

Comfort, the Intelligent Home System

Installation Manual

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Specifications

Zones

- 8 fully programmable zones on Control Panel, expandable to 16 or 24 with Local Expansion Module (LEM) and 64 with Slave Expansion Panels (SEPs)
- Each zone configurable for 0 or 2 end-of-line resistors
- Up to 32 predefined Zone types to simplify zone configuration
- Surge/Over voltage protection for each zone

Power Supply

- US: 16.5 V 40VA Class II UL Listed transformer manufactured by Mascon, Type ATW-1640
- Minimum Standby Battery requirement: 12V, 7 AH sealed lead-acid battery for 4 hour standby. (UL985: One 7 AH battery for 24 hour standby with 200 mA auxiliary current, or two 7AH batteries for 24 hour standby with 400 mA auxiliary current). Reverse protection for battery.
- 1.5 A regulated DC supply with Resettable Fuse protection
- Supervised for Mains failure and low battery

Auxiliary Supply Outputs

- 12V unswitched supply
- 12V switched supply (programmable reset for latched detectors)
- Note: Both switched and unswitched auxiliary supplies and 8 Outputs have a combined continuous current limit of 1A. (500 mA for UL applications)

Alarm Outputs

- Speaker Drive with 20 siren patterns
- Siren Output with programmable siren pulse patterns.
- Strobe output (12v)
- Combined Alarm Output current of 1.5 A max (with battery)

System Supervision

- Low Battery
- Mains failure
- Telephone Line cut
- Individual Zone tamper (open-circuit or short-wiring) with 2 end of line resistors
- Dedicated 24 hour Tamper input (used for cabinet and siren tamper)

Memory

- Nonvolatile memory maintains configuration during total removal of power

- Event log with 250 events (FS18) or 125 events (FS17) which can be accessed remotely or locally.

Alarm Types

- 32 programmable alarm types including user-definable alarm types
- Predefined alarm types include Intruder, Fire, Panic, Duress, Arm , Disarm etc.. Each alarm type selects a siren pattern, telephone combination, can trigger a user-defined response, which turns on/off appliances, lights etc.. Each alarm type can be set to report to any combination of the telephone numbers

Dialer / Digital Communicator

- 8 programmable telephone numbers. Each alarm type activation can be programmed to dial to any combination of telephone numbers.
- Each number can be assigned to Central station, voice phone, personal pager, or recorded voice message.
- Pager automatically displays system ID, alarm type and Zone or User number (depending on the alarm type)
- 2 Central Monitoring station numbers with individual account numbers.
- Digital communicator formats supported include all major pulse formats (3x1, 4x1, 3x2, 4x2 at 10 pps, 20 pps and 40 pps), Contact ID, Surgard. (This product has been tested by Underwriters Laboratories with the Radionics Model 6400 receiver using 3-1 40 pps and 4-2, 40 pps formats).

Home Automation Outputs

- 8 open collector outputs on main board, expandable to 16 with Local Expansion Module, and 64 with Slave Expansion Panels
- Each output can drive external relay or infrared LED for remote control appliances. Relay Modules with 4 relays are available.
- Selectable Pulsed or Steady output activation.
- 32 (FS18) or 25 (FS17) selectable infrared codes (air conditioners, home entertainment) for any output.
- Built-in X10 interface to PSC04 (110V 1 way) /PSC05(110V 2 way) TW7223 (230V 2 way) module.
- Over voltage and Surge-protected outputs.

Keypad / Door Station

- Up to 8 Keypads and 3 Door Stations per system (Require auxiliary Power Supply for more than 4 Keypad/Door station combinations)
- Keypad/Door Station current consumption : 15 mA (idle), 120 mA with siren
- Indicator LEDs: Home/Trouble, Armed/Alarm, Power Failure/Low Battery, New Message, Microphone on.
- Voice and siren sounds
- Built-in microphone for recording, intercom and alarm verification
- Tamper switch (24 hour)
- Loss of Communications Trouble alarm
- Backlighted keys

Telephone Answering machine

- Digital Answering machine with 10 minutes of recorded messages
- 8 programmable mailboxes with individual sign-in codes.
- Recorded messages with individual time/date stamps.
- Answering machine is accessible from any phone in the house.
- Call screening option on Keypad
- Recordable greeting message and user names for each mailbox.
- Messages are automatically played back when the mailbox user signs in, or may be accessed from any telephone. New messages can be forwarded to a phone or pager for each mailbox.
- Automatically erases the oldest saved message when a new message is recorded and recording memory is full.

False Alarm Filtering Features

- 2 way voice on Keypad
- Voice Alarm History with Date and Time of zone activation.
- Voice Alarm Tracking in real time of activated zones
- Alert zone types require activation of another zone to trigger a confirmed alarm
- Local alarm warning option for delay entry time-out prior to full alarm.
- Open- or short-circuit zone condition can be signaled as a trouble condition (when 2 end-of-line resistors are used)
- Night Mode Delay zone setting.
- Double sign-in of duress code required to generate duress alarm.

Sign-in Codes

- 16 user codes with individual authorization for arm and disarm, local and remote access, and disarm after alarm. First 8 user codes for mailboxes
- Engineer code for system and security settings.
- Sign-in Tamper alarm for protection against repeated sign-in code attempts.

Emergency Buttons

- Quick activation of Fire and Panic on keypad.

Test Features

- Battery Test - Immediate or at programmed intervals
- Security Check (walk test) zone activation is announced on Keypad
- Dial test - dials to all programmed telephone numbers, pagers, Central Stations, audible on Keypad
- Siren Test - Momentary activation
- Strobe Test. - turns on and off the strobe.
- Engineer Test Mode - allows engineer to work on the system without causing alarms.

Event Log

- 250 Events for FS18, 125 events for FS17
- Full voice log, with date/time stamp and voice description of events

- Local or remote access.
- Select 1st event, last event, previous event , next event , next day, previous day for quick navigation.
- Uploadable to PC using COMFIGURATOR for Windows, may be printed or saved

Other Features

- Door Station intercom with home or remote phones (requires Door Station)
- 8 Voice Reminder Messages capable of dialout to pager and telephone.
- Family Care Alarm to monitor inactivity.
- 16 Time Programs
- 8 Vacation programs
- Remote Programming from any phone with Engineer Sign in code.

Ordering Information - Products and Accessories

- Comfort 8001- ENTRY: Comfort Entry with Enclosure, Accessory pack and User Manual, and transformer.
- Comfort 8001- PRO: Comfort Pro with Enclosure, Accessory pack and User Manual, and transformer.
- Comfort 8001- ULTRA: Comfort Ultra with Enclosure, Accessory pack and User Manual, and transformer.
- LEM01 - Local Expansion Module 8+8 (8 zones, 8 outputs)
- LEM02 - Local Expansion Module (8 zones, 0 outputs)
- LEM03 - Local Expansion Module (16 zones, 0 outputs)
- EOL4.7K - 4.7K End-Of-Line insulated resistors
- EOL2.7K - 2.7K End-Of-Line insulated Resistors
- KP01 - Keypad
- KP02 - Keypad with IR receiver
- DP01 - Door Station
- SEM01 - Slave Expansion Module with built-in battery charger
- SEM02 - Slave Expansion Module (requires 12V external supply)
- UCM01 - Universal Communications Module with Comfigurator software
- UCM/IR - Universal Communications Module with IR Learner
- UCM/CBUS - C-Bus Interface Module
- UCM/EIB - EIB Interface Module
- UCM/Smartfit - Honeywell Smartfit Interface Module
- CWM01 - Comfort Webserver Module for connection to Intranet or Internet
- LP01 12 V lamps
- RLY01 4 way Relay Module
- RLY02 8 way Reed Relay Module
- CSM01 Single Current Sensor Module
- CSM03/2 Dual Current Sensor Module

- BPM01 Battery Protection Module
- SCS01 - Scene Control Switch with 4 buttons and indicators. Up to 8 SCS/RIO combination in a Comfort Pro or Ultra system
- SCS01/IR - Scene Control Switch with 4 buttons and indicators, with IR receiver.
- RIO01 - Remote Input/Output Module with 8 Digital inputs and 8 open-collector Outputs. Up to 8 SCS/RIO combination in a Comfort Pro or Ultra system
- IRR01 - Infrared Receiver for RIO.
- TWS01 Single Lighting Control Module (for two way switching)
- TWS02 Dual Lighting Control Module (for two way switching)
- IRM01 Infrared Transmitter Module with series protection.
- IR01W Infrared transmitter cable assembly for short range (round led)
- IR02W Infrared transmitter cable assembly for short range (flat led)
- RGR03 Ringer Module
- ZTS Zone Test Switch
- VPG01 Voice Programmer Module
- T-UL - UL-listed Transformer (16.5V, 40VA) manufactured by Macon, Type ATW-1640
- BT1270 - Battery 12V 7AH
- TB02 - 2 way Terminal Blocks
- TB03 - 3 way Terminal Blocks
- Accessory Pack AP01: Contains 8 x 4700 ohms, 8 x 2700 ohm EOL Resistors, 8 x shunts (for Zone Headers JZ1 to JZ8), 10 x 3-way Terminal Blocks (JP3-7, JP10-14), 2 x 2-way Terminal Blocks (JP8,9) Battery Cable with battery lugs

Comfort Documentation

Technical Manuals

The Comfort Technical Manuals are meant for installers. They are divided into several booklets for better organization and to make it easier to find the desired information.

Comfort Installation Manual

This manual includes the specifications, installation, setup, wiring requirements, testing/commissioning, troubleshooting, and FAQs.

Programming with Configurator

Shows how to use the Configurator software tool to program Comfort. Discusses the programming concepts, techniques and programming strategy.

Configurator Reference Manual

This describes the Configurator software and shows how to use each screen and feature. It is essentially the HELP file for Configurator.

Programming by Engineer Menu

This shows how to program Comfort using the Engineer Menu by keypad or telephone.

Programming Worksheet

If you are programming Comfort using the Engineer Menu, the worksheet is the place where you write down your customer configuration and programming settings. We strongly recommend that you do not attempt to install a system without using this worksheet as it will make your programming much easier, and prevent you from missing any settings. A detailed record of how each system is configured is crucial for proper management. Also, keep it updated as any future changes are made.

Action Codes Reference

A Complete list of Actions and how they are used. Action codes are commands for Comfort. These are assembled into Responses (sometimes called "Macros") to produce multiple operations. Master these and you can make your Comfort system do what no other system can. Action Codes can be specified in Configurator's Response Wizard

You can get the system up and running with the default settings, but it is likely you will want to do some of the clever things which attracted you to Comfort in the first place. You will need a good grasp of Action Codes and how they are used in Responses.

Applications Manual

The applications manual shows how to use Action codes and Responses to program Comfort in commonly used scenarios. This is updated as new applications and solutions are added.

Training Materials

Check with your Comfort distributor or Cytech Technology for new Training Materials, like presentations, tutorials, exercises etc. which are updated from time to time.

Comfort Modules

Each of the Comfort modules and accessories listed in the previous section comes with its own manual.

For Users

User Manual with Quick Start Guide

The Quick Start Guide gives simple instructions on how to get started with Comfort. The rest of the User Manual is a detailed users guide for those who want to make full use of Comfort's unique capabilities.

Quick Reference Card

This folded card is handy reference to Comfort which can be kept in a purse or wallet.

Internet

Cytech Technology Web site

Our Web site a <http://www.cytech-technology.com> has all the manuals and other documentation, FAQs, applications, brochures, as well as software which can be downloaded. Other sections include News, Features, Products, Distributors, and an interactive demonstration.

Comfort User Groups

Join our user forum on the Internet on Yahoo Groups at

<Http://groups.yahoo.com/group/comfort-technical/>

Click on Join. This user group is a forum for discussion, comments, problems, new product announcements and technical support for Comfort Users.

Comfort Control Panel Models

Comfort is available in 3 main models; Entry, Pro and Ultra. The table below shows the differences and features of each. Comfort Entry is a low-cost system for smaller homes, with up to 16 zones and 16 outputs (with LEM01) or 24 zones and 8 outputs (with LEM03). Comfort Pro is for larger homes with up to 64 zones and 64 outputs. Comfort Ultra includes more Responses (1023), 6 Control Menu Groups, and is suitable for large homes with extensive automation.

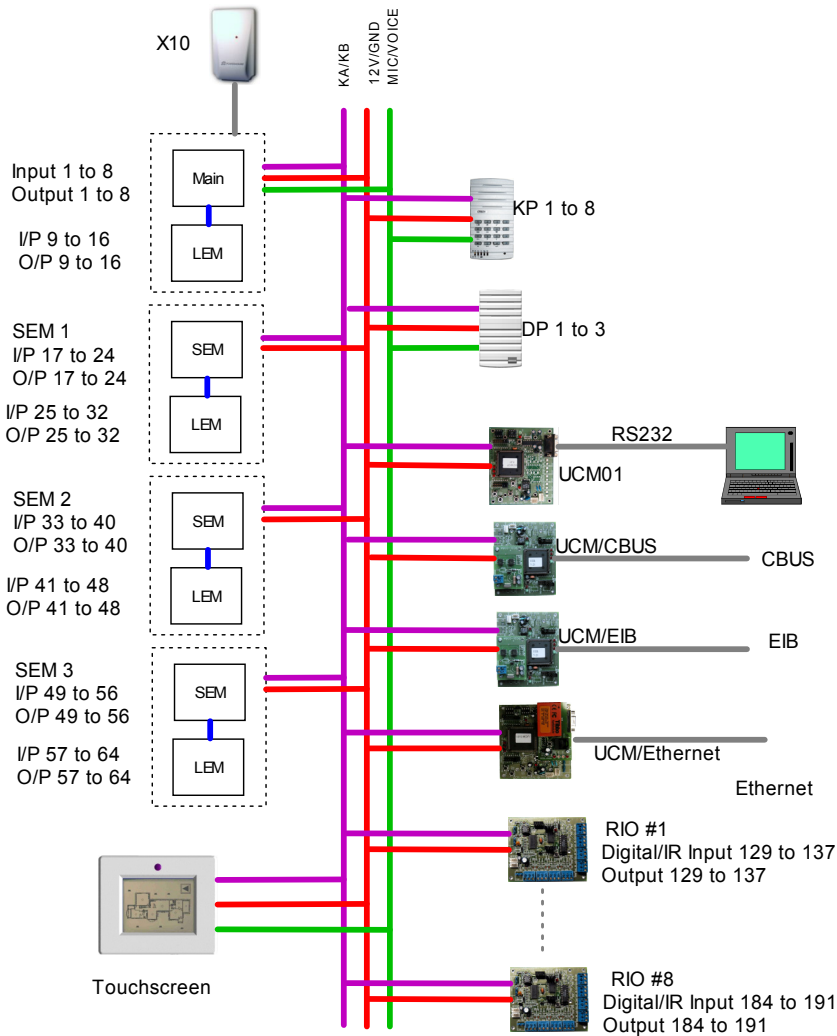
Comfort is scalable - you can upgrade from one model to another simply by changing two Integrated Circuits (ICs); U1 which is the microcontroller which runs the operating firmware, and U4 the Nonvolatile Memory (NVM) which contains all the programmed settings. This allows you to select the most suitable model for your customer's present requirements without worrying about limitations when it comes to future expansion.

Some of the programming features described in this manual may be applicable for Ultra only, or Ultra and Pro - when this is so, it will be stated in the text.

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Model	Entry	Pro	Ultra
Firmware (U1)	"Entry"	"Outside"	"Action"
File System Memory (U4)	FS17 (32 kbits)	FS18 (64 kbits)	FS21 (256 kbits)
Control Menu Groups	1	3	6
Control Devices per Group	10	10	10
Control Actions per device	10	10	10
Total Control Menu Actions	100	300	600
Dialout for Alarm	8 phone numbers		
CMS Phone Numbers	2		
Voicemail	8 Mailboxes		
Send X10 House Codes	16, limited by Responses		
Receive X10 Responses	1 house code	1 house code	>1 house code
Reminder Messages	8		
Time Programs	16		
User Sign-in Codes	16		
Auto Answering	Yes		
Control by Local Phone	Yes		
Announcements	Yes		
Alarm History	Yes		
Alarm Types	31		
Zone Types	31		
Vacation Programs	8		
IR Code Memory (Send)	544 bytes (approx 16 codes)	950 bytes (approx 27 codes)	4096 bytes (approx 120 codes)
Event Log (events)	100	250	250
Responses	99	255	1,023
Codes per Response	6	6	8
Max Inputs/Outputs	16	64, 128 w/RIO	64, 128 w/RIO
IR Receive Codes	N/A	128	256
Counters	8	128	256
Flags	16	64	64
User Timers	8	16	16
RS232 Command Interface	No	Yes	Yes
C-Bus Interface	No	Yes, UCM/CBUS	Yes, UCM/CBUS
EIB Interface	No	Yes, UCM/EIB	Yes, UCM/EIB
RIO/SCS Support	No	Yes	Yes
Smartfit Interface	No	UCM/Smartfit	UCM/Smartfit
CWM interface	No	Yes	Yes

Comfort Architecture



The above diagram shows how Comfort can be expanded in relation to its architecture.

The Main Comfort panel contains 8 inputs and 8 open-collector Outputs with dedicated Tamper Input and Siren, Strobe and Speaker outputs. A

Local Expansion Module provides another 8 inputs and 8 outputs (LEM01) or 8 inputs (LEM02) in the same enclosure, to give a maximum of 16 Inputs and 16 Outputs. The Outputs are open-collector transistors, capable of driving 12V relays or infrared transmitter LEDs.

The Slave Expansion Module (SEM01 with its own battery charging circuit, or SEM02 which requires an external power supply) provides another 8 Inputs and 8 Outputs with dedicated Tamper Input and Siren, Strobe and Speaker outputs. A Local Expansion Module can be connected to the SEM to provide another 8 inputs and 8 outputs (LEM01) or 8 inputs (LEM02) in the same enclosure, to give a maximum of 16 Inputs and 16 Outputs with the Slave.

