

CARRIER PROGRAM COMBINER
PATCHING PROCEDURES AND OUT-OF-SERVICE TESTS
CARRIER PROGRAM TRANSMISSION
ANALOG MULTIPLEX TERMINAL EQUIPMENT

This section describes patching and testing procedures for three arrangements of transmit combining module ED-52293 and for the standard arrangement of receive combining module ED-52294.

This section is issued to replace Sections 356-800-300, 356-800-501, and 356-800-505 which are cancelled, to add patching and testing procedures for the group 3 transmit combining module, and to include information on the high frequency program bridge. **Equipment Test Lists are affected.**

Proper monitoring procedures must be observed to prevent loss of service while patching and testing. Three available monitoring signals are: test signal, conversation, and pilot. The most effective monitoring signal is a 1-kHz test signal on a voice channel. Monitoring practices are established by local policy. Be familiar with monitoring practices before performing any of the procedures in this section. Typical monitoring connections are suggested in Fig. 1 and 2.

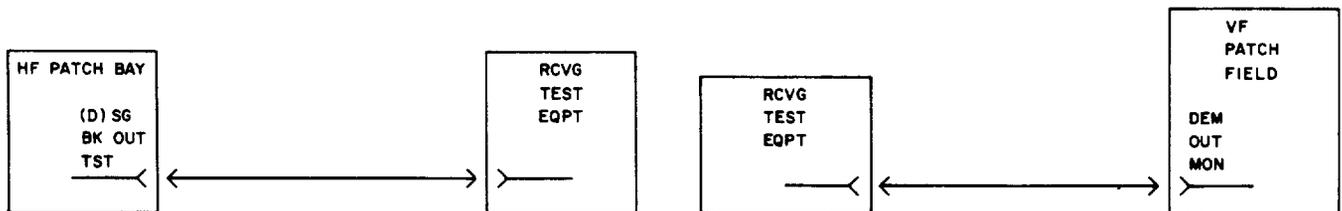


Fig. 1—Suggested Transmit Monitoring Connection

Fig. 2—Suggested Receive Monitoring Connection

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CHART 1

PATCHING PROCEDURES FOR TRANSMIT COMBINING MODULE ED-52293

APPARATUS:

Spare or maintenance transmit combining module ED-52293 of the same group number as the regular transmit combining module to be patched out

9P1A or B Patch Cords for patching at transmit jack field to patch out a group 1 or group 2 transmit combining module

3P15A Patch Cords, 6 feet long with 310 plug on each end, for patching at high frequency program bridge panel to patch out a group 3 transmit combining module.

STEP	PROCEDURE
1	<p>Check that the spare transmit combining module to be patched in is adjusted and operating properly.</p> <p>Note: Testing procedures are explained in Charts 2, 3, and 4. A maintenance (MTCE) group 3 transmit combining module is provided for use with a high frequency bridge.</p>
2	<p>Proceed to Part A to patch out a regular group 1 or group 2 transmit combining module, or proceed to Part B to patch out a regular group 3 transmit combining module.</p> <p>A. Patching Procedure for a Group 1 or Group 2 Module</p> <p>At transmit jack field,</p> <p>Caution: Improper patching will cause loss of service. Observe proper monitoring procedure.</p>
3	<p>Insert one end of a triple patch cord (9P1) fully into the FLT OUT, HYB IN A, and HYB IN B jacks (Fig. 3) for the spare transmit combining module.</p> <p>Note: These three jacks are mounted side-by-side in the jack field.</p> <p>Caution: In the following step, the plug on the other end of the cord must be connected so that:</p> <ul style="list-style-type: none"> (a) The regular GDF IN jack will connect to the spare FLT OUT jack. (b) The regular CH BK OUT jack will connect to the spare HYB IN A jack. (c) The regular PROG OUT jack will connect to the spare HYB IN B jack.

