Test of PAMP8v2-40K

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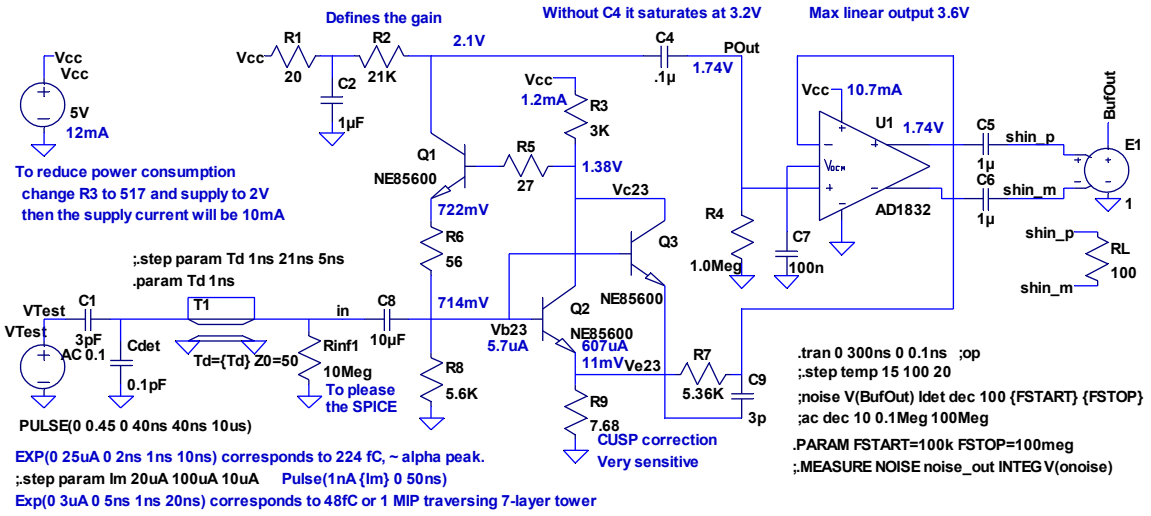

Fig. 1: Schematics of the PAMP8v2-40K as it used in simulations

Oscillograms of the response of the PAMP8v2-40K to a trapezoidal input signal with amplitude 450mV and different rise times.

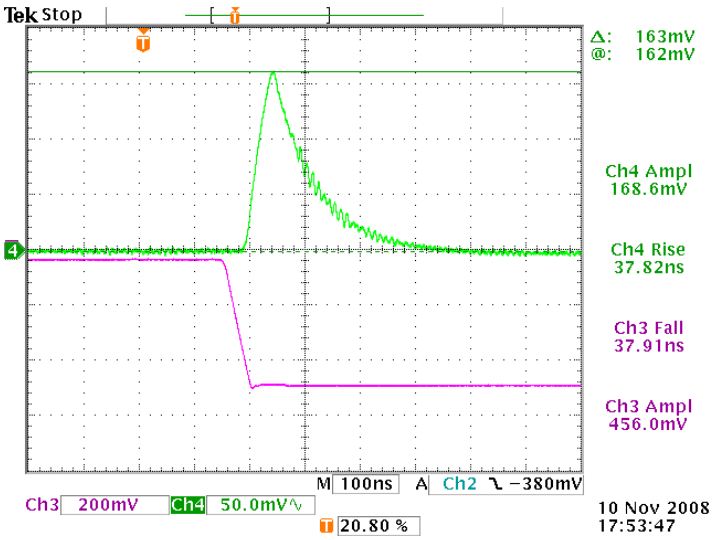

Fig. 2: Test pulse (red, measured at point VTest on the schematics) and the output of the preamplifier (red, point shin_p on the schematics). Note the rise time are equal.

