

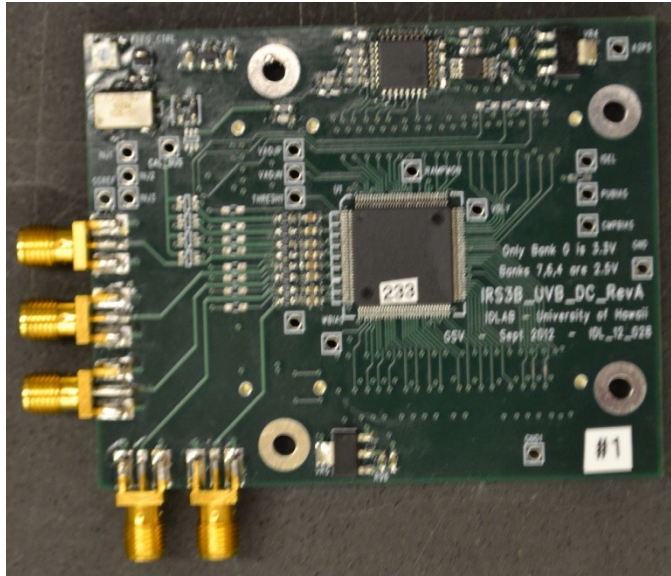
Electronics Update from Hawaii

1. IRS3B Trigger testing Update (Gary/Luca)
2. SciFi Tracker Update (Xiaowen/Brian)
3. HV boards status (Gerard/Gary)

10-JAN-2013 update

M. Andrew, B. Kirby, L. Macchiarulo, X. Shi, G. Varner, G. Visser

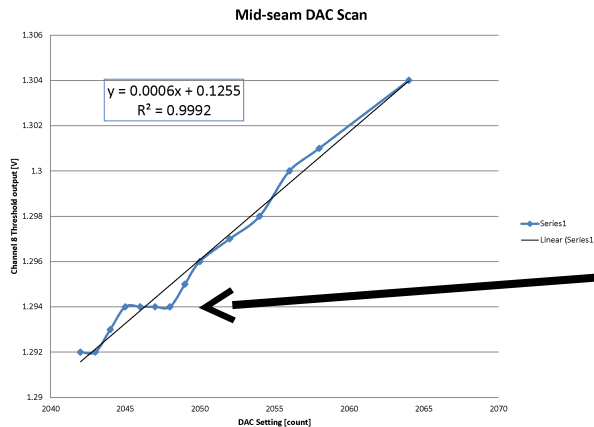
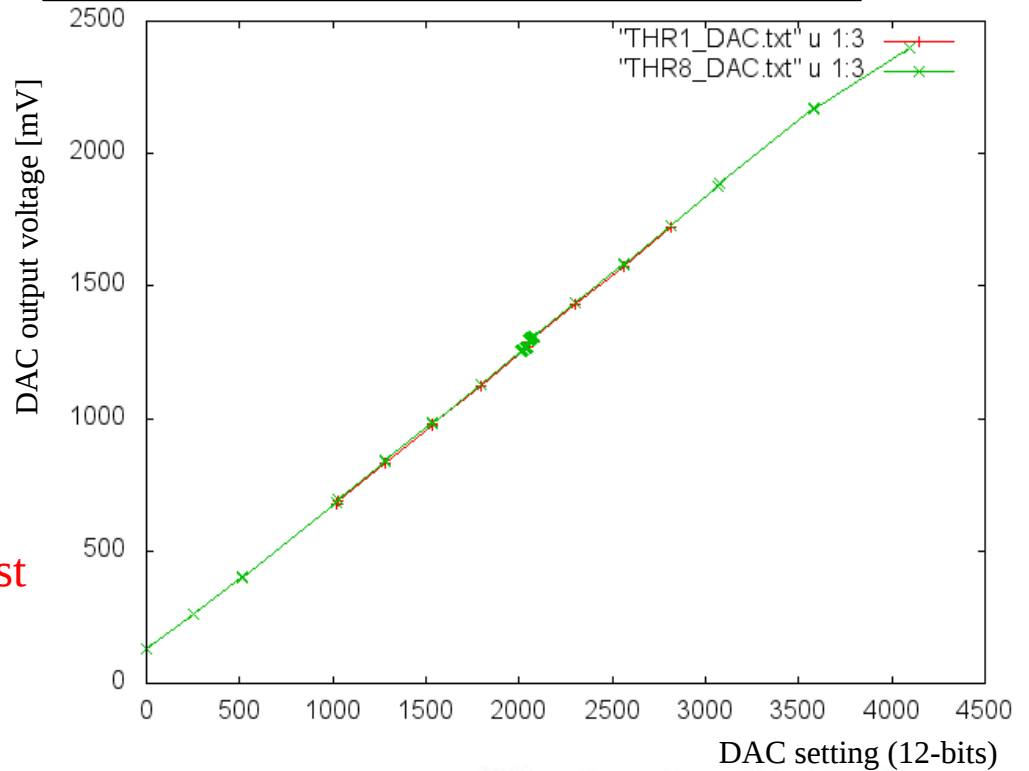
IRS3B Trigger Studies



