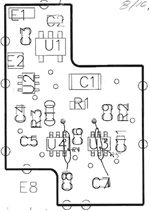
**IFR 4000 that fails the Power Detect self test (it passes all other tests). All components on RF converter board**

First:

* CR7 Schottky Detector diode p/n HSMS-2865-TRIG (4816-0000-040, SAP#55112) LAB400-0003
* AT1 attenuator p/n RFP-50-20AE 50W 20dB attenuator that is located just above R59, (2901-0000-021, SAP#38221)

If there is a daughter board on the RF converter board:

* A couple of resistors that can be added to the small PC board on the RF Converter board to help with that problem. The 4.7 k resistors are soldered between one end of C7 and C8 (the ends connected to U3 pin 5 and U4 pin 5) and ground.



* Another culprit for DET failure is U23.  Measure the resistance between the two outside legs to see if it measures between 900 to 1000 ohms both ways.
* RF switches by U23 cause this same failure as well. Try measuring pins 5 and 8 on U8, U9, U11, U12, and U20 to ground to make sure the resistance is greater than 3000 ohms.  The tech here has seen these ICs be the cause of the PWR DET problem by having too much loss through them and measuring the resistance is one way to help find it.

If all the resistance checks look good, then you will have to trace the signal through the circuit and compare it to a good one to see if you can figure out where the level is off at.

When the 4000 does the Power Detect test, it turns off all modulation, sets the attenuation to a certain level and selects the Direct port. It then sends a 113 MHz signals to the Direct port which allows it to measure the signal using the Power Meter.  It is looking for a certain range on the reading and anything outside of that range will fail.

Next it drops the attenuation by 3 dB and repeats the test looking for a certain range of values to either pass or fail the test.

Connect a coax from the Direct port (RF I/O port) to a spectrum analyzer and watch the signal when the Power Det test is running. Hopefully you can see what is happening when the test occurs and compare it to a 4000 that will pass this test.

* Cold soldering on IFR400 U20 Pin 8 and U23 Pin 2 on JP Avionics resulted in failing Power detect test, passes Power input check of 5W in. Symptoms were -15.00dBm/-19dBm out on RF I/O port during Power DET test. TP 1measured 1.3Vpp/0.96Vpp, reduced level through TP 2,3,4,5,6,7,8,9. Loss was at TP 10 with U20 Pin 8, TP8 with U23 Pin 2. After further diagnosis (and intermittent failures) resulted in finding a 40mVpp drop across the U16 switch. Replacing the switch resulted in an improved output of H: 2.90Vpp L: 2.04Vpp at TP1 versus H: 2.48Vpp L: 1.74Vpp when the unit was passing its self test.

RF I/O port 113MHz signal during Self Test, Power Detect portion: H: -9.00dBm, L: -12.00dBm, (TP1 for signal measurement) All circuit measurements done with a Tek MDO4054-6 with a Tek TPP1000 1 Ghz X10 probe.

Circuit measurements, 113MHz signal. Test points refer to drawing. There is the High Value, Low Value and the signal present when the IFR4000 is on the self Test screen, no test executing (however the self test must be run once for the signals to be present:

