Control System for the WS Beam Line and Two-arm Spectrometers

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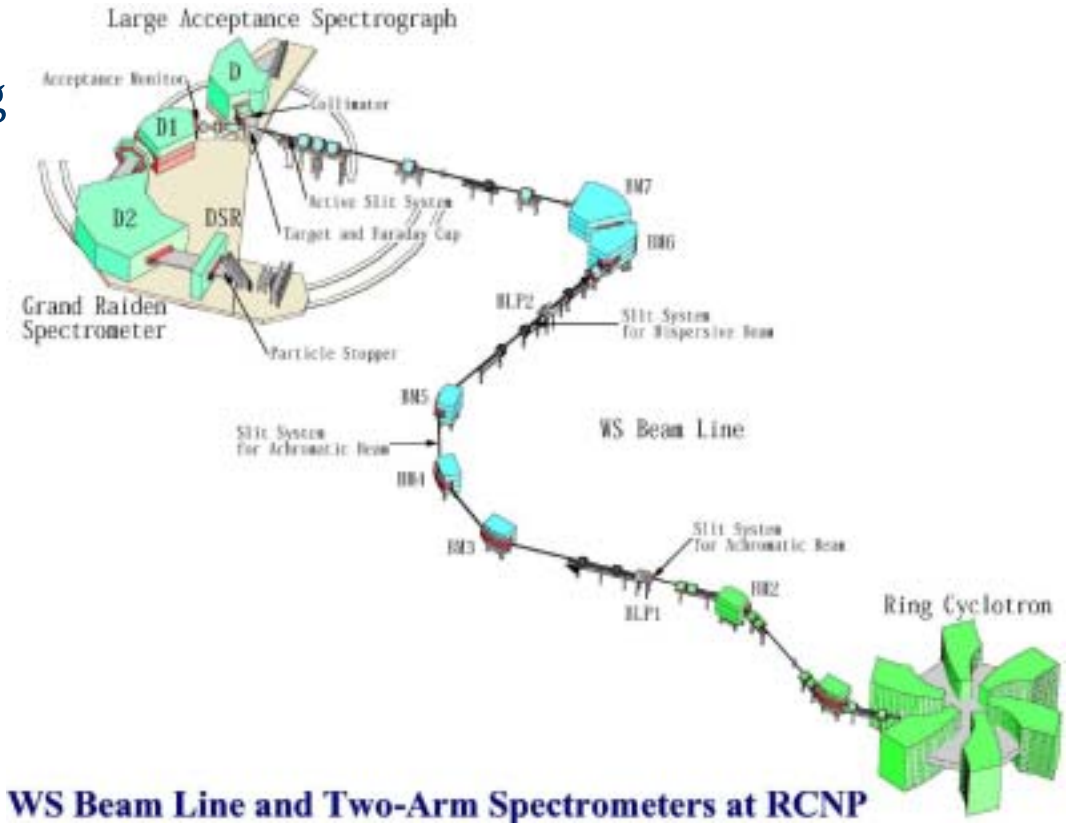
Collaborators

- Constructors
  - Y. Sakemi (Manager)
  - M. Uraki (Hardware)
  - T. Wakasa (Software)
- Advisers
  - K. Nagayama (PS, NMR)
  - Y. Inata (SCU)
  - K. Tamura (TCP/IP)
  - K. Hatanaka

WS and Two-arm Spectrometers

- Slit Systems in WS
- Target & FC in Scattering Chamber
- Active Slit System in WS and Grand Raiden
- Particle Stopper
- Collimator for LAS
- Spectrometer Control
  - Power Supplies
  - Magnetmeters
    - NMR Probes
    - Hall Probes



