

ENHANCEMENT AND REPAIR OF THE BESSY II STORAGE RING SEPTA PULSER UNITS

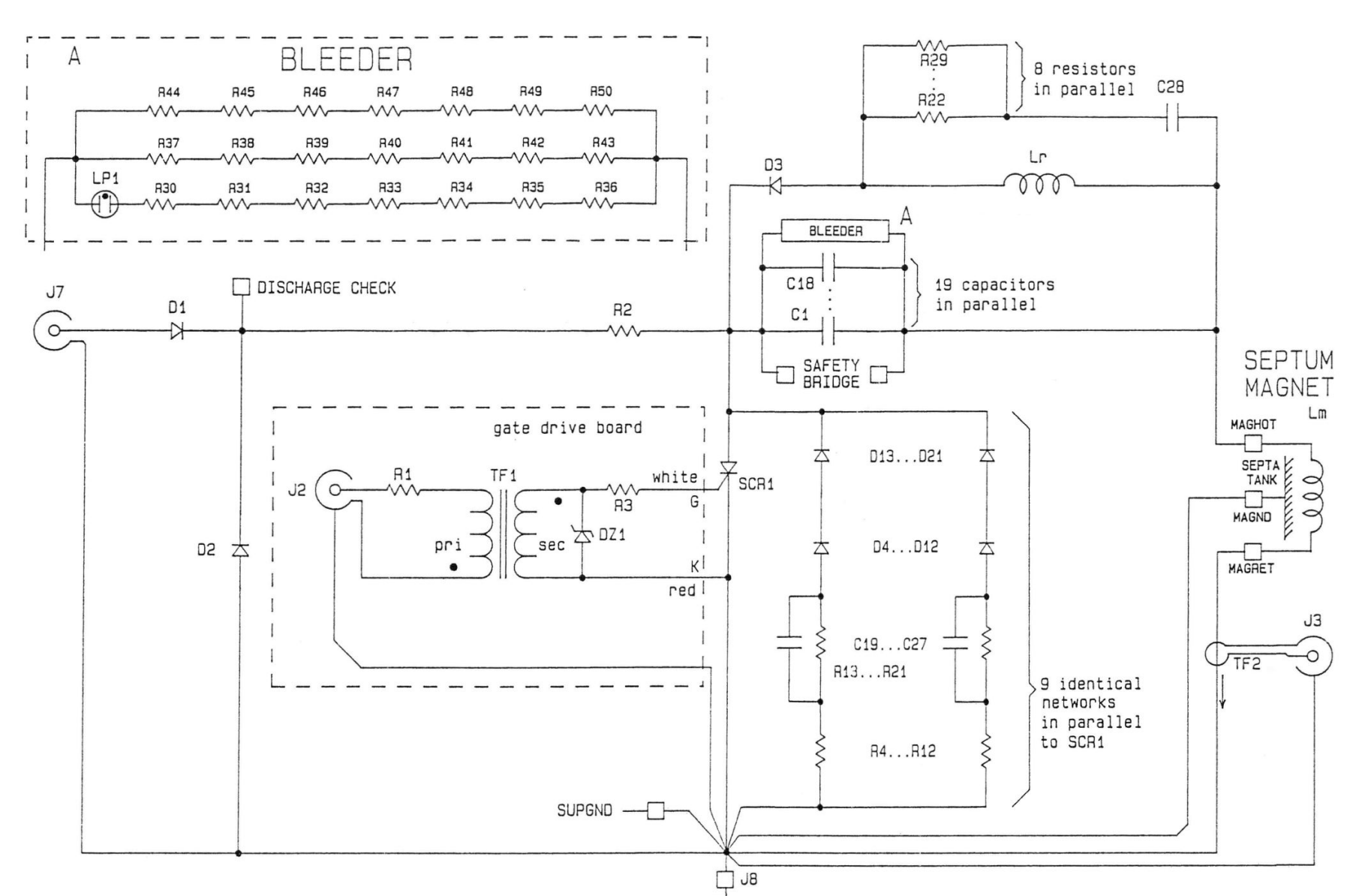
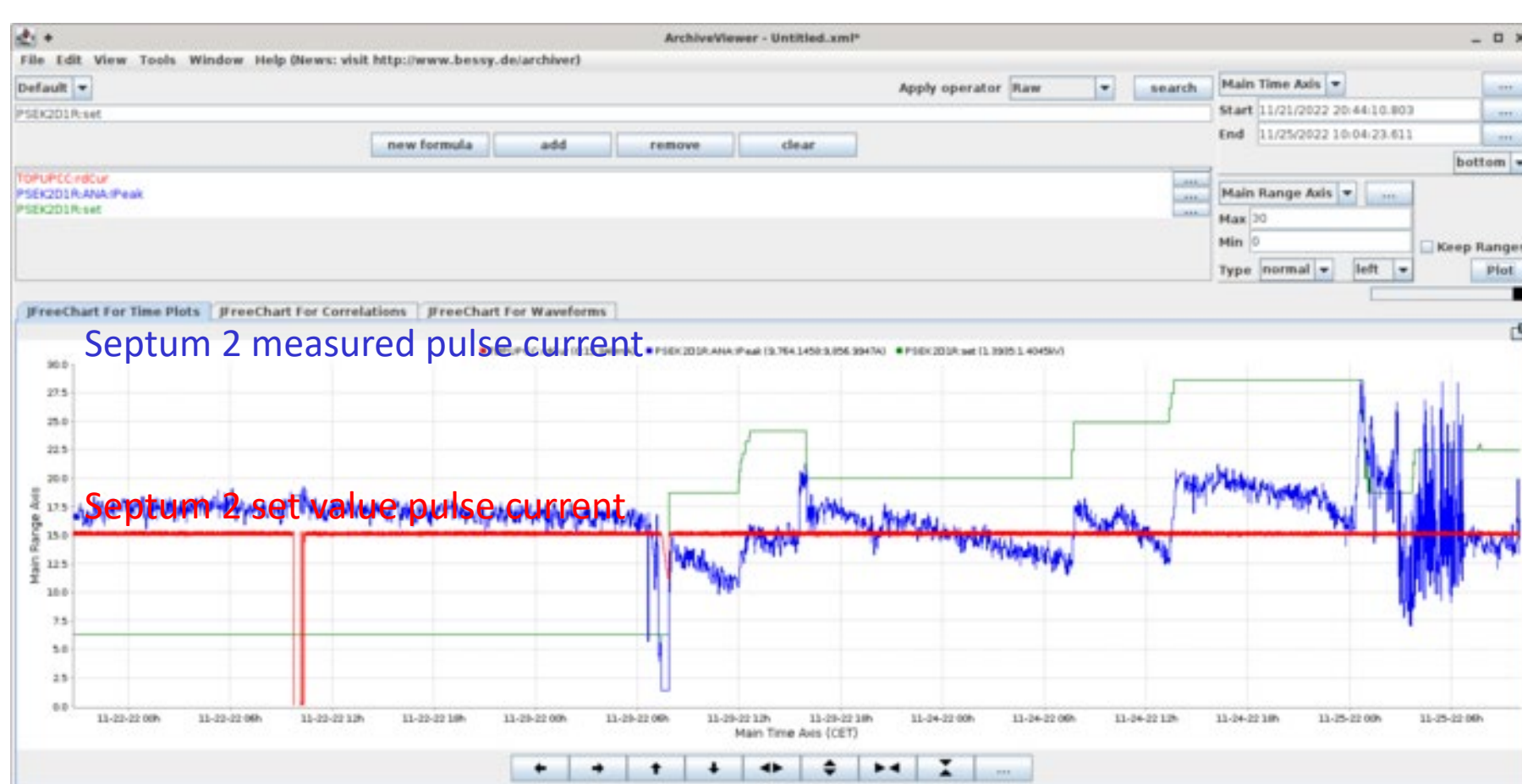
Employing a Full-Sine Septum Pulser Unit at BESSY II Storage Ring Injection