Up to 3 Slaves (SEM) with their own Local Expansion Module can be connected to the Main Comfort panel for a maximum of 64 Inputs and 64 (open-collector) Outputs.

Remote Input/Output Modules (RIO) each provide 8 digital or Infrared Inputs. These RIO digital Inputs cannot be used as alarm inputs like those of the Main and Slave Expansion Modules. Infrared Receivers (IRR01) can be connected to any RIO input to allow Remote Controls like Comfort RC01 and Philips Pronto to send commands to Comfort (received Infrared Responses). Normally Open switches can also be connected to each RIO input to activate Responses. Up to 8 RIOs can be connected to Comfort to provide 64 Digital/IR inputs and a further 128 open-collector outputs.

With 3 SEMs, 4 LEMs and 8 RIOs Comfort has a maximum capacity of 64 Alarm/Digital Inputs, 64 Digital/IR Inputs, and 128 open-collector Outputs.

The Universal Communications Module UCM01 provides an RS232 Interface to PCs and serial devices. It is used for upload/download programming using the Comfigurator software tool, and for interfacing to third-party software like Ace-Comfort and other systems with serial interfaces like AMX, Crestron, and Homevision.

Other types of UCM include UCM/EIB for interface to the European Installation Bus, or Instabus; UCM/CBUS for interface to Clipsal's C-BUS; UCM/Ethernet to an Ethernet Local Area network. Up to 8 UCMs can be connected to a Comfort system.

Design Considerations and Applications

Run Additional Cables

If you require a 6-core cable to a part of a building, run an extra 6 core cable as well, you never know what may be needed in the future! If possible, (although not a requirement) use screened cables for trouble-free installations. The same applies to CAT 5 cables.

Current Consumption

It is very easy to underestimate the load which can be placed on a system unintentionally. Before starting to run cables, find-out the

current draw from all the devices to be attached to the system FIRST. It may be that supplementary power supplies will be needed sooner than you think. If the standby current is over 850 mA install a Power Supply Unit (PSU).

Think future retrofit

Comfort is one of the most expandable systems around! Installers can benefit from ongoing upgrades and modifications as there is so much 'add-on potential'. Selling to an existing customer is always easier than finding new customers. A customer may wish to connect to a Central Station or add security lighting. They may require home control using X-10 or operate the curtains, or they may just want more detection points, a camera or Keypad, additional intercoms or even flood detection!. A little forethought during the initial installation can make upgrading a system in the future so much easier. Future proof every installation for Comfort!

Always allow for extra capacity in the cables. If more zones or outputs are required, run extra cables to the other end of the building so you can install Keypads. Customers may have already shown an interest in these things and plan to add them at a later date. If you are already taking cables in a certain direction, increase the capacity. You may need to estimate what a customer might need in the future. Some companies prefer to install Comfort as a 'basic system' and take a planned approach to their marketing by sending special offers throughout the year to stimulate the interest in time for their annual inspection and do the update at the same time.

Detectors

Aim to use 2 End of Line resistors for added security. You only need a pair of conductors per zone to give both zone information and tamper protection. The resistors should be fitted into the detector.

X-10 in New House Builds

The ideal time to integrate Home Control functionality is during the planning and design stages of new homes so that the cabling between wall switches and lamp fittings can be configured to use AD10 or LD10 DIN rail modules sited in a separate container near to the Comfort Panel and possibly the fuse board. Bring the wall-switch cables AND light fitting cables back to the X10 consumer unit, rather than the usual convention of running wall-switch cables to the light fitting and the light fitting to the mains supply. This gives maximum flexibility as you can still use the wall switch or Comfort to control the light. This is because the wall switch is actually switching the AD10 module which in turn switches the mains onto the bulb. Distance and noisy mains supplies can seriously impact the strength of X-10 signals around a house. Test the house first, using the UR24 and Radio Transceiver Module. These two devices can also be used to provide a wireless interface to perform any of Comfort's Responses. See 'X-10 received codes' in Worksheet Table 32.

X-10 house codes can be categorized by their applications. You may need to switch OFF all of one particular address at once. You could use X-10 'A' address' as general switching, 'L' for external lights, 'H' for Heater (i.e. Central Heating) etc.. Never use X-10 to control appliances which could create a dangerous situation if suddenly switched ON or left ON for long periods of time

Lighting Control Linked to Security

When someone enters the property through the front door when the system is armed, the hall or front lights can be switched on if the light level, (determined by a photocell) is low.

If an Intruder Alarm occurs, the lighting in the violated area may be turned on so the owner can quickly identify the areas of possible intrusion.

If a fire is detected, lights in the exit route can be turned on.

Monitoring Outside Movement

Outside PIRs can trigger announcements of programmed descriptions e.g.. "Front Garden", "Garage", "Driveway" on the Keypads.

External movement can be programmed to trigger user-recorded warning messages like "Please leave the area at once or else..." In stores, movement in certain aisles may also trigger more friendly messages.

Several CCTV cameras may be positioned outdoors, connected to a common monitor, switched by relays depending on which outside PIR detects movement. Relay Modules with 4 relays are available. When the Doorbell is pressed, the front door camera could be switched through.

For lighting, the same external PIRs could be used to operate lighting. The prevailing light level can be determined by using a photocell connected to a zone, and the corresponding light turned on if it is dark. One of the 8 timers could be used to switch off the lights a few minutes later if no further movement is detected. You may also wish to start a time lapse video machine using a different output (set the record time to 3 minutes at a time).

Wireless Zones

Some installations may require radio control of certain zones such as panic switches, arming, or maybe even zone shunting. These can be achieved using stand-alone radio (RF) transmitters and receivers. The resistors for each zone would normally be fitted across the relays inside the receiver's box.

RF transmitters often have 2 to 4 switches and allows customers to have their Garage Door or Gate to also be controlled from the one transmitter. This is relatively simple to achieve because Garage Doors are often manually opened using a normally open bell-type push-switch. To provide control using a spare channel of the transmitter, simply connect

the receivers normally open relay across the bell-push terminals in parallel.

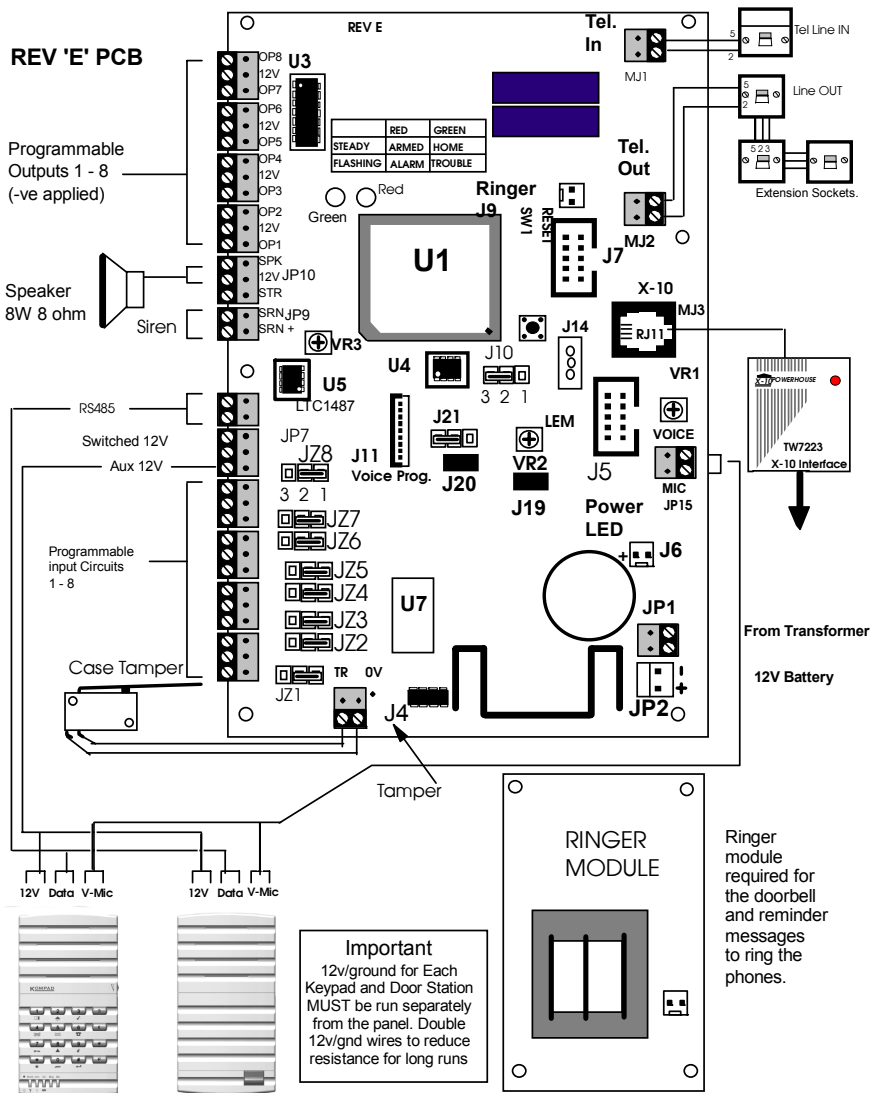
Automatic Gate Control

Comfort can be connected to control automatic gates using the outputs and the 12 Volt RLY01 relay board. Often these are triggered by a pulsing a normally open contact for 1 second using action code 130. The gate may close after a preset time or when another Pulse command is given. The Open Gate or door command can be given from the Door Station menu when used in conjunction with the Door Station

Curtain Control

Comfort can be used to operate some curtain controllers. This can be achieved using two outputs per curtain controller, one to open and one to close'. Usually the output is pulsed for about 1 second to trigger the curtain controller. It is advisable to consider the position of movement detectors when operating a curtain while the system is armed as this is capable of causing a false alarm' To avoid this, install the detector in the corner adjacent to the curtains so that the curtain movement is not in the detector's field of view or write the curtain ON and Off Responses to include the shunting of the zone using the bypass action code(75) then pulse the output to open the curtain then run a 20 second timer and unbypass the zone (76).

SECTION 2 INSTALLATION



To be Installed by qualified Service personnel

ICs

- ❖ U4 - System configuration Nonvolatile Memory (NVM). This is where all Engineer programming information for a system setup is stored.
- ❖ U1 - Program IC. This IC contains the firmware, for all of Comfort's embedded behaviour. This IC can be replaced to upgrade to new functionality and features.
- ❖ U7 - Voice IC. For Comforts voice menu and messages. It may be reprogrammed for other vocabularies by downloading a vocabulary using the Configurator software tool.
- ❖ U5 - RS485 Interface IC.
- ❖ U26 - Pulse dialing IC socket. Not used

Connections

- ❖ MJ1 - TEL-IN. Connection to Public Switched Telephone Network.
- ❖ MJ2 - TEL-OUT. Connection to House phones.
- ❖ MJ3 - Connection to X10 PSC05/TW523/TW7223 Interface.
- ❖ JP1 - Transformer Input connection
- ❖ JP2 - 12V Battery Connection for Sealed Lead-Acid Rechargeable Battery.
- ❖ JP3 - JP6, Zones 1-8 input connections for Zones 1-8.
- ❖ JP7 - 12V Auxiliary and Switched Supply (3 position terminal block)
- ❖ JP8 - RS485 KA/KB (2 position terminal block)
- ❖ JP9 - 12V Siren Connection for 12 Volt sirens, SRN terminal is the trigger, SRN+ is 12V positive hold-off. 0V may be taken from GND at J4.
- ❖ JP10 - Speaker and Strobe Connection for Speaker and 12V Strobe Light.
- ❖ JP15 - MIC/VOICE connection to Keypads and Door Stations.
- ❖ J4 - Connection to Panel and Bell box Tamper. Short terminal block with wire-link if tamper Input is not used.
- ❖ J5 - LEM Connection Point for ribbon cable.
- ❖ J6 - Mains Power On LED header.
- ❖ J11 - 9 way header for Voice Programmer Board
- ❖ J13 - 2 way header for RGR02 (Australia only)
- ❖ J9, J14 - Headers for Ringer Board connection
- ❖ J15 - 4 way header for UCM/SEMs
- ❖ J23 - Test connector (4 way header)

Jumper Settings and Adjustments

- ❖ SW1 - Reset Switch. This switch should be pressed after downloading a configuration from COMFIGURATOR or after changing a Location setting.
- ❖ J1 - (2 position header) - Leave Open
- ❖ J2 - 3 pin Test Header. **Do not shunt**
- ❖ J3 - 2 pin header . **This must be shunted**
- ❖ JZ1 - JZ8 3x8 way header - Insert shunt in the position nearest the terminals for the corresponding Zone 1 to 8 if no EOL resistor is used for the zone. Insert a shunt in the position away from the terminal block if Double EOL resistors: 2K7 connected in series and 4K7 is connected across the contact.
- ❖ J10 (3 position header) - Shunt inserted over position 2 and 3. This jumper is used when programming a new vocabulary using the Voice Programmer.
- ❖ J19 2 way header. Volume setting for Siren sounds on Keypads. Shunt for louder.
- ❖ J20 2 way header. Must be shunted always.
- ❖ J21 3 way header - for echo cancellation setting (See Testing and Commissioning section). Default position of shunt is 1-2.
- ❖ VR3 - Speaker Volume for advisory tones. Alarm tones (e.g.. for Intruder and Fire) are always at full volume regardless of this settings
- ❖ VR1 - Keypad/Door Station Microphone level adjustment
- ❖ VR2 - Tuning Adjustment for Echo cancellation. DO NOT Adjust - it has been set at the factory.

Location of Panel

The system should be mounted in a dry area, with access to an unswitched AC power source and incoming telephone line.

Mounting

Do not remove printed circuit boards from the cabinet as they are sensitive to electrostatic discharge and may be damaged with incorrect handling.

Remove the knockout holes and mount the cabinet to the wall. Do not connect the transformer and backup battery until all other wiring is complete. Take precautions against damage by static discharge by using an antistatic wrist strap tied to a suitable earth point.

Transformer

- 🔊 **For US Installations, use a UL approved 16.5V 40 VA transformer (manufactured by Mascom, Type ATW 1640). Connect the**

transformer output wires to the AC IN (JP1) terminal blocks through the mains inlet knockout hole. The plug-in transformer should be connected to an unswitched power supply outlet. Connect a 16 AWG green-jacketed solid conductor ground wire from the earth terminal on the studs provided on the enclosure to a metal pipe, grounding rod or other established earth ground for protection against lightning-induced surge.

- ⚡ **For UK:** The mains transformer is supplied in the enclosure. The mains installation should be carried out by a qualified electrician in accordance with Electrical Wiring Regulations (BS 7671). As this is a permanently connected equipment, the fixed wiring must have a readily accessible disconnect device, e.g.. isolation switch.
- ⚡ **For Australia and New Zealand,** the transformer is in the form of an approved 3 pin plug pack . The plug pack should be connected to a socket with a protective earthing connection.

Warning Notice (Australia/New Zealand Installations)

This equipment must only be installed and maintained by qualified Service Personnel. Connect the Protective Earth (Plug Pack) before the telephone line cord. Disconnect the telephone line cord before the protective Earth (Plug Pack). The protective Earth wire should be connected to the earth stud on the metal case.

- ⚡ **Ensure that continuous current supplied from the AUX terminals and outputs is less than 750 mA.**

The transformer secondary output is connected to the AC IN (JP1) terminals.

- ⚡ **Do not share the transformer secondary with any other equipment. Do not connect the transformer until all other wiring is completed.**

Backup Battery (JP2)

Connect a 12V 7 AH sealed lead-acid battery to the BATT (JP2) terminals. This will give more than 24 hours of standby power to the system if 200 mA or less of auxiliary current is used. The Expansion board requires less than 35 mA. Connect the positive terminal of the battery to the + terminal of JP2 and the negative terminal of the battery to the - terminal of JP2. The battery provides standby power to the system in the event of power failure and supplies additional current when required, e.g. to drive the siren during an alarm. Do not connect the battery until all wiring is completed. The battery current is limited to 2.5A by a resettable fuse (F1).

- ⚡ **For UL985 installations, two 7AH batteries may be connected in parallel to provide continuous 24 hours standby operation for current of 500 mA. A special 2 ft battery harness (HN02) is available for this purpose. If the current is kept to 200 mA, a single 7 AH battery may be used to provide 24 hour standby.**

- ⚠ The system may not operate correctly without a backup battery.**

Back-Up Battery Calculation.

Standards require that alarm systems must be designed and installed with adequate battery back-up capacity to run the system for a minimum number of hours upon a loss of mains power. To do this, first establish the system Quiescent Current (QC). This is the current drawn when the system is in idle state, i.e not dialing, or talking, dialout out or receiving calls, with all outputs off, without any external loads like PIRs, sirens, speaker, relays. This value in Amperes should be multiplied by the minimum time duration that is required under the relevant standards. The Amp/hour battery size should be of a higher capacity than the result of the calculation. It is always advisable to install the highest capacity battery which can physically fit into the enclosure.

E.g.: QC = 0.650 A (650 mA)

For 8 hours required stand by, QC x 8 = Battery Size A/hr (Min)

0.650 x 8 = 5.2 Amp-hour, hence ,

Next available Battery size is **6.5 (or 7) Amp-Hour**

The table below shows typical quiescent current consumption of Comfort and its modules when supplied from a 12V battery with the AC off. This is useful in determining the battery life for a configuration. This is meant as a guide only as current consumption may vary.

Module	Quiescent Current (milli-amperes)	
	Typical	Maximum
Comfort Controller	80	96
Door Station	10	12
LEM	10	12
UCM	70	84
SEM01/SEM02	45	54
RIO	15	18
Keypad (silent)	15	18
Keypad talking (Min volume)	75	90
Keypad talking (Max volume)	170	204

As can be seen from the above figures, the main determinant of battery life is the external load, as the system itself draws very little current, typically 175 milliamps with a 32 zone system with Keypad, and Door Station. When the system is not idle, ie talking, dialing, receiving calls, it will take much more current, but this is a very small proportion of the day, ie most of the time, it will be in quiescent state. The maximum load current must be estimated in any calculation of battery life.

