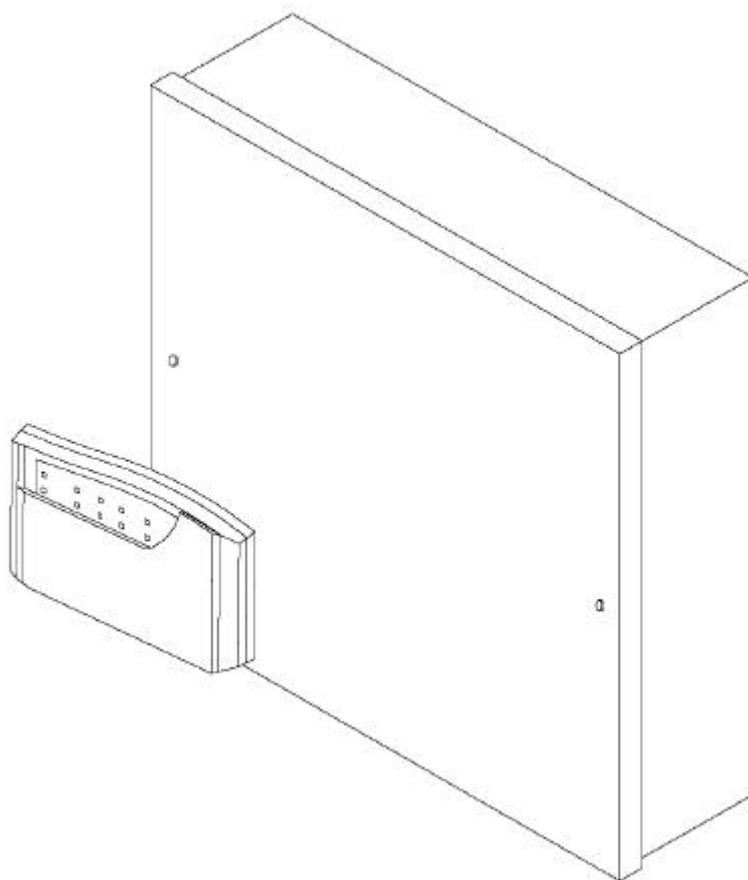


INSTALLATION MANUAL



CEF AP28 CONTROL PANEL
With additional options

AP28

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WARNINGS

Prolonged short circuit of any supply can cause damage to the unit. Take the necessary precautions in not allowing liquids to spill on or into the unit.

STANDARDS

This unit conforms to EMC directive 89/336/EEC & LVD 73/23/EEC. This unit has been tested and has proven to meet all current emission and immunity regulations as set out by the EU. This unit conforms to the requirements of BS4737 part 1 1986 which relates to security control equipment.

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PRODUCT DESCRIPTION

The AP28 is an 8 zone programmable microprocessor control panel using state of the art technology and manufacturing techniques. The panel has many advanced features that can only be found in more expensive control panels. These features include two user codes, Chime, Fire, and Keypad PA. There are many options in the programming functions to allow the control panel to be versatile and user friendly. This panel is the ideal choice for residential or light commercial installations.

AVAILABLE PARTS

A selection of spares and extras are available. These are:-

- Remote Keypad - giving full control over the control panel.
- Spare PCB - for replacement in the event of failure.

These can be obtained from your original place of purchase.

INTENDED USE

This panel is designed to be used in residential and light commercial applications such as homes, small shops etc.

SPECIFICATIONS

PROCESSOR VERSION

SPECIFICATION FOR SOFTWARE REVISION NUMBER

V3.0

The software revision number is located on the top of the main processor

POWER SUPPLY

Power Supply

Mains Supply Voltage	230 V AC Nominal
PSU output voltage	13.7 V Nominal
Maximum output current	1 A (total)
Aux. current	500 mA Max.
Battery Fuse	1 A (20 mm)
Panel Quiescent	40 mA

KEYPADS

Keypads

Supply Voltage	13.7 V
Quiescent Current	20 mA
Active	45 mA
Maximum number allowed	6