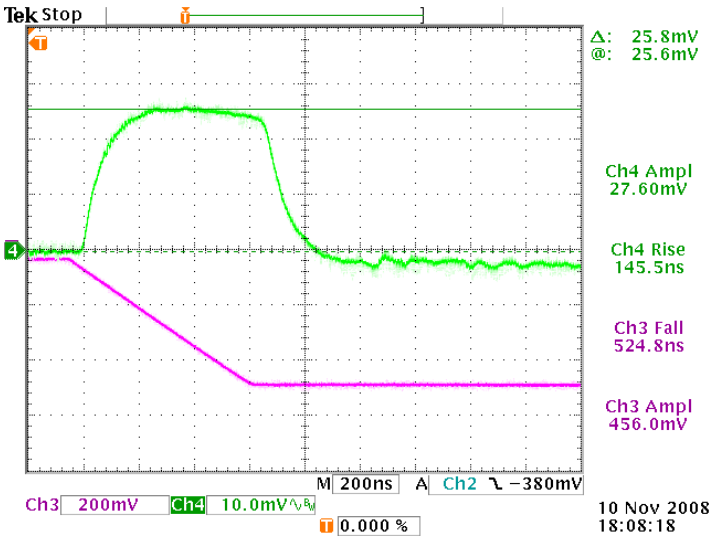

Fig. 3: Longer rise time, 524ns.

Signal measured by 65MHz 12-bit digitizer (HBD ADC system)

One ADC count corresponds to approximately 1mV, one time division – 16ns.

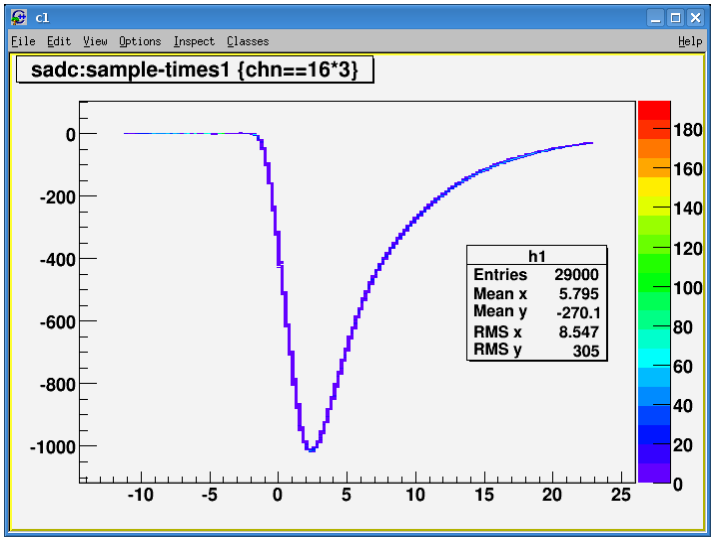

Fig. 4: Input signal step 900mV, rise time 40ns. The peak integral -31369.

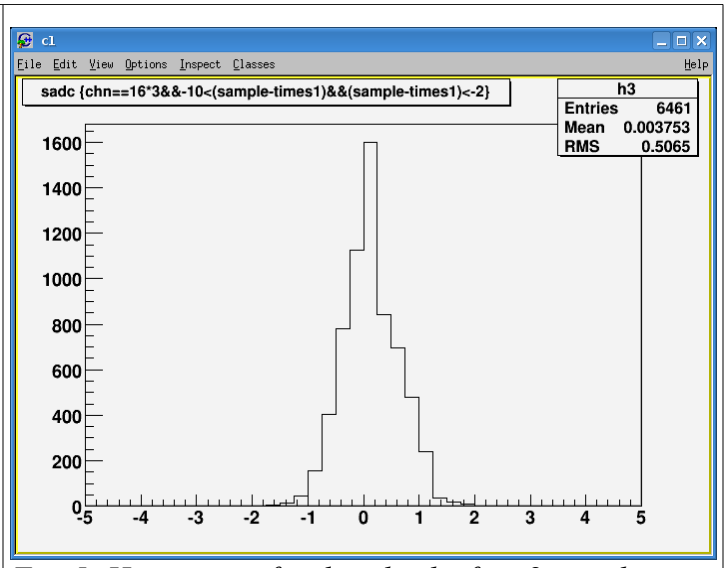

Fig. 5: Histogram of pedestals, the first 8 samples prior to the pulse.

The single-sample dynamic range is RMS/Amplitude = 2000. The actual dynamic range is even higher because the noise of the pedestals cannot be estimated since it is less than on ADC count.

