AIDA test

RIKEN
NiSHiNA
CENTER

FEB

2015

AIDA tests: February 2015

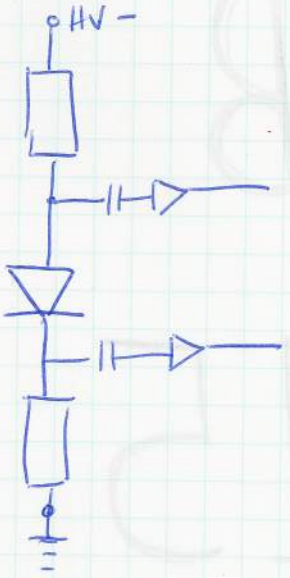
Installed DSSD: 2977-7 and ^{207}Bi source. 3 modified kapton cables.

17/02/15 Jumper settings of adapter PCBs

-ve P+N strips to reverse bias diode connected to Lemo J9 G/R (or J10 depending on side)
LNK4/5 not connected

+ve n+n sides have both LK5/1 pins connected to ground ~~from~~ bias

LK2/3 connect PCB ground to kapton ground ~~screen~~
→ connect on all active cards



2:30 pm Biased detector to -100 V @ 11.6 μA

FEEs used: NNAIDA 1 } p side
NNAIDA #6 }

NNAIDA #3 } n
NNAIDA #8 }

Set shaping time to 2 μs
slow comparator threshold 0x1F (p-side)
0x18 (n-side)

Pulser width: NNAIDA 1 → ~ 1000 ch
#6 → very large
3 → 160 ch
#8 → ~ 3000 ch

NNAIDA #3 is much more quiet than the 3 other FEEs connected to the DSSD.

4pm: started Tape Server and Merger

6pm Changed to caen N1519 floating HV supply
We couldn't use same configuration as in
DL: positive voltage through core to nn strips
braid (low V ref) to pn strips
leakage current tripped bias supply

We could bias the detector reversing the polarity:
-100 V to pn strips through cable core
ref voltage through cable braid to nn strips
jumpers in ground link for nn strips (as used for grounded bias supply).

Tried +ve bias to nnaida3
→ open circuit
Tried then to nnaida8
→ short circuit with leakage current of >200 μA @ ~5V.

Leakage current 11.5 μA at 100 V

nnaida 1 → ~800 ch
6 → ~3000 ch
3 → ~150 ch
8 → ~2000 ch

10am We noticed nnaida #3 was the only one without a metalic shield in front of the pins to FEE in PCB. We ~~forced~~ removed the shielding plate for all 4 PCBs

	width
NNAIDA #1 →	~30 to ~60 ch
NNAIDA #3 →	~140 ch
NNAIDA #	
NNAIDA #	

Feb 19th

check status of system is same config as yesterday; except for removing Cu braid
→ new bias levels
→ moved back to NNADA #3

	pulse width	rate/sec
NNADA #1:	~800 ch	
NNADA #3:	~110 ch	
NNADA #6:	~2300 ch	~5k/strip
NNADA #8:	~~1200 ch~~ ~950 ch	~5k/strip

Added again Cu-braided grounded through clamps attached to LEMO connectors of ~~FEE~~ PCB adaptors.

	pulse width	rate/strip
NNADA #1:	~600 ch	~50-100 Hz
NNADA #3:	~120 ch	25 Hz
NNADA #6:	~2100 ch	~6000 Hz
NNADA #8:	~1000 ch to 800	~5-6K Hz

⇒ NO clear effect

↳ Hm. non Gaussian peak.

