

# DDS Application Note for KN-Q7A Kit

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26 July 2013

Many thanks to those who have contributed to this note. I would especially wish to thank: DC1BA of Germany for his many suggestions.

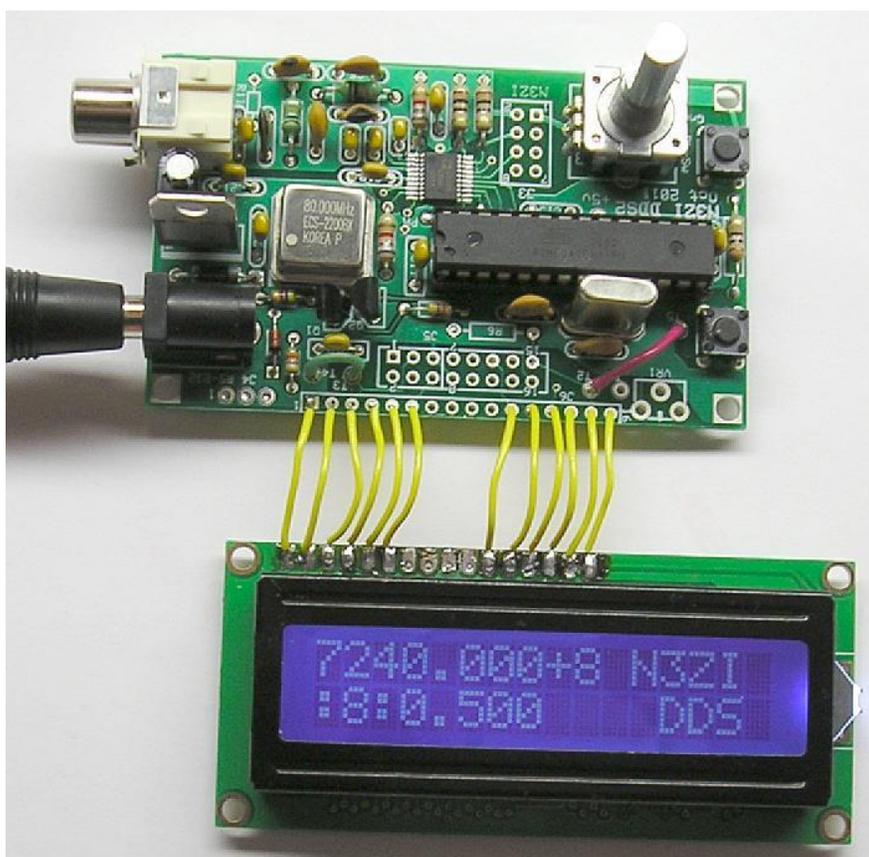
**Note:** I am now including two different methods to make the connection. I discovered that the Wire Wrap Socket does not plug in to my machine type sockets that I use, so I made one more modification:



I soldered a machined socket to the wire wrap pins so that it would insert into my PC board more easily.

For this application, I used the DDS from: <http://www.pongrance.com/>

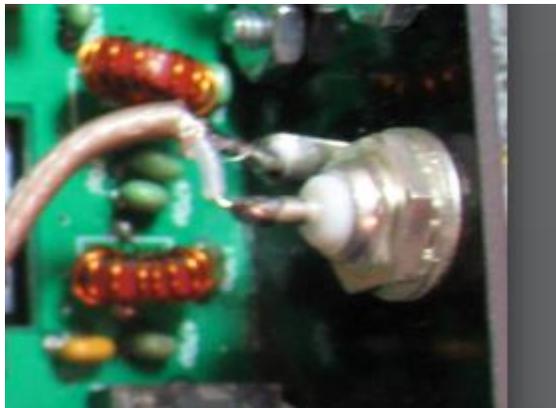
## SUPER DDS ~ 1Hz Step



Basically, the DDS or Variable Frequency Oscillator replaces the VXO oscillator in the radio. We will disconnect the oscillator circuitry from the mixer and injecting an external LO directly into the NE602. The actual frequency will be  $LO - IF$ . Make sure to keep it within the HAM bands.

