DATA SYSTEMS—CENTRAL OFFICE
WIDEBAND REGENERATIVE REPEATER—WRR-1, J70174
TEST PROCEDURES

CONTENTS PAGE

1. GENERAL

1.01 This section describes central office testing procedures for the Wideband Regenerative Repeater (WRR-1). This section is primarily for use at time of installation; however, it may be used in clearing trouble conditions.

1.02 The WRR-1 is a 2-way repeater used primarily to extend the facilities over which Data Set (DS) 303-type can operate. It may be equipped for synchronous, nonsynchronous, or alternate synchronous-nonsynchronous operation with DS 303-type.

1.03 Tests are provided for the different configurations of the repeater. Refer to Table A, select the proper repeater operation, and perform the test steps indicated.

2. PREPARATION FOR ALL TESTS

2.01 When testing a WRR-1 with restored polar line signals, a restored polar DS 303-type should be used in conjunction with an office-mounted 912A Data Test Set (DTS) equipped with the J79912AB interface unit. When testing a WRR-1 with balanced dc line signals, a DS 303-type with balanced dc line signals must be substituted for the restored polar type.

2.02 When testing a WRR-1 with balanced ac customer signals, a DS 303-type is not needed, but a portable 912A DTS equipped with the J79912AA interface unit is required.

2.03 The controls on the 912A DTS must be set to accommodate the type of test being performed. Operate the following switches to the indicated settings as required:

SWITCHES	SETTINGS
POWER	ON
TRANSMIT—TRIGGER	+
TRANSMIT—TEST SIGNAL	2087
TRANSMIT—OUTPUT	NORMAL
RECEIVE—TEST SIGNAL	2087
RECEIVE—INPUT	NORMAL
RECEIVE—WORD SYNC	AUTO
RECEIVE—TRIGGER	+
RECEIVE—TIMING	0
RECEIVE—COUNTER	OFF
J79912AB INTERFACE UNIT—SEND REQUEST	ON
J79912AB INTERFACE UNIT—DATA SET	(See Note)
J79912AB INTERFACE UNIT—TEST MODE	OPERATE
J79912AA INTERFACE UNIT—TEST MODE	BAL

TABLE A
WIDEBAND REGENERATIVE REPEATER TEST REQUIREMENTS

WIDEBAND REGENERATIVE REPEATER TYPE OF OPERATION	TEST STEPS TO BE PERFORMED				
	1-8	9-18	19-31	32-40	41-47
Nonsynchronous	X			X	X
Synchronous		X		X	X
Alternate synchronous-nonsynchronous			X	X	X

TABLE B

BIT RATE SWITCH SETTING (NOTE 1)	SYNCHRONOUS TEST	NONSYNCHRONOUS TEST		
	R.P., BAL AC- OR BAL DC-TYPE LINE SIGNALS	AT LEAST ONE SIDE R.P. TYPE LINE SIGNALS	NO CP IN J1 OR J13 AND AT LEAST ONE SIDE BAL AC-TYPE LINE SIGNALS	BOTH SIDES BAL DC-TYPE LINE SIGNALS
	SYNC RECOVERY CP SIDE A J4, SIDE B J10	ROLL-OFF FILTER CP SIDE A J1, SIDE B J13	INTERFACE CP SIDE A J5, SIDE B J9	INTERFACE CP SIDE A J5 SIDE B J9
18.75	AR247			
19.2	AR142	AR413		
40.8	AR220			
50	AR143	AR126	AR136	
200	AR144			
230.4	AR145	AR128		
EXT (Note 2)	AR407			AR361

Note 1: Use EXT if internal data set clock is provided.

Note 2: Requires a transmit clock and a synchronous recovery in Data Set 303-type.

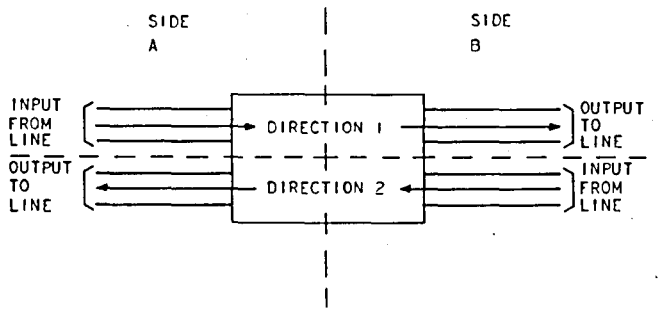


Fig. 1—WRR-1 Direction of Transmission

Note: Operate to the number corresponding to the data set to be used for test.

