

Comfort
Applications Manual

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Security/Automation Integration

1 SECURITY / AUTOMATION INTEGRATION

- 1.1 Automatically Switch off appliances when system is armed
- 1.2 Programming Lights to turn on when Alarm is activated
- 1.3 Switch on Lights when entering the premises at night
- 1.4 Switch on a Light when Movement is detected at Night
- 1.5 Switch Lights when Movement is detected (Light Level Dependent)
- 1.6 Prowler Sequence in Vacation Mode
- 1.7 Flashing Lights during Alarm

Security/Automation Integration

1.1 Automatically Switch off appliances when system is armed

For convenience and energy saving, lights and selected appliances may be switched off automatically when the system is armed to Away or vacation mode.

Program a Response in Security Mode Responses. This menu is in Engineer Menu (3,5). This will cause the system to activate the programmed response when the security mode is changed to the specified mode (Home, Away, Night or Day). For example, to switch off all X10 appliances when the system is armed to Away and Vacation mode, program Away Mode Response to do Response 65. Response 65 is programmed to turn off all X10 Housecode A devices, while Response 66 turns off only house code A lights.

In Away Mode, the strobe can also come on for 3 seconds to give a visual confirmation that the system is armed. Use Action 74 (Do Response) to link several Responses together. The Away Mode Response is set to 28, which activates Response 118 and 65.

To turn off all X10 Lights in Night Mode, program The Night Mode Response to do Response 66. The Night Mode Response is set by default to 31. Response 31 has 74,66 (do Response 66 which is Off all Lights Housecode A). This indirect method seems to be more complicated, but makes it easier to combine responses, like in the Away Mode Response.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|-------------|-----|-----|----|-----|---|----------------------------------|
| Response | Action code | | | | | | Remarks |
| 28 | 74 | 118 | 74 | 66 | 255 | | Away Mode Response Do 118, do 65 |
| 31 | 74 | 65 | 255 | | | | Night Mode Response, do 66 |
| 65 | 195 | 65 | 00 | 01 | 255 | | X10 Housecode 'A' units off |
| 66 | 195 | 65 | 0 | 13 | 255 | | X10 Housecode A lights off |
| 117 | 66 | 0 | 255 | | | | Strobe Off |
| 118 | 66 | 1 | 194 | 8 | 0 | 3 | Strobe On 3 seconds then R117 |
| | 117 | 255 | | | | | |

| Engineer Menu, 3 - Control Settings, 5 - Security Mode Responses | |
|--|-------------------------|
| 1 - Away Mode Response | 2 - Night Mode Response |
| 28 | 31 |

When the system is armed to Vacation Mode, the Away Mode Response is activated. There is no Vacation Mode Response menu.



The Security Off Response is activated when the system is disarmed from any of the Armed modes. It is not activated when disarmed from a 24 hour alarm, e.g. Panic Alarm when Security is already Off

This example applies to X10 control, but it is equally easy to control lights via relays.

Security/Automation Integration

1.2 Programming Lights to turn on when Alarm is activated

Each of the 31 Alarm types can be linked to a Alarm Responses when activated. This allows any additional action to be performed when the alarm occurs.

When an Intruder Alarm occurs, all the lights in the house can be programmed to turn on. When a Fire Alarm occurs at night, the lights showing the way to leave the building may be turned on. These are some of the uses of the Alarm Type Response.

In this example, we will program all the lights controlled by X10 lighting modules to turn on when an Intruder Alarm occurs.

Step 1 Response 96 is set to X10 All Lights House code A ON by default. If not, program a Response to Action codes 195,65,00,03,255. Action Codes 195 is for X10 Control. 65 is ASCII code for House code A, 00 is the Keycode, which is not used here and 03 is for X10 All Lights ON command. 255 is the terminator. This response takes up 5 bytes including the terminator, so it fits into 1 Response.

Step 2 Program Response 25 to 74,96, i.e. Do Response 96.

Step 3 Program the Response number into the Intruder Alarm Type. Enter Engineer menu, Press 2 - Alarm Types, Enter 1# (Alarm Type 1 is Intruder Alarm), press 2 - Response, and enter the Response number (25 by default) and # key.

This indirect method of setting Alarm Response to 25 and in Response 25 do Response 96 seems more complicated, but makes it easier to combine more responses in Response 25 by using more action 74 (Do Response). 3 lines are reserved for Response 25 to cater for more actions. For example, to also turn on all lights for housecode B, add 74, 122 (Do Response 122, which is X10 housecode B all lights ON) to Response 25.

This completes the programming. Test the program by causing an Intruder alarm.

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|--------------|
| Alarm Type | 2 - Response |
| 1, Intruder | 25 |
| 9, panic | 25 |
| 11, tamper | 25 |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--------------------------------------|-------------|----|----|----|-----|--|
| Response | | Action code | | | | | |
| 25 | Intruder/panic/tamper alarm Response | 74 | 96 | | | | |
| 96 | X10 all lights housecode A on | 195 | 65 | 00 | 03 | 255 | |

Application 1.5 shows how to flash the lights instead of turning them on

Security/Automation Integration

1.3 Switch on Lights when entering the premises at night

When the system is armed and the entry door is opened, a light may be programmed to turn on so that the person coming home does not have to grope in the dark for a light switch. Furthermore, the light may be programmed to turn on only in the night hours.

When the designated Entry door(s) is opened in Away, Night or Vacation Mode, an Entry Alert is activated. This alarm type starts the siren beeping to warn the person entering to disarm the system before the entry time expires. You can also program a Response to be activated by this alarm type.

In this example, we shall program a Response to turn on the lights connected to X10 module address code A1 after 7 P.M. and before 6 A.M.

- Step 1** Enter Engineer menu, 2 - Alarm Types. Enter 10# for Entry Alert.
- Step 2** Press 2 - Responses. Enter an unused Response, say 45 and #.
- Step 3** From Engineer Menu, press 3 - Control Settings, 6 - Responses. Enter 45 #.
- Step 4** Enter the following Actions: 73,03 (Get Hour of Day), 69, 19 (Skip to Marker if > = 7 P.M.), 70, 6 (Skip to Marker if < 6 A.M.), 193 (Exit Response, also Marker), 195,65,1,5 (X10 A1 ON).

The lights and appliances may be controlled by the outputs via appliance relays or infrared LEDs, or using X10 appliance or lamp modules.

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|--------------|
| Alarm Type | 2 - Response |
| 10, Entry Alert | 45 |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Response | Action code |
| 45 | 73 | 3 | 69 | 19 | 70 | 6 |
| | 193 | 195 | 65 | 1 | 5 | 255 |



For systems with 255 Responses, Response 247 is preprogrammed for X10 A1 ON between 7 PM and 7 am, and Entry Alert Alarm Type 10 is set to Response 247.

Security/Automation Integration

1.4 Switch on a Light when Movement is detected at Night

An external PIR may be set up to turn on an outside light for a few minutes if any movement is detected at night. There are self-contained sensor lights which can do this, but Comfort is able to handle this in a more intelligent way and integrate it with the whole system. In this example, we shall program Comfort to turn on the light (connected to output 5) if the time is between 7 PM to 7 am. The light will be turned off after 5 minutes if no further movement is detected, but movement while the light is still on will retrigger the light and timer. This light can also be controlled on the Home Control Menu. The output relay in this application is connected in parallel to the light switch, so it works only when the light switch is in the OFF position.

Step 1 Set up a zone as Normally Open Switch zone type (8). Assign an unused Response say 45 to this.

Step 2 Program the Response as follows: 73,03 (Get hour of day), 69,19 (Skip if >= 19, i.e.. 7 PM), 70,07 (Skip if < 7 am), 193 (exit), 74,9 (Do Response 9 i.e.. Output 5 ON), 194,1, 1,44, 10 (Start user timer 1 for 300 seconds, then do Response 10, i.e.. Output 5 OFF), 255 (end). This response takes up 18 codes so the next 2 Responses lines cannot be used for other purposes. This Response turns on the light only between 7 PM and 7 am for 5 minutes, and then turns it off. If the light is already on, it restarts the timer.

Step 3 Set up a Control Menu item to control the light directly as shown in the table below.

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | |
|---|--------------------|-----------|-------------|--------------|
| Press | 1 | 2 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | ON Response | OFF Response |
| | "outside movement" | 8 | 45 | |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|-------------|----|-----|-----|----|---|
| Response | Action code | | | | | |
| 45 | 73 | 3 | 69 | 19 | 70 | 7 |
| | 193 | 74 | 9 | 194 | 1 | 1 |
| | 44 | 10 | 255 | | | |
| 9 | 128 | 5 | 1 | 255 | | |
| 10 | 128 | 5 | 0 | 255 | | |

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|-----------------|----------------|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 0 to 9, * | "Outside Light" | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | | "Off" | 10 | "On" | 9 |

If the light is controlled by X10, use X10 action code 195 to control the lamp module.

Security/Automation Integration

1.5 Switch Lights when Movement is detected (Light Level Dependent)

An external PIR may be set up to turn on an outside light for a few minutes if any movement is detected at night. This response refers to a photocell on a zone to determine when darkness occurs. There are some detectors which also include a light sensor output which can do this. This may be a negative trigger output and can be used to either switch a 12v relay connected to the zone or the negative can connect directly to the zone terminal and programmed as zone type 8 (normally open) going negative when dark.

In this example, we shall program Comfort to turn on the light (connected to output 5) if the light sensor on zone 13 is active (i.e. closed circuit). The light will be turned off after 5 minutes if no further movement is detected, but movement while the light is still on will retrigger the light and timer. This light can also be controlled on the Home Control Menu. The output relay in this application is connected in parallel to the light switch, so it works only when the light switch is in the OFF position.

- Step 1** Set up a zone as Normally Open Switch zone type (8). Assign an unused Response say 45 to this.
- Step 2** Set up a zone for the light sensor contact as Normally Open Switch zone type (8) without response
- Step 3** Program the Response as follows: 79,13 (Get state of zone 13), 12 (Exit if zero i.e.. 0 = light 1= dark), 74,9 (Do Response 9 i.e.. Output 5 ON), 194,1, 1,44, 10 (Start user timer 1 for 300 seconds, then do Response 10, i.e.. Output 5 OFF), 255 (end). This response takes up 11 codes so Response 46 cannot be used for other purposes. This Response turns on the light only between when it is dark and there is movement and then turns it off. If the light is already on, it restarts the timer.
- Step 4** Set up a Control Menu item to control the light directly as shown in the table below.

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | |
|---|--------------------|-----------|-------------|--------------|
| Press | 1 | 2 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | ON Response | OFF Response |
| | "outside movement" | 8 | 45 | 0 |
| 13 | "Light sensor" | 8 | 0 | 0 |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|-------------|----|----|-----|-----|-----|
| Response | Action code | | | | | |
| 45 | 79 | 13 | 12 | 74 | 9 | 194 |
| | 1 | 1 | 44 | 10 | 255 | |
| 9 | 128 | 5 | 1 | 255 | | |
| 10 | 128 | 5 | 0 | 255 | | |

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|-----------------|----------------|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 0 to 9, * | "Outside Light" | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | | "Off" | 10 | "On" | 9 |

If the light is controlled by X10, use X10 action code 195 to control the lamp module in responses 9 and 10 or change the response numbers to ones which contain the correct X-10 module commands.

Security/Automation Integration

1.6 Prowler Sequence in Vacation Mode

An external PIR may be set up to turn on an outside light for a few minutes if any movement is detected at night. This is a three stage conditional response. The first stage refers to a photocell on a zone to determine when darkness occurs before switching the external light. Using Response 86 and 45. This will be the most used function. To provide additional deterrent effect, a lighting sequence designed to imitate an occupant getting up to investigate a sound has been devised. This will depend upon two other conditions being 'true': If the system is in Vacation Mode and after 12.00 AM (set by a flag 14 within Time Program 14 which only activates on a Holiday) . Response 86 also does this before moving on to Response 56 to do the switching. This will firstly switch the Bedroom Light(A2) then after 5 seconds switch the Landing light(A3) and then after another 5 seconds the Hall light(A4). The lights will stay on for 10 minutes before they are all finally switched off. The flag will also be reset by the light sensor sensing daylight to avoid the sequence happening before 12 midnight later that evening. The use of 12 Midnight as the starting time is based upon the assumption that Vacation Programs will have been used to operate lighting etc. randomly up until 12 Midnight. This lighting sequence can operate throughout the night whenever external movement is detected and will cease when daylight is detected (flag 14 is cleared).

There are some detectors which also include a light sensor output which can do this. This may be a negative trigger output and can be used to either switch a 12v relay connected to the zone or the negative can connect directly to the zone terminal and programmed as zone type 8 (normally open) going negative when dark.

In this example, we shall program Comfort to turn on the lights (X-10 addresses A1,A2,A,3 and A4) if the light sensor on zone 13 is active (i.e. closed circuit). The outside light(A1) will be turned off after 5 minutes if no further movement is detected, but movement while the light is still on will retrigger the light and timer. Set up a zone to monitor outside activity as (zone type 8 or 23). Assign On Response 86 to this.

