

Droege Modifications and Noise Characteristics.

Four high voltage Droege power supplies were modified according to steps (1) and (2) of NuMI-NOTE-ELEC-0942, *Modification of Droege HV Supplies for Ethernet Control of the Beam Monitoring Ion Chambers*. The modified version has a more limited (0-1kV) and similar voltage characteristics as the unmodified version when used in conjunction with FLARE purity monitor electronics than the unmodified version.

The University-of-Indiana-made purity monitor HV supply and amplifier has some low-pass signal conditioning for the HV signal. This removes much of the AC noise on the HV signal. When this capability is disabled, high-frequency noise from the Droege becomes more apparent.

We observed the cathode signal output of the University of Indiana purity monitor electronics when powered by the unmodified and modified Droege supplies. The table below outlines what was examined.

HV Conditioning	Droege HV Supply	Voltage	Timescale	Figure	
ON	UNMODIFIED	500V	10 ms	Fig. 1	
			40 us	Fig. 2	
	MODIFIED	500V	10 ms	Fig. 3	
			40 us	Fig. 4	
			OFF	10 ms	Fig. 5
				40 us	Fig. 6
OFF	UNMODIFIED	5kV	10 us	Fig. 7	
			40 ms	Fig. 8	
		1kV	10 ms	Fig. 9	
			40 us	Fig. 10	
		500V	10 us	Fig. 11	
			40 ms	Fig. 12	
	MODIFIED	1kV	10 ms	Fig. 13	
			40 us	Fig. 14	
		500V	10 us	Fig. 15	
			40 ms	Fig. 16	
		50V	10 us	Fig. 17	
			40 ms	Fig. 18	
		OFF	10 us	Fig. 19	
			40 ms	Fig. 20	

With HV signal conditioning, both the modified and unmodified Droegees provide a similar signal (see Figs. 1-4) and this signal is as clean as one can expect from the experimental setup (compare Figs. 1-4 to Figs. 5 & 6). Without HV signal conditioning, differences appear. Namely, the modified Droege produces a similar amount of noise as the unmodified one only at a higher frequency. This is especially apparent when comparing Figs. 9 & 11 to Figs. 13 & 15, but also note the lack of the ~20kHz AC signal in Figs. 14 & 16 relative to Figs. 10 & 12.

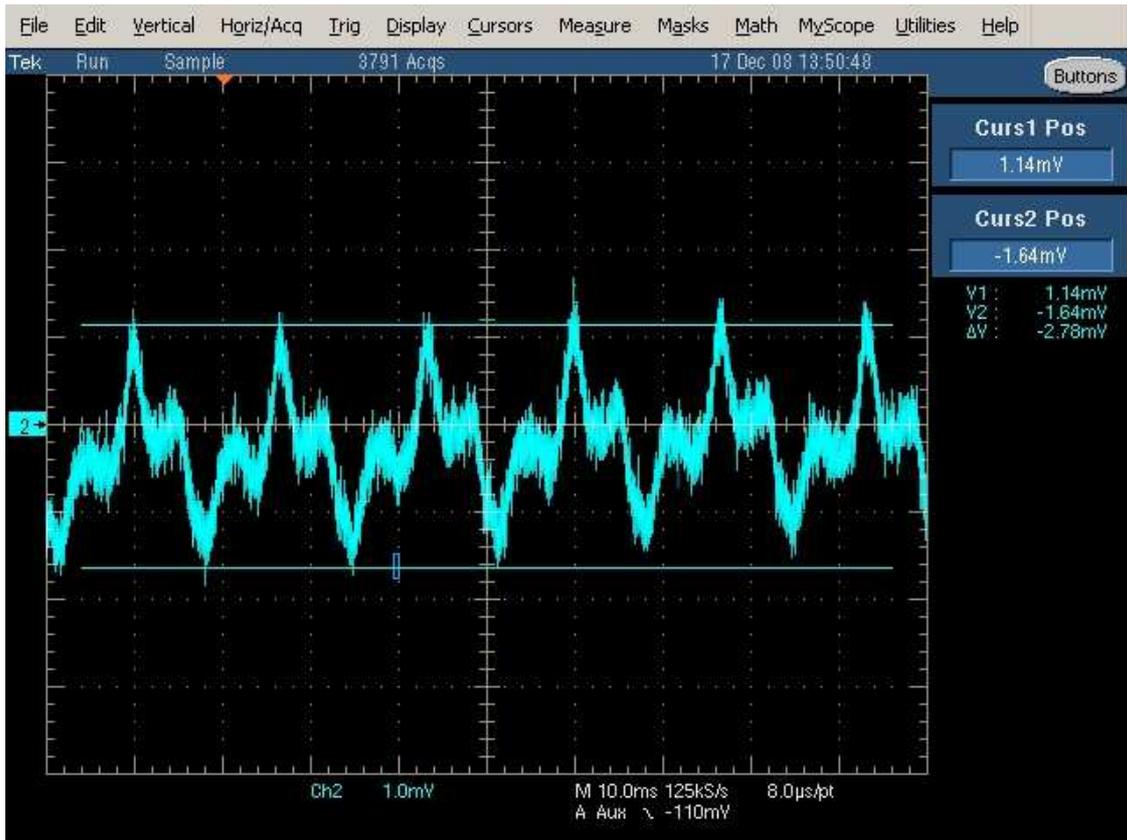


Fig. 1: Output of PrM electronics with HV conditioning when powered by unmodified Droege at 500V.

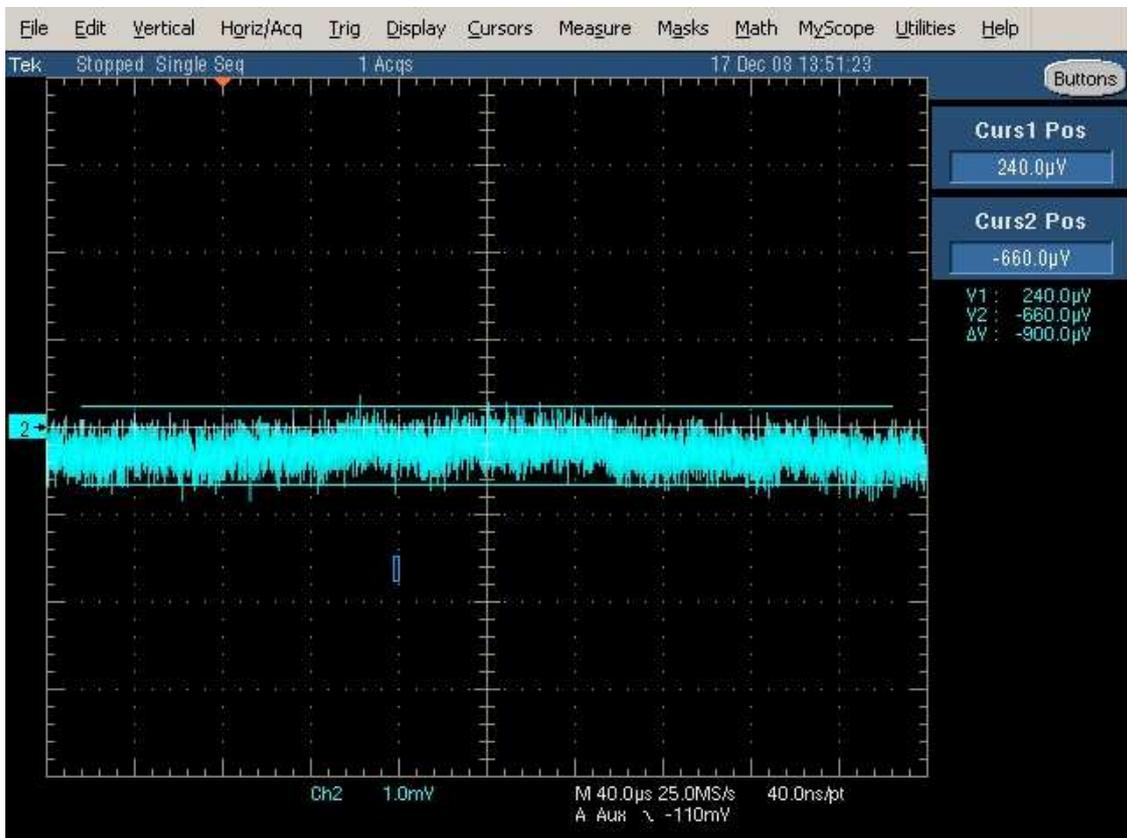


Fig. 2: Output of PrM electronics with HV conditioning when powered by unmodified Droege at 500V.

