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Establishment of Can Protocol in Industrial Applications

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ABSTRACT: The CAN protocol is a serial communication standard that was created for the automotive industry, but because of its adaptability, it has also made its way into other sectors like industrial automation. However, it should be noted that the CAN protocol, which employs CAN frames and is communicated over the CAN bus, calls for a CAN controller. These days, RISCProcessors with a CAN controller on the chip are typically employed in a variety of industries. In light of this, the protocol development phasebecome active. However, CISC processors are still widely used in many businesses, and CISC is emphasized in the curriculum in the educational sector.architecture. These controllers require an external interface since they lack an internal CAN controller. Given that itits internal registers need to be externally interfaced.

Key words: CAN , RISC (reduced instruction set computer**),CISC (**Complex Instruction Set Computer)

I. INTRODUCTION

Robert Bosch, a German auto parts maker, invented the Controller Area Network (CAN) in themid-1980s as a technique for automotive applicationsmaking serial communication robust. It was intended toincrease the dependability, safety, and fuel efficiency of carsthereby reducing the weight and complexity of wiring harnesses.The CAN protocol has gained popularity since its debut.industrial automation is quite popular, andtruck and automobile uses. This essay provides thethe creation of a serial communication protocol known asProtocol CAN. RISC processors like the ARM tend to bePIC family and on-chip CAN are also present.the CAN frame is created by the controller. In There is no sense in developing such CPUs.instead of just adjusting the on-board registership. Concerning CISC processors

II. SELECTION METHODOLOGY

- For CAN (Controller area network)
- CAN= A strong vehicle communication standard called a controller area network (CAN) was created to let microcontrollers and other devices connect with each other's applications without the need for host computers.
- SPI=Shift registers, sensors, and SD cards are just a few examples of the small peripherals that are frequently connected to microcontrollers using the Serial Peripheral Interface (SPI) interface bus. The device you want to talk to is selected using a choose line, which also uses separate clock and data lines.
- I2C=I2C is a serial protocol for two-wire interface that is used in embedded systems to link low-speed peripherals including microcontrollers, EEPROMs, A/D and D/A converters, and I/O interfaces. Since Philips invented it, practically all major IC manufacturers now make use of it.
- CAN= To enable microcontrollers and devices to communicate with each other's applications without the need for host computers, a robust vehicle bus standard called a Controller Area Network was created.
- Modbus= Modicon Systems created the communication protocol known as Modbus. It is a technique used to send data through serial lines between electrical equipment, to put it simply. Modbus Slaves are the devices providing the information, and Modbus Masters are the devices requesting the information.
- BACnet= Building automation and control networks use BACnet, a data communication standard. A data communication protocol is a set of guidelines that governs the transfer of data across a computer network. These guidelines encompass everything from the type of cable to use to the proper manner to format a request or instruction.

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III. INTRODUCTION TO DATA ON CAN BUS

Two separate wires are used by the CAN bus for communication.CAN high and CAN low are the names of the cables. once theBoth lines carry 2.5V when the CAN bus is in idle mode. When datasent, the CAN high line rises to 3.75V.moreover, the CAN low falls to 1.25V, creating aDifference between the lines of 2.5V. Considering that a voltage difference between the two is necessary for communicationSAUDAGAR, UBAIDJournal of Scientific Engineering and Technology Research InternationalPages 6105–6111 of Volume 03, Issue 31 in October 2014.CAN bus lines are not affected by inductive couplingelectrical fields, spikes, or other noise. This resultsFor networked communications on mobile equipment, CAN bus is a dependable option.

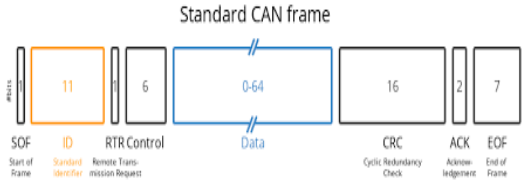

Fig1. Data on CAN bus.

Because of the way CAN bus communications work, data can be sent and received on the bus by all modules. Any module has the ability to send data, which every other module receives, enabling both peer-to-peer and broadcast data transmissions. The CAN bus supports a variety of baud rates up to 1 Mbit/s. 125 Kbit/s and 250 Kbit/s are the two most used baud rates. The "broadcast communication mechanism," which is based on a message-oriented transmission protocol, is the foundation of CAN. Instead of defining stations and station addresses, it defines message contents. Every message has a message identifier, which is distinct across the whole network since it indicates the message's priority as well as its content. The only significant
without being overly concerned that you'll make a mistake; in the worst case, you can replace the chip for a few dollars and start over.