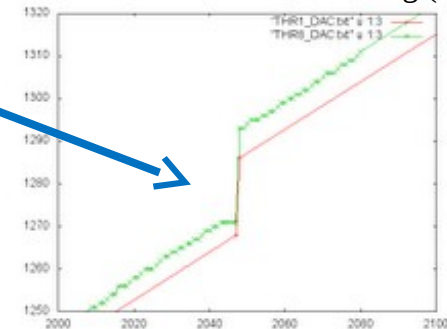
Now have access to a number of DAC channels, can study

Again, using the “Universal Eval”, as test platform

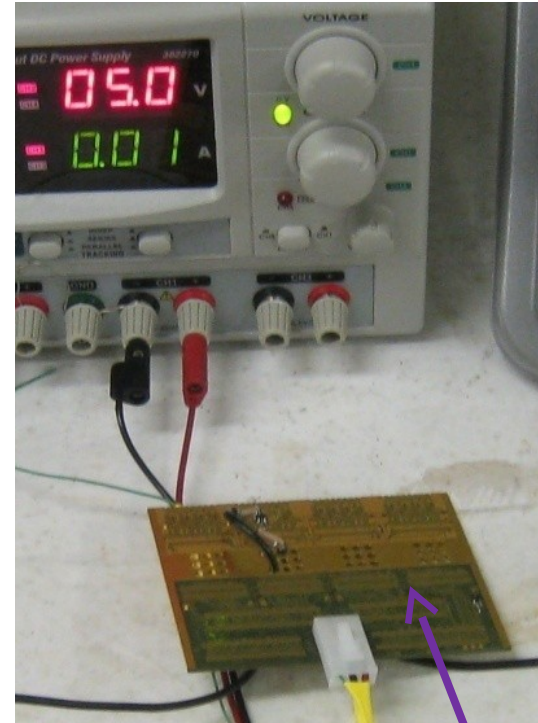
Some Resistance offset in DACs – most prevalent at the “mid seam” of R-2R ladder



“worst case”
~20mV, many almost seamless



Including new Pre-amp

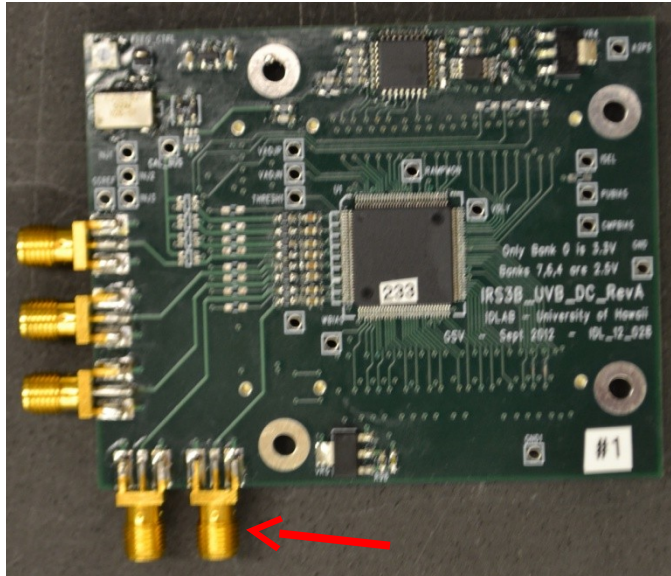


Amplified signal using the inverting/shaping circuit prototyped on **Carrier 1 eval** – to be used on future carriers