The responses are defined as follows:

86 = This response initiates the outside light response and checks for conditions, if holiday and flag 14.

56 = Uses timers 2,3,4 and 5 to switch X-10 modules A2,A3 and A4 on at intervals before switching them all off after 10 minutes.

45 = Outside lights A1 switched for 5 minutes conditional upon darkness only

85 = Set flag 14, use in Time Program at 12 AM on holidays

84 = Unset flag 14 when zone 13 (light sensor) detects daylight

126 = All internal lights A2, A 3 and A4 Off.

33-40 = On and Off responses for X-10 modules A1 - A4.

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | |
|---|------------------------|-----------|-------------|--------------|
| Press | 1 | 2 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | ON Response | OFF Response |
| | "outside movement" | 8 or 23 | 86 | 0 |
| 13 | "Light sensor control" | 8 | 0 | 84 |

Outside Light 5-minute switching Response with Light Level Condition

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
| Response | Action code 1 | Action code 2 | Action code 3 | Action code 4 | Action code 5 | Action code 6 |
| 45 | 79 | 13 | 12 | 74 | 33 | 194 |
| | 1 | 1 | 44 | 34 | 255 | |
| 33 | 0 | 65 | 1 | 5 | 255 | |
| 34 | 195 | 65 | 1 | 7 | 255 | |

Security/Automation Integration

Holiday and Time Condition Responses

| | | | | | | |
|-----|----|----|----|-----|----|-----|
| 86 | 74 | 45 | 73 | 19 | 12 | 132 |
| | 14 | 2 | 12 | 74 | 56 | 255 |
| 126 | 74 | 34 | 74 | 74 | 36 | 74 |
| | 38 | 74 | 40 | 255 | | |

Prowler Sequence and Flag 14 Controls

| | | | | | | |
|----|-----|-----|-----|-----|-----|-----|
| 56 | 194 | 5 | 0 | 5 | 35 | 194 |
| | 4 | 0 | 10 | 37 | 194 | 3 |
| | 0 | 20 | 39 | 194 | 2 | 2 |
| | 88 | 126 | 255 | | | |
| 84 | 132 | 14 | 0 | 255 | | |
| 85 | 132 | 14 | 1 | 255 | | |

X-10 Modules Control Responses

| | | | | | | |
|----|-----|----|---|---|-----|--|
| 35 | 195 | 65 | 2 | 5 | 255 | |
| 36 | 195 | 65 | 2 | 7 | 255 | |
| 37 | 195 | 65 | 3 | 5 | 255 | |
| 38 | 195 | 65 | 3 | 7 | 255 | |
| 39 | 195 | 65 | 4 | 5 | 255 | |
| 40 | 195 | 65 | 4 | 7 | 255 | |

Engineer Menu 3 - Control settings, 3 - Time Programs

| Press | 1 | 2 | | 3 | |
|-----------|------------------|------------|-------------|----------|--|
| Time Prog | Days of Week | Time (Hrs) | Time (Mins) | Response | Description |
| 14 | Only on Holidays | 0 | 00 | 85 | Set prowler flag 14 at midnight during a holiday |

If the light is controlled by X10, use X10 action code 195 to control the lamp module in responses 9 and 10 or change the response numbers to ones which contain the correct X-10 module commands.

Security/Automation Integration

1.7 Flashing Lights during Alarm

Lights on the premises can be made to flash when an alarm is activated, in order to attract attention and to scare the intruder. This makes use of an Alarm Response, which is started when an alarm is triggered. The following Response will cause flashing of lights connected to X10 Lamp modules

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|------------------------------------|
| Alarm Type | 2 - Response |
| 1, Intruder | 49, Start Flashing Lights |
| 9, Panic | 49, Start Flashing Lights |
| 17, Security Off | 77, Stop Timer for flashing Lights |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|----|-----|-----|-----|---|
| Response | Description | Action Codes | | | | | |
| 96 | X10 All Light On House code A (downstairs Lights) | 195 | 65 | 0 | 3 | 255 | |
| 66 | All Lights Housecode A Off (downstairs lights) | 195 | 65 | 0 | 1 | 255 | |
| 122 | X10 All Lights Housecode 'B' ON (Upstairs Lights) | 195 | 66 | 0 | 3 | 255 | |
| 123 | X10 All Lights 'B' OFF (Upstairs Lights) | 195 | 66 | 0 | 1 | 255 | |
| 49 | Do Resp 96, & 122, Start Timer 7 for 5 seconds, then Resp 51 | 74 | 96 | 74 | 122 | 194 | 7 |
| | | 0 | 5 | 51 | 255 | | |
| 51 | Do Resp 66 & 123, Start Timer 7 for 5 seconds, then Resp 49 | 74 | 66 | 74 | 123 | 194 | 7 |
| | | 0 | 5 | 49 | 255 | | |
| 77 | Security Off Response, Stop Timer 7 | 85 | 7 | 255 | | | |

Response 49 :

Do Response 96 (X10 'A' housecode All Light on) , Response 122 (X10 'B' all Lights on), Start Timer 7 for 5 seconds & then Response 51. X10 Housecode A can be used for Downstairs lights, while Housecode B can be used for upstairs lights. Response 51:

Do Response 66 (X10 'A' All Lights Off), Response 123 (X10 'B' All Lights Off), start Timer 7 for 5 seconds & Response 49

This has the effect of flashing the lights and off at intervals of 5 seconds To stop the flashing sequence, use the Security Off Response to stop the timer using Action 85 (Stop Timer). Note that the same timer can be used in different Responses as long as they do not run at the same time



Alarm Type 17, Disarm, Response is activated whenever the system is disarmed when the system is armed or during an alarm. The Security OFF Mode Response (Eng 3,5,0) is activated when system is disarmed but not when the system was not armed, e.g. for 24 hour alarms.

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2 SECURITY APPLICATIONS

- 2.1 Bypassing zones using a switch
- 2.2 Bypassing groups of zones on the Voice Menu
- 2.3 Programming Zones to Chime.
- 2.4 "Soak Testing" Detectors
- 2.5 Announcing Zones on the Keypads
- 2.6 Sending an Alarm Abort signal to Central Station (UK)
- 2.7 Programming a Daily Central Station Dial Test and Battery Test
- 2.8 Using Delay Zones to Prevent False Alarms in Night Mode
- 2.9 Switching CCTV Cameras based on Movement
- 2.10 Alternate Sirens for Alarms
- 2.11 Vibration Analyzer
- 2.12 Disabling or Limiting Alarm Dialout in Night and Day Modes
- 2.13 Disabling/Limiting Alarm Dialout to Tel 3-8 in Night /Day Modes
- 2.14 Family Care (No Activity) Alarm for Monitoring the Elderly
- 2.15 Silent Panic Alarm
- 2.16 Continuous Announcement of Zone in Alarm
- 2.17 Chime in Alarm if system is not disarmed
- 2.18 Alternative Night Arming Using Night Mode key and Voice Menu
- 2.19 Interaction with Outputs and Alarm Responses (UK)
- 2.20 Power Failure Delay Setting

Security Applications

2.1 Bypassing zones using a switch

One or more zones may be bypassed and unbypassed using a switch or keyswitch. This can be used in night mode to go into the protected zones to watch television or to go to the kitchen at night, without having to disarm the system. The rest of the zones remain protected against intruders. The switch can be used to unbypass the zones to fully protect the premises when the activity is over.

- Step 1** Program an unused Response to bypass the zone or zones. As an example, we are going to use Response 45 to bypass zones 3, 4, and 5. In the Engineer Menu, go to 3 - Control Settings, 6 - Responses, enter 45#. Enter actions 75, 03, 75, 04, 75, 05, 255 . Enter each action code followed by the # key. 75 is the Bypass Zone action, and the next code is the selected zone number, so the above actions bypass zones 3, 4, and 5. 255 is the terminator. The Response has 7 action codes including the terminator, which is more than the 6 codes allotted to a Response. As a result, Response 46 cannot be used. Activating Response 45 will bypass the 3 zones.
- Step 2** Program another unused Response, say Response 47 to unbypass the same zones, Using the same procedure as above enter actions 20,03,20,04,20,05,255. Action 20 is the Unbypass Zone action, with the zone number in the following action code. Hence these actions unbypass zones 3,4, and 5. Again this Response takes up 7 action codes, so Response 48 cannot be used. Activating Response 89 will unbypass these zones. Alternatively, Action 10 may be used to unbypass all zones, provided that there are no other zones which should remain bypassed at this time. This uses only 2 action codes (10,255), allowing Response 48 to be used for other purposes.
- Step 3** Connect a keyswitch to one of the zones as Zone Type 8, normally open switch. Closing the switch bypasses and opening the switch unbypasses the zones.
- Step 4** Program the zone as follows. Enter Engineer menu, 1 - Zone Settings , and enter zone number and # key.
- Step 5** Press 1 for Description and enter the words to describe the zone from the wordlist e.g. "Night Bypass". Remember to enter # after each word number up to a maximum of 4 words.
- Step 6** Press 2 for Zone type. Enter 8 for zone type (Normally Open Switch).
- Step 7** Press 3 for Entry path. Press 0 for OFF
- Step 8** Press 5 for ON Response. Enter 45# in our example for the Zone ON response
- Step 9** Press 6 for OFF Response. Enter 47# for the Zone OFF Response.

Turning the switch to the ON (or closed) position bypasses these zones. Turning the switch OFF unbypasses these zones. The switch has no effect if the system is in Security off.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | |
|---|-------------|--------|----|--------|----|--------|
| Response | Action code | | | | | |
| 45 | 75 | (zone) | 75 | (zone) | 75 | (zone) |
| | 255 | | | | | |
| 47 | 20 | (zone) | 20 | (zone) | 20 | (zone) |
| | 255 | | | | | |

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | | |
|---|-------------|-----------|-----------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | Entry/exit path | ON Response | OFF Response |
| | | 8 | 0 - OFF | 45 | 47 |

Security Applications

2.2 Bypassing groups of zones on the Voice Menu

The Home Control Menu may also be used to bypass and unbypass zones as well as controlling lights and appliances. This can be used in night mode to go into the protected zones to watch television or to go to the kitchen at night, without having to disarm the system. The rest of the zones remain protected against intruders. The voice menu can be used to unbypass the zones to fully protect the premises when the activity is over.

- Step 1** Program an unused Response to bypass the zone or zones. As an example, we are going to use Response 45 to bypass zones 3, 4, and 5. Go to Control Settings, Responses, enter 45 # (Engineer menu 3,6, *Response 45#*). Enter actions 75, 03, 75, 04, 75, 05, 255. Enter each action code followed by the # key. 75 is the Bypass Zone action, and the next code is the selected zone number, so the above actions bypass zones 3, 4, and 5. 255 is the terminator. The Response has 7 action codes including the terminator, which is more than the 6 codes allotted to a Response. As a result, Response 46 cannot be used. Activating Response 46 will bypass the 3 zones.
- Step 2** Program another unused Response, say Response 47 to unbypass the same zones, Using the same procedure as above enter actions 76,03,76,04,76,05,255. Action 76 is the Unbypass Zone action, with the zone number in the following action code. Hence these actions unbypass zones 3,4, and 5. Again this Response takes up 7 action codes, so Response 48 cannot be used. Activating Response 89 will unbypass these zones. Alternatively, Action 10 may be used to unbypass all zones, provided that there are no other zones which should remain bypassed at this time. This uses only 2 action codes (10,255), allowing Response 48 to be used for other purposes.
- Step 3** In this example, we will program Control key 9 to do the bypassing and unbypassing with action key 1 for ON and 0 for OFF. Enter Engineer menu, press 3 - Control Settings, then 1 - Control Menu.
- Step 4** Press 9 to select Control key 9.
- Step 5** Press 1 for Description. Enter a suitable description e.g. "bypass downstairs". Enter # after each word up to a maximum of 4 words.
- Step 6** Press 2 for Control Action. We shall program key 1 to bypass and 0 to unbypass.
- Step 7** Press 1 to select the action key for bypass. Enter a word, say "ON" to describe the bypass action.
- Step 8** Enter the Response number 45#. The Bypass function is programmed.
- Step 9** Press 0 to select the action key for unbypass. Enter a word, say "OFF" to describe the unbypass action.
- Step 10** Enter the Response number 47# to perform the unbypass function.
- Step 11** Leave the other action keys 2 to 9 unassigned.

