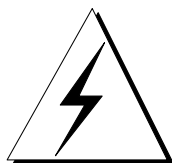# cardax

Prox Mifare Series (Teardrop)

CAUTION

This equipment contains components that can be damaged by electrostatic discharge. Ensure both you and the equipment are earthed before beginning any servicing.

Before you Begin

Unpack the Prox Mifare Series (Teardrop) reader and check the shipment contains the following items:

- 1 x Prox Mifare Series (Teardrop) reader base
- 1 x Prox Mifare Series (Teardrop) reader facia
- 1 x printed circuit board (PCB) assembly
- 2 x self tapper pan head fixing screws
- 1 x cable assembly

Power Supply Requirements

Power for the Prox Mifare Series (Teardrop) reader is usually taken from the incoming supply of the device to which it is connected. That is, from the:

- Cardax FT Reader I/O Interface
- Cardax FT Controller 3000
- Cardax FT Universal Reader Interface (Cardax FT URI)
- Cardax Commander Universal Reader Interface (Cardax Commander URI).

The supply at the reader should be 13.6 V DC ± 15%. The current draw is 180 mA per reader. This is in addition to the requirements of any other device (for example, the URI) powered from the same supply.

Prox Mifare Series (Teardrop) readers require a good quality linear power source. If you do not use the recommended power supply, it may affect the performance of the reader.

Note: Switch mode power supplies are not recommended as they may reduce the read range of the Prox Mifare Series (Teardrop) reader.

Cabling

The Prox Mifare Series (Teardrop) reader uses the Cardax IV communications system. This means it can be connected to the following Cardax equipment:

- Cardax FT Reader I/O Interface
- Cardax FT Controller 3000
- Cardax FT URI
- Cardax Commander URI

Use 4 core, 0.2 mm^2 (AWG 24) cabling with a maximum, nominal capacitance of 120 pf/m. The maximum external diameter of the cable must not exceed 5 mm (1/5 inch).

With this type of cable, the maximum distance between the Prox Mifare Series (Teardrop) reader and the device to which it connects is 200 m (650 ft).

Note: You need a special cable terminating tool to connect the building cabling to the Prox Mifare Series (Teardrop) reader. The tool has a head (Part No. C861145) and handle (Part No. C861115). You also need a special tool (Part No. C41611) to open the Prox Mifare Series (Teardrop) reader if necessary.

Mounting Distance Between Proximity Readers

The distance between any 2 proximity readers must be greater than 200mm in all directions.
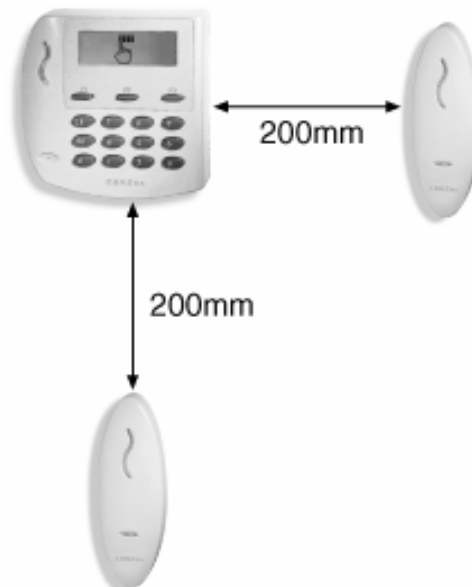
Please note that 200mm in all directions includes the distance through walls.
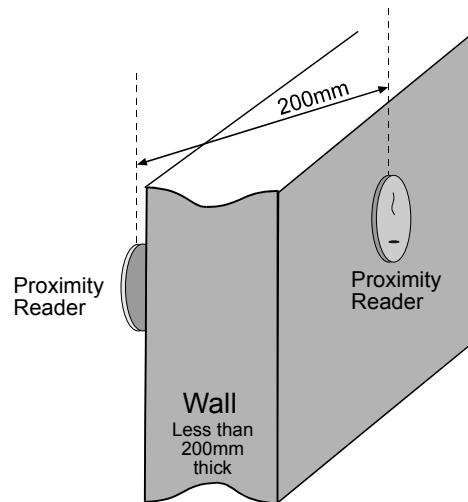
Mounting

Note: The Prox Mifare Series (Teardrop) reader has been designed to metric specifications. Therefore any imperial measurements provided are approximate only.

The Prox Mifare Series (Teardrop) reader is designed to be mounted on any solid flat surface, however metal surfaces can result in a reduced read range.
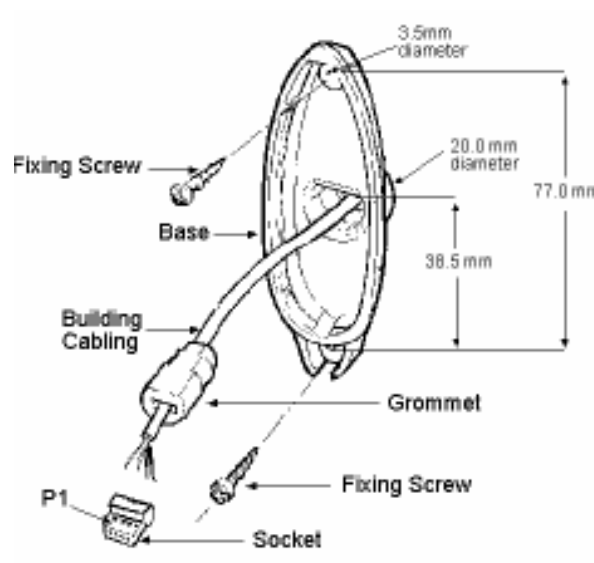
Note: The grommet through which the cables feed into the base of the Prox Mifare Series (Teardrop) reader helps to keep the unit waterproof.

