Preamplifier SSB-Electronics SP-13 for the 13cm band

Matthias DD1US Rev 1.0 May 18th 2025

Hello,

Recently I was able to acquire second hand a preamplifier for the 13cm band from SSB-Electronics SP-13. These amplifiers are no more available new.

The LNA is operating with a supply voltage of 13.8V which can be supplied via the coaxial cable to the transceiver/receiver or via a dedicated PL-jack. It includes relays which bypass the preamplifier during transmission. The RF connectors are N type.

SSB-Electronics is giving the following specifications:

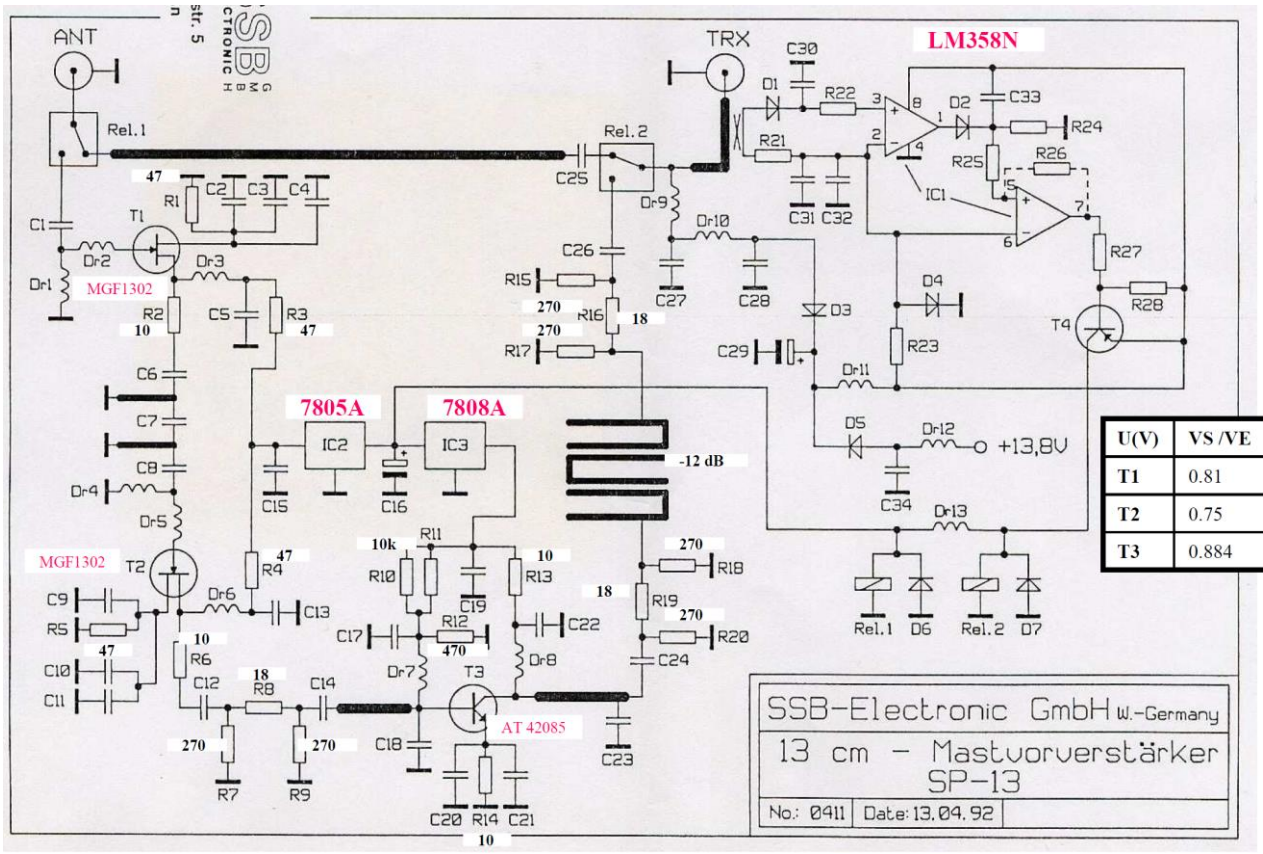
Frequency range:	2300 … 2400 MHz
Gain (typ):	25 dB
Noise Figure (typ):	1.2 dB
OIP3:	+35 dBm
Supply voltage:	+12 ...14 V
Supply current:	120 mA typ.
Max TX power (VOX):	10 W
Max. TX power (DCW-2004B) FM:	25 W
Max. TX power (DCW-2004B) SBB:	50 W

The preamplifier is built into a nickel-silver encasing for proper shielding. I like this material very much because in contrast to tin-plated cabinets it is not prone to corrosion. The metal encasing is built into a blue plastic encasing to protect it from rain.

