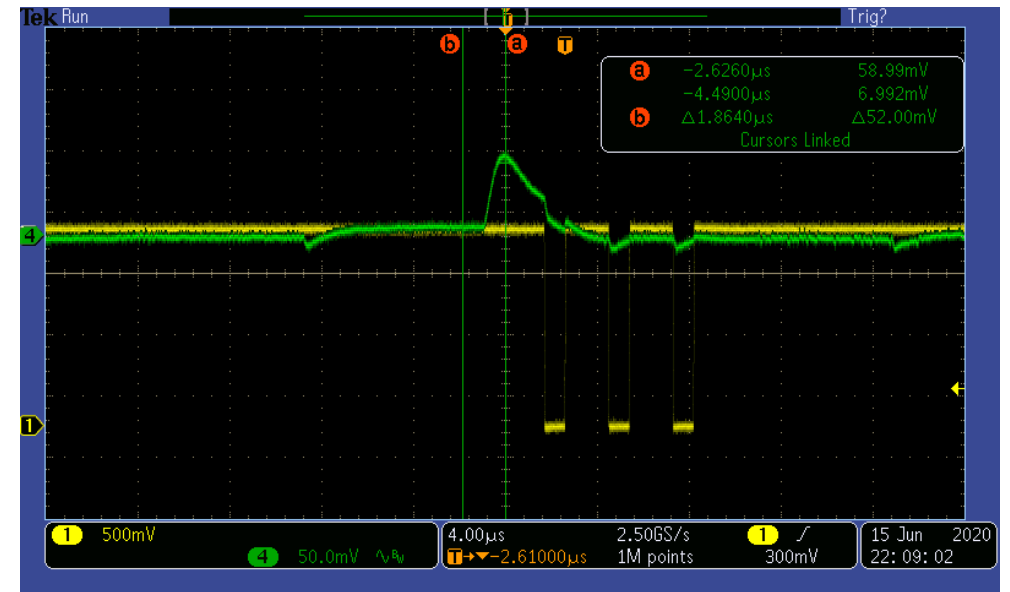


LArPix testing update

Peter Madigan

Nonlinearity of testpulse DAC

- While attempting to measure threshold sensitivity, noticed large non-linearity of test pulse DAC
 - Drop out at high (>243) and low (<41) ends
 - Overshoot at every multiple of 32 of varying degrees (between $\sim 10\text{mV}$ and 75mV)
- Led to confusion with gain settings
 - high gain ($\text{csa_gain} = 0$)
 - low gain ($\text{csa_gain} = 1$)
- \Rightarrow RMS noise is x2 greater than previously reported



Re-examined chip/system noise

- Systematic study of front-end variables
 - bias currents
 - VDDD / VDDA
 - controller
 - package / front-end capacitance
- Only moderate (~10%) reduction in noise with VDDA reduced to 1.2V and with csa bias current increased
- RMS strongly correlated with front-end capacitance (kTC noise)
- Confirming this with cryo-tests

Front end cap.	Packaging	Noise (ped. rms)
1.2pF	none	800e-
pixel + trace + package	100QFP	1100e-
package	100QFP	600e-

Noise status with 3x3 tile rev2

- RMS (typical, 300K): $\sim 1100e^-$ eq.
- Threshold (typical, 300K): $\sim 5000e^-$ eq. ($\sim 1/4$ MIP)
- Cryo-testing to occur today / tomorrow
- Chip performance is not quite where we would like things, but at this point 3x3 tile design seems ok to produce (pending cryo results)

Socket board

- Brooke can update more here, but I think the general status is
 - Pedestal widths appear ok
 - Leakage rate is normal
 - Difficulty setting low thresholds
 - Analog monitor does not appear to work
- I will be shipping back the 2 socket boards that require modifications

PACMAN v1r1

- Stable communication with pixel tile
 - tested >64M packets, no bit errors
- Modified tile power circuit performs well
- Armin almost complete with rev2 layout
- Most critical item => get a PACMAN + socket board to Leon for testing
 - Need components from Davis to assemble
 - Updates to larpix-control for PACMAN interface are finished (v3.2.1)