Using the mounting dimensions on the back of this Installation Note as a guide, drill a 20 mm ($^3/_4$ inch) diameter hole for the base extrusion through or into the mounting surface to a minimum depth of 40 mm ($1^1/_2$ in).

Drill two pilot holes for the fixing screws.

Run the building cabling through the base and grommet.

Fit the base to the 20 mm (³/₄ inch) hole and secure it to the mounting surface using the two fixing screws provided. Note that using other types of screws could interfere with the electronics.

Note: It is very important that the base of the reader is flush with and tight against the mounting surface. If you are mounting the Prox Mifare Series (Teardrop) reader on a rough surface you should make the surface as smooth as possible under the reader and up to 25mm (1 in) around the reader. This is to enable easy removal at a later date is required.

Push the socket back into the grommet.

Push the grommet and socket back into the Prox Mifare Series (Teardrop) reader base.

Check the tape covering the antenna wire solder joints is in position. Install the PCB assembly into the base, ensuring the connector on the back of the PCB assembly fits into the socket in the base. The PCB assembly should click into place.

Fit the facia onto the base by clipping the small lip, inside the facia, over the top edge of the base and holding the top, press the bottom of the facia down until it clicks onto the bottom of the base.
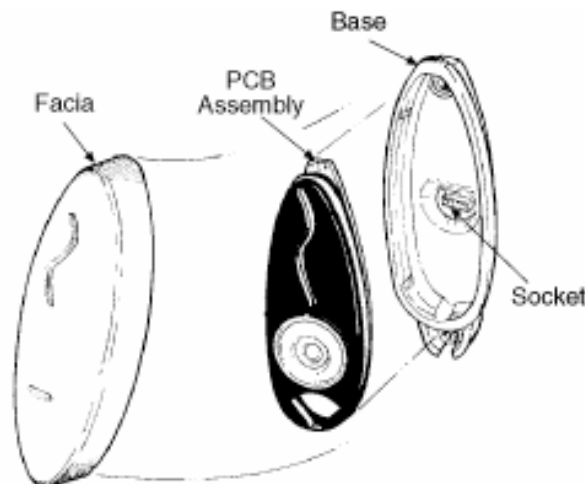
Removing the Facia

To remove the facia from the Prox Mifare Series (Teardrop) reader base you need the plastic de-latching tool (Part No. 41611) shown below. The end of the tool is used for removing the facia.
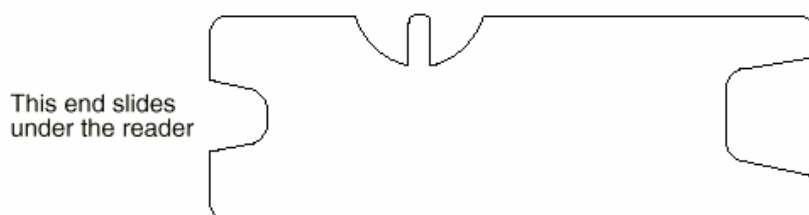
De-latching tool

1. Slide the de-latching tool firmly under the bottom of the Prox Mifare Series (Teardrop) reader.

2. Hold the top of the Prox Mifare Series (Teardrop) reader with your fingers and squeeze the de-latching tool up, towards the top of the reader with your thumb.

3. Lift the facia away from the base.

   If the base is not flush to the wall, or the screws have become loose you may need to pack the space between the de-latching tool and the wall. A thin piece of cardboard is usually all that is necessary, (i.e. a business card folded in two).

4. Cut a notch in the folded edge of the card similar in shape to the notch in the de-latching tool as shown below.

5. Slide the card under the bottom of the facia and then use the de-latching tool with the card as packing.
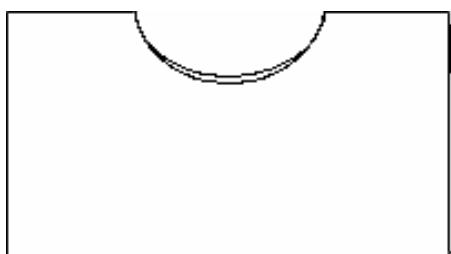
Connections

The Prox Mifare Series (Teardrop) reader connects to one of the following:

- Cardax FT Reader I/O Interface
- Cardax FT Controller 3000
- Cardax FT URI
- Cardax Commander URI

Use the cable terminating tool to connect the cables to the socket as described in the following sections.

Pin number 4 of the Prox Mifare Series (Teardrop) reader connector feeds into the cable terminating tool first.

Connecting to the Cardax FT Reader I/O Interface

The Cardax FT Reader I/O Interface has connections for up to sixteen Prox Mifare Series (Teardrop) reader or other Cardax IV readers.

