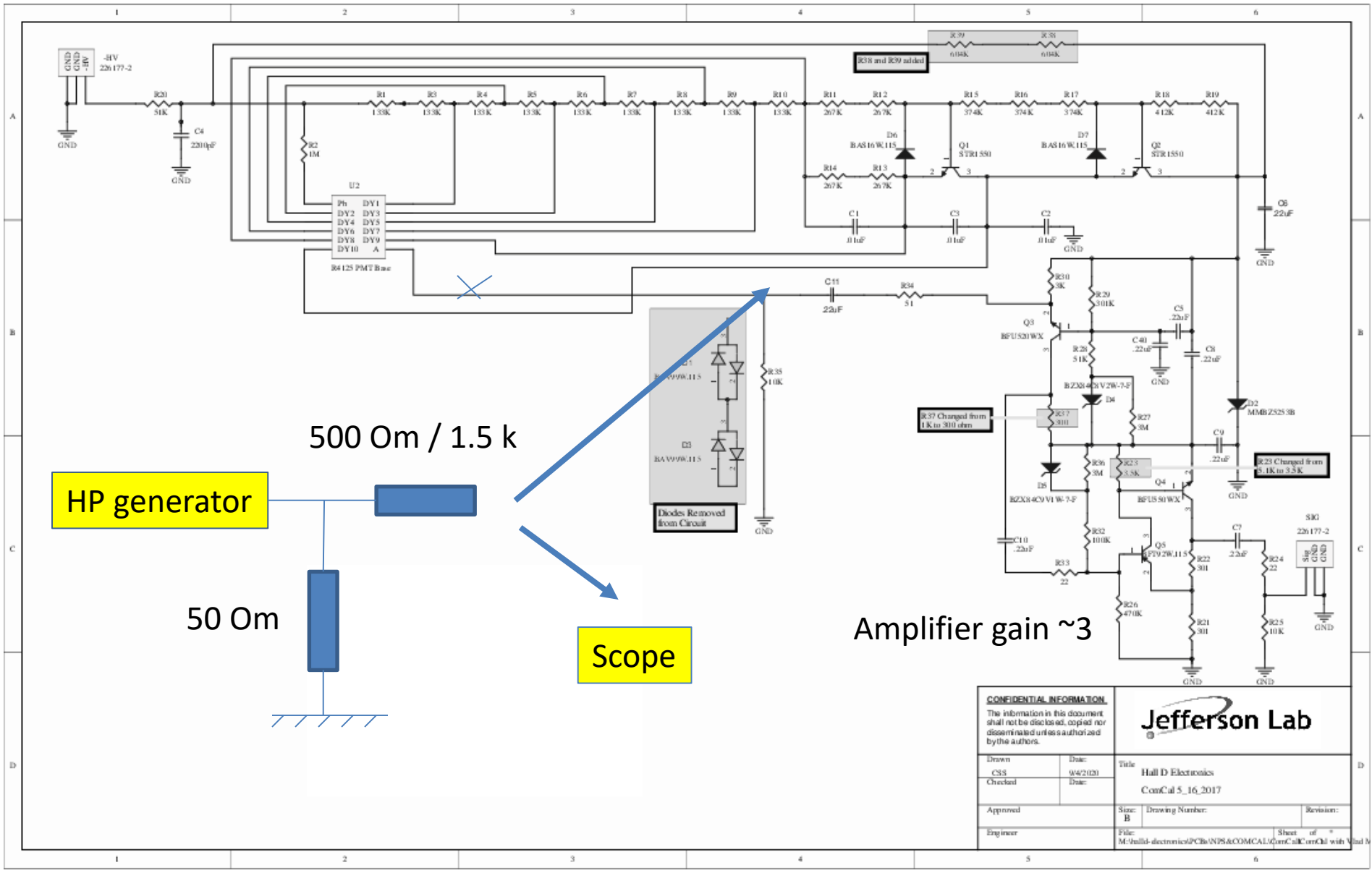
500 Om / 1.5 k
HP generator
50 Om
Scope
Amplifier gain ~3
Diodes Removed from Circuit
R38 and R39 added
R37 Changed from 1K to 300 ohm
R23 Changed from 5.1K to 3.5K
