

18cm/21cm prime focus receiver (1270-1730 MHz)

This system is used for sensitive continuum, VLBI (especially 18cm), spectroscopy, and pulsar observations. Be aware, that this band may be influenced by RFI. It can be used in combination with a multi channel polarimeter of 8x4 MHz band width, and a total 40 MHz wide channel. Interferences are heavily present in these bands, unfortunately also around the 1720 MHz OH transition.

Overview

RX Name	Band	Frequency range [GHz]	Polarisation	Nr. of Horns	Horn position relativ to center of focus cabin
P200mm	L	1.27-1.73	dual-circular (center horn)	1	Central horn: Az: 0 arcsec, Elv: 0 arcsec

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
1.400	A	LCP	5.0	20	1.54	13	54	1.88	66	580	June 2015
1.400	B	RCP	5.0	20	1.56	13	54	1.88	66	580	June 2015
1.660	A	LCP	1.6	18	1.54	12	54	1.85	65	490	October 2013
1.660	B	RCP	1.5	19	1.52	13	53	1.85	65	490	October 2013
normalized Gain curve ($G = A0 + A1 \cdot Elv + A2 \cdot Elv^2$)							Observed in	confirmed			
A0 = 1.0		A1 = 0.0		A2 = 0.0			Feb 2024				

Comments:

- Strong interferences can occur in this frequency regime, eg. between 1.50 and 1.64 GHz!
- There are two values for the noise cal, different by about 6dB. See the table below to learn which receiver version uses which value.

Available receiver versions (for OBSINP)

Version	Description	Details
EDDPOL_MULTIFIBA	spectro-polarimeter backend for continuum observations	with 32k channels
EDD_PULSAR_MULTIFIBA	pulsar backend	
cont_spec_100mhz	continuum and spectroscopy version with the XFFT spectrometer	
vlbi	Version for VLBI observations	

Below here: Information is currently updated.

Version description for OBSINP

RX Name	Wavelength [cm]	Frequency (center) [GHz]	Nr. of Horns
P200mm 4-Box (1.29-1.73 GHz)	21.0-18.0	1.29-1.73	1
Version:	Comment		
1. Cont./Line: 1,29-1,43 GHz (BW: 100 MHz)	21cm, 2 channel continuum/line version		
2. Cont./Line: 1,59-1.725 GHz (BW: 100 MHz)	18cm, 2 channel continuum/line version		
3. Pulsar 1,29-1,43 GHz (BW: 100 MHz)	21cm, Pulsar version		
4. Pulsar: 1,59-1.725 GHz (BW: 100 MHz)	18cm, Pulsar version		
5. VLBI: 1,29-1,43 GHz (BW: 100 MHz)	21cm VLBI version		
6. VLBI: 1,59-1.725 GHz (BW: 100 MHz)	18cm VLBI version		
7. Polarimeter: 1,29-1,43 GHz (BW: 100 MHz)	21cm, 8 channel polarimeter		
8. Polarimeter: 1,59-1.725 GHz (BW: 100 MHz)	18cm, 8 channel polarimeter		
Horn offsets [arcsec]	-874.4,971.1		

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 "OnlPlot 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

18/21cm PFK (Multi-RX-Box I, 2 channel cont/line, Pulsar and VLBI versions)			
Channel	IF	Pol.	Comment
1	SB	LCP	TP A
2	SB	RCP	TP B
3	SB	cross	cos AB
4	SB	cross	sin AB

18/21cm PFK (Multi-RX-Box I, multi channel polarimeter version)			
Channel	IF	Pol.	Comment
1	SB	LCP	center=freq-14MHz, BW=4MHz, TP A
2	SB	RCP	center=freq-14MHz, BW=4MHz, TP B

18/21cm PFK (Multi-RX-Box I, multi channel polarimeter version)

Channel	IF	Pol.	Comment
3	SB	cross	center=freq-14MHz, BW=4MHz, cos AB
4	SB	cross	center=freq-14MHz, BW=4MHz, sin AB
5	SB	LCP	center=freq-10MHz, BW=4MHz, TP A
6	SB	RCP	center=freq-10MHz, BW=4MHz, TP B
7	SB	cross	center=freq-10MHz, BW=4MHz, cos AB
8	SB	cross	center=freq-10MHz, BW=4MHz, sin AB
9-28	...	...	continues in 4MHz steps until
29	SB	LCP	center=freq+14MHz, BW=4MHz, TP A
30	SB	RCP	center=freq+14MHz, BW=4MHz, TP B
31	SB	cross	center=freq+14MHz, BW=4MHz, cos AB
32	SB	cross	center=freq+14MHz, BW=4MHz, sin AB
			last 4 channels contain the total IF
33	SB	LCP	BW=40MHz, TP A
34	SB	RCP	BW=40MHz, TP B
35	SB	cross	BW=40MHz, cos AB
36	SB	cross	BW=40MHz, sin AB

Spectroscopy modes and resolution

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
100	32768	1300	3.1	0.704	0.816
100	32768	1320	3.1	0.693	0.804
100	32768	1340	3.1	0.683	0.792
100	32768	1360	3.1	0.673	0.780
100	32768	1380	3.1	0.663	0.769
100	32768	1400	3.1	0.653	0.758
100	32768	1420	3.1	0.644	0.747
100	32768	1440	3.1	0.635	0.737
100	32768	1600	3.1	0.572	0.663
100	32768	1620	3.1	0.565	0.655
100	32768	1640	3.1	0.558	0.647
100	32768	1660	3.1	0.551	0.639
100	32768	1680	3.1	0.545	0.632
100	32768	1700	3.1	0.538	0.624
100	32768	1720	3.1	0.532	0.617

BW ... band width

nchan ... number of spectral channels

nu ... center frequency

Df ... Channel separation (in frequency)

Dv ... Channel separation (in velocity)

dv ... Velocity resolution ($dv=1.16 \cdot Dv$)

Tcal measurements

Tcal as measured in November 2014



Tcal as measured in June 2013



Note that although the lines continue it is not possible to observe at frequencies between 1425 MHz and 1560 MHz.

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