Repair and Servicing of the IFR 1000A/S Series – Part 2

By: John Kuivinen, WB6IQS at ATT (dot) net
Vista, CA.

September 1, 2015

Revision A1

CHANGING OUT 5 VOLT INCANDESCENT LAMPS FOR LED INDICATORS

ASSUMPTIONS:
This is not a basic servicing techniques paper. It is assumed that the reader has a working knowledge of electrical safety, DC and AC voltage measurements and PCB repair techniques. The writer will not be responsible for your soldering mistakes, PCB damage, putting polarized capacitors in backwards, making mistakes in wiring or assembling components incorrectly. I have checked all of the drawings, captions and pictures to the best of my ability but no guarantees of zero errors can be assumed.

This paper will provide some of the lessons learned on trying (note trying!) to get my 7 IFR 1000A and 1000S units back on the air.

CONVERSION OF INDICATOR LAMPS TO LEDS:
The two front panel indicator lamps are nominally 5 Volt white incandescent lamps that have a short life and are easily broken.

Pre-check the IFR 1000s for correct operation with a Volt meter. Verify that the two Frequency Lock indicator voltages are present at about 4.0 Volts DC for the MHz and KHz indicator lamps. The lamps may or may not be working so assume that the lamps are defective if the correct voltages are present and the unit is otherwise operating normally.

When getting ready to replace the indicator lamps, I found it easier to temporarily remove the center Frequency Error meter movement and set it aside. When removing / replacing the meter movement you will probably also have to remove the oscilloscope display assembly and oscilloscope mounting rail. My “fat fingers” were not good enough to do the surgery in place without granting me more access room to the rear of the front panel. If you are used to working in small tight places all of this extra effort may not be necessary.

Any sort of LED could be used but I found that a green T 1 3/4 size was just the correct O.D. to fit the hole and I used a small amount of clear glue to hold them in place. You can also use 2 – part epoxy or JB Weld for this. The LEDs are lifetime solutions and probably will never again need replacing.

The resistor value was selected to provide 10 mA of current at 1.5 VDC for the LED: (4 VDC – 1.5 VDC)/ 0.01 A = 270 Ohms (approx.). If you want a different color or higher brightness LED you may need to select a different value resistor / LED combination.

To determine which side is the cathode and which side is the anode use a variable power supply set to 5 VDC, attach a clip lead to the negative source and another clip lead from the positive source to the resistor. Try first one way and if the LED does not light up then flip the LED around. Solder the resistor to the cathode (+) lead of the LEDs. Use small diameter heat shrink tubing to secure the resistor connection and prevent any shorts during normal operation.

Remove the 4 wires from the lamp assemblies and straighten out the ends so that the shrink tubing will not hang up during re-assembly. Pre-tin the wire ends. Remove the lamp sockets by slowly pushing them through the front panel. Be careful not to scratch the front panel paint or logos. Laying the IFR 1000 on a soft surface with the face down, replace the empty lamp housing sockets with the LED assemblies. Then dab a bit of glue on the back of the LED assemblies to secure them in place. Let the glue set completely (usually overnight) before proceeding with the final soldering and re-assembly.

Place shrink tubing on the orange and white / blue striped wires that were unsoldered earlier. Then solder the orange wire to the resistors (cathode lead)

and the white / blue striped wire to the anode leads. After cooling, then slide the shrink tubing forward and using a small hot air gun set the tubing in place to prevent short circuits in the lamp wiring.

See attached schematic for details of wiring: