Sandia National Laboratories

Clamping of Wide Range 1 HVPS

Summary of FWR ACRR-12-0011
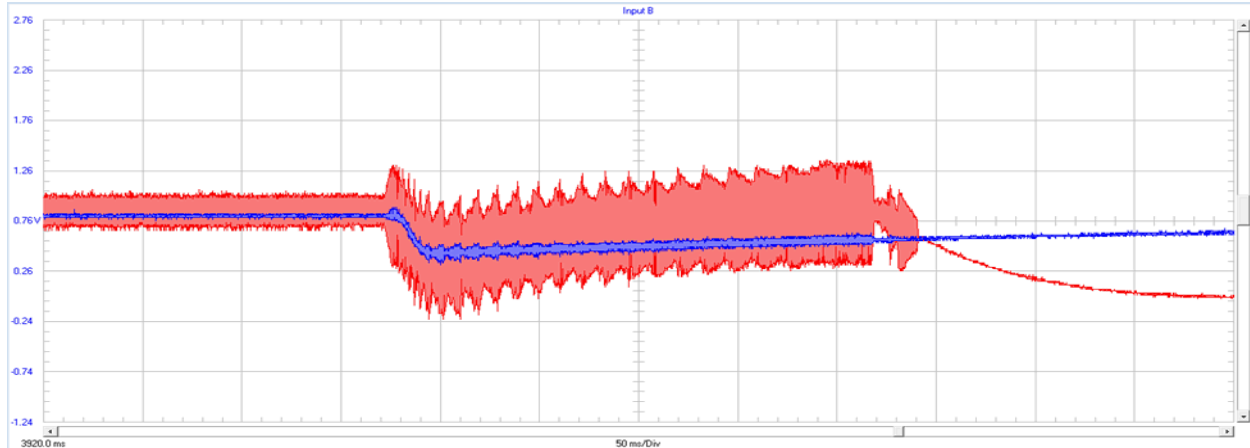
James Klein & Ken Mulder

8/8/2012

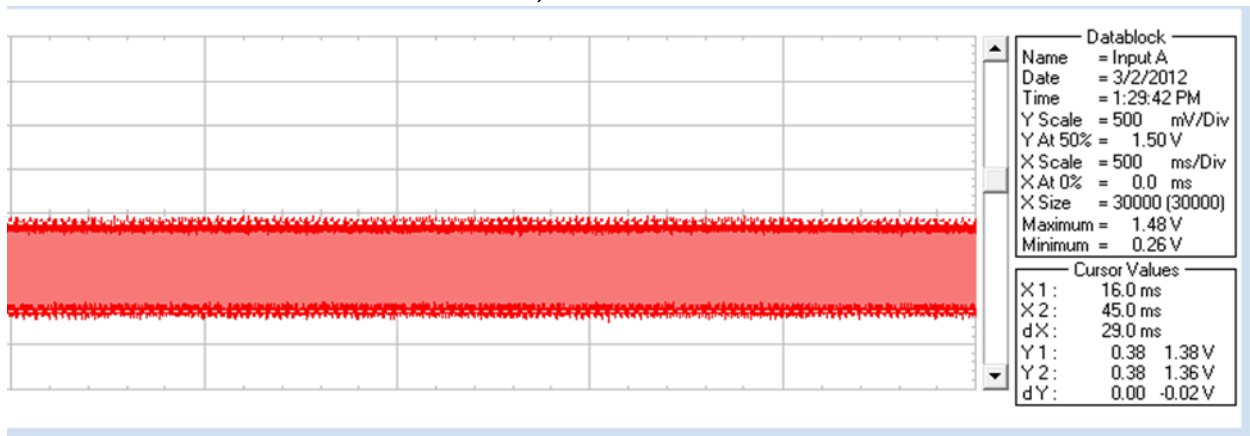**SAND Number:2012-665C**

WR ACRR-12-0011 summary

Problem: Wide Range 1 would "clamp" during a large pulse, and would have to be reset by de-energizing the High Volts Power Supply (HVPS) at the amplifier cabinet in the high bay.

