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This word document contains figures representing the Test & Alignment for the Receiver Transmitter RT-1501A. These figures are scanned images from Section IV of the maintenance manual part number 006-15590-0000, Revision 2 dated October 1991. It should be noted that those pages “Intentionally Left Blank” were not scanned and are therefore not included here.

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BENDIX/KING

MAINTENANCE MANUAL
RT-1501A RECEIVER-TRANSMITTER

SECTION IV TEST AND ALIGNMENT

1. General

This section contains information pertaining to the test and alignment of the RT-1501A Radar Receiver-Transmitter. The test and alignment procedures in this manual are intended for use only when the R-T unit does not meet the functional test requirements as presented in Part 3, "Section II Functional Test," or as a periodic calibration procedure.

2. Test Equipment

Testing and aligning the RT-1501A requires a properly operating IU-1507A Interface Unit and IN-1502A/B Radar Indicator and the test equipment that are listed in table 4-1. The number in parentheses following the equipment common name in table 4-1 refers to the item number in table 1-1, Part 9 of this manual. Table 1-1 (Part 9) contains detailed information on the test equipment.

WARNING: OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES. THE TECHNICIAN OR OPERATOR SHOULD OBSERVE ALL SAFETY PRECAUTIONS WHEN PERFORMING THE TESTS AND ADJUSTMENTS CONTAINED HEREIN.

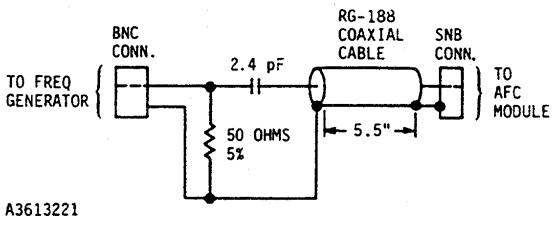
ITEM NUMBER	COMMON NAME
1	System test panel
2	Pulse generator
3	X-band generator
4	Dummy load
5	Coupler
6	Stick attenuator 10 dB/20 dB
7	Adapter
8	Stopwatch
9	Power meter
10	Thermistor mount
11	Oscilloscope
12	Frequency counter
13	DVM
14	X10 probe
16	Current probe amplifier
17	Current probe
18	115V 400 Hz power supply
19	28 Vdc power supply
20	Crystal detector

RT-1501A Test Equipment Required
Table 4-1 (Sheet 1 of 2)

2.

ITEM NUMBER	COMMON NAME
21	Video monitor
22	40 dB attenuator
23	Sweep generator
24	Signal generator
25	Rf detector probe
26	Adjustable attenuator (0 to 10 dB)
27	Adjustable attenuator (0 to 100 dB)
28	RF Mixer
(No number)	Receiver Simulator (fabricate per figure 4-1)
30	X1000 Probe
31	6 dB Pad
35	Echo Box (modified)
37	Simulated magnetron load

RT-1501A Test Equipment Required
Table 4-1 (Sheet 2)



Receiver Simulator, Fabrication Instructions
Figure 4-1

3. Test and Alignment Procedures

A. General

To locate test points called out in the test and alignment procedures, refer to the applicable schematic diagrams and companion board layout illustrations in Part 4, Section VII, of this manual. All voltages and waveforms are measured with respect to chassis ground, unless otherwise specified. The number in parentheses following test equipment common name refers to corresponding item number in table 1-1, Test Equipment, in Part 9 of this manual.

The following test and alignment procedures do not describe the disassembly necessary to access a particular test point or alignment point. Refer to Section V of this part of the manual for any disassembly procedures that may be required.

B. Preliminary Resistance Check

CAUTION: BEFORE APPLYING POWER TO FAULTY UNIT, CHECK RESISTANCE OF PRIMARY POWER INPUT FOR POSSIBLE SHORTED CONDITION.

Using DVM (13), measure resistance between pin A and pin C of front-panel connector J1101. The measured resistance should be greater than 1000 ohms.

C. Test Setup

Figures 4-2 and 4-3 present the test setup used while performing tests and alignments on the RT-1501A. The initial test setup procedure follows:

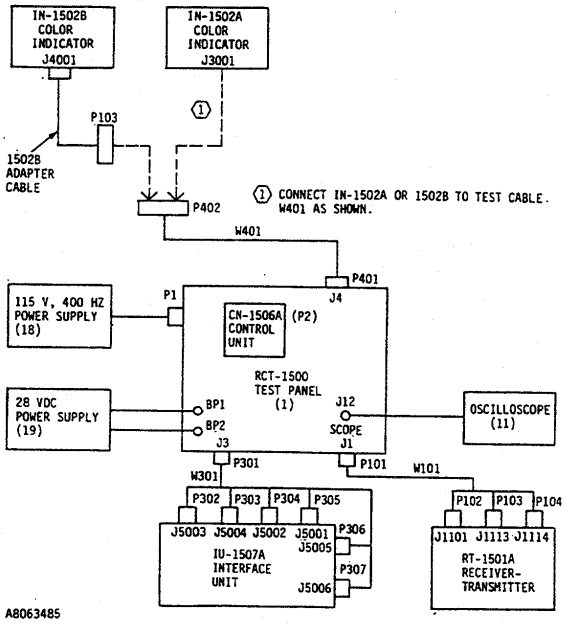
(1) Connect antenna dummy load and waveguide coupling to R-T unit, as shown in figure 4-3.

(2) Set controls on control unit to positions listed in table 4-2.

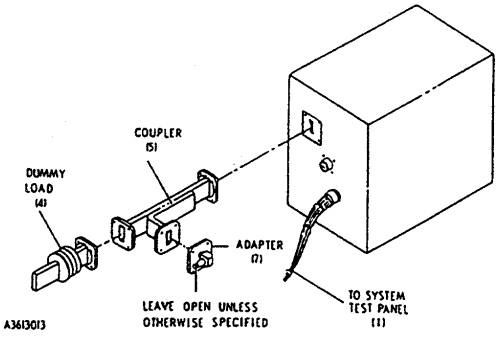
CONTROL	POSITION
RADAR mode selector switch	OFF
DISPLAY mode selector switch	ACFT
OVERLAY mode selector switch	RDR
GAIN controls (BCN and SRCH)	Fully CW (MAX)
STC control	Fully CCW

Control Unit Control Settings
Table 4-2

3.C.(2)



RT-1501A System Test Setup
Figure 4-2



R-T Unit Termination During Tests
Figure 4-3

(3) Set the system test panel switches and controls to the positions listed in table 4-3.

NOTE: Turn 115V/400HZ adjustment fully counterclockwise and connect system test panel to 28-Vdc and 115V 400 Hz power.

CONTROL	POSITION
POWER switch	ON (up)
IND switch	OFF (down)
RT switch	OFF (down)
IU switch	OFF (down)
METER switch	115V
115V/400HZ adjust	Adjust for 115V (center) on NOMINAL METER
BCN CODE switch	2
RANGE NM switch	20
COLOR switch	BLACK
OMEGA WORD GROUP switch	1
CRS control	0
BEARING control	0
COMPASS control	0
VOR DEVIATION control	0
VOR TO/FROM switch	TO
DME DISTANCE control	40
IAS KNOTS switch	50
10° GYRO switch	OFF
SCOPE switch	BORESIGHT
FLAG ON switches	All OFF
BCN MILES switch	17
DATA SEL switch	RT
VOR switch	OFF (down)
ILS ENBL switch	OFF (down)
RT FAULT switch	OFF (down)
STC ON switch	OFF (down)
ANT switch	SIM
SIM switch	1503
GYRO SENS switch	50 MV
OBS 2/3/PGM1 switch	3 (down)
IAS/TAS/PGM2 switch	IAS (down)
ANT SIZE switch	39
PGM4 switch	OFF (down)
PGM5 switch	OFF (down)
FLIR ENBL switch	OFF (down)
RS170/PAL switch	PAL

System Test Panel Control Settings
Table 4-3

(4) Connect system test setup as shown in figure 4-2.

3.

D. Power Supply Voltage Checks and Adjustment

(1) Set the system test panel (1) IU, IND, and RT power switches ON (up). Set RADAR mode selector switch to OFF. Verify that SRCH and BCN GAIN controls on control unit are fully CW.