Factory Restart

Comfort does not have a factory restart setting because unlike alarm systems, there are simply too many different settings. The configuration is stored within U4 Nonvolatile memory (NVM). There are 3 methods to achieve factory defaults;

- 1 Replace U4 with one with default values
- 2 Transfer the default file (default.cct) using CONFIGURATOR.
- 3 Use the UCM with a Master U4 (in the master socket) and press the DLOAD button to download the contents to the Comfort U4.

Cable Routing / Requirements

The minimum cable type to be used for detection devices, sounders should be 6-core alarm cable (7/0.2mm). This has a resistance of approximately 8 ohms per 100 meters.

Shielded Twisted pair (STP) CAT 5 cables are required for Keypads and Door Stations. Each cable runs from the panel separately, in a "star" or home-run configuration. Use of untwisted and unscrewed cables may cause noise interference to be heard on the Keypad and Door Station.

Where spare conductors are available in multicore cable runs, they should be used to double-up the 12V power supply cables to the each control station to reduce circuit resistance and further improve current performance. Ensure that all RS485 communication lines and detection circuit cables are kept away from mains supply cables.

Keypad and Door Stations

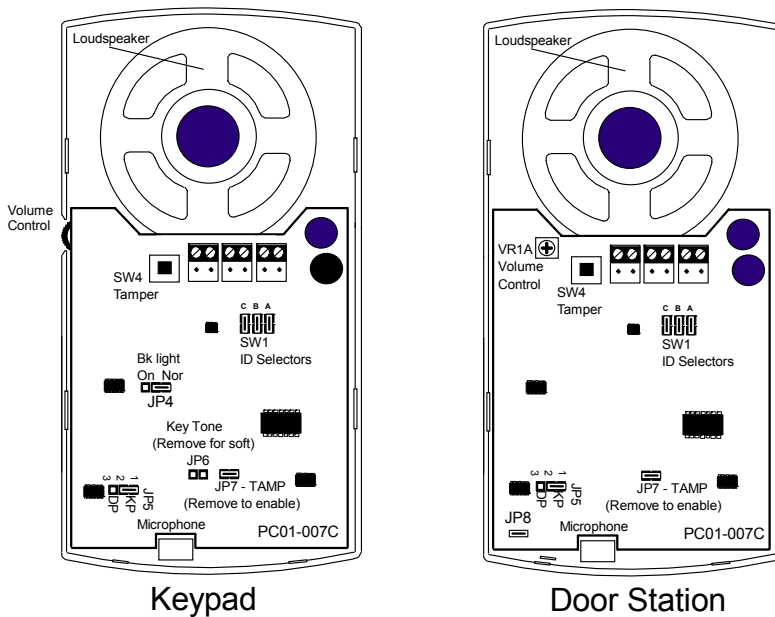


Figure 2.2 - Keypad and Door Station Settings (rev C)

Open the Keypad housing by pushing a screwdriver into the two slots at the front bottom one at a time until the catch is released. **Do Not apply too much force as this may break the catch.** Separate the front and back housings by pulling the top housing firmly away at the bottom edge. **However, even if the catches break, the housings can be closed properly as the main catches are on the side wall.**

Mount the back housing on the wall using the screws supplied. Connect the 6 wires from the terminal blocks on the Keypad to the Comfort PCB according to the connection diagram above. The Comfort Panel should be switched off during the Keypad installation. **Connect the Keypad/Door Station 12V wire to the 12V terminal, NOT the S12V terminal**

The total resistance of each 12V and ground wire run should be less than 5 ohms. If necessary, use an extra pair of wires for 12V and ground.

If more than one Keypad/Door Station is used, connect their 12V and ground wires directly back to the Comfort control panel. Do not connect in series.

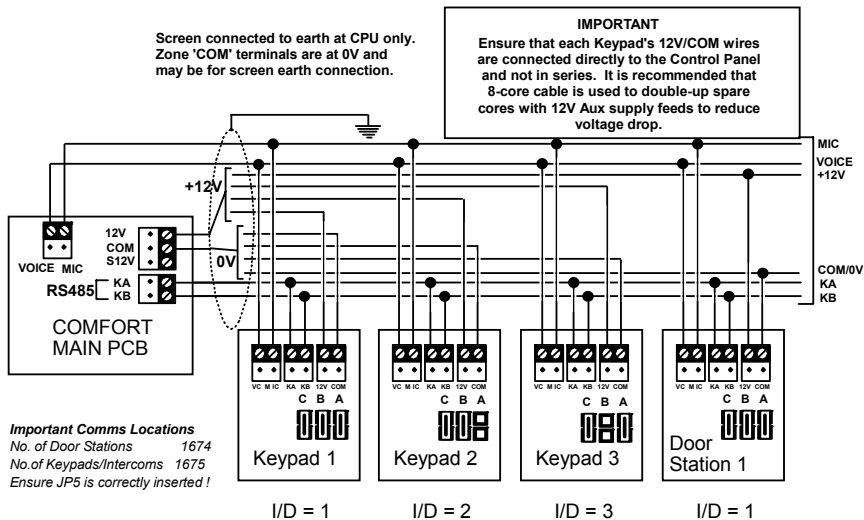


Figure 2.3 - Keypad and Door Station Connections

Keypad PCB Versions

The PCB version of the keypad is silk-screened on the bottom right corner of the board. PC01-007B does not support the Infrared receiver function (KP02) while PC01-007C (released in January 2001) does support Infrared receiver function, with the appropriate components soldered in, as well as a shunt to permanently turn on the backlight. The differences in the shunt settings are described below.

Shunts

JP4: 3 pin header for Backlight selection. "Normal" position for backlight on when key is pressed, Entry alert or Alarm. "On" position for Backlight permanently on. Default - "Normal". **This applies to PC01-007C only**

JP5: Keypad/Door Station selection: Shunt positions 1 - 2. for Keypad, 2 - 3 for Door Station. **For PC01-007C, JP5 is horizontally oriented**

JP6: Keypad key Beep volume. Short for louder beep volume. Default Open (soft). **Not on Door Station PCB**

JP7: Tamper Shunt. Short to disable tamper switch. Default shorted (disabled)

JP8: Disable Doorbell button. When shunt is removed, door station button is disabled. The shunt is removed when the Door Station is used as a keypad (JP5 to keypad position) for announcement. **This applies to PC07-007C only.**

SW1: ID selection

ID Selection:

Set the headers SW1 according to the ID of the Keypad according to the table

ID	SW1 - A	SW1 - B	SW1 - 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

Up to 8 Keypads and 3 Door Stations may be installed in a system. Keypad Ids must be numbered consecutively. For example, if there are 2 Keypads they must be set to Ids 1 and 2. The same applies to Door Stations. If there are 2 Door Stations, they must be set to 1 and 2. Each keypad must have a unique ID which is not shared with another keypad. The same applies to Door Stations. Door Station IDs are independent of keypad IDs.

After termination of the wires and ID selection, close the Keypad/ Door Station by hooking the front housing to the back housing along the top edge and pushing the bottom of the front housing into the back housing.

Switch on power to the Comfort Panel. A short beep should be heard on the Keypad followed by "Security Off". The appropriate indicator LEDs should light up.

Location

DO NOT install a Door station in a noisy environment like beside busy road, as the background noise may prevent the telephone side from being heard on the Door Station

Number of Keypads and Door Stations

In Comfigurator, go to Configuration > Modules & Settings to set the number of Keypads and Door Stations that will be connected to the system. If for example, the number of keypads is set to 4, there should be 4 Keypad with IDs 1,2,3 and 4.

Voice Station/Door Station Intercom Tuning

The Keypad and Door Stations act as intercoms with a local or remote telephone. In the user Menu press 5 for Voice Station to talk to any keypad, and 6 for Door Station to talk to a Door Station. In this mode, if the audio levels are not set correctly, a howling noise will be heard, due to positive feedback between the microphone and speaker of the keypad or door station. This is less serious in the case of a local telephone, but is a bigger problem for a remote telephone and especially for a mobile phone, because the additional delays caused by the mobile network makes it more difficult to "echo-cancel". Because of the tendency for howling, the intercom communication between a telephone and the keypad or door station is implemented in "half-duplex" mode, in which the conversation is in both directions, but at any one time, only one direction is active (ie keypad/door station microphone to telephone, or telephone to keypad/door station speaker). The conversation switches

between directions depending on which side is "talking" or having the most signal. This mechanism is similar to that in handsfree speakerphones. When both sides are silent, the keypad microphone to telephone direction is active, so that sounds at the keypad/door station can be heard on the telephone. When the person on the telephone talks, the direction rapidly switches over so that the keypad microphone is muted and the telephone voice can be heard on the keypad/door station speaker.

On the Comfort CPU, the VR1 trimmer (near the Voice/MIC terminal block) sets the MIC recording and listening level for the Microphone for all connected keypads and door stations. Rotate anticlockwise to reduce the microphone volume and vice versa. Go to Voice Station Mode using a local telephone with a keypad. Turn the pot fully anti-clockwise and then slowly turn it clockwise, listening for the start of feedback "howling". Repeat this with a mobile phone. You will find that the VR1 trimmer may need to be at a lower level (anticlockwise) for a mobile phone compared to a local telephone or remote fixed line telephone.

Check that you can hear the keypad or door station from a mobile phone and a person at the keypad or door station can hear the person talking on a mobile phone. If not, refer to the Troubleshooting section of Key pads/Door Stations.

DO NOT install a Door station in a noise environment like beside busy road, as the background noise may prevent the telephone side from being heard on the Door Station

Door Station as Internal Intercom

The Door Station can be used as an intercom within the premises, by making it appear as a Keypad. Set JP5 so that the Door Station is a Keypad. Set the ID switches in SW1 to select the next available address for a Keypad. Program Location 1675 to correspond to the number of Keypads in the system. Reset the Comfort panel. Pressing the Doorbell button will initiate the Intercom mode just like pressing the F + 8 function key. The Doorbell button also switches communications to talk mode when communications is established. However, this intercom cannot terminate the Intercom Mode, as there is no F key. Intercom mode can be terminated by the other Keypad or can be left to 'time out'.

Speaker and Strobe (JP10)

Connect a strobe light to the 12VF and SB- outputs if needed. Observe the polarity. For UL Installations use a UL approved strobe, eg Wheelock LS1-12-VFR. In the event of an alarm, the strobe is turned on until the system is disarmed. The Strobe and speaker terminals have a combined current limit of 1 A, protected by a resettable fuse (F3)

- ⚠ For UL applications, the maximum current for alarm output terminals should not exceed 500 mA .**
- ⚠ The backup battery must be connected for the Siren to work properly.**

Connect an 8 ohm 5W (minimum) speaker to the SPK- and 12VF terminals. Polarity is not important for a speaker.

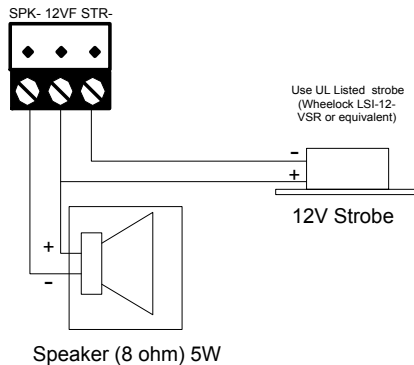


Figure 2.4 - Speaker and Strobe connection

The speaker provides up to 20 siren types with different patterns and frequencies to identify alarm states and trouble conditions. The speaker may be used as an internal siren, but is not meant to be the primary audible alarm indicating device.

The speaker gives 2 levels of sound volume: For alarms, the full volume is produced. For trouble and information tones, as when arming, a lower, adjustable level of sound is produced. This volume may be adjusted by trimmer VR3 near the SPK terminals. The Strobe and speaker terminals have a combined current limit of 1.A, protected by a resettable fuse (F3).

Siren (JP9)

Some supervised or self-actuated bell boxes may sound as soon as they are connected. If so, they may need a pull-up resistor (1K-ohm) placing between the +12V hold-off and their negative 'trigger' terminal. This should be inserted at the bellbox end. Should you wish to work on the bellbox connections or open the control panel, you can immobilize the system from causing a tamper alarm by entering Engineer Test Mode via Eng. Menu 8,6, 1 for on. Upon deselecting this option 8,6 ,0 for Off, the system will enter 'Security Check Mode' and will report any faults through the keypad. 'Tamper Alarm' means the Panel Tamper or Bellbox Tamper switch or Connections are open or incorrect.

SRN- This is the bell trigger output which can be programmed for SAB or SCB (Siren Reverse) operation as follows: Select Siren Reverse Option 'ON' for SCAB in Engineer Menu 4,3. *SBA, Siren Reverse OFF=Default.*

SAB: SRN- will switch to 0V on alarm and will provide a maximum of 700mA.

SCB: SRN- will provide a negative hold off (500mA), which is removed on alarm.

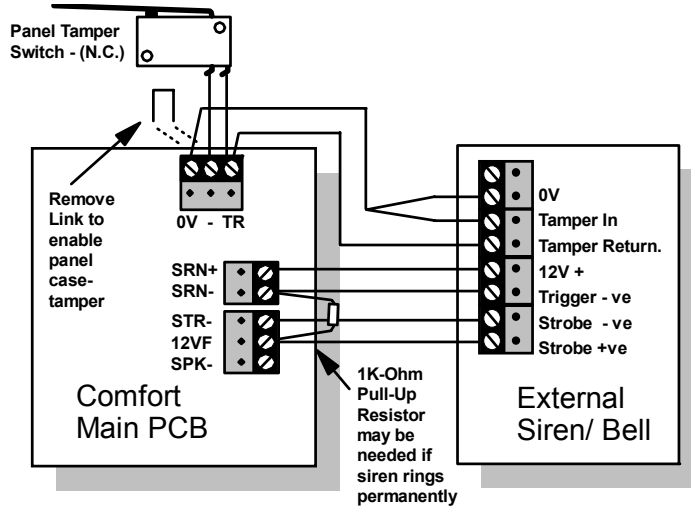


Figure 2.5 - Siren Connections

For UL 985 Fire Alarm installations, the circuit in Figure 2.6 should be used, where the relay disconnects the siren when a single ground fault or open circuit on the siren wiring occurs, to prevent the siren from sounding during this condition. The output must be programmed to turn on when a Siren Trouble alarm occurs. Press the Reset button on the system when the problem has been fixed to turn off the relay and reconnect the siren.

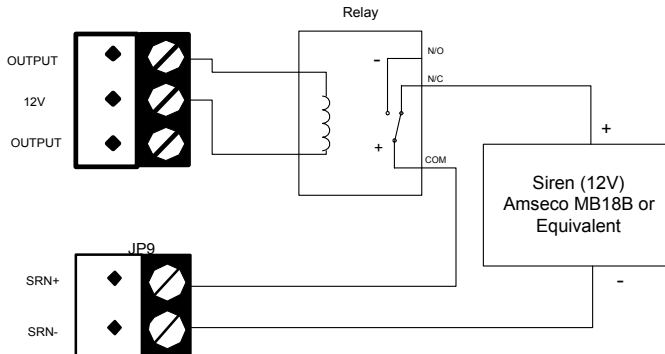


Figure 2.6: Siren Connections for UL985

- ☎ **For UL 985 installations where the siren is used as the primary audible indicator, Alarm Type 22 must be programmed for a Trouble signal.**
- ☎ **For UL applications, the siren, strobe, speaker and auxiliary current should not exceed 500 mA**

Telephone Connections

Single Line Telephone Connection

Connect the incoming telephone line to the TEL IN Terminal Block. Connect the telephone wires going to the house phone(s) to the TEL OUT Terminal Block. The system will work with any tone-dialling telephone.

Telephones, facsimile machines and other telecommunications equipment may be connected to the Telephone OUT socket.

- ☎ **Do not connect any other equipment between the incoming telephone line and the control panel. Also, do not connect any other telephone equipment including fax machines and PABX in parallel with the control panel. Violating the above conditions may prevent the control panel from seizing the telephone line to dial out during an alarm condition.**
- ☎ **For New Zealand installations, use a Telecoms-approved line cord**

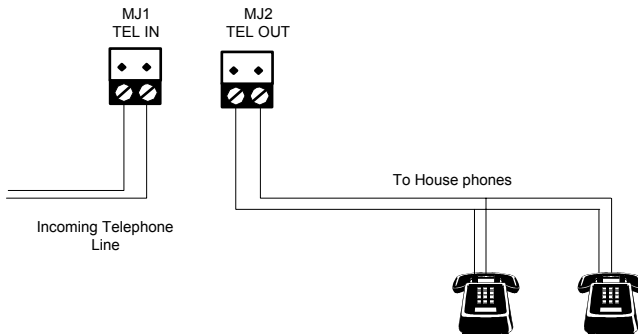
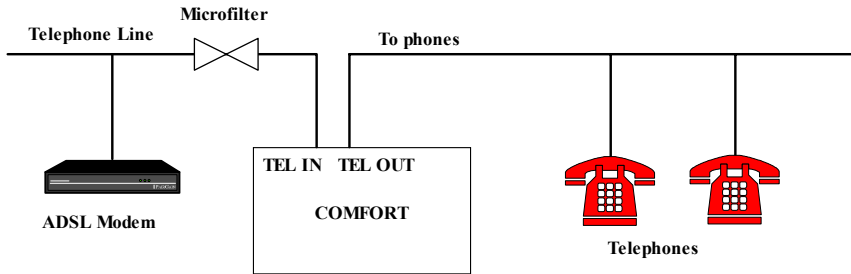


Figure 2.7 - Single Line Telephone Connection

ADSL Connection

An ADSL modem on the same telephone line as Comfort should be connected before Comfort on the TEL IN connection as shown in the diagram below;



A microfilter must be connected between the ADSL modem and Comfort. Comfort is connected to the "Telephone" end of the microfilter. It will not necessary to use microfilters for the other telephones in the house. The telephones should be connected to Comfort TEL OUT, and NOT to the ADSL modem. This will ensure that Comfort can still dial to the programmed telephones in case of an alarm.

