USER'S MANUAL

CBI-485220WA

Two-Channel High-Speed CAN Interface Card (FIFO) with Termination

2-channel high-speed CAN	High-speed CAN communications rate 60 kbps to 1 Mbps	SJA1000 compatible CAN controller
Transmission lengh 40 m (max.)	64-message transmit/receive FIFO	I/O transfer mode

Interface®

www.interface.co.jp

Notes to Users

The specifications of the product are under continuous improvement and while every effort is made to keep this manual up-to-date, we reserve the right to update the contents of this user's manual without prior notice. Therefore, you should thoroughly read this user's manual even if you have often purchased this product before.
Using this product requires technical knowledge of hardware and software.
Use this product only under the specified conditions such as power supply, voltage, temperature, and humidity range.
Interface Corporation's products are not designed with components intended to ensure a level of reliability suitable for use under conditions that might cause serious injury or death.
Please consult our Technical Support Center if you intend to use our products for special purpose, such as use for moving vehicles, medical treatment, aerospace engineering, controlling nuclear power, submerged translators and so on. This product is made under strict quality management, however, when using this product for the purposes that may result in any damages, lost profits, or any other incidental or consequential damages resulting from breakdown of this product, the user is required to take adequate and appropriate measures, such as installing safety devices to avoid possible serious accidents.

Conventions Used in This Manual

	This icon denotes a warning, which advises you of precautions to take to avoid injury, data loss, or system crash.
	This icon denotes a note, caution, or warning.

Indemnification

Interface Corporation makes no warranties regarding damages resulting from installation or use of this product, whether hardware or software, and the user assumes all risk.
Interface Corporation shall not be liable for any incidental or consequential damages, including damages or other costs resulting from defects which might be contained in the product, product supply delay or product failure, even if advised of the possibility thereof. Customer's right to recover damages caused by fault or negligence on the part of Interface Corporation shall be limited to the amount paid by the customer for that product.
This product including its software may be used only in Japan. Interface Corporation cannot be responsible for the use of this product outside Japan. Interface Corporation does not provide technical support service outside Japan.

Warranty

Interface Corporation products are warranted for a period of either one year or two years from the date of shipment, as evidenced by receipts or other documentation. This warranty does not apply to the software products and expendable supplies such as batteries.
Note: You can determine the warranty period at our Web site by the serial number of your product. Those without Internet access should contact the Sales Information Center.

During the warranty period Interface Corporation will, as a general rule, replace or recondition the defective product without charge, in which case the user will be required to pay the shipping costs, except as set forth below.

The Warranty provided herein does not cover expendable supplies such as batteries and damages, defects, malfunctions, or failures caused by impact during transportation while under owner's responsibility; owner's failure to follow the instructions and the precautions contained in this manual; modification and/or repair of the product by other than Interface Corporation, trouble caused by use with peripherals not specified by Interface Corporation, power failure or surges, fire, earthquake, tidal wave and/or flood.
This warranty applies only when the product is used in Japan.
Interface Corporation warrants its repairs for six months, and will again repair the same defective part without additional charge provide the product is economically repairable. In that case, the user should attach a copy of the most recent repair report to the repair request form. If no repair report is attached, it will be considered as a new repair request.

Before You Export Interface Products

The foreign exchange and foreign trade law of Japan controls the export of this product, due to its possible use as a STRATEGIC MATERIAL. Therefore, before you export this product, you must secure an export permit from the Ministry of Economy, Trade and Industry of Japan.

Revision History

Version	Date	Comments
1.0	March 2005	User's manual MCA-E485220WA published.

Due to constant product improvements, the information in this user's manual is subject to change without prior notice.

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Chapter 1 Introduction

1.1 Summary

The CBI-485220WA is a CAN (Controller Area Network) Interface card for CardBus-based computers. Two high-speed communications channels compliant with ISO11898-2 are achieved with the SJA1000 CAN controller (Royal Philips Electronics or equivalent) and PCA82C250 CAN transceiver (Royal Philips Electronics or equivalent). The maximum bit rate is 1 Mbps. Each channel provides independent communications at individually set bit rates. With the large-capacity FIFO buffer, this card can transmit/receive messages at high speed. Simple operation checks of CAN bus can be performed. By using the JKC-4851A, the terminating resistors can be connected.

