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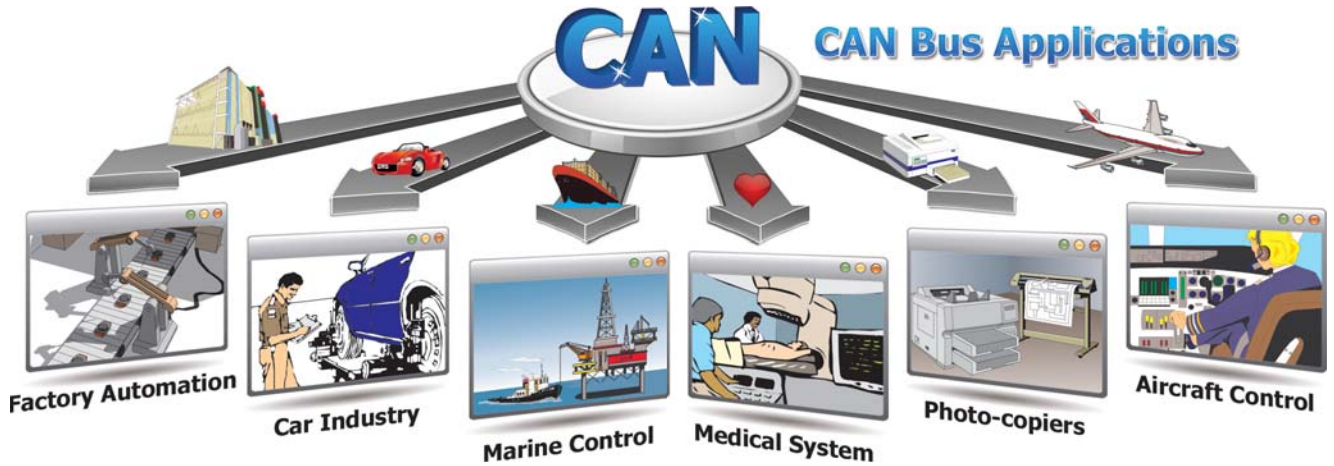
CAN BUS

Vol. CAN 1.08.04-EN

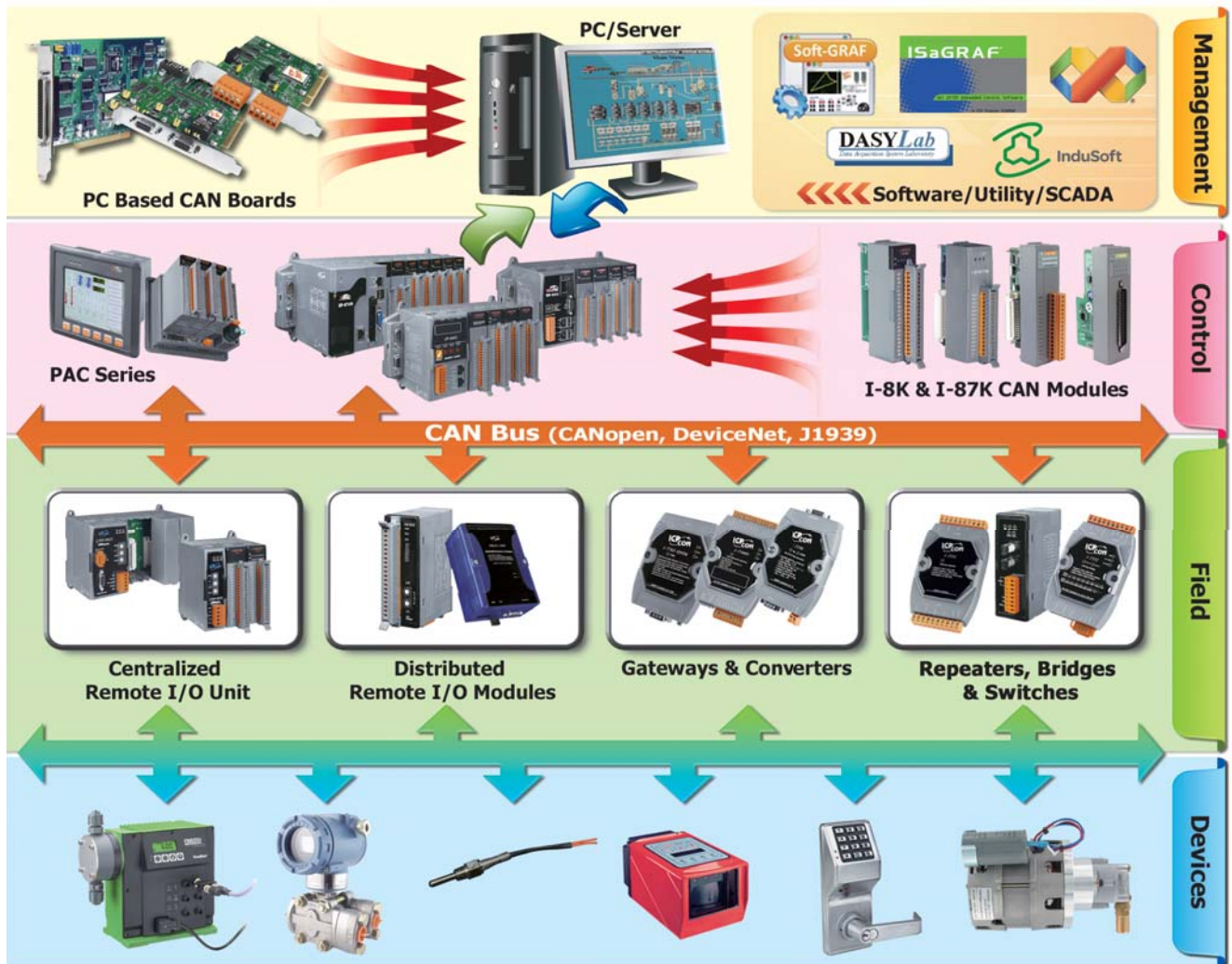
2019.Apr.



1. Overview



ICP DAS has been developing rich **CAN-based/DeviceNet/CANopen/J1939** products for more than 10 years, including PCI interface cards, Fieldbus converters, PACs, gateways and remote I/O modules. We provide complete hardware solutions to satisfy a wide variety of CAN-based applications that can effectively solve issues related of data acquisition and calculation, transmission distance extension, network topology limitations, communication interface transformation, and noise resistance. In addition, ICP DAS supplies a large ranges of software resource, such as utility tools, APIs, demo programs, OPC, ActiveX and third-party drivers, which can help users to develop complex custom control and monitoring systems more easily and quickly. For certain special applications, we can offer flexible OEM/ODM projects to match the different requirements of our customers. Through ICP DAS's efficient and reliable service, you can easily complete your complex CAN-based projects.

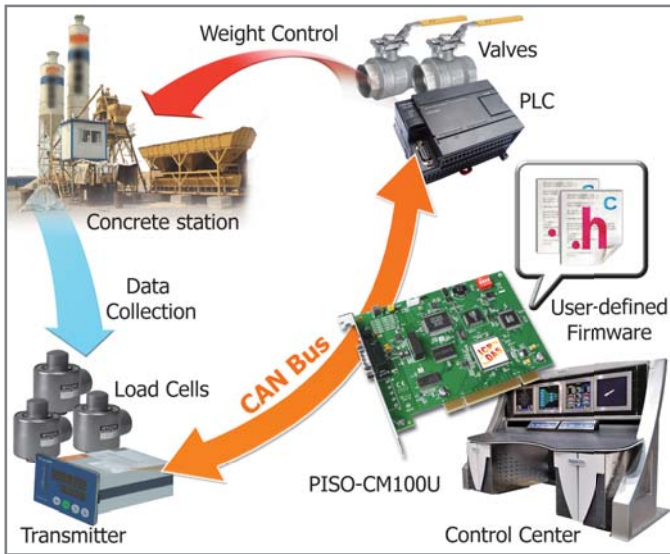




Selection Guide

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Case Studies



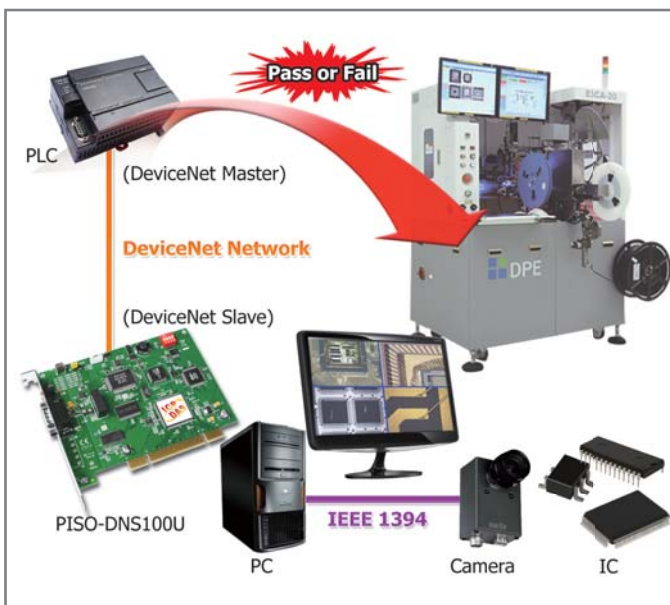
Concrete Station Monitoring & Control System

- **Location:** China
- **Product:** PISO-CM100U
- **Description:** The result of the quantity control for each recipe material seriously affects the quality of the concrete. In order to adjust each quantity promptly, CAN bus is applied. In this system, the PISO-CM100U is used to monitor the weight of each material from the load cells and send the recipe to the PLC. As the same time, the PC updates all the data on the screen. By utilizing the user-defined firmware in the CPU of the PISO-CM100U, the PC loading can be effectively reduced, and the system becomes more efficient and reliable.



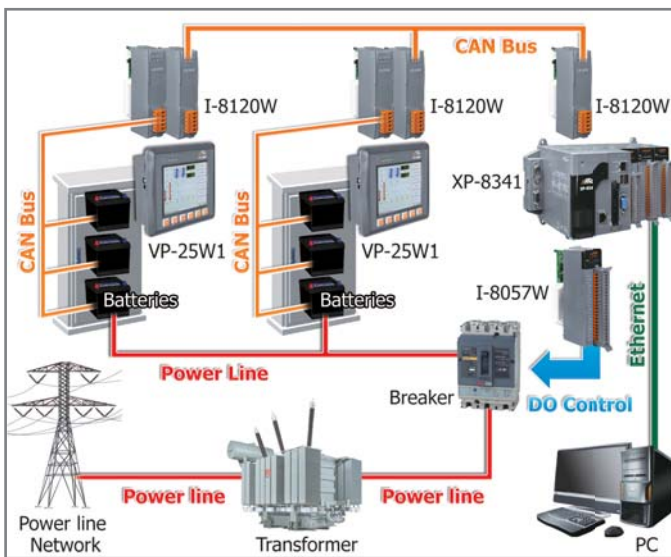
Cash-in-transit Vehicle

- **Location:** England, United Kingdom
- **Product:** I-7530-FT
- **Description:** A telematics and vehicle control system need to be closely integrated with each other by implementing data exchange interface. LSFT (Low Speed/Fault Tolerance) CAN is a familiar type of interface in the application of automotive electronics systems. The I-7530-FT is specially designed for solving the problem of interface transformation between LSFT CAN and RS-232. In this way, the cash-in-transit of the manufacturer can efficiently control the door of the cash safe and directly monitor the status of the rear access vehicle door on the telematics.



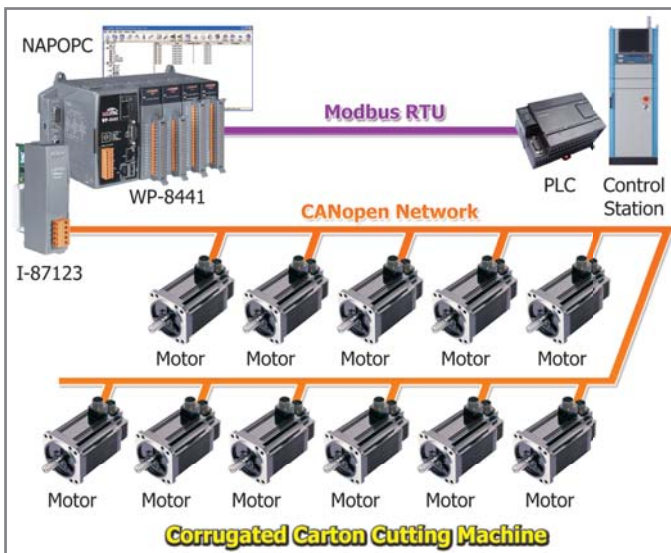
IC Inspection Machine

- **Location:** Hsinchu, Taiwan
- **Product:** PISO-DNS100U
- **Description:** The IC inspection process is necessary for good quality control. Though PLCs are cheap and stable, IC inspection is a difficult task for a PLC. The user uses a PC plus a camera together with a PISO-DNS100U to perform the IC inspection, and uses a PLC to control the mechanism used to reject defective ICs. After completing the inspection, the PC writes the result to the PISO-DNS100U. Because the PLC is used as a DeviceNet master, it can easily retrieve the information from the PISO-DNS100U via the DeviceNet network.



Energy Storage System

- **Location:** China
- **Product:** I-8120W, I-8057W, VP-25W1, XP-8341
- **Description:** This system improves the usage efficiency of electrical power. During the off-peak time for electricity use, the unused electricity can be stored in batteries. During peak time, these batteries then supply power to the electricity grid. The user has utilized two I-8120W modules plugged in one VP-25W1 in each subsystem. One is for obtaining the battery status, and another is for transmitting the data to the XP-8341. The XP-8341 then transmits the status information to the PC via the Ethernet and controls the charge time using a breaker.



Corrugated Carton Cutting Machine

- **Location:** Taichung, Taiwan
- **Product:** WP-8441, I-87123
- **Description:** In this case, the orientation and speed of the cutting knives and rollers seriously affects the quality of the output. Because all of the knives and rollers are controlled by 31 motors, the user selected CANopen-based motors in order to achieve that. The WP-8441 and I-87123 together act as a CANopen master to simultaneously control all of the motors, taking advantage of the CANopen features of synchronization and high communication performance. By using this architecture, all of the motors are able to be quickly moved to the target position at the same time by simply sending a single command.



MRI Cooling System

- **Location:** China
- **Product:** I-7232D
- **Description:** In order to reduce costs, an MRI manufacturer uses a chiller made in China instead of a more expensive German product. However, the user experienced difficulties due to the different communication interfaces. By using the I-7232D, this problem was solved. The I-7232D was able to be used as a Modbus RTU master while communicating with the chiller. In contrast, in the CANopen network, the I-7232D can be used as a CANopen slave. As a result, the I-7232D is able to easily pass information from the chiller to the CANopen master, and conversely transfer CANopen commands to the chiller.

