

# Design Note

From: DEMI R & D Dept.

DN#: 040

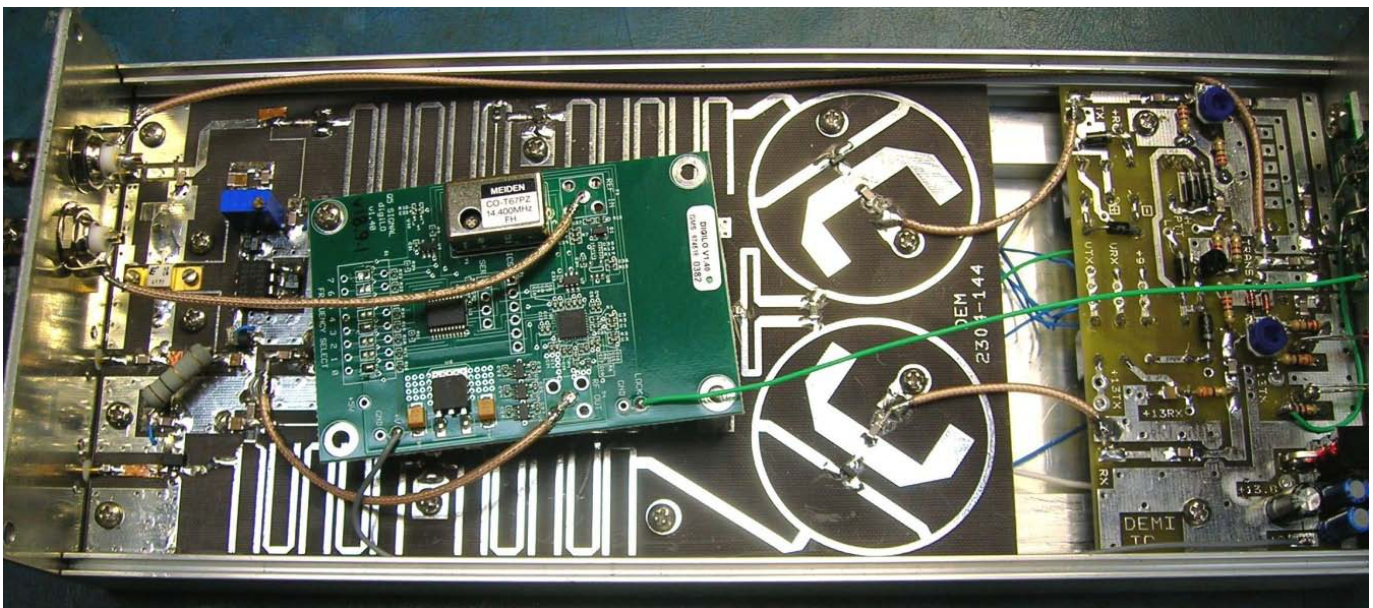
Date: April 1st, 2021

Re: Install DigiLO in 2304 and 3456 transverters

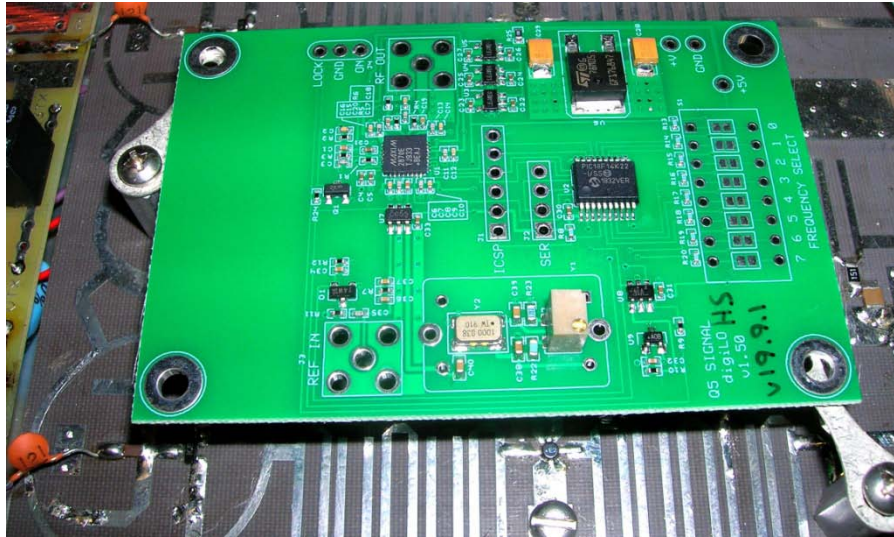
**PREFACE:** With the ability of having a stable and accurate frequency in all microwave transverters, this design note describes the proper installation of a Q5 DigiLO synthesizer in to either a DEMI 2304 or 3456 transverter that utilize a MICRO-LO. Both transverters have the same mechanical foot print which is of importance when mounting the DigiLO board in the transverter.