(2) At control unit, set RADAR mode selector switch to TEST.

(3) Wait a minimum of 90 seconds. Verify that 28 Vdc power supply (19) output is +28V and then measure with DVM (13) the R-T unit power supply voltages at the test points given in table 4-4. The voltages should be within the limits indicated in the table.

TEST POINT	POWER SUPPLY VOLTAGE	VOLTAGE LIMITS
*P1218-17	+20V	+19.6 to +20.4 Vdc
P1218-28	+15V	+14.25 to +15.75 Vdc
P1218-21	+8V	+7.6 to +8.4 Vdc
P1218-20	-15V	-14.25 to -15.75 Vdc

*P1218 is the mating connector for J3018 on the processor module.

Power Supply Voltage Measurements
Table 4-4

(4) If any power supply voltage is not within the limits specified, reconnect DVM (13) probe to connector J1218 pin 17. Then, adjust potentiometer R5012 through access hole in power supply cover until DVM (13) indicates +20.0V.

(5) Repeat step (3). All power supply voltages should be within limits specified in table 4-4.

(6) Disconnect DVM (13), set RADAR mode selector switch to OFF, and leave switch OFF for at least 60 seconds before proceeding.

E. Time Delay Test

(1) After at least a one-minute wait, set RADAR mode selector switch to TEST and simultaneously start stopwatch (8). Initially, there should be no test pattern on the indicator.

(2) The instant test pattern appears on the indicator, stop stopwatch (8) and note time. The R-T turn-on time delay should be from 60 to 90 seconds. The indication RT FAULT should also appear at the right side of indicator.

F. Limiter Test

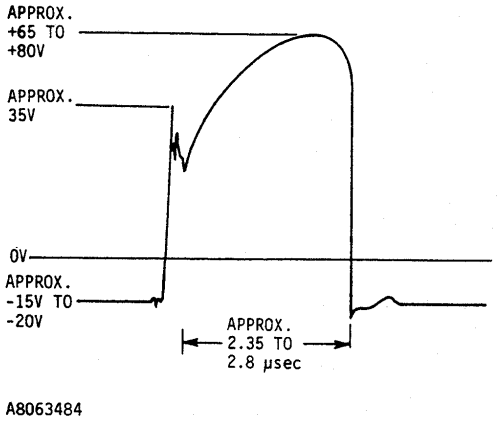
(1) At control unit, set RADAR mode selector switch to OFF. Disconnect magnetron high-voltage connector from pulse transformer and connect simulated magnetron load (37) to pulse transformer. Connect simulated magnetron load ground clip to chassis.

(2) Set control unit RADAR mode selector switch to WX. Allow approximately 90 seconds for system to time in. Check that modulator begins operating (audible buzzing sound is detectable).

(3) Set control unit RADAR mode selector switch to OFF. Disconnect preamplifier-limiter cable connector P1934 from J3034 on processor module. Set RADAR mode selector switch to WX. Wait for at least 2 minutes and verify that modulator does not operate.

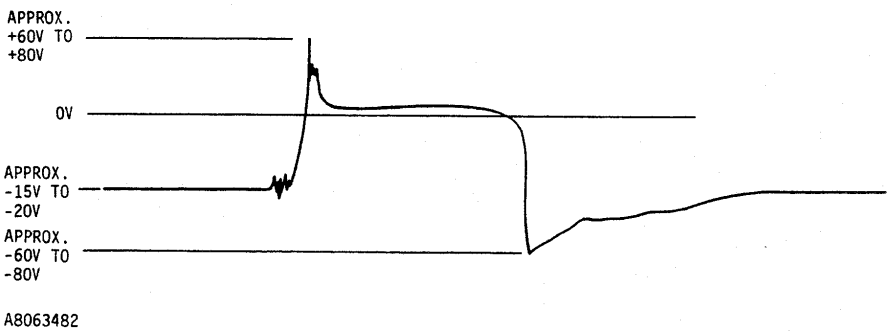
(4) Set RADAR mode selector switch to OFF. Reconnect preamplifier-limiter cable connector to the processor module.

(5) Connect oscilloscope (11) to TP3008 on processor module. Set RADAR mode selector switch to WX. After timeout, oscilloscope presentation should agree with figure 4-4. Remove oscilloscope probe.



Limiter Drive Waveform
Figure 4-4

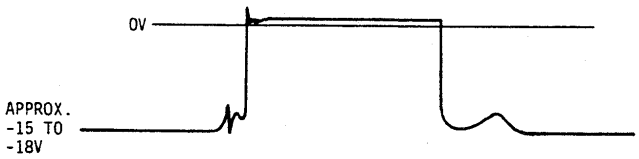
(6) Connect oscilloscope (11) to the side of R1901 closest to R1946 on preamplifier-limiter bias module (TP1913 on -0502 bias modules). Waveform displayed on oscilloscope should agree with figure 4-5. Remove oscilloscope probe.



Limiter Drive to CR1917
Figure 4-5

(7) Connect oscilloscope (11) to the side of R1902 closest to R1946 on the preamplifier-limiter bias module (TP1911 on -0502 bias modules). Waveform displayed on oscilloscope should agree with figure 4-6. Remove oscilloscope probe.

SCOPE SETTING:
VERT: 10V/DIV
SWEEP: 1usec/DIV



Limiter Drive to CR1916
Figure 4-6

(8) Set control unit RADAR mode selector switch to OFF. Disconnect simulated magnetron load (37) from pulse transformer and reconnect the magnetron.

3.

G. Transmitter Tests and Alignments

(1) Output Power Test

(a) At control unit, set RADAR mode selector switch to STBY.

(b) Connect test setup as shown in figure 4-7.

(c) Refer to figure 4-7. Connect stick attenuator (6) to adapter (7) for a total of 30 dB attenuation, including directional coupler (5).

(d) Connect thermistor mount (10) to the stick attenuator (6).

(e) Connect power meter (9) to the thermistor mount (10). Calibrate power meter and set it to the 10 dBm range.

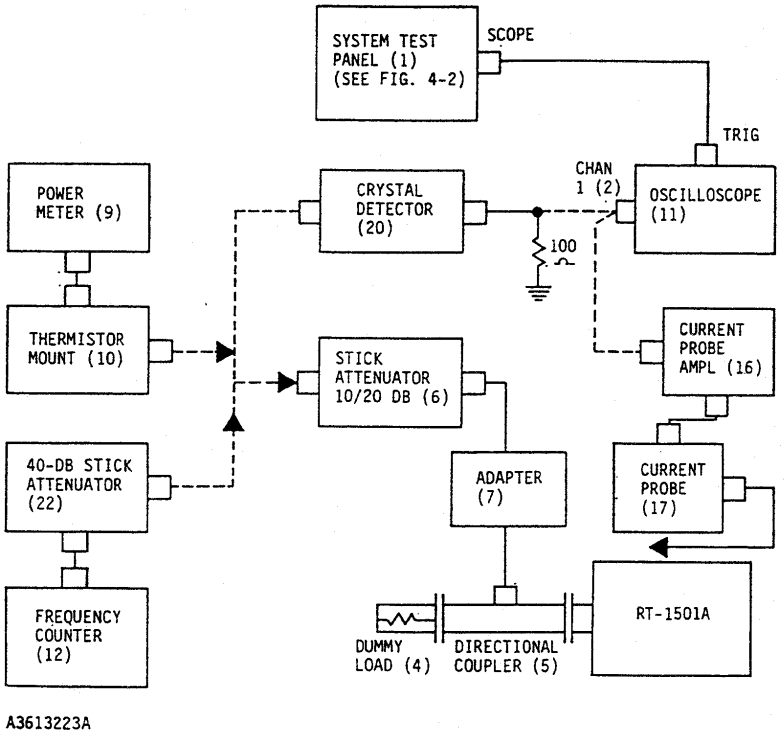
(f) Set RADAR mode selector switch on control unit to TEST. Using the RNG pushbuttons, select the 160 NM range, as noted on indicator. The reading on the power meter (9) should be zero.

