

Comfort, the Intelligent Home System

Comfort
Fingerprint
Reader
Interface
FPR01

Comfort Fingerprint Reader Interface

Comfort Fingerprint Reader Interface

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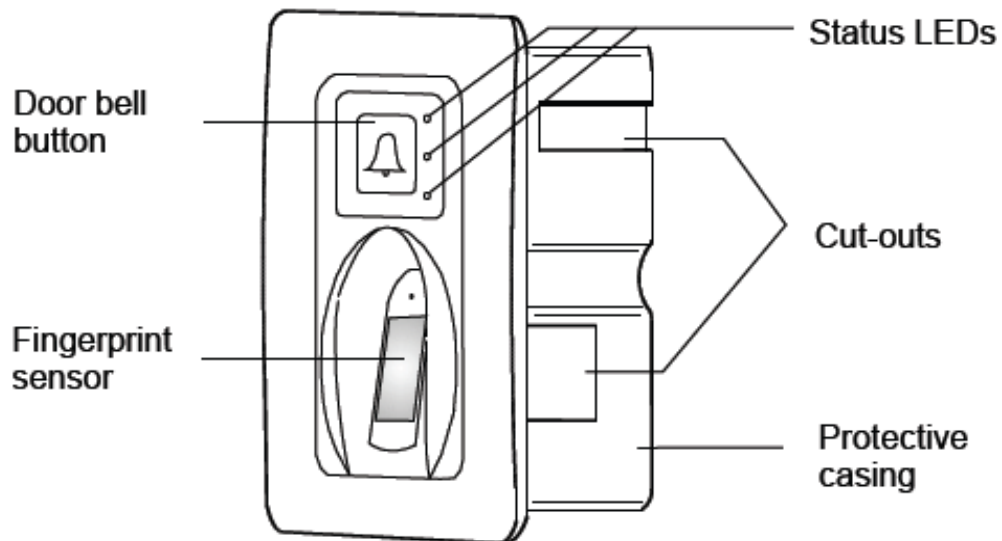
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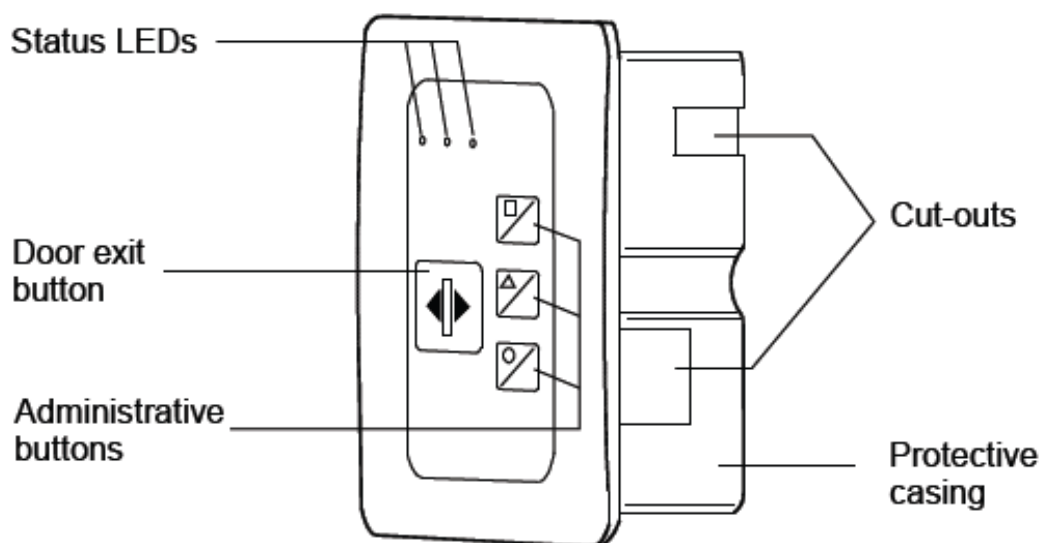
Comfort Fingerprint Reader Interface

Introduction to the Comfort Fingerprint Reader Interface

- The Comfort system supports integration to the FPR01 fingerprint Reader system via the UCM/Access. The UCM/Access provides a data interface to the FPR01, enabling integration of an access control system to trigger Comfort responses, such as to arm or disarm the security system, or to switch on lights based on identification of the specific user. The Comfort Fingerprint Reader is suitable for small offices or homes where a biometric reader is required for access and/or for arming and disarming.
- The Fingerprint Reader System consists of 2 parts: The Controller unit and the Fingerprint Reader.
- The Fingerprint Reader is the unit that is normally mounted at the entry point, consisting of a door bell button, 3 status LEDs and the fingerprint sensor.



- The controller unit is the unit that is mounted at the exit point, consisting of 3 status LEDs, a door exit function to open doors, and 3 administrative buttons.



Comfort Fingerprint Access Interface

Specifications

UCM/Access

- PCB Size: 108 x 88 mm
- Power Supply: 12V 30 mA (from Comfort) for UCM
- Operating Temperature: 0-70°C

FPR01

- Size: 86 x 86 x 35 mm for both controller unit and fingerprint unit
- Power Supply: 12V 170mA (from Comfort) for Fingerprint Access Controller
- Operating Temperature: 0-70°C
- Type of sensor: Silicon

Features

- 16 Users including Master (User 1)
- 6 Finger templates for each user. Total of 52 Templates for all users
- Each user identification activates a Response on Comfort
- Duress Template to activate Duress Alarm (System accepts the user but silently activates Duress Alarm dialout)
- Tamper Alarm (UCM ID) due to loss of communications with the FPR01
- Open Door command from Comfort to unlock door

Equipment

The following equipment is required

- UCM/Access Module with firmware version "Access 5.148" or above. The UCM/ACCESS is designed to interface to third-party Access Control Systems through a serial interface (RS485 or RS232)
- FPR01 Fingerprint Reader System. This is a stand-alone (non-networked biometric access control system which communicates with the Comfort system through the UCM/Access.
- Comfort II system with firmware version "Ultra 5.164" or above.

Settings

Connections

- JP3 - 12V/COM terminal block. Connect to 12V/COM on Comfort if JP2/2A not used. Do not connect if JP2/2A is used to connect back to Comfort. This may also be used to provide power to the fingerprint access controller.
- JP4 - KA/KB terminal block. Connect to KA/KB on Comfort if JP2/2A not used. Do not connect if JP2/2A is used to connect back to Comfort. **NOT** to be connected to D+/D- on the fingerprint controller.

