
OVER-THE-HORIZON RADIO SYSTEMS
ITTL 12A-1 OVER-THE-HORIZON RADIO SYSTEM
NUS 3298 RECEIVER
DUAL DIVERSITY OPERATION
TESTS AND ADJUSTMENTS

The tests and adjustments described in this section require the system receivers to be operated in dual diversity with the receiver under test removed from service as described in Section 403-413-301.

These tests are arranged in a sequence which avoids duplication of operations and should be performed in the order presented.

The functions of the controls on the two receiver control units in each receiver are summarized in Table A.

CHART	PAGE
1—Gain Control Tests and Adjustments	3
2—Receiver Alarm Tests and Calibration	6

APPARATUS

- 1—FM Test Set, 37F
- 1—General Radio Co. Signal Generator, 1021-AU
- 1—Microlab Power Divider, DP-4
- 1—Attenuator, 9A, 9 dB
- 2—Hewlett Packard Cable Assemblies, 11501A
- 2—Microlab RF Attenuators, 3 dB, AA03N

TABLE A
RECEIVER CONTROL UNIT FUNCTIONS

CONTROL	FUNCTIONS	
	UPPER CONTROL	LOWER CONTROL UNIT
CONVR (meter switch)	Meter left branch mixer crystal currents	Meter right branch mixer crystal currents
130V (meter switch)	Meter +130 volt supply to left branch components	Meter +130 volt supply to right branch components
AVC TST (meter switch)	Upper receiver con- trol unit tests	Lower receiver con- trol unit tests
SLOPE ADJ (potentiome- ter)	Modification of standard control unit to provide in- dependent adjust- ment of left receiver branch gain control vol- tage	Modification of standard control unit to provide in- dependent adjust- ment of right receiver branch gain control vol- tage
FIL (circuit breaker) FIL ADJ (potentio- meter) FIL ACT (switches) FIL ACT (meter switch)	On-off and test operations of fila- ment circuits to left receiver branch IF preampli- fier, IF main amplifier, and upper receiver control unit	On-off and test operations of fila- ment circuits to right receiver branch IF preampli- fier, IF main amplifier, and lower receiver control unit
CONT (switch) AUTO (potentio- meter) MAN (potentio- meter) GC BIAS (meter switch) RCVR OUTPUT (meter switch)	Adjustment and metering of gain control circuits operation of both receiver branches when upper receiver control unit is selected by means of the AGC ampli- fier selector switches	Adjustment and metering of gain control circuits operation of both receiver branches when lower receiver control unit is selected by means of the AGC ampli- fier selector switches
+BIAS (potentio- meter) +BIAS (meter switch)	Adjustment and metering of stabi- lizing bias to fixed gain stages in left receiver branch	Adjustment and metering of stabi- lizing bias to fixed gain stages in right receiver branch

CHART 1

GAIN CONTROL TESTS AND ADJUSTMENTS

STEP	PROCEDURE										
1	Remove the cables normally connected to both IF main amplifier INPUT jacks. Adjust both EQUAL ATTEN controls to 0 dB.										
2	On both receiver control units, make the following adjustments:										
	<table border="1"> <thead> <tr> <th>CONTROL</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>CONT (switch)</td> <td>MAN</td> </tr> <tr> <td>MAN (potentiometer)</td> <td>Fully counterclockwise</td> </tr> <tr> <td>Meter switch</td> <td>RCVR OUTPUT</td> </tr> </tbody> </table>	CONTROL	POSITION	CONT (switch)	MAN	MAN (potentiometer)	Fully counterclockwise	Meter switch	RCVR OUTPUT		
CONTROL	POSITION										
CONT (switch)	MAN										
MAN (potentiometer)	Fully counterclockwise										
Meter switch	RCVR OUTPUT										
3	On the diversity switching panel, operate the AGC AMPLIFIER SELECTOR switch to select the upper receiver control unit.										
4	Make the test arrangement shown in Fig. 1.										
5	On the 1021-AU signal generator, make the following adjustments:										
	<table border="1"> <thead> <tr> <th>CONTROL</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>POWER</td> <td>POWER</td> </tr> <tr> <td>MODULATION</td> <td>OFF</td> </tr> <tr> <td>METER READS</td> <td>CARRIER</td> </tr> <tr> <td>250-920 MEGACYCLES</td> <td>Receiver frequency</td> </tr> </tbody> </table>	CONTROL	POSITION	POWER	POWER	MODULATION	OFF	METER READS	CARRIER	250-920 MEGACYCLES	Receiver frequency
CONTROL	POSITION										
POWER	POWER										
MODULATION	OFF										
METER READS	CARRIER										
250-920 MEGACYCLES	Receiver frequency										
6	On the 37F FM test set, set the MV switch to 1 and the PWR switch to the ON position.										
7	Calibrate the signal generator at the 500-millivolt level and then adjust the ATTENUATOR control to -70 dBm.										
8	Connect the cable normally used at the INPUT jack of the left IF main amplifier.										
9	Adjust the signal generator ATTENUATOR control to obtain a low value but discernible indication on the FM test set meter. Make the necessary adjustment of the signal generator frequency control to obtain a maximum meter indication while limiting the indication to less than 0 dBm with the ATTENUATOR control.										

