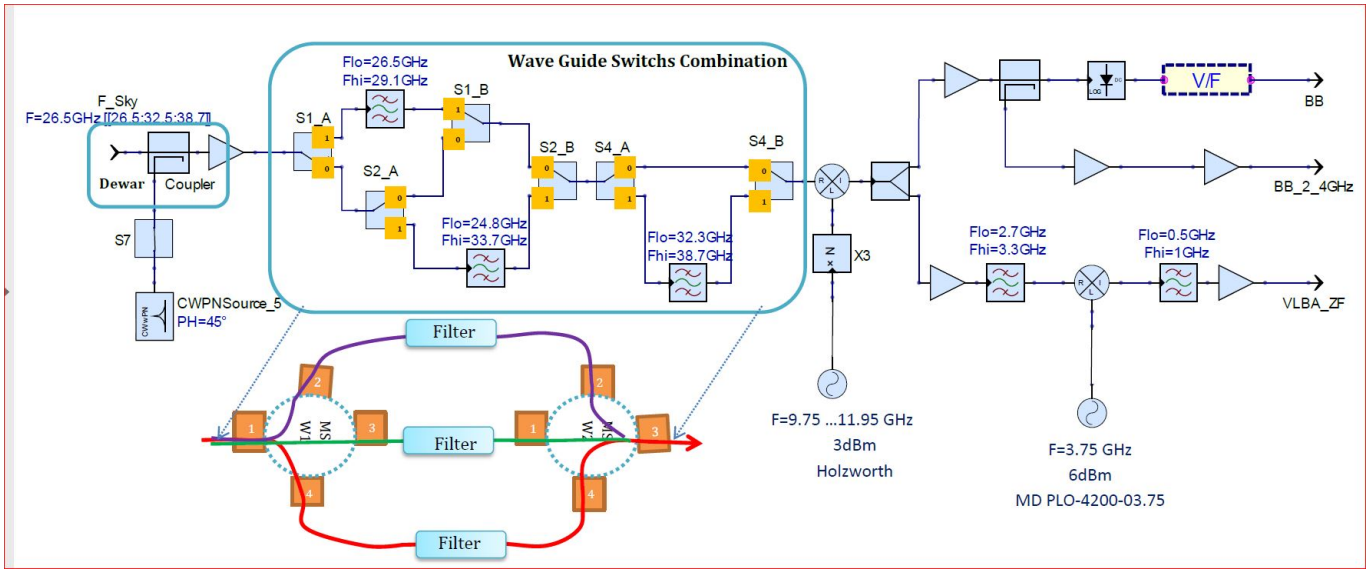
Technical Documentation of the 1cm Receiver 27 - 38 GHz (P10mm)

Type	HEMT cooled
Channel	1
Receiver Noise Temperature	10-40 K
Bandwidth RF-Filters	See below filter combination
Polarization	Linear
Calibration	Noise Diode
Feed	Primary Focus Horn

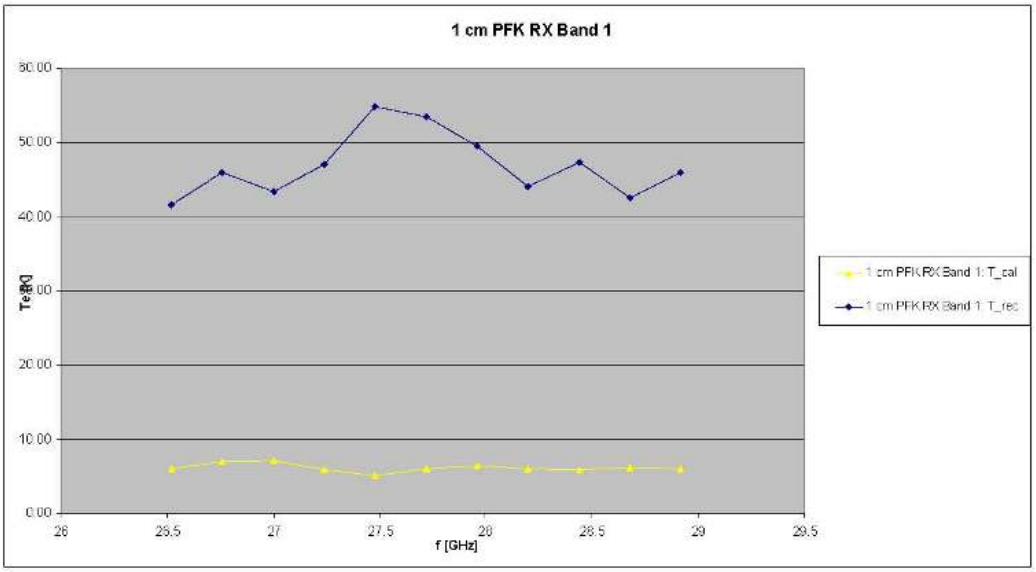
Frequency Range	26.5 - 38.7 GHz		
1.IF	2 - 4 GHz (Broadband)		
1.Synthesizer	Holzworth HSM12001	Frequency 9.75 - 11.95 GHz	
Filter Band	*Frequency Band*	*Frequency Synthesizer and LO1*	*Side Band*
Band 1	26.4 - 29.1 GHz	F = 3*(9.75 - 10.7 GHz) = 29.25 - 32.1 GHz	LSB
Band 2	28.5 - 33.7 GHz	F = 3*(10.5 - 11.9 GHz) = 31.50 - 35.7 GHz	LSB
Band 3	32.3 - 38.7 GHz	F = 3*(9.77 - 11.9 GHz) = 29.31 - 35.7 GHz	USB
2.IF	500 - 1000 MHz		
2.Local Oscillator	fixed Phase Locked Oscillator	LO2=3.75 GHz	