GENERAL

General

Normal operating temperature	0°C to 40°C
Humidity	10 to 90% R.H. non condensing
Dimensions	W 263 mm H 223 mm D 82 mm
Control Panel Weight	2.7 kg Excluding Battery
Standby Battery	7.0 Ah 12 V Rechargeable Lead Acid
Standby Time (load dependant)	24 hrs with 2.8 Ahr nom. 60 hrs with 7.0 Ahr nom. Based on panel, Keypad, & 2 pir's 40+20+25+25mA = 110mA Quiescent
Cable Runs	
Zone/circuits	100m max with 50mA load.
Sounder	50m max with 7/0.2 100m max with 16/0.2 or 2 x 7/0.2

FACTORY DEFAULTS

Factory Defaults

User/customer Code 1	1234
User/customer Code 2	Disabled (0000)
Engineer Code	7890
Circuit 1	Entry Circuit. (Fixed)
Circuit 2	Alarm Circuit isolated in Night set.
Circuit 3	Alarm Circuit.
Circuit 4	Alarm Circuit.
Circuit 5	Alarm Circuit.
Circuit 6	Alarm Circuit.
Circuit 7	Alarm Circuit.
Circuit 8	P.A (Personal Attack)
Full Set Exit Time	30 Seconds
Night set Exit Time	15 Seconds
Entry time	30 Seconds
Sounder Ring Time	15 Minutes
Chimes	Disabled
Programmable options	Non selected

INSTALLATION

Locate the control panel out of sight, such as in a hall, under stairs or in a cupboard where connection is easy and the detector zone and mains cables can be concealed. Avoid areas subject to high temperatures or humidity such as next to a boiler, airing cupboard or conservatory.

Mounting

1. Remove the lid screws and remove lid.
2. Remove the PCB or keypad packaging.
3. Place the panel in the selected position and mark the three fixing holes.
4. Mount the Panel securely using all three mounting hole positions.
5. Attach the tamper spring and mount the PCB onto the support pillars.

WIRING THE CONTROL PANEL

ELECTRICAL SAFETY NOTICE.

THIS PRODUCT MUST BE EARTHED

This Power Supply must be permanently connected to the mains supply in accordance with current IEE wiring regulation. A 3 amp fused spur, installed by a qualified electrician, is strongly recommended.

Any fault which could be mains related must be diagnosed and corrected by a qualified electrician to ensure continued safe operation.

CAUTION: Under certain circumstances the transformer metalwork can reach 70°C. this is normal and within prescribed limits.

Battery connection.

Maximum battery size 12V 7.0Ah

This panel requires a standby battery to be fitted to provide power in the event of mains failure. A valve regulated lead acid battery must be used.

Detector circuits

Connections are provided for up to eight detector circuits of which normally closed detection devices must be used. A common tamper loop is provided for all detection devices marked as **24 HR Tamper**. One or more devices may be connected to each alarm circuit. These should be connected in a series configuration. These circuit connections are located to the bottom right of the PCB (see diagram B).

PIR Latch Line (L+)

In the event of two or more detectors (motion sensors or glassbreak detectors) being fitted to any single zone, latching detectors should be used. The 'L+' connection provides this function. It is low (0 V) when unset and high (12 V) when set. It should be connected to the appropriate SET or LATCH terminal in your detector. See glossary for explanation.

INSTALLATION PROCEDURES

MOUNTING PROCEDURE

MAINS POWER WARNING

BATTERY SPECIFICATION

DETECTOR CIRCUITS

LATCH LINE DESCRIPTION

**DETECTOR
RESET**

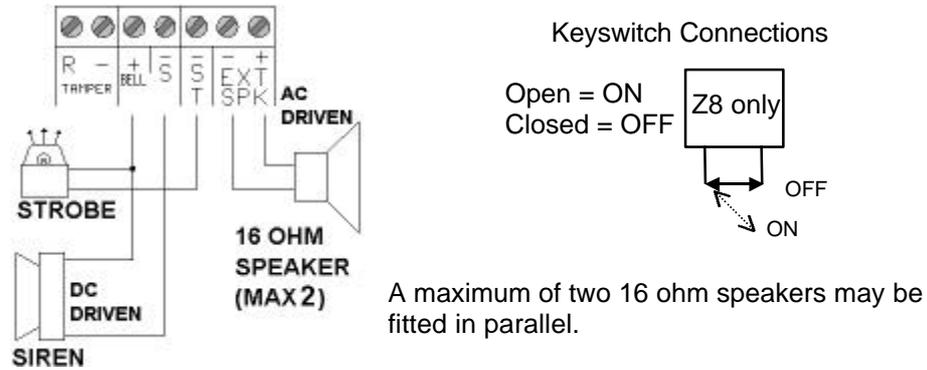
Detector reset (L+ when programmed for ID)

Some detectors require the removal of power to reset (e.g. Viper Plus® or Smoke detectors). The **L+** terminal can be programmed to be used as an 'ID' output using option 7-4. The **L+** terminal should then be used as the negative supply for these devices. The positive supply should be taken from the **AUX +**.

