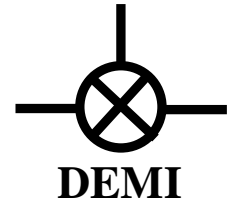


# Design Note



From: DEMI R & D Dept.

DN#: 032

Date: March, 15, 2012

Re: Installing the VHF ApolLO in the "L" series 144-28INT Transverter, the VHF ApolLO K

**PREFACE:** This document will aid the installation of the VHF ApolLO synthesizer in an assembled DEMI L144-28INT transverter or L144-28INTK or CK. The installation of the VHF ApolLO disables the standard local oscillator. This document does not provide instructions for utilizing both standard and the VHF ApolLO in the same assembly.

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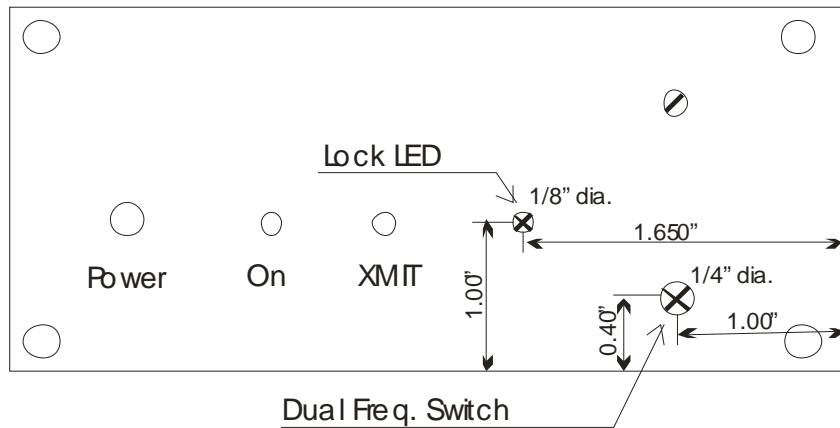
## **CIRCUIT UNDERSTANDING:**

This document may be utilized if building a kit or modifying a functioning transverter. After reading and becoming familiar with the VHF ApolLO document, you should understand that there are a few frequency selections around the 116 MHz standard frequency range that could be desired in your application. You may opt for a different LO frequency only if you desire a different operating "IF" frequency. If you desire a different IF frequency from standard, select one that is band specific for your transverter (listed between 24 and 32 MHz IF), and understand that your 28 MHz IF transverter **will not** operate at the 50 MHz range just by changing the LO frequency. It would require other component changes and beyond the scope of this design note.

## **CIRCUIT MODIFICATION and PREP:**

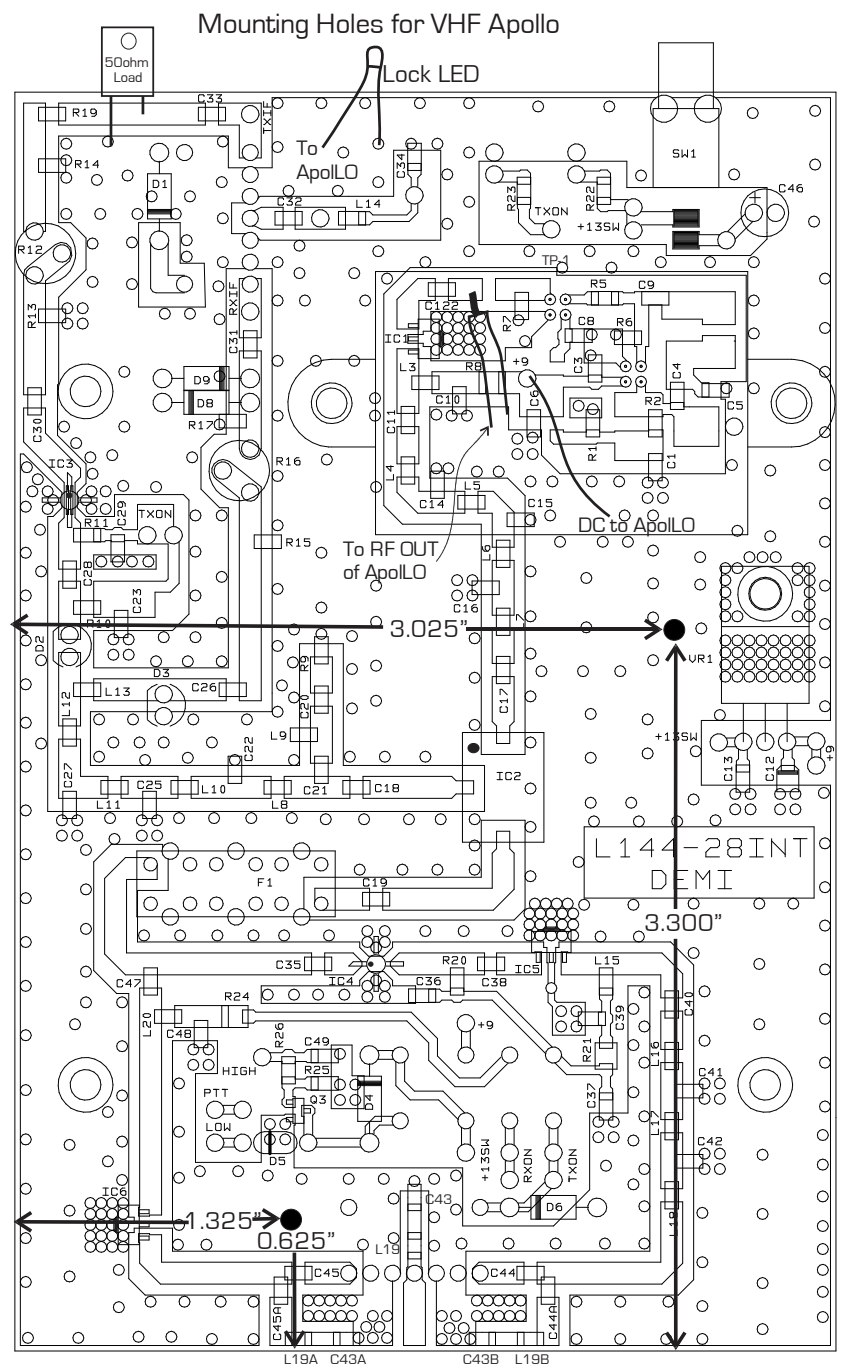
With an assembled INT, start by removing the LO shield. Save the 4-40 hardware. The standard LO circuit needs to be disabled and prepared for the VHF ApolLO injection by removing the PTC, R3, R4, and C7. The Xtal does not need to be removed but it is not supported mechanically so removed it. The Piston trimmer is not utilized and would make a handy component for the junk box so it can also be removed. If you are building a kit, only remove R3, R4, and C7 and then assemble the kit schematically from IC1, L3 and R8 on.