2.04 When testing restored polar or balanced dc-type line signals, operate the DATA SET selector switch located on the wideband control panel to the number corresponding to the data set being used for test.

2.05 The 912A DTS BIT RATE switch setting is determined by the bit rate of the WRR-1. Refer to Table B and determine line signals and corresponding BIT RATE switch settings.

2.06 When testing the WRR-1 with restored polar or balanced dc-type line signals, the DS 303-type located in the wideband data test bay (WDTB) should have the same bit rate and type of line signal as WRR-1.

3. WIDEBAND REGENERATIVE REPEATER TEST

3.01 ***General:*** The purpose of this test is to assure the central office tester that the WRR-1 is functioning properly and that the proper line signal power has been set by means of pads in the WRR-1.

3.02 The repeater has two directions of transmission. The A-to-B direction of transmission is designated direction 1. The B-to-A direction of transmission is designated direction 2. These directions must be assigned (Fig. 1).

3.03 When sides A and B are equipped for the same type of line signals, the repeater can be tested on a straight-through basis. It will be tested first in direction 1. The same test is applicable for direction 2 with differences shown in parentheses ( ). To verify a properly functioning repeater, both directions of transmission must be tested.

3.04 Sides A and B are equipped for the same type line signals when one of the following conditions exists:

(a) J1 and J13 have the same code of circuit pack installed, and Data Auxiliary Set (DAS) 809B2, if provided, is provided on both sides.

(b) No circuit packs are installed in J1 and J13, and J5 and J9 have the same code of circuit pack installed.

3.05 When sides A and B are equipped for different type line signals, the signal is looped, and directions 1 and 2 of side A and side B are tested simultaneously.

3.06 ***Equipment Required:***

1—Hewlett Packard E60-204B transmission measuring set (located in the WDTB) or equivalent signal generator and power meter

1—912A Wideband data test set (WDTS) equipped with the J79912AB interface unit (located in the WDTB and used for testing when the WRR-1 is equipped for restored polar or balanced dc line signals)

1—748A Extractor tool

1—Data Set 303-type (located in the WDTB) A restored polar type DS 303 is required for testing a restored polar type WRR-1. A balanced dc-type DS 303 is required for testing a balanced dc-type WRR-1.

1—Portable 912A Wideband Data Test Set equipped with the J79912AA interface unit (used for testing when the WRR-1 side A and side B are equipped for balanced ac customer signals)

1—ED 73248-20 G2 Balanced interface cord (used when the J79912AA interface unit is provided)
—Patch cords as required.

3.07 ***Preparation:*** Operate switches on the 912A DTS as required in Part 2.

Note 1: If the WRR-1 is provided with sides A and B equipped for the ***same type*** line signals (restored polar or balanced dc) and testing in direction 1, then perform steps (1) and (2). If testing in direction 2, note that applicable sides are shown in parentheses. To verify a properly functioning repeater, both directions of transmission must be tested. See Fig. 2.

Note 2: If the WRR-1 is provided with sides A and B equipped for ***unlike*** line signals and if testing in direction 1 and looped back in direction 2, then perform steps (3), (4), and (5). See Fig. 3. Side B can be equipped for balanced ac customer signals in this test. This

looped test does away with the need for the portable 912A WDTS. If side A is equipped for balanced ac customer signals, refer to Note 3.

Note 3: If the WRR-1 is provided with sides A and B equipped for ***unlike*** line signals and testing in direction 2 and looped back in direction 1, then perform steps (6), (7), and (8). See Fig. 3. Side A can be equipped for balanced ac customer signals in this test. This looped test does away with the need for the portable 912A WDTS. If side B is equipped for balanced ac customer signals, refer to Note 2.

Note 4: If WRR-1 is provided with sides A and B equipped for balanced ac customer signals and the direction of testing is direction 1, then perform step (9). If testing in direction 2, note that differences are shown in parentheses. To verify a properly functioning repeater, both directions of transmission must be tested. See Fig. 4.

(1) Prepare the repeater for test by connecting the output of the DS 303-type to the input for direction 1 (for direction 2) of the repeater via the wideband service bay (WSB) using patch cords as necessary.

(2) Connect the output for direction 1 (for direction 2) of the repeater to line input of the DS 303-type via WSB using patch cords as necessary.

(3) At the WSB, use patch cords as necessary and connect the output of direction 1 to the input of direction 2.

(4) Use patch cords as necessary and connect the line output of the DS 303-type to the line input for direction 1 of WRR-1.

(5) Use patch cords as necessary and connect the line input (receive data) of the 303 to the line output for direction 2 of WRR-1.