The Prox Mifare Series (Teardrop) reader connects to either plug PA or plug PB in Groups 1 to 8.

Make the connections from the Prox Mifare Series (Teardrop) reader to the Reader I/O interface as shown:
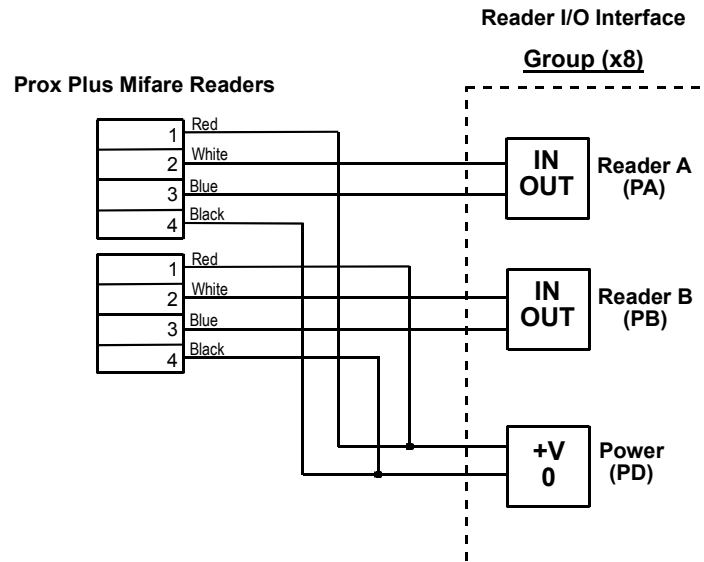
For the location of the plugs on the Reader I/O Interface, refer to the component layout diagram:
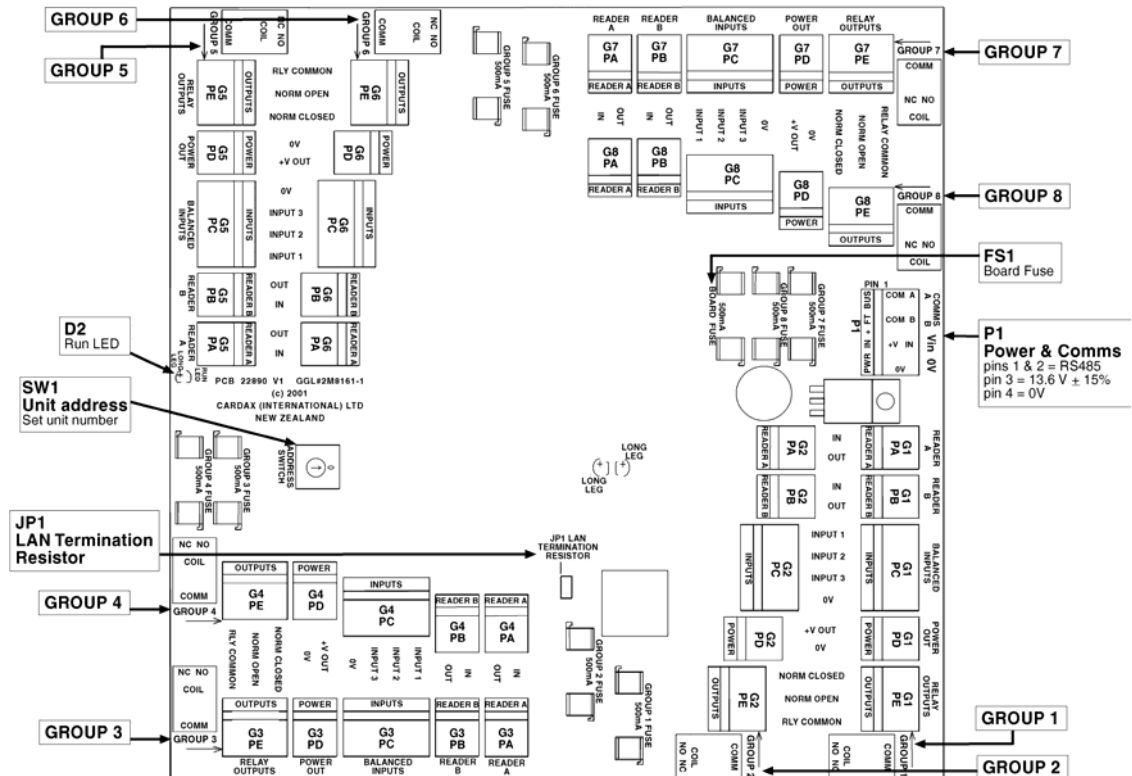
Connecting to the Cardax FT Controller 3000

The Cardax FT Controller 3000 interfaces the following types of reader into the Cardax FT Command Centre system:

- Cardax IV readers, including Prox Mifare Series (Teardrop) readers
- Wiegand readers

Each Cardax FT Controller 3000 can interface up to eight Prox Mifare Series (Teardrop) readers into the Cardax FT Command Centre system.

The ports to which the Prox Mifare Series (Teardrop) reader can connect are set up as four distinct groups (numbered 1 to 4). Each group provides connection for two Prox Mifare Series (Teardrop) readers or other Cardax IV readers. Refer to the following diagram for the location of the ports on the Cardax FT Controller 3000.