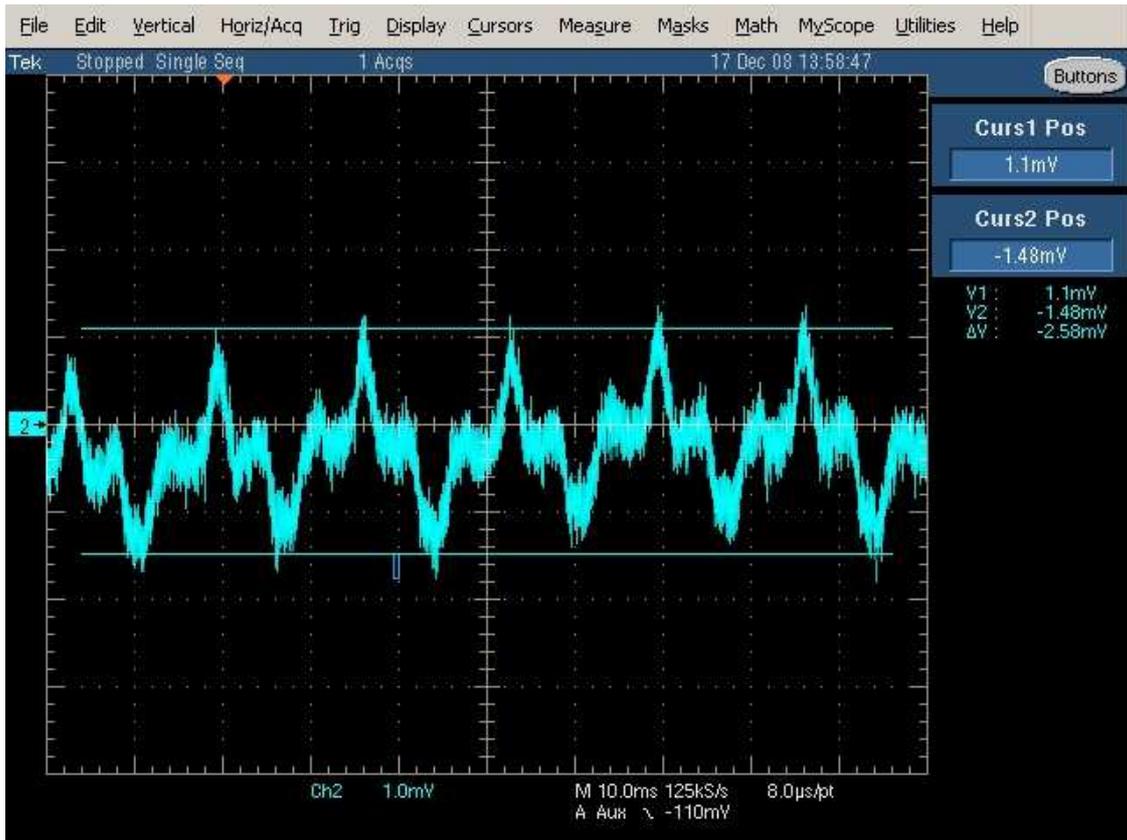


Fig. 3: Output of PrM electronics with HV conditioning when powered by modified Droege at 500V.

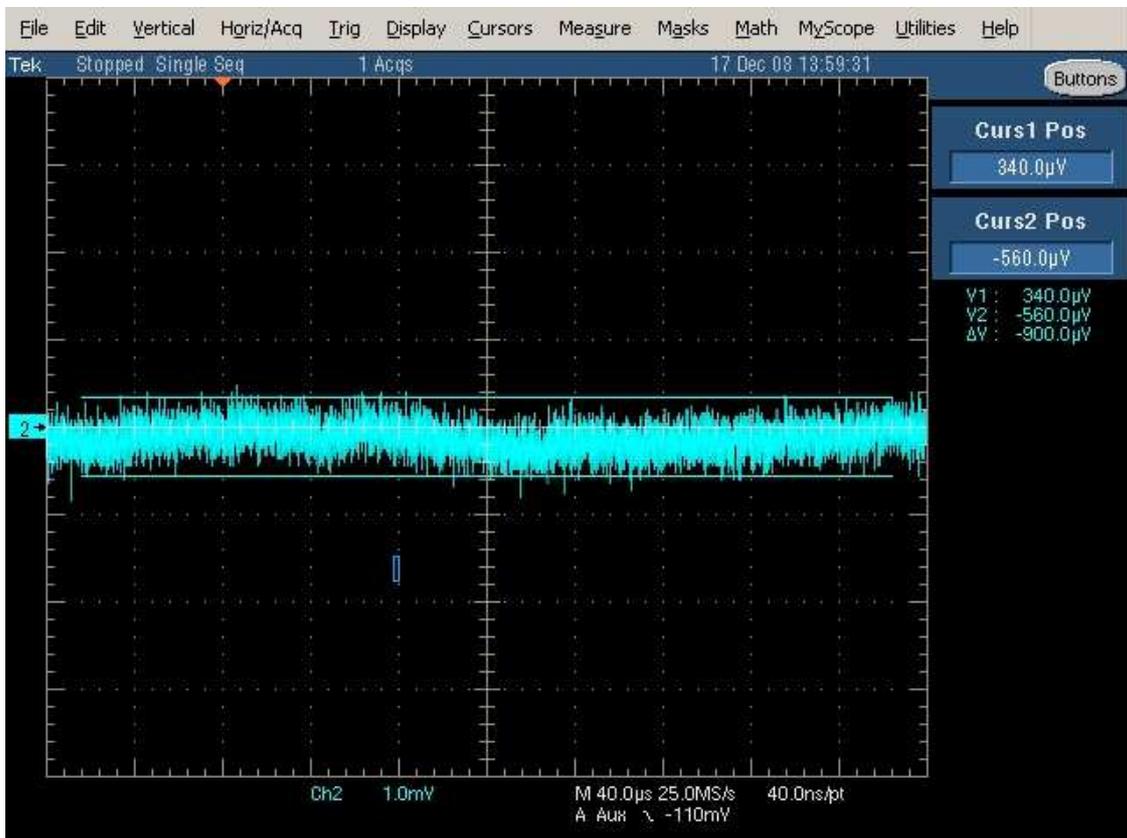


Fig. 4: Output of PrM electronics with HV conditioning when powered by modified Droege at 500 V.

