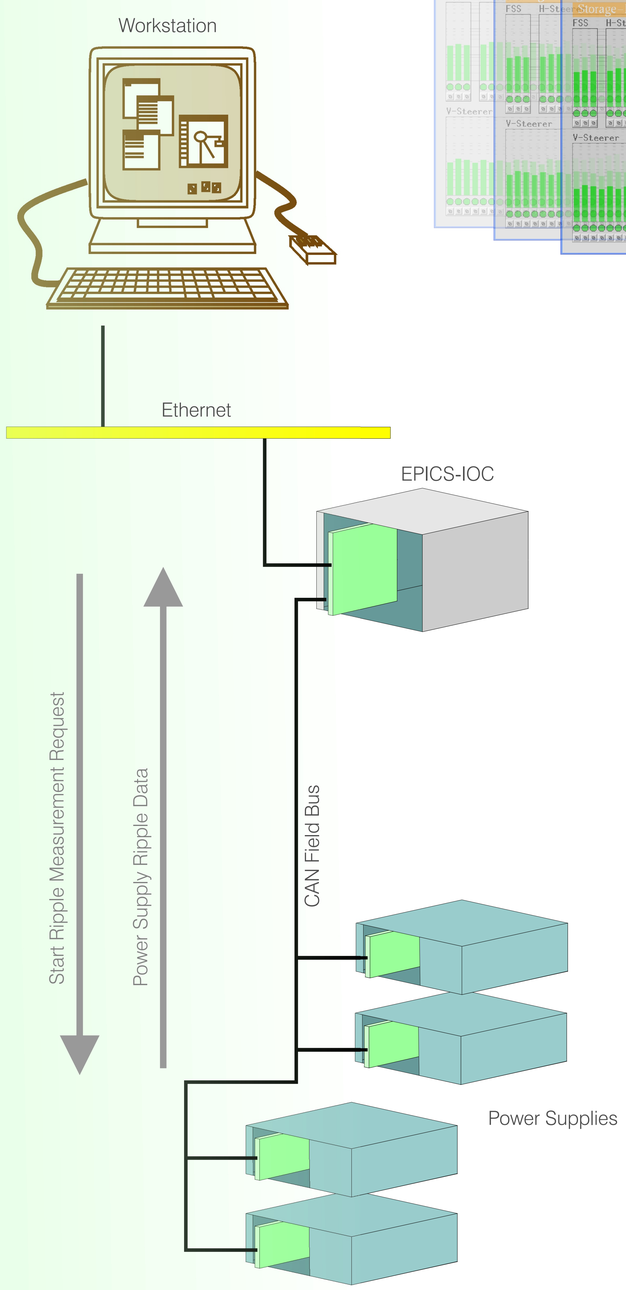
BESSY
Berliner Elektronenspeicherring-Gesellschaft
für Synchrotronstrahlung m.b.H.

Ripple Diagnostic on BESSY Power Supplies

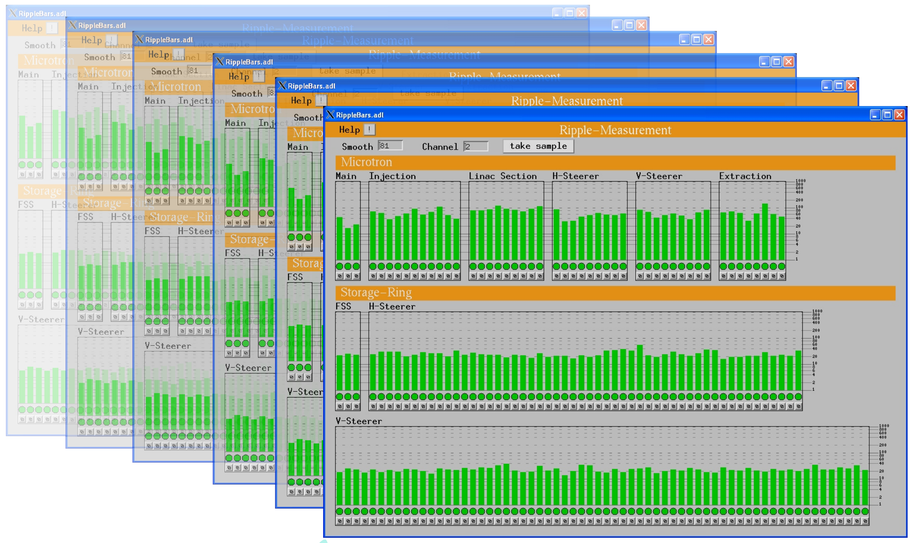
A Method for Supervison without Complex Measurement

