

Notes on Bo HV and Pulser Configuration

1 Setting High Voltage

High voltage to PMTs is set through a CSS interface on uboonepab02. To start the css interface, as user uboonedaq logged in locally, type

```
cssgui.server start
```

To set the high voltage for one channel, select “On” from the dropdown box at the top of the relevant column. Type the desired voltage into the “Target voltage” box, and choose “Ramp”. To remove HV from that channel, select “Off”. The present voltage and current can be seen in the relevant text boxes. Channel one controls the 8inch MicroBooNE style PMT with TPB plate. Channel 2 controls the 2inch cryo PMT with no wavelength shifter.

Trips may occur for several reasons. In standard operating conditions, the most common is the level interlock, which trips PMT high voltage when the Bo argon level is below 20 inches. In case of emergency, to operate HV when Bo is in this condition contact Ben J. Other trips may occur when the PMT surpasses the hardware-set voltage limit, or the specified current limit. If you need to recover after a trip occur, choose “Off”, “Reset”, and then repeat the standard HV setting procedure.

2 Configuring the LED Pulser Board

A USB controlled pulser board is used to deliver a specified pulse sequence to the LEDs. The pulser board has four outputs, labelled and accessed as 0,1,2,3. The default pulser to LED mapping 0=C, 1=D, 2=A, 3=B. The board produced two trigger outputs, corresponding to 0||1 and 2||3, which for the purposes of this study represent “visible” and “UV” triggers. Despite the fact that the trigger outputs are formed from ORs of pairs of LEDs, pulse sequences can specify pulsing of individual LEDs, though in our default sequences, 0,1 and 2,3 always pulse together in pairs. The voltage delivered to each channel is specified in the pulser configuration as a number between 0 and 4900, corresponding to a nonlinear voltage scale running between 0 and 16V.

Two pulse sequences are loaded onto uboonepab02, corresponding to approx 1Hz and approx. 100Hz rate. In each sequence, a train of pulses is delivered for a few seconds, followed by a few seconds gap. The pulse train alternates between UV and visible pulses, with voltages 4000 supplied to the UV channels and 2500 to the visible channels. The pulse width is also specifiable, and by default the width of the UV pulses is 2ns and the width of the visible pulses is 1ns. To run either sequence

As user uboonedaq:

```
cd ~uboonedaq/Pulser
./Pulse1Hz.sh
or
./Pulse100Hz.sh
```

This will configure the pulser board in one of the two the default pulse sequences. To stop the pulser, one can either type “RE” into PUTTY, or disconnect and reconnect the USB cable at the server. To change from one pulse sequence to the other, the pulser should be reset in between to prevent unpredictable behavior. To load a PUTTY window for interactive control after loading a pulse sequence, type

```
putty -load Pulser
```

The Pulser putty profile specifies the relevant baud rate and communication parameters for controlling the board interactively via text input. Note that commands should always be typed into the putty dialog box, even though when a default pulse sequence has been loaded they will appear in another terminal window rather than in the putty box itself.

Some common pulser commands are given below:

Command	Function
RE	Reset the pulser and clear any pulse sequences
WD [channel] [voltage]	Set pulse height at channel = {0, 3} to voltage = {0, 4900}
WB 12 [w0][w1]	Set channel 0,1 pulse widths to w0={0,F} and w1= {0,F} nanoseconds
WB 13 [w2][w3]	Set channel 2,3 pulse widths to w2={0,F} and w3={0,F} nanoseconds
S1	Single pulse on all channels with specified parameters