

Recent Projects (Fall 2020)

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Langstone Transceiver Recap



Langstone Features

- •Touch screen user interface
- •All mode (CW/SSB/FM/AM) narrow band transceiver
- •70MHz 5.7GHz
- •Experimental support for 10GHz and 24GHz using Harmonic mixing
- Waterfall spectrum display
- Band Data Outputs



First task Ruggidize the Adalm Pluto



Pluto has some physically delicate components











Langstone Transceiver Updated



Langstone External Frequency Reference



Pluto Reference Frequency

40 MHz Onboard Reference 10ppm Can be replaced with a 1ppm oscillator



Much smaller, challenge to fit!



Pluto RF Frequency Reference



From AMSAT_DL forum discovered no need to remove existing oscillator as it has an enable pin!



Pluto RF External Frequency Reference



C124 is not fitted in production, so pad can be used to attach 0603 Cext. 50MHz can come in on SECURELY anchored mini PTFE Coax





Pluto Reference Frequency

Nothing special about 40MHz frequency External clock works 30 to 80MHz 10MHz reference available Much easier to generate odd harmonics than even Had used the G4HUP DFS30 before Obvious choice was 50MHz



DFS30 Block diagram



Just need to retune filters for 50MHz Pluto just needs >-15dBm signal to Lock





How to tell the Pluto about new reference?

The hardware was the easy bit. What you need to do to tell the Pluto the reference is 50MHz took 6 hours of research and lots of experiments! The answer (it works, no idea why!):-

fw_setenv adi_loadvals 'fdt addr \${fit_load_address} && fdt get value fdt_choosen /configurations/\${fit_config}/ fdt && fdt get addr fdtaddr /images/\${fdt_choosen} data && fdt addr \${fdtaddr}; if test ! -n \${ad936x_skip_ext_refclk}; then if test -n \${ad936x_custom_refclk}; then fdt set /clocks/clock@0 clock-frequency \${ad936x_custom_refclk}; elif test -n \${ad936x_ext_refclk}; then fdt set /clocks/clock@0 clock-frequency \${ad936x_ext_refclk}; fi; fi; fi test -n \${model}; then fdt set / model \${model}; fi; if test -n \${attr_name} && test -n \${attr_val}; then fdt set /amba/spi@e0006000/ad9361-phy@0 \${attr_name} \${attr_val}; fi' fw_setenv ad936x_custom_refclk "<5000000>"



Pluto PCB Modification



Note the way the 50 MHz coax is very well anchored



10MHz Reference and DFS50 Installed





Front Panel Modifications



Used <u>locking</u> toggle switch to select external or internal 10 MHz reference



Pluto PTT Output

W5HN





Small PCB allows Pluto to provide external PTT output for amp etc. <u>Pluto needs F5OEO custom software</u>



Pluto Output Spectrum



You may remember the Pluto could be used to generate signals on 10GHz and 24GHz, Intrigued, I recorded the output spectrum at 144MHz 1mW output:-





- North

Texas



Resolution?

In my transverter driver the amplifier has an Minicircuits PLP200 LPF on the input and a Discrete LPF on the output of the amp

All unwanted signals are now 60dB down at 100mW output



Other Projects



SDR Splitter







SDR Splitter





SDR Splitter Design by PE9GHZ





SDR Splitter my version External View



Attaches directly to BNC socket on FT817/IC-705 Note 12V and TX LEDs



SDR Splitter my version Internal View



The RK1-12V relays are rated to 1.5GHz 10W

Make sure 12V is applied or TX power will go through splitter into SDR with not much loss



VK3CV 122GHz Transceiver monitor



- Was using PC to monitor status
- Started looking at using a PIC to monitor status
- Last night in Scatterpoint (SP-2011) G8AGN published an Arduino solution
- As I had the parts already built it this morning in 2 hours!
- Got software 60 minutes ago, works fine
- No time to take pictures of mine, so the following screenshots from G8AGN article:-



Block Diagram



W5HN



Receive Displays







Transmit Displays









https://wiki.microwavers.org.uk/Langstone_Project https://github.com/g4eml/Langstone https://wiki.batc.org.uk/Custom_DATV_Firmware_for the_Pluto#PTT_output https://tbspace.de/plutosdrclockinput.html http://pe9ghz.org/cmsms/index.php?page=miscprojects