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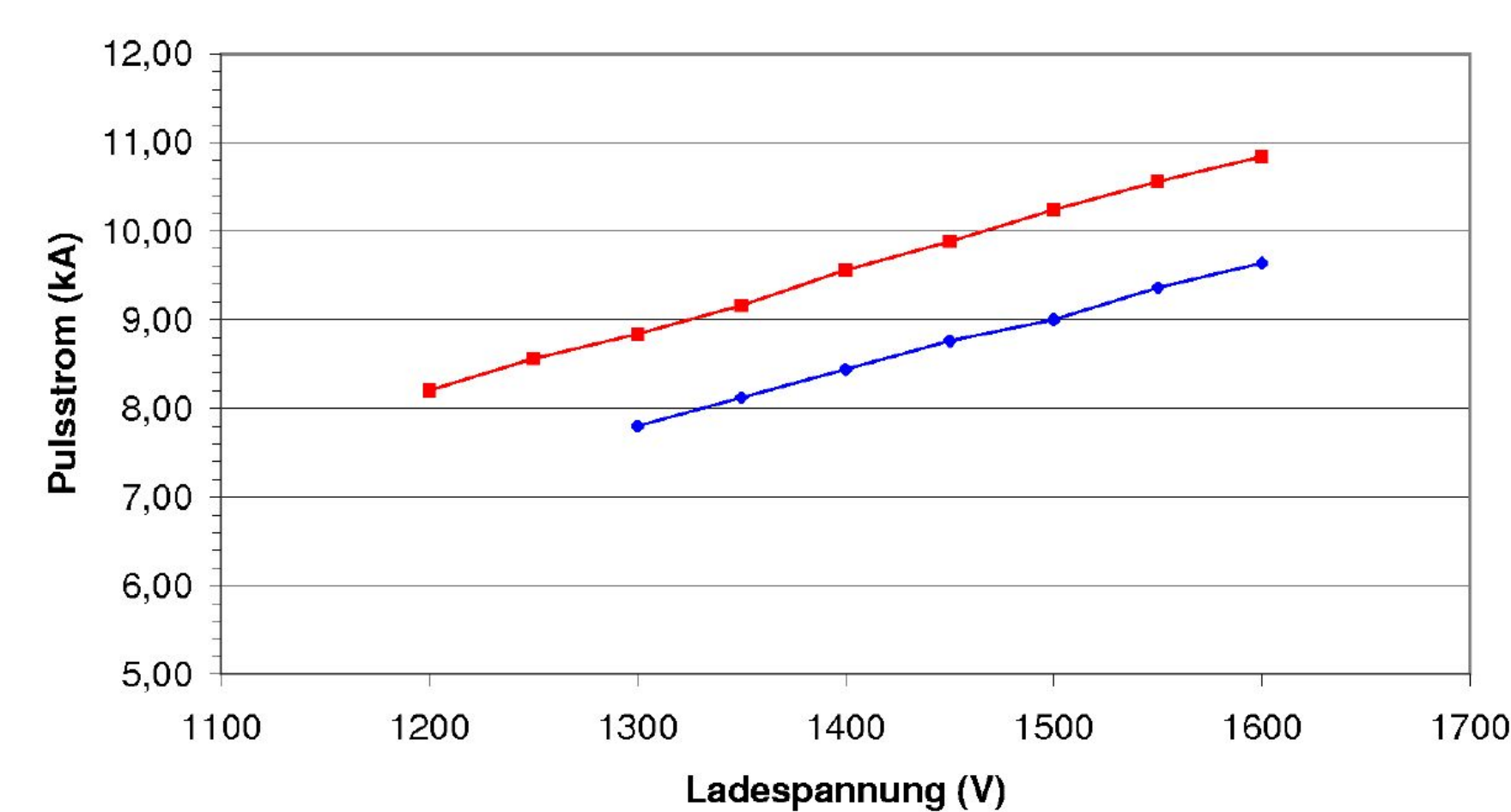
ABSTRACT: Since the BESSY II project was carried out successfully two half-sine septum pulsers are deployed permanently to power the both similar independent septa magnets. Two additional pulser units are in stock as spare parts. Recently, instabilities of the output pulse currents were observed. The Poster describes the fault finding process within the four available pulser units and the mitigation of the technical shortcomings.

