

IndustryPack Mezzanine Modules Simplify the Design and Development of Field Bus-based Industrial Automation Systems

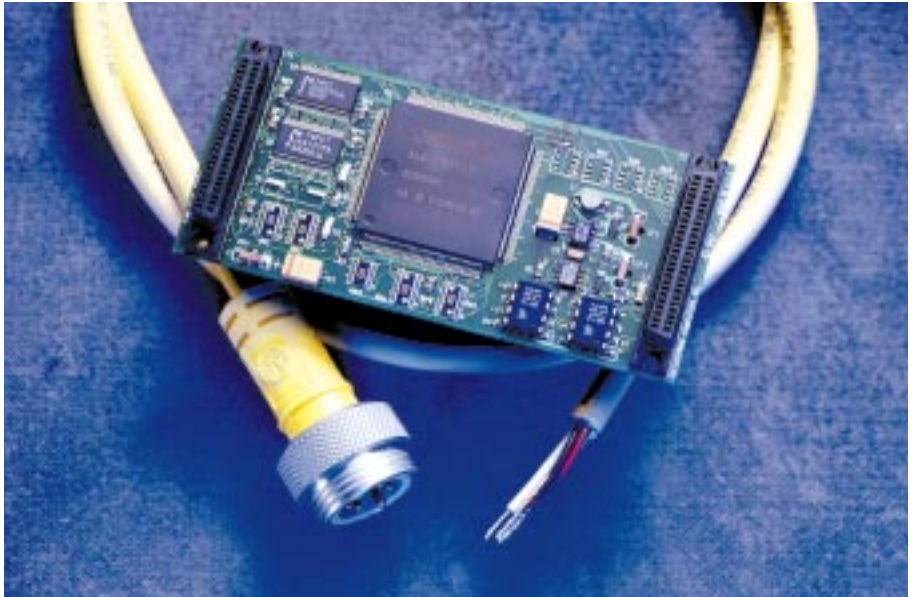
Ease of use, simplicity and reliability are three qualities inherent in field bus architecture that have led to its increased utilization in industrial automation applications. According to recent research figures from CiA (CAN in Automation), a manufacturers' group for Controller Area Network (CAN) and field bus, over 24 million CAN nodes were shipped in 1997. In the year 2000, shipments are expected to reach 125 million.

Field bus architecture has a number of distinct advantages over other network or data communications architectures, such as Ethernet or serial communications. It features a highly reliable and robust transmission speed of 1000 kbits with a short latency time. It also allows multiple master bus, message broadcast, and comprehensive error detection and elimination.

Due to its adoption by major industrial manufacturers, CAN has jumped into the lead as the most popular choice of field bus architectures. CAN provides a simple but well defined interface - yet it allows an application-specific interface to be implemented. Several application layers can be implemented over the generic CAN data link and physical layer architecture, such as DeviceNet (by Allen Bradley), SDS (by Honeywell), and J1939 (by SAE, Society of Automotive Engineers).

SBS GreenSpring Modular I/O (Menlo Park, CA), a highly successful I/O and mezzanine vendor in the VME and industrial automation market, recently introduced two new field bus modules - IP-DeviceNet and IP-CAN.

Utilizing the flexible, modular design of IndustryPack modules, up to four IP-DeviceNet modules can be plugged into a 6U VME, ISA, PCI, or 6U CompactPCI slot. Up to two IP-DeviceNet modules can be plugged into a 3U VME, 3U CompactPCI, PC/104 or Allen Bradley OC-1747 slot. This enables engineers to build a field bus system that links heterogeneous nodes with various bus plat-



forms. It also allows engineers to mix and match field bus with other I/O modules.

The IP-DeviceNet/IP-CAN modules feature a well-known intelligent CAN controller, the Siemens C167, that runs at 20 MHz and includes an on-board memory of 640 KB SRAM and 128 KB Flash. With an intelligent I/O controller built into the module, on-board firmware can be written. This frees up the CAN messaging and control functions from the main CPU or host processor in the system.

The IP-DeviceNet module includes on-board firmware to implement the DeviceNet slave and master node functions. To comply with ODVA's (Open Device Vendor Association) specification on DeviceNet, the physical interface is implemented with a PCA82C251 CAN transceiver that includes optical isolated power and a signal interface.

The DeviceNet firmware development is a joint effort between SBS GreenSpring and the Dearborn Group (Farmington, MI). Dearborn Group specializes in providing software and application solutions for the CAN bus. Dearborn's software development team wrote an API in the firmware to implement the complete DeviceNet message set. It features a

general purpose CAN message set, a fragmentation message set, a DeviceNet master message set, and a DeviceNet slave message set.

The IP-CAN module is a generic CAN module, without the DeviceNet application layer firmware and isolation interface. Users can customize IP-CAN for other DeviceNet variation interfaces, or to implement other CAN application protocols, such as SDS, J1939, or CANOpen. A bootstrap loader and serial port are available for uploading firmware.

With the popular Siemens C167 controller used in the IP-CAN module, several industry-leading compiler, assembler, and debugger packages are available for software development. Both Keil Software and Tasking Inc. offer comprehensive development toolkits for the C167 controller.

Besides IP-CAN and IP-DeviceNet, SBS GreenSpring also offers a line of IndustryPacks for other field bus protocols, including LON, InterBus, Sercos and Arnet. For more information, contact SBS GreenSpring Modular I/O at 650-327-1200 or visit the web site at www.sbs-greenspring.com.