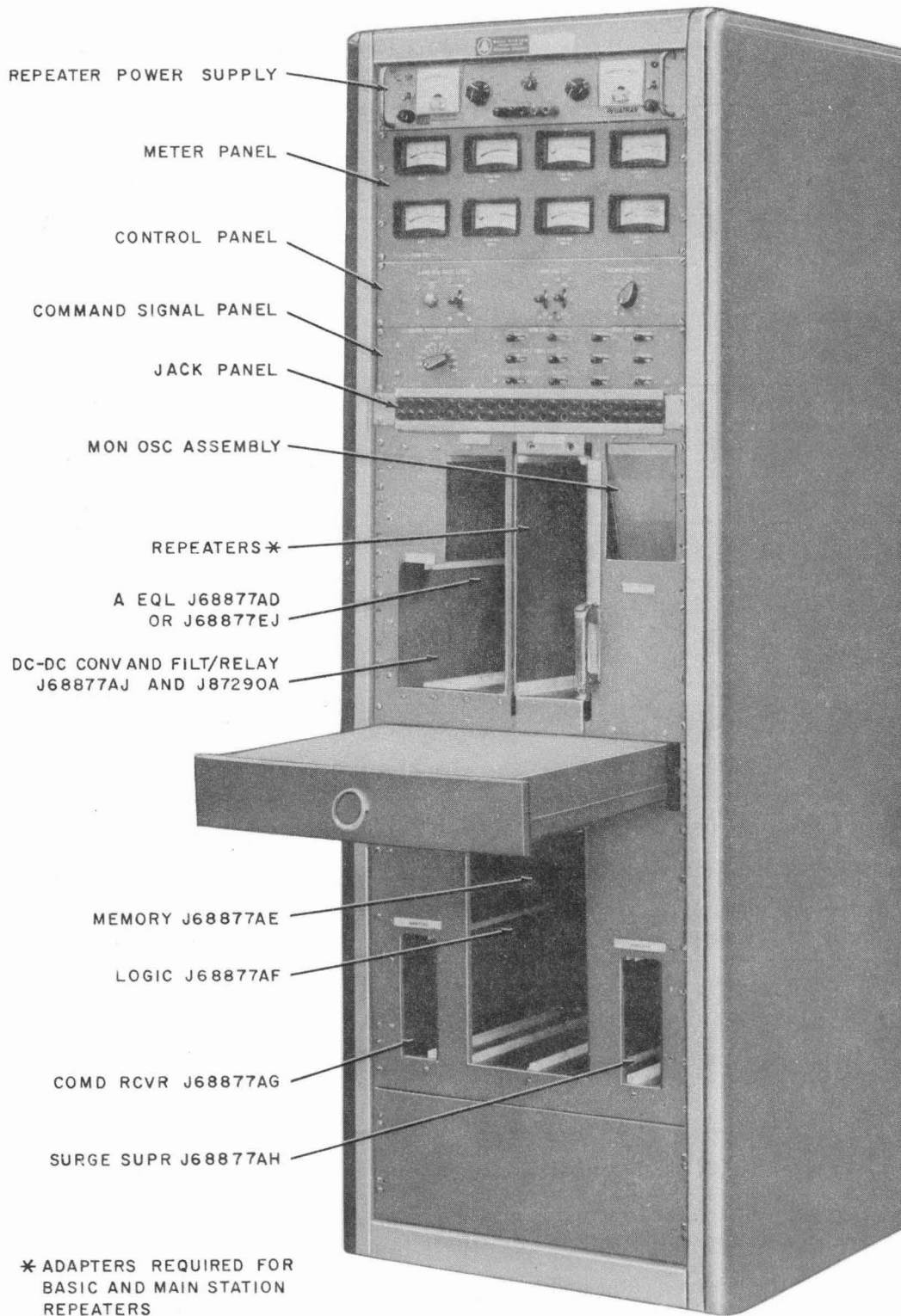


Fig. 2—L4 Line Repeater Test Set J68906B

CHART 1 (Contd)

