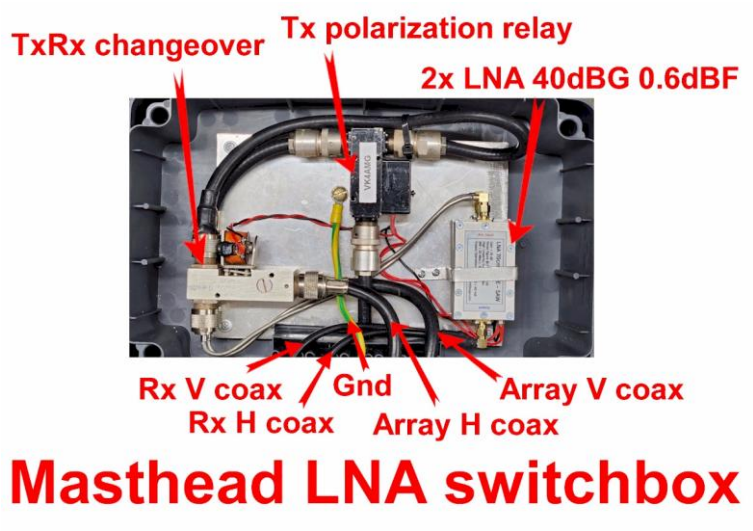
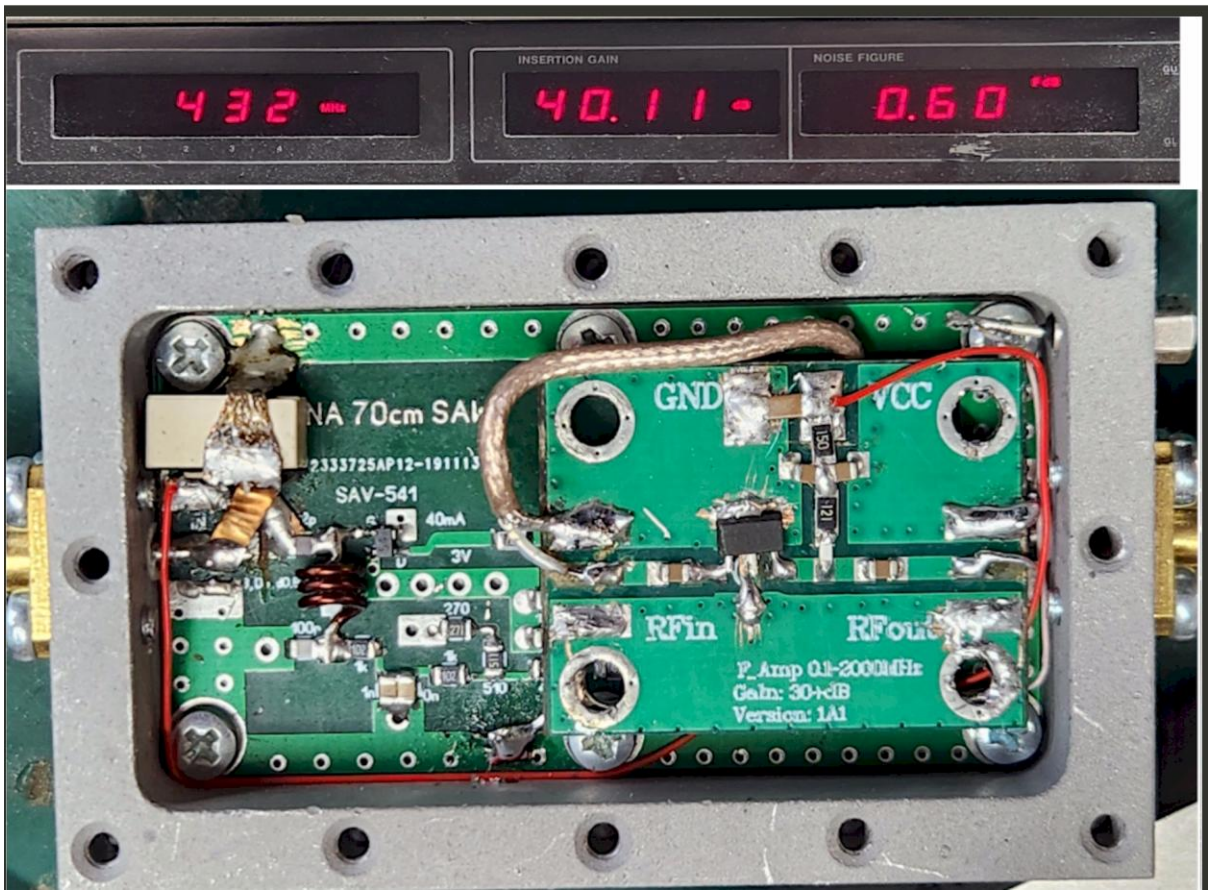
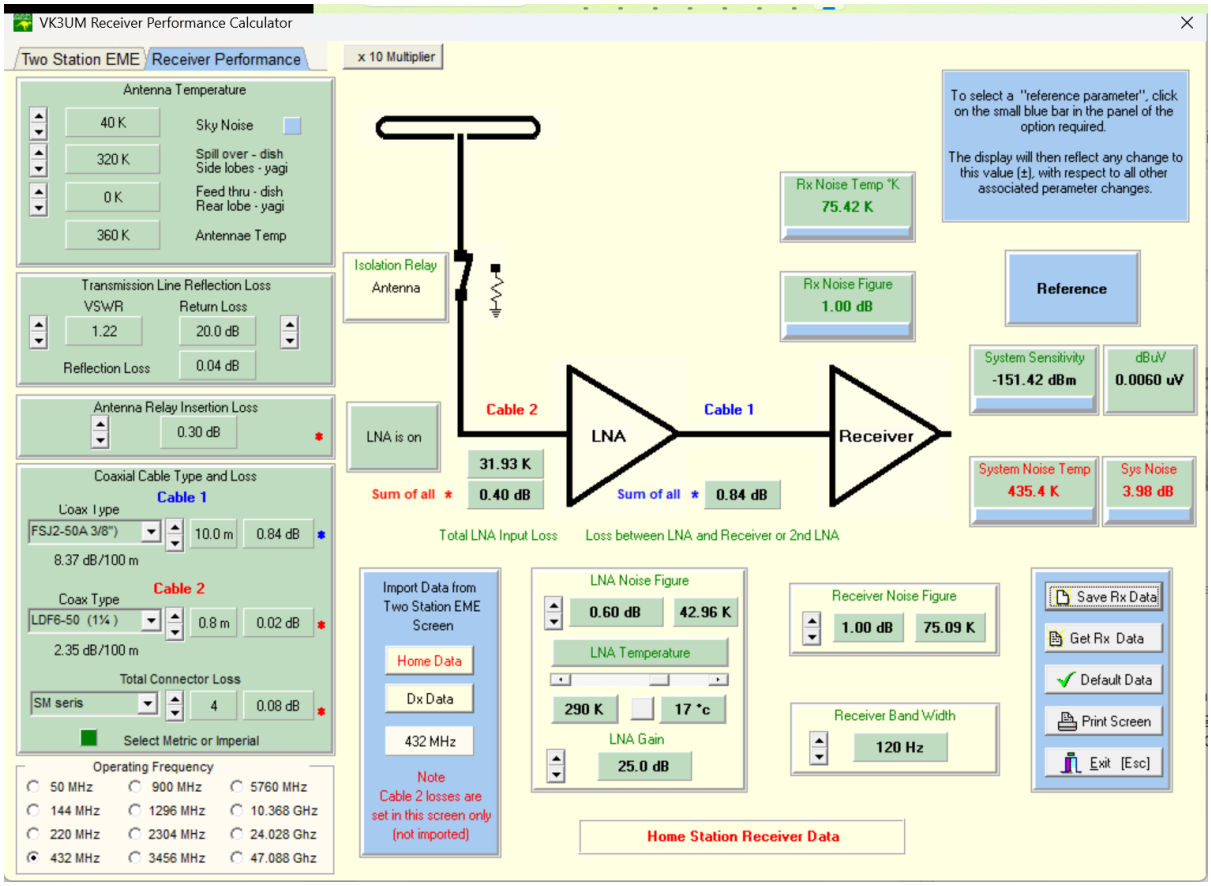


