

<i>Safety Systems Department</i>	BCS Average Current Monitor PROM Configuration Procedure				
	DCO No.	Released By:	Effective Date June 27, 2022	Document No. CD-SS-BCS-07-10-01	Rev. 02

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BCS Average Current Monitor PROM Configuration Procedure

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Revision History

Rev No.	Effective Date	revisions
02	June 27, 2022	Changes per Maxx Tepper; changes to the operating system our laptops used to perform this upgrade.
01	31 March 22	1173

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1.0 Introduction

1.1 Purpose

This procedure configures the firmware and parameter PROM of the LCLS-II ACM Receiver and Tonegen chassis'.

2.0 Prerequisites

2.1 Laptop Credentials

User: upgrade

Password: lcls2bcsacm

2.2 LCLS-II BCS ACM Network Configuration

Serial #	Copper IP	Fiber IP	EPICS ID	Chassis
TG #1	192.168.1.120	192.168.10.120	900	Tone Generator
RX #1	192.168.1.121	192.168.11.121	910:A	Receiver 1A
RX #2	192.168.1.122	192.168.12.122	910:B	Receiver 1B
RX #3	192.168.1.123	192.168.13.123	922:A	Receiver 2A
RX #4	192.168.1.124	192.168.14.124	922:B	Receiver 2B

3.0 PROM Configuration Procedure: Firmware Images

- 3.1 Transfer the needed bit file(s) to the approved programming laptop via a USB drive to the following location:

/home/upgrade/lcls2-bcs-acm-bench/firmwares

- 3.2 The PROM WRT switch should be down, the LED should be green, EPICS PVs PromSwitch, PromConfig and PromLocked should be 0

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- 3.3 Connect to the CONFIG port of the chassis with the approved programming laptop and dongle using an ethernet cable
- 3.4 Flip the PROM WRT switch up. The LED should turn red and EPICS PVs PromSwitch and PromLocked should change to 1
- 3.5 On the laptop, open a terminal and navigate to the proper directory for script execution:

```
$ cd /home/upgrade/lcls2-bcs-acm-bench
```
- 3.6 Reboot to bootloader using command:

```
$ python3 -m qf2_python.scripts.reboot_to_bootloader -t [COPPER_IP]
```
- 3.7 The PROM WRT LED will be solid red anytime the chassis is in bootloader
- 3.8 If not done already, configure the chassis to boot to runtime automatically:

```
$ python3 -m qf2_python.scripts.update_firmware_configuration -i B -s AUTOBOOT_TO_RUNTIME=1 -t [COPPER_IP]
```
- 3.8 This command will not work if the most recent spartan runtime firmware is not properly linked in this directory. To do this, do the following:

```
$ python3 -m qf2_python.scripts.get_board_information -t [TARGET_COPPER_IP]
```
- 3.8 Copy the Runtime SHA256 string
- 3.8 Create the symlink; you will be pasting this copied string to the end of the linked file name (v_{copied_sha256_string}.py)

```
$ ln -s qf2_python/QF2_pre/dev_runtime.py qf2_python/QF2_pre/v_{copied_sha256_string}.py
```
- 3.9 Run the unlock PROM script using command

```
$ python3 -m qf2_python.scripts.unlock_prom -t [COPPER_IP]
```
- 3.10 If needed, load the Spartan bootloader firmware using command:

```
$ python3 -m qf2_python.scripts.update_image -i B -b firmwares/bootloader_image.bit -t [COPPER_IP]
```
- 3.11 If needed, load the Spartan runtime firmware using command:

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```
$ python3 -m qf2_python.scripts.update_image -i R -b firmwares/runtime_image.bit -t [COPPER_IP]
```

- 3.12 If needed, load the Kintex application firmware using command:

```
$ python3 -m qf2_python.scripts.update_image -b firmwares/kintex_image.bit -t [COPPER_IP]
```

- 3.13 Run the PROM lock script using command:

```
$ python3 -m qf2_python.scripts.lock_prom -r 2 -t [COPPER_IP]
```

- 3.14 If new bootloader firmware was loaded, reboot to bootloader using command:

```
$ python3 -m qf2_python.scripts.reboot_to_bootloader -t [COPPER_IP]
```

- 3.15 If new bootloader firmware was loaded, verify the loaded bootloader firmware using command:

```
$ python3 -m qf2_python.scripts.get_board_information -t [COPPER_IP]
```

- 3.16 Reboot to runtime using command:

```
$ python3 -m qf2_python.scripts.reboot_to_runtime -t [COPPER_IP]
```

- 3.17 If new runtime or kintex firmware was loaded, verify the loaded runtime or kintex firmware using command:

```
$ python3 -m qf2_python.scripts.get_board_information -t [COPPER_IP]
```

- 3.18 Flip the PROM WRT switch down. The LED should turn green, EPICS PVs PromSwitch, PromConfig and PromLocked should be 0

- 3.19 Cycle power on the chassis by disconnecting the power for at least 30 seconds.

- 3.20 If new runtime or kintex firmware was loaded, verify the loaded runtime or kintex firmware using command:

```
$ python3 -m qf2_python.scripts.get_board_information -t [COPPER_IP]
```

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4.0 PROM Configuration Procedure: JSON Parameters

- 4.1 Transfer the needed json file(s) to the approved programming laptop via a USB drive to the following location (the files may also be edited on the laptop directly using a text editor):

```
/home/upgrade/lcls2-bcs-acm-bench
```

- 4.2 The WRT PROM switch should be down, the LED should be green, EPICS PVs PromSwitch, PromConfig and PromLocked should be 0

- 4.3 Connect to the CONFIG port of the chassis with the approved programming laptop and dongle using an ethernet cable

- 4.4 On the laptop, launch a terminal and navigate to the proper directory for script execution:

```
$ cd /home/upgrade/lcls2-bcs-acm-bench
```

- 4.5 Reboot to bootloader using command:

```
$ python3 -m qf2_python.scripts.reboot_to_bootloader -t [COPPER_IP]
```

- 4.6 The PROM WRT LED will be solid red anytime the chassis is in bootloader

- 4.7 Load the json file into the PROM using command:

- 4.7 For RXs:

```
$ python3 -m qf2_python.scripts.update_parameters -j file-name.json -t [COPPER_IP]
```

- 4.7 For Tonegen:

```
$ python3 -m qf2_python.scripts.update_parameters_tonegen -j file-name.json -t [COPPER_IP]
```

- 4.8 Reboot to runtime using command:

```
$ python3 -m qf2_python.scripts.reboot_to_runtime -t [COPPER_IP]
```

- 4.9 Cycle power on the chassis by disconnecting the power for at least 30 seconds.

- 4.10 With an on-network computer, and with a SLAC Unix account, ssh into mcclogin:

```
$ ssh slac-unix-user@mcclogin
```

- 4.10 Navigate to the following directory:

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```
$ cd /afs/slac.stanford.edu/u/cd/nludlow/projects/ACM/lcls2-bcs-acm-bench
```

4.10 Verify the json values were loaded by looking at the corresponding EPICS values (see the table in section 2.3 for EPICS ID):

```
$ python verify_parameters.py ACM:HTR:[EPICS_ID]
```

4.10 Example: for Receiver 2A:

```
$ python verify_parameters.py ACM:HTR:922:A
```