Development of the CSS-BOY Overview Screen for the Hall C NPS CAEN High Voltage System

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CSS-BOY screens are being developed to control and monitor the Hall C Neutral Particle Spectrometer (NPS) CAEN high voltage system. This note describes the CSS-BOY overview screen.

The CSS-BOY overview screen for the NPS CAEN high voltage system, Fig. 1, was created with Python; doing so enables changes to be implemented programmatically (e.g. changes to color rules and LED grid layout). The screen has a 36 by 30 grid of LED indicators, each representing a high voltage channel for a photomultiplier tube (PMT). The LEDs are arranged in the same way as the crystals and the PMTs in the crystal array, Fig. 2.

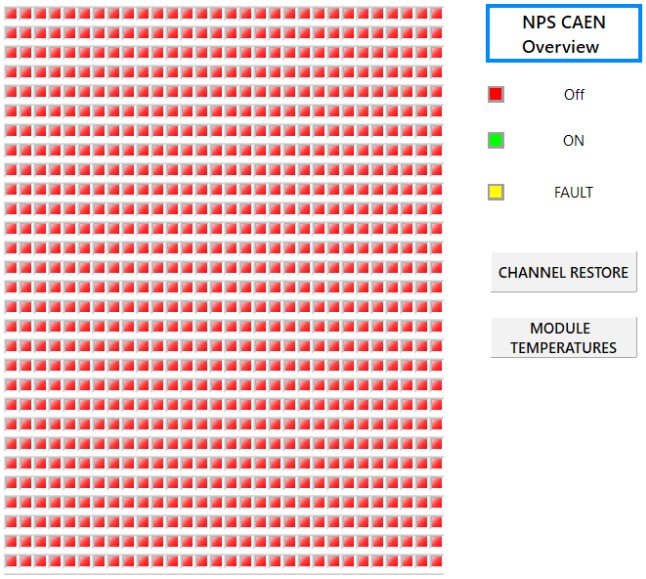

FIG. 1. Screenshot of *NPS CAEN Overview* screen. Red LEDs indicate that all CAEN high voltage channels are off.

Each LED is connected to an EPICS process variable that indicates that channel's status. If the high voltage channel for a PMT is off, the LED will be red; if on, green. LEDs blink yellow if the high voltage channel has a fault (i.e. channel readback voltage doesn't match the set voltage, channel has tripped, or the internal temperature of the module is above or below predefined limits).

Each LED is clickable; when clicked, a high voltage channel status screen, Fig. 3, pops up. At the top of the screen, channel status is indicated by the LEDs and at the bottom the channel's current and voltage are displayed. The over temperature warning for each module is initiated when that module's internal temperature exceeds 65°C. This warning does not activate an interlock. Operator action is needed to turn the module power off.

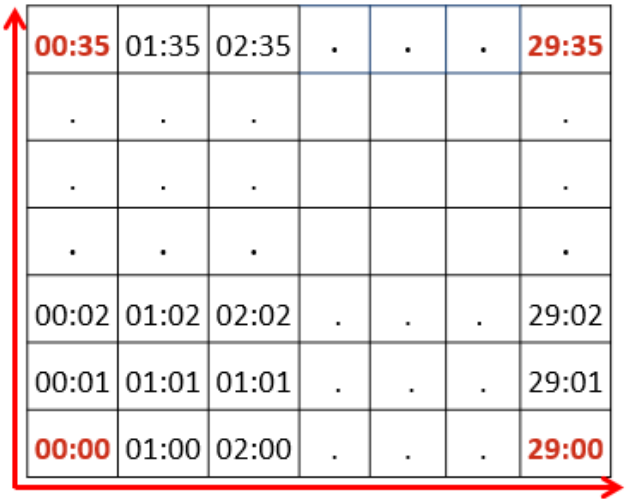

FIG. 2. Numbering scheme for CAEN high voltage PMT slots and channels. The following formula allows for the conversion between slot and channel numbers and crystal numbers.
mm:*nn* ↔ ch#:slot# ↔ PMT# (in column):PMT col#
PMT# ∨ crystal# = n x 36 + m; $n \in [0,29] \wedge m \in [0,35]$,where n is slot number and m is channel number.

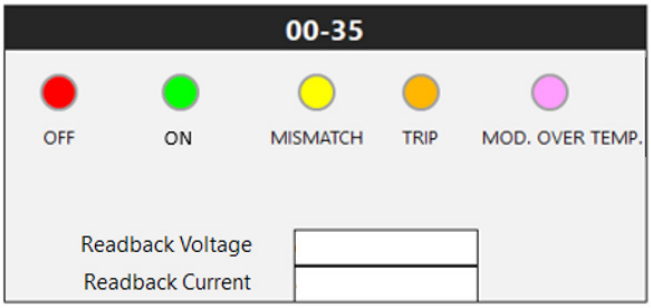

FIG. 3. Screenshot of high voltage channel status pop-up screen showing colored LEDs for each possible status of a CAEN high voltage channel, and the channel's voltage and current.

The *channel restore* button on the overview screen is to reset a channel that has tripped. Development of the pop-up screen is in progress.

Figure 4, the module temperature screen, shows for each module an LED which indicates power status—when a module's power is on, that LED is green, when off, red. There are buttons on the screen to turn each module's power on or off. Further, the screen displays each module's slot number and internal temperature (# symbols in the Figure).

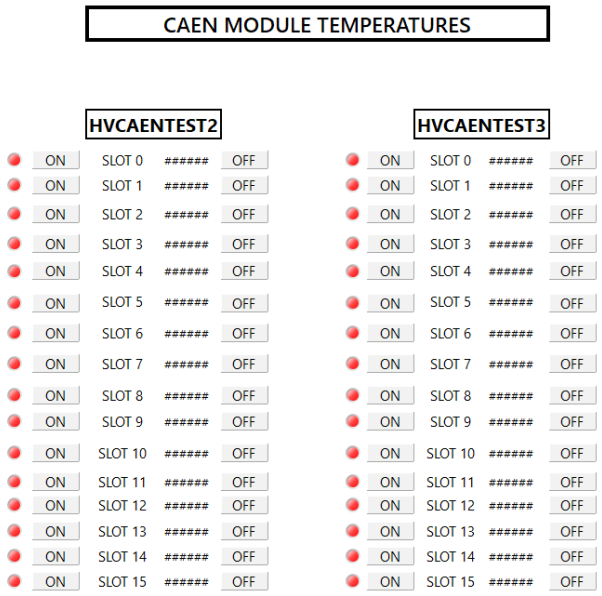

FIG. 4. Screenshot of pop-up screen when module temperatures button on overview screen is clicked.

The overview CSS-BOY screen developed to control and monitor the CAEN high voltage system will be integrated into Hall C's EPICS system.