Packing List

Item	Part Number	Qty.
☐ CardBus Card	CBI-485220WA	1
☐ Cable	JKC-4851A	1

1.1.1 Features

1. CAN protocol
   The CBI-485220WA can perform high-speed CAN communications compliant with the CAN 2.0B protocol and ISO11898-2. This product uses the SJA1000 CAN controller (Royal Philips Electronics or equivalent) and PCA82C250 CAN transceiver (Royal Philips Electronics or equivalent). The maximum bit rate is 1 Mbps.

2. One CAN controller for each channel
   The CBI-485220WA incorporates one CAN controller per channel. Each channel provides independent communications at individually set bit rates. The system clock frequency is 24 MHz.

3. High-performance CAN controller
   By adopting the SJA1000 CAN controller, the following functions are provided:
   error code capture, error count, two receiver message filters, and so on.

4. Large-capacity FIFO buffer
   The CBI-485220WA incorporates 64 messages for transmit FIFO and 64 messages for receive FIFO per channel. This feature reduces CPU load. It also allows you to transmit/receive data at high speed without data loss.

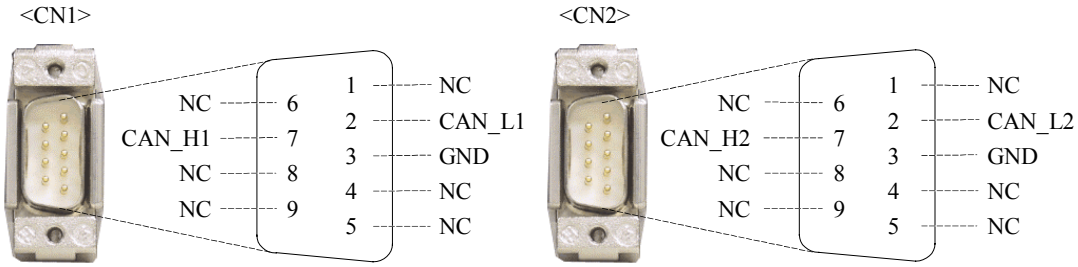
5. Pseudo message
   Pseudo messages can be transmitted. By using this function, a specified pseudo message can be transmitted in a fixed cycle. Simple operation checks of CAN bus can be performed.

6. CAN bus monitor
   The CBI-485220WA can monitor messages and error status which were transmitted to the CAN bus. It can also confirm those timings to monitor by 10 μs. Moreover, it can configure response messages not to output. This feature helps you to monitor without loading to network.

Chapter 2 Signal Definitions

2.1 Cable Connector Pin Assignments

- CN1, CN2



NC: Not connected
Connector catalog number: 17JE-23090-02(DC2C)
Screw: #4-40UNC

2.1.1 Signals

Signal Description

Signal	Pin Number	Direction	Description
CAN_L	2	Input/Output	CAN Low
CAN_H	7		CAN High
GND	3	—	Ground

Note: Connect the cable only with the CBI-485220WA.

2.1.2 Acceptable Cable Connector

9-pin D-sub female connector
Connector catalog number: GM-9LFU (Honda Tsushin Kogyo Co., Ltd.) or equivalent

Chapter 3 Specifications

3.1 Hardware Specifications

Parameter	Specification
Number of channels	2
Communications standards	CAN2.0B protocol-based, ISO11898-2
Bit rate	High-speed CAN: 60 kbps to 1 Mbps
CAN controller	SJA1000 (Royal Philips Electronics) or equivalent
CAN transceiver	PCA82C250 (Royal Philips Electronics) or equivalent
CAN controller system clock frequency	24 MHz
Transmit/receive buffer memory	64 messages for transmit each channel 64 messages for receive each channel 64 records for error status each channel
Memory size	4 kB × 2
Maximum cable length	40 m
Number of connection units	30 (max.)
Power consumption	+3.3 Vdc (+/-0.3 V): 0.3 A (typ.)
Bus requirements	PC Card Standards-Based CardBus
Card size	PCMCIA/JEITA Type II
Environmental conditions	Operating temperature: 0 °C to 50 °C Relative humidity: 20% to 90% (non-condensing)
On-card connector	CN1, CN2: 9-pin D-sub male connector (attached cable connection)

3.2 Electric Characteristics

This chapter shows the electric characteristics of the CBI-485220WA.