Comfort Fingerprint Reader Interface

- JP2 and JP2A - 4 way headers (12V/COM/KA/KB). Either connector can be connected to Comfort's J6 connector via the supplied cable when JP3 and JP4 are not used. This plug-in cable connection is used when the distance between the controller and UCM/Access is less than 30 cm. For longer distances, use the JP3 and JP4 terminal blocks.
- JP1 – KA/KB terminal block. Connect to D+/D- on fingerprint access controller respectively. **DO NOT** connect D+/D- to JP4.

Jumper Settings

- J2 (RS232/RS485) – insert shunt in “485” position. If this header is not present, it has been preset to the correct state in the factory.
- SW7 (RS485 ID Primary) – set according to ID of the UCM/Access (see “UCM ID Switch” settings)
- SW8-A – removed if a tamper signal is supposed to be triggered when no communication is established between the UCM/Access and the fingerprint access controller.

Buttons

- SW1 - RESET. This button reinitializes the UCM/Access module. It does not change any parameters in Comfort or the fingerprint access controller.

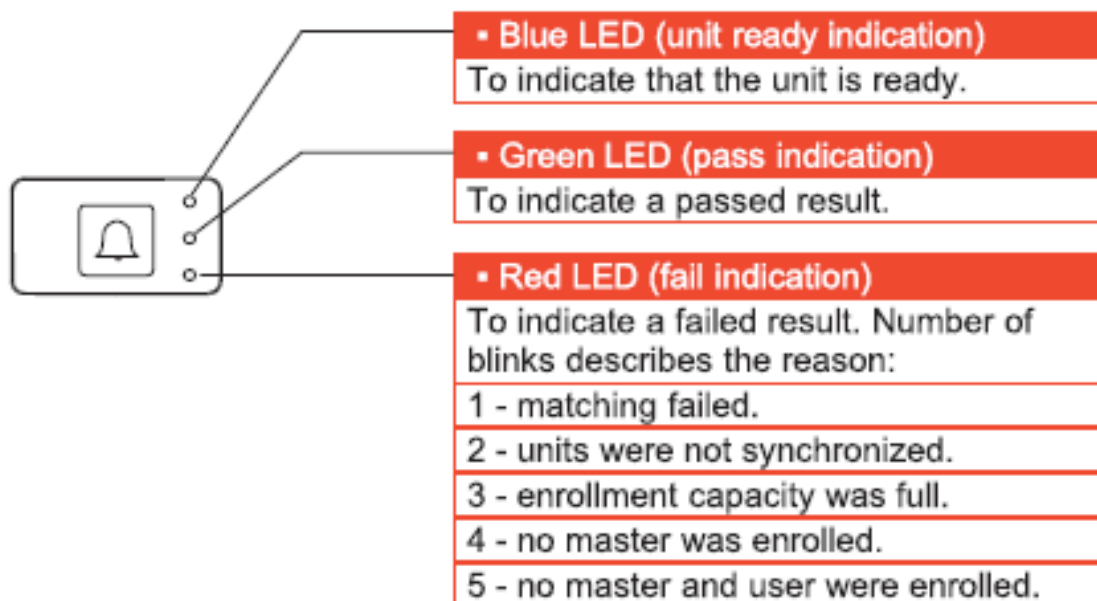
DIP switch settings (on Fingerprint Controller unit)

- SW1 – Positions 1,2,3 (RS485) set to ON.
- SW1 – Positions 4,5,6 (RS232) set to OFF.
- SW1 – Positions 7,8 (BT) set to OFF.

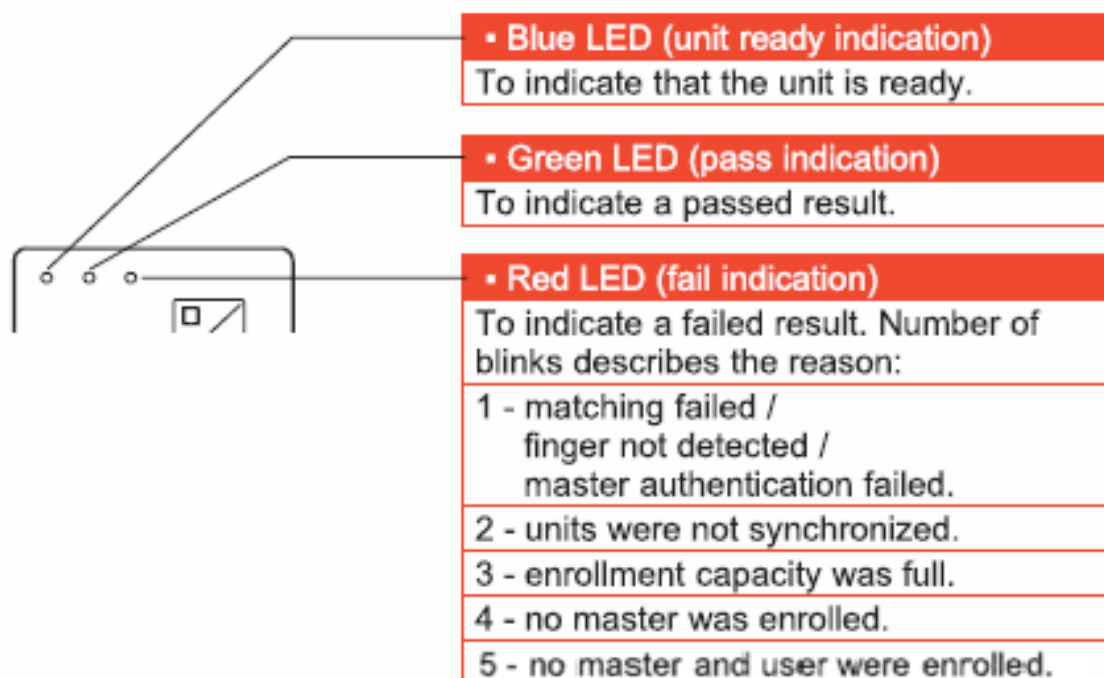
LED Indicators (on UCM)

- D1 “RDY” (Green) – should be on at all times
- D2 “BUSY1” (Red) – indicates when processing incoming data string
- D3 “BUSY2” (Red) – indicates when sending outgoing data string
- D4 “ERR” (Red) – error indicator
- D9 (Red) – RS485 Transmit to Comfort
- D10 (Green) – RS485 Receive from Comfort

LED Indicators (on Fingerprint Sensor Unit)



LED Indicators (on Controller Unit)



Comfort Fingerprint Reader Interface

ICs

- U1 - Microcontroller IC. Label indicates the firmware version number "UCM/Access 5.XXX"
- U4 – RS485 Interface to Fingerprint Reader.
- U5 - RS485 Interface to Comfort.

