

5411 Multi-function Reader Interface

IN039

Removing the cover

If the cover is fitted to the 5411 Reader Interface, you can remove it by squeezing the sides and pulling it off.

Mounting

The 5411 Reader Interface has four mounting holes in the rear of the case. The Reader Interface must not be mounted in direct sunlight. You can mount the Reader Interface in any orientation to suit the direction you want the cables to enter the case. The lid can be fitted either way up. Avoid mounting reader interfaces side by side if you intend to configure them by holding a card over each circuit board.

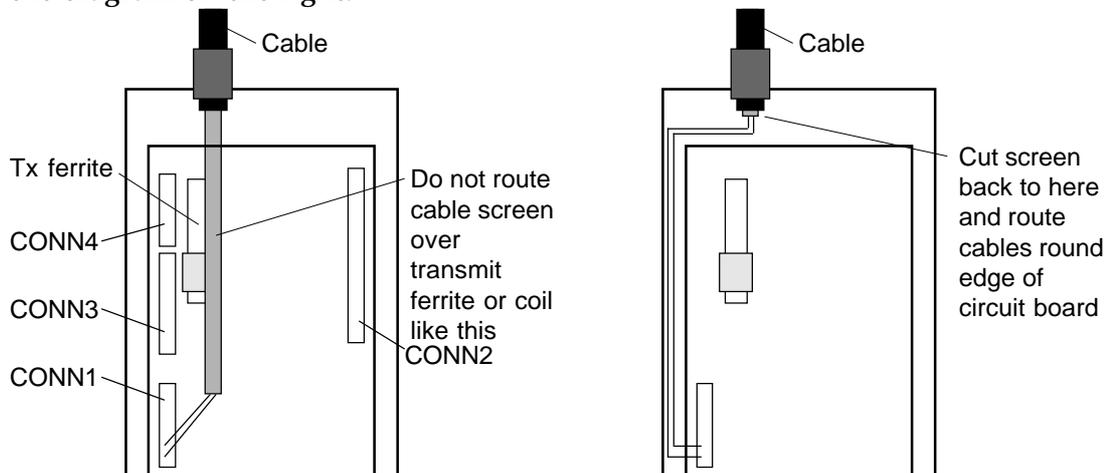
Mark out and drill four mounting holes for the base and screw it in position on the wall, checking that the cable entry point is accessible. External connections are made to the 5411 Reader Interface via cables which can enter through two cable glands on the case.

Connecting

Connections to antennas (reading head or loop coupler) are made to CONN1. Connections to power supply, mains earth, host and reading head LEDs are made to CONN2. Connections to relay, inputs and outputs are made to CONN3. Connections to RS485 comms are made to CONN4.

Cable routing

You must not route screened (shielded) cable over the transmit ferrite or coil on the circuit board as shown in the left diagram below. Cut the screen back to the cable gland and route the conductors around the edge of the circuit board as shown in the diagram on the right.



280 Reading Head

The table below lists connections to the 280 Reading Head. It shows the pins on CONN1 and CONN2 (the connectors on the 5311 Reader Interface circuit board) which should be connected to the pins on TB1 (the connector on the 280 Reading Head).

5311	280RH	Function
<u>RX</u>	TB1-6	Receive line
RX	TB1-7	Receive line
SCR	-	Rx cable screen - connect to 5311 only
<u>SCR</u>	-	Tx cable screen - connect to 5311 only
<u>TX</u>	TB1-8	Transmit line
TX	TB1-9	Transmit line
R	TB1-3	Red LED cathode (-ve)
G	TB1-5	Green LED cathode (-ve)
<u>A</u>	TB1-4	Amber LED cathode (-ve)
	TB1-1	Horn (-ve)
VA	TB1 - 2	LEDs common anode, horn (+ve)

Note: the polarity of the two transmit lines and the two receive lines does not matter.

The Tx and Rx lines must be connected using individually screened twisted pair cables. For distances up to 200 metres you can use 812 Cotag Cable, or cable with 0.38mm² (22AWG) conductors (for example Belden 8723 or equivalent for twin twisted pair). For distances between 200 and 300 metres you must either use 812 Cotag Cable, or cable with 0.5mm² (20AWG, 16/0.2) conductors (for example Belden 9402 or equivalent for twin twisted pair). The maximum distance between the Reader Interface and the reading head is 300 metres using either 812 Cotag Cable or 20AWG screened twisted pairs. Any suitable 5-core cable can be used for the LEDs and horn.

090 Reading Head

The table below lists connections from the 5311 Reader Interface to the 090 Reading Head.

5311	090RH	Function
<u>RX</u>	terminal 6	Receive line
RX	terminal 7	Receive line
SCR	-	Rx cable screen - connect to 5311 only
<u>SCR</u>	-	Tx cable screen - connect to 5311 only
<u>TX</u>	terminal 1	Transmit line
TX	terminal 2	Transmit line
R	terminal 4	red LED cathode (-ve)
G	terminal 5	green LED cathode (-ve)
VA	terminal 3	LEDs common anode (+ve)

Note: the polarity of the two transmit lines and the two receive lines does not matter.