Comparison of the output signals of PAMP8v2-40K and PAMP8v2-4K

In following figures the output pulse is fitted using flat pulse with exponential front and tail:

```
Double_t fexprect(Double_t *x, Double_t *par)
{
	Float_t xx = x[0];
	Double_t f;
	Float_t tail = par[2]+par[3];
	if (xx<par[2]) f = 0.;
	else
		f = -par[0]*(1.-exp(-(xx-par[2])/par[1]));
	if(xx>par[3])
		f = -par[0]*(1.-exp(-(par[3]-par[2])/par[1]))*(exp(-(xx-par[3])/par[1]));;
	return f;
}
```

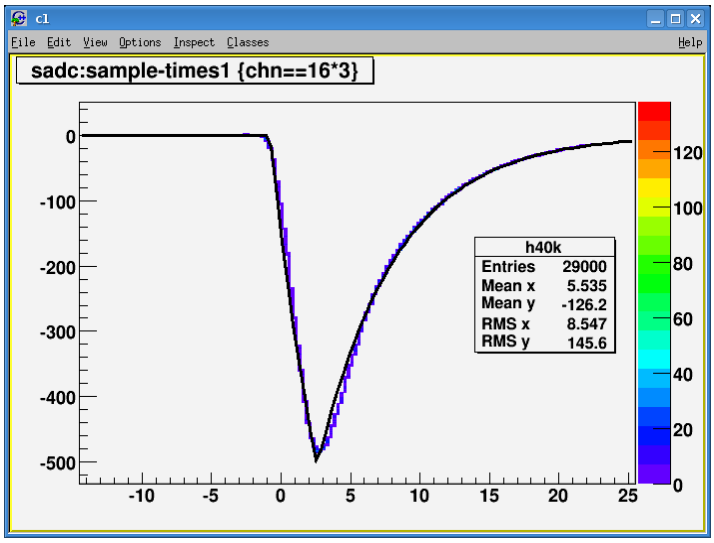

Fig. 6: PAMP8v2-40K

1 Amplitude 1.12490e+03 9.07971e-02
2 RiseTime 5.63859e+00 5.64528e-04
3 Front -7.85000e-01 fixed
4 Tail 2.60000e+00 fixed

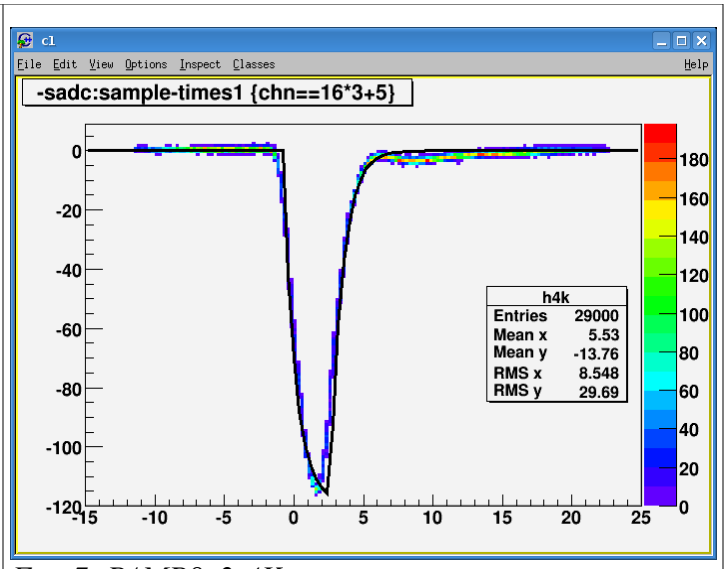

Fig. 7: PAMP8v2-4K

1 Amplitude 1.18875e+02 3.67031e-02
2 RiseTime 8.82452e-01 7.39756e-04
3 Front -7.85000e-01 fixed
4 Tail 2.60000e+00 fixed

Note that the fitted amplitude of the PAMP8v2-40K is 10 times higher than in PAMP8v2-4K, this is consistent with the gain.
The rise time for PAMP8v2-40K is 5.6 ticks = 86ns, for PAMP8v2-4K it is 0.88 ticks = 13.5ns.

Simulation using LtSpice

The same input pulse (step 450mV with 40ns rise time) applied as in previous pictures.

