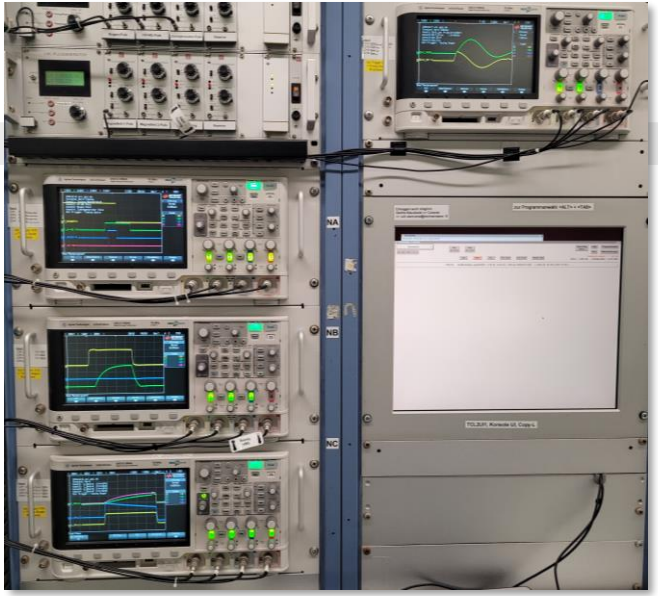
Modernisierung HKR UNILAC

Quellenoszilloskope

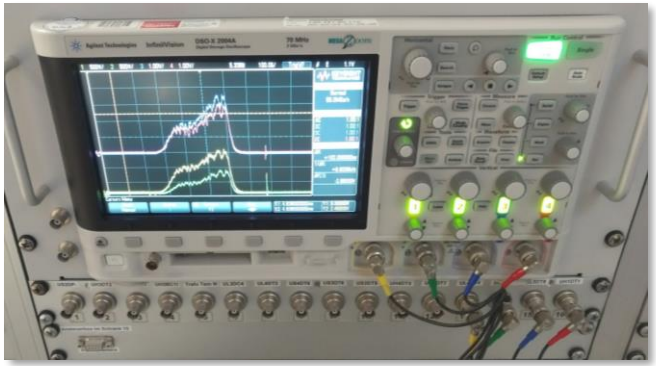
Present status

- To operate an ion source it is necessary to observe a temporal structure of pulses from different IS-devices and beam diagnostics
- All necessary signals are in LSB1
- Most important signals are transferred to HKR as analog signals
- In the new MCR in FCC analog signals are not foreseen
- ***A solution for ion source signals is required***

LSB1:

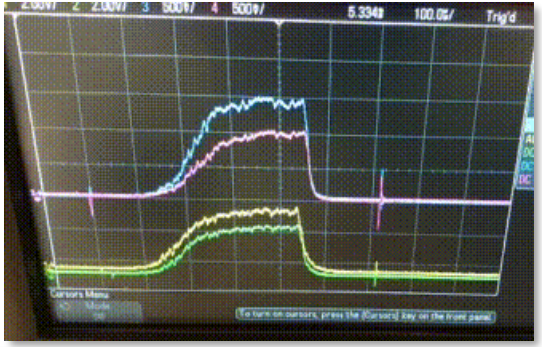


HKR:

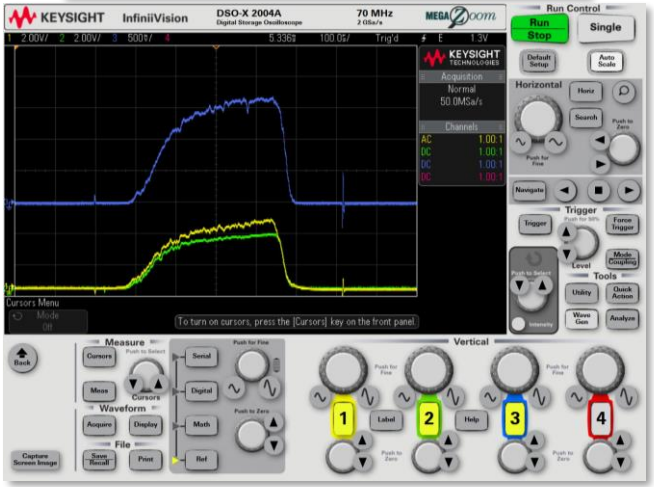


Concept of solution

- Most important for IS-operation signals that has to be observed with rate > 1 Hz should be **digitized**

