OPERATION AND MAINTENANCE
REGENERATOR STATION
1× N FREQUENCY DIVERSITY
DR 6/11-135EC
REGENERATOR PROCEDURES

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1. GENERAL

This practice is used to test and adjust the regenerator bay. These procedures are normally performed when referred to from the alarm-clearing procedures, the repair verification flowchart, or annual FCC tests. The procedures can also be used on a stand-alone basis.

Each procedure lists the recommended test equipment and accessories. Each piece of equipment is keyed with an item number (that is, Item A1) that corresponds to an item number in Table A, B, or C under the TEST EQUIPMENT AND ACCESSORIES tab. These tables provide the minimum specifications for each piece of test equipment, and these specifications allow the technician to select alternate test equipment.

Using other than the recommended test equipment may require a slightly different test setup to perform the following procedures. Follow the manufacturer's setup and/or operation procedures.

1.1 UPDATE INFORMATION

This practice is reissued to bring regenerator procedures up to date, specifically to revise Part 7, Part 8, and Figures 1, 2, and 3. The practice is used in binders 421-103-090 and 421-103-100.

1.2 ADMONISHMENTS

Admonishments are strategically-placed reminders to assure the safety of personnel ***(DANGER)***, to minimize service interruptions ***(Caution)***, and to prevent equipment damage ***(Warning)***. Read the admonishments in the MAINTENANCE tab.

1.3 SERVICE PROTECTION

Service must be protected before most of the procedures in this practice are performed. The preface information for each procedure contains one of the following:

> ***Note:*** THIS IS AN IN-SERVICE PROCEDURE.
>
> ***Caution: THIS IS AN OUT-OF-SERVICE PROCEDURE.***

The ***Note*** shows that the procedure can be performed on working equipment without performing any service protection operations. The ***Caution*** shows that manual service protection operations ***must*** be performed to avoid interrupting service. The appropriate manual operation is referenced at the appropriate step in the procedure.

Service on the regular equipment to be tested ***must*** be manually switched to the protection equipment to prevent service interruptions. If the protection equipment is to be tested, it ***must*** be manually locked out to prevent the regular equipment from switching to it during the testing.

If necessary, refer to the SERVICE PROTECTION tab and/or the OPERATIONS tab to perform or verify proper service protection.

2. POWER UNIT VOLTAGE CHECKS

This procedure is used to check both the input and output voltages on the 471- and 474-type power units (color-coded white). The 471-type power unit is used with a –24 V battery supply. The 474-type is used with a –48 V battery supply.

This procedure can be performed on any power unit installed in a regular or protection regenerator shelf or the control and service channel shelf.

Note: THIS IS AN IN-SERVICE PROCEDURE.

The following test equipment is required to perform this procedure:

1 - Digital multimeter (Item A1).

For digital multimeter specifications, see TEST EQUIPMENT AND ACCESSORIES tab.

DANGER: To prevent electrical shock, follow office safety requirements when measuring dc voltage.

PROCEDURE

1. Using a digital multimeter, verify that the requirements at the specified test points listed in Table A are met.
2. Return to the instruction that referenced this procedure.

   If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

END OF PROCEDURE

TABLE A

POWER UNIT VOLTAGES (NOTE)

VOLTAGE TO BE CHECKED	VOLTAGE VALUE	TEST POINTS	REQUIREMENTS (V dc)
INPUT	–24 V	V_{in} + and –	–20.0 to –28.5
	–48 V		–42.0 to –60.0
OUTPUT	+5 V	V1 + and RTN*	+4.8 to +5.2
	–5 V	V1 - and RTN*	–5.0 to –5.4
	+15 V	V2 + and RTN*	+14.0 to +19.0
	–15 V	V2 – and RTN*	–14.0 to –19.0

Note: The expected output voltage(s) is identified on the shelf label below each power unit.

*Use V2 RTN test point on ± 15 volt power unit.

3. IF INPUT POWER LEVEL CHECK

This procedure is used to measure the IF signal level into a digital regenerator shelf. This level is measured at the patch panel located on the right side of the shelf.

The IF input signal (coming from the radio receiver) is measured at the plug end of the IF cable connected to the IF IN jack.

Caution: THIS IS AN OUT-OF-SERVICE PROCEDURE.

The following test equipment is required to perform this procedure:

1 - Power meter (Item A4)

1 - IF power sensor (Item A6)

1 - Adapter, 358 plug to 558 jack (Item B9)

1 - Adapter, 75-ohm, N jack to 477D jack (Item B14)

1 - 4-inch screwdriver (Item C8).

Note: A test cable, if necessary, must be no longer than 5 feet.

For recommendations and specifications of test equipment, see TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

1. Protect service as follows:
   - If testing a regular regenerator (shelf C or D), have terminal station or remote alarm center perform a manual line switch operation for the appropriate (A/C or B/D) direction.
   - If testing a protection regenerator (shelf A or B), have terminal station or remote alarm center perform a protection channel lockout manual operation for the appropriate (A/C or B/D) direction.
2. Remove the right side bay cover, if equipped.
3. On the patch panel, remove the IF cable from the associated IF IN jack for the regenerator under test.
4. Connect the IF power meter to the plug end of the IF cable removed in Step 3.
5. Observe the power meter indication.

