



The New Comb Intercom with way, way more...IoT

Introducing the MK II Plus, the next generation smart intercom that gives you all the control you are accustomed to, and more.

Ideal for cluster complexes, town-houses, business parks, residential estates and several other access managed environments.



MK II Series Hardware Installation Manual

MK II Plus/Lite



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Thank you for using Comb-Communications



ICON GUIDE

Throughout the book, icons are used to focus attention on important aspects. The following icons are used to direct attention and act as a reference guide:

<i>Icon</i>	<i>Description</i>
	THIS ICON INDICATES A WARNING. A WARNING IS SOMETHING THAT MAY CAUSE SERIOUS INJURY OR DEATH IF NEGLECTED.
	This icon indicates a caution. A caution may be defined as something that may cause serious damage to equipment or the surroundings if not attended too. A caution may also indicate actions that may nullify the warranty of the product.
	A note provides the user with guidance and assistance.

LIST OF ABBREVIATIONS AND SYMBOLS

<i>Abbreviation\Symbol</i>	<i>Description</i>
Ω	Ohm
3G	Third Generation
AUX	Auxiliary
C	Common
CCID	Chip/Smart Card Interface Devices
CFI	Client Furnished Information
DB	Distribution Board
Ethernet	Data only – no voice.
FRX	Free Exit
GSM	Global System for Mobile Communication
GPRS	General Packet Radio Service
ICCID	ICCID is a unique identifier of SIM Card
ID	Identity
IMEI	International Mobile Equipment Identity
LCD	Liquid Cristal Display
LED	Light Emitting Diode
LTE	Long Term Evolution
mm	Millimetre/s



Abbreviation\Symbol

Description

Abbreviation\Symbol	Description
NC	Normally Closed
NO	Normally Open
PCB	Printed Circuit Board
PED	Pedestrian
SIM	Subscriber Identity Module
TRG	Trigger
V	Volt
VDC	Volt Direct Current
VAC	Volt Alternate Current



Chapter 1: General Overview

INTRODUCTION

From pioneering the use of ground breaking technology in the market place to a track record spanning over ten years and more than a million gate openings daily, Comb Communications has grown into a business that is leading the way into the future of integrated systems and web service platforms.

Our footprint in the market, local and international is testament to the success of our technologies and the research and development focus of the business will continue to deliver state-of-the-art offerings that set the benchmark in the industries of the future. All whilst leveraging “The internet of things” and making your life easier with more intuitive technology.

“We provide smart access control solutions and intuitive management thereof through current technologies and web-based applications, along with the backing of a design focused development house.”

The functional products we manufacture are seamlessly integrated with design-focused web-based platforms that provide you the power to control any form of access. This is the culmination of our ethos of innovation, incubation, acceleration and integration – all aimed at giving you Access and Control.

What sets us apart is the ability to leverage best-of-breed, existing technologies alongside our own groundbreaking developments, with a team of dedicated and experienced professionals, which ensures success not only with every implementation, but provides you peace-of-mind that you truly have the solution suited to your requirements, whatever the demand.

This installation manual has been developed to guide installers on how to correctly install the MKII System. In order for the system to function optimally it is strongly suggested that installers follow these instructions carefully.



Failure to follow the instructions set out in this manual may nullify the validity of the warranty.

PRESENTATION

This manual is divided into the following chapters:

1. Chapter 1: Introduction. The aim of this chapter is to orientate the installer on the use of the manual.
2. Chapter 2: Product Overview. This chapter provides an overview of the product which includes the major components and the product specifications.
3. Chapter 3: Product Installation. This chapter guides the installer so that the product can be installed correctly.
4. Chapter 4: Fault Finding and Test Procedures. This chapter assists the installer in the identification of faults and suggests the remedial action that must be taken to rectify said faults.



Chapter 2: Product Overview

WARRANTY

All goods manufactured by Comb Communications Pty (Ltd) carry a 12 month factory warranty from date first installed on our website. All goods are warranted to be free of faulty components and manufacturing defects. Faulty goods will be repaired or replaced at the sole discretion of Comb Communications. This carry-on warranty is subject to the goods being returned to the premises of the Master Distributor. The carriage of goods is for the customer's account. This warranty is only valid if this correct installation and application of goods, as laid out in the terms and conditions documentation accompanying said goods, is adhered to. All warranty claims must be accompanied by the original invoice.

All claims made by the end user must be directed to their respective service provider/installer. The following conditions will disqualify this product from the warranty as laid out above. These conditions are non-negotiable. Any unauthorized non-manufacturer modifications or repairs to the product and components thereof. Variations to the installation technique as lay out by Comb Communications. Exclusions to the warranty: LCD display, Surge protector, speaker and the battery is excluded and do not have a warranty.

PRODUCT DESCRIPTION

The MKII intercom system offers the user management and administration features to maximise the functionality that GSM based intercom systems can offer.

The product has the following differentiating features:

1. Fully-integrated with Centurion remotes.
2. GSM – Global system for mobile communication.
3. Mobile alert structure.
4. Easy to use.
5. Flexibility.
6. Time-based access control.

Main features

The MKII series products have the following main features:

1. Quick and easy installation, no wiring other than mains supply – operates via cellular network.
2. Uses new embedded SIM technology – does not need a SIM card.



SIM Chip is not compatible with all networks as it is network specific. Please enquire.

3. Convenient web-based interface for system updating and reporting.
4. Battery backup and built-in surge protection.
5. Robust and durable entry panel.
6. Programming can be done online.



For online programming, an annual web access license fee is required.

7. Unlimited, controlled access for residents.
8. Ability to communicate with security personnel at the gate.
9. Back-lit LCD display (double line).
10. Weatherproof enclosure suitable for outdoor or indoor environments.
11. Quick and reliable synchronisation and firmware updating.

PRODUCT IDENTIFICATION

External Components

The Comb MKII series Intercom systems has the following external components (See

Figure 1):



Figure 1: External Components of the MKII Series Intercom.