UCM ID Switch

Comfort is able to support up to 8 UCMs. SW7 is a set of 3 headers which determines the UCM ID, according to the table below:

ID	SW7- A	SW7- B	SW7- C
1	Short	Short	Short
2	Open	Short	Short
3	Short	Open	Short
4	Open	Open	Short
5	Short	Short	Open
6	Open	Short	Open
7	Short	Open	Open
8	Open	Open	Open

By convention, ID=1 is reserved for UCM05 or UCM/USB for writing/reading configuration file. The UCM/Access should be set to ID 2 or above so that any RS485 communications failure can be reported by Comfort.

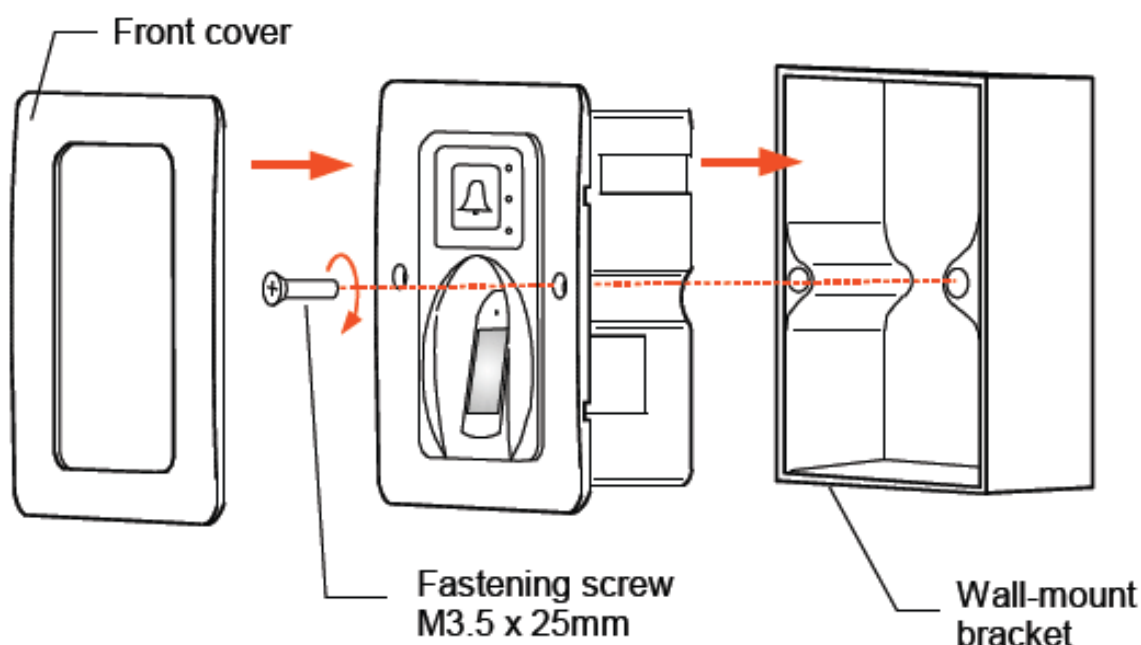
Press RESET on the UCM/Access after changing the ID settings.

The Number of UCMs in Configurator > Modules and Settings must be set according to the UCMs in the system.

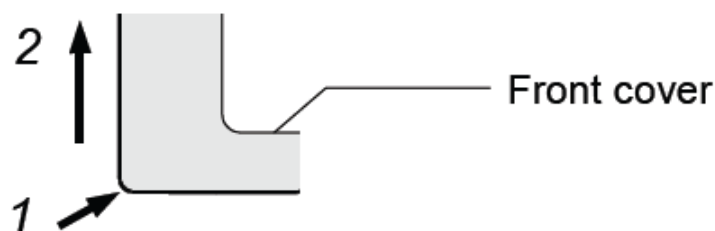
Comfort Fingerprint Access Interface

Mounting

- 1 Both the controller and fingerprint units can be flush-mounted or wall-mounted. This section will focus on the wall mounting aspects.



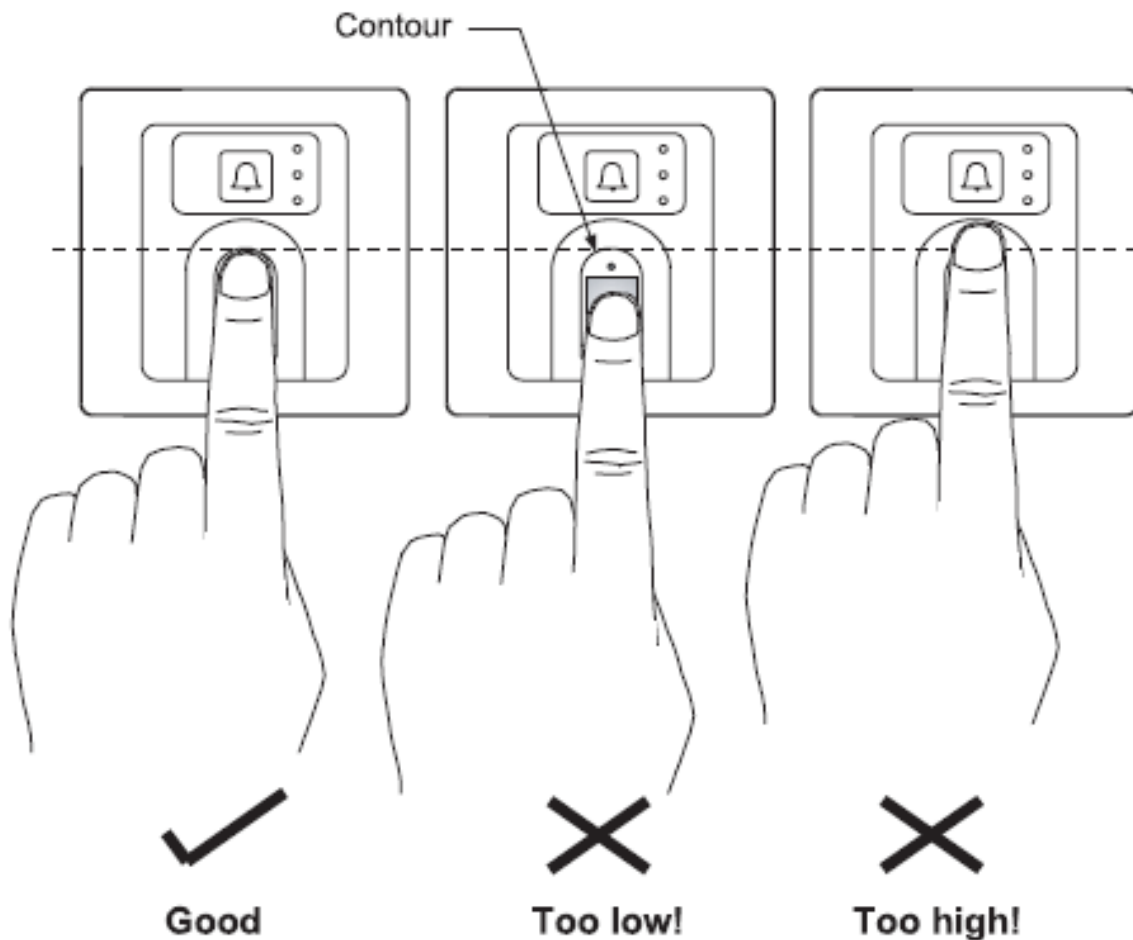
- 2 Select a suitable UK standard type of wall-mount bracket, ideally one that the unit is able to fit in nicely into.
- 3 If the front cover has been clipped on, remove the front cover of the unit before securing the unit to the bracket. To do so, utilise the groove located at the bottom left corner of the cover as illustrated in the following diagram. To do so, insert a small screwdriver into the groove to lift the corner. Next, slide the screwdriver upwards to remove the left hand side. The rest should come out quite easily.



