

382-087C

**Figure 5-2. Hot Test Bed Equipment Interconnect Diagram**

## 5.2.2 Maintenance Turn-On Procedure

### 5.2.2.1 FALCON™ Series Equipment Maintenance Turn-On Procedure

Table 5-2 describes the maintenance turn-on procedure for the antenna coupler when connected to FALCON™ Series equipment. The maintenance turn-on procedure is used as a guide for setting the receiver-transmitter front panel properly to power up the radio system from a de-energized state to a fully operational state. In each step the maintainer must observe the radio system for normal operating conditions. Faults may be observed by BIT or a visual observation. The first column in Table 5-2 contains the procedure. The second column gives the expected normal observation, and the third column references the procedure to follow if the expected normal observation is not found. These references include BIT troubleshooting and non-BIT troubleshooting. When BIT "SELF TEST" is run at the receiver-transmitter, the antenna coupler is not included. Coupler BIT (Paragraph 5.2.2.3) is run only at the antenna coupler with its cover removed so that the BIT START pushbutton can be operated.

For Hot Test Bed cabling information, see Table 5-2 and refer to Table 5-1.

**Table 5-2. Maintenance Turn-On Procedure (FALCON™ Series)**

Step	Observe	Reference
a. Toggle ON/OFF switch of system power supply to the ON position.	Red power indicator lights on Power Supply.	Refer to Chapter 5, Troubleshooting, in the Falcon™ Series System Manual (10181-0084-01 or 10515-0006-4200).
b. Turn the receiver-transmitter FUNCTION knob clockwise from the OFF position to the Single Sideband (SSB) position.	The receiver-transmitter displays an initialization screen, followed by the same display as when it was last used in SSB mode.	Refer to Chapter 5, Troubleshooting, in the Falcon™ Series System Manual (10181-0084-01 or 10515-0006-4200).
c. Turn the receiver-transmitter FUNCTION knob clockwise from the SSB position to the TEST position.	The receiver-transmitter displays an initialization screen, followed by the following display:  TEST VERSION VSWR	Refer to Chapter 2, Operation, in the Falcon™ Series System Manual (10181-0084-01 or 10515-0006-4200).
d. Press and release the receiver-transmitter ENTER key.	The receiver-transmitter displays the following:  ** SELF TEST ** * IN PROGRESS *  If a BIT fault is generated on the receiver-transmitter front panel, write down the fault code. This BIT fault pertains to the Hot Test Bed setup since the receiver-transmitter BIT does not check the antenna coupler.  If no errors occur during BIT, the receiver-transmitter displays the following:  SELF TEST DONE ** NO ERRORS **	Refer to Chapter 2, Operation, in the Falcon™ Series System Manual (10181-0084-01 or 10515-0006-4200).  Refer to Chapter 5, Troubleshooting, in the Falcon™ Series System Manual (10181-0084-01 or 10515-0006-4200).  This indicates that the Hot Test Bed setup is functioning correctly.

**Table 5-2. Maintenance Turn-On Procedure (FALCON™ Series) (Continued)**

Step	Observe	Reference
e. Press and release ENTER key. Press → repeatedly to select VSWR. Continue to Step f.	The R/T displays the following screen:  TEST VERSION VSWR  TEST is flashing.  The R/T displays the following screen:  TEST VERSION VSWR  VSWR is flashing.	Refer to Chapter 2, Operation, in the FALCON™ Series System Manual (10181-0084-01 or 10515-0006-4200).
f. Press and release ENTER.	The R/T displays the following screen:  VSWR FREQUENCY? 02.0000 MHZ  02.0000 is flashing.	Refer to Chapter 2, Operation, in the FALCON™ Series System Manual (10181-0084-01 or 10515-0006-4200).

