CRYPTAG[â] CENSUS[â]

CR1-MPX8 SITE MANUAL SUPPLEMENT

Issue 1, February 2001

Trademark Notice:

Cryptag is a registered trademark of Identec Ltd.

Census is a registered trademark of Identec Ltd.

Patents:

Cryptag is protected by patents in the UK and other countries.

Registered Designs

Various aspects of the reader design are registered.

WARNING NOTICE

This product uses radio frequency signals to identify tags, and is therefore subject to possible interference. Any application should bear this in mind, and in particular it should not be possible for personal safety to be jeopardised by a failure to read.

Cryptag Census neither uses nor generates hazardous voltages. You should not connect any such voltage to the reader.

$$CE$$

This product complies with the following European Community directives:

Low voltage directive (73/23/EEC)
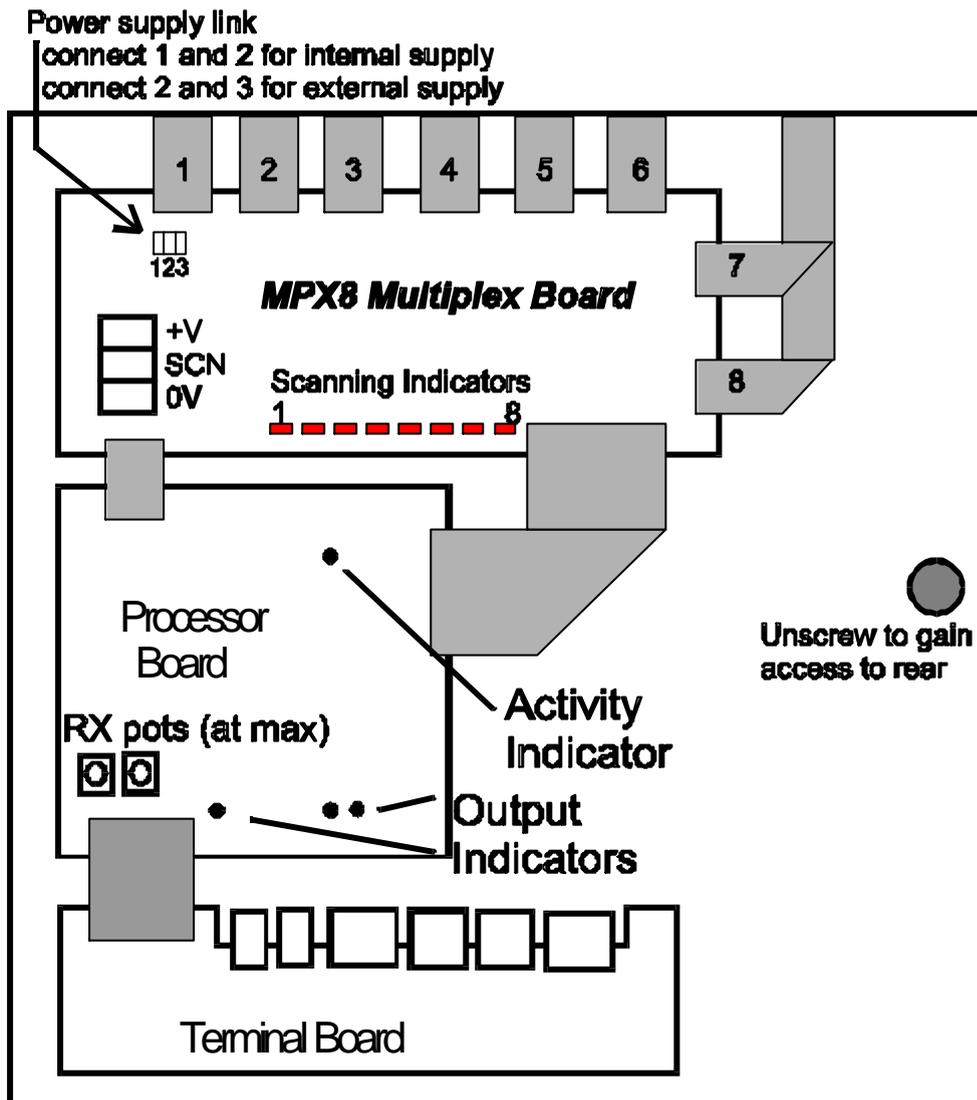[1]**EMC Directive (89/336/EEC)**

Introduction

This supplement to the CR1 Site Manual describes the installation of versions with the MPX8 Aerial Multiplexer board. It should be read in conjunction with the CR1 Site Manual.

The MPX8 Multiplexer is used where a number of aerial loops are used to cover an area. The reader connects to each aerial loop in turn, looking for tags which are within range of that loop. It then goes on to the next aerial loop, scanning across all of the loops. The simplest scan pattern is to look at all 8 aerial loops in turn, but other patterns are possible for instance giving more time to one aerial loop. This is usually only possible when fewer than 8 aerial loops are connected. Consult Identec for details.