The Tx and Rx cable specification is the same as for the 280 given above. Any suitable 3-core cable can be used for the LEDs.

Loop antenna

The table below lists connections from the 5411 Reader Interface to the 270 Loop Coupler.

<u>5311</u>	<u>270LC</u>	<u>Function</u>
RX	TB3-B	Receive line
$\overline{\text{RX}}$	TB3-R	Receive line
SCR	-	Rx cable screen - connect to 5311 only
SCR	-	Tx cable screen - connect to 5311 only
$\overline{\text{TX}}$	TB4-B	Transmit line
TX	TB4-R	Transmit line

Note: the polarity of the two transmit lines and the two receive lines does not matter.

The Tx and Rx cable specification is the same as for the 280 given above.

For full details of installing and testing loop antennas, see chapter 7 of the handbook, HB02/65.

Unlike Reading Heads, loop antennas have no LED indicators to show the cardholder when the door is unlocked. The 272 Remote Indicator provides red, amber and green LEDs for use with loop antennas (or hidden 280 Reading Heads). It should be mounted where it can be seen by people as they walk up to the loop antenna.

The connections to the 272 Remote Indicator are as follows:

<u>Reader</u>	<u>272RI</u>	<u>Function</u>
R	terminal 2	red LED (-)
G	terminal 4	green LED (-)
A	terminal 3	amber LED (-)
VA	terminal 1	LEDs common anode (+)

Power supply

The power supply connections to the 5411 Reader Interface are as follows:

<u>Reader</u>	<u>Function</u>
0V	Power supply 0V (-ve)
VIN	Power supply +12V DC unregulated (max 15.6V, min 10.7V, 0.5A max)

The power supply you use must be able to provide 500mA DC continuous at 12V (+25% -10%). It is recommended that you use a linear power supply (as opposed to a switch-mode power supply) to cut down on noise which might otherwise reduce the reading range.

The power supply can be unregulated but must be smoothed. The voltage must be within the range 10.7V to 15.6V at all times under all load conditions.

If you connect the power the wrong way round, the circuit is protected by a self-resetting fuse (which will be hot to touch!).

Earthing

<u>Reader</u>	<u>Function</u>
E	Mains earth

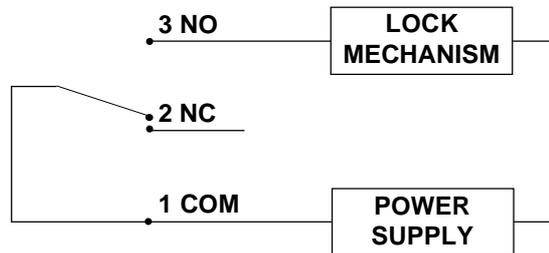
In situations where a separate mains earth is available and where extra protection may be needed from the effects of high energy electrical discharges (such as from electrical storms) a separate connection (labelled E) is available for the mains earth. If you make this connection, remove LK1 to isolate the earth track on the printed circuit board from 0V of the power supply. (The position of LK1 is shown in the diagrams at the beginning of this section.)

Relay (for door lock mechanism or for alarm output)

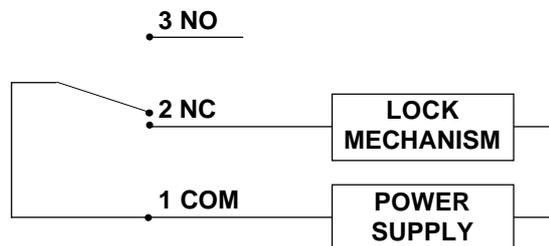
The relay has three terminals: COM (common), NO (normally open) and NC (normally closed). The relay is electrically isolated and can be connected to a power supply of maximum 30V AC or DC passing a maximum current of 2A.

<u>Reader</u>	<u>Function</u>
NC	Normally closed contact
COM	Common
NO	Normally open contact

A door lock mechanism which needs power to lock should be wired as follows:



A door lock mechanism which needs power removed to lock should be wired as follows:



Note that it must always be made possible for people to evacuate a building whether or not power is available.

Output O1 (for alarm output in mode 4, or for noise/jam detected output in modes 2 and 3, or for local warning output in modes 1 and 5)

Output O1 has many different functions, depending on the application mode configured. It is a floating open collector output (no internal pull-up resistor). When it is off, it can be driven to any DC voltage between 0V and +12V. When it is on, it pulls the load down to 0V and can sink up to 250mA. For low current devices up to 10mA such as the horn in the 280 Reading Head, you can draw the power from VA. If any equipment connected to this output is likely to draw too much current, or if it requires its own external power supply, we recommend that you use O1 to switch an external relay.

Reader	Function
O1	Alarm output in mode 4 Noise/jam detected output in modes 2 and 3 Local warning output in modes 1 and 5

Input I1 (for door contacts in modes 4 and 5, or “read-on-demand” input in modes 1 and 4)

To monitor the state of the door, input I1 should be connected to 0V via a switch whose contacts are closed when the door is closed, and which open when the door opens. The Reader should be configured so input I1 is active-high.