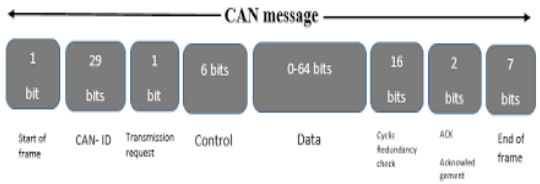

Fig2. CAN message frame.

A CAN base frame message begins with the start bit called "Start of Frame (SOF)", this is followed by the "Arbitration field" which consist of the identifier and the "Remote Transmission Request (RTR)" bit used to distinguish between the data frame and the data request frame called remote frame. The following "Control field" contains the "IDentifier Extension (IDE)" bit to distinguish between the CAN base frame and the CAN extended frame, as well as the "Data Length Code (DLC)" used to indicate the number of following data bytes in the "Data field". If the message is used as a remote frame, the DLC contains the number of requested data bytes. The "Data field" that follows is able to hold up to 8 data byte. The integrity of the frame is guaranteed by the following "Cyclic Redundant Check (CRC)" sum.The end of the message is indicated by "End of Frame (EOF)". The "Intermission Frame Space (IFS)" is the minimum number of bits separating consecutive messages. Unless another station starts transmitting, the bus remains idle after this.

IV. MESSAGE FORMATS

Four message formats are distinguished by CAN: data, remote, error, and overload frames. Here, we focus just on the data frame depicted in Fig. 5. The start-of-frame (SOF) bit signals the start of a data frame. It is followed by the remote transmission request (RTR) bit and an eleven-bit identity. The arbitration field is composed of the identify and the RTR bit. How many bytes of data are to come after the control field, which has six bits, is indicated in the data field. The size of the data field ranges from 0 to 8 bytes. The cyclic redundancy checksum (CRC) field, which helps the receiver to determine whether the received bit sequence was corrupted, is placed after the data field. The transmitter uses the two-bit acknowledgment (ACK) field

V. TRANSCEIVER CAN

The Controller Area Network (CAN) protocol uses the MCP2551 as the interface between the physical bus and the controller. It is specifically designed for high-speed applications up to 1 Mbps in automobiles. The device provides the CAN controller with differential transmission, differential receiving, and bus send capabilities. It is capable of both sending and receiving. Standard data, remote frames, and extended data

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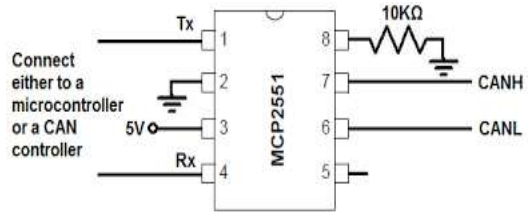

Fig 3. CAN transceiver

VI. EXISTING SYSTEM

In industrial settings, the CAN is used to operate a machine's DC motor based on the environment's temperature. In this system, the machine's speed is inextricably linked to the temperature value. When a machine is in use, if the temperature rises, the motor speed lowers, and if the temperature drops, the motor speed increases, meaning the speed

Drawbacks

- Due to the continues variation in the machine speed there is a chance to decrease in the production level.
- Due to overheat of machine, there will be a chance of increase in its surroundings temperature which creates difficulty
- to manually interface to the machine.
- Always change in the machine speed may have the chance to decrease machine life span.

VII. CONCLUSION:

Because of the way CAN bus communications work, data can be sent and received on the bus by all modules. Any module has the ability to transmit data, unlike the rest of the modules are provided allowing peer-to-peer and data transmissions that are broadcast. CAN bus may be used. up to 1 Mbit/s of baud rates are available. The most typicalThere are 125 Kbit/s and 250 Kbit/s baud rates. CAN is In accordance with the "broadcast communication mechanism," This is based on a transmission that is message-oriented. protocol. It establishes message contents as opposed to addresses for stations and stations. Each message includes a message identifier, which is distinctive across the board network because it determines the priority and the content the message's. Two protocols are supported by CAN. message frame formats: the only, crucial distinction xtending in length

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