CONFIDENTIAL INFORMATION
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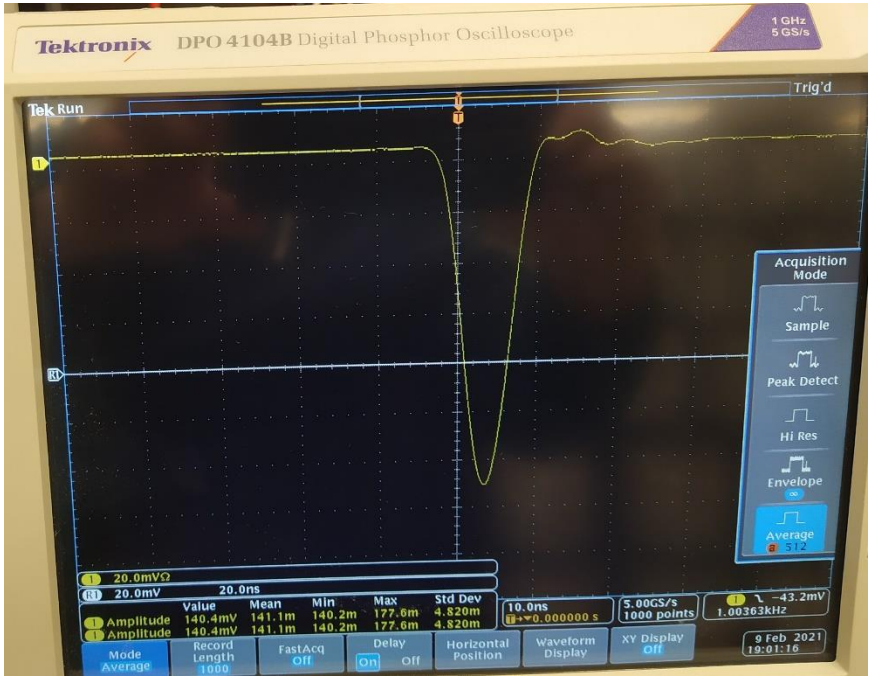
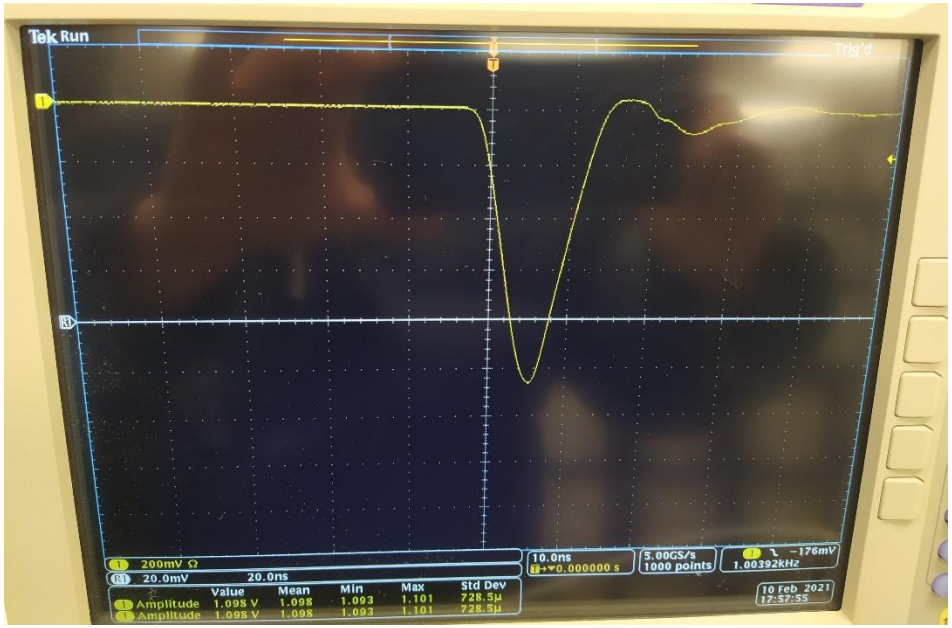
Jefferson Lab
Hall D Electronics
ComCal 5_16_2017

