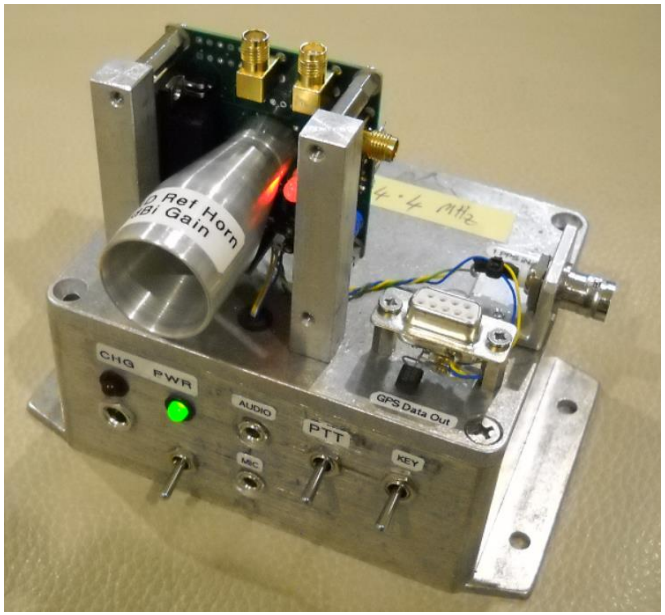
VK3CV 122 GHz Project Update

North Texas NTMS Microwave Society



W5LUA Al Ward

May 5, 2020

May 3, 2020 Message from Tim

North Texas NTMS Microwave Society

All the product is here now :)

Tim

Hi all,

DHL & Fedex delivered the other horns and made PCB's today.

The PCB's are not individually packaged so I'll have to get something suitable to put them in before sending them out.

I've decided to test every board before I send them on, so it will take a little while yet.

I'll be interleaving testing and packaging as I go.

Be on the lookout for post & packaging invoices from me as I assemble the orders for shipment.

cheers

Tim

April 26, 2020 Message from Tim

North Texas NTMS Microwave Society

test set up for production boards.

Tim

Apr 26 #660

Hi all,
I've made a little video of the proposed test set up for the production boards to validate that were getting RF out and that the RX sensitivity is as expected.
This will also test that the TCXO can be steered by the 1pps input.
You can check it out in my YouTube channel here..
https://youtu.be/Pa5zC-qj2Z4

regards
Tim

My understanding of the Test Procedure

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- Uses board #2 as a signal source at 122.5 GHz to measure received S/N of board #1.
- Test on board #1. Insert 1 pps into DUT and connect an FT-817 to the 144 MHz IF port. Turn AGC off. Confirm LO frequency is 122.356 GHz. (122.5 GHz – 122.356 GHz = 144 MHz IF for receive only).
- This frequency is verified by measuring the startup VCO frequency which is 1.9118125 GHz. This is 1/64 of the final frequency. Using the math feature of the HP 53131A universal counter, the meter can now indicate the final frequency of 122.356 GHz.
- Uses a Fluke 45 ac voltmeter to measure relative received S/N ratio of board #1 in dB, typically 13 to 15 dB S/N
- Monitor DUT current, typical is 98 mA
- To measure output of board #1 at 122.5 GHz he uses an HP 75-110 GHz mixer to receive 122.5 GHz
- Spurs look to be down -18dBc to -25dBc
- The first two boards are used as “standards” for pass/fail criteria on production boards

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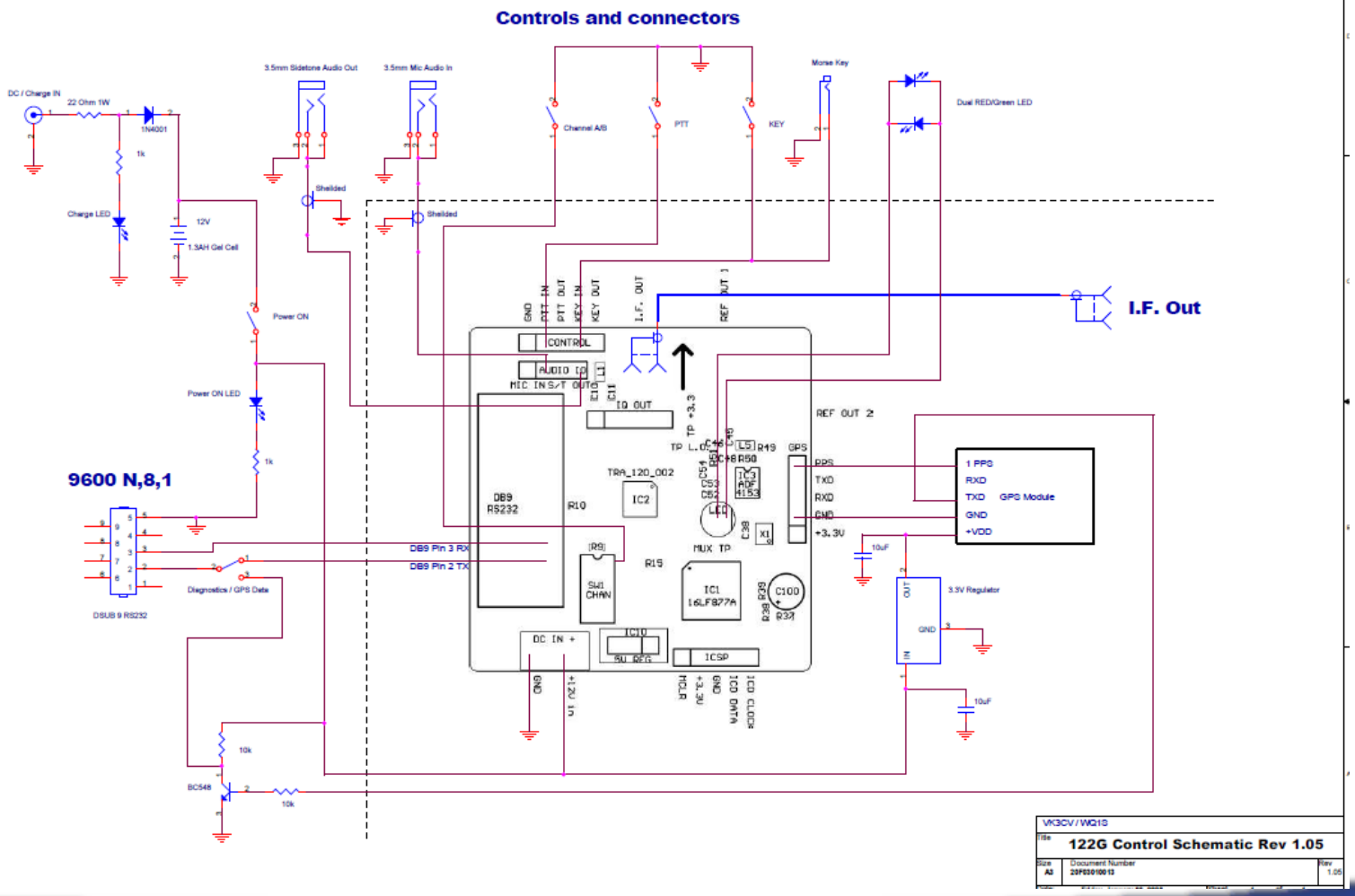
122G Control Circuitry