(g) Rotate the RADAR mode selector switch through each of its positions (WX, WXA, SRCH, and BCN), stopping at each position to observe the reading on the power meter (9). In SRCH position, use PULSE pushbutton to select SRCH L and SRCH M (long and medium pulse). Power output for each mode should be no less than 33.0 dB.

NOTE: Add attenuation (coupler and stick attenuator) to meter reading for total rf power output.

(h) Measure power output for the SRCH S mode. Rf power output for this mode should be not less than 2 dB from the power output observed in step (g) for the SRCH L mode.

(i) Rotate RADAR mode selector switch to TEST. Disconnect the thermistor mount (10) and power meter (9) from the stick attenuator (6).



Transmitter Tests, Test Setup
Figure 4-7

(2) Frequency Adjustment

(a) Verify that TEST mode is selected.

(b) Connect frequency counter (12) to the R-T unit output through 70 dB of attenuation, as shown in figure 4-7.

(c) Set RADAR mode selector switch to WX. After the transmitter has operated for a minimum of 15 minutes, set magnetron tuning adjustment, located on side of magnetron, for an output frequency of 9375 ±0.5 MHz as indicated on the frequency counter (12).

(d) Set RADAR mode selector switch to TEST. Disconnect frequency counter (12) and 40 dB stick attenuator (22) from R-T unit output.

(3) Rf Pulse Test

(a) Verify that TEST mode is selected.

(b) Connect crystal detector (20) to output of stick attenuator (6). See figure 4-7. Terminate crystal detector output with 100 ohms and connect it to oscilloscope (11) channel 1. Set oscilloscope (11) horizontal sweep to 0.5 us per division and appropriate volts per division.

(c) At control unit, set RADAR mode selector switch to WX. Measure width of rf pulse at 50 percent points. Pulse width should be from 2.1 to 2.5 microseconds.

(d) At control unit, set RADAR mode selector switch to SRCH and use PULSE switch to select SRCH M (medium) pulse. Measure pulse width at the 50 percent points. Pulse width should be from 0.45 to 0.55 microseconds.

(e) Press PULSE switch on control unit to select SRCH S (short) pulse. Measure pulse width at the 50 percent points. Pulse width should be from 75 to 125 nanoseconds.

(f) At control unit, set RADAR mode selector switch to STBY. Remove crystal detector.

(4) Modulator Adjustment

(a) Connect oscilloscope (11) current probe (17) to wire loop on drain of Q4006 (E7), located on modulator regulator module. Set current probe amplifier (16) to 10 ma/mV. Set oscilloscope horizontal sweep to 1 millisecond.

(b) Set RADAR mode selector switch to WX. At regulator module, adjust R4007 for switching time of 3.2 milliseconds maximum as observed on oscilloscope.

(c) Set RADAR mode selector switch to STBY. Connect current probe (17) to the magnetron HV lead.

(d) Set RADAR mode selector switch to WX. Note current pulse amplitude on oscilloscope. The pulse amplitude should be from 5.5 to 6.0 amperes. If amplitude is greater than 6.0 amperes, readjust R4007 for no more than 6.0 amperes.

(e) Set the RADAR mode selector switch to STBY. Disconnect current probe.

(5) Magnetron Filament Test

(a) Set RADAR mode selector switch to OFF. Disconnect connector P4016 from S/L pulse modulator module.

(b) Connect DVM (13) probe to terminal 10 and common lead to terminal 3 of pulse transformer assembly.

(c) Set RADAR mode selector switch to STBY. DVM should indicate filament voltage from 6.0 to 6.6 Vdc.

(d) Set RADAR mode selector switch to OFF. Reconnect connector P4016 to S/L pulse modulator module. Disconnect DVM leads.

(6) Suppression Pulse

(a) Connect oscilloscope (11) to the SUPPR BNC jack on system test panel (1).

(b) Set RADAR mode selector switch on control unit to SRCH and press PULSE pushbutton to select SRCH S mode.

(c) Measure pulse width and amplitude on oscilloscope. Pulse width for SRCH S mode should be 2 to 3 us, and amplitude should be 10 $\pm$2 volts.

(d) Press PULSE pushbutton to select SRCH M mode. The suppression pulse width should remain 2 to 3 us, and amplitude should remain 10 $\pm$2 volts.

(e) Press PULSE pushbutton to select SRCH L mode. The suppression pulse width should now be 4 to 5 us, and amplitude should remain 10 $\pm$2 volts.

(f) Set RADAR mode selector switch on control unit to BCN. Measure pulse width and amplitude on oscilloscope. Pulse width for BCN mode should be 4 to 5 us, and amplitude should be 10 $\pm$2 volts.

(g) Set RADAR mode selector switch on control unit to WX. Measure pulse width and amplitude on oscilloscope. Pulse width for WX mode should be 4 to 5 us, and amplitude should be 10 ±2 volts.

H. Afc Tests and Alignment

(1) Local Oscillator Control Voltage Adjustment

(a) Connect DVM (13) to TP7009 on the afc module. DVM should indicate from 4.5 to 5.5 volts dc.

NOTE: This test should be made only after the transmitter has been in operation for at least 15 minutes.

(b) If measured voltage is out of tolerance, adjust FREQ ADJ screw on the local oscillator (LO) assembly until DVM (13) indicates 5.0 ±0.2 volts dc.

(2) Lock Test and Adjustment

(a) Connect X10 probe (14) from oscilloscope (11) channel 1 to TP7004 on afc module.

(b) Set oscilloscope (11) for 1 volt per division, for ground reference at bottom graticule on screen, and for time base suitable for pulse presentation.

(c) Note peak amplitude of lock pulse on oscilloscope (11). It should be from 4.25 to 4.75 volts peak, with respect to ground reference (2 Vdc plus 2.25 to 2.75V pulse).

(d) If the lock pulse amplitude is out of tolerance, adjust R7029 on afc module for a pulse amplitude of 4.5 volts peak with respect to ground reference.

(3) Mode Change Lock Test

(a) Using X10 probe (14), connect oscilloscope channel 1 to TP7009 on afc module.

(b) Set ground reference at bottom graticule on oscilloscope (11) screen. At control unit, adjust range switches for 10 nm as viewed on indicator. Local oscillator (LO) control voltage should be approximately 5 volts peak with respect to ground reference, as viewed on the oscilloscope.

(c) At control unit, set RADAR mode selector switch to WXA, BCN, and SRCH (SRCH L, SRCH M, and SRCH S) while observing waveform on oscilloscope. The afc should lock at approximately 5 volts at TP7009 on the first downward sweep at each mode setting.

(4) Discriminator Alignment

(a) Set control unit RADAR mode selector switch to TEST. Repeat paragraph 3.G.(2) to ensure that magnetron frequency is correct. Record the frequency to the nearest one-hundredth (.XX) MHz for later reference.

(b) Disconnect the frequency counter (12) from R-T unit output and remove the 40 dB stick attenuator (22) from the rf input of the frequency counter.

(c) Connect frequency counter (12) to the UNCAL OUTPUT connector at the rear of the X-band generator (3). This will give a more accurate frequency indication of the X-band generator output. Adjust frequency of X-band generator until frequency counter indicates the same frequency, within ±20 kHz, of that recorded in step (a) or step (h).

(d) Connect a cable from the rf output of the X-band generator (3) to the adapter (7) via the 10 dB stick attenuator (6). Set RADAR mode selector switch to WX and select the 160 NM range.

(e) Adjust X-band generator (3) attenuator to obtain a peaked signal of approximately 2 volts on oscilloscope (11). Adjust X-band generator delay and width controls for a signal approximately 40 NM wide on the indicator, delayed 160 NM from the origin.

(f) Adjust L7017 on afc module for a peak video response on oscilloscope (11).

(g) Disconnect X-band generator (3) from stick attenuator (6). Again, measure the magnetron frequency, using frequency counter and 40 dB attenuator (22).

(h) Compare the frequency measured in step (g) with that measured in step (a). If the frequency difference is greater than 50 kHz, repeat steps (b) through (g), using the frequency measured in step (g) as the X-band generator adjustment frequency in step (c).

(5) Afc Intracircuit Alignments

NOTE: These alignments are performed after repair of afc module or if the requirements of a test or an adjustment in paragraphs 3.H.(1) through 3.H.(4) were not met.

