Operating Manual for LBNL ATLAS SCT Electrical Tests 2002

Leah Zimmerman
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Hybrid and Module Tests

The VME crate should be on at all times. However, if power cycling needs to occur, disconnect the hybrid/module before commencing with power cycling. Reconnect the hybrid/module after turning on the VME crate.

Hybrid Setup

For both the longterm burn-in and short room-temperature electrical tests, hybrids are tested on a cooling fixture. The patch and support cards are screwed into the fixture to ensure proper grounding. Dry air is circulated into the box at all times.

Module Setup

Once modules are put in their box, they should not be removed; with the exception of a shortage of boxes or rework. The boxes are cooled when tests are running to keep a thermistor measurement of approximately room temperature. Dry air is circulated through at all times. For the longterm electrical test and the thermal cycling test, the module box is placed inside a programmable environmental chamber. During the short electrical tests, module boxes are covered in black cloth to minimize light-induced leakage current.

Running the tests on hybrids or modules

1. Make sure that the VME crate is powered on.
2. Install devices as described above.
3. Make sure that the dry air is flowing.
4. Turn on chiller.
   - For the hybrid room temperature tests, the chiller should be set at approximately 17^{o}C to obtain a thermistor temperature of about 22^{o}C.
   - For the hybrid longterm burn-in, the chiller dial should be set to about 37^{o}C to obtain the same temperature on the hybrid thermistors. (Need to add 10 hours of cold [0^{o}C] test).
   - For the module room temperature tests, the chiller should be set at approximately 9^{o}C to obtain a thermistor temperature of about 27^{o}C.
   - For the module longterm test, the module box should be placed in the environmental chamber set to -19oC to obtain a thermistor measurement of 0^{o}C.
5. In the folder D:\sctvar\config, check that the st_system_config.dat file defines the correct modules/hybrids.
6. In the same directory, check that the proper .det files exist for the hybrids/modules under test. For hybrids, we will use default.det file for simplicity. However each module needs its own specific .det file where we list the capacitor factors for each chip. Make sure that the .trim and

.mask files do not exist unless they are specifically required. (Note: the .trim and .mask files will not be needed under normal testing circumstances).

7. Run the testing software (ST icon on the desktop). Your username for DB (database) upload is your initials (2 min, 4 max). No=0, Yes=1.
8. Check that the hybrid power has come on and that the temperatures and currents are at the appropriate levels on the Burst Display window. If no tests are running, the numbers are updated every 10 seconds.
9. For a module test, switch off the LV power to the hybrid and allow the temperature to stabilize around room temperature. Then run an I-V Curve. Choose 4, ramp up to 500V quickly and return to 200V when completed. Then turn the LV on.
10. Start the appropriate testing sequence. For the Characterisation Test, use a scope to answer the Hard Reset test questions. (Note: due to windows bugs, you must enter space 1 to answer “yes” to the Hard Reset test questions).
11. All other tests continue without intervention. The Characterisation Test takes a total of about one hour per hybrid or module to complete. For 6 hybrids/modules, the test can take all day. The longterm test currently takes 100h(hybrids)/24h(modules), although these times will be reduced with experience among the SCT community.
12. Monitor the tests while they are running to catch any program crashes as soon as possible.
13. When the testing sequence has completed, shut down the software with the “Exit” button. Confirm in the Rint window by typing y (often gives you an error the first time, just repeat the process) and the program will power down and shut off. Do not stop root using ".q" as this does not turn off the LV or the HV power.
14. When sctdaq has exited, check that the LV and HV power lights are off. If they are not, restart the software and immediately “Exit” again. This should turn off the power correctly.
15. Switch off the cooling. For the module longterm test, take care to keep the module in a dry air environment until it reaches room temperature to avoid any danger of condensation.
16. Disconnect devices under test. And put the hybrid or module in the dry air cabinet for safekeeping.
17. Check that the hybrid/module passed each test in the results text file (serialnumber_date.txt) and that the ps files look appropriate.
18. Test sequence results may be analyzed using perl scripts. The test sequence name is needed for these. Test results and root files should be archived and backed up, respectively.