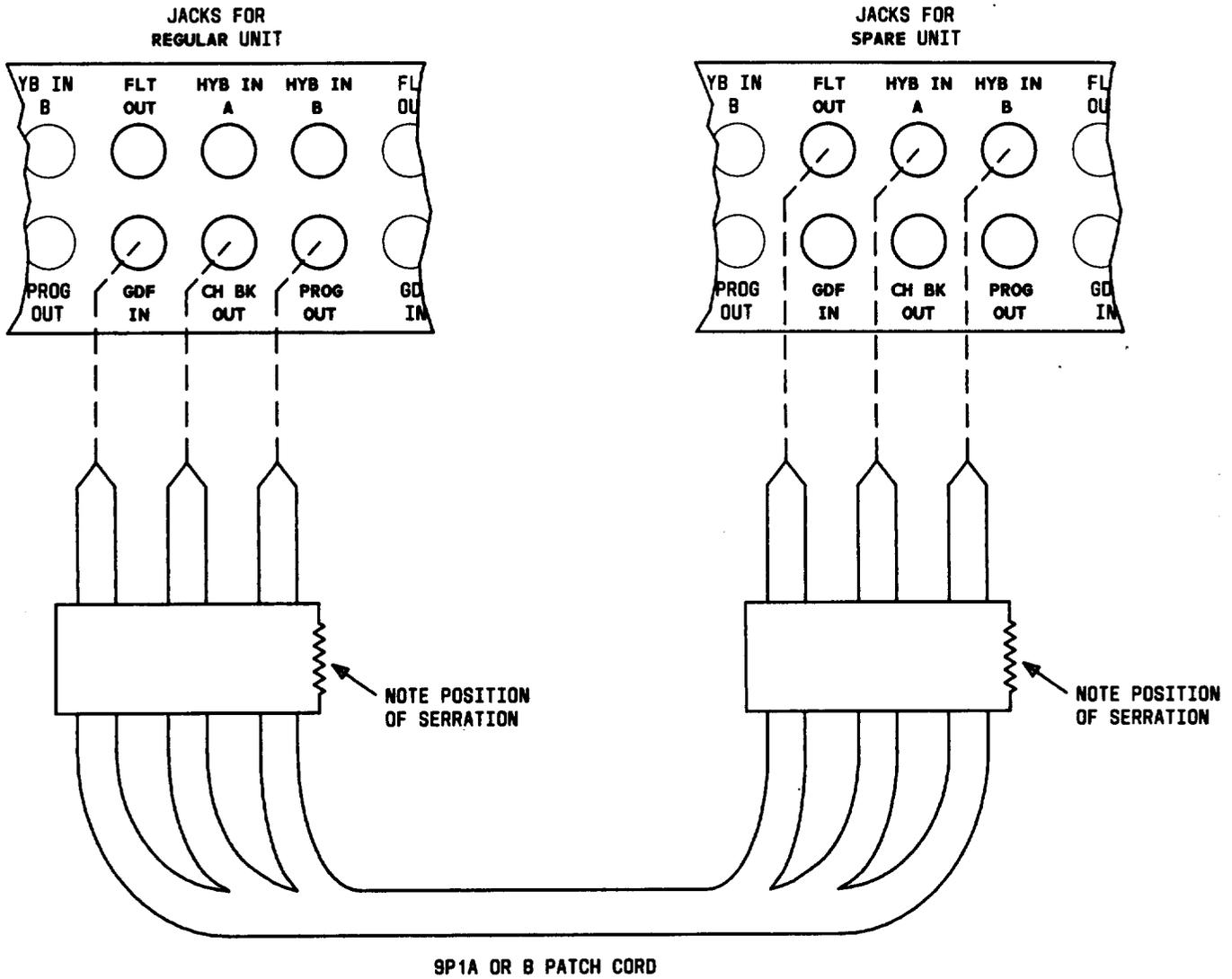


Fig. 3—Transmit Combining Module Patching Diagram

 CHART 1 (Cont)

STEP	PROCEDURE
4	Push the triple patch cord plug quickly and fully into the regular GDF IN, CH BK OUT, and PROG OUT jacks to complete the patch (Fig. 3).
5	Observe the monitor indication. Requirement: Normal power for the monitoring point used
6	Adjust the AMPL ADJ control on the spare transmit combining module for proper power if the requirement is not met. Note: The regular transmit combining module is now out of service and may be tested per Chart 2 or 3.
B. Patching Procedure for a Group 3 Module	
Note: This procedure permits substituting the maintenance (MTCE) transmit combining module for the regular module serving a high frequency program bridge.	
Caution: <i>Improper patching will cause loss of service. Observe proper monitoring procedure.</i>	
At high frequency program bridge panel,	
7	Connect one end of patch cord 1 to the AMPL IN MTCE jack on the high frequency program bridge panel [patch (1), Fig. 4].
8	Connect one end of patch cord 2 to the AMPL OUT MTCE jack on the panel [patch (2), Fig. 4]. Note: Read the following step completely before patching. Make the following patch cord connections simultaneously to replace a working regular module with the maintenance module.
9	Connect the free end of patch cord 1 to the PROG OUT jack and simultaneously connect the free end of patch cord 2 to the BRDG IN jack on the panel. Note: The regular transmit combining module is now out of service and may be replaced or tested per Chart 4.

CHART 2

TESTING PROGRAM COMBINER WITHOUT ALTERNATE-USE SWITCH

APPARATUS:

Sending Test Equipment (STE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -35 to -50 dBm

Impedance: 135 ohms, balanced

Receiving Test Equipment (RTE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -35 to -35 dBm

Impedance: 135 ohms, balanced

3P17B or P3BP Cords (135 ohms).