   Requirement:

   Regenerators equipped with standard IF interconnect cable (less than or equal to 50 feet), –7.2 to –9.2 dBm.

   Regenerators equipped with long IF interconnect cable (greater than 50 feet), –10.5 to –12.9 dBm.

6. If further tests require access to the regenerator patch panel, return to the instruction that referenced this procedure.

   If no further tests require access to the regenerator patch panel, disconnect all test equipment and reinstall all cables removed.

7. Remount side cover.

8. Return to the instruction that referenced this procedure.

   If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

END OF PROCEDURE

4. IF OUTPUT POWER LEVEL CHECK

This procedure is used to measure the IF signal level out of a digital regenerator shelf. This level is measured at the patch panel located on the right side of the shelf.

The IF output signal (going to the radio transmitter) is measured at the IF OUT jack.

Caution: THIS IS AN OUT-OF-SERVICE PROCEDURE.

The following test equipment is required to perform this procedure:

1 - Power meter (Item A4)

1 - IF power sensor (Item A6)

1 - Adapter, 358 plug to 440 plug (Item B11)

1 - Adapter, 75-ohm, N jack to 477D jack (Item B14)

1 - 4-inch screwdriver (Item C8).

Note: A test cable, if necessary, must be no longer than 5 feet.

For recommendations and specifications of test equipment, see TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

1. Protect service as follows:
   - If testing a regular regenerator (shelf C or D), have terminal station or remote alarm center perform a manual line switch operation for the appropriate (A/C or B/D) direction.
   - If testing a protection regenerator (shelf A or B), have terminal station or remote alarm center perform a protection channel lockout manual operation for the appropriate (A/C or B/D) direction.
2. Remove the right side bay cover, if equipped.
3. On the patch panel, remove the IF cable from the associated IF OUT jack for the regenerator under test.
4. Connect the IF power meter to the IF OUT jack.
5. Observe the power meter indication.

   Requirement:

   Regenerators equipped with standard IF interconnect cable (less than or equal to 50 feet), –6.1 to –8.1 dBm.

   Regenerators equipped with long IF interconnect cable (greater than 50 feet), –1.0 to +1.0 dBm.
6. If further tests require access to the regenerator patch panel, return to the instruction that referenced this procedure.

   If no further tests require access to the regenerator patch panel, disconnect all test equipment and reinstall all cables removed.

7. Remount side cover.
8. Return to the instruction that referenced this procedure.

   If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

END OF PROCEDURE

5. FRAME RESUPPLY CLOCK FREQUENCY CHECK

This procedure is used to check the frequency of the oscillator in the FRAME RSPLY unit. This unit is located in the transmit portion of the digital regenerator shelf. The frequency of the oscillator is measured at the FRS CLK jack.

Note: THIS IS AN IN-SERVICE PROCEDURE.

The following test equipment, adapters, and cables are required to perform this procedure:

1 - Counter/timer (Item A2)

1 - Adapter, SMB snap-on plug to BNC plug (Item B12)

1 - 5-foot coaxial cable with SMB jacks (Item B20).

For recommendations or specifications of test equipment, see the TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

1. Connect the frequency counter to the FRS CLK jack on the FRAME RSPLY plug-in unit (color-coded red).
2. Observe the frequency counter indication.

   Requirement: 24,031,000 Hz to 24,034,000 Hz.

   If the requirement is not met, remove the regenerator from service, replace the FRAME RSPLY unit, and repeat this procedure.
3. Disconnect all test equipment.
4. Return to the instruction that referenced this procedure.

   If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

END OF PROCEDURE

6. MODULATOR CARRIER FREQUENCY CHECK

This procedure is used to check the frequency of the internal oscillator that provides the 70-MHz carrier frequency. This measurement is made at the CARRIER FREQ jack on the faceplate of the 64QAM MOD unit in the transmit portion (color-coded red) of the digital regenerator shelf.

Note: THIS IS AN IN-SERVICE PROCEDURE.

The following test equipment, adapters, and cables are required to perform this procedure:

1 - Counter/timer (Item A2)

1 - Adapter, SMB snap-on plug to BNC plug (Item B12)

1 - 5-foot coaxial cable with SMB jacks (Item B20).

For recommendations and specifications of the test equipment, see the TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

1. Connect frequency counter to CARRIER FREQ jack on 64QAM MOD unit (color-coded red).
2. Observe the frequency counter indication.

   Requirement: 69,993,000 Hz to 70,007,000 Hz.

   If the requirement is not met, remove the regenerator from service, replace the 64QAM MOD unit, and repeat this procedure.
3. Disconnect all test equipment.
4. Return to the instruction that referenced this procedure.

