

## 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). Typical modes are:

Mode	Channels	IF	Bandwidth	Attenuation-enabled	Comment
097	8+16	VLBA IF	100 MHz	yes	
185	8+16	VLBA IF	500 MHz	yes	
128	8+16	Narrowband (SB)	100 MHz	yes	
134	8+16	Narrowband (SB)	50 MHz	yes	needs change in .front-files
128	1-7,9-15	7-Beam IF	100 MHz	yes	exclusively for 21-cm 7-beam
161	1-7,9-15	7-Beam IF	300 MHz(*)	yes	exclusively for 21-cm 7-beam
033	8+16	Optical	2/2.5 GHz	no	used for UBB/new K-band
161	8+16	Baseband	1 GHz(+)	yes	mainly for VLBI and pulsars

(\*) 300 MHz from frontend, MultiFiBa has 2.5 GHz bandpass (+) 1GHz from IF, MultiFiBa has 2.5 GHz bandpass

000	Bypass through the MultiFiBa, used for the 2 GHz modes. When using this mode, one can not use the MultiFiBa for leveling, but has to use the so-called XIF.
128	Applying the internal 100 MHz filter, almost exclusively used for spectroscopy with the 21-cm 7-feed and AFFTTS.
161	No filter applied for channels 01-07 and 09-15 (used for 21-cm 7-feed pulsar search with the EFFTTS/AFFTTS), while channels 08 and 16 are fed into the (X)FFTTS filterbox (used for spectroscopy with the XFFTTS in 100 and 500 MHz bandwidth mode). Note that the (X)FFTTS filterbox provides 100 and 500 MHz bandwidth filters and allows to switch between VLBA and narrow-band (SB) IF, <b>both has to be set using ObsInp!</b> The latter is mandatory for everything which uses the XFFTTS!
192	Special mode for using the DFB in polarimetry mode

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.

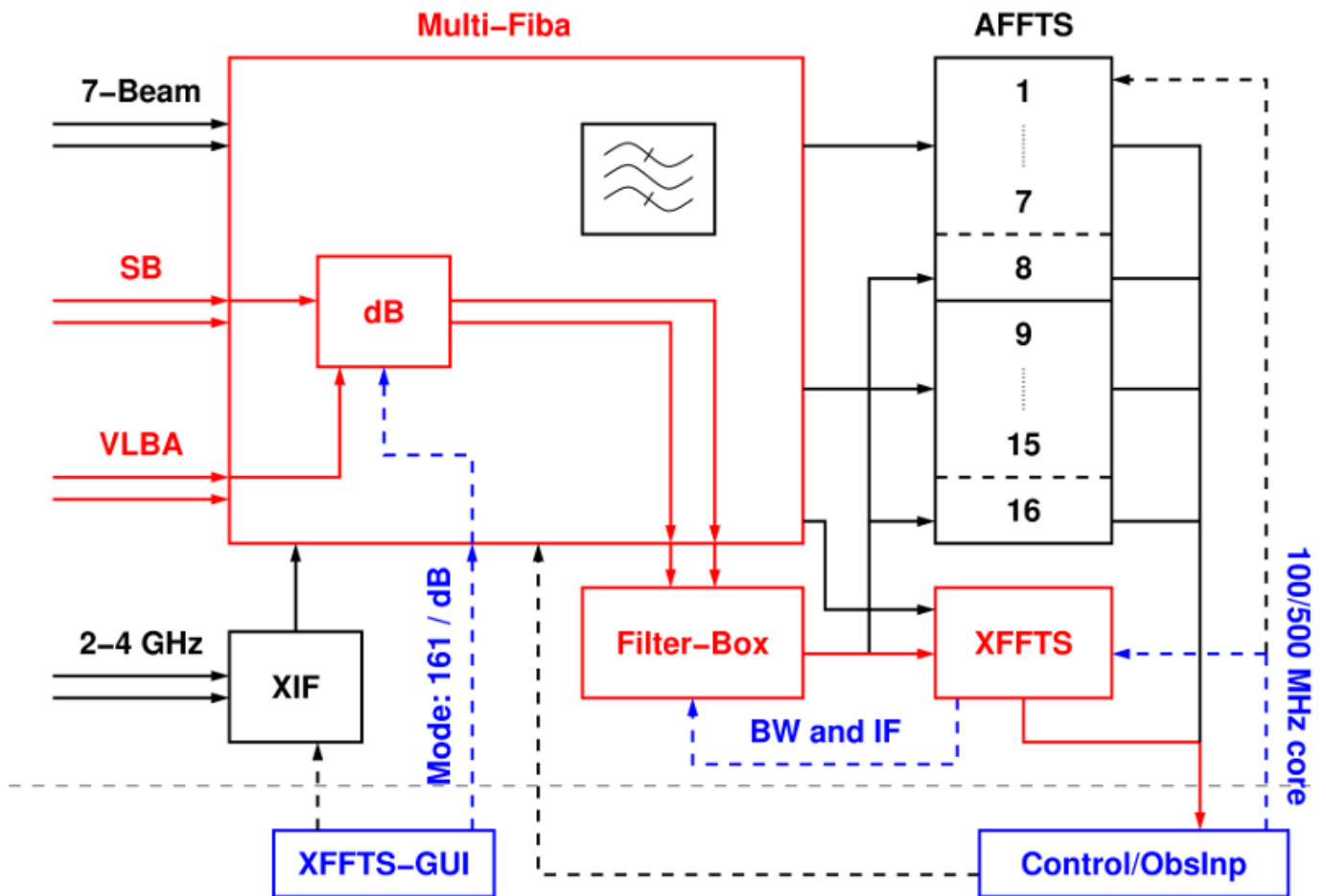
**Note 1: For spectroscopy observations with the XFFTS, there is a software [XFFTSGui](#) which can be used to set the MultiFiBa modes and levels (as well as XIF attenuation values!).**

