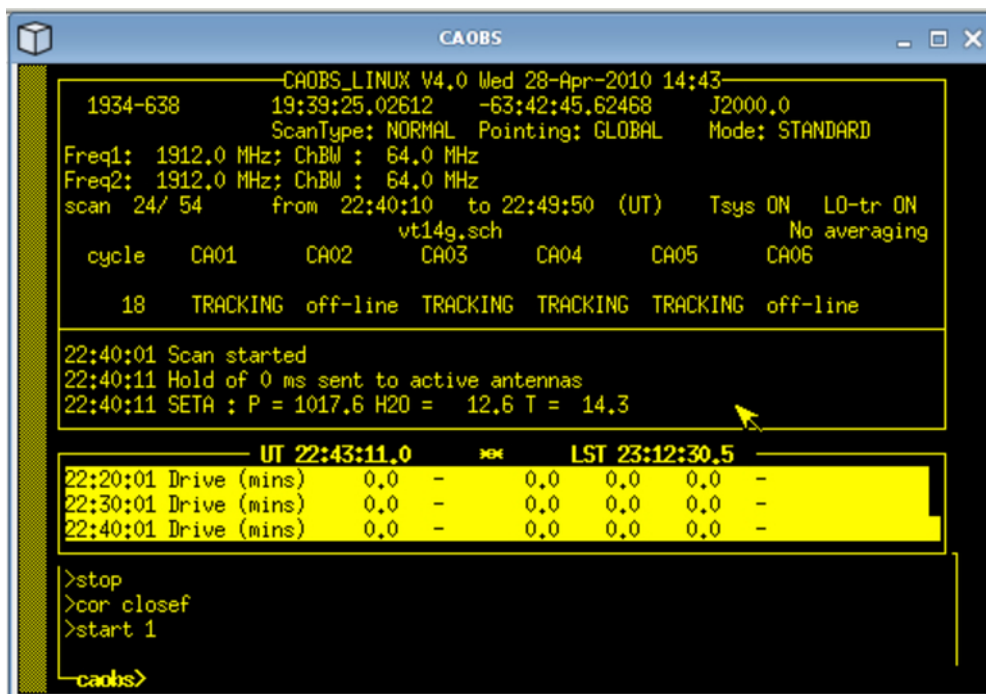


## Appendix A caobs reference

CAOBS is the primary interface between the observer and the telescope. It coordinates the functions of the antennas and the correlator. It runs on XBONES and is normally displayed on a VNC display.



```
CAOBS
-----CAOBS_LINUX V4.0 Wed 28-Apr-2010 14:43-----
1934-638      19:39:25.02612      -63:42:45.62468      J2000.0
              ScanType: NORMAL Pointing: GLOBAL Mode: STANDARD
Freq1: 1912.0 MHz; ChBW : 64.0 MHz
Freq2: 1912.0 MHz; ChBW : 64.0 MHz
scan 24/ 54   from 22:40:10 to 22:49:50 (UT)   Tsys ON   LO-tr ON
              vt14g.sch                          No averaging
 cycle  CA01   CA02   CA03   CA04   CA05   CA06
      18  TRACKING off-line TRACKING TRACKING TRACKING off-line

22:40:01 Scan started
22:40:11 Hold of 0 ms sent to active antennas
22:40:11 SETA : P = 1017.6 H2O = 12.6 T = 14.3

----- UT 22:43:11.0 ----- LST 23:12:30.5 -----
22:20:01 Drive (mins)  0.0 - 0.0  0.0  0.0 -
22:30:01 Drive (mins)  0.0 - 0.0  0.0  0.0 -
22:40:01 Drive (mins)  0.0 - 0.0  0.0  0.0 -

>stop
>cor closef
>start 1
caobs>
```

Figure A.1: A typical CAOBS display. Antennas 1, 3, 4 and 5 are tracking 1934-638. Antennas 2 and 6 are not being used.

Interaction with CAOBS is done with a set of typed commands (documented below).

CAOBS will normally already be running before you start observing. If it isn't,

- Check that CACOR is running. (The CACOR GUI is usually displayed in a separate VNC display.) If it is not, start CACOR as described in
- Locate the yellow/black CAOBS window in the XBONES and type  
atcaobs@xbones:~\$ caobs

Wait about one minute while CAOBS refers to its database and initialises.