1. Barrel lock.
2. LCD Screen.
3. Durable Keypad.
4. Front Plate.
5. Speaker and Microphone.
6. Robust Enclosure.



Physical Dimension

The physical dimensions of the Comb MKII Series intercoms are as follows (See Figure 2):

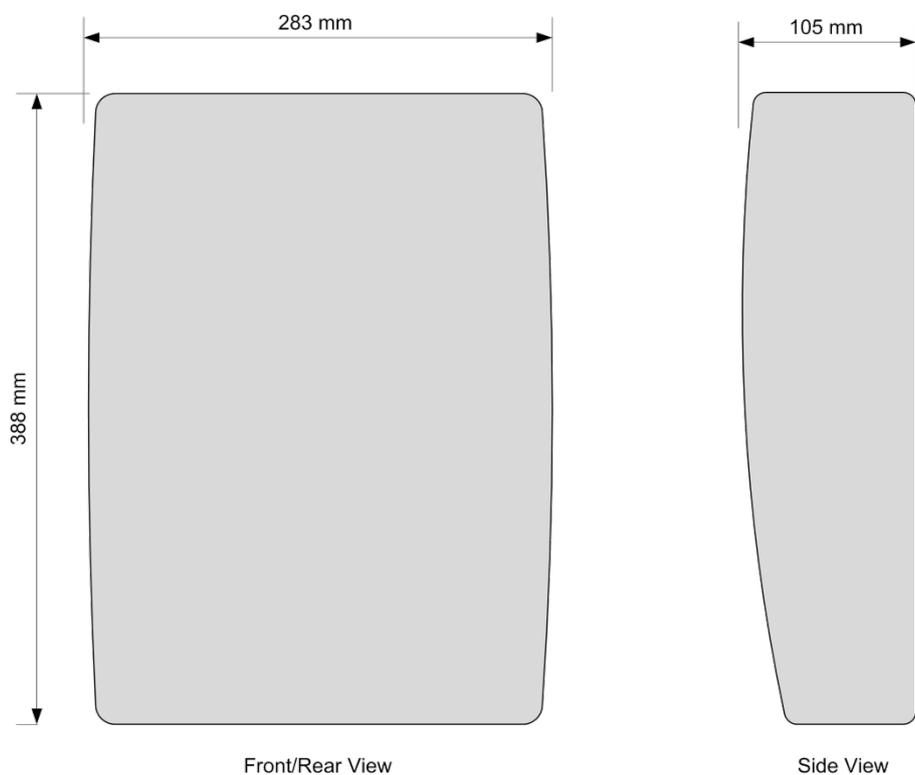


Figure 2: Physical Dimensions of the MKII Series Intercom

Technical and Functional Specification

Technical and Functional Specifications		
Description	MK II Lite	MK II Plus
Input Voltage	85-255VAC 13-24VDC	85-255VAC 13-24VDC
Current Draw	200 mA	200 mA
Wiring Requirements between DB and Unit (min thickness)	2 mm	2mm
Humidity Range	-10°C - 85°C	-10°C - 85°C
Surge Protection	Yes	Yes
Calling Module Illumination	Call buttons backlit	
Network Capability	3G	3G
SIM Card Required	Yes	Yes
Airtime Required	Yes	Yes



Technical and Functional Specifications		
Description	MK II Lite	MK II Plus
SD Card Capability	No	Yes
Ethernet Connection	No	Yes
USB Connection	No	Yes

Relays

The relays on the PCB are as follows:

Intercom	Wire	Gate Motor
Relay 1	Normally Open (NO)	Trigger (TRG)
	Common (C)	COM
	Normally Closed (NC)	
Relay 2	NO	Pedestrian (PED)
	C	COM
	NC	
Relay 3	NO	Free Ext (FRX)
	C	COM
Relay 4	NO	Auxiliary (AUX)
	C	COM
Relay 5	NO	AUX
	C	COM



Chapter 3: Product Installation

BEFORE INSTALLATION CHECKLIST

Before beginning the installation ensure that the following has been done:

1. The GSM/GPRS signal strength of the area must be tested to ensure that there is appropriate signal strength for the unit to function optimally.



Always ensure your signal is above 20 for a consistent GPRS and GSM connectivity.

2. Before removing the unit from the box, test the 220V feed to ensure that it is within safe specifications and that it is earthed correctly.



UNSAFE WORKING PRACTICES AROUND ELECTRICITY CAN CAUSE SERIOUS INJURY OR DEATH.



Do not connect the earth on the same line as the electric fence energiser. Doing this may cause serious damage to the unit which in turn may nullify the warranty.

3. Ensure that the inline lighting protector has been fitted correctly and is in working order.
4. Before installing the unit ensure that the main circuit breaker is off.



UNSAFE WORKING PRACTICES AROUND ELECTRICITY CAN CAUSE SERIOUS INJURY OR DEATH.

REQUIRED TOOLS, FASTNERS AND EQUIPMENT

The following tools and equipment is required to install the MKII:

1. 3 mm Flat Screw Driver.
2. 5.5 mm Alan Key.
3. 5.5 mm Nut Drive.
4. 5 mm Philips Screw Driver.
5. 8 mm Socket Drive.
6. 8 mm Socket Drive.
7. Power drill (Wall Mounting).
8. Six (6) M8 5 mm stainless steel countersunk bolts and nuts (minimum length 15 mm).
9. 8 mm Masonry Drill Bit (Wall Mounting).
10. Three (3) 8 mm Rawl bolts (Wall Mounting).



MOUNTING INSTRUCTIONS

Gooseneck Mounting Recommendations

1. Ensure the gooseneck is installed according to manufacturer specifications.
2. Ensure that the gooseneck is installed in such a manner that it is easily reachable for the drivers of vehicles.
3. Ensure that the gooseneck does not hamper traffic.
4. Ensure that there are no obstructions inside the gooseneck that can prevent the electrical wires from being fed through.
5. Ensure that you have six (6) M8 stainless steel bolts, nylock nuts and washers to secure the mounting plate.



The screws that attaches the mounting plate to the gooseneck is not supplied and must be bought before installation.

Wall Mounting Recommendations

6. Ensure that there are no hidden electrical conduits or water pipes before drilling the holes to secure the mounting plate.



FAILING TO DO THIS MAY CAUSE SERIOUS INJURY OR DEATH.

7. Ensure that you have three (3) 8 mm rawl bolts and washers to secure the mounting plate to the wall.



The rawl bolts that attaches the mounting plate to the wall is not supplied and must be bought before installation.