(6) At the WSB, use patch cords as necessary and connect the output for direction 2 to the input for direction 1.

(7) Use patch cords as necessary and connect the line output of the DS 303-type to the line input for direction 2 of WRR-1.

(8) Use patch cords as necessary and connect the line input (receive data) of the 303 to the line output for direction 1 of WRR-1.

(9) Using the balanced interface cord, insert P1 into the WSB line output jack for direction 1 (for direction 2) of WRR-1. Insert P2 into the WSB line input jack for direction 1 (for direction 2) of WRR-1. Connect the other end of the balanced interface cord into the high-speed connector of the J79912AA interface on the portable 912A WDTS.

3.08 At the WDTB, condition the Hewlett Packard transmission measuring set for 135-ohm line impedance.

3.09 ***Procedure:*** If test results are unsatisfactory and DAS 809B2 is provided, install or remove the applicable options per Table C. The DAS 809 is now out of the WRR-1 data path. Retest WRR-1. If test results are satisfactory, reconnect DAS 809B2 and retest. If test results are again unsatisfactory, the DAS 809B2 is causing the trouble and should be replaced.

Note: If DAS 809B2 is removed from the WRR-1 side facing the test data set, it should also be removed from the test data set.

After verification of DAS 809B2 (using Table C), the original options must be restored.

NOTES:
1. SOLID LINES INDICATE TEST CONNECTIONS FOR DIRECTION 1 (SIDE A AND SIDE B EQUIPPED FOR RP OR BAL DC TYPE LINE SIGNALS).
2. DASHED LINES INDICATE TEST CONNECTIONS FOR DIRECTION 2 (SIDE A AND SIDE B EQUIPPED FOR RP OR BAL DC TYPE LINE SIGNALS).

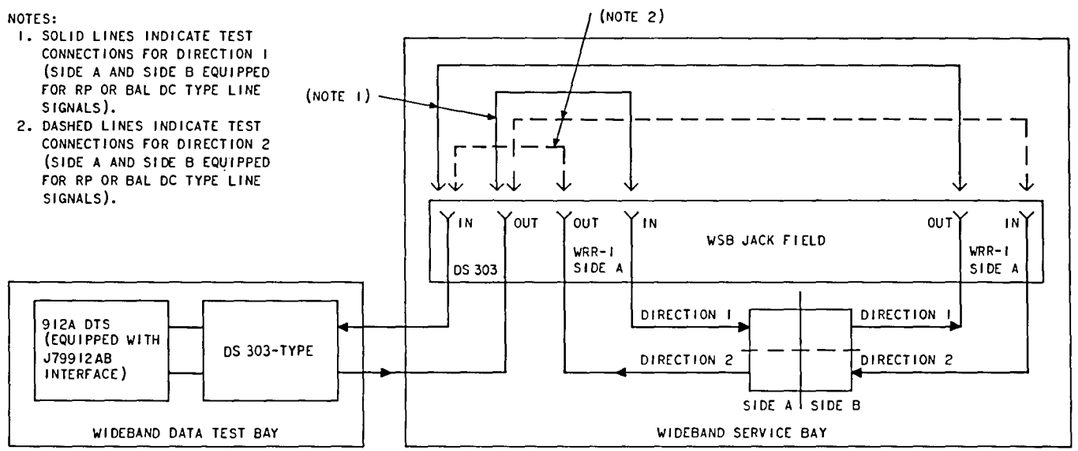
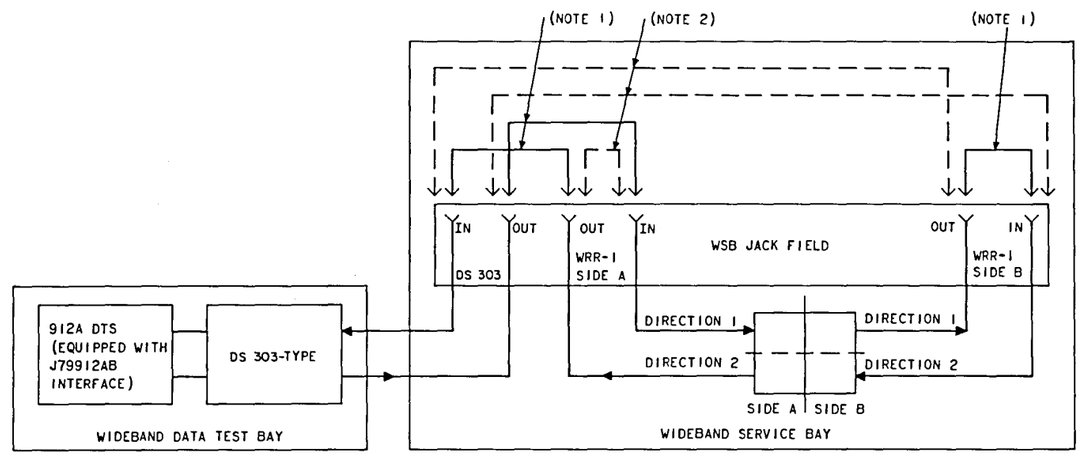
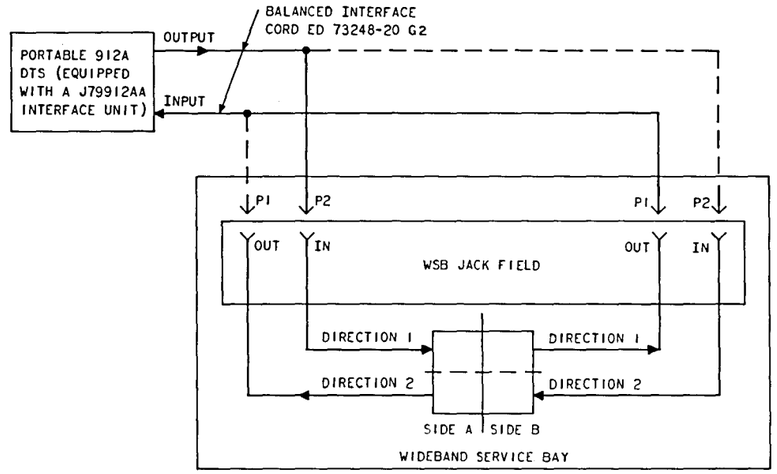