SOUNDERS

Internal Sounders, Speakers, Strobe and Keyswitch Wiring.

DIAGRAM A



**EXTERNAL
DEVICES**

External Sounder & Strobe.

Diagram A shows the connection for external sounder and strobe. Please note sounder trigger is applied negative. (Negative ring).

- ST- Strobe switched negative trigger.
- S - Sounder switched negative trigger
- + Sounder hold off/strobe positive supply.
- Sounder hold off supply & sounder tamper feed (negative)
- R Sounder tamper return. (negative)

**AUXILIARY
POWER**

AUX DC - Detector power.

The auxiliary power is provided from connections marked 'AUX'. This is to provide the 12 V supply for detectors e.g. movement or glassbreak detectors. The auxiliary power output is rated at 500 mA max. (12 VDC nominal). See diagram B

**PCB BOARD
LAYOUT**

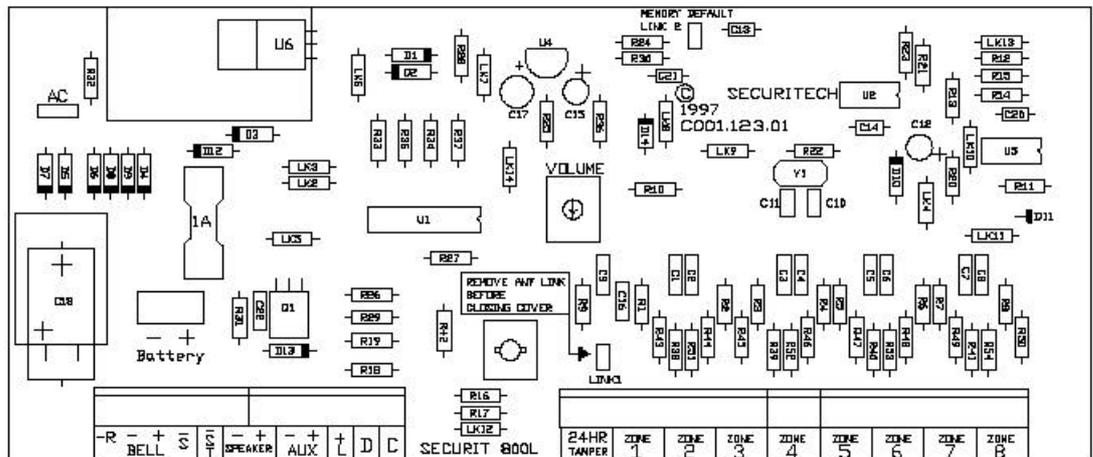


DIAGRAM B

MOUNTING A REMOTE KEYPAD

1. Choose the keypad location and then mark the holes for mounting.
2. Make sure the cable is run through the backbox.
3. Screw the backbox in the selected position making sure it is not twisted.

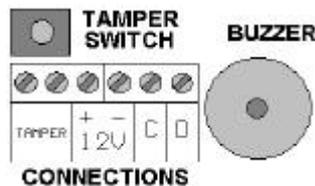
WIRING A REMOTE KEYPAD

Use 6 core cable for connection of all remote keypads.

Connect the cable into the terminals shown below in diagram C making sure each wire goes to a like named terminal in the panel. **C** goes to **C**, **D** to **D**, **+** to **+** and **-** to **-**. Wire the tamper wires in series with your existing tamper loop.

Individual keypads do not need to be identified to the system. If more than one remote keypad is used it can be either wired back the control panel or daisy chained from another keypad. All connections are in parallel with the exception of the tamper circuit which **MUST** be wired in series. (see glossary of terms for series and parallel examples).

DIAGRAM C



POWERING UP

INITIAL POWER UP The lid should remain off the main control panel so that engineer mode may be used. Alternatively, entering **7890 #** can also be used to enter engineer mode. If the engineers code is entered and the panel is then left, it will set.