TP Circuit location High Value Low Value IFR4000 Waiting for Self Test to start

1 RF splitter 2.94Vpp 2.08Vpp 0mVpp Same as RF I/O port

R69/R59/R70

2 U8 Pin 5 4.14Vpp 2.88Vpp 0mVpp

3 U8 Pin 5 4.14Vpp 2.88Vpp 2.68Vpp

4 U11 Pin 8 4.14Vpp 2.88Vpp 2.68Vpp

5 U11 Pin 3 4.66Vpp 3.26Vpp 2.58Vpp

6 U12 Pin 3 4.66Vpp 3.26Vpp 2.58Vpp

7 U12 Pin 5 4.66Vpp 3.26Vpp 2.58Vpp

8 U23 Pin 3 4.58Vpp 3.12Vpp 2.60Vpp

9 U24 Pin 6 508mVpp 380mVpp 324mVpp

10 U20 Pin 8 216mVpp 142mVpp 108mVpp

11 U20 Pin 3 196mVpp 126mVpp 108mVpp

12 HY5 Pin 4

13 U15 Pin 3 236mVpp 156mVpp 116mVpp

14 U15 Pin 5 240mVpp 168mVpp 124mVpp

15 U19 Pin 11 302mVpp 208mVpp 176mVpp U19 Pin 5

16 U17 Pin 11 476mVpp 472mVpp 216mVpp U17 Pin 5

17 U18 Pin 14 616mVpp 616mVpp 284mVpp U18 Pin 14

18 U18 Pin 11 802mVpp 802mVpp 364mVpp U18 Pin 5

19 W19 1.72Vpp 1.72Vpp 776mVpp

20 U16 Pin 3 1.72Vpp 1.72Vpp 776mVpp

21 U16 Pin 8 1.72Vpp 1.72Vpp 776mVpp

22 U13 Pin 3 1.768Vpp 1.768Vpp 816mVpp

23 U14 Pin 6 2.18Vpp 2.18Vpp 1.02Vpp

24 U14 Pin 3 404mVpp 404mVpp 196mVpp

25 U25 Pin 6 608mVpp 608mVpp 276mVpp

26 U25 Pin 3 41.6mVpp 41.6mVpp 20.4mVpp

25 U33 Pin 1 35.6mVpp 35.6mVpp 15mVpp

See diagrams for locations. Note that clearer drawings from Doug have different ICs for the digital attenuator, U18, U17, U19. They are shown to the right on the table above.

**Other Failures:**

**MK 2 Failures:**

* U22 (5050-2500-700, SAP#55842) LAB405-0002
* U9 (3223-0005-027, SAP43873) LAB405-0001
* HY4, HY2 TDC-9-IN possibly U42, U8 Re-calibrate the Marker cal. See how much has changed, calibrate back in. Even a few 1/10th of a dB will cause a failure. Amp levels (Marker)

**Localizer 2:**

* C139 (1635-0103-001, SAP#13471)

**LVL DET 15:**

* U14 (3222-9106-500, SAP#43796)

**SWR:**

SWR is usually caused by transmitting power down the SWR port. It usuallyshows up as a LVL DET 15 self test failure. Parts affected by transmitting down the SWR port are:

* R252 (4732-3749-001, SAP#53823)
* R251 150Ω (4734-1500-001, SAP#54107) LAB100-0005
* U5 (3223-8302-000, SAP#44163) LAB405-0000
* U14 (3222-9106-500, SAP#43796)
* CR6 (4816-0000-040, SAP#55112) LAB400-0003 \*not always affected

**NVRAM:**

* BT1 (4000-9232-501, SAP#4646906)

**Freq Counter and Power Det self test failure:**

Cold soldering on U23 Pin 2, need larger tip to re-solder, sucks a lot of heat to properly re-solder

**RF Level failing on low level outputs (-120 dBm)**

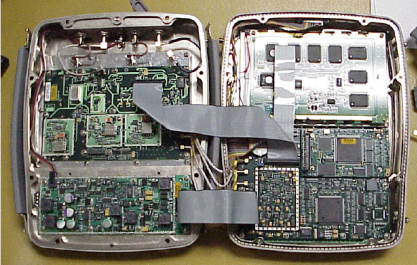
Older serial numbers have a leaky RF gasket or an IC that doesn’t have enough isolation.