Fig. 2—Test Connections When Side A and Side B are Equipped for R.P. or Bal. DC-Type Line Signals



NOTES:
1. SOLID LINES INDICATE TEST CONNECTIONS FOR TESTING IN DIRECTION 1 AND LOOPING BACK IN DIRECTION 2. SIDE A AND SIDE B ARE EQUIPPED FOR UNLIKE TYPE LINE SIGNALS. SIDE A MUST NOT BE EQUIPPED FOR BAL AC CUSTOMER SIGNALS.
2. DASHED LINES INDICATE TEST CONNECTIONS FOR TESTING IN DIRECTION 2 AND LOOPING BACK IN DIRECTION 1. SIDE A AND SIDE B ARE EQUIPPED FOR UNLIKE TYPE LINE SIGNALS. SIDE B MUST NOT BE EQUIPPED FOR BAL AC CUSTOMER SIGNALS.

Fig. 3—Test Connections When Side A and Side B are Equipped for Different Type of Line Signals



NOTES:

1. SOLID LINES FROM 912A DTS INDICATE TEST CONNECTIONS FOR DIRECTION 1 (SIDE A AND SIDE B EQUIPPED FOR BAL AC CUSTOMER SIGNALS).
2. DASHED LINES FROM 912A DTS INDICATE TEST CONNECTIONS FOR DIRECTION 2 (SIDE A AND SIDE B EQUIPPED FOR BAL AC CUSTOMER SIGNALS).

Fig. 4—Test Connections When Side A and Side B are Equipped for Bal. AC-Customer Signals

TABLE C

OPTIONS TO REMOVE DAS 809B2 FOR TEST

IF DIRECTION OF TRANSMISSION IS			
DIRECTION 1		DIRECTION 2	
AND DAS 809 IS PROVIDED ON SIDE			
A	B	A	B
Add: TB2 Ⓥ 36 to 37	Remove: TB2 ⓏⒸ 30 to 31 Add: TB2 Ⓗ 31 to 32	Remove: TB2 ⓏⒸ 34 to 35 Add: TB2 Ⓥ 33 to 34	Add: TB2 Ⓗ 28 to 29

Note: These options appear on TB2 of the WRR-1.

STEP	PROCEDURE
	Nonsynchronous Test
1	At the 912A DTS, operate the TRANSMIT—BIT RATE and RECEIVE—BIT RATE to the proper nonsynchronous bit rate as determined in Table B.
2	Using the attenuator located in the WSB, adjust the data signal power at the WRR-1 input as required in Table D.

