SIO-485.CF User Manual

Part Number 3102

SEALEVEL ®
SYSTEMS INCORPORATED

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OVERVIEW

The SIO-485.CF card is an RS-422/485 CompactFlash™ serial card with the following features:

- Type I CompactFlash™ form factor for CF+ equipped PDAs, Handheld PCs, laptops, etc.
- Driver software provided for Windows 95, 98, 98SE, Me, NT4, 2000, XP, CE and PocketPC
- 16C550 compatible, buffered UART with 16-byte FIFO
- Data rates to 921.6K bps
- Switchable x1 or x8 baud rate supports up to 921.6K baud
- Automatic RS-485 tri-state enable/disable
- 3.3V or 5V compatible
- All modem control signal signals implemented
- Compatible with all standard serial COM software
- ESD protected RS-422/485 drivers
- Software controlled power management
- Low power consumption
- Detachable cable with DB-9M connector

ABOUT THE SIO-485.CF

The SIO-485.CF card is an RS-422/485 serial card designed using a 16C550 compatible UART. The serial data and control lines are buffered using ESD protected RS-422/485 transceivers.

Industry standard baud rates up to 921.6K bps are supported, together with 16-byte TX and RX FIFOs. A small switch is located at the back edge of the card, which allows selection of "x1" or "x8" baud rate multiplier. This feature allows up to 921.6K bps operation without needing special device drivers on the host (in x8 mode you simply multiply the setting shown on the host by 8 to get the real serial data rate - e.g. 19.2K bps set in software with "x8" mode gives 153.6K bps data rate physically in hardware). See section 5 for the switch settings.

The SIO-485.CF conforms to the industry standard CompactFlash+™ interface that allows connection of peripherals to the system bus of a laptop, handheld PC or PDA. The CF+ specification extends the earlier memory-only CompactFlash™ interface to allow I/O devices and extra power for the card. The SIO-485.CF is an I/O type device and requires a CF+ capable slot.

INSTALLING THE SIO-485.CF

3.1 Windows 95, 98, 98SE, Me, NT4, 2000, XP

You will first need to install SeaCOM prior to using the SIO-485.CF. Installing the supplied SeaCOM software that comes with your product will copy the necessary files into the proper Windows folders. Windows will use these files to "recognize" the SIO-485.CF card.

Note: Windows NT4 requires additional 3rd party Card & Socket Services (additional charge, not included).

3.2 Windows CE, PocketPC

There is no need to install any software for Windows CE or PocketPC. Simply insert the SIO-485.CF card and it will appear in a list when you go to set up a "Connection".

HARDWARE SPECIFICATION

4.1 PINOUT

The SIO-485.CF is supplied with a detachable 12" cable that terminates with a DB-9M connector with female jackscrews (to match the port at the back of a PC). The pinout below applies to the SIO-485.CF and the DB-9M connector on the supplied cable (the cable is pinned one-to-one).

PIN	NAME	FUNCTION
1*	RXD-	Receive Data inverting input
2	RXD+	Receive Data non-inverting input
3	TXD-	Transmit Data inverting output
4	TXD+	Transmit Data non-inverting output
5	GND	GROUND
6	CTS-	Clear To Send inverting input
7	RTS-	Request To Send inverting output
8	CTS+	Clear To Send non-inverting input
9	RTS+	Request To Send non-inverting output
Shield	-	See note **

* Pin 1 is nearest the edge of the card.
** The cable shield is grounded at the card-end, runs the full length of the cable and is not connected at the equipment end (i.e., does not connect to the DB-9 shell) to help to avoid ground loops.

Technical Note: Please terminate any control signals that are not going to be used. The most common way to do this is connect RTS- to CTS- and connect RTS+ to CTS+. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

Note: The mating connector type: Honda RMC-E9F2S-BSLA2N-A2

x8 ←——

——→ x1

PIN 9   PIN 1
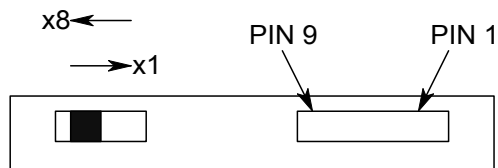
4.2 ELECTRICAL

All figures quoted are typical parameters @ 25°C (77°F)

ESD PROTECTION: All RS-422/485 signal lines on the SIO-485.CF card are protected against electrostatic discharge (ESD) >1kv – IEC1000-4-4

UART CLOCK SPEED: Switch selectable Baud rate multiplier:
x1: UART CLOCK is 1.8432MHz ->115.2K bps max
x8: UART CLOCK is 14.7456MHz -> 921.6K bps max

RS-422 MODE: CTS/RTS flow control signals available

RS-485 MODE: Auto-tristate of TXD drivers when not transmitting. Delay from last TX stop bit to high-Z typ. 4ms (+/-10%).

TERMINATORS: None in card. Use external termination resistor as req.