Physical Layout



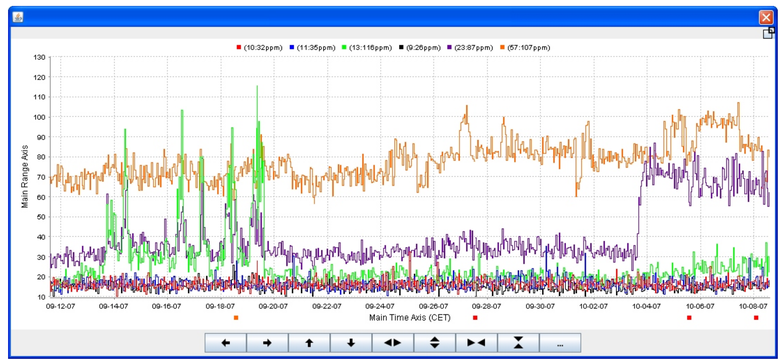
Power supply output ripple values are measured with a fast AD converter on the interface cards inside the power supplies. A CAN trigger object starts the ripple measurement. After an internal signal processing, the power supplies transmit their measured and calculated values over the CAN bus to the Input Output Controller(IOC) which makes them available over ethernet.

Data Handling



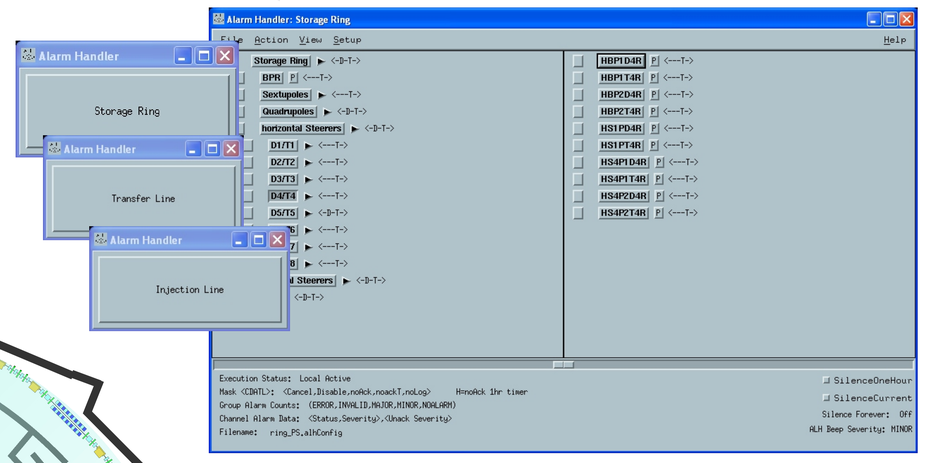
Ripple Information Main Window

Supervision of the power supply ripple behaviour by cyclic measurements and colored visualisation of increased ripple values