TABLE D

POWER AT WRR-1 INPUT (MEASURED INTO TRANSMISSION MEASURING SET)

RESTORED POLAR		BALANCED DC	BALANCED AC
BASEBAND	PASSBAND		
+6 dBm	−4 dBm	−3 ±2 dBm	Nominal output power from 912A WDTS (0 ±6 dBm)

STEP	PROCEDURE
3	At the 912A DTS, operate the COUNTER switch to ON. Observe that the counter does not count.
4	When testing restored polar type line signals, reduce the input signal by 12 dB and repeat Steps 2 and 3.
5	If sides A and B are arranged for the same type line signals, at WRR-1 remove the line interface CP from J5 (J9) and observe that the counter counts errors very rapidly.
6	If sides A and B are arranged for unlike-type line signals, at WRR-1 remove the line interface CP from J5 and J9 and observe that the counter counts errors very rapidly.
7	Replace the line interface CPs and observe that the counter stops registering errors.
8	Perform the output power requirements test, Steps 42 through 48.
	Synchronous Test
9	At the 912A DTS, operate the TRANSMIT—BIT RATE and RECEIVE—BIT RATE switches to the proper synchronous bit rate as determined in Table B.
10	Using the attenuator located in the WSB, adjust the data signal power at the WRR-1 input as required in Table D.
11	At the 912A DTS, operate the COUNTER switch to ON. Observe that the counter does not count.
12	When testing restored polar type line signals, reduce the input signal by 12 dB and repeat Steps 10 and 11.
13	If sides A and B are arranged for the same type line signals, at WRR-1 remove the sync recovery and regenerator CP from J4 (J10). Observe that the counter counts errors very rapidly.
14	If sides A and B are arranged for unlike-type line signals, at WRR-1 remove the sync recovery and regenerator CP from J4. Observe that the counter counts errors very rapidly.
15	Reinstall the removed circuit pack and observe that the counter stops registering errors.
16	If sides A and B are arranged for unlike-type line signals, at WRR-1 remove the sync recovery and regenerator CP from J10. Observe that the counter counts errors very rapidly.
17	Reinstall the removed circuit pack and observe that the counter stops registering errors.
18	Perform the output power requirements test, Steps 42 through 48.

STEP	PROCEDURE
	Alternate Synchronous-Nonsynchronous Test
19	At the 912A DTS, operate the TRANSMIT—BIT RATE and RECEIVE—BIT RATE switches to the proper synchronous bit rate as determined in Table B.
20	Using the attenuator located in the WSB, adjust the data signal power at the WRR-1 input as required in Table D.
21	At the 912A DTS, operate the counter switch to ON. Observe that the counter does not count errors.
22	When testing restored polar type line signals, reduce the input signal by 12 dB and repeat Steps 20 and 21.
23	If the alternate sync-nonsync feature is provided and tested in the sync mode and sides A and B are arranged for the same type line signal, at WRR-1 remove the sync recovery CP from J4 (J10). At the 912A DTS, observe that the counter counts errors very rapidly.
24	If sides A and B are arranged for unlike-type line signals and tested in the sync mode, at WRR-1 remove the sync recovery CP from J4. At the 912A DTS, observe that the counter counts errors very rapidly.
25	At WRR-1, replace the sync recovery CP and observe that the counter does not count.
26	If sides A and B are arranged for unlike-type line signals, at WRR-1 remove the sync recovery CP from J10. At the 912A DTS, observe that the counter counts errors very rapidly.
27	At WRR-1, replace the sync recovery CP and observe that the counter does not count.
28	If WRR-1 alternate sync-nonsync feature is provided, using patch cords as necessary, connect the output from the transmission measuring set signal generator to the input of WRR-1. The data set is not used for this test. Condition the transmission measuring set signal generator for an output of 23.5 $\pm$0.1 kHz and an output power level of 0 dBm. Remove the sync recovery CP J4 (J10) in the direction being tested. (If testing in direction 1, remove CP in J4. If testing in direction 2, remove CP in J10. If one side is looped, remove J4 and J10.) Measure the WRR-1 line output power into the transmission measuring set power meter. The power level should be 0 $\pm$2 dBm for restored polar and +3 $\pm$2 dBm for balanced dc-type line signals.
29	Condition the transmission measuring set signal generator for an output of 24.3 $\pm$0.1 kHz and an output power level of 0 dBm. Measure the WRR-1 line output power in the direction being tested, direction 1 (direction 2) at the WSB. The power level should be less than −30 dBm. Replace the sync recovery CP.
30	Disconnect the transmission measuring set and re-establish the data connections.
31	Perform the output power requirements test, Steps 42 through 48.

