21cm prime focus receiver (1260-1510 MHz)

This system can be used for sensitive continuum, spectroscopy, and pulsar observations. Additionally, it will be employed in search-programs for space-debris. Be aware, that this band may be influenced by RFI. The central horn has two circular polarizations, each of the outer six horns two linear polarizations.

Overview

RX Name	Band	Frequency range [GHz]	Polarisation	Nr. of Horns	Horn position relativ to center of focus cabin
P217mm	L	1.26-1.51	dual-circular (center horn) 2xlinear (outer horns)	7	Central horn: Az: 0 arcsec, Elv: 0 arcsec Outer horns: (-785.0,453.0),(0.0,906.0),(785.0,453.0),(785.0,-453.0),(0.0,-906.0),(-785.0,-453.0) 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
1.408	A	LCP	4.5	23	1.55	15	55	1.8	85	587	Mar 2020
1.408	B	RCP	4.4	22	1.55	14	55	1.8	85	587	Mar 2020

normalized Gain curve (G = A0 + A1·Elv + A2·Elv2)			Observed in	confirmed
A0 = 1.0	A1 = 0.0	A2 = 0.0	Dec 2007	Jan 2014

Comments:

- Values for the other horns will follow.

Available receiver versions (for OBSINP)

Version	Description	Details
EDDPOL_32k_Faraday	spectro-polarimeter backend for continuum observations	with 32k channels
EDDPOL_64k_Faraday	spectro-polarimeter backend for continuum observations	with 64k channels
EDD_PULSAR	pulsar backend	not usable for continuum observations!

Below here: Information is currently updated.

Version description for OBSINP

RX Name	Wavelength [cm]	Frequency (center) [GHz]	Nr. of Horns
P217mm 7-Beam (1.26-1.51 GHz)	21.0	1.26-1.51 (1.4)	7
Version:	**Comment**		
1. Beam-Park-Mode (BW: 47 MHz)	Version for space debris search		
2. Continuum/Line (XFFTS) (BW: 100 MHz)	Continuum/Line with the central horn (+1) only.		
3. Pulsar (BW: 300 MHz)	Pulsar wide band filter		
4. Line with AFFTS only	HI Survey		
Horn offsets [arcsec]	(0.0,0.0),(-785.0,453.0),(0.0,906.0),(785.0,453.0),(785.0,-453.0),(0.0,-906.0),(-785.0,-453.0)		

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

21cm-7beam PFK (only 2 out of 7 horns for continuum)			
Channel	**IF**	**Pol.**	**Comment**
1	SB	LCP	central horn 1, TP A
2	SB	RCP	central horn 1, TP B
3	SB	cross	central horn 1, cos AB
4	SB	cross	central horn 1, sin AB
5	SB	linear	horn 2, TP A
6	SB	linear	horn 2, TP B
7	SB	cross	horn 2, cos AB
8	SB	cross	horn 2, sin AB

Spectroscopy modes and resolution

BW	nchan	nu	Df	Dv	dv
MHz		MHz	kHz	km/s	km/s
100	16384	1320	6.1	1.386	1.608
100	16384	1340	6.1	1.366	1.584
100	16384	1360	6.1	1.345	1.561
100	16384	1380	6.1	1.326	1.538
100	16384	1400	6.1	1.307	1.516
100	16384	1420	6.1	1.289	1.495
100	16384	1440	6.1	1.271	1.474

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