SHARP Troubleshooting

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1 HWP problems

We list some known failure modes of the half-wave plate motion. Note that some aspects of the HWP motion can be separately tested by going to the "SHARC Controls" window in IRC, typing in a half-wave plate angle, and pushing "set".

a) "analog output offset" problem: symptom is that the stored HWP angles plotted with `dorawplot` are incorrect. (These angles come from the EDAS HWP controller over analog signal lines.) Sometimes you see the expected staircase pattern, but all the angles are offset by as much as 30 degrees. At other times, the angles and/or the status signals look like complete garbage. The data you are collecting may be fine, however. To investigate this, first try to process the data using both the `--nohwp` flag and the `--edas XX` flag in `dointeg`. Try XX=0.5 and make it bigger if that does not work. If this trick allows you to successfully execute `dointeg`, then proceed to the section on Irc Logs below to learn how you can tell if the polarimetry data is usable.

b) wrong number of HWP angles found by `dointeg`: If only 1 HWP angle is found, very likely you tried to process sweep mode data with `dointeg`. If you get some other number of HWP angles that is not 4, one possibility is that there is a problem with one or both of the analog signals from the EDAS. This is discussed in item "a" above.

c) mechanical problem with the HWP motion: When the system is working, the moves are good to 0.2 degrees. If you experience increasingly inaccurate HWP moves, eventually resulting in "-4" output on IRC screen, when the error exceeds the nominal threshhold, this may be a sign of a mechanical problem. If this is due to a loose set screw then it will require a repair job on the HWP module, probably by the day crew. However, there is another way that you can get increasingly inaccurate HWP moves, which is if the temperature is too low. See discussion of the temperature controller in the SHARP Observing Instructions.

d) "rough spots": we restrict motion to 50 - 117.5 because of rough spots near 0 degrees and 180 degrees. The motor usually gets stuck if it gets into these rough spots. In this case, you have to get it out by turning the HWP with your hand. (You have to remove the cardboard side panel on SHARP Box 3 to do this. NOTE: Be careful not to touch the actual HWP crystal.)

e) If the sharcii computer will not communicate successfully with the EDAS HWP controller, this may be due to the "EDAS date problem". The solution is given in a document called "troubleshooting the EDAS date problem" - go to the SHARP web page and click on "teamsite".

2 Irc Logs of HWP postion

If you get the "analog output offset" problem and you can process the files with dointeg using the flags described above, then the data may be OK. The only way to know for sure is to check the IRC logs, which are located at
`/home/kilauea/sharc/irc/ircData/sharc/IrcLogs`.
Use the script `doircplot` to plot them. This is a python script, so you can get help on using it by typing `doircplot -h`. The IRC logs have names in the format log_YYYYMMDD_HHMMSSSSS.txt. `doircplot` will read these and generate a plot showing the error in the HWP angle versus time. It will also create a text file (irclog.txt by default) which lists the commanded and actual HWP angles by file number and by time.

If the IRC logs show the HWP is moving fine, keep taking data, but make a note in the log that the analog output offset problem is occurring. Also e-mail the SHARP team. On the other hand, if the IRC logs show HWP move errors (errcode not zero in irclog.txt or delta angles greater than about 2 degrees), then there is a serious problem that must be fixed before any valid polarimetry data can be collected.

3 Chopper Problems

- bad waveform

  If you don't like the chopper waveform you can always use the /force flag in the chopper command that will force it to look for a new solution. To force the chopper to find a new solution: "sec 300 0.925925925 6 6 /force"

- mismatch between chop and nod

  If `dointeg` is refusing to analyze a data file because the chop throw is too different from nominal (nominal is what you input into the IRC coarse dither window) but you want it to analyze the file anyway, then you can add the `--nochop` flag to the dointeg call. This will bypass this particular check.

- typing any `sec` command returns the phrase TRANSIENT.

  You can try restarting the antenna computer. This is described in the troubleshooting section of Simon's web page "Introduction to Observing":
  `http://cso.caltech.edu/wiki/cso/observing/operating`
  This should fix the chopper, but you will also now have to quit and restart at least the IRC client, IRC server, and DSOS stuff.

4 Problems with Pointing

If you can't point at Jupiter's moons, try adding the /jpl flag:

UIP> planet callisto /jpl

5 Problems with Focusing

Sharp uses "constant" mode for the focus. Occasionally, there can be some problem with the focus that can only be fixed by typing:

UIP> focus /constant

Such problems include (a) if the UIP display is flashing "FIXED", or (b) if there is no such flashing but the focusing just doesn't seem to work.

6 Problems with the integration lengths from "dointeg"

If the "nod check" shows that the first left integration of the first HWP position is too short (say, below around 11) then this may lead to low signal-to-noise. The main reason why this "failed nod check" occurs is that the ZA is too low. For example, if the ZA < 10 this failure often occurs. However, occasionally, the problem will occur for $10 <$ ZA < 20. We don't fully understand this problem, but the easiest fix is to simply switch to a source at higher ZA.

There is another possible fix that might work - though we have not yet tried it. The idea is to change the IRC scripts in such a way as to alter the timing of the data collecting. SHARP IRC scripts are discussed in a separate posted document. Here are instructions for changing a parameter that should affect the length of the first "left":

On kilauea/puuoo, edit the file polarimeterSingleFile.py in `~sharc/irc/` by changing this single line: "overhead = 20 # seconds before data stats" Restart IRC client and server; note that you may have to use "sharcClientTest" instead of "sharcClient" to start the client. Also, note that there is some possibility that sharcClientTest may take about six or seven minutes to start up due to a bug in this script.

7 Other Problems

7.1 Problems with the SHARC-II camera

These can often be solved by consulting the SHARC-II web page: `http://www.submm.caltech.edu/~sharc/`

7.2 Miscellaneous problems with the CSO

Other troubleshooting tips can be found in the troubleshooting section of Simon's web page "Introduction to Observing": `http://cso.caltech.edu/wiki/cso/observing/operating`

7.3 Intruder alarm goes off and there is no intruder

UIP> shutter /alarmoff