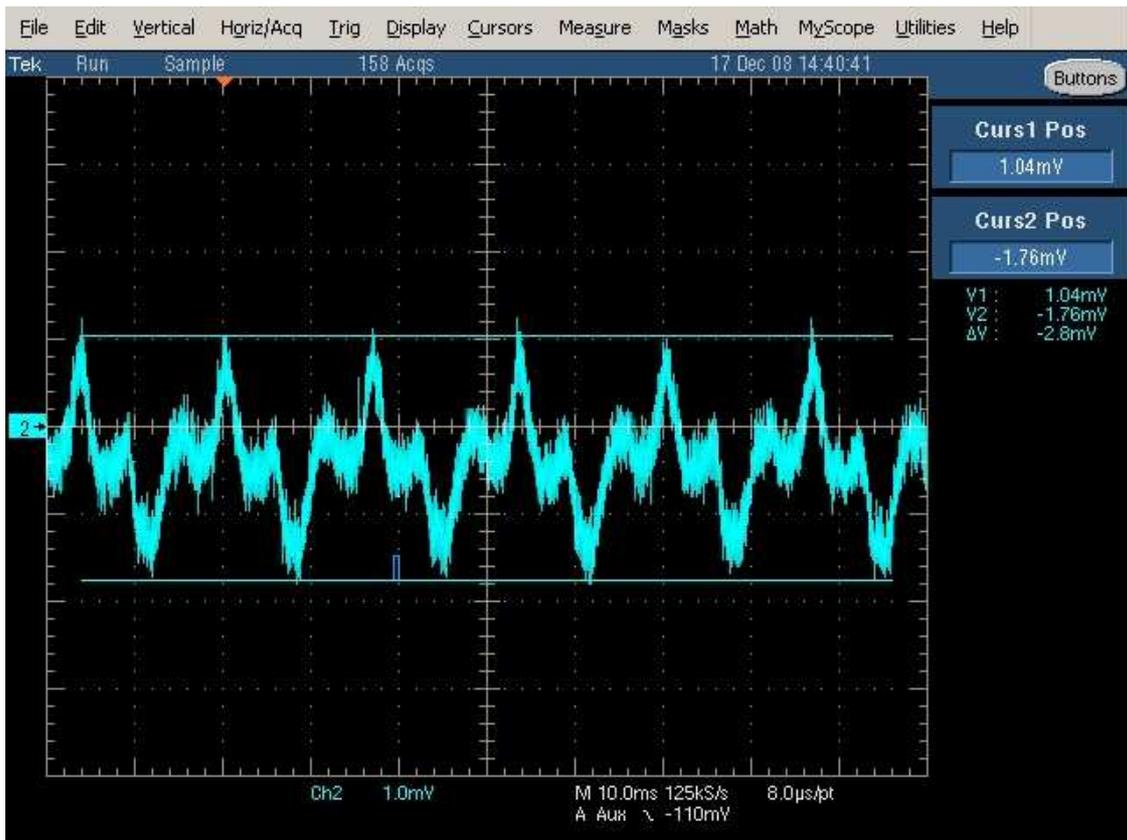


Fig. 5: Output of PrM electronics without HV conditioning when powered by modified Droege switched OFF.

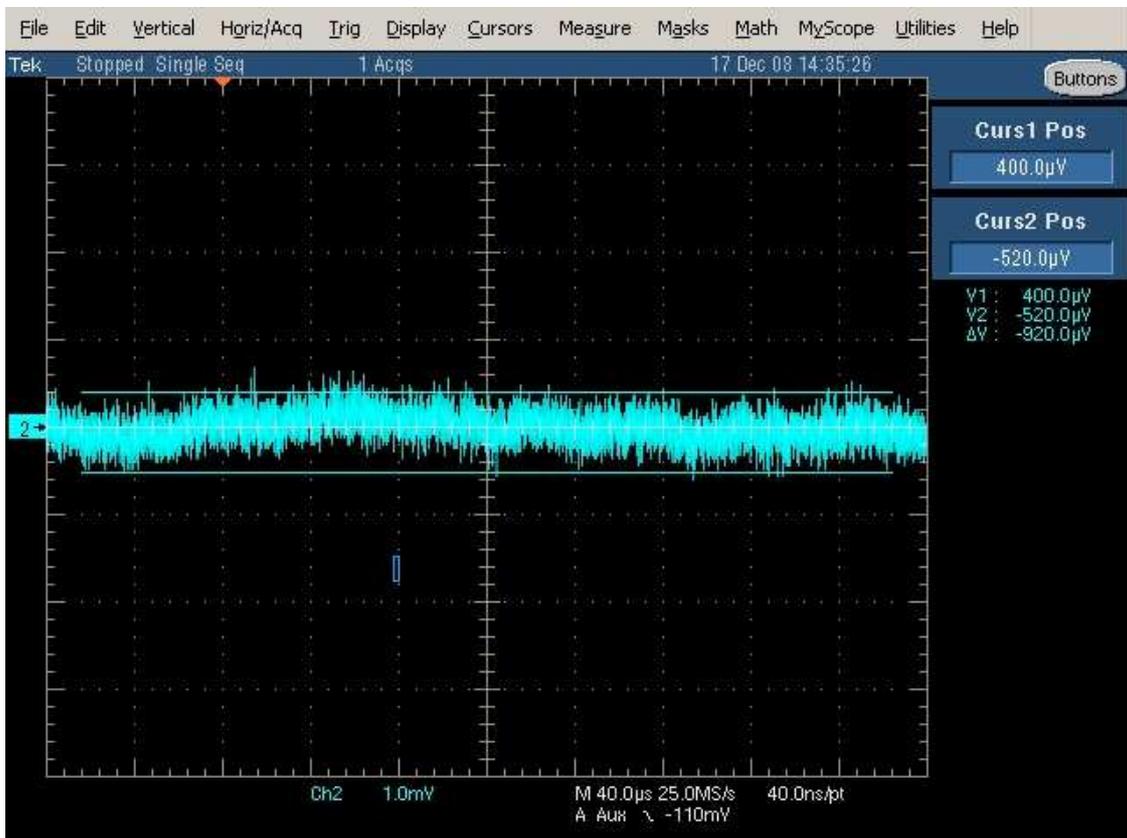


Fig. 6: Output of PrM electronics without HV conditioning when powered by modified Droege switched OFF.

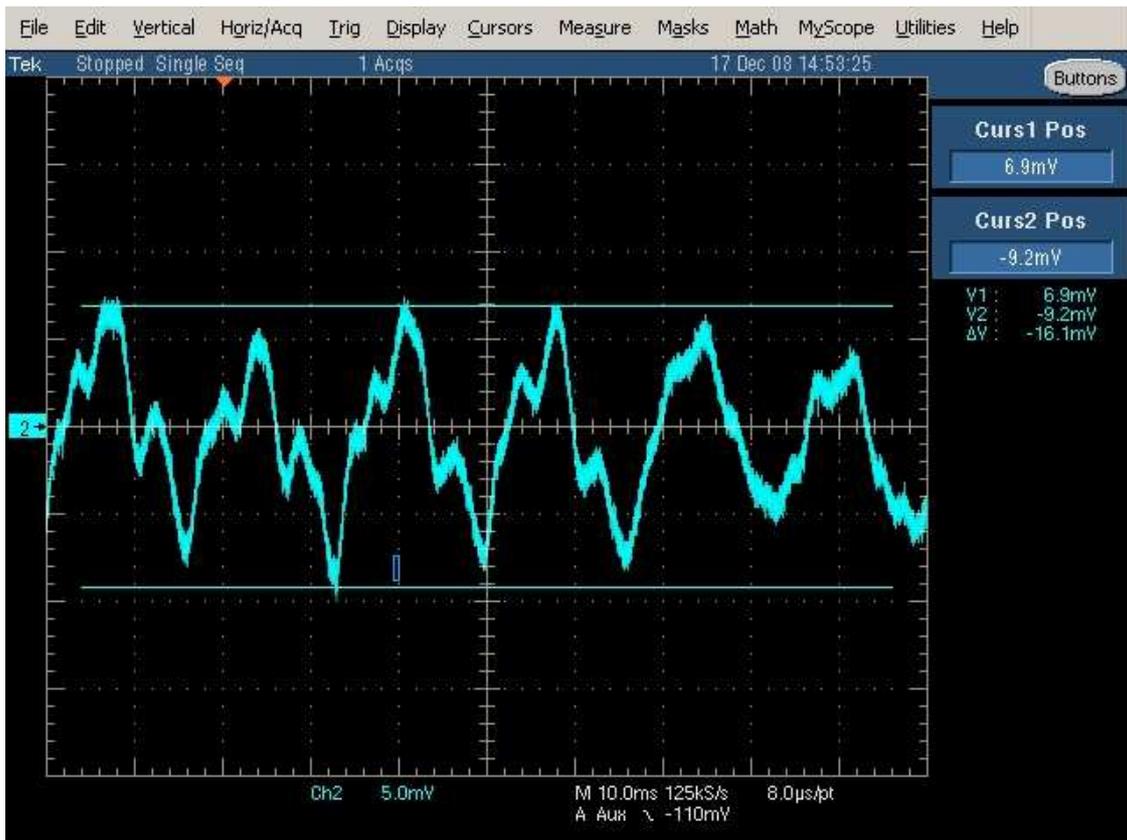


Fig. 7: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 5kV.