10:47 Grounded nose to PCB of NNADA 7-8

	width	rate/strip
NNADA #1:	~600 ch	~150 Hz
NNADA #3:	~120 ch	25 Hz
NNADA #6:	~2000 ch	~~7000~~ 6000 Hz
NNADA #8:	~1000 ch	6000 Hz

⇒ NO clear change

10:55 change of preamp Ref settings:

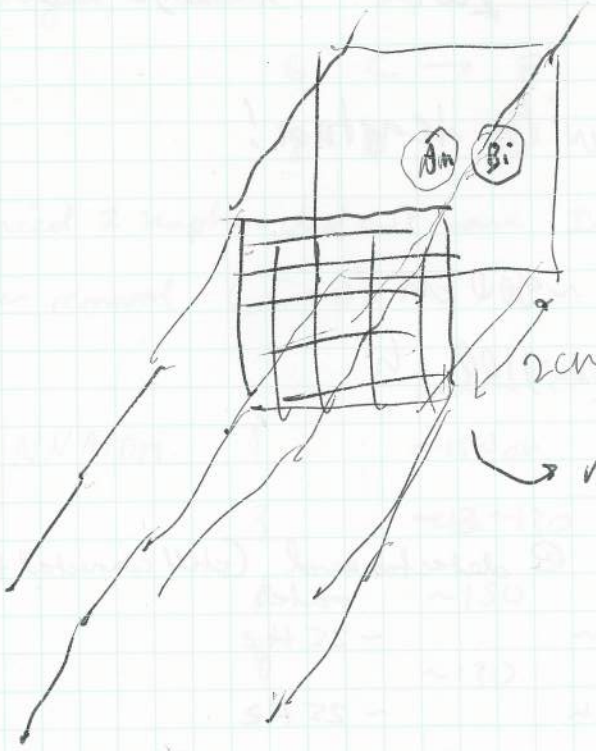
NWA-DA#8 preamp Ref 0x30 → 0x60

NWA-DA#1 preamp Ref 0x62 → 0x82

⇒ No effect observed

We put back preamp reference to original settings.

11:30



→ new DSSD: ~~4977-20~~
2977-2Φ

biased to 100 V; 10.9 μA.

Pulser widths

		pulse width
NWA-DA	1	600 ch
NWA-DA	3	150 ch
NWA-DA	6	1300 ch
NWA-DA	8	700 ch

kapton cables

1:45 pm Swaped ~~FEEs~~ for NNAIDA #3 & #8, ~~&~~ only from FEE side (i.e., still attached to detector).

	width	rate
NNAIDA 3	~ 700 ch	~300 Hz
NNAIDA 8	~ 200 ch	~30 Hz

So noise moved with kapton!

For completeness

NNAIDA 1	~800 ch
NNAIDA 6	~1100 ch

14:35 Disconnected Kaptons @ detector end (still connected to FEEs)

	width	rate
nnaida 1	~250 ch	~25 Hz
nnaida 3	~120 ch	~25 Hz
nnaida 6	~160 ch	~25 Hz
nnaida 8	~120 ch	~25 Hz

Cable/nnaida combinations

nnaida 1 → A
3 → B
6 → C
8 → D

Kapton B shows no α/β spectrum in nnaida3 on channel 1.1.4, suggesting break cable for this channel

Break likely to be near PCB end as no effect seen from increased capacitance.

Waveforms in all nnaida look noise-free and as expected
→ nnaida1 possibly a bit noisier than rest.

15:20 Changed some of the kapton cables to check them
kept nnaida3 + kapton B combo.
Changed nnaida1 : A → E (not isolated)
6 : C → F
8 : D → G
Noticed 2 kaptons did not have "Isolated" label on them after removal (C+D).

		width (ch)	rate (Hz)
NNAIDA	1	~150 ch	~25
	3	~130	~25
	6	~150	~25
	8	~130	~25

(with α+β sources)

15:45 Connected detector 2977-20 up to FEEs with kaptons: (Bias kept same)
nnaida1 - E
3 - B
6 - F
8 - G
config
-ve core → nnaida6

(1.2@~500)

	width (ch)	rate (Hz)
nnaida1	~190	~60
3	~250 (1.1@500)	~60
6	~180 (1.1@~500)	~40
8	~350	~100

Rate spectra look like:

Plausible physics-wise as α-source is in centre of detector so would expect inner strips to see higher rate than outers as αs won't get that far due to angles.