3.2.1 Absolute Maximum Rating

Item	Min.	Max.
CAN_H, CAN_L input voltage	-8 V	+18 V
Input potential difference between CAN_H and CAN_L	-1.0 V	+5.0 V

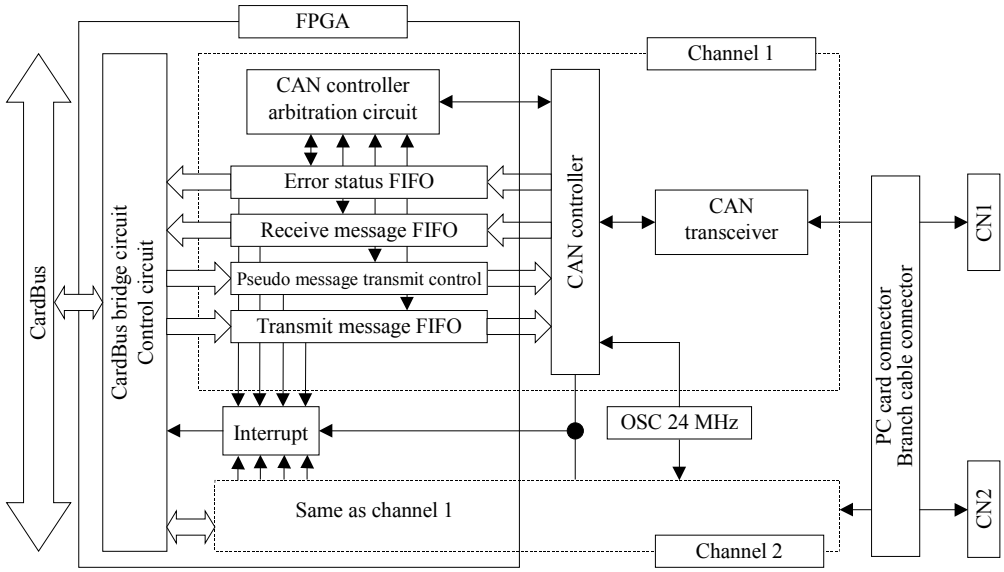
3.2.2 Recommended Operating Environment

Item	Min.	Max.
CAN_H input voltage	2.0 V	4.5 V
CAN_L input voltage	0.5 V	3.0 V
Input potential difference between CAN_H and CAN_L	-0.5 V	3.0 V

3.2.3 DC Specifications

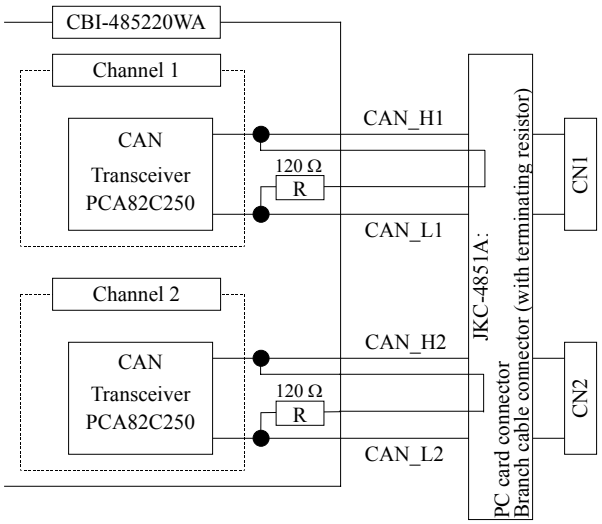
Item	Bus Level	Min.	Max.
CAN_H output voltage	Recessive	2.0 V	3.0 V
	Dominant	2.75 V	4.5 V
CAN_L output voltage	Recessive	2.0 V	3.0 V
	Dominant	0.5 V	2.25 V
Input potential difference between CAN_H and CAN_L	Dominant, no load	1.5 V	3.0 V
	Dominant, load: 45 Ω	1.5 V	—
	Recessive	-500 mV	+50 mV
CAN_H output current	CAN_H external voltage: -5 V	—	-105 mA
CAN_L output current	CAN_H external voltage: +18 V	—	+160 mA
Input potential difference between CAN_H and CAN_L (Recessive)	-2 V < Voltage for CAN_H, Voltage for CAN_L < +7 V	-1.0 V	+0.5 V
	-7 V < Voltage for CAN_H, Voltage for CAN_L < +12 V	-1.0 V	+0.4 V
Input potential difference between CAN_H and CAN_L (Dominant)	-2 V < Voltage for CAN_H, Voltage for CAN_L < +7 V	+0.9 V	+5.0 V
	-7 V < Voltage for CAN_H, Voltage for CAN_L < +12 V	+1.0 V	+5.0 V