   If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

END OF PROCEDURE

7. IF LOOPBACK S/I STRESS CHECK

This procedure is used to check the performance of the digital regenerator equipment while it is isolated from the radio equipment. The IF output signal is looped back to provide the IF input signal to the receiver of the same channel. This procedure is used to isolate a performance problem between the regenerator and radio equipment and to evaluate the preservice performance of a regenerator after replacing performance-affecting circuits.

Performance quality is determined by measuring the tolerance of the looped digital regenerator pair to a 74-MHz interference tone injected into the IF signal path at the receiver input. Performance evaluation is then made on the bit-error-rate (BER) performance at a specified signal-to-interference (S/I) ratio.

The test configuration for the looped back S/I test is shown in Figure 3. The IF output signal "S" from the transmitter is looped back, through the low-loss (less that 1 dB) path of the unequal loss combining network, to the receiver IF input. The adjustable level 74-MHz interference signal "I" is injected into the receiver IF input signal through the high-loss path of the combining network.

Once the loopback network is established, the testing process consists of the following:

1. Measuring the looped back 64-QAM IF signal "S" without the interference "I" present.
2. Measuring and setting the level of "I" to establish the required S/I ratio without "S" present.
3. Observing and evaluating the cyclic redundancy check (CRC) error performance with both S and I present at the required S/I ratio.

Caution: THIS IS AN OUT-OF-SERVICE PROCEDURE.

Warning: To prevent electrostatic discharge (ESD) damage to plug-in units, ensure that all ESD precautions are followed.

TEST EQUIPMENT

- Refer to Figure 1.

For recommendations and specifications of test equipment, see the TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

> ***Note:*** This procedure applies to regular or protection regenerator equipment for receivers with or without the TE unit. However, if the regenerator transmitter portion of a terminal-to-regenerator hop is being evaluated using a terminal receiver that is equipped with a TE, the transversal equalizer function ***must be bypassed or disabled*** for proper evaluation. This is necessary since the TE can mask or compensate for some transmitter degradations.

1. Remove the right front side cover of the regenerator bay.

2. Protect service as follows:
   - If testing a regular regenerator (C or D), have terminal station or remote alarm center perform a manual line switch operation for the appropriate (A/C or B/D) direction.
   - If testing a protection regenerator (A or B), have terminal station or remote alarm center perform a protection channel lockout manual operation for the appropriate (A/C or B/D) direction.

Establish the Loopback and Measure the "S" (IF Signal) Power Level

3. On the right shelf patch panel of the digital regenerator to be evaluated, remove the IF cables from the IF IN jack and the IF OUT jack.
4. On the regenerator under test, operate the MAN FRS pushbutton of the FRAME RSPLY unit (color-coded red).
5. Determine the test cables to establish the S, I, and S+I paths (Figure 3), and keep the same cables for all tests in this procedure.
6. Measure the "S" (IF signal) power level (Figure 1).
   a. Establish the test connections shown in Figure 1.
   b. Measure the power at the end of the 5-foot test cable, and record the reading as "S."

      Requirement:

      Regenerators equipped with standard IF interconnect cable (equal to or less than 50 feet), –6.9 to –8.9 dBm.

      Regenerators equipped with long IF interconnect cable (greater than 50 feet), –11.3 to –13.7 dBm.

      If the requirement is not met, check the test connections and equipment setup. If it is still ***not*** met, go to Step 28.

Set the "I" (Interference) Power Level

7. Condition the 74-MHz "I" source to send 74 MHz at about +10.0 dBm.

   Note: If a microwave system analyzer is used as the 74-MHz "I" source, ensure that all transmitter sweep and deviation signals are off.
8. Establish the test connections shown in Figure 2.
9. Measure the power level at the end of the 5-foot test cable, and adjust the "I" power level to 29 dB below the "S" power level recorded in Step 6.

   Note: To do this, set the "I" power level to 9 dB below the recorded "S" power and then decrease the IF level by 20 dB in the "I" path.

Establish the IF Loopback "S+I" Test Connection

10. Establish the test connections shown in Figure 3.

11. Remove the termination and connect the test cable with the "S" signal to the unequal loss combining network as shown in Figure 3. Connect the "S+I" combined signal to the IF IN jack.

12. Condition the digital transmitter/receiver as indicated by the appropriate case below.

    Case 1 If a receiver is being evaluated or a transmitter is being evaluated through a receiver without a TE, perform S/I Performance Measurement—Case 1.

    Case 2 If a transmitter is being evaluated through a receiver with an Analog TE, perform S/I Performance Measurement—Case 2.

    Case 3 If a transmitter is being evaluated through a receiver with a digital TE, perform S/I Performance Measurement—Case 3.

S/I Performance Measurement—Case 1

13. Observe the ERR RATE (bar graph) display on the associated CHAN CONTR unit. Allow at least 10 seconds before determining if the requirement is met.

    Requirement: The bar-graph display shall not be lighted above the line between the 8 and the 7 segments (BER $\leq 5 \times 10^{-8}$).

    If the requirement is met, go to Step 23.

