

Hodoscope & NIM Handbook

NMSU Nuclear Physics Group

E1039/SpinQuest Experiment
November 22, 2022



SpinQuest Spectrometer Layout

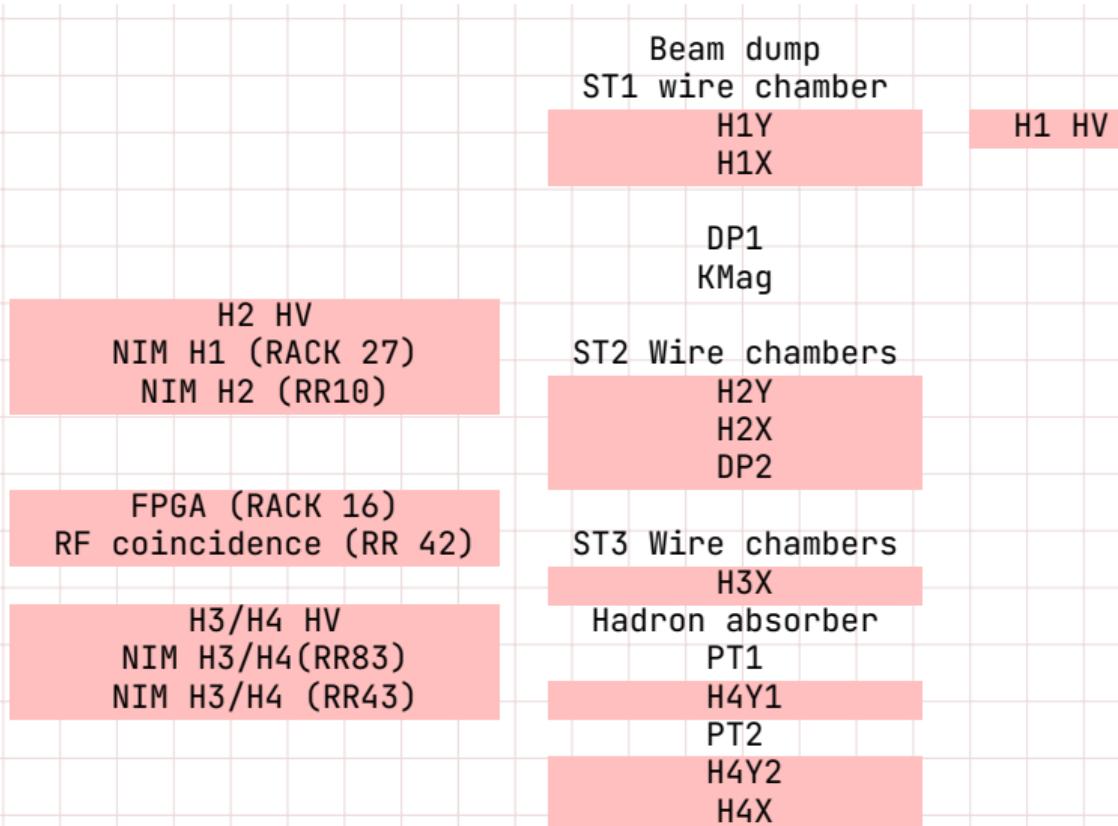


Table 1: Block diagram of the SpinQuest spectrometer. Pink shaded blocks are in the Hodoscope/NIM sub-system.

Debugging Hodoscope/NIM Sub-System

Some common steps of debugging Hodoscope/NIM sub-system includes;

- » Check the hodoscope hits in online monitor.
- » Check the raw signal from the hodoscopes.
- » Check the output signal from the discriminator.
- » Check the raw NIM signal.
- » Check the RF gated signal.

Order of these steps might change depending on the type of the issue.

Replacing Electronics

- » When replacing 4413 discriminators make sure to;
 - » keep the module threshold at the minimum. Typically this is ~ -15 mV.
 - » adjust the width to $\sim 15 - 20$ ns.
- » When replacing LEMO cables (or any cables) make sure that they are in the same length and they have correct labels in the both ends of the cable.