This completes the programming. Test the bypass on the voice menu in Night mode or Away mode

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|--------|----|--------|----|--------|-----------------------|
| Response | Action code | | | | | | Description |
| 45 | 75 | (zone) | 75 | (zone) | 75 | (zone) | Bypass zone numbers |
| | 255 | | | | | | |
| 47 | 76 | (zone) | 76 | (zone) | 76 | (zone) | Unbypass zone numbers |
| | 255 | | | | | | |

| Table for Control Menu Programming | | | | |
|------------------------------------|-----------------------|------------|-------------|----------|
| Key | Description | Action Key | Action Word | Response |
| | | (0 to *) | (0-255) | (0-99) |
| 9 | "DOWNSTAIRS" "BYPASS" | 0 | OFF | 89 |
| | | 1 | ON | 87 |

Security Applications

2.3 Programming Zones to Chime.

Certain zones may be programmed to give a chime sound on the speaker. This is often used for doors. It may be used for outside PIRs to give warning that someone is approaching. The chime sound is performed by a Response which activates the Chime Siren type.

Step 1 Program the zone settings in Engineer menu, 1 - Zone settings. Program the settings for Description (1) , Zone Type (2), Entry path (3) as required for the zone.

Step 2 Response 75 by default is set to activate the Chime Siren Type. Check that Response 75 contains the actions 64, 15 (Activate Siren type 15). Assign this response number to the ON Response. If Response 75 is used for other actions, program an unused Response using the same actions.

This completes the programming. Whenever the zone is activated, the chime will be heard.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | |
|---|-------------|----|-----|--|--|-----------------------|
| Response | Action code | | | | | Description |
| 75 | 64 | 15 | 255 | | | Siren Type 15 - CHIME |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|-----------|------------|----------------|-----------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Response | OFF Response |
| | | | | 75 | |

Chime only at certain times

Alternatively, the zone can be made to chime only at certain times. As an example, we shall program the chime only from 7 PM to 6 AM

Step 1 Select an unused Response. Enter Engineer menu, press 3 - Control Settings, 6 - Responses. Enter the new Response number and # key.

Step 2 Enter the actions 73, 03, 69, 19, 70, 6, 193, 64, 15, 255. The action 14, 03 gets the hours of day (00 to 23). The action 69, 19 is Skip if greater than or equal to (>=) 19 (7 PM). Hence, if the time is later than 7 PM , the next actions are skipped. 70,6 is Skip if the time is less than 6. If the time is later than 7 PM or earlier than 6 am, the next action 193 (Exit from Response) is skipped. From 7 PM to 6 am, the action 64,15 activates the Chime siren type. As this Response takes up 10 codes, which is more than the 6 allowed for a Response, the next Response number cannot be used.

This completes the programming.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | |
|---|-------------|----|----|-----|----|---|
| Response | Action code | | | | | Description |
| | 73 | 03 | 69 | 19 | 70 | Between 7 PM and 6 AM, activate siren type 15 (Chime) |
| | 193 | 64 | 15 | 255 | | |

Security Applications

2.4 "Soak Testing" Detectors

Most installers have come across installations where PIRs cause false alarms every now and then. The reasons for this could be lizards and insects crawling over the detector, changes in temperature due to drafts, faulty or intermittent detectors, wiring problems, and a host of reasons. It may take time to pinpoint the actual cause of the problem. One way around the problem is to assign the troublesome detector as an Alert Zone Type, so that another Alert zone within 10 minutes is required to cause a full alarm, provided the placement of detectors is carefully considered to allow this option. Another way is to temporarily program the PIR zone as a "soak test" zone type, which does not cause a noisy alarm which wakes the neighbors, and records the trigger event in the event log. This makes use of a "Soak Test" zone type which causes an idle-state Alarm.

- 1 Program Zone Type 22 as a "Soak Test" Zone type, using the following settings in Locations menu or CS-Xpress Zone Types Screen. In later systems, Zone Type 22 is already set up for Soak Test as default, but check anyway. Reset the panel after changing Locations or downloading from CS-Xpress

| Location (Eng Menu 7,4,1) | Value | Zone Type 22 Settings |
|---------------------------|-------|---|
| 1384 | 60 | Instant in Night and Away Modes |
| 1385 | 6 | Normally Closed, not 24 Hr, Sensitivity No 6 (300 ms) |
| 1386 | 14 | Normal Alarm Type 14 |
| 1387 | 5 | Trouble Alarm Type 5 |

- 2 Set Alarm Type 14 to dial to the programmed phone(s) for notification, and set Event Log ON. The Description to be reported to event log and voice phone can be set to "Zone Alert" if required.

| Dial-out | Dial Indexes | Description | Alarm State |
|----------|---------------------------|--------------------|-------------|
| (2,1) | (2,1,1) | (2,3) | (2,8) |
| 1 = ON | set phones ON as required | 106 = "Zone Alert" | 0 |

This completes the programming. When the zone is triggered during Night and Away Modes, the system will dial to the programmed phones and report in the Event Log.

Security Applications

2.5 Announcing Zones on the Keypads

Zones which are protected at that time are always announced on the Voice Station. For example, in Night Mode, any intrusion into the protected night zones are announced. Normally, in Security off, zones which are inactive (i.e.. not protected) will not be announced on the Voice Station.

It is easy to program any zone to be announced on the Voice Station at any time. This is an alternative to the chime assignment, which does not inform which zone has been detected. There may be more than 1 zone which is to be announced when activated, e.g. the back door, front door. A chime will not give the information as to which zone is being triggered, whereas a Voice announcement provides the required information to warn the user.

Action 01 (Announce Zone) when programmed into a Zone Response enables this function. Response 59 is programmed by default with this Action 01 for the required zone(s) if User Flag 15 is I off. This will cause an announcement whenever that zone is detected. Flag 15 is used as a control to determine if the announcement is to be made. The Flag may be set by a switch or in the Home Control Menu to turn off zone announcements. The flags are off by default, so if no Responses are set up to set the flag, the announcements are always turned on.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|----|---|----|---|-----|---|
| Response | Action code | | | | | | Description |
| 59 | 132 | 15 | 2 | 13 | 1 | 255 | Announce zone on Voice Station if Flag 15=0 |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-------------|-----------|------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description | Zone Type | Entry Path | ON Response | OFF Response |
| | | | | 59 | |

Alternatively, the voice announcement can be programmed to be active only at certain times, by using the Get Hours action

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | Description |
|---|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------------------|
| Response | Action code | |
| | 73 | 03 | 69 | 19 | 70 | 6 | Between 7 PM and 6 AM, announce Zone |
| | 193 | 1 | 255 | | | | |

Announcing Zone Off

If the Zone OFF Response is set to Response 59, the zone will be announced when the zone is restored. To announce that the zone is "OFF" or "CLOSED" when it is restored, say for a door or window, program the Zone Off Response to 59 and program the word number for the OFF word in Location 1689. For example if word 229 "Off" is programmed in Location 1689, when the zone is restored it will say (zone name) "Off". If word 70 "Closed" is used, then the zone name followed by "Closed" will be announced. This is a global setting, which means that all zones with Off Response set to 59 will announce the word programmed in Location 1689 when restored

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-------------|-----------|------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description | Zone Type | Entry Path | ON Response | OFF Response |
| | | | | 59 | 59 |

The table above shows both on and off responses set to 59, announce zone

| Locations (Engineer Menu 7,4,1) | |
|---------------------------------|-------|
| Location ¹ | Value |
| 1689 | 229 |

The table above shows Location 1689 programmed with the word for "Off"

Revised March 1999

Security Applications

2.6 Sending an Alarm Abort signal to Central Station (UK)

An Abort (Misoperation) signal may be sent to the Central Station if a correct sign-in code is used to disarm the system within 90 seconds of an alarm occurring. This informs the Central Station that the alarm received was due to an operational error and should not be passed on to the police.

Alarm Type 20 (Abort) contains the Alarm characteristics for this. Program the Alarm Type as follows (Default settings are given in the list of Alarm Types. The following steps are for changing the default settings if required):

- Step 1** Enter the Engineer Menu and press 2 for Alarm Type. Enter 20# to select Abort Alarm.
- Step 2** Press 1 for Dial Settings. Press 1 for ON to enable dial-out for Abort. The voice menu then asks for settings for the 8 dial indexes. Dial Settings 1 and 2 are for Monitoring Stations and 3 to 8 are for phone or pagers (which should be set to 0 for OFF). Set Dial Index 1 or 2 to 1 for ON depending on which Monitoring Station the report is to be sent.
- Step 3** Press 3 to program the Report Code for abort. The Report code may be one or 2 digits depending on the format. For 2 digit formats, the second digit is ignored. Each digit is entered separately with the # key. The Restore code for this alarm type is not used.
- Step 4** Siren Type is set to 0 (No siren) by default.
- Step 5** Press 2 for Response to enter a Response if required.
- Step 6** Abort Time is set by default to 90 seconds. This default setting may be changed in the Locations menu. Location 44 gives the Abort time in seconds. Enter Engineer menu, press 7 - System Settings, 4 - Star Menu, 1 - Locations. Enter Location 44#. Enter the new abort time in seconds followed by #.

This completes the programming. Test the Abort alarm by triggering an alarm (Intruder or Fire) and then signing in within 90 seconds.

| Engineer Menu, 2 - Alarm Type | | | | | | | | |
|-------------------------------|-------------|--------------|------------|----------|-------------|--------------|------------|-----------------------|
| Alarm Type | Press | 1 | | | 3 | 4 | 5 | 7 |
| | Description | Dial Setting | Dial Index | Response | Report Code | Restore Code | Siren Type | Arm in Trouble State? |
| 20 | Abort | Yes | 1 | 0 | | RR | | Yes |

| Locations (Engineer Menu 7,4,1) | |
|---------------------------------|-------|
| Location ¹ | Value |
| 44 | 90 |

Security Applications

2.7 Programming a Daily Central Station Dial Test and Battery Test

The Dial Test (User Voice Menu 3,4,3 or Engineer Menu 8,3) dials to all programmed phone numbers (up to 8), including the 2 Central Monitoring Stations. It is also possible to program a daily Dial Test only for the Central. Station(s). A Time Program is used for this. The Time Program activates a Response which starts the CMS Dial Test.

- Step 1** Enter the Engineer Menu, 3 - Control Settings, 3 - Time Programs. Select the Time Program number to be used and # key.
- Step 2** Press 1 for Day of Week, and program each day of week for which the dial test is to be done. If the dial test is to be done every day, set all the days of week from 1 to 8¹ to ON.
- Step 3** Press 2 for Time. Enter the Time - hours (0 to 23) and Minutes (0-59), each followed by the # key.
- Step 4** Press 3 for Response. Response 125 is programmed by default to do the CMS Dial Test. Enter the Engineer Menu, 3 - Control Settings, 6 - Responses. Enter Response number 125 and #. Check that the action code 80,18 is programmed. Action code 80,18 causes activation of Non-detector Alarm 18 (CMS Dial)

Battery Test

Comfort automatically performs a battery test at a programmed interval and for a programmed duration, switching off the mains power, and allowing the battery to power the system. Location 720 contains the interval between tests in hours, default 24 hours while Location 721 contains the duration of the test in minutes, default 2 minutes. Duration 720 is programmed with 0 or 255, no automatic battery test is performed

An immediate battery test can be performed via the Test Menu (Engineer 8,1) or User (3,4,1). When the Battery Test Option is activated, an immediate Battery test is performed. The next battery test will be performed after the programmed Interval in Location 720.

Security Applications

2.8 Using Delay Zones to Prevent False Alarms in Night Mode

The Comfort System is able to configure zones as Entry Delay Zones. This means that violating this zone when armed does not cause an immediate alarm, but triggers an Entry Alert, which is what happens if the Entry Door is opened when the system is armed. The speaker starts beeping to warn that the system must be disarmed within the Entry Time to prevent an Intruder Alarm.

This helps to prevent false alarms caused by someone forgetting to disarm the system in the morning or by someone going to the protected area at night. At the same time, it still maintains protection of the premises at night.

The zones programmed as Entry Delay zones should be positioned carefully so as to monitor those areas where the occupants would pass first as they leave their room. Other zones in the house may be left protected in Night Mode.

In this example, we shall program a PIR as an entry delay zone only during Night Mode and connect it to Zone 3.

- Step 1** Enter Engineer menu and select 3 - Control Menu, 6 - Responses. Response 54 is programmed by default to start an entry delay only in Night Mode.
- Step 2** Check that the Response contains actions 73,00,68,02,04,255. This takes 6 bytes and fits into one Response slot. 73,00 means Get the current Security Mode. 68,02 means Skip to Marker if the value is not 2, or Night Mode. 04 is the action code for Start Entry Delay. In Night Mode, the entry delay is started. In other modes, the action 04 is skipped, and nothing happens.
- Step 3** Enter Engineer menu and select 1 - Zone Settings. Enter the zone number, 3 and the # key.
- Step 4** Press 1 to enter the description. Enter the appropriate words from the wordlist, say "Upstairs Movement".
- Step 5** Press 2 to enter the Zone Type. Enter Immediate Movement (Zone Type 5) or Immediate Away Movement (Zone Type 18) and the # key.
- Step 6** Press 3 for Entry/exit path. Set this OFF.
- Step 7** Press 5 - ON Response. Enter 54# (or whatever Response you have programmed for entry delay).
- Step 8** Press 6 - OFF Response and enter 0#

This completes the programming. Test the setting by arming to Night Mode and passing by the zone before any other zones. The slow beeping from the speaker indicates that an Entry Alert has been triggered.