MK II Lite Intercom PCB

The MK II Lite has the same basic layout as the MKII Plus. The main components on the MK II Lite PCB are as follows (See):

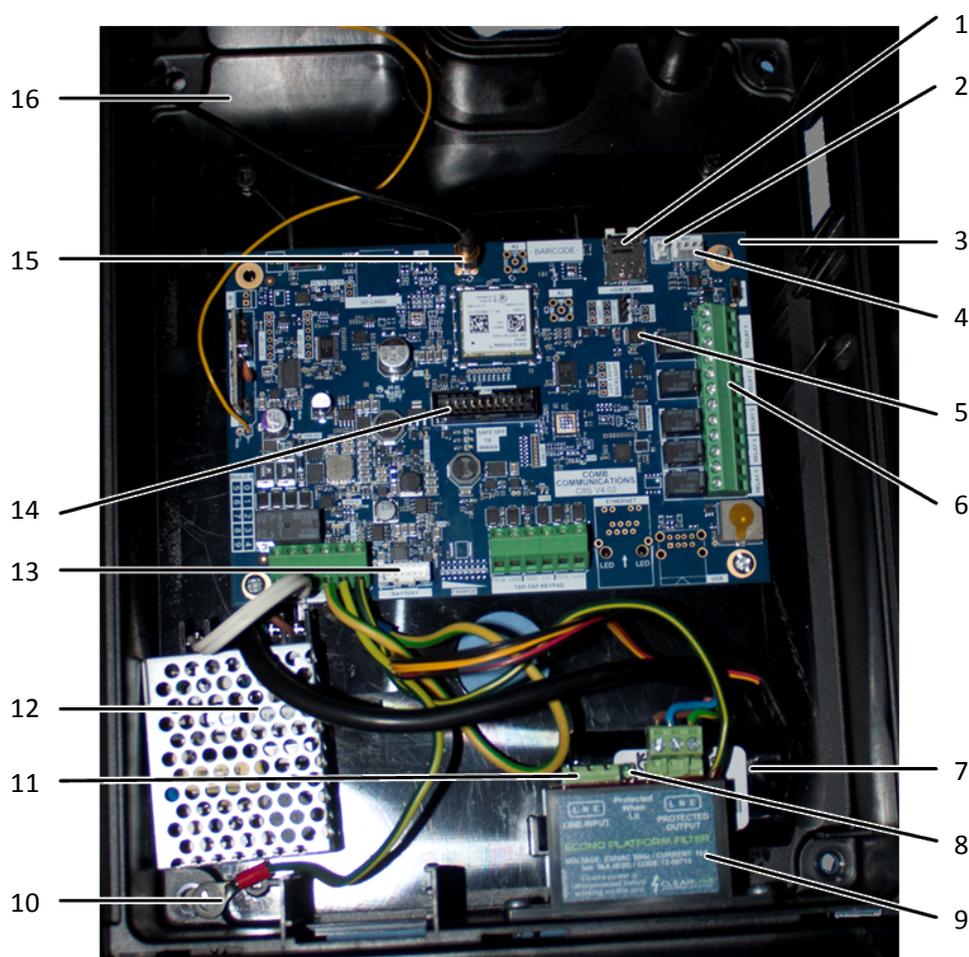


Figure 3: MKII Lite Interior Layout

- | | | | |
|-----|-------------------------------|-----|-------------------------------|
| 1. | SIM Card Slot. | 2. | Microphone Connection. |
| 3. | PCB | 4. | Speaker Connection. |
| 5. | SIM Chip. | 6. | Relay Connection. |
| 7. | Battery. | 8. | LED Light on Surge Protector. |
| 9. | Surge Protector. | 10. | PCB Earth Wire. |
| 11. | 220V Installation Connection. | 12. | Switch Mode Power Supply. |
| 13. | Battery Connection on PCB. | 14. | Ribbon Connection. |
| 15. | Antenna Connection. | 16. | Robust Enclosure. |



The cover plate (See [9 – 12]) has the same layout as the MKII Plus.

MKII Plus PCB



The MKII Plus interior layout is as follows (See):