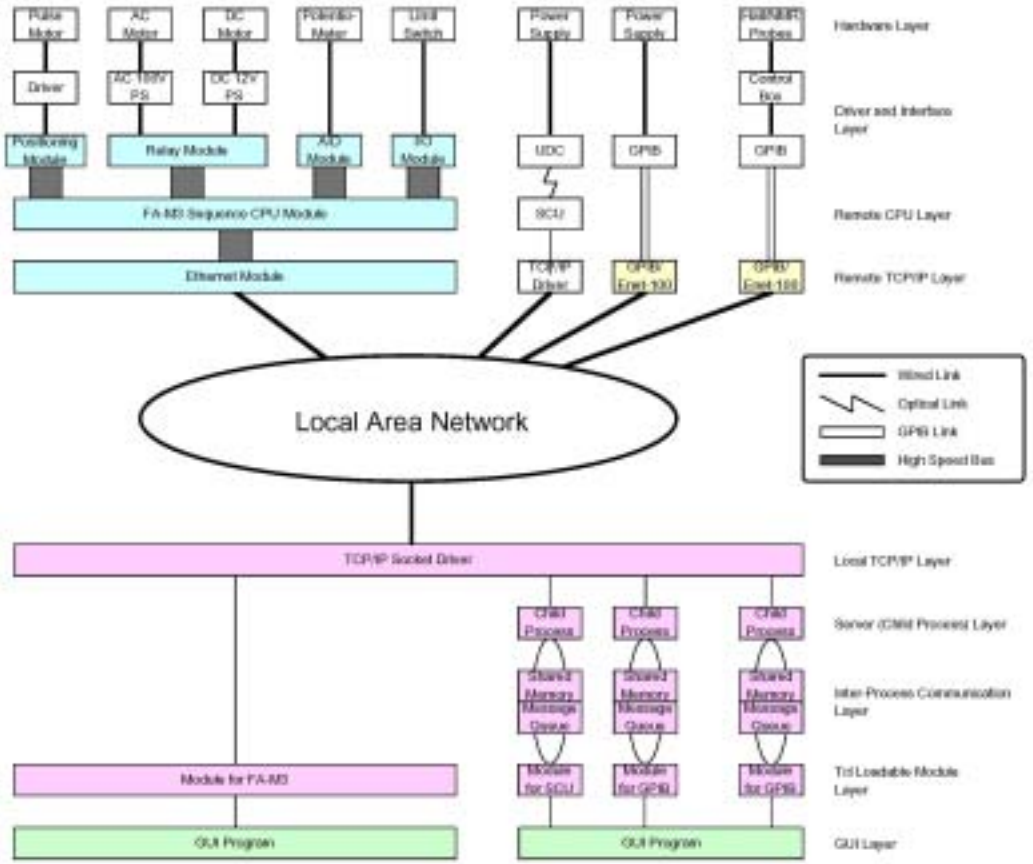
WS Beam Line and Two-Arm Spectrometers at RCNP

Requirements

- Stable and Reliable
  (Hardware (Radiation Damage) and Software)
- Flexibility and Scalability
- Open Software and Libraries
- High Performance Feedback System
- Network Capabilities
- Graphical User Interfaces (GUI)

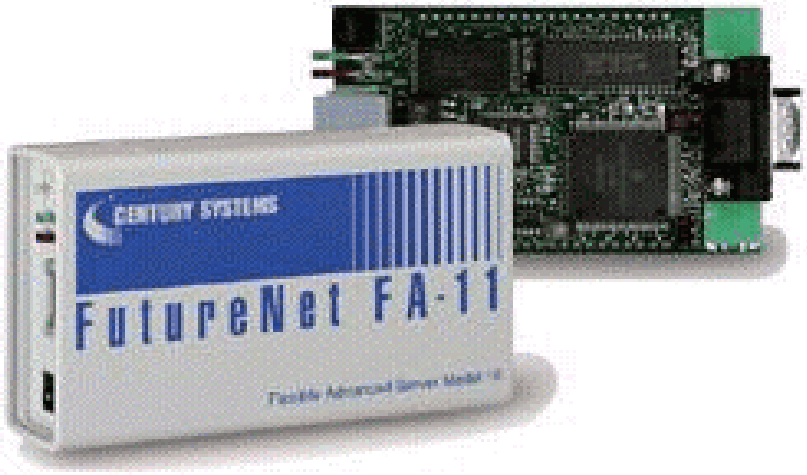
Layer Scheme of Control System

- Client/ Server system
- Shared Memory and Message Queue
- STAR Topology
- 100M LAN