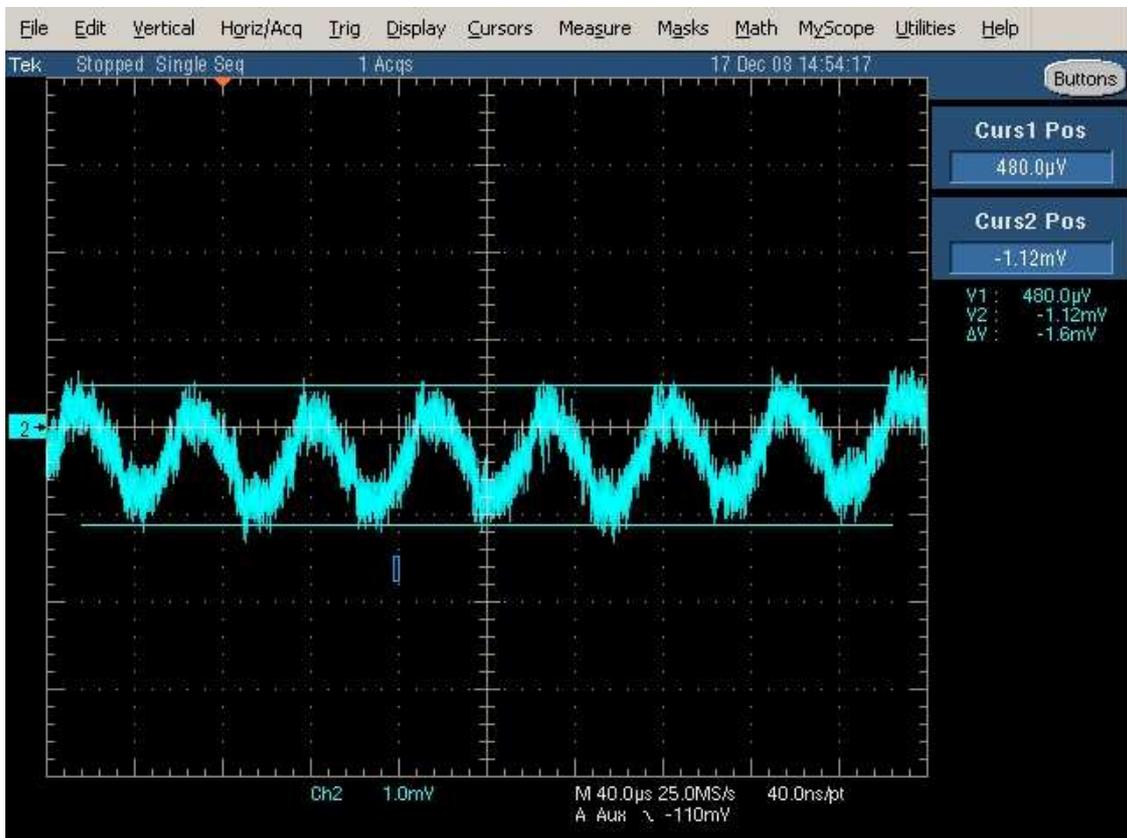


Fig. 8: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 5kV.

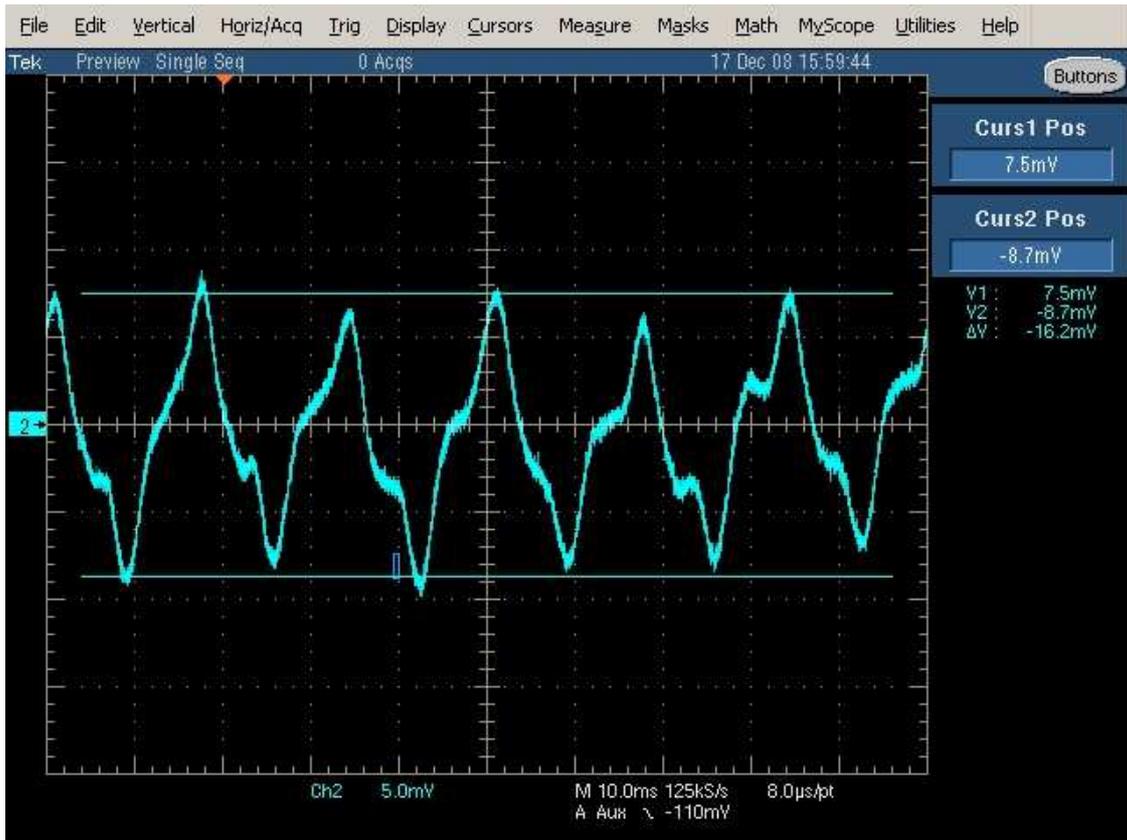


Fig. 9: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 1kV.

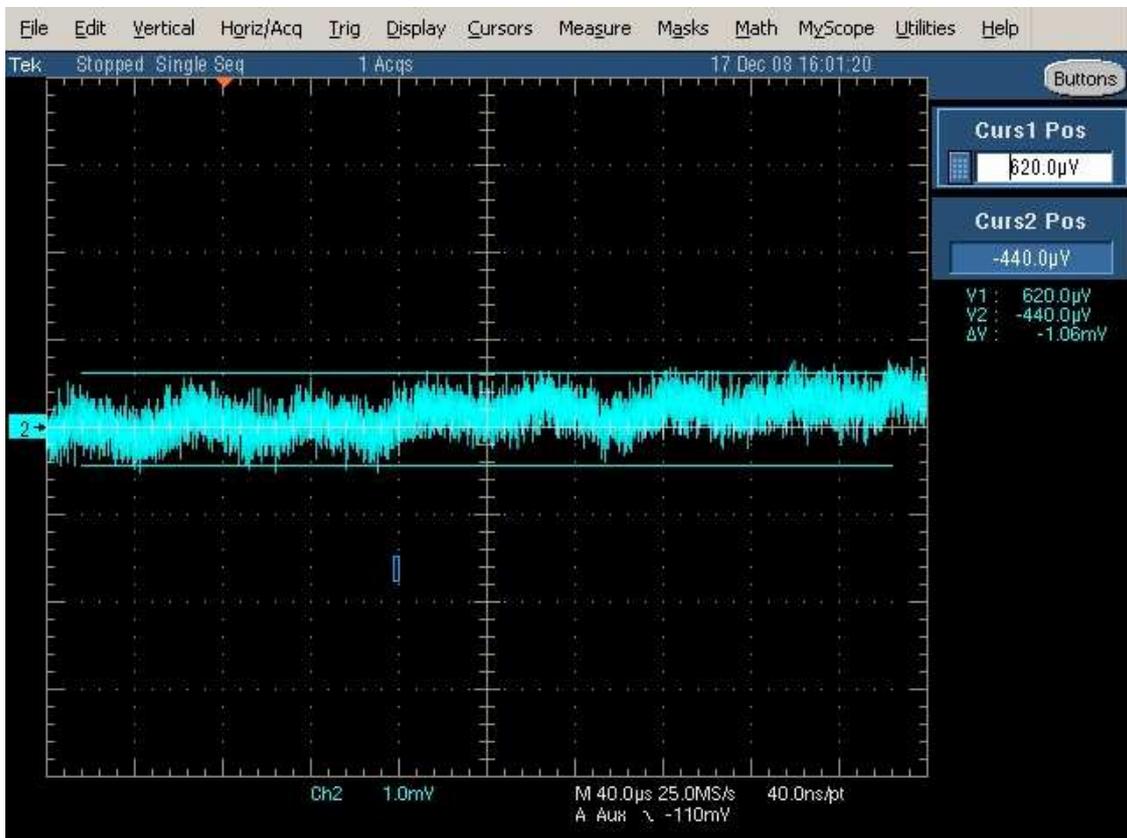


Fig. 10: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 1kV.

