L3 CPS Calibration Code

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- To get the calibration values
- To extract CPS channel and translate hardware ID to strip ID
- To read these calibration values
- To Set up these calibration values

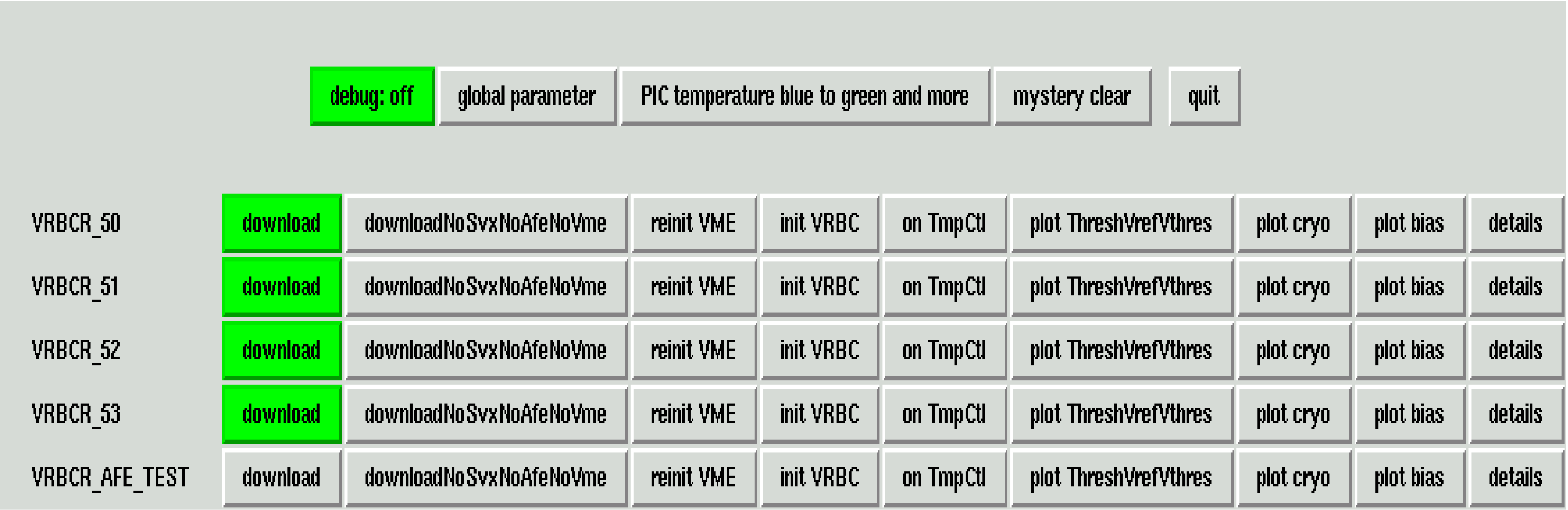