WARNING: TURN OFF POWER TO SYSTEM AND DISCONNECT CONNECTOR P1210 FROM REGULATOR MODULE TO DISABLE TRANSMITTER AND PREVENT POSSIBLE HIGH-VOLTAGE SHOCK HAZARD. TURN ON SYSTEM POWER.

(a) Afc Oscillator Alignment

1 Set oscilloscope (11) to channel 1, vertical sensitivity to 0.01 volts per division, time base to 0.05 microseconds, and to automatic trigger. At control unit, set RADAR mode selector switch to STBY.

2 Using X10 probe, connect oscilloscope (11) channel 1 to TP7002 on afc module. Adjust L7006 (located within the shielded section) on afc module for a maximum peak-to-peak amplitude of waveform, as observed on oscilloscope. The amplitude should be approximately 180 mV p-p.

NOTE: L7006 is adjusted through access hole in shielded compartment on afc module.

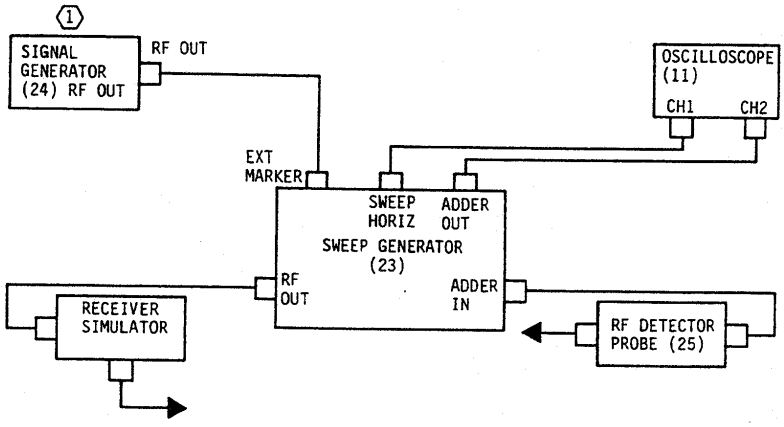
3 At control unit, set RADAR mode selector switch to OFF. Disconnect oscilloscope from TP7002.

(b) Afc Module Test Setup

1 Connect test setup as shown in figure 4-8.

2 Set oscilloscope (11) controls as follows:

CONTROL	SETTING
Horizontal Display	X-Y
CH1 and CH2 Input Select	DC
CH1 Volts/Div	1V
CH2 Volts/Div	0.5V



① RF SIGNAL GENERATOR NOT REQUIRED IF SWEEP GENERATOR HAS INTERVAL MARKERS.

Afc Module Test Setup
Figure 4-8

3 Set signal generator (24) controls as follows:

NOTE: Signal generator (24) not required if sweep generator (23) has internal markers.

CONTROL	SETTING
Frequency	87.00 MHz
Modulation Mode	CW
RF Output	0 dBm

4 Set sweep generator (23) controls as follows:

CONTROL	SETTING
Attenuator	110 dB
Center Freq	87 MHz
Marker Width	Midway
Marker Size	Minimum Usable
Sweep Mode	1-50
Sweep Width	1/3

5 Disconnect coaxial connector P2031 from rf input jack J7031 on afc module. Then connect receiver simulator (figure 4-1) output connector to J7031.

(c) Rf Alignment

1 At control unit, set RADAR mode selector switch to STBY. Connect rf detector probe (25) to TP7001 on the afc module.

2 At sweep generator (23), set attenuator to 3 dBm. Use the 87-MHz marker and adjust sweep width and center frequency control for a suitable waveform display.

3 Tune L7003 for maximum frequency response at 87 MHz, as observed on oscilloscope.

NOTE: Sometimes the maximum frequency response may not be precisely on the 87-MHz marker.

4 Position waveform peak on oscilloscope (11) so top of peak touches center horizontal graticule line.

5 Reduce sweep generator (23) attenuation by 2 dB. The 87-MHz marker should appear above the horizontal graticule line on the oscilloscope screen.

(d) Afc Mixer Alignment

1 Connect jumper lead between TP7010 and TP7005 on afc module. Set the sweep generator (23) attenuation to 30 dB.

2 Referring to figure 4-8, connect rf detector probe (25) to case (collector) of Q7004 on afc module.

3 Adjust L7011 on afc module to obtain a peaked bandpass response at the 87-MHz marker, as observed on the oscilloscope.

4 Reduce sweep generator attenuation to 20 dB and note waveform amplitude. Reduce attenuation further to 10 dB. Output amplitude should not increase. Set sweep generator attenuator to 20 dB.

5 Disconnect rf detector probe. Do not remove jumper lead between TP7005 and TP7010.

(e) Afc Discriminator and Lock Detector Alignment

1 Connect jumper lead from TP7010 to CR7003 anode on the afc module.

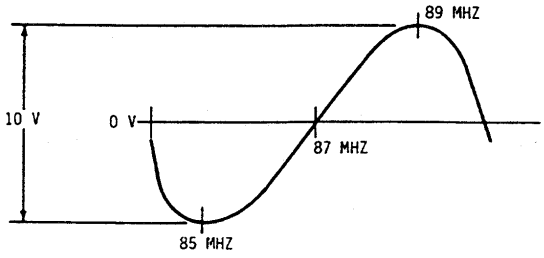
2 Referring to figure 4-8, connect X10 probe (15) from TP7006 to channel 2 of oscilloscope (11).

3 Set oscilloscope (11) channel 2 sensitivity to 1V/Div.

4 Adjust L7017 until zero crossover point of discriminator curve is aligned with 87-MHz marker, as seen on oscilloscope (11). Peak amplitude of the positive and negative peaks of discriminator curve should be at least +4 and -4 volts respectively. See figure 4-9. Reconnect channel 2 of oscilloscope to ADDER IN input of sweep generator (see figure 4-8).

5 Increase signal generator (24) frequency until marker is positioned on positive peak of discriminator curve. Marker frequency should be at least 89 MHz. See figure 4-9.

6 Decrease signal generator (24) frequency until marker is positioned on negative peak of discriminator curve. Marker frequency should be no greater than 85 MHz.



Discriminator S-Curve Waveform
Figure 4-9

NOTE: Steps 7 through 11 make up the locking-window alignment procedure.

7 Connect X10 probe (14) from ADDER IN input on sweep generator (23) to TP7004 on afc module. Readjust signal generator (24) frequency to 87.00 MHz.

8 Adjust L7014 on the afc module for a peaked response at the 87-MHz marker frequency, as observed on oscilloscope.

9 Connect oscilloscope (11) channel 2 via X10 probe (14) to TP7004. Adjust R7029 on afc module for a response amplitude of 2.5 ±0.1 volts peak with respect to oscilloscope (11) ground reference.

10 Set sweep generator for maximum attenuation. Connect DVM (13) probe to TP7004. DVM (13) should indicate +2.0 ±0.2 Vdc. Reset sweep generator attenuation to 30 dB.

11 Connect oscilloscope (11) channel 2 to TP7007 on afc module. Set channel 2 sensitivity to 5V/Div.

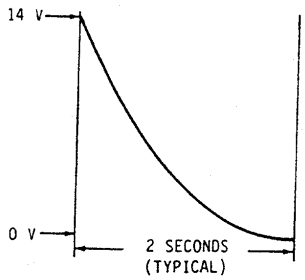
12 Disconnect jumper lead between TP7010 and CR7003 anode. The signal on oscilloscope screen should switch between approximately +12 volts and -12 volts.

13 Disconnect cable from the sweep generator (23) RF output. Observe that signal ceases switching on the oscilloscope and remains at +12 volts. Leave sweep generator (23) RF output disconnected.

(f) Afc Sweep Test

1 Connect oscilloscope (11) channel 2 via X10 probe (15) to TP7009. Set channel 2 sensitivity to 2V/Div.

2 Remove jumper lead between TP7005 and TP7010. Sweep waveform seen on oscilloscope (11) should be similar to one shown in figure 4-10.



Sweep Waveform
Figure 4-10

3 Set control unit RADAR mode selector switch to OFF. Disconnect receiver simulator from J7031 and reconnect P2031 to J7031. Reconnect modulator assembly.