Clip fast signal from Avtech pulser to obtain MCP-PMT like input

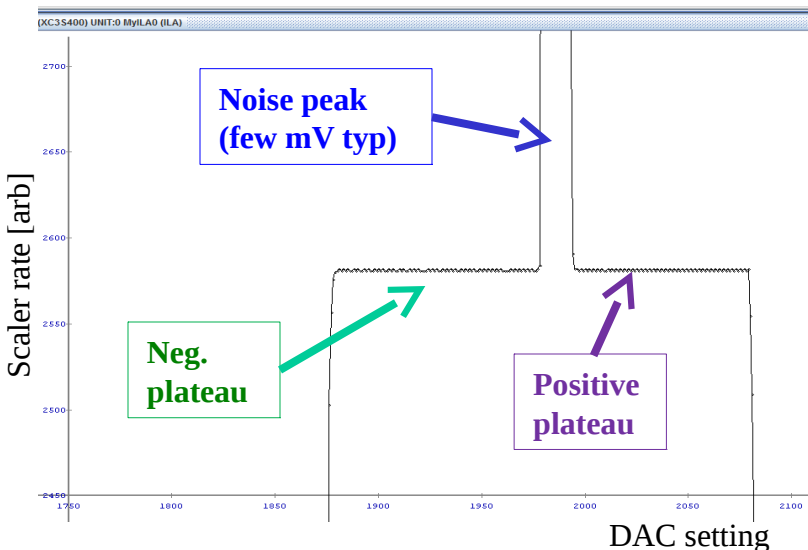
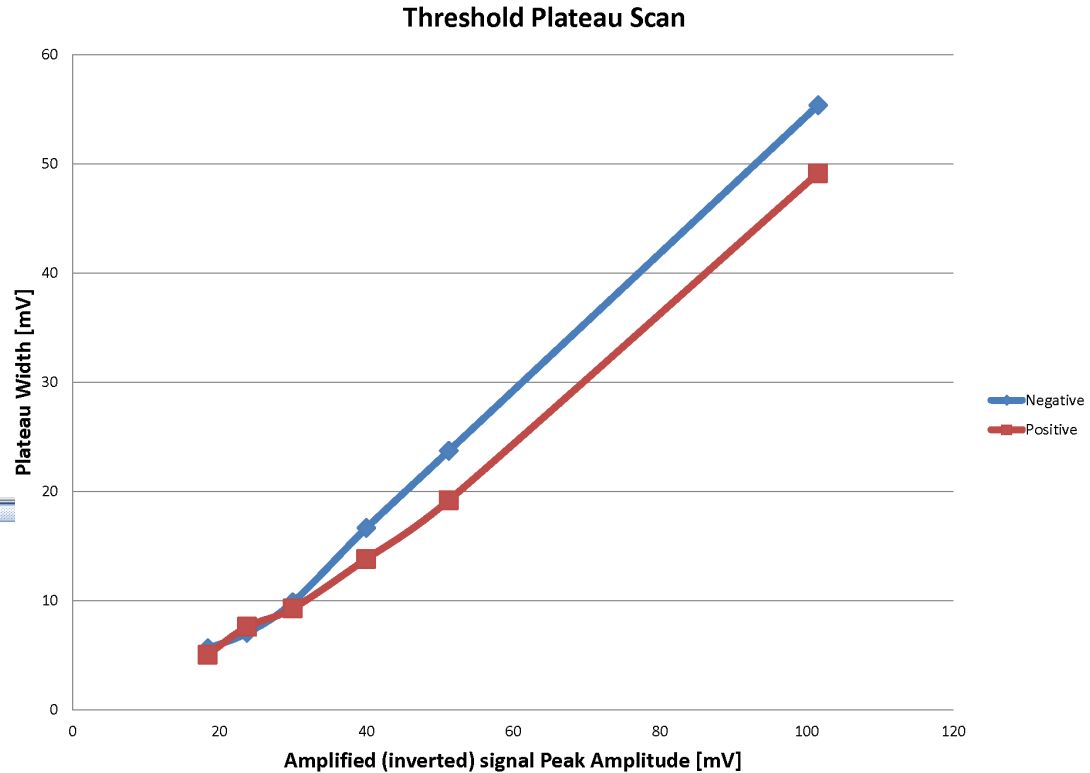
- **FWHM ~ 1ns**

Trigger Threshold Result (1)



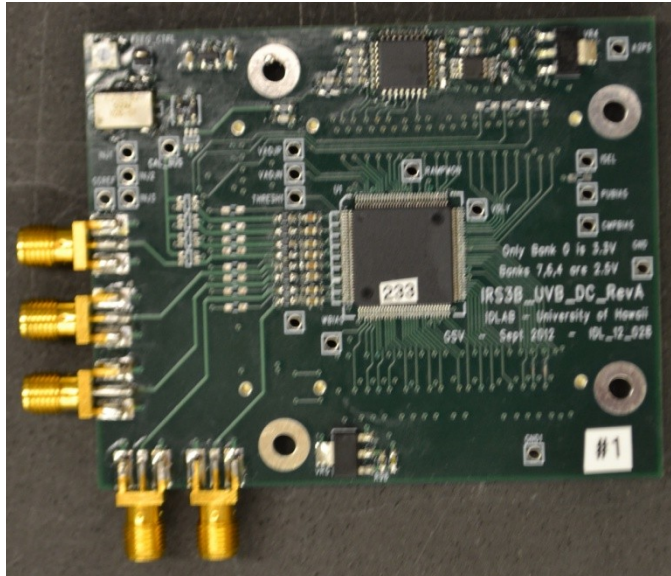
Initial test Threshold scan:
Ch8

Inject signal and scan
count-rate versus threshold



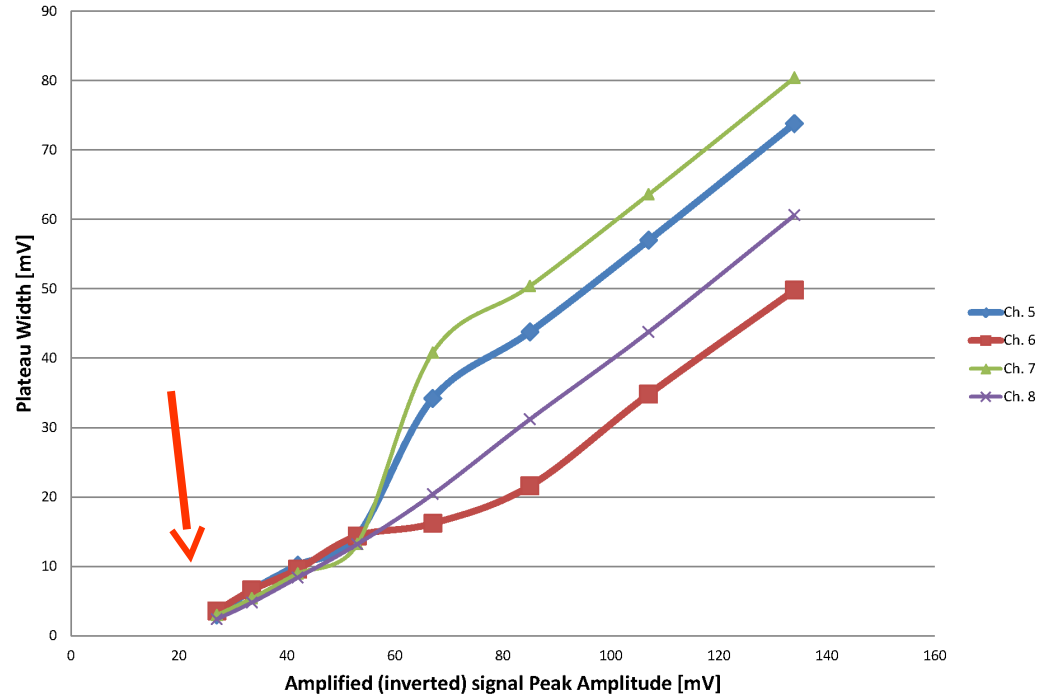
Based upon this – estimated should be able to trigger reliably down to 20-30mV amplified, shaped output peak voltage (~ 5x10⁵ gain)