**EXPLANITION:** With standard hardware and cabling, the performance of both transverters will improve, making any 20-30 year old transverter have state of the art performance. The installed circuit will be complete with the choice of utilizing the DigiLO's internal 10 MHz clock circuit or the ability of connecting to an external GPS locked source that will automatically switch when desired. With a simple modification to the front panel, the LOC LED is installed in order to indicate which source is being utilized. Minor circuitry changes are required along with inter band segment switching. If replacing the A-32, it will only be necessary to do so if you require the internal 10 MHz source option.

**THE MODIFICATION:** The modification starts with the removal of the LO board. Leave the wires and the coax attached to the transverter board. Next pick out mounting holes on the transverter board that will support the DigiLO board. Use the DIGILO board for alignment and review the pictures below.

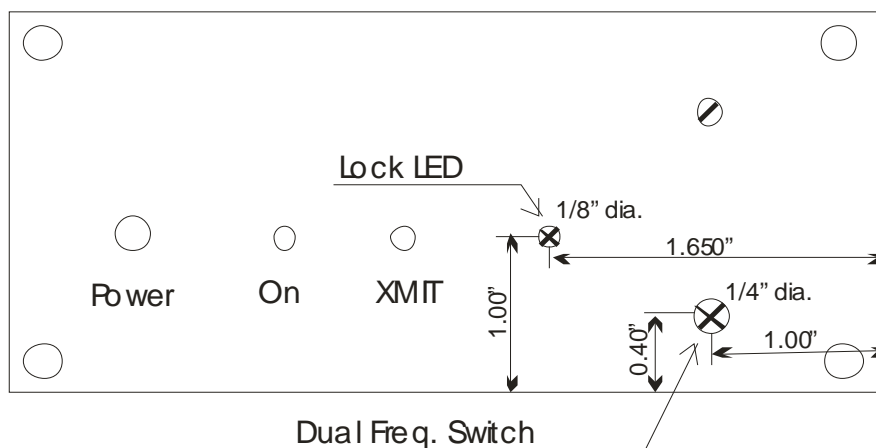


Use two 4-40 x 1/2" standoffs and lock washers to replace the existing 4-40 screws and directly bolt the board in place or use ground lugs and solder them to the board holes after alignment. Then use the replaced screws to hold the board in place. Be sure to orientate the board as shown. The example is the 2304 transverter on the previous page and 3456 below. BUT-- there are other hole combinations that will work for both transverters.



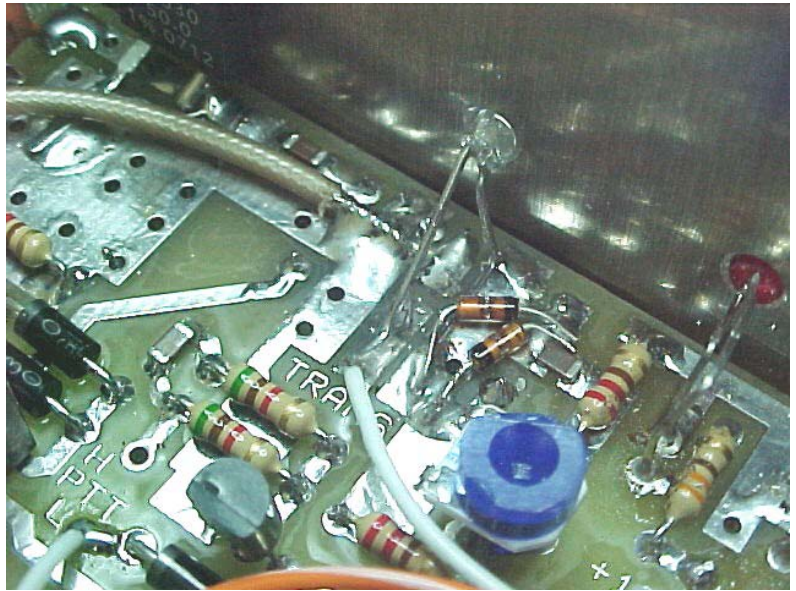
Attach the coax from the transverter to the RF OUT of the DigiLO and the wire to the +V. Make them as short as possible. Install a BNC connector in the rear panel for the external 10MHz input(if you desire to use one) and connect a coax from the connector to the REF IN on the DigiLO as shown in the 2304 picture.

**INSTALLING THE LOC LED and FREQUENCY SELECT SWITCH:** Some individuals might choose not to install the LOC LED; but it is simple to do. It requires the removal of the front panel and make the required hole placement. There is an additional 1/4 hole in the panel for a frequency select switch. If you do not desire to switch between 2304 and 2320 or 3456 and 3400, it's not required. Both holes are shown and dimensioned in the pictorial below. Measure, mark, and drill the front panel. If you chose to use the frequency switch, solder three wires about 6 inches long, to a SPDT switch and install the switch. Then install the panel with the wires under the TC board. Route the wire up between the TC and transverter pallet before attaching the panel.