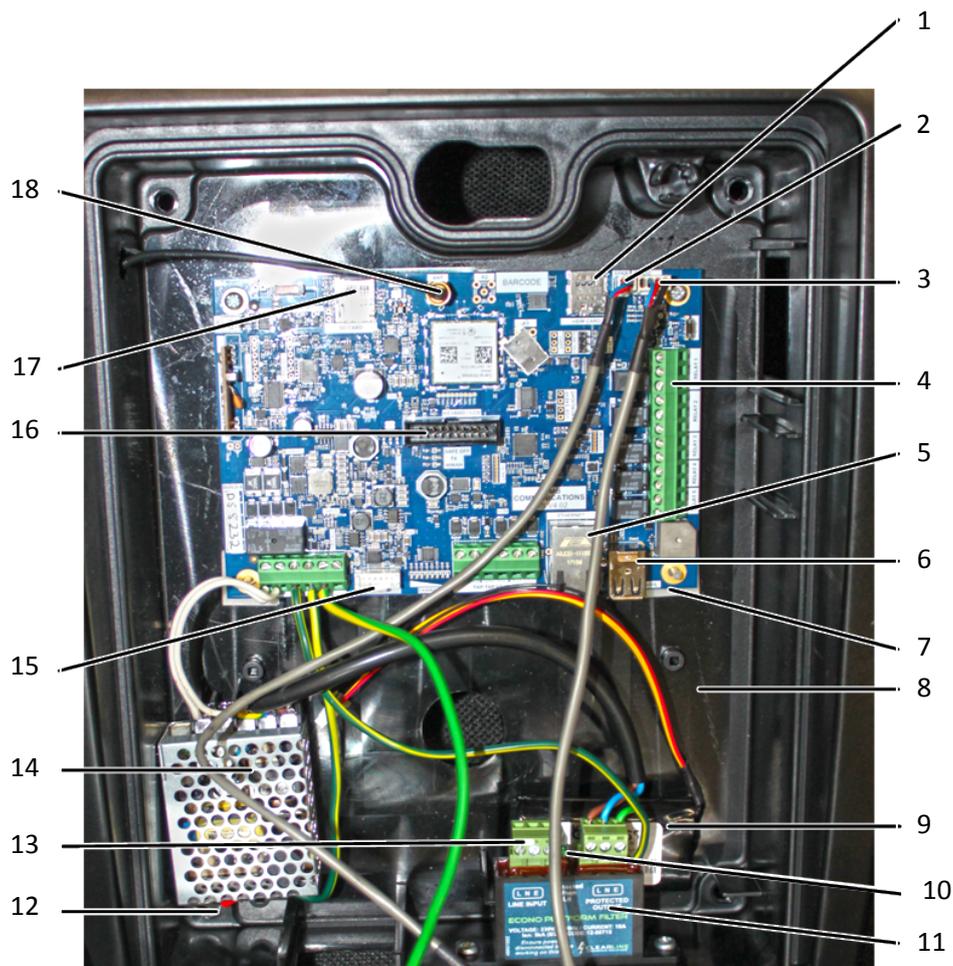


Figure 4: MK II Plus Interior Layout

- | | | | |
|-----|-------------------------------|-----|-------------------------------|
| 1. | SIM Card Slot. | 2. | Microphone Connection. |
| 3. | Speaker Connection. | 4. | Relay Slots. |
| 5. | Ethernet Connection. | 6. | USB Connection. |
| 7. | PCB. | 8. | Robust Enclosure. |
| 9. | Battery. | 10. | LED Light on Surge Protector. |
| 11. | Surge Protector. | 12. | PCB Earth Wire. |
| 13. | 220V Installation Connection. | 14. | Switch Mode Power Supply. |
| 15. | Battery Slot on PCB. | 16. | Ribbon Slot on PCB. |
| 17. | SD Card Slot. | 18. | Antenna Connection |



INSTALLATION PROCEDURE (GOOSENECK)

1. Ensure that the gooseneck is installed according to manufacturer specifications.
2. Ensure that there are no obstructions in the gooseneck that can prevent the electric wire from being passed through the goose neck.



Always work on a clean dry surface as water and dust may damage internal components of the unit.

3. Once the unit has been removed from the packaging installation can begin.

Installation

4. Put the unit on a level surface with the numeric pad facing upwards.
5. Unlock the unit.
6. Lift the unit so that it stands on its base.
7. Disconnect the speaker earth wire (1) using a 5.5 mm nut driver; remove the nut (2) securing the earth wire from the Keypad/LCD Assembly (3).

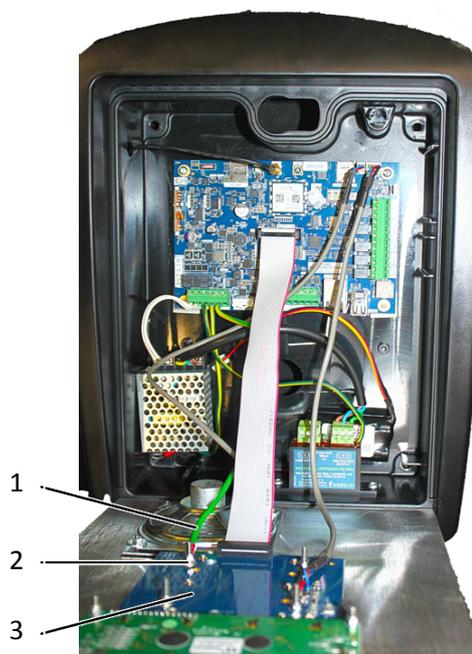


Figure 5: Disconnect Front Cover Earth Wire



8. Replace the nut and washers on the screw so that you don't misplace it

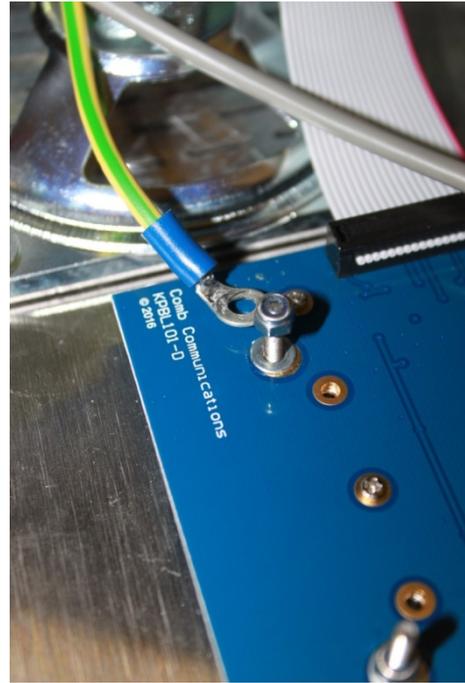


Figure 6: Replace the Nut and Washers

9. Disconnect the Front Cover from the PCB (See Figure 7)¹:
 - a. Disconnect the microphone connector (1) from the PCB.
 - b. Disconnect the speaker connector (2) from the PCB.
 - c. Disconnect the ribbon connector (3) from the PCB.
10. Lift the front plate from the slots in the housing.

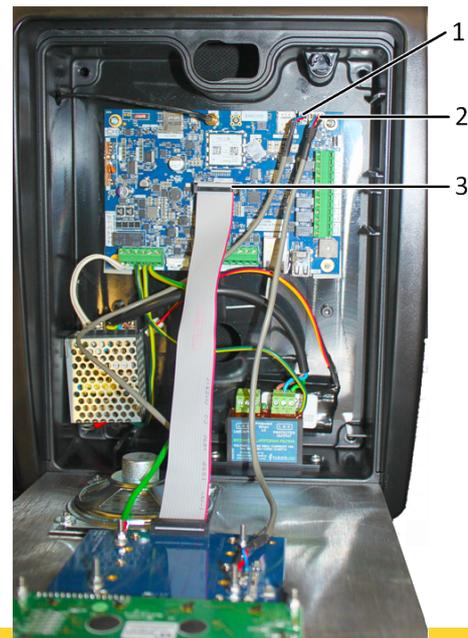


Figure 7: Disconnect Front Cover From PCB



Place the front cover on a clean, dry surface to prevent water and dust damage.

¹ MKII Plus PCB used for illustrative purposes.



11. Remove the cover (5) from the mounting plate (6) as follows (See Figure 8):
 - a. Using the 5.5 mm Alan Key remove the four Allan Capped screws (1 - 4).
 - b. Remove the housing (5) from the mounting plate (6).