STEP	PROCEDURE
	Alarm and Bypass Test
32	At the WRR-1 46A power unit, remove the −48V fuse and observe that the NO VOLTAGE lamp is lighted.
33	If office alarm is provided, verify that alarm is operated.
34	Operate office alarm cut-off and verify that alarm is unoperated.
35	At the WRR-1 46A power unit, reinstall the −48V fuse and observe that the NO VOLTAGE lamp is extinguished.
36	At the WRR-1 46A power unit, remove the −48V fuse and observe that the NO VOLTAGE lamp is lighted.
37	If side A and side B are equipped for the same type line signals, the bypass circuit should now be activated. Remove the line interface CP from J5. Observe that the 912A DTS does not register errors. Replace the line interface CP in J5.
38	If side A and side B are equipped for unlike-type line signals, the bypass circuit should not be activated. Observe that the 912A DTS registers errors.
39	At the WRR-1, operate the ALM DIS nonlocking key and verify that the office alarm is disabled.
40	At the WRR-1 power unit, reinstall the −48V fuse and observe that the NO VOLTAGE lamp is extinguished.
	Output Power Requirements Test
	Note: This test must be performed for direction 1 and direction 2.
41	At the 912A DTS, operate the TRANSMIT—BIT RATE and RECEIVE—BIT RATE switches to the proper bit rate as determined in Table B.
42	Condition the transmission measuring set power meter to measure 0 dBm. Using patch cords as necessary, connect the transmission measuring set power meter into the WSB output jack associated with direction being tested, direction 1 (direction 2).
43	If testing in direction 1 and DAS 809 is provided on side B, meter should indicate −10 ±2 dBm. If meter indicates between −8 and −12 dBm but other than −10 dBm, select the proper 53-type "dB loss" pad and insert into socket AT1 on CP AR427. Verify that the meter indicates −10 ±0.25 dBm.
44	If testing in direction 2 and DAS 809 is provided on side A, meter should indicate −10 ±2 dBm. If meter indicates between −8 and −12 dBm but other than −10 dBm, select the proper 53-type "dB loss" pad and insert into socket AT2 on CP AR427. Verify that the meter indicates −10 ±0.25 dBm.

STEP	PROCEDURE
45	When testing restored polar type line signals and DAS 809 is not provided, meter should indicate 0 $\pm$1 dBm. If meter indicates between -1 and $+1$ dBm, the proper 53-type "dB loss" pad must be selected to provide 0 $\pm$0.25 dBm. ***Note:*** If testing in direction 1, select proper pad and insert into socket AT1 on CP AR427. If testing in direction 2, select proper pad and insert into socket AT2 on CP AR427. Verify that the meter indicates the desired dB level.
46	When testing balanced ac customer signals, the meter should indicate 0 $\pm$2 dBm.
47	When testing balanced dc-type line signals, the meter should indicate $+3$ $\pm$2 dBm.
48	Disconnect the transmission measuring set and re-establish data connections.

4. TROUBLESHOOTING

4.01 ***General:***

(a) The preceding tests are designed to determine if the WRR-1 is operating properly. If the WRR-1 repeater does not meet the conditions specified in the test steps, there is a trouble. The troubleshooting chart lists the possible circuit packs for each WRR-1 configuration that may cause trouble.

(b) The step numbers in the troubleshooting chart correspond to the test step number. When performing a test and the indications are not as specified, refer to the same step number in the troubleshooting chart.

(c) There will not be a step in the troubleshooting chart for each step in the test chart. Some of the steps in the test chart specify procedure and do not require an indication.

4.02 ***Equipment Required:***

1—748A Extractor tool (WECo)

4.03 ***Troubleshooting Procedure:***

(a) Before performing any troubleshooting procedure, check for obvious causes of trouble. Check the following:

(1) Loose cords, connectors, connections

(2) Incorrect interconnections or strapping on circuit packs

(3) Broken wires

(4) Physical damage.

(b) The following troubleshooting chart lists the control or indicator, the correct condition of the control or indicator for that step, and the possible circuit pack or packs causing the trouble. If, after replacing the circuit packs specified in the troubleshooting chart, the trouble still exists, a point-to-point check of the interconnecting wiring is necessary.

4.04 ***Replacing Circuit Packs:*** If the correct condition does not exist as specified in the troubleshooting chart, it will be necessary to replace indicated circuit packs one at a time until the trouble condition no longer exists. Replace indicated circuit packs as follows.

If a circuit pack is removed from either J5, J6, J7, J8, or J9, service may be interrupted in both direction 1 and direction 2. If it becomes necessary to replace one of these circuit packs, proper tests should be performed to assure that both direction 1 and direction 2 meet the necessary test requirements.

(a) Verify that the correct options, and no others, are installed on the new circuit pack for that particular WRR-1 configuration being tested.