Here are some pictures of the device:

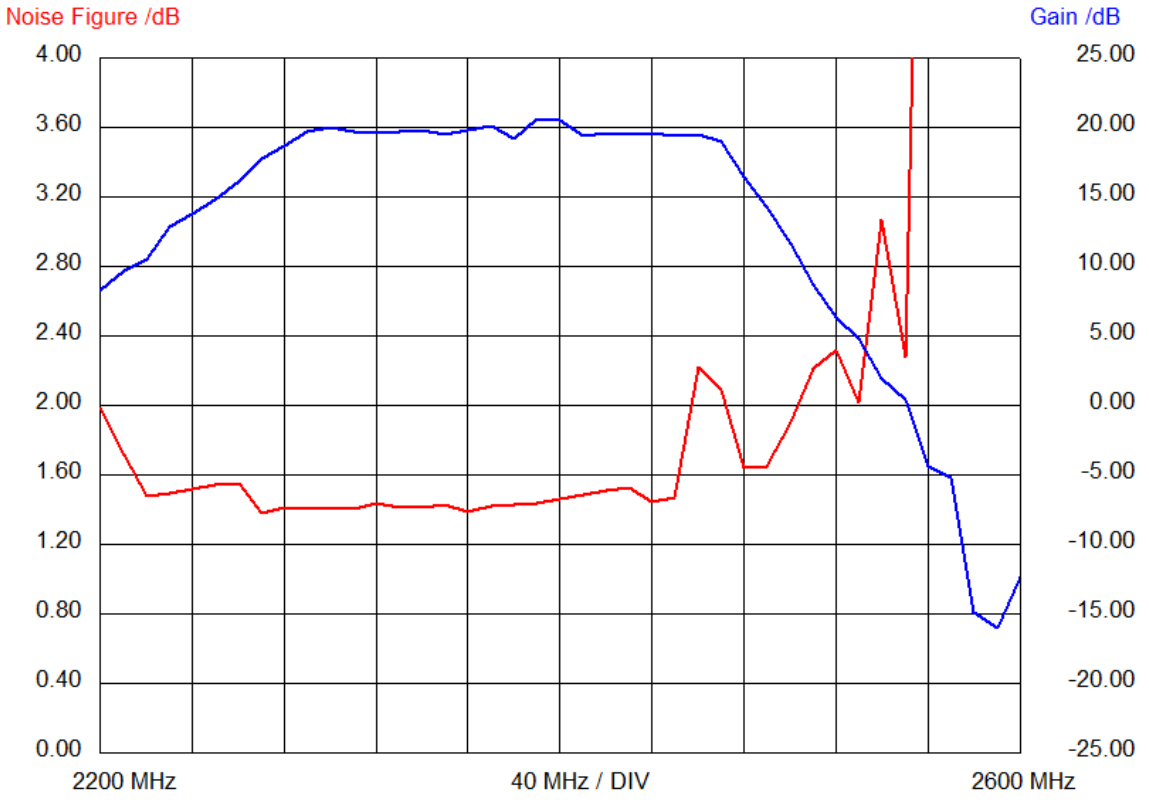

SUPER-AMP
GaAs-FeT PREAMPLIFIER
MODEL SP-13
2300-2400 MHz
SSB
GERMANY

I found an excellent presentation from F5DQK in the internet, where he described in very detail his reverse engineering and repair of such an SP-13 preamplifier. He also published the schematic of the unit:



U(V)	VS /VE	VD
T1	0.81	4.33
T2	0.75	4.39
T3	0.884	7.89

I measured gain and noise figure in the frequency range 2200 to 2600 MHz:



