

## §7. New Remote Control System for Potential Depressed Collector Gyrotron in Local Area Network

Idei, H.  
Naha, H., Suzuki, Y. (TOSHIBA)

Power supplies of collector, body, anode, heater, and magnetic coil parts are required to operate a potential depressed collector gyrotron. The equipments are controlled with Programmable Logic Controller(PLC). The PLC communicates with a Personal Computer using User Datagram Protocol(UDP). UNIX Operating System(OS) is adopted for the PC. Power supplies and PLC are located at Heating Equipment Room in LHD main building. The PC is located at RF Control Room and used to control all equipments remotely. This control system was designed and produced by the manufacture of the power supplies, TOSHIBA.

For LHD experiments, three collector power supplies have been prepared. The operation parameters for each power supply can be set up separately. To operate the gyrotron safely without arcing, an aging process is necessary. Occasionally, one collector power supply is used for the LHD experiment, and the others are operated in the aging process. The operation using one TOSHIBA PC confuses us in these cases. Graphical User Interface(GUI) should be designed and produced for each power supply. A NIFS workstation whose OS is UNIX is prepared for new remote system of TOSHIBA power supplies in Local Area Network(LAN). Figure 1 shows relationship among the workstation, the TOSHIBA PC and the other terminals in the LAN.

The outline of the new remote control system is illustrated in Fig.2. A TCP server process is newly installed to communicate with the NIFS workstation in the TOSHIBA PC. In the workstation, a TCP client process and 3 GUI parts in X-Window System are designed and produced. Figure 3 shows operation panels of the new remote application. A radio switch, that is selected whether setup from the NIFS workstation is allowed or not, is made in the TOSHIBA

PC. Since we adopt the X-Window system, control or operation is available, not only Heating Equipment Room but also LHD Control Room. The LHD Man-machine Interface System(LMS) takes an operation log and requests to set parameters, of the ECH operating system. The communication with the LMS workstation have been satisfied in the new remote system, together with the another ECH remote control system. We were able to take a operation log for about 1000 shots in the LHD experiments during 2nd experimental campaign.

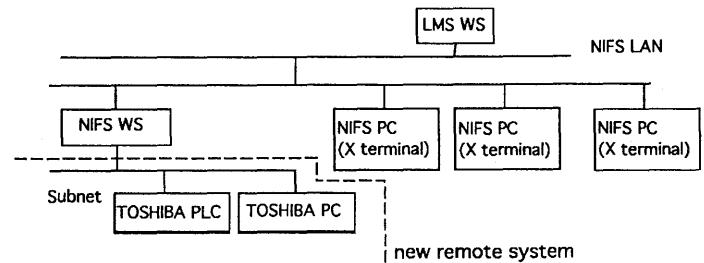


Figure 1. Relationship between NIFS workstation, TOSHIBA PC, LMS workstation and the other terminal in LAN.

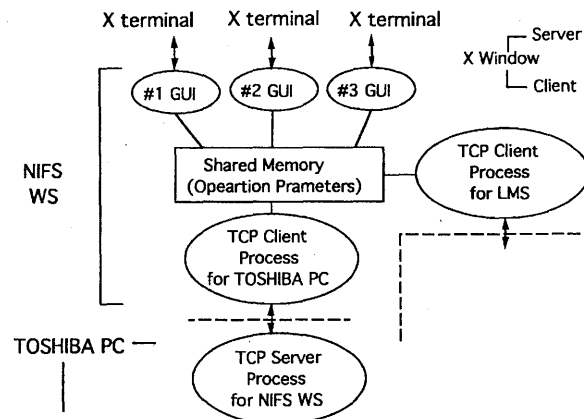


Figure 2. Application outline of the new remote control system.

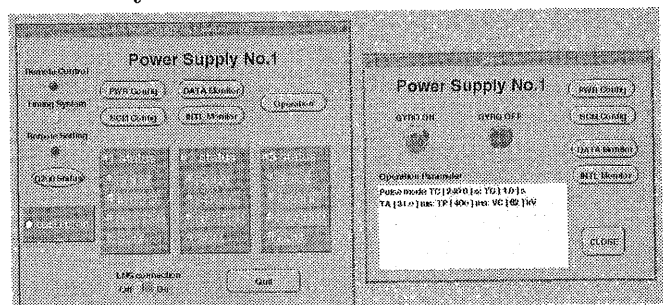


Figure 3. Operation panels of the new remote application.