16:44 Saving data to file in current configuration:
- Am + Bi source
- replaced kapton PCB
- Cu braid grounding + nose ground

File /TapeData/Feb2015/R1_*.gz
Better description in ELOG entry ID #

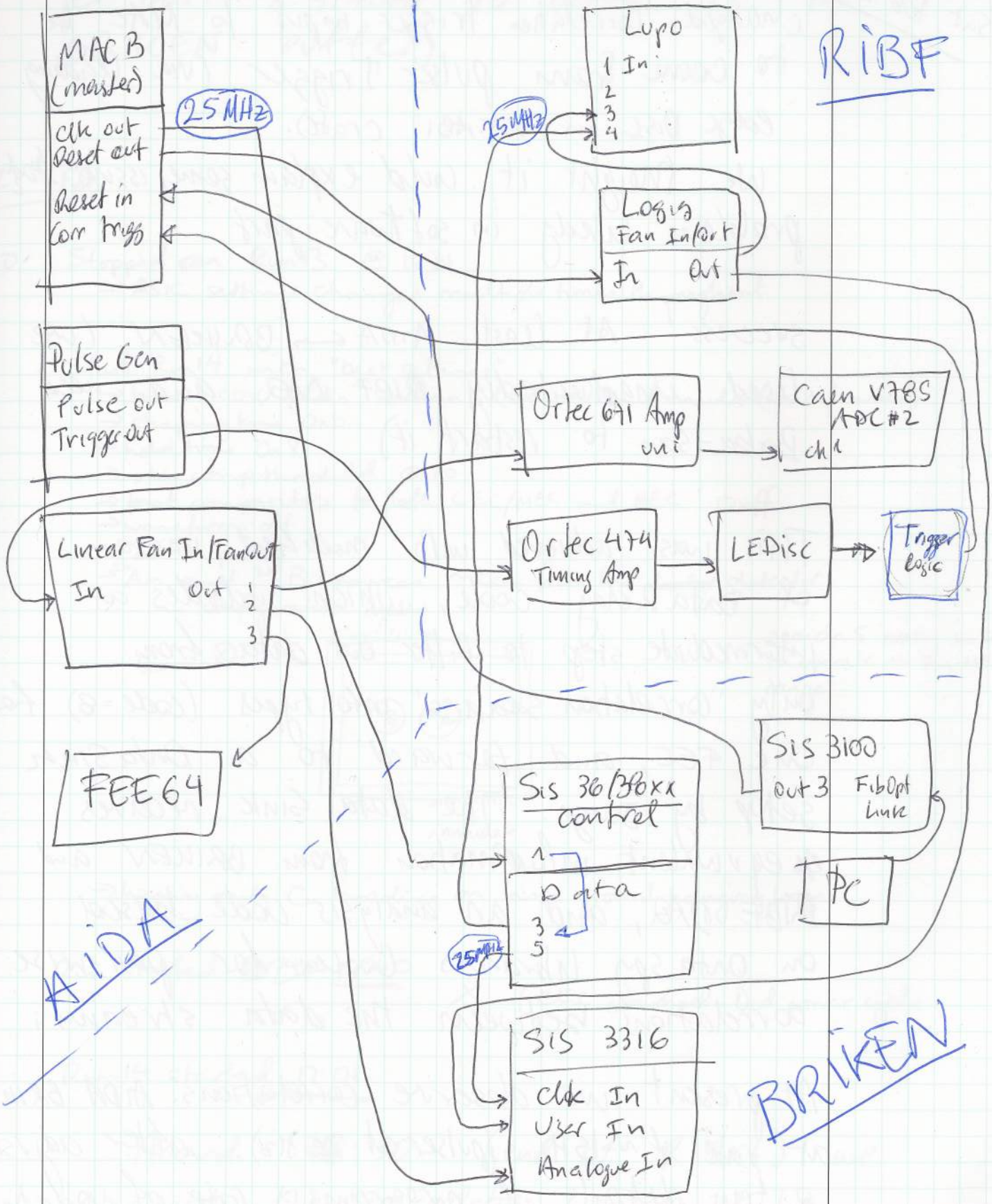
17:40 New run R3_0.gz
This is after giving the BROKEN VME crate a pulser signal from our NIM crate. They are on same mains supply, so the change should not affect the resolution of our system.

