

Question of the divider and PMT gain and Bogdan's slides:

From slides 3, 6 and 8 – the PMT gain is half of that stated due to the bias modifications already on the divider. The PMT gain should then be reduced by a factor of 250 – 500 (from Bogdan's calculations and by shorting dynodes) and comparing to the present implementation:

- a) 0.5×10^6 (present PMT gain)/500 = 1000 (proposed PMT gain on slide 8).
- b) X25 (present preamp gain) x X20 (proposed amplifier) = 500 (to regain signal range at ADC).

We have all the dividers we need already with the preamp gain of x25. The consensus, per our recent meeting, is to use the present divider and test it with shorted dynodes. We have tested this divider extensively and verified good performance up to 3 MHz rates and within the 2% linearity rating from Hamamatsu. Also, noise has not been an issue per the results obtained in recent tests in Hall D.

An external amplifier with a gain of x20 is reasonably easy to implement with very low noise but we need to consider the implementation (packaging, crates, etc.). With Lemo connectors, a 16-channel module is reasonable but we would be considering around 70 modules and about 4 VME-size crates and 1 or 2 racks. These numbers are just for context.

Possible next steps are as follows:

- 1) Test present divider w/ x25 preamp and short last few dynodes to decrease PMT gain. May use available amplifiers (x10, etc.) to assess performance. PMT linearity with shorted dynodes needs to be measured.
- 2) If item 1's performance is acceptable, move on to modify all dividers and design and implement external amplifier.
- 3) If not, assess PMT linearity with shorted dynodes, develop new divider with DC power preamp, etc.

We also need to discuss available personnel for testing.

Thoughts on cabling for preamp DC power:

It seems to me that space is very tight to add any PCBs in that same space but there may be space on the edges if we need to add some cabling for the preamp DC power through daisy-chained connections. It would be preferable to implement the DC connections, if indeed the DC power is needed, from the same PCBs you already show on the drawing also from the standpoint of servicing the electronics/PMTs. I understand, however, that you already have these PCBs.