

## Lucent RFTGm-II-XO Modification to Add 10MHz Output

By Skip Withrow

15Jan2013

Another of the telecom surplus GPSDO units that is available to time-nuts is the Lucent series of RFTG (reference frequency timing generator) boxes. There have been a number of generations including the RFG, RFTG, RFTG-m, and RFTGm-II in both Rb (rubidium oscillator) and XO (crystal oscillator) versions. Both the RB and XO versions use the same main circuit board. As it turns out the Rb units have a 10MHz output (that is fed to the XO unit) and a 10MHz test point. The XO unit does not have any 10MHz output, but since the same boards are used it is very easy to add this feature to these Lucent boxes. The RFTGm-II boxes also have 1pps available on the same connector as the RS-422, so after modification you have the same I/O capability as the Trimble Thunderbolt (though nowhere the software control capability).

This article specifically addresses the RFTGm-II-XO modification, but earlier generations are easy to modify as well. The modification only involves six components (4 surface mount and 2 thru-hole). It adds an emitter follower that produces a 10MHz square wave at the output connector.

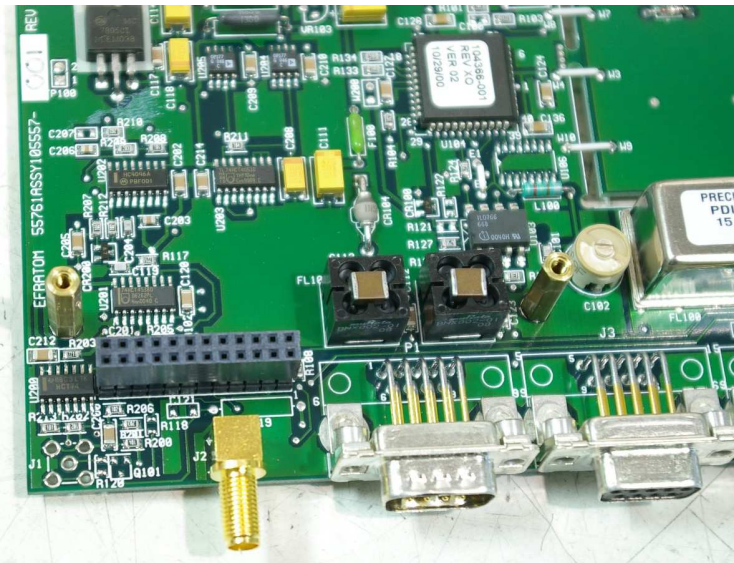


Photo 1 – Close-up on area of interest.

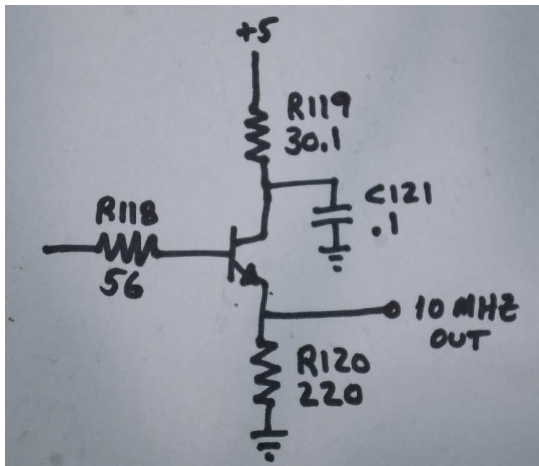


Figure 1 = Schematic of emitter follower.

To modify the unit it is necessary to disassemble the RFTG to liberate the main board. First, remove the 4-40 screws from the bottom of the unit. Remove the screws holding on the cover from the front of the unit. Remove the mounting nuts from the TNC and SMA connectors. Remove the standoffs from the DB-9 connectors. Pull the circuit board assembly from the front panel. Remove the four screws holding the GPS receiver and remove it, pulling straight up. Remove the 4-40 screws holding the daughter card and remove it by pulling straight up. You can now use the main board to help locate the ¼" hole that needs to be drilled in the front panel for the new SMA connector.

The components for the modification are:

Right angle female SMA connector (Mouser 712-CONREVSMA002-L – I used a connector salvaged from another PC board)

R118 – 56 ohms (0805 surface mount)

R119 – 30.1 ohms (leaded, board holes are fairly small, needs to be at least 1 watt)

R120 – 220 ohms (0805 surface mount)

C121 - .1uF (1206 surface mount)

Q101 – 2N3904 (Mouser 512-MMBT3904)

The component values for the resistors and capacitor were determined by removing them from an Rb unit. The transistor used was a general-purpose type that should handle the task.

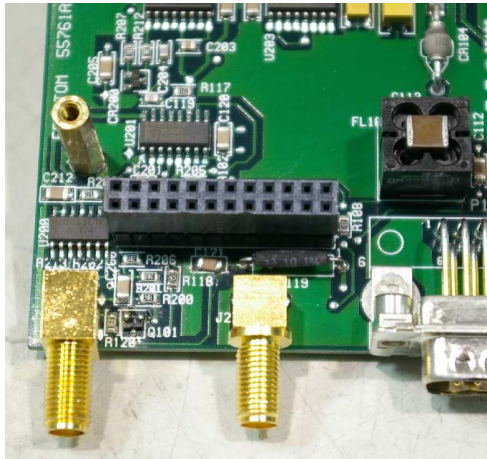


Photo2 – Board after modification

After mounting the components to the main board, just reassemble the unit in reverse order. HINT – If your hole for the SMA is not perfectly located it may help to not solder the connector until the main board is remounted to the front panel, screw the new connector to the panel, then solder.

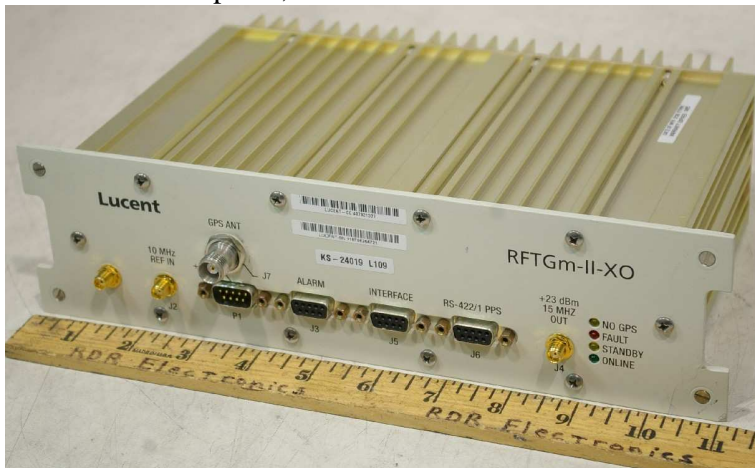


Photo 3 – Modified unit reassembled