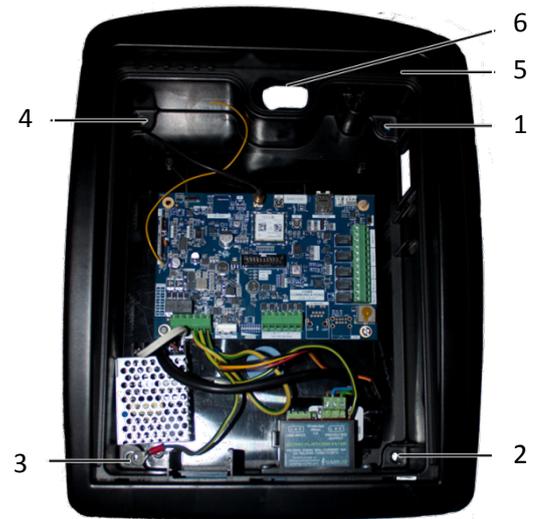


Figure 8: Remove Cover from Mounting Plate

Screw no (3) also earths the PCB (See Figure 8).



Place the housing on a clean, dry surface to prevent water and dust damage.

12. The mounting plate (1) has the following holes (See Figure 9):
 - a. Wall mounting holes (2).
 - b. Cover mounting holes (3).
 - c. Gooseneck mounting holes (4).
 - d. Wiring hole (5).
13. Align the goose neck mounting holes with the corresponding holes on the gooseneck pillar.
14. Ensure that the curved end of the mounting plate faces up.
15. Insert six M8 stainless steel bolts and secure the intercom mounting plate to the gooseneck pillar.
16. Feed the 220V supply through the centre hole (5).

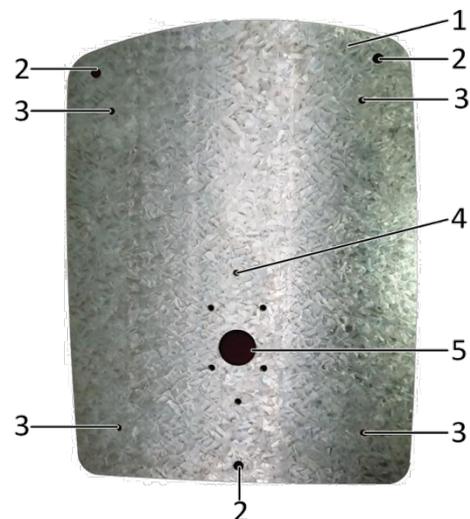


Figure 9: Mounting Plate



The screws that attach the mounting plate to the gooseneck are not supplied. It is suggested that 6 M8 stainless steel counter sunk bolts and nylock nuts are used to secure that mounting plate.



Ensure that the 220V supply is not kinked or pinched as this may cause a short circuit that may damage the unit.

17. Insert the SIM card in the slot (1) on the PCB and ensure that it is securely latched (See Figure 10).
18. Align the housing (2) with the mounting plate and replace the top two Allan Capped screws.
19. Place the earth wire (3) in position and replace the Allan Cap screw (4) that secures the earth wire and the housing.

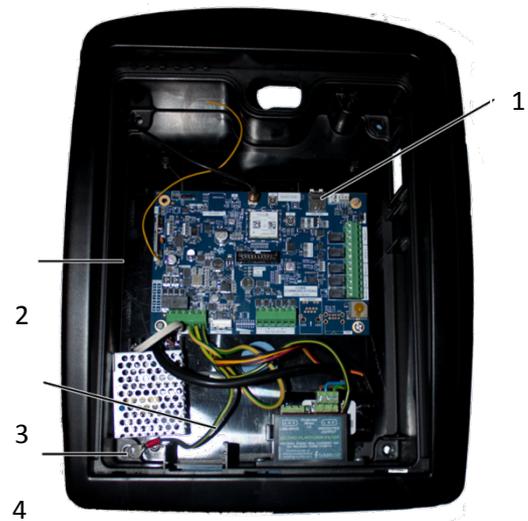


Figure 10: Mounting Plate



Failing to secure this earth wire may cause serious damage to the unit. Failing to follow this instruction may nullify the warranty.

20. Connect the 220V power to the unit (See Figure 11).
21. Replace the front plate in the slots on the housing.



Figure 11: Connecting 220V



22. Reconnect the earth wire (1) with its nut and washers (2) (See Figure 12).
23. Reconnect the ribbon cable (3).
24. Reconnect the speaker connector (4) to the PCB.
25. Reconnect the microphone connector (5) to the PCB.
26. Connect the battery (6) to the PCB battery connection (7).
27. Switch on the circuit breaker.

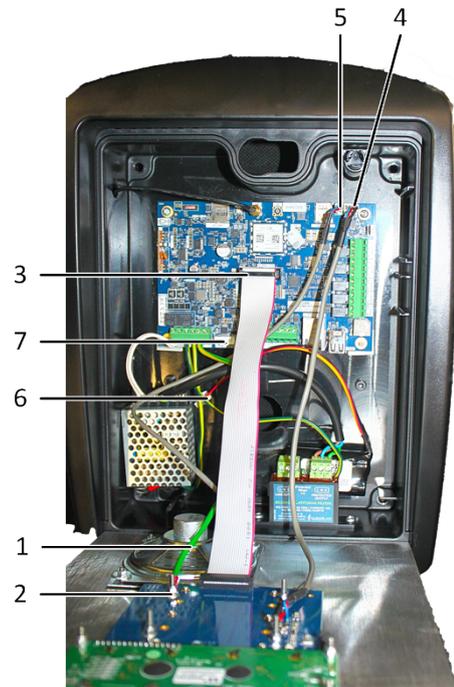


Figure 12: Reconnect PCB



**Failing to secure this earth wire may cause serious damage to the unit.
Failing to follow this instruction may nullify the warranty.**



Checks



THE SYSTEM IS NOW POWERED UP. UNSAFE WORKING PRACTICES AROUND ELECTRICITY CAN CAUSE SERIOUS INJURY OR DEATH.

