

# 6-cm secondary focus receiver (4600-5100 MHz)

This is a 4-channel 2-horn system for sensitive continuum, polarimetry, VLBI, and pulsar observations.

## Calibration Information

| Frequency<br>[GHz]                                | Channel | Polarisation   | Tcal<br>[K] | Tsys<br>[K]       | Sensitivity<br>[K/Jy] | SEFD<br>[Jy] | Aperture<br>Eff. [%] | TMB/S<br>[K/Jy] | Main<br>Beam<br>Eff.<br>[%] | FWHM<br>[arcsec] | Last<br>update |
|---------------------------------------------------|---------|----------------|-------------|-------------------|-----------------------|--------------|----------------------|-----------------|-----------------------------|------------------|----------------|
| 4.850                                             | A / B   | LCP / RCP      | 1.8         | 27                | 1.55                  | 18           | 53                   | 2.4             | 63                          | 146              | June<br>2008   |
| normalized Gain curve (G = A0 + A1·Elv + A2·Elv2) |         |                |             |                   |                       |              | Observed in          | confirmed       |                             |                  |                |
| A0 = 0.97323                                      |         | A1 = 1.2702E-3 |             | A2 = -1.5059E-5   |                       | May 2004     |                      |                 |                             |                  |                |
| A0 = 0.995                                        |         | A1 = 5.2022E-4 |             | A2 = -1.27874e-05 |                       | Feb 2008     |                      |                 |                             |                  |                |

## Comments:

- The values for LCP and RCP do not differ significantly.
- The new gain curve (Feb 2007) was corrected for opacity.
- If no other information about the opacity is available a typical zenith tau value of about 0.016 should do a good job.

## Version description for OBSINP

| RX Name                      | Wavelength [cm]                                                   | Frequency (center) [GHz] | Nr. of Horns |
|------------------------------|-------------------------------------------------------------------|--------------------------|--------------|
| <b>S60mm Double Beam</b>     | 6                                                                 | 4.6-5.1 (4.85)           | 2            |
| <b>Version:</b>              | <b>Comment</b>                                                    |                          |              |
| 1. Continuum (BW: 500 MHz)   | Broad Band Continuum + Polarimeter                                |                          |              |
| 2. Pulsar (BW: 500 MHz)      | Pulsar 500 MHz Version                                            |                          |              |
| 3. Line (BW: 100 MHz)        | Spectroscopy/Continuum using narrow band IF + VLBI IF Polarimeter |                          |              |
| 4. Line (BW: 500 MHz)        | Spectroscopy/Continuum using VLBA IF + VLBA IF Polarimeter        |                          |              |
| 5. Pulsar+8dB(BW: 500 MHz)   | Pulsar with attenuation                                           |                          |              |
| <b>Horn offsets [arcsec]</b> | Horn 1: 236.6,-1336.0, Horn 2: -248.4,-1336.0                     |                          |              |

## 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

## 6cm SFK multi horn receiver with polarimeter, 2 horns

| Channel | IF   | Pol.  | Comment        |
|---------|------|-------|----------------|
| 1       | SB   | LCP   | Horn 1, TP A   |
| 2       | SB   | RCP   | Horn 1, TP B   |
| 3       | SB   | cross | Horn 1, cos AB |
| 4       | SB   | cross | Horn 1, sin AB |
| 5       | BB   | LCP   | Horn 1, TP A   |
| 6       | BB   | RCP   | Horn 1, TP B   |
| 7       | BB   | cross | Horn 1, cos AB |
| 8       | BB   | cross | Horn 1, sin AB |
| 9       | BB   | LCP   | Horn 2, TP A   |
| 10      | BB   | RCP   | Horn 2, TP B   |
| 11      | BB   | cross | Horn 2, cos AB |
| 12      | BB   | cross | Horn 2, sin AB |
| 13      | VLBA | LCP   | Horn 1, TP A   |
| 14      | VLBA | RCP   | Horn 1, TP B   |
| 15      | VLBA | cross | Horn 1, cos AB |
| 16      | VLBA | cross | Horn 1, sin AB |

## Spectroscopy modes and resolution

| BW  | nchan | nu   | Df   | Dv    | dv    |
|-----|-------|------|------|-------|-------|
| MHz |       | MHz  | kHz  | km/s  | km/s  |
| 100 | 32768 | 4600 | 3.1  | 0.199 | 0.231 |
| 100 | 32768 | 4700 | 3.1  | 0.195 | 0.226 |
| 100 | 32768 | 4800 | 3.1  | 0.191 | 0.221 |
| 100 | 32768 | 4900 | 3.1  | 0.187 | 0.217 |
| 100 | 32768 | 5000 | 3.1  | 0.183 | 0.212 |
| 100 | 32768 | 5100 | 3.1  | 0.179 | 0.208 |
| 500 | 32768 | 4600 | 15.3 | 0.994 | 1.154 |
| 500 | 32768 | 4700 | 15.3 | 0.973 | 1.129 |
| 500 | 32768 | 4800 | 15.3 | 0.953 | 1.105 |
| 500 | 32768 | 4900 | 15.3 | 0.934 | 1.083 |
| 500 | 32768 | 5000 | 15.3 | 0.915 | 1.061 |
| 500 | 32768 | 5100 | 15.3 | 0.897 | 1.040 |

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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