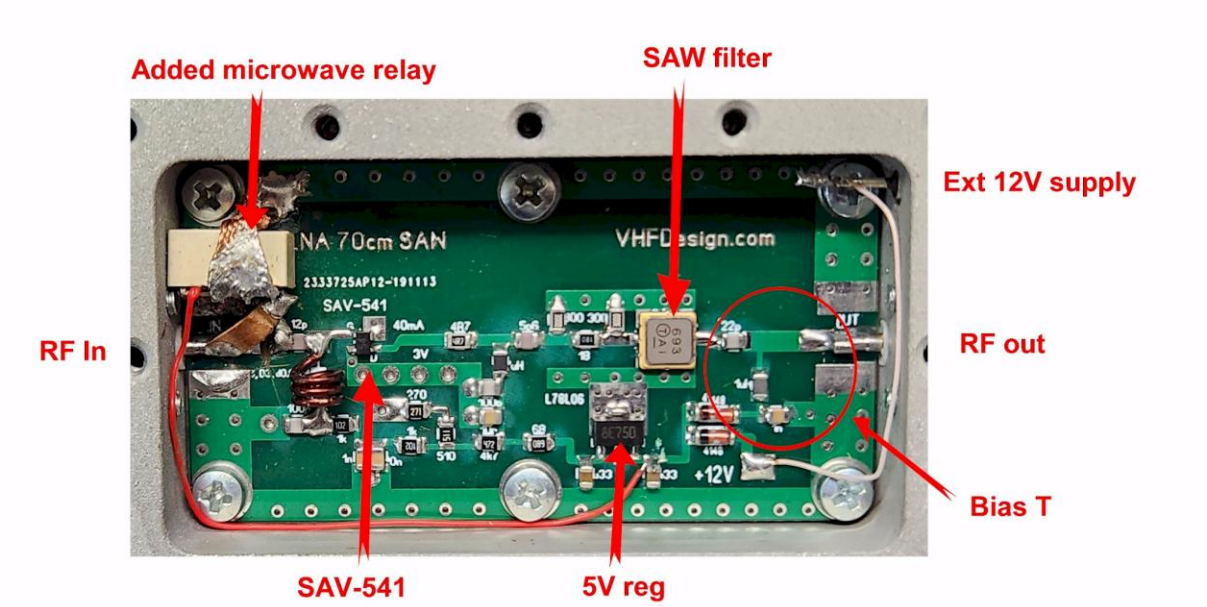
VHF Design LNA 70cm SAW 18dBG 0.3dBF was chosen for the EME array. tow (V & H polarization) feed to a Dual VHF SDR in the shack via 15m LMR240 cable (4.5dB) and a 15dB splitter. MAP65 is used with the SDR for wide band decode a adaptive polarization. The splitter allows concurrent use of a second receiver (Funcube Pro+) with WSJT. The AFE822x SDR-VHFx2 (https://afedri-sdr.com/index.php/afe822x-sdr-vhfx2-dual-channel) has a NF of 6dB. VK3UM EME calculator shows more LNA gain is required to mask the NF at the SDR. A PGA-103 fitted to a generic VHF preamp and biased for 12V was selected as a second stage. To simplify connectors and interwiring the PGA-103 was fitted in the VHF Design enclosure. The external 12V feed through was rewired for the BiasT supply to feed the TxRx aerial changeover relay for the array.