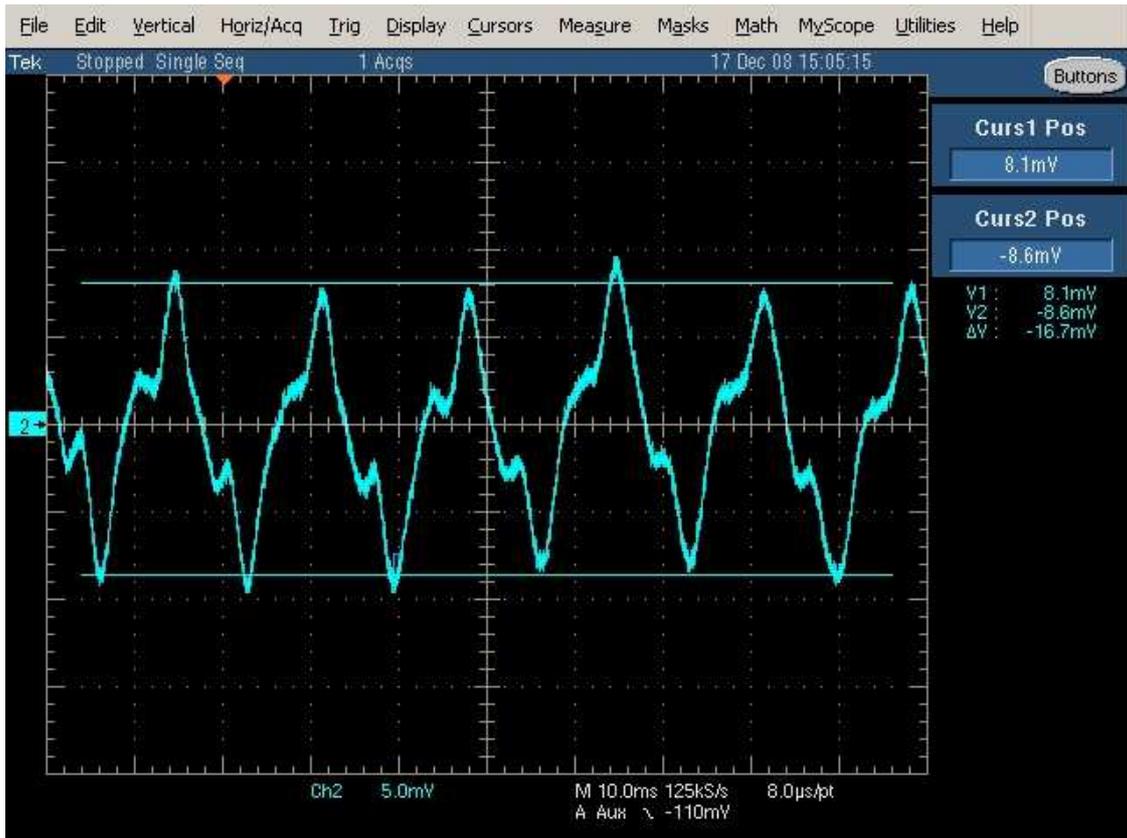


Fig. 11: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 500V.

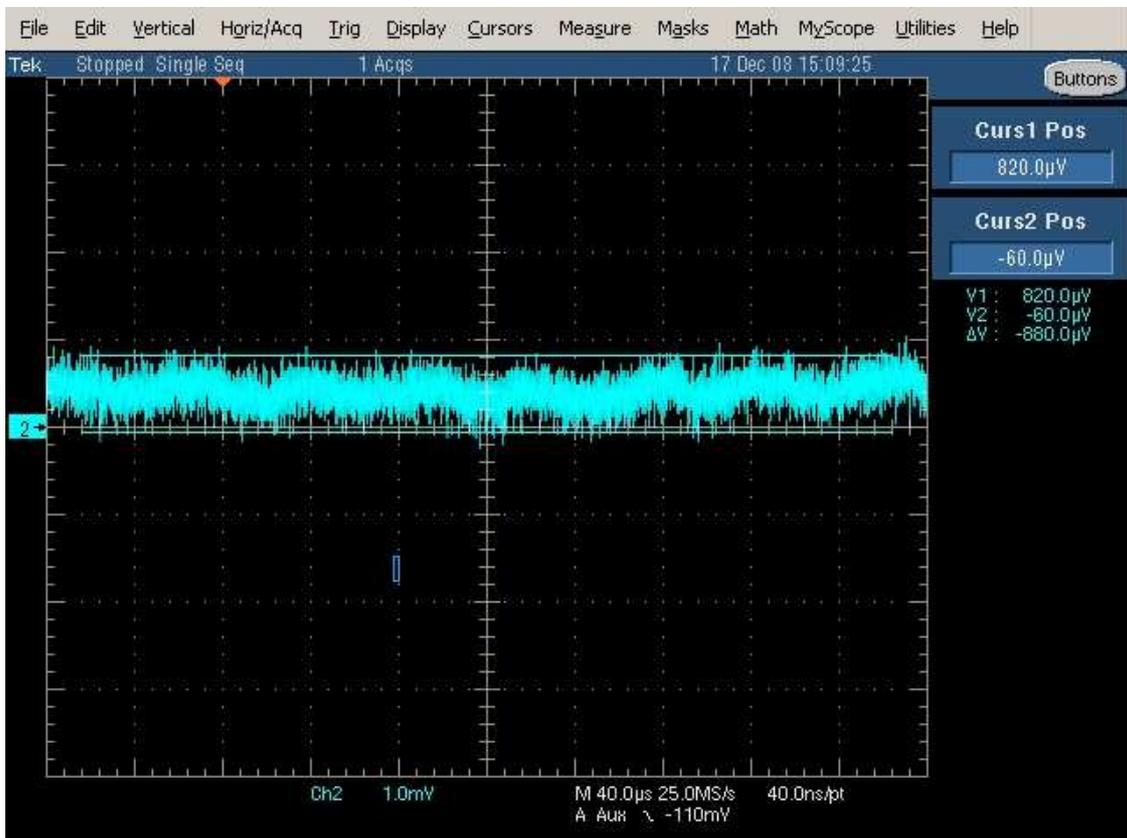


Fig. 12: Output of PrM electronics without HV conditioning when powered by unmodified Droege at 500V.