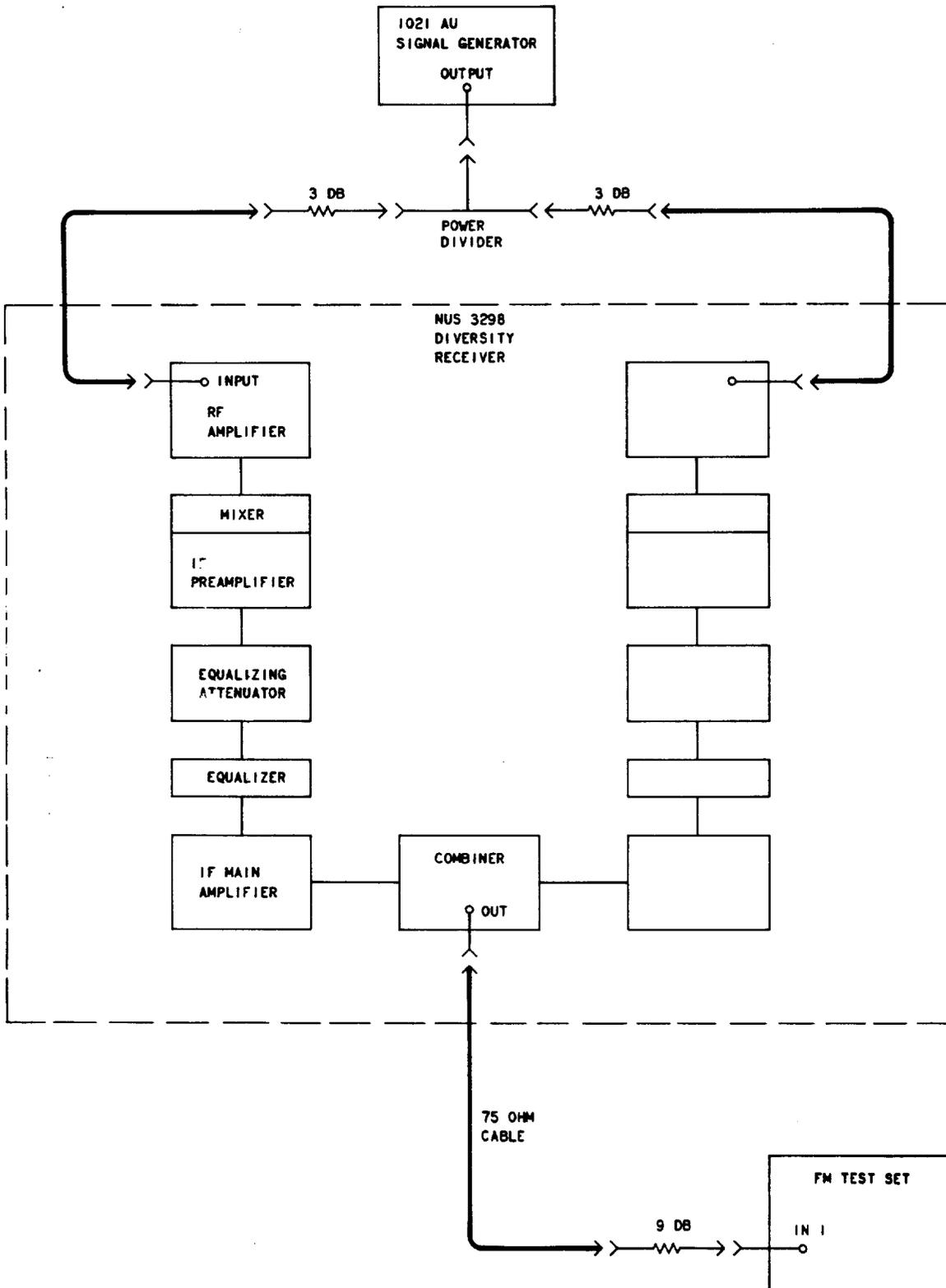


Fig. 1—NUS 3298 Receiver—Gain Control and Alarm Tests—Test Setup Diagram

CHART 1(Cont)