(g) Ring Time Test

1 Connect echo box (35) to the directional coupler (5) output.

2 Set control RADAR mode selector switch to WX and set system test panel (1) STC switch to off.

3 Connect a coax cable from echo box (35) SCOPE BNC connector to one channel of the oscilloscope (11). The other oscilloscope channel should be connected to the system test panel SCOPE jack.

4 Tune echo box (35) frequency control until the detected signal, from the echo box, displayed on oscilloscope is maximum amplitude at approximately 9375 MHz.

5 Adjust coil L7017 on afc module for maximum width and amplitude of the video test pulse on oscilloscope (11).

6 Repeat steps 4 and 5 until no further change is observed.

7 Disconnect echo box (35).

I. Comparator Threshold Adjustment

(1) Connect DVM (13) probe to TP3018 on the processor module. Set DVM for 1 Vdc measurement.

(2) Set RADAR mode selector switch to WX. Adjust R3062 on the processor module until DVM indicates +0.52 Vdc.

(3) Connect DVM (13) to U3007, pin 5. DVM should indicate +0.79 ±0.04 Vdc.

(4) Connect DVM (13) to U3007, pin 12. Adjust R3063 for +1.20 Vdc reading on DVM.

J. Sensitivity Time Control (STC) Adjustment

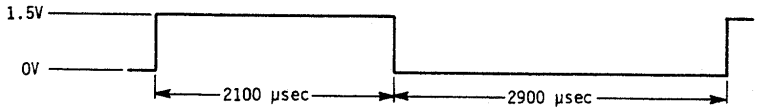
(1) Adjust control unit STC control fully CCW. Test panel (1) STC switch should be off and WX RADAR mode should be selected.

(2) Connect DVM (13) to TP3507 on STC module. Adjust R3509 for 10.00 ±0.01 Vdc indication on DVM.

(3) Connect DVM (13) to U3515, pin 6, on STC module. Set RADAR mode selector switch to SRCH and press PULSE pushbutton for SRCH L mode. Adjust R3521 for a 0- to 10-millivolt indication on DVM.

(4) Set test panel (1) STC switch to ON. Connect oscilloscope (11) via X10 probe (14) to TP3508 on STC module. Set RADAR mode selector switch on control unit to TEST. Adjust oscilloscope time base to view the waveform, which should resemble figure 4-11.

3.J.(4)



NOTE: VALUES ARE APPROXIMATE.

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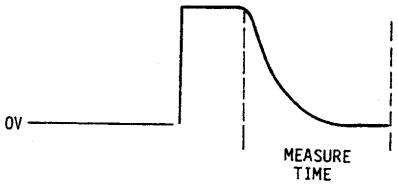
STC Waveform, TEST Mode
Figure 4-11

(5) At control unit select all other RADAR modes (WX, BCN, SRCH S, SRCH M, and SRCH L) and verify that waveform displayed is similar to figure 4-12 and that STC time for each mode complies with table 4-5.



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STC Waveform, Transmit Modes
Figure 4-12

MODE	TIME (uSEC)*	NAUTICAL MILES
WX	680 ±50	55
BCN	680 ±50	55
SRCH S	120 ±10	10
SRCH M	240 ±10	20
SRCH L	550 ±50	45

* STC time is measured from beginning of ramp to the point where the ramp reaches zero volts.

STC Time
Table 4-5

(6) Connect oscilloscope (11) X10 probe (14) to TP3511 on STC module. Set RADAR mode selector switch to WX. Verify that STC curve displayed on oscilloscope is now referenced to -15 Vdc.

(7) Connect oscilloscope X10 probe to TP3514 (VIDEO) on processor module. Check that the video noise varies from zero volts to maximum during the STC period.

(8) Select each RADAR mode and vary the control unit STC control from CCW to CW and note the effect on video noise. Repeat for each mode and verify that:

(a) WX and BCN modes - Varying STC control has no effect on the noise.

(b) SRCH S, SRCH M, and SRCH L modes - Varying STC control CCW to CW causes noise to increase to maximum level in STC region.

K. False Alarm Test and Adjustment

(1) At the control unit, set:

(a) RNG switches for 160 nautical miles.

(b) RADAR mode selector switch to WX.

(c) RATE switch for 45 degrees per second scan rate as observed on indicator display.

(2) Note the number of noise dots that appear on the indicator display over an average of five antenna scans. There should be no more than 100 false targets (noise dots) per scan.

(3) At the control unit, select SRCH S mode and select the 10 NM range. Note the number of noise dots that appear on the indicator display over an average of five antenna scans. There should be no more than 100 noise dots per scan.

(4) Adjust the STC control on the control unit fully CW and repeat step (3) for the SRCH M mode at 20 NM range. There should be 100 false targets, maximum.

(5) If the false alarm rates as noted in steps (2), (3), and (4) are in tolerance, proceed to receiver tests in paragraph 3.L. If out of tolerance, proceed with steps (6) through (9).

(6) At control unit, set RNG switches for 160 NM and RADAR mode to WX. Adjust R2040 on the receiver module for a maximum false alarm display of 20 dots per scan. Check all ranges in WX mode for false targets and readjust R2040, if necessary, for optimum number of false targets.

(7) Set control unit RADAR mode selector switch to SRCH and press PULSE pushbutton for SRCH S mode. Adjust R2033 on receiver module for a maximum of 30 false target dots.

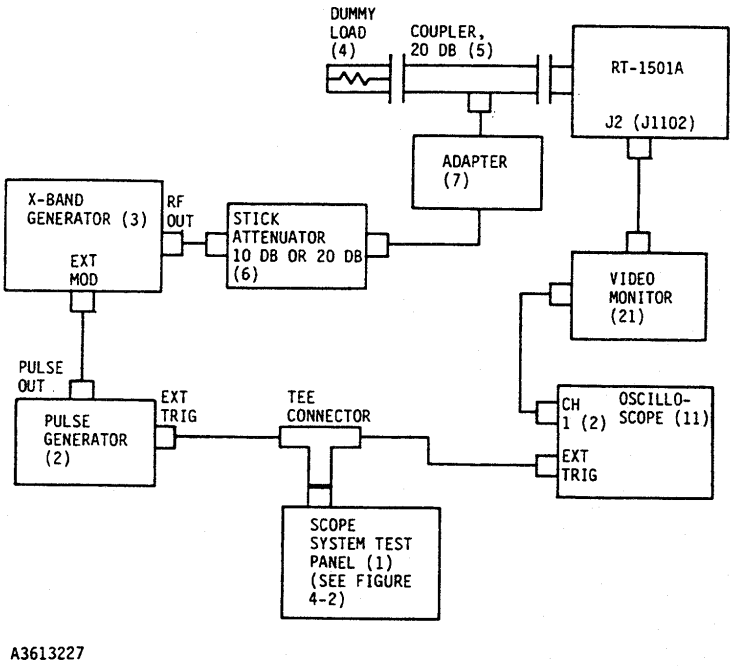
(8) At control unit, select SRCH M mode and set STC control fully CW. Select the 20 NM range. Slowly adjust R2031 on receiver module for a maximum of 30 false target dots.

(9) Set the RADAR mode switch to BCN. Verify that no false alarms appear at any range setting. If necessary, adjust R2553 on beacon module to just eliminate the false alarms.

L. Receiver Tests

(1) Test Setup

Connect test setup as shown in figure 4-13.



Receiver Tests, Test Setup
Figure 4-13

(2) Sensitivity (MDS)

(a) Connect channel 1 of oscilloscope (11) to the test video output of video monitor (21). Set SCOPE selector switch on system test panel (1) to TRIG.

(b) Set oscilloscope (11) controls as follows:

(1) Channel 1 sensitivity to .2V/Div.

(2) Time base: 50 usec.

(3) External trigger.

(c) At control unit, set RADAR mode switch to TEST. Connect X-band generator (3) rf output to 10 dB stick attenuator (6), connected to adapter (7). See figure 4-13.

(d) Turn on the X-band generator (3) and allow it to stabilize.

(e) Modulate the X-band generator externally using a pulse generator (2).

(f) Set RADAR mode switch to WX and select the 160 NM range using the RNG pushbutton switches.