1. Switch the mains supply on, the internal sounder will start. *This denotes a tamper alarm.*
2. Enter **1 2 3 4** followed by the # (hash) key - this will silence the sounder and the TAMPER LED flashes. *This has now acknowledged and cancelled the alarm, however because either the panel or keypad lid is removed your main tamper loop is open, this is normal.*
3. Connect your battery and walk test the control panel. *This will make sure all the zones are clear.*
4. Power Down and complete the wiring of the control panel. *NEVER wire the control panel live.*
5. Power back up, cancel the alarm and enter engineering mode by entering **7, 8, 9, 0**. *The panel is now ready for programming.*
6. If no programming is required close any lids that are open and press the # key. This exits engineering mode. Now refer to the users manual for customer options.

MOUNTING
REMOTE
KEYPADS

WIRING
REMOTE
KEYPADS

KEYPAD
DIAGRAM

INITIAL POWER
UP

NO
PROGRAMMING
NEEDED?

**ENTER
ENGINEERING
MODE**

To enter engineering mode, enter the engineering code and then press the # (HASH) key. This forces the panel into engineering mode **Note:** If left unattended for approximately 60 seconds it will revert to day mode.

**EXIT
ENGINEERING
MODE**

To exit engineering mode, confirm any options you have selected with the * (STAR) key, then close ALL tamper circuits and wait for approximately 60 seconds after which the panel will automatically exit engineering mode or pressing the # (HASH) key will manually exit engineering.

**STAY IN
ENGINEERING
MODE**

If you need to stay in engineering for longer unattended periods, once in engineering mode open a tamper circuit. The easiest way to do this is to remove the lid of the panel or keypad.

PROGRAMMING

PROGRAMMING

GENERAL

To exit all options press * to confirm the selection The accept tone will sound.

CHIME

CHIME 2 1 (Range - any alarm zone)

Enter 2-1. Enter the keys corresponding to the zone(s) required to chime. On exit from engineer mode zones selected will be set to chime, the customer may disable chime only on zones programmed with this option (see user manual). If no zones are selected the user will not be able to access their chime option and an error tone will be heard.

**SOUND
OPTIONS**

SOUND OPTIONS 2 2

- Enter 1 Disable exit / entry sounds in part and home set
- Enter 2 Disable accept / error sounds in part and home set

**TIMERS
EXIT TIME**

EXIT TIME 3 0 (Range 10-90 Seconds.)

Enter 3-0. A new time can be programmed by entering a key from the table.

- Enter 1 10 Seconds. Led 1 on.
- Enter 2 15 Seconds. Led 2 on.
- Enter 3 30 Seconds. Led 3 on. (Factory default)
- Enter 4 45 Seconds. Led 4 on.
- Enter 5 60 Seconds. Led 5 on.
- Enter 6 90 Seconds. Led 6 on.

ENTRY TIME

ENTRY TIME 3-1 (Range 10-90 seconds)

Enter 3-1. A new time can be programmed by entering a key from the table.

- Enter 1 10 Seconds. Led 1 on.
- Enter 2 15 Seconds. Led 2 on.
- Enter 3 30 Seconds. Led 3 on. (Factory default)
- Enter 4 45 Seconds. Led 4 on.
- Enter 5 60 Seconds. Led 5 on.
- Enter 6 90 Seconds. Led 6 on.

SOUNDER DURATION (sounder ring time) 3-2 (Range 3-20 minutes)

Enter 3-2. A new time can be programmed by entering a key from the table.

Enter 1	3 minutes. Led 1 on.
Enter 2	4 minutes. Led 2 on.
Enter 3	5 minutes. Led 3 on.
Enter 4	10 minutes. Led 4 on.
Enter 5	15 minutes. Led 5 on. (Factory default)
Enter 6	20 minutes. Led 6 on.

NIGHT SET / HOME SET EXIT TIME 3-3 (Range 0-90 seconds)

Enter 3-3. A new time may be programmed by entering a key from the table.

Enter 0	0 Seconds. All LED's off (Instant).
Enter 1	10 Seconds. Led 1 on.
Enter 2	15 Seconds. Led 2 on. (Factory default)
Enter 3	30 Seconds. Led 3 on.
Enter 4	45 Seconds. Led 4 on.
Enter 5	60 Seconds. Led 5 on.
Enter 6	90 Seconds. Led 6 on.