Feb 20
10:00 Put new MACB for AIDA + RIBF DAQ test

We have ~1 us jitter in 25 MHz clock from MACB:

~~10 ns~~

Settings for DAQ correlation test



Sat Feb 21

changed correlation trigger input to MAC be to come from pulser Trigger (via leading edge Disc in WASABI crate).
We thought it could explain some issues, but problem likely in software part

success! At least AIDA ↔ BRIKEN (we closed unadvertedly BIBF DAQ, and need Baba-san to restart it)

This was achieved with modified version of DataRelay code, which includes an intermediate step to filter out data from only "correlation scalars" into types (code=8) for one FEE, and forward to a DataSink setup by Jorge. The data sink receives equivalent information from BRIKEN and BIBF DAQ, and an analysis code based on Data spy libraries looks for pair-wise correlations between the data streams;

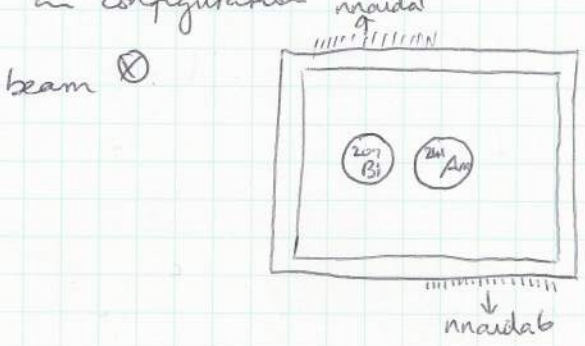
At present we observe correlations AIDA:BRIKEN at rate of ~ 15Hz (pulser at 25Hz): after adjusting a few details of programs: rate of updating graphical output of correlation code; number of words included in buffer sent to data sink (now ~ 1 sec of correlation pulsers

per buffer, similar to what is in ~~BRIKEN~~ buffer).

Mon 23rd Feb

16:30 Stopped ~~run~~ Run13 @ 16:31
→ ASIC settings changed multiple times throughout

Start Run14 with "best settings".
→ bias -100V into maida6 (-ve core) and maida3 (low ref braid)
→ shaping time 0x6
→ hold time 0x8
→ slow comp threshold 0x10
→ fast comparitors for both LEC/MEC and HEC 0xff
→ waveforms off
→ 25 Hz pulser
→ ^{241}Am and ^{207}Bi sources ~2cm from the ~~doctor~~ detector in configuration