(g) Adjust X-band generator (3) for a frequency of 9375 MHz. Set up the pulse generator (2) width and delay controls for a 500-microsecond (40 NM) pulse delayed 120 NM.

(h) Vary the frequency and attenuation of the X-band generator (3) to obtain a maximum video signal as displayed on the oscilloscope (11).

(i) Reduce the amplitude of output signal from the X-band generator (3) by increasing the dBm setting of the output attenuator control for a 50% green/50% black indicator display. It may be necessary to readjust the frequency. The receiver MDS (minimum discernible signal) level in dBm is the sum of all signal attenuations (output attenuator reading, cable, stick attenuator, and directional coupler). The MDS level for the WX mode should be equal to or better than -107 dBm.

(j) Set system test panel (1) STC switch to ON. Adjust control unit STC control fully CCW and select the SRCH L mode.

(k) Connect DVM (13) to TP3510 on STC module. Adjust R3521 for a 0- to 10-millivolt indication on DVM.

(l) Set STC switch to off and select WXA mode. Repeat steps (g) through (i). MDS level for the WXA mode should be equal to or better than -107 dBm.

(m) Select SRCH L mode and verify that SRCH GAIN control on control unit is fully CW. Repeat steps (g) through (i). MDS level for SRCH L mode should be equal to or better than -107 dBm.

(n) Select the SRCH S mode using the PULSE pushbutton on the control unit. Select the 10 NM range.

(o) Set up pulse generator for a 10-microsecond pulse delayed 8 NM (200 microseconds). Repeat steps (h) and (i). MDS level for the SRCH S mode should be equal to or greater than -94 dBm.

(p) At control unit, select the SRCH M mode and the 20 NM range.

(q) Set up the pulse generator (2) for a pulse width of 10 microseconds delayed 16 NM (200 microseconds).

(r) Repeat steps (h) and (i). Verify that MDS for the SRCH M mode is -101 dB minimum.

(s) At control unit, set RADAR mode selector switch to BCN and select the 160 NM range. Set up X-band generator (3) for a frequency of 9310 MHz and check that BCN GAIN control on control unit is fully clockwise. Vary the frequency and attenuation of the X-band generator (3) to obtain a maximum video signal as displayed on the oscilloscope (11). Set up pulse generator for a pulse width of 250 microseconds (20 NM) delayed 120 NM. Then repeat step (i), looking for a white signal on the indicator. Verify that MDS for the BCN mode is -85 dBm minimum.

(3) Contour

(a) Set RADAR mode selector switch on control unit to WX and select the 160 NM range using the RNG pushbutton switches.

(b) Repeat steps (g), (h), and (i) of the previous paragraph to obtain MDS level for the WX mode. Record MDS level.

(c) Increase amplitude of X-band generator (3) output by 16 dB.

(d) Adjust R3063 on the processor module for 15 to 17 dB difference between MDS and half-yellow/half-red display. This is the contour level.

(e) Connect DVM (13) to TP3018 on processor module. Readjust R3062 on the processor module for a 0.52 ± 0.01 volt dc indication on DVM if necessary.

(f) Set RADAR mode selector switch on control unit to WXA. Increase X-band generator (3) output signal level by 10 dB. The red display on the indicator should flash on and off.

M. Fast Time Constant (FTC)

(1) Set STC switch on system test panel (1) off (down). Adjust X-band generator (3) frequency to 9375 MHz. At control unit set RADAR mode selector switch to SRCH, press PULSE pushbutton to select SRCH L mode, and select the 20 NM range. Set pulse delay at pulse generator (2) to 100 microseconds and pulse width to 25 microseconds. At X-band generator (3), adjust output attenuator for a pulse amplitude of 2 volts peak, on the oscilloscope.

(2) Observe pulse displayed on oscilloscope and then press FTC pushbutton. Verify that the pulse now displayed is differentiated (red leading edge nearest the origin).

(3) Press PULSE pushbutton to select SRCH M mode. Repeat step (2). Verify that the differentiated pulse time constant is less than in step (2).

(4) Press PULSE pushbutton to select SRCH S mode. Repeat step (2). Verify that the differentiated pulse time constant is less than in step (3). Press FTC pushbutton to off.

N. Manual Gain Adjustment

(1) Set RADAR selector switch to SRCH and press PULSE pushbutton for SRCH L mode. Select the 160 NM range using the RNG pushbutton switches.

3.N.

(2) Repeat steps (h) and (i) of paragraph 3.L.(2) in this section of manual to obtain MDS level for the SRCH L mode.

(3) Set the SRCH GAIN control on control unit fully CCW and increase X-band generator (3) output signal level by 32 dB. Adjust R3036 (MAIN GAIN) on processor module until display again indicates 50% blue and 50% black.

(4) Rotate the SRCH GAIN control on control unit fully clockwise.

(5) Set RADAR mode selector switch to BCN.

(6) Referring to paragraph 3.L.(2)(s), measure the MDS with the control unit BCN GAIN control set fully clockwise.

(7) Rotate BCN GAIN control to the fully counterclockwise position.

(8) Increase X-band signal generator (3) output level by 22 dB. Adjust R3073 on processor module for the MDS reference established in step (6).

O. STC Check

(1) Set RADAR mode selector switch to WX and select the 80 NM range. Check that STC control is fully counterclockwise.

(2) Set up pulse generator (2) for a pulse width of 250 microseconds (20 NM) delayed 40 NM with X-band generator (3) frequency at 9375 MHz.

(3) Set STC switch on system test panel (1) to ON. At X-band generator (3), increase pulse amplitude until signal is writing half red/half yellow (red above 50 NM and yellow below 50 NM). This will be used as the reference. Record X-band generator output attenuator reading.

(4) At control unit, select 20 NM range. At pulse generator (2), reduce pulse width to 60 microseconds (5 NM) and pulse delay to 10 NM.

(5) At X-band generator (3), increase signal amplitude until the reference level of step (3) is reached (half signal red/half yellow at 12.5 NM). Adjust signal generator, if necessary, for maximum response. Record the output attenuator setting. The difference between the value recorded in step (3) should be 7 to 17 dB. At control unit, vary the STC control from fully counterclockwise to fully clockwise and observe that it has no effect on the presentation. Return STC control fully counterclockwise.

(6) Set RADAR mode selector switch to SRCH and press PULSE pushbutton of control unit to select SRCH L mode. Set range to 40 NM.

(7) Set up pulse generator (2) for a pulse width of 120 microseconds, centered on the 40 NM range ring. Adjust X-band generator (3) output attenuator for a 50% red/50% yellow display. Record attenuator setting.

(8) Set range to 20 NM. Adjust delay for a centered 10 NM signal. Adjust output attenuator for 50% red and yellow. Note attenuator setting. Determine difference in attenuator setting between 40 NM [step (7)] and 10 NM delays. This difference should be 13 to 23 dB.

(9) Adjust STC control on control unit from fully counterclockwise to fully clockwise and observe that target display becomes all red when the control is rotated fully clockwise. Return STC control to fully counterclockwise.

(10) Use PULSE pushbutton to select SRCH S. Set range to 10 NM. Adjust pulse generator (2) for a pulse width of 2 NM (25 microseconds), centered on the 10 NM range ring.

(11) Adjust X-band generator (3) output attenuator for a 50% red/50% yellow display. Record attenuator setting.

(12) Set range to 5 NM. Reduce delay to a centered 2.5 NM signal. Readjust output attenuator for a 50% red and yellow signal at 2.5 NM. Determine difference between attenuator settings for 10 NM [step (11)] and 2.5 NM delays. Difference should be 13 to 23 dB.

(13) Adjust STC control on control unit from fully counterclockwise to fully clockwise and observe that target display becomes all red when the control is rotated fully clockwise. Return STC control to fully counterclockwise.

(14) At control unit, press PULSE pushbutton to select SRCHM mode. Set range to 20 NM.

(15) Set up pulse generator (2) for a 2 NM (25 microsecond) wide pulse, centered at 20 NM. Adjust X-band generator (3) output attenuator for a 50% red/50% yellow display of target. Record attenuator setting.