As the aerial loops are multiplexed in time, with each loop only active for a proportion of the time available, the effect is to reduce effective reading speed. (See below under Performance for more details.) Compared with a Master/Slave reader, a multiplexed reader is always slower. A multiplexed reader can handle more than 2 aerial loops. In addition, as each loop is being read at a different time interference on one aerial loop will only affect that loop. The reading range of one loop is not affected by interference on other loops.

This manual describes the use of the MPX8 multiplexer board with a CR1 single reader. The MPX8 can also be configured for use with CR1 dual readers (of all types), where two output channels (Wiegand or Clock/Data, and RS232) are required. Where more outputs are needed a BBMUX should be used. For more information, contact Identec.
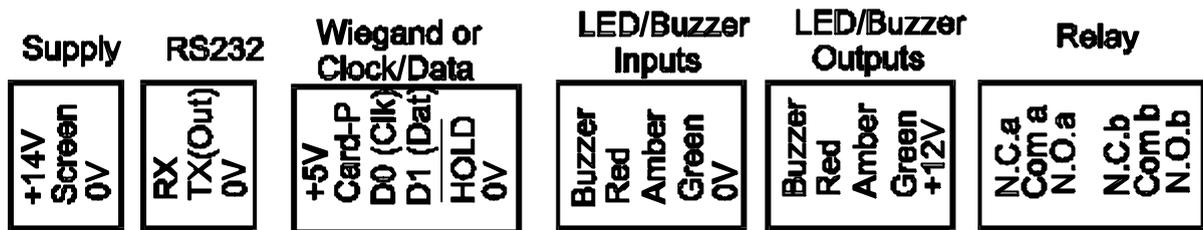
Installation

Power supply link
connect 1 and 2 for internal supply
connect 2 and 3 for external supply

MPX8 Multiplex Board

123

+V
SCN
0V

Scanning Indicators
1 _ _ _ _ _ _ _ 8

Processor
Board

RX pots (at max)

Activity
Indicator

Output
Indicators

Unscrew to gain
access to rear

Terminal Board

The CR1-MPX8 reader is supplied in a metal case which should be mounted on a suitable wall. Inside the reader there is a hinged panel which has circuit boards mounted on both sides. On the front side are the external connections of the reader, while on the rear are the Aerial Modules which are used to connect to each aerial loop. Unscrew the knurled fastener on the right hand side of the panel to obtain access to the rear.

When making connections to the CR1-MPX8 reader, take care to ensure that cables will not be damaged when the hinged panel is swung out.

The external connections to the terminal board are the same as for a CR1 reader.
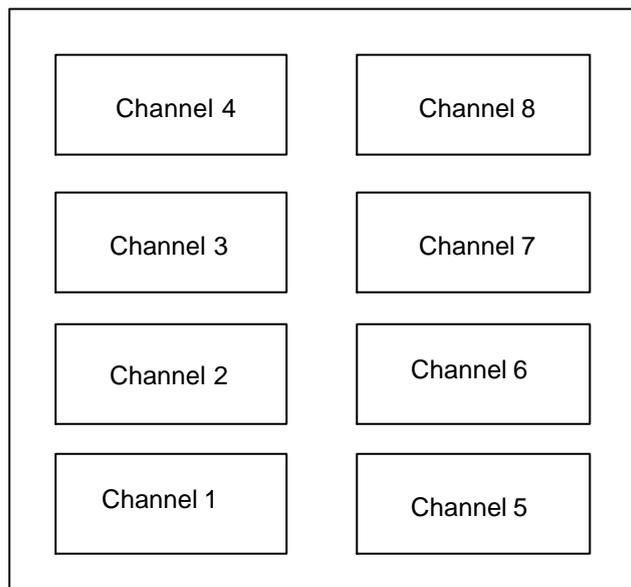
Supply	RS232	Wiegand or Clock/Data	LED/Buzzer Inputs	LED/Buzzer Outputs	Relay
+14V Screen 0V	RX TX(Out) 0V	+5V Card-P D0 (Clk) D1 (Dat) HOLD 0V	Buzzer Red Amber Green 0V	Buzzer Red Amber Green +12V	N.C.a Com a N.O.a N.C.b Com b N.O.b