    If the requirement is not met, go to Step 28.

S/I Performance Measurement—Case 2

14. ***Warning: To prevent ESD damage to plug-in units, ensure that ESD precautions are followed, including connecting wrist strap to ground and placing removed plug-in units in ESD protective containers before disconnecting from ground and transporting units.***

15. Replace the two TRNSV FLT units with two TE PATCH units. If necessary, refer to the plug-in unit replacement procedures.

16. Observe the ERR RATE (bar graph) display on the associated CHAN CONTR unit. Allow at least 1 minute before determining if the requirement is met.

    Requirement: The bar-graph display shall not be lighted above the line between the 8 and the 7 segments (BER $\leq 5 \times 10^{-8}$).

    If the requirement is met, remove the two TE PATCH units, reinstall the original TRNSV FLT units, and go to Step 23.

    If the requirement is not met, go to Step 28.

S/I Performance Measurement—Case 3

17. With the TE on NORM, observe the ERR RATE bar graph on the associated CHAN CONTR unit. Allow at least 1 minute before determining if the requirement is met.

    Requirement: The bar-graph display shall not be lighted above the line between the 8 and 7 segments. (The BER shall be less than or equal to 5×10^{-8}.)

    If the requirement is not met, go to Step 28.

18. If necessary, increase the 74-MHz "I" signal to show 5×10^{-8} on the bar graph and note S/I ratio for the error rate.

19. Using a universal counter, measure the "I" pseudo error rate at the 5×10^{-8} CRC rate and note for future reference.

20. Turn the TE to OFF, but leave the counter connected to continually measure the pseudo errors.

21. If necessary, reduce the 74-MHz "I" level (increase the S/I ratio) to reduce the pseudo error rate to about 5×10^{-8}. Note the reduction necessary to achieve the same error rate.

    Requirement: The difference between the increase and reduction shall be less than or equal to 3 dB.

    If the requirement is not met, go to Step 28.

22. Turn the TE OFF/NORM pushbutton to NORM.

Restore the Equipment For Normal Operation

23. Disconnect all test connections at the regenerator bay.

24. Release the MAN FRS pushbutton on the FRAME RSPLY unit.

25. Reinstall the IF cables to the IF IN and IF OUT jacks.

26. If no further access to the regenerator IF jacks is required, reinstall the side cover.

27. Return to the instruction that referenced this procedure.

    If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

Evaluate a Failure to Meet Requirements

28. If the requirement was not met and this procedure was referenced from another procedure, return to that procedure to see if there are instructions about a failure to meet requirements. If there are no instructions or the given instructions are inadequate or this procedure was not referenced from another procedure, go to the next step.

29. The failure of a regenerator receiver or transmitter to meet the requirements of this performance check is probably cause by a defective regenerator circuit pack. Do a one-at-a-time replacement/retest procedure with the regenerator still in the looped configuration to determine if this is the case.

If replacing the unit does not correct the problem, check for a defective spare, a wiring problem, or a defect on the regenerator shelf. Use the applicable shelf SDs, circuit pack input/output information in the O&M maintenance support manual, and a circuit pack extender card to isolate and eliminate the problem.

When the problem has been corrected, go to Step 3.