Parallel Phone Connections

If it is not possible to run the incoming telephone line directly to the TEL IN terminals, it is possible to connect TEL In parallel with other phones with IGNORE LINE CUT setting. See Worksheet Table 35 under "Ignore Line Cut" setting

- ☎ This method of connection is not for UL installations or monitored systems, and is only applicable to Home Automation-only installations**

Connection to Keyphone and PABX systems

A key telephone system may be to the TEL OUT socket. To access the system with a key telephone, press the button which selects the incoming line to which the system is connected, and press *, sign-in code and # in the usual way. The system cannot be connected as an extension of a key telephone system. Remote telephone access can be achieved by dialing into the exchange line to which the system is connected.

A PABX may be connected to the TEL OUT socket. A telephone may be connected in parallel to the PABX, to be used for local system access. Remote telephone access can be achieved by dialing into the exchange line to which the system is connected. See Figure 2.8 for connection

- ☎ With this method of connection, the extension phone will not be able to access the system if the CO line for Comfort is in use. Also, for remote access, the user must dial the precise number and not the hunting line to ensure that Comfort can receive the call.**

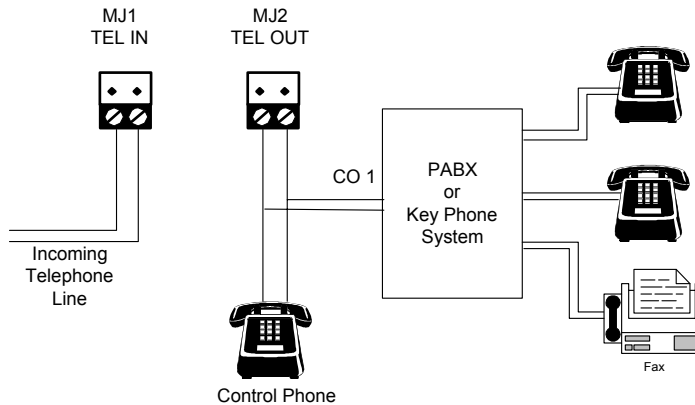


Figure 2.8 - Connection before PABX/Keyphone System

Connection to extension of PABX (Not for UL installations)

It is also possible to connect the system as an (analogue) extension of a PABX, for non-monitored systems. A normal telephone may be connected to the TEL OUT socket for system access and for use as a normal extension phone. In this connection method, Comfort can take messages from any of the incoming CO lines if the extension is programmed to ring on all incoming calls.

Other extension phones can access the system by dialing the extension to which Comfort is connected.

The programmed telephone numbers for dialing out must include the access digit usually "9" or "0" to obtain an outside line.

- ⚠ The system must not be connected as an extension of a PABX system for UL-approved or monitored installations, as it may not be possible to seize the telephone line to dial out during an alarm. Also it would not be possible to detect telephone line cut on the incoming exchange lines.**

Zone Input Terminals Z1-Z8 (JP3 - JP6)

All wiring shall be in accordance with the National Electrical Code ANSI/NFPA 70-1990.

Each zone may be wired as Normally Closed (NC) or Normally Open (NO). Any unused zones should be programmed as Zone Type 0 with the zone inputs left open and corresponding zone header (JZ1 to JZ8) with a shunt (shorting link) in the position closer to the terminal blocks for No End Of Line resistor

- ⚠ Normally Open and Normally Closed contacts cannot be connected to the same zone.**

Circuits without EOL Resistor

This is applicable for UL Grade B Household Burglar Alarm Systems units

Wire zones according to Figure 2.9 for Normally Closed Contacts and Figure 2.10 for Normally Open Contacts.

The corresponding 3-pin header for the zone, JZ1 to JZ8 (for zone Z1 to Z8) should have a shunt (shorting link) inserted nearest the terminal block (2 to 3) when no EOL Resistor is used

In this configuration, the system does not differentiate between contact open and open circuit wiring (tamper) condition, or contact closed and short-circuit wiring (fault) condition. The Zone Settings in the Engineer menu determine if the contact is Normally Closed (N.C.) or Normally Open (N.O.). N.O. and N.C contacts cannot be connected on a single zone.

Do not use this for UL985 Fire detection zones

To provide a **global tamper** protection for these types of zone configuration, assign one zone as a 'tamper' zone type 20 and connect all zone wiring tampers in series connected to this tamper zone.

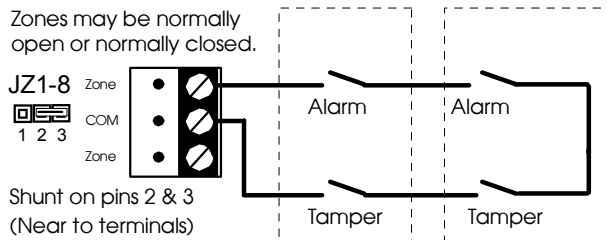


Figure 2.9 - Normally Closed Contacts without EOL Resistor

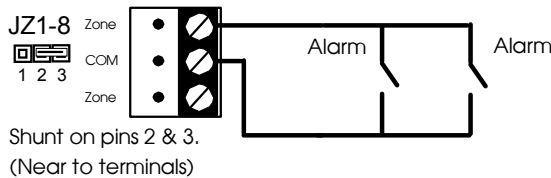


Figure 2.10 - Normally Open Contacts without EOL Resistor

Circuits with 2 EOL Resistors

This is applicable for UL Grade A Household Burglar Alarm System units.

Wire zones according to Figure 2.11 for N.O and N.C contacts. The Zone Settings in the Engineer menu determine if the contact is Normally Closed (N.C.) or Normally Open (N.O). N.O. and N.C contacts cannot be connected on a single zone.

- The corresponding header for the zone, JZ1 to JZ8 (for zone Z1 to Z8) should have a shunt (shorting link) inserted in the top position.**

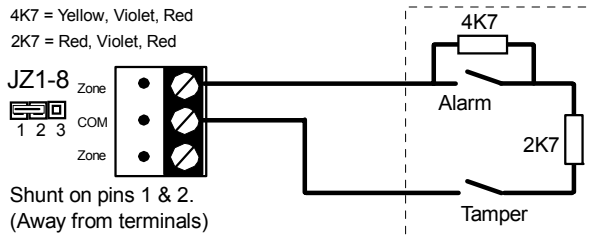


Figure 2.11 - N.C or N.O contact with 2 EOL Resistors

The 2 EOL resistors should be connected at the contact and not at the control panel. With 2 EOL resistors connected in this way, the system is able to distinguish open and closed contacts from open circuit and short circuit wiring for full supervision of the zone contacts. Any short or open circuit fault will trigger a Zone Trouble Alarm which can be reported to the programmed phone numbers. The table below shows the expected values of circuit resistance for open and close conditions

Status	Zone Resistance (Ohms)
Closed	2 K 7
Open	7 K 4

4-wire Smoke Detectors

Smoke Detectors are connected as Normally Open (NO) or Normally Closed (N.C) zones with 2 EOL resistors. Follow the wiring diagram in Figure 2.12 for UL Installations. The 4700 ohm resistor should be connected in parallel with the last contact. The 2700 ohm resistor should be connected in series with the detector at the detector in order to be able to distinguish a ground fault (short-circuit) condition from a contact closed condition. The corresponding Header JZ1 to JZ8 should have a shunt (shorting link) inserted into the top position. Smoke and Heat Detector zones are programmed as Fire Zone Types. A Pulsed On/off siren pattern indicating Fire Evacuation is produced when this zone type is activated (by default). If the zone wiring is cut or open-circuit or shorted, a Zone Trouble alarm is generated.

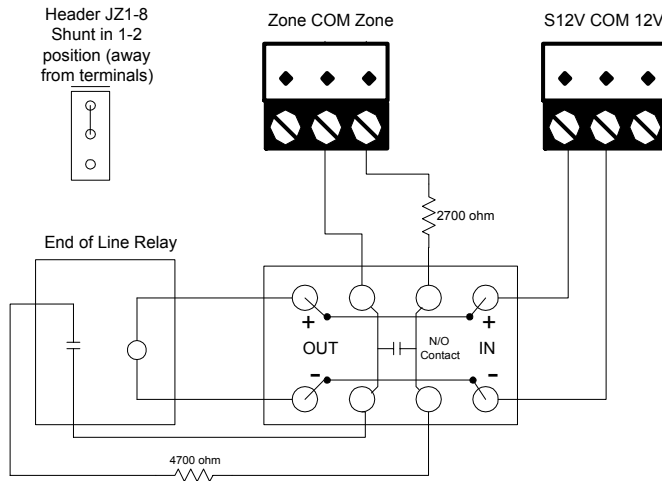


Figure 2.12 - 4 Wire Smoke Detectors for UL Installations

- 🔊 For UL985 installations, it is mandatory to program an automatic Battery Test every 4 hours.**

Connection of Multiple Detectors to a zone

The system has the unique ability to announce the type of the activated zone during Security Check (during arming) , alarm history, alarm tracking, and event log. So if more than one detector is connected to a zone input, it should ideally be of the same type and in the same location, for example, magnetic contacts for several windows in the same room. The following diagram shows magnetic contacts, PIRs or Shock detectors in series on the same zone. Note how the 4K7 resistor is in parallel to the whole chain of contacts and the 2K7 resistor is in series with it. If the Tamper connector of the detectors is used, it should be connected as shown below, so that if any Tamper contact is open, it causes the whole circuit to be open.

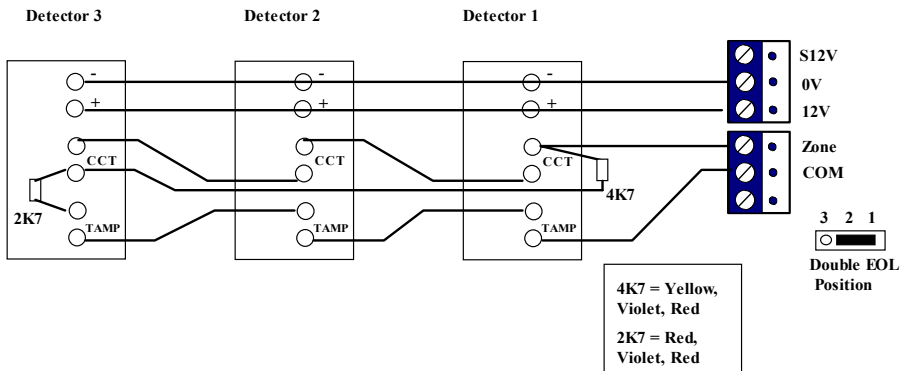


Figure 2.12A - Multiple Contacts on one zone with EOL Resistors

Some shock detectors can latch their LED on following an alarm for identification. To make the most of this feature, the S12V can be used to supply 12V instead of the 12V terminal. Comfort can be programmed to interrupt the supply and reset the detectors upon re-arming of the system.

Do not mix Fire Detectors with Burglary Detectors under the same zone.

Tamper Input (J4)

A tamper switch may be connected to the TAMPER input (2 pin Terminal J4). If not used, short the J4 terminal block with a wire. This terminal may be connected to an external tamper switch of a bell box as well as to the tamper switch of the control panel enclosure as in the figure below. The tamper switches may be connected in series as shown below. The Alarm type activated when the circuit is broken is Tamper (Alarm type 11).

Alternatively, any zone may be programmed as a Tamper zone type.

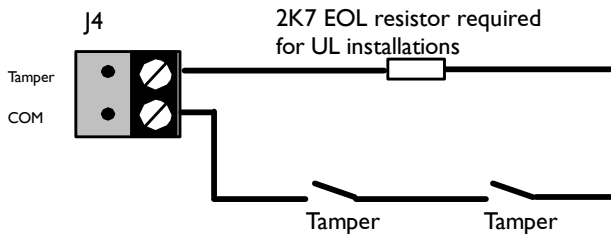


Figure 2.13 Tamper Input connection

Negative Applied Detectors

Certain types of detector such as outside PIR's and photocells provide an open-collector output as a trigger rather than a relay output. This type of signal can be connected directly into a zone terminal providing it is a negative signal in one state and 'floating' in the other state. If the signal goes negative when detecting, use a normally-open zone type such as Type '8' (normally-open switch). This is suitable for light sensors or external non-alarming detectors which may be used as monitors to drive Responses for lighting and CCTV applications.

The negative signal should be applied to non-eol zone where the trigger wire connects just to one side of the zone, provided the detector has a 12v supply derived from the panel acting as a reference.

If tamper protection is required on the zone, three wires will be required and the zone jumper should be removed from the header. A single 2K7 resistor should be fitted in series with two of the wires at the detector. The detector's negative trigger should then connect to the side of the resistor and wire which returns to the zone terminal and NOT to the wire that returns to the zone COM terminal, which is already at 0V .

'GJD XL or Opal' detectors have both -ve alarm trigger outputs *and* a built-in photocell -ve output. Comfort 'default ' uses zone 13 for a light sensor.

Output Terminals OP1 - OP8 (JP11-JP14)

Each of the 8 outputs may be connected to infrared LEDs, indicator LEDs or external relays. Each output is an open-collector transistor output (pull to ground) capable of supplying 200 mA, but total current from these outputs together with the switched (S12V) and unswitched auxiliary power (12V) terminals should not exceed 500 mA, and protected by a resettable fuse (F2). If higher current is required, an external supply may be used instead of the 12V terminals. (see Supplementary Power Supplies)

⚠ For UL installations, the total current from Alarm output terminals, outputs and aux power should not exceed 500 mA

Connection to External Relays

Connect external relays for appliance according to Figure 2.14. External relays should be connected between the 12V terminal and the output terminal. They should be located near to the enclosure.

⚠ Not for UL Installations

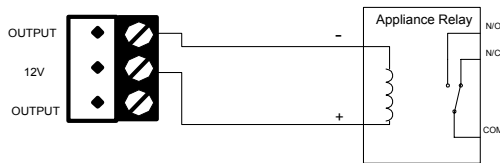


Figure 2.14 - Output Connection to a Relay

Two Way Light switching with Comfort

To allow the user to also manually control the light, use a 2 way switch and a current sensor (CSM01) , as shown in the figure below. The current sensor detects the presence of an AC current through a Mains wire passing through its coil. The current sensor contacts are connected to an input. Worksheet Table 26 gives the Locations to enter the Input numbers providing feedback for each Control Key. When configured in this way, the Home Control menu will announce the state of the appliance (on, off, open, closed). The Two way Switch Control Module (TWS01) is available as a PCB module.

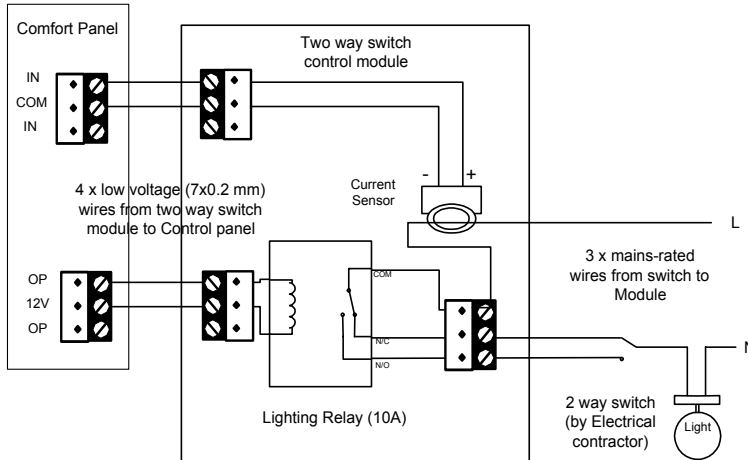


Figure 2.15 - Two way Switching for Lighting Control

Not for UL Installations

Current Sensor Operation

The insulated "Live" mains wire goes through the loop of the current sensor. **Do not put both L and N wires through the sensor.** The Current sensor consists of a current transformer CSM03-CT and a current sensor module CSM03-PCB which is plugged into two adjacent zone inputs in Comfort. When there is AC current flowing through the mains wire, The current transformer senses the AC current flowing in the mains wire and the CSM-PCB gives a closed contact status on its output open collector, which is connected to one of the zones designated for feedback. CSM03-PCB can be connected to two CSM03-CT current transformers. Compared to using a relay, this method has the advantage of not having any contact with the mains voltage. The sensitivity of the current sensor is 100 mA rms. If the appliance being controlled takes less than 100 mA, put two or more turns of the Mains L wire through the current sensor. Using a current sensor connected to an

Input allows the Home Control menu to announce whether the appliance is actually ON or OFF. The input number connected to the current sensor is programmed in the "Feedback Input" field in Worksheet Table 26 for each Control Key.

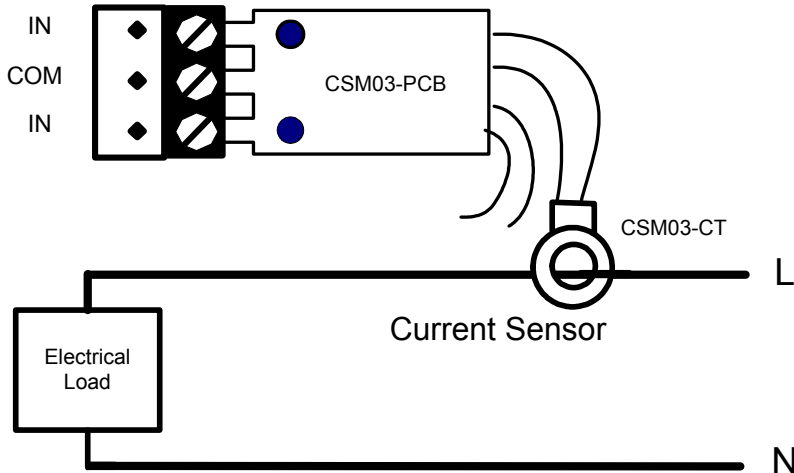


Figure 2.16 Using Current Sensor for Feedback

Connection to Infrared LEDs

There are 3 types of IR transmitter modules which can be connected to the outputs; IRM01 for longer distances (up to 8 meters range), IR01W or IR02W for short range transmissions (up to 1 meter range)

IRM01 is meant for transmitting infrared signals across a room to one or more receivers. It has built-in series resistance and series resettable fuse to protect the infrared led from damage.