**Table 5-2. Maintenance Turn-On Procedure (FALCON™ Series) (Continued)**

Step	Observe	Reference
g. Press ↑ and ↓, or numeric keypad to enter in desired frequency if different from default value.	The R/T will display the new frequency value as it is entered. The value entered will be flashing.	Refer to Chapter 2, Operation, in the FALCON™ Series System Manual (10181-0084-01 or 10515-0006-4200).
h. Press and release ENTER.	<p>The R/T displays the following screen:</p> <p>POWER: 125 WATT VSWR: 1.1:1</p> <p>If VSWR measures greater than 2:1, the antenna coupler is not tuning properly.</p> <p>If the R/T displays any of the following screens, a run time fault has occurred:</p> <p>FAULT COUPLER FAULT COUPLER WARNING TUNE FAULT COUPLER OVERTEMP HIGH VSWR COUPLER NOT INST</p> <p>COUPLER COMM FLT</p>	<p>No problem found; refer to Paragraph 5.2.2.3 for antenna coupler internal BIT operation.</p> <p>Refer to TAP 1.</p> <p>Refer to TAP 1.</p> <p>Fault originated in the power amplifier and is a power amplifier fault. Refer to the FALCON™ Series System Manual (10181-0084-01 or 10515-0006-4200).</p>

### 5.2.2.2 RF-5800H Series Equipment Maintenance Turn-On Procedure

Table 5-3 describes the maintenance turn-on procedure for the antenna coupler when connected to the RF-5800H Series equipment. The maintenance turn-on procedure is used as a guide for setting the receiver-transmitter front panel properly to power up the radio system from a de-energized state to a fully operational state. In each step, the maintainer must observe the radio system for normal operating conditions. Faults may be observed by BIT or a visual observation. The first column in Table 5-3 contains the procedure. The second column gives the expected normal observation, and the third column references the procedure to follow if the expected normal observation is not found. These references include BIT troubleshooting and non-BIT troubleshooting. When BIT "TEST" is run at the receiver-transmitter, the antenna coupler is not included. Coupler BIT (Paragraph 5.2.2.3) is run only at the antenna coupler with its cover removed so that the BIT START pushbutton can be operated.

For Hot Test Bed cabling information, see Table 5-2 and refer to Table 5-1.

**Table 5-3. Maintenance Turn-On Procedure (RF-5800H Series)**

Step	Observe	Reference
a. Toggle ON/OFF switch of system power supply to the ON position.	Red power indicator lights on power supply.	Refer to system manual (10515-0122-4200, 10515-0123-4200, or 10515-0124-4200).
b. Turn the receiver-transmitter FUNCTION knob clockwise from the OFF position to the PT position.	The receiver-transmitter displays an initialization screen, followed by the same display as when it was last used.	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
c. Press the <b>OPT</b> key.	The receiver-transmitter displays an initialization screen, followed by the following display:  GPS-TOD RETUNE RADIO SCAN TEST	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
d. If necessary, use the left/right arrow keys to select the <b>TEST</b> field.	GPS-TOD RETUNE RADIO SCAN TEST	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
e. Press the <b>ENT</b> key and, if necessary, use the left/right arrow keys to select the <b>ALL</b> field.	<b>ALL BATTERY</b> <b>VSWR SPECIAL</b>	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
f. Press <b>ENT</b> to start the test.	The receiver-transmitter displays the following:  *** TEST *** IN PROGRESS  If a BIT fault is generated on the receiver-transmitter front panel, write down the fault code. This BIT fault pertains to the Hot Test Bed setup since the receiver-transmitter BIT does not check the antenna coupler.  If no errors occur during BIT, the receiver-transmitter displays the following:  *** TEST *** PASSED	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).  Refer to Chapter 5, Troubleshooting, in the RF-5800H-MP Intermediate Maintenance Manual (10515-0117-4300).  This indicates that the Hot Test Bed setup is functioning correctly.
g. Press the <b>CLR</b> key to return to the previous screen.	The R/T displays the following screen:  <b>ALL BATTERY</b> <b>VSWR SPECIAL</b>	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).