Future Net FA-11
- *RS232 to Ethernet Interface* -

- Converter to connect RS232 instruments to the Ethernet (LAN)
- Up to 460 kbps
- Use for HV control (between the CAMAC Crate Controller and the Ethernet (LAN))
- LeCroy HV4032A and REPIC 32010



GUI for HV Control

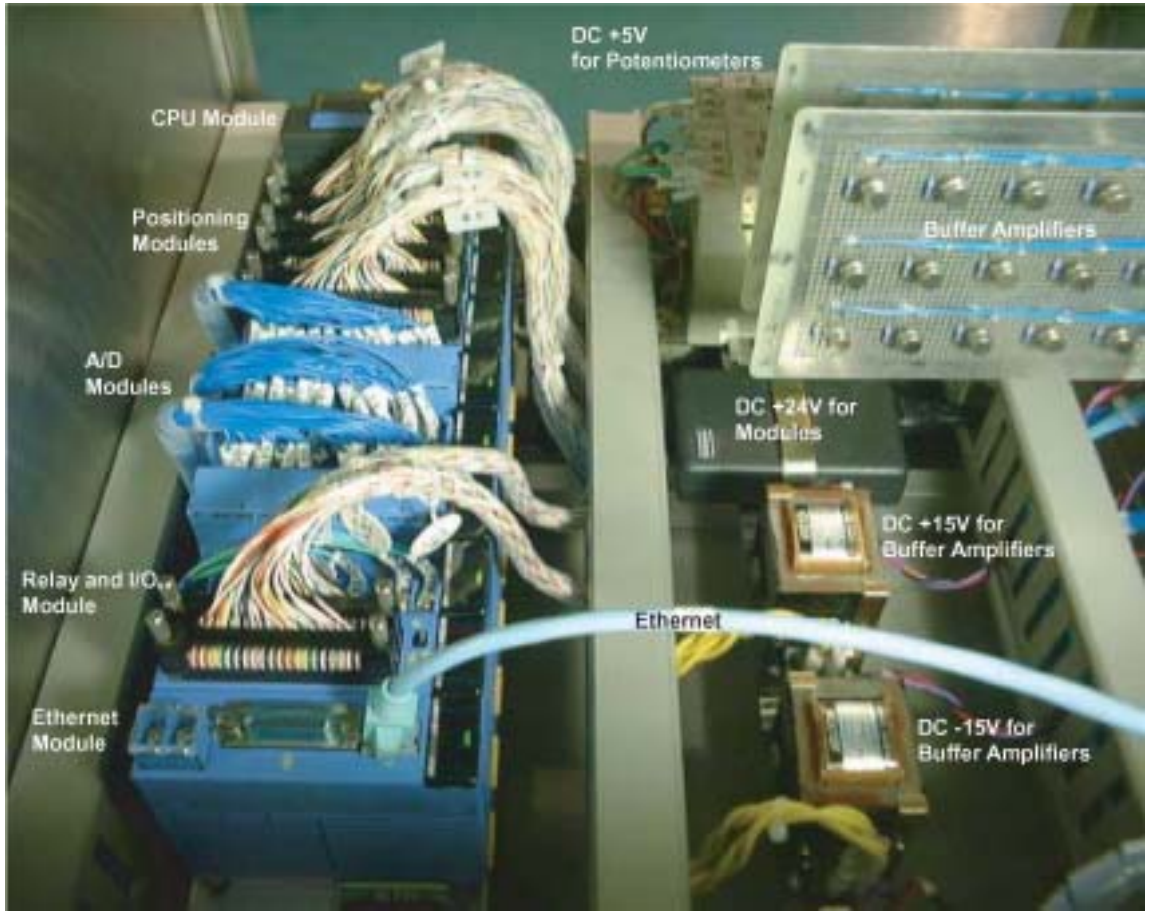
- GUI with Tcl/Tk
- Remote Control with X
- Control up to 16 Frames
- Data Load/Save
- Same Interface for HV4032A and RPH32010
- Special Thanks to Prof. H. Okamura