3.3 Circuit Diagram



3.4 External Input/Output Circuit

The figure below shows the external input/output circuit of the CBI-485220WA.



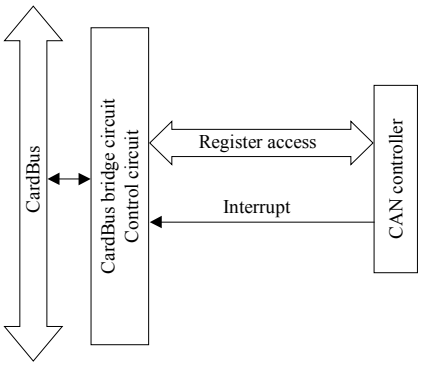
3.5 CAN Controller Access

3.5.1 Basic Mode

The CBI-485220WA can directly access all registers of the SJA1000 CAN controller. Moreover, an interrupt request is issued for CardBus by the controller interrupt signal. Basic CAN mode and Peli CAN mode are selectable.

- Basic CAN mode
  It is the mode which is compatible with the conventional PCA82C200 CAN controller (Royal Philips Electronics or equivalent). The contents and arrangement of a register are the same.

- Peli CAN mode
  It is the mode which added the extended function to the conventional CAN controller. It has such function as 64-byte receive FIFO. More advanced communications control can be performed by using the extended function.

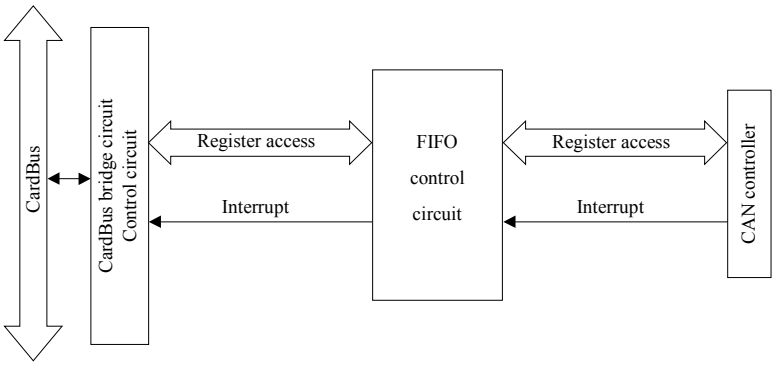


3.5.2 FIFO Mode

In FIFO mode, the following functions are provided:

- Transmit message FIFO or pseudo message transmit for transmit
- Reseive message FIFO for receive
- Error status FIFO for error control

These modes require accesses to the CAN controller in the internal control. Therefore, direct accesses to some part of registers of the CAN controller are forbidden.



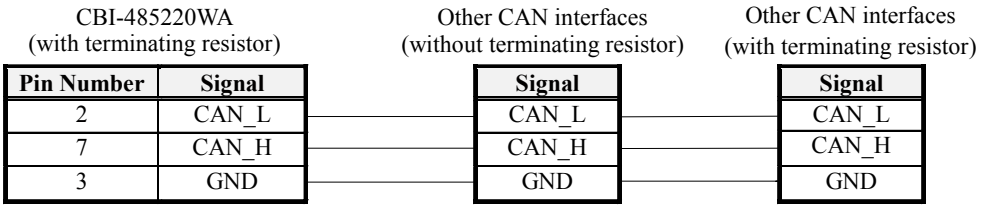
Notes:

- When using our driver software, this card can be used regardless of CAN controller modes. Moreover, driver software cannot control CAN controller directly.
- When controlling this card directly without using our driver software, refer to the data sheet of the SJA1000 CAN controller or I/O map.