END OF PROCEDURE

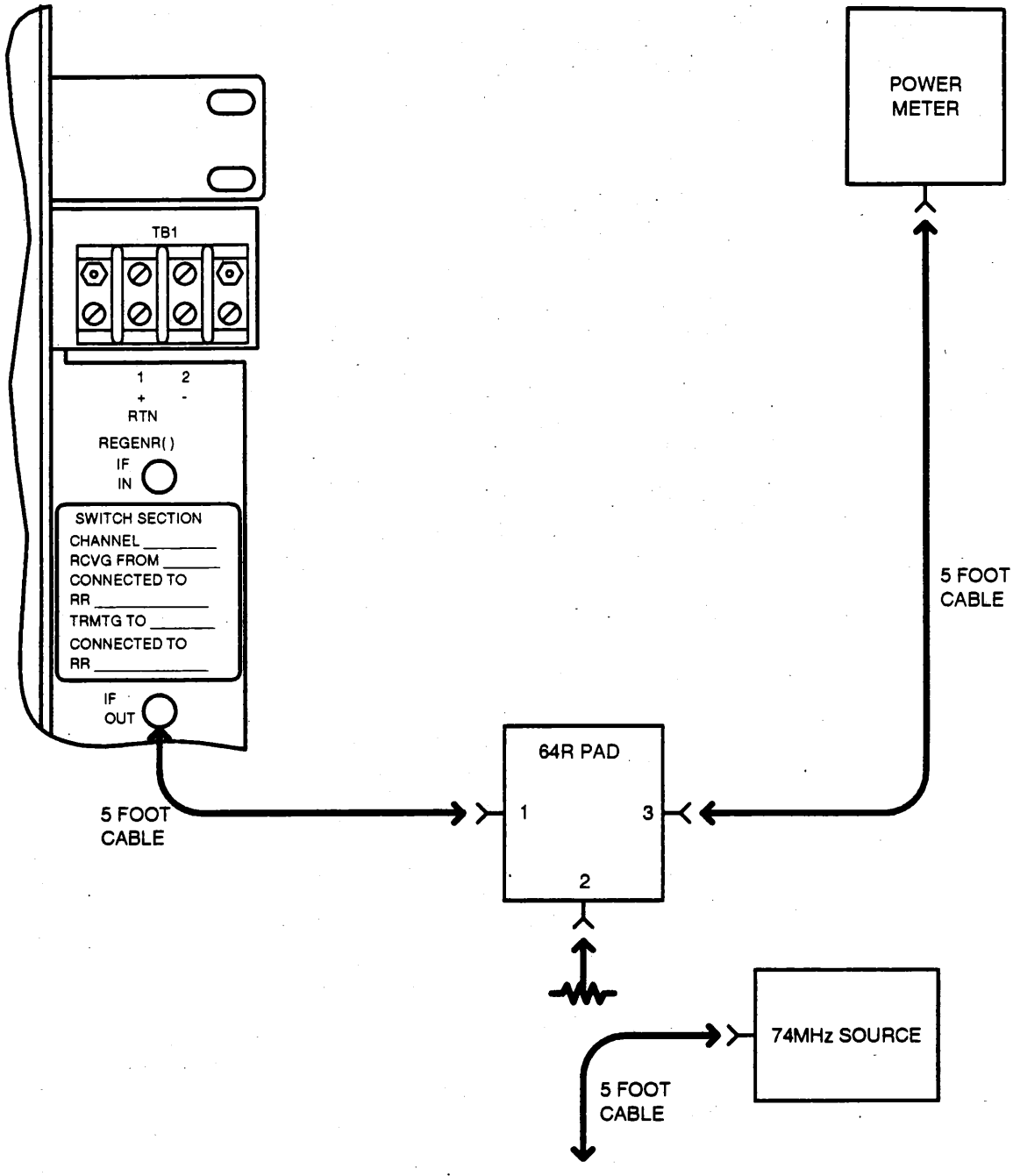

Figure 1 – "S" (IF Signal) Power Level Measuring Connections

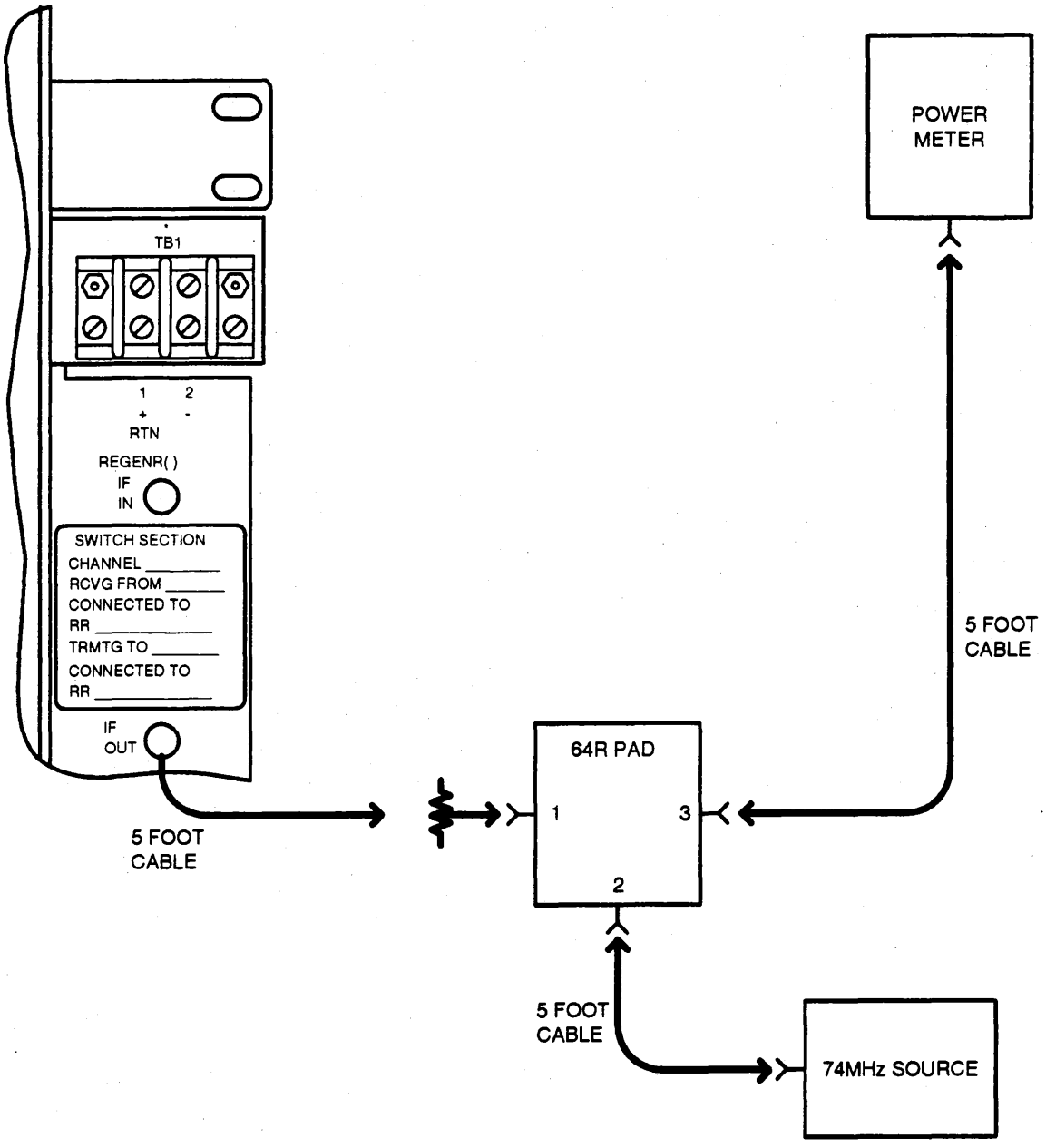

Figure 2–"I" (Interference) Power Level Setting Connections

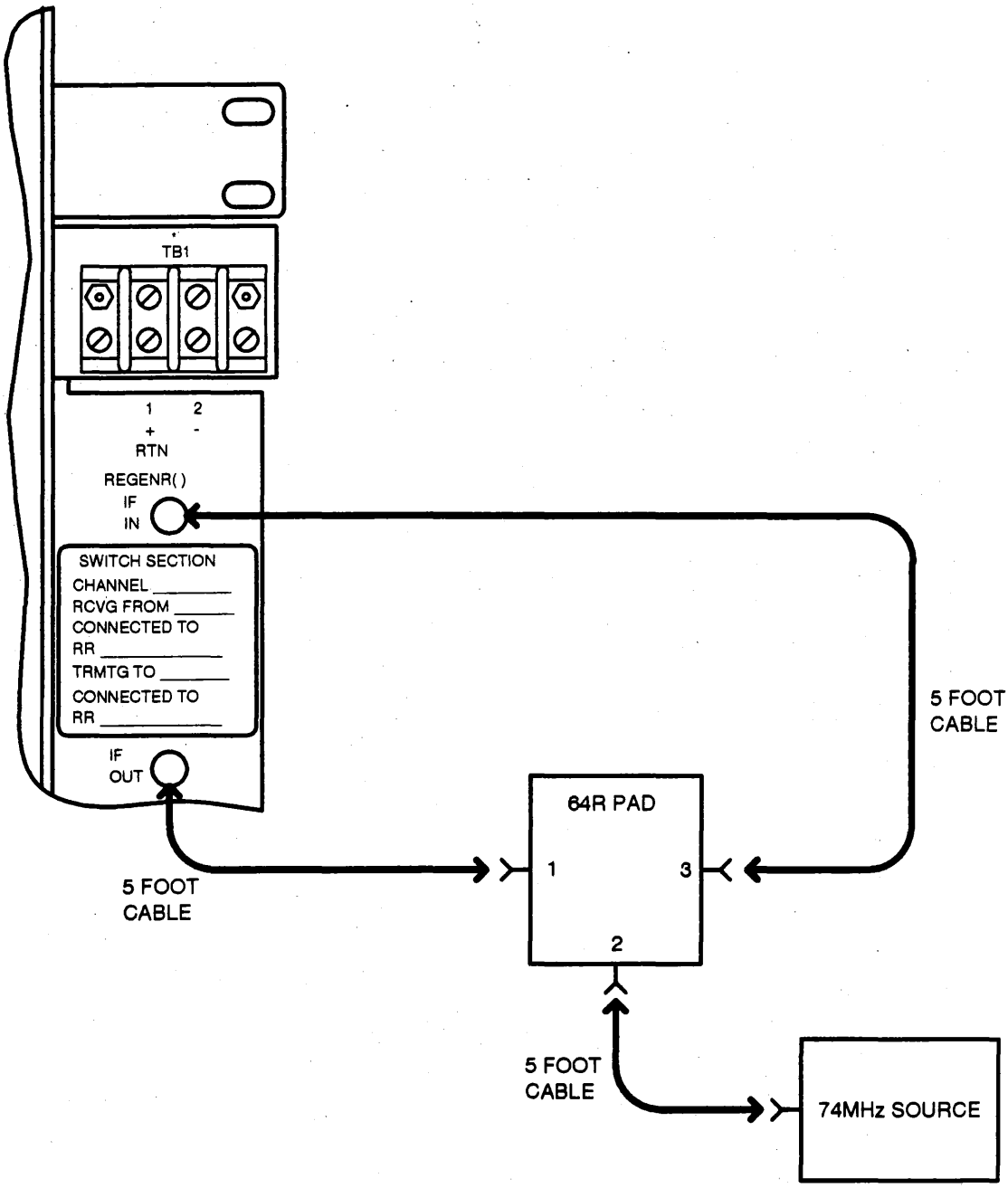

Figure 3–IF Loopback S/I Stress Check Connections

8. IF LOOPBACK TRANSVERSAL EQUALIZER PERFORMANCE CHECK

This procedure is used to check the performance of the transversal equalizer in the digital receiver while it is isolated from the radio hop. It is also used to isolate suspected TE problems and to evaluate the preservice performance of a repaired digital receiver after replacing performance-affecting circuits.

