

VME BASED REAL TIME DATA ACQUISITION AND CONTROL SYSTEM FOR SST-1 ICRH TRANSMISSION LINE

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The VME based Data Acquisition and Control system is commissioned for remote operation of SST-1 Ion Cyclotron Resonance Heating (ICRH) transmission line system. The transmission line consists of (a) a pressurized 9 inch 50 ohm coaxial line, (b) matching systems at two different time scales and (c) vacuum transmission line called interface, linking the transmission line to the fast wave antennae. One single line transmits the power from the RF generator to the two antenna boxes placed at diametrically opposite radial ports. A high power 3dB hybrid coupler is used to split the power at 22 - 25 MHz, 45.6 MHz and 91.2 MHz for the two transmission line arms. Each transmission line arm has 24 voltage probes, motorized automatic matching network (in ms) and course tuner (in s). Automatic matching network consists of two stubs coupled with stepper motor and two nos. of vacuum variable capacitors coupled with high-speed servomotor. Motorized course tuner consists of one phase shifter and one stub.

The VME based system for monitoring and control is a power PC-604 processor based. The 24 probe signals from RF detector of each arm of transmission line is processed through the signal conditioning rack and connected to VME compatible VGD4 card which is used to digitize the analog I/P signal in $\sim 100 \mu\text{s}$ timescale. The application software at VME side acquires the signals. To match the antenna impedance to the generator impedance, required parameters, VSWR and error signals are calculated and control signals are generated through VME digital I/O card (VMIVME-2528) for motor driver/controllers. The Carrier Board AVME 9660 with timer card IP-480 is used for generating different timing pulses and sequences.

The real time controlling application software modules are developed on the VME hardware on Vxwork RTOS Tornado environment in C++ with networking and Board Support Package libraries. The Graphical User Interface is developed in Tcl/TK on Linux platform on PC for online monitoring and interactive control. The acquired data is archived on Network file system based binary files on Database Server.

Transmission line system is powered from RF generator and functional requirement for the system has been checked with actual antenna load. In this paper, a detailed study of performance of transmission line system in presence of VME will be presented.