Chapter 4 External Connections

4.1 Example Connection

The figure below shows example connection of the CBI-485220WA.



Note: To avoid an error, connect a CAN Interface with terminating resistor to the both ends of the network.

Chapter 5 Installation

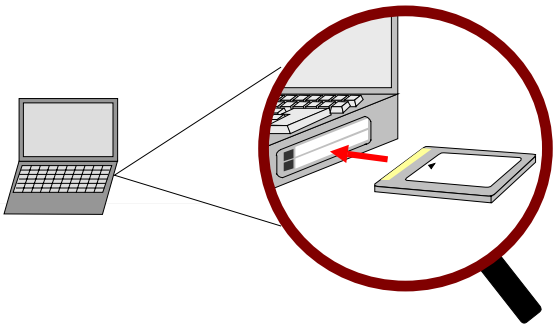
BE SURE TO ELIMINATE STATIC ELECTRICITY OF YOUR BODY BEFORE YOU INSTALL OR REMOVE THIS PRODUCT.

5.1 Card Installation

When you install this product in your system, read the manual of your system which refers to the PC card slot.

1. Make sure that the system is turned off and the power cable is unplugged.
   (This card corresponds to Hot Swap. You can insert this card when the system turns on.)

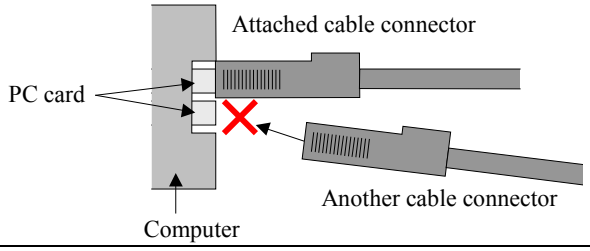
2. Insert the card into the PC card slot in your system.



3. Plug in the power cord, and turn on the system.

! Be careful of the insert direction when you insert this product into your system to avoid system damage.

! The attached cable may interfere with the card cable connector for the adjacent slot or computer because of the connector form of the attached cable. The figure below shows an example.



5.2 Driver Software Installation

Refer to our Web site for the Help of each optional software when you install and use it.

5.3 Card Uninstallation

The method of removing PC card from your system differs depending on each system. Please read the manual of your system.

! Do not remove this product when accessing to the external equipment. Your system may not operate correctly.

5.4 Multiple CardBus Cards

When using multiple cards in one system, it is required to write the CardBus ID number to the ROM in the card. The CardBus ID configuration utility program in the software can configure the number. Refer to Help files for more details.

Notes:

- Write the configured CardBus ID number on the back side of each card to easily confirm the number.
- Please download and use the newest version about software.

The following example shows the CardBus ID number is "0."

Back side of the card

Chapter 6 Glossary

6.1 List of Definitions

The list below explains a selection of technical terms used in this manual.

Term	Definition
CAN	CAN is an acronym for Controller Area Network. Standardized by ISO as a serial communications protocol, CAN was developed by the German electrical equipment manufacturer, BOSCH, for use in automotive networks. After being regulated by ISO, CAN soon became the de-facto standard in the automobile industry. CAN technology is now used in various other fields such as factory automation, agriculture, medical equipment, nautical craft, and also DeviceNet.
ISO11898-2	The high-speed CAN communications standard. The bit rate range is between 125 kbps and 1 Mbps. It may not be connected to a fault-tolerant CAN bus.
Terminating resistor	The resistor used in order to minimize reflection of an electric signal, also called a terminator.
Dominant	A logical 0 is represented by the dominant bit. When a dominant bit and recessive bit are output simultaneously by two different drivers on the same bus, only the dominant bit is observed on the bus signal line.
Recessive	A logical 1 is represented by the recessive bit. When the bus is in the idle state, a recessive bit is observed on the bus signal line.

Chapter 7 Notes for Users

For your safety, follow all warnings and instructions described in this manual.