2. CAN Bus Repeater/Bridge/Switch

The CAN Bus Repeater/Bridge/Switch is used to enhance the signal quality, extend the communication distance, isolate CAN bus network. ICP DAS provides following products.








Model Name	I-7531	I-7532	I-2534	I-5534-M
	Isolated CAN Bus Repeater	Isolated Two-channel CAN Bus Bridge	4-Port CAN Bus Switch	4-Port CAN Bus Switch with Metal Casing
Pictures				
CAN Interface				
Transceiver	NXP 82C250		NXP TJA1042	
Channel number	2		4	
Connector	3-pin screwed terminal block (CAN_GND, CAN_L, CAN_H)	4-pin screwed terminal block (CAN_GND, CAN_L, CAN_SHLD, CAN_H)	9-pin male D-Sub with CAN_GND, CAN_SHLD, CAN_H, CAN_L	
Transmission speed (bps)	5 k ~ 800 k with auto baud rate detection	5 k ~ 1 M selected by rotary switch or utility tool		
Transmission Distance (m)	Depends on the CAN baud rate	Duplicates the transmission distance depended on the CAN baud rate		
Propagation Delay	Max. 200 ns (shortens the transmission distance by ~ 40 m)	Depends on the CAN baud rate (Max. 134 us @ 1 Mbps)	Depends on the CAN baud rate (Max. 440 us @ 1 Mbps)	
Terminator Resistor	Jumper for 120 Ω terminator resistor		DIP switch for the 120 Ω terminator resistor	Jumper for 120 Ω terminator resistor
Isolation	3000 VDC for DC-to-DC, 2500 Vrms for photo-couple			
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B			



3. USB to CAN Converters



The I-7565 series is the USB to CAN converter with a maximum of two independent CAN channels that supports CAN protocols 2.0A and 2.0B. It becomes very convenient and easy to access and control the CAN devices via the USB port of the PC.

Model Name	tM-7565	I-7565	I-7565-H1	I-7565-H2	I-7565M-HS	I-7565-CPM	I-7565-DNM	
Pictures	1-Port Cost Effective USB to CAN Converter 	1-Port Cost Effective USB to CAN Converter 	1-Port High Performance USB to CAN Converter 	1-Port High Performance USB to CAN Converter 	2-Port High Performance USB to CAN Converter 	Intelligent USB to CANopen Converter 	Intelligent USB to DeviceNet Converter 	
USB Interface								
Connector	USB Type B							
Compatibility	USB 1.1 and 2.0 standard							
Compatibility								
Cannel	1	1	1	2	2	1	1	
Transceiver	NXP TJA1042	Philips 82C250	NXP TJA1042			NXP 82C250	NXP 82C250	
Connector	7-pins screwed terminal block	9-pin male D-Sub		10-pin terminal block	8-pin terminal block	9-pin male D-Sub		
Baud Rate (bps)	10 k, 20 k, 50 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1M						125 k, 250 k, 500 k	
Isolation	2500 Vrms	3000 Vrms				3000 VDC		
Terminator Resistor	Selectable 120 Ω terminator resistor by a jumper							
Protocol	CAN 2.0A/2.0B					CIA 301 V4.02	DeviceNet Volume I ver2.0, Volume II ver2.0	
Receive Buffer (frame)	256	1000	256	128 for each CAN port	256 for each CAN port	1000	256	
Max. Data Flow (fps)	425	250	3000	1500 fps for each CAN port	10000 fps for each CAN port	-	-	

High-performance 1-Port USB to CAN Converter

I-7565-H1



The I-7565-H1 is a high-performance intelligent USB to CAN converter with one CAN port that can help users to make data collection and process on a CAN bus network easily and quickly. It improves the transformation speed of the I-7565, and allows receiving max. 3000 standard 2.0A CAN frames per second. The powerful CPU of the I-7565-H1 provides the accurately time-stamp for each CAN message that is useful to analysis and diagnostic the CAN network.

- Provides a configuration utility that can be used to transmit/receive CAN messages
- Driver supported for Windows 2K/XP/Vista/7 (32 or 64-bit)/8.x , and Linux
- Max. data flow for a single channel is 3000 fps (standard frame)
- No external power supply required (powered by the USB port)
- Built-in jumper for the 120 Ω terminal resistor of the CAN bus
- Programmable CAN bus baud rate from 5 kbps ~ 1 Mbps
- Compatible with CAN specification 2.0 parts A and B
- 2500 Vrms photocoupler isolation on the CAN side
- Supports CAN bus acceptance filter configuration
- Fully compatible with the ISO 11898-2 standard
- 3 kV galvanic isolation for the CAN port
- Removable terminal block
- Provides one CAN port



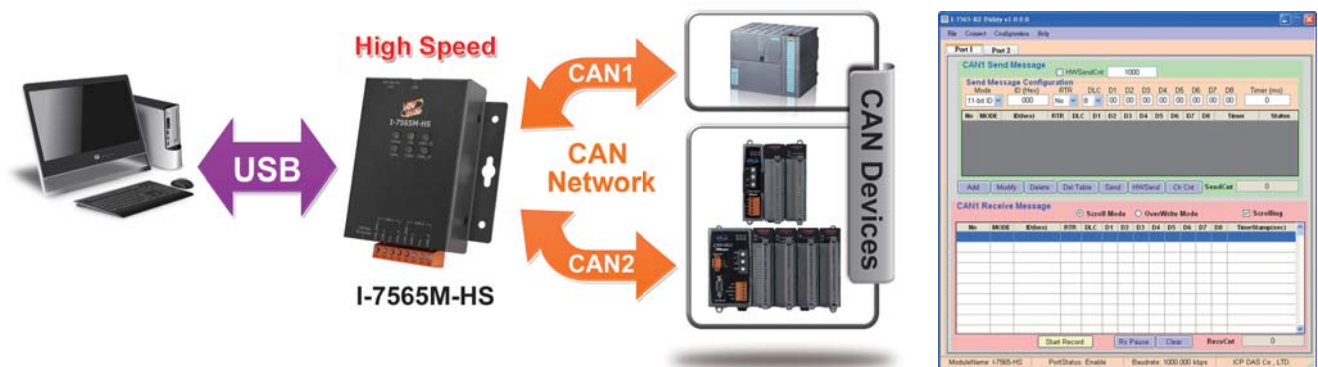
High Speed USB to 2-port CAN Bus Converter

I-7565M-HS



I-7565M-HS is a high speed USB to CAN converter with two CAN channels. It improves the transformation speed of other I-7565 series, and allows receiving max. 15000 standard 2.0A CAN frames per second. I-7565M-HS support CAN2.0A/2.0B protocol and different baud rates from 10 kbps to 1000 kbps. The important feature of I-7565M-HS is to support the user-defined baud rate function no matter what the baud rate is. When connecting I-7565M-HS to PC, PC will load the relevant device driver automatically (hot plug & play). Therefore, users can make data collection and processing of CAN bus network easier and quicker by applying I-7565M-HS.

- Compatible with USB 2.0 (High Speed)
- Support both CAN2.0A and CAN2.0B specifications
- No external power supply (powered by USB)
- Programmable CAN bus baud rate from 10kbps to 1000kbps
- Support CAN bus message filter configuration
- Timestamp of CAN message with at least $\pm 10\mu s$ precision
- Built-in dip-switch to select 120 ohm terminal resistor for CAN Bus
- Provide utility tool for users module setting and CAN bus communication testing conveniently
- Provide API library for user program development



1-Port Cost Effective USB to CAN Converter

tM-7565






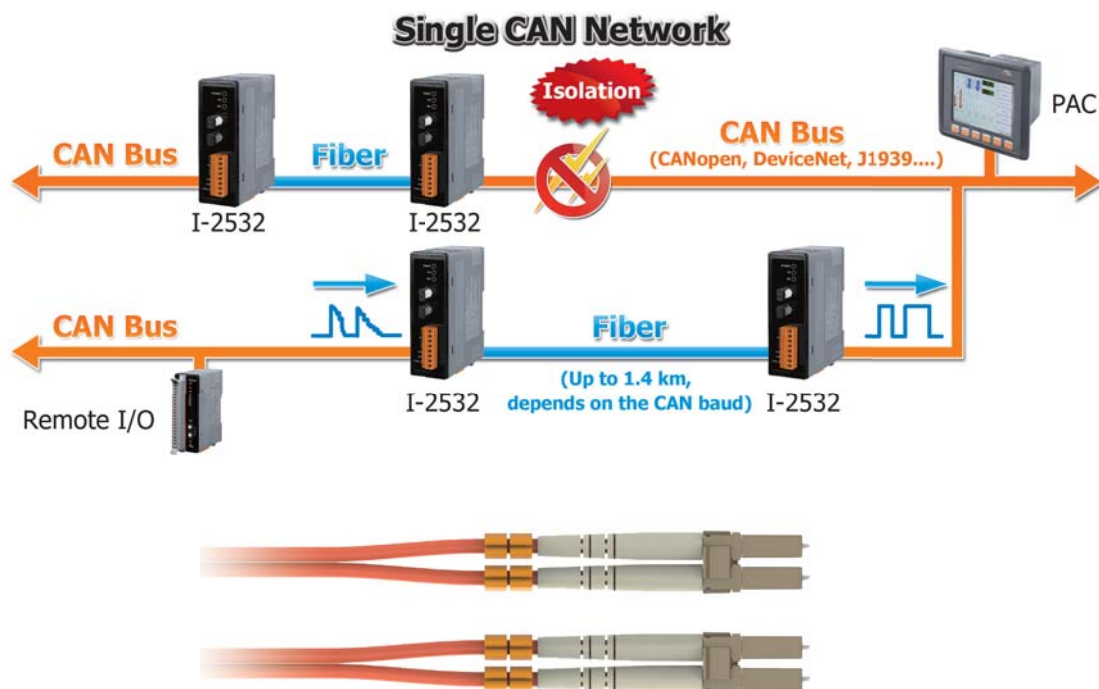
The tM-7565 is a tiny USB to CAN converter to fit for narrower environment as a result of its small size. Since it has USB interface, it is easily to be used via laptop. It has isolation on power side and on CAN bus side and it has a good performance. The function of tM-7565 can full compatibly with I-7565. In additional, it provides new function such as listen only. User can use this function to listen CAN bus messages and error detection. According to above features, tM-7565 is an economical and practical USB to CAN converter solution.

- Compatible with CAN specification 2.0A and 2.0B
- Fully compatible with ISO 11898-2 standard
- Support various CAN baud rate from 10K bps to 1M bps
- Support user-defined CAN baud rate
- Support various USB baud rate from 110 bps to 230400 bps
- Build-in selectable 120 Ω terminator resistor
- Software configurable CAN and USB communication parameters
- Power, data flow, and error indicator for CAN and USB
- Watchdog inside
- Support pair connection mode
- Software buffer on CAN bus side and USB side
- Support user-defined end of characters on pair connection mode
- Support listen only mode
- Support time stamp response on USB side



4. CAN to Fiber Converter/Bridge

Models	I-2532	I-2533	I-2533CS	I-2533CS-60	I-2533CS-A/I-2533CS-B
Pictures	CAN to Multi-mode Fiber Converter 	CAN to Multi-mode Fiber Bridge 	CAN to Single-mode Fiber Bridge 		
CAN Interface					
Connector	Screwed terminal block (CAN_GND, CAN_L, CAN_H)				
Baud Rate (bps)	10 k ~ 500 k	10 k ~ 1 M			
Transmission Distance (m)	Depends on baud rate				
Propagation Delay	Max 125 ns	Max. 125 μs (depends on the CAN baud rate)			
Terminator Resistor	DIP switch for the 120 Ω terminator resistor				
Isolation	3000 VDC for DC-to-DC, 2500 Vrms for photo-couple				
Specification	ISO 11898-2, CAN 2.0A and CAN 2.0B				
Fiber Interface					
Connector	ST Type		SC Duplex Type		SC Type
Wave Length (nm)	850		1300 or 1310		TX: 1310, RX: 1550 for I-2533CS-A TX: 1550, RX: 1310 for I-2533CS-B
Fiber Cable (μm)	Multi-mode 50/125, 62.5/125 or 100/140		Single-mode 8.3/125, 8.7/125, 9/125 or 10/125		
Transmission Distance	Max. 1.4 km	Max. 2 km	Max. 30 km	Max. 60 km	Max. 15 km
UART Interface					
COM1	–	RS-232 (for configuration)			
COM 1 Connector	–	3-pin screwed terminal block (RxD, TxD, GND)			
Transmission Speed (bps)	–	115200			
Data bit	–	8			
Stop bit	–	1			
Parity	–	None			



CAN to Single-mode Fiber Bridge

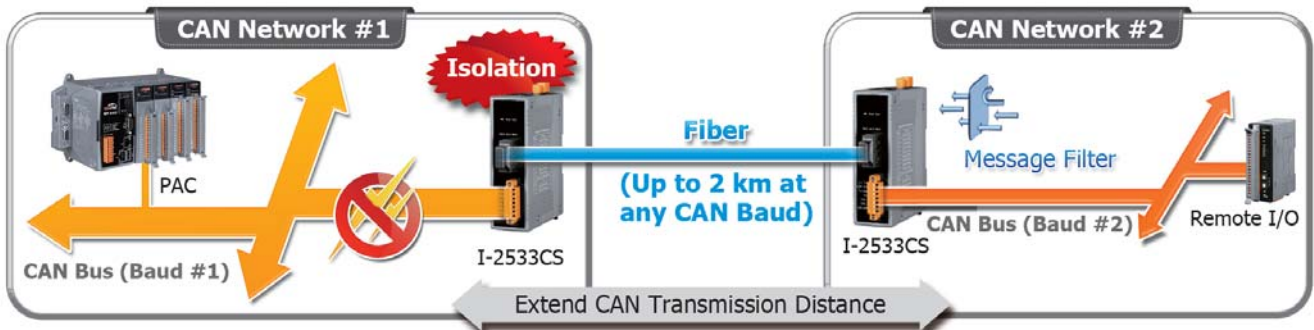
I-2533CS I-2533CS-60

NEW



The I-2533CS series (I-2533CS/I-2533CS-60) is a local CAN bridge used to establish a connection between two CAN bus systems via single mode fiber transmission medium. In order to solve the problem between CAN and fiber transmission mediums, the I-2533CS series is specially designed for converting the electrical CAN bus signal to the optical signal- and recover the signal to CAN bus by using another I-2533CS series. Compared with other CAN/Fiber converters, the I-2533CS series has three more important features. First, the transmission distance limitation of the CAN bus system will not be reduced due to higher CAN baud rate. No matter what kind of CAN baud rates you use, the data transmission distance of fiber is up to 30 km (60 km for I-2533CS-60). It means that the total network working distance can be extended.