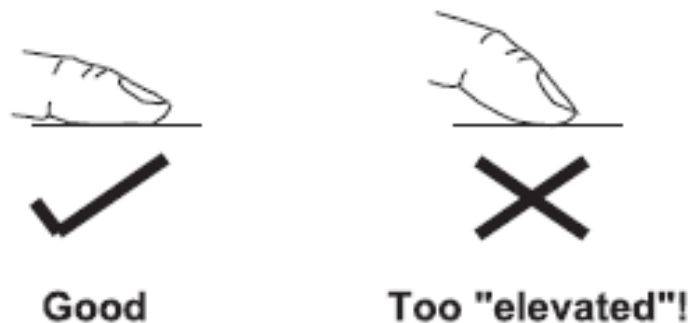
Ensuring a Good Match

To ensure that a good match between the fingerprint captured and the fingerprint stored, the following must be done:

- Ensure that the finger is not placed too high or too low to enable the system to capture the fingerprint accurately. Utilise the contours of the perimeter of the sensor to do so as illustrated below.



- Ensure that the finger is placed flat on the surface of the sensor rather than being elevated as shown in the following diagram.



- Ensure that the finger is maintained in the same position during matching as that of during enrolment.

Typical Installations

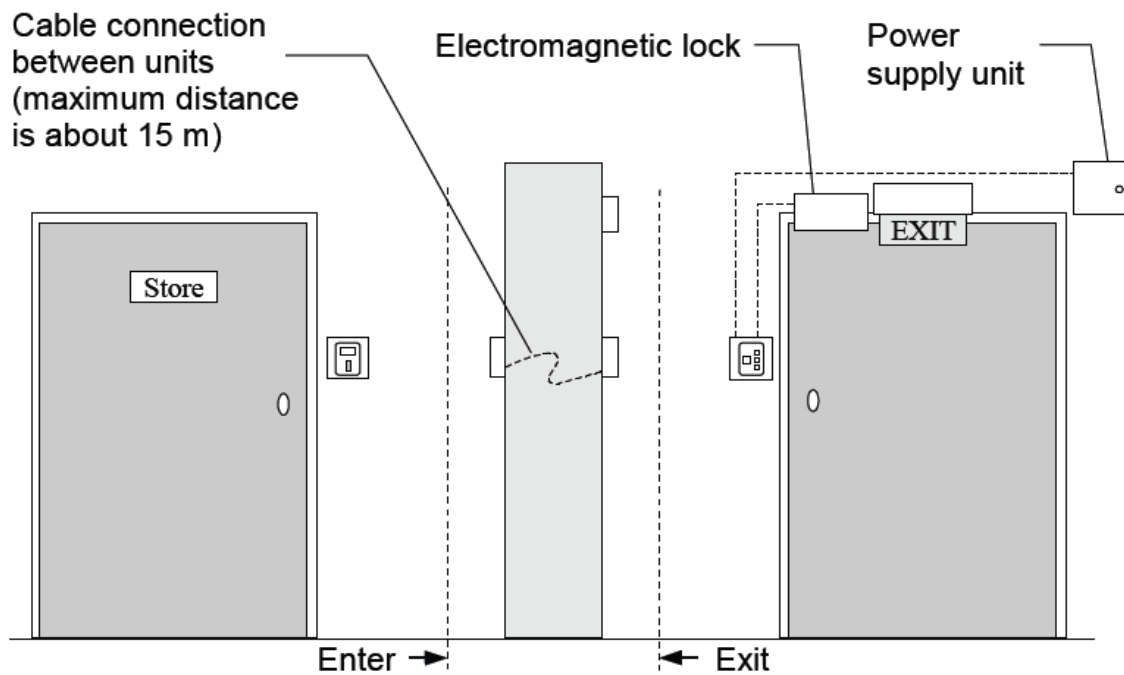
There are two typical installations:

- Electromagnetic locks
- Door strikes

Illustrations of the 2 installations are shown in the following diagrams.

Electromagnetic Locks

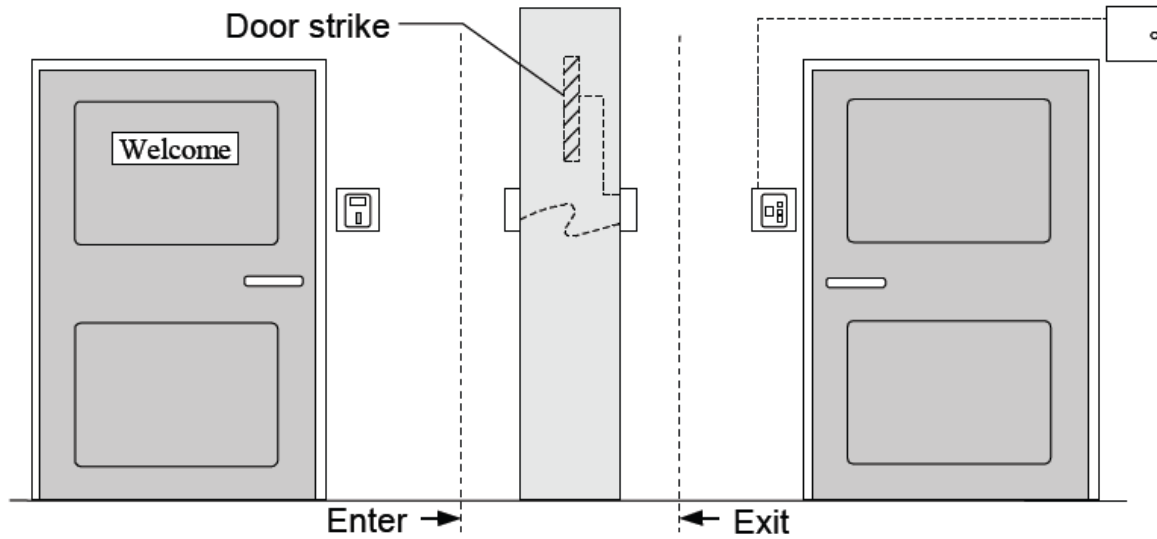
- Exposed and consist of 2 magnetic plates.