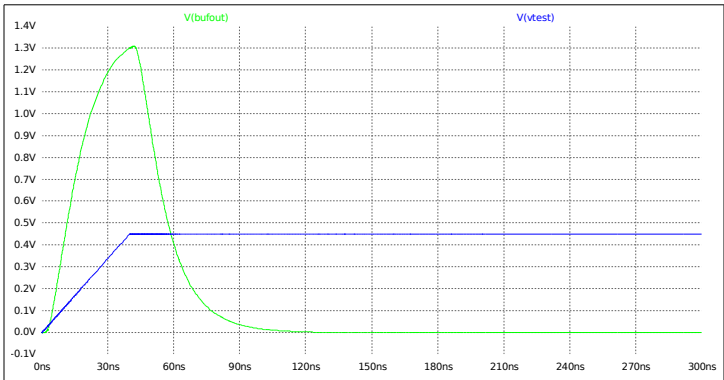

Fig. 8: PAMP8v2-40K

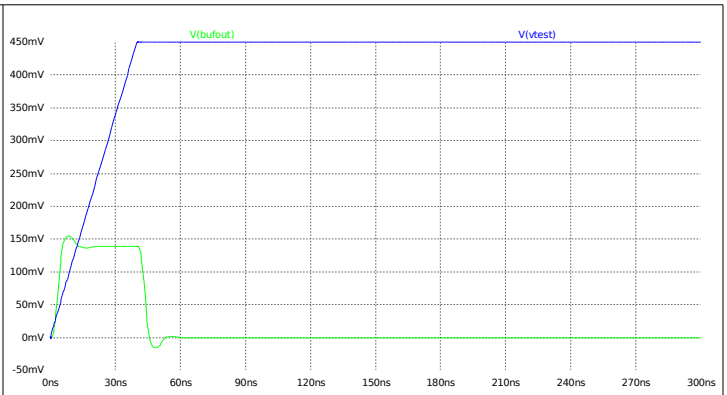

Fig. 9: PAMP8v2-4K

The actual rise time is much slower that the simulated one. The actual gain is similar to the simulated results.

The possible reason for discrepancy in rise time between simulation and measurements.

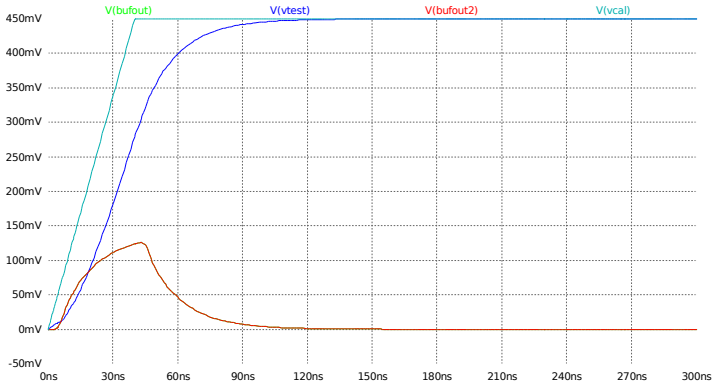

Fig. 10: PAMP8v2-4K , compare with fig. 7. The possible reason for slow rise time could be series resistance of the calibrator

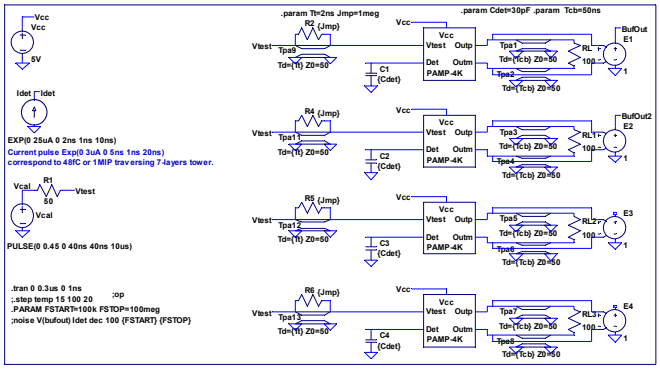

Fig. 11: Schematics of the distribution of the test pulses.