I. To get the calibration values

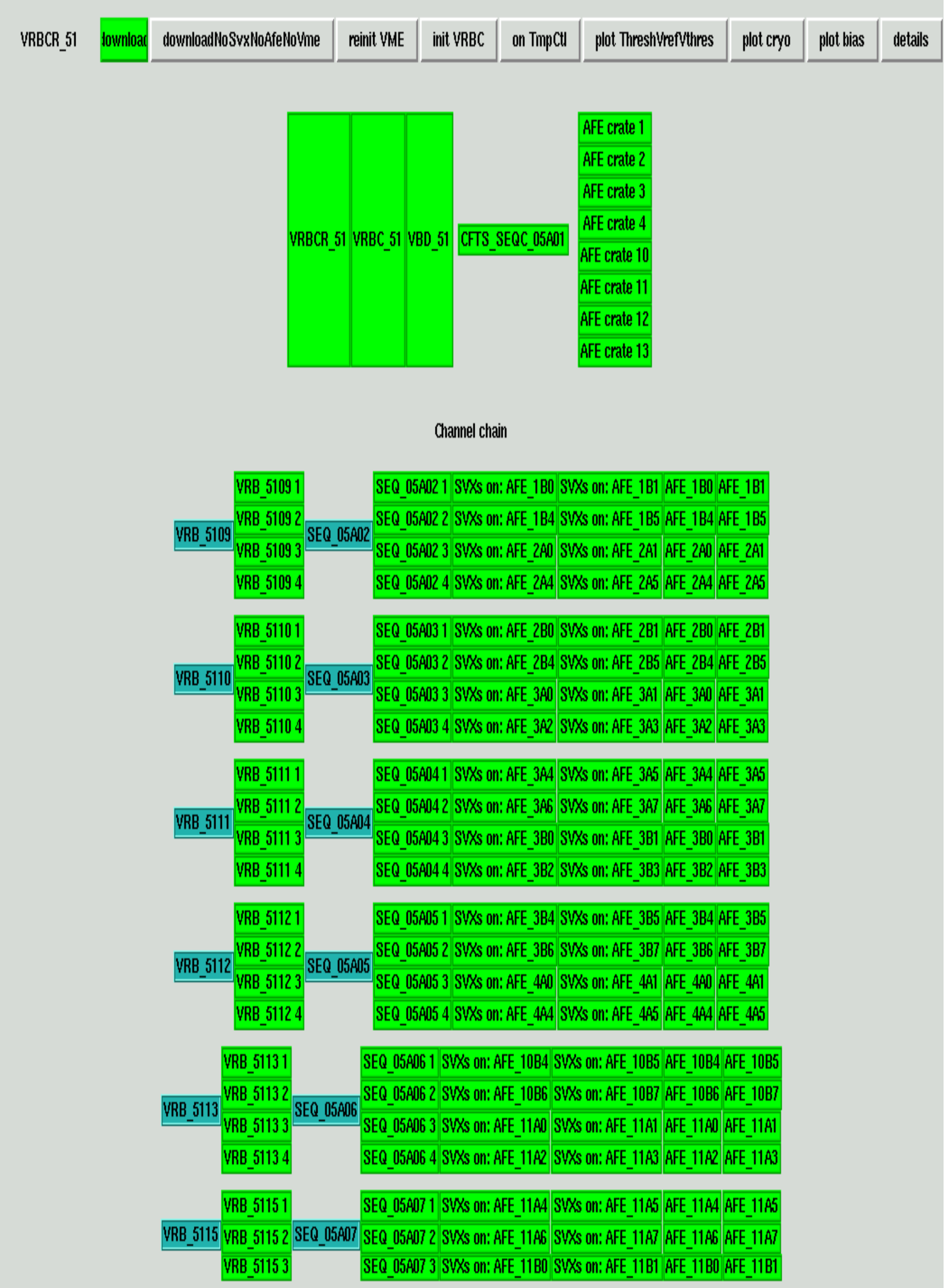
On online machine:

```
>setup d0online
>cft_gui
```

(1) To get the calibration run number

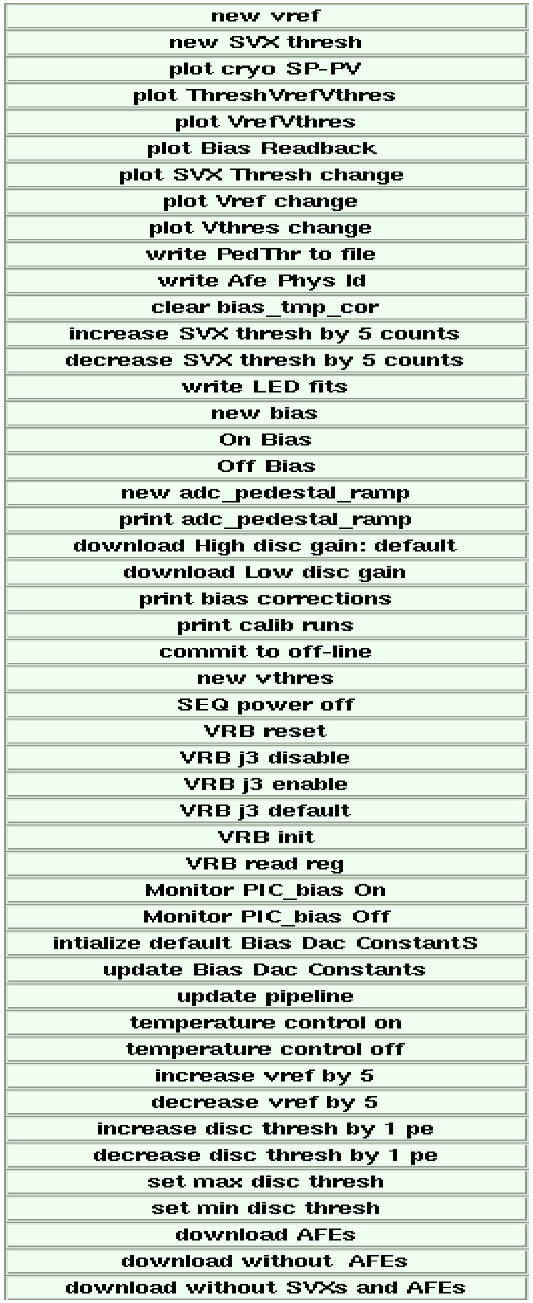
(2) To write pedestal values and threshold to a text file