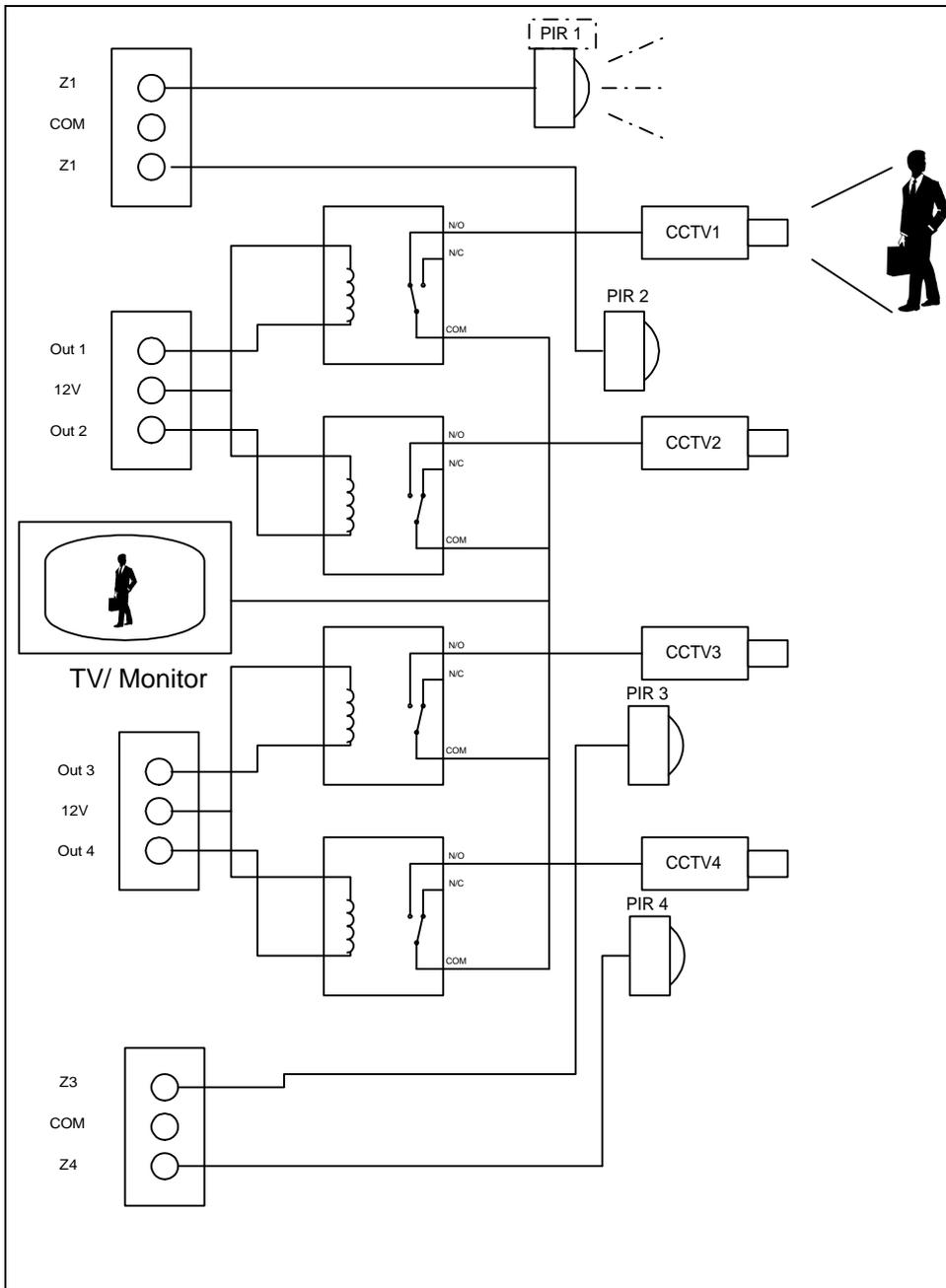
| `Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| Response | Action code | Description |
| 54 | 73 | 00 | 68 | 02 | 04 | 255 | Start Entry delay if Night |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|---------------------------|------------|----------------|-----------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Response | OFF Response |
| | "Upstairs" "hall" (e.g.) | 5 - Immediate Movement | 0 - OFF | 54 | 0 |

Security Applications

2.9 Switching CCTV Cameras based on Movement

Comfort can be programmed to switch several CCTV cameras to a TV monitor based on movement detected in strategically located PIRs.



The diagram above shows the setup. A PIR and camera are positioned so as to monitor an area of interest. Each PIR is connected to a zone on Comfort. Each zone is linked by programming to an Output. Movement detected in that zone will cause the related output to switch on. Only 1 output is ever switched on at one time. Each output is connected to a relay as shown. The relays are connected so that the common is connected to the monitor. The Normally Open contacts of the relay are connected to the cameras. In the diagram above, the grounds or commons are left out to avoid clutter. In this way, only one camera is connected to the monitor or TV at a time. Movement in any of the zones will cause the monitor to display the picture from the appropriate camera.

These PIRs may also be used as security zones in the normal way, i.e.. movement can trigger alarms when the system is armed.

Security Applications

This setup can also be used to implement audio verification by using double pole relays. Use the other pole to switch microphones to the Voice Station MIC input (see App 5.2 for Audio Verification). Triggering a PIR will switch both the audio and cameras to the area monitored.

Programming is as follows:

In the example, Zones 1 to 4 and Outputs 1 to 4 are used.

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|------------------------|------------|----------------|-----------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Response | OFF Response |
| 1 | | 5 - Immediate Movement | | 41 | 0 |
| 2 | | 5 - Immediate Movement | | 43 | 0 |
| 3 | | 5 - Immediate Movement | | 45 | 0 |
| 4 | | 5 - Immediate Movement | | 47 | 0 |

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|---|-----|-----|----|---|--------------------------------|
| Response | Action code | | | | | | Description |
| 41 | 74 | 4 | 74 | 6 | 74 | 8 | Outputs 2,3,4 OFF, Output 1 ON |
| | 0 | 1 | 255 | | | | |
| 43 | 74 | 2 | 74 | 6 | 74 | 8 | Output 1,3,4 OFF, Output 2 ON |
| | 74 | 3 | 255 | | | | |
| 45 | 74 | 2 | 74 | 4 | 74 | 8 | Output 1,2,4 OFF, Output 3 ON |
| | 74 | 5 | 255 | | | | |
| 47 | 74 | 2 | 74 | 4 | 74 | 6 | Output 1,2,3 OFF Output 4 ON |
| | 74 | 7 | 255 | | | | |
| 1 | 128 | 1 | 1 | 255 | | | Output 1 ON |
| 2 | 128 | 1 | 0 | 255 | | | Output 1 OFF |
| 3 | 128 | 2 | 1 | 255 | | | Output 2 ON |
| 4 | 128 | 2 | 0 | 255 | | | Output 2 OFF |
| 5 | 128 | 3 | 1 | 255 | | | Output 3 ON |
| 6 | 128 | 3 | 0 | 255 | | | Output 3 OFF |
| 7 | 128 | 4 | 1 | 255 | | | Output 4 ON |
| 8 | 128 | 4 | 0 | 255 | | | Output 4 OFF |

Program Zones 1 to 4 with the appropriate descriptions and zone type as required. The zone types should be one of the Movement types if used for alarm, or it may be Momentary Switch (Zone Type 8) if it is not to trigger an alarm.

This completes the programming. Make the connection as shown in the diagram, taking care to connect up the return wires accordingly.

Security Applications

2.10 Alternate Sirens for Alarms

Comfort has 20 siren types which are used for the various Alarm Types in the system. The List of Siren Types can be found in the Programming Tables Annex to the Installation Manual. For each Alarm Type, a Siren Type may be assigned. In the Engineer Menu, Press 2 for Alarm Settings, enter the Alarm Type (1 to 31) and #, and 5 for Siren Type. Enter the Siren Type (0 to 20) and the # key. A Siren Type of 0 means no siren is assigned -- no sound will be produced.

For the Intruder alarm type, Siren Type 1 is assigned by default, and for the Fire alarm type, Siren Type is the default siren. Siren Types 8 is an alternate siren which may be used.

Siren Type 8 is a 2 tone siren with 1 second on and 2 second off cadence on the Bell (siren). On the speaker, it alternates between 1 kHz for 1 second and 2 kHz tones for 2 seconds.

Certain Siren Types, 3,4,5,16,17,18,19 are used by the system in generating arming tones and for the Ringer siren. These particular siren types do not need to be assigned by Alarm Types. They may also be used by Alarm Types if the sound is found suitable, but they will still be used for their primary purpose. For example, Siren Type 3 is used when arming the system and no open zones are detected. This gives a slow pulsed beeping sound. Changing the characteristics of this siren type will alter the arming sound accordingly. You cannot assign another siren type for this purpose, because the assignment is fixed by the system software.

Other Siren Types not used by the system may be assigned as required by the Alarm Types.

Security Applications

2.11 Vibration Analyzer

A Vibration Analyser can be implemented, using low cost inertial sensors while reducing the incidence of false alarms without having to use expensive dedicated Vibration analyzers.

The algorithm implemented in this example is that 3 triggers from the vibration sensor within 30 seconds is required to activate the intruder alarm when the system is armed. Other algorithms may be equally or more effective, depending on the specific type of sensors used, and the surface to which the sensors are mounted.

The zone is set to zone type 7 (Instant Vibration for Away, Night, Day), Zone Type 19 (24 hour Vibration), Zone Type 25 (Vibration 100 ms Instant), Zone type 28 (Away/Night 100 ms) or Zone Type 29 (Away /Night 20 ms, depending on which of the security mode it is active and the sensor sensitivity. Each time the zone is triggered, a timer is checked to see if it is running. If it is not running, it is started for a duration of 30 seconds, and a counter is set to an initial value of 1. If the timer is not running, the counter is incremented, and if the count is 3 or higher the alarm is activated. If the counter reaches the set level of 3, the response ends without the Skip Alarm action 21 and the Intruder alarm is activated. If the counter is less than 3, the Skip alarm action prevents the alarm from activating. Action 21 skips an alarm but is recorded in the event log when triggered. This allows the incidence of the vibration sensor activation to be monitored.

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|---------------------------|------------|----------------|-----------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Response | OFF Response |
| 5 | | 7,19,25,28,29 (Vibration) | | 86 | 0 |

| Zone Type | Off | Away | Night | Day | Sensitivity |
|------------------------------|----------|---------|---------|----------|-------------|
| 7, Instant Vibration 50 ms | Inactive | Instant | Instant | Instant | 50 ms |
| 19, 24 hour Vibration | Instant | Instant | Instant | Instant | 50 ms |
| 25, Instant Vibration 100 ms | Inactive | Instant | Instant | Instant | 100 ms |
| 28, Away/ Night 100 ms | Inactive | Instant | Instant | Inactive | 100 ms |
| 29, Away Night 50 ms | Inactive | Instant | Instant | Inactive | 50 ms |

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | |
|---|--------------|----|-----|-----|----|-----|
| Response | Action Codes | | | | | |
| 86 | 86 | 8 | 16 | 194 | 8 | 0 |
| | 30 | 0 | 131 | 7 | 0 | 192 |
| | 83 | 7 | 70 | 3 | 85 | 8 |
| | 193 | 21 | 255 | | | |

| | |
|--------------|--|
| 86,8,16 | Check Timer 8, Skip if not zero (i.e. if running) |
| 194,8,0,30,0 | Timer not running, Start Timer 8 for 30 seconds, no response |
| 131,7,0 | Load Counter 7 with 0 |
| 192 | Marker |
| 83,7 | Increment Counter 7 |
| 70,3 | Skip if < 3 (skip alarm after marker) |
| 85,8 | Count >= 3, Stop Timer 8 |
| 193 | Exit (to activate alarm) |
| 21 | Skip Alarm |
| 255 | End |

If more than 1 such vibration analyzer is needed, another Response utilizing a different counter and timer is needed for independent operation. At the cost of slightly lower protection against false alarms, the same

Security Applications

response using the same Timer and counter may be used for multiple sensors as the chances of concurrent activation of several sensors within the timer window of 30 seconds is not high

Warning Message with Vibration Analyser

The Vibration zone can be programmed so that each time the vibration is activated, a warning message can be played on any keypad. The following Responses should be programmed into the Vibration Zone:

Response: 133, Reminder 1 to 8 , Keypad 0-8, 23, 74, 86, 255

Record a warning message into Reminder 1 to 8, e.g. "This house is protected by the Comfort System. Please go away or the police will be called". It is not necessary to set any Days of week or activation times for this Reminder.

Action 133, reminder, keypad causes the reminder message to be played on the specified keypad. If the keypad specified is 0, the message is played on all keypads.