J1 to J4 RS485 terminating resistors

Group 4

Group 3

Group 2

Group 1

PA1 to PA4 Power Out
pin 1 = power out
pin 2 = 0 V

PC1 to PC4 Inputs
pin 1 = Input 1
pin 2 = Ground
pin 3 = Input 2

PB1 to PB4
2 x Cardax IV Readers per connector

Reader 1 = pins 1 & 3
Reader 2 = pins 2 & 4

Pin 1 = Reader 1 transmit
Pin 2 = Reader 2 transmit
Pin 3 = Reader 1 receive
Pin 4 = Reader 2 receive
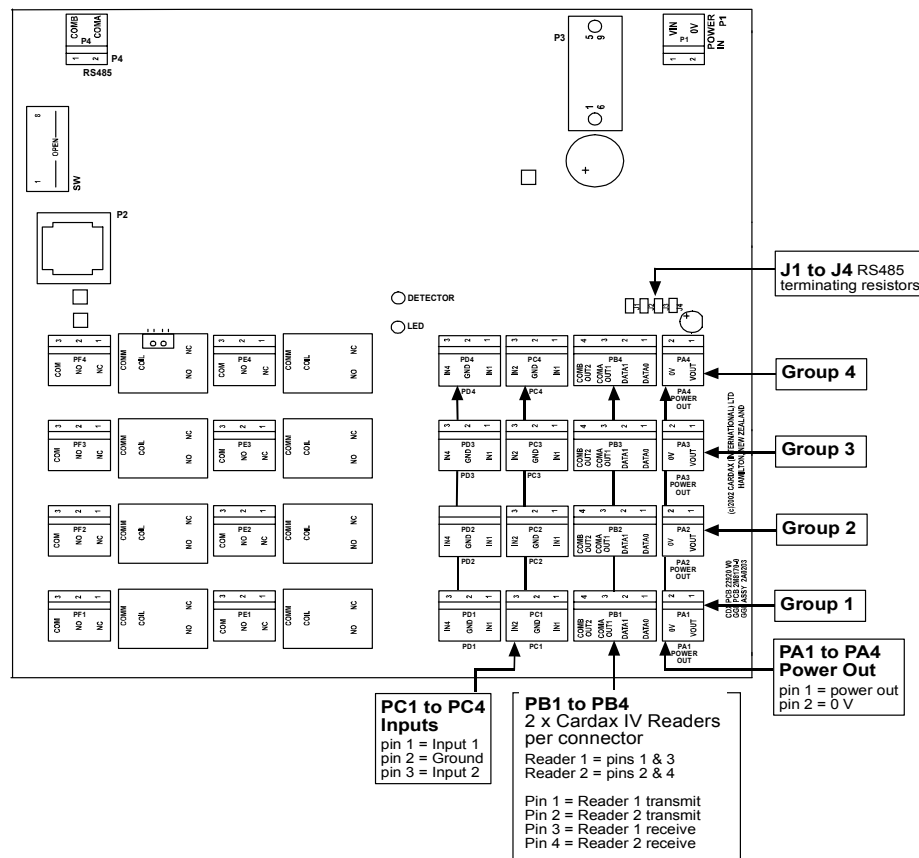
Make the connections from the Prox Mifare Series (Teardrop) reader to the Cardax FT Controller 3000 as shown:

Cardax FT Controller 3000

<u>Group (x4)</u>

PB1 and PA1... to... PB4 and PA4

PB				PA	
OUT2	OUT1	DATA1	DATA0	0 V	VOUT
4	3	2	1	2	1

Red	White	Blue	Black
1	2	3	4

Prox Plus Mifare Reader 2

Red	White	Blue	Black
1	2	3	4

Prox Plus Mifare Reader 1
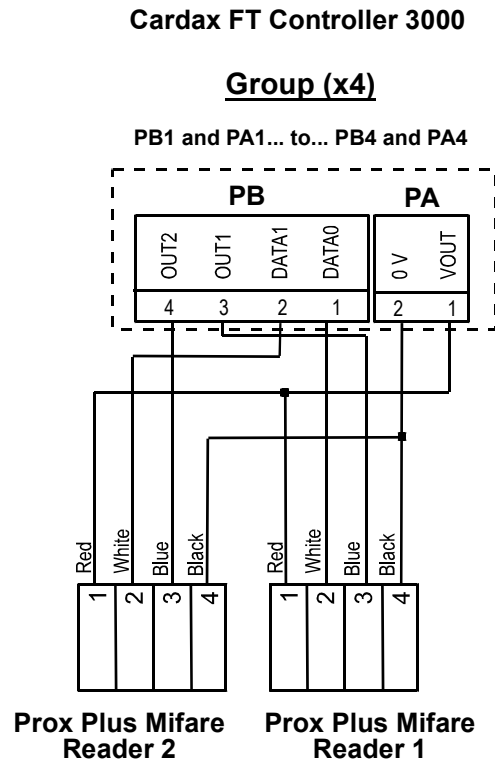
Note:
Within each group, you cannot mix Cardax IV readers with Wiegand Readers. This is because connecting one Wiegand reader requires all four pins on plug PB. For example, if you connect a Prox Mifare Series (Teardrop) reader to Port 1 of Group 1, Port 2 of Group 1 can only connect to another Cardax IV reader.

