

# Signal paths to the spectroscopic, VLBI, and pulsar backends

There are several IF chains going to the Faraday room (where the backends live), most importantly the VLBA and narrow-band (SB) IF. Furthermore, the 21-cm 7-feed system has its own IF; and some receivers provide a 2+ GHz IF over optical fibers. All IFs are usually used with different bandwidth setups and need different attenuation to bring the power to a level which is appropriate for the backend ADCs. This is done using the so-called **MultiFiBa**.

The various IFs coming from the receivers are fed into the 16-channel MultiFiBa, which allows to apply several internal bandpass filters and attenuation. Channels 1-7 and 9-15 is almost exclusively used for the 21-cm 7-Beam system. All other receivers are attached to channels 8+16. For each channel the **mode** can be changed with the command

```
SXXNNNZ
```

where XX stands for the channel which one would like to change and NNN is a three-byte code for the mode. XX can be 01 to 16, or 99 (for all channels). **Note, that the MultiFiBa got a very slow processing unit, so sometimes it may take a while until the requested mode is set.** Typical modes are:

| Mode | Channels | IF name         | IF range<br>[MHz] | Bandwidth<br>[MHz] | Attenuation<br>enabled | Comments                           |
|------|----------|-----------------|-------------------|--------------------|------------------------|------------------------------------|
| 249  | 8+16     | VLBA IF         | 700-800           | 100                | yes                    |                                    |
| 185  | 8+16     | VLBA IF         | 500-1000          | 500                | yes                    |                                    |
| 128  | 8+16     | Narrowband (SB) | 100-200           | 100                | yes                    |                                    |
| 134  | 8+16     | Narrowband (SB) | 150-200           | 50                 | yes                    | needs change in .front-files (ULO) |
| 128  | 1-7,9-15 | 7-Beam IF       | 100-200           | 100                | yes                    | exclusively for 21-cm 7-beam       |
| 161  | 1-7,9-15 | 7-Beam IF       | 0-300             | 300(*)             | yes                    | exclusively for 21-cm 7-beam       |
| 033  | 8+16     | Optical         | 0-2500            | 2500               | no                     | used for UBB/new K-band            |
| 161  | 8+16     | Baseband        | 0-1000            | 1000(+)            | yes                    | mainly for VLBI and pulsars        |

(\*) 300 MHz from 7-Beam Rx/IF, MultiFiBa only applies 2.5 GHz lowpass

(+) 1GHz from IF, MultiFiBa only applies 2.5 GHz lowpass

One can change the attenuation using the commands

```
AXX@NNN
AXX+NNN
AXX-NNN
```

where XX is again the channel number (01-16), NNN is the attenuation in 0.1dB steps, i.e., 010 is 1dB, while 100 means 10dB. With the first command one directly sets the attenuation to a value, while the plus and minus version increase/decrease by a certain amount. For example

## A99@100

sets the attenuation in all channels to 10dB.

## A03-030

decreases attenuation in channel 3 by 3dB. **However, not all signal paths are internally going through the attenuation unit of the MultiFiBa (as indicated in the table above).**

The commands can be sent in the "MultiFiBa" tab within ObsInp.

Note 1: For standard spectroscopy observations with the XFFTS (using MultiFiBa channels 8+16), there is the software [XFFTSGui](#) which can be used to set the MultiFiBa modes and levels.

Note 2: The XFFTSGui will only work correctly, when a spectroscopy core is running on the XFFTS.

Note 3: If, for some reason, you want to set the MultiFiBa manually, you should also close the XFFTSGui, as there may occur problems, when multiple clients connect to the former.

## MultiFiBa technical scheme



[bsb\\_multifiba\\_rev.4\\_20141120.pdf](#)

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Last update: 2016/03/15 13:49