**Table 5-3. Maintenance Turn-On Procedure (RF-5800H Series) (Continued)**

Step	Observe	Reference
h. Use left/right arrows to select VSWR.	The R/T displays the following screen:  ALL BATTERY VSWR SPECIAL	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
i. Press and release ENT.	The R/T displays the following screen:  VSWR FREQUENCY 02.0000 MHZ	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
j. Use the numeric keypad to enter in desired frequency if different from default value.	The R/T will display the new frequency value as it is entered.	Refer to Chapter 3, Operation, in the RF-5800H-MP Operation Manual (10515-0117-4200).
k. Press and release ENT.	The R/T displays the following screen when complete:  POWER: 125 WATT VSWR: 1.1:1  If VSWR measures greater than 2.0:1, the antenna coupler is not tuning properly.  If the R/T displays any of the following screens, a run time fault has occurred:  COUPLER FAULT COUPLER WARNING OVERTEMPERATURE COUPLER TUNE FAULT PA WARNING HIGH VSWR VSWR TEST FAILED	No problem found; refer to Paragraph 5.2.2.3 for antenna coupler internal BIT operation.  Refer to TAP 1.  Refer to TAP 1.

### 5.2.2.3 Internal BIT Operation

The Static BIT tests basic coupler function without an RF signal in the RF signal path. The Transmit BIT is more advanced in that the antenna coupler RF signal path is tested with an RF signal, which allows most relays and tuning elements to be electrically checked. To run the Static BIT and Transmit BIT tests, continue with the following procedure:



Voltages hazardous to human life are present if power is not removed from the unit. Failure to remove power from the unit can cause injury or death to personnel.



**NOTE**

RF-382 Transmit BIT must be performed into an open circuit to be successful.