1. Check that the LED flashes.
2. Check that the red LED stays lit.
3. Check signal strength.

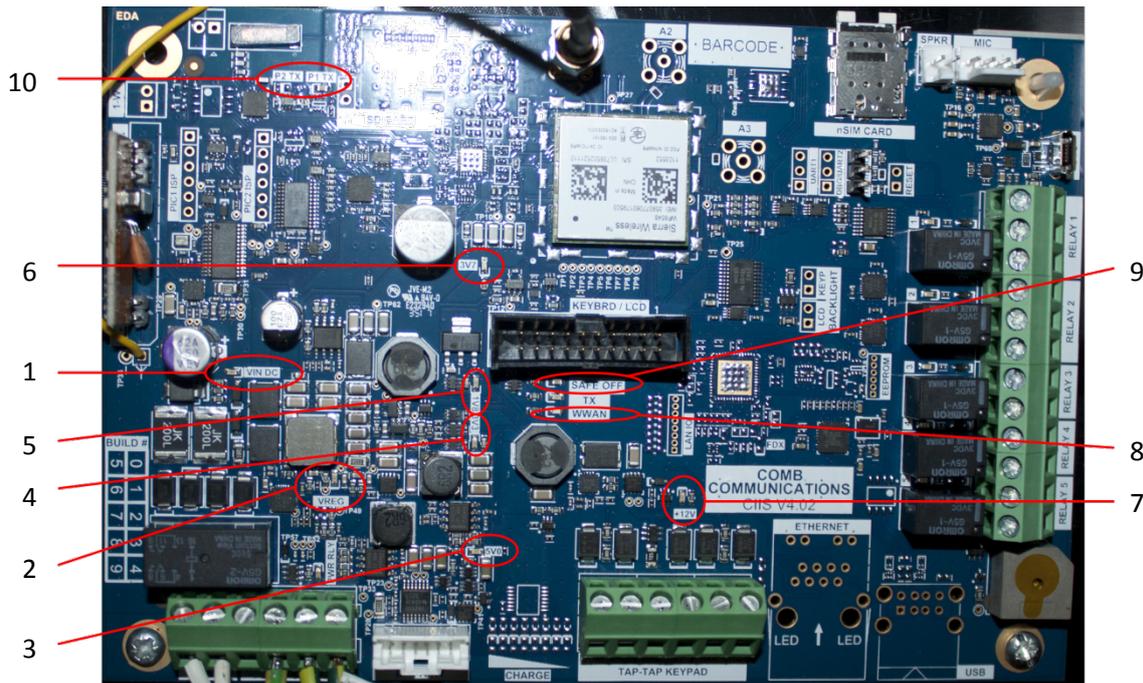


Figure 13: MK II PCB Lights

- | | |
|-----------------------------------|---|
| 1. VIN DC – Confirms board is ON. | 2. VREG – Registers voltage on the PCB. |
| 3. 5V0 – 5V circuit running. | 4. 3V3 – 1.8V circuit running. |
| 5. 1V8 – 3.3V circuit running. | 6. 3V7 – 3.7V circuit running. |
| 7. +12V – 12V circuit running. | 8. WWAN – Web/GSM/3G services running. |
| 9. SAFE OFF – Shutdown mode. | 10. PX1 & PX2 TX – Remote receiver. |



INSTALLATION PROCEDURE (WALL MOUNT)

1. Ensure the wall mount is in a secure location.
2. Ensure that there are no hidden electrical cables or water pipes before drilling the holes for the mounting plate.



Always work on a clean dry surface as water and dust may damage internal components of the unit.

3. Once the unit has been removed from the packaging installation can begin.

Installation

4. Put the unit on a level surface with the numeric pad facing upwards.
5. Unlock the unit.

6. Lift the unit so that it stands on its base.
7. Disconnect the speaker earth wire (1) using a 5.5 mm nut driver; remove the nut (2) securing the earth wire from the Keypad/LCD Assembly (3) (See Figure 14).

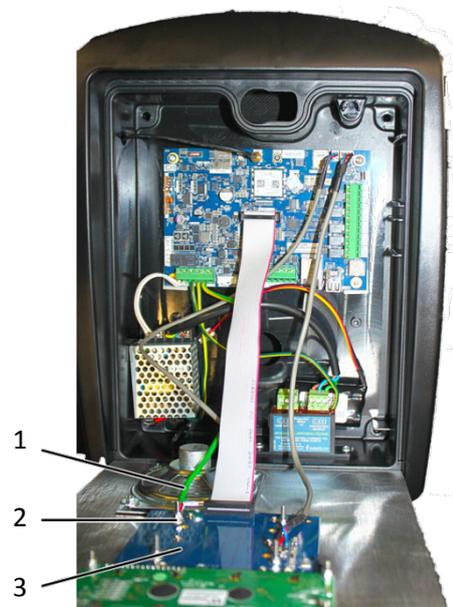


Figure 14: Disconnect Front Cover Earth Wire



8. Replace the nut and washers on the screw so that you don't misplace it (See Figure 15.)

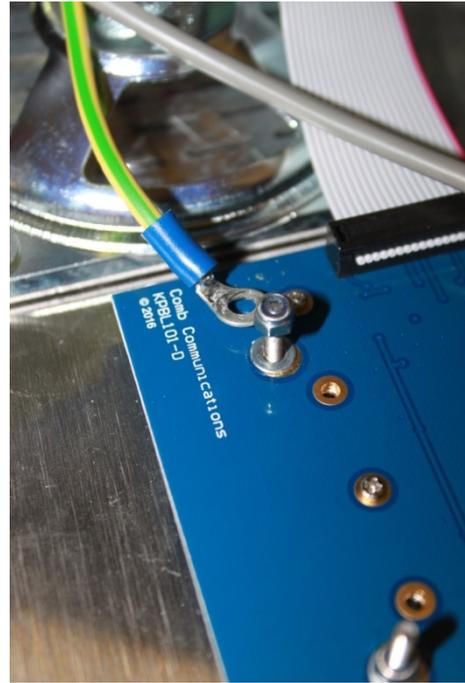


Figure 15: Replace the Nut and Washers

9. Disconnect the Front Cover from the PCB (See Figure 16)²:
 - a. Disconnect the microphone connector (1) from the PCB.
 - b. Disconnect the speaker connector (2) from the PCB.
 - c. Disconnect the ribbon connector (3) from the PCB.
10. Lift the front plate from the slots in the housing.

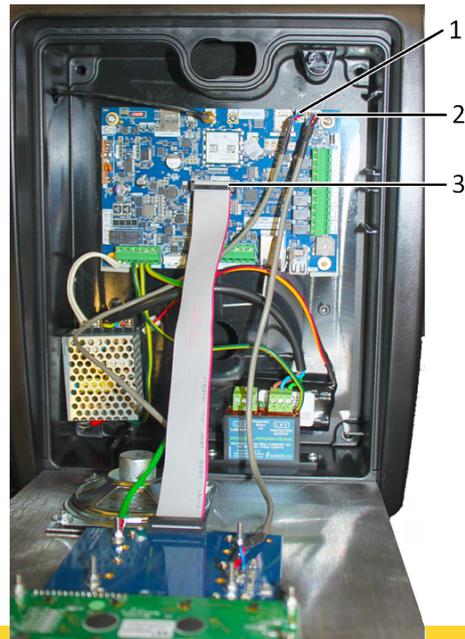


Figure 16: Disconnect Front Cover From PCB



Place the front cover on a clean, dry surface to prevent water and dust damage.