Signal pulse from generator

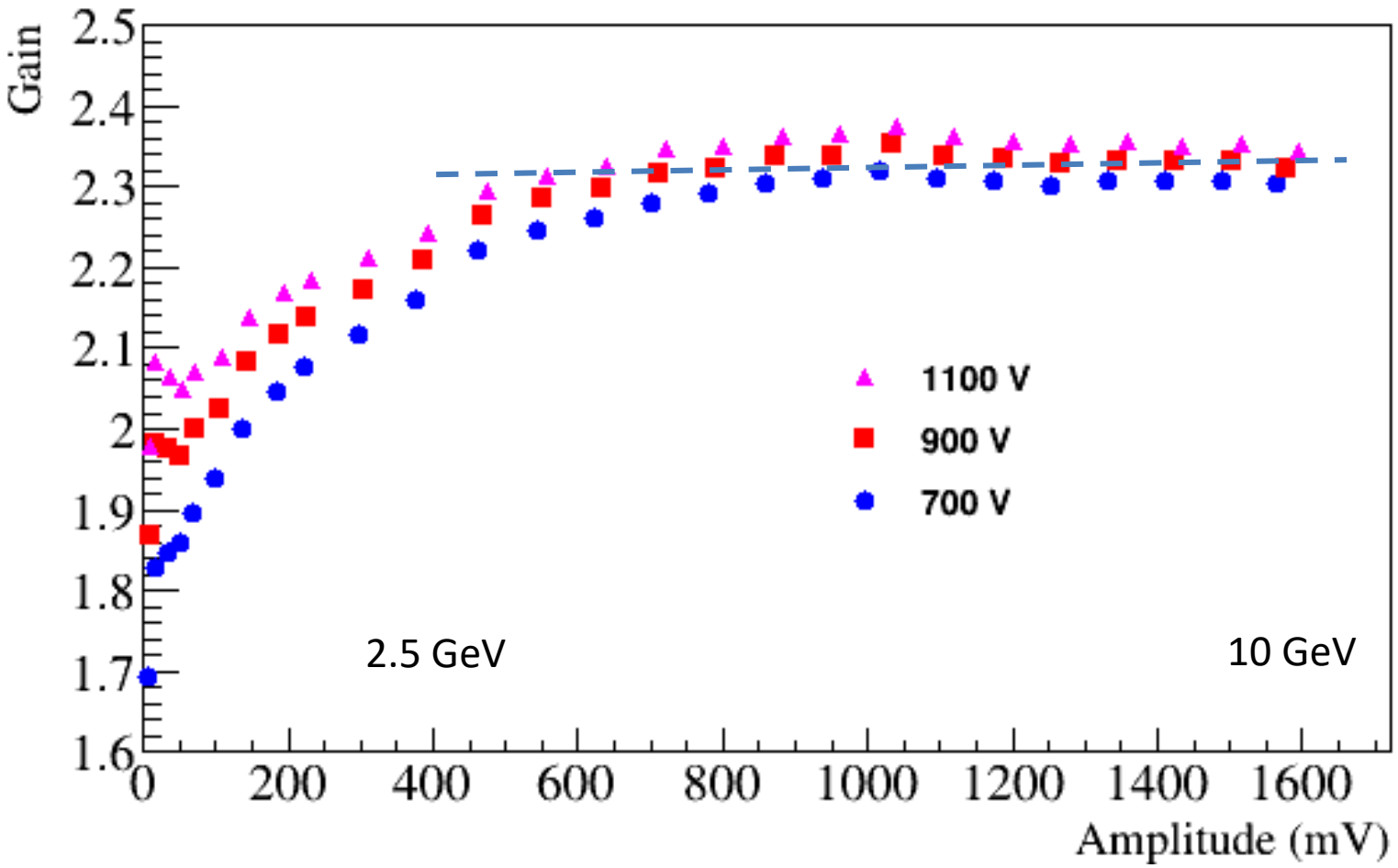


Amplified signal pulse



full width ~10 ns

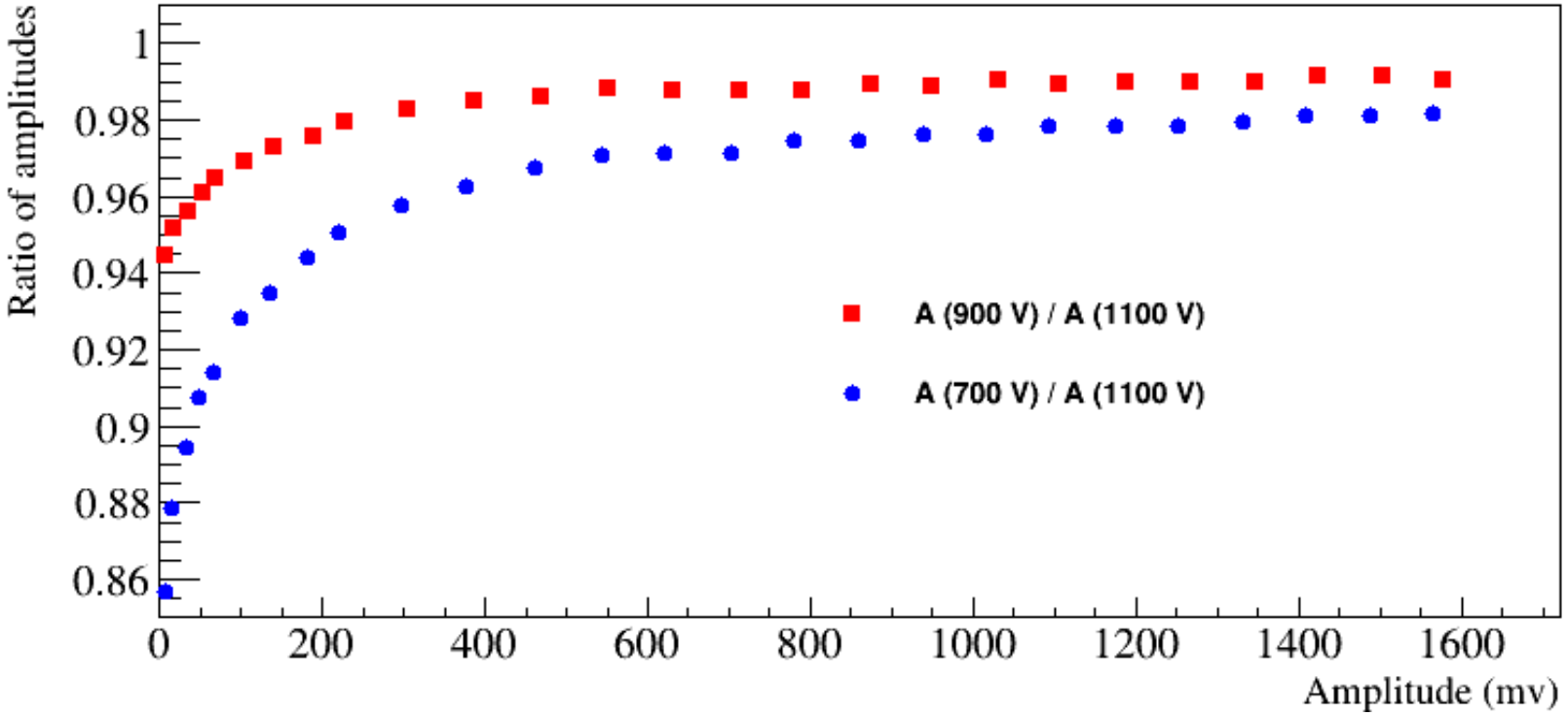
Amplifier Gain (A_{amp} / A_{HP})



- Relatively stable gain for amplitudes between 0.5 V and 1.6 V
- Non linearity on the level of 10 % below 0.5 V

Non linearity for different divider current

700 V - 700 μ A
900 V - 900 μ A
1100 V - 1.1 mA



- Better linearity at larger divider currents