- Fully compatible with the ISO 11898-2 standard
- Support both CAN 2.0A and CAN 2.0B
- NXP TJA1042 CAN transceiver
- Wave Length: 1310 nm
- 2500 Vrms isolation on the CAN side
- Transmission distance up to 30 km at any CAN baud rate (60km for I-2533CS-60)
- Build-in switch to select 120 Ω terminal resistor
- Fiber Cable: 8.3/125, 8.7/125, 9/125 or 10/125 μm
- Allow user-defined CAN baud rate
- 3 kV galvanic isolation between the power supply and CAN channel
- Rotary switch for CAN baud rate configuration
- Utility tool for CAN message filter configuration



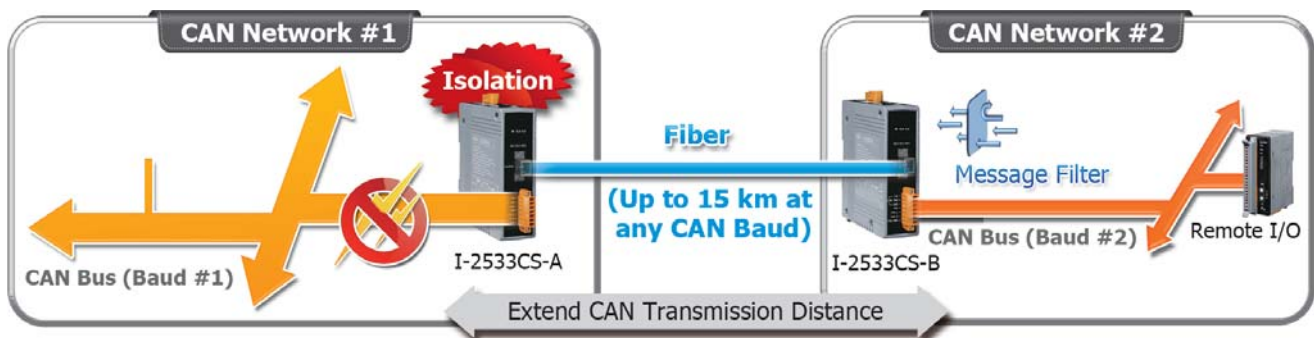
CAN to Single-mode Fiber Bridge

I-2533CS-A I-2533CS-B



The I-2533CS-A/B is a type of CAN-to-Fiber bridge that can be used to establish a connection between two CAN networks. It supports Wavelength Division Multiplexing (WDM) technology so that only a single fiber cable is needed for transmitting bi-directional CAN data. As the I-2533CS-A and I-2533CS-B must be paired because of hardware limitations, this means that the cost of deploying fiber cable can be effectively reduced. Compared with other CAN/Fiber converters, the I-2533CS-A/B has three significant features. First, the I-2533CS-A/B can be used to overcome the transmission distance limitations of the CAN Bus. Consequently, the transmission distance can be extended to up to 15 km using fiber cable, regardless of the CAN baud rates used in the system.

- Embedded NXP TJA1042 CAN transceiver
- 2500 Vrms isolation on the CAN side
- 120 Ω terminal resistor selectable via DIP switch
- CAN baud rate configurable via rotary switch
- Fiber Type: SC, Single mode, 100 Base-FX
- Utility for CAN message filter configuration
- Allows user-defined CAN baud rates
- Fully compatible with the ISO 11898-2 standard
- Wavelength: • Tx: 1310 nm, Rx: 1550 nm for I-2533CS-A
• Tx: 1550 nm, Rx: 1310 nm for I-2533CS-B
- Fiber Cable: 8.3/125, 8.7/125, 9/125 or 10/125 μm
- Supports both CAN 2.0A and CAN 2.0B specifications
- Max. transmission distance up to 15 km at any CAN baud rate
- 3 kV galvanic isolation between the power supply and the CAN channel



5. Ethernet/Wi-Fi to CAN Converters

Model Name	Description	
Ethernet/Wi-Fi to CAN Converter	I-7540D-MTCP	Modbus TCP to CAN Converter
	ECAN-240	Modbus TCP Client/Server to two CAN ports Gateway
	I-7540D	Ethernet to CAN Converter
	I-7540D-WF	Wi-Fi to CAN Converter

Modbus TCP to CAN Converter

I-7540D-MTCP



Inheriting to the most of all features of the I-7540D, the I-7540D-MTCP enables CAN networks to be combined with the Internet/Ethernet. It can be used to not only access the CAN network via the Ethernet, but can also realize Ethernet transparent transmission on the CAN network. In order to connect the PLCs, HMIs and SCADAs with the CAN devices more easily and conveniently, the I-7540D-MTCP supports the Modbus TCP and Modbus RTU communication protocol. This module can act as a Modbus TCP server, and wait for the commands from the Modbus TCP client. When the controller is a Modbus RTU master, the I-7540D-MTCP is able to be the Modbus RTU slave, and transfer the Modbus RTU commands to the CAN messages. These features mean that users can setup their applications more flexibly and conveniently.

- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898-2 standard
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Support maximum 24 Ethernet clients connection
- Support 30 specific CAN IDs in the Modbus TCP/RTU mode
- Provide the transparent communication between the CAN devices via Ethernet
- Provides one channel each for CAN, RS-232, RS-485 and 10/100 Base-T Ethernet



Pair Connection Architecture



Modbus TCP Client/Server to two CAN ports Gateway

ECAN-240



ECAN-240 is a ethernet to CAN two ports gateway. Users can communicate with different CAN networks at the same time. In order to be used more easily in industry, the ECAN-240 supports Modbus TCP client and Modbus TCP server function. Users can choose one of them for fitting their application.

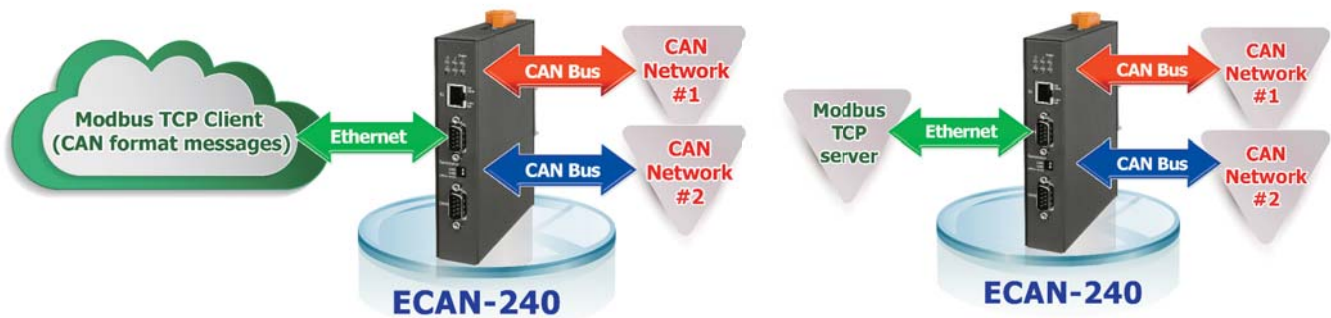
Furthermore, the two CAN ports have different purposes according to their usages. For example: In pair connection mode, the different CAN networks can be communicated with each other via module configuration.

- Fully compatible with the ISO 11898-2 standard
- Includes built-in DIP-switch the can be used to enable/disable the terminator resistor
- Includes an RJ-45 Ethernet interface with auto-negotiation function
- Includes two CAN bus interfaces with 9 pin D-sub connector
- Includes two rotary switches for selection of CAN bus baud rate
- Contains LED indicator on RJ-45 for ethernet status



Modbus TCP Server

Modbus TCP Client



Pair Connection



Ethernet to CAN Converter

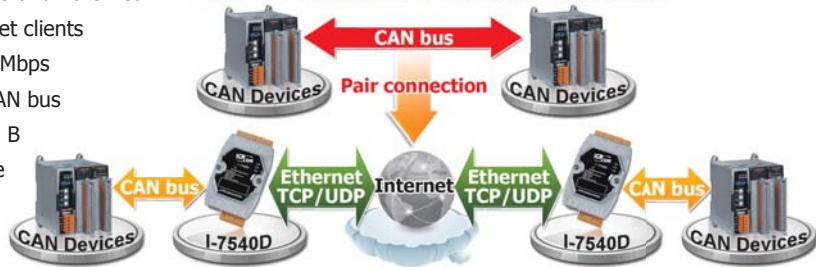
I-7540D



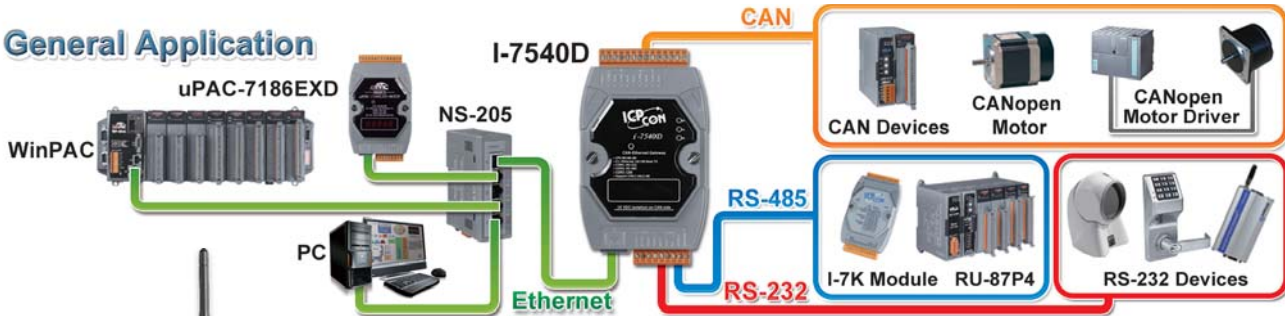
The I-7540D is a CAN to Ethernet converter, and is usually applied as an Ethernet to CAN/RS-232/485 device server. It supports socket access functions and virtual COM port technology which helps users to get the CAN, RS-232, RS-485 data via virtual COM port. The I-7540D also provides transparent mode, which enables CAN networks to be coupled together over the Internet/Ethernet, whereby remote monitoring and control is possible. By the features of tiny operating system, protocol independence, small casing and flexibility, it is able to widely fit various RS-232, RS-485 and CAN applications, which may be based on private RS-232 protocol, private CAN protocol, Modbus RTU protocol, CANopen protocol, DeviceNet protocol or J1939 protocol.

- Provide the transparent communication between the CAN devices via Ethernet
- Provide one channel each for CAN, RS-232, RS-485 and Ethernet
- Provides connections for a maximum of 25 Ethernet clients
- Supports a range of baud rates from 10 kbps ~ 1 Mbps
- Jumper for the 120 Ω terminator resistor of the CAN bus
- Compatible with CAN specification 2.0 parts A and B
- 2500 Vrms photocoupler isolation on the CAN side
- Fully compatible with the ISO 11898-2 standard
- Supports the Virtual COM technology
- 10/100 Base-T Ethernet port

Extend CAN communication distance



General Application



Wi-Fi to CAN Converter

I-7540D-WF



The I-7540D-WF supports the wireless transmission of CAN data between a CAN network and a WLAN network according to the 802.11b/g standard. It provides CAN to WLAN converter functionality together with wireless transparent transmission on the CAN network. The I-7540D-WF is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and is often used in short ranges up to 100 m. Using an appropriately configured router, CAN data can be determined to pass or filter from the CAN networks to the Ethernet. The wireless connection that is established between two I-7540D-WF units can be used instead of a cable, and enables the connection of CAN networks that would otherwise be difficult to link such as rotational machineries.

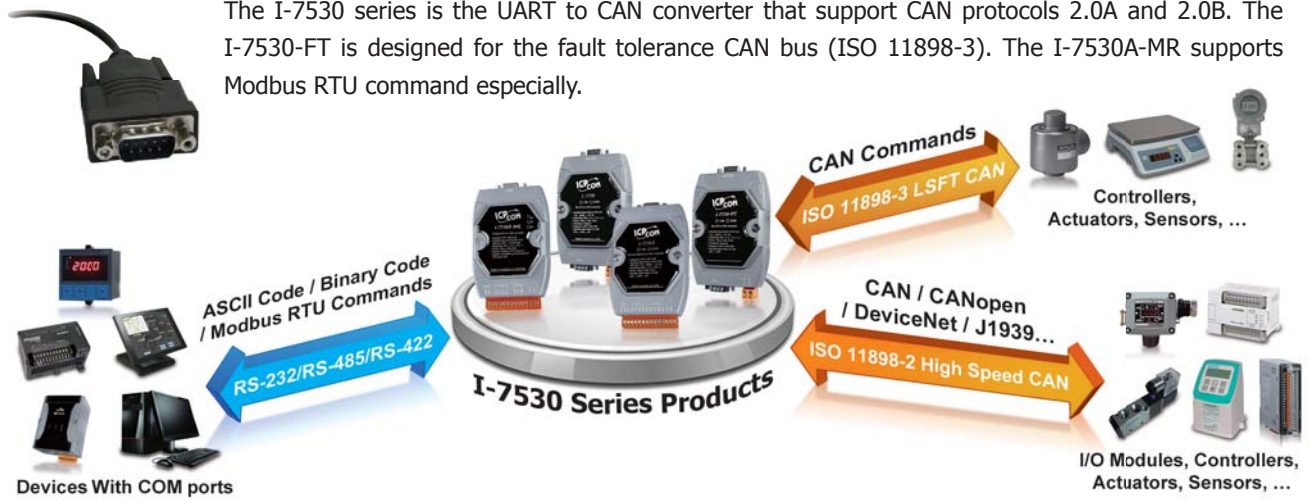
- IEEE 802.11 b/g compliant
- Wireless data transmission via WLAN
- Connects CAN networks via a WLAN bridge
- Compatible with CAN specification 2.0 parts A and B
- Wireless transmission distance: up to 100 meters
- Two different operation modes: infrastructure and ad-hoc
- Supports WEP, WPA and WPA2 encryption for wireless LAN
- Point to point or point to multi-point connection via wireless LAN
- Communication efficiency (peak value): one-way is up to 700 fps (client->server, server->client), two-way 350 fps (client<=>server)

Ad hoc mode (AP is not necessary)



6. UART to CAN Converters

The I-7530 series is the UART to CAN converter that support CAN protocols 2.0A and 2.0B. The I-7530-FT is designed for the fault tolerance CAN bus (ISO 11898-3). The I-7530A-MR supports Modbus RTU command especially.