Trigger Plateau Comparison

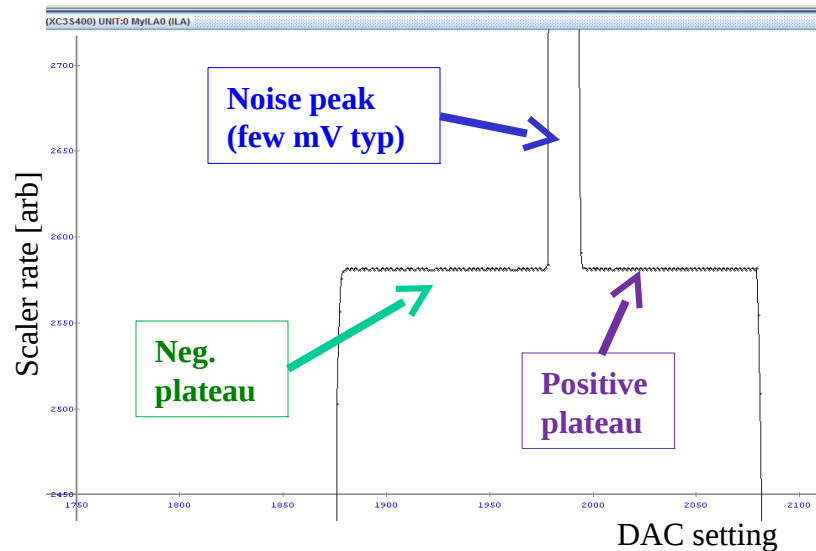


Inject signal and scan
count-rate versus threshold

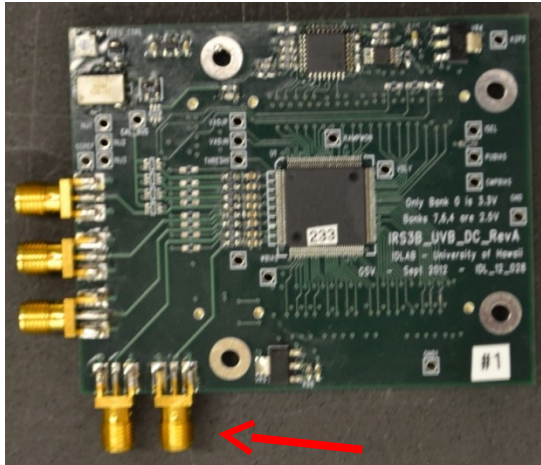
Comparison of plateaus:
Ch5-8 (positive plateaus)