(b) Replace circuit packs one at a time until the trouble is corrected.

(c) Reinstall all original circuit packs except for the new one which corrected the trouble. It will remain in the WRR-1.

(d) If, after replacing an original circuit pack, the WRR-1 repeater does not function properly, that circuit pack is defective and should be replaced.

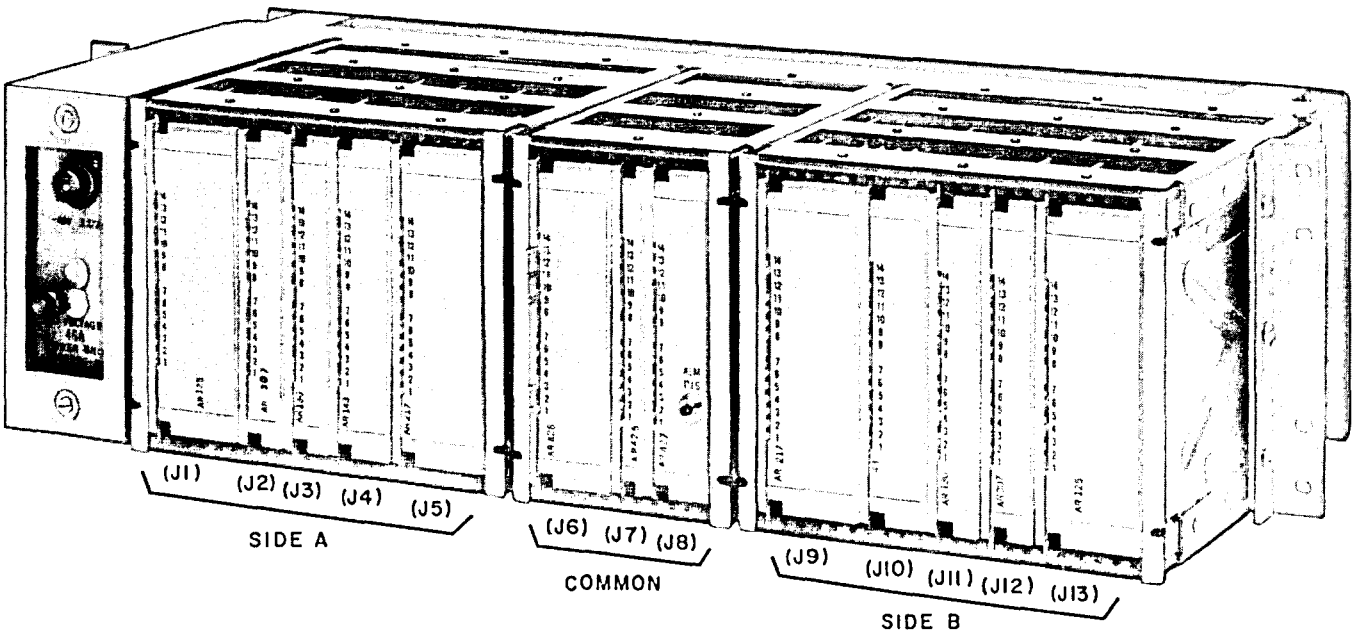


Fig. 5—Wideband Regenerative Repeater—Front View

TABLE E

SIDE A CIRCUIT PACKS		COMMON CIRCUIT PACKS		SIDE B CIRCUIT PACKS	
J1	AR413	J6	AR426	J9	AR217
	AR126	J7	AR425		AR218
	AR128	J8	AR427	J10	AR142
J2	AR307				AR143
J3	AR130				AR144
J4	AR142				AR145
	AR143				AR220
	AR144				AR241
	AR145				AR407
	AR220			J11	AR130
	AR241			J12	AR307
	AR407			J13	AR413
J5	AR217				AR126
	AR218				AR128