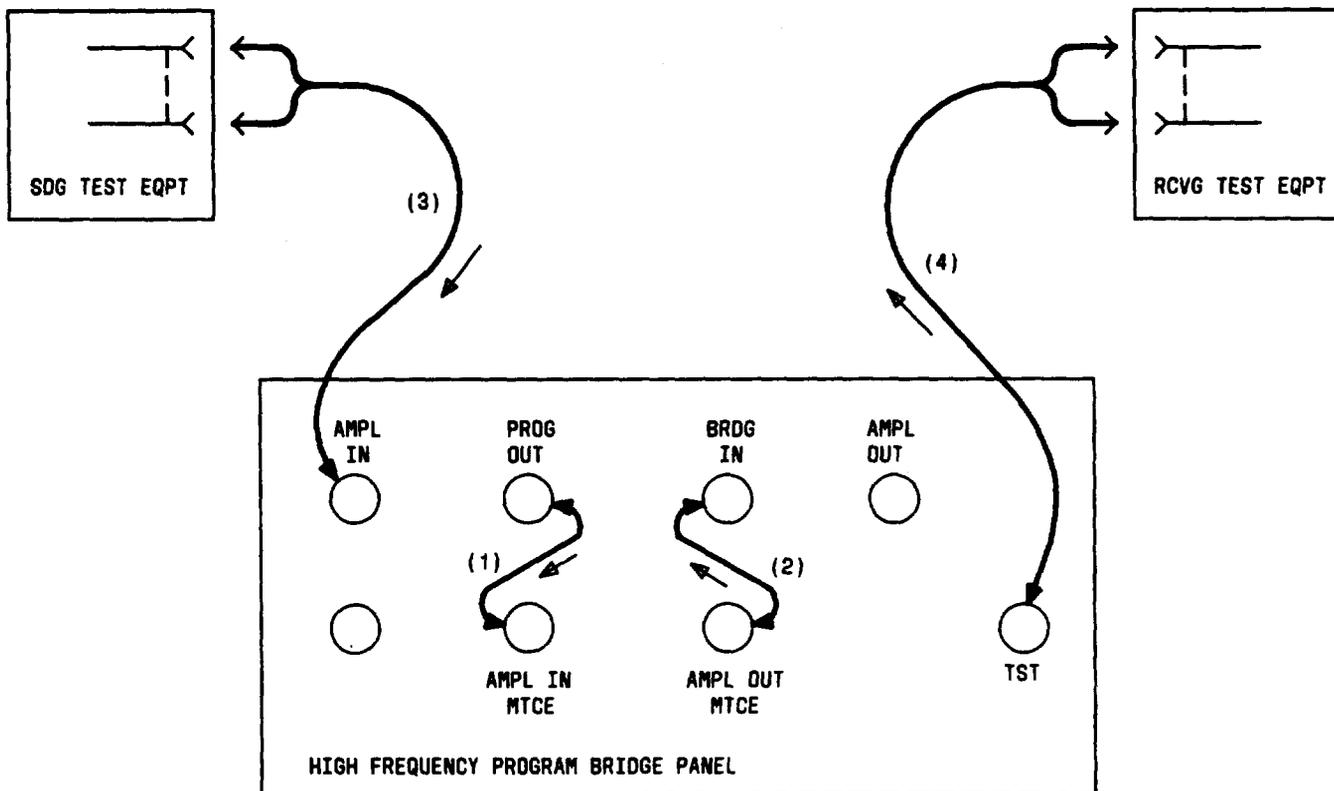


Fig. 4—Patching at High Frequency Program Bridge

STEP

PROCEDURE

Note: A group 1 transmit combining module ED-52293 is used in a program combiner *without* an alternate-use switch.

Caution: *The transmit combining module to be tested must be out of service before performing these tests.*

Note: If any requirement in this chart is **not** met, replace the transmit combining module under test with a spare group 1 transmit combining module.

A. Gain Test**At transmit jack field,**

- 1 Adjust the STE and RTE as follows:

Frequency: 83 kHz

Power: -37.4 dBm

Impedance: 135 ohms, balanced.

- 2 Locate the HYB IN A, HYB IN B, and FLT OUT jacks for the transmit combining module under test.

- 3 Connect the STE to the HYB IN A jack [patch (1), Fig. 5].

- 4 Connect the RTE to the FLT OUT jack [patch (2), Fig. 5].

At transmit combining module,

- 5 Adjust the AMPL ADJ control on the transmit combining module, if required.

Requirement: -37.4 dBm at the FLT OUT jack.

At transmit jack field,

- 6 Remove patch (1), Fig. 5.

- 7 Adjust the STE for 83 kHz and -46.0 dBm.

- 8 Connect the STE to the HYB IN B jack [patch (3), Fig. 5].

- 9 Measure the signal power at the FLT OUT jack.

Requirement: -48.4 dBm ± 0.2 dB

- 10 Remove patch (3), Fig. 5.

CHART 2 (Cont)

STEP	PROCEDURE
B. Edge-of-Band Test	
<i>At transmit jack field,</i>	
11	Adjust the STE and RTE for 63 kHz and -37.4 dBm.
12	Connect the STE to the HYB IN A jack [patch (1), Fig. 5].
13	Measure the signal power at the FLT OUT jack.
Requirement: -37.4 dBm \pm 0.2 dB	
14	Adjust the STE and RTE for 107 kHz and -37.4 dBm.
15	Measure the signal power at the FLT OUT jack.
Requirement: -37.4 dBm \pm 0.2 dB	
<i>At transmit combining module,</i>	
16	Remove the transmit combining module under test if any requirement in Step 5, 9, 13, or 15 is not met.
17	Insert a spare group 1 transmit combining module to replace the module removed.
18	Repeat Steps 1 through 17, as required.
<i>At transmit jack field,</i>	
19	Remove patches (1) and (2), Fig. 5.
Note: The transmit combining module is now ready for in-service use.	
20	Return the module to service per the procedure in Part A of Chart 5.

