

## 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 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 [XFFTS GUI](#) which can be used to set the MultiFiBa modes and levels.

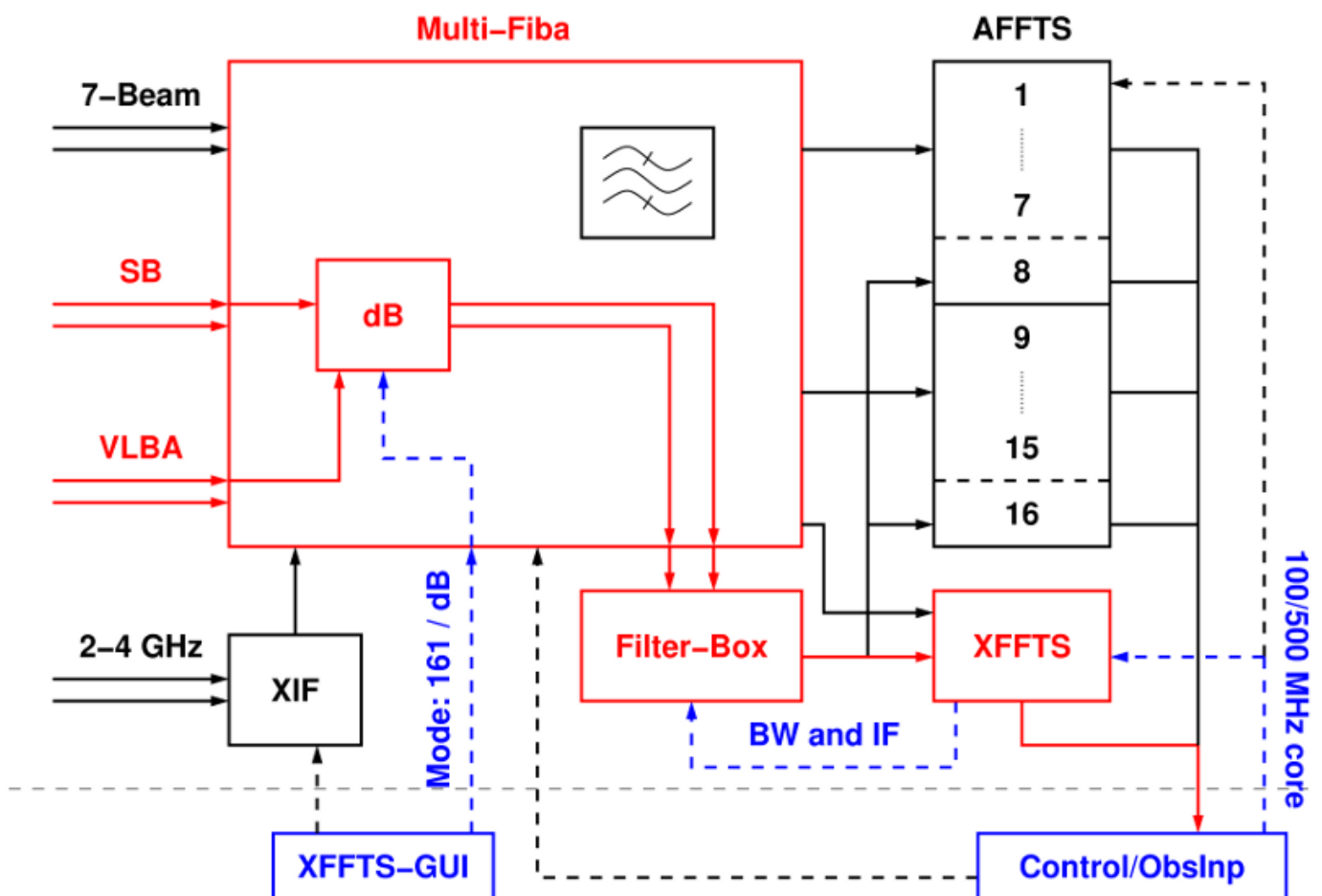
Note 2: The XFFTS GUI will only work correctly, when a spectroscopy core is running on the XFFTS.