maida5 noisy so set to operate in the MEC range

→ heavy duty Cu braiding on, nose ground hanging loose

Run started ~~16:40~~ 16:40 × FEEs crashed. Did power cycle

Run14 started 17:01

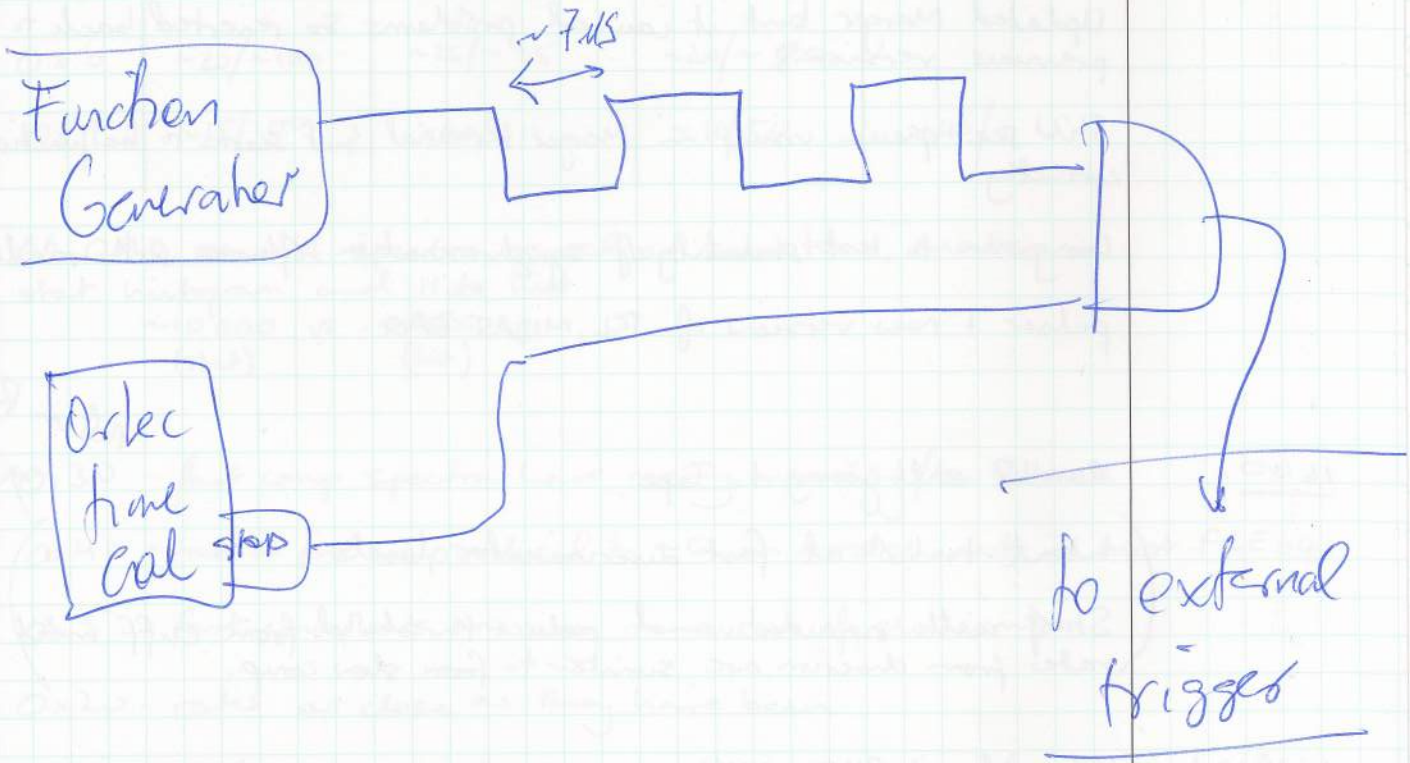
Around 18:30 (end of R14_1) we changed the correlation pulser to be triggered externally by a pseudo-random pulse (coincidence of a wave generator and an Ortec 462 time calibrator). Pulser input ~~x~~

Signal flow diagram for AIDA + BELEN + RIBF DAQ integration.

(cont R14-2)

Pulser input was disconnected for a couple of minutes about 18:40

Now pulser triggered externally



R15_0: 7:20pm. ~~removed~~

changed pulser trigger to only external

Before (R14_) 25MHz internal trigger was still enabled.

Correlations still work fine.

24/02/15

1200 Run 18 started with "best" settings
- → bias -100V
- → shaping time 0x6
- → hold time 0x8
- → fast comp thresholds 0xff
- → slow comp threshold 0x10

(^{241}Am + ^{207}Bi sources in place + 25Hz pulser)

New AIDA FEE64 firmware in nnaida1-16
New ~~ver~~ version of TCL, MIDAS DAQ (AIDA exec).

Updated Merger but it caused problems so reverted back to previous version.

Still see queue issues in Merger terminal but seems to be functioning correctly.

Long run to test stability of synchronisation software with randomised pulser + new version of TCL, MIDAS DAQ.

1600 Run 18 still going to Tape.

Want to look at fast discriminator levels

Start with nnaida1 and reduce threshold from 0xff until rates from discrim are similar to from slow comp.

