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Advanced Controlling of Motor Over"Can" Protocol & Amend Motor Speed Control Using "Can" Protocol (Controller Area Network)

KEYWORDS: CAN protocol, CAN buses, encoder motor and UART terminal.

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ABSTRACT

Controlling a motor driven machines in a network is main aspect in various industries. In present situation the industries are modifying their manual machines with automated machines. This requires the efficient controlling of this machines connected in one network for easy user interface.To reduce the network complexity and increase the efficiency we introduce our new technologycalled motor speed control using CAN protocol. Our technology consists of an intelligent network which controls the speed of an encoder dc motor. This motor is interfaced with controller commonly known as slave node which receives commands from the master node over CAN network. The master node controller is interfaced with UART terminal, therefore the user can command the desired speed value. This physical value is converted into logical digits and transferred to slave node through CAN buses (CAN high & CAN low). The slave node will receive the data and rotate the motor according to the received data. Now, to verify whether the motor is rotating at actual speed a feedback from encoder motor is taken and displayed on LCD

I. INTRODUCTION

This project is based on the speed controlling of motor using CAN protocol. The system is implemented using PIC micro- controller. To satisfy the customer requirements for greater safety, comfort, convenience and to cope up with increasing demands in industries and reduced network complexity.

The development of CAN began when more and more electronic devices were implemented into modern motor vehicles. Examples of such devices include engine management systems, active suspension, ABS, gear control, lighting control, air conditioning, airbags and central locking. All these mean, more safety and more comfort for the driving and of course a reduction of fuel consumption and exhaust emissions.

"In advance to this, we are developing a device which can be
Implemented to control the speed of the motor which can be future implemented in vehicle or in robotic cars."

II. OBJECTIVIES

The goal of our project is to control the speed of motor using CAN module. We will control the speed of an optical encoder motor, which is an electromechanical device that has an electrical output in digital form which is proportional to the angular Position of the shaft.

Our objective for using the CAN module is that CAN (Controller Area Network) is a serial communications bus for real-time control applications, which operates at data rates of up to 1 Megabits per second, and has excellent error detection and confinement capabilities.

This project describes the PIC microcontroller based design and Implementation of CAN Bus prototype for future expansion in automotive. It focus on hardware and software design of intelligent node. Hardware interface circuit mainly consists of MCP2510 stand-alone CAN-Controller with SPI interface, PIC16f887 microcontroller based on 16-bit CPU and MCP2551 high speed CAN Transceiver. MCP2551 CAN Transceiver implements ISO-11898 standard physical layer requirements. The software design for CAN bus network are mainly the design of CAN bus data communication between nodes, and data processing for analog signals. The design of software communication module includes system initialization and CAN controller initialization unit, message sending unit, message receiving unit and the interrupt service unit.

With the use of CAN, point-to-point wiring is replaced by one serial bus connecting all control systems. This is accomplished by adding some CAN-specific hardware to each control unit that provides the "rules" or the protocol for transmitting and receiving information via the bus.

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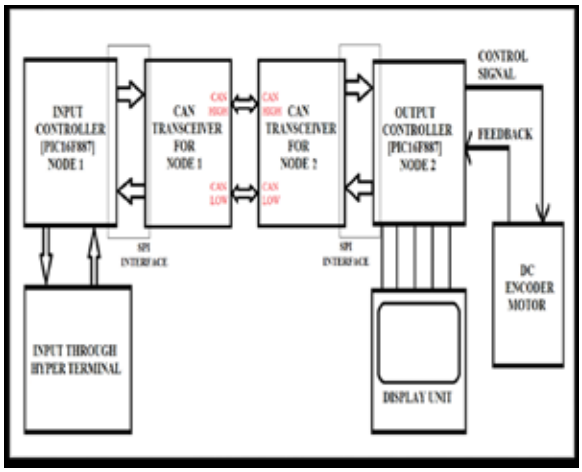

Figure 1 Working of the device

This system consist of master controller and slave controller which are interconnected through SPI (serial peripheral interface) using CAN modules through CAN buses (CAN high & CAN low). The desired speed applied by the user at master node is transferred to the slave node through CAN modules (MCP2510 & MCP2551).

The slave node will respond to the received data and rotate the encoder motor according to the received data. The actual speed of the motor is being continously monitored by the controller. The actual rotating speed of motor is feedbacked from the encoder motor to the controller, which in response displayed on LCD display at slave node.

III. PROPOSED SYSTEM

Process of the system:

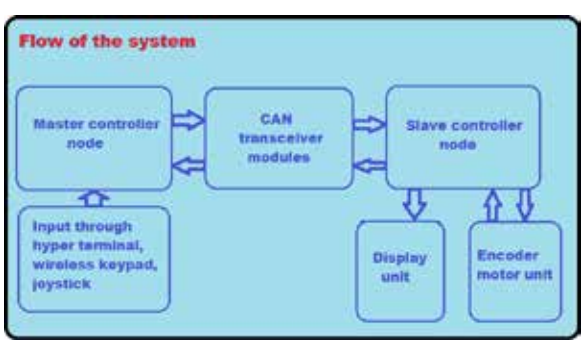

Figure 2 Flow of the System

1. In this system there are two main nodes (nodes can be added) which are having the microcontroller in it to perform the application.
2. In this system the dominant part is CAN network. Which is connected with both node 1(master) and node 2(slave).
3. Input to node 1 can be given through hyper terminal, wireless keyboard, joystick etc.
4. Node 1 will be responsible to take input from user through serial peripheral interface it will communicate with CAN controller.
5. CAN transceivers are interfaced by the twisted pair cable, they are known as CAN high and CAN low signal.
6. This CAN high and CAN low signal are responsible for communicating different nodes connected to a network.
7. The other side of this system is node 2, in which the application is defined. This node is interfaced with an encoder motor and 16*4 LCD, which works as feedback system.
8. Here from node 1 the user will give desired speed to node 2 through rigid CAN network.
9. The desired speed is received by node 2 will rotate the encoder motor as per the applied speed by the user at node 1.
10. The actual rotating speed of an encoder motor is verified by taking feedback from the encoder motor, the feedback is generated by the angular motion of the shaft sensed by the ray of light, which produces analog signal.
11. This analog signal is taken as feedback and compared with the applied speed which is also an analog signal. The result of this comparison is displayed on the LCD.
12. Parameters are set which will display the encoder revolving count and RPM (rotation per minute).

IV. FEATURES

- Multi-master serial bus
- Rigid data transfer
- Low power consumption
- Faster data transfer
- Low maintenance
- Secured data transfer
- Compact design

V. ADVANTAGES

- Organized and sophisticated compared to current point to point communication.
- Reduction in weight and cost of wiring looms/harnesses.
- Can handle multiple controllers simultaneously.
- Works in Real Time.
- Can be used in various applications.

VI. FUTURE SCOPE

This system can be enhanced by employ it into a car by controlling its speed. We can also use this system into medical equipment and devices, where the rigidness is very much important.

VII. CONCLUSION

This device is more flexible, time saving, secured and accurate for the examination system. The ultimate aim is for Smart E-Supplementary to automate the real time examination system and eliminate the problems of current examination system by using intelligent device.

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