Yokogawa FA-M3
- *Motor Control Unit* -

- Fast
  - Calculates 20K steps in 1 ms
  - Minimum scan time is 200 micro-seconds
- Compact
  - Postcard size
  - Easy to protect from radiation damages
- Network Capabilities
  - Remote OME (Operation Maintenance and Engineering)

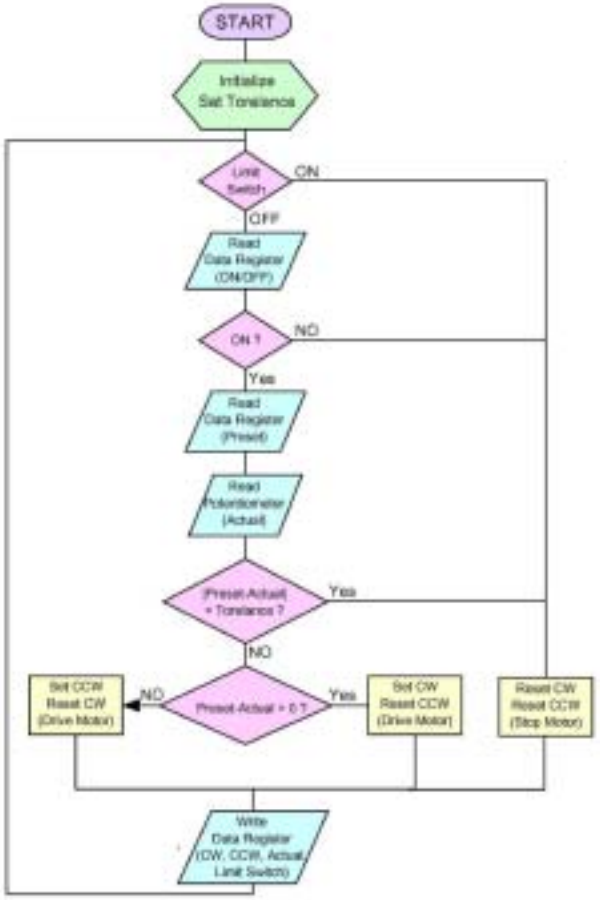
Motor Control Unit

- Assembled by M. Uraki
- Control 24 Pulse Motors
- Control 2 DC Motors
- Connected to the LAN