TROUBLESHOOTING CHART

STEP	INDICATOR	NORMAL CONDITION	POSSIBLE DEFECTIVE CIRCUIT PACKS (SEE FIG. 5 AND TABLE E) FOR DIRECTION OF TRANSMISSION												REMARKS
			DIRECTION 1						DIRECTION 1 OR 2	DIRECTION 2					
			SIDE A CPs			SIDE B CPs			COMMON CPs	SIDE B CPs			SIDE A CPs		
			R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC		R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC	
3	COUNTER	Does not register errors	J1, J2, J3, J5	J5	J5	J9	J9	J9	J8	J9, J11, J12, J13	J9	J9	J5	J5	J5	
4	COUNTER	Does not register errors	J2							J12						
5	COUNTER	Registers errors														Steps 5, 6, and 7 are provided to check the data path, insuring a proper test setup. If counter does not register errors, verify that the NO VOLTAGE lamp on the 46A power unit is not lighted. If NO VOLTAGE lamp is not lighted, remove CP (AR)427 from J8. If counter does not count, check test setup.
6	COUNTER	Registers errors														
7	COUNTER	Does not register errors	J1, J2, J3, J5	J5	J5	J9	J9	J9	J8	J9, J11, J12, J13	J9	J9	J5	J5	J5	
11	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J8	J11, J12, J13, J9, J10	J9, J10	J9, J10	J5	J5	J5	
12	COUNTER	Does not register errors	J2							J12						
13	COUNTER	Registers errors							J8							See remarks for Steps 5, 6, and 7.
14	COUNTER	Registers errors							J8							
15	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J8	J9, J10, J11, J12, J13	J9, J10	J9, J10	J5	J5	J5	See remarks for Steps 5, 6, and 7.
16	COUNTER	Registers errors							J8							
17	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J8	J9, J10, J11, J12, J13	J9, J10	J9, J10	J5	J5	J5	
21	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J6, J7 J8	J9, J10, J11, J12, J13	J9, J10	J9, J10	J5	J5	J5	

TROUBLESHOOTING CHART (Cont)

STEP	INDICATOR	NORMAL CONDITION	POSSIBLE DEFECTIVE CIRCUIT PACKS (SEE FIG. 5 AND TABLE E) FOR DIRECTION OF TRANSMISSION												REMARKS
			DIRECTION 1						DIRECTION 1 OR 2	DIRECTION 2					
			SIDE A CPs			SIDE B CPs			COMMON CPs	SIDE B CPs			SIDE A CPs		
			R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC		R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC	
22	COUNTER	Does not register errors	J2							J12						
23	COUNTER	Registers errors							J8							See remarks for Steps 5, 6, and 7.
24	COUNTER	Registers errors							J8							
25	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J6, J7 J8	J9, J10, J11, J12, J13	J9, J10	J9, J10	J5	J5	J5	
26	COUNTER	Registers errors							J8							
27	COUNTER	Does not register errors	J1, J2, J3, J4, J5	J4, J5	J4, J5	J9	J9	J9	J6, J7 J8	J9, J10, J11, J12, J13	J9, J10	J9, J10	J5	J5	J5	
28	Transmission measuring set	Measures correct dBm				J9		J9	J6, J7				J5		J9	If meter registers no power out, replace J6 and J7.
29	Transmission measuring set	Measures less than —30 dBm							J6, J7							
32	NO VOLTAGE lamp	Lighted														Check central office —48 volts. If voltage is present, the WRR-1 46A power unit is defective. (May be power indicator lamp.)
33	OFFICE ALARM	Operated							J8							Verify that the REMOTE CUT-OFF ALARM key is not operated and connections are properly made to office alarm. (It should be non-locking.)
34	OFFICE ALARM	Unoperated							J8							
35	NO VOLTAGE lamp	Extinguished														Defective 46A power unit.
36	NO VOLTAGE lamp	Lighted														Check central office —48 volts. If voltage is present, the WRR-1 46A power unit is defective.

TROUBLESHOOTING CHART (Cont)

STEP	INDICATOR	NORMAL CONDITION	POSSIBLE DEFECTIVE CIRCUIT PACKS (SEE FIG. 5 AND TABLE E) FOR DIRECTION OF TRANSMISSION												REMARKS
			DIRECTION 1						DIRECTION 1 OR 2	DIRECTION 2					
			SIDE A CPs			SIDE B CPs			COMMON CPs	SIDE B CPs			SIDE A CPs		
			R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC		R.P.	BAL AC	BAL DC	R.P.	BAL AC	BAL DC	
37	COUNTER	Does not register errors							J8							Verify that A option is installed.
38	COUNTER	Registers errors							J8							Verify that A option is not installed.
39	OFFICE ALARM								J8							
40	NO VOLTAGE lamp	Extinguished														Defective 46A power unit.
43	Transmission measuring set	Registers −10 ±2 dBm				J9										The DAS 809B2 may be causing the trouble. Remove DAS 809B2 and check for power level of 0 ±1 dBm. If this tolerance is met, the trouble is in DAS 809B2.
44	Transmission measuring set	Registers −10 ±2 dBm												J5		
45	Transmission measuring set	Registers 0 ±1 dBm				J9							J5			
46	Transmission measuring set	Registers 0 ±2 dBm					J9							J5		
47	Transmission measuring set	Registers +3 ±2 dBm						J9							J5	