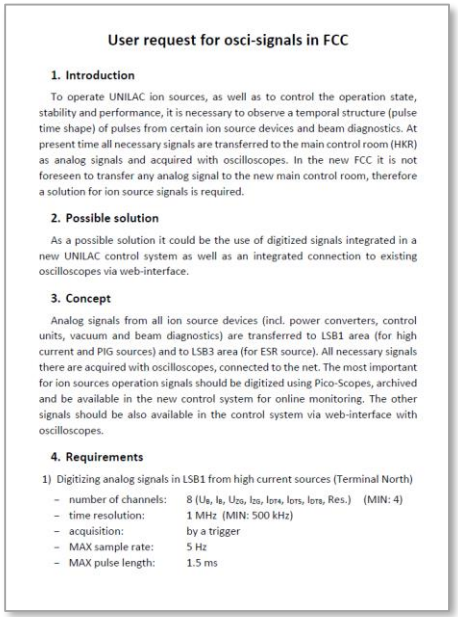


- All other signals acquired with oscilliscopes on LSB1 could be accessed via **Web-interface** (limited by ~1 Hz)



Requirements for digitizing

- High current ion sources (Ter. North)
  - Number of channels: 8 (MIN: 4)
  - Time resolution of signal: 1 µs => 1 MHz (MIN: 500 kHz)
  - Acquisition: by a trigger (every shot)
  - MAX sample rate: 5 Hz
  - MAX pulse length of signal: 1.5 ms
- PIG ion sources (Ter. South)
  - Number of channels: 8
  - Time resolution of signal: 1 µs => 1 MHz (MIN: 500 kHz)
  - Acquisition: 5 Hz synchronized with UNILAC
  - MAX sample rate: 5 Hz
  - MAX pulse length of signal: 7 ms



User request for osci-signals in FCC

1. Introduction

To operate UNILAC ion sources, as well as to control the operation state, stability and performance, it is necessary to observe a temporal structure (pulse time shape) of pulses from certain ion source devices and beam diagnostics. At present time all necessary signals are transferred to the main control room (HKR) as analog signals and acquired with oscilloscopes. In the new FCC it is not foreseen to transfer any analog signal to the new main control room, therefore a solution for ion source signals is required.

2. Possible solution

As a possible solution it could be the use of digitized signals integrated in a new UNILAC control system as well as an integrated connection to existing oscilloscopes via web-interface.

3. Concept

Analog signals from all ion source devices (incl. power converters, control units, vacuum and beam diagnostics) are transferred to LSB1 area (for high current and PIG sources) and to LSB3 area (for ESR source). All necessary signals there are acquired with oscilloscopes, connected to the net. The most important for ion sources operation signals should be digitized using Pico-Scopes, archived and be available in the new control system for online monitoring. The other signals should be also available in the control system via web-interface with oscilloscopes.

4. Requirements

1) Digitizing analog signals in LSB1 from high current sources (Terminal North)
   - number of channels: 8 (U_B, I_B, U_{2S}, I_{2S}, I_{OT4}, I_{OT5}, I_{OT8}, Res.) (MIN: 4)
   - time resolution: 1 MHz (MIN: 500 kHz)
   - acquisition: by a trigger
   - MAX sample rate: 5 Hz
   - MAX pulse length: 1.5 ms

Further requirements

- Archiving digitized signals
  - Option of **Enable / Disable** archiving for each channel

- Integration in control system
  - User interface for online monitoring
  - User interface for working with archived data
  - Links for oscis web-interface in App Launcher