Comfort Fingerprint Reader Interface

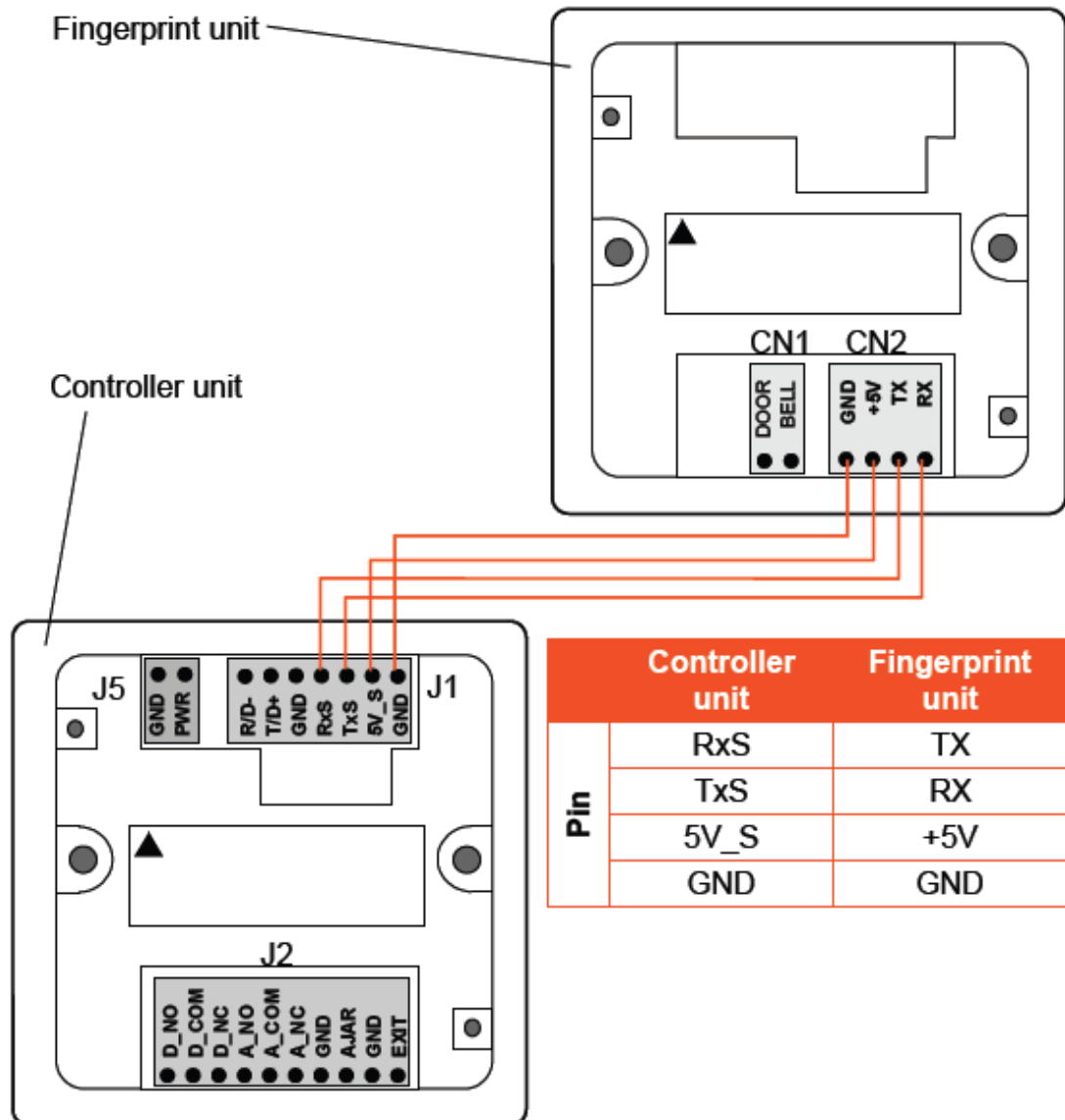
Door Strikes

- Embedded in the side frames of the door.
- For more elegant installations



Comfort Fingerprint Access Interface

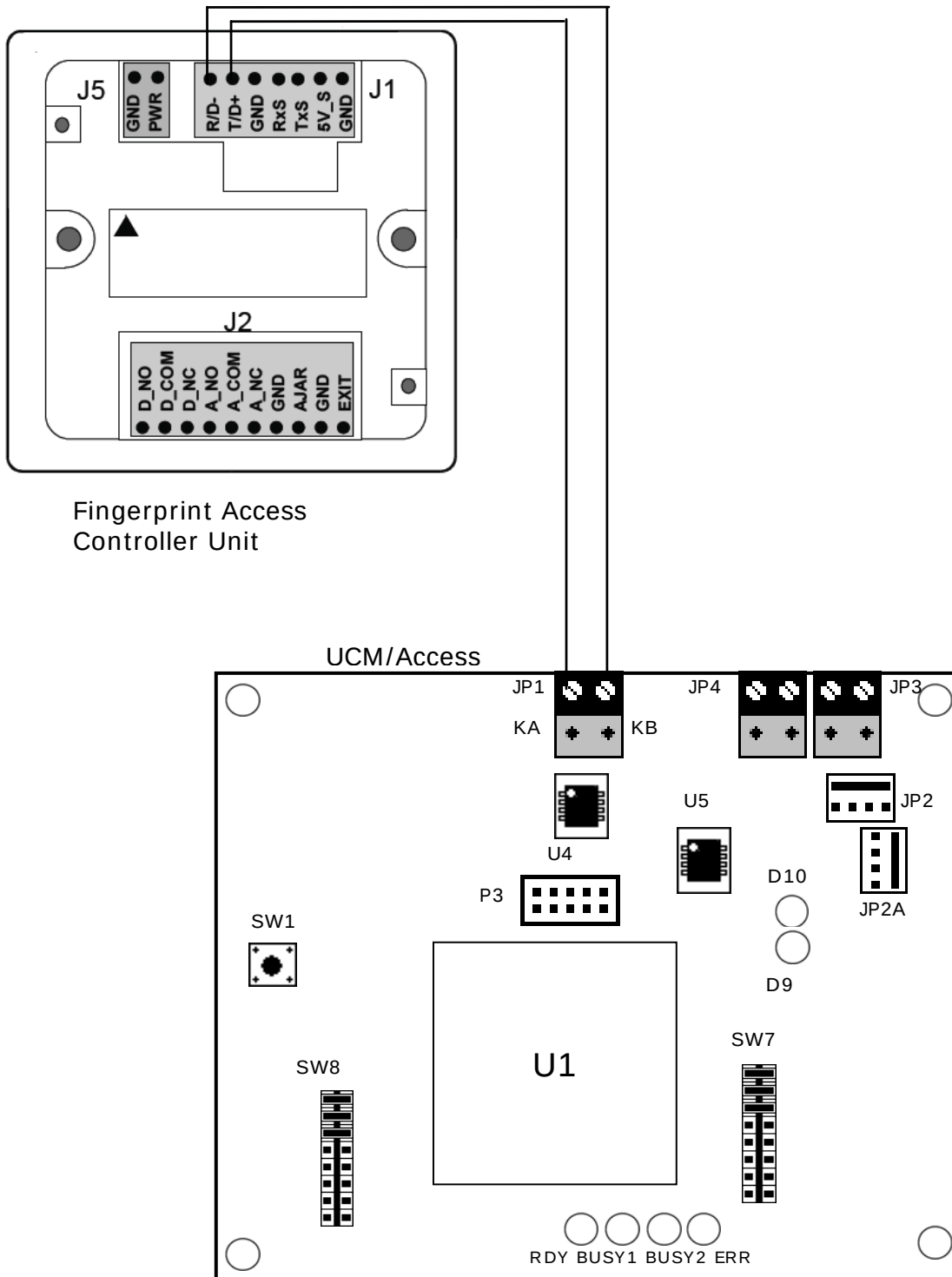
Connections (Internal)