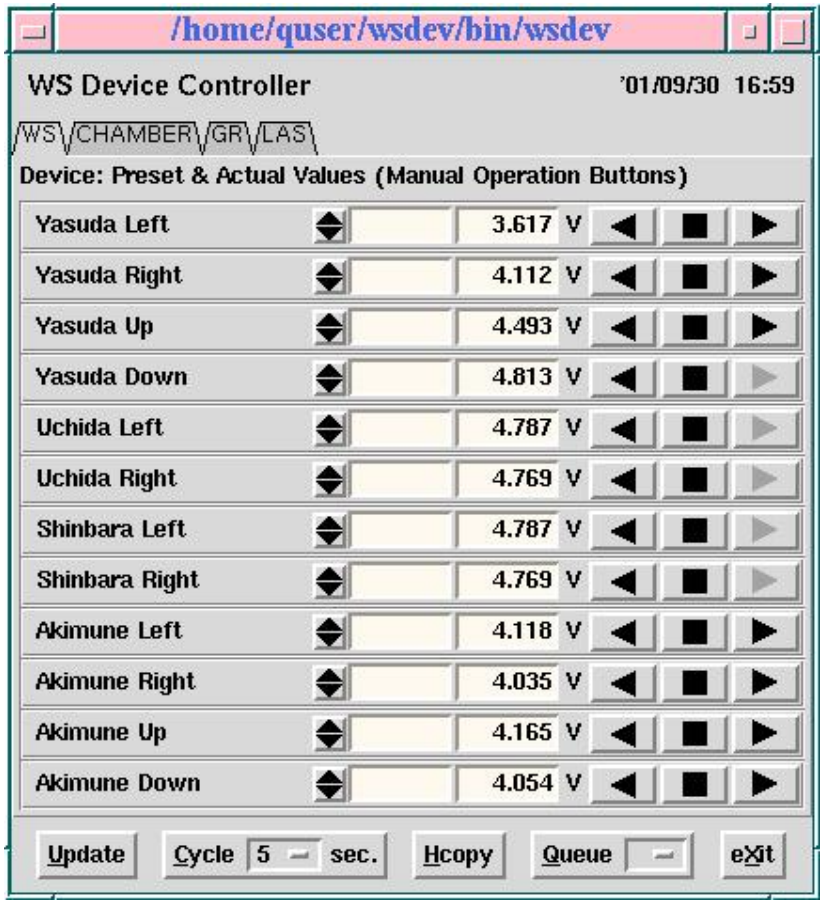
Flow Diagram of Motor Control

- 24 Pulse Motors for WS and Grand Raiden
- 2 DC Motors for FC
- 2 AC Motors for LAS
- 2 ms for scan
- Scalable and Flexible



GUI for Motor Control

- GUI with Tcl/Tk
- Remote Control with X
- Scalable and Flexible
- Special Thanks to Prof. H. Okamura

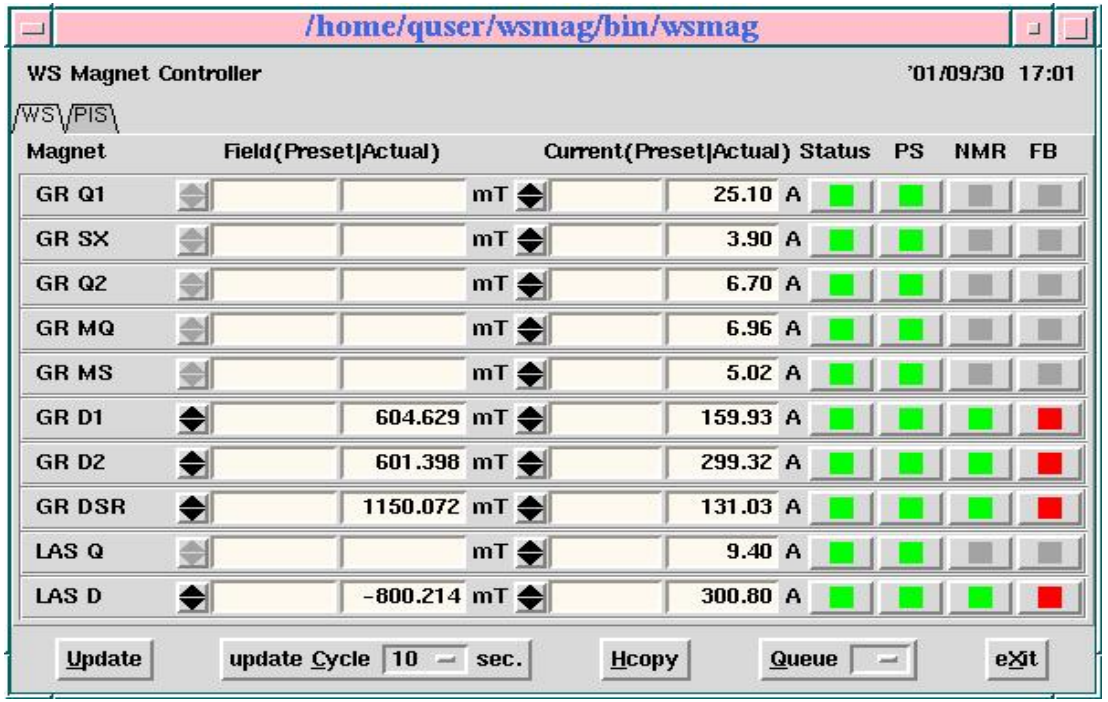


NI GPIB-Enet/100
- GPIB to Ethernet Interface -

- Configure and use easily
- Control GPIB through the network (LAN)
- Available Linux Driver
- Transfer data over 800 kB/s

