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	Bandwidth	Attenuation	Comments
			[MHz]	[MHz]	enabled	
216	8+16	VLBA IF	700-800	100	yes	
185	8+16	VLBA IF	500-1000	500	yes	
000	8+16	Narrowband (SB)	100-200	100	yes	
006	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