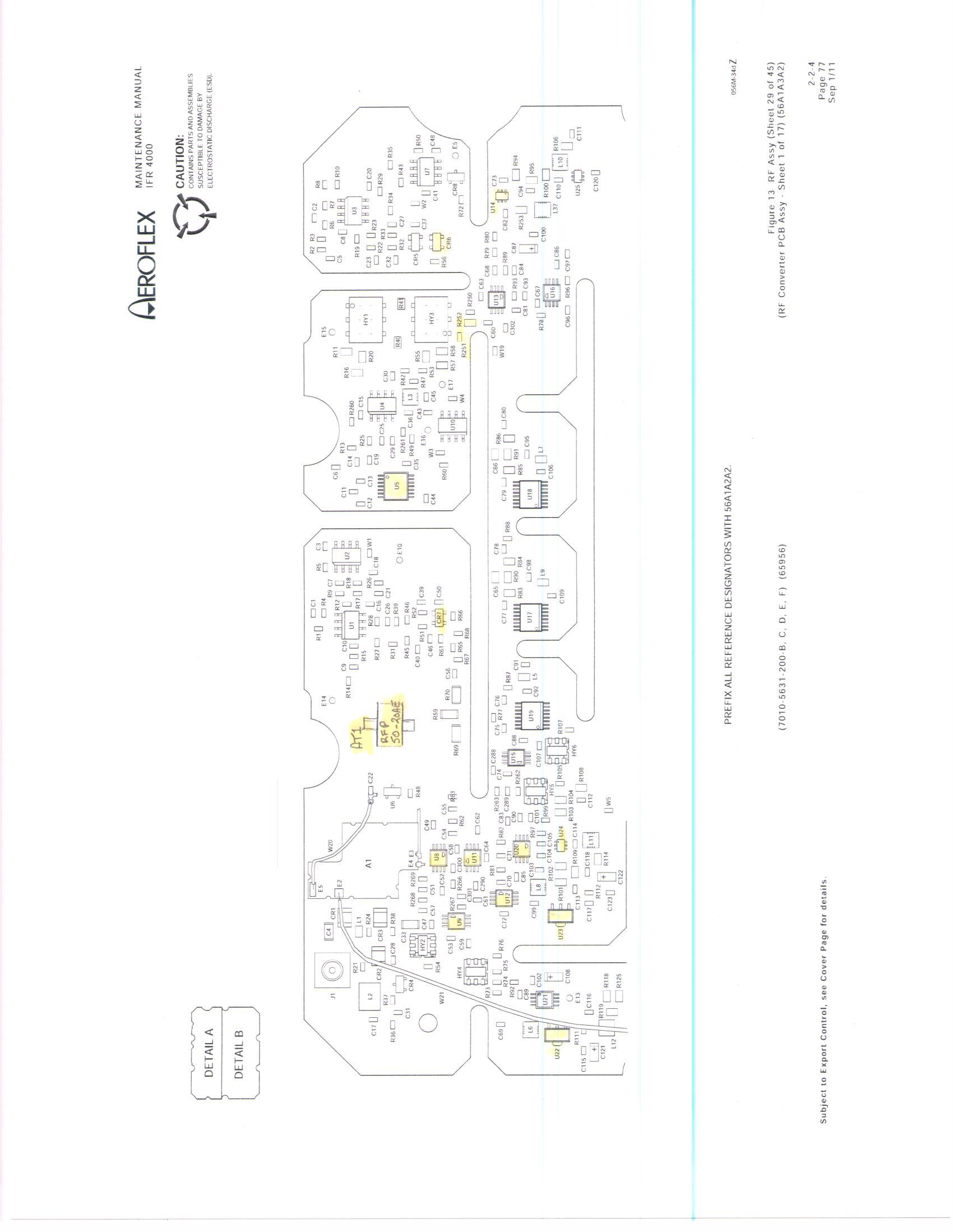
Newer serial numbers: - check that the RF coax’s are tightened down and not cracked.

-There’s a wire that’s routed over the small PCB on the RF converter board; try re-routing it closer around the edge

**Aux I/O Frequency Counter:**

Check aux I/O input resistor and MUX; the ribbon cables going from the front unit to back of the unit can pick up crosstalk on the wires. Make sure they are routed properly.



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