For this test, the digital transmitter IF output signal is looped back to the digital receiver through a TE propagation distortion simulator (PDS) test set, the IF AGC amplifier, and adaptive slope equalizer (ASE) circuits in the associated radio receiver. The radio IF AGC amplifier and adaptive slope equalizer circuits are required in this loopback configuration to compensate for the losses and gross slope shapes introduced by the TE PDS during the dynamic stress tests.

Following the TE evaluation, the carrier recovery performance of the digital receiver is tested by interrupting the loopback IF signal ahead of the radio receiver. For robust receivers, the TE PDS is left in the loopback configuration with the notch distortion fixed at 70 MHz. Non-robust receivers are not evaluated with the TE PDS test set. Carrier recovery performance is evaluated by determining how quickly the digital receiver can **regain** carrier lock after reconnecting the IF signal.

The test configuration for the TE dynamic stress procedure is shown in Figure 4. The test procedure will vary depending on the type of digital transmitter/receiver configuration. There are three configurations of digital equipment:

1. **Non-robust**—Analog or no TE with AMR34 CRLTR.
2. **Robust**—Analog TE (TRNSV FLTs) and AMR234 CRLTR.
3. **Digital TE**—AMR184 TE.

This procedure applies to any regular or protection channel. The ASE in the associated radio receiver should be able to pass its Over-the-Air Propagation Distortion Performance Check. If there is any doubt, perform that test first.

Caution: THIS PROCEDURE IS SERVICE-AFFECTING UNLESS THE PROPER SWITCHING OPERATION HAS BEEN PERFORMED.

Prerequisite: Radio receiver AGC amplifier and adaptive slope equalizer are working properly and the radio delivers proper IF signal to terminal receiver. If in doubt, perform appropriate radio test to verify.

Warning: To prevent ESD damage to plug-in units, ensure that all ESD precautions are followed.

TEST EQUIPMENT

- Refer to Figure 4.

For recommendations and specifications of test equipment, see the TEST EQUIPMENT AND ACCESSORIES tab.

PROCEDURE

1. Protect service as follows:

   a. If testing a regular channel, have terminal station or remote alarm center perform a manual line switch for the appropriate A/C or B/D direction.

   OR

   b. If testing the protection channel, have terminal station or remote alarm center perform a protection channel lockout for the appropriate A/C or B/D direction.

Establish Loopback Test Setup

2. Remove the right front side cover of the regenerator bay.
3. Establish the test connections shown in Figure 4.
4. Engage the MAN FRS pushbutton (yellow LED MAN FRS ON will light) on the FRAME RSPLY unit for the associated regenerator channel and direction to be tested.

Check Transversal Equalizer Notch Performance

5. Set the TE PDS to the left stop position.
6. While observing the ERR RATE display (bar graph) on the associated CHAN CONTR unit, manually rotate the TE PDS test set control back and forth between the left and right stop positions. Rotate the control at a rate of one end-to-end sweep about every 2 seconds. Continue the sweep action for about 10 seconds.

   Requirement: The ERR RATE display does not light completely (***FR*** segment is not lighted).

   If the requirement is met with the NON-MIN output, repeat this step with the MIN output of the TE PDS. If the requirement is met with both positions, go to Step 7.

   If the requirement is not met, repeat this step to verify that the sweep speed and procedure were performed correctly. If the requirement is still not met, go to Step 14.

Check Digital Receiver Recovery Performance

7. If testing a ***robust*** or ***digital TE*** receiver, rotate the TE PDS notch control to locate the notch at about 70 MHz (about 3/4-turn clockwise between the stop posts)

   OR

   If testing a ***non-robust*** receiver, disconnect the TE PDS test set and patch the test cables with the appropriate adapter.

8. Disconnect the test cable from the digital transmitter TRMT IF OUT jack.

9. While observing the CARRIER LOCK LOSS indicator on the 64QAM DEMOD unit, reconnect the test cable to the TRMT IF OUT jack. Note the time required for this indicator to extinguish after reconnecting the test cable.

   Requirement for robust or digital TE receivers: Immediately (1 second or less).

   Requirement for non-robust receiver: Delayed (3 seconds or less).

   Repeat the test for robust or digital TE receivers with both the MIN and NON-MIN outputs of the TE PDS.

   If the requirement is met, go to Step 10.

   If the requirement is not met, go to Step 14.