* not in R18

R18 just has random pulser and TCL + MIDAS updates running to test stability

16:01 Closed R18_

We'll do a pulser walkthrough before scanning fast comparator thresholds.

1641 Run 19 has 1st pulser walkthrough
- → non-linear in some nnaida, possibly due to loading issues caused by the input to the sum/invert being connected to FAN IN/OUT by T-piece
- → will try again in the morning after removing T-piece and having connection to sum/invert from pulser as sole input
- → if that doesn't help, will connect pulser ~~to~~ directly to the p+n and n+n strips separately, changing polarity of pulser.

1645 Run 20 ~~Fast thresh~~

Changing fast discrim to try get same rates as from slow comp

fast comp thresh	Rate (fast/slow) [s⁻¹] nnaida1	nnaida3	nnaida6	nnaida8
0xff	0/~100	0/~100	0/~100	0/~200
0xf	~30/~~100~~ 125	~35/~80	~25/~125	~30/~125
0xb	~20/~100	~25/~75	~20/~80	
0x9	~25/100	~40/60	~10/50	~40/

At 0x20, ~~at~~ with spectra zeroed at same time, number in stat histogram and Hits list

~10000 vs ~4000
(stat) (hit)

0x30 - fast comp spectra have many missing/low rate ch

0x40 - rate in fast comp reduced to ~0 in most channels in most FEE64s

0x5 - fast comp rate now way in excess of slow comp

0x20 - rates as close as they have been

Will set at 0x20 and run a some data to disc for offline analysis.

Run 20 ~~ed~~ ended @ 17:36

Run 21 started @ 17:38

Fast comp threshold @ 0x20 for LEC/MEC

Stopped 19:08

25/02/15

1500

Swapped power switches to replace old green one

Put one in and RPi couldn't connect to it, could not find /dev/ttyUSB0

Tried many permutations of USB0/1/2 etc with various permissions and putty windows, no luck.

Tried with alternative new one, worked just fine.

See today's elog entry for error messages.

Cannot connect to Rly16 window from B3F, just @ RPi.

2nd pulser walkthrough to tape.

Same "best" settings as yesterday @ 1200

~~Run 22 started 15:06~~

Run 22 started 15:10.

~2mins @ each value on potentiometer.

Run 22 stopped 15:40.

3:47

Reference values of resolution with - 100V as supply

NNAIDA#	WIDTH	NNAIDA#	WIDTH
3.1.8	150	6.1.8	138*
3.1.9	144	6.1.9	160
3.1.10	170	6.1.10	157
3.1.11	133	6.1.11	194*
~~3.1.8~~ B-8 3.1.8	185	8.1.8	236
~~B-9~~ 3.1.9	185	8.1.9	235
~~B-10~~ 3.1.10	198	8.1.10	238
B-11 3.1.11	186	8.1.11	246

~~not gaussian~~ is not very gaussian.

- Changed polarity of CAEN HV supply to positive
- → Now apply +100V to NNAIDA 6 (ref of Lemo to NNAIDA 3)
- → moved jumpers in link 1 & 5 of NNAIDA 3,8 to Link 1, 5 of NNAIDA 1, 6
- → Biascad DSSD: +100 V, 11.5 MA leakage Current (det 2977-20)

NNAIDA #	WIDTH	NNAIDA #	WIDTH
1.1.8	148	6.1.8	158
1.1.9	146	6.1.9	164
1.1.10	155	6.1.10	169
1.1.11	156	6.1.11	175
3.1.8	182	8.1.8	241
3.1.9	181	8.1.9	233
3.1.10	203	8.1.10	~~472~~ 236
3.1.11	190	8.1.11	243