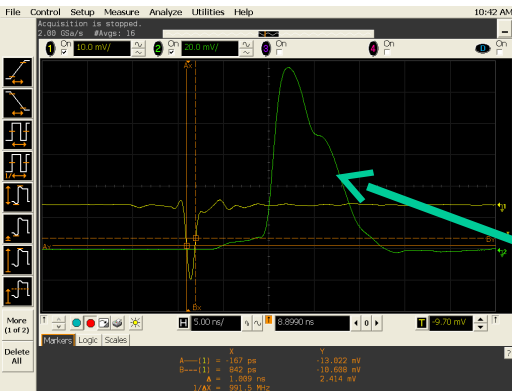
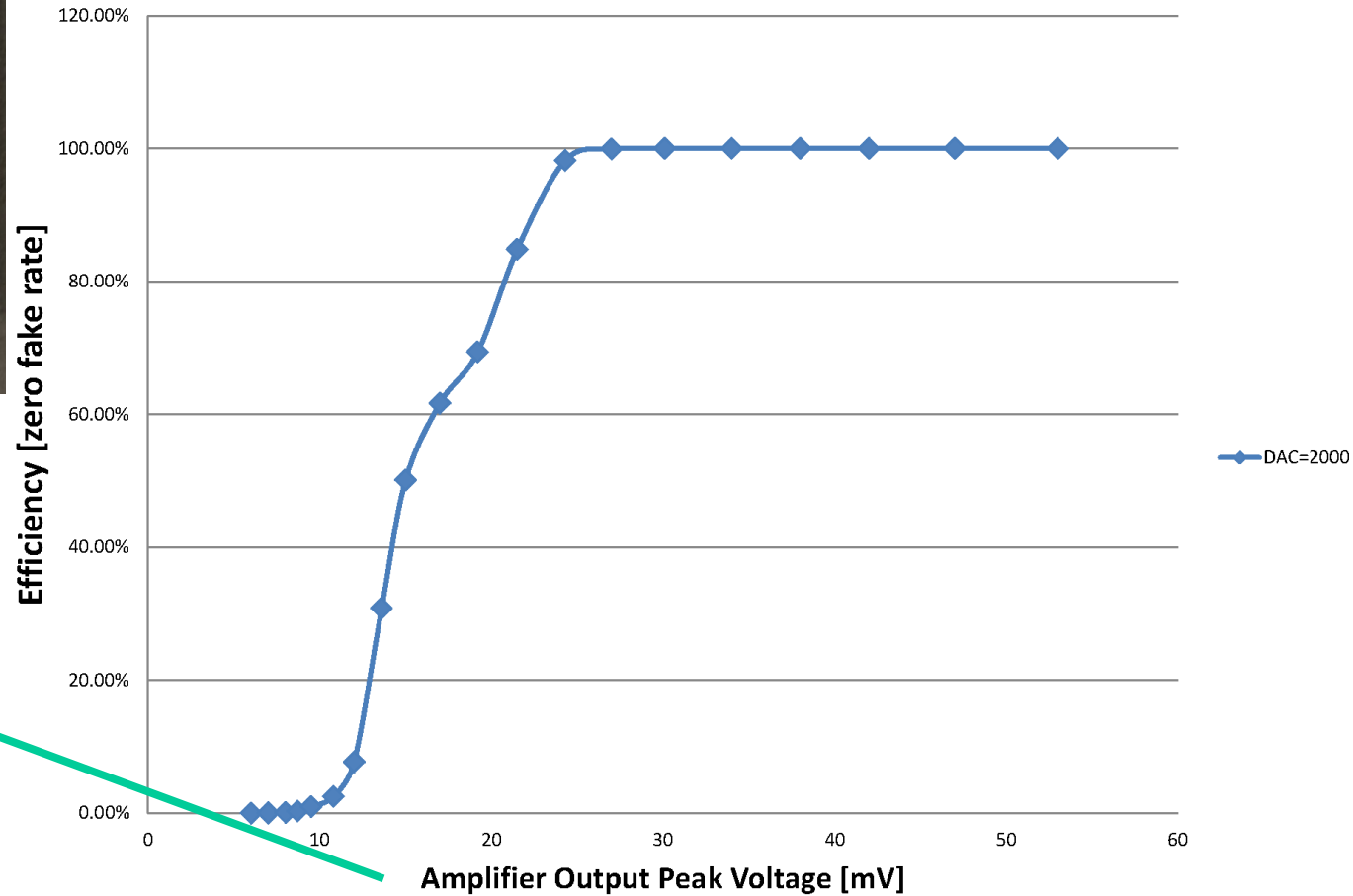
Splitting due to crossing the DAC mid-seam; Arrow indicates the planned operating range



Trigger Threshold Result (2)