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

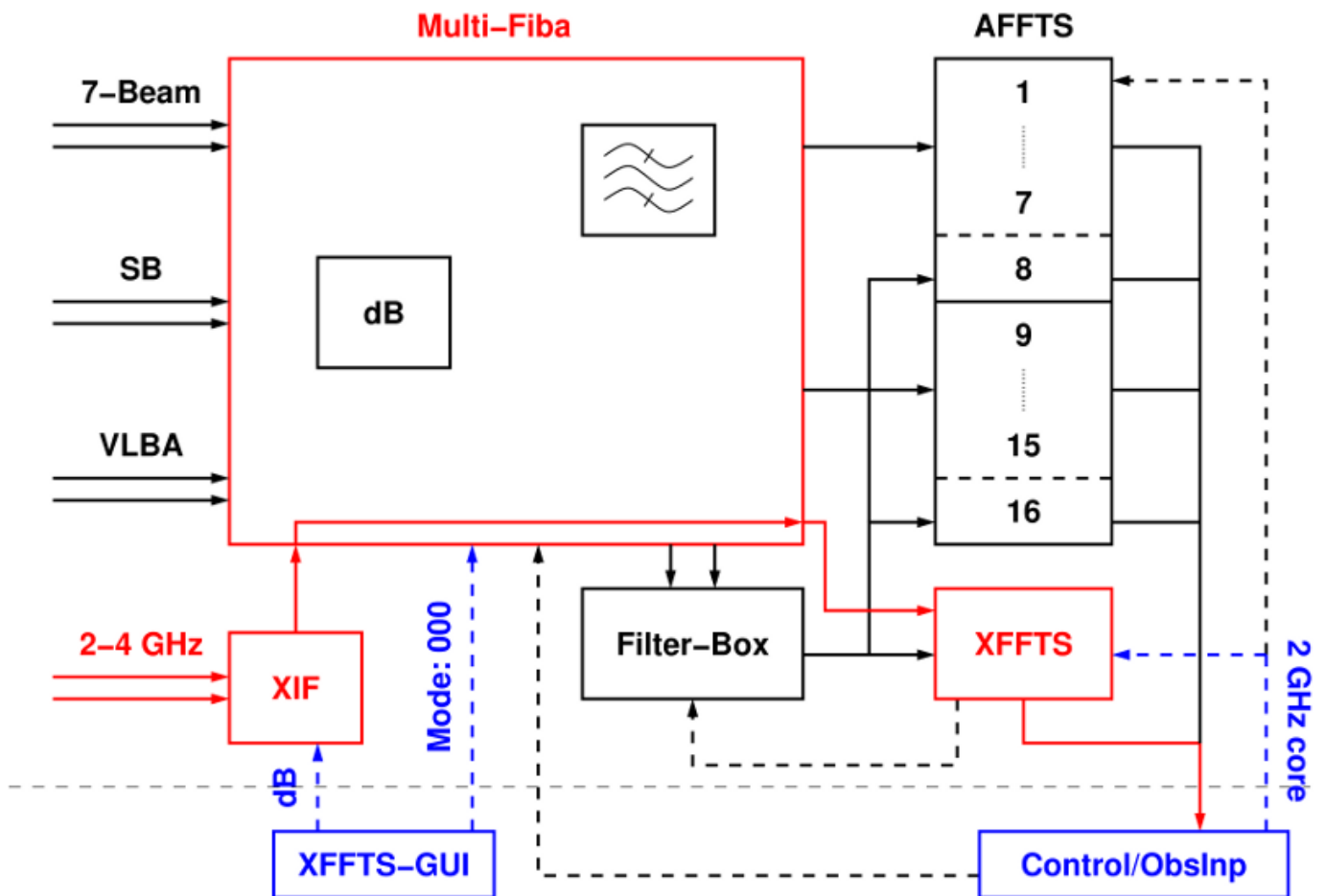
**Note 3: If, for some reason, you want to set the MultiFiBa manually, you should also close the XFFTSGui, as there might occur problems, when multiple clients connect to it.**