NIM Signal

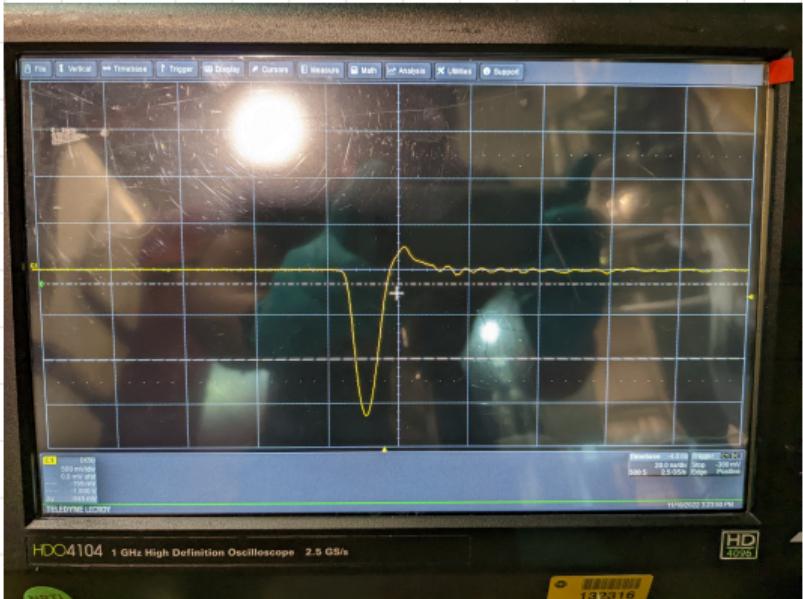


Figure 1: Typical raw signal from the hodoscope paddle.

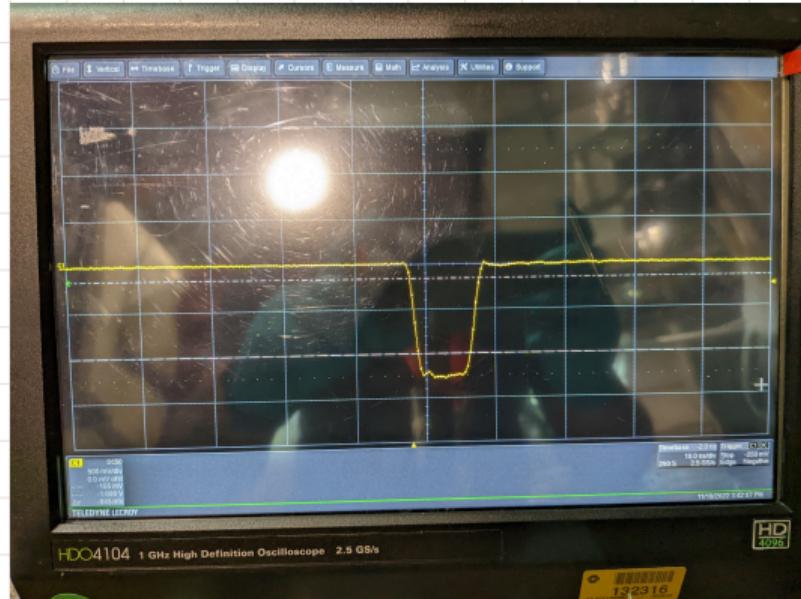


Figure 2: Typical NIM output signal from the LeCroy 4413 discriminator. The threshold of the discriminator set for the minimum value ($\sim -15\text{mV}$) and the width is set to $\sim 15\text{ns}$.

H1 Patch Panels

H1T23	H1T11	H1B23	H1B11		H1L20	H1R20	H1L10	H1R 10
H1T22	H1T10	H1B22	H1B10		H1L19	H1R19	H1L09	H1R 09
H1T21	H1T09	H1B21	H1B09		H1L18	H1R18	H1L08	H1R 08
H1T20	H1T08	H1B20	H1B08		H1L17	H1R17	H1L07	H1R 07
H1T19	H1T07	H1B19	H1B07		H1L16	H1R16	H1L06	H1R 06
H1T18	H1T06	H1B18	H1B06					

Table 2: Block diagram of the top patch panel.

H1T17	H1T05	H1B17	H1B05		H1L15	H1R15	H1L05	H1R 05
H1T16	H1T04	H1B16	H1B04		H1L14	H1R14	H1L04	H1R 04
H1T15	H1T03	H1B15	H1B03		H1L13	H1R13	H1L03	H1R 03
H1T14	H1T02	H1B14	H1B02		H1L12	H1R12	H1L02	H1R 02
H1T13	H1T01	H1B13	H1B01		H1L11	H1R11	H1L01	H1R 01
H1T12		H1B12						

Table 3: Block diagram of the bottom patch panel.

4413 Pin Numbers

7	8
5	6
3	4
1	2
9	10
11	12
13	14
15	16

Table 4: Pin numbers of the 4413 discriminator.

H1 4413 Discriminator Channel Mapping

H1XT13	H1XT12		H1XB13	H1XB12		H1XT02	H1XT01		H1YL17	H1YL16
H1XT15	H1XT14		H1XB15	H1XB14		H1XT04	H1XT03		H1YL19	H1YL18
H1XT17	H1XT16		H1XB17	H1XB16		H1XT21	H11XT20		H1YL20	
H1XT19	H1XT18		H1XB19	H1XB18		H1XT23	H1XT22			
H1XT11	H1XT10		H1XB11	H1XB10		H1XB23	H1XB22		H1YL15	H1YL14
H1XT09	H1XT08		H1XB09	H1XB08		H1XB21	H1XB20		H1YL13	H1YL12
H1XT07	H1XT06		H1XB07	H1XB06		H1XB04	H1XB03		H1YL11	
H1XT05			H1XB05			H1XB02	H1XB01			

H1 4413 Discriminator Channel Mapping