



# 812 SMART CARD READER/WRITER

## User's Guide

This document contains all of the information you need to connect and use an 812 smart card reader/writer. If you have specific questions concerning the reader/writer which are not found in this manual, please contact the dealer you purchased this product from.

If your dealer cannot supply you with the information you need, then feel free to contact IBC directly by phone, fax, or through e-mail.

Update information on all IBC products, as well as utility software and software for testing readers can be found on our internet pages at <http://interbar.com>.

Thank you for purchasing an IBC product. In order to serve you better, we welcome all comments you may have concerning our products and manuals. Please send your comments to IBC using e-mail to [comments@interbar.com](mailto:comments@interbar.com).

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## FUNCTIONALITY

The 812 smart card reader/writer can read and write to any 8-bit or 16-bit addressed I<sup>2</sup>C memory-style smart card. These are any of the smart cards that are 24Cxx based.

These cards are readily available and can be purchased from any of the major smart card suppliers.

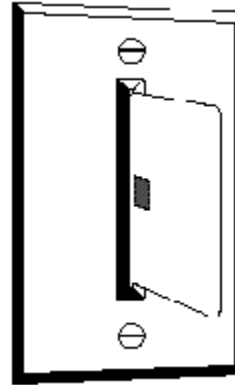
Combined with software, the 812 can be used to store and process data on these cards for almost any purpose, including access control, and machine or equipment control.

Features of the 812 reader/writer are:

- Bicolor led (controlled by serial commands)
- RS232 connection for easy communications
- Optional onboard relay for door actuation or equipment control
- Mountable to a standard gang box, with integral face plate
- Reads/Writes 8-bit and 16-bit cards
- Can be enabled for automatic data transmission upon card insertion

Special versions of the 812 reader are also available with internal firmware for time debit transactions for controlling the pre-paid use of machines or equipment. Contact IBC for further information if this is the type of reader you are looking for.

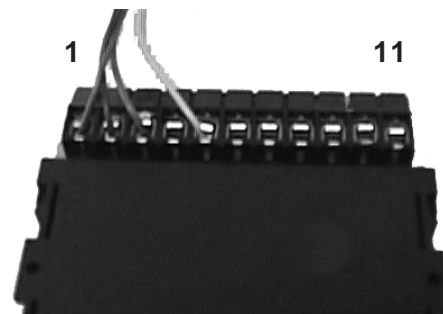
## MOUNTING



The reader is designed to be easily mounted into a single gang box or into a piece of oem equipment. The reader is normally mounted vertically as shown in the picture above however it can also be mounted horizontally.

## WIRING

The reader contains an 11-position screw terminal connector for easy wiring, as shown in the picture below.



Depending on your installation, not all of the 11 terminals will be used. The following table lists the use for each of the terminals.

## RS232 Connections

1	GND
2	VDC
3	TX
4	
5	RX
6	
7	
8	led control (if external control)
9	relay normally open
10	relay common
11	relay normally closed

## RS422 Connections

1	GND
2	VDC
3	TX+
4	TX-
5	RX+
6	RX-
7	
8	led control (if external control)
9	relay normally open
10	relay common
11	relay normally closed

The wires are easily connected to the terminal by loosening the screw for the associated position, inserting the wire, and then tightening the screw.

For installations which are using a 5VDC power supply, 18 gauge wire is recommended if the run is more than 20'. For long runs above 20', we recommend using a 12VDC or 24VDC reader, and 18 or 20 gauge wire for the power.

The communications cable can be 20 or 22 gauge cable.

## **LED**

There is a bi-color led located at the front of the reader. The led is controlled by sending the reader serial commands. Optionally, the led can be controlled electrically by external equipment (special orders only).

Normally, upon power start up, the led will be red unless you have requested special firmware with your reader. The led colors can then be changed using serial commands to be either red or green.

## **POWER**

Models are available which run off of 5VDC, 12VDC, or 24VDC. power usage (maximum) is about 50ma at 5VDC.

## **RELAY**

The 812 may be optionally ordered with an internal relay. This relay can be used to control the opening of doors or other devices.

The relay is a **form c** relay, meaning there is one common line, one normally open line, and one normally closed line.

When the relay is not engaged, the normally closed line will always have the same voltage potential as the common line, while the normally open line will not be connected. When the relay is engaged, the normally closed line will not be connected, and the normally open line will

have the same voltage potential as the common line.

Upon power on, the relay is normally disengaged.