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

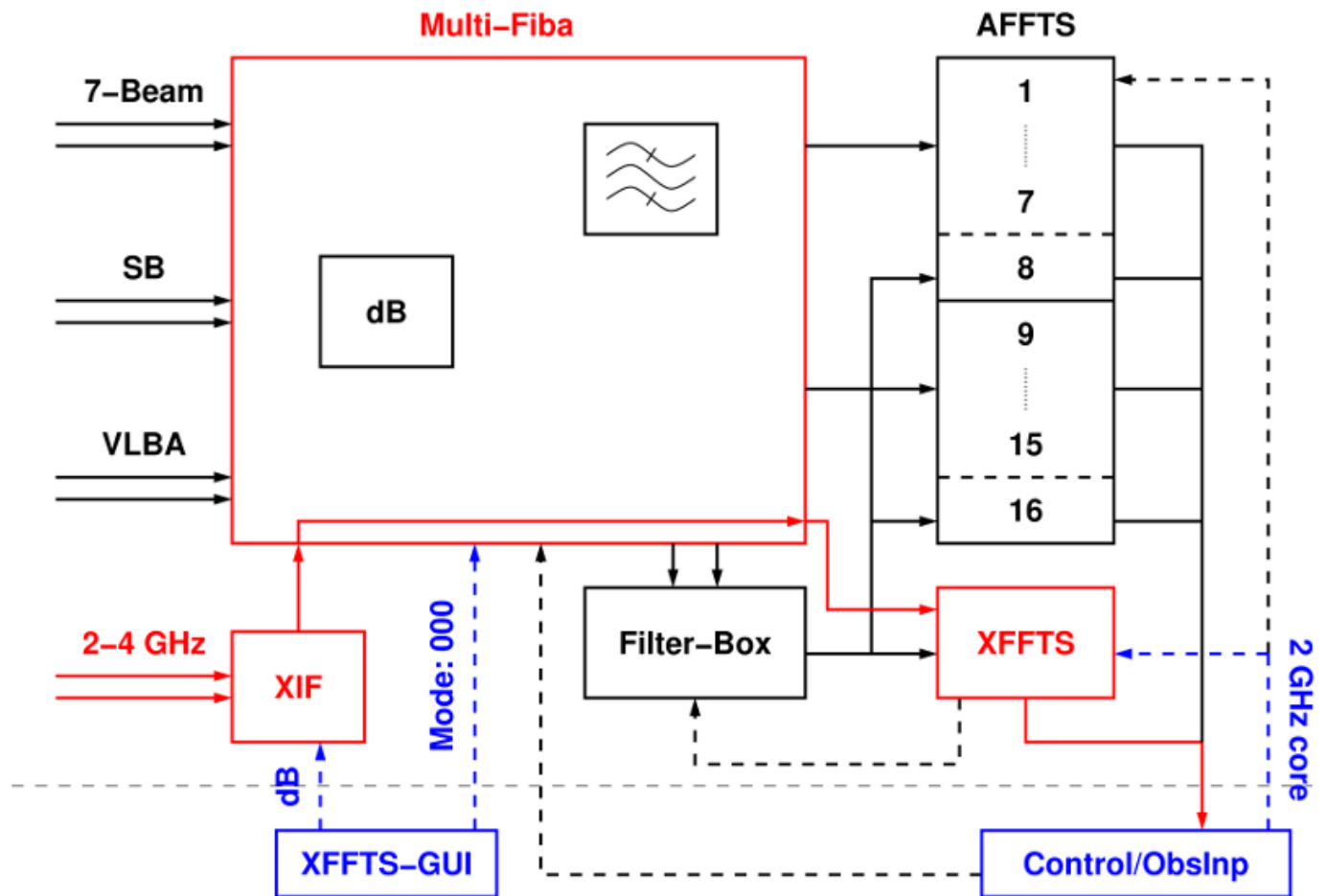
## Wiring schemes for spectroscopy

**Outdated. Will be updated soon.