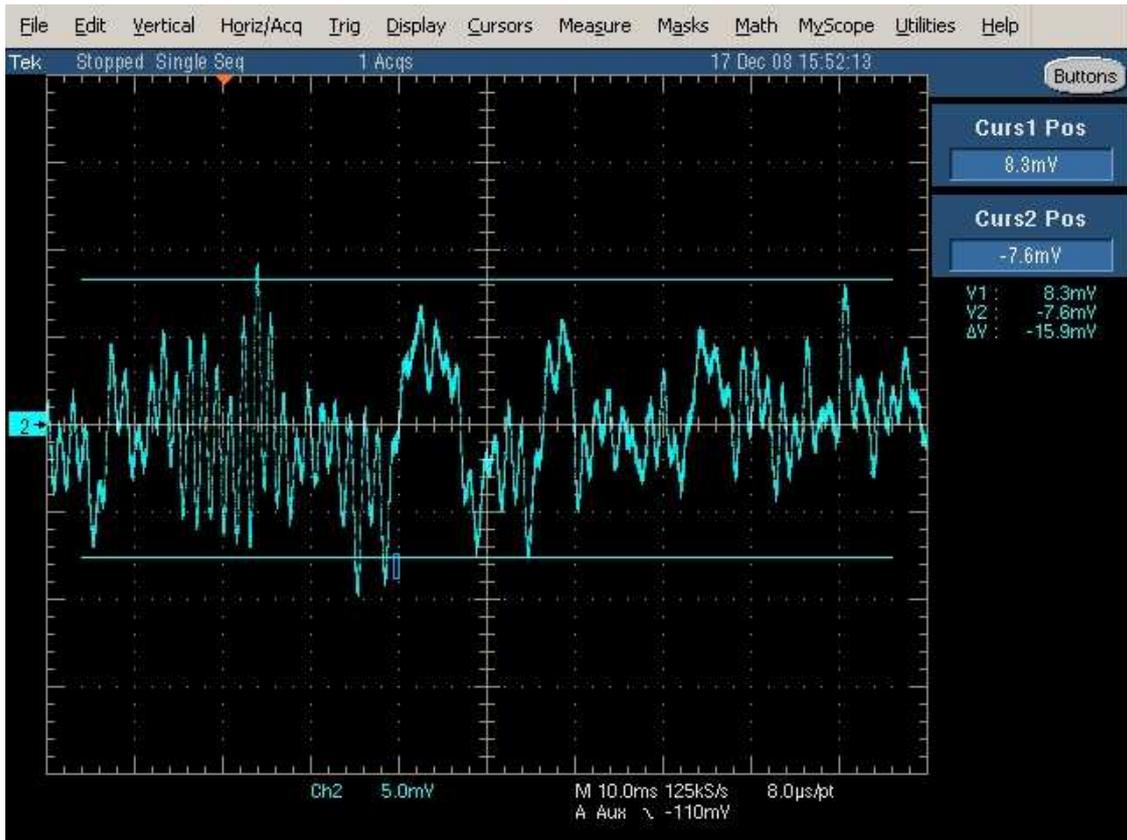


Fig. 13: Output of PrM electronics without HV conditioning when powered by modified Droege at 1kV.

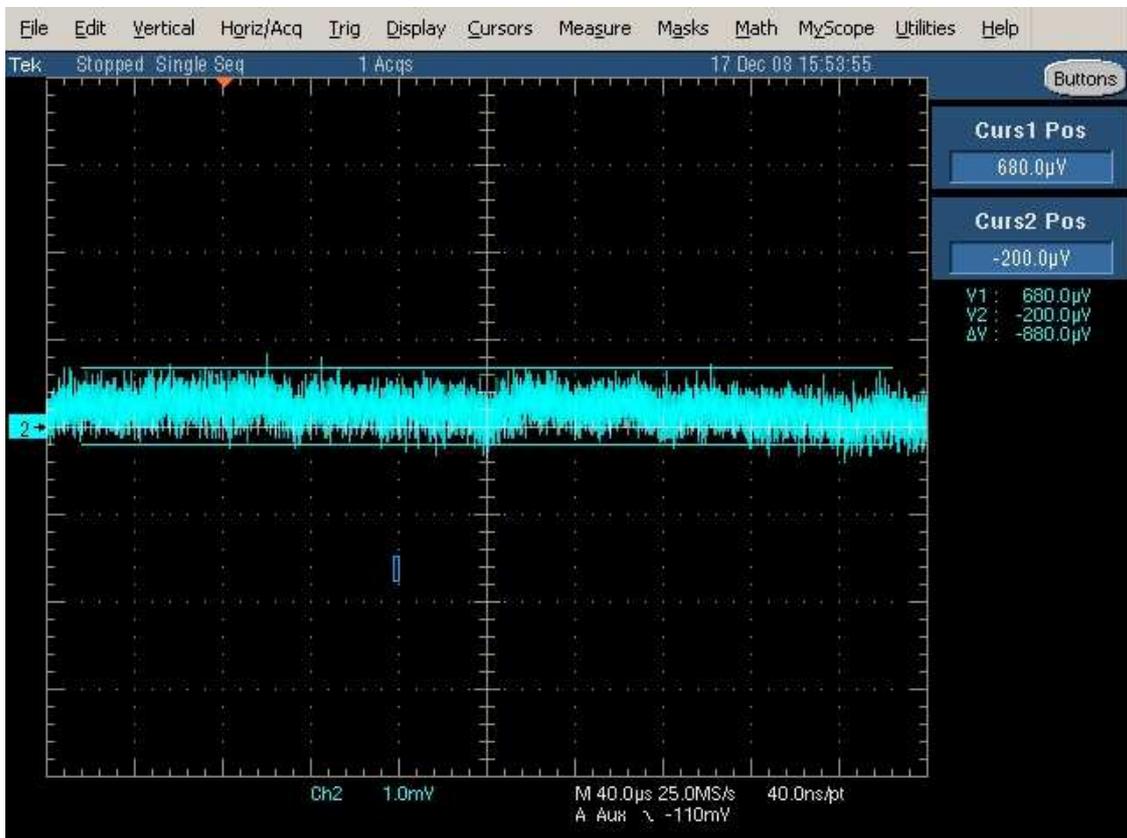


Fig. 14: Output of PrM electronics without HV conditioning when powered by modified Droege at 1kV.

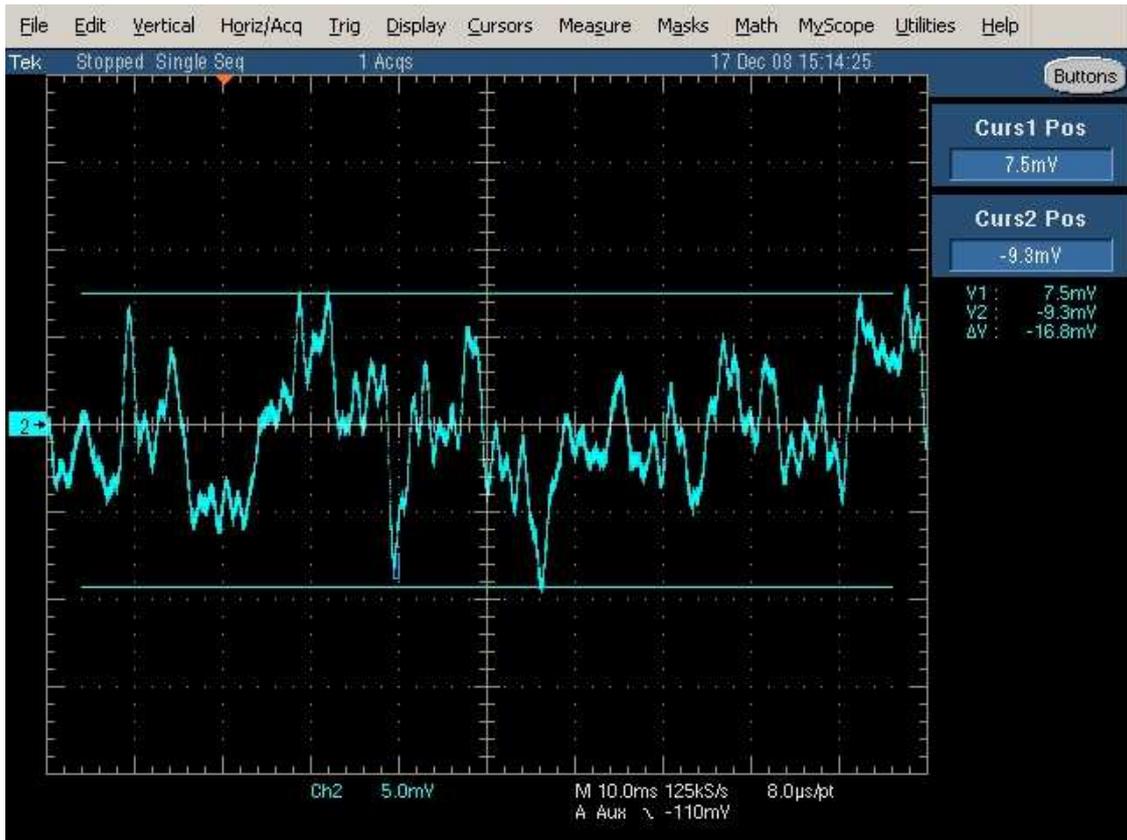


Fig. 15: Output of PrM electronics without HV conditioning when powered by modified Droege at 500V.