The maximum ratings for the internal relay is 30VDC, 500ma.

## **COMMUNICATION**

Serial communications is done using RS232 , with the line set at 9600 baud, 8 data bits, no parity, 1 stop bit.

This cannot be changed in the reader; however special configurations may be ordered.

It is not necessary to connect the serial receive to the reader if you will not be sending commands to the reader.

## **AUTO TRANSMIT**

The reader can be programmed to automatically transmit information when a card is inserted. This is done by setting the appropriate control areas in the reader (see the programming section).

## **CARD READING**

The reader has contacts for reading the smart card on only one side, so the smart card can be inserted only one way.

It is advisable to place a label or some other way of identifying which side the card should be inserted in, on the reader.

When a smart card of the proper format is inserted into the reader, the reader will transmit the smart card information automatically if the auto-transmit option is set.

If the auto-transmit option is not set, you can then communicate directly with the reader by sending serial commands.

## **PROGRAMMING**

Commands can be sent to the reader for controlling the led's and relay, obtaining version information, and reading or writing to the card.

All commands that are sent to the reader must be followed by a carriage return (hexadecimal 0D).

Commands which read or write to the card read/write single bytes only. In other words, you can read or write to only 1 byte at a time. The exceptions to this are the three commands which transmit bulk information (see below).

When you read or write to a byte location, the reader will respond back with a status character informing you of the result of the operation. For reads - this status character is returned prior to the read data. For writes, it is the only value returned.

Please note that all addresses are sent as a 4-digit number. For some memory cards (8-bit for example), the valid byte address ranges will be 0 thru 127. In this case, the address must be zero filled to make up 4 numerics (address 98 should be coded as 0098).

Attempting to read/write invalid addresses can yield unpredictable results, so make sure the address you are read/writing to is valid for the card you are using.

Data stored in the smart cards is binary data. For a 128 byte smart card, the data will consist of 128 bytes of binary (not ascii) data, addressed from address 0 thru 127. Data written to the card, and data read from the card, will be binary. This means that to set address 1 to a 1, you must send a binary 1 (ctrl-a) as the data to encode the byte to a 1. If you want to set the byte to the character "1", then you send the character which is a hexadecimal 31.

### **standard commands (not read/write)**

<b>V</b>	returns the version identifier of the firmware
<b>!xx</b>	triggers the relay for xx seconds
<b>]xx</b>	turns on the green led for xx seconds, xx=00=leave on
<b>}xx</b>	turns on the red led for xx seconds, xx=00=leave on

### **8-bit card commands**

<b>xxxxxx</b>	reads byte address xxxxx	returns status char + data
<b>yxxxxxd</b>	write data "d" to address xxxxx	returns status char
<b>axxxxx</b>	reads 16 bytes starting at address xxxxx	returns status char + data
<b>bxxxxxd...</b>	write 16 bytes of data "d" starting at address xxxxx	returns status char

**16-bit card commands**

<b>rxxxxx</b>	reads byte address xxxxx	returns status char + data
<b>wxxxxxd</b>	write data "d" to address xxxxx	returns status char
<b>cxxxxx</b>	read 16 bytes of data starting at address xxxxx	returns status char + data
<b>dxxxxxd...</b>	write 16 bytes of data d... starting at address xxxxx	returns status char

**bulk information commands (no status char is sent)**

-	8 bit card, read 128 bytes of data starting at address 0
=	16 bit card, read 256 bytes of data starting at address 0
+	read 256 bytes of data of internal e2 starting at address 0

**internal e2 commands**

<b>Raaaaa</b>	reads byte address aaaaa
<b>Waaaaad</b>	write data "d" to address aaaaa
+	read 256 bytes of data starting at address 0

You do not need to be concerned about reading or writing to the internal e2 unless you want to set the reader to automatically transmit information when a card is inserted. If you want the reader to do this, you must set the following internal e2 locations as defined below. Please note these are byte locations which contain binary information, not ascii information.

Location 2	set to binary 0 for no autotransmit, set to binary 1 for autotransmit of an 8-bit card, set to binary 2 for autotransmit of a 16-bit card
Location 3	set to the starting position (in binary) of the data to transmit
Location 4	set to the length (max 127, in binary) of the data to transmit

**status values**

The value and meaning of the status characters are:

binary 1	no response from smart card, or bad command
binary 2	data verification error on write
binary 5	ok
binary 6	no smart card inserted