MOTIVATION

Pulse current instabilities were discovered in accelerator operations.

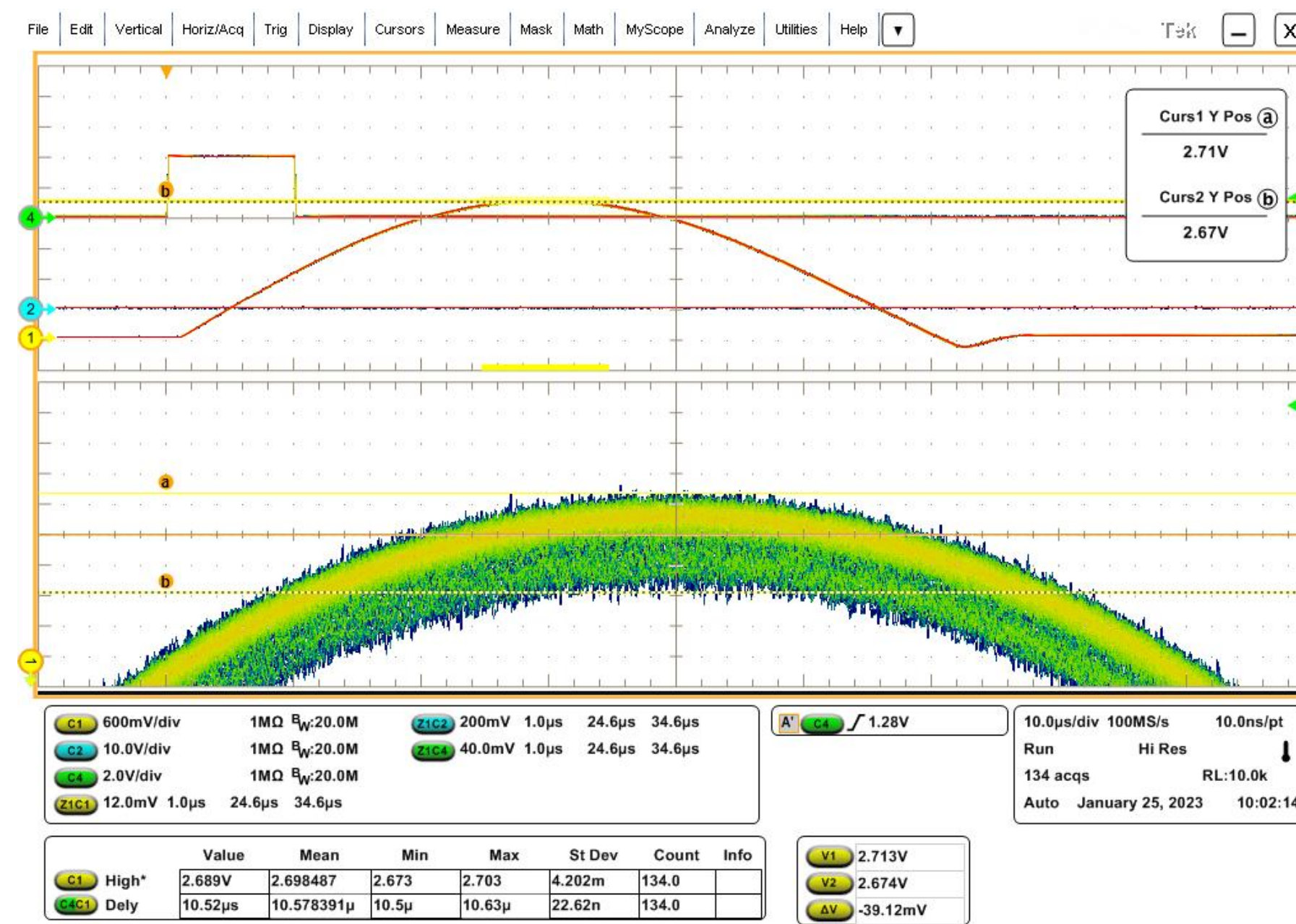


This diagram shows the linearity of the generated pulse currents compared to the charging voltage for two capacitor banks of different sizes. The original capacitor bank with 19 capacitors with a size of 5 μF , a total of 95 μF , was expanded to 24 capacitors with 5 μF , a total of 120 μF in order to achieve the required pulsed current amplitudes.



METHODS

Measurements in laboratory environment to confirm observations.