Models	I-7530-FT	I-7530	I-7530T	I-7530A	I-7530A-MR	tM-7530	tM-7530A
	RS-232 to Fault-Tolerance CAN Converter	RS-232 to CAN Converter		RS-232/422/485 to CAN Converter	Modbus RTU to CAN Converter	Tiny RS-232 to CAN Converter	RS-232/RS-485/RS-422 to CAN Converter
Pictures							
CAN Interface							
Transceiver	AMIS 41682	NXP 82C250	TJA1042	NXP 82C250		NXP TJA1042	
Connector	9-pin male D-sub					3 pins spring type terminal block	7-pin terminal block
Baud Rate	10 k, 20 k, 50 k, 125 k bps	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps					
Protocol	ISO 11898-3 (low speed fault tolerance), CAN 2.0A and CAN 2.0B	ISO 11898-2, CAN 2.0A and CAN 2.0B					
Receiver Buffer	1000 data frames					256 data frames	
Isolation	-	3000 Vdc for DC-to-DC				1000 Vdc for DC-to-DC	
UART Interface							
Type	RS-232			RS-232/422/485		RS-232	RS-232/422/485
Protocol	-				Modbus RTU slave	-	
Connector	9-pin female D-sub			14-pin terminal block		9-pin female D-sub	10-pin terminal block
Baud Rate (bps)	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200			300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400			
Receiver Buffer	900 data frames					256 bytes	
System							
Power Consumption	1 W						
Power Input	+10 VDC ~ +30 VDC						
Dimensions (W × L × H)	72 × 118 × 33 (mm)					52 × 86 × 32 (mm)	52 × 93 × 27 (mm)
Operating Temperature	-25°C ~ +75°C						
Storage Temperature	-30°C ~ +80°C						

Tiny UART/CAN converter

tM-7530A



The tM-7530A is a tiny UART/CAN converter to fit narrower environment as a result of its small size. It has isolation on power side and on CAN bus side and its performance is faster than other UART/CAN module. The function of tM-7530A can full compatibly with I-7530 and I-7530T. In additional, it provides new function such as listen only. User can use this function to listen CAN bus messages and error detection. According to above features, tM-7530A is an economical and practical UART/CAN converter solution.

- Compatible with CAN specification 2.0A and 2.0B
- Support various CAN baud rate from 10K bps to 1M bps
- Software configurable CAN and UART communication parameters
- Support pair connection mode
- Software buffer on CAN bus side and UART side

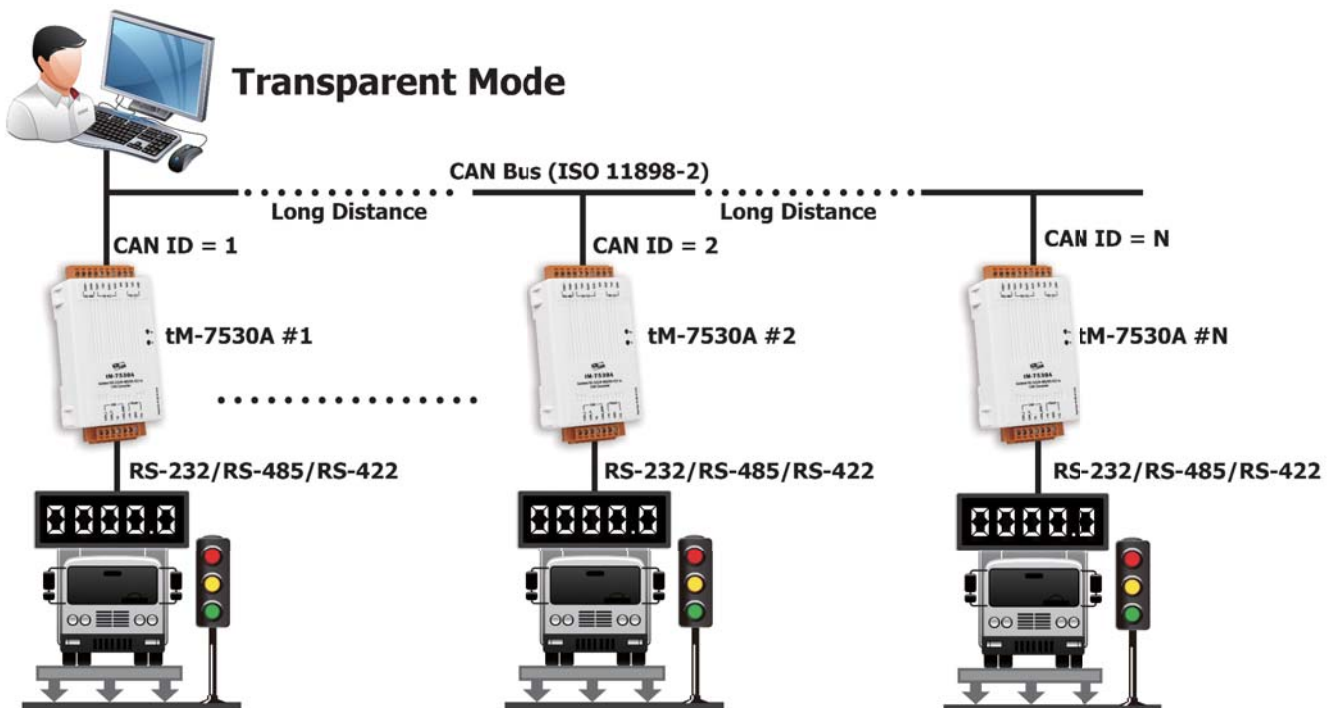
Pair Connection Mode



tM-7530A Application



Transparent Mode



7. CANopen Gateways

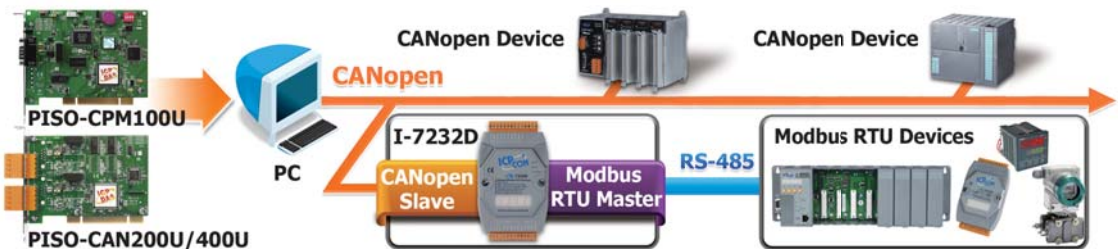
Model Name	Description	
CANopen Gateway	I-7232D	CANopen Slave to Modbus RTU Master Gateway
	GW-7433D	Modbus TCP/RTU Slave to CANopen Master Gateway
	GW-7553-CPM	PROFIBUS DP Slave to CANopen Master Gateway

CANopen Slave to Modbus RTU Master Gateway

I-7232D



The I-7232D is a CANopen slave to Modbus RTU master gateway, and allows a CANopen master to have ability to access the Modbus slave devices. In the CANopen network, the I-7232D is a NMT slave, SDO server, PDO producer, and PDO consumer. From the view of the Modbus network, it is a Modbus RTU master which polls all the predefined data of the Modbus RTU slaves, and bypass the CANopen control commands to the Modbus slaves. The I-7232D follows the CANopen specification CiA-301 v4.02 and CiA-401 v2.1, and supplies many features of CANopen protocols, such as dynamic PDO, EMCY object, error output value, SYNC cyclic and acyclic. An EDS file is also provided by the utility tool. Users can easily apply the I-7232D in the standard CANopen master with the EDS file.

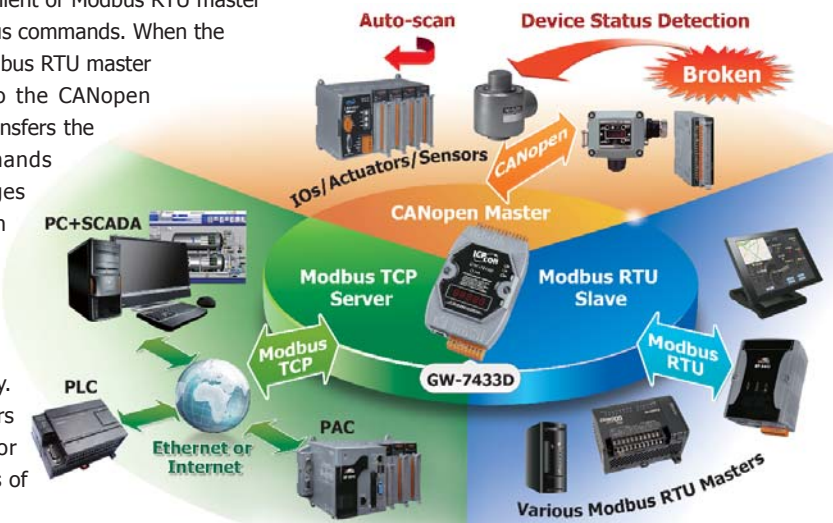


Modbus TCP/RTU Slave to CANopen Master Gateway

GW-7433D



The GW-7433D is communication transformation mechanisms between the Modbus protocol and the CANopen protocol. This module is able to collect the information of the CANopen slaves periodically, and returns these data to the Modbus TCP client or Modbus RTU master while receiving the Modbus commands. When the Modbus TCP client or Modbus RTU master needs to output data to the CANopen slaves, the GW-7433D transfers the received Modbus commands to the CANopen messages to handle the CANopen slaves. Both of the Modbus TCP server and the Modbus RTU slave functions can work on the GW-7433D simultaneously. The GW-7433D also offers the Modbus registers for recording the life statuses of the CANopen slaves.



PROFIBUS DP Slave to CANopen Master Gateway

GW-7553-CPM



The GW-7553-CPM is designed for the slave device of PROFIBUS DP protocol. It allows PROFIBUS master to access CANopen slave devices. These CANopen slave device may be a sensor, actuators, ICPDAS CAN-2000 series modules and so forth. In addition, we also provide the utility software for users to configure the GW-7553-CPM.



8. DeviceNet Gateways

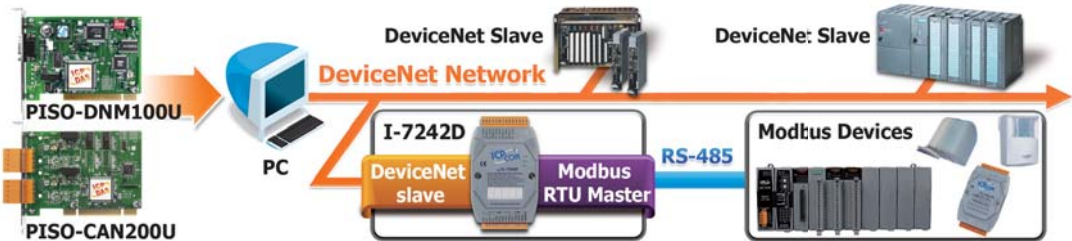
Model Name	Description	
DeviceNet Gateway	I-7242D	DeviceNet Slave to Modbus RTU Master Gateway
	GW-7243D	DeviceNet Slave to Modbus TCP/RTU/ASCII Master Gateway
	GW-7434D	Modbus TCP/RTU Slave to DeviceNet Master Gateway

DeviceNet Slave to Modbus RTU Master Gateway

I-7242D



The I-7242D allows a master located on a DeviceNet network to enter into a dialogue with the slaves on a Modbus RTU network. It's a "Group 2 Only Server" device in the DeviceNet network, and supports "Predefined Master/Slave Connection Set". From the view of the Modbus network, it is a Modbus RTU master which polling all the predefined data of the Modbus RTU slaves, and bypass the DeviceNet control commands to the Modbus slaves. This device is widely used in the application of building automation, remote data acquisition, environment control and monitoring, laboratory equipment & research, factory automation, etc. The I-7242D also has the utility tool which is used to configure the I-7242D's parameters and build the EDS file. Through the EDS file, it is easy to apply the Modbus RTU devices in DeviceNet applications.

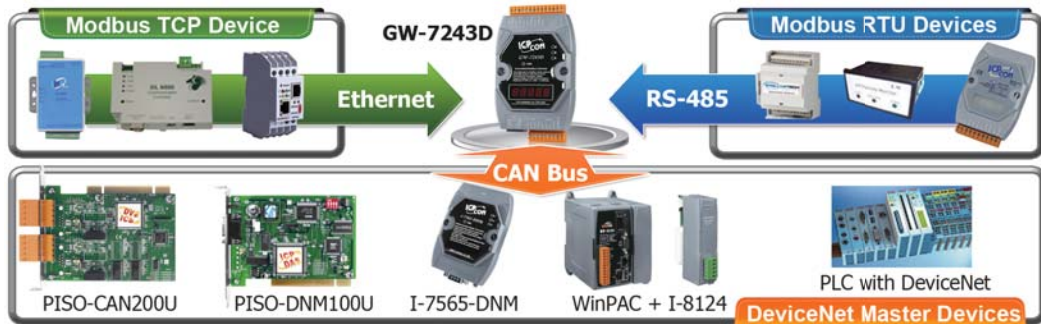


DeviceNet Slave to Modbus TCP/RTU/ASCII Master Gateway

GW-7243D



The GW-7243D offers the DeviceNet slave and Modbus master functions, and enables the DeviceNet master to access the Modbus slave devices. In the DeviceNet network, the module acts as a Group 2 Only Server device, and waits to build the connection with the DeviceNet master. In the Modbus network, the GW-7243D is a master device, and cyclically sends the commands to access the Modbus slave devices. Both the Modbus TCP client and Modbus RTU/ASCII master interfaces of the GW-7243D can work simultaneously. This feature means that users are able to integrate different kinds of Modbus slave devices together into the DeviceNet network no matter these devices provide Ethernet, RS-232 or RS-485 communication interfaces. In order to simplify the use of the GW-7243D, the GW-7243D Utility tool for configuration and EDS file production is given to build the applications easily and quickly.



Modbus TCP/RTU Slave to DeviceNet Master Gateway

GW-7434D



The GW-7434D is a communication protocol transformation between the DeviceNet protocol and the Modbus TCP protocol. This module solves the problem to connect an existing DeviceNet network to the Ethernet-based PLC, HMI or SCADA for setting up a control or monitoring system. Different to the GW-7243D, the GW-7434D offers the Predefined Master connection Set function and Group 2 only Server function as a DeviceNet master, and enables accessing the DeviceNet slaves automatically and cyclically. If the PLC, HMI or SCADA would like to access the DeviceNet slaves and simultaneously communicate with the Modbus slaves or COM-based devices connected with the RS-232 or RS-485 ports of the GW-7434D, the GW-7434D can be the Modbus TCP server or VxComm server to exchange the data with those devices.



