DEDICATION

This thesis is dedicated to my parents.

Also, this thesis is dedicated to my friends who have been a great source of motivation and inspiration.

Finally, this thesis is dedicated to all those who believe in the richness of learning.

Acknowledgment

First of all I thank Allah whom through his grace and blessing has supported me during these times.

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Abstract

Ethernet's combination of low cost, wide spread availability and market familiarity has been attractive to industrial automation applications.

In this thesis, Ethernet technology has been reviewed for industrial purposes. An application has been developed to control a remote motor through the network. To make the motor network capable, an Ethernet interface has been added to a microcontroller; the microcontroller is used to drive the Ethernet interface and on the other side used to actuate the motor.

In industrial systems real time communication must be provided, so that UDP is used instead of TCP because UDP does not have to establish a formal connection and as a result is a faster way to send a message.

المستخلص

إجتمعت فى تقنية الإيثرنت كثير من المميزات مثل التكلفة البسيطه والإنتشار الواسع و الوفره السوقيه، الشئ الذى جعلها جاذبه للتطبيقات الصناعيه.
فى هذه الأطروحه تم التعرض لتقنية الإيثرنت للأغراض الصناعية. تم تطوير تطبيق للتحكم عن بعد فى محرك عبر الشبكة، ولجعل هذا المحرك ذو مقدرة على التعامل مع الشبكه، تم إضافة واجهة إيثرنت بينية لمتحكم دقيق.
تم إستخدام هذا المتحكم الدقيق لقيادة دائرة متحكم الإيثرنت ومن ناحية أخرى التحكم فى المحرك.
يجب تزويد الأنظمة الصناعية بإتصال ذو زمن حقيقى ومن اجل هذا تم إستخدام بروتكول UDP بدلاً عن TCP وذلك لأن ال UDP لايحتاج لإنشاء إتصال مسبق وبالتالى يعتبر وسيلة اسرع لإرسال البيانات.

Terminology

LAN	Local Area Network
DQDB	Distributed Queue Dual Bus
FDDI	Fiber Distributed Data Interface
100VG	100 Voice Grade
CSMA/CD	carrier sense multiple access /collision detect
IEEE	Institute of Electrical and Electronics Engineers
ANSI	American National Standards Institute
DTE	Data terminal equipment
DCE	Data communication equipment
UTP	unshielded twisted-pair
STP	shielded twisted-pair
OSI	Open System Interconnection
ISO	International Organization for Standardization
MAC	Media Access Control
LLC	Logical Link Control
PRE	Preamble
SOF	Start-of-frame delimiter
DA	Destination address
SA	Source addresses
FCS	Frame check sequence
CRC	cyclic redundancy check
VLAN	Virtual Local Area Network
NIC	network interface card
NRZ	Non Return to Zero
MES	manufacturing execution software
I/O	Input/Output
RS232	Recommended Standard #232
RS485	Recommended Standard #485
RS422	Recommended Standard #422
TCP/IP	Transmission Control Protocol/ Internet Protocol
UDP/IP	User Datagram Protocol/ Internet Protocol
ARP	Address Resolution Protocol
IHL	Internet header length
TTL	Time to live
ISN	initial sequence number
ACK	Acknowledgment

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