NOTE: If extension speakers are fitted then the exit sounder volume for Night or Home set can be altered by the control on the PCB marked **VOLUME**

Option Code	Option Description	Results from choosing option no.							
		0	1	2	3	4	5	6	
3-0	Exit Time (secs)		10	15	30	45	60	90	
3-1	Entry Time (secs)		10	15	30	45	60	90	
3-2	Sounder Duration (mins)		3	4	5	10	15	20	
3-3	Night / Home Exit (secs)	0	10	15	30	45	60	90	

Examples

Change the FULL set exit time to 60 seconds

ENTER THIS	3-0	5	*
Description	Choose full set	Select 60 seconds	Confirm selection

Change the Sounder duration to 3 minutes

ENTER THIS	3-2	1	*
Description	Choose sounder	Select 3 minutes	Confirm selection

Change the ENTRY time to 45 seconds

ENTER THIS	3-1	4	*
Description	Choose entry	Select 45 seconds	Confirm selection

**SOUNDER
DURATION**

**NIGHT / HOME
SET EXIT TIMER**

SUMMARY

CIRCUIT PROGRAMMING

CIRCUIT PROGRAMMING 4 (Range 2-7)

Circuits 2 - 7 can be reprogrammed to suit your requirements. Circuit 1 is fixed as a Final exit circuit. Circuit 8 has limited options.

ENTER	PROGRAM ZONE
4 - 2	2
4 - 3	3
4 - 4	4
4 - 5	5

ENTER	PROGRAM ZONE
4 - 6	6
4 - 7	7
4 - 8	8

Select the circuit you wish to alter, it may then be programmed by entering one key from the following table.

N/S = Night Set

Option no.	Zones 2-7	Zone 8
1	Alarm	Alarm
2	Alarm with walk through	Fire
3	Alarm & Isolate in Night Set	PA
4	Alarm, Walk through & Isolate in N/S	Keyswitch
5	Alarm, Walk through & N/S Entry	
6	Fire	
7	Entry Route	
8	P.A	

SEE GLOSSARY OF TERMS (p.11) FOR DESCRIPTIONS OF ZONE TYPES etc.

To program zone 3 as an "Entry Route" enter - **4 3 7 ***

To program zone 8 as a "Keyswitch" enter - **4 8 4 ***

Momentary keyswitch Turn and hold for 0.5 sec = FULL SET

Turn and hold for 2.3 sec = PART SET

EXTENDED PROGRAMMING

EXTENDED PROGRAMMING OPTIONS 7 (Range 1-8)

- Enter **7 - 1** Disables sounder & strobe in night set.
- Enter **7 - 2** Keypress tamper alarm (after 16 incorrect keypresses)
- Enter **7 - 3** Full set door sense setting.
- Enter **7 - 4** Convert L+ to ID- output.
- Enter **7 - 5** Allow Manual Isolation of Zone 1 (Entry/Exit) In Night Set.
- Enter **7 - 6** Remote Keypad PA Enable (Operated by * & #).
- Enter **7 - 7** L+ signals first to alarm.
- Enter **7 - 8** Inhibit strobe in Night and Home Set and testing. (For speech dialler connection)

HOME SET ZONE SELECTION 8 (Range 1-8 N/A if Fire or PA)

The Home Set feature enables parts of the premises to be alarm protected while other parts are occupied. This is similar to Night Set except that an Exit/Entry route is not required as part of the Setting or Unsetting procedure.

In programming mode press **8** to select Home Set zone selection mode, then by pressing the keys **1-8** on the keypad you will select which zones you want ISOLATED during home set. As a key is pressed, its relevant LED on the display will toggle on or off. Any LED's that are ON will be ISOLATED during home set and any that are off will remain ACTIVE.

HOME SET ZONE SELECTION

ENGINEER ACCESS CODE 1-1

The engineer access code is programmed to **7890** by default. To change this code (while in engineering mode):

1. Enter 1-1. LEDs 1, 2, 3 and 4 will illuminate.
2. Enter the new 4 digit code. *After each keypress one LED will go out.*

The speaker will emit an accept tone if the new code is accepted. If the speaker emits an error tone, then your new chosen code is invalid. This could be due to a conflict with another code. At this time your old access code is still valid. Repeat the procedure using a different code.