(16) Reduce pulse delay for a centered 5 NM display. Adjust output attenuator for a 50% red and yellow display. Determine difference between attenuator settings for 20 NM and 5 NM delays. Difference should be 13 to 23 dB.

(17) Adjust STC control on control unit from fully counterclockwise to fully clockwise and observe that target display becomes all red when the control is rotated fully clockwise. Return STC control to fully counterclockwise.

(18) Set RADAR mode selector switch to BCN. Set range to 40 NM. Adjust X-band generator (3) frequency to 9310 MHz. Adjust X-band generator frequency, delay, pulse width, and attenuator for a 2-volt peak, 100-microsecond wide video pulse (half noise point), delayed 500 microseconds at the output of TS-1207 Test Monitor (21). Adjust X-band generator attenuator to obtain the 2-volt peak amplitude at the pulse leading edge. Note the attenuator setting. Adjust delay for 125 microseconds. Adjust X-band generator attenuator for a 2-volt peak amplitude to the leading edge of the pulse. Note attenuator setting. The difference in attenuator settings should be 7 to 17 dB.

(19) Adjust the signal generator output level to reduce the signal level until the target display is reduced approximately 50% in width. Adjust the STC control from counterclockwise to clockwise and note that the STC control has no effect on the target width. Reset the STC control fully counterclockwise.

P. Monitor Check

(1) Set RADAR mode switch to TEST. Note that RT FAULT legend is displayed at right side of indicator display.

(2) Set RADAR mode switch to WX. Note that RT FAULT legend has disappeared from indicator display.

(3) Disconnect local oscillator (P6012) from J3012 of processor module. Note that RT FAULT legend reappears on indicator display.

(4) Reconnect P6012 to J3012 of processor module. Note that RT FAULT legend has disappeared from indicator display.

3.

Q. Test Pattern Check

(1) At control unit, set RADAR mode selector switch to TEST and set RNG pushbutton switches for 80 NM, as seen on indicator display.

(2) Note that RT FAULT legend appears at right side of indicator display.

(3) Note on the indicator display that test pattern consists of concentric bands in this order: green, yellow, red, yellow, green. The inner green band should begin at 30 NM or less from the origin. The outer green band should end from 70 to 80 NM. The yellow and red bands should be approximately the same width.

(4) If the yellow and red bands are not approximately the same width, adjust R3029 (TEST LEVEL) on the processor module until the band widths are approximately equal.

R. Receiver Module Tests and Alignments

NOTE: These alignments and tests are performed only after repair of the receiver module or if the requirements of a test or alignment in paragraphs 3.L. or 3.O. have not been met.

(1) Search-Short Wide Bandwidth

(a) Turn off power to system test panel (1).

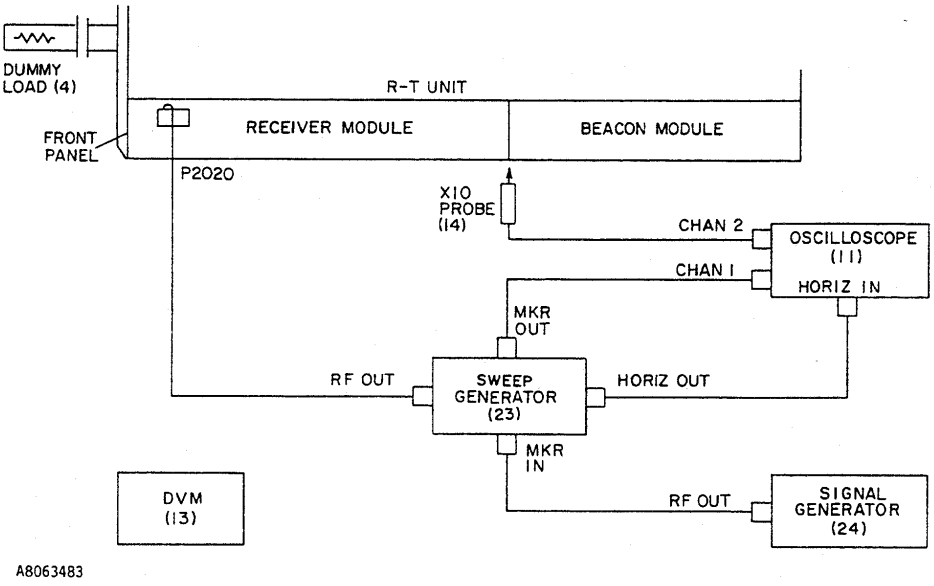
(b) Disconnect receiver cable connector P1020 from preamplifier limiter. Disconnect connector P1210 from regulator module to disable transmitter. Disconnect STC module connector P3509 from processor module connector (J3009) to disable the STC.

(c) Connect test setup as shown in figure 4-14.

(d) Turn on power to system test panel (1) and set METER select switch to 28 (Vdc).

(e) At control unit, set RADAR mode selector switch to SRCH. After approximately 90 seconds, check that +28 Vdc is center scale on NOMINAL METER. If not, adjust power supply (19) for nominal indication on panel meter.

(f) Press control unit PULSE pushbutton to select SRCH S mode. Verify that STC switch on system test panel (1) is off (down). Remove receiver rf cover and connect jumper lead with a 3k-ohm load from chassis ground to TP2005 on receiver module.



Receiver Module, Test Setup
Figure 4-14

(g) Adjust SRCH GAIN control on control unit fully CCW. On receiver module, connect a jumper lead from chassis ground to TP2001, and preset potentiometers R2031, R2033, and R2040 fully CCW.

(h) Set up DVM (13) to the 200-mV range. Connect DVM to TP2003 on receiver module. Adjust R2071 (VIDEO DC OFFSET ADJ) for an indication on DVM of 0 Vdc ±5 mV.

(i) Disconnect jumper with 3 k-ohm load from TP2005 and reinstall cover. (Leave jumper to TP2001 installed.) Rotate SRCH GAIN control fully CW. Connect X10 probe (14) from oscilloscope (11) channel 1 to TP2003.

(j) Adjust sweep generator (23) attenuators to 73 dB and select sweep mode.

(k) On oscilloscope (11), adjust channel 1 vertical position to set trace 5 divisions up from bottom of graticule. Adjust signal generator (24) frequency to 87.000 MHz. Set up sweep generator (23) for a center frequency of 87.00 MHz with the 87-MHz marker on. Adjust the sweep generator marker controls for the best display. Adjust oscilloscope (11) channel 2 vertical position to place the peak of the response curve at the center horizontal graticule line.

(l) Set the sweep generator (23) attenuators to 70 dB. Increase signal generator (24) frequency so that marker is positioned at the high frequency side where the response curve crosses the center horizontal graticule. The frequency should be 92.0 to 95.7 MHz.

(m) Reduce signal generator (24) frequency to the low frequency side until waveform again is at crossover point of response curve and center horizontal graticule. The frequency should be 80.0 to 82.7 MHz.

(n) Return sweep generator (23) attenuators to 73 dB. Verify that reference point set on oscilloscope (11) in step (k) remains on center horizontal graticule line.

(2) Search-Mid Bandwidth

(a) With control unit RADAR mode selector switch set to SRCH, press PULSE pushbutton to select SRCH M mode.

(b) With sweep generator (23) set to sweep mode, adjust attenuators to 83 dB.

(c) On oscilloscope (11), adjust channel 1 vertical position to set trace 5 divisions up from bottom graticule. Adjust signal generator (24) frequency to 87.000 MHz.

(d) Adjust L2017 through slot in rf cover to center the response at the 87-MHz marker. Readjust sweep width for better resolution.

(e) Set sweep generator attenuators for 80 dB. Increase signal generator (24) frequency so that marker is positioned at the high frequency side where the response curve crosses the center horizontal graticule. The frequency should be 88.0 to 88.3 MHz.

(f) Reduce signal generator (24) frequency to the low frequency side until waveform again is at crossover point of response curve and center horizontal graticule. The frequency should be 86.0 to 86.3 MHz.

(g) Return sweep generator (23) attenuators to 83 dB. Verify that reference point set on oscilloscope (11) in step (c) remains on center horizontal graticule line.

(3) Weather, Beacon, and Search-Long Narrow Bandwidth

(a) Set control unit RADAR mode selector switch to WX.