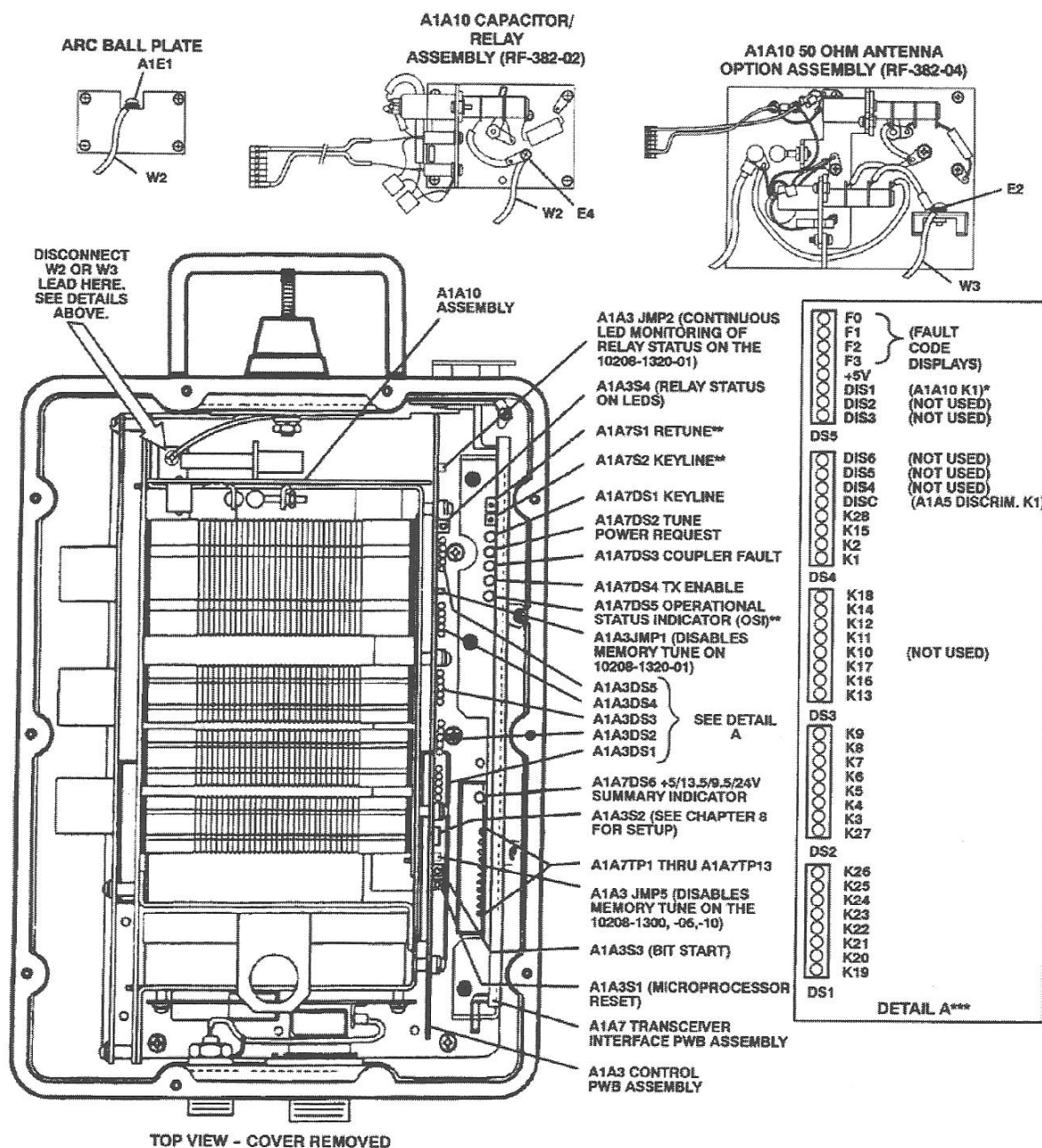
- a. Remove power from the receiver-transmitter.
- b. Remove MP2 Top Cover Assembly per Paragraph 6.6.1.1.
- c. Use a Phillips®-tip screwdriver (Item 3) to disconnect the High Voltage Wire Assembly, W2 or W3, from the A1A10 Assembly, or the Arc Ball Plate. See Figure 5-3. If the coupler is an RF-382-04, remove the external coax cable and/or N-to-BNC adapter from the J3 50-Ohm N-Connector antenna port. This will allow the J3 lever arm to return to the unconnected position. This is done to allow the antenna coupler to test into an open circuit.
- d. Restore power to the receiver-transmitter.
- e. Set the receiver-transmitter frequency to 7.7000 MHz, SSB Continuous Wave (CW) mode when using a Falcon™ Series System. For RF-5800H systems, set receiver-transmitter to FIX, CW mode with a frequency of 07.7000 MHz, TX Power Medium for 125 W and 150 W systems or TX Power Low for 400 W systems.
- f. Momentarily key the receiver-transmitter. The antenna coupler will attempt to tune.
- g. Press the S3 switch (BIT START) on the A1A3 Control PWB Assembly. This initiates a series of tests called Static BIT, that are performed by the microprocessor. Upon pressing A1A3S3, the relays are activated in a sequence corresponding to a left-to-right progression (DS1 to DS5) of the LED indicators (K19 through DIS1) on the A1A3 Control Printed Wiring Board (PWB) Assembly. The Light-Emitting Diodes (LEDs) that are marked "NOT USED" in Figure 5-3, Detail A, will not light. As each relay is activated, an audible click should be heard as the LED turns on and off. If a relay fails to click as the LED switches, or if an LED fails to light, or if an LED lights out of sequence (this includes continuously lit LEDs, except for +5 V), note the relay number and refer to Paragraph 5.2.3 and Table 5-4, Interactive Static BIT, for corrective action. Major assemblies are shown in Figure 5-4.
- h. If a fault is detected by the Static BIT algorithm, a fault code will be displayed on the A1A3 Control Board LEDs F3-F0 (DS5). Refer to Paragraph 5.2.3 and Table 5-5 to identify the fault and corrective action. Major assemblies are shown in Figure 5-4.
- i. If steps g and h do not indicate a fault or relay problem, then proceed to Step j.
- j. For Falcon™ Series System momentarily key the receiver-transmitter. For RF-5800H Systems, key system constantly until Transmit BIT relay activity ceases (10 to 20 seconds).
- k. The coupler will attempt to tune, then Transmit BIT will run. The relays will be checked by the microprocessor under tune power conditions. After these checks are completed, the relays will stop clicking. If any faults were detected, the fault code LEDs F3-F0 (DS5) on the A1A3 Control PWB Assembly will light. Refer to Paragraph 5.2.3 and Table 5-6 to identify the fault and corrective action. Major assemblies are shown in Figure 5-4.