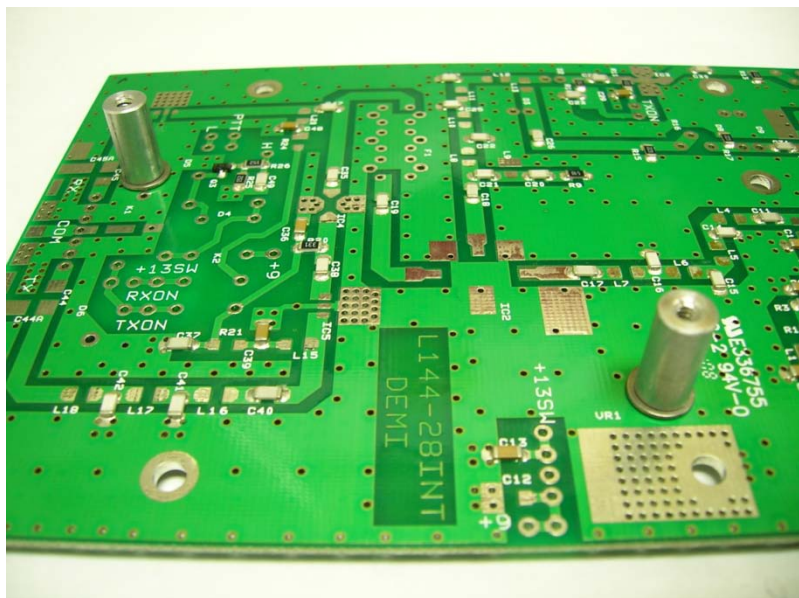
The front panel will need a hole drilled for the LOC indicator LED so it should be removed. Be careful if the 50 ohm load is mounted to the front panel. Use the next drawing to properly locate the 1/8" hole for the LOC LED in the front panel. If you desire a dual frequency option such as move the transverter in the 2 M band without changing the IF frequency, the switch hole may be also installed. Install the switch before attaching the panel to the enclosure by trial fit it for switching direction. See the next page.



Now, depending on the vintage of the transverter you have, it may or may not have the required mounting holes for the VHF Apollo. Check the modified component placement document shown next. The correct hole placement is dimensioned. If your board does not have the holes as shown, you will need to drill both of them to 1/8" in size. Remove the board, then measure, mark and drill as specified. The holes are for standoffs that are bolted through the bottom side. If you are building a kit, the board should have the correct holes.

The modified component placement also shows the components that are to be removed or not installed if building a Kit. It also shows the attachments of the DC power wire and RF coax connected to the VHF Apollo. If you are building a kit, the board should be assembled after removing the specified components then note the components that are not to be installed per the standard L144-28INT document. Do not install the assembled board in the enclosure until the following steps are completed.