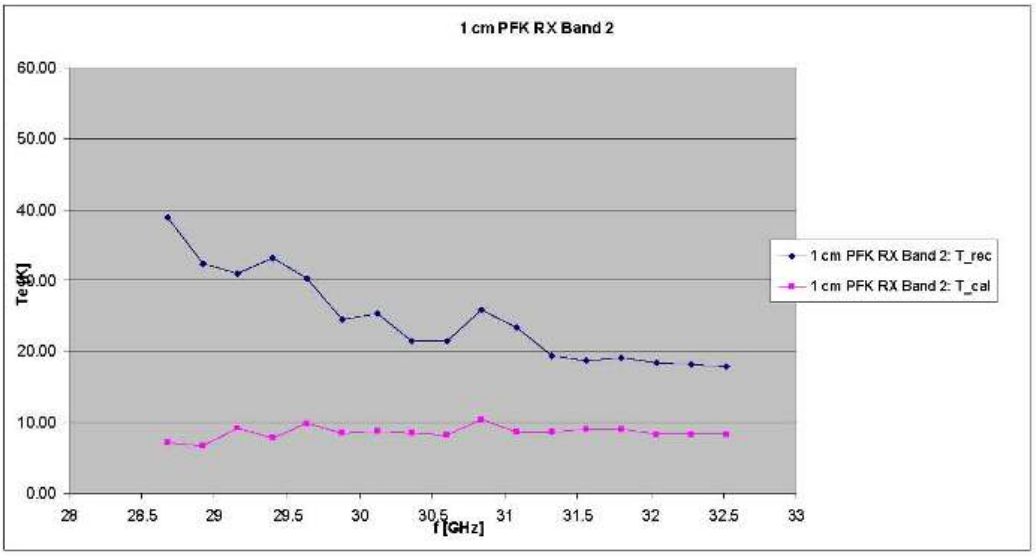
Block Diagram

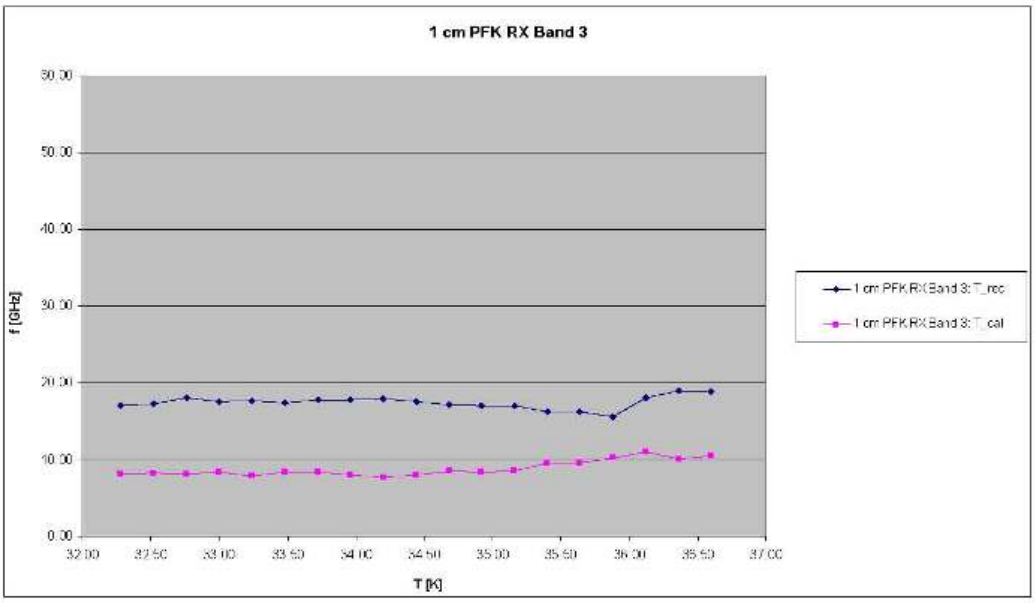


> Simplified Block Diagram of p10mm_receiver_withholzworth.pdf, (ZMK on 26.03.2021)

Receiver Noise Temperature


1 cm PFK RX Band 1
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Te [K]
26
26.5
27
27.5
28
28.5
29
29.5
f [GHz]
1 cm PFK RX Band 1: T_cal
1 cm PFK RX Band 1: T_rec


1 cm PFK RX Band 2
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Te [K]
28
28.5
29
29.5
30
30.5
31
31.5
32
32.5
33
f [GHz]
1 cm PFK RX Band 2: T_rec
1 cm PFK RX Band 2: T_cal



Comments

This system is equipped with 3 RF-Filters to suppress mirror frequency reception. During observation, the filter and ULO settings have to be selected according to the observation frequency (see block diagram).In March 2007 the LNA was replaced by an InP-HEMT MMIC-amplifier designed for the 9mm receiver. Therefore the noise figure at low frequencies is not ideal.This system is part of the Primary Focus Multi Frequency Box #1 (PM 1).