² MKII Plus PCB used for illustrative purposes.



11. Remove the cover (5) from the mounting plate (6) as follows (See Figure 17):
 - a. Using the 5.5 mm Alan Key remove the four Allan Capped screws (1 - 4).
 - b. Remove the housing (5) from the mounting plate (6).

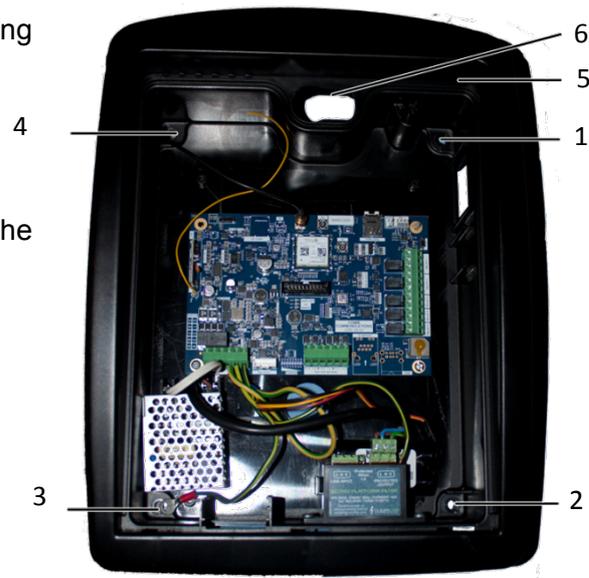


Figure 17: Remove Cover from Mounting Plate

Screw no (3) also earths the PCB (See Figure 8).



Place the housing on a clean, dry surface to prevent water and dust damage.

12. The mounting plate (1) has the following holes (See Figure 18):
 - a. Wall mounting holes (2).
 - b. Cover mounting holes (3).
 - c. Gooseneck mounting holes (4).
 - d. Wiring hole (5).
13. Align the wall mounting holes with the corresponding holes drilled in the wall.
14. Ensure that the curved end of the mounting plate faces up.
15. Insert the three 8 mm rawl bolts and secure the intercom mounting plate to the wall.
16. Feed the 220V supply through the centre hole (5).

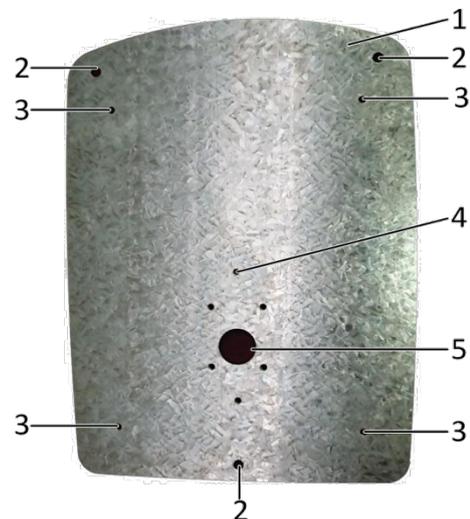


Figure 18: Mounting Plate



The screws that attaches the mounting plate to the wall is not supplied. It is suggested that 8 mm rawl bolts are used to secure that mounting plate.



Ensure that the 220V supply is not kinked or pinched as this may cause a short circuit that may damage the unit.

17. Insert the SIM card in the slot (1) on the PCB and ensure that it is securely latched (See Figure 19).
18. Align the housing (2) with the mounting plate and replace the top two Allan Capped screws.
19. Place the earth wire (3) in position and replace the Allan Cap screw (4) that secures the earth wire and the housing.

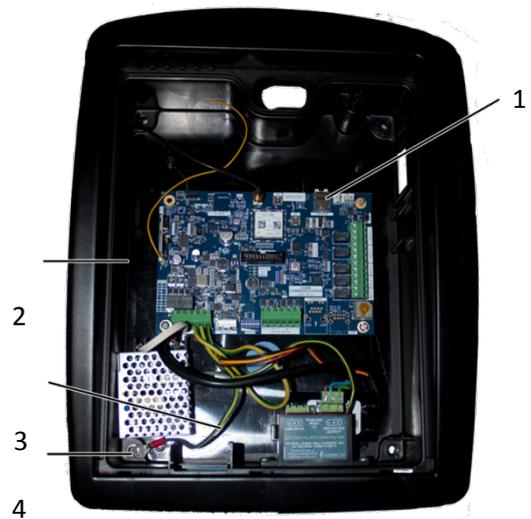


Figure 19: Mounting Plate



Failing to secure this earth wire may cause serious damage to the unit. Failing to follow this instruction may nullify the warranty.

20. Connect the 220V power to the unit (See Figure 11).
21. Replace the front plate in the slots on the housing.



Figure 20: Connecting 220V



22. Reconnect the earth wire (1) with its nut and washers (2) (See Figure 12).
23. Reconnect the ribbon cable (3).
24. Reconnect the speaker connector (4) to the PCB.
25. Reconnect the microphone connector (5) to the PCB.
26. Connect the battery (6) to the PCB battery connection (7).
27. Switch on the circuit breaker.

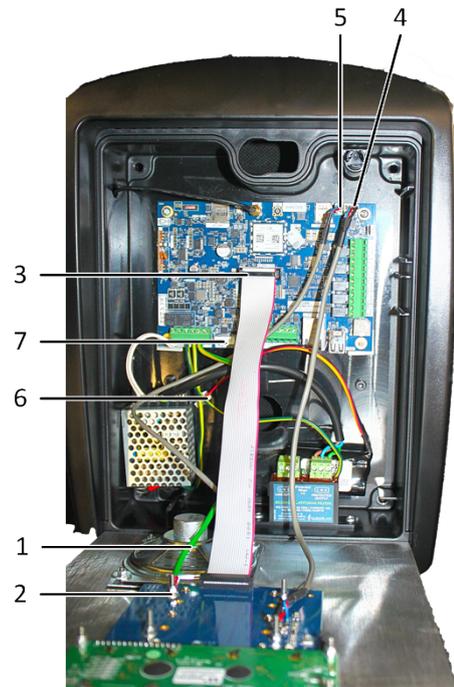


Figure 21: Reconnect PCB



Checks



THE SYSTEM IS NOW POWERED UP. UNSAFE WORKING PRACTICES AROUND ELECTRICITY CAN CAUSE SERIOUS INJURY OR DEATH.