ENGINEER EVENT LOG REVIEW 5 (Choices of set & unset)

The Panel stores the last set and unset states and the last alarm event. The log is arranged into SET and UNSET events. Log entries indicate the first and subsequent alarms and also isolated circuits. First to alarm is shown by the LED being ON continuously. Subsequent alarms are shown by the LED(s) flashing and isolated circuits by the LED(s) pulsing slowly. The buzzer sounds whilst reviewing the SET logs and is silent while reviewing the UNSET logs.

To view the engineers log press the **5** key from the program mode. The log starts viewing DAY 1 SET. View the remaining logs by pressing the relevant key **2** for 2nd, **3** for 3rd and so on up to **9**. Press the **0** key to get the last alarm condition.

The **#** key alternates between SET and UNSET logs and can be used at any time.

ENGINEER TEST OPTIONS 6 (Range 0-5)

To conduct testing activities first press the **6** key from within engineering mode and then one of the option below.

- | | |
|----------------|---|
| Enter 0 | Internal buzzer (entry exit sound etc.) |
| Enter 1 | Internal Sounder (Alarm sounds from speaker / keypad) |
| Enter 2 | External Sounder |
| Enter 3 | External Strobe |
| Enter 4 | L+ Terminal(even if programmed as ID-) |
| Enter 5 | FULL LOAD (Everything enabled) |

ENGINEER ACCESS CODE

ENGINEER LOG REVIEW

ENGINEER TEST OPTIONS

FACTORY DEFAULTS

RESTORE DEFAULT PROGRAMMING

RESTORE DEFAULT CODES

GLOSSARY OF TERMS

FACTORY PROGRAMMING DEFAULTS 9-9

Restoring programming Defaults.

Enter 9-9, The sounder will give a rapid pipping sound, wait for 5 seconds, an accept tone sounds, the factory programming defaults are restored. The user and engineer codes do not change.

Note: If any keys are pressed this procedure will be aborted.

Restoring Code Defaults

1. Place the small link supplied with the spare fuses, on the memory link.
This is positioned above the volume control and is labelled "Memory Default".
2. Remove the mains and battery supply.
3. Wait a few seconds then re-connect the battery and then the mains
Refer to page 6 regarding initial power up. The speaker will emit the accept tone and the factory user code defaults will be restored.
4. **Be sure to remove the link .**

Locking the Engineer Code

Use this option with care. You can lock the engineer code to prevent unauthorised alteration. To enable the engineer code must end in **9**. If the engineer code is lost, it will not be possible to enter engineer mode, the PCB will need to be replaced. This is considered to be a "Chargeable repair".

GLOSSARY OF TERMS

FULL SET

This is a setting method normally used when leaving the premises. Full system armed.

NIGHT SET

This is a setting method normally used when going to bed

HOME SET

This is a setting method normally used for high security protection whilst still inside the premises. For example an antiques cabinet etc.

ALARM

This is a zone that will trigger the panel when activated, providing the panel is set.

WALK THROUGH

This zone will be disabled during an entry period.

ISOLATE IN NIGHT SET

This simply means the zone will be disabled when the panel is NIGHT SET. For example downstairs

NIGHT SET ENTRY

When the panel is NIGHT SET the zone, when activated, will start the entry timer but if the panel is FULL SET then this zone will acts as an ALARM zone.

ENTRY CIRCUIT

This will start the entry timer when activated providing the panel is set.

FIRE (for use with smoke detectors etc.)

A zone that when activated emits an ascending sound from any internal speakers. If the panel is set, external sirens and strobes will also sound but in an unset state the external sounders will pulse every two seconds.

TAMPER

This is a loop that should run through every device on your system. If broken, it triggers the internal speakers. If the panel is set, the external sounders and strobes will also trigger. The tamper LED is shown on the keypad as **TPR**.

CHIME

Chime is similar to a doorbell. This can be used to alert a user to a certain zone being triggered during the day.

DOOR SENSE SETTING

This allows you to have a variable FULL SET EXIT TIME. You can program the EXIT time to maximum and when you full set the system, the exit time will drop to 8 seconds as soon as the EXIT door has closed thus avoiding the preset exit time.

KEYSWITCH

This allows the panel to be Full set, Part set, Unset and Reset via zone 8.