9. J1939 Gateways

J1939 is the vehicle bus standard used for communication and diagnostics among vehicle components, originally by the car and heavy duty truck industry in the United States. Because of the success of applying in vehicles, J1939 has become the accepted industry standard and the vehicle network technology of choice for off-highway machines in applications such as construction, material handling, and forestry machines. It is a higher-layer protocol based on Controller Area Network (CAN), which provides serial data communications between microprocessor systems (ECU) in any kind of heavy duty vehicles.

Model Name		Description
J1939 Gateway	GW-7228	Modbus RTU Slave to J1939 Gateway
	GW-7238D	Modbus TCP/RTU Slave to J1939 Gateway

Modbus RTU Slave to J1939 Gateway

GW-7228



The GW-7228 enables the Modbus RTU master to exchange the data with the devices in the J1939 network. This module provides the Modbus slave functions on the RS-232, RS-422, and RS-485 ports so that the Modbus RTU master can easily control and monitor the J1939-based devices. If users use one of the communication ports for application, the other two ports can be used to monitor the Modbus communication situations between the Modbus master and the GW-7228. This feature is helpful for diagnosis while setting up an application system. For J1939 CAN networks, the GW-7228 supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the Diesel power-train, in-vehicle networks for trucks and buses or where the Modbus RTU and J1939 protocols transformation is needed.

- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support Modbus RTU slave protocol with function codes 03, 04, 06 and 16
- Support BAM of Connection Management message
- Provide PWR/J1939/MODBUS indication LED
- Support RS-232, RS-485 and RS-422 interfaces
- Built-in jumper to select 120 Ω terminal resistor



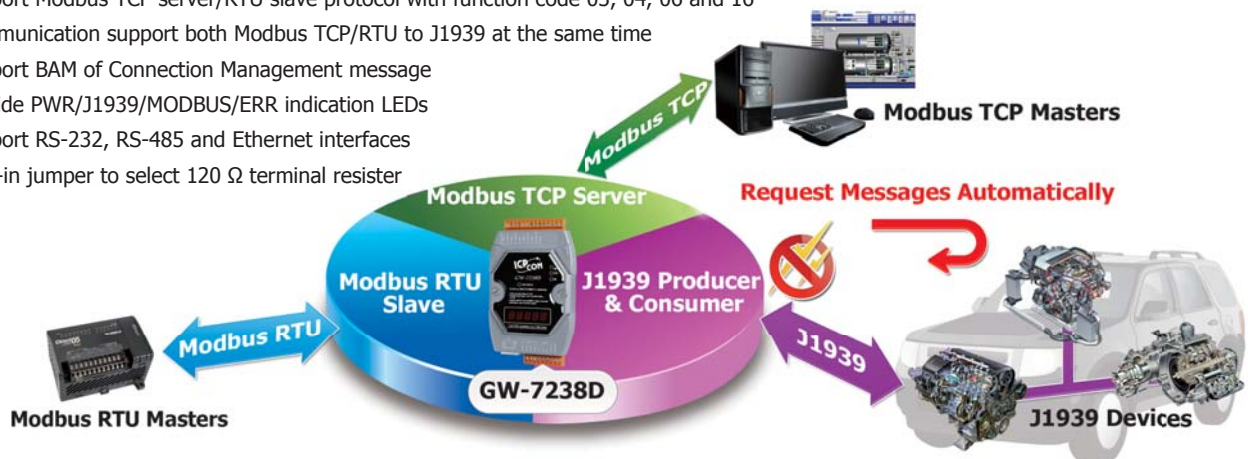
Modbus TCP/RTU Slave to J1939 Gateway

GW-7238D



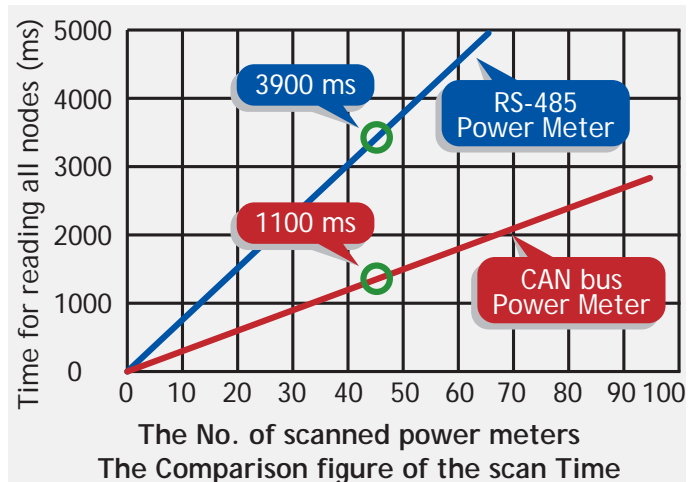
Similar to the GW-7228, the GW-7238D is a J1939 to Modbus slave gateway. The main difference is that the GW-7238D has an Ethernet port as the Modbus TCP server, and allows connecting with up to 5 Modbus TCP clients. The GW-7238D also offers an RS-232 and RS-485 ports which are the Modbus RTU slaves and enable the Modbus RTU master to exchange the data with the devices in the J1939 network. Both the Modbus TCP server and the Modbus RTU slave functions of the GW-7238D can work simultaneously. This feature means that users can apply the GW-7238D in their applications more flexibly and more economically. For J1939 CAN networks, the GW-7238D supports PDU1, PDU2, broadcast and destination specific type of J1939 messages, and is widely applied in the various J1939-based applications.






- Transmission and reception of all types of J1939 messages, including PDU1, PDU2, broadcast and destination specific
- Support Modbus TCP server/RTU slave protocol with function code 03, 04, 06 and 16
- Communication support both Modbus TCP/RTU to J1939 at the same time
- Support BAM of Connection Management message
- Provide PWR/J1939/MODBUS/ERR indication LEDs
- Support RS-232, RS-485 and Ethernet interfaces
- Built-in jumper to select 120 Ω terminal resistor



10. CAN Bus Power Meter

PM-3000-CPS series power meter is used for gathering the real-time power consumption information by the CAN interface. It supports not only polling mode, but also Auto-response mode which lets the power meter automatically reply the CAN messages in the predefined time period. This makes the communication more efficient while building a large power monitor system.



Models	PM-3033-CPS	PM-3133-CPS	PM-3112-CPS	PM-3114-CPS	PM-4324-CPS
Pictures					
AC Power Measurement					
Wiring	1P2W-1CT 1P3W-2CT 3P3W-2CT 3P3W-3CT 3P4W-3CT	1P2W-1CT 1P3W-2CT 3P3W-2CT 3P3W-3CT 3P4W-3CT	1P2W-2CT	1P4W-4CT	1P2W-1CT 1P3W-2CT 3P3W-2CT 3P3W-3CT 3P4W-3CT
Measurement Voltage	10 ~ 500 V		10 ~ 300 V		10 ~ 500 V
Measurement Current	1A or 5A	CTØ10 mm (60 A); CTØ16 mm (100 A); CTØ24 mm (200 A); CTØ36 mm (300 A); CTØ36 mm (400 A)	CTØ10 mm (60 A); CTØ16 mm (100 A); CTØ24 mm (200 A);		CTØ10 mm (60 A); CTØ16 mm (100 A); CTØ24 mm (200 A); CTØ36 mm (300 A); CTØ36 mm (400 A)
Measurement Frequency	50/60 Hz				
W Accuracy	Better than 0.5% (PF=1)		Better than 1% (PF=1)		Better than 0.5% (PF=1)
Power Parameter Measurement	True RMS voltage (Vrms), True RMS current (Irms), Active Power (kW), Active Energy (kWh), Apparent Power (kVA), Apparent Energy (kVAh), Reactive Power (kVAR), Reactive Energy (kVARh), Power Factor (PF), Frequency				
Data Update Rate	1 Second				
Alarm Output					
Power Relay	N/A	Form A (Normal Open) x 2; 5 A @ 250 VAC (47 ~ 63 Hz), 5 A @ 30 VDC			
Power					
Input Range	+12 VDC ~ +48 VDC				+85 VAC ~ +264 VAC
Power Consumption	2 W				6 W
Mechanical					
Casing	Plastic				
Module Installation	DIN-Rail Mounting				DIN-Rail Mounting; Wall mounting
Environment					
Operating Temperature	-20°C ~ +70°C				
Storage Temperature	-25°C ~ +80°C				
Ambient Relative Humidity	10 ~ 90% RH, Non-condensing				

CAN Bus Power Meter

PM-3033-CPS



PM-3112-CPS



PM-3133-CPS

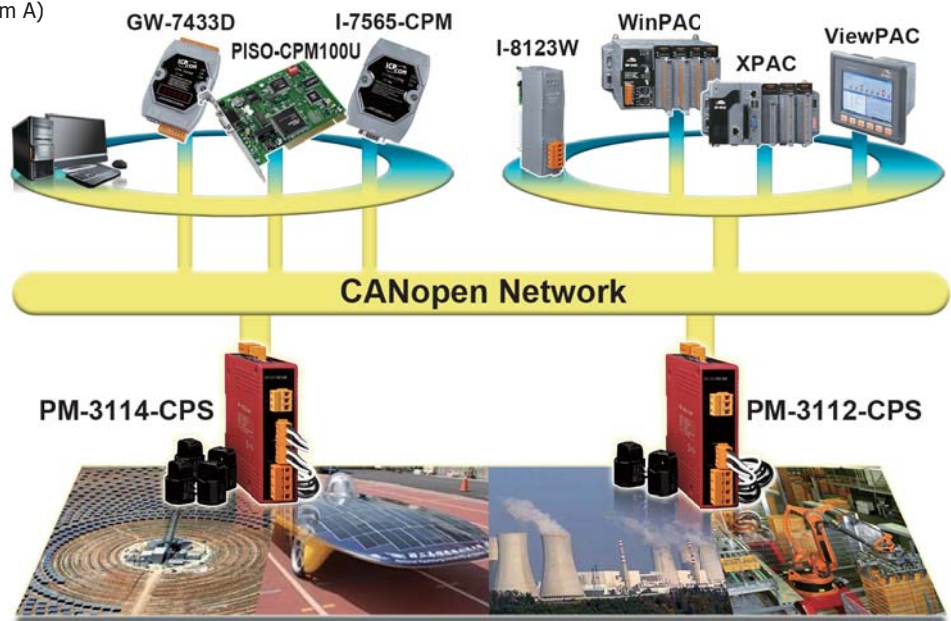


PM-3114-CPS



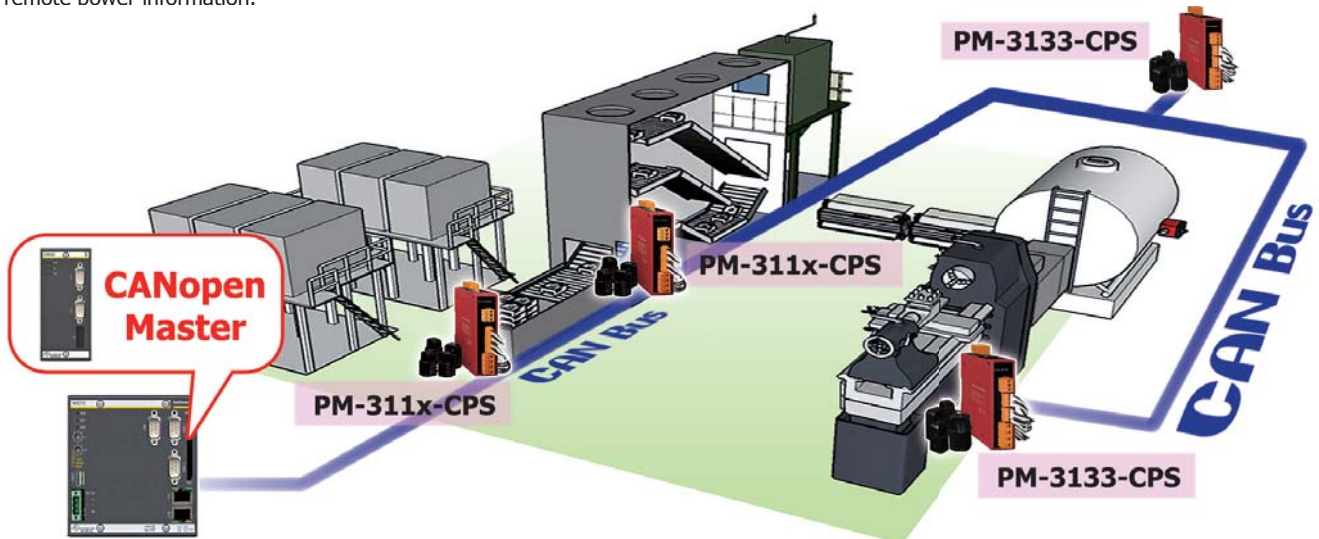
The Smart Power Meter PM-3000 Series can give you access to real-time electric usage for power management. With its high accuracy (<1%, PF=1), the power meter series can be applied to both low voltage primary side and/or medium/high voltage secondary side and enables the users to obtain reliable and accurate energy consumption readings from the monitored equipment in real time under operation. These compact size and cost-effective power meters are equipped with revolutionary wired clip-on CT (various types, support input current up to 200 A).

- Current Measurements Up to 200 A with Different CT Ratio
- Supports 2 Power Relay Output (Form A)
- Voltage Measurements Up to 300 V
- W Accuracy Better than 1% (PF=1)
- Energy Analysis for 1P2W, 1P4W
- True RMS Power Measurements
- Clip-on CT for Easy Installation
- Supports CAN Bus Interface
- Supports CANopen Protocol



Case Studies: Power Control System of Factory



In this case, user add several PM-3114-CPS into existing CANopen network for monitoring power system of factory. The PM-3133-CPS and PM-311x-CPS can be accessed by any standard CANopen master. It makes the communication more efficient when collecting a lot of remote power information.



11. CAN Bus Data Logger

The CAN bus data logging device serves for logging of communication over the CAN data bus. Each received data packet is given a specific time mark, which shows the precise arrival time of data. The actual time mark is obtained from the internal real time clock (RTC), therefore it is independent of the global system time. Data logging on a common SD card allows further analysis and system monitoring on a PC. The CAN-Logger100/200 device by ICP DAS is the result of extensive CAN bus testing and CAN bus programming and is suited for all type of CAN bus application.