- 1 Connect the fingerprint unit to the controller unit via the 4-core cable provided.
- 2 Connect RxS, TxS, 5V_S and GND of J1 on the controller unit to TX, RX, +5V and GND of CN2 on the fingerprint unit respectively, as shown in the figure above.

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Connections (to UCM)



Comfort Fingerprint Access Interface

- 1 Ensure that the Fingerprint Access Controller is already set up.
- 2 Before connecting, set the ID on SW7 to the ID of the UCM/Access according to the table in the previous section and according to the number of other UCMs in the RS485 Network. If there is only 1, set the ID to 2. By convention, ID 1 is reserved for UCM05 or UCM/UBS to write/read from Comfort. Communications Failure is not reported for ID=1. Up to 8 UCMs of different types (e.g. C-Bus, EIB, KT01, etc.) can be connected to the Comfort network.
- 3 The UCM/Access is connected to Comfort via the supplied 4 way white cable from the 4 pin header JP2 to Comfort's header J6, or Comfort II's RS485 header. This supplies power to the UCM, as well as allowing communications between Comfort and the UCM/Access. It is not necessary to switch off the power to Comfort before plugging in this connection.
- 4 Connect D+ and D- of the Fingerprint Access Controller to KA and KB on JP1 respectively. If Comfort is needed to supply the power to the Fingerprint Access Controller, connect 12V and COM from JP3 to PWR and GND on the controller. The connections should adhere to the following table:

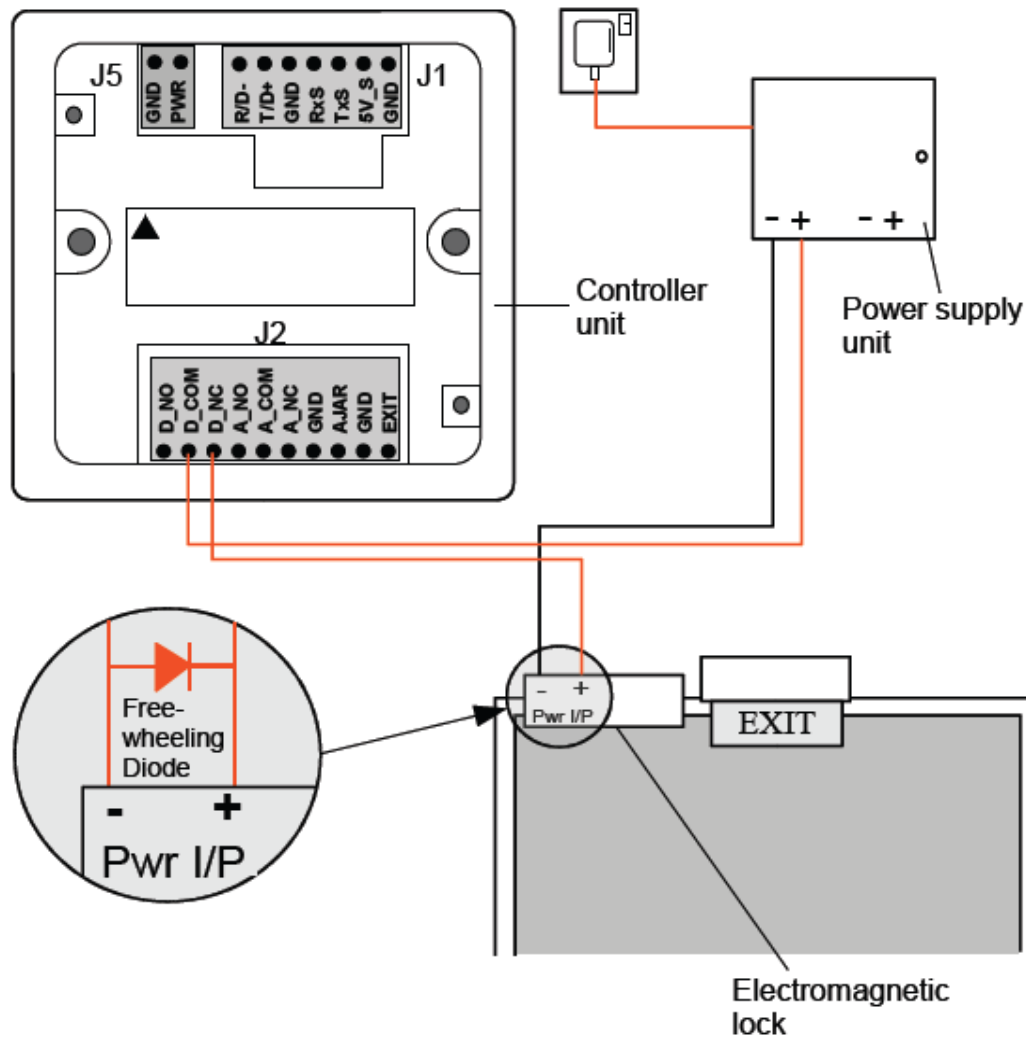
Comfort	Fingerprint Access Controller
12V	PWR
COM	GND
KA (JP1)	D+
KB (JP1)	D-

- 5 The LEDs D9 (red) and D10 (green) should blink rapidly showing that RS485 communications has been established between Comfort and the UCM.