STEP	PROCEDURE
10	Adjust the signal generator ATTENUATOR control to obtain an FM test set meter indication of 0 dBm. Record the signal generator output level indicated on the ATTENUATOR control.
	Requirement: The signal generator output level should be no greater than -57 dBm.
	Note 1: This is a measure of the receiver branch gain which is the sum of the signal generator attenuator indication (sign ignored), 19-dB test circuit loss, and the FM test set meter indication. The required branch gain is 76 dB.
	Note 2: If the requirement is not met, perform the component tests in Section 403-413-508.
11	Operate the signal generator ATTENUATOR control fully clockwise.
12	Disconnect the cable from the left IF main amplifier. Reconnect the cable normally used at the right IF main amplifier.
13	Adjust the signal generator ATTENUATOR control to obtain an FM test set meter indication of 0 dBm.
	Requirement: The signal generator output level should be no greater than -57 dBm and should agree with the value recorded in Step 10 ± 6 dB.
	Note: Failure to meet the requirement indicates gain inequality between the two receiver branches which can best be located by transposing receiver components.
14	Alternately connect the cables to the two IF main amplifiers while observing the FM test set meter. In the receiver branch producing the greater output, adjust the EQUAL ATTEN controls to obtain an output indication which is within 1 dB of that obtained from the lower gain branch.
15	On both receiver control units, operate the SLOPE ADJ potentiometers fully counterclockwise and the MAN potentiometers fully clockwise.
16	Adjust the signal generator ATTENUATOR control to -20 dBm. Connect the cables at the INPUT jacks of both IF main amplifiers.
17	On the receiver control unit selected for use, operate the MAN potentiometer to obtain an FM test set meter indication of $+3$ dBm.
18	Disconnect the cables normally used at both IF main amplifier INPUT jacks and then alternately connect the two cables while observing the FM test set meter. Note the value of the greater indication. In the receiver control unit associated with the receiver branch producing the low-value output meter indication, adjust the SLOPE ADJ potentiometer to obtain an output indication which equals that from the higher gain branch.
19	Connect the cables normally used at both IF amplifier input jacks.
20	On both receiver control units, operate the CONT switch to AUTO. On the receiver control unit selected for use, adjust the AUTO potentiometer to obtain an FM test set meter indication of 0 dBm. Note and record the receiver control unit meter indication on the 2.5 full-scale volts range.
21	Operate the AGC AMPLIFIER SELECTOR switch to place the second receiver control unit in operation. Repeat the adjustments described in Step 20.

CHART 1(Cont)

STEP	PROCEDURE
22	Retain the test setup for calibrating the alarm system as described in Chart 2 of this section.

CHART 2**RECEIVER ALARM TESTS AND CALIBRATION**

STEP	PROCEDURE
	RF Level Alarm Test
1	Verify that the test equipment and receiver under test are arranged as at the conclusion of the dual diversity adjustment tests described in Chart 1 of this section. <i>Note:</i> The receiver should be operating in dual diversity using automatic gain control and connected to the test arrangement shown in Fig. 1. The signal generator should be set at the receiver frequency with the output level calibrated. The 9-dB attenuator and FM test set shown connected to the receiver combiner output serve as a combiner termination. A 486A termination may be used in place of the attenuator and the FM test set.
2	On the signal generator, slowly operate the ATTENUATOR control to -20 dBm and then to -60 dBm. <i>Requirement:</i> The receiver RF LEVEL alarm lamp should extinguish and the alarm should sound when the -10 and -60 dBm levels are reached. A 3-dB variance is acceptable. <i>Note:</i> If necessary, adjust the RF LEVEL SENSITIVITY and CENTERING controls on the receiver alarm panel to meet the requirement. The SENSITIVITY control setting determines the alarm silence span.
	IF Output Alarm Test
3	Adjust the signal generator ATTENUATOR control to -40 dBm. Disconnect the cable normally used at the INPUT jack of the left IF main amplifier. <i>Requirement:</i> The IF OUTPUT alarm indicator lamp should extinguish and the alarm should sound within 4 minutes. <i>Note:</i> Failure to meet the requirement is indication of IF alarm circuit trouble; the most likely cause would be failure of timer M1 in the alarm panel.
4	Reconnect the cable at the left IF amplifier and repeat the test in Step 3 with the right IF amplifier input cable disconnected.
5	Reconnect all receiver cables. If desired, retain the test arrangement for calibration of the system carrier level recorder as described in Section 403-413-513.