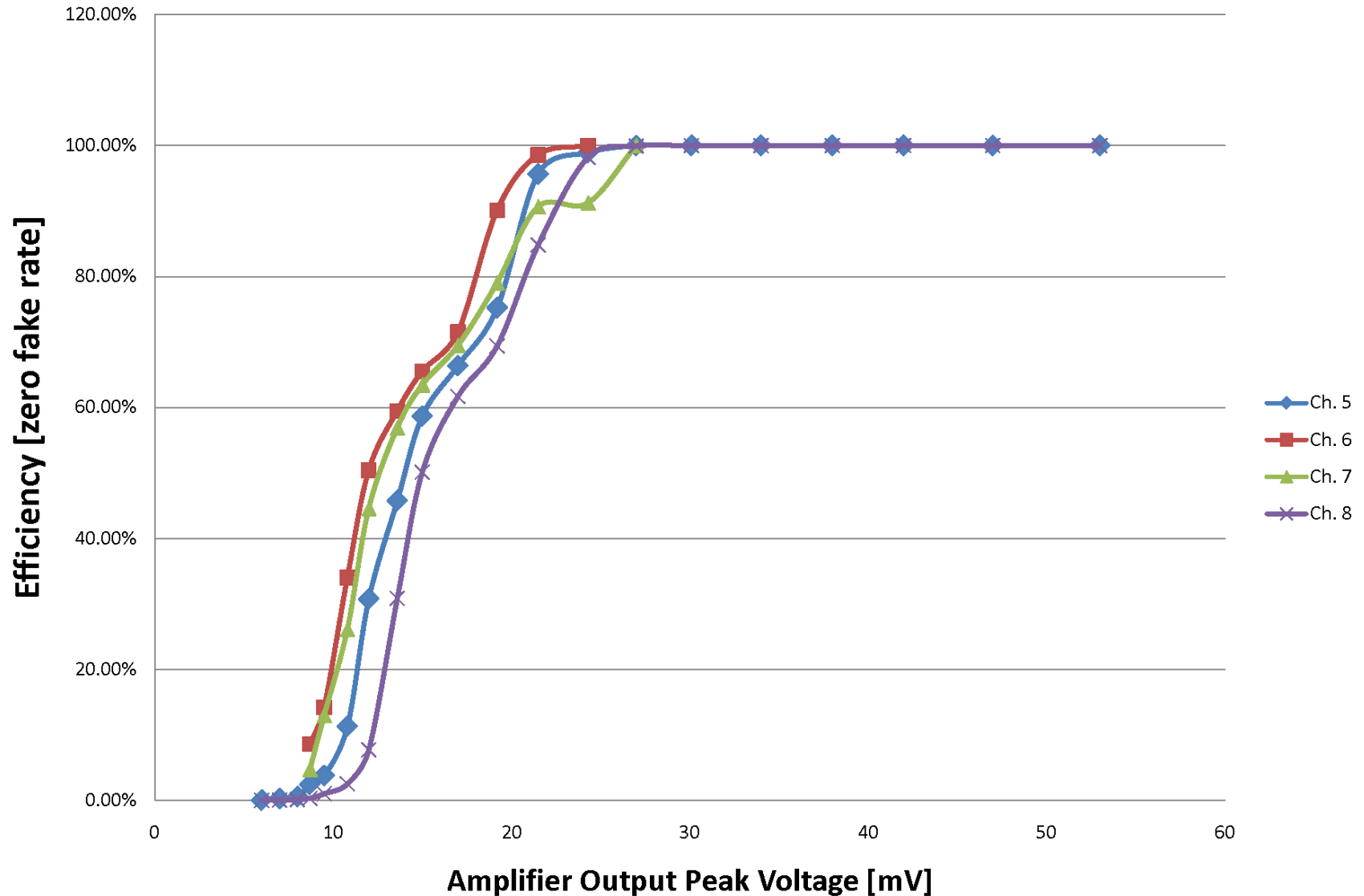
Ch. 8 Threshold scan



~50% efficiency for 15mV peak pulses (near 100% for 24mV peak). Need to confirm this is shaped output peak voltage range for lower gain (~ 5x10⁵ gain) operation

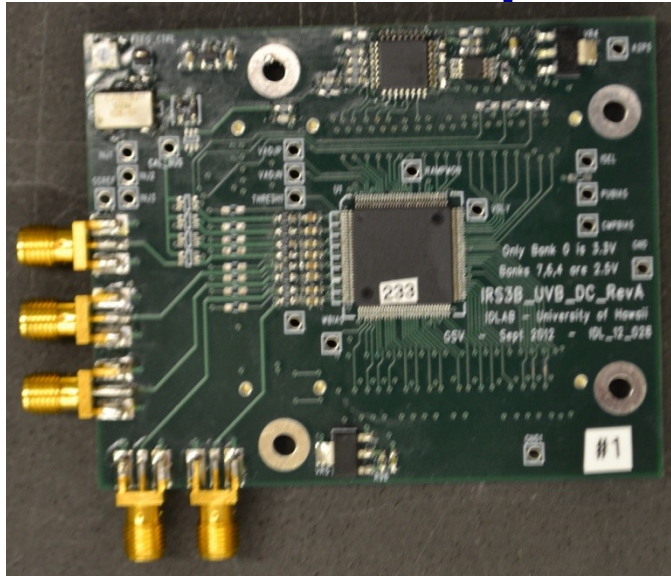
Initial test Threshold scan:
Ch8

Trigger Threshold Comparison



Channel 8 actually worst of those checked, more statistics needed.

Follow-up IRS3B Timing Results



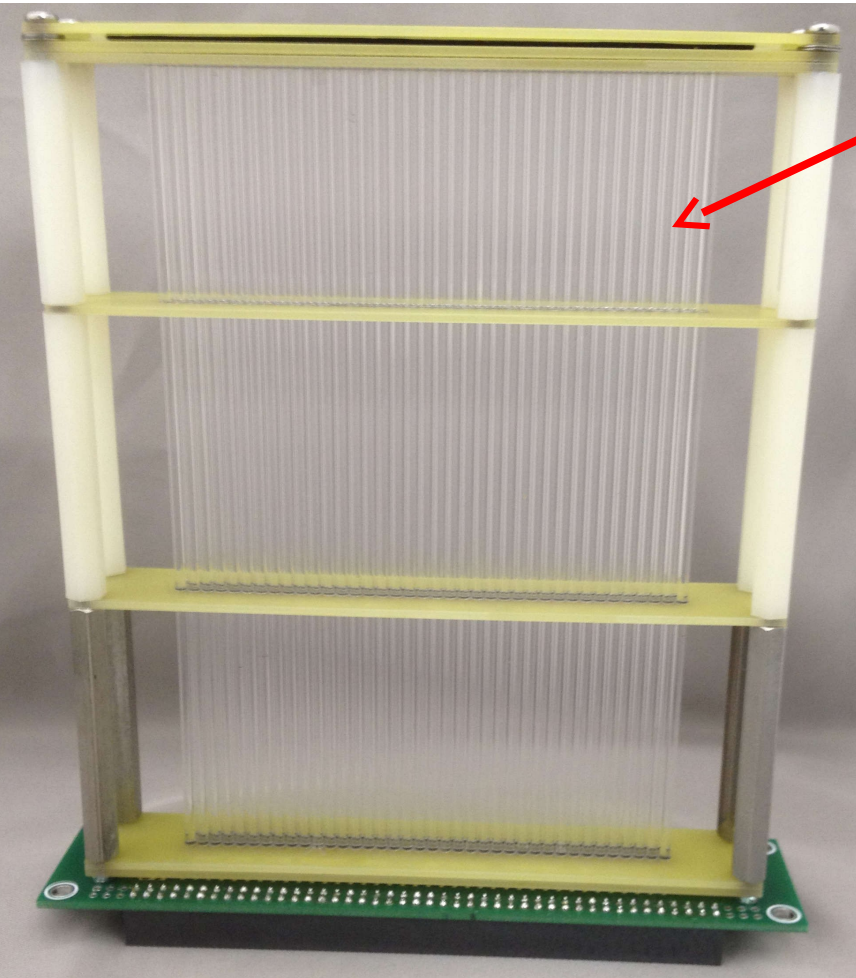
2.5GSa/s this test
Signals input: **Ch5** – **Ch6**

