



Atacama Pathfinder
EXperiment
—
Progress Report

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APECS - LABOCA/ABBA pre-shipment tests

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1 Purpose

This report describes the pre-shipment tests made at the MPIfR between APECS and the LABOCA-ABBA frontend and backend control computers. The tests were carried out on July 10 and 11, 2006. The goal was to verify the communication between APECS and the hardware and to test the requirements described in [1], in particular that the required data rate of 295 pixels @ 200 Hz can be achieved for all observing modes.

2 Software Versions

The following software versions were used for the test.

2.1 APECS Modules

Module	Version
apexBUILD	0.120
DevIOUDPSock	0.23
apexExtPkgs	0.37
apexins	0.83
apexDevSim	0.40
apexObsTool	0.165
FitsWriter	1.351
apexCalibrator	0.208
apexMonEngine	0.22
apexMonTool	0.31
apexObsLogger	0.44
apexRadiometer	0.34
apexSynthesizer	1.33
apexWobbler	0.37
apexUDPcid	0.11
apexTE	0.8
apexPBE	0.40
apexBlankSyncGen	1.7
apexChiller	1.7
apexOptPoint	0.20
apexWeatherStation	0.24
apexOptics	0.6
apexSourceCatalogs	0.2
apexClassTools	0.1
apexTiltmeters	0.4

2.2 LABOCA/ABBA Software

Functionality	LabView Version	Virtual Instrument File Version
Frontend	National Instruments LabVIEW 7.1, NI-DAQmx driver 7.4	laboca_frontend_20060710a.vi
Backend	National Instruments LabVIEW 7.1, NI-DAQmx driver 7.4	laboca_daq_20060403a.vi

3 Tested Observing Modes

The available calibration and mapping modes were tested in normal and in "continuous-data" mode according to the following "apecs" script:

```
# Frontend/Backend setup

frontends 'laboca'
laboca.backends 'abba' # Implicitly selects 5ms dump time for all modes !

laboca gain=4
abba gain=10

# Total power modes

continuous_data 'off'

calibrate mode='hot' # LABOCA features only a hot load, no cold.
skydip time=5
point
focus
on 30
otf 3600,0.5,400,40,time=0.005

continuous_data 'on'

calibrate mode='hot'
skydip time=5
point
focus
on 30
otf 3600,0.5,400,40,time=0.005

# Wobbler mode

wob
on 30
```

4 Test Setup

On the APECS side the simulation and development system at the MPIfR ("control") was used with the "abm0" telescope simulators and the APEX device simulators except for the real LABOCA and ABBA hardware.

The ABBA backend was fully set up. Initially, the time was not aligned due to the GPS receiver not being synchronized. This was quickly fixed. The frontend was not cooled and thus no real signals were connected to the backend.

The LABOCA frontend computer was fully functional. The hot calibration load could be moved under remote control. The amplifier microprocessors were connected and allowed to test removing and storing DC offsets and setting the frontend gain. Temperature monitoring with the real thermometers was enabled, the recycling procedure was available, and the power line was under remote control.

5 Results

5.1 CORBA Objects

All CORBA objects were present. Their monitor points were checked using the APECS master status display.

The "APEX:LABOCA:AMPLIFIER" object delivered 320 offsets instead of 295. This led to a crash of the FitsWriter. The frontend computer software was modified to deliver the correct number according to the MBFITS definition. Then the data taking went fine.

The default of "APEX:LABOCA:CALUNIT" was to be turned off. This default was changed to "on" as APECS does not automatically turn devices on. The load could be commanded from APECS, however, the actual status changed to the final value before the load arrived at the stops mechanically. This behavior was changed to indicate the period while the load is moving because APECS continues to observe once the load position is reached.

5.2 Observing Modes

The above observing modes, including a wobbler scan, were then tested. APECS removed the amplifier offsets at the start of each scan and stored them in the MBFITS dataset. The FitsWriter was able to cope with the data rate under all conditions. The online data calibration and skydip reduction in the "APEX Calibrator" was working. Further online reduction of the mapping modes using "BoA" was not possible because the latest update of that package was not yet available for inclusion in APECS. In wobbler mode, ABBA delivered data for 3 phases (1,2 and 0 for blanked data which may be of interest in combination with the wobbler position data). The FitsWriter can handle these extra entries without problems. The APEX calibrator will ignore them.

A long-term test with 60 OTF maps was started on July 11. The data taking went fine for about 40 scans (4 hours) until the FitsWriter got stuck. When the FitsWriter was restarted, the observing continued from the APECS side, but meanwhile the LABOCA frontend computer had gotten stuck while the backend computer was still OK at that time. This behavior seems to happen once in a while. It is, however, assumed that this occurs only with the lab hardware. The real computer hardware is already at the site in Chile and can be tested only during installation and commissioning.

References

- [1] Muders, D. and Hafok, H., 2006, APECS Bolometer Observing Software, APEX Report APEX-MPI-DSD-0019, Rev. 1.1