### A.1 Using caobs

Observers interact with CAOBS through a command line interface. Though there are many commands (see the [caobs Commands \(page 66\)](#) section), there are only a handful that are used often.

```
caobs> set file filename      Loads a schedule file
caobs> track #                Tracks on scan # of the schedule file for ever (or until the source sets)
caobs> stop                  Stops observing
caobs> start (#/n)           Starts observing on scan # of the schedule and proceeds to subsequent
                             scans in the observation. It will cycle through the schedule n times

caobs> corr command          Sends a command to the correlator
caobs> stow                  Stows antennas
caobs> stow                  Stows the antennas
```

## A.1.1 caobs Commands

Many of the commands that were part of the caobs command-set pre-CABB, are now executed in the CABB processes. Other commands are no longer appropriate. CABB commands can be executed from within CAOBS by prefixing corr in the CAOBS command. The following list of CAOBS commands includes the CABB commands that are often executed from within CAOBS

`attach ca0#|all`

Connect CAOBS to either antenna # or all antennas. (This will be impossible if the ACC is dead or otherwise unavailable.) Use this command to try to reconnect antennas that CAOBS reports as 'off-line'. Related commands: detach, disable, enable.

`cain cycle default`

set cycle period to 10 seconds

`cain cycle p`

set cycle period to *p* seconds

`cancel` Stops the current pattern (POINTing or mosaic)

Related commands: point.

`catie commands`

(tied array control) is now done in CACOR. See [cacor \(page 73\)](#) for information on CATIE.

`corr commands`

Any correlator command can be executed from within CAOBS by prefixing the command with 'corr[elator]'. Commands that are often executed in CAOBS are documented here. See [cacor \(page 73\)](#) for more complete information on correlator commands.

`corr[elator] acal [s1 s2] [a]`

Request that CACOR calculate an amplitude calibration. *s*<sub>1</sub> and *s*<sub>2</sub> are flux values for frequency 1 and frequency 2 respectively. If the source is PKS1934-638 or PKS0823-500, the flux values are not required. The 'a' switch causes the command to be executed. (Without 'a' the calculation is done, but it is not actually implemented.)

`corr[elator] close[file]`

Request that CACOR close the current file. CAOBS must be stopped before executing this command. CACOR's display will show display FITS FILE: CLOSED. A new data file will automatically be opened when a scan is started if a file is not already open. Related commands: stop.

`corr[elator] dcal [a]`

Request that CACOR calculate corrections required to make the phase flat across the band (i.e. calculates geometric delay offsets). The 'a' switch causes these corrections to be applied. (Without 'a' the calculation is done, but it is not actually implemented.)

`corr[elator] pcal [a]`

Request that CACOR set the astronomical phases to zero. The 'a' switch causes these corrections to be applied. (Without 'a' the calculation is done, but it is not actually implemented.)

`detach ca0n|all`

Disconnect CAOBS from either antenna *n* or all antennas.

Related commands: attach.

`disable bell`

Turn off the terminal alarm. The terminal alarm is sounded when CAOBS detects an error condition that you should know about.

Related commands: enable bell.

`disable ca0n|all`  
 Disable the drive machinery and turret rotator for either antenna `ca0n` or all antennas. This will leave everything else as though it was observing.  
 Related commands: `enable ca0n`, `set atten`, `attach`, `detach`.

`disable correlator`  
 Detach the correlator from CAOBS.  
 Related commands: `enable correlator`.

`disable turret ca0n`  
 Disable turret rotation for antenna `n`. Data will be flagged if the turret is in the wrong position.  
 Related commands: `enable turret`.

`enable bell`  
 Turn on the terminal alarm. The terminal alarm is sounded when CAOBS detects an error condition that you should know about.  
 Related commands: `disable bell`.

`enable ca0n|all`  
 Enable the drive machinery for either antenna `ca0n` or all antennas. Use this command if CAOBS reports that the antennas are disabled.  
 Related commands: `disable ca0n`, `attach`, `detach`.

`enable correlator`  
 Attach the correlator from CAOBS.  
 Related commands: `disable correlator`.

`enable turret ca0n`  
 Enable turret rotation for antenna `n`.  
 Related commands: `disable turret`.

`exit`  
 Stop CAOBS and exit from CAOBS.

`extend`  
 Stop cycling through scans in a schedule file and continue the current scan indefinitely.  
 Related commands: `next`.

`init`  
 Initialise **all** CAOBS parameters to default values. This is equivalent to exiting CAOBS and restarting, only faster. **Treat this command with caution.**  
 Related commands: `reset`.

`next`  
 Move to the next entry in the schedule, i.e., move to the next scan. This command will cancel an `extend` command and has no effect in mosaic mode.  
 Related commands: `extend`.

`point n`  
 runs point scan on source `n` in schedule.  
 Related commands: `cancel`, `set point_pattern`, `set point_ifflag`, `set point_antennas #####`.