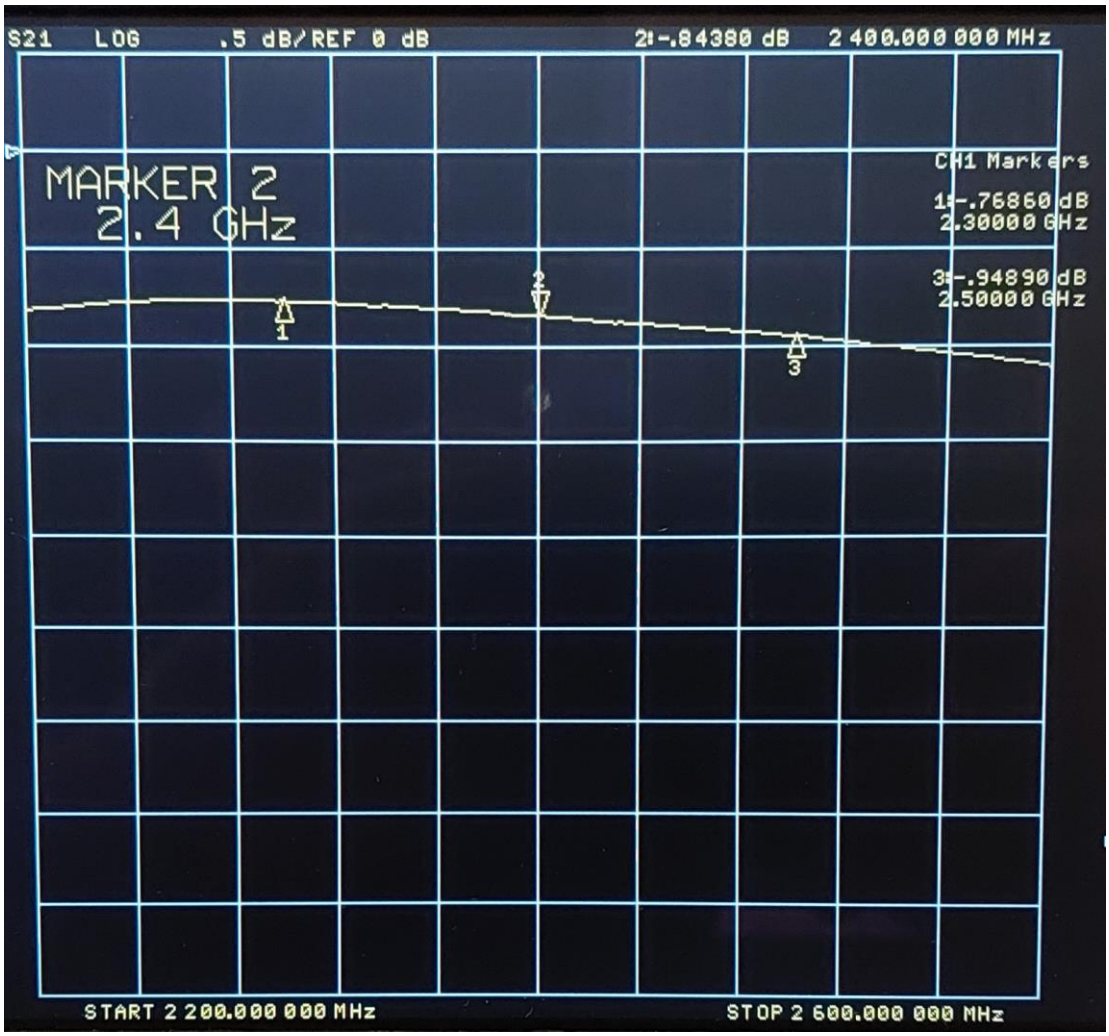
Here is table of the measured values:

Frequency	Gain	NF
2200 MHz	8.33 dB	1.99 dB
2210 MHz	9.74 dB	1.71 dB
2220 MHz	10.50 dB	1.48 dB
2230 MHz	12.92 dB	1.50 dB
2240 MHz	13.79 dB	1.52 dB
2250 MHz	14.82 dB	1.55 dB
2260 MHz	16.18 dB	1.55 dB
2270 MHz	17.75 dB	1.38 dB
2280 MHz	18.70 dB	1.41 dB
2290 MHz	19.74 dB	1.40 dB
2300 MHz	20.06 dB	1.41 dB
2310 MHz	19.72 dB	1.41 dB
2320 MHz	19.60 dB	1.44 dB
2330 MHz	19.68 dB	1.41 dB
2340 MHz	19.79 dB	1.42 dB
2350 MHz	19.54 dB	1.43 dB
2360 MHz	19.82 dB	1.39 dB
2370 MHz	20.09 dB	1.42 dB
2380 MHz	19.26 dB	1.43 dB
2390 MHz	20.59 dB	1.44 dB
2400 MHz	20.50 dB	1.46 dB
2410 MHz	19.41 dB	1.49 dB
2420 MHz	19.64 dB	1.51 dB
2430 MHz	19.47 dB	1.53 dB
2440 MHz	19.61 dB	1.45 dB
2450 MHz	19.41 dB	1.47 dB
2460 MHz	19.55 dB	2.22 dB
2470 MHz	19.04 dB	2.09 dB
2480 MHz	16.41 dB	1.64 dB
2490 MHz	14.26 dB	1.65 dB
2500 MHz	11.59 dB	1.91 dB
2510 MHz	8.68 dB	2.22 dB
2520 MHz	6.35 dB	2.32 dB
2530 MHz	4.78 dB	2.02 dB
2540 MHz	1.94 dB	3.07 dB
2550 MHz	0.43 dB	2.28 dB
2560 MHz	-4.40 dB	8.04 dB
2570 MHz	-5.14 dB	8.17 dB
2580 MHz	-14.83 dB	17.44 dB
2590 MHz	-15.97 dB	16.81 dB
2600 MHz	-12.31 dB	10.50 dB

The measurement results are a bit worse than the specified values from the supplier. I measured a minimum noise figure of 1.39 dB in the 13 cm band versus a specified typical value of 1.2 dB. Also, the measured gain of approx. 20 dB, which is very flat from 2.3 to 2.4 GHz is lower than the specified typical value of 25 dB.

What is especially nice about this preamplifier is his selectivity thanks to the embedded bandpass filter.

Finally, I measured the insertion loss in TX mode:



The insertion loss between 2300 and 2400 MHz is about 0.8 dB. It is not specified by the supplier. Assuming that this loss is mostly due to the RF relays this means that the preamplifier itself (without the relays) has a noise figure of about 1 dB.

I always appreciate feedback and will be happy to answer questions.

Please send it to the Email address which you can find on my website.

Best regards

Matthias DD1US

Homepage: http://www.dd1us.de