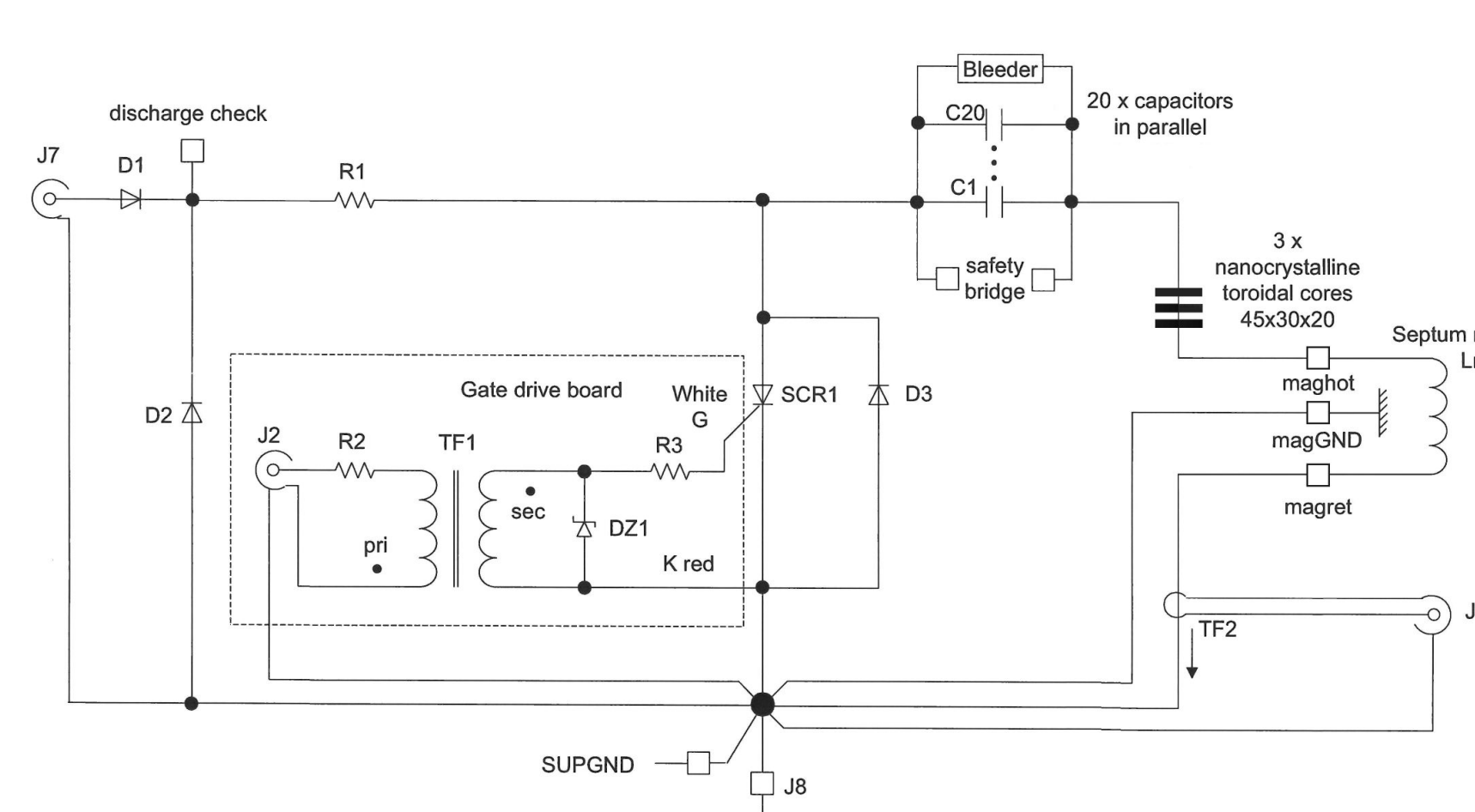


The image of the long-term measurement shows the deviations in the measured pulse current amplitude. Upon closer examination of the internal structure of the pulser unit, a faulty contact was identified as the reason.



Outlook - Stray field and Eddy Current reduction

Conversion to a full-wave pulser to suppress eddy current effects in septum rail.
Septum stray field reduction by further improvement of septum magnet design, e.g. additional Mu-metal shield.



