Updates on HRPPD #25 activities *Hardware intervention* 

Weekly Meet

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# Position dependent signal

- → Square pulse (2 Vpp; 10 kHz) fed to XoX
- Looking at signals induced on 16 pads for each of the 16 groups (SMA-I fed to Oscilloscope channel via 50 Ω) (using a probe)



1 group 4 rows of (16+4) pins 4 x 16 Anode pads

Chosen corner for tests							
	Val	ues are	in mV				
G	~ 14.4	~ 8.6	~ 8.6	~ 8.6			
	~ 14.9	~ 14.9	~ 15.7	~ 15.9	PC		
	~ 15.9	~ 15.0	~ 15.0	~ 15.5			
	~ 13.1	~ 12.5	~ 14.7	~ 15.9			

Mapping from rear end

 The amplitudes are position dependent, Similar values for the four rows of one group

# Samtec pins damaged, screws broken



4 pins (from chosen corner) found damaged



# **Hw Intervention**

- → All interposers remounted in similar fashion (knotch at same position for 16 groups)
- Broken screws glued (non-conductive)
- Pressure applied uniformly on the backplane for better mechanical contacts (planarity improved ~few tens of µm)
- → 3/4 broken pins repaired
- → HV connection optimised (ensuring that the pins do not touch the PCB)
- Interface robust ground reversible



All tests are without robust grounding of the backplane

- → Square pulse (2 Vpp; 10 kHz) fed to XoX
- Looking at signals from Pin 1 of a group of 32 Pins

One pin still

- Still some position dependency. Overall mechanical contacts improved
- With SMA-I (16 pads) amplitude becomes ~ 200 mV (It was few tens of mV)

damaged Chosen corner for tests Values are in mV PC						
		~ 160		~ 492	~ 486	~ 168
		~ 476		~ 492	~ 486	~ 488
		~ 476		~ 492	~ 486	~ 144
		~ 476		~ 492	~ 486	~ 168
		~ 146		~ 492	~ 146	~ 140
		~ 492		~ 492	~ 476	~ 158
		~ 492		~ 492	~ 476	~ 132
		~ 492		~ 492	~ 476	~ 486

#### G

Amplitude from Pin 1 of a group of 32 pins Mapping from rear end

- HV configuration: -200\_700\_-200\_700\_-30 V @ XoX\_NoX\_XoN\_NoN\_PC
- Trigger on Laser pulse: Intensity 1.8, Rep. frequency 600 Hz
- Without robust grounding and Anode HV pin terminated with 0  $\Omega$



All tests are without robust grounding of the backplane. Usual set up with protection card and 8 mm diameter hole.

- Noise level did not improve
- → Trigger at Laser sync pulse
- → Signals from 16 pads (SMA-I) (from usual corner); amplitude ~2 mV
- → Appears at ~ 40 ns
- → Very fast rising edge
- Nothing similar is found from the other SMA-II and micro-coax cables

- $2 V_{PP}$  (100 kHz) square pulse provided to XoX
- Triggering on the square pulse
- Looking at single channels (using probe)



- 2 V<sub>PP</sub> (100 kHz) square pulse provided to XoX
- Triggering on the square pulse
- Looking at single channels (using probe), 16 pads (using SMA-I)



# Keithley software

- → Tera Term (V 5.4.0) software installed in Windows PC
- ➔ It reads the Keithley reading
- Storing the reading work on progress

About Tera Term X				
Tera Term Version 5.4.0 x86 (Git 9694ce3f1) (C) 2004-2025 TeraTerm Project		ОК		
	Includes:			
	Tera Term Pro version 2.3 Copyright (C) 1994-1998 T. Teranishi			
	IPv6 extention version 0.81 (C) 2000-2003 Jun-ya KATO			
	Oniguruma 6.9.10			
	SFMT 1.5.1			
Build inf Compil SDK: W Date ar Git Bra	o: er: Microsoft Visual C++ 14.42 build 34435 /indows SDK (NTDDI_VERSION=0x0A000010) nd Time: Mar 3 2025 06:41:58 nch: HEAD			
Author: https://teratermproject.github.io/				

🚾 COM9 - Tera Term VT	BEAD?
File Edit Setup Control Window Help	-1.536976E-09A.+9.168409E+03.+5.120000E+02
CONF? : DC''	READ?
'CURR:DC'' 1EAS?	-1.729215E-09A,+9.205918E+03,+5.120000E+02 EFTC2
IEAS?	-1.729215E-09A,+9.205918E+03,+5.120000E+02
CONF?	read?
'CURR = DC'' ?ET CH?	-7.856349E-08A,+9.386447E+03,+5.120000E+02 read?
FETC?	-2.271530E-09A,+9.861758E+03,+5.120000E+02
READ?	*IDN *IDN?
FETC?	KEITHLEY INSTRUMENTS INC.,MODEL 6485,1173763,B04 Jun 20 2006 16:11:55/A02 /F
1EAS?	
1EAS?	



#### SMA-I 16 pads together

Noise level (without HRPPD and HV) ~ 0.6 mV Noise level (with HRPPD and without HV) ~ 40 mV Noise level (with HRPPD and HV) ~ 45 mV