بسم الله الرحمن الرحيم

قال تعالى:

﴿قَالُواْ سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَا مَا عَلَمْتَنَا إِنَكَ أَنْتَ اَلعَلِيمُ الحَكِيمُ﴾

صدق الله العظيم

[البقرة:]32

Dedication

To my parents

ACKNOWLEDGMENT

First, all praise is to Allah, the Almighty, who gave me the strength, and patience to carry out this work.

My gratitude to Sudan University of Science and Technology, and the Electrical Engineering Department, for their support.

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Finally, I would like to express my sincere gratitude to my mother for her continuous moral support, my father for his valuable comments, and for all family members and friends for their concern and encouragement.

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ABSTRACT

In controlling complex and large systems remotely always, there will be two units namely: Master control units and remote control units.

The first one known as master terminal units (MTU) which may be located away from the system under control, while the second unit known as remote terminal units (RTU) connected through I/O channel to the field device using the convenient voltage and current to control the device. The RTU work under the command coming from MTU using same protocols

For controlling the system between the MTU and device, compatibility is a must.

The problem under investigation is to analyze and evaluate how the MTU and device be made compatible through another media, which is RTU560. This device is a converter which combines the two protocols used for successful control.

الخلاصة

في انظمة التحكم الكبيرة والمعقدة التى يتم التحكم فيها عن بعد هناك وحدتان اساسيتان , وحدة التحكم الرئيسية و وحدة التحكم عن بعد .

الاولى تعرف بالوحدة الطرفية الرئيسية وهى تكون بعيدة عن المجال الذى يسلط علية التحكم . و الاخرى تعرف بالوحدة الطرفية للتحكم عن بعد. يتم الربط بينهما خلال قنوات دخل وخرج جهدية وتيارية .

الوحدة الطرفية للتحكم عن بعد تستقبل الاوامر وترسل الاشارات من و الى الوحدة الطرفية الرئيسية بواسطة مجموعة من القوانين تعرف بالبروتكولات .يجب ان تكون هناك موائمة بين الاجهزة الموجودة في الحقل والوحدة الطرفية الرئيسية .

في هذا البحث تم أستعراض وتحليل كيفية عمل نظام التحكم اذا كان هناك اختلاف في البروتكولات المستخدمة في النظام بين الاجهزة ووحدة التحكم الرئيسية خلال جهاز وسيط اخر هو

(RTU560) هذا الجهاز يعمل علي الموائمة بين البروتوكلين لإنجاح عملية التحكم.

NOMENCLATURE

BCU: Bus Connection Units.

CMU: Communication Units.

CP: Controls Process.

CPU: Central Process Unit.

CRC: Cyclic Redundancy Code.

DCF77: Deutschland Long wave signal Frankfurt 77.5KHz.

GPS: Global Positioning System.

HCI: Host Communication Interface.

IC: Internal Communication.

IEC: International Electro technical Commission.

IED: Intelligent Electronic Device.

I/O: Input Output.

IOM: Input/Output Master.

IOC: Input Output Microcontroller.

IP: Internet Protocol.

LAN: Local Area Network.

MMI: Man Machine Interface.

MPU: Main Processing Unit.

MTU: Master Terminal Unit.

NCC: Network Control Center.

OSI: Open Systems Interconnection.

PDP: Process Data Processing.

PID: Proportional Integral Derivative.

PLC: Programmable Logic Controller.

PSU: Power Supply Unit.

RAM: Random Access Memory.

ROM: Read Only Memory.

RTU: Remote Terminal Unit.

SCADA: Supervisory Control And Data Acquisition.

SCI: Subordinate device Communication Interface.

SLC: Serial Line Controller.

STCA: Seamless Telecontrol Communication Architecture.

TCP: Transmission Control Protocol.

UART: Universal Asynchronous Receiver Transmitter.

USART: Universal Synchronous Asynchronous Receiver Transmitter.

UPS: Uninterruptible Power Supply.

UDP: User Datagram Protocol.

WAN: Wide Area Network.