Again, using the “Universal Eval”, still a number of firmware deficiencies:

- Better pedestal method
- Timebase servolocking
- Wilkinson servo off
- Restricted range – still need timing adjustment

$\sigma \sim 0.12 \text{ bin} \square \sim 50\text{ps}$
Time diff ($\sim 35\text{ps}$)

Sci-Fi Tracker Progress

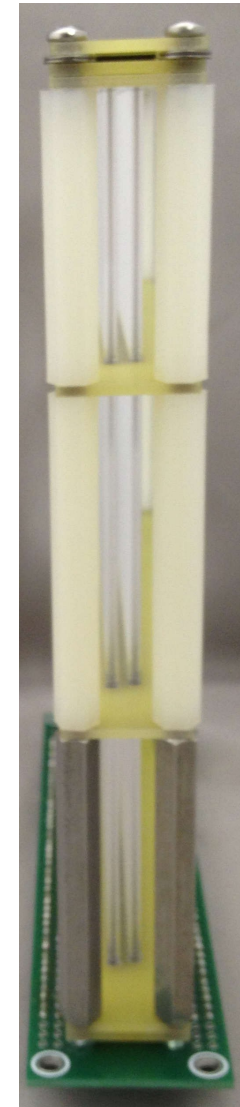


75 fibers per plane (1.25mm pitch)