IR01W and IR02W are meant for short range infrared transmissions, up to 1 meter only. IR01W has a round IR transmitter led and IR02W has a flat IR transmitter led.

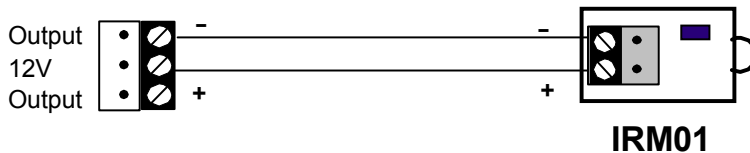


Figure 2.17 - Output Connection to Infrared LED

Note that indicator and infrared LEDs have polarity and should be connected in the right terminal.

Using Lamps for Output Testing

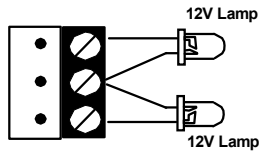


Figure 2.18- Output Connection to Test Lamps

A valuable tool for testing output programming are 12V lamps connected to the Output terminal Blocks. Unlike LEDs, these lamps do not have polarity, and can be connected directly to the Output terminals without the need for a series resistor. These lamps take around 80 mA current so they impose a real load on the outputs, similar to relays.

12V Auxiliary Supply Outputs (12V and S12V)

12V and GND supply 12V to devices which require power e.g.. motion detectors. The S12V terminal provides 12V to external devices which require resetting when activated, e.g.. smoke detectors.

Prior to firmware 4.101, S12V is automatically turned off for 5 seconds when the system is disarmed. For firmware 4.101 and above, S12V does not turn off automatically when disarmed. Action 90 must be used to turn off S12V when needed, either when the system is disarmed or when the system is being armed. Latched Smoke detectors and Shock detectors need to be reset when the system is being armed. This can be done by specifying a Response number in Location 1850 (from firmware 4.88)

Total continuous current from these and the Output 12V terminals should not exceed 1 A. These terminals are current limited by resettable fuses.

- ⚠ Do not connect PIRs set as 24 hour zones to the S12V supply.**
- ⚠ For UL installations, the total current from Alarm output terminals, outputs and 12v terminals should not exceed 500 mA**

Using 12V Supplementary Supplies

Larger installations that place additional current demands will require the installation of one or more supplementary power supplies. As a guide, if the normal standby (quiescent) current of your system is greater than 850mA, then an additional 12V DC power supply should be installed. Ensure that the 0V ground of Comfort Main Auxiliary is connected to the 0V of all supplementary 12V Power supplies. +12V should NOT be commoned.

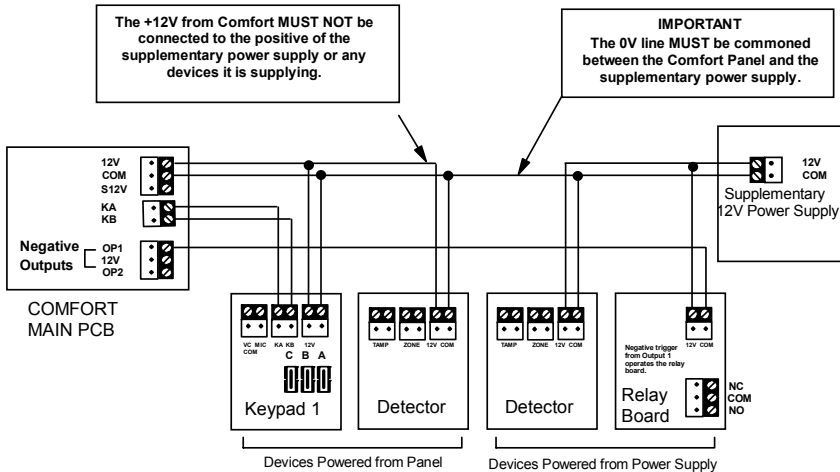


Figure 2.19 Connecting a 12V Supplementary Supply

Measuring System Quiescent Current

The battery must remain in circuit when taking this reading and all detection devices, Keypads, Door Phones and other devices requiring power **MUST** be powered by the system while in 'Security Off' Mode and free from wiring faults.

This is measured by placing a digital meter set to current range of 2 Amps or more in series with the 'Red' back-up battery lead using insulated crocodile clips. Now, remove the mains supply to the panel for a few seconds and note the meter reading. If it is 850mA or above then an additional power supply should be fitted.

Resettable Fuses

The auxiliary and battery supplies are protected by two positive temperature coefficient (PTC) resettable fuses of 1A and 2.5A respectively. If either rated maximum current is exceeded then the DC supply will be interrupted until the fault is removed. This type of protection is slower acting than a conventional fuse taking between 0 and 30 seconds to act depending on the severity of the overload. The voltage is restored once the fault is removed and the fuses cool down, which can take a few seconds.

X10 Connection (MJ3)

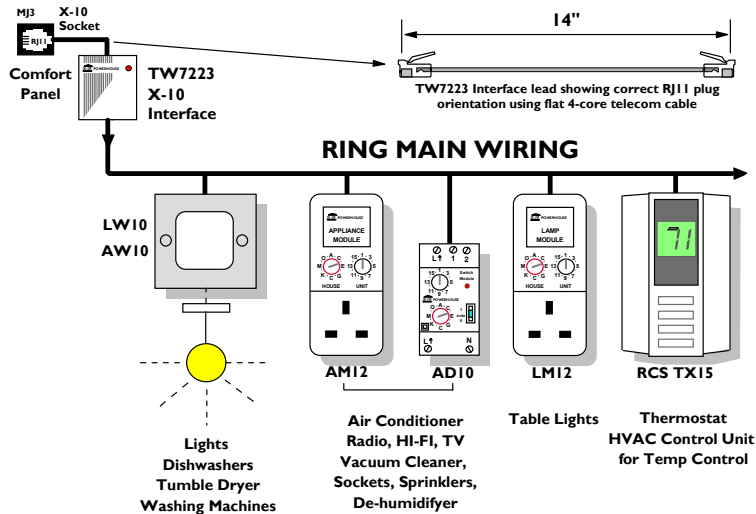


Figure 2.20- X10 Connection

The PSC05/TW7223/TW523 X10 interface is connected via a 4 way telephone cord to the MJ3 RJ11 jack on the Comfort panel. This X-10 interface receives signals from Comfort and converts the code into commands which can be sent along the AC mains wiring to X-10 compatible devices around the property.

A one-to-one 4 way telephone wire would be used to connect the X10 interface to the MJ3 RJ11 jack on the Comfort panel. Once power is applied the red LED on the interface should light. Whenever an X-10 command is sent from Comfort, the red LED will go off briefly. This can be a good indication when tracing for the cause of a problem.

X-10 commands are included in Comfort's Response Library.

- 🔊 **This unit will only operate X10 Modules on the same Phase as the X10 Interface, unless an X10 Phase Coupler is used**

Mains Supply

It is always advisable to check a property for the ability to transmit X-10 signals reliably around the electrical ring-main using the UR24/TM12U before specifying the use of X-10. Some buildings with noisy mains supplies or appliances can produce a masking effect to X-10 signals, also X-10 signals can attenuate over distance. Generally, it is better to make sure that your Comfort CPU is supplied by the same consumer unit/ring-main and same-phase which your X-10 modules are working on although you can use X-10 on 3-phase installations with phase couplers to take X-10 signals across from one phase to the next using two FD10 modules.

- 🔊 **The PSC04/PSC05 X10 interface must be plugged into a mains socket in the same room as the Comfort Panel. This feature has not been evaluated by Underwriters Laboratories.**

Local Expansion Modules

There are three types of Local Expansion Modules:

The LEM01 has 8 inputs and 8 outputs.

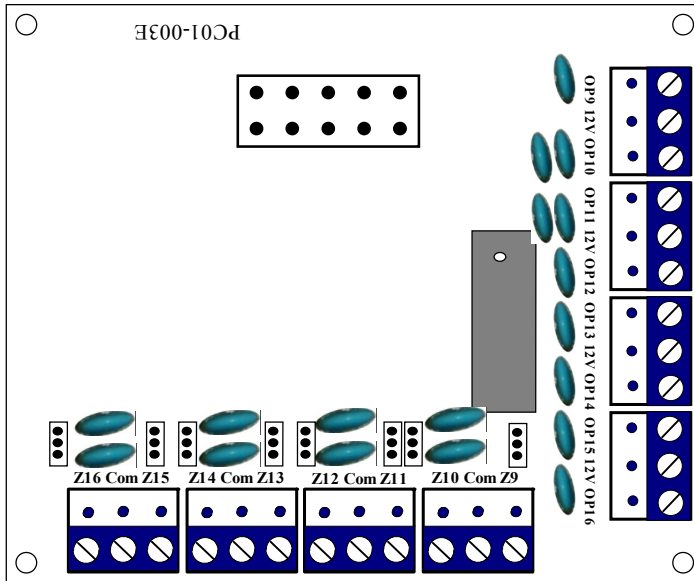


Figure 2.21 - LEM01

The LEM02 has 8 inputs with no outputs.

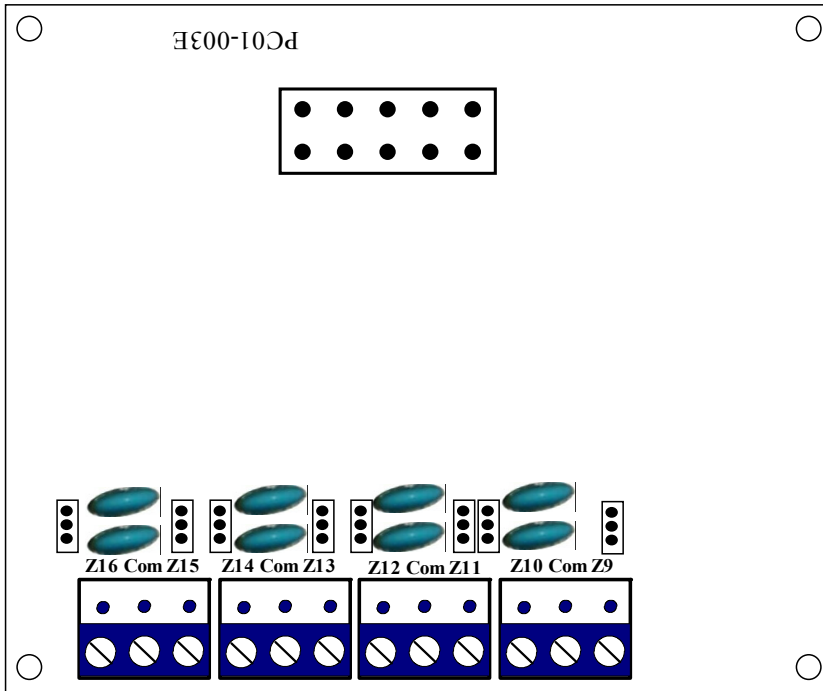


Figure 2.22 - LEM02

The LEM03 has 16 inputs and no outputs.

To enable the LEM03 16-zone board, go to Configuration > Modules & Settings and check the box for LEM03 (24 zone). This can also be done in Engineer Menu Location 40 (Table 35). If the LEM03 is used with the Comfort main panel, the system will have 24 Inputs and 8 outputs which cannot be expanded further. The LEM03 cannot be connected to a Slave Expansion Module SEM01 or SEM02.

The Local expansion modules are connected locally to the Comfort main panel or Slave expansion Panels (LEM03 cannot be connected to a Slave Expansion) via a short 10-way ribbon cable to socket J5. The board is mounted within the main panel using the four fixing posts and screws provided.

RGR03 Ringer

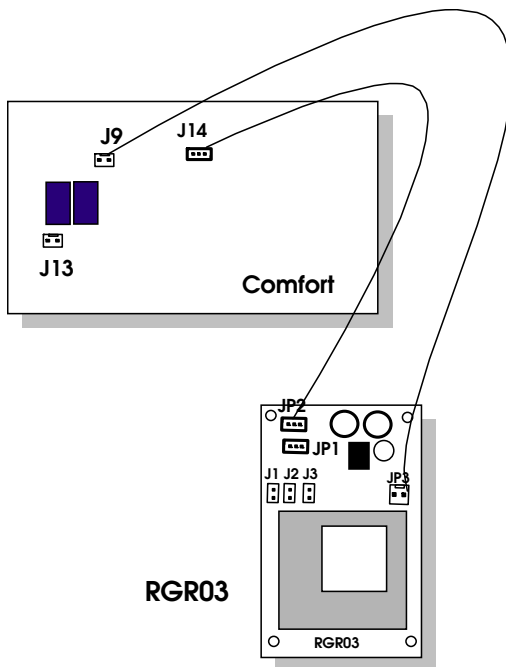
The RGR03 Ringer Module has two functions:

- 1 It rings the local phone whenever the Door Station doorbell button is pressed
- 2 It rings the local phone whenever a reminder message is played.

It is not strictly essential as the keypads will also chime when the doorbell or reminder message operates. However, it is very useful in the yard or garden or even in the bathtub when a visitor is at the gate or Door Station , as you can answer the doorbell using a cordless phone.

The older RGR01 and RGR02 Ringer Modules have been phased out as they may not be able to ring the newer DECT (Digital Enhanced Cordless Telephone) cordless phones. RGR03 is also able to ring more phones connected in parallel.

Comfort to RGR03 Connections



RGR03	Comfort	Cable Type
JP1/JP2	J14	Red/Black/yellow stripe 3-way lead
JP3	J9	White 2-way lead

On RGR03 JP1 and JP3 are in parallel - either may be used

RGR03 Jumper Settings

J1	J2	Freq	
Open	Closed	16.7	
Open	Open	20hz	
Closed	Open	25hz	
Closed	Closed	50hz	Default

J3	Amplitude	
Open	Open - 75 VRMS	
Closed	Closed 50 VRMS	Default

The jumper settings allow ringing characteristics to be set corresponding to requirements of different countries.

RGR02 Isolator (For Australia Only)

Functions of RGR02

The RGR02 module provides the voltage to supply the local phone connected to Comfort's TELEPHONE OUT connector for local phone control of Comfort. RGR02 is required for this purpose in Australia only. Without RGR02, the local telephones will not be able to control Comfort by pressing *, the user code and # key.

RGR02 may also be used to ring the local telephones when the DP01 doorbell is pressed, and when a timed Reminder message is activated. However RGR02 may only be able to ring 1 or 2 phones connected to TEL OUT, and may NOT work with newer DECT (Digital Enhanced Cordless Telephones). Hence for ringing functions, it is recommended to add a RGR03 Universal Ringer Module.

Every system installed in Australia must have an RGR02 connected to it to be able to comply with Australian Communication Authority (ACA) requirements.

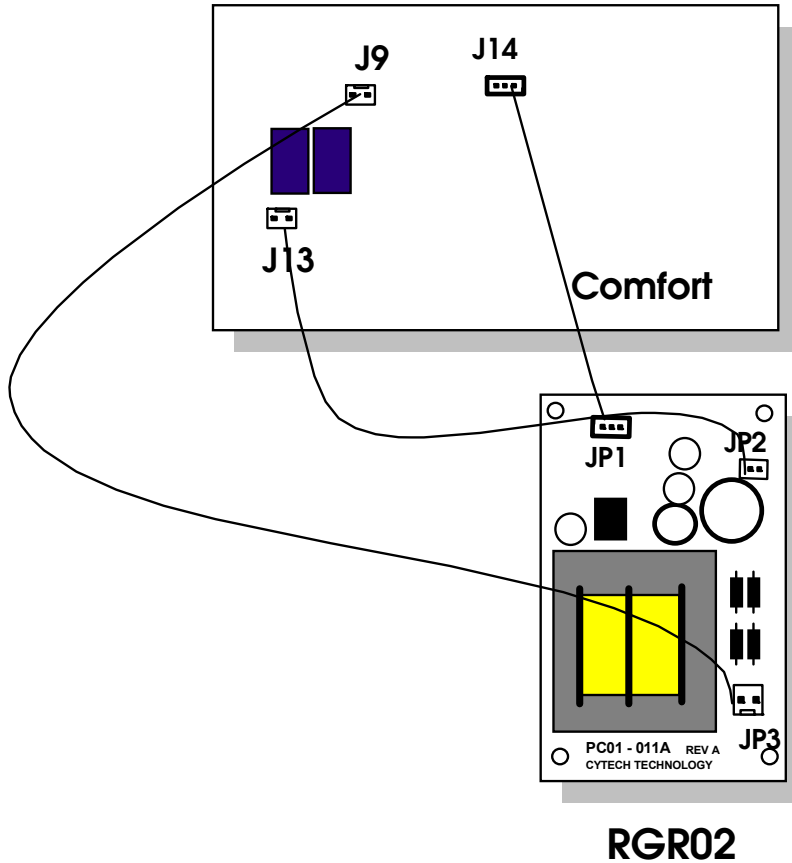
Note: The Ringer Module is NOT required for dial-out operations.

RGR02 Connectors

- JP2 - Telephone Voltage supply
- JP3 - Ringer Wire
- JP1 - Power supply from Comfort

These 3 headers must be connected to Comfort using the supplied cables.

