RF setup

Linear - Circular conversion

All Mopra receivers produce linear polarizations. These are converted to circulars through tunable hybrids. Generally only the C-band need to be tuned (when changing between 6.7 and 4.8 GHz). Such tuning is done manually and need ATNF staff at Mopra.

IF cabling

Rcp and Lcp from IF#1 comes from the equipment room on cables C13 and C31. IF#2 comes down cables CC11 and CC13 (Rcp and Lcp respectively).

These are normally connected directly to DAS1 and DAS2. Historically for Lcp only experiments one had to re-cable Lcp (ie C31) to DAS IFP#1 input. However depending on the experiment this is probably not required and a suitable "cdisko" channel selection can be used.

Coherence test/test tone

This has to be done with a CRO locally. There are plans for a remotely accessible CRO but it is not yet operational.

To test coherence, you need to inject a test tone 5 MHz above the lower band edge first IFP channel. For the normal 16 MHz "vsop" profiles this means injecting a tone 11 MHz *below* the tuning frequency.

The test tone is generated by Wiltron #2 (W-2), which is located in the control room downstairs (it leaks too much RFI when located in the vertex room) and can be controlled remotely.

One can use `mmdrive` to control W-1 and W-2 but that often had difficulties with W-2.

{Useful mmdrive commands are > w:2 freq <freq> - to set the frequency > w:2 rflvl <level> - to set the level from -70 to +20 dBm > w:2 rfon | rfoff - to turn the output on or off}

However, a special program mmd has been developed to control W-2 only. Commands are: > mmd - to get started > freq <MHz> - to set the frequency > rflvl <dBm> - to set the power level (-70 to +20) > rfon OR rfoff - to turn output on or off > status - to show what has been setup > quit - to exit mmd > ? - to get a list of all commands.

For a coherence test tone:

Log onto bigrock as observer and run > mmd > freq <MHz> - to set test tone frequency (5 MHz above edge of band) > rflvl <dBm> - to set power level (typically -20 to -10).

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  Higher frequencies (e.g. 8 GHz) may need more power (Up to +20 dBm).
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> rfon - to turn tone on

Look at the CRO in rack F(??). Input one is connected to the 5 MHz reference from the maser and is used as a trigger. Input two should be connected to DAS monitor port XXX, which should contain the test tone you have injected. If the system is setup correctly (right DAS profile) and coherent, you should see the test tone 5 MHz locked to the 5 MHz from the reference. Note that the DAS would probably complain of high levels but these are needed to see the tone on teh CRO

> rfoff - to turn tone off

Remote setup and DAS tests

When observing remotely, it is still possible to use the test tone (at a lower power level), record some data and check the tone is visible at the expected frequency using fauto.

RF levels from W-2 should be setup so that the DAS levels stay correct but the test tone can still be seen in the band. Usually ~ -20 dBm at L-band up to ~0 to +10 for X-band.

Start cdisko (currently on mpvsi2) and setup (under "advanced settings" in "configure") to record 1sec files. Setup a test experiment (e.g test271109), select cable and channels to record (usually 1-8 channels with the Huygens cable). Set disk to one of the xraids (needed for 8 channels) and start recording.

Go to the subdirectory in the xraid where the data are written. Then start fauto e.g. > fauto -v -online – for the vsop profiles. This will keep displaying spectra for all DAS channels at ~5sec intervals.

Using mmd commands to set test-tones successively for each band and check that the tone appears as expected in the correct channels. Move the test-tone frequency around to check all channels and also check for any band inversions.