**NOTE**

For RF-5800H Systems, the Transmit BIT pass/fail condition must be observed before releasing the system key. Any faults detected will only be reported to the fault code LEDs while the key is still being held. Likewise, any faulty relay reported via LED indicator at the end of Transmit BIT will only remain indicated as long as the system key is still being held.

- l. To repeat the Static and Transmit BIT, return to step g.
- m. To clear the antenna coupler out of BIT test mode, press A1A3S1 to reset the antenna coupler.
- n. Remove power from the receiver-transmitter. Reconnect High Voltage Wire Assembly removed in Step c.
- o. If there was no BIT fault in any of the preceding steps, continue with Paragraph 5.2.4. If a fault has been corrected, the unit is repaired. Proceed to Step p.
- p. Reinstall the MP2 Top Cover Assembly per Paragraph 6.6.1.2. Return LRU to system service. Refer to local directives for disposition of the faulty SRU.





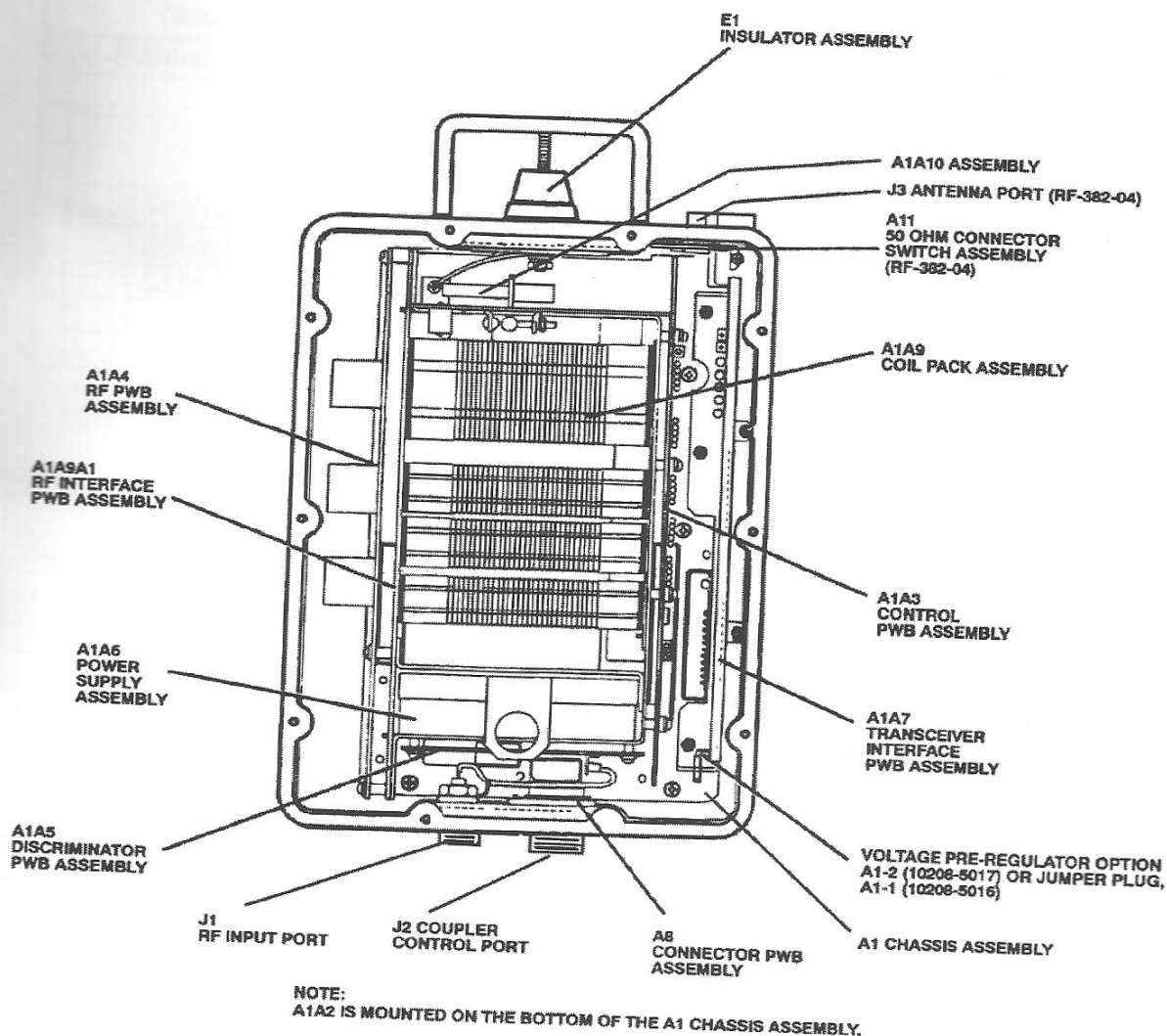
\* IF EQUIPPED WITH A 10208-1320-01, OR A 10208-1300-06 A1A3 CONTROL PWB ASSEMBLY, DIS1 LED IS NOT USED IN TRANSMIT BIT. IF EQUIPPED WITH A 10208-1300, OR A 10208-1300-10 A1A3 CONTROL PWB ASSEMBLY, DIS1 LED IS NOT USED IN STATIC BIT AND TRANSMIT BIT.