Mod to change from 1pps to 10 MHz for frequency control

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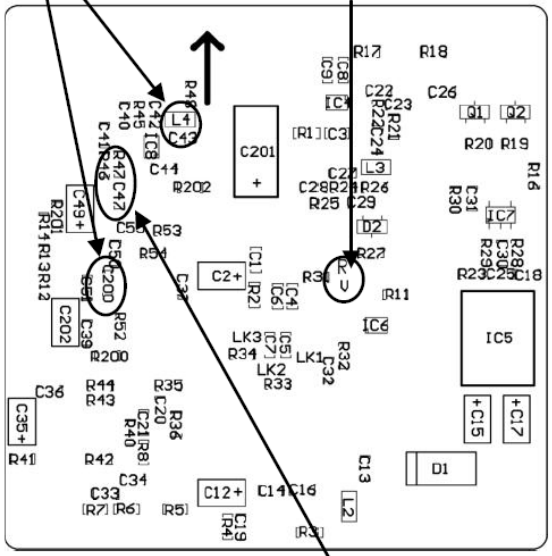
Bottom Side (Remove C200,L4)

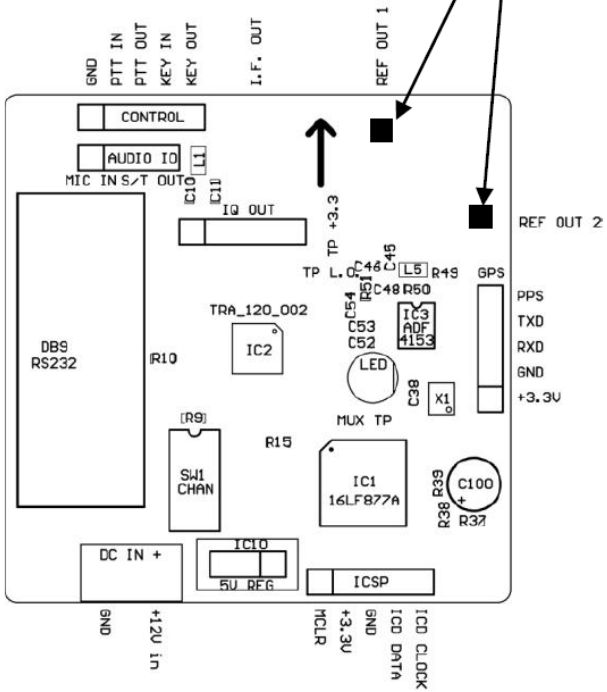
(Open link R, Close Link V)



Bottom Side (Place C47,R47)

Top Side

External 10MHz Ref In (Either)



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Who has purchased units?

- Check your order here https://tinyurl.com/y349sedu
- The following NTMS guys have purchased boards and/or horns.
- W5LUA, N5BRG, K5ZSJ, WA5VJB, WA5JAT, N5PGH, AA5AM, KI5WL, KC4YOE, AE5B, K9JHK, AA9IL (plus other 8s & 9s), & K8ZR……
- Anyone else?

Things to Consider

- The transmitter will operate on CW and FM modes only – no USB. Default frequency is 122.5 GHz. Probably stick with that.
- Pick an IF, any IF. Program the LO for (122.5 GHz – IF). Default is LO at 122.356 GHz for a 144 MHz IF.
- There is an A/B switch for changing frequency
- Use either 1 pps or modify board to accept an external 10 MHz input for phase locking LO.
- On/off keying at 1000 Hz for making antenna gain measurements
- Build a platform / assembly that can be used to accurately point the system. Beamwidths will be narrow when using a dish and even with a feedhorn!
- Looking forward to playing with these units and comparing to the DB6NT mixer – according to the specs, the VK units should be superior on both transmit and receive.

Testing After Delivery

- I plan to set up a 200 ft test range in my back yard with a weak signal source to test receive S/N ratio at 122.5 GHz.
- I can also do relative output power measurements with an HP spectrum analyzer and an HP 11970W harmonic mixer.
- I can also attempt noise figure measurements with a borrowed 140 GHz noise source from Doug AD0CX.
- Or DSB sun noise measurements
- Sounds like fun!