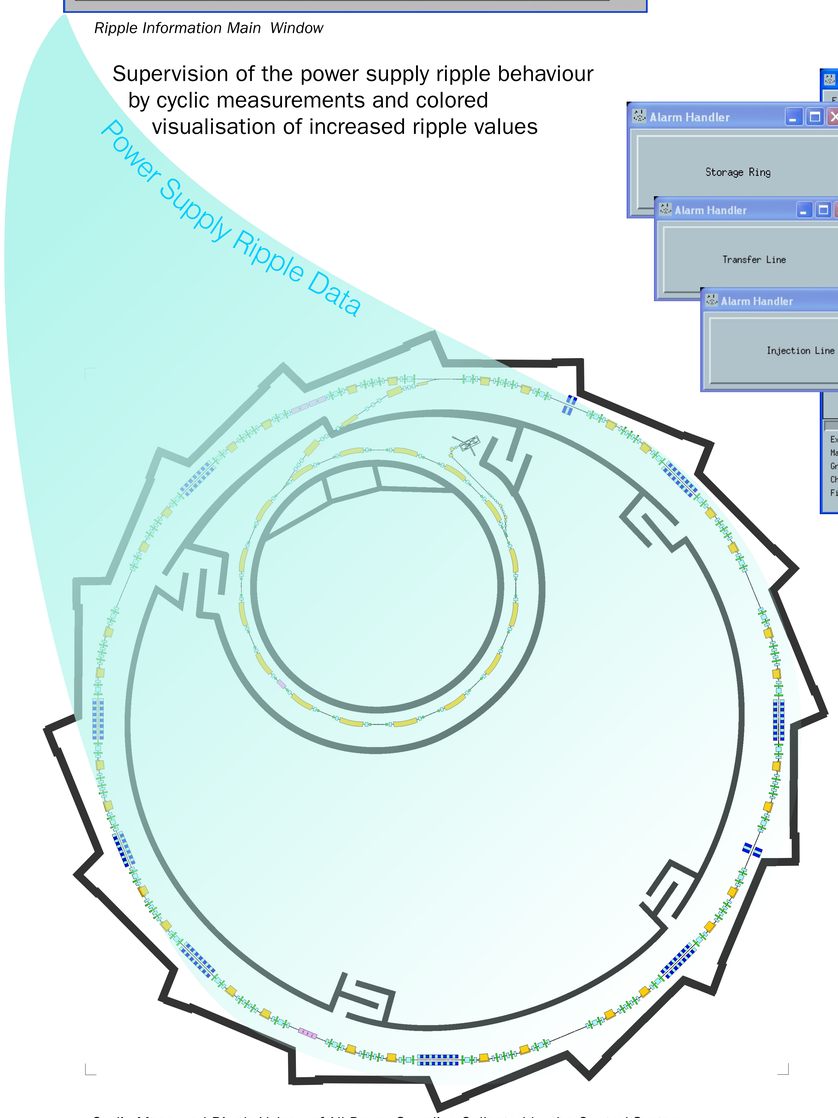
Archiver Window with Ripple Values of 5 Power Supplies

Archiving of power supply output ripple values supports the detection of temporarily and long term increasing ripple values. This is a method to detect defective power supplies or aged and malfunctioning electronic devices without complex measurement methods.



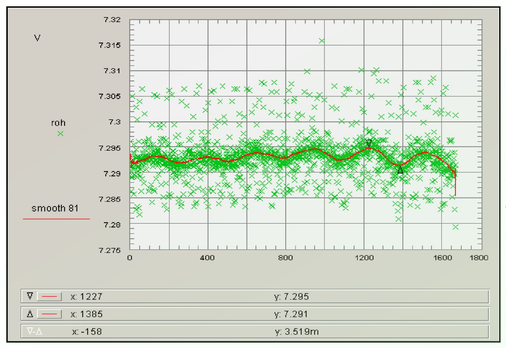
Alarmhandler Window for Ripple Alarm Tracking

The alarm handler is configured to notify operator and device responsible staff about ripples exceeding a predefined limit.



Cyclic Measured Ripple Values of All Power Supplies Collected by the Control System

Ripple Measurement Result on a Single Power Supply



The interface cards in the power supplies include an additional fast AD converter. This AD converter performs 1670 measurements during one period of the mains voltage (20ms). This is equal to a sampling rate of 83.5 kHz. The green crosses represent the individual measurements, the red line shows the smoothed values. Smooth 81 means that the average determination of every smoothed value uses a count of 40 values before and of 40 values after this value for calculation. The black markers difference is the transmitted ripple value. The smooth factor is adjustable and is transmitted together with the ripple measurement start command.

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