Models	CAN-Logger100	CAN-Logger200
Pictures		
CAN Interface		
Transceiver	NXP TJA1042	
Channel Number	1	2
Connector	5-Pin male M12 x 1 (Pin 1: F.G., Pin 2: +Vs, Pin 3: GND, Pin 4: CAN_H Pin 5: CAN_L)	5-Pin male M12 x 2 (Pin 1: F.G., Pin 2: +Vs, Pin 3: GND, Pin 4: CAN_H Pin 5: CAN_L)
Transmission Speed (bps)	10 k, 20 k, 50 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1 M and user-defined baud rate	
Terminator Resistor	DIP switch for the 120 Ω terminator resistor	
Isolation	3000 VDC for DC-to-DC, 2500 Vrms for photocoupler	
Specification	ISO-11898-2, CAN 2.0A and CAN 2.0B	
CAN Filter	Utility tool	
USB Interface		
Connector	USB Type B x 1	
Compatibility	USB 2.0 High Speed	
Max. Data flow	Transmit: 4000 fps ; Receive: 1000 fps	
Software Driver	Windows XP/7/8.1/10	
Data Logger Capability		
Storage Media	SDHC type flash – support 4 to 32 GB	
Recording Format	Binary	
Time Stamp Resolution	10 us	
Configuration	Utility tool	
Trigger	Log continuously	
Data Logger	Maximum message rate, receive: 15000 msgs/s	
LED		
Round LED	Power, MS, SD, CAN1, CAN2, CAN_ST LEDs	Power, MS, SD, CAN_Rx, CAN_Tx, CAN_ST LEDs
Power		
Power Supply	USB power or CAN bus power (Unregulated +10 ~ +30 Vdc) delivery	
Protection	Power reverse polarity protection, Over-voltage brown-out protection	
Power Consumption	0.1A @ 24V	
Mechanical		
Installation	DIN-Rail	
Casing	Metal	
Dimensions (W x L x H)	102 mm x 102 mm x 44 mm (W x L x H)	
Environment		
Operating Temperature	-25°C ~ +75°C	
Storage Temperature	-30°C ~ +80°C	
Relative Humidity	10 ~ 90% RH, Non-condensing	

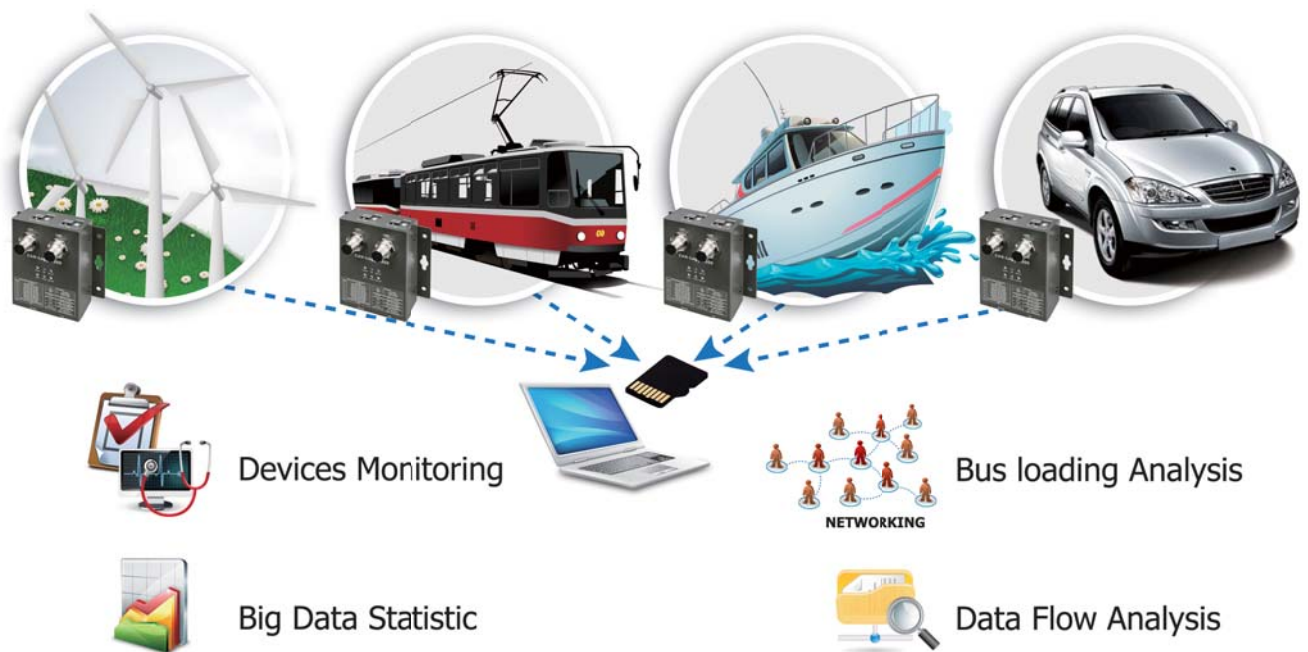
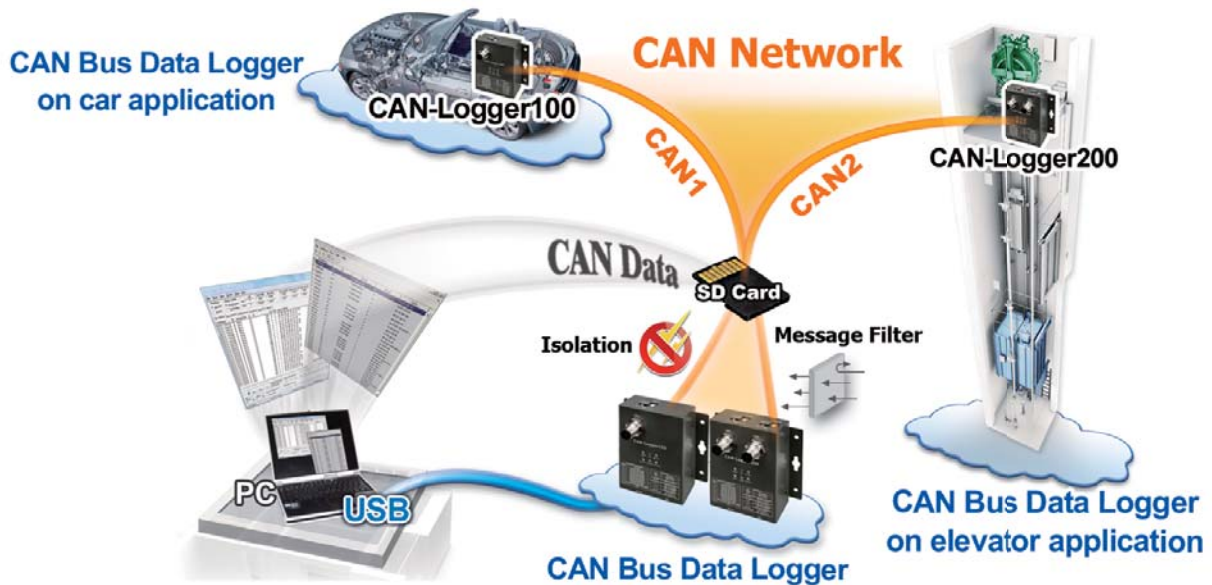
USB to 1/2-port CAN bus data logger device

**CAN-Logger100
CAN-Logger200**



The CAN-Logger series devices (CAN-Logger100 / CAN-Logger200) are high-performance intelligent CAN bus data logger device with one/two CAN port that can help to make data collection and to process on a CAN bus network easier and quicker. The powerful CPU of the CAN-Logger devices provide the accurately time-stamp for each CAN message and supports storage media like SD or SDHC type flash for saving these CAN messages that is useful to analysis and diagnostic the CAN Bus network. In order to enhance the portability of the CAN-Logger, this module is powered by the USB interface or M12 connectors of CAN bus interface. The CAN-Logger devices use the standard USB HID driver of the Windows system.

- CAN-Logger100 provides one CAN port.
CAN-Logger200 provides two CAN ports
- Power by the USB port or CAN port
- 3 kV galvanic isolation for the CAN port
- Full compatible with the ISO 11898-2 standard
- 2500 Vrms photocoupler isolation on the CAN side
- Supports CAN bus acceptance filter configuration
- Compatible with CAN specification 2.0 parts A and B
- Programmable CAN bus baud rate from 10 kbps ~ 1 Mbps
- Built-in jumper for the 120 Ω terminal resistor of the CAN side
- Supports 4 to 32 GB SDHC type flash for saving CAN messages
- CAN messages are time-stamped with 10 microseconds resolution
- Provides a configuration utility that can be used to transmit/receive CAN messages



12. PC-based CAN Bus Boards

To access the CAN sensors, actuators, and I/O modules we provide communication boards for PC-based solution.

Communication Boards:

The following CAN bus communication boards are designed for different interface and different CAN port number. The common features are:

1. Compatible with CAN specification 2.0 parts A and B
2. Fully compatible with ISO 11898-2 standard
3. Supports baud rate from 10 kbps to 1 Mbps
4. 2 kV galvanic isolated
5. Direct memory mapping to the CAN controller

Software Support:






► For Windows:




- ✓ LabVIEW CAN Driver
- ✓ DASyLab CAN Driver
- ✓ RTX CAN Driver
- ✓ PISOCNX Active Object
- ✓ NAPOPC.CAN DA Server
- ✓ InduSoft Driver
- ✓ Power Meter Driver

► For Linux:

- ✓ SocketCAN Device Driver

PC-based CAN Communication Boards

Model Name	PEX-CAN200i	PISO-CAN100U	PISO-CAN200U	PISO-CAN400U	PISO-CAN800U
Pictures					
CAN Channel	2	1	2	4	8
Bus Interface	X1 PCI Express	Universal PCI			
On-board CPU	-				
Baud Rate	Programmable transfer rate up to 1 Mbps				
Terminator Resistor	Jumper for 120 Ω terminator resistor				
Galvanic Isolation	2 kV				
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net				
RTX Driver	Yes				-
LabVIEW Driver	Yes				-
InduSoft Driver	Yes				-
OPC Server	Yes				-
OCX	Yes				-
SocketCAN Driver	Yes				-
Device Driver	Windows XP/7/8/10 (32-bit/64-bit OS), Linux 2.6.x ~ 4.8.0				

Model Name	PCM-CAN100	PCM-CAN200	PCM-CAN200P
Pictures			
CAN Channel	1, and the other for bypass	2	
Bus Interface	PCI-104		PC/104-Plus
On-board CPU	-		
Baud Rate	Programmable transfer rate up to 1 Mbps		
Terminator Resistor	Jumper for 120 Ω terminator resistor		
Galvanic Isolation	2 kV		
PC APIs	API for VB, VC, BCB, VB.Net, C#.Net		
RTX Driver	Yes		
LabVIEW Driver	Yes		
InduSoft Driver	Yes		
OPC Server	Yes		
OCX	Yes		
SocketCAN Driver	Yes		
Device Driver	Windows XP/7/8.1/10, Linux		

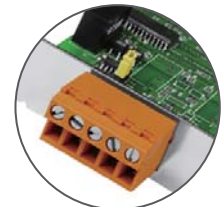
Model Name	PISO-CM100U	PISO-CM200U	PCM-CM100	PISO-DNM100U	PISO-DNS100U	PISO-CPM100U	PCM-CPM100
Pictures							
CAN Channel	1	2	1				
Bus Interface	Universal PCI		PCI-104	Universal PCI			PCI-104
On-board CPU	Yes						
On-board CPU OS	MiniOS7	-	MiniOS7				
On-board CPU APIs	C/C++	-	C/C++	-			
Default Firmware	CAN 2.0A/2.0B			DeviceNet Master	DeviceNet Slave	CANopen Master	
EDS File Support	-					Yes	
Baud Rate	Programmable transfer rate up to 1 Mbps			125 k, 250 k, and 500 kbps		10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps	
Terminator Resistor	Jumper for 120 Ω terminator resistor						
Galvanic Isolation	2 kV	3 kV	2 kV				
PC APIs	API for VB, VC++, BCB, Delphi	API for VB.Net, C#.Net, VC++, Net	API for VB, VC++, BCB, Delphi	API for VB, VC++, VB.Net, C#.Net			
LabVIEW Driver	-			Yes	-		
InduSoft Driver	Yes	-	Yes		-	Yes	
Power Meter Driver	Yes	-	Yes	-			Yes
Device Driver	Windows XP/7/8.1/10, Linux	Windows XP/7/8.1/10	Windows XP/7/8.1/10, Linux				

Connector Types: -T/-D

Each CAN bus board provide two type of connectors and, DB9 and Terminal Block.



PISO-xxxxx-D



PISO-xxxxx-T

Accessory:

Optional Cable for PISO-CAN800U

CA-9-3705:

DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 0.3 M (90°)

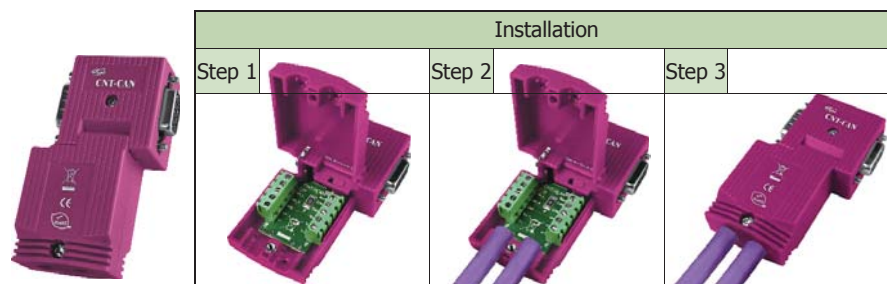


CA-9-3715D:

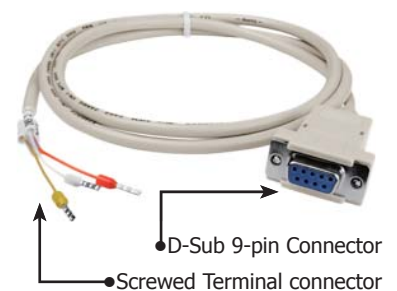
DB-37 Male (D-sub) to 4-Port DB-9 Male (D-sub) cable. 1.5 M (180°)



Optional CAN bus connector: CNT-CAN

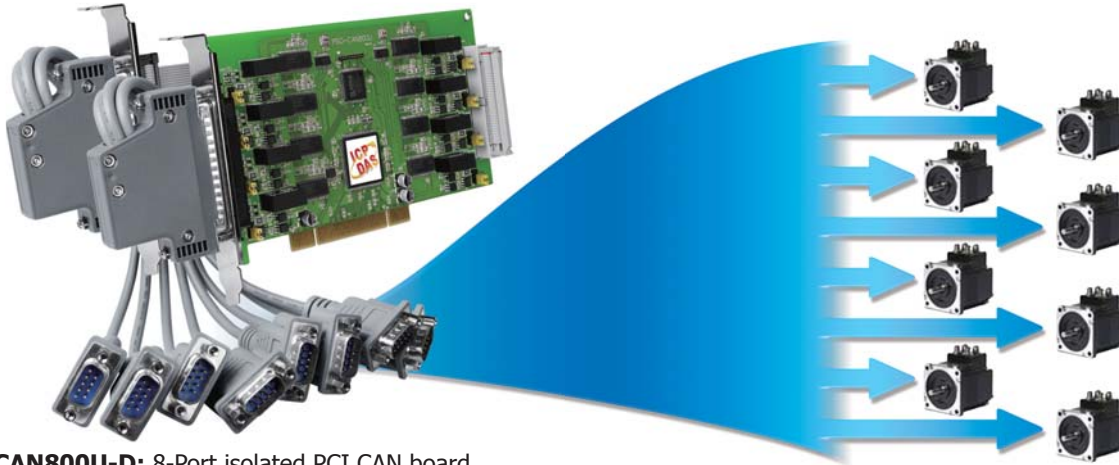


CA-0910-C



CAN bus boards

The PCI and PCI Express CAN bus boards use the new CAN controller Phillips SJA1000T and transceiver TJA1042, which provide bus arbitration, error detection with auto correction and re-transmission function. It can be installed in a 5V or 3.3V PCI slot and supported truly "Plug & play".



