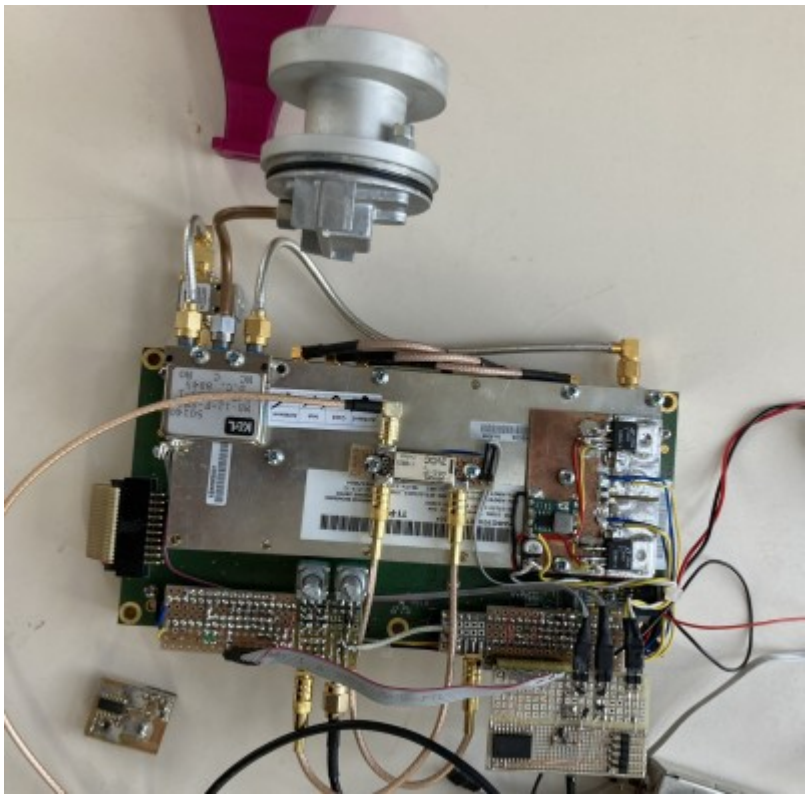
Compact 10 GHz transverter

There are 10 GHz transceiver modules from Cambridge Broadband Networks available at eBay. Based on these modules a compact transverter(in contrast to former modular approaches) for the 3 cm amateur radio band was built.