23: Action 23 disables the zone announcements so that Comfort will announce the Reminder message instead of the zone

74,86: Do Response 86 which is the Vibration Analyser

Each time the vibration zone is activated, the warning message is played. If there are 3 knocks, the alarm is activated.

Updated September 2000.

Security Applications

2.12 Disabling or Limiting Alarm Dialout in Night and Day Modes

Some customers may not want the system to dial out at night, or may want to limit the dial-out to only certain of the programmed phones, say only to CMS and not to pagers or phones. This is covered in the next application. For this application will describe how to disable dial-outs for Intruder Alarms only. This will not affect Panic or Fire Alarm dial-outs.

Action Code 100 (Allow Dialout to Dial Settings) can be used to limit dialout only to the specified combination of dial settings 1 to 8. The table below (from "Programming with Action Codes") shows the value for combinations of dial settings. The 1st row of numbers is the dial setting 1 to 8, while the second row of numbers gives the value to be added together for the dial setting.

For example, to allow dialout to phones 3 and 4 only, add $8 + 4 = 12$. Action codes 100,12 will limit the dial-out to phones 3 and 4 only. To disable dialout to all phones, use actions 100,0 as shown below.

| | Phone Index | | | | | | | |
|-----------|-------------|----|----|----|---|---|---|---|
| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Add value | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

This action is applied to Alarm responses. For example, to prevent dialout to all phones in Night and Day modes for Intruder Alarm Type (Macro 25), use the following actions in an unused Response (R 'n') and into Macro response 25 after 74,96 (switch all lights on) using 74, R 'n' (do response, R 'n').

~~Fig 3 Modified (Intruder) Response 28~~ Modified (Intruder) Response 28

It is important to insert the new response into the existing rather than to add it at the end because the exit function '193' in the existing response will prevent the new response from being reached in 'Night Mode'.

New Response '23'

73,0 (Get Security Mode)

67,2 (Skip if 2, i.e. Night) skip is being used here to give an exit function

67,3 (Skip if 3, i.e. Day) Used if Day Mode is used while the property is occupied.

193 (Exit) This marker prevents the response from continuing if it is not Night Mode

100,0 (disable dial-out to all phones)

255 (Terminator)

In Response Menu (Eng Menu 3,6), enter Response 28 and # key, modify the existing response with the new action codes 74, 23 as per the eg. Followed by # after each number. Also create new response 'n' in as a new number allowing for 2 lines for the Response.

The same Response 23 can be used for other Alarm Types where there is to be no dial-out in Night and Day Modes such as for Fire, Power Failure and Low Battery.

Modified 25 September 1999, Applicable for V4.17 and above

Security Applications

2.13 Disabling/Limiting Alarm Dialout to Tel 3-8 in Night /Day Modes

Some customers may not want the system to dial out at night, or may want to limit the dial-out to only certain of the programmed phones, say only to voice phones and pagers (Tel 3 - 8) and not to the Central Station (Tel 1-2). This may be particularly applicable for Fire and Intruder Alarm Types, where occupants may prefer a local alarm only in Night Mode, but have the Central Station notified in Away Modes.

Action Code 100 (Allow Dialout to Dial Settings) can be used to limit dialout only to the specified combination of dial settings 1 to 8. The table below (from "Programming with Action Codes") shows the value for combinations of dial settings. The 1st row of numbers is the dial setting 1 to 8, while the second row of numbers gives the value to be added for the dial setting.

For example, to *allow* dialout to phones 4 and 5 only, add $8 + 16 = 24$. Action codes 100, 24 will allow the dial-out to phones 4 and 5 only. To disable dialout to all phones, use actions 100,0

| | Phone Index (2nd parameter used with action code 100) | | | | | | | |
|-----------|---|----|----|----|---|---|---|---|
| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Add value | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

This action is applied to Alarm responses. For example, to prevent dialout to all phones in Night and Day modes for Fire Alarm, use the following actions in an unused Response

73,0 (Get Security Mode)

67,2 (Skip if 2, i.e. Night),

67,3 (Skip if 3, i.e. Day)

193 (Exit)

100, 252 (allow calls to Tel No's 3 - 8 only) ($128 + 64 + 32 + 16 + 8 + 4 = 252$)

255 (Terminator)

To manually add the skip to an alarm type

In Alarm Types Menu (Eng Menu 2), enter Alarm Type 1 (Intruder Alarm) and # key, press 2 for Response and enter the response number (148) which was programmed below.

The same Response can be used for other Alarm Types as required where there is to be no dial-out in Night and Day Modes. The Alarm Types table below shows some of the possibilities.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|---|--------------|-----|----|---|-----|-----|
| Resp | Description | Action Codes | | | | | |
| 148 | Skip dialout to Telephone 1 & 2 (CMS) if in Night or Day Modes. | 73 | 0 | 67 | 3 | 193 | 100 |
| | | 252 | 255 | | | | |

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|--|
| Alarm Type | 2 - Response |
| 1, Intruder | 148, Skip dial-out (Tel 1 & 2) if in Night and Day Modes |
| 5, Zone Trouble | 148, Skip dial-out (Tel 1 & 2) if in Night and Day Modes |
| 11, Tamper 11 | 148, Skip dial-out if (Tel 1 & 2) in Night and Day Modes |
| 22, Siren Trouble | 148, Skip dial-out if (Tel 1 & 2) in Night and Day Modes |
| 12, Fire Alarm | 148, Skip dial-out if (Tel 1 & 2) in Night and Day Modes |

Created 28 April 1999, Applicable for V4.17 and above

Author: Andrew Roberts, Comfort Home Controls

Security Applications

2.14 Family Care (No Activity) Alarm for Monitoring the Elderly

If no movement is detected in a zone or group of zones within a programmed time period, an alarm can be triggered which dials to the programmed combination of numbers. Besides monitoring elderly people, the applications for this include a commercial or retail premises where it is possible for people to mask or cover the PIRs during opening hours, so that they can break in after closing time.

In this example, three zones are monitored for activity. If there is no activity for a period of 2 hours (when the system is disarmed), an alarm is triggered, which dials to the programmed number or numbers for that alarm type. Each of the monitored zones restarts a Timer when triggered in Security off. If the timer expires without being restarted by any of the selected zones, the alarm is activated. The Off Response is used to start the timer instead of the ON response, as continuous movement in an area may cause the PIR to remain activated (open for long periods of time). The ON response stops the timer so that if there is continuous movement, the timer does not run down and activate the family care alarm.

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|----------------------------|-----------|------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description (4 words max.) | Zone Type | Entry Path | ON Response | OFF Response |
| 6 | | 5 | | 48 | 45 |
| 7 | | 5 | | 48 | 45 |
| 8 | | 5 | | 48 | 45 |

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|---|
| Response | Action code | Description |
| 45 | 73 | 0 | 13 | 194 | 1 | 28 | Get Security Mode. If armed (NZ), exit. Start Timer 1 for 7200 seconds (2 hrs), then do Response 47 |
| | 32 | 47 | 255 | | | | |
| 47 | 88 | 14 | 255 | | | | Do Alarm 14 (Family Care) |
| 48 | 85 | 1 | | | | | Stop Timer 1 |

| Alarm Types Menu (Engineer menu 2) | | | | | |
|------------------------------------|------------------|-------------------|-------------------------|---------------|-------------|
| Alarm Type | 1 - Dial Setting | 2 - Response | Description | 5 -siren type | alarm state |
| 14, Family Care | ON | 0 | 110 = Family Care Alarm | 0 | 0, Idle |
| 19, Armed | | 48 (Stop Timer 1) | Off | 0 | 0, Idle |

Program the dial indexes 1 to 8 for the Family care dialout. When the system is armed, the Timer is stopped so that expiry will not cause the alarm to occur

When the system dials out, the called party can activate the keypad 2 way audio by pressing 5 for Voice Station to talk to the person in the house.

Security Applications

2.15 Silent Panic Alarm

In banks, jewelry shops and other establishments, the panic alarm should be silent. This can be done easily by changing the Siren Type of the Panic Alarm to 0.

Each of the 31 Alarm Type has programmable parameters. One of these is the Siren Type. The Siren Type may be set to one of 20 Siren Types which give different tones and cadences on the keypad and external siren. The list is shown below:

| Siren Type | Sound Type | Duration (secs) | Description | |
|------------|------------------|-----------------|-------------|---|
| 1 | Intruder | 0 | 0 | Sweeping Siren |
| 2 | Fire | 1 | 600 | Pulsed siren - Temporal 3 pattern required by UL985 |
| 3 | Arming Tone | 2 | 300 | Slow Beeps |
| 4 | Away Arm Trouble | 3 | 600 | Fast Beeps |
| 5 | Away Armed | 4 | 1 | Two beeps |
| 6 | Warning | 5 | 120 | Pulsed on and off siren |
| 7 | Short Trouble | 3 | 10 | Fast beeps for 10 seconds |
| 8 | Alternate Siren | 7 | 300 | Another Siren Pattern |
| 9 | Test Siren | 0 | 2 | Intruder Siren for 2 seconds, used for Siren Test |
| 10 | Doorbell | 6 | 4 | Chime "ding-dong" |
| 11 | Trouble | 3 | 65,536 | Fast Beeps for 10 minutes |
| 12 | Ring | 10 | 20 | "beep..beep....."beep...beep" |
| 13 | Beep | 11 | 300 | Continuous beep alert |
| 14 | Arm Fail | 8 | 60 | Pulsed siren |
| 15 | Chime | 9 | 2 | Two tone chime |
| 16 | Night Armed | 4 | 1 | Two beeps on keypad but not on siren |
| 17 | Alternate Chime | 11 | 3 | Another Chime |
| 18 | Auto Arming | 2 | 300 | Slow Beeps |
| 19 | Auto Arm trouble | 3 | 300 | Fast Beeps |
| 20 | Not Assigned | 0 | | Spare |

Enter Alarm Types Menu (Engineer Menu 2), enter 9# for Panic Alarm, press 5 for Siren Type, and enter 0#. Siren Type 0 means no audible siren.

When the panic button is pressed, there will be no siren sound, but the dialout will go on. However, the keypad will announce the name of the zone according to the programmed words. Comfort always announces the name of the instant zone which is activated To disable this zone announcement, use Action 23 (Skip Zone Announcement). First, program an unused Response, say 127 = 23,255

Then assign the Response to the Zone On Response. If the panic zone is zone 3, go to Eng Menu 1 for Zone, Enter 3#, then press 5 for Zone Response, enter 127#. This prevents zone from being announced when the panic button is pressed.

7 April 1999

Security Applications

2.16 Continuous Announcement of Zone in Alarm

When an alarm is activated, Comfort normally announces the zone name once on the keypad. The siren will then be heard on the keypad. Comfort can be programmed to continuously announce the triggered zone so that the zone can be investigated. The siren on the keypad will be at a low volume on the keypad while the announcement is going on. The continuous zone announcement is heard when Comfort is not doing a dial-out.

To activate this feature, go to Location 40 (Eng Menu 7,4,1). Listen to the current setting in that location. The contents and meaning of each of the bit settings in Location 40 are shown below. You must set the bit corresponding to Repeat Alarm zone on Keypad. If your current setting is 17, this is a combination of 1 (Siren Reverse) and 16 (Disable Voice on Doorphone). Add 64, which is Repeat Alarm Zone on keypad to 17, to give a total of 81. Enter the value of 81 into Location 40. RESET the system either pressing the Reset pushbutton switch on the Comfort panel or via a remote reset (if you are not at site) by the Reset menu 7,4,2. When Comfort reinitializes, the setting will be in effect.

| Flag Settings Location 40 | Location | Add Value | Value | Engineer Menu |
|-------------------------------------|----------|-----------|-------|------------------|
| Siren Reverse (Self-actuated siren) | 40 | 1 | | 4,3,3 (Table 16) |
| Ignore Line Cut | | 2 | | |
| Reserved | | 4 | | |
| Reserved | | 8 | | |
| Disable Voice on Door Station | | 16 | 16 | |
| LEM 16 Input (no output) | | 32 | | |
| Repeat Alarm zone on Keypad | | 64 | | |
| Reserved | | 128 | | |
| Total | | | | 16 |

To test, arm the system and trigger a zone. The keypads will announce the zone name repeatedly. Trigger another zone. The keypads will now announce the new zone.

This can be very valuable in allowing the occupants to quickly identify the cause of an alarm



The zone continuous announcement can be heard only while Comfort is not doing a dial out, or after the dial-out During dialout, the keypad does not produce any announcement.

Security Applications

2.17 Re-dial to Phones in Alarm if system is not disarmed

When an alarm is activated, Comfort dials up any combination of to 8 telephones, pagers, or Central stations to report the alarm. The 8 telephone numbers are split into two groups; the first two i.e. 1 and 2, and the last five, i.e. 3 to 8. Any voice phone sign in (or CMS kissoff in the first group) in any of the two groups will end the dial out to the other numbers in the group, and it will be the responsibility of the recipient to take the necessary agreed action to handle the alarm.