Discussion

Measured gain verified our beam tests results
(if measured the gain correctly . . .)

FCAL:

- An amplifier will be needed for inner FCAL insert layers, though with a relatively small gain between 3 and 6.

- Possible solutions to improve the amplifier:

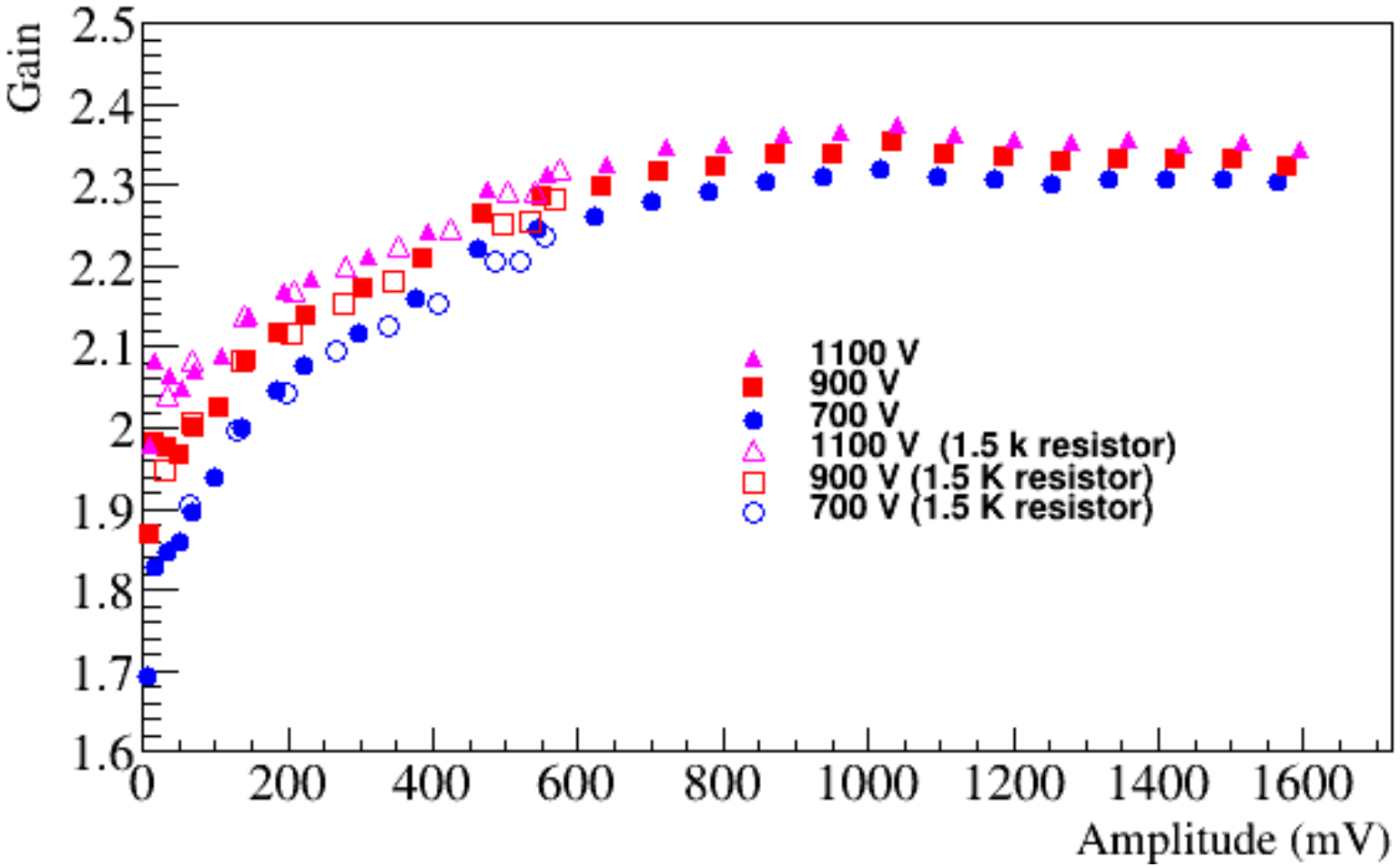
  - use on-board amplifier, provide additional power to the amplifier (decouple power for divider and amplifier), use one extra cable to each PCB