STEP	PROCEDURE
10	Apply power to the repeater by performing the following: (a) Set the repeater power supply DC switch to on. Note: The pilot lamp above the DC switch lights, indicating that the supply output is connected to the load. (b) Advance the MAIN voltage control to approximately 50 volts. (c) Adjust the CURRENT AMPS control to give a current indication of 0.52 A (520 mA) on the DC AMPERES meter. Requirement: The DC VOLTS meter indicates 30 ± 3 volts. Note: The power supply is now operating in the constant current mode and is supplying the required 520 mA.
11	Set the STE (sending test equipment) to deliver 20.448 MHz at approximately -20 dBm.
12	Patch the output of the STE through the test attenuator to the CAL jack associated with the HF LINE IN jack on the test set jack panel [patches (1) and (2), Fig. 3].
13	Set the test attenuator to 0.00 dB.
14	Set the RTE (receiving test equipment) to measure 20.448 MHz at -20.00 dBm.
15	Patch the RTE to the CAL jack associated with the HF LINE OUT jack [patch (3), Fig. 3].
16	Adjust the output of the STE, as necessary, to obtain an exact -20.00 dBm indication on the RTE (use RTE expanded scale meter).
17	Set the test attenuator to the approximate midvalue of the attenuator setting range computed and recorded in Step 2 for 20.448 MHz.
18	Patch the RTE to the HF LINE OUT jack [remove patch (3) and make patch (4), Fig. 3].
19	Patch the test attenuator to the HF LINE IN jack [remove patch (2) and make patch (5), Fig. 3].