`ppglobal`  
 Loads the global pointing solution into the ACCs. It will rewrite `pparams.dat`  
 Related commands: `ppload`, `ppfix`.

`ppload`  
 Loads the current `pparams.dat` into the ACCs.  
 Related commands: `ppglobal`, `ppfix`.

`ppfix n`  
 Loads the pointing parameters found by the pointing scan with the catag number `n`  
 Related commands: `ppglobal`, `ppload`.

`offset ca0n|all daz del`  
 Force either antenna `ca0n` or all antennas to track a position offset from that specified by the schedule file; `daz`, `del` are the azimuth and elevation offsets in arcminutes. The offsets cease to apply at the next drive request (i.e., at the next `start` or `track` command or when the next scan starts).

---

`reconfig array name`  
selects new antenna array. This command needs to be followed by an `init`.  
Related commands: `init`.  
**Warning: Reconfig commands are used when initialising and calibrating the array after a reconfig. Executing them could destroy your observations - it could take several hours to recover).**

`reconfig bszero`  
sets baseline solution to zero in the file `station_errors.file`. **Warning: Reconfig commands are used when initialising and calibrating the array after a reconfig. Executing them could destroy your observations - it could take several hours to recover).**

`reconfig clear`  
Clears global delays and delay and phase offsets. **Warning: Reconfig commands are used when initialising and calibrating the array after a reconfig. Executing them could destroy your observations - it could take several hours to recover).**

`reconfig ppinit`  
resets az and el offsets to defaults for this station post. **Warning: Reconfig commands are used when initialising and calibrating the array after a reconfig. Executing them could destroy your observations - it could take several hours to recover).**

`redraw` Refresh the screen.

`reload` Reload the schedule file.

`reset ca0n|all`  
Resets the ACC for antenna `n`, or all ACCs. Do not restart your observations until after the antenna image in the `ATDRIVEMON` display has returned to 'normal'.

`rtconnect`  
Establishes a connection with the RT (round-trip) system that controls the LO required for millimetre observations. This command needs to be given if the RT program is ever restarted while `CAOBS` is running.

`set aver n`  
Average your data in time (note, this can also be set in `SCHED`) - `n` is the number of integration cycles (which are typically 10s) to be averaged. Stop the scan before using this command. When observing large fields you should be careful not to average so much that you significantly distort your image (azimuthal smearing caused by time averaging increases linearly with distance from the phase centre). Refer to Appendix D of Killeen (1993) for details. The current averaging time is displayed on the `CAOBS` screen.  
Related command: `show status`.

`set diode on/off/switching`  
Controls the noise cal. Switching is required for standard observations. On and Off are maintenance modes.

`set el_limit`  
Define the elevation limit. The hardware limit is  $12^\circ$ . You can use this command to skip sources in your schedule file below a certain elevation. Please type `init` at the end of your run so you don't surprise the next observer.  
Related commands: `show el_limit`, `set rise_time`.

`set file filename`  
Load the schedule file `filename`, which must be in the directory `$ATCA_SCHED` on `XBONES`. Details of the schedule will appear on the topmost section of the `CAOBS` screen. Enter the start command to initiate an observation using this schedule file.  
Related commands: `show file`.

`set genset_on ALL|CB|CA0n`

Turn on ALL generators, or generator for the control building only, or generator for antenna CA0n, respectively.

This can be done without stopping observing, however it is important to monitor progress as there may be no alarms if a generator fails to start.

Only generators on attached antennas will be turned on. This allows additional control of antennas that are turned on.

Related commands: `attach`, `detach` `set gennset_off`.

`set genset_off ALL|CB|CA0n`

Turn off ALL generators, or generator for the control building only, or generator for antenna CA0n, respectively.

This can be done without stopping observing, however it is important to monitor progress.

The power source will not automatically switch back to mains if a generator fails after the power supply has switched to generator when it has been called for by the `set genset_on` command: In this case, you will actually have to request the generator be turned off with the `set genset_off` command.

Related commands: `set genset_on`, `attach`, `detach`.

`set hold n`

The HOLD parameter is used to inhibit correlation only during those cycles affected by antenna movement. This command sets the hold period to `n` times the hold increment for every cycle (normally 512ms), irrespective of antenna drives. `set hold 0` returns to automatic hold calculation.

Related commands: `disable hold`.

`set mm ca0n ab`

Set the attenuation levels in the mm receiver. This command only works for the 12mm and 3mm wavelengths. Unlike the fine and coarse attenuators, the first attenuator setting (a) is applied to both 'a' polarisations (A1 and A2) and the second setting (b) is applied to both 'b' polarisations (B1 and B2). Each attenuator step introduces (or removes) 1dB of attenuation to the signal path. There are 16 mm attenuator steps (0-15).