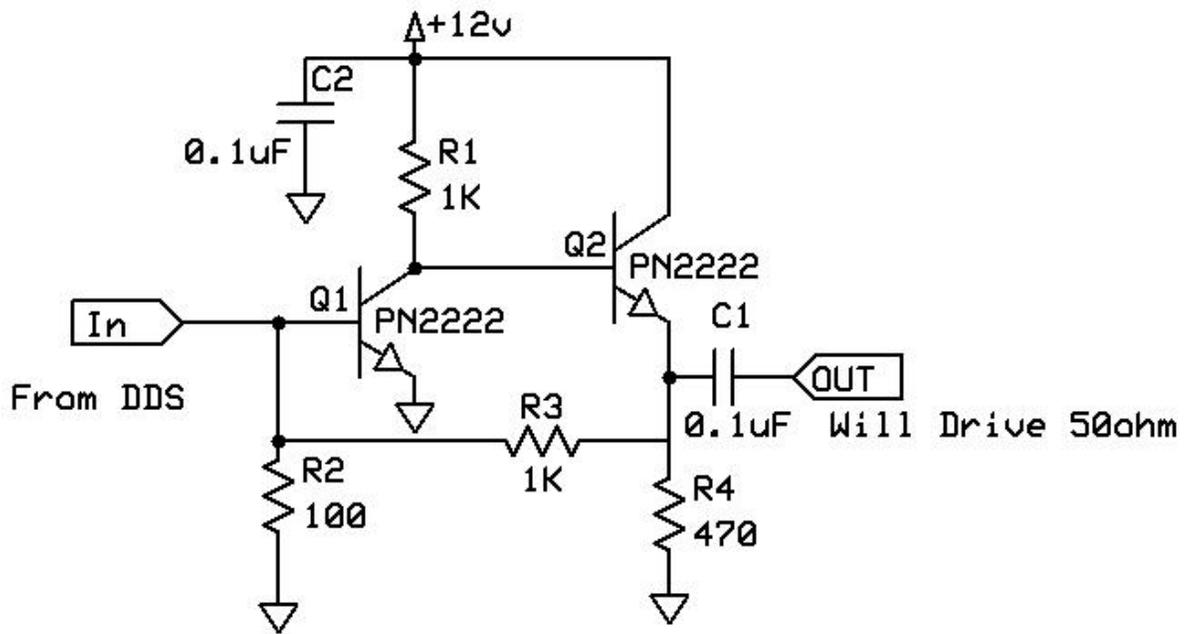
Here are the basic steps used:

- 1) When building the radio, use a socket for the NE602 mixer instead of soldering it directly to the board. Using a longer lead wire wrap socket is ideal.
- 2) Get the radio tuned up and working with the VXO as originally designed.
- 3) Remove the NE602 mixer chip
- 4) Get the wire wrap 8 pin IC socket. Solder the socket to a simple PC board such as Radio Shack: Cut off pin 6 and 7. Pin 7 will not be used and Pin 6 will be connected to the DDS.  
**Jameco Part no. 94474**
- 5) Solder a short piece of RG174 or shielded audio cable, center to pin 6 of the socket, shield to pin 3 of the socket up close to the bottom of the socket. (Pin 3 is grounded)
- 6) Plug the NE602 into this new socket, and then plug the new socket into the original socket on the PCB. The NE602 is now connected directly pin for pin as it originally was, except for pin 6 and 7. Pin 7 is not connected at all, and pin 6 goes to the little piece of coax.
- 7) Install the connector of your choice on the radio's back panel, and connect the other end of your coax to it.



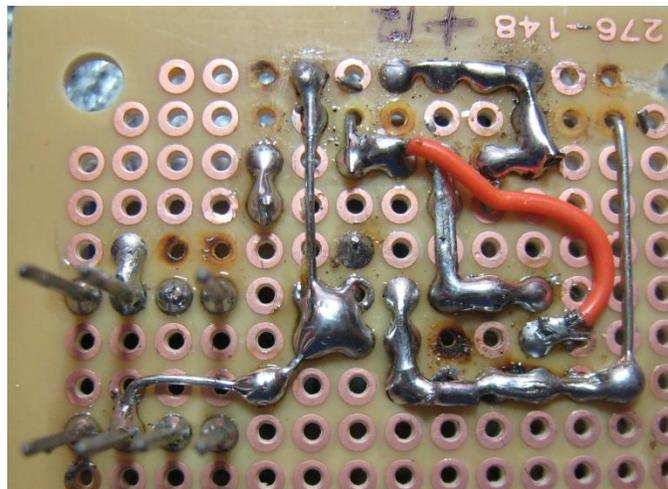
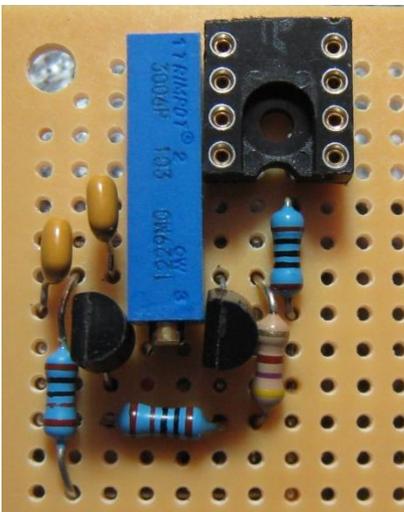
NOTE: Some DDS's will not have the proper voltage swing, so it may be necessary to add a buffer or amplifier to the system.