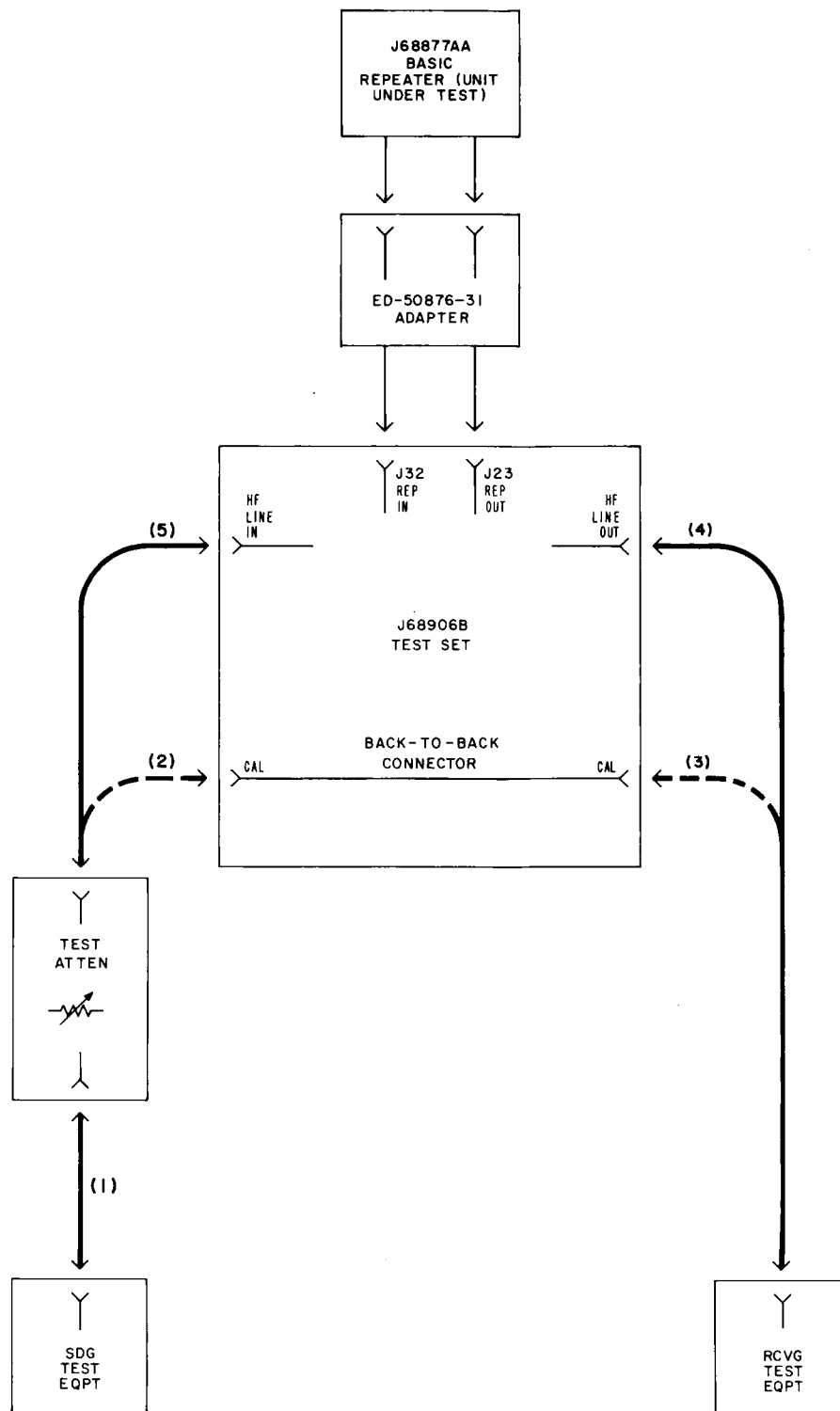


Fig. 3—Test Arrangements

CHART 1 (Contd)

STEP	PROCEDURE						
20	Adjust the test attenuator to obtain, as near as possible, a -20.00 dBm indication on the RTE; record the attenuator setting. Requirement: The attenuator setting plus the expanded scale meter indication shall be within minimum and maximum values computed in Step 2 for 20.448 MHz. Note: Repeater gain equals value measured in Step 20 plus test set loss.						
21	Make gain measurements at each of the other frequencies listed in Table A by repeating Steps 11 through 20.						
22	Turn down the MAIN voltage control to zero on the repeater power supply. Requirement: Repeater power supply voltage and current meters indicate zero.						
23	Remove the repeater unit from the test set adapter and remove the LBO network.						
24	Proceed with Part B if the repeater is to be prepared for installation at a specific repeater location. Otherwise, the test is completed, follow local procedures to store the unit. B. Preparation for Installation						
25	Determine from office records the code of the LBO network required.						
26	Install the required LBO network.						
27	Determine, from Table B, the loss at 11.648 MHz of the LBO network installed.						
28	Determine the required test attenuator setting per the following example. Example 2: <table> <tr> <td>Attenuator setting for 11.648 MHz, recorded in Step 20:</td> <td>23.05 dB</td> </tr> <tr> <td>Minus LBO network loss from Table B (assume 4100AF used):</td> <td>-6.78 ± 0.25 dB</td> </tr> <tr> <td>Required attenuator setting:</td> <td>16.27 ± 0.25 dB.</td> </tr> </table>	Attenuator setting for 11.648 MHz, recorded in Step 20:	23.05 dB	Minus LBO network loss from Table B (assume 4100AF used):	-6.78 ± 0.25 dB	Required attenuator setting:	16.27 ± 0.25 dB.
Attenuator setting for 11.648 MHz, recorded in Step 20:	23.05 dB						
Minus LBO network loss from Table B (assume 4100AF used):	-6.78 ± 0.25 dB						
Required attenuator setting:	16.27 ± 0.25 dB.						
29	Repeat Steps 8 through 20 to measure the overall repeater gain at 11.648 MHz. Requirement: Attenuator setting determined in Step 28. Note: Repeater gain equals attenuator setting plus test set loss.						

CHART 1 (Contd)

STEP	PROCEDURE
30	Turn the MAIN voltage control to zero on the repeater power supply. Requirement: Repeater power supply meters indicate zero volts and zero current.
31	Remove the repeater unit from the test set.
32	Place a gummed label, similar to the one illustrated in Fig. 4, on the LBO network just below the handle and fill in applicable portions as indicated by asterisks (*).

TABLE B

LINE BUILD-OUT NETWORKS			
LBO NETWORK CODE	BUILD-OUT DISTANCE (MILES)	LOSS AT 11.648-MHZ PILOT	
		DB	TOLERANCE
4100A	0.0	0.00	0.0
4100AC	0.2	2.71	± 0.25 dB 
4100AD	0.3	4.07	
4100AE	0.4	5.42	
4100AF	0.5	6.78	
4100AG	0.6	8.14	
4100AH	0.7	9.49	
4100AJ	0.8	10.85	
4100AK	0.9	12.20	
4100AL	1.0	13.56	

FORM ST1 8-67			
TYPE *	SER. NO. *		
IN SERVICE *	LOCATION *		
OUT SERVICE	TUBE *		
GP	db	D.E. TYPE	
LBO #1 *	LBO #2 *		
STRAP	PORTS 1 & 3	2 & 4	
REASON OUT			

Fig. 4—Equipment Identification Tag