7.1 Caution, Periodic Inspections, and Storage

Failure to follow this warning may result in electric shock, burns, serious injury, and in some cases, even cause death.

⚠ Warning!

- Keep this product away from flammable gases.

Use this product only under the conditions as shown below.

Environmental Specifications

Parameter	Specification
Temperature Range	0 °C to 50 °C
Relative Humidity Range	20% to 90% (non-condensing)
Dust	Typical office environment
Corrosive Gas	None
Noise	Far from power source and its wiring
Voltage Requirements	CardBus specification: +3.3 Vdc (+/-0.3 V)

The following inspections should be carried out on this card periodically.

Periodic Inspections

Item	Checkpoint
Cable Connections	Be sure that all connectors and cables are installed correctly.
Connector Contacts	Check for dirt or corrosion.

TO AVOID DAMAGE TO THE CARD AND POSSIBLE INJURY, TAKE APPROPRIATE PRECAUTIONS AS DESCRIBED BELOW WHEN HANDLING IT.

Caution!

! This card should be stored exactly the same way as when it was received. Proceed as follows:

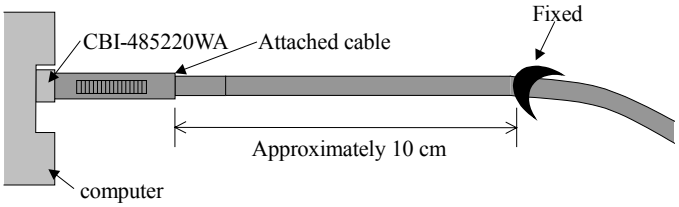
1. Put the card back in its PC card case.
2. Wrap the PC card case with the original packing material.
3. Avoid excessive humidity.
4. Do not expose the card to the direct rays of the sun.
5. Store the card at room temperature.

! Do not modify the card. Interface Corporation assumes no liability for any malfunctions resulting from users' unauthorized modification of the card.

! Take measures to avoid and minimize shock, vibration, magnetic fields, and static electricity in the storage or operating environment of this card.

! Make sure that the card is disconnected from the cable before inserting or removing any cards.

! Please keep the attached cable in a horizontal position for approximately 10 cm from the card connection part as below, and fix it not to move, even if stress starts. The connector may be damaged, if the 10N (approximately 1 kgf) or more loads are added its connection part.



Chapter 8 Troubleshooting

8.1 Checkpoints

Problem	Solution
Data cannot be transferred correctly.	Double-check all cable connections.
	To use the multiple CardBus cards, configure the CardBus ID number by using the CardBus ID utility program. In case multiple Interface CardBus cards of the same type are installed in the same system, the ID number on each Interface CardBus card is used to uniquely identify each card.
	If the power requirements exceed the system power budget, the circuits on the card or connected external circuits cannot be powered properly. Prepare an external power supply for your CardBus card.
	If the pins are connected incorrectly, the data cannot be transmitted. Make sure that there are no incorrect connections.
	If the communications parameters for transmitter and receiver are not the same values, the data cannot be correctly transmitted. Configure them to be the same.
Communications are not reliable. A transmit/receive error occurs.	Check whether the selected terminating resistor is suitable for your system. Refer to "3.4 External Input/Output Circuit," page7.
The computer does not recognize this card.	Use the PCI device viewer (BPF-0801) to examine the CardBus card on your computer. Please send the result to our Technical Support Center by fax or e-mail. The PCI device viewer may be downloaded from our Web site free of charge.
The computer does not respond after Standby mode. (Input and output are disabled.)	Set the System standby setting to "Never".

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For Assistance:

If you would like to inquire our products, please contact below.

E-mail	support@interface.co.jp
URL	www.interface.co.jp/support/

Repair and Maintenance:

We provide repair and maintenance service for your damaged product. If you need this service, please refer to "**Repair and Maintenance**" of a user's manual of Japanese version and follow the procedures for repair and maintenance applications.

PLEASE NOTE: We do not accept the repair for the product which is **not** used in Japan. If you use our products in other countries, please contact the store where you purchased them.

You can download a user's manual of Japanese version from our Web site below.

URL: www.interface.co.jp

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