Channel chain

VRB_5109	VRB_5109 1	SEQ_05A02	SEQ_05A02 1	SVXs on: AFE_1B0	SVXs on: AFE_1B1	AFE_1B0	AFE_1B1
	VRB_5109 2		SEQ_05A02 2	SVXs on: AFE_1B4	SVXs on: AFE_1B5	AFE_1B4	AFE_1B5
	VRB_5109 3		SEQ_05A02 3	SVXs on: AFE_2A0	SVXs on: AFE_2A1	AFE_2A0	AFE_2A1
	VRB_5109 4		SEQ_05A02 4	SVXs on: AFE_2A4	SVXs on: AFE_2A5	AFE_2A4	AFE_2A5
VRB_5110	VRB_5110 1	SEQ_05A03	SEQ_05A03 1	SVXs on: AFE_2B0	SVXs on: AFE_2B1	AFE_2B0	AFE_2B1
	VRB_5110 2		SEQ_05A03 2	SVXs on: AFE_2B4	SVXs on: AFE_2B5	AFE_2B4	AFE_2B5
	VRB_5110 3		SEQ_05A03 3	SVXs on: AFE_3A0	SVXs on: AFE_3A1	AFE_3A0	AFE_3A1
	VRB_5110 4		SEQ_05A03 4	SVXs on: AFE_3A2	SVXs on: AFE_3A3	AFE_3A2	AFE_3A3
VRB_5111	VRB_5111 1	SEQ_05A04	SEQ_05A04 1	SVXs on: AFE_3A4	SVXs on: AFE_3A5	AFE_3A4	AFE_3A5
	VRB_5111 2		SEQ_05A04 2	SVXs on: AFE_3A6	SVXs on: AFE_3A7	AFE_3A6	AFE_3A7
	VRB_5111 3		SEQ_05A04 3	SVXs on: AFE_3B0	SVXs on: AFE_3B1	AFE_3B0	AFE_3B1
	VRB_5111 4		SEQ_05A04 4	SVXs on: AFE_3B2	SVXs on: AFE_3B3	AFE_3B2	AFE_3B3
VRB_5112	VRB_5112 1	SEQ_05A05	SEQ_05A05 1	SVXs on: AFE_3B4	SVXs on: AFE_3B5	AFE_3B4	AFE_3B5
	VRB_5112 2		SEQ_05A05 2	SVXs on: AFE_3B6	SVXs on: AFE_3B7	AFE_3B6	AFE_3B7
	VRB_5112 3		SEQ_05A05 3	SVXs on: AFE_4A0	SVXs on: AFE_4A1	AFE_4A0	AFE_4A1
	VRB_5112 4		SEQ_05A05 4	SVXs on: AFE_4A4	SVXs on: AFE_4A5	AFE_4A4	AFE_4A5
VRB_5113	VRB_5113 1	SEQ_05A06	SEQ_05A06 1	SVXs on: AFE_10B4	SVXs on: AFE_10B5	AFE_10B4	AFE_10B5
	VRB_5113 2		SEQ_05A06 2	SVXs on: AFE_10B6	SVXs on: AFE_10B7	AFE_10B6	AFE_10B7
	VRB_5113 3		SEQ_05A06 3	SVXs on: AFE_11A0	SVXs on: AFE_11A1	AFE_11A0	AFE_11A1
	VRB_5113 4		SEQ_05A06 4	SVXs on: AFE_11A2	SVXs on: AFE_11A3	AFE_11A2	AFE_11A3
VRB_5115	VRB_5115 1	SEQ_05A07	SEQ_05A07 1	SVXs on: AFE_11A4	SVXs on: AFE_11A5	AFE_11A4	AFE_11A5
	VRB_5115 2		SEQ_05A07 2	SVXs on: AFE_11A6	SVXs on: AFE_11A7	AFE_11A6	AFE_11A7
	VRB_5115 3		SEQ_05A07 3	SVXs on: AFE_11B0	SVXs on: AFE_11B1	AFE_11B0	AFE_11B1



II. extract CPS channel and translate hardware ID to strip ID

(Thanks to Drew Alton.)

(1) a mapping file applied for translating the hardware address to strip ID

(2) a script file used to extract CPS channel and save strip ID, pedestal value and threshold to three text file (axial layer, u_layer and v_layer each).

```
26070a  43.1 48 45   →  -1234  65.5  73
26070b  43.1 48 45   →   1197  63.3  73
```

III. read these calibration values

Code: cps_util/CPSUnpacker.cpp

Method:

void CPSUnpacker::setup_calibration(int type, float adc_per_mev, float strpthrsh, float pedestal)

Array: gains[iz][ilay][istrip]
pedestals[iz][ilay][istrip]
mip_values[iz][ilay][istrip]
thresholds[iz][ilay][istrip]

Where "type" is a rcp parameter,

type=0, use the default calibration values for MC;

type=1, read the calibration values from text file;

type=other value, access offline database to get calibration values;

IV. Set up these calibration values

Code: l3fcpsunp/L3TCPSUnpack.cpp

Method:

void L3TCPSUnpack::RunInit()

At the beginning of each run, it will set up calibration constants.