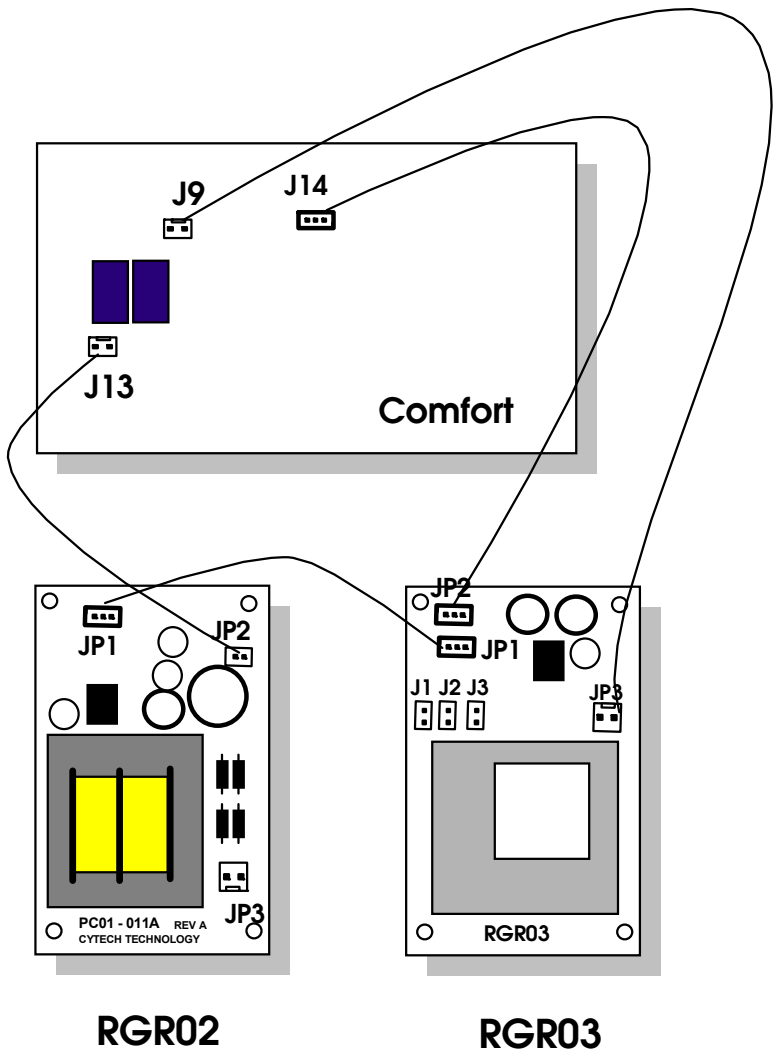
Comfort to RGR02 Connections (Australia Only)



This diagram shows the connections when the RGR03 Ringer is not used. RGR02 provides ringing voltage.

RGR02	Comfort
JP1	J14
JP2	J13
JP3	J9

Comfort to RGR02 and RGR03 (Australia Only)



This diagram shows the connections when the RGR03 Ringer is used together with RGR02. RGR03 provides ringing voltage.

RGR02	Comfort	RGR03
JP1		JP1/JP2
JP2	J13	
	J9	JP3
	J14	JP1/JP2

JP3 on RGR02 is not connected in this case.

RGR02 Setting in Configurator

In Configurator > Configuration > Modules & Settings, check the RGR02 box. This sets the ringing frequency for RGR02 if it is being used as a ringer. If you are using RGR03 as ringer, then this setting is ignored.

RGR03 Jumper Settings

J1	J2	Freq	Amplitude - J3
Open	Closed	16.7	Open - 75 VRMS
Open	Open	20hz	Closed 50 VRMS
Closed	Open	25hz	
Closed	Closed	50hz	Default is in italics

Quick Start Power-On Checklist

- 1 Connect the Keypads and Door Station to the Comfort panel using wires KA/KB, 12V/Ground, and Mic/Voice pairs. Set the ID jumpers for each Keypad and Door Station are set correctly.
- 2 In Configurator, load the default template (File > New), set the number of Keypads and Door Stations according to the number of each that has been installed. It is not necessary to have completed programming the entire configuration before turning on power for this quick test.
- 3 Measure and log the functional resistance of each detection circuit.
- 4 Terminate all zone wiring into the respective Zone Terminal Blocks on the Main board or Local Expansion Module (LEM) and label accordingly. Connect detector 12V supplies to the auxiliary 12V output terminal block.
- 5 Check all zone jumpers are in the double EOL (1-2 away from terminal blocks) or no EOL positions (2-3 closer to the terminal blocks).
- 6 Apply mains power without the battery. Observe the red and green LEDs on the main board while the system is going through its self-testing cycle. Both LEDs should turn on when power is first applied. After a second, the red led should turn off. After around 5 seconds, the green led which was on should go off for a second and turn on again. This indicates that the Voice system and the U4 NVM has been checked and is the correct version. If things go wrong here, refer to the section on "Troubleshooting".
- 7 The Keypads should announce "Security Off".
- 8 Enter *1234# on each Keypad. The User Voice Menu should be heard. End by pressing the F (Function) key, and go on to the next Keypad.
- 9 If there is a Door Station, press the Doorbell button. The doorbell chime should be heard on the Keypads. Press any key on any Keypad and "Press 1 for Door Station" to talk to the Door Station. Only the Keypad or Door Station can talk at any one time, with the Keypad controlling the direction of the conversation. Press 1 to alternate between listen and talk.

- 10 Press the Night Mode one-touch key (with the Moon Icon) on any Keypad. After a few seconds the Keypads should announce "Night Mode". The Red LED should come on and the Green LED go off on the Keypad.
- 11 Exit from the Keypad menu by pressing F. Test the local phone operation by lifting the handset or press Handsfree button, press within 4 seconds, + code + #. You should hear the Voice Menu. Press some keys to go into various menus to verify that the local phone access is working. If you cannot get into the Voice Menu, see the "Troubleshooting" Section.
- 12 The system is ready for programming, If you cannot get to this point, refer to the section on "Troubleshooting" for ideas on what may have gone wrong. To program using Comfigurator software, refer to "Programming with Comfigurator". For programming by Engineer Menu using keypad or telephone refer to "Engineer Menu Programming". Programming using Comfigurator is highly recommended except for very simple configurations.

SECTION 3 TESTING AND COMMISSIONING

Installation of Comfort and programming using the worksheet and/or Configurator software should have been completed. The following steps divided into sections will help you to successfully test and commission a Comfort system. If any of the steps do not have the intended result, refer to the next section on troubleshooting.

Security/ Zones

- 1 Go into the Test Menu (Engineer Menu 8 or User Menu 3,4), or Keypad F+3.
- 2 Activate the Security Check menu and do a walk test. Activate every detector and ensure that the zone is announced on the Keypad. Detectors will not cause alarms during this test. Press any key on the Keypad to end this test mode. There is no time-out for Security Check, so remember to turn it off. If a 24 hour zone like tamper was activated during Security check, it will cause an alarm upon getting out of Security Check.
- 3 If home appliances have current sensors connected to the zone inputs for feedback status, activate these appliances and listen for the programmed words.
- 4 Activate the Siren Test. The speaker and siren are activated for a few seconds.
- 5 If a Strobe Light is connected, activate the Strobe Test. Ensure that the strobe is switched on and off as directed.
- 6 Arm the security system to away mode. Check that the system arming procedure is completed once the entry door is opened and closed. Any programmed Away Mode response should be activated (eg turn off all lights).
- 7 Open the Entry Door. The Speaker and Keypad should give a slow beeping tone, and any programmed Entry Alert Response should be activated. Entry path zones should be announced but not cause an alarm. Sign in to disarm to Security Off.

Dialout/ Telephone Numbers

- 1 Program the telephone numbers for dialout, and activate the dial test using Keypad F+3,3. The dial test is audible on the Keypad. The dialed digits, busy and ringback tones, as well as pager tones, Monitoring Station handshake and kissoff tones are audible. Ensure that the dial outs are successful. If a cellular phone is programmed, check that it can sign in and access the system. Note that a Central Station Kissoff or a Voice phone sign-in will stop further dialouts to the group of telephones which it is in, i.e. Phones 1,2 or 3 to 8. If the system is unable to dial out successfully, see the next section on troubleshooting.
- 2 Arm the system and trigger an alarm. Ensure that the siren and strobe turns on, and that the system dials to the programmed numbers. When the system dials to a Voice phone, check that the alarm voice menu is heard, and do alarm history, alarm tracking, and disarm.

- 3 Disconnect the Tamper input. A tamper alarm should be generated. (24 hour alarm). Reconnect the tamper input and disarm to turn off the alarm.

Home Control Menu

- 1 Activate the programmed home control menus to control the programmed appliances.
- 2 Check that the feedback status is announced on the Control Menu, if programmed for feedback.

Answering Machine

- 1 Record a memo using F+4. End the recording by pressing any key. The Message LED should come on steady to show that there is a new memo message. Sign in to hear the new message. If the message is distorted, reduce the recording volume by adjusting the VR1 trimmer on the Comfort panel near the Voice/MIC terminal block. Messages recorded on the Keypad will not be as clear as recordings from the telephone, because of background noise.
- 2 Dial in from another phone to record a message on the answering machine. The recording should end automatically when silence is detected for around 10 seconds.
- 3 Sign on the keypad to listen to the recorded message. Check that the message is sufficiently loud. If the message is too soft or if Comfort cuts off the recording before it is finished, the recording level may be set too low. The recording level can be adjusted in Configurator via Configuration > Voice Settings > Record Level. The slider should normally be set to maximum value of 3 (from Version 4.121). The valid values are 0 to 3 with 3 being the maximum value and the default. Any value higher than 3 will be treated as 3 (maximum) Reset is not required. This setting does not affect keypad recording level (which is set by the VR1 trimmer).

Local Phone Access

- 1 Use the local phone to sign in by pressing * code #. Each key pressed should be followed by a short beep tone to indicate that it has been recognized. The voice menu should be heard, and the DTMF keys should be able to select the various menus.

Remote Phone Access

- 1 Dial into the system. Ensure that the system answers the call after the designated number of rings. Ensure that the system recognizes the DTMF keys, which should be able to select the various menus. Each key pressed should be followed by a beep tone to show that the key has been recognized.

Voice Station

- 1 If there are more than 1 Keypad, press F+8 to activate Intercom mode. All other Keypads should hear voice from the originating Keypad. Any keypress on another Keypad will shut off other Keypads and allow that Keypad to talk with the originator. Any Keypad can talk by pressing and releasing any key. Press F to end.
- 2 Using the local phone, sign in and press 5 for Voice Station to do two way communication with the Keypad. You should be able to hear sounds on the Keypad. When you talk, you should be heard on the Keypad. The conversation is half-duplex, i.e. only one side can talk or be heard at a time.
- 3 **Ensure that header J20 is shunted and J21 (3 pin header) has a shunt on positions 1-2 (default) or 2-3.**
- 4 Trimmer VR2 below the LEM connector and to the right of the U1 IC is for adjustment of echo cancellation to compensate for the telephone line characteristics, which depends on how far your premises is from the telephone exchange or Central Office (CO). This trimmer is adjusted to the optimum position at the factory. Do not attempt to adjust it without instructions from the manufacturer.
- 5 Location 1700 sets the gain level of the telephone line to keypad speaker with allowable values 0 to 3 (maximum). The default value for this is 2. Any value higher than 3 is taken to be 3 (maximum). Reset is not required.

Door Station

- 1 If there is a Door Station, pressing the button when Security is OFF should cause the Keypad to give a door chime tone. Use the local telephone to answer and talk with the Door Station. Check that both sides can be heard clearly. If a Response has been programmed into Location 52, press 7 to open the door or gate.
- 2 The Keypad can also be used to talk to the Door Station. Only 1 side can talk at a time. The Keypad controls the direction of the conversation, by pressing 1 to alternate talk and listen modes.
- 3 Program Alarm Type 25 to dial to a mobile phone Arm to Away Mode, and press the Doorbell. The system should call to the mobile and allow it to talk to the Door Station.

Remember to set Time and Date

Before leaving, remember to set the Time and Date, using Program Menu 2. When downloading from Configurator, there is an option to set Date and Time from the PC Real time clock.

SECTION 4 TROUBLESHOOTING

It is our experience that 80 to 90% of the problems typically encountered are described here and can be solved according to the instructions give here. It is advisable to carry this guide around whenever going on site for installation, testing & commissioning, or troubleshooting.

Troubleshooting Kit

When installing Comfort or attending to problems on site, it is advisable to have the following tools in the tool kit:

- 1 Multimeter for checking continuity and resistance.
- 2 A hands free telephone for checking telephone voice menu operation
- 3 12V Test lamps for checking outputs
- 4 Default programmed U4 Nonvolatile Memory (NVM) chips, in case certain settings have been corrupted or wrongly programmed.
- 5 Infrared LED with resistor wired up a long cable and terminated in terminal block. This can be connected directly to the output check transmission of Infrared signals to remote-controlled appliances

Red/Green LEDs Initialization Sequence Wrong

When power is first applied or the Reset button is pressed, the system goes through a self-test sequence. Observe the red and green leds on the Comfort panel (not the Keypads). The correct sequence should be:

- 1 Both Leds turn on
- 2 The Red LED goes off after 1 second, with the green LED remaining on
- 3 The Green LED turns off after 5 seconds and immediately comes on again
- 4 The Keypads announce "Security Off"

If the above sequence does not happen, check the following:

The Red and Green Leds do not come on after Power Up

There may be a problem with the U1 Chip. Replacing U1 may fix the problem.

The Green LED remains on after 5 seconds, i.e. does not blink

The Voice System may be faulty or the Voice Chip U7 may not be programmed correctly. Using a Voice Programmer Board to program U7 may fix the problem.

The Red and Green LEDS both come on after 5 seconds:

The U4 Nonvolatile memory (NVM) is the wrong version or may not be the right format. Changing the U4 to a default-programmed U4 of the correct version will clear the problem. Downloading default settings or a

valid file from CONFIGURATOR and pressing the RESET button may also fix the problem.

Keypad/ Door Station Problems

“Communications Failure”

Home LED blinks and “Communication Failure, ID ” followed by the ID number is reported upon user sign-in. This means that a Keypad or Door Station is not communicating with the Comfort panel. The ID address of the Keypad or Door Station which is not communicating is reported. This ID identifies which Keypad/Door Station is giving the problem, according to the table below:

Keypad	ID	Door Station	ID
1	65	1	49
2	66	2	50
3	67	3	51
4	68	SEM (Slave)	
5	69	1	33
6	70	2	34
7	71	3	35
8	72		

- 1 Check the wiring to the unit concerned.
- 2 If Communications Failure happens each time on Security Off, the power may have been connected to S12V. Keypad power should be connected to 12V terminals.
- 3 The problem could also be due to one of the devices on the RS485 bus (eg SEM, Keypad, Door Station, UCM) putting a fault on the bus. Remove each device from the KA/KB line and see if the communications failure problem disappears.

Keypad Beeps continuously

If a Keypad is beeping continuously, it means that it has not received any RS485 communications on the KA/KB lines for the last 6 seconds. The beeps will continue until any key is pressed or if communication resumes. The beeping does not occur if the unit can receive communications but is not addressed by the Control panel, due to settings in Locations 1674 and 1675.

- 1 Check that the KA/KB are connected to KA/KB on the Comfort panel.
- 2 Check that the U5 IC (LTC1487) on the Comfort PCB close to the KA/KB terminal block is installed, and in the right orientation.
- 3 If **all** Keypads and Door Stations beep continuously, it means that the problem lies on the Comfort panel. Check that the U5 IC s inserted in the socket, and there is voltage 12V to 14V on the 12V terminal.

Keypad keys do not beep when pressed

If the keypad keys do not give a beep tone when pressed, but there is no continuous beeping tone as described above, the keypad is receiving communications from the control panel, but its id is not being polled. If

there are 10 keys pressed without a poll of that id, further key presses will not produce beeps.

- 1 Check that the Keypad/ Door Station selection (JP5) is correctly set to 1-2 (upper position) for Keypad, and 2-3 (lower position) for Door Station.
- 2 Check that the ID selection switch SW1 is set to the correct id according to the ID selection table in Chapter 2.
- 3 Check that Location 1675 is correctly set to the number of Keypads and Location 1674 to the number of Door Stations. The Comfort system must always be reset after changing Locations 1674 or 1675
- 4 Check that the KA and KB connections are not reversed.

Pressing any key gives a long beep

This means that another keypad is being used, intercom or menu mode. Pressing F will end use of the other keypad, ("thank you, Goodbye").

Cannot Sign in on Keypad

- 1 Check that the MIC and Voice are connected to JP15 on the Control Panel. If voice is not heard, the problem is in the Audio path.
- 2 Check that the CONFIGURATOR interface is not still connected.
- 3 Check that the Keypad/Door Station ID (SW1) and Keypad/ Door Station selection (JP5) is correctly set for each Keypad and Door Station.
- 4 Check that the Volume Control knob on the Keypad (or the internal trimmer in the Door Station) is not all the way down.
- 5 Check that all other Keypads are not in use, for example in Security Check which does not time out. Press F on the active Keypad to exit.

None of the Indicator LEDs on the Keypad are on

At least one LED should always be on steady or blinking.

- 1 Check that the 12V and Ground are connected to the corresponding terminals on the Comfort panel, and the wires are not reversed.
- 2 Use a multimeter to check that 12V is actually coming to the Keypad

Playback of Recording from the Keypad is Distorted

Usually, this is because the Microphone trimmer is set to too high a gain. Reduce the gain by tuning the MIC trimmer VR1 lower (clockwise) on the Control panel.

Doorbell Chime is too loud or long

Adjust trimmer VR1A on the Door Station for lower volume of voice and chime. Be careful that it does not make the voice level too soft. Also, remove the shunt from header J19 on the Comfort PCB to soften the doorbell chime. However, this also softens the siren tones on the keypads.

In older defaults, the door bell chime was set at 2 seconds for each "ding-dong" tone. To change this to ½ second for each tone follow the following table. There is no need to Reset the system in this instance.

