

# 230- & 460-GHz Facility Heterodyne Receivers

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New 230- and 460-GHz facility heterodyne receivers have 4- to 8-GHz IF output and use synthesized local oscillator. They are tuned automatically by a receiver computer when the LO command is issued within the UIP. Below is an example of UIP commands to issue to set up the telescope to use these new receivers:

```
UIP> uip\lo 12co2-1 /if 5.5
UIP> uip\pointing 230b_460b
UIP> uip\spectrometer /ffts1w 5.5 /ffts2b /restart /lock_ignore
```

*UPDATE: The option '/lock\_loop synthesized\_lo' no longer needs to be specified explicitly.*

It takes about a minute for the receiver tuning. Spectrometers need to be instructed to ignore the lock signal since there is no phase-lock loop in the synthesized local oscillator.

Currently the FFTS1 and lower-half of the FFTS2 (FFTS2B1 and FFTS2B2) are connected to the 230-GHz receiver, and the upper-half of the FFTS2 (FFTS2B3 and FFTS2B4) is connected to the 460-GHz receiver. The AOS5 is not available. To specify the upper-half of the FFTS2 in the SPECTROMETER command, use the undocumented /FFTS2B34 option as follows:

```
UIP> uip\spectrometer /ffts2b34 /restart /lock_ignore
```

The FFTS2 channels are numbered from 1 through 32768 internally. To point the telescope using the FIVE\_POINT command and upper-half of the FFTS2, the channel range to integrate should be within channels 16385 and 32768. Use the HALF\_WIDTH argument and /CENTER option, or the /RANGE option to explicitly specify it. For example:

```
UIP> uip\five_point 10 /RANGE 16385 24576 /FFTS2
```

Currently we use the same pointing file named 230b\_460b.pointing\_setup for both the receivers, but we may use separate settings in future.

If the receiver tuning completes but the receiver has no sensitivity on the sky, it is possible that the synthesizer output is turned off. To reset the power level and reenables the output, switch to a different local oscillator (phase lock) system and back:

```
UIP> uip\lo /lock_loop default
UIP> uip\lo /lock_loop synthesized_lo
```

To switch between the 230- and 460-GHz receivers, or at the end of night, turn off the receiver currently in use by the following command:

```
UIP> uip\lo /off
```

As long as the LO command is able to communicate with the receiver computer, you do not need to interact with it directly. If the LO command throws exceptions relating communication with the receiver computer, reestablish the connection using the following command:

```
UIP> uip\lo /restart
```

If you still receive exceptions after issuing the above command, you may have to reboot the receiver computer. The receiver computer is located in the back-end room on the second floor. After reboot, the receiver control software will automatically start up. Issue the above command to establish the connection.

For engineering and troubleshooting purposes, the vncviewer can be used to control the receivers directly or watch debug messages:

```
$ vncviewer -shared 128.171.86.39:2
```

*UPDATE: The screen number has been changed from 1 to 2.*