The AFE822x maximum RF input is specified as +26dBm. As the TxRx changeover relay (Dowkey CX600 equivalent) provides only 20dB isolation and the transmit power may be QRO additional isolation was achieved in the LNA. A microwave relay was fitted at the RF In connector and connected with brass strip and braid. There are many miniature microwave relay types (Omron G6Z, Nais ARE, Axicom HF3, etc) are available. Some provide over 50dB isolation with less than 0.2dB insertion loss at 70cm. Proper PCB mounting is required to achieve these figures. With the ad hoc installation greater than 20dB isolation and 0.2 dB insertion loss was achieved for a two-pole single changeover type relay. Maximum RF input > 46dBm. LNA noise figure 0.6dBF.



The LNA second stage uses a PGA-103 specified at 22dBG, < 0.6dBF at 400MHz, and output >20dBm (1dB compression). A generic eBay RF amplifier was modified for the PGA-103 and the bias resistors were revised for 12V supply at 80mA (120R). the 22p at the output of the SAW filter of the first stage was removed and 50R miniature coax cable connected between the output of the SAW filter and the input of the 2nd LNA stage. The RF OUT of the enclosure was connected by pigtails to the PGA-103 PCB. 12V from the LNA bias T was connected to the PGA-103. The external V input feedthrough was connected to the bias T output to supply the TxRx changeover relays. Overall performance measured at 40dBG 0.6dBF


VK3UM Receiver Performance Calculator
Two Station EME
Receiver Performance
x 10 Multiplier
Antenna Temperature
40 K
Sky Noise
320 K
Spill over - dish
Side lobes - yagi
0 K
Feed thru - dish
Rear lobe - yagi
360 K
Antennae Temp
Transmission Line Reflection Loss
VSWR
1.22
Return Loss
20.0 dB
Reflection Loss
0.04 dB
Antenna Relay Insertion Loss
0.30 dB
Coaxial Cable Type and Loss
Cable 1
Coax Type
FSJ2-50A 3/8")
10.0 m
0.84 dB
8.37 dB/100 m
Cable 2
Coax Type
LDF6-50 (1¼)
0.8 m
0.02 dB
2.35 dB/100 m
Total Connector Loss
SM seris
4
0.08 dB
Select Metric or Imperial
Operating Frequency
50 MHz
144 MHz
220 MHz
432 MHz
900 MHz
1296 MHz
2304 MHz
3456 MHz
5760 MHz
10.368 GHz
24.028 Ghz
47.088 Ghz
Isolation Relay
Antenna
LNA is on
Cable 2
LNA
Cable 1
Receiver
31.93 K
Sum of all
0.40 dB
Sum of all
0.84 dB
Total LNA Input Loss
Loss between LNA and Receiver or 2nd LNA
Rx Noise Temp °K
75.42 K
Rx Noise Figure
1.00 dB
To select a "reference parameter", click on the small blue bar in the panel of the option required.
The display will then reflect any change to this value (±), with respect to all other associated perameter changes.
Reference
System Sensitivity
-151.42 dBm
dBuV
0.0060 uV
System Noise Temp
435.4 K
Sys Noise
3.98 dB
Import Data from Two Station EME Screen
Home Data
Dx Data
432 MHz
Note
Cable 2 losses are set in this screen only (not imported)
LNA Noise Figure
0.60 dB
42.96 K
LNA Temperature
290 K
17 °c
LNA Gain
25.0 dB
Receiver Noise Figure
1.00 dB
75.09 K
Receiver Band Width
120 Hz
Save Rx Data
Get Rx Data
Default Data
Print Screen
Exit [Esc]
Home Station Receiver Data



VHF Design LNA 70cm SAW



PGA-103 2nd Stage