The terminating resistors (J1 for Group 1, J2 for Group 2, etc.) must NOT be fitted for those groups to which Prox Mifare Series (Teardrop) readers are connected.

Connecting to the Cardax FT URI

Connect the cables to the socket as shown:

Cardax FT Universal Reader Interface

Prox Plus Mifare Connector

		Plug P1 or P2
4	Black	GND
3	Blue	OUTPUTS
2	White	OUTPUTS
1	Red	DET
		COMMS
		COMMS
		5/12V
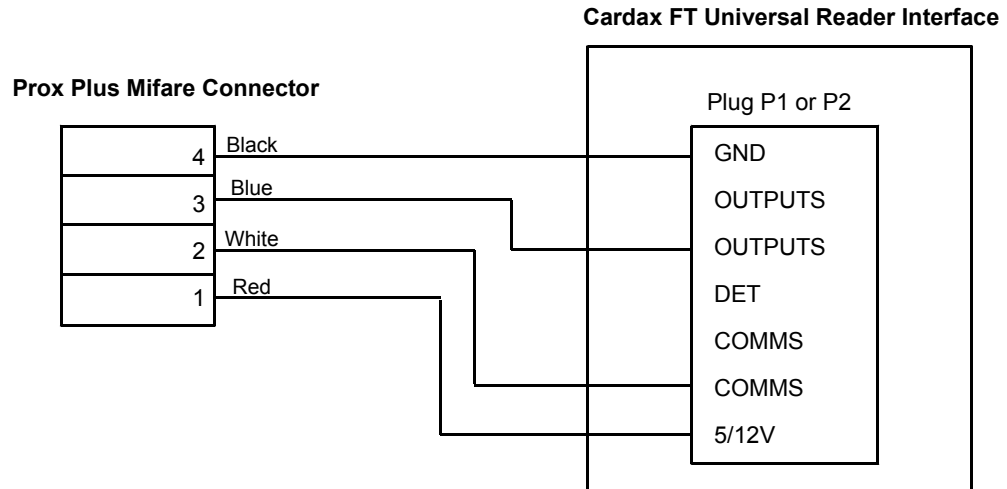
Connect the Prox Mifare Series (Teardrop) reader connector to either the P1 or P2 plug on the Cardax FT URI. Refer to the Cardax FT URI component layout diagram, next, for the location of the plugs.

P2 Non-CardaxFT Reader 2
pin 1 = 5/12 V power
pin 2 = DataA
pin 3 = DataB
pin 4 = Card detect
pin 5 = LED output
pin 6 = Beeper output
pin 7 = Ground

P3 Keypad
pin 1 = Row1
pin 2 = Row 2
pin 3 = Row 3
pin 4 = Row 4
pin 5 = Column1
pin 6 = Column2
pin 7 = Column3
pin 8 = Ground

P6 13.6 V ± 15%out
pin 1 = 13.6 V ± 15%
pin 2 = Ground 3A fused

F2 13.6 V Output Fuse
Rating = 3A

F1 13.6 V Input Fuse
Rating = 500mA

D10 Comms LED
flashing = communicating with FT Controller

P5 Power & Comms
pins 1 & 2 = RS485
pin 3 = 13.6 V ± 15%
pin 4 = 0V

JP1 Reader Voltage select
= 5V (200mA total)
= 12V (1A total)

D17 and D21 Relay state indicators
LED on = Energised
LED off = De-energised

P7 Relay Outputs
pin 1 = R1 Normally closed
pin 2 = R1 Normally open
pin 3 = R1 Common
pin 4 = R2 Normally closed
pin 5 = R2 Normally open
pin 6 = R2 Common
pin 7 = Ground

D18 Run LED

P1 Non-CardaxFT Reader 1
pin 1 = 5/12 V power
pin 2 = DataA
pin 3 = DataB
pin 4 = Card detect
pin 5 = LED output
pin 6 = Beeper output
pin 7 = Ground

P8 Diagnostic port

SW1 Unit address
Set unit number

P4 Balanced Inputs
pin 1 = Input1
pin 2 = Input 2
pin 3 = Input 3
pin 4 = Input 4
pin 5 = Input 5
pin 6 = Input 6
pin 7 = Ground

Connecting to the Cardax Commander URI

Connect the cables to the socket as shown in the following diagram.

Universal Reader Interface

Prox Plus Mifare Connector

Plug P4 (Exit) or P5 (Entry)