  - use external amplifiers for modules in inner layers (place inside dark room ?)

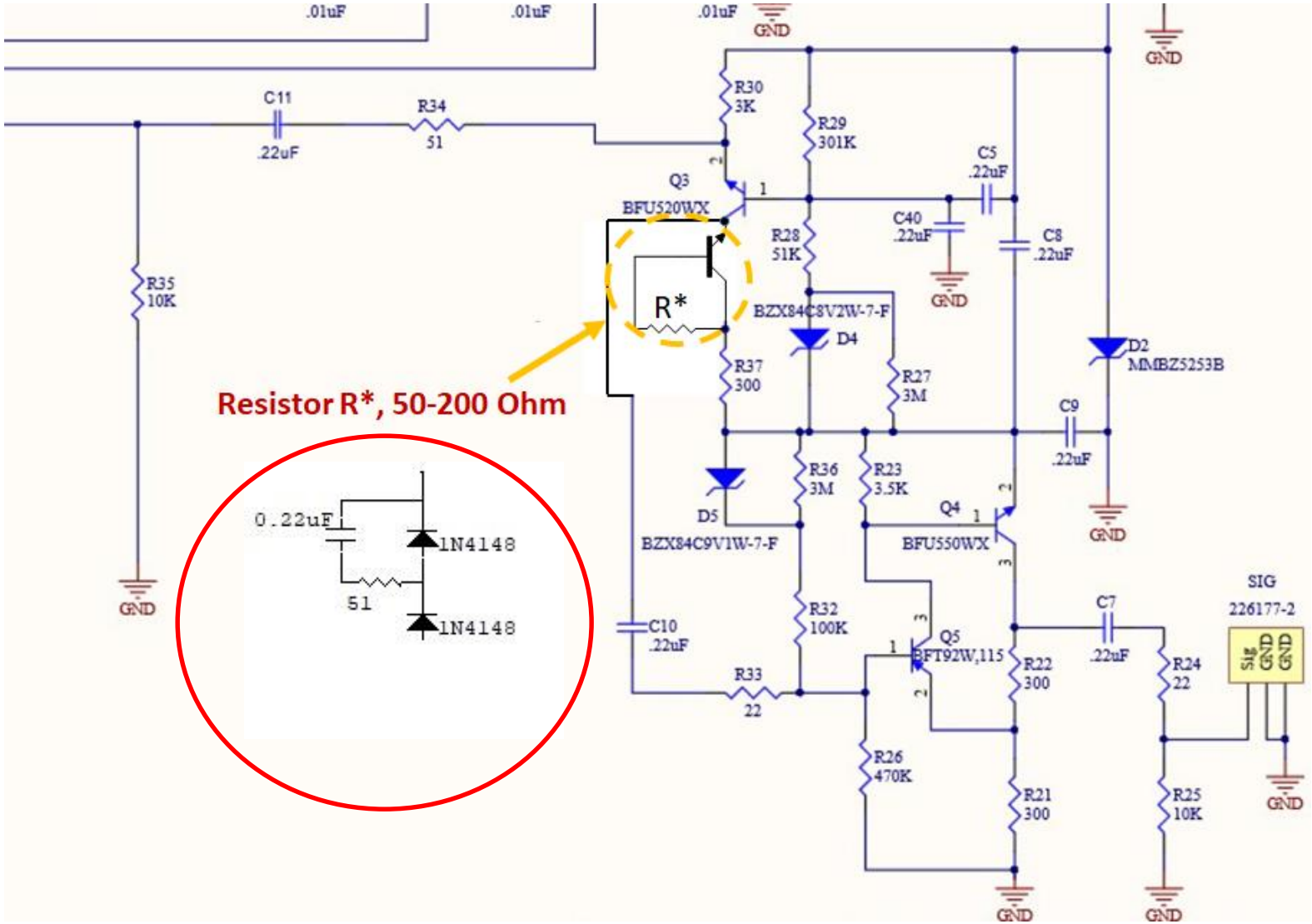
  - apply non-linearity corrections for already existing bases