Connections (to Electromagnetic Lock)

The following illustrates the use of the door relay for use with an electromagnetic lock. The points D_COM and D_NC are used in this example. In other cases, depending on the type of locks, D_COM and D_NO may be used instead.

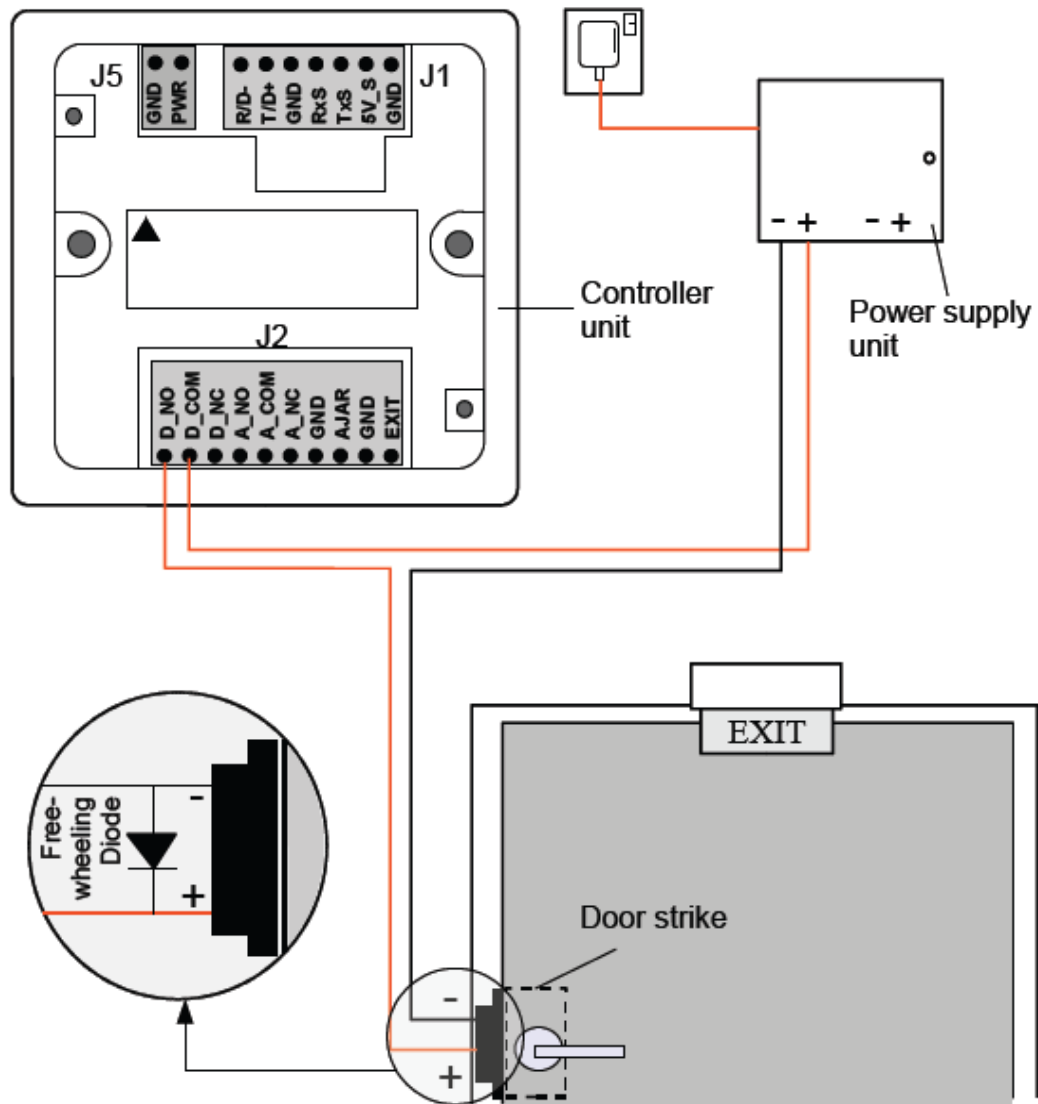
Note that the free-wheeling diode is placed to prevent backflow of current to the controller unit.



Connections (to Door Strike)

The following illustrates the use of the door relay for use with a door strike. The points D_COM and D_NO are used in this example. In other cases, depending on the type of locks, D_COM and D_NC may be used instead.

Note that the free-wheeling diode is placed to prevent backflow of current to the controller unit.



Synchronisation

The controller and fingerprint sensor units must both be synchronised when:

- Using them together for the first time
- One of the units has been replaced

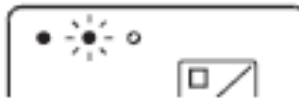
First Time Synchronisation

This would be the first step to undertake to ensure that the controller and fingerprint sensor units would be able to function together.

- 1 Press and hold  for 2 seconds on the controller unit, and release upon hearing 3 beeps and the first (blue) LED starts to blink.



- 2 Press , ,  on the controller unit. The second (green) LED will blink when synchronisation is successful.



- 3 Similarly, the second (green) LED on the fingerprint sensor unit will also blink to indicate a successful synchronisation.



Subsequent Synchronisation

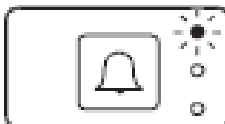
If a master fingerprint has been enrolled, synchronising the units will be preceded by master authentication.

- 1 Press and hold  for 2 seconds on the controller unit, and release upon hearing 3 beeps and the first (blue) LED starts to blink.



- 2 Press , ,  on the controller unit.

- 3 The first (blue) LED on the fingerprint unit will blink, indicating that the system is awaiting a master's authorisation.



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- 4 When synchronisation is successful, the second (green LED) on the fingerprint unit will flash.



- 5 If the synchronisation has failed, the third (red) LED will flash. Note the number of blinks and compare against the section on "LED Indicators (on Fingerprint Sensor Unit)".

Activating Responses based on User

When a valid user is authenticated at the reader, a Response in Comfort is activated based on the User number 1 to 16. This response can be used to arm or disarm the security system, to control lights and appliances based on the user, or based on the time of day.