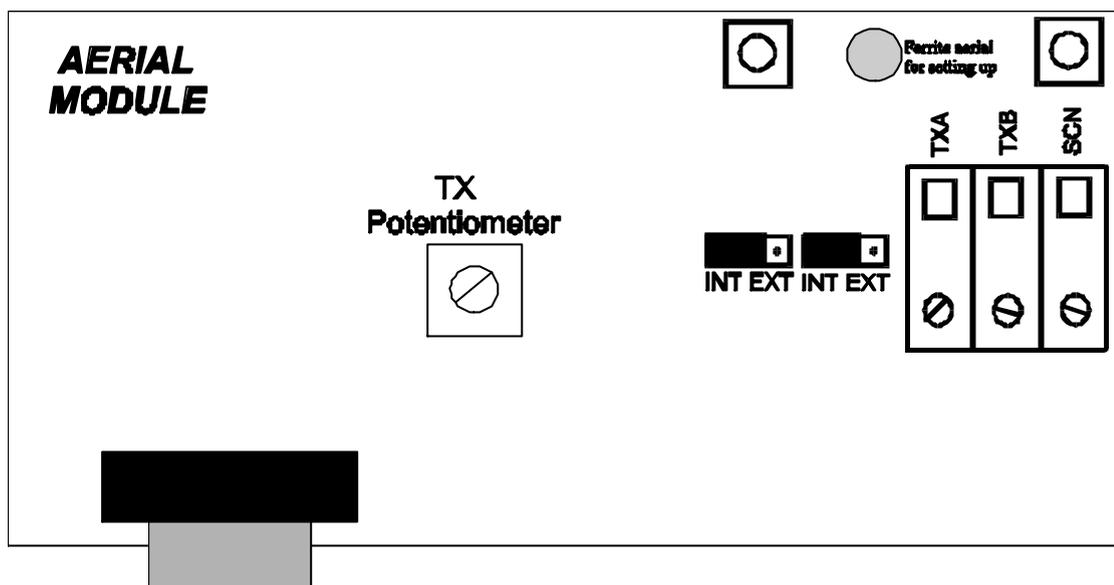**Terminal Board Connections**

The MPX8 board (together with all of the Aerial Modules) can obtain their power from the reader supply or from a separate supply. Under normal circumstances only one Aerial Module is active at the same time, and the total current consumption of the reader is little more than for a standard CR1 reader. If the reader has special software which allows more than one Aerial Module to transmit at once, it is advised that the external power supply input is used.

If an external power input is needed connect the power input to both the Terminal Board and the MPX8 Multiplexer Board. The terminal block is to the left of the board, just above the ribbon cable to the Processor Board.

Ensure that the power supply selection link is set correctly.

Each of the Aerial Modules should be connected to its own loop, and each loop should be tuned, in the same way as for normal CR1 readers with external aerial loops.

Channel 4	Channel 8
Channel 3	Channel 7
Channel 2	Channel 6
Channel 1	Channel 5

AERIAL MODULE

TX Potentiometer

Ferrite aerial for setting up

TXA   TXB   SCN

INT EXT   INT EXT

Commissioning

As with any CR1 with external aerial loops, it is a good idea to set up the reader initially with the internal ferrite aerial which is fitted to the Aerial Module. This has a short range of only 10cm, so each aerial loop channel can be checked individually before connecting the external loops. Set all of the links to INT (as shown). Commission the reader as normal up to the point of connecting to the external loops.

A tag should be read on the internal ferrite aerial of **all** the channels which are being used.

Now commission each aerial loop in turn. Disconnect all other aerial loops, for instance by removing the ribbon cable. Put the two links for that channel at EXT and then commission the external loop as normal. If the loop's tuning is being checked by minimising current consumption this is acceptable, as only one loop is active at any one time. Check that each aerial loop channel covers the desired area.

Having tuned all of the loops, it may be worth going round them all again to check their tuning. This is because the tuning can be affected by another tuned loop nearby, especially if the wire of the loops is very close. A single re-adjustment should be sufficient.

Finally reconnect all channels and ensure the links are set at EXT, and check the overall performance of the reader.

Troubleshooting

The majority of possible problems are covered by the CR1 manual. If a single channel does not work, check the following:

If the internal aerial does not work (expected range about 10cm)
Check all ribbon cables, especially those relating to this channel.
Check that the TX potentiometer for that channel is set at maximum for the time being.
Check that the software is configured to drive that channel (look at Scanning Indicator LEDs)

If the internal aerial works, but the external loop gives little or no range
Troubleshoot the external loop in the same way as any other external loop.

Performance

Each aerial loop connected to a CR1-MPX8 should give the same range as the same loop connected to a normal CR1 reader. This range will not be affected by the other loops. As has already been mentioned, each aerial loop connected to a CR1-MPX8 is operated independently so the range of each aerial loop is only affected by the noise that the aerial loop sees.

Multiplexed loops are slower than single aerials, as each loop has to be scanned in turn. The apparent reading rate is very much determined by how the aerial loops are arranged. A normal CR1 can read about 15 tags in a second, and it has a dynamic read rate of about 7 tags per second – which means that about 7 tags can pass the reader in every second and be read reliably. With the multiplexer scanning tags, only about 12 tags will be read in each second. If a tag is within range of two loops, then those 12 tags will include that tag twice, so there is less time to read other tags. The total dynamic reading rate of a multiplexed reader will be less than that of a standard reader.

As an example, consider a case where there are 4 doors to a building, and a CR1-MPX8 is used to monitor tags coming through any of those 4 doors. There will be 4 loops, but as people walk towards the doors they may sometimes be within range of two of those loops. The overall dynamic reading rate for the whole entrance is going to be about 5 to 6 tags per second. This is the total number of people who can come through any of the 4 doors.