Amplifier Gain (A_{amp} / A_{HP})

Different 'injection' resistor

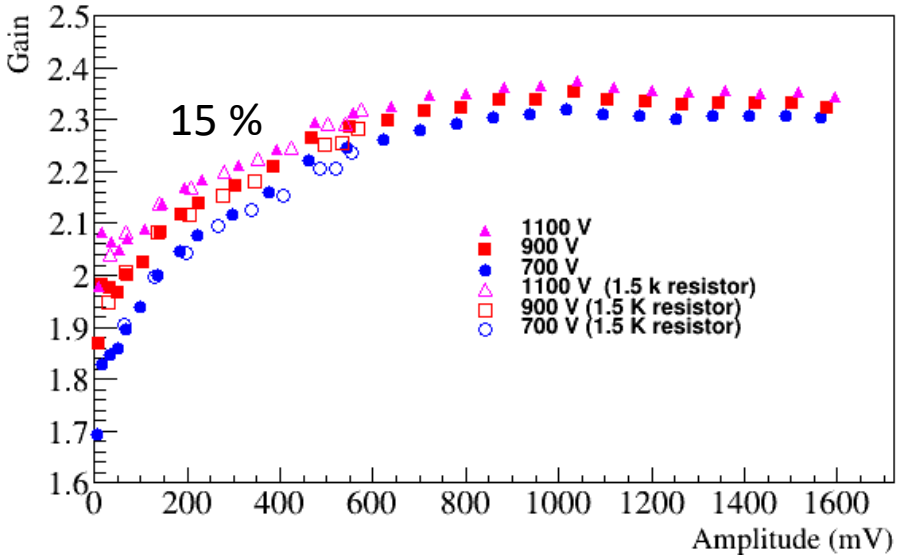


Modifications of the base

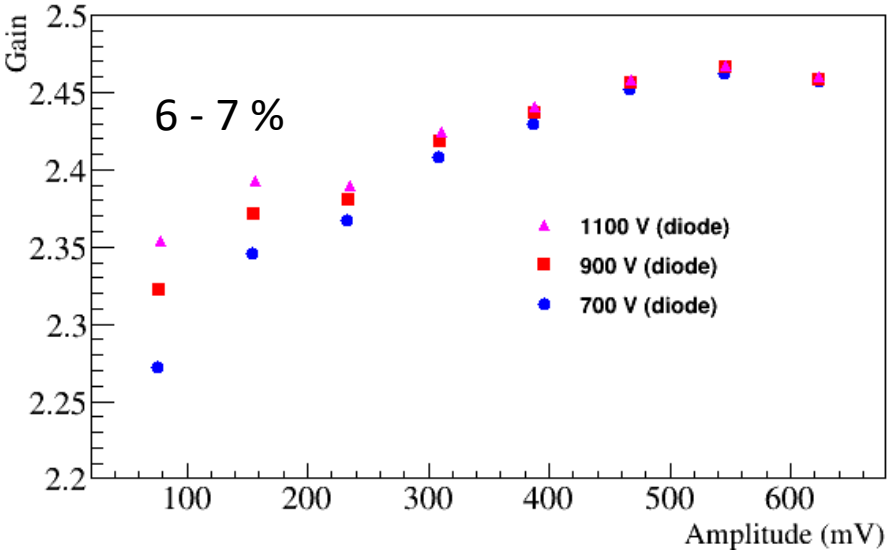


Amplifier Gain (A_{amp} / A_{HP})