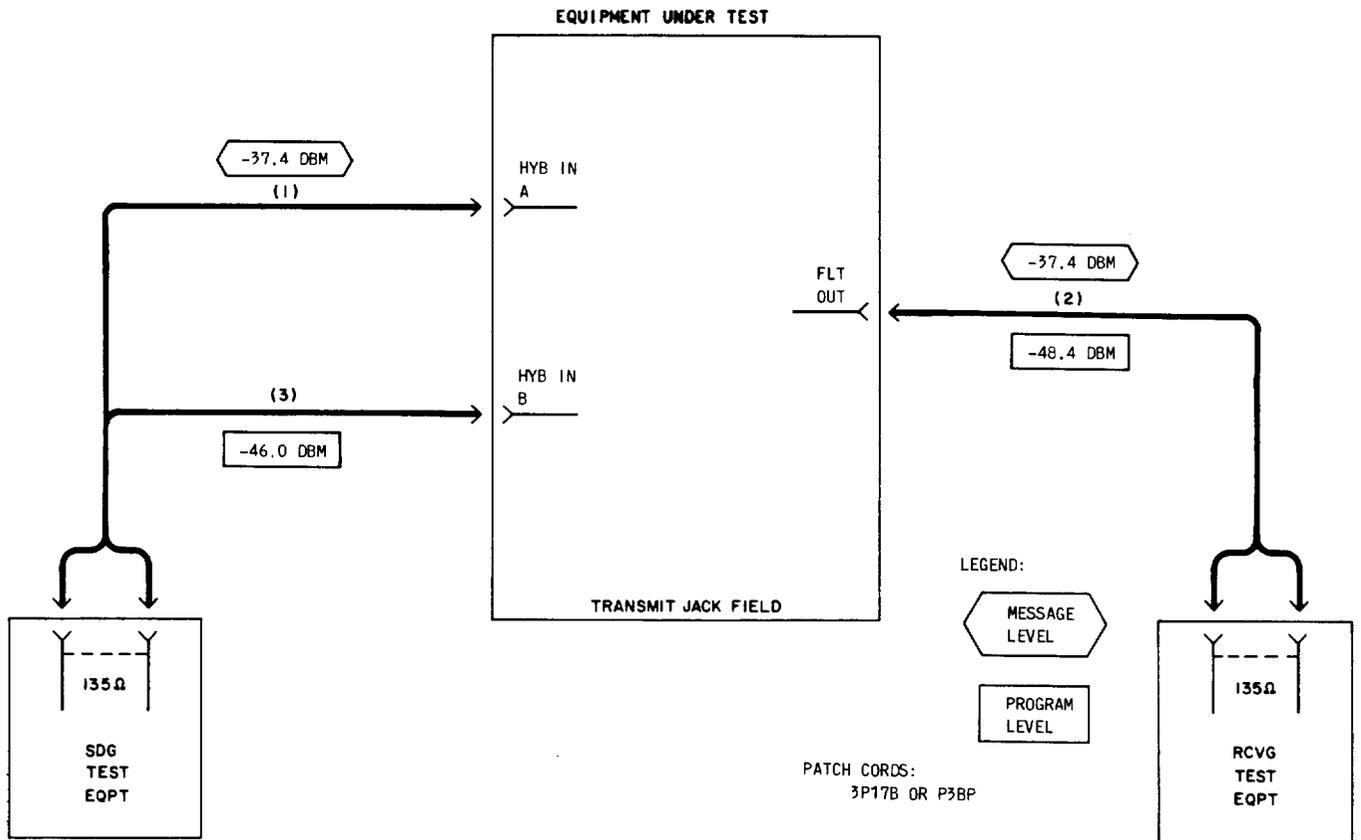


Fig. 5—Transmit Combining Module Test Connections

CHART 3

TESTING PROGRAM COMBINER WITH ALTERNATE-USE SWITCH

APPARATUS:

Sending Test Equipment (STE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -35 to -80 dBm

Impedance: 135 ohms, balanced

Receiving Test Equipment (RTE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -35 to -80 dBm

Impedance: 135 ohms, balanced

3P17B or P3BP Cords (135 ohms).

STEP

PROCEDURE

Note: A group 2 or modified group 1 transmit combining module ED-52293 is used in a program combiner *with* alternate-use switch. The alternate-use switch is provided in program combiner switch panel ED-52585. This equipment arrangement is used only for 5-kHz program service.

Caution: *The transmit combining module to be tested must be out of service before performing these tests.*

Note: If any requirement in this chart is *not* met, replace the transmit combining module under test with a spare group 2 transmit combining module.

A. Gain Test***At transmit jack field,***

- 1 Adjust the STE and RTE as follows:

Frequency: 71 kHz

Power: -37.4 dBm

Impedance: 135 ohms, balanced.