Note: To use the keyswitch for setting and unsetting, connect to zone 8 and program that zone to be KEYSWITCH. To set the panel, turn the key so that the contacts are open, hold in this position for about a second for full set or about 2 seconds for night set. To unset the panel, turn and hold for about ½ second. To reset open and close the keyswitch after an alarm condition.

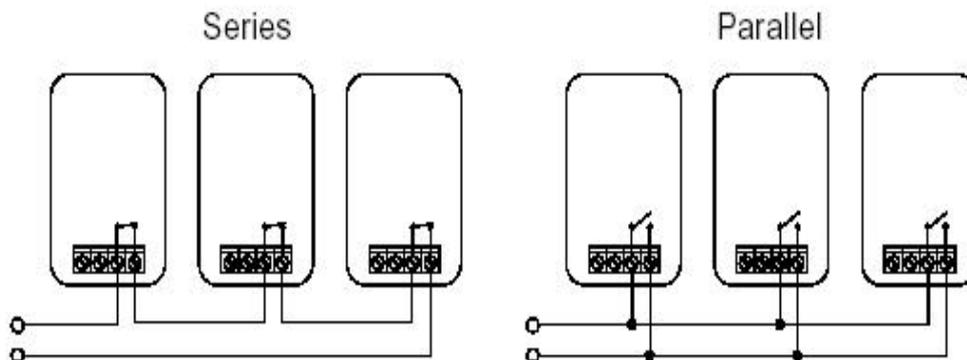
THE ACCEPT TONE

This is heard when an action is accepted.

THE ERROR TONE

This is heard when an action is not accepted.

SERIES AND PARALLEL



LATCHING DETECTORS

These detectors, when triggered during a set period, latch on to aid the process of alarm event origin checking. These detectors are only normally used if many detectors are to be used on a single zone but are to cover a large area of space.

THIS INFORMATION SHOULD BE KEPT EITHER INSIDE THE CONTROL PANEL OR WITH THE INSTALLER. IT CAN BE USED TO REFER TO PROGRAMMING DETAILS WHEN NEEDED.

ZONE	ZONE USE / LOCATION								RESISTANCE
1									Ω
2									Ω
3									Ω
4									Ω
5									Ω
6									Ω
7									Ω
8									Ω
TIMER	VALUE								
FULL									SECONDS
NIGHT									SECONDS
EXT SOUNDER									MINUTES
TICK BOX	1	2	3	4	5	6	7	8	CHECKED
EXTENDED OPTIONS									
BATTERY VOLTAGE									V
AUX. VOLTAGE									V
INSTALLED BY									

SOUNDER CONNECTIONS					
CONTROL PANEL	ST-	S-	+	-	-R
SONADE 2000	STROBE-	B	D	A	T
FLASHGUARD XL+	STROBE-	SIREN-	SUPPLY+	SUPPLY-	TAMPER OUT
STARLIGHT 2000	ST	-R	+H	-H	RTN
AG 6 & AG 8	ST-	-SW	V+	V-	RET
NOVA GUARD 2+T	STROBE-	S-	12V+	12V-	R
SPIRIT AU1000	STB-	TRG-	HOLD OFF +	HOLD OFF -	RTN-
GENERAL TERMINALS	STROBE TRIG -	SIREN TRIG -	SUPPLY+	SUPPLY-	TAMPER RETURN

NOTE: When installing a self-actuating sounder remove panel link between R- and -.