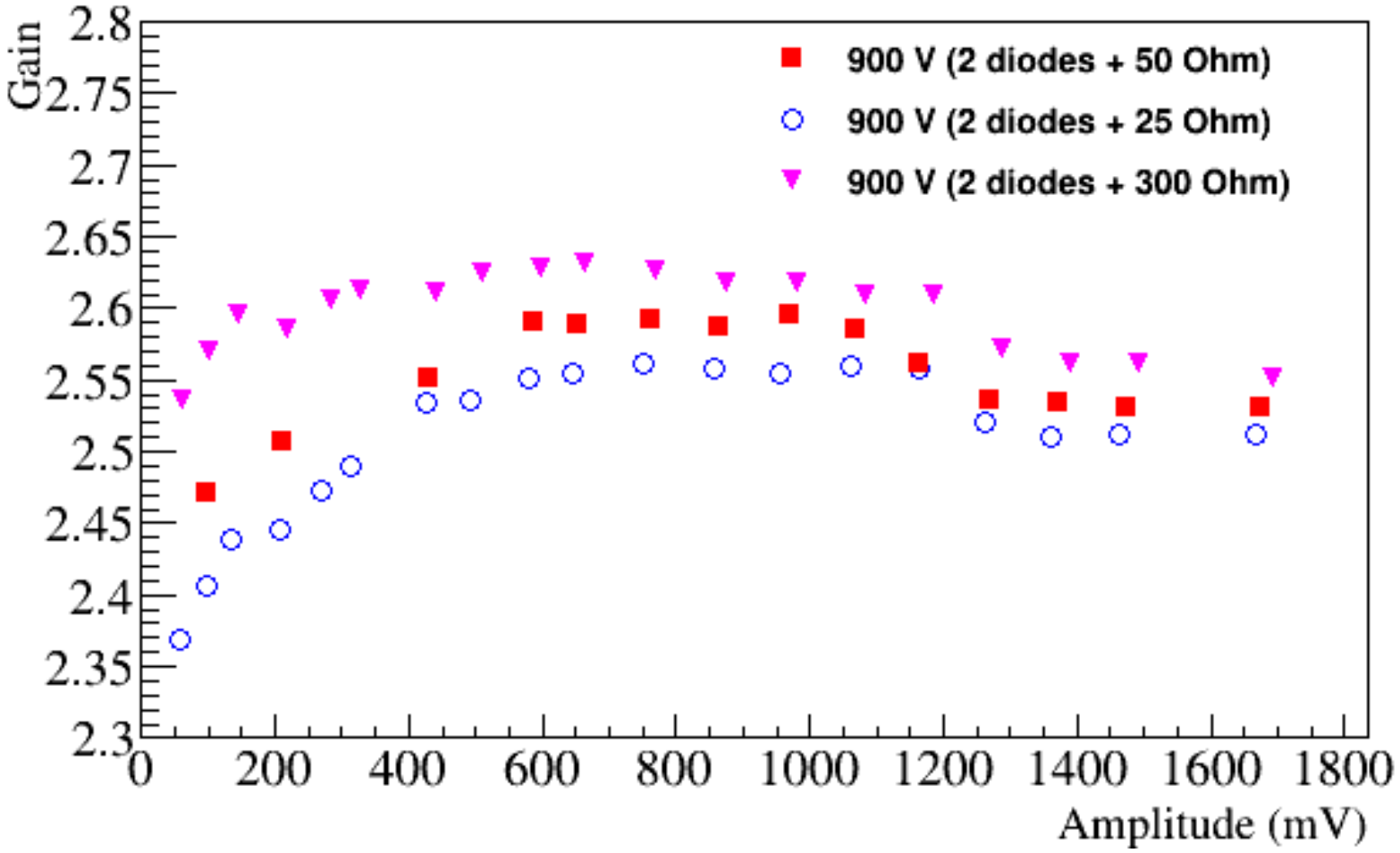
Default amplifier



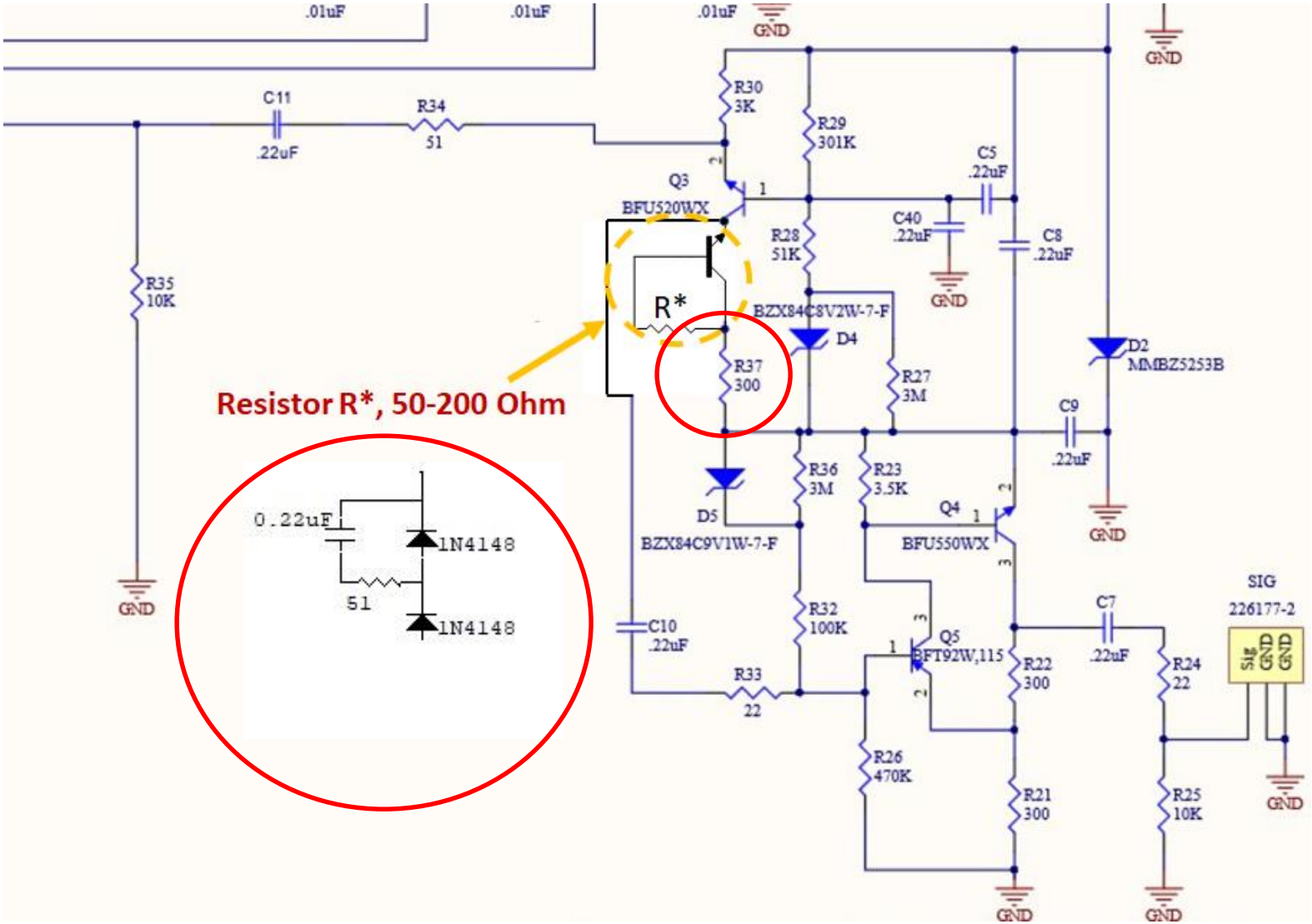
Add diode



Two diodes


Gain
2.8
2.75
2.7
2.65
2.6
2.55
2.5
2.45
2.4
2.35
2.3
0
200
400
600
800
1000
1200
1400
1600
1800
Amplitude (mV)
900 V (2 diodes + 50 Ohm)
900 V (2 diodes + 25 Ohm)
900 V (2 diodes + 300 Ohm)

Nex Steps


.01uF
.01uF
.01uF
GND
GND
C11
.22uF
R34
51
R30
3K
R29
301K
C5
.22uF
Q3
BFU520WX
C40
.22uF
C8
.22uF
R28
51K
R35
10K
R*
BZX84C8V2W-7-F
D4
D2
MMBZ5253B
R37
300
R27
3M
Resistor R*, 50-200 Ohm
C9
.22uF
R36
3M
R23
3.5K
D5
BZX84C9V1W-7-F
Q4
BFU550WX
0.22uF
1N4148
51
1N4148
C10
.22uF
R32
100K
C7
.22uF
SIG
226177-2
Q5
BFT92W,115
R22
300
R24
22
R33
22
R26
470K
R21
300
R25
10K
GND
GND
GND
GND
GND

Discussion

Test 1 – 2 options

Start redoing dividers for CCAL.

Default: bypassed amplifier

Optional: gain of 3, the best we can get
no space on the existing PCB for 2-diode scheme

Continue with the divider optimization when the lab is re-opened

Consider on-board OPS bases amplifier (Fernando's design)
- perform tests in the lab

Prepare new dividers and install them after the PrimEx run
- test with the SRC experiment during this year