\*\* RF-382-01, RF-382A-01 ONLY.

\*\*\* ALL RELAYS ARE ON THE A1A4 AND A1A9 ASSEMBLIES UNLESS OTHERWISE NOTED.

382-020(C)

Figure 5-3. Coupler Indicator Identification



382-019(C)

Figure 5-4. Antenna Coupler Major Assemblies

### 5.2.3 Troubleshooting with BIT Fault Isolation

The following tables provide information to aid the maintainer in interpreting the LEDs on the A1A3 Control PWB Assembly. These LED sequences identify the BIT fault codes listed below. Each table lists a specific failure the maintainer might encounter. Refer to Paragraph 5.2.2.3 for BIT test procedures.

Table 5-4 provides Interactive Static BIT LED and relay test fault conditions. Table 5-5 provides Static BIT fault codes, and Table 5-6 provides Transmit BIT fault codes. Replace one assembly at a time until the fault is cleared.

**Table 5-4. Interactive Static BIT LED and Relay Test Fault Conditions\***

Fault Condition (A1A3DS1 - DS5)	Replace Assembly
All relay LEDs fail to light.	A1A3, A1A7
DIS1 (A1A10K1) relay fails to click in sequence when the A1A3 Control PWB Assembly is a 10208-1300-06 or a 10208-1320-01.	A1A3, A1A10
DISC (discriminator) relay fails to click in sequence.	A1A5, A1A3, A1A2
K9, K13, K14, K16, K17, or K18 relay fails to click in sequence.	A1A9, A1A3, A1A2
Any other relay fails to click in sequence (except those marked "NOT USED" in Figure 5-3, Detail A).	A1A4, A1A3, A1A2, A1A9

\*If equipped with a 10208-6300-01 A1A10 50 Ohm Antenna Option Assembly, the A1A10K2 relay is solely controlled by the J3 lever arm and the A11 50 Ohm Connector Switch Assembly.