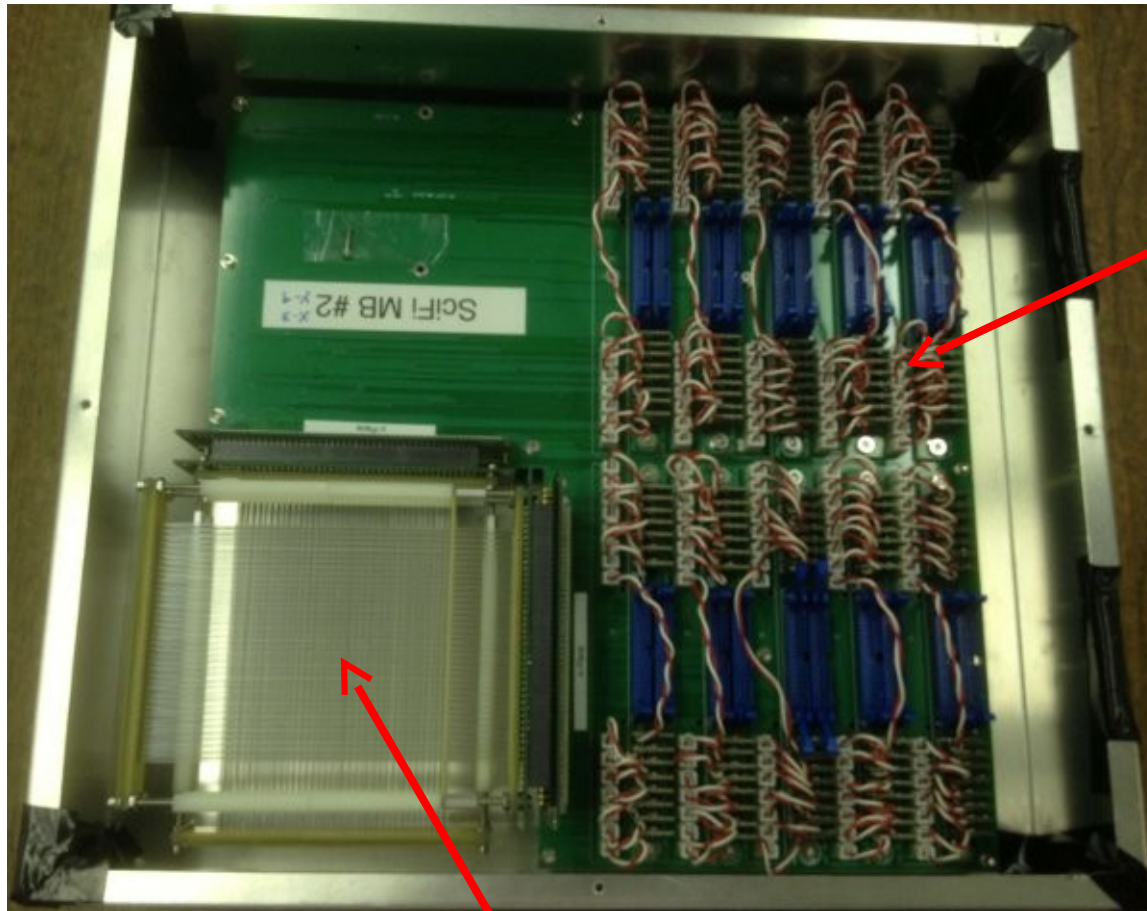
Reduced multiple-scattering material

$\sigma \sim 0.36 \text{ mm} \square$ good enough?

Side view



Sci-Fi Tracker Module



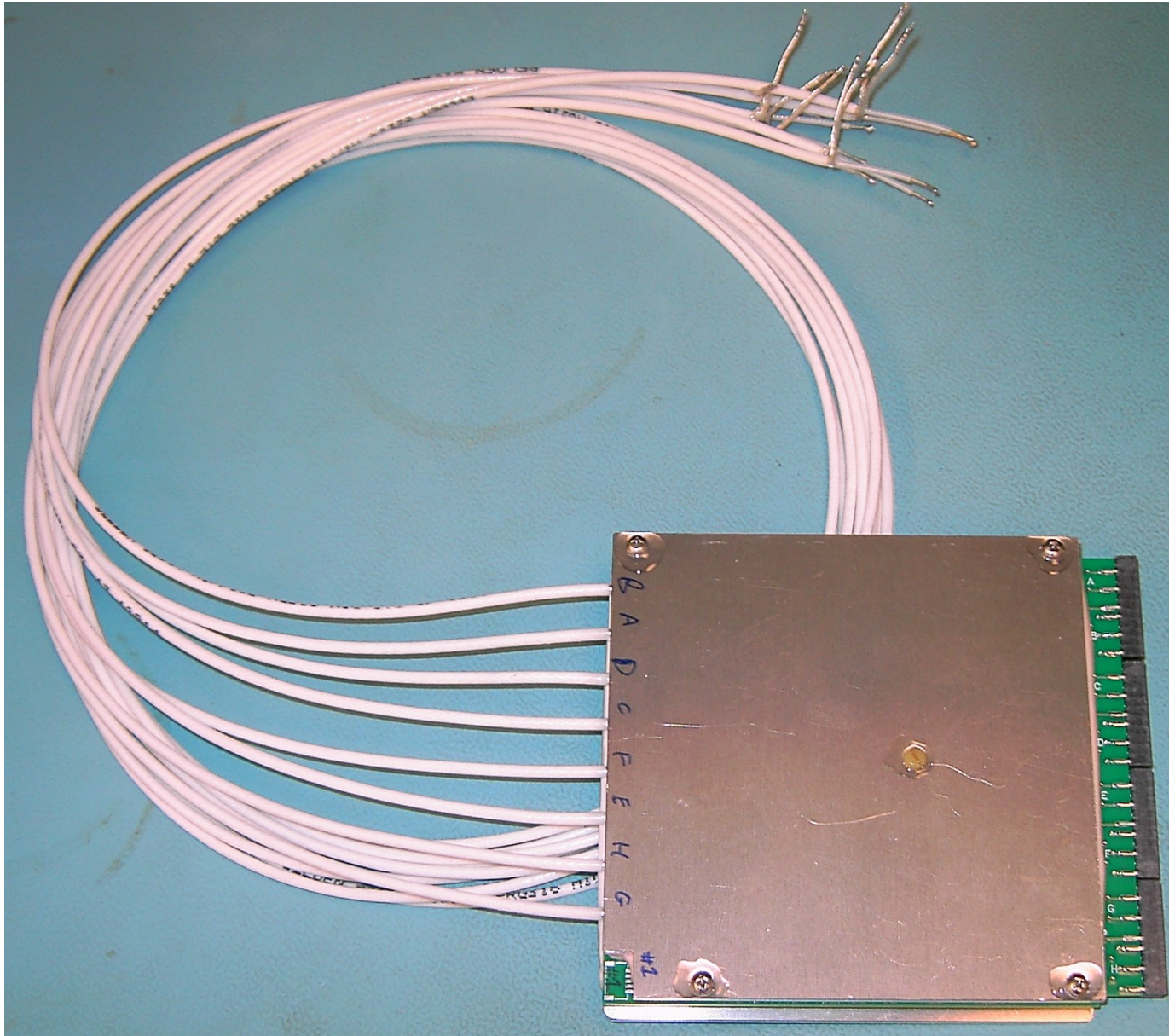
Preamplifiers
installed on
motherboard

Fully assembled Sci-Fi
module has 150
MPPCs+fibres

- New preamplifiers received and installed
- Ribbon cable readout to SCROD+carrier motherboard

X and Y fibre layers

First New HV (Gerard) received



**4 more modules
(4 needed + 1
spare) to be
assembled in the
next few weeks.**

**NOTE: board
input already
has series
resistor – do not
use external
filtering inline
(connect directly
to HV supply)**