

ASKAP Observing

General Overview

Two different antenna are used for observing at ASKAP - AK07 has an L-band feed permanently installed while AK32 has an X-band feed installed. Both are connected to the control room by RF over fibre technology and fed into an RF switch to allow recording from one of the telescopes.

There are 3 main processes run for ASKAP observing. `askap_drv` is the main telescope control. It itself consists of a terminal based control process and a GUI. `askap_drv` must be running. VLBI scheduling is run from a process called "`vlbi_drv`", while the actual recording is via a command line process called `px14_record`. Generally VLBI observers are not expected to start any of these processes, though they do crash/freeze from time to time.

See the test screencast covering these notes at:

<https://youtu.be/JCI210gyX8w>

Observing startup

Note that the antenna control and recording (`px14_record`) are totally separate. You can restart one without affecting the other.

Antenna control

Make sure previous instances of `askap_drv` and `vlbi_drv` are not running. `^C` any stalled processes if necessary.

The driver task "`askap_drv`" needs to run first for communicating with the antenna. This can be done by:

```
> cd askap/run
> askap #n
```

where `#n` is the CETCI antenna number. 26 for Ak32 (X-band) or 19 for Ak07 (L-band). e.g. "`askap 26`" to run with AK32. This starts `askap_drv` and the antenna gui in one step.

If the antenna is stowed ("`high_stow`" in and red), then type "`unstow`" into the gui command input. Other commands you may need are:

| | |
|------------------------|---------------------------|
| <code>stow</code> | Stow the antenna |
| <code>unstow</code> | Unstow the antenna |
| <code>drive_off</code> | Manually turn drives off |
| <code>drive_on</code> | Manually turn drives on |
| <code>update</code> | Synch with the ntp server |

VLBI schedule

To run a VLBI schedule, use `vlbi_drv`:

```
> cd askap/run  
> vlbi_drv ../sched/vt999a-ak.psn
```

(replace vt999a with the name of the experiment). This assumes schedules have been previously copied to `~vlbi/askap/sched`.

Recording Data

Data is recorded using the program `px14_record`. It is a standalone terminal based program which reads data off the installed PCI sampler card and writes formatted data to local disk (or eVLBI network streaming).

There are currently (24/3/2015) 3 data disks - `/mnt/raid_0`, `/mnt/raid_1`, `/mnt/raid_2`. You need to manually “cd” to a data disk with enough free space and create a directory for the experiment. `px14_record` can be run as

```
> px14_record -o <EXPER> -t <TT>h -v <VV>
```

| | |
|---------|--|
| <EXPER> | File name prefix - usually the experiment name |
| <TT> | Recording time. 12h is 12 hours, 10s is 10 seconds |
| <VV> | Internal gain -usually about 10 for L-band, 20 for X-band |
| -invert | Invert the spectra, needed if using an effective lower sideband mixing |

An example usage is:

```
> df -h  
> cd /mnt/raid_1  
> mkdir vt999a  
> cd vt999a  
> px14_record -o vt999a -t 10h -v 12
```

Typical output is:

```
1.0 nbuf=4646 Rate=514 Stddev=1123.7,1569.4 Elapsed 00:00:19  
vt999a_083_021047.lba -15.87
```

This shows time since last update (1.0 sec), number of buffers recorded, approx recording data rate, StdDev of the two polarisations (from 12 bit data), Elapsed time since starting, current file name and clock offset in millisecc.

Notes:

- While running the measured RMS should be between 1000 and 2000. If not restart (see below) and adjust the “-v” option to increase or decrease gain/attenuation on the sampler card

- px14_record can be terminated either typing “escape” or ^C. Escape is “safer”.

Monitoring

Regularly (10-15min) check the following. The drive system on ASKAP is known to fail moderately regularly

- The antenna is pointing in the right location (check lba_monitor). Note ASKAP skips some sources which have not yet risen at MRO.
- The ASKAP drive GUI shows no red lights. (No error conditions, Antenna state all yellow)
- The “stack” counter is ticking over while onsource (not while slewing)
- The recorder is still recording
- The recorder clock offset is < a few 10's millisecc and changing slowly
- Watch the wind in MoniCA. If it is above 50 km/h you should stow.

Troubleshooting

- **px14_record fails with error such as “failed to allocate DMA buffer”**. Try the following in order till it works:
 - Try again a few times with a short pause between attempts.
 - `sudo /etc/init.d/px14400 restart`
 - Reboot the machine (`sudo reboot`). You need to know how to restart from scratch so generally get an expert to do this
- **ASKAP drive error (red light on GUI)**. Kill vlbi_drv (^C). Click “stop” in the gui. Type “drive_off”. Wait a few seconds. type “drive_on”. If the errors do not go repeat the drive off/on sequence a few more times.
- **Antenna not tracking or stack not counting down**. Check source is above the horizon. If it is try restarting entire drive software - kill GUI, ^C askap_drv and vlbi_drv. Then restart using “askap XX” command and vlbi_drv. Easier way to restart is to use the “up arrow” in the GUI.
- **px14_record clock offset is huge**. Ask someone to resync the maser
- **px14_record clock offset is changing rapidly**. Quit px14_record (press escape) and restart.

From:

<http://www.atnf.csiro.au/vlbi/dokuwiki/> - ATNF VLBI Wiki

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<http://www.atnf.csiro.au/vlbi/dokuwiki/doku.php/lbaops/askapobservingsummary>

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