In certain situations, usually for paging in commercial or industrial applications, there may be concern that those who received the message may not have received the call or may not have taken action. Comfort can be programmed to retrigger the dialout after a successful round of dialouts.

This is done by starting a timer when the Intruder alarm (and other alarms like panic) are triggered. This timer when it expires, should check the Alarm State at that time. If it is in Alert or Alarm State (i.e. it has not been disarmed), then the Intruder alarm can be reactivated again, which would also turn on the siren and start the dialout again.

| Engineer Menu 2 - Alarm Settings | | |
|----------------------------------|----------|----|
| Press | 2 | |
| Alarm Type | Response | |
| 1 | Intruder | 97 |

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | Description |
|---|-------------|----|-----|-----|----|---|--|
| Response | Action code | | | | | | |
| 97 | 86 | 1 | 13 | 194 | 1 | 5 | If Timer 1 not running, Start Time 1, 306 seconds then Response 98 |
| | 50 | 99 | 255 | | | | |
| 99 | 73 | 9 | 70 | 2 | 88 | | If Alarm State > or = 2 (ie alert or alarm) then Activate alarm 1 (intruder) |
| | 255 | | | | | | |

Response 97 starts Timer 1 for 306 seconds, provided Timer 1 is not already running. This is longer than the default rearm time of 300 seconds. After the rearm time, the siren will turn off and the system will rearm to Alert mode. When Timer 1 expires after 306 seconds, Response 98 checks if the system is still in Alert or Alarm state, which means that it has not been disarmed, and will then trigger the alarm again

This would restart the siren again. If this is undesirable, add another action 7 (Siren Off) after 88,1. If the alarm was reactivated because of other zone triggers, the timer 1 would not be restarted, so that Timer 1 would time out even if there were subsequent zone activity after the initial alarm trigger.

Security Applications

2.18 Alternative Night Arming Using Night Mode key and Voice Menu

The Home Control Menu may also be used to provide different part-set combinations for providing a variation for the normal Night Mode such as for when guests are staying overnight. This effectively extends the area of occupancy to other rooms while the system is set to the Night Mode selections.

This can be achieved by attaching a Home Control Menu option (*action code 134, Go to keypad menu*) onto the Night Arm button which then gives the Night Arm options. The Home Control Menu 0 must also be programmed with the new responses and words. Pressing Night Mode button will provide a voice menu such as Night Setting Menu, press 1 for Night Mode 1, press 2 for Night Mode 2. Night Mode 1 will be the usual Night Mode selection, whereas Night Mode 2 will bypass two additional areas, in this instance Zones 7 & 8 but you can add as many as you wish. Once the choice has been made, the user should press the hash key to exit the menus, the arming tones will then be heard briefly followed by 'Night Mode' announcement. The default response 73 for Night Set arming will only allow setting from Security Off Mode or Day Mode, this is important for security reasons.

Note Night Mode 2 has been armed first followed by Night Mode 1, the bypass state of zones 7 and 8 will be 'ON' (disabled). If this is undesirable, then add the unbypass commands (76, 7, 76, 8) to the end of response 73 so that you can switch between the two Night Modes.

The bypass function will restore to 'Full protection' once the system has been disarmed and Away Mode is next set, the bypass function is only temporary.

After programming the responses and locations, the system must be reset.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|----|----|-----|-----|----|
| Response | Description | Action Codes | | | | | |
| 146 | Bypass Zones 7 and 8 | 75 | 7 | 75 | 8 | 255 | |
| 147 | Home Control Menu '0' | 134 | 4 | 0 | 255 | | |
| 144 | KEY ARM Night and Bypass zones 7 and 8 | 74 | 73 | 74 | 146 | 255 | |
| 73 | KEY ARM Night from Security Off and Day modes only | 73 | 0 | 67 | 1 | 72 | 22 |
| | | 255 | | | | | |

| Programming Table for Control Menu, 3,1 | | | | |
|---|-------------------|------------|--------------|----------|
| Key | Description | Action Key | Action Word | Response |
| | | (0 to *) | (0-255) | (0-99) |
| 0 | "NIGHT MODE MENU" | 1 | NIGHT MODE 1 | 73 |
| | | 2 | NIGHT MODE 2 | 144 |

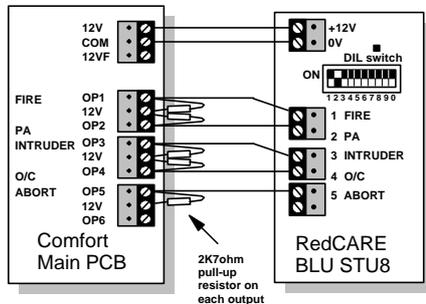
| Engineer menu, 7, 4, 1 Locations | |
|----------------------------------|--------------|
| Keypad Key 'Night' | 2 - Response |
| Location 1815 | 147 |

Author: Andrew Roberts, Comfort Home Controls

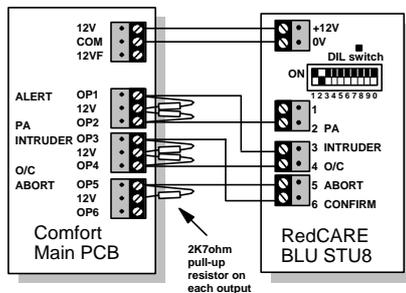
Security Applications

2.19 RedCARE STU Connection with Outputs and Alarm Responses (UK)

A Some installations may require 'Line Fault Reporting' such that the Central Station is informed when a 'line cut' has occurred using means *other* than the telephone line that has been cut. A stand-alone RedCARE STU or *DualCom* Paknet interface card may be installed to the system to transfer alarm status and line fault information to a central station using a radio method or 'loss of carrier' method. These devices are triggered using Comfort's outputs and alarm types.



STU Figure 2.15 - Output Connection to



STU Figure 2.16 - Confirmed Alarms using a

Using Outputs (table 15) at +12V and switch to 0V (negative applied) in alarm condition and can supply up to 200mA. They cannot be inverted except by using a relay. The outputs are controlled from responses (table 33) inserted in the alarm types menu in table 18. Some of these responses may require the action code '20' inserting within if you require an Engineer Reset requirement upon activation. (e.g Intruder Alarm, Armed Tamper and Siren Tamper Alarm conditions).

The outputs are normally programmed as latching 'ON' = negative applied using action code 128. So when programming the 'ON' responses ensure that the outputs are also switched OFF afterwards using a multiple string command (outputs 1-5 OFF) when the system is disarmed to 'Security OFF' Mode. This is achieved entering the relevant Response into alarm type 19 'System Open' (Response 77).

RedCARE and *DualCom* cannot transmit sequential zone information to the central station at present unlike Comfort which uses 'Contact ID' sequential reporting. To improve upon this Comfort's Alarm Filtering may be used to differentiate between a single zone activation and multiple zone activation.

With Comfort, when two different zones which are programmed as 'alert zone' types are triggered within 10 minutes, an intruder alarm is produced. So by setting internal zones as 'Alert Types' such that when more than one Alert Zone is triggered within 10 minutes an Intruder Alarm is produced, this can be treated as an ALARM CONFIRMATION signal or SECOND ALARM.

e.g. To transmit A CONFIRMED ALARM signal using REDCARE or *DualCom* set up the alert alarm type and response to trigger an output and connect it to trigger a Channel 3 (intruder) on the STU and the intruder Alarm type can be used to trigger a Channel 7 (Confirmed Alarm). Please refer to above italics for notes on restoring these outputs on disarm.

Refer to NACOSS Codes of Practice NACP 14 for design guidance on the use of ALARM CONFIRMATION systems.

Security Applications

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|-----|----|-----|-----|----|--|
| Response | Action code | | | | | | Description |
| 11 | 74 | 2 | 74 | 4 | 74 | 6 | Output 1,2,3, 4 and 5 OFF Use in Security Off Response 77 or Alarm Type 17 |
| | 74 | 8 | 74 | 10 | 255 | | |
| 1 | 128 | 1 | 1 | 255 | | | Output 1 ON - Fire Alarm |
| 2 | 128 | 1 | 0 | 255 | | | Output 1 OFF |
| 3 | 128 | 2 | 1 | 255 | | | Output 2 ON - Panic Alarm |
| 4 | 128 | 2 | 0 | 255 | | | Output 2 OFF |
| 5 | 128 | 3 | 1 | 20 | 255 | | Output 3 ON - Intruder Alarm and Engineer Reset(20) |
| 6 | 128 | 3 | 0 | 255 | | | Output 3 OFF |
| 7 | 128 | 4 | 1 | 255 | | | Output 4 ON - System Set |
| 8 | 128 | 4 | 0 | 255 | | | Output 4 OFF - System Unset |
| 9 | 128 | 5 | 1 | 255 | | | Output 5 ON - Abort Alarm |
| 10 | 128 | 5 | 0 | 255 | | | Output 5 OFF |
| 25 | 74 | 5 | 73 | 25 | 16 | 74 | Intruder Alarm Macro / Engineer Reset / Lights |
| | 96 | 193 | 74 | 49 | 255 | | |
| 77 | 85 | 7 | 74 | 11 | 255 | | Security Off Mode Response, Timer 7 Off, Outputs 1 - 5 OFF |
| | | | | | | | |
| 191 | 74 | 96 | 74 | 122 | 74 | 1 | Fire Alarm Macro - X10 Lights ON, Output 1 ON |
| | 255 | | | | | | |

| Engineer Menu, 2 - Alarm Type | |
|-------------------------------|---------------------------------|
| Alarm Type | 2 - Response |
| 1, Intruder | 25, Output 3 ON, X10 Lights ON |
| 9, Panic Alarm | 3, Output 2 ON |
| 12, Fire Alarm | 191, Output 1 ON, X10 Lights ON |
| 17, System Open | 77, Output 4 OFF |
| 19, System Set | 7, Output 4 ON |
| 20, Alarm Abort | 9, Output 5 ON |

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Author: Andrew Roberts, Comfort Home Controls

Security Applications

2.20 Power Failure Delay Setting

In areas where power trips are common, there may be many nuisance calls to the monitoring station, pager and mobile phones. Comfort reports a power failure alarm when power is lost for 30 seconds. This delay time cannot be changed. However, it is possible to allow a longer delay before Comfort reports a Power Failure, by using Timer and Alarm Response. This will work for version 4.84 and above.

First, change the default Alarm Type for Power Failure in Non-Detector alarms. In CSXPress, Security Screen -> NonDetector alarms, set Power Failure to Family Care Alarm Type 14 (it was set to Power failure Alarm Type 8). On the keypad, you can do the same thing by programming Location 6 to 14 (it was programmed as 8). This causes Alarm type 14 to be activated instead of Alarm Type 8 when a power failure is detected after 30 seconds

Program a Response say 124, to start a Timer for (5 minutes in the example, but you can choose your own delay time) and then trigger Alarm Type 8, (the actual Power Failure alarm).

When Power is restored, the Timer must be stopped so that it does not cause the power failure alarm to be activated. From version 4.84, Location 1847 is for a Response when the Power Failure is restored

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | Description |
|---|-------------|---|-----|----|-----|-----|---|
| Response | Action code | | | | | | |
| 124 | 194 | 1 | 1 | 44 | 125 | 255 | Start Timer 1 for 300 seconds (1x256 + 44) the Response 125 |
| 125 | 88 | 8 | | | | | Activate Alarm Type 8 (Power Failure) |
| 126 | 85 | 1 | 255 | | | | Stop Timer 1 |

| Location Menu (Engineer Menu 7,4,1) | |
|-------------------------------------|---|
| Location | value |
| 6 (Power Failure Nondetector alarm) | 14 (Alarm type setting for Family Care) |
| 1847 (AC Fail Restore Response) | 125 (Response to stop Timer 1) |

| Engineer Menu, 2 - Alarm Type | | | |
|-------------------------------|-------------|---------------------|-----------------|
| Alarm Type | 1 - Dialout | 2 - Response | 8 - Alarm State |
| 14, Family care | 0 | 124 (start Timer 1) | 0 |

For Alarm Type 14, set Dialout to 0 so it does not cause any dialout

When the power fails, instead of alarm type 8, alarm type 14 is activated. The AlarmResponse starts Timer 1 for 5 minutes. After 5 minutes of power failure Response 125 is activated, which causes Alarm Type 8, the true Power Failure alarm. If before 5 minutes is up, the power is restored, the power restore response 126 in Location 1847 causes the timer to be stopped, so Alarm Type 8 is not activated.

