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Web Enabled Embedded Devices using SNMP Technology for Real-Time Monitoring and Control Applications

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Abstract

Connecting other devices over the internet than just PCs is becoming a common place now. There are web enabled embedded devices almost everywhere. By combining the internet world to the embedded devices, it makes it much easier to be able to achieve the real-time data from across any location. This thesis aims to web - enable an embedded device, a power supply using a web interface. The development will be constituted with a combination of the correct product and the technology. The technology that we consider using for this project is the SNMPv1 protocol.

SNMP (Simple Network Management Protocol) is now a days the key enabling technology, while, with the development of embedded internet, manufacturers are required to “web-enable” the configuration and management of their products. Thus the integration of SNMP and Web in embedded devices will make products competitive.

The main task in achieving the aim was the programming and the communication between the power supply and the Lantronix Xport Pro device. The programming was done on the Linux environment for the Xport Pro device and then the integration for loading the web pages were done using a GUI software through FTP server. The majority of the work involved in this project was developing the correct data and making a stable communication link between the power supply and the Xport Pro device.

During the development process, several issues were encountered with the software as well as the Xport Pro devices. The loading of the software on these devices consumed most of the time as it kept on encountering faults which made the devices dead. However, with the help of the FTP server on the windows machine, it was much easier to connect the power supplies and re-load the software onto the Xport Pro software. Testing was the easiest task and real-time data was displayed on the web pages with no other faults.

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List of Abbreviations

ARP – Address Resolution Protocol

BCT – Battery Condition Test

CGI – Common Gateway Interface

COTS - Connection-Oriented Transport Services

CLTS - connectionless-mode Transport Service.

CLI – Common Line Interface

DHCP – Dynamic Host Configuration Protocol

DNS – Domain Name System

ECS- Embedded Computer System

EEPROM - Electrically Erasable Programmable Read-Only Memory

FTP – File Transfer Protocol

HTML – Hyper Text Markup Language

HTTP – Hyper Text Transfer Protocol

IP – Internet Protocol

ISO – International Organisation for Standardization

ICMP – Internet Control Message Protocol

LLC – Link Layer Control

LAN – Local Area Network

MAC – Media Access Control

MIB – Management Information Base

M2M – Machine to Machine

NMS – Network Management System

OID – Object Identifier

OSI – Open Systems Interconnection

PDA – Personal Digital Assistant

PC – Personal Computer

POP – Post Office Protocol

SNMP – Simple Network Management Protocol

SYSLOG – System log

SMTP – Simple Mail Transfer Protocol

SSL – Secure Socket Layer

SSH - Secure Socket Shell

PSU – Power Supply Unit

TCP – Transmission Control Protocol

UDP – User Datagram Protocol