# An LRIS System Operations Sourcebook

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## 0.1 Introduction

The purpose of this manual is to document miscellaneous procedures that are too short to warrant manuals of their own, procedures such as system start up, shutdown and the building of the entire software system from scratch.

## 0.2 LRIS Startup

The following procedure is used to start up the LRIS and it's software:

1. Apply power to the spectrograph controllers and encoders.
2. Apply power to the spectrograph CCD electronics.
3. Make sure the LRIS instrument workstation is up. No LRIS specific software must be running, but the system must be up for VxWorks to boot on the VME systems.
4. Run Open Windows from the instrument workstation.
5. Select from the Open Windows menu, LRIS Tools, either "Startup LRIS" or "Startup LRIS No DCS" depending on whether you wish to run the DCS or DCS simulator along with the LRIS. This spawns the MUSIC tasks for network communications and the image reading and display software.
6. Apply power to the CCD and motor control VME crates. This loads VxWorks.
7. On the motor control VME console type `<lris_startup.vxworks` to load and initialize the LRIS VME motor control software.
8. On the CCD control VME console type `<ccd_startup.vxworks` to load and initialize the CCD control software.
9. On the CCD control console:

   Type `tdl 0,2` to test the fiber link to the timing board on camera 0.

   Type `tdl 0,3` to test the fiber link to the utility board on camera 0.

   Run the program `cbv` to change the camera bias voltages if you are not happy with the defaults.

   Type `sbv 0` to apply the bias voltages. This must be done regardless of whether or not you changed the default bias voltages.

## 0.3 LRIS Shutdown

The following procedure should be followed to completely shut off the LRIS:

1. Close the trapdoor (`modify trapdoor=closed`).
2. Switch off all reference lamps (`lamps_off`).
3. Switch off power to the spectrograph.
4. Switch off power to the both VME systems.
5. Select "Shutdown" from the "LRIS Tools" menu on the instrument workstation.
6. Exit OpenWindows on the instrument workstation.

## 0.4 Building the System from Source

The best way to build the LRIS control software system on a new computer would be to `tar` the old system (the `/lserv` directory tree), copy the `tarfile` to the new system, untar it there, recompile, relink and remake the libraries on the new system.

The following is a checklist for creating the LRIS software:

1. Create the `/kroot` directory tree. This should be done automatically for you when you retrieve the source files via `tar`.
2. Execute `make` in the following directories:

   [ ] `/kroot/kss/lris/tasks/watch_ccd` to create the `watch_ccd` tasks.

   [ ] `/kroot/kss/lris/tasks/readccd/write_image` to create the file and tape image functions.

   [ ] `/kroot/kss/lris/tasks/readccd/readccd` to create the image server.

   [ ] `/kroot/kss/lris/fiord` to create the FIORD library.

   [ ] `/kroot/kss/lris/vme/cserv_common` to create the VME control server.

   [ ] `/kroot/kss/lris/vme/lserv` to create the LRIS motor control subsystem.

   [ ] each of the individual stage directories in `/kroot/kss/lris/vme/lserv/shell` to create the stage test programs. This is not necessary for the normal operation of the LRIS.

   [ ] `/kroot/kss/lris/vme/ldserv` to create the LRIS CCD control system.

   [ ] `/kroot/kss/lris/vme/ldserv/shell` to create the CCD test programs.

   [ ] `/kroot/kss/lris/vme/readccd` to create the LRIS VME CCD image server.

   [ ] `/kroot/kss/lris/vme/music/dlib` to create the VME MUSIC library.

- [ ] `/kroot/kss/lris/vme/music/traffic` to create the VME traffic object files.
- [ ] `/kroot/kss/lris/vme/mlog/src` to create the error logging object files.
- [ ] `/kroot/kss/lris/vme/util/src` to create the VME utility object files.
- [ ] `/kroot/kui` to create the use interfaces.
- [ ] `/kroot/ktl` to create the Keck Task Library.
- [ ] `/kroot/kss/aut` to create the autoguider subsystem.
- [ ] `/kroot/kss/dcs` to create the DCS interface.

Eventually there will only be a single `makefile` in `/kroot`. A `make` command in this directory will create the objects, libraries and tasks for the entire system.