- 1 Ensure that the Fingerprint Access Controller is already set up and functioning correctly before including the UCM/Access into the network.
- 2 Program the desired responses either with the keypad (see "Engineer Menu Programming") or Configurator (see "Programming with Configurator"). **Note: Configurator 2.1.0 does not support User number Responses. This will be supported in a future version**
- 3 Enter Engineer Menu via the keypad and assign the responses in the locations as seen below. Note that two locations need to be programmed, e.g. for User 1, locations 744 and 745. If the response number is less than 256 (e.g. response 10), then assign the response number to location 744 and 0 to location 745. If the response number is 256 or greater, then divide the number by 256 to get the quotient and remainder. The quotient should go to the larger location and the remainder in the smaller location, e.g. assigning response 300 to User 4, dividing 300 by 256 would give a quotient of 1 and remainder of 44; thus location 750 will take a value of 44 and 751 will take value 1. The list of locations is shown in the following table.

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User Response Locations

User	Location 1	Location 2
1	744	745
2	746	747
3	748	749
4	750	751
5	752	753
6	754	755
7	756	757
8	758	759
9	760	761
10	762	763
11	764	765
12	766	767
13	768	769
14	770	771
15	772	773
16	774	775

Others

Some other features are incorporated between the Fingerprint Access System and Comfort such as a duress finger and deletion of users from Comfort.

There are 2 different levels – master and user. The master has greater authorisation level and can allow users to be added or deleted. Users, on the other hand, do not possess the authorisation to do so.

Enrol Master

This enables a new master to be added in to the Fingerprint Access System is used to sign-in.



- 1 Press and hold  for 2 seconds to activate enrol master function.
- 2 Enter master key sequence (as indicated in the following table).
- 3 Authenticate with finger of a master, if any.
- 4 Enrol the new master finger (as explained under “During Enrolment”).
- 5 Up to 6 fingers can be enrolled for each master. However, in the system, there can only be 20 fingerprint data stored for all the masters.

Enrol User

This enables a new user to be added in to the Fingerprint Access System is used to sign-in.



- 1 Press and hold  for 2 seconds to activate enrol user function.
- 2 Enter user key sequence (as indicated in the following table).
- 3 Authenticate with finger of a master.

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- 4 Enrol the new user finger (as explained under “During Enrolment”).
- 5 Up to 6 fingers can be enrolled per user. However, in the system, there can only be 52 fingerprint templates stored for all the users.

Enrol Duress

This enables a duress alarm to be generated by Comfort whenever a duress finger is used to sign-in.

- 1 Press and hold  for 2 seconds to activate enrol user function.
- 2 Enter duress sequence of , , .
- 3 Authenticate with finger of a master.
- 4 Enrol the new duress finger (as explained under “During Enrolment”).
- 5 Up to 6 fingers can be enrolled for duress.

During Enrolment

This explains the enrolment process where the points on the fingerprint are to be captured.

- 1 The first (blue) LED should be flashing, with beeps in sync with the flashes. This indicates that the system is ready to enrol a user/master.



- 2 Place the finger on the sensor. Lift up the finger when the beeps have been muted. The first (blue) LED should blink for a short while as the system extracts the information required on the fingerprint.
- 3 Upon a successful first placement, the second (green) LED will flash once and the constant beeping should be heard again. Place the same finger on the sensor in the same position when that happens. Similar to the first placement, lift up the finger when the beeps stop.



- 4 If the enrolment is successful, the second (green) LED will flash once, signalling the process is completed.



- 5 If not, the third (red) LED will flash for a few times. Note the number of blinks and compare against the section on “LED Indicators (on Fingerprint Sensor Unit)”.

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Delete User

This enables a user to be deleted by the Fingerprint Access Interface.

- 1 Press and hold  for 2 seconds to activate enrol master function.
- 2 Press  once to commence deletion.
- 3 Enter user key sequence (as indicated in the following table) of user to be deleted.
- 4 Authenticate with finger of a master user
- 5 All fingers enrolled for this user will be deleted.

User	Key Sequence	Remarks
1	[1, 1, 1]	
2	[1, 1, 2]	
3	[1, 1, 3]	
4	[1, 2, 1]	
5	[1, 2, 2]	
6	[1, 2, 3]	
7	[1, 3, 1]	
8	[1, 3, 2]	
9	[1, 3, 3]	
10	[2, 1, 1]	
11	[2, 1, 2]	
12	[2, 1, 3]	
13	[2, 2, 1]	
14	[2, 2, 2]	
15	[2, 2, 3]	
16	[2, 3, 1]	
27	[3, 3, 3]	Duress

Changing Door Open Duration

This allows the duration for the door relay to be changed.

- 1 At the controller unit, press and hold  for 2 seconds. Release when the blue LED on the controller blinks.
- 2 Press  ,  to set the duration to 5 seconds,  ,  to set to 10 seconds, and  ,  to set to 15 seconds.

Delete (from Comfort) – not implemented

This allows Comfort to send a delete command to delete users.

- 1 Program a response to send the following Action Code string:
197,UCM ID (of the UCM/Access),68,85,(user number in ASCII), 255

For instance, sending 197, 18, 68, 85, 48, 49, 255 would send a string to delete User 1.

- 2 Alternatively, Comfigurator may be used. To do so, set the response to send RS232, select the target UCM ID (ID of the UCM/Access) and set the Output String Format to Text String. Send the following:

DUnn, where nn is the User number.

For instance, sending DU01 will delete User 1.

Opening Door (from Comfort)

This allows Comfort to send a command to the controller to open the door for a specified duration.

To do so, a response must be programmed to send the following Action Code string:

200, UCM ID (of the UCM/Access), Door No, Duration (not implemented), 255

For instance, programming 200, 18, 01, 10, 255 would trigger a command to open the door01.

The duration is currently not implemented and is dependent on the selected duration (see Changing Door Open Duration).

Note that the current models have at most 1 door connected.

Troubleshooting

Long Continuous Beeps

When there are long continuous beeps from controller and fingerprint units, check the Tx/Rx connection from fingerprint unit to TxS/RxS of controller unit is correct. Refer to the "Connection (internal)" diagram.

Factory Reset fingerprint reader and controller unit

If at any time, the controller / fingerprint unit might have corrupted such that one is unable to access the units, a reset to factory default may be needed.

Fingerprint Reader

To reset, short pin 3 and pin 4 of CN3 (5-pin header) after the first beep upon power up. Keep it shorted for a few seconds until the blue LED light up.

Controller Unit

To reset, short the 2-pin 'init' header (J25) after the first beep upon power up. Keep it shorted for a few seconds until the blue LED light up.

Power reset both units again to begin the first synchronisation.

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Version History

- 1.0.3 (6 October 2009) – Added DIP switch settings on fingerprint controller unit
- 1.0.2 (14 July 2009) – Added troubleshooting section
- 1.0.1 (12 October 2006) – Initial release



Document Title:	Comfort Fingerprint Reader Interface
Version Number:	1.0.3
Date Last Modified:	6 October 2009
Firmware:	5.148 or above