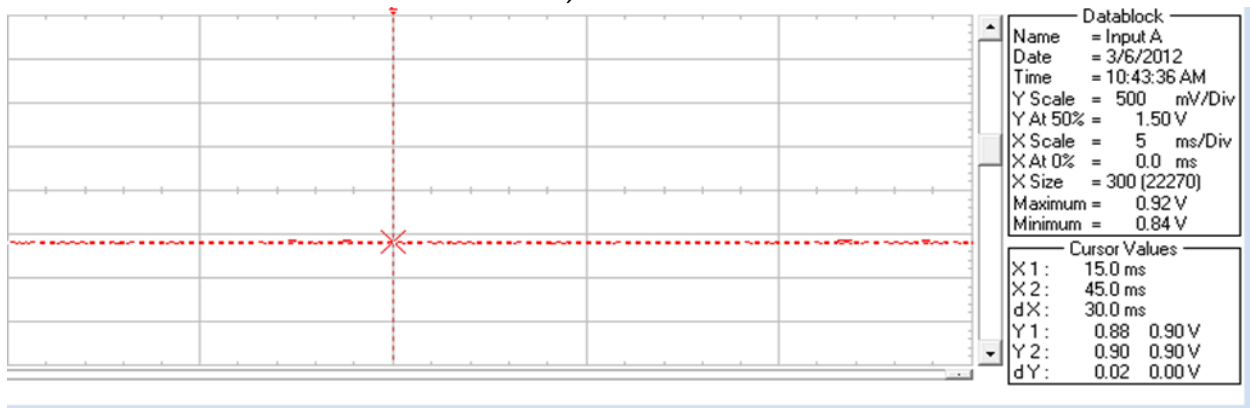*Max Pulse. Red=WR1 0-1000VDC PS(#164), Blue=WR2 0-2000VDC PS(#9105029)*

Background: Both Wide Range channels are identical except for the high voltage power supplies. WR2 has a 0-2,000VDC power supply, while WD1 has a 0-1,000VDC power supply. The "new" power supply was sold by the vender as an approved replacement and installed in WR1 in 2010. The 0-1,000VDC power supplies also have a higher ripple DC on a test bench.

HVPS #013, 0-1000VDC on test bench


```
Datablock
Name     = Input A
Date     = 3/2/2012
Time     = 1:29:42 PM
Y Scale  = 500    mV/Div
Y At 50% =   1.50 V
X Scale  = 500    ms/Div
X At 0%  =   0.0  ms
X Size   = 30000 (30000)
Maximum  =   1.48 V
Minimum  =   0.26 V

Cursor Values
X1:      16.0 ms
X2:      45.0 ms
dX:      29.0 ms
Y1:      0.38   1.38 V
Y2:      0.38   1.36 V
dY:      0.00  -0.02 V
```

HVPS #0005001, 0-2000VDC on test bench


```
Datablock
Name     = Input A
Date     = 3/6/2012
Time     = 10:43:36 AM
Y Scale  = 500    mV/Div
Y At 50% =   1.50 V
X Scale  =   5    ms/Div
X At 0%  =   0.0  ms
X Size   = 300 (22270)
Maximum  =   0.92 V
Minimum  =   0.84 V

Cursor Values
X1:      15.0 ms
X2:      45.0 ms
dX:      30.0 ms
Y1:      0.88   0.90 V
Y2:      0.90   0.90 V
dY:      0.02   0.00 V
```

Solution: Replace the power supply for WR1 with a 0-2000VDC PS. The new style power supplies provided by Thermo are acceptable for steady state operations, but require an operator workaround (de-energizing the power supply in the amplifier cabinet) during pulse operations (large pulses). To prevent this workaround a spare HVPS was acquired from SPR/CX (0-2000VDC #0005001) and installed in WD1.