Reader	Function
I1	Door monitoring input
0V	Short I1 to 0V when door is closed

If the Reader is configured for read-on-demand, it will only poll the reading area when I1 is active.

Input I2 - external relay control (door exit control button in mode 5, alarm clear in modes 2 and 3)

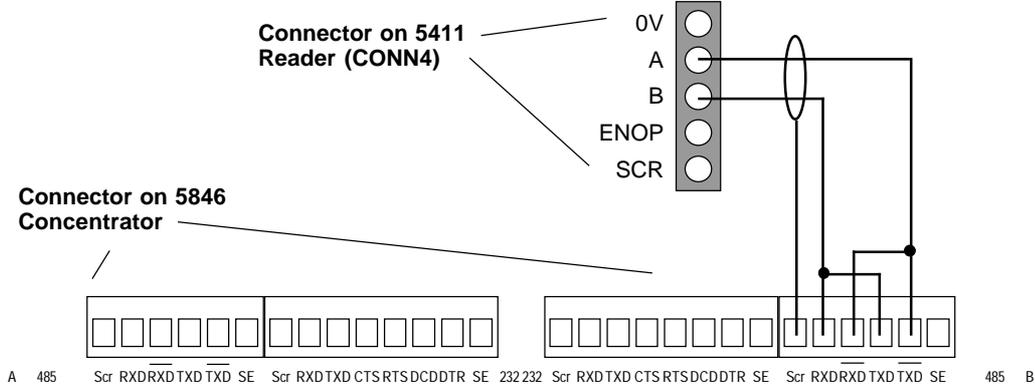
To provide a door exit control (egress) function, input I2 should be connected to 0V via a normally open pushbutton switch mounted next to the door on the secure side. When the input is shorted, the relay is activated as configured (usually for the relay time).

In modes 2 and 3, the relay provides the alarm output. If the relay is configured so that it is internally latched after an alarm, I2 can be used to clear the alarm externally, either by pressing a button or by turning a keyswitch.

Reader	Function
I2	External relay control
0V	Short I2 to 0V to activate

RS485 comms (for configuring and monitoring Readers)

The RS485 comms should be connected to the downstream side of a 5846 Concentrator, as shown in the following diagram:



Notes:

1. The downstream TXD and RXD connections on the Concentrator should be linked together and connected to the A connections on the Readers. The downstream TXD and RXD connections on the Concentrator should be linked together and connected to the B connections on the Readers.
2. The cable should be screened twisted pair, for example, Belden 8273, and can be up to 1km in length. The cable screen (shield) should be connected to the Concentrator only. At the Readers it should be cut back and insulated.
3. To connect several Readers to the Concentrator (up to 8 are allowed), run the twisted pair cable to each Reader, connecting all the A terminals together, and all the B terminals together.

Reader1	Reader2	Reader 3	Concentrator
A	A	A	<u>TXD/RXD</u>
B	B	B	<u>TXD/RXD</u>

4. Set the ADRS switch (SW2) on each Reader's circuit board to a unique address. Switch 1 of SW2 is the most significant bit of the address, switch 4 the least significant.

Host system

Connect the data interface as follows:

Wiegand

D0	Data zero
D1	Data one
0V	Signal ground

Magnetic Stripe

D0	Data
D1	Strobe
DA	Present
0V	Signal ground

ASCII TTL (0V/+5V levels)

D0	TXD
\overline{DA}	RTS
H	CTS
0V	Signal ground

(For ASCII RS232 output at 0V/+12V levels, use the 5810 RS232 Converter.)

The LED connections on the Reader are open collector outputs, so they can be driven by a host either instead of, or as well as, being internally controlled by the Reader. To light the LED on the reading head or remote indicator, the host should pull the corresponding terminal down to 0V.

Reader	Function
R	Short to 0V to light red LED
G	Short to 0V to light green LED
A	Short to 0V to light amber LED

Configuring

The Reader must be in configuration mode (CONF switch 1 up/ON, switch 2 down) - the green MODE LED flashes at one second intervals.

- To teach the Reader Interface its configuration, present the programmed configuration card. The MODE LED lights for two seconds when the card is read successfully. For details of how to program a configuration card, see the handbook, HB02/65.
- To teach the Reader Interface its Distributor and Secondary Codes, present any of the normal programmed cards which will be used with the system. **Note: you only need to do this if the Reader is configured to read 64 bits of tag code.** The MODE LED lights for two seconds when the card is read successfully. (You may be able to get the card to read by holding it over the circuit board.)
- When you have configured the Reader Interface, return switch 1 of the CONF switch down.

Testing

There is a test mode on the Reader Interface (CONF switches 1 and 2 both up/ON) which makes the MODE LED light when it reads any card.

If your 5411 Reader Interface is not working correctly, refer to the chapter of the handbook, HB02/65, which describes your application.

IN039
Iss 1
February 1996