CHART 3 (Cont)

STEP	PROCEDURE
2	Press both PROG switches simultaneously to assure program combining circuit is in program mode. <i>Note:</i> Adjacent PROG lamp lights in jack field.
3	Locate the HYB IN A, HYB IN B, and FLT OUT jacks for the transmit combining module under test.
4	Connect the STE to the HYB IN A jack [patch (1), Fig. 5].
5	Connect the RTE to the FLT OUT jack [patch (2), Fig. 5]. <i>At transmit combining module,</i>
6	Adjust the AMPL ADJ control on the transmit combining module, if required. <i>Requirement:</i> -37.4 dBm at the FLT OUT jack.
7	Adjust the STE and RTE for 99 kHz and -37.4 dBm.
8	Measure the signal power at the FLT OUT jack. <i>Requirement:</i> -37.4 dBm \pm 0.2 dB <i>At transmit combining module,</i>
9	Remove the transmit combining module under test if either requirement in Step 6 or 8 is not met.
10	Insert a spare group 2 transmit combining module to replace the module removed.
11	Repeat Steps 1 through 10, as required. B. Edge-of-Passband Test <i>At transmit jack field,</i>
12	Adjust the STE and RTE for 61 kHz and -37.4 dBm.
13	Measure the signal power at the FLT OUT jack. <i>Requirement:</i> -37.4 dBm \pm 0.2 dB

CHART 3 (Cont)

STEP	PROCEDURE
14	Adjust the STE and RTE for 79 kHz and -37.4 dBm.
15	Measure the signal power at the FLT OUT jack. Requirement: -37.4 dBm \pm 0.2 dB
16	Adjust the STE and RTE for 89 kHz and -37.4 dBm.
17	Measure the signal power at the FLT OUT jack. Requirement: -37.4 dBm \pm 0.2 dB
18	Adjust the STE and RTE for 107 kHz and -37.4 dBm.
19	Measure the signal power at the FLT OUT jack. Requirement: -37.4 dBm \pm 0.2 dB
	At transmit combining module,
20	Remove the transmit combining module under test if any requirement in Step 13, 15, 17, or 19 is not met.
21	Insert a spare group 2 transmit combining module to replace the module removed.
22	Repeat Steps 12 through 21, as required.
	C. Edge-of-Stopband Test
	At transmit jack field,
23	Adjust the STE and RTE for 83.5 kHz and -37.4 dBm.
24	Measure the signal power at the FLT OUT jack. Requirement: -77.4 dBm or lower (-78.0 dBm is lower than -77.4 dBm)
25	Adjust the STE and RTE for 87.5 kHz and -37.4 dBm.
26	Measure the signal power at the FLT OUT jack. Requirement: -77.4 dBm or lower (-78.0 dBm is lower than -77.4 dBm)

CHART 3 (Cont)

STEP	PROCEDURE
27	Remove the program combiner switch panel ED-52585 associated with the transmit combining module under test if the requirement in Step 24 or 26 is not met. <i>Note:</i> A program combiner switch panel may serve two program combiner circuits. In this case, the second circuit must be patched per the procedure in Chart 1. This panel is not a plug-in unit. The wiring must be disconnected in order to remove the panel.
28	Install a spare program combiner switch panel to replace the panel removed.
29	Repeat Step 23 through 28, as required.
	D. Alternate-Use Switch Test
	<i>At transmit jack field,</i>
30	Adjust the STE and RTE for 85.5 kHz and -37.4 dBm.
31	Measure the signal power at the FLT OUT jack. <i>Requirement:</i> -77.4 dBm or lower (-78.0 dBm is lower than -77.4 dBm)
32	Press both MSG switches simultaneously to switch to the message mode. <i>Note:</i> Adjacent MSG lamp lights in jack field.
33	Measure the signal power at the FLT OUT jack. <i>Requirement:</i> -37.4 dBm \pm 0.2 dB
34	Remove the program combiner switch panel ED-52585 associated with the transmit combining module under test if the requirement in Step 31 or 33 is not met. <i>Note:</i> See <i>Note</i> in Step 27.
35	Insert a spare program combiner switch panel to replace the panel removed.
36	Repeat Steps 30 through 35, as required.
37	Remove patches (1) and (2), Fig. 5. <i>Note:</i> The transmit combining module is now ready for in-service use.
38	Return the module to service per the procedure in Part A of Chart 5.

CHART 4

TESTING HIGH FREQUENCY PROGRAM BRIDGE

APPARATUS:

Sending Test Equipment (STE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -46 dBm

Impedance: 135 ohms, balanced

Receiving Test Equipment (RTE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: -46 dBm

Impedance: 135 ohms, balanced

3P17B or P3BP Cords (135 ohms).

STEP

PROCEDURE

Note: A group 3 transmit combining module ED-52293 is used with a high frequency program bridge NJ01365A.

Caution: *The transmit combining module to be tested must be out of service before performing these tests.*

Note: If any requirement in this chart is *not* met, replace the transmit combining module under test with a spare group 3 transmit combining module.

A. Gain Test

At high frequency program bridge panel,

1 Adjust the STE and RTE as follows:

Frequency: 83 kHz

Power: -46.0 dBm

Impedance: 135 ohms, balanced.

CHART 4 (Cont)

STEP	PROCEDURE
2	Connect the STE to the AMPL IN jack [patch (3), Fig. 4].
3	Connect the RTE to the TST jack [patch (4), Fig. 4].
4	Adjust the AMPL ADJ control on the transmit combining module, if required. Requirement: -46.0 dBm at TST jack
5	Remove patches (3) and (4), Fig. 4. At transmit combining module,
6	Remove the transmit combining module under test if the requirement in Step 4 is not met.
7	Insert a spare group 3 transmit combining module to replace the module removed.
8	Repeat Steps 1 through 7, as required.

