

# 3.6cm secondary focus receiver (7800-8900 MHz)

This is a 4-channel system mainly for sensitive continuum observations, polarimetry, VLBI and pulsar observations. Simultaneous operation with the S-band (13cm, 2.2 GHz) receiver for geo VLBI observations are possible.

## 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 |
|--------------------------------------------------------------------------------------------------|---------|--------------|-----------------|----------|--------------------|-----------|------------------------------|--------------|--------------------|---------------|-------------|
| 8.410                                                                                            | I (BB)  | RCP          | 2.5             | 22       | 1.35               | 18        | 45                           | 2.6          | 49                 | 81.7          | Jul 2008    |
| 8.410                                                                                            | J (BB)  | LCP          | 2.5             | 22       | 1.35               | 18        | 45                           | 2.6          | 49                 | 81.7          | Jul 2008    |
| 8.550                                                                                            | I (BB)  | RCP          | 2.5             | 23       | 1.35               | 18        | 46                           | 2.6          | 50                 | 80.6          | Jul 2008    |
| 8.550                                                                                            | J (BB)  | LCP          | 2.5             | 25       | 1.35               | 19        | 46                           | 2.6          | 50                 | 80.6          | Jul 2008    |
| <b>normalized Gain curve (<math>G = A0 + A1 \cdot \text{Elv} + A2 \cdot \text{Elv}^2</math>)</b> |         |              |                 |          |                    |           | <b>Observed in confirmed</b> |              |                    |               |             |
| A0 = 0.99500                                                                                     |         |              | A1 = 4.3434e-04 |          | A2 = -1.0562e-05   |           | Feb 2007                     |              |                    |               |             |

## Comments:

- All values are valid for the new receiver which was installed in September 2001. If you need data for the old one, please contact [akraus\\_at\\_mpifr-bonn.mpg.de](mailto:akraus_at_mpifr-bonn.mpg.de).
- Note that (against our usual designation) Channel A is RCP and B LCP!
- If no other information about the opacity is available a typical zenith tau value of about 0.015 should do a good job.

## Version description for OBSINP

| RX Name                    | Wavelength [cm]                                                   | Frequency (center) [GHz] | Nr. of Horns |
|----------------------------|-------------------------------------------------------------------|--------------------------|--------------|
| <b>S36mm + 13cm</b>        | 3.6/13                                                            | 7.9-9.0 (8.35)/2.4       | 1            |
| <b>Version:</b>            | <b>Comment</b>                                                    |                          |              |
| 1. Continuum (BW: 1.1 GHz) | Broad Band Continuum + Polarimeter                                |                          |              |
| 2. Line (BW: 100 MHz)      | Spectroscopy/Continuum using narrow band IF + VLBI IF Polarimeter |                          |              |
| 3. Line (BW: 500 MHz)      | Spectroscopy/Continuum using VLBA IF + VLBA IF Polarimeter        |                          |              |
| 4. Pulsar (BW: 1.1 GHz)    | Pulsar 1.1 GHz BW Version                                         |                          |              |
| 5. Pulsar (BW: 500 MHz)    | Pulsar 500 MHz BW Version                                         |                          |              |
| 6. Pulsar (BW: 100 MHz)    | Pulsar 100 MHz BW Version                                         |                          |              |

## 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

| <b>3.6cm SFK single horn receiver with polarimeter (+13cm offset horn for Geo-VLBI)</b> |           |             |                |
|-----------------------------------------------------------------------------------------|-----------|-------------|----------------|
| <b>Channel</b>                                                                          | <b>IF</b> | <b>Pol.</b> | <b>Comment</b> |
| 1                                                                                       | SB        | RCP         | TP A           |
| 2                                                                                       | SB        | LCP         | TP B           |
| 3                                                                                       | SB        | cross       | cos AB         |
| 4                                                                                       | SB        | cross       | sin AB         |
| 5                                                                                       | SB        | RCP         | 13cm, TP A     |
| 6                                                                                       | BB        | LCP         | TP A           |
| 7                                                                                       | BB        | RCP         | TP B           |
| 8                                                                                       | BB        | cross       | cos AB         |
| 9                                                                                       | BB        | cross       | sin AB         |
| 10                                                                                      | VLBA      | LCP         | TP A           |
| 11                                                                                      | VLBA      | RCP         | TP B           |
| 12                                                                                      | VLBA      | cross       | cos AB         |
| 13                                                                                      | VLBA      | cross       | sin AB         |

## Spectroscopy modes and resolution

| <b>BW</b>  | <b>nchan</b> | <b>nu</b>  | <b>Df</b>  | <b>Dv</b>   | <b>dv</b>   |
|------------|--------------|------------|------------|-------------|-------------|
| <b>MHz</b> |              | <b>MHz</b> | <b>kHz</b> | <b>km/s</b> | <b>km/s</b> |
| 100        | 32768        | 7800       | 3.1        | 0.117       | 0.136       |
| 100        | 32768        | 8000       | 3.1        | 0.114       | 0.133       |
| 100        | 32768        | 8200       | 3.1        | 0.112       | 0.129       |
| 100        | 32768        | 8400       | 3.1        | 0.109       | 0.126       |
| 100        | 32768        | 8600       | 3.1        | 0.106       | 0.123       |
| 100        | 32768        | 8800       | 3.1        | 0.104       | 0.121       |
| 500        | 32768        | 7800       | 15.3       | 0.586       | 0.680       |
| 500        | 32768        | 8000       | 15.3       | 0.572       | 0.663       |
| 500        | 32768        | 8200       | 15.3       | 0.558       | 0.647       |
| 500        | 32768        | 8400       | 15.3       | 0.545       | 0.632       |
| 500        | 32768        | 8600       | 15.3       | 0.532       | 0.617       |
| 500        | 32768        | 8800       | 15.3       | 0.520       | 0.603       |

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 and Tsys measurements



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