Arming & Disarming

3 ARMING AND DISARMING

- 3.1 Arming and disarming using a 2 position keyswitch
- 3.2 Arming and disarming using a Momentary Keyswitch
- 3.3 Connecting a Stand-alone Keypad for Arming and Disarming.
- 3.4 Connecting a Ready to Arm Status LED
- 3.5 Automatic Arming and Disarming by Time Program
- 3.6 Programming more than 1 Entry Door
- 3.7 Connecting an Exit Terminator (Push-to-set) Switch (UK Only)
- 3.8 "Intelligent" Arming
- 3.9 Automatically Arm and Switch Off Lights if No Movement for a preset period
- 3.10 Time-zoned Disarm Alarm
- 3.11 Timed Exit and Rearm
- 3.12 One-Touch Night Mode Arm Key combined with Timed Exit/Rearm
- 3.13 Return to Day Mode when disarming from other Modes
- 3.14 Disarming Day Mode when internal door is opened in Day Mode

Arming & Disarming

3.1 Arming and disarming using a 2 position keyswitch

A keyswitch may be used to arm and disarm the system, in addition to the voice menu.

- Step 1** Response 72 and 73 are programmed by default to arm to Away Mode and Night Mode respectively. Check that Response 72 contains actions 73,0,13,72, 01, 255. 73,0 checks Security Mode. 13 is Exit if NZ, i.e. exit if armed, Action 72 is the Keyswitch or Manual Arm action, and the next code is the selected security mode (1 for Away, 2 for Night, 3 for Day, 4 for Vacation), Response 73 contains actions 73,0 (Check security mode), 67,1 (skip if 1 =away mode), 72, 02 (arm to Night).
- Step 2** Response 70 is programmed by default to disarm the system to Security off. The Response contains actions 71, 00, 255. Action 71 is the Arm action, and the next code is the selected security mode (0 for Off) so the above actions disarms to Security off. 255 is the terminator.
- Step 3** Connect a keyswitch to a zone so that the contact is normally open. Closing the switch should arm and opening the switch should disarm to Security off.
- Step 4** Program the zone as a N/O Switch Zone Type as follows. Enter Engineer menu, 1 - Zones , and enter zone number and # key.
- Step 5** Press 1 for Description. Enter the words from the Wordlist to describe the zone e.g. "Arm Key".
- Step 6** Press 2 for Zone type. Enter 8 # for N/O Switch.
- Step 7** Press 3 for Entry path. Set to OFF
- Step 8** Press 5 for ON Response. Enter Response 72 or 73 and the # key
- Step 9** Press 6 for OFF Response. Enter Response 70#

This completes the programming. When the keyswitch is turned on (closed), the system will do a local arm, i.e.. Security Check followed by "Please Exit". The user is required to Exit and close the Entry door. However, if the keyswitch is programmed to arm to Night Mode, exit is not required. This performs the same function as local arming using the voice menu.

If there are zones open when the system is being armed, the speaker sounds will indicate whether the user can exit, or if he has to close windows or doors first. Fast beeps about 2.5 times/second) indicate that zones are open, while slow beeps (1 per second) is an indication to exit. The Keypad will announce the open zones or "please exit" .

For automatic arming by Time program, refer to the application "Automatic Arming and Disarming"

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|-------------|----|-----|----|----|-----|---|
| Response | Action code | | | | | | Description |
| 72 | 73 | 0 | 13 | 72 | 1 | 255 | KEY ARM Away from Security Off |
| 73 | 73 | 0 | 67 | 1 | 72 | 2 | KEY ARM Night from Security Off or Day Mode |
| | 255 | | | | | | |
| 70 | 71 | 00 | 255 | | | | Disarm |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|---------------------------|-----------|-----------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone (1 - 16) | Description (4 words max) | Zone Type | Entry/exit path | ON Response | OFF Response |
| | "key" "switch" | 9 | 0 - OFF | 72 or 73 | 70 |

Arming & Disarming

3.2 Arming and disarming using a Momentary Keyswitch

A momentary keyswitch may be used to arm and disarm the system. In this case, two Outputs should be connected to Indicator LEDs to indicate the system status. The LEDs indicate the following states:

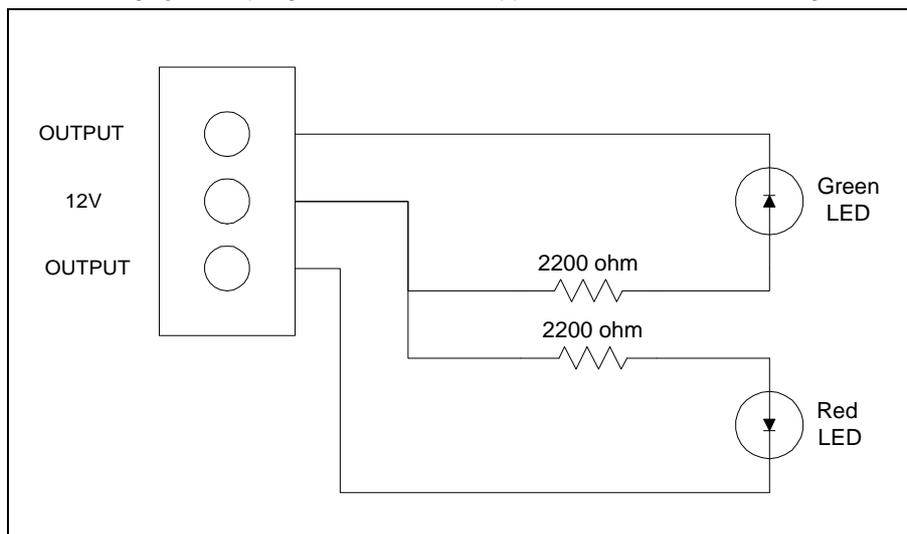
| LED | Steady | Flashing | Location |
|---|--------------|----------|----------|
| RED | Armed | Alarm | 45 |
| GREEN | Security off | Trouble | 46 |
| The Green LED also flashes during arming if not all zones are clear | | | |

- Step 1** Connect a Red LED and Green LED to 2 Outputs, say 7 and 8 according to the figure below.
- Step 2** Response 60 is programmed by default to alternately change to Security off and Away Mode as follows: Enter the Engineer Menu, press 3 - Control Settings, 6 - Responses. Enter the Response Number and # key. The action codes should be as follows; 73, 00 (Get Mode), 16 (Skip if not Zero i.e.. not Security off), 73, 09 (Get Alarm State), 69, 02 (Skip if >= 2 Alert state), 72, 01 (Arm to Away), 193 (Exit), 72, 00 (Security off), FF. There are 13 actions codes, which is more than the 6 allowed for a standard Response. This means that the next 2 Response numbers (61 and 62) cannot be used. When this Response is activated, it will arm to Away Mode if the current mode is Home, and it will disarm to Security off if the current mode is not Security off. If an alarm or alert condition is active while in Security off (say 24 hour alarm), the system will disarm, instead of arming. To arm to Night Mode instead of Away Mode, use Response 56 instead.
- Step 3** Connect a keyswitch to a zone so that the contact is normally open. Closing the switch should alternately arm and disarm the system. The keyswitch should be connected with double EOL Resistors (see figure 5.8 in the Installation manual)
- Step 4** Program the zone as a Momentary Switch Zone Type as follows. Program the zone as follows. Enter Engineer menu, 1 - Zones, and enter zone number and # key. Enter the words from the Wordlist to describe the zone e.g. "Arm Key". Program the zone type (submenu 2) as a Normally Open Switch (zone type 8). Set the Entry path (submenu 3) to OFF. Program Response 90 in our example for the Zone ON response (submenu 5) and 0 for the Zone OFF Response (submenu 6).

This completes the programming and setup. The Indicator LEDs give the arm status of the system, so that the user know if he is arming or disarming the system.

If there are zones open when the system is being armed, the speaker sounds will indicate whether the user can exit, or if he has to close windows or doors first. Fast beeps about 2.5 times/second) indicate that zones are open, while slow beeps (1 per second) is an indication to exit. The keypad will announce any zones which are open

For automatic arming by Time program, refer to the application "Automatic Arming and Disarming"



Arming & Disarming

| Response | Action code | Description |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|---|
| 56 | 73 | 00 | 16 | 73 | 09 | 69 | If Security off, change to Night. If not Security off, change to Home. If alarm, disarm |
| | 02 | 72 | 02 | 193 | 72 | 00 | |
| | 255 | | | | | | |
| 60 | 73 | 00 | 16 | 73 | 09 | 69 | If Security off, change to Away. If not Security off, change to Home. If alarm, disarm |
| | 02 | 72 | 01 | 193 | 72 | 00 | |
| | 255 | | | | | | |

| | Engineer Menu - 1, Zone Settings | | | | | Remarks |
|-------------|----------------------------------|-----------|-----------------|---------|----------|---------------------|
| Press | 1 | 2 | 3 | 5 | 6 | |
| Zone 1 - 16 | Description (4 words max) | Zone Type | Entry/exit path | ON Resp | OFF Resp | |
| | "Key" "Switch" "away" | 8 | 0 - OFF | 60 | 0 | Arm/disarm to Away |
| | "Key" "Switch" "night" | 8 | 0 - OFF | 56 | 0 | Arm/disarm to Night |

Arming & Disarming

3.3 Connecting a Stand-alone Keypad for Arming and Disarming.

For those installations without the Keypad, a stand-alone keypad may be connected up to arm and disarm the system. In this example, we shall use the Model DSR 18K Programmable Digital Keypad. This model has 3 LEDs (green, yellow, red), 2 relay outputs (Door Relay and Aux. Relay) and 3 security codes (Master Code, User Code 1 and User Code 2). Other similar keypads may be used as well, following the principles shown in this application.

The Aux. Relay shall be connected to a zone (Normally open) as a momentary switch zone type. When the 4 digit code is entered, the relay shall be programmed to pulse for around 1 second, and alternate between Security off and Away (or Night) Mode. The status LEDs should be connected to 2 outputs to indicate the status of the system according to the following table. If there is an additional LED available on the keypad, it may be used to indicate Power Failure, Low Battery, or Telephone Line Cut, by programming the locations according to the table below:

| Locations for Status Indication Outputs (Engineer 7,4,10) | | | |
|---|--------------|----------|----------|
| LED | Steady | Flashing | Location |
| RED | Armed | Alarm | 45 |
| GREEN | Security off | Trouble | 46 |
| The Green LED also flashes during arming if not all zones are clear | | | |

An output may be connected to the Door remote control input to release the door strike. There is a tamper switch which may be connected to one of the zones as a Tamper Zone.

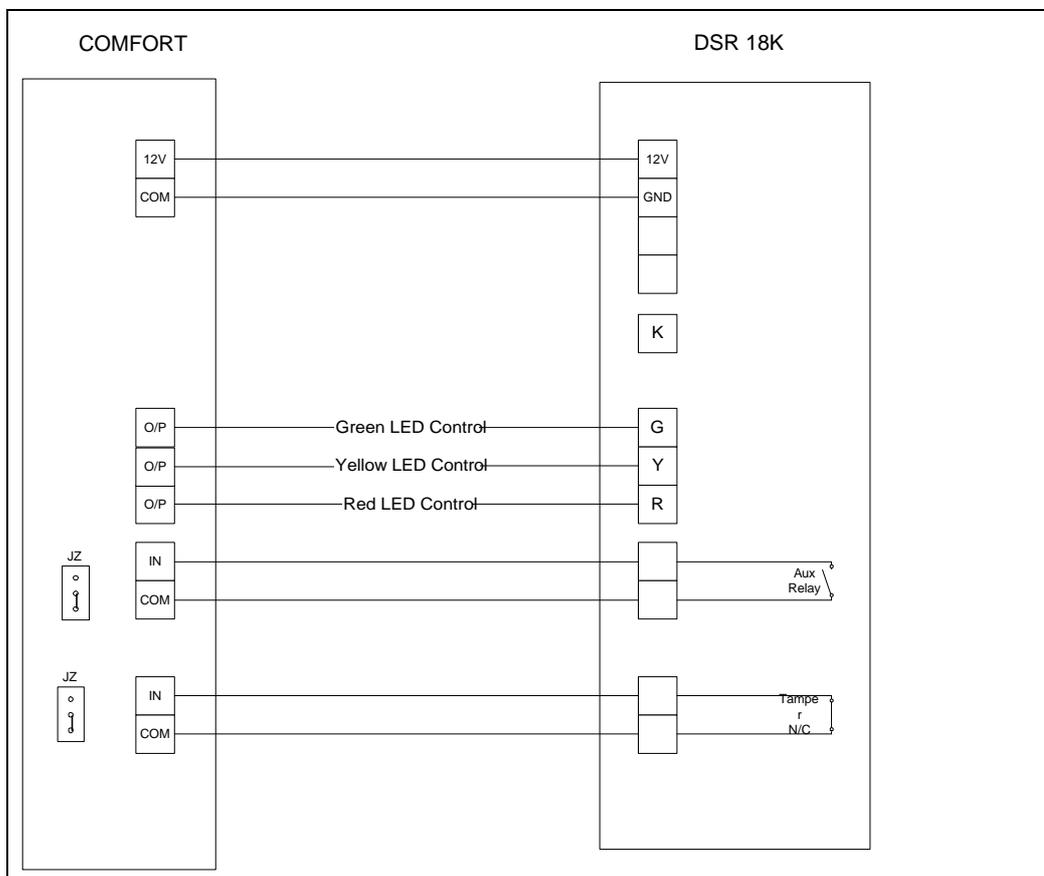
- Step 1** Program the DSR 18K as follows: Aux. Relay - 1 second activation. One of the codes is set to activate the Aux. Relay, while the other codes are disabled. The panic key is disabled, as it activates the Aux. relay. LED Control is set to external control negative (i.e.. 0V turns on the LED).
- Step 2** Connect the DSR 18K keypad as shown in the figure below. Power is supplied by the Comfort auxiliary output supply, which has a 500 mA (continuous) capacity. The Green and RED LED inputs are connected to two outputs on Comfort , say Output 7 and 8 respectively. These points are pulled to ground to turn on the LEDs. The Aux. Relay output is connected to one of the Comfort zones as a Momentary (Normally Open) switch (Zone Type 8). Insert a shunt into pins 2 and 3 of the corresponding JZ1 to JZ8 header if no EOL resistors are used. The Tamper switch is connected to another zone as a Tamper Zone (Zone Type 13).
- Step 3** Response 60 is programmed by default to alternately change to Security off and Away Mode. The action codes are ; 73, 00 (Get Mode), 15 (Skip if Zero i.e.. Security off), 72, 00 (Change to Security off), 193 (Exit), 73, 09 (Get Alarm State), 69, 02 (Skip if >= 2 Alert state), 72, 01 (Arm to Away), 193 (Exit), 72, 00 (Security off), FF. There are 16 actions codes, which is more than the 6 allowed for a standard Response. This means that the next 2 Response numbers (61 and 62) cannot be used. When this Response is activated, it will arm to Away Mode if the current mode is Home, and it will disarm to Security off if the current mode is not Security off. If an alarm or alert condition is active while in Security off (say 24 hour alarm), the system will disarm, instead of arming
- Step 4** In order to assign outputs 7 and 8 to be the indicator LEDs, go to the Locations Menu (Engineer Menu, 7 - System Settings, 4 - Star Menu, 1 - Locations). Enter Location 45 (and # key). The menu will say "Enter new number and # key" . Location 45 contains the output number to be assigned to the red indicator LED. Enter the output number and # (7 in this example) for the Red/Armed/Alarm LED for the value in this location. For the next location, enter 46#. Location 46 contains the output number to be assigned to the green LED. Enter the output number and # key (8 in this example).
- Step 5** Program the Aux. Relay Input zone as a Momentary Switch Zone Type (8) according to the table below. Set the ON Response to the one programmed in step 3. Whenever the aux. relay is activated (by entering the code on the keypad), the mode will switch between Home and Away.
- Program the Tamper zone as a Tamper Zone Type (13) according to the table below.