Location	Value
415	10
417	10
482	20

Tune Parameters for Voice Station and Door Station

If the remote phone is unable to hear the Keypad or Door Station whenever there is a sound on the monitored area, there may be wrong settings in some of the Tune Parameter Locations. The following apply to Rev E boards with version 4 firmware. The 1st two columns show Tune Parameter values in the Configurator Tune Parameter screens to check, while the 2nd 2 columns show the Locations and values to check. Check either the Configurator or Locations values

Configuration		Tuning Parameters		
- General Information - Modules & Settings - Voice Settings - IR Transmit Codes - Tuning Parameters		Index	Description	Value
		31	Mic/Line Priority	0
		32	Term_COUPL_LOSS	2047
		33	SP_block	2730
		34	Mic to LINE Gain	16000
		35	Line to SPK Gain	281
		36	SP_AEC_CLIP+	16000
		37	SP_AEC_CLIP-	-16000
		38	SP_EEC_CLIP+	16000
		39	SP_EEC_CLIP-	-16000
		40	SP_AEC_ENABLE	1
		41	SP_EEC_ENABLE	1
		42	SPK_TONE_LINE_LEVEL	6
		43	AEC_VOX_HYST	-127
		44	EEC_VOX_HYST	-127

Tune Parameter	Description (Legal Values)	Default Value	Location	Value
31	Mic/Line Priority (-4 to +4 = +ve numbers favour the Mic)	0	110	0
			111	1
33	AEC Loss Threshold (0 to 16000)	2,730	114	170
			115	10
34	Mic to Line Gain (0 to 16000)	16,000	116	128
			117	62
35	Line to Speaker Gain (0 to 400)	281	118	25
			119	1
36	SP_AEC Clip + (0 to 32767)	16,000	120	128
			121	62

Tune Parameter	Description (Legal Values)	Default Value	Location	Value
37	SP_AEC Clip - (-32768 to 0)	-16,000	122	128
			123	193
38	SP_EEC Clip + (0 to 32767)	16,000	124	128
			125	62
39	SP_EEC Clip - (32768 to 0)	-16,000	126	128
			127	193

Each pair of locations controls a 16 bit value from 0 to 65535. For example Location 116 and 117 control the Gain from Microphone to the telephone line. Location 116 is the least significant byte and 117 is the most significant byte. The default values Location 116 = 128 and 117 = 62 give a combined value of $62 \times 256 + 128 = 16000$. Reset the system to effect the changes

Telephone cannot hear Voice Station or Door Station

In Voice Station or Door Station mode, if you cannot hear sounds on the keypad or Door Station even if you keep silent, (i.e. cannot switch to Listen Mode), but the KP or Door Station is able to hear the telephone, try the following steps:

- 1 Does the problem occur only for 1 unit (keypad or Door Station)? If so it is a problem with the wiring of the MIC wire from the affected Keypad or Door Station, or a faulty microphone on the unit. You can check the MIC and Speaker on all keypads by using the Keypad Intercom mode (F+8). Check that all other keypads can hear. Press a key on other keypads to put that keypad into talk mode and check that the microphone on that unit is working.
- 2 Too much background noise around the telephone can prevent the keypad or door station from being heard. Try moving to a quieter area.
- 3 If the problem still persists, try increasing the gain of the Line to Speaker circuit in Tuning Parameter 35 Line to SPK gain. Reset the Comfort system and test again. (Remote reset is possible on Engineer menu 7,4,2). **Always do a dial test after changing these locations to confirm that dialout is not affected.**

Door Station or Keypad cannot hear voice from telephone

The converse of the previous problem is the telephone voice cannot be heard on the keypad or door station, but the keypad/Door station voice can be heard on the telephone. Try the following steps:

- 1 If only 1 Keypad or Door Station is unable to hear the telephone voice, the volume control on the keypad or Door Station may be set too low. The SPK wire on the affected unit may be not connected properly, or the speaker may be faulty. A noisy environment around one of the units may also prevent the telephone from getting through.
- 2 If all the keypad/door stations are not able to hear voice coming from the telephone, check "Phone Intercom Voice Level" in Comfigurator > Voice Settings. This can also be programmed in Location 1700. This sets the gain level of the voice from the telephone to the speakers. The values range from 0 (minimum) to 3 (maximum). Any value higher than

- 3 is taken to be 3 (maximum). Reset is not required. The default level is 2. Valid from firmware Version 4.121.
- 3 Of the above does not work, the VR1 trimmer for the Microphone circuit on the Comfort PCB may be set too high. Reduce it to the minimum by turning it anti clockwise. If this solves the problem, the trimmer can be adjusted back (clockwise) for higher MIC gain if required. The VR1 trimmer should be close to the minimum (anti clockwise) in most cases.
 - 4 If the problem still persists with VR1 at the extreme anti clockwise position, increase the gain of the Line to Speaker circuit in Configurator Tune parameter 35 "Line to SPK gain" or Location 118 and 119. Check that Location 119 is set to 1 and Location 118 is set to 25 as in the above table. Increase the value in Location 118 to 250 (maximum 255) to start with, reset and test. **Always do a dial test after changing these locations to confirm that dialout is not affected.**
 - 5 Too much background noise around the keypad or Door Station may prevent the voice on the telephone from being heard on the keypad/Door Station. The MIC/LINE Priority can be reduced to a negative value. The allowable values are -4 to +4, with positive numbers giving greater priority to the Microphone and negative numbers giving greater priority to the telephone side. **DO NOT** install a Door station in a noise environment like beside busy road

Telephone hears only Noise from Keypad/Door Station

In this case, you can hear noise on the telephone from the keypad or Door Station. The keypad and Door Station will not be able to hear voice from the telephone because the telephone will always be in Listen Mode. This may happen if the wire run from the Comfort PCB to the keypad or Door station is very long or is running close to the AC mains.

- 1 Adjust the VR1 trimmer on the Comfort PCB to the minimum by turning it anti clockwise. If this solves the problem, the trimmer can be adjusted back (clockwise) for higher MIC gain if required. The VR1 trimmer should be close to the minimum (anti clockwise) in most cases.
- 2 If the problem still persists with VR1 at the extreme anti clockwise position, increase the gain of the Line to Speaker circuit using Locations 118 and 119 (Configurator Tune parameter 35). Check that Location 119 is set to 1 and Location 118 is set to 25 as in the above table. Increase the value in Location 118 to 250 (maximum 255) to start with, reset and test. **Always do a dial test after changing these locations to confirm that dialout is not affected.**

Door Station cannot Ring the Telephone

If pressing the Door station button cannot ring the local telephone, but the keypad can answer the door station, the problem could be in the Ringer Module. Check that the ringer cable from the Ringer Module to Comfort main PCB is connected correctly.

The problem could also be caused by a telephone or too many telephones connected in parallel. The Ringer cannot drive an unlimited number of telephones. See **Too many Telephone/Faulty Telephones** below.

Keypads go into Intercom Mode by themselves

If keypads go into Intercom Mode by themselves (MIC LED comes on), it could be due to a loose shunt on the JP5 header on the keypad PCB. Poor or intermittent contact on this header causes the keypad to initiate Intercom Mode, as this point is connected to the Intercom pushbutton.

Phone Problems

House Telephones do not Ring

Each telephone's ringer circuitry presents a load to a ringing signal called the Ringer Equivalence Number (REN). If the sum of the RENs of all the phones exceeds the limit, some or all of the phones may not ring. Adding Comfort to a home containing a number of phones may push the total REN beyond the limit, causing ringing problems. Removing one or more telephones may correct the situation.

No Dial Tone on Local Phones, incoming call does not ring phones

This means that the telephones are not connected to the Telephone Line. This is usually due to the telephone wiring or a fault on the incoming telephone line.

Switch off Comfort at the mains and disconnect the battery. In this condition, the telephone line is connected directly to the telephones through the normally closed contacts of a relay. If the problem persists, it is not caused by Comfort - it is caused by the telephone wiring or telephone line fault. **Do not forget to set the system Date and Time after power on**

Cannot Sign in on Local Phone

When * is pressed on the local phone **within 6 seconds** of lifting the handset, there should be a relay click on the panel. Subsequent keys should have beep tones as acknowledgment that the system has detected the key presses.

- 1 If no relay click is heard, it could mean that the Keypad is being used. Press F on the Keypads to end the Keypad operation and try again.
- 2 Use a telephone which you know does work. The customers telephone may not be compliant with telecom requirements even though it may seem to work.
- 3 Check Location 1849 which is the time in seconds allowed for * to be pressed after going offhook. This is usually set to 6 (seconds). If the value set is too low, it could prevent you from signing in. (From v4.88).
- 4 If the relay clicks when the * key is pressed, but the phone goes dead, check that the TEL IN and OUT connections have not been interchanged.
- 5 Replace the U4 on the system with one which has been programmed with default settings. If Locations relating to DTMF detection have been changed inadvertently, it may cause this problem. If the default U4 works, reprogram the U4 according to the customers settings using the Keypad or CONFIGURATOR.

- 6 We have found that in rare occasions, certain telephones may not be able to sign in locally, because they require a higher voltage to operate than other phones. These are normally not type-approved models. In such cases, another model of telephone on the premises may be able to work.
- 7 See **Too many Telephones/ Faulty Telephones above**

"Phone Trouble"

If the voice says "Phone Trouble" when the handset is lifted, it means that the phone line is cut or not working. Check the incoming telephone line connection. Comfort detects low voltage on the telephone line and supplies its own power to the local telephone so that it can still be used to operate the system. The speaker produces a beeping sound for 10 seconds to indicate the trouble condition, and the green led on the PCB flashes. The condition is cleared when the line is restored and the user signs in with their code to acknowledge. The speaker volume for the trouble beep can be adjusted using the trimmer next to the speaker terminals. During an alarm, the speaker volume is at the maximum and not affected by the trimmer adjustment. Phone Trouble is also detected if telephone equipment is connected in parallel to the TEL IN terminal and the parallel telephone is offhook. (See section on Parallel Phones below)

Parallel Phones at TEL IN

There should be no telephones or faxes connected in parallel to the incoming line to the panel, otherwise when the parallel line is used, Comfort will detect a Phone Trouble. Also the system may not be able to seize the line to dial out in the event of an alarm. There can be parallel phones connected to the TEL OUT connector. If due to existing wiring constraints, it is not possible to avoid telephones connected in parallel to TEL IN, it is possible to set "Ignore Line Cut" setting in Location 40 (See Table 35)

- ⚠ **Setting Ignore Line Cut results in a loss of security as the System is unable to dial out if the parallel phone is offhook. This cannot be used for UL systems or monitored systems, and is meant for systems concerned mainly with Home Automation only**

Telephone Relays click every 10 seconds without getting "Phone Trouble"

This symptom is probably caused by a faulty connection of the telephone line to TEL IN where one of the telephone wires is not connected.

Customer has their own Answering Machine

If the user prefers to use their own answering machine, set the number of rings much higher than their answering machine in each mode (Home, Away, Night, Vacation). This is done in User program menu 1,1. **The user can still access the Comfort system by calling, letting the phone ring exactly once, and then hanging up, and dialing again within 10 to 25 seconds. Comfort will answer the call immediately and play the Greeting message if there is one, or say "Please Sign in". This is applicable from V4.139. The "Answering Machine**

Bypass” Option must be set in Configurator -> Modules and Settings. It can also be set in Location 40 (see worksheet Table 35). From Version 4.160 onwards, Program menu 1,0 will enable or disable this setting.

Customer's Caller ID Does not work

Comfort has been tested to be compatible with Caller ID adjuncts and telephone sets. However, it is not possible to test with every Caller ID models available. The caller ID set may be connected either at the TEL IN or TEL OUT input. If there are problems,

- 1 Check that the caller ID is type-approved for the country of use.
- 2 We have found that actual telephone cable should be used to connect the caller ID set to the telephone line. Cables used for security wiring may not be suitable.

The Users Line is always Busy

Try the following tests:

- 1 One of the phones in the house could be faulty, presenting a low impedance which holds up the line, possibly due to lighting. Disconnect all the telephones by unplugging the TEL OUT Connector and try to dial in again. If you hear a ringback tone on the telephone, it means that one of the telephones is faulty.
- 2 If the line is still busy, Comfort could be holding onto the line because it is always trying to dial out or because of some other fault. Remove the battery connection and switch off power to Comfort, and put back the TEL OUT terminal block so that the phones are connected to the telephone line. The telephone line is connected to TEL OUT through the closed contacts of a relay. Dial in again. If the phones ring, the Comfort PCB is faulty and must be replaced. If the line is still busy, the telephone line is faulty.
- 3 Switch off Comfort at the mains and disconnect the battery. In this condition, the telephone line is connected directly to the telephones through the normally closed contacts of a relay. If the problem persists, it is not caused by Comfort - it is caused by the telephones or telephone line fault. **Do not forget to set the system Date and Time after power on**

Special Telecom Services (e.g.. Call Forwarding and Voice Mail)

Call Forwarding and Answering services on the subscribers line may give a broken dial tone when in operation. Comfort waits for up to 9 seconds for a continuous dial tone before dialing out. If the broken dial tone does not restore to a continuous tone after a few seconds, disable the detection of Dial Tone in Location 39 (See Table 35) by subtracting 128 from the value at that location. Push the reset button on the Comfort panel. Comfort will dial after 5 seconds in the absence of dial tone.

Comfort Does Not Answer Incoming Call

This could be caused by having too many telephones connected to TEL OUT, or the use of telephones which are not type-approved. The ringing

signal may be detected as a falls offhook indication, thus preventing Comfort from answering an incoming call. It may also prevent the Door Station from ringing the telephone, or prevent other telephones from signing in, or cause a dialout in a non-alarm state (e.g.. System armed or disarmed reporting) to be aborted as Comfort thinks the phone is offhook. The telephone may otherwise seem to be working properly, able to make and receive calls.

Comfort Cannot Dial Out

- 1 Check that J3 header is shorted with a shunt. If J3 is not shorted Comfort will not be able to dial out. J3 is located on the left edge of the Printed Circuit Board, near to the two relays K1 and K2. On later versions of the board PC01-0001E (4), J3 is not present.
 - 2 Check that the relevant Alarm Types have the Dial Settings on (Eng Menu 2,1) and the dial settings are enabled for the phones which are to be dialed (1 to 8).
 - 3 Does the telephone line have Call forwarding or Voice Answering (provided by the phone company)? This may prevent a dialout because Comfort may not detect a dial tone. See "Special Telecom Services".
 - 4 Do a **Dial Test** (F3,3 or User menu 3,4,3 or Engineer menu 8,3). This dials to all programmed telephones from 1 to 8. The dialing tones, busy tones, ringback tones, as well as handshake and kissoff tones from the Monitoring Station receiver are audible on the Keypad. This is very useful in troubleshooting dialing problems. If the system cannot detect dial tone, it will say "Please hang up" in case an incoming call is holding the line, and wait for the caller to hang up. If dialing to the CMS or pager or voice phone, the system cannot detect the handshake or pager tones or voice answer, you can hear this.
 - 5 When during pager dialout, you can hear that pager beeping tones are soft and the system does not send the DTMF pager message in response to the beeping tones, increase the gain from Line to Speaker using Locations 118 and 119 (Comfigurator Tune parameter 35). Check that Location 119 is set to 1 and Location 118 is set to 25 as in the above table. If necessary, increase the value in Location 118 to 250 (maximum 255) to start with, reset and test. **Always check that the voice station mode conversation can be heard in both directions after you change these locations.**
 - 6 Disconnect all the local telephones by removing the TEL OUT terminal block. See **Too Many Telephones/Faulty Telephones** above. A Faulty telephone may prevent a Dial test (non-alarm situation) from working, but in alarm Comfort cuts off the local telephones. Setting the flag "Always Cut Local Phones during dialout" in Location 40 (Table 35) may fix this problem by cutting off the local phones when dialing out even in Idle and Trouble States.
 - 7 Check the settings for Pulse Dial (Eng Menu 7,1). If the telephone line is tone dialing, the Pulse dial setting should be OFF. Check the PABX Setting (Eng Menu 7,2). If the panel is not on a PABX extension, the PABX setting should be OFF, otherwise the system will dial a 0 or 9 to try to get an outside line.
-  **Pulse Dialing is not supported from V4.87 as few countries still support this.**

- 8 If the dialout is still unsuccessful, check the following. If any of the locations are changed, RESET the system.

Parameter	Should be	Menu	Remarks
PABX Setting	Off	Engineer 7,2	If not connected to PABX extension
Pulse Dial	Off	Engineer 7,1	NO LONGER IN USE from 4.87
Location 260	11	Engineer 7,4,1	Pager Start key (*)
Location 261	12	Engineer 7,4,1	Pager key displayed as '-' (#)
Location 262	11	Engineer 7,4,1	Pager 1st end key (*)
Location 263	11	Engineer 7,4,1	Pager 2nd end key (*)
Location 48	65 - 70	Engineer 7,4,1	Pager Frequency Upper
Location 49	40 - 55	Engineer 7,4,1	Pager Frequency Lower
Location 80	8	Engineer 7,4,1	DTMF Tone level
Location 81	0	Engineer 7,4,1	DTMF Tone level (continued)
Location 86	80	Engineer 7,4,1	Defaults
Location 87	0	Engineer 7,4,1	Defaults
Location 88	40	Engineer 7,4,1	Defaults
Location 89	0	Engineer 7,4,1	Defaults

Arming/Disarming Problems

Arm Fail after the Entry Door is closed

When Away Arming and the Entry door is closed, there is a 6 second delay for exit path PIRs to settle. If any zone is found to be open at the end of the 6 second period, there will be an "Arm Fail" alarm. Check that PIRs do not take more than 6 seconds to restore. There may be an adjustment on the PIR to shorten this. This applies to Final Door Arming method (See Worksheet table 3 for Away Arming methods).

Keypad Disarm has delay before "Security Off"

When disarming by keypad, there may be a short delay before the keypad gives the usual "Security Off" announcement. This may happen especially when disarming after an alarm, when the system is dialing out. It may take a few seconds for Comfort to terminate the dialout and come back to announce on the keypad. Dialouts interrupted in this way will resume after the "Security Off" announcement, and are never lost.

No Voice on Keypad when Arming or Disarming

For Firmware Versions 4.6X and older, announcements like "Please Exit", "Away Mode", "Security Off" are heard on the keypad when arming or disarming. If the local phone is taken offhook when arming or disarming, the voice will not be heard on the keypad. This is to allow the phone to arm or disarm. This may also be caused by a faulty telephone.

Sign-in Codes Lost

User Code Lost

Go To Program Menu (Engineer menu 9), 5 for User Codes and 0 to Erase all Users or 2 to Erase a single user by number. If all users are deleted, the default user code is reset to 1234, and all messages in mailboxes will be erased.

Individual users can be deleted in Program Menu 5,2 and selecting the user number. All the messages in that mailbox will be deleted. The user must be added using Program Menu 5,1 (Add User).