**Table 5-5. Static BIT Fault Codes**

A1A3DS5 Fault Codes					
F3	F2	F1	F0	Built-in Test Equipment (BITE) Result	Replace Assembly
0	0	0	0	BIT Passed	
0	0	0	1	Random Access Memory (RAM) Failure	A1A3
0	0	1	0	Electrically Erasable Programmable Read Only Memory (EEPROM) Failure	A1A3
0	0	1	1	Real Time Clock Failure	A1A3
0	1	0	0	5 V Reference Failure	A1A3, A1A5
0	1	0	1	Analog-to-Digital (A/D) Converter Failure	A1A3, A1A5
0	1	1	1	Detected Forward Power Failure	A1A5, A1A3, A1A2
1	0	0	0	Detected Reflected Power Failure	A1A5, A1A3, A1A2
1	0	0	1	R <sub>p</sub> Reading Failure	A1A5, A1A3, A1A2, A1A6
1	0	1	0	Phase Reading Failure	A1A5, A1A3, A1A2, A1A6
1	0	1	1	Overvoltage Detector Failure	A1A4, A1A3, A1A2, A1A9
1	1	0	0	Overcurrent Detector Failure	A1A5, A1A3, A1A2
1	1	1	0	Frequency Counter Failure	A1A5, A1A3, A1A2
1	1	1	1	Fault Logic Failure	A1A3

**Table 5-6. Transmit BIT Fault Codes**

A1A3DS5 Fault Codes				BITE Result	Replace Assembly
F3	F2	F1	F0		
0	0	0	0	BIT Passed	
0	0	0	1	Tune Fault	A1A3, A1A4, A1A5, A1A9, A1A7, A1A10, A1A2
0	0	1	0	High Tune Power Fault	A1A7, A1A5, A1A3
0	0	1	1	Low/No Tune Power Fault	A1A5, A1A3, A1A7, A1A4, A1A9, A1A2
1	0	0	0	Frequency Counter Fault	A1A5, A1A3, A1A2
1	0	0	1	RF Relay Fault*	A1A4, A1A9, A1A5, A1A3
1	0	1	0	Phase Reading Fault	A1A5, A1A3, A1A2
1	0	1	1	R <sub>p</sub> Reading Fault	A1A5, A1A3, A1A2
1	1	0	0	Reflected Power Fault	A1A5, A1A3, A1A4, A1A9, A1A2

\*The LED for the faulty relay should remain lit after Transmit BIT is completed.

#### 5.2.4 Troubleshooting with Non-BIT Fault Isolation

Table 5-7 is a list of the non-BIT fault symptoms. Next to the symptom observed is a reference to the recommended action that should be taken. When the recommended action is to remove and replace assemblies, replace the assemblies one at a time in the order listed, testing the UUT after replacing each assembly. Chapter 6, Table 6-1, references the assembly removal and replacement procedures.

When the recommended action is to perform a Troubleshooting Analysis Procedure (TAP), proceed to the specified TAP. Refer to Paragraph 5.2.5 for more TAP information. It is recommended that Power Output Test (Paragraph 6.3.2) should be performed after non-BIT troubleshooting is complete.

If the actions do not correct the problem, proceed to the troubleshooting index in Paragraph 5.3.3.

**Table 5-7. Non-BIT Fault Symptoms**

Symptom Observed	Recommended Action
<b>Fault Messages that Appear on R/T Front Panel Display (Run Time Faults)</b>	
COUPLER FAULT (FALCON™ System)	Refer to Table 5-8.
COUPLER WARNING (FALCON™ System)	Refer to Table 5-8.
TUNE FAULT (FALCON™ System)	Refer to Table 5-8.
COUPLER COMM FLT (FALCON™ System) - Fault originates in the power amplifier.	*
COUPLER OVERTEMP (FALCON™ System) - Fault originates in the power amplifier.	Refer to Table 5-8.