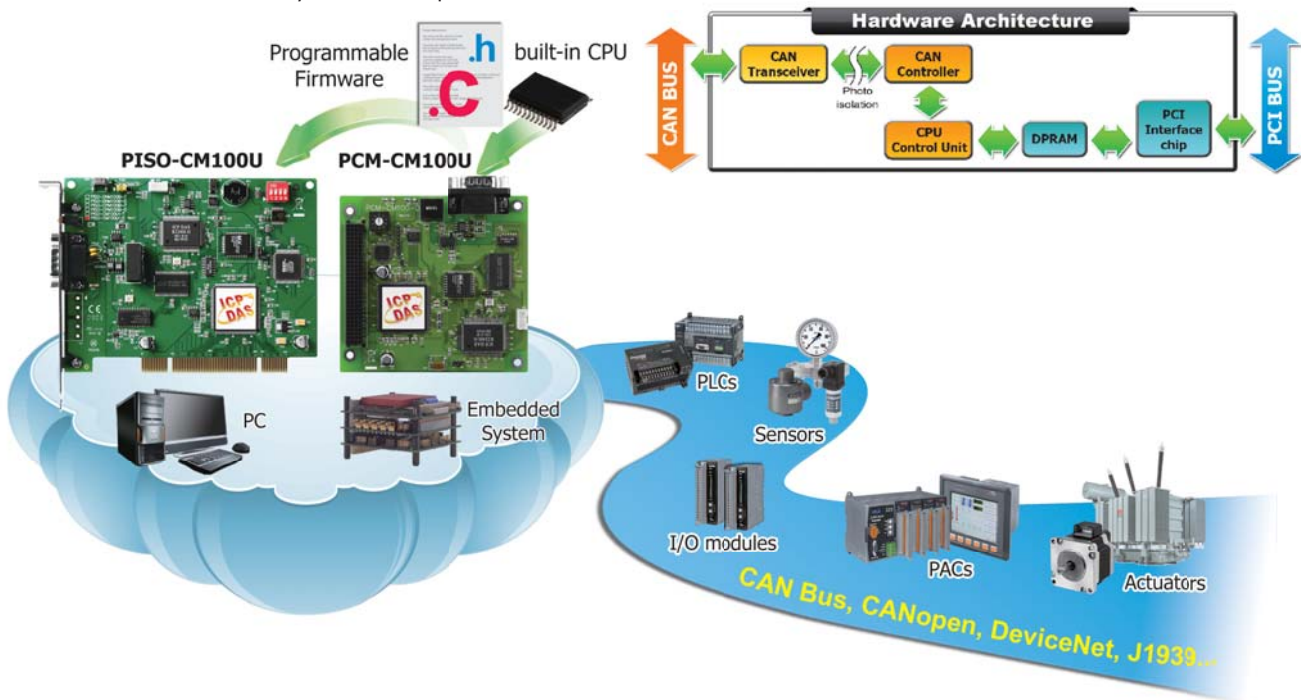
PISO-CAN800U-D: 8-Port isolated PCI CAN board

Common Features:

- Universal PCI card, supports both the 5 V and the 3.3 V PCI bus
- Compatible with CAN specification 2.0 parts A and B
- Fully compatible with the ISO 11898 -2 standard
- Support a range of baud rates from 10 kbps ~ 1 Mbps
- VB, VC++, Delphi, and Borland C++ builder demos are provided
- Built-in jumper for the 120 Ω terminator resistor of the CAN bus
- 2500 Vrms photocoupler isolation on the CAN side
- Provide 1/2/4/8 independent CAN channels
- 2 kV galvanic isolation for each CAN port
- Direct memory mapping to the CAN controller
- Supports LabVIEW and DASyLab drivers

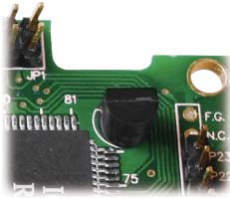
PISO-CM100U, PCM-CM100: CAN board with built-in programmable CPU

As a stand-alone CAN controller, the PISO-CM100U/PCM-CM100 represents a powerful and economic solution. It has an internal 16-bit 80186 compactable CPU for the complex protocol interpretations and implementations. Owing to the real-time DOS-like OS, MiniOS7, the PISO-CM100U/PCM-CM100 can cover most of all time-critical CAN-based applications, such as self-define CAN protocol, CANopen, DeviceNet, J1939, and so forth. Therefore, when users develop their projects, the PISO-CM100U/PCM-CM100 is helpful to handle the process of the CAN messages, and share the CPU loading of the PC or embedded system. Besides, the PISO-CM100U/PCM-CM100 allows users designing the firmware of the PISO-CM100U/ PCM-CM100. Through the library and demos, it is easy to finish the user-defined firmware to satisfy the users' requirements.



13. Palm-size Programmable CAN Controllers

The palm size PACs (Programmable Automation Controller) includes I-7188XBD-CAN, uPAC-7186EXD-CAN and uPAC-5001D-CAN2. With abundant and various peripherals and communication ports, the PAC can integrate different communication interface, like CAN bus, RS-232, RS-485, Ethernet and so on. In order to increase the modules openness and applications flexibility, the PAC provides MiniOS7, a DOS-like real-time single-task operation system for adapting to all kinds of needs. Users can develop application programs via C/C++ compiler.



Unique 64-bit Hardware Serial Number



Built-in RTC - Real Time Clock



5-Digit 7-Segment LED Display



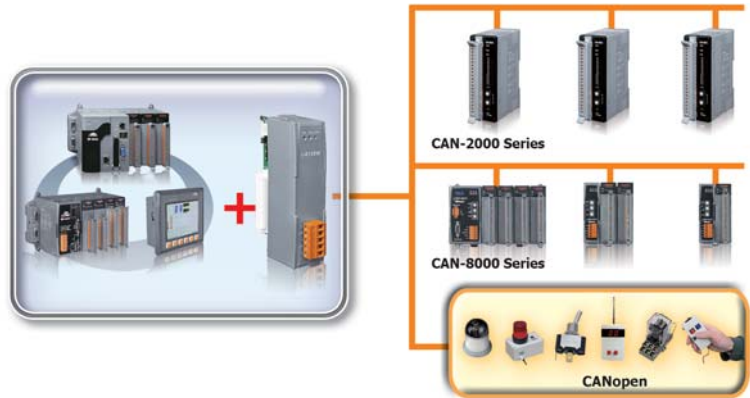
microSD expansion

Model Name	I-7188XBD-CAN	uPAC-7186EXD-CAN	uPAC-5001D-CAN2
Pictures			
System Software			
OS	MiniOS7 (DOS-like embedded operating system)		
Development Software			
Download Interface	RS-232 (COM1) or Ethernet		
Language	C language		
Compilers	TC++ 1.01, TC 2.01, BC++3.1 ~ 5.2x, MSC 6.0, MSVC++ (before version 1.5.2)		
CPU Module			
CPU	80188, 40 MHz or compatible	80186, 80 MHz or compatible	
SRAM	512 KB	512 KB	512 KB
Flash	512 KB	512 KB	512 KB
microSD Expansion	-		Up to 2 GB
EEPROM	2 KB	16 KB	
NVRAM	31 Bytes (battery backup, data valid up to 10 years)		
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year		
64-bit Hardware Serial Number	Yes, for Software Copy Protection		
Watchdog Timers	Yes (0.8 second)		
Communication Ports			
Ethernet	-	10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND) or RS-485 (Data+, Data-), non-isolated	RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated	
COM 2	RS-485 (Data+, Data-) with internal self-tuner ASIC; non-isolated		
CAN	1 channel	1 channel	2 channels
LED Indicator			
7-Segment LED	Yes		
Programmable LED Indicators	4	5	
Mechanical			
Dimension (W × L × H)	72 mm × 122 mm × 33 mm		91 mm × 123 mm × 52 mm
Installation	DIN-Rail Mounting		
Environmental			
Operating Temperature	-25 ~ +75°C		
Storage Temperature	-30 ~ +80°C		
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)		
Power			
Input Range	10 ~ 30 Vdc		12 ~ 48 Vdc
Redundant Power Inputs	-		Yes
Power Consumption	3 W		

14. PAC-based CAN Modules

These CAN bus communication modules are the solutions to the various CAN application requirements in PAC family with rich CAN bus protocols. The I-8123W, I-87123W, I-8124W, and I-87124W separately support CANopen and DeviceNet master protocols. Users can apply them in PAC to connect to CANopen and DeviceNet devices to reach various CANopen/DeviceNet systems easily.

For the especial CAN bus applications, the I-8120W and I-87120W are designed for users to apply in PAC series. The default firmware of I-8120W and I-87120W provides the transmission and reception of CAN bus messages in PAC. In addition, users can design the specific firmware in these modules to reduce the loading of the PAC in C language.



CAN/CANopen/DeviceNet Communication Module (Parallel/Serial Bus)						
Model Name	I-8120W	I-87120	I-8123W	I-87123	I-8124W	I-87124
Pictures						
Communication						
Interface	ISO 11898-2 CAN					
Port	1					
Terminator	120 Ω Selected By Jumper					
Max. Speed (K bps)	1000		1000		500	
Controller Chip	SJA1000T					
Transceiver Chip	82C250					
Protocol	CAN 2.0 A/2.0 B		CANopen CiA 301 ver 4.02, CiA 401 ver 2.1		DeviceNet Volume I ver 2.0, Volume II ver 2.0	
System						
Hot Swap	-	Yes	-	Yes	-	Yes
Data Communication	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface	Parallel Interface	Serial Interface
User-defined Firmware	Yes		-		-	
Isolation	2500 Vrms					
Power Consumption	2 W					
Connector	5-pin Terminal Block					
Optional Accessories	CA-0904 Cable					
 CA-0904						
Model Name	I-8120W	I-87120	I-8123W	I-87123	I-8124W	I-87124
PAC Driver Support						
I-8000, iP-8000	-	BC, TC	-	BC, TC	-	BC, TC
VP-2111						
WP-8000-CE7 WP-9000-CE7 VP-2000-CE7 VP-4000-CE7	eVCpp 4.0, VB.Net 2005, C#.Net 2005					
XP-8000-WES7 XP-9000-WES7 iPPC Series	VB.Net 2005, C#.Net 2005, VC 2005					
LP-8000	-	GCC	-	GCC	-	GCC

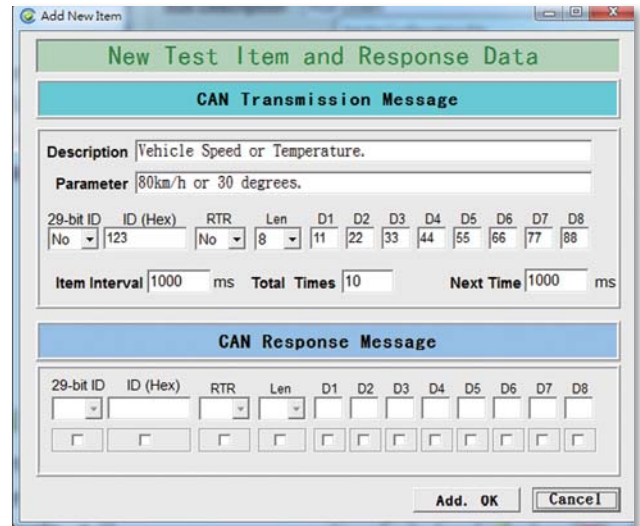
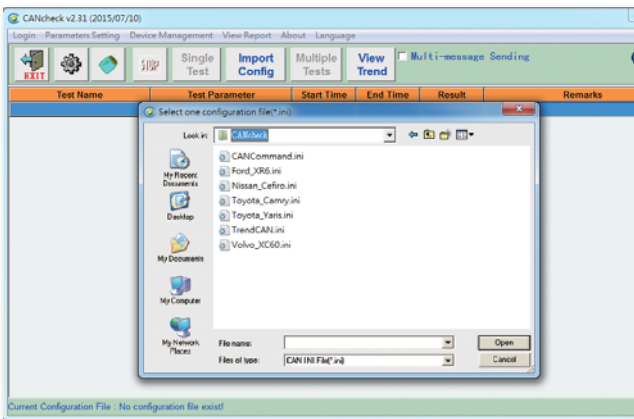
15. CANcheck

CANcheck – the software is developed by ICP DAS for CAN device detection and diagnosis. It is consisted of seven parts.



• CAN Message Modeling

Users can model the vehicle CAN protocol or other special CAN protocol, set to the CANcheck software, the software will be able to follow the CAN command set and command transfer cycle. Users could provide the meaningful description for each CAN command. This helps to manage and identify all the complex CAN commands.

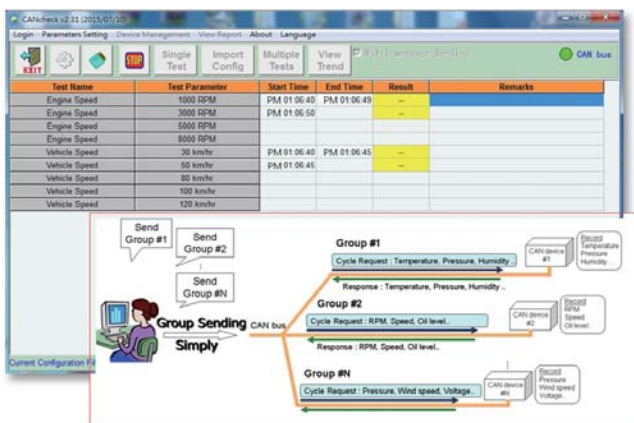
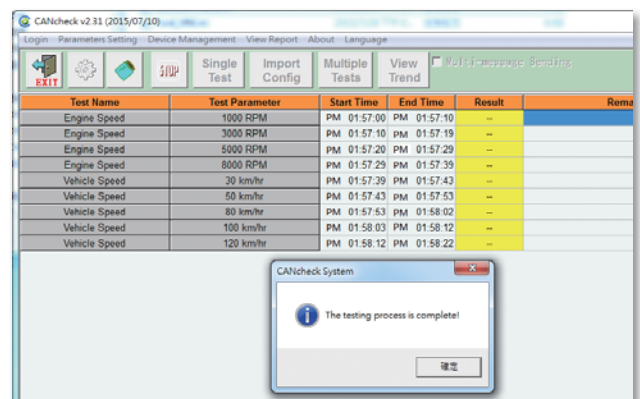


• CAN Message Management

Different CAN message sets can be stored in different configuration files. The user can easily pipe different configuration files for different test cases. For example, a car factory can store several different cars' data in different configuration files, and then call the corresponding one as needed to test each car.