Engineer Code Lost

Engineer Code cannot be recovered using the keypad. Configurator can be used to transfer the program from System -> PC and the Engineer code can be seen from the Security -> Sign in Codes screen. This method can also be used to recover lost user codes so that messages do not have to be erased.

Answering Machine Problems

Message Recording on the telephone Cuts off before Caller has finished

The Record Time is found in Telecoms > Answering. This is the maximum time in seconds allowed for each recorded message (default = 60 seconds). If the caller hangs up before the allowed time, or a prolonged silence is detected, Comfort will end the message and will save the remaining time for other new messages. If callers are cut off while they are recording a message before the allowed time, it is probably because Comfort detected silence below a threshold for a preset time. This could be because of high attenuation on the telephone line due to distance from the telephone exchange, or the caller talking softly.

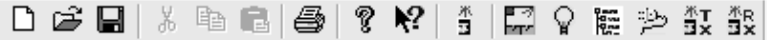
There are some Tuning Parameters which can help in this situation. Go to Configuration > Tuning Parameters. The screen of Tuning Parameters is as shown below.

Tuning Parameter 10 (Voice Detection Threshold) determines the minimum energy level at which voice is detected. Below this level, it is interpreted as silence. To make the system more sensitive to low level voice, reduce this value from the default of 8. Legal values are 1 to 32767.

Tuning Parameter 12 (Silence Detection Time) is the period of silence in 10 millisecond units before the Comfort answering machine reports silence, and thus end the recording. To make it less likely for a period of silence to be reported increase the value from the default of 500 (5 seconds). Legal values are from 0 to 65535.

After changing these values reset Comfort.

File Edit View Transfer Options Tools Help



Configuration

- General Information
- Modules & Settings
- Voice Settings
- IR Transmit Codes
- Tuning Parameters**

Tuning Parameters

Index	Description	Value
4	Initial Silence Threshold	11264
5	Silence Threshold Step	12
6	Silence Burst Threshold	2
7	Silence Burst threshold time	15
8	Silence Compression	1
9	Synthesized silence energy	8192
10	Voice Detection Threshold	8
11	Reserved	-1
12	Silence detection time (10 ms)	500
13	Reserved	-1
14	Reserved	-1

Tracing Alarms

Use Event Log

Most false alarms can be attributed to user error, improper selection or placement of alarm sensors especially PIRs and shock/vibration sensors. Comfort's Event log is a valuable tool in identifying the cause of such problems.

The last 250 events (125 events for Comfort ENTRY model) can be heard by going to the Event log F+5 on the keypad or User menu (3,3) or Engineer menu (8,3). You can navigate through the log by pressing 1 for next event, 2 for previous event, 0 for 1st event, 9 for last event, 3 for Next Day, 4 for Previous Day. See The Event Log can also be obtained by using the Comfigurator software > Transfer Menu > Upload Event Log. The events can then be printed or saved on file. The following table shows the events recorded and their meaning.

Event	Restor3	Description
Alarm Erased	N/A	Alarm activation aborted within the 'Abort Time'.
Alarm Voice Message OK	N/A	Dial-out acknowledged by recipient pressing # key.
Arm Failure	N/A	System failed to arm, returned to Security Off Mode.
Away Mode	N/A	System armed to Away Mode - Full Set
Battery Warning	Restore	The battery was tested with AC 'OFF' and found to be low
"Zone Name" Bypassed	Zone No. Bypass Off	A zone was bypassed
Change Time	N/A	Date or Time Changed
33-40 Communications Failure	33 Restore	Slave Expansion Module 1-3 Data Failure. Prefix denotes ID.Address 33=SEP 1, 34= SEP 2, 35= SEP 3
49-55 Communications Failure	49 Restore	Door Station 1-4 Data Failure. Prefix denotes ID. 49 =Door Station 1, 50=Door Station 2, 51=Door Station 3
65-72 Communications Failure	65 Restore	Keypad 1-8 data failure. Prefix denotes ID 65=Keypad 1, 66=Keypad 2, 67=Keypad 3, 68=Keypad 4 etc...
Day Mode	N/A	The system is armed to Day Mode
Dial Test	N/A	System dial-test selected.
Doorbell	N/A	Doorbell pressed while system is armed
Duress Alarm	N/A	Duress Code entered by user adding or subtracting '2' from their code, it will be preceded by: (time) mailbox sign-in code OK.
Engineer Menu Phone Call Sign-In	N/A	System dialed engineer via a response linked to a function key
Entry Alarm	N/A	A valid user code was not entered within the entry timer duration.
Engineer Reset (UK Only)	N/A	The Engineer has reset the system following Alarm Activation, using * on Engineer Menu

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Event	Restor3	Description
Engineer Menu	N/A	The Engineer has entered the system using the Eng Access code.
Force Arm	N/A	During Exit, the # key was pressed to force arm the system.
Fire Alarm & Zone	Restore	Fire Alarm Activation followed by Zone number.
Key Arm	N/A	System armed using the one-touch key or a key switch
Intruder Alarm & Zone	N/A	Intruder Alarm Activation followed by Zone number.
(Name) Sign-In Code Ok	N/A	Valid user code 1-16 entered using local phone or Keypad.
(Name) Phone Call Sign-In	N/A	Valid user code 1-16 entered remotely using external phone.
Monitoring Station OK	N/A	Kissoff from Monitoring Station received
Night Mode	N/A	System Armed to Night Mode - Part Set.
Panic Alarm & Zone	Restore	Panic Alarm Activation followed by Zone number.
Pager Dial OK	N/A	Successful dialout to pager with correct acknowledgment
Perimeter Alarm & Zone	N/A	Perimeter Alarm Activation followed by Zone number.
Phone Trouble	Restore	Telephone line cut
Phone Number 1-8	N/A	System attempted to dial telephone number 1-8.
Power Failure	Restore	Mains Power Removed
Security Off	N/A	The system is disarmed and unset.
System Armed	N/A	System Armed to one of the three modes.
System Reset	N/A	System reset using Reset Button, Engineer Menu or CONFIGURATOR.
Sign-In Tamper	Restore	More than six unsuccessful attempts to sign-in at the Keypad while the system is armed.
Tamper Alarm	Restore	Panel (JP5), Bell tamper, Keypad, Door Stations or Zone with 24-hour tamper zone type.
33,49,65 Tamper Alarm	Restore	Panel JP5, SEP, Door Station or Keypad tamper activation, 33-35=SEP 1-3, 49-52=Door Station 1-4 and 65-68=Keypad1-4.
Vacation Mode	N/A	System is armed to Vacation Mode
Voice Reset	N/A	A problem occurred with the Voice Engine, which was reset to clear the problem.
Zone Alert & Zone	N/A	Zone with alert zone type activated
Zone Trouble	Restore	Zone tampered with followed by Zone number .

False Alarm on Disarming

This may be caused by connecting PIRs or Keypads to the S12V output instead of the 12V terminals. S12V and 12V share the same terminal block. S12V is meant for detectors which need to be reset on disarming, and is switched off for 5 seconds when the system is disarmed. PIRs

programmed as 24 hour zones which have their supply connected to S12V will activate when disarmed. Also Keypads which are powered from S12V will report "Communication Failure".

- 🔊 **For firmware version 4.101 and above, S12V does not automatically reset upon system disarm. It has to be programmed using Action 90, to cater for latched shock detectors which are to be reset upon arming.**

End of Line Resistors

If the zone is set for 2 EOL resistors, Check that the correct values of EOL resistors are used and that they are connected correctly, ie 2.7K in series with the contact and 4.7K in parallel with the contact as shown in Figure 2.11 of the Engineer Manual. Incorrect values or connection of EOL resistors may seemingly have no effect , but the threshold might be very close to being detected as Open. A change in temperature may cause the system to go into alarm.

Zone Trouble

Go into Security Check (Eng Menu 8,2) or F3,2 on Keypad. The names of the zones activated are announced. If 2 End-of-line resistors are used on zones, open-circuit and short-circuit wiring are announced as "Zone (N) Trouble". If zones are open on entering Security check, they are announced once at the beginning.

If the zone is configured for 2 EOL resistors, check that the proper EOL resistors are used and that the zone shunt is set for 2 EOL resistors.

Frequently Asked Questions

Is the Siren Duration restarted during Alarm by new zone activations?

The siren duration starts when a zone is triggered to cause an alarm. If another zone is triggered while the siren is still on, the siren continues but the timer is not restarted if the same siren type is activated. The siren will time out according to the programmed duration after the original activation. However, if a different siren type is activated, e.g.. a Fire Alarm Siren after an Intruder alarm siren, then the new siren duration will take effect.

Does the system rearm after an alarm?

When an alarm occurs, the siren turns on for the programmed time, depending on the Alarm type. When the siren turns off, the system is rearmed and remains in Alert state. Any new intrusion will trigger a new alarm. If the entry door is opened, an entry delay will start, not an instant alarm, so the owner returning home will not cause an alarm.

Can a PIR be used as an Entry Door zone for Final Door Arming?

A PIR should never be set to Zone Type 2 (Entry/Exit Zone). When arming to away mode, any movement through the zone will cause the system to arm when the PIR restores and after a delay of 6 seconds. This may cause the system to arm prematurely and cause a false alarm. If a magnetic contact for the Entry door cannot be installed (retrofit), then set the Away Arming method to Arm After Exit Delay. This is shown in Table 3 of the worksheet. Set Location 1692 to 1. This will cause the system to arm after the Exit delay in Away Mode without waiting for Entry door. However, if there is no Entry Door, one of the PIRs must be programmed to cause an Entry Delay when armed. This can be done using Actions 73,0,12,5,255 (Get Security Mode, exit if Zero, Start Entry Delay).

How does Comfort handle Telephone line Cut?

When a line is cut is detected and confirmed (around a minute), a Phone Trouble alarm is activated. By default, this gives a fast trouble beep for 10 seconds. If there is a Line cut during or before an alarm with bell delay, the siren is activated immediately. Normally, it is not advisable for a line cut to turn on a full intruder alarm, because of the high possibility of false alarms due to intermittent telephone service, but it is possible to customize the Alarm type settings of the Phone Trouble alarm (Alarm Type 3) to turn on the siren. It is also possible to turn on the siren when the system is armed. This is done using the Alarm Response (Engineer Menu 2 for alarm type, 2 for Response). Program a response which checks the security mode, and if armed, activate one of the siren types.

How to disable Telephone Line Cut detection

In certain retrofit installations, where it is not possible to connect the incoming telephone line to the Control panel TEL IN, and there are other telephones connected in parallel, the telephone line cut detection must be disabled. If not, when the parallel telephone is used, a Phone Trouble alarm will be reported. To disable telephone line cut detection, refer to Worksheet Table 35 for Location 40 settings. One of the settings (add 2) is to ignore Line cut. After changing this location, the control panel must be reset by pressing the RESET button on the panel or remotely by Engineer menu 7,4,2.

How to recover lost User Codes

If users other than User 1 (Master code) forget their codes, the User program Menu can delete them and Add the code again (in Program menu 5,2). If the Master Code (for User 1) is lost, the Engineer can get into program Menu by Pressing F+0, then Engineer menu, and then 9 for Program menu. Then press 5 for User Codes and 2 to erase User 1 and add the user again.

Does the system remain armed after removal of power?

After a complete loss of power, including battery discharge, the system remembers its last state and restores it. If the system was armed to Away, Night or Day mode, it will re-arm to that mode when powered up again. The Date and Time will be reset to default after a complete power loss, and will need to be reprogrammed.

Can Announcements be disabled on certain keypads?

Yes, go to the keypad for which announcements are to be disabled, and go to Program Menu 3,1. Press 1 to enable announcements, 0 to disabled them **on that keypad alone**. This is also described in the User Manual.

Can Comfort be Partitioned?

Comfort does not have any partitioning feature, where the system can be subdivided into two or more independent partitions, able to be armed and disarmed independently. However, it is possible to use the OMIT action (from v4.96) to bypass a group of zones (programmed as immediate in all modes) usually using a key switch or a stand-alone access control keypad to achieve a similar function. Refer to the Application Manual for the programming and setup.

BABT Approvals (United Kingdom)

- 1 This equipment is approved on a direct exchange line for Tone (DTMF) dialing
- 2 Although this equipment can use either loop disconnect or DTMF signaling, only the performance of the DTMF signaling is subject to regulatory requirements for correct operation. It is therefore strongly recommended that the equipment is set to use DTMF signaling for access to public or private emergency services. DTMF signaling also provides faster call setup.
- 3 The Ringer Equivalence Number (or REN) value allows you to establish how many telephones or pieces of equipment, such as this equipment, you can connect to your line. To find out the REN value of the apparatus on your line, add up the REN values of each item of apparatus connected. Any B.T instrument is assumed to have an REN of 1, unless otherwise stated. If you connect apparatus such that the total REN value is more than 4, one or more pieces of equipment may not ring and/or answer calls correctly. The REN of this equipment is 4.0. It is not intended for connection in parallel with other terminal equipment.
- 4 The equipment has been approved for use of the following facilities:
 - Auto Answering
 - Recording and Answering
 - Auto Dialing

It may help callers if your outgoing answering machine message includes your full telephone number.

This product must be installed in accordance with the installation instructions contained in this manual.

CE Marking (Europe)

This equipment complies with the requirements of the EMC Directive (89/336/EC) and the Low Voltage Directive (73/23/EC) provided that all equipment used also carries the CE Mark and the installation follows the instructions given in this manual. The equipment has been tested to EN55022 Part B; Conducted and Radiated Emissions.

Safety Status of Connecting Ports

The following circuits are present within the equipment with the safety status specified in the table below:

Connector	Safety Status
Incoming and Outgoing telephone lines (MJ1, MJ2)	TNV
Box headers connected to Expansion Modules (J7,J5)	SELV
Terminal Blocks to Outputs, Zones, Bell, Strobe, speaker	SELV
Battery Connector connected to standby battery (BATT)	SELV
Terminal Block to Transformer Secondary	SELV
Terminal Block with 12V supply for external circuitry	SELV
Terminal Block for X10 TW523 (MJ3)	SELV

Warnings Required By New Zealand Telecoms

General Warnings

The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, not does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, not does it imply that any product is compatible with all of Telecom's network services.

Decadic Signaling

The decadic (or pulse) signaling is not supported on this equipment.

Dialing to Emergency Services

This equipment shall not be set up to make automatic calls to the Telecom "111" Emergency service.

Parallel Connection

This equipment is not to be connected to a line in parallel with other telephone equipment.

Test Calls

This equipment may be set up to carry out test calls at predetermined times. Such test calls may interrupt any other calls that may be set up on the line at the same time. The timing for such test calls should be discussed with the equipment installer. The timing for test calls from this equipment may be subjected to "drift". If this proves to be inconvenient and your calls are interrupted, then the timing problem should be discussed with the equipment installer. The matter should NOT be reported as a fault to the Telecom Faults Service

Automatic re-attempts to the same number

The equipment shall be set to operate within the following limits for compliance with Telecom's specifications:-

- a. There shall be no more than 10 call attempts to the same number within any 30 minute period for any single manual call initiation, and
- b. The equipment shall go onhook for a period of not less than 30 seconds between the end of one attempt and the beginning of the next attempt

Automatic calls to different numbers

In order to operate within the limits of Telecoms' Specifications, the associated equipment shall be set to ensure that automatic calls to different numbers are spaced such that there is no less than 5 seconds between the end of one call and the beginning of the next.

Call Answering

In order to comply with Telecom's Telepermit requirements, the equipment shall be set up ensure that calls are answered between 3 to 30 seconds of receipt of ringing.

Faults

In the event of any problem with this equipment, it is to be disconnected and a telephone may be connected directly in its place. The user shall then arrange for the equipment to be repaired. Should the matter be reported to Telecom as a wiring fault, and the fault be proven to be due to the equipment, then a call-out charge will be incurred.

Locally Generated Ringing

Difficulties may be experienced with this device ringing some types of phones connected to it. If this problem occurs, it should be referred to the equipment installer and NOT to Telecoms Fault service

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Limited Warranty

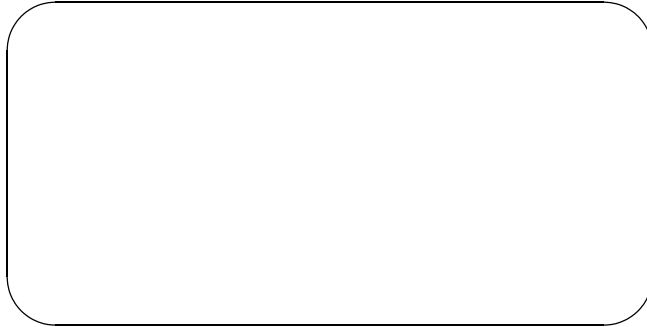
Cytech Technology Pte Ltd. provides a warranty for a period of 12 months from the date of purchase. This warranty covers defects in materials and workmanship under conditions of normal use by the original buyer only. In the case of any breach of such warranty, Cytech Technology Pte Ltd. shall either repair or replace the defective equipment upon return of the equipment to its repair center at the purchasers own expense.

This warranty does not apply to damages incurred in shipping, handling or other causes beyond the control of Cytech Technology Pte. Ltd. including but not limited to: alterations to the product, abuse, improper application, lightning, physical damage, mechanical shock, excessive voltage or extremes in temperature.

While the product is an advanced security and automation system, it does not offer guaranteed protection against burglary, fire or other emergency. Any Intruder alarm system is subject to failure or compromise.

Despite frequent testing and due to but not limited to all or any of the following; disruption in electrical supply or communications, criminal or accidental tampering, it is possible for the system to fail to perform as expected. Cytech Technology Pte Ltd. does not warrant that the product or system may not be compromised, or that it will in all cases prevent loss of property by Burglary, fire or otherwise, nor that it will in all cases give adequate warning or protection. A properly installed and maintained security system may only reduce risk of fire, burglary robbery or otherwise, but it is not a guarantee that these will not occur.

Cytech Technology Pte Ltd. is not liable under any circumstances for any damages, loss of anticipated revenue, loss of time or any other losses resulting from the purchase, installation, use or failure of this product.



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