28. Check that the LED flashes.
29. Check that the red LED stays lit.
30. Check signal strength.

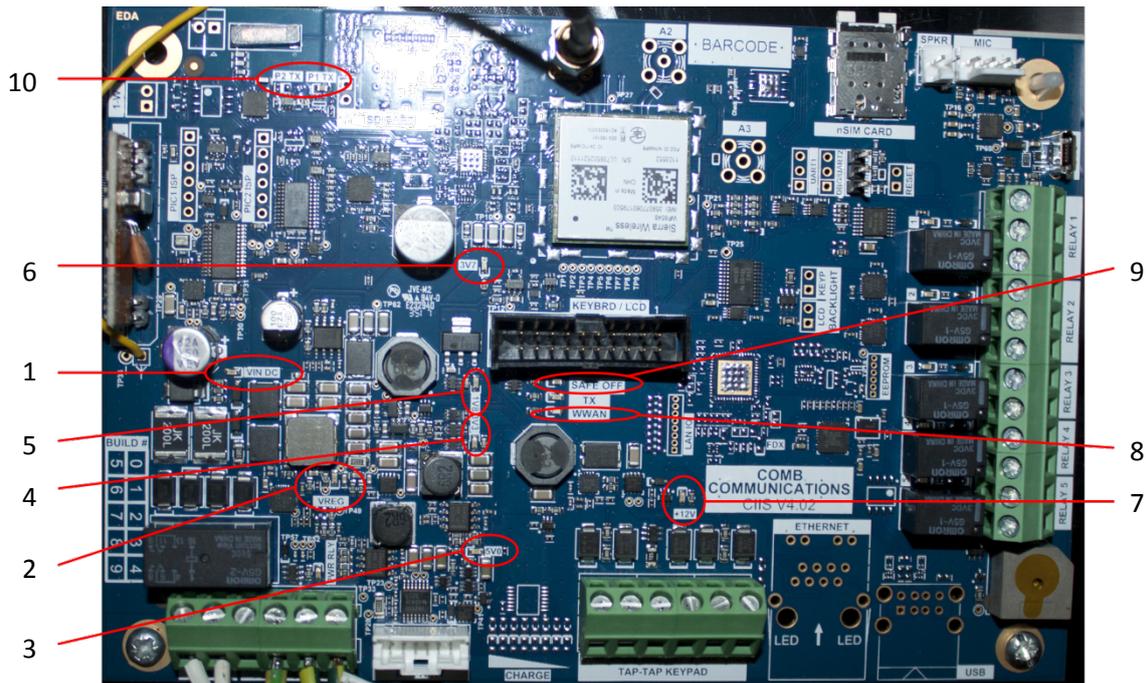


Figure 22: MK II PCB Lights

- | | |
|------------------------------------|--|
| 31. VIN DC – Confirms board is ON. | 32. VREG – Registers voltage on the PCB. |
| 33. 5V0 – 5V circuit running. | 34. 3V3 – 1.8V circuit running. |
| 35. 1V8 – 3.3V circuit running. | 36. 3V7 – 3.7V circuit running. |
| 37. +12V – 12V circuit running. | 38. WWAN – Web/GSM/3G services running. |
| 39. SAFE OFF – Shutdown mode. | 40. PX1 & PX2 TX – Remote receiver. |



Chapter 4: Fault Finding and Test Procedure

FAULT FINDING

<i>Indication</i>	<i>Possible Fault</i>	<i>Solution</i>
Power to the unit has been switched ON but no lights are on.	No power from the DB.	Check the circuit breaker to ensure that it is ON.
	Faulty line between DB and the unit.	Check the power line to the unit to ensure that it is working.
	Faulty surge protector.	Check the surge protector.
	Faulty transformer.	Check the switch mode power supply.
The power from the DB is in working order but there is no light on the surge protector.	Faulty surge protector.	Replace the surge protector.
Light on at the surge protector but no lights on at the PCB.	Faulty transformer.	Replace the switch mode power supply.



TEST PROCEDURE

<i>Supervisor Code</i>		<i>Description</i>
1.	*#0001	Firmware version
2.	*#0002	GSM signal strength.
3.	*#0003	Synchronise the unit.
4.	*#0004	Keypad reboot.
5.	*#0005	Battery charge in percentage.
6.	*#0007	Modem initialisation.
7.	*#0008	Request board ID.
8.	*#0010	SIM ICCID number.
9.	*#0011	Modem IMEI number.
10.	*#0012	Delete all SMS.
11.	*#0013	Network status.
12.	*#0014	TAP status enable/disable.
13.	*#0015	Pull code.
14.	*#0016	System status.



INSTALLATION HANDOVER

Installer must ensure that a proper handover is conducted. The attached checklist must be completed and send back to Comb-Communications within five (5) working days of installation.



Failure to submit the completed handover checklist may nullify the warranty of the unit.

Installation and Handover Checklist

<i>Installation Step</i>	<i>Yes</i>	<i>No</i>	<i>Comments</i>
1. GSM/GPRS Signal has been tested.			
2. The electricity feed from the distribution board to the unit has been tested and is within the safe operating parameters.			
3. An inline lightning protector has been fitted and is in an operating condition.			
4. The unit receives GSM/GPRS signal.			
5. The earth wire connecting to the cover plate has been secured.			
6. The earth wire connecting the PCB to the mounting plate is in place and secure.			
7. The speaker connection has been fitted to the PCB.			
8. The microphone connection has been fitted to the PCB.			
9. The ribbon has been connected to the PCB.			
10. The SIM card is activated.			
11. The SIM card is properly installed on the PCB.			
12. The microphone has been tested and is in working condition.			
13. Keys to the unit has been handed over to the end-user.			
14. On-line login details and registration			



of complex complete.			
Signature Installer			
Date of Installation			
Signature of Responsible Person			
Date			