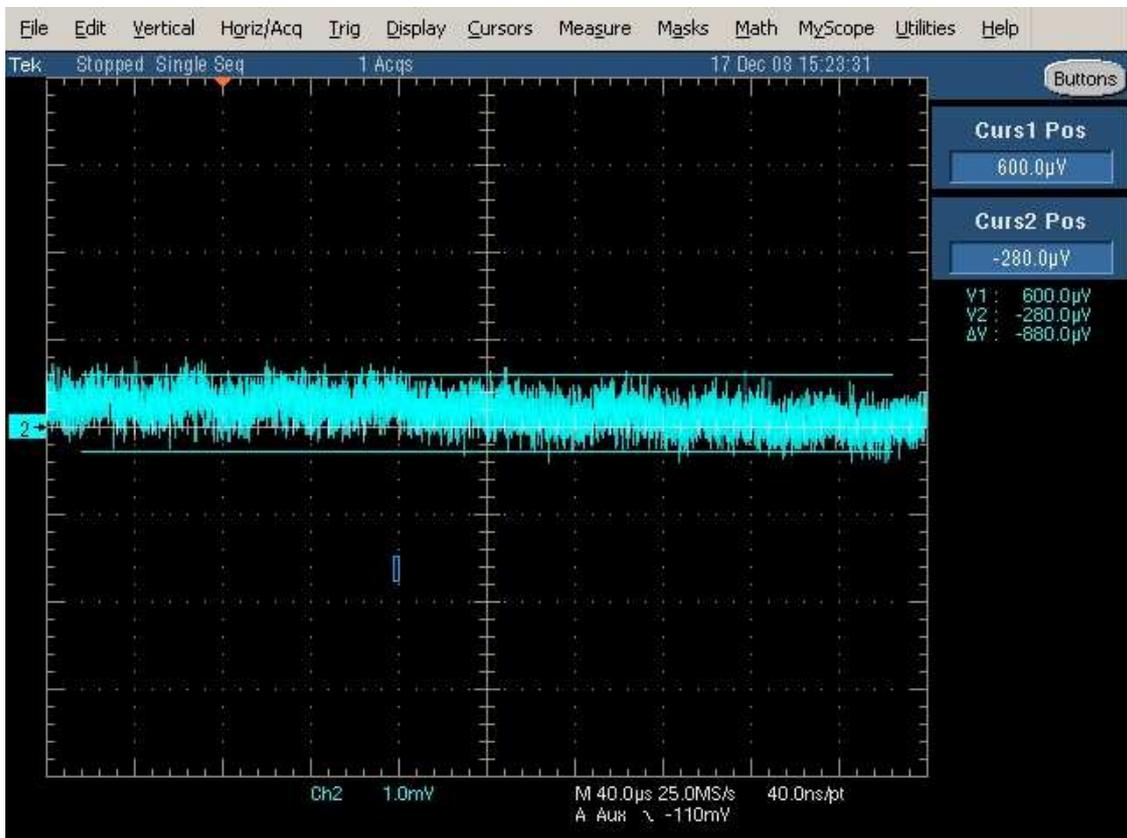


Fig. 16: Output of PrM electronics without HV conditioning when powered by modified Droege at 500V.

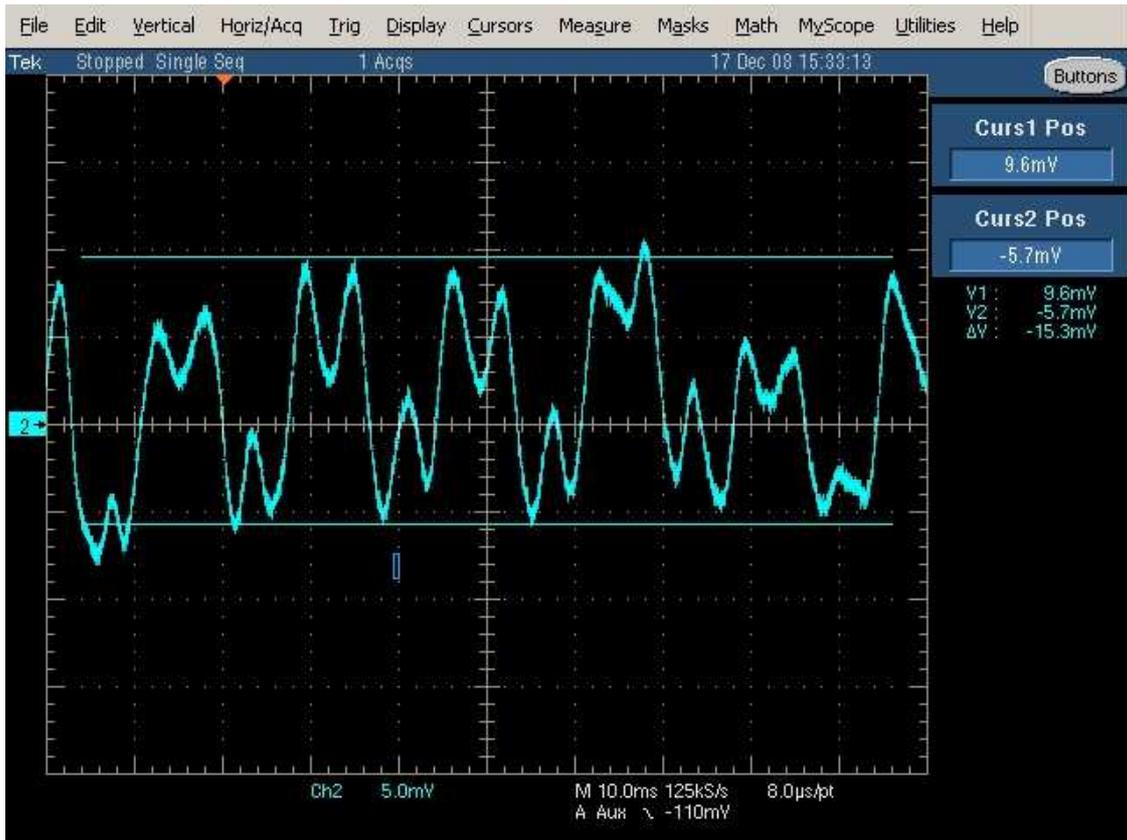


Fig. 17: Output of PrM electronics without HV conditioning when powered by modified Droege at 50V.