Prox Plus Mifare Connector	Wire	Universal Reader Interface
4	Black	1 GND
3	Blue	2 BPR
2	White	3 LED
1	Red	4 DET
		5 1-CK
		6 0-DT
		7 5/12V
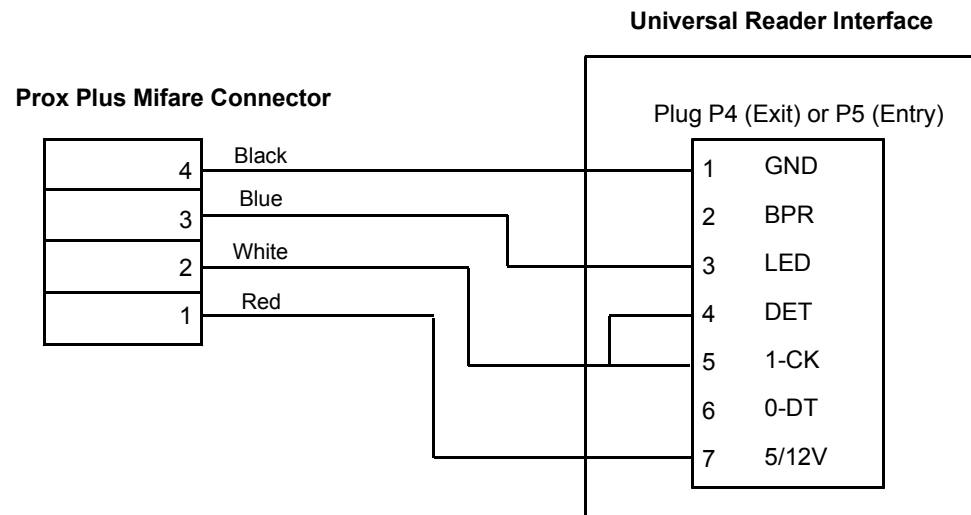
Note:
Refer to Cardax Commander URI Components, for the location of the Cardax Commander URI components.

Initialisation

Initialising with the Cardax FT Reader I/O Interface

Refer to the *Cardax FT Reader I/O Interface Installation Note* (Part number 3E1016) for initialisation instructions.

Initialisation of the Cardax FT Reader I/O Interface does not require prior connection to the Prox Mifare Series (Teardrop) reader. The Prox Mifare Series (Teardrop) reader will be operational as soon as it is:

- connected to a Cardax FT Reader I/O Interface, and
- configured as a Cardax IV reader within the Cardax FT Command Centre system.

Initialising with the Cardax FT Controller 3000

Refer to the *Cardax FT Controller 3000 Installation Note* (Part number 3E1089) for initialisation instructions.

Initialisation of the Cardax FT Controller 3000 does not require prior connection to the Prox Mifare Series (Teardrop) reader. The Prox Mifare Series (Teardrop) reader will be operational as soon as it is:

- connected to a Cardax FT Controller 3000, and
- configured as a Cardax IV reader within the Cardax FT Command Centre system.

Initialising with the Cardax FT URI

Refer to the *Cardax FT Universal Reader Interface Installation Note* (Part number 3C4518) for initialisation instructions.

Initialisation of the Cardax FT URI does not require prior connection to the Prox Mifare Series (Teardrop) reader. The Prox Mifare Series (Teardrop) reader will be operational as soon as it is:

- connected to a Cardax FT URI, and
- configured as a Cardax IV reader within the Cardax FT Command Centre system.

Initialising with the Cardax Commander URI

Type of Door Lock

Depending on the type of lock fitted to the door that the reader is controlling, you will need to initialise the URI with the door either closed or open.

If you initialise the URI with the door held open, it sets the door to unlock and remains unlocked until the door is fully closed again. If you initialise the URI with the door closed it sets the door to unlock and resets to lock as soon as the door is opened.

Note:
If you are installing the Prox Mifare Series (Teardrop) reader to control a turnstile you should consult the turnstile manufacturer for details of the locking mechanism used.

Push-Button Exit

If the door has a push button exit, ensure the URI Exit terminal has the push-button fitted and correctly terminated with a 10 kΩ resistor before you power on.

Check Software Version

You should check the URI software version to ensure it is correct for your installation. The software version number is written on the label of the EPROM mounted at the bottom right of the URI processor board.

URI software versions that are compatible with the Prox Mifare Series (Teardrop) reader are shown below:

Software	Reader Type
vW3.61 to vW3.67 or vW6.xx series *	One door Cardax Prox or Swipe Readers
vW7.xx TC series	URI Special Options
vW4.74 to vW4.81 or vW9.xx series *	Two door Cardax Prox or Swipe Readers