B. Edge-of-Band Test**At high frequency program bridge panel,**

- 9 Adjust the STE and RTE for 63 kHz and -46.0 dBm.
- 10 Connect the STE to the AMPL IN jack [patch (3), Fig. 4].
- 11 Connect the RTE to the TST jack [patch (4), Fig. 4].
- 12 Measure the signal power at the TST jack.
Requirement: -46.0 dBm \pm 0.2 dB
- 13 Adjust the STE and RTE for 107 kHz and -46.0 dBm.
- 14 Measure the signal power at the TST jack.
Requirement: -46.0 dBm \pm 0.2 dB

CHART 4 (Cont)

STEP	PROCEDURE
	<i>At transmit combining module,</i>
15	Remove the transmit combining module under test if the requirement in Step 12 or 14 is not met.
16	Insert a spare group 3 transmit combining module to replace the module removed.
17	Repeat Steps 9 through 16, as required.
	Note: The transmit combining module is now ready for in-service use.
18	Return the module to service per the procedure in Part B of Chart 5.

CHART 5**REMOVING PATCH FOR TRANSMIT COMBINING MODULE ED-52293**

STEP	PROCEDURE
1	Proceed to Part A for a group 1 or group 2 transmit combining module, or proceed to Part B for a group 3 transmit combining module.
	A. Removing Patch for a Group 1 or Group 2 Module
	<i>At transmit jack field,</i>
	Caution: <i>The connection must be broken quickly in the following step to avoid interrupting service.</i>
2	Remove the triple patch cord plug from the GDF IN, CH BK OUT, and PROG OUT jacks for the regular transmit combining module.
3	Observe the monitor indication.
	Requirement: Normal power for the monitoring point used

CHART 5 (Cont)

STEP	PROCEDURE
4	Adjust the AMPL ADJ control on the regular transmit combining module for proper power if the requirement is not met.
5	Remove the triple patch cord plug from the FLT OUT, HYB IN A, and HYB IN B jacks for the spare transmit combining module.
6	Disconnect the monitoring equipment.

B. Removing Patch for a Group 3 Module

At high frequency program bridge,

Caution: *The connections must be broken quickly in the following step to avoid interrupting service.*

- | | |
|----|---|
| 7 | Remove patch cord 1 from the PROG OUT jack and simultaneously remove path cord 2 from the BRDG IN jack on the panel. |
| 8 | Observe the monitor indication.

Requirement: Normal power for the monitoring point used |
| 9 | Adjust the AMPL ADJ control on the regular transmit combining module for proper power if the requirement is not met. |
| 10 | Remove the other ends of patch cords 1 and 2 from the AMPL IN MTCE and AMPL OUT MTCE jacks on the panel. |
| 11 | Disconnect the monitoring equipment. |
-

CHART 6

PATCHING PROCEDURE FOR RECEIVE COMBINING MODULE ED-52294

APPARATUS:

Spare Receive Combining Module ED-52294

9P1A or B Patch Cord.

STEP	PROCEDURE
1	<p>Check that the spare receive combining module to be patched in is adjusted and operating properly.</p> <p>Note: Testing procedures are explained in Chart 7.</p> <p>At receive jack field,</p> <p>Caution: Improper patching will cause loss of service. Observe proper monitoring procedure.</p>
2	<p>Insert one end of a triple patch cord (9P1) fully into the AMP IN, AMPL A OUT, and AMPL B OUT jacks (Fig. 6) for the spare receive combining module.</p> <p>Note: These three jacks are mounted side-by-side in the jack field.</p> <p>Caution: In the following step, the plug on the other end of the cord must be connected so that:</p> <ul style="list-style-type: none">(a) The regular GDF OUT jack will connect to the spare AMP IN jack.(b) The regular CH BK IN jack will connect to the spare AMPL A OUT jack.(c) The regular PROG IN jack will connect to the spare AMPL B OUT jack.
3	<p>Push the triple patch cord plug quickly and fully into the regular GDF OUT, CH BK IN, and PROG IN jacks (Fig. 6) to complete the patch.</p>
4	<p>Observe the monitor indication.</p> <p>Requirement: Normal power for the monitoring point used</p>
5	<p>Adjust the AMPL ADJ control on the spare receive combining module for proper power if the requirement is not met.</p> <p>Note: The regular receive combining module is now out of service and may be tested per Chart 7.</p>

