

# LCLS How-To Boot an EPICS IOC

## LCLS How-To Boot an IOC

### References

- [README](#)
- [How-to Configure an RTEMS Processor NVRAM](#)
- [EVR Installation](#)
- [CVS Directory Tree](#)
- [Connecting to the serial port of an EPICS IOC](#)
- [How-to Release Software](#)
- [Network](#)

**When booting an ioc for the first time follow steps 1-8. To boot an existing ioc proceed to step 11.**

#### Step 1:

Get ip address for your EPICS IOC by filling out the [Accelerator Facility IP Request Form](#) [Controls Group IP Request Form](#) and submitting it to [Ken Brobeck](#). Specify the [subnet](#) for your ioc, which would be LCLSDEV for a development ioc or LCLSCA for a production ioc. Please note that the ioc nodename submitted MUST follow the [LCLS Naming Conventions](#).

#### Step 2:

Once you have an ip address for your node, send email to SCCS to request that your node be added to the NIS group lcls-rtems. This will provide write permission on the NFS disk to your ioc. Click [here](#) for more details.

\*Step 3:\*If your processor has a serial port, request a terminal server port assignment from [Charlie Granieri](#) if you do not already have one. Otherwise, proceed to step 5. You can obtain a DIGI to MVME6100 serial cable from [Charlie](#), as well. Click [here](#) for terminal server and cable information. Note, that if your terminal server is a DIGI the serial cable from a DIGI port to a MVME6100/MVME5100/MVME3100 is color coded green.

#### Step 4:

If your processor has a serial port connected to a server, iocConsole will be used to remotly connect to your ioc from a linux host. To use iocConsole, you will need to modify the cvs file

Facility	CVS Path
Development	epics/iocCommon/All/Dev/screeniocs
LCLS	epics/iocCommon/All/lcls/screeniocs
FACET-II	epics/iocCommon/All/facet/screeniocs
Test-Facility	epcis/iocCommon/All/acctest

#### Step 5:

Setup your processor [NVRAM](#) Make sure that your processor has a SLAC ID sticker. If not, please contact [Kristi Luchini](#).

#### Step 6:

Create a directory for any files that will be written, for example, save and restore files written for your ioc by ChannelWatcher, and the screenlog:For development:

```
ssh laci@lcls-dev2

cd $IOC_DATA
mkdir <ioc nodename>
cd <ioc nodename>
mkdir restore iocInfo autosave
```

For production contact Ken Brobeck and request that the controls infrastructure for a new IOC. You will need the following:

```
$EPICS_IOCS/<ioc,cpu>
```

```
$IOC_DATA/<ioc,cpu>
```

For Soft IOCs: Autostartup scripts in on <facility>-daemon1

For RTEMS IOCs and LinuxRT CPUs send Ken Brobeck or Arjun Shetty information to boot your CPU via DHCP.

#### Step 7:

Create a ChannelWatcher configuration file for your ioc in [\\$TOOLS/ChannelWatcher/config](#). The filename format is <ioc nodename in uppercase>.sav. All subsystems have their own ChannelWatcher monitoring process. So either create a new file, Master.XX, where XX is your 2-char subsystem alias defined in the [LCLS Naming Conventions](#) or add your new ioc configuration file to the appropriate Master file.

### Step 8:

Follow the cram instructions for releasing an EPICS IOC Application from development to production.

### Step 9:

Create the boot links and startup scripts for your IOC and CPU for LinuxRT in \$EPICS\_IOC<ioc,cpu>. Template startup scripts are located in \$EPICS\_IOC/template

for [LinuxRT](#) IOCs and CPUs

for [RTEMS](#) IOCs

for [Linux](#) IOCs

### Step 10:

Add your IOC to the screeniocs file and commit your changes to CVS. The screeniocs file is used by iocConsole to connect to the serial port of your IOC. The information that you will need is the nodename, which is referred to as the "alias", then terminal server node name and the terminal server port connected to your device. Table 3 below provides an example of a screeniocs entry for an RTEMS ioc.

**Table 3**

Alias	Terminal Server	Port No.	host screen is run	Comment
ioc-b15-mg01	ts-b15-mg01	2002	lcls-dev1	# b15-123-0427-S0 (bottom slot)

Table 4 below lists the CVS path to the screeniocs file for each facility.

**Table 4**

Facility	CVS path to screeniocs
Dev	epics/iocCommon/All/Dev
LCLS	epics/iocCommon/All/lcls
LCLS-II	epics/iocCommon/All/lcls
FACET-II	epics/iocCommon/All/facet
TestFac	epics/iocCommon/All/acctest

### Step 11:

a) Additional IOC Applications will need to be modified to include your IOC, Crate and any addition devices such as EVR or ACSW's . In IOCManager add your ioc, crate and acsw if needed, to the appropriate facility database area file. In addition update the srcArchive file for that facility. Commit changes to the code management system, tag and release to production, rebooting the necessary IOCs and alarm handlers.

- IOCManager
- AlarmsConfigs-ntwk
- AlarmConfigs-<subsystem>
- AlarmConfigs-evnt, if your IOC includes timing

b) The network and possibly timing display will need to be update to add your device.

**Table 5**

Facility	CVS path to Network Display	CVS path EDM Event Display
Development	tools/edm/display/lcls/ntwk_dev_main.edl  -- OR ---  tools/edm/display/misc/lab_dev_main.edl	tools/edm/display/misc_<area>_main.edl
LCLS	tools/edm/display/lcls/ntwk_<area>_main.edl	tools/edm/display/misc_<area>_main.edl
LCLS-II	tools/edm/display/lcls2/ntwk_area_<area>_main.edl	tools/edm/display/misc_<area>_main.edl
FACET-II	tools/edm/display/facet/ntwk_<area>_main.edl	tools/edm/display/misc_<area>_main.edl
TestFac - ASTA	tools/edm/display/asta/asta/ntwk_asta_main.edl	tools/edm/display/misc_<area>_main.edl
TestFac - XTA	tools/edm/display/xta/ntwk_xt01_main.edl	tools/edm/display/misc_<area>_main.edl

#### Step 12:

For production systems you will need to archive the required PVs for the IOCManager and your subsystem application. The IOCManager archived files will be found in the IOCManager/<tag\_name>/IOCManager/archive/<nodename>.archive. This file is generated during the build from the substitutions file in IOCManagerApp/srcArchive/<nodename>.ar substitutions

**Table 6**

Facility	Archive PV List
FACET-II	generate the archive file for your IOC application and copy the file to \$IOC_DATA/<nodename>/archive/<nodename>.archive  Format: PVNAME INTERVAL [ monitor/scan ]. The interval is in seconds. For monitor the interval is set to 1.
LCLS,LCLS-II, TestFac, Dev	send generated archive list to Patrick Pascual using the format above

Booting and existing ioc:

#### Step 13:

Connect to the serial port on your IOC via iocConsole as follows:

iocConsole <nodename>

Boot your [ioc](#) or bring up the appropriate facility home display (i.e. LCLSHOME, FACETHOME, LCLS2HOME, ASTAHOME or XTAHOME) and navigate to the Network Area display for your IOC. Select the button listing the nodename of your IOC, and select the [IOC Reboot](#) button or cycle the crate power, from the [Power Off](#) and [Power On](#) button.