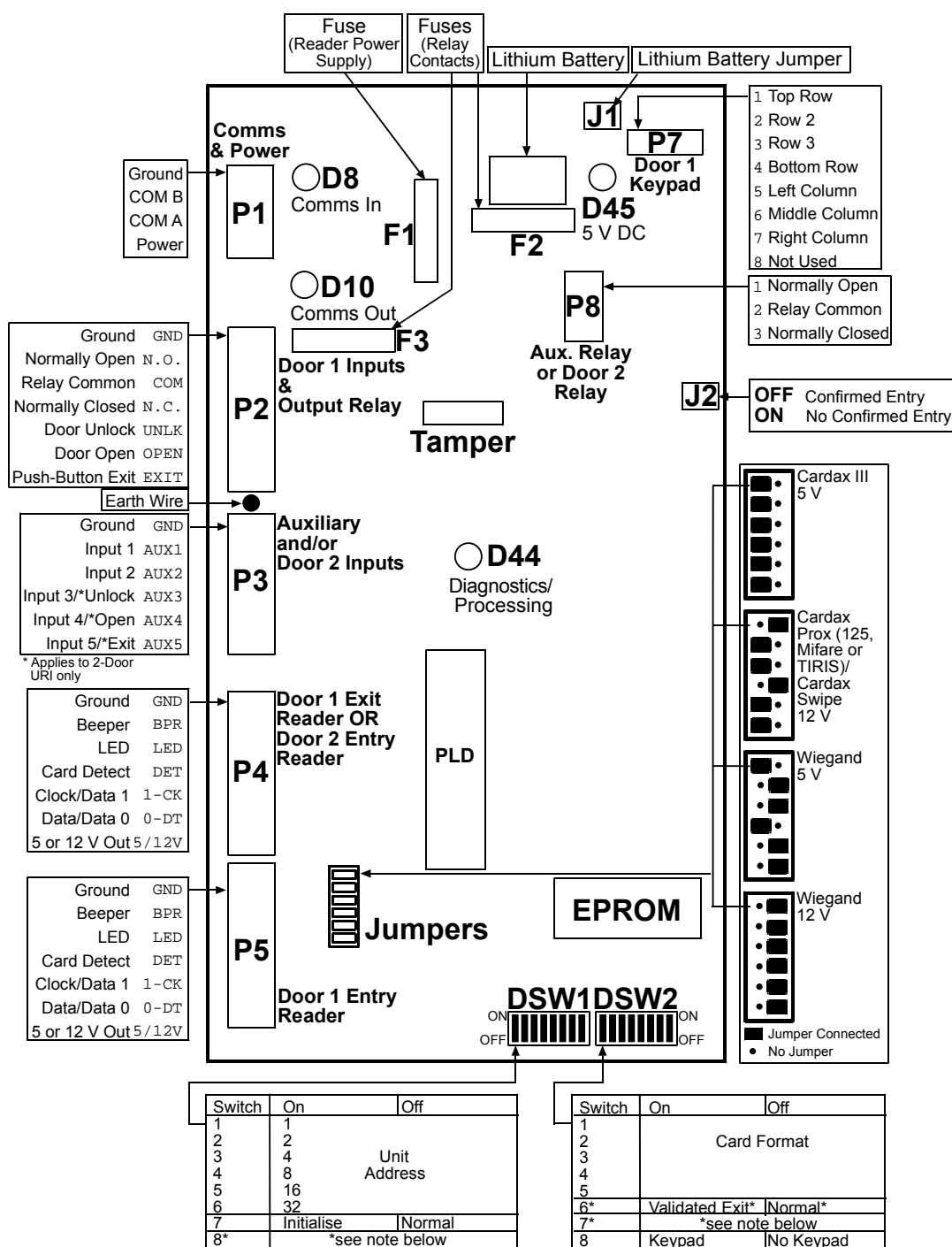**Note:** * These software versions will have one of the following suffixes:

GT = 2 wire modem connection

G = 4 wire modem connection

// = direct connection via comms lines ie. no modem

Cardax Commander URI Components

Please refer to the diagram below for the location of the Cardax Commander URI components.

Fuse (Reader Power Supply)
Fuses (Relay Contacts)
Lithium Battery
Lithium Battery Jumper

Comms & Power

Ground
COM B
COM A
Power

P1

○ **D8** Comms In

F1

○ **D10** Comms Out

F3

J1

P7 Door 1 Keypad

○ **D45** 5 V DC

F2

1 Top Row
2 Row 2
3 Row 3
4 Bottom Row
5 Left Column
6 Middle Column
7 Right Column
8 Not Used

P8

Aux. Relay or Door 2 Relay

1 Normally Open
2 Relay Common
3 Normally Closed

Ground GND
Normally Open N.O.
Relay Common COM
Normally Closed N.C.
Door Unlock UNLK
Door Open OPEN
Push-Button Exit EXIT
Earth Wire

P2

Door 1 Inputs & Output Relay

Tamper

J2

OFF Confirmed Entry
ON No Confirmed Entry

Ground GND
Input 1 AUX1
Input 2 AUX2
Input 3/*Unlock AUX3
Input 4/*Open AUX4
Input 5/*Exit AUX5
* Applies to 2-Door URI only

P3

Auxiliary and/or Door 2 Inputs

○ **D44** Diagnostics/ Processing

Cardax III 5 V

Cardax Prox (125, Mifare or TIRIS)/ Cardax Swipe 12 V

Ground GND
Beeper BPR
LED LED
Card Detect DET
Clock/Data 1 1-CK
Data/Data 0 0-DT
5 or 12 V Out 5/12V

P4

Door 1 Exit Reader OR Door 2 Entry Reader

PLD

Wiegand 5 V

Ground GND
Beeper BPR
LED LED
Card Detect DET
Clock/Data 1 1-CK
Data/Data 0 0-DT
5 or 12 V Out 5/12V

P5

Door 1 Entry Reader

Jumpers

EPROM

Wiegand 12 V

■ Jumper Connected
● No Jumper

DSW1 DSW2

ON / OFF

Switch	On	Off
1	1	
2	2	
3	4	Unit
4	8	Address
5	16	
6	32	
7	Initialise	Normal
8*	*see note below	

