

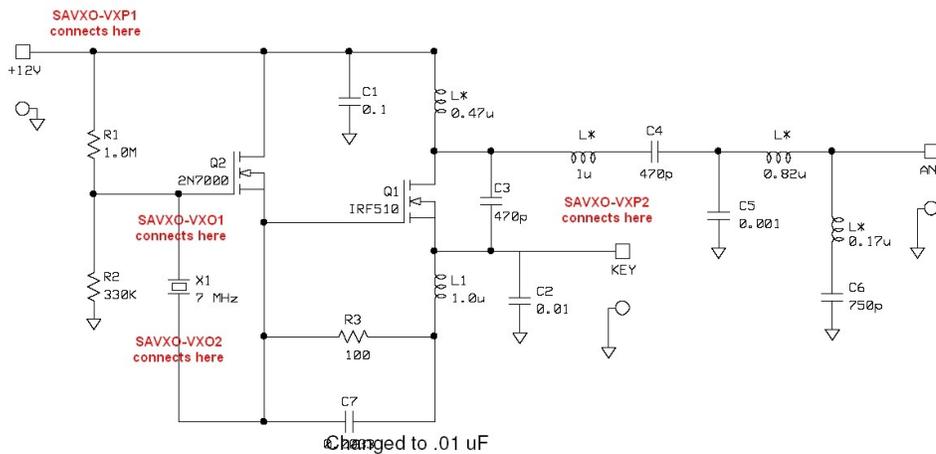
Many builders of the Four State QRP Group Stand Alone VXO (SAVXO) intend to use it to drive a new or existing NS-40 Transmitter, also sold by Four State. What will not be obvious to most is the way the SAVXO is connected to the NS-40, so that they both work as intended. This document addressed that need.

The SAVXO has two build options available. When built to drive the NS-40 transmitter, the SAVXO has a 220 Ohm resistor across the output to properly load the NS-40, so that it is stable and can run without a crystal. Below is a photo of the SAVXO with that option shown.



The 220 Ohm resistor used in the NS-40 option is the one shown just to the right of C12.

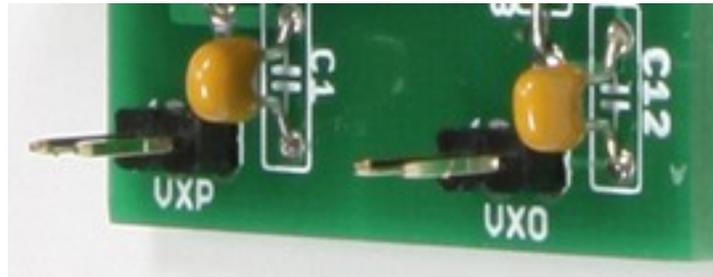
Connecting the SAVXO to the NS-40 requires 4 connections. These are shown in the next photo, which is the NS-40 circuit diagram that has additional information appended to it to show where the SAVXO connections go.



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First of all, the NS-40 and the SAVXO need to receive their power from the same power supply, so that they share the same ground reference. Also very important, if the NS-40 and SAVXO pair will be keyed by a MagicBox T/R unit, that should also be powered from the supply common to the NS-40 and SAVXO. Using the same power supply will eliminate any kind of grounding issues which might occur if using different power supplies.

Referencing the photo below, the VXP header contains the SAVXO power supply connections with the left pin being pin 2 (- connection) and the right pin being pin 1 (+ connection).



Referencing the NS-40 circuit diagram and the above photo, VXP1 is connected to the +12 supply point on the NS-40 PCB. VXP2 is connected to the “hot” side of the NS-40 key line, the point on the NS-40 diagram and PCB labeled “Key”. That takes care of the first two connections. Use the supplied female header supplied with the SAVXO kit to make these connections.

Referencing the photo above, the VXO header contains the SAVXO RF output connections with the left pin being pin 2 (“cold” connection) and the right pin being pin 1 (“hot” connection). This part of the SAVXO circuitry is floating and does not share a ground common to the rest of the SAVXO PCB.

Again referencing the NS-40 circuit diagram and the above photo, VXO1 is connected to the NS-40 crystal pad that shares a connection with the 2N7000 gate. Looking at the NS-40 PCB, that would be the left lead of the crystal. VXO2 is connected to the NS-40 crystal pad that shares a connection with the C7, R3 and IRF510 gate, which is also the right lead of the crystal. As before, use the supplied female header supplied with the SAVXO to make these connections.

Note: The crystal of the NS-40 must be removed prior to making the connections from the SAVXO. It is recommended to use 3 pins of a machined pin IC socket as a crystal socket after the crystal is removed. The center pin of the 3 is cut off on the bottom side, so that only the outer pins remain. This can then be soldered to the NS-40 PCB where the crystal was and the crystal can be reused if desired, as long as the SAVXO isn't plugged in. As another suggestion, on the other end of the leads coming from the VXO header, use another set of 3 pins with the center one cut off as a male plug to plug the SAVXO RF drive into the NS-40. The VXO leads should be kept under 6 inches in length and the pair of wires color coded so that the “hot” lead is distinguishable from the “cold” lead. Twist the leads together at 3-4 turns per inch to improve the immunity of this pair to stray RF. The power supply leads to the SAVXO should be as short as practical to reduce stray RF pickup.

Once the SAVXO is properly connected, close the key and while driving a dummy load, watch the power output of the NS-40 on a suitable meter. Increase the drive from the SAVXO using the SAVXO TR1 trimmer until the NS-40 power output peaks. When a peak is reached, back down the drive from the SAVXO about 5%, just so the NS-40 isn't being over driven.