• CAN Message Verification

Different CAN instruments have different command sets; correspondingly, the return messages also differ. CANcheck can be used to perform verification of expected return messages – an easy way of error-checking operations. This feature does away with manual log-checking, and with it human error and tedium.

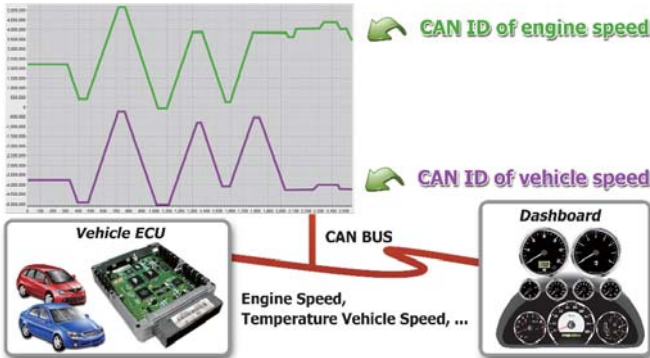
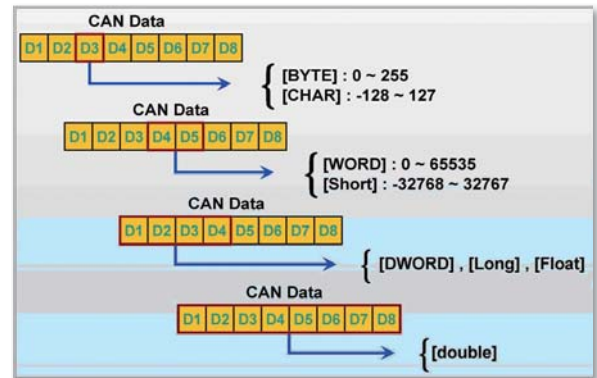


• CAN Message Group

In most of CAN applications, the CAN master sometimes iteratively polls entire remote devices with the sequential CAN commands. In the multi-message sending mode, CAN messages will be divided into groups according to CAN-ID. In single group, the CAN commands will be sent sequentially at specific time interval. Every group could work individually at the same time. It will simplify the CAN application projects and help to manage CAN devices more efficiently.

• CAN Data Conversion

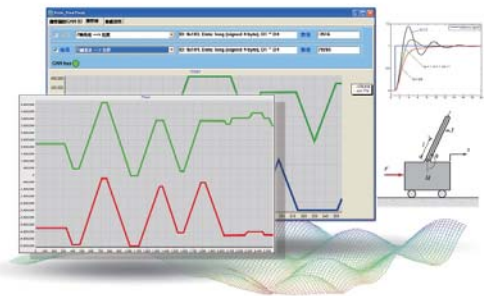
The CANcheck software provides the functionality of implementing the conversion of the CAN data. The CAN data of the specific CAN ID could be converted to the value of "long" type, "float" type and etc. When receiving the specific CAN messages, the CAN data will be converted to the specific data type and data value quickly and automatically. The users could focus on those converted value and need not to convert for each raw data manually. This conversion will help the users to deal with the huge raw data more friendly.



Description	Parameter	CAN ID	Data Type	Data Range	Value
X-Axis Motor	Position (V1)	0x103	long (signed 4-byte)	D1 - D4	101700
Y-Axis Motor	Position (V2)	0x104	float (4-byte)	D5 - D8	0
X-Axis	Temperature (V3)	0x2E7	double (8-byte)	D1 - D8	0
Y-Axis Motor	Position (V4)	0x2B3	long (signed 4-byte)	D1 - D4	25000100
Y-Axis	Pressure (V5)	0x204	float (4-byte)	D5 - D8	0
Y-Axis	Temperature (V6)	0x2E8	double (8-byte)	D1 - D8	0

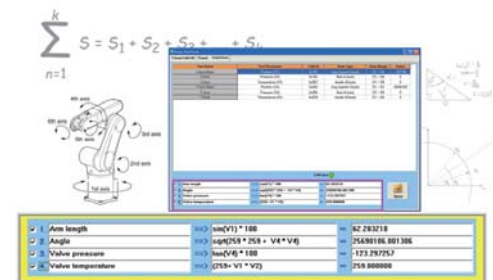
• Trend Chart Functionality

The CAN messages transmitted on the CAN bus always contains much important information. One part of the information is used to control the system by the host controller, and the other which may not be used by the host controller is interested during the trial run. The CANcheck offers the visualization tool, the trend chart, to monitor the information. It can transfer the raw CAN data into the meaningful and physical information, such as engine speed, vehicle speed and fuel consumption, and show these on the trend chart. Without any modification of the host controller, users can obtain the details change of the system easy and quickly.



• Real-Time Mathematic Functions

In some applications, the meaningful information must be obtained via a series of complex mathematical calculation from the raw CAN messages. The CANcheck allows users to arrange up to 4 groups of the mathematical formulas which will transfer the raw data to the useful information instantly while the CAN messages are received. Combined with the trend chart, it is a very useful and helpful toolkit for monitoring or debugging the systems.



The detailed features are:

- (1) No need to write any programs. The graphical interface is ready-made and easy
- (2) Limited to neither the vehicle nor instrument brand; it's interoperable.
- (3) The CAN communication protocol settings file protects against security leaks, ensuring safe operation.
- (4) Can set the returned CAN discrimination, eliminating the hassle of wading through logs and manually interpreting results.
- (5) Can be used to operate and diagnose lights, windows, dashboard or other vehicular electronic systems and components.
- (6) Supports CAN 2.0A and CAN 2.0B specifications.
- (7) The test command planning interface to set the test command, the transfer cycle, detecting the reply command and users' description.
- (8) Can store commands to the specific file.
- (9) Supports both the single- and multi-function tests. In multi-function testing, the software provide multi-message sending option.
- (10) Provides time stamps for the beginning and end of each test.
- (11) Displays real-time CAN status
- (12) Provides the data conversion from the received CAN messages automatically.
- (13) Supports two trends to display the real-time waveform which comes from the CAN messages.
- (14) Provides four free-edited mathematic functions to transfer the raw data instantly and automatically.
- (15) Provides English, Traditional Chinese and Simple Chinese interfaces.

Supported OS: Windows 10、Windows XP, 7

Supported CAN board, converter: PISO-CAN100U, PISO-CAN200U, PISO-CAN400U, PISO-CAN-800U, PEX-CAN200i, PCM-CAN200, PCM-CAN200P, I-7530, I-7530-FT, I-7530A, I-7530A-MR, I-7540D, I-7540D-MTCP, I-7565, I-7565-H1, I-7565-H2

Ordering Information >>>

CANcheck Software for CAN device detection and diagnosis, USB keypro included.

Case Studies: Diagnosing the dashboard by the CANcheck software

In recent years, vehicle electronics technology improved and advances day by day. A great of advanced electronic technology has been applied into the vehicle. The vehicle has built-in more and more electronics technology. That will not only enhance the driving performance of the vehicle and provide more protection of the road safety. The traditional vehicle use direct-control method to control all devices. This method can not satisfy the rapid maintenance and higher driving safety requirements. Nowadays, the automotive is smaller and smaller. The coarse wires take up available space of the car. So the vehicle control system gradually has been changed by the CAN bus (Control Area Network) technology, such as fuel injection control unit, ABS(Anti-lock Braking System) unit, ASR(Acceleration Slip Regulation) unit, AT(Automatic Transmission) unit, airbags, continuity adjustable tracing system, powerdriven windows, brake system, lighting control system and etc. Therefore, the sensing and controlling system which built-in the CAN bus technology has become one of the key automotive projects. The vehicle dashboard which supports CAN bus communication has become basic and necessary equipment. The dashboard which built-in the CAN bus would help to integrate various vehicle information, such as engine temperature, engine speed, vehicle speed and fuel and other travel information. In the harsh and noise environments, CAN bus technology provides a high level of fault tolerance and error correction mechanism. The control system of the vehicle network becomes reliable, space-saving, stable and easy maintenance.

CANcheck software, the software will be able to follow the CAN command set and command transfer cycle. Users could provide the meaningful description for each CAN command. This helps to manage and identify all the complex CAN commands.



ABS Indicator	Seat Belt Indicator	Engine Indicator	Battery Indicator
Oil Indicator	Temp. Indicator	Airbag Indicator	Brake Indicator

1. Connect the CAN bus

We use the high performance USB/CAN converter which is I-7565-H1. Connecting the I-7565-H1 with dashboard and running the CANcheck software. The topology is shown below.



2. Testing the indicator LED

According to the CAN protocol of different vehicles, the CANcheck could send the CAN messages to the dashboard. We could check every fault indicator LED in the dashboard to verify if it works or not.



3. Testing the Vehicle Information

The CANcheck could send different vehicle CAN protocols. We have tried to simulate various engine data and vehicle information. The dashboard would show the corresponding data which the CANcheck has sent.



5. Testing with real vehicle from OBD-II port

We use the USB/CAN converter which is the I-7565-H1. The picture below shown how the I-7565-H1 connect to the OBD-II port of the Toyota Yaris.



7. Checking the dashboard and OBD-II when turn on the engine

After turn on the engine, all raw data will be sent to dashboard and OBD-II port. We developed simple utility to read the CAN messages which are the engine speed and vehicle speed. We found the dashboard and our utility showed the same information below.

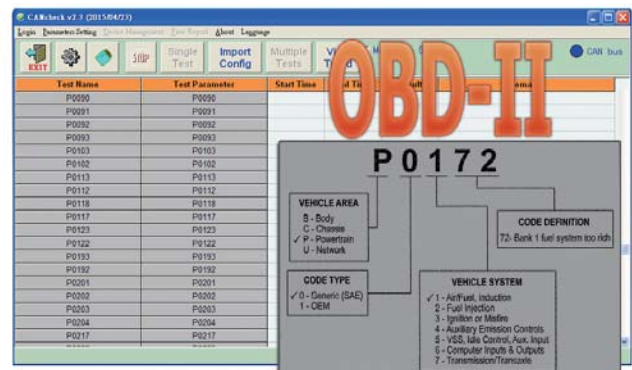


Conclusion

The CANcheck is not only able to verify the vehicle dashboard, but also could check the vehicle sensors of safety system, such as air bag, ABS, breaking system and etc. The CANcheck is software which is used to verify the functions of CAN devices from any manufacturers. It provides users to design the test commands and the expected response, and arrange the test procedure for their CAN products. When starting the test, the software will go the predefined procedure to send the specific messages and check if the corresponding responses are correct. This is not only useful for the QC of the CAN devices such as light, dashboard ..., but also helpful to diagnostic the CAN application systems.

4. Testing OBD-II Command

OBD-II (On-board diagnostics/SAE J1797) is CAN protocol used to request data from a vehicle which is used as a diagnostic tool. We could read the raw data of the vehicle, such as the Catalyst Temperature, O2 Sensor Monitor, Misfire, Fuel Trim and etc.



6. Checking the sensors of the vehicle when turn on power

After turn on the power, the dashboard will check important sensors automatically. After checking the sensors and they work fine, the fault indicator LED will turn off. The picture below shows the fault LEDs.

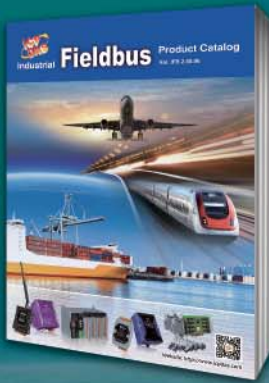


8. Checking the dashboard and OBD-II when driving

We want to check the changes of the raw data. We drive out and show the received information of the CAN messages. Even the vehicle was moving, we found the dashboard and our utility still showed the same information below.



ICP DAS Catalogs



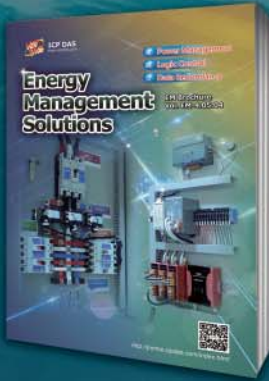
Industrial Fieldbus

- RS-485
- Industrial Ethernet
- Profinet
- CAN bus
- CANopen
- Devicenet
- J1939
- PROFIBUS
- HART
- Ethernet/IP
- BACnet



PC-based I/O Boards

- PCI Express Bus Data Acquisition Boards
- PCI Bus Data Acquisition Boards
- ISA Bus Data Acquisition Boards



Energy Management Solution

- InduSoftt SCADA Soffttware
- Smart Power Meter Concentrator
- Smart Power Meter
- True RMS Input Module
- TouchPAD Devices - VPD Series



IIoT Product

- IoTstar: cloud management software
- UA-5200: communication server
- WISE series: IIoT host
- iCAM series: IP camera
- MQ-7200M series: MQTT I/O module
- Sensors: temperature, humidity, CO2, PM2.5,...



Machine Automation

- Motionnet Solutions
- EtherCAT Motion Control Solutions
- Ethernet Motion Control Solutions
- Serial Communication Motion Control Solutions
- PC-based Motion Control Cards
- PAC Solutions - Motion Modules



Smart Building, Smart Home Automation

- Video Intercom & Access Control
- Touch HMI - TouchPAD Series
- Smart Lighting Control
- Energy Saving - PM/PMC Series
- Environmental - DL/CL Series
- Motion Detector - PIR/RPIR Series
- Wi-Fi Wireless - WF Series
- Infrared Wireless - IR Series
- ZigBee Wireless - ZT Series
- IIoT Server & Concentrator
- Data Server - iDaSer Series
- LED Display - iKAN Series



TouchPAD HMI Solutions

- Introduction
- TPD/VPD Products Series
- Video Intercom & Access Control Series
- TPD/VPD Application



Wireless Solution Products

- WLAN Products
- Radio Modems
- 3G/4G Products
- GPS Products
- Bluetooth LE Converters
- ZigBee Products
- Infrared Wireless Modules
- Wireless Modbus Data Concentrators
- Bluetooth LE Gauge Master for Mitutoyo Gauges



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