

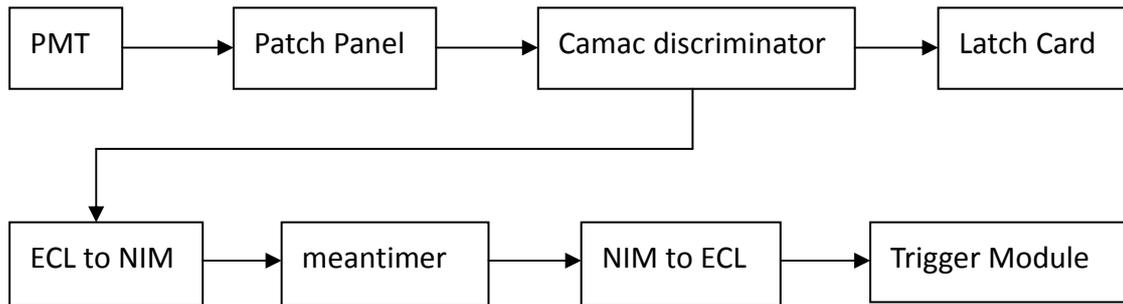
Memo on signal handling of station 4 hodoscope planes

September 24<sup>th</sup>, 2010

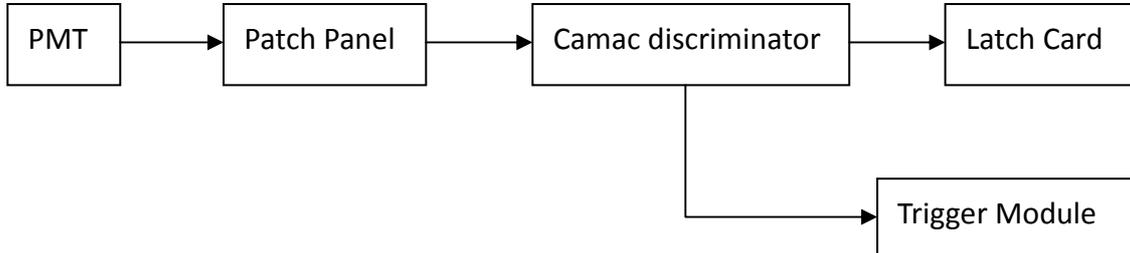
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There are two PMTs associate with each paddle in Station 4 hodo planes. This document describes how we are going to handle these signals.

Plan 1:



Plan 2:



All PMT output signals are to be sent to the patch panels via RG58 (BNC connectors). The connectors on the patch panel are BNC-LEMO type. The cable length/delay will be adjusted via the Lemo cables connecting the patch panel and the camac discriminators. The camac discriminators under consideration are LeCroy 4413, which could provide a minimum threshold of -15 mV. This camac discriminator gives two ECL outputs per input channel; one of the outputs will be sent to the Latch Module, and the other one will eventually be sent to the Trigger Module for Trigger decision. The discriminator output signal width is to be set to 15 ns, which could provide sufficient timing overlap with the signals from the same RF bucket in the Trigger Modules, given that the maximum jitter from a single paddle is  $\sim \pm 7\text{ns}$  with respect to *the* RF signal. The RF signals from the accelerator will be transformed to a

53MHz square-wave, NIM level clock signal using a zero-crossing discriminator (Ortec T140).

In plan 1, the LeCroy 624 meantimers are to be utilized. The advantage of utilizing the meantimer is the time jittering from the station 4 paddles will be greatly reduced, but the trigger efficiency may suffer somewhat since the meantimer module requires both input signals to present to produce an output pulse. We do not know whether this will be an issue if we set the discriminator threshold at -15mV. In addition a few more electronics are also needed in plan 1.

In plan 2, the discriminator outputs go to the Trigger modules and the Latch modules directly. While being straightforward, the time jitter is larger and thus additional FPGA programming of the Trigger modules will be required.

At present, we will proceed with plan 1 first during the test run. If the hodo efficiency is not acceptable, we will then move to plan 2.