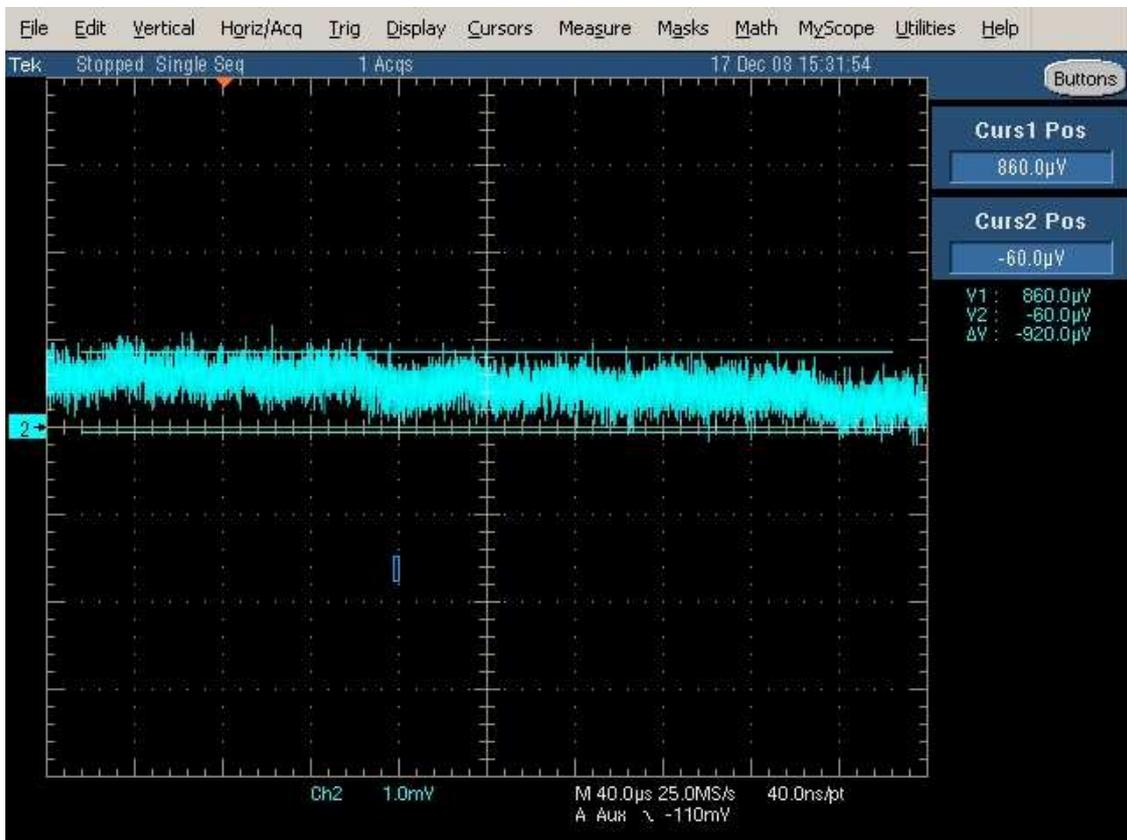


Fig. 18: Output of PrM electronics without HV conditioning when powered by modified Droege at 50V.

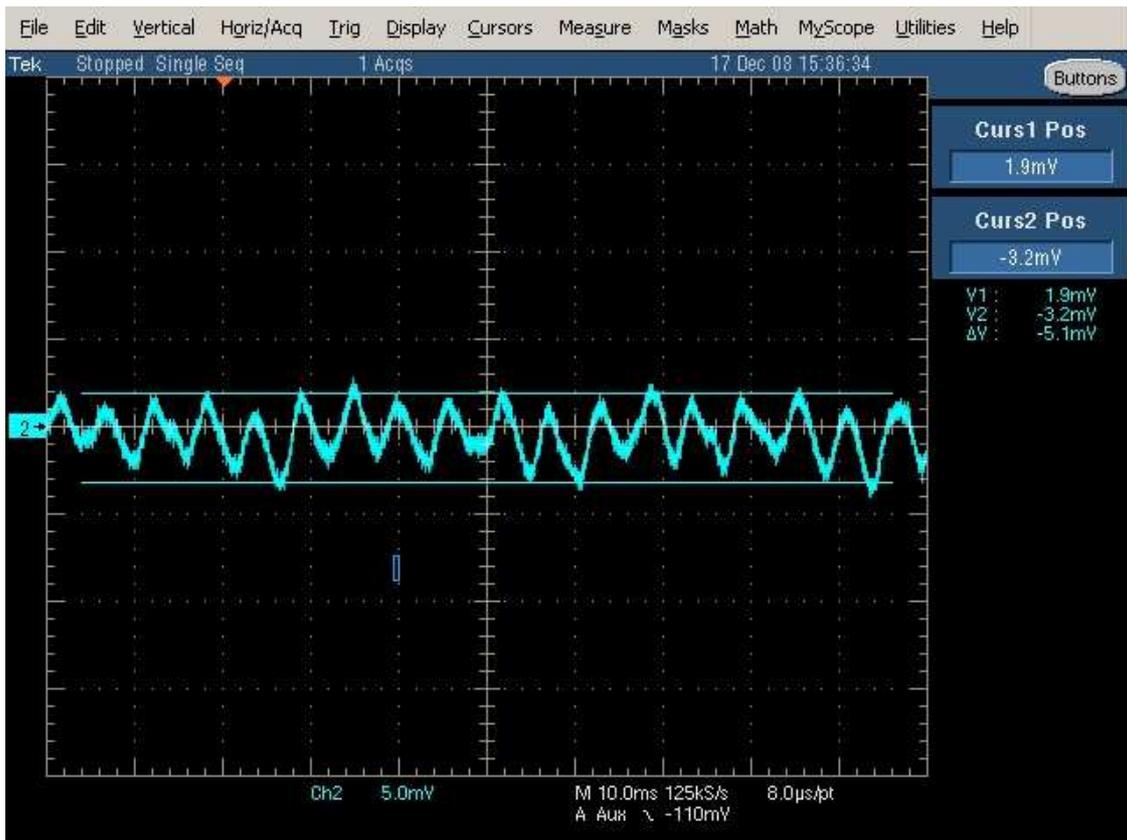


Fig. 19: Output of PrM electronics without HV conditioning when powered by modified Droege switched OFF.

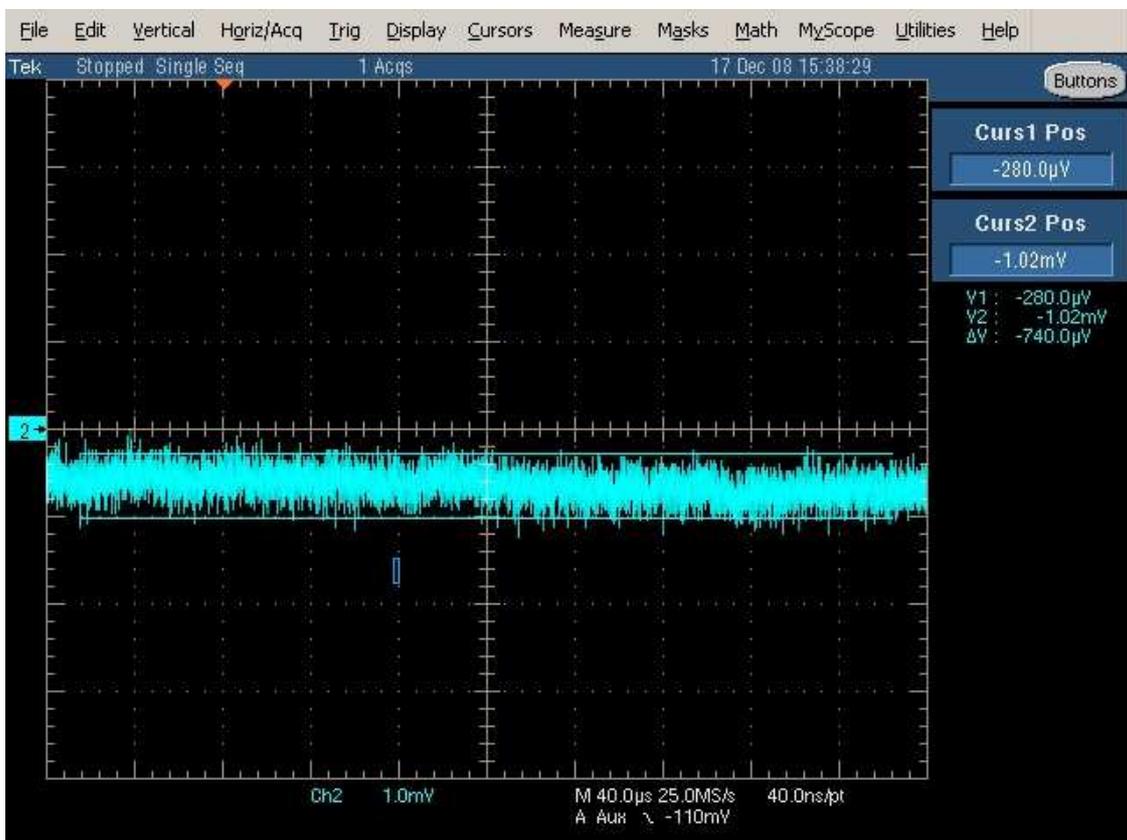


Fig. 20: Output of PrM electronics without HV conditioning when powered by modified Droege switched OFF.