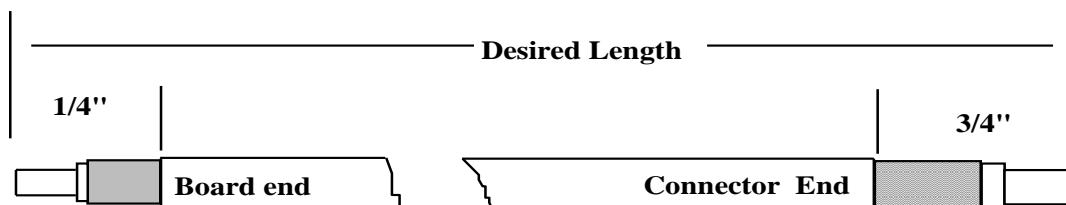




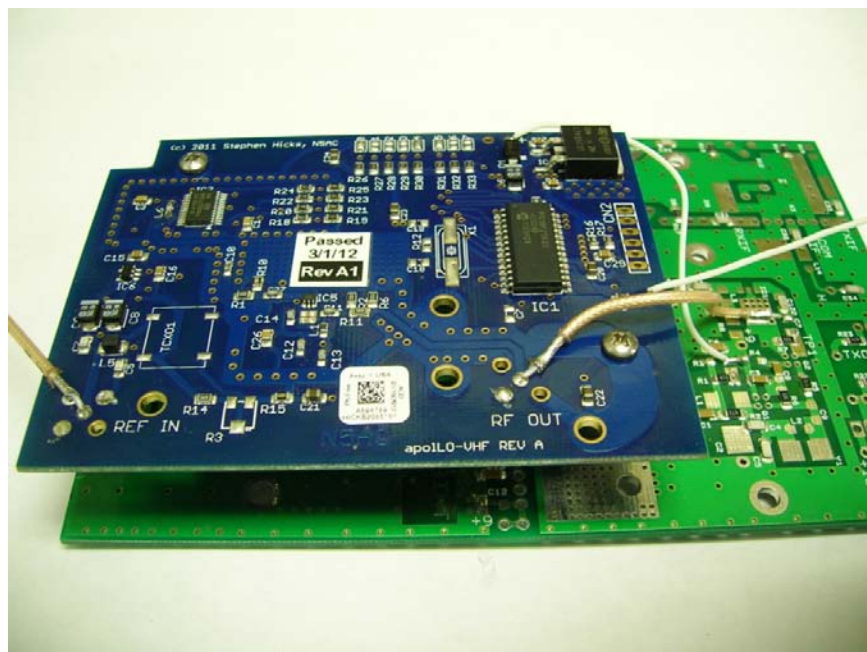
After the holes are drilled (if required) or the board is assembled if it is a kit, install the ½" tall 4-40 round threaded stand offs. Use the 4-40 screws removed from the shield or found in the Kit. Insert the screws through the bottom side of the board and place the flat washer on the screws on the top side of the board. The washers are used as additional spacers. Then install the ½" round standoffs as show in the picture to the left. Make all hardware snug. The picture is a Kit board before assembly. An unassembled board is shown for clarity. Next, mount and wire the INT board in the enclosure. If you are building a kit, follow the assemble instructions and complete your desired configuration. If you require all

4 BNC connectors for your transverter configuration, an extra 3/8" hole will need to be made in the rear connector panel. You may open up the AUX connector hole if you do not have a use for it. Then, complete the wiring and configuration as desired.

**INSTALATION of the VHF ApoILO:** Next prep two lengths of coax, 3" and 5" as diagram shows below. The 3" needs two ¼" ends and the 5" needs both the ¼" and ¾" ends.



Mount the VHF ApoILO as shown with ¼" 4-40 Screws Then, attach the coax as show in both the picture and the previous modified component placement. The 3" coax connects the RF OUT of the VHF ApoILO to C122 on the L144-28INT. The ¼" end and the 5" coax attaches to the REF IN of the VHF ApoILO. The DC wire is the 3" #24. Strip and tin then attach as shown in the picture or in the modified component placement. The 3" #28 wire (the thin one) is striped and tinned and attached to the via at the one end of R8 on the VHF ApoILO board.



of

Connect the REF IN coax to any open BNC connector. Now install the blue LED (clear in color when not powered). Insert it into the LED hole in the front panel cut, bend and fit the short leg of the LED to fit in one of the via holes in the ground plane of the circuit board. After you decide which hole to use, scrape some of the solder mask of before soldering. Now, shorten the other leg of the diode and attach the wire from the VHF Apollo from R8 to the lead. You may insulate the connection using whatever means you have. The transverter is ready for test but first program the VHF Apollo to the desired frequency but following its instructions.

**TESTING:** After connecting the DC and 10 MHz source, switch on and both the Red power LED and Blue LOC led should be lit. If so and you have a kit, follow the testing instructions omitting the standard oscillator section. If this is a retro fit, then the transverter should be ready to use.

For trouble shooting, recheck wiring and programming. If you have a frequency meter, you may probe the RF OUT to verify correct frequency. If the level is in doubt, it can be checked by removing C17 and measuring with a mw power meter. The level should be +17dBm +/- 2 dB.

### **Component Parts List for the VHF ApoLO INT:**

2 4-40 x 1/2" round standoff

2 4-40 x 1/4" screw

8" of Teflon coax

3" of # 28 wire

3" of #24 wire

1 – Blue LED (clear in color)

1- BNC connector and hardware.

1- SPDT switch

1 1/4" hole plug