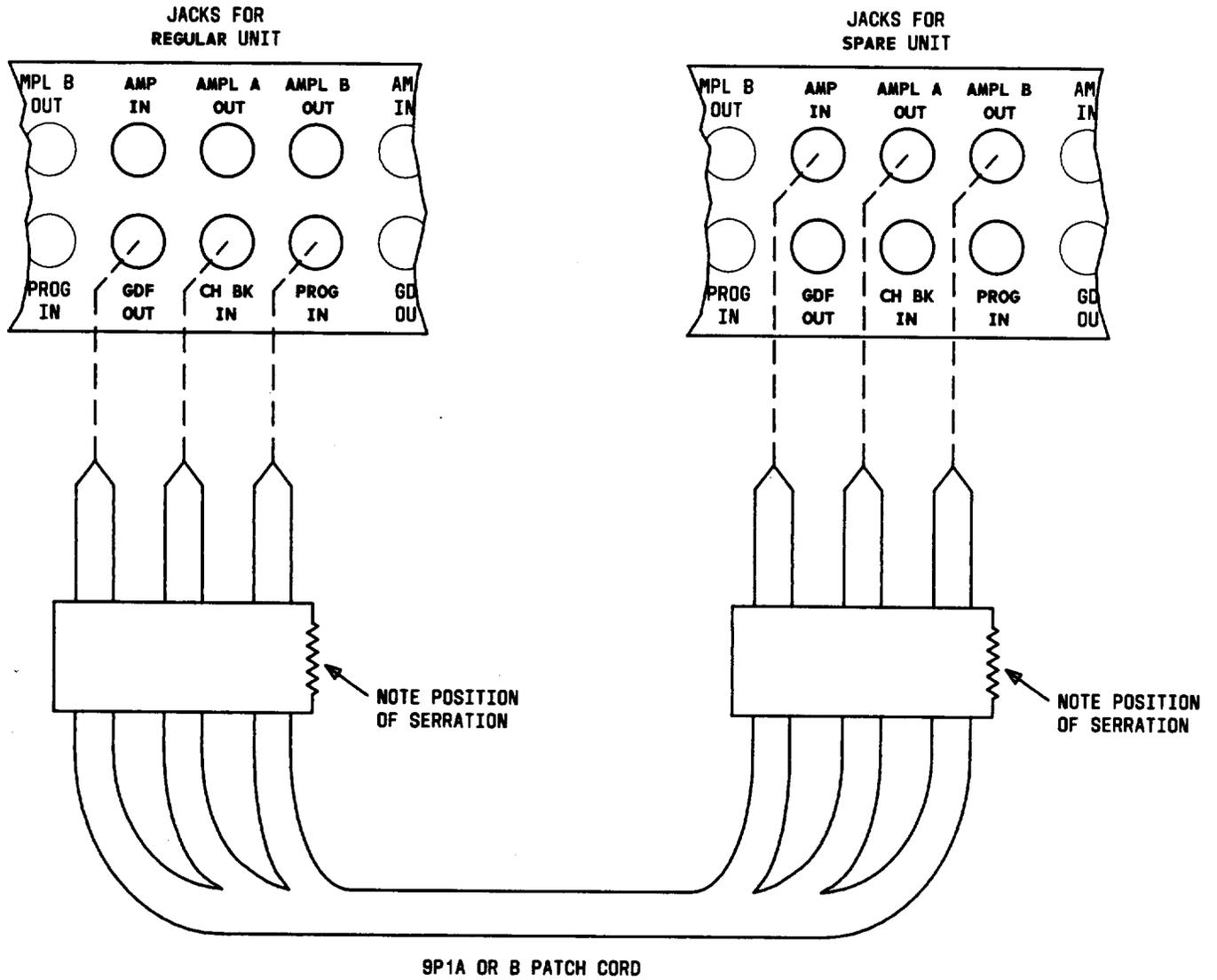


Fig. 6—Receive Combining Module Patching Diagram

CHART 7

TESTING PROCEDURE FOR RECEIVE COMBINING MODULE ED-52294

APPARATUS:

Sending Test Equipment (STE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: 0 to -30 dBm

Impedance: 135 ohms, balanced

Receiving Test Equipment (RTE) (Section 356-010-500):

Frequency: 60 to 108 kHz

Power: 0 to -30 dBm

Impedance: 135 ohms, balanced

3P17B or P3BP Cords (135 ohms).

STEP

PROCEDURE

Caution: The receive combining module to be tested must be out of service before performing these tests.

Note: If any requirement in this chart is not met, replace the receive combining module under test with a spare receive combining module.

A. Gain Test

At receive jack field,

1 Adjust the STE and RTE as follows:

Frequency: 83 kHz

Power: -5.0 dBm

Impedance: 135 ohms, balanced.

CHART 7 (Cont)

STEP	PROCEDURE
2	Connect the STE to the AMP IN jack [patch (1), Fig. 7].
3	Connect the RTE to the AMPL A OUT jack [patch (2), Fig. 7].
4	Adjust the AMPL ADJ control on the receive combining module, if required. Requirement: -5.0 dBm at the AMPL A OUT jack.
5	Remove patch (2), Fig. 7.
6	Adjust the STE for 83 kHz and -16.0 dBm.
7	Connect the RTE to the AMPL B OUT jack [patch (3) Fig. 7].

