

3mm primary focus receiver (84000-95500 MHz)

This is a 3-channel dual-feed system designed for VLBI observations. It is also available for continuum and spectroscopic observations, but one should be aware that the observatory is located at rather low elevation and the weather conditions are not ideal for mm-observations.

Since some years there exists a NASA satellite that operates a radar at 90 GHz. The radar is called CloudSat and is powerful enough too not only produce RFI, but it can also destroy the receiver when passing inside the beam. Please check the [CloudSat homepage](#) when planning 3mm observations. The CloudSat page also provides a forecast for satellite passages at specific radio observatories: [here for Effelsberg](#).

Calibration Information

Frequency [GHz]	Channel	Polarisation	Tcal [K]	Tsys [K]	Sensitivity [K/Jy]	SEFD [Jy]	Aperture Eff. [%]	TMB/S [K/Jy]	Main Beam Eff. [%]	FWHM [arcsec]	Last update
86.25	A	LCP	13.1	158	0.14	1154	4.8	1.38	10	10.9	Mar 2013
86.25	B	RCP	16.7	161	0.14	1174	4.8	1.37	10	10.9	Mar 2013
normalized Gain curve ($G = A0 + A1 \cdot Elv + A2 \cdot Elv^2$)						Observed in confirmed					
A0= 0.63495		A1=2.3001E-2		A2=-3.6231E-4		May 2012					

Comments:

- Tcal for channel C, the weather horn, is about 42 K, Tsys about 150K.
- The calibration parameters for this receiver strongly depend on the weather conditions.

Version description for OBSINP

RX Name	Wavelength [cm]	Frequency (center) [GHz]	Nr. of Horns
P3mm 4-Box (84-87 GHz)	0.3	84.0-95.5	1
Version:	Comment		
1. Cont./Line/VLBI (BW: 500 MHz)	Continuum, spectroscopy, and VLBI version		
2. Pulsar (BW: 500 MHz)	Pulsar version		
Horn offsets [arcsec]	-1070.5, 1046.6		

Channel assignment in the MBFITS data files

Note that the narrow line and VLBA IF channels are usually only available when the specific line version of the receiver was selected. In addition for most receivers with narrow line channels the cables at the patch board need to be connected by the receiver group.

To select different channel numbers in OBSINP, the online plot, or the toolbox the numbers have to be

specified like $c(1)+c(2)$ to add channel 1 and 2. E.g. channel 1 and 2 contain the LCP and RCP broadband channels, then "OnIPlot pen='c(1)+c(2)'" or "toolbox use='c(1)+c(2)'" will select these channels. In OBSINP the pen can be directly specified in the receiver selection menu.

Abbreviations:

SB: narrow band channel (Schmalband-Kanal), 100 MHz band width

BB: digital broad band channel (Breitband-Kanal), band width varies for different receivers

VLBA: VLBA IF, 500 MHz band width

BW: band width

TP: total power

3mm PFK (Multi-RX-Box II)			
Channel	IF	Pol.	Comment
1	BB	LCP	Horn 1, TP A
2	BB	RCP	Horn 1, TP B
3	BB	RCP	Horn 2, TP A
4	VLBA	LCP	TP A
5	VLBA	RCP	TP B
6	VLBA	cross	cos AB
7	VLBA	cross	sin AB

Spectroscopy modes and resolution

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
100	32768	85000	3.1	0.011	0.012
100	32768	87000	3.1	0.011	0.012
100	32768	89000	3.1	0.010	0.012
100	32768	91000	3.1	0.010	0.012
100	32768	93000	3.1	0.010	0.011
100	32768	95000	3.1	0.010	0.011
500	32768	85000	15.3	0.054	0.062
500	32768	87000	15.3	0.053	0.061
500	32768	89000	15.3	0.051	0.060
500	32768	91000	15.3	0.050	0.058
500	32768	93000	15.3	0.049	0.057
500	32768	95000	15.3	0.048	0.056

BW ... band width

nchan ... number of spectral channels

nu ... center frequency

Df ... Channel separation (in frequency)

Dv ... Channel separation (in velocity)

dv ... Velocity resolution ($dv=1.16*Dv$)

Tcal and Tsys measurements

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<https://eff100mwiki.mpifr-bonn.mpg.de/> - **Effelsberg 100m Teleskop**

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