Preliminary Information

Application Brief

APPLICATIONS:

Steppers and Encoders

Home Appliance Controls Integrated with Voice Control

Smart Appliances

Home Security

Digital Telephone Answering Machine

Engine Management

Power Line Modem

Servo Drives

Automotive Control

Electric Lawn Equipment

Noise Cancellation

Internet Appliances

IP Phone

Modems

Magnetic Card Readers

Security

Digital Speakers

Voice Recognition Systems

"Hands-free" Kits

Digital Cameras

Telecom Test Equipment

Fuel Management Systems

and more. . . . . .

DSP56F80X High-Speed CAN Interface

The Controller Area Network (CAN) standard allows various data transfer rates among multiple modules using only a simple twisted pair cable. Since the CAN was originally designed to be used as a vehicle serial data bus, it satisfies the demands of real-time processing, reliable operation in a vehicle's EMI environment, is cost-effective, and provides a reasonable data bandwidth. When used in automobiles, the following are some common speeds used for various networks in a car:

- Engine Network > 250Kbps
- Body Network <= 125Kbps
- Sub-System Network < 50Kbps

A CAN Network contains several CAN interface nodes connected to a CAN bus, as shown in Figure 1.

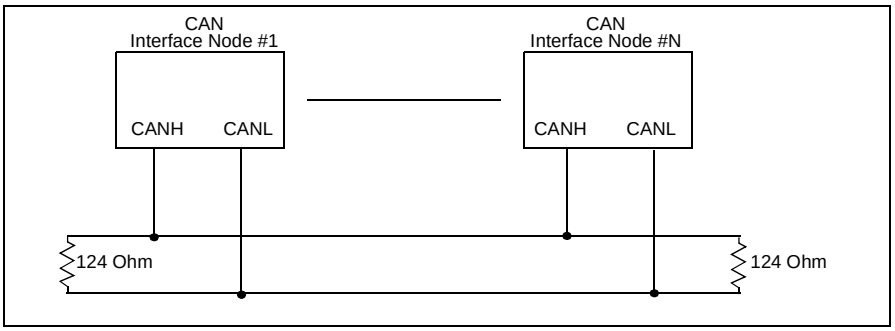

Figure 1. CAN Network

A CAN interface node contains three functional modules;

1. Protocol Controller.
2. Physical Layer Interface.
3. Bus connector.

For the example shown in Figure 2, a Motorola DSP56F805 provides the CAN Protocol Controller function, a Philips Semiconductor PCA82C250 provides the CAN Physical Layer Interface, and two 10-pin headers provide connection to the CAN Bus.

DSP56F805 is a DSP based Motor Controller, containing an on-chip CAN peripheral interface capable of CAN bus operation up to 1Mbps. The Motorola Scalable Controller Area Network (MSCAN) module is a communication controller implementing the CAN 2.0 A/B protocol. MSCAN utilizes an advanced buffer arrangement. This arrangement provides a predictable real-time buffer, simplifying application software.

The PCA82C250 device provides a differential transmit capability to the CAN bus supporting 110 nodes at up to 1Mbps. Additionally, it provides current-limit circuit protection on its transmitter output state, protecting it against output power or ground short-circuits on the CANH and CANL lines. One of the 10-pin headers provides a connection point to the CAN bus. This connection point can be the first or last node on the CAN bus chain by enabling the CAN bus terminator.

Otherwise, the example node interface could connect into an existing CAN bus providing a daisy-chain connection for the next node on the bus.

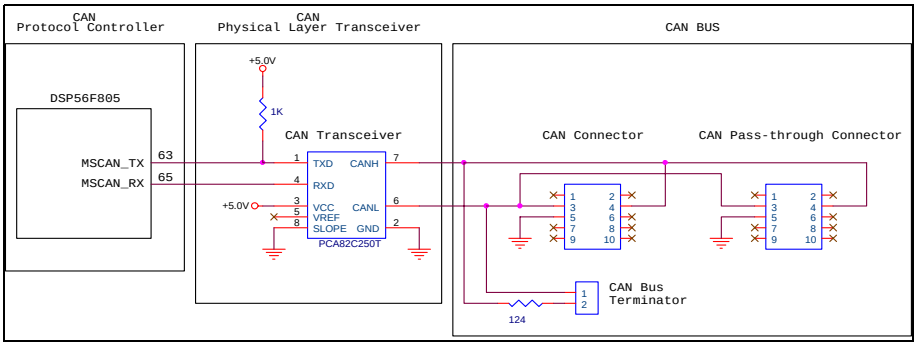

Figure 2. DSP56F805 1Mbps CAN Interface Node

The DSP56F805's MSCAN Interface provides the CAN Transmit Data Output, MSCAN_TX, and the CAN Receive Data Input, MSCAN_RX, signals. The MSCAN_TX signal from the DSP goes to the TXD input line on the PCA82C250. The RXD signal from the PCA82C250 goes to the DSP's MSCAN_TX signal line. The CANH and CANL signals from the PCA82C250 go to the CAN Bus connectors. For high-speed operation, the SLOPE signal is tied to ground. This allows the transmitter's output transistors to switch ON and OFF as fast as possible without RISE and FALL slope limiting.