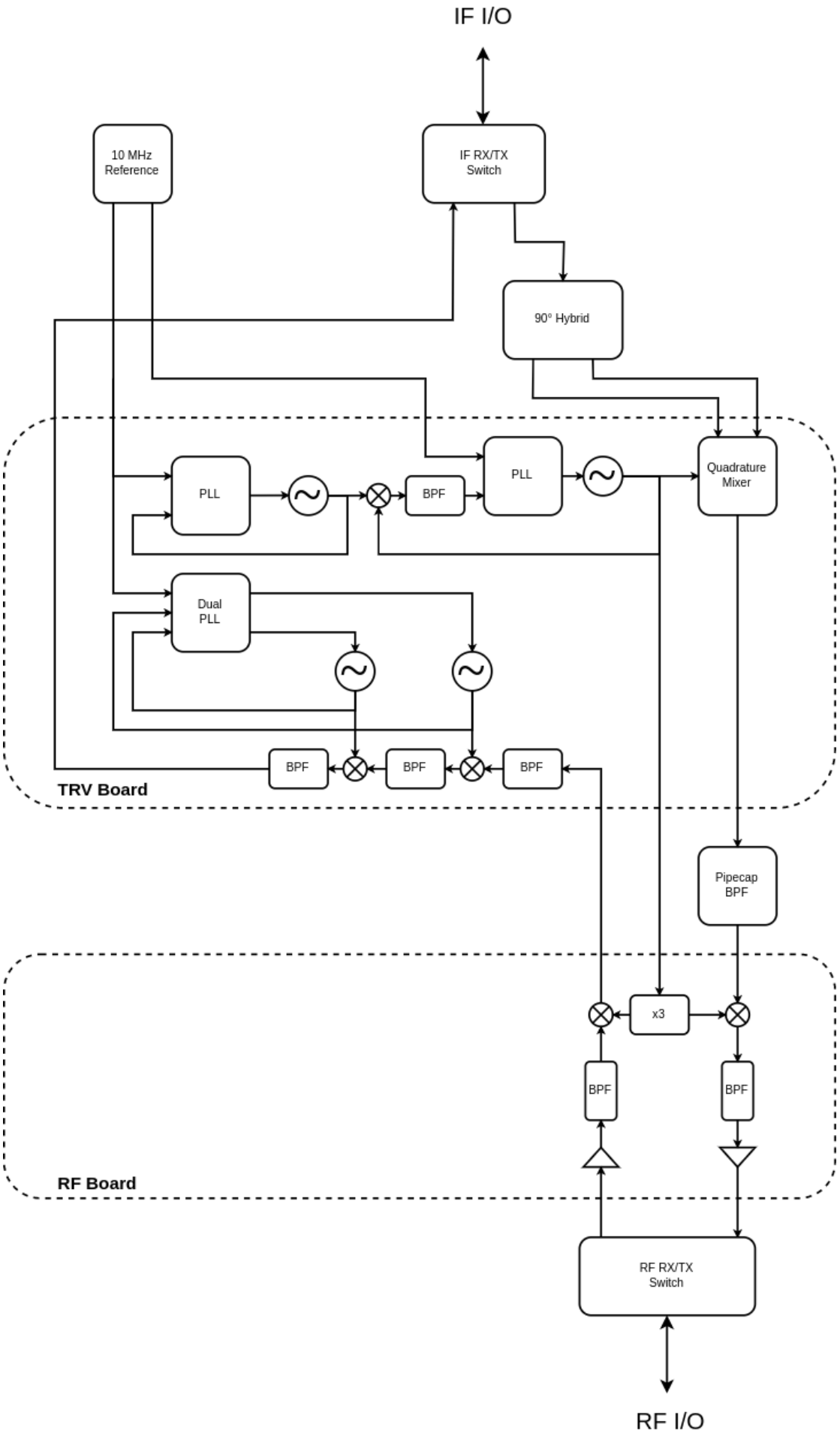


First all the details of the modules were reverse engineered(documented here in german) and a concept for the usage as a 3cm transverter was worked out. A first prototype was tinkered together and performed very well:



Concept

The idea is to use as much as possible parts from the original design and adapt them to a simplex transverter with the same IF for receiving and transmitting.


IF I/O
10 MHz Reference
IF RX/TX Switch
90° Hybrid
PLL
BPF
PLL
Quadrature Mixer
Dual PLL
BPF
BPF
BPF
TRV Board
Pipecap BPF
x3
BPF
BPF
RF Board
RF RX/TX Switch
RF I/O

As transceiver IF 50 MHz is used. The transmit path is designed for <1W input power. With a 90° hybrid coupler the quadrature mixer in the transmit section of the transceiver module is used as a image reject mixer to 2.63 GHz. This IF gets filtered externally with a 28mm pipe cap filter to further attenuate the LO and side-band signal (+harmonics). In the first built 0.5 W output power could be reached without additional tuning of the power amplifier. The receiving chain consists of 3 translations from 10 GHz to 2886 MHz to 320 MHz to 50 MHz. There is very much gain involved and can be adjusted by several step attenuators. On the first built the noise was adjusted to be 10 dB higher than the noise of the transceiver to maintain a good noise figure. Switching between receiving and transmitting needs reprogramming of the synthesizers and switching of RF and IF, which is handled by the MCU. An integrated 10 MHz OCXO delivers reference signals for all the PLL synthesizers.

Modifications

TX Baseband Filters

TX IF Filter

PA Power Supply

RX IF Filter

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