## Wiring schemes for spectroscopy

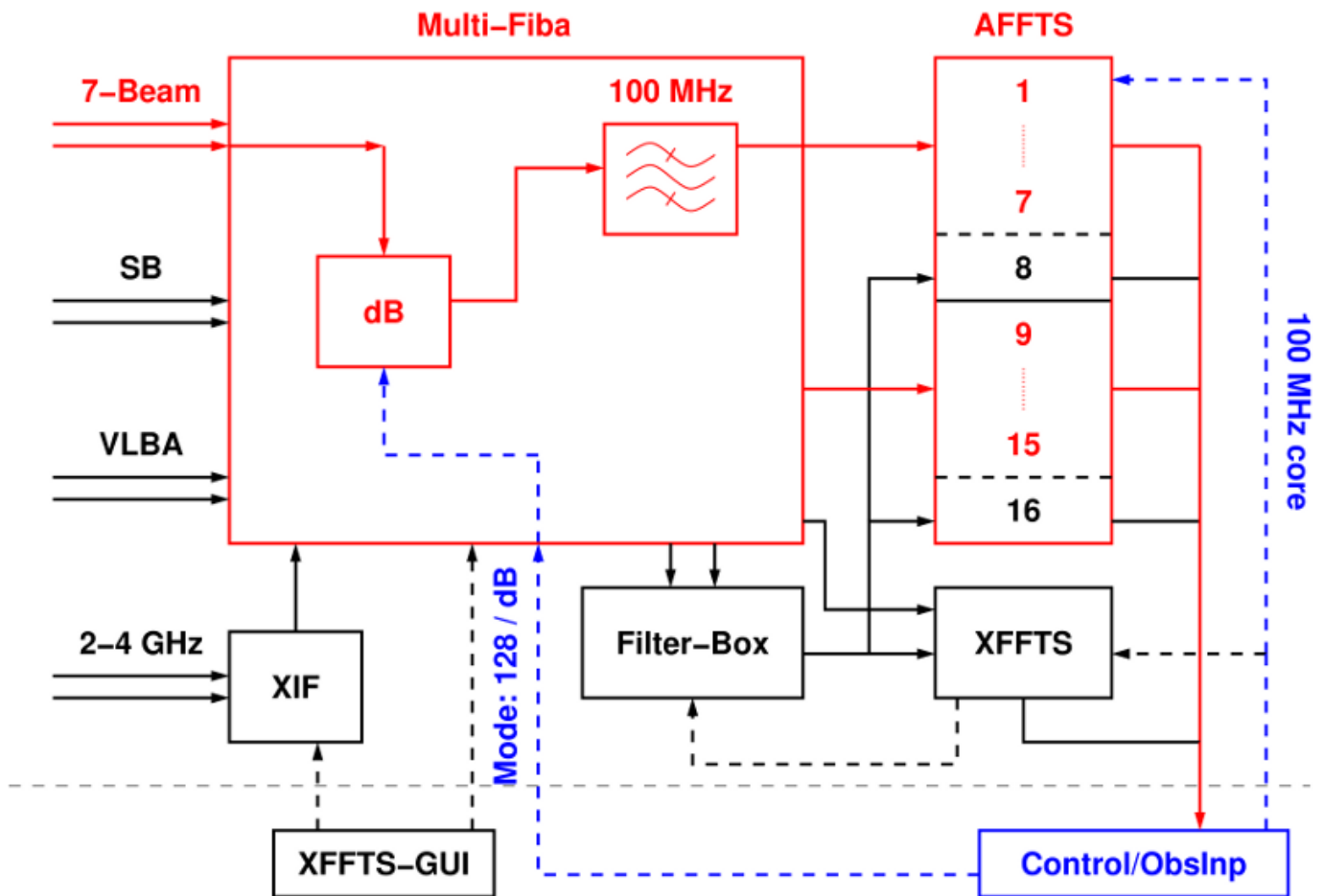
### XFFTS 100/500 MHz Bandwidths



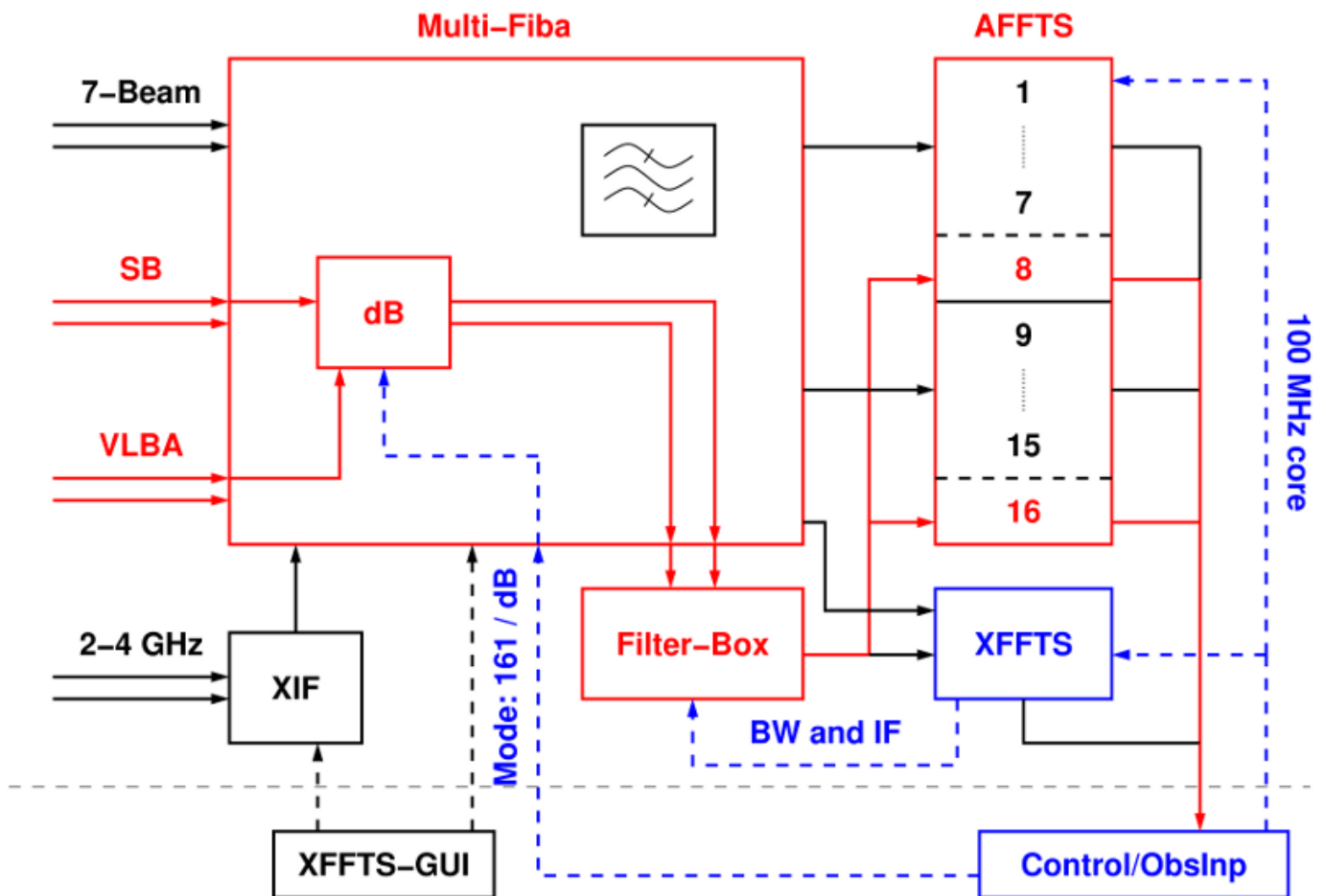
### XFFTS 2 GHz Bandwidth



## AFFECTS 7-Beam (100 MHz)



**AFFT channels 8 and 16 (100 MHz)**



## Pictures



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