

A.3: Test and simulation setup for Indus control system (TASSICS)

Indus-1 and Indus-2 Synchrotron Radiation Sources (SRS) are national facilities which operate on round the clock basis for researchers from all across the country. The control systems of Indus-1 and Indus-2 have two-layered and three-layered architecture, respectively. In both the systems, Layer-1 (L-1) has servers and PCs, running SCADA applications. Layer-2 (L-2) and Layer-3 (L-3) are primarily based on system bus standards known as Versa-Module Eurocard i.e. VME. Communication between L-1 and L-2 is over Ethernet and between L-2 and L-3 is over PROFIBUS. To test the software and hardware schemes of various sub-systems of these control systems, a VME based three-layer Test and Simulation Setup for Indus Control System, abbreviated as TASSICS, has been developed. This setup can be used to test new developments as well as modifications and enhancements in the existing control systems before deploying them in the field.

Layer-2 and Layer-3 VME infrastructure: There are two 19” VME racks which house two L-2 and five L-3 VME stations (Figure A.3.1).



Fig. A.3.1: VME racks with L-2 and L-3 stations.

These stations are equipped with CPU boards, analog and digital input and output boards, PROFIBUS communication boards and cables. Test jigs are also developed for simulating the analog and digital inputs. Latching modules have also been installed in the rack to latch the momentary digital output signal to be readback by digital input boards.

Engineering station: An engineering station has been prepared for L-2 and L-3 related developments and testing (Figure A.3.2). This station has a PC with required IDE software, EPROM programmer and EPROM Eraser.

There is also an 8-port multi-serial module, using which we can access communication ports of CPU boards, control program execution and can also see the debug information printed by CPUs.



Fig. A.3.2: L-2 and L-3 engineering station.

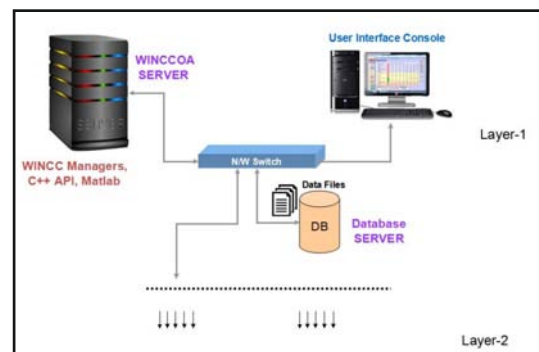


Fig. A.3.3: Client server architecture at Layer-1.



Fig. A.3.4: GUI on user console during testing.

SCADA Setup at Layer-1: Figure A.3.3 shows the client-server architecture implemented at Layer-1. There is a Windows 2008 R2 based server having installations of WinCC Open Architecture (WINCCOA) SCADA, Visual Studio, MATLAB, SQL Server Database and other utility software. For logging the data in the text file, data logging script has been written. These logged data can be used later for analysis. A general purpose database has been made in SQL server to log test data. SCADA's API manager communicates with L-2 and updates data-points with field data. Machine-data and alarm-data files that are generated, are logged in central database server. The user console accesses data on server and presents GUIs that are used during testing and simulation (Figure A.3.4).

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