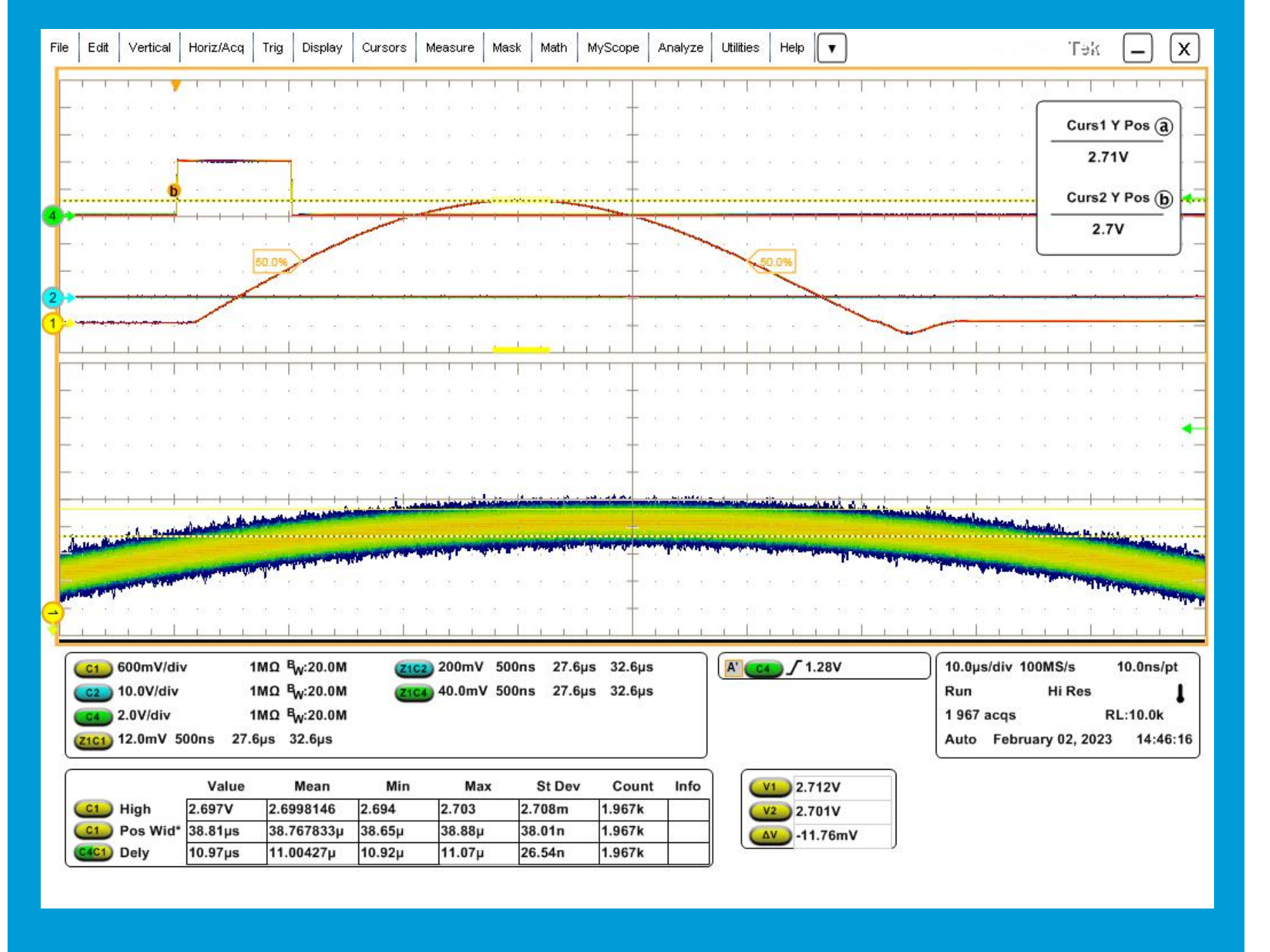
RESULTS

The use of an aluminum busbar proved to be unsuitable for long-term operation. In order to keep the repair manageable, the spare parts were made of brass and the flexible connection lead to the septum magnet was soldered into copper sheet for better contact.



CONCLUSION

The long-term measurement in the laboratory showed a significant improvement in the measured pulse current stability. The specified pulse current stability can be achieved and guaranteed again. The pulser renewal work continues with the knowledge gained. With new pulser units, these current-carrying parts will no longer be made of aluminum.



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- J. Feikes, O. Dressler, "Operational experiences with the BESSY II injection system", proceedings of the PAC99, p. 1279, New York, NY, U.S.A., 1999.
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