**

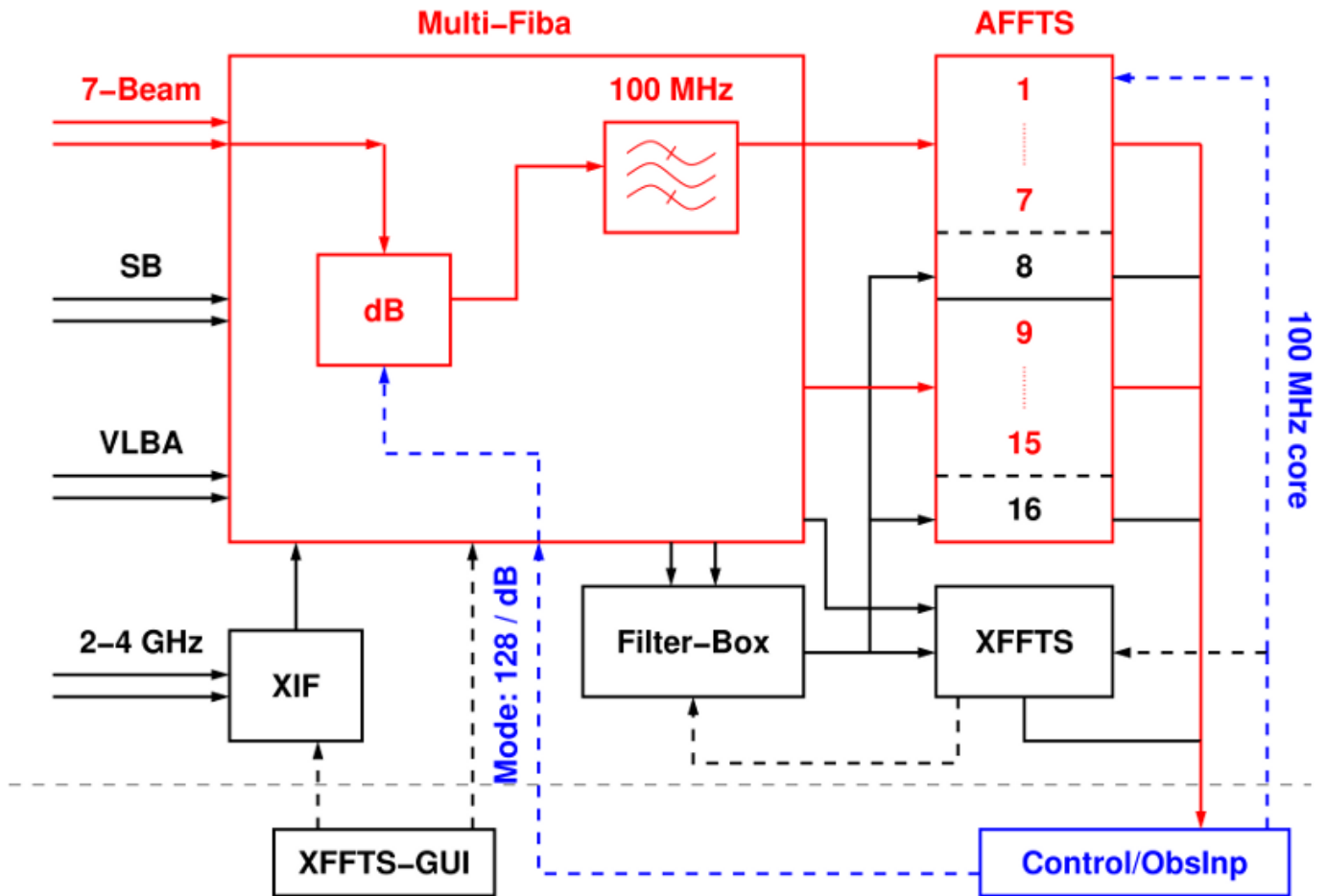
### XFFTS 100/500 MHz Bandwidths



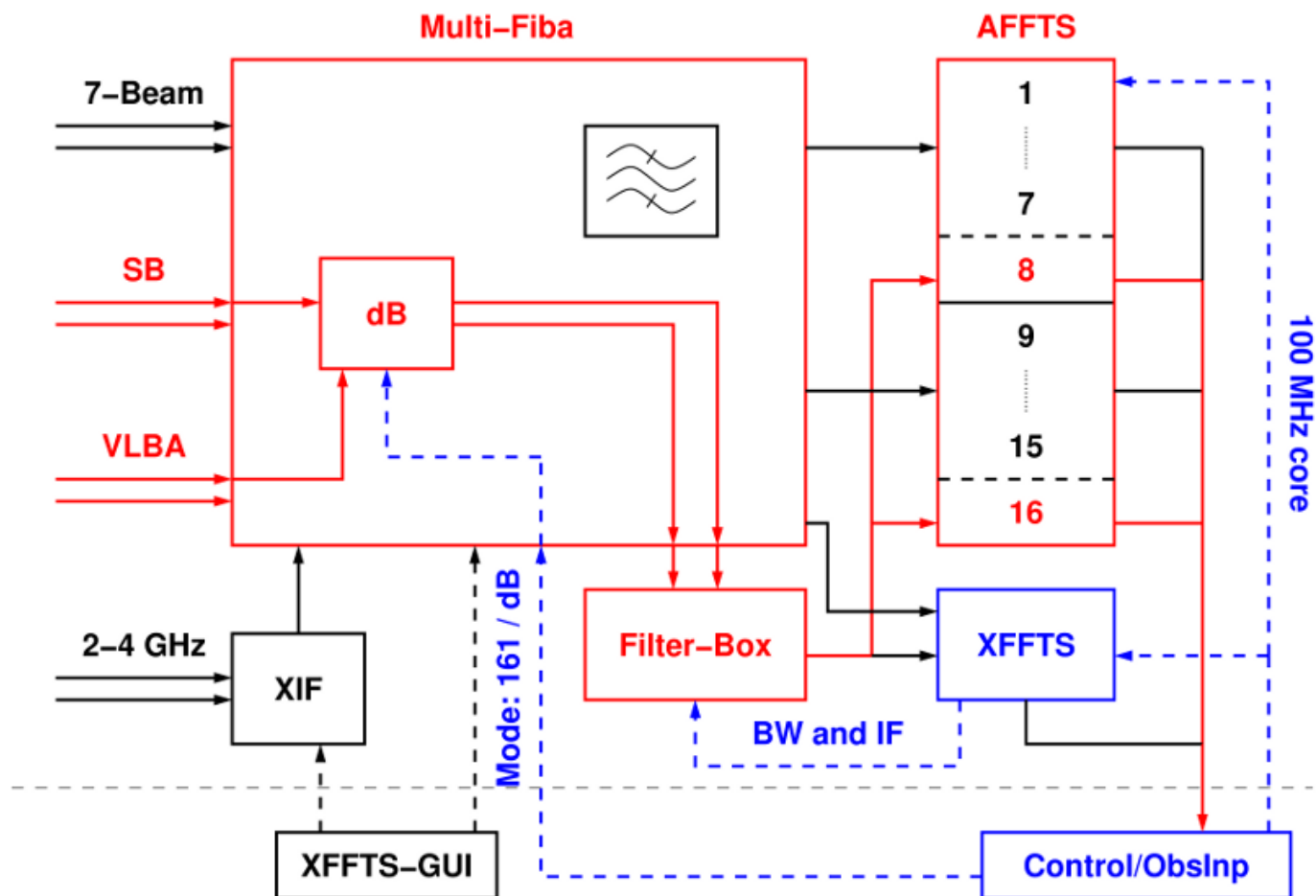
### XFFTS 2 GHz Bandwidth



### AFFTS 7-Beam (100 MHz)



## AFFTTS channels 8 and 16 (100 MHz)



## Pictures



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