- 8) If you have not done so, build the little 2 transistor buffer for the DDS2 as outlined on the Pongrance website. See schematic with potentiometer added.



DDS Buffer Amp

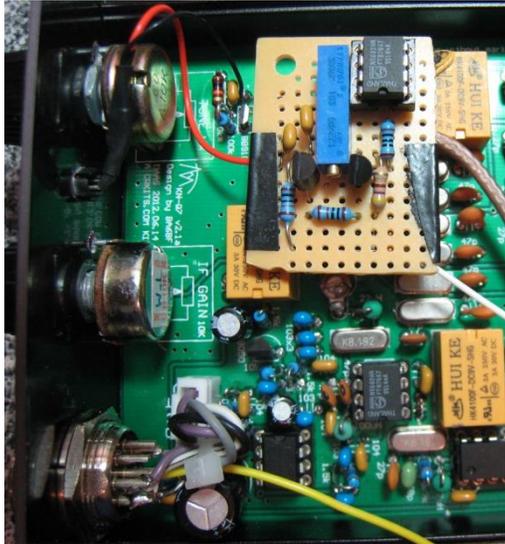
9) Connect a 10K pot in series with the buffer output, and set it maximum resistance



10) Connect the output of the DDS from the output of the buffer pot to the KN-Q7A

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11) Connect the Power from the board to the +12 volt supply. See my white wire.



11) Program the DDS for the KN-Q7A IF frequency. Not all DDS's will have this capability.

12) If you have a scope, measure the RF injection level going in to the radio. Gradually decrease the resistance of the buffer pot until output rises to 200 - 300 mV pp. If you don't have a scope, just gradually increase the injection level while listening to the background audio of the radio with the IF gain wide open. When you no longer hear any increase in the background noise, you should be pretty close.

13) QSY and have fun!

Note: You may want to re-tune all of the transformers for the center of the band.

Please remember that the Toroid Coils are filtered for 40 Meters, so don't try to use this on just any frequency.

The beauty of this way of doing things is it only takes a moment to restore the radio to its original functionality if you are going portable, mobile, etc. and don't want to carry around an external VFO.

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# A Simpler Method to Use the N3ZI DDS2

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This method uses the same DDS from the previous example, but uses a much simpler method. I have found that with the N3ZI DDS2 that there is not a need for the buffer.

Parts Needed:

- 1) N3ZI DDS2: <http://www.pongrance.com/super-dds.html>
- 2) 8 Pin wire warp socket: Jameco – 94474
- 3) SMA Connector: Jameco – 145374
- 4) SMA Cable: Jameco – 2099391
- 5) Perforated PC Board: Jameco – 616690

Cut a board approximately 0.8 inches by 0.6 inches from the perforated PC Board. You need to make the holes a little larger for the SMA connector. Press fit the SMA connector into the end of the board. Press fit the 8 pin socket behind the SMA connector with the pin 1 and 8 nearest the SMA connector.



On the under-side, as shown, clip pin 7 of the IC Socket.

Also clip pin 6, but not as close to the board since we will be soldering the center connector of the SMA to Pin 6 of the socket.

Next, connect ground to pin 3 of the socket and the ground section of the SMA.

We will remove the NE602A from the KN-Q7A board and insert this adapter into the existing socket.

Place the NE602A in the adaptor socket making sure to orient the pins properly.

Now drill a hole (about 0.25 inches) at the back plate of the case, near the Antenna Connector. I prefer to center it on the back plate.



Mount the SMA Cable and connect the other end to the Adaptor.

You can now connect the DDS2 to the back of the radio and tune to your favorite 40 Meter frequency. This will also work for the 20 Meter unit.

You can easily unplug this module and re-insert the NE602A for normal VXO operation.