In general this command should be executed while CAOBS is 'observing' (i.e. the correlator is in the 'go' state).

Related commands: `show mm`, `show atten`, `set atten`, `show coarse`, `set coarse`, `disable auto`, `enable auto`, `set bypass`.

`set paddle in|out`

Operates W band room temperature paddle.

`set point_antennas #####`

Defines which antennas will have their pointing solutions solved for – so `set point_ant 2,3,4` would find pointing errors for antennas 2, 3 and 4.

Related commands: `cancel`, `point`, `set point_pattern`, `set point_ifflag`

`set point_ifflag jklm`

Defines the IF channels to be used for pointing, e.g.

> `set point_if 12` would select XX and YY for the first frequency.

Related commands: `cancel`, `point`, `set point_pattern`, `set point_antennas #####`.

`set point_pattern #`

Specify the # of cycles the antenna will be on any given pointing position during a pointing scan.

If # is a positive number, the pointing mode is selfcal – all antennas move at the same time. There must be at least 4 antennas enabled for this mode of pointing to work.

---

If # is a negative number, holography mode pointing is executed – the array is divided into 2 sub-arrays and the pointing pattern is executed by the two sub-arrays separately.

Related commands: cancel, point, set point\_ifflag, set point\_antennas #####.

set rise\_time {[n]}

If a source is below the horizon, CAOBS will wait for up to n minutes for the source to rise. If the source will not be up in that time, the array observes the next source in the schedule file.

Related commands: set el\_limit, show el\_limit, show rise\_time.

set scanlength h:m:s

If you set the position to be observed using the track 0 command, you can set the length of the scan.

set source sourcename

If you set the position to be observed using the track 0 command, you can modify the source.

set tton|ttoff

Turn the test tone on/off.

show coarse

Display the current coarse attenuator settings.

Related commands: set coarse, set atten, enable auto, disable auto.

show el\_limit

Display the elevation limit.

Related commands: set el\_limit, set rise\_time.

show file Display the schedule file name.

Related commands: set file.

show frequency c

Display the frequency in MHz of conversion chain c.

show length

Display the length of the current scan.

show mode Display the epoch currently being used by CAOBS.

show name Display the name of the current source.

show point\_pattern

Display the pointing pattern during a pointing scan.

Related commands: set point\_pattern, set point\_ifflag, set point\_antennas #####, cancel, point.

show rise\_time Display the time that CAOBS will wait for a source that is below the horizon.

Related commands: set rise\_time

show start

Display the Universal Time of the current scan's start.

show status

Display general array information.

start {[n[/m]]}

Commence observations once you have used the set file command to load your schedule file. This command opens a data file and starts a scan. See below for mosaicing. If you omit n/m then CAOBS starts a scan at the first object in the schedule file and stops after the last scan in the file. If you give a value for n then CAOBS starts a scan at the nth object in the schedule file. At the end of this scan, CAOBS starts a scan for the next object in the schedule

file and so on until the end of the schedule file. If you include a value for *m*, then CAOBS repeats all the scans in the schedule file *m* times. If the source sets, CAOBS will send the array to the next source which has not set.

Related commands: `stop`, `track`, `correlator closefile`.

**Warning:** if all of your sources are set while this command is still being carried out, then you will get the same number of terminal beeps and twice as many lines of error messages as the number of sources you have asked to be observed (e.g., for sources that are set when the `start` command is run, *m* times the number of sources!).

For mosaic mode observing, the format for the command is `start n,k/m`, where *n* is the scan number in the schedule file, *k* is the position (data line number) in the mosaic file and *m* is the number of times to repeat the whole process.

`stop` Stops the current scan. The antennas will stop moving. Use the `correlator closefile` command to close the data file. A stop command is always sent to the antennas, even if no scan is underway.

Related commands: `start [n]/[m]`, `track`, `corr closefile`.

`stow {[ca0n]}` or `stow [n]`

Drives antenna `ca0n` to azimuth 90° and elevation 85°. Brakes are applied to the drives once this position has been reached. If you omit `ca0n` then all antennas are stowed. To start observations after a stow, just use the `start` or `track` commands.

`track {[n]}` Track the source in scan *n* of the current schedule file continually until a `stop` command. If *n* is omitted, track the first source in the schedule file. If *n*=0 use the current settings, but allow them to be modified by the `set` command.

Related commands: `start [n]/[m]`, `stop`, `corr closefile`.

`wrap north|south`

Specify the desired wrap, after stopping the scan. Then restart the scan. The command that follows this must be a `start` or `track` command. Anything else will cancel the request.