(b) With sweep generator (23) set to sweep mode, adjust attenuators to 73 dB.

(c) On oscilloscope (11), adjust channel 1 vertical position to set trace 5 divisions up from bottom graticule. Adjust signal generator (24) frequency to 87.000 MHz.

(d) While observing the display on oscilloscope (11), adjust C2046 through hole in receiver cover for a response centered at 87 MHz. Use maximum sweep width to enhance the resolution.

(e) Reduce sweep generator (23) attenuator by 3 dB. Increase signal generator (24) frequency so that marker is positioned at the high frequency side where the response curve crosses the center horizontal graticule. Note the frequency.

(f) Reduce signal generator (24) frequency to the low frequency side until waveform again is at crossover point of response curve and center horizontal graticule. Subtract this frequency from that noted in step (e). The difference between the 3-dB low side and the 3-dB high side should be from 575 to 650 kHz.

(4) False Alarm Adjustment Controls

(a) Check that RADAR mode selector switch is set to WX. Remove receiver cover and disconnect jumper lead from TP2001.

(b) Connect DVM (13) to TP2001. Connect X10 probe (14) from oscilloscope (11) channel 2 to TP2003.

(c) Observe oscilloscope display and adjust R2040 (0.5 MHZ FALSE TARGET ADJ) for approximately 1 volt of noise. DVM indication at TP2001 should be a maximum of 2 volts.

(d) Set RADAR mode selector switch to SRCH and use PULSE pushbutton to select SRCH S pulse.

(e) Observe oscilloscope display and adjust R2033 (10 MHZ FALSE TARGET ADJ) for approximately 1 volt of noise. DVM indication at TP2001 should be a maximum of 1.75 volts.

(f) Use PULSE pushbutton on control unit to select SRCH M pulse.

(g) Observe oscilloscope display and adjust R2031 (2 MHZ FALSE TARGET ADJ) for approximately 1 volt of noise. DVM indication should be a maximum of 1.5 volts.

(5) STC and Gain Operation

(a) Reinstall the STC module ribbon cable to energize the STC module.

(b) With control unit set to SRCH M mode, check that SRCH GAIN controls varies the display on the oscilloscope ((11).

(c) Adjust control unit STC control while observing oscilloscope. Verify that STC control varies the display accordingly.

(d) Disconnect DVM and oscilloscope probe from receiver module test points and reinstall cover. Disconnect sweep generator from receiver module and reattach P1020 to J2020.

S. Beacon Module Tests and Alignment

(1) Test Setup

(a) At system test panel, set controls as follows:

CONTROL	SETTING
POWER	Off (down)
METER	28
STC	Off (down)

(b) At control unit, set controls as follows:

CONTROL	SETTING
RADAR	OFF
BCN GAIN	MAX (Fully CW)
SRCH GAIN	MAX (Fully CW)

(c) Turn on oscilloscope (11), pulse generator (2), and signal generator (24). Allow 15 minutes for test equipment to stabilize.

(d) Disconnect receiver cable connector P2021 from preamplifier-limiter. Disconnect connector P1210 from regulator module to disable transmitter.

(e) Connect test setup as shown in figure 4-15.

(f) At control unit, set RADAR control to BCN.

(g) At system test panel (1), set POWER switch to ON.

(h) Allow two minutes for RT-1501A to resume normal operation.

(2) BCN Noise Test

(a) Adjust pulse generator (2) as follows:

1 Repetition rate: 5000 uSec (200 Hz)

2 Pulse delay: Center of oscilloscope (11) display

3 Pulse width: 1 uSec

4 Amplitude: 2V peak positive

(b) Adjust signal generator (24) as follows:

1 Frequency: 150 MHz

2 Mode: CW

3 Amplitude: As required

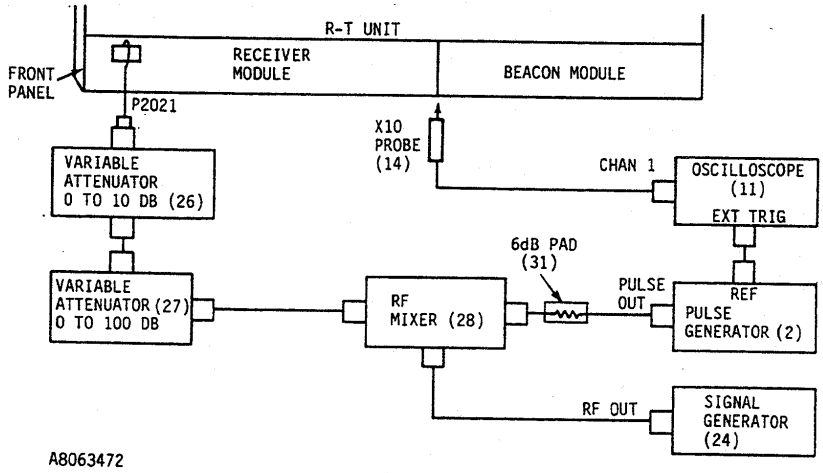
NOTE: Disconnect the rf output cable from the signal generator (24) for this test.

(c) Adjust oscilloscope (11) as follows:

1 CHAN 2: DC and inverted

2 VOLT/DIV: 0.2V

3 TIME/DIV: 1 MS



Beacon Module, Test Setup
Figure 4-15

(d) Connect X10 probe from oscilloscope channel 1 to TP2501 on beacon module.

(e) Adjust variable attenuators (26, 27) for 112 dB attenuation.

(f) Adjust R2553 on beacon module for a 0.2V negative peak noise level at TP2501.

(g) Connect oscilloscope channel 1 to TP2502. Measure noise displayed on oscilloscope (11). It should be 1.2V, maximum.

(3) Bandwidth

(a) Set the variable attenuators (26, 27) for 70 dB attenuation. Reconnect the rf output cable to signal generator as shown in figure 4-15.

(b) Adjust attenuators (26, 27) for pulse of 1 volt peak on oscilloscope (11). Center the pulse using the DELAY control on pulse generator (2). Pulse width should be 1 microsecond.

(c) Set signal generator (24) to 151 MHz and adjust C2514 for maximum pulse amplitude.

(d) Set signal generator (24) to 134 MHz and adjust C2505 for maximum pulse amplitude.

(e) Set signal generator (24) to 162 MHz and adjust C2511 for maximum pulse amplitude.

(f) Adjust output attenuator of pulse generator for a 0.4-volt pulse on oscilloscope (11). Note attenuator setting.

(g) Set signal generator to 134 MHz and adjust output attenuator for a 0.4-volt peak pulse.

(h) Adjust C2514 until the responses at 134.00 and 162.00 MHz are the same.

(4) Response Flatness and Output

(a) While observing oscilloscope (11), vary the signal generator (24) frequency from 134 to 162 MHz and determine the frequencies of minimum and maximum response.

(b) Adjust output attenuator of pulse generator (2) for a 0.4-volt pulse amplitude at each of these two frequencies. Note attenuator difference between the frequency of minimum response and that of maximum response. This difference should not exceed 6 dB.

(5) Sensitivity

(a) Adjust signal generator for highest pulse amplitude, as observed on oscilloscope, within the 134- to 162-MHz band.

(b) Set oscilloscope (11) to 0.2V per division. Adjust variable attenuators (26, 27) for pulse amplitude of 0.4V peak (noise plus pulse) from 0V reference. Add total attenuation, including variable attenuators (26, 27), generator (2) output, and 2-dB attenuation for rf mixer (28). Receiver input should be -92dBm, maximum.

3.S.

(6) Agc Voltage

(a) Set DVM (13) to measure 2 Vdc.

(b) Connect DVM probe to TP2502 on beacon module. Adjust R2553 for a 1.00 ± 0.01 Vdc level at TP2502.

(c) Disconnect DVM.

(7) Pulse Rise Time Versus Frequency

(a) Connect oscilloscope (11) to TP2501 on beacon module.

(b) Readjust variable attenuators (26, 27) for 2.0-volt peak indication on the oscilloscope (11).

(c) Set signal generator (24) to 150 MHz. Measure pulse rise time at 10 percent and 90 percent points. Pulse rise time should be no more than 200 nanoseconds.