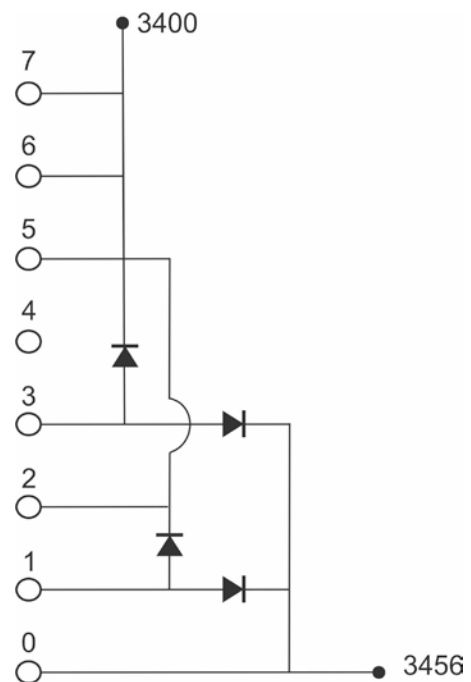
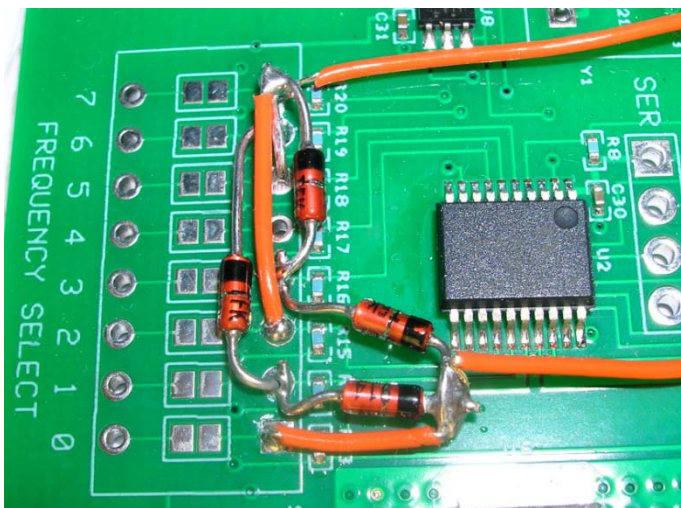




First do the LOC LED. There are different TC board versions, some have extra pads near the panel and some don't. Pictured is one that doesn't. The white wire shown comes from the LOC signal pad on the DigiLO. The LED is attached to the closest Ground connection and the hot side is connected to the IF coax pad. Remove the DC blocking capacitor and then move the IF coax and solder it directly to the Common IF relay. Then use the vacated pad for the LED and LOC line connection. Now for the ON connection, out of the DigiLO, remove the resistor which supplies the "ON" led in the transverter and connect the "ON" led to the ON connection on the DigiLO. So, when you are utilizing the internal source of the DigiLO, the transverter ON LED will be lit. When you connect the external 10 MHz source, the LOC LED will light and the ON LED will shut off. Consider the transverter on and active if either LED is lit.



If you are not utilizing the frequency select switch, just select the pads to short from the frequency selection chart of the DigiLO and you are done with the assembly. If you desire frequency switching, it becomes a bit tricky. Referring to the frequency selection chart, determine which combinations of pads need to be shorted to ground to provide the frequency combinations you desire with your transverter. There is a great chance that some pads will be used for both frequency selections. If this is the case, it will require what is called "Steering Diodes" connected to the shared pads being used. The schematic example shown next is for a 3456/3400 transverter. The common pads need the diodes. The two points labeled 3400 and 3456 in the schematic go to the two outer legs of the switch. The center lead of the switch connects to ground anywhere in the transverter. The wires and diodes can be connected directly to the DigiLO board and bundled together directly, then connected to the switch wires.



**TESTING THE NEW CHANGE IN FREQUENCY:** After the assembly is complete, you can follow Design Note 039 starting at the section titled the same and complete the testing of the transverter. DN039 is specifically for a 3456 transverter but the principle and levels are identical in the 2304 transverters with any frequency change applied to it. The only thing to remember is the fundamental LO frequencies are directly injected into the LO chain without multiplication and may produce a very high level of LO power. This may require the removal of the first stage in the LO chain to bring the level to a +10 dBm at the test point. After that level is established in the transverter, all other frequencies and levels specified in DN039 should be obtainable along with any mix in the 13 cm band.

**CONVERSION OF THE ORIGINAL SHF 2304/3456 TRANSVERTERS.** There may be a few of these units being used that the owner may want to install a DigiLO in for better frequency accuracy and stability. Not having either one of these around for testing, all we can recommend is to eliminate the 4 and 6 times multiplier circuit on the LO input and drive the filter/amplifier section with the direct frequency LO signal. The 3456 board would look like the pictorial below. Fill in the narrow line with a 100 mill wide copper foil and inject. Understand that this would be purely experimental conversion.

