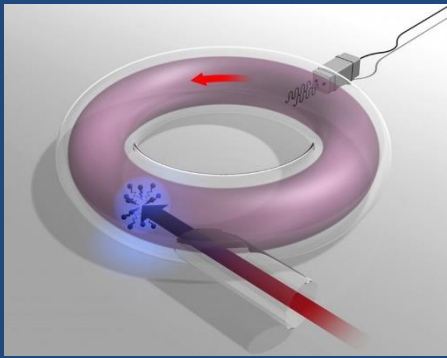




ION CYCLOTRON RESONANCE HEATING



About the Client

Client is an autonomous R&D organization of Government of India. institute is mainly involved in theoretical and experimental studies in plasma science & technology which include basic plasma physics, magnetically confined hot plasmas and plasma technologies for industrial application.

Summary

System should have 8 independent RF source having 2.5 MW power output at VSWR of 2.0 and Bandwidth of 2MHz and each source should be operated independently as well as in slave mode with synchronization with central control system of the Client, also it should be operated continuously at the specified performance with maximum reliability and for same Local Control Unit (LCU) is required.

The Challenge

Development of Local Control Unit (LCU) for R&D unit to prove the technical feasibility of achieving the integrated performance of the RF source as per the specification. It consist of:

- Sequence control unit and safety system based on PLC
- Real time control loop having loop time of 20 μ s to 200 μ s
- Interlock system having response time of 3-5 μ s
- Data acquisition with Real time visualisation

Our Solution

- Fast interlock with status acquisition at the rate of 1 μ s and having response time of 3-5 μ s
- PLC based Remote sequence control, setting and status logging system
- Data Logging with four level alarm and online display of selected cooling channel which requires slow acquisition
- Acquisition of different selected parameters at medium (1-10ms) and fast (1 μ s) rate

INDUSTRY

Research &
Development

KEY CHALLENGES

- High speed Interlocking system
- Control loop execution time less than 200 μ s

SOLUTION

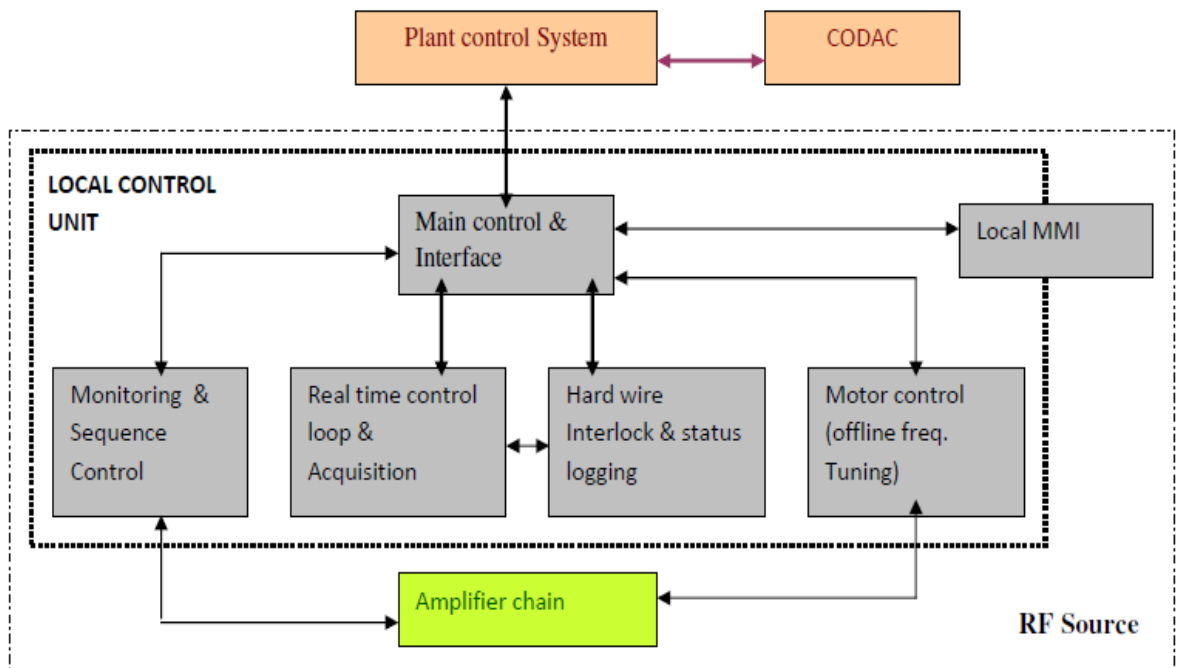
- Real time control loop having loop time of 20 μ s - 200 μ s
- Real time control loop for Power Regulations

Benefits

- PXI based Off line analysis facility
- On line display of selected channel and off line analysis facility for these channels



- Development of Signal processing card as per standard (I/O optical Tx/Rx card)
- Development of RF signal processing card and FPGA based card as per standard



Rack of metal frame and fulfil the IEC standard for electronic cabinet

- Real time control system: One complete system
- PLC system: One complete system
- Data logger for 48 cooling channels
- Signal Processing card :
- Analog I/P (optical Rx) + Analog o/p (optical Tx)
- Analog i/p: Rx & Tx card, Analog I/P (optical Rx) & Analog o/p(optical Tx)
- Optical Tx/Rx card for Digital i/p + 4Digital o/p and counterpart
- RF Amp/phase detection module (FPGA based)





IEC Standards

IEC	Tech Committee	Title
61000	TC77	Electromagnetic compatibility
61010	TC66	Safety requirement for electrical equipment for measurement & Control for laboratory use
60801	SC65A	EMC for Industrial process measurement and control equipment
61131	SC65B	Programmable controller
60728	SC12G	Cable distribution system
60300	TC 56	Reliability and Maintainability management
60529	TC70	Degree of protection provided by enclosure
61140	TC64	Protection against electric shock. Common aspects for Installation & Equipment
60038	TC8	IEC standard Voltage
60059	TC8	IEC standard current rating
60050	TC1	International Electro technical Vocabulary

Benefits

- High precision and High accuracy design
- Rugged and reliable system design
- EMI/EMC compliance design

Our Value Addition

- On line monitoring of channels
- Off line Analysis of channels
- All statutory complied system design