HVPS#0005001, 0-2000VDC on test bench

Max Pulse. Red=WD1 0-2000VDC PS (#0005001), Blue=WR2 0-2000VDC PS (#9105029)
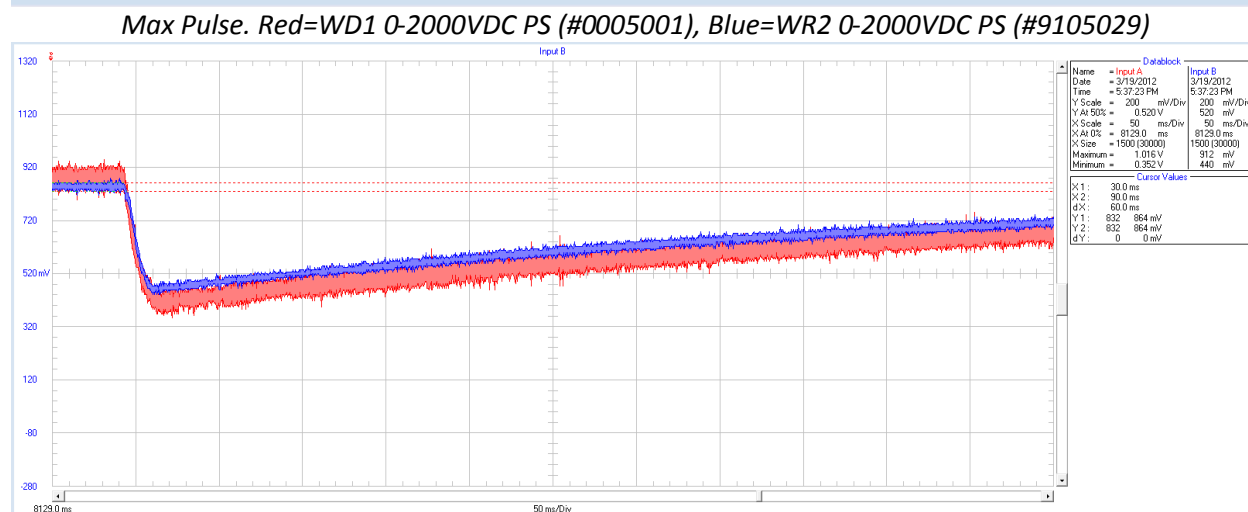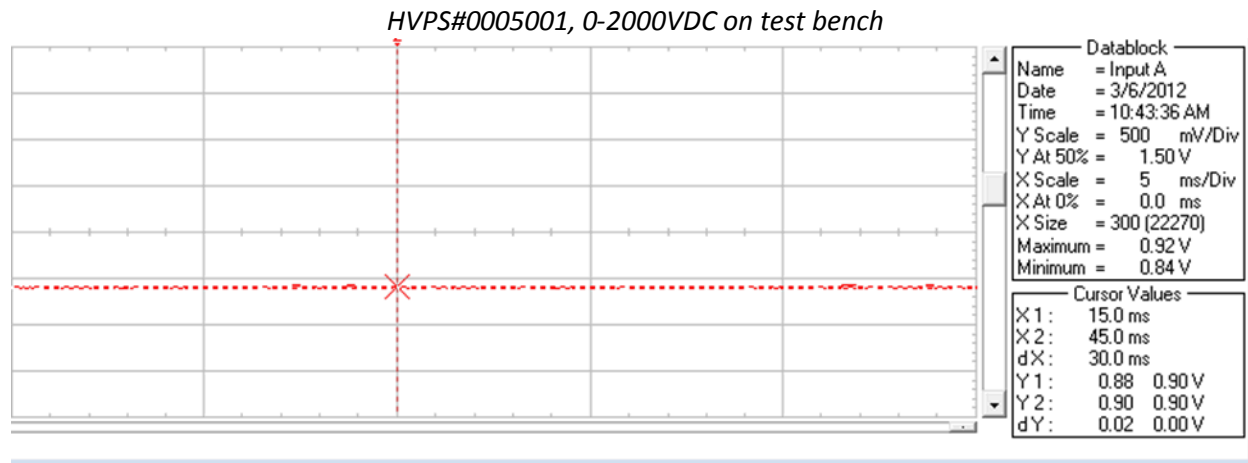
Spare parts: The 0-2000VDC power supplies are no longer produced, but SPR/CX has one spare 0-2000VDC PS (#9212026) that is in new condition, and one 0-2000VDC PS (#9006011) in unknown condition (found on a work bench). SPR/CX also uses the 0-2000VDC PS in their neutron detectors. ACRR has one new 0-1000VDC PS (#013), one used 0-1000VDC PS (#164), and one used 0-2000VDC PS (#0005002).

Summary: HVPS #0005001 works well in WR1, and solves the problem of clamping during large pulses.