FAIL-SAFE FEATURE: The receiver inputs include a fail-safe feature that guarantees a logic high on the receiver when the inputs are open circuit

4.3 POWER CONSUMPTION

All figures quoted are typical parameters @ 25°C (77°F)

COMMUNICATION ACTIVE: 80mA typical @ 5V, 55mA typical @ 3.3V
(Includes 45mA consumed by terminating resistors)
IDLE MODE: 22mA typical @ 5V, 10mA typical @ 3.3V

4.4 MECHANICAL

MASS: 10g typical (0.352 oz)
FORM FACTOR: 36.4mm x 42.8mm x 3.3 mm overall
(1.43" x 1.68" x 0.13")

4.5 ENVIRONMENTAL

HUMIDITY: <80% R.H. (non-condensing)
TEMP: 0-50°C ambient (32-122°F)

4.6 NOTES ON SERIAL DATA THROUGHPUT

The maximum bit rate of 921.6K bps does not imply that the maximum sustained throughput rate of the serial port will be as high. The actual throughput that can be achieved depends on many factors including the host PC speed, the serial data block size, duty cycle, and overall host interrupt latency.

4.7 BAUD RATE SETTINGS

The table below illustrates the common baud rate values available for each of the baud rate multiplier switch positions:

HOST SETTING	SWITCH = x1	SWITCH = x8
300 bps	300 bps	2400 bps
1200 bps	1200 bps	9600 bps
2400 bps	2400 bps	19.2K bps
4800 bps	4800 bps	38.4K bps
9600 bps	9600 bps	76.8K bps
19.2K bps	19.2K bps	153.6K bps
38.4K bps	38.4K bps	307.2K bps
57.6K bps	57.6K bps	460.8K bps
115.2K bps	115.2K bps	921.6K bps

4.8 REGISTER INTERFACE

For reference, the SIO-485.CF behaves as a 5V card to the host system. This is to make the host system default to 5V when possible, giving the highest RS-422/485 output signals and therefore best noise margins. The Card Information Structure does not define any 3.3V tuples because some platforms will take this as a sign to run at 3.3V, even when 5V is available. On a PDA or HPC, the host will power the card at 5V if it is available, otherwise it will be powered at 3.3V (despite the absence of 3.3V tuple entries).

USING THE SIO-485.CF CARD

5.1 TERMINATION

RS-422 and RS-485 lines should be terminated at the end of the main branch of the receiver with the cables characteristic impedance. These terminating impedances reduce signal reflections at the cable end. It is not necessary to terminate the transmitter end of the cable. The most common method of termination is to install a terminating resistor, typically with a value of 120Ω, at a single receiver.

The SIO-485.CF does not have internal termination resistors. If required, a 120Ω resistor should be connected between RXD+ and RXD- pins of the DB-9M connector. For RS-422 applications, a terminating resistor will also be required between the CTS+ and CTS- pins. Using a DB-9 terminal block (p/n: TB05, available separately) will simplify field wiring requirements.

5.2 FAIL SAFE BIASING

A transmission line enters an indeterminate state if no drivers are transmitting on it or the line has been cut. This indeterminate state can cause the receivers to receive invalid data bits from noise picked up on the cable. To prevent reception of these data bits, the SIO-485-CF receiver inputs incorporate 1.2kΩ pull-up and pull-down biasing resistors to ensure that the differential voltage on the RXD and CTS pairs is greater than the 200mV input logic "1" threshold (even in the presence of an external 120Ω terminating resistor).

5.3 TXD AND RTS DRIVERS

The RTS signal on the SIO-485.CF is always enabled, regardless of the mode in which the card is being used.

The SIO-485.CF incorporates an auto-tristate feature on the TXD signal driver. The driver is enabled only when data is in the process of being transmitted. This feature can prevent bus contention in RS-485 networks caused by multiple transmitters driving the line in opposing states. The auto-tristate feature is always in operation, regardless of the mode in which the card is being used.

Note: When multiple characters are transmitted back-to-back, the output drivers stay active for the entire duration of the transmission (i.e., the drivers do not go in and out of tri-state for each character in a multi-character block).

5.4 RS-422 OPERATION

In RS-422 systems, all eight signal lines from the DB-9M connector are used. Typically, four twisted pair cables are used, one pair for each of the four signals: TXD, RXD, RTS, and CTS. The RS-422 electrical interface allows data to be transmitted and received simultaneously since each signal has its own pair of wires.

5.5 RS-485 OPERATION

The SIO-485.CF can be used for both half-duplex (one twisted pair) and full-duplex (two twisted pairs) configuration. However, for half-duplex mode, the link between the TXD and RXD signals must be made externally on the DB-9M connector.

Note: The transmitted characters will always be received in this mode. The RXD receiver is not disabled during transmission.

The handshaking signals RTS and CTS are still driven by the card, but are not usually connected to another node. However, if required by the application software, to force the CTS signal input on the SIO-485.CF true, the RTS signals must be looped back to the CTS inputs.

WARRANTY

Sealevel's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured products. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at its Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing.

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for life. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect or abuse are not covered under this warranty.

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