FAULT FINDING

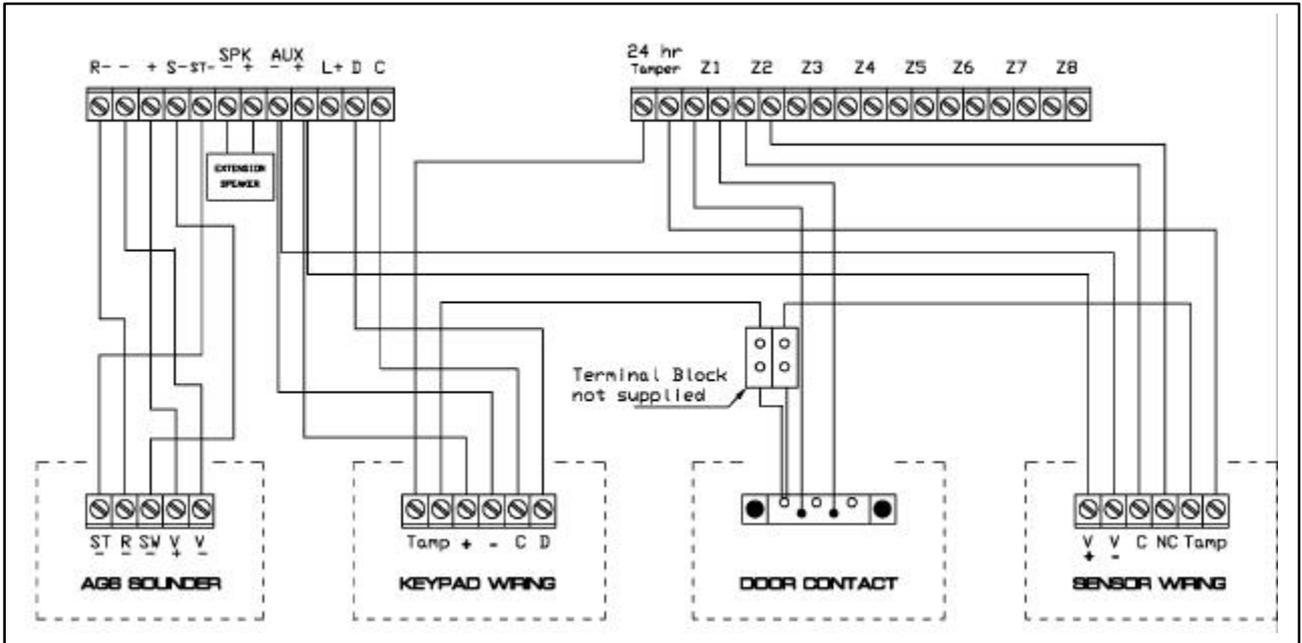
A selection of common known problems and solutions are listed below.

Problem	Cause	Answer
Programmed 7-5 but zone 1 will not isolate in night set.	Have not MANUALLY isolated zone when setting panel.	When night setting enter code * 0 * 1.
Zone 1 is permanently lit	Memory default link is on.	Remove link.
Tamper will not clear with lid on.	Tamper loop open	Check 24hr tamper, sounder tamper and all devices for an open tamper loop.
PA will not work on the keypad	Not holding * & # long enough or option not enabled	Be sure to HOLD * & # until the alarm activates. Enable option 7-2.
Mains light not on.	No mains	Check fuse & mains supply
Battery not taking over after mains fail	Battery fuse blown or battery not connected or flat battery.	Connect battery and check 1A battery fuse. Fit new battery.
Remote keypad not responding	Incorrect wiring	Check wiring. C to C & D to D.
Zones failing to activate.	Incorrect wiring	Make sure the devices are wired in series NOT parallel.
Zone activates during entry	Seeing an alarm zone on entry or deviating from entry route.	Make sure all zones on entry route are programmed with walkthrough. Do not deviate.
Zone activates even in day mode	Programmed to PA or FIRE.	Reprogram the zone to be an alarm zone or similar.

If you are still experiencing problems then contact our technical helpline with information at hand regarding your situation. If your problem stems from wiring, you may be required to write down wiring instructions so have a pen and paper at hand.

General questions & Answers

Question	Answer
Can two bell boxes be used on the system	Yes, make sure tampers are in series and do not exceed the current limit
Can a "sound bomb" be installed	Yes, connect between AUX+ and S-. Be sure not to exceed maximum current rating.
How many PIR's can be connected to a zone	While it is better practice to limit the number of detectors per zone, upto 10 may be fitted. Zone resistance should not exceed 50 ohms.
Can the engineer set the panel without the need of a user code	Yes, if the engineer code is entered the panel will start the set. The engineer code will also unset if the panel was set using the engineer code, it will not unset if a user set the panel.
What happens if the zone is still in fault when the bell cuts off	The panel will re-arm. Any zone in fault will be temporarily isolated and will re-arm when the fault clears.
Will there be any further alarms	Any further alarm activation's will trigger the bells again for the selected time. If any zone activates three times in succession it will be isolated. Alarms can occur from other zones.



Wiring Diagram



City Electrical Factors

Unit 2 Arkwright Court
 Fylde Industrial Estate
 Blackpool
 FY4 5DR

Technical support 01253 792898