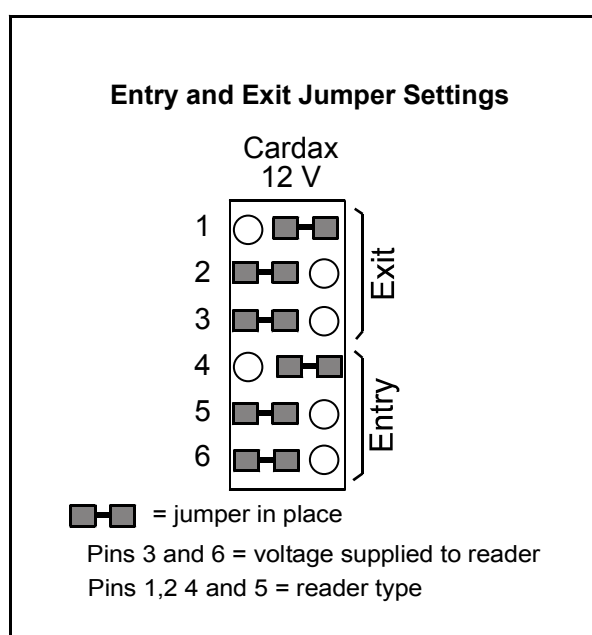| Switch	On	Off
1		
2	Card Format	
3		
4		
5		
6*	Validated Exit*	Normal*
7*	*see note below	
8	Keypad	No Keypad

* Depends on Software Version.

Setting the Jumpers

Tamper the URI by opening the door of the cabinet. This releases the tamper switch.

The URI has a set of six jumpers grouped into two sets of three. One group is labelled ENTRY and the other is labelled EXIT.

ENTRY jumpers set the voltage and card type of the reader connected to plug **P5**. EXIT jumpers set the voltage and card type of the reader connected to plug **P4**.

Set the Entry and Exit jumpers for the Prox Mifare Series (Teardrop) reader as shown below:

Entry and Exit Jumper Settings

Cardax
12 V

1 ○ ■–■   ⎫
2 ■–■ ○   ⎬ Exit
3 ■–■ ○   ⎭
4 ○ ■–■   ⎫
5 ■–■ ○   ⎬ Entry
6 ■–■ ○   ⎭

■–■ = jumper in place

Pins 3 and 6 = voltage supplied to reader
Pins 1,2 4 and 5 = reader type

Confirmed Entry

Connector **J2** on the URI controls the Confirmed Entry function. If you initialise the URI with no jumper fitted on **J2** the Confirmed Entry function will be ON. To switch the Confirmed Entry function OFF, you must initialise the URI with a mini-jumper fitted across both pins of connector **J2**.

Connecting the Reader

Connect the Prox Mifare Series (Teardrop) reader to the URI Entry Plug **P5**.

Note:
If you are using two entry readers (2 door software) you must connect the second entry reader to URI Plug **P4** to initialise the URI. Ensure Entry and Exit jumpers are set to the same configuration.

If you are only using an Exit reader you must connect the reader to the Entry Plug **P5** to initialise the URI. After you have initialised the URI you should connect the Exit reader to URI Exit Plug **P4**.

Setting the Dip Switches

Set DIPSW1 as follows:

Switches	On	Off
1 **2** **3** **4** **5** **6**	1 2 4 8 16 32 } Unit Addresses	
7	Initialise	Normal
8	1 door software = liftcar reader 2 door software = keypad on door 2	1 door software = door reader 2 door software = no keypad on door 2

Set DIPSW2 as follows, where 0 = OFF and 1 = ON:

URI Software	vW6.xx and vW9.xx	vW3.61 to vW3.67 and vW4.74 to vW4.81
	DIPSW2	DIPSW2
Reader	12345678	12345678
Prox Mifare Series (Teardrop) reader only, no authorised exit	00000000	00011000
Prox Mifare Series (Teardrop) reader only, with authorised exit	00000100	00011100
Prox Mifare Series (Teardrop) reader with external keypad and no authorised exit.	00000011	10011011
Prox Mifare Series (Teardrop) reader with external keypad and authorised exit.	00000111	10011111

For further details on software versions refer to *Check Software Version* earlier in this Installation Note.

Initialise Process

CAUTION

⚠ Do not fit the lithium battery jumper (J1) before powering up the URI. If the jumper is fitted you must remove it and wait 10 seconds.

Power up the URI.

The yellow LED (**D45**) should be permanently ON. This indicates that 5 V is present on the board.

The green LED (**D44**) should flash twice, pause, then flash twice again. This is a continuous sequence while the URI is unitialised and indicates it is processing.

The red LED (**D8**) should flash if polls are received from the Commander.

Note:
A URI can be initialised without being connected to a Commander.

Set DIPSW1:7 to ON.

Present aSmart Card to the Prox Mifare Series (Teardrop) reader.

Note:
You must present the card within 30 seconds of setting DIPSW1:7 to ON. If you are initialising with two readers connected to the URI, you should present the card to the reader on URI plug **P5**.

Set DIPSW1:7 to OFF

The green LED (**D44**) will begin flashing continuously.

The other red LED (**D10**) will flash each time the URI replies to a poll from the Commander.

Replace the lithium battery jumper **J1**.

Restore the tamper by closing the door of the URI cabinet.

Approvals and Standards

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Note: Changes or modifications not expressly approved by Gallagher Group Ltd could void the user's authority to operate the equipment.

CE

ACN: 002132943

Mounting Dimensions

Pilot hole

Slot

20 mm hole

39 mm

20 mm

51 mm

39 mm

Pilot hole

17 mm