Restore Equipment to Normal Operation

10. Disconnect all test connections from the radio bay and the terminal bay.

11. Reconnect the IF cable at the TRMT IF OUT jack on the regenerator shelf and the bay cable at the IF IN jack of the IF AGC AMPL unit in the radio bay.

12. If no further access to the IF jacks is required, reinstall the side cover on the regenerator bay.

13. Return to the instruction that referenced this procedure.

    If this procedure was used on a stand-alone basis, go to the REPAIR VERIFICATION tab unless other tests are required.

Evaluate a Failure to Meet Requirements

14. If the requirement was not met and this procedure was referenced from another procedure, return to that procedure to see if there are instructions about a failure to meet requirements. If there are no instructions or the given instructions are inadequate or this procedure was not referenced from another procedure, go to the next step.

15. The failure of a receiver to meet requirements is probably the result of defective TE units or a failure in one or more of the associated demodulation circuits (64QAM DEMOD to 64QAM DECSNs). Refer to the REPLACEMENT PROCEDURES tab and do a one-at-a-time replacement/retest procedure while in the ***looped*** test configuration. This process should begin with the following units in the specified order: TRNSV FLTs, CRLTR, 64QAM DEMOD, and 64QAM DECSNs.

    If the problem is still not resolved, replace and retest the radio receiver units involved in the loopback.

    If replacing the unit does not correct the problem, check for a defective spare, a wiring problem, or a defect on the regenerator shelf. Use the applicable shelf SDs, circuit pack input/output information in the O&M maintenance support manual, and a circuit pack extender card to isolate and eliminate the problem.

    When the problem has been corrected and ***all*** requirements in this procedure have been met, go to Step 10.

END OF PROCEDURE

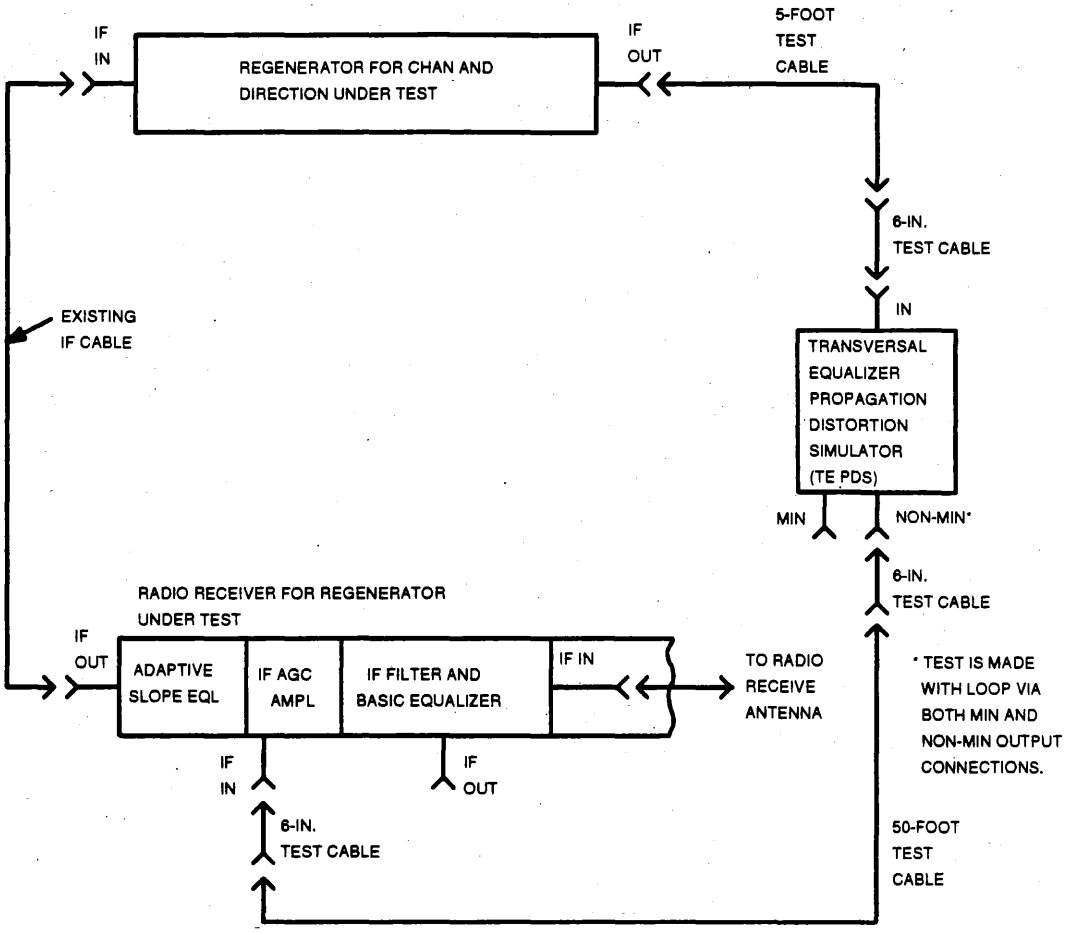

Figure 4–IF Loopback TE Performance Check Connections