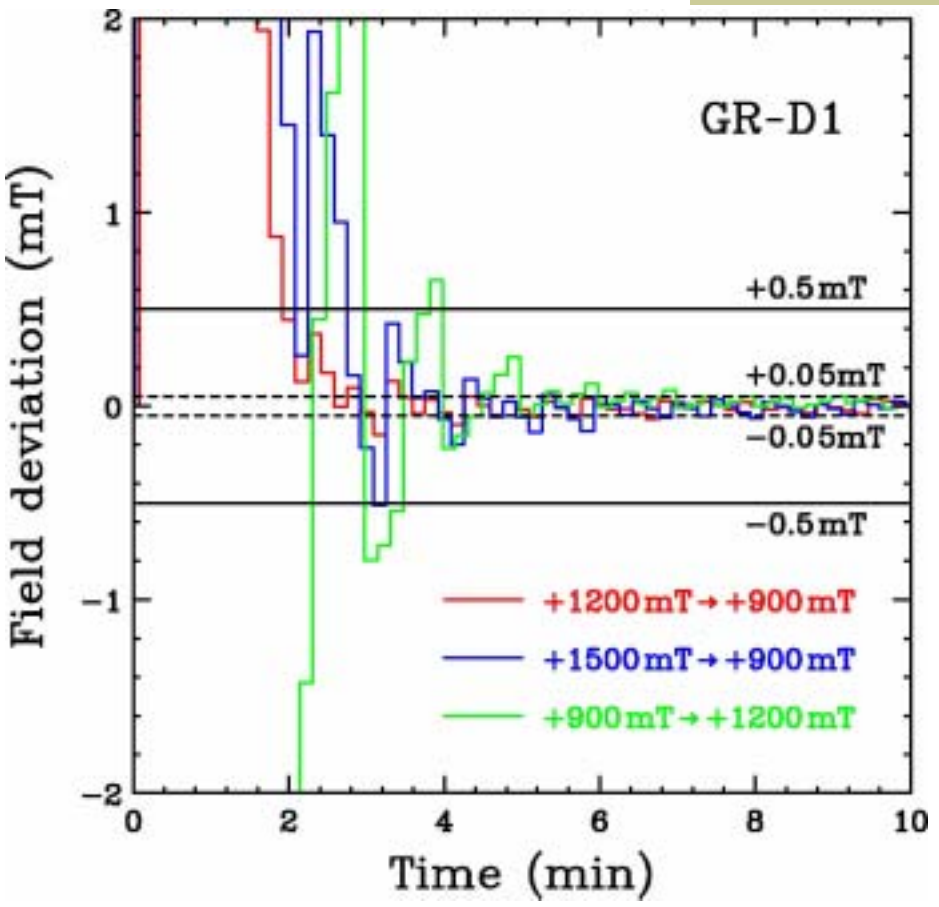
GUI for Spectrometer Control

- GUI with Tcl/Tk
- Remote Control with X
- Both Field and Current Settings are available
- PID Feedback System is implemented
- Special Thanks to Prof. H. Okamura



PID Feedback System

- Supervised by K. Nagayama
- PID Algorithm
- Set magnetic field within 0.05 mT after 5 minutes
- Keep magnetic field within 0.02 mT after 10 minutes



Summary

- ✓ Stable and Reliable
- ✓ Flexible and Scalable
- ✓ Open Software and Libraries with C and Tcl/Tk languages
- ✓ High Performance Feedback System based on a PID Algorithm
- ✓ Remote Control through the LAN
- ✓ User Friendly GUI