Notre Dame CsI Documentation

J. M. April 7, 1994

1.0 Overview

1.1. CsI location & cabling

Each CsI crystal is read out by a photodiode/preamplifier combination inside the MPS magnet. The signal is carried out of the magnet region by a 20' coaxial cable to a patch panel on side of the magnet opposite the control room. From there it goes via a 160' coaxial cable to the fast trailer. Each 160' cable leads to a lemo connector on the face of a splitter shaper board module.

1.2 Splitter Shaper Modules

The splitter shaper modules are located in two NIM bins on the top of the CsI racks in the fast trailer. Each splitter shaper board has two purposes, to carry the shaped signal to the ADCs, and to provide an amplified trigger for the discriminators. The inputs for the ssplitter shaper modules are the right front lemo connectors; discriminator outputs are located on left front panel; ADC output is via a 34 pin connector on the rear of the module for a twisted pair ribbon cable. Each ribbon cable is numbered on both ends.

1.3 Operating Voltages

The CsI barrel is supplied by a 5 wire shielded cable running from the power distribution box to a 5 pin socket on the CsI barrel. A small jumper cable runs power from CIB barrel to CIA. Power is supplied by three power supplies located directly behind the power distribution box. Each power supply has a current and a voltage which can be read out on the face of the supply. ***At the beginning of each shift the current and voltage values should be checked.*** Typical operating voltages are:

VOLTAGE	CURRENT
+30V	.1A +/- .1A
-16V	4.2A +/-.2A
+8V	2 +/- .1A

1.4 Display Software

The Primary display program for the CsI is NDDisplay, accessible from the e852daq toolbox. NDDisplay is menu driven and more or less self explanatory. For additional information about the operation of this program see section 3. ***Periodically, shift personnel should check the event display and the trigger histograms to make sure the CsI is still being read out in the trigger.***

1.5 Halo Counters

In addition the CsI barrel has 6 Beam Halo Counters, intended for monitoring and calibration. These 6 counters are positioned on the upstream and downstream ends of the barrel. Halo counter high voltage is supplied by the LeCroy 32 spigot units located at the end of the fast trailer. Shift personnel are expected to check the halo counter high voltage each shift typical operating voltages are shown below.

HALO COUNTER #	**High Voltage Setting**	**HALO COUNTER #**	**High Voltage Setting**
H.C. #1	1800V	H.C. #4	1800V
H.C. #2	1800V	H.C. #5	1800V
H.C. #3	1800V	H.C. #6	1800V

2.0 Hardware Debugging

UNDER NO CIRCUMSTANCES IS THE CSI TO BE TURNED OFF: *if the CsI is noisy it should remain on, since it does not directly impact the trigger rate.*

PROBLEM:	**SOLUTION:**
WARNING: pedwrite.c: block <number> :: ERROR ADC <number> channel <number> failure	A CsI block's associated electronics has failed. Typically the problem is due to a loose lemo connector on the front of the Splitter Shaper boards or a loose ribbon cable on the back side to the ADC. Make sure the lemo and/or ribbon cable is plugged in for the ADC- s/s combination indicated by the error message.
ERROR: pedwrite.c: <number> channels not responding: Major CsI malfunction	A large portion of the CsI has failed. Check power, make sure the CsI is turned on. If the switch is in the on position, then check if all three power supplies are giving the appropriate amount of power and current by looking at the gauges on the three supplies. Acceptable values are: **+8V @ 2+/-.1A** **-16V @ 4.2+/-.1A** **+30V @ .1+/-.1A**

3.0 CsI Monitoring Software

2.1 Monitoring Software

The goal of the monitoring software is twofold, to provide a timely indication of when a channel is malfunctioning, and to provide a permanent easy to read record of the status of the barrel for each run. All code mentioned here runs under IRIX5 and is located in the ~e852/bin directory on mpsdaq.

2.2 pedwrite

Pedwrite is a program that is intended to run with the DAQ to monitor the CsI pedestals. This software requires the environment variable E852_CSIPEDS to be defined, this can be done by sourceing ~e852/setup. This variable contains the path to the directory in which hbook histograms and text file summaries of pedestal data are located. The program monitors the CsI pedestals by fitting the pedestals from each adc channel to a gaussian. If the pedestal is too wide or narrow the program sends, if applicable, an alarm warning to all alarm clients. If over a predefined number of channels fail an alarm error message is sent to all alarm clients indicating a major CsI failure.

Usage: *pedwrite* <options>
Options are:

[-D<hostname>]	dispatcher hostname
[-t]	use halo trigger to acquire pedestals
[-d]	debug flag with single event display
[-n<number>]	number of events to histogram default = infinity
[-s]	set how often alarm is checked
[-o<output file>	output file with debug option
[-h]	print options
[ctrl-c]	kill program (during execution)

2.3 csidis

A program to view single CsI events, useful for debugging DAQ and trigger.

Usage: *csidis* <options>
Options are:

[-h<hostname>]	dispatcher hostname
[-i]	Look at energy in CsI
[-l<latch>]	trigger latch word, ex: -l0x4
[-p]	print out each event to stdio
[-f]	filter events for halo
[-d]<level>	set minimum adc level ex: -d700
[-w]	wait between event displays
[ctrl-c]	kill program (during execution)

2.4 NDMon

NDMon is a display client which produces histograms of the CsI and assorted other detectors which include DEA and CPV. It uses CERN HBOOK4 code to produce and fill histograms in a global section which can be accessed by other programs to view. The suggested methods of viewing histograms is with PAW or csidisplay (see below). NDMon is currently compiled only under irix5 since the global sections are handled much better there. NDMon should be started automatically when the daq comes up. There are also simple shell scripts called NDStart and NDStop to start and stop the default versions. It is recommended that the user read the man page on NDMon for more information. Also, NDMon -h will print the options usage for easy reference.

A sample command to run NDMon is given below:

```
~e852/bin.irix5/NDMon -e -ondcsi -s0 CSID &
```

2.5 NDHist

This is a more complicated version of NDMon. It is primarily intended for CsI analysis, but can also be used for monitoring. NDMon is recommended for monitoring. There is a man page on NDHist available.

2.7 csidisplay

csidisplay is a graphical interface for viewing CsI histograms. It can view the global sections created by NDMon or a HBOOK4 file. It is a simple X/Motif program which is completely menu driven and uses PAW to view the histograms. There is a man page on csidisplay.