BRIKEN PC

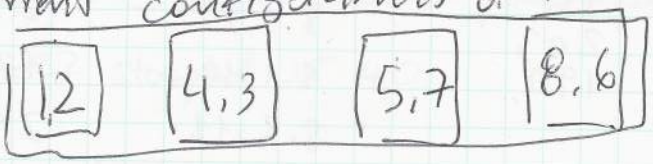
FOR DAQ SYNCHRONIZATION TEST

- pc name : briken1 (10.32.6.54)
- user : daeq
- password : BrikenTest15

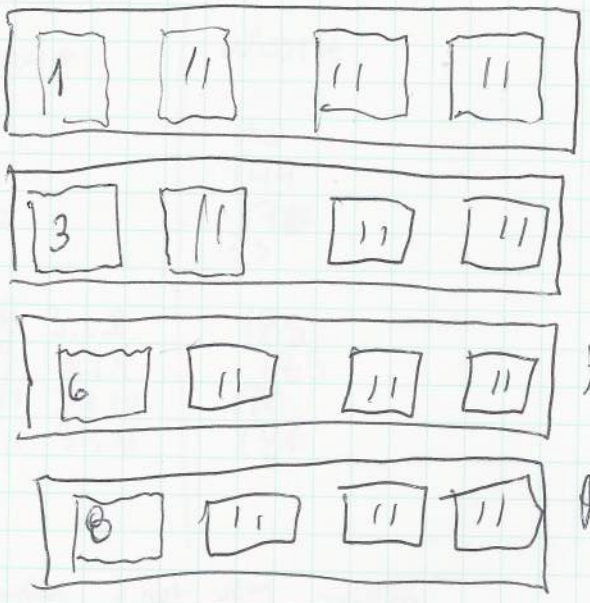
~~See BRIKEN~~

See BRIKEN elog entry #6 for how to run SyncCheck

17:00 Current configurations of NARVDA power supply



changed to



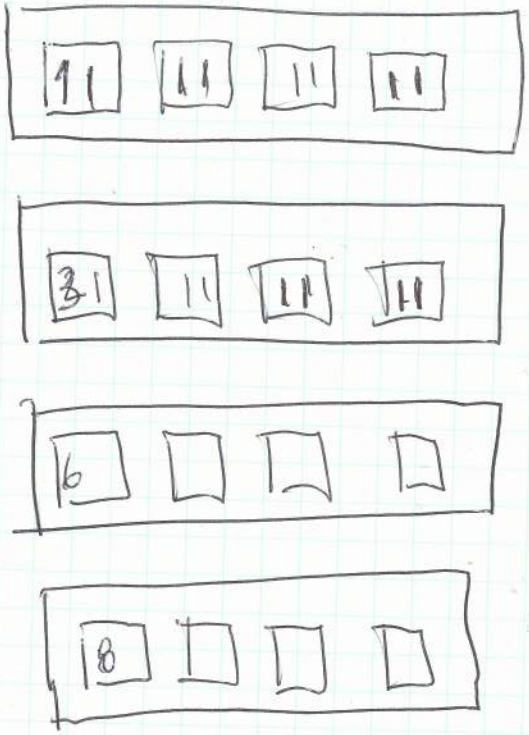
all others still connected

with all 32 NNADA modules the current in USB power relay was too large and a fuse went off we had all 4 PSUs powered from same side of power relay.

Pulser width with new configuration

NNADA#	WIDTH	WIDTH2	NNADA#	WIDTH	WIDTH2
1.1.8	145	140	6.1.8	231	284
1.1.9	149	140	6.1.9	276	295
1.1.10	156	164	6.1.10	255	324
1.1.11	160	164	6.1.11	309	341
3.1.8	216	141	8.1.8		362
3.1.9	216	166	8.1.9		377
3.1.10	230	180	8.1.10		414
3.1.11	224	182	8.1.11		418

New config: remove 14 unused FEE64 from PSUs (empty boxes in diagram), keep power for NNADA 1-16, and the two that replaced NNADA6 and NNADA 8 in PSU#1, #3



only NNADA #6 & NNADA #8

No pair plugged

11 ← both pairs plugged

R23 18:25pm: pulser with configuration of FEE64 power supply after removing 14 of the FEE64 cards not used.