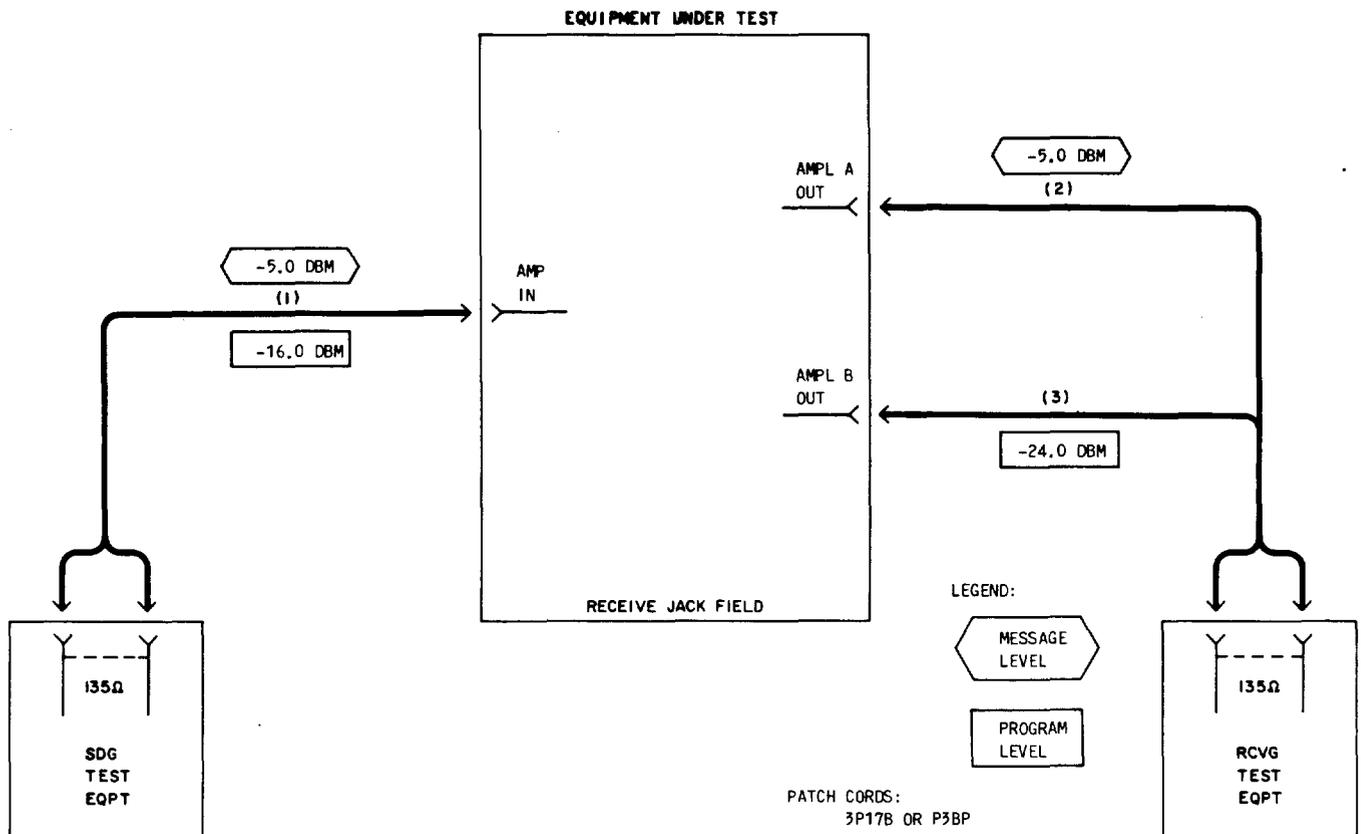


Fig. 7—Receive Combining Module Test Connections

CHART 7 (Cont)

STEP	PROCEDURE
8	Measure the signal power at the AMPL B OUT jack. Requirement: -24.0 dBm \pm 0.2 dB
9	Remove patch (3), Fig. 7. B. Edge-of-Band Test
10	Adjust the STE and RTE for 63 kHz and -5.0 dBm.
11	Connect the RTE to the AMPL A OUT jack [patch (2), Fig. 7].
12	Measure the signal power at the AMPL A OUT jack. Requirement: -5.0 dBm \pm 0.2 dB
13	Adjust the STE and RTE for 107 kHz and -5.0 dBm.
14	Measure the signal power at the AMPL A OUT jack. Requirement: -5.0 dBm \pm 0.2 dB
	At receive combining module,
15	Replace the receive combining module under test if any requirement in Step 4, 8, 12, or 14 is not met.
16	Insert a spare receive combining module to replace the module removed.
17	Repeat Steps 1 through 16, as required.
	At receive jack field,
18	Remove patches (1) and (2), Fig. 7. Note: The receive combining module is now ready for in-service use.
19	Return the module to service per the procedure in Chart 8.

CHART 8

REMOVING PATCH FOR RECEIVE COMBINING MODULE ED-52294

STEP	PROCEDURE
	Caution: <i>The connection must be broken quickly in the following step to avoid interrupting service.</i>
	At receive jack field,
1	Remove the triple patch cord plug from the GDF OUT, CK BK IN, and PROG IN jacks (Fig. 6) for the regular receive combining module.
2	Observe the monitor indication.
	Requirement: Normal power for the monitoring point used
3	Adjust the AMPL ADJ control on the regular receive combining module for proper power if the requirement is not met.
4	Remove the triple patch cord plug from the AMP IN, AMPL A OUT, and AMPL B OUT jacks (Fig. 6) for the spare receive combining module.
5	Disconnect the monitoring equipment.