Arming & Disarming

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | Description |
|---|-------------|----|----|-----|----|----|---|
| Response | Action code | | | | | | |
| 56 | 73 | 00 | 16 | 73 | 09 | 69 | If Security off, change to Night. If not Security off, change to Home. If alarm, disarm |
| | 02 | 72 | 2 | 193 | 72 | 0 | |
| | 255 | | | | | | |
| 60 | 73 | 00 | 16 | 73 | 09 | 69 | If Security off, change to Away. If not Security off, change to Home. If alarm, disarm |
| | 02 | 72 | 1 | 193 | 72 | 0 | |
| | 255 | | | | | | |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|----------------------------|----------------------|------------|--------------------|----------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description (4 words max.) | Zone Type | Entry Path | ON Resp | OFF Resp |
| | "Arm", "Relay" | 8 - Momentary Switch | 0 - OFF | 60.00 ¹ | 0 |
| | "Tamper" | 13 - Tamper | 0 - OFF | 0 | 0 |

¹To arm to Night Mode instead of Away Mode, use Response 56 instead.



Connecting a DSR 18K keypad to Comfort

Note: A Voice Station or Doorphone is needed to tell what zones have to be closed, as there is no zone indication with this type of keypad. Also, more input and outputs and wiring is needed to connect this up.

More than 1 keypad can be connected to the same zone. The Normally Open contacts of the Aux. Relays can be connected in parallel to the same zone. The Outputs to drive the LEDs can be connected to more than 1 keypad at a time.

Arming & Disarming

3.4 Connecting a Ready to Arm Status LED

Comfort does not require a "Ready" led like conventional alarms. This is because in conventional alarms, when the Arm operation is started, the user has to clear all zones within the Exit Time. For Comfort, when arming, the user does not need to know in advance which zones are not clear, as all open zones are announced on the Keypads, so the user does not need to look at the keypad. The Exit Delay is started only when the zones are closed so the user does not need to hurry to close the zones.

For those who insist on a Ready led, this may be implemented by connecting an led to one of the outputs. This LED will indicate if all protected zones are closed to allow the system to be armed.

In this example, zones 1 to 6 are burglary and/or fire zones which are to be protected. Output 5 is connected to an LED for Ready Status, which means all zones are closed, and the system is ready to arm.

Whenever one of the zones is switched off, a Response will be triggered which will check the state of all the zones monitored. If all zones are off, then the Output is turned on, If not all zones are off, nothing is done. When one of the monitored zones is turned on, the output is turned off.

- Step 1** Connect the indicator LED to the output as shown in the Installation manual figure 5.13. Use a 2200 ohm resistor in series with the LED.
- Step 2** Program an unused Response, say 89 as follows. In Engineer menu, select 3 - Control Settings, 6 - Responses, then enter 89#. Enter Actions 79,01 (get state of zone 1), 13 (exit if Not Zero), 79, 02 (get state of zone 2), 13 (Exit if not zero), 79, 03 (get state of zone 3), 13 (Exit if not zero), 79, 04 (get state of zone 2), 13 (Exit if not zero), 79, 05 (get state of zone 3), 13 (Exit if not zero), 79, 06 (get state of zone 2), 13 (Exit if not zero), 128, 05, 01 (Output 5 ON), 255 (terminator). This response requires 22 action codes, so the next 3 responses 90 to 92 cannot be used.
- Step 3** Program an unused Response say 93 as follows: Enter actions 128, 5, 0 (Output 5 off), 255.
- Step 4** Select Zone Response (Engineer menu 1 - Zone Settings, enter Zone 1 #, 5 - ON response, and enter Response 93#. Then press 6 - OFF Response and enter Response 89#. When the zone goes on, Response 93 is activated which turns on Output 5. When the zone goes off, Response 89 is activated which turns off Output 5 only if all zones 1 to 6 are off.
- Step 5** Do the same for Zones 2 to 6.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | Description |
|---|-------------|-------------|-------------|-------------|-------------|-------------|---|
| Response | Action code | |
| 89 | 79 | 1 | 13 | 79 | 2 | 13 | If zones 1 to 6 are off, turn on Output 5 |
| | 79 | 3 | 13 | 79 | 4 | 13 | |
| | 79 | 5 | 13 | 79 | 6 | 13 | |
| | 128 | 5 | 1 | 255 | | | |
| 93 | 128 | 5 | 0 | | | | Turn on Output 5 |

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|-----------|------------|---------|----------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Resp | OFF Resp |
| 1 | | | | 93 | 89 |
| 2 | | | | 93 | 89 |
| 3 | | | | 93 | 89 |
| 4 | | | | 93 | 89 |
| 5 | | | | 93 | 89 |
| 6 | | | | 93 | 89 |

Arming & Disarming

3.5 Automatic Arming and Disarming by Time Program

You can program Time Programs to automatically arm and disarm the system. In this example, we shall program 2 Time Programs to Arm to Night Mode at 11 PM, and to Disarm at 6 am every day of the week. For automatic arming, if zones are open and Force Arm is allowed (Check Engineer Menu 4,3,1 - Force Arm Option), the system will automatically bypass these zones. There will be no exit time. If the bypassed zones are later closed, they will be protected. If Force Arm is not allowed and zones are open, the system will not arm - it will go back to Security off.

Occupants are out and have armed to Away mode, the auto-arm response will not change to Night mode. If they are away overnight or on vacation, or leave the house before the disarm time and arm manually to Away, the system will not disarm, as the auto-disarm response only disarms from Night Mode.

Step 1 Response 69 is programmed by default to arm to Night Mode from Security off. In the Engineer Menu. Check this by going to 3 - Control Settings, 6 - Responses, enter 69#. Actions 73, 0, 13, 71, 02, 255 should be programmed into the Response. Action 73, 0 means Get the Security Mode. Action 13 is Exit if not Zero, i.e.. Exit from Response if not Security off. Action 71 is the Auto Arm action, and the next code is the selected security mode (0 for Home, 1 for Away, 2 for Night, 3 for Vacation), so the above actions arm to Night Mode only if in Security off. The Response has 6 action codes including the terminator, which fits into the 6 codes allotted to a Response. If the system is in any other mode, i.e.. Away, Night or Vacation Mode, it will not arm to Night Mode. If the occupants are out, and the system is armed already, the system will not arm to Night Mode.

Step 2 Response 63 is programmed by default to disarm the system to Security off if the system is in Night Mode. In the Engineer Menu, go to 3 - Control Settings, 6 - Responses, enter 91#. Enter actions 73, 0 (Get Security Mode), 68, 02 (Skip to Marker if not 2, i.e.. Night Mode), 71, 00 (Disarm to Security off) , 255 (terminator). This Response disarms to Security off only if the system is in Night Mode. Hence, if the occupants leave the house early and armed to Away Mode, the system will not disarm.

Step 3 Program a Time Program to do the Auto-arm Response at a selected time. In this example, we shall set Time Program 1 for 11 PM every night. In the Engineer Menu, select 3 - Control Settings, and 3 - Time Programs. Enter the Time Program number 1 and # key. Press 1 for Day of Week and select 1,2,3,4,5,6,7,8 ON. Press 2 for Time and enter 23 hours 0 minutes (don't forget to press # after entering hours and minutes). Press 3 for Response and enter 69#.

Step 4 Program a Time Response to do the auto-arm to Night Mode Response at a selected time. In this example, we shall set Time Program 2 to disarm to Security off at 6 am each morning. Enter the Time Program Menu as described above.. Enter the Time Program number 2 and # key. Press 1 for Day of Week and select 1,2,3,4,5,6,7,8 ON . Press 2 for Time and enter 23 hours 0 minutes (don't forget to press # after entering hours and minutes). Press 3 for Response and enter 63#.

This completes the programming. Test the Time Programs by changing the time to 10:59 PM. At 11:00 PM, the system will be armed. You can confirm this by listening to the 2 beeps on the speaker or siren which means the system is armed. Also the RED Indicator LED will turn on (steady). Check that if the system is in Away Mode at 11 P.M, it will not arm. Check the Disarm Time Program by setting the time to 5:59 am. At 6:00 am, the system should disarm. You can confirm this by checking the Green indicator LED which should turn on (Steady). Also, check that if the system is already armed to Away at 6 A.M., it will not disarm. After testing, set the date and time correctly.

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|---------------------------------------|
| Response | Action | Action | Action | Action | Action | Action | Description |
| 63 | 73 | 0 | 68 | 2 | 71 | 0 | If Night Mode, Disarm to Security off |
| | 255 | | | | | | |
| 69 | 73 | 0 | 13 | 71 | 2 | 255 | Auto Arm to Night from Security off |

| Engineer Menu 3 - Control settings, 3 - Time Programs | | | | | |
|---|-----------------|------------|-------------|----------|---|
| Press | 1 | 2 | | 3 | |
| Time Prog | Days of Week | Time (Hrs) | Time (Mins) | Response | Description |
| 1 | 1,2,3,4,5,6,7,8 | 23 | 00 | 69 | Arm to Night Mode from Security off at 6 PM every day |
| 2 | 1,2,3,4,5,6,7,8 | 06 | 00 | 63 | Disarm to Home from Night Mode at 6 AM every day |

Arming & Disarming

3.6 Programming more than 1 Entry Door

Usually, only 1 door is designated as an entry door. An entry door is used to exit the premises after the system is armed, as well as to enter when the system is armed.

More than 1 door may be programmed as an entry door. For example, the front and back entrances of a shop may be used as entry doors, as the staff may want to have the option of entering and leaving from both doors.

Zone Type 2 is the Entry Door Type. The zones to be entry doors should be assigned to this zone type.

- Step 1** Enter Engineer menu, 1-Zone Settings. Enter the zone number and # key.
- Step 2** Press 1 - Description and enter the words from the wordlist to describe the zone. Don't forget to enter # after each word.
- Step 3** Press 2 - Zone Type. Enter 2 # to select Entry Door.
- Step 4** Press 3 - Entry/exit Path. Press 1 for ON if this door when open is not to be announced during Security Check when arming to Away or Vacation Mode. Press 0 for OFF if the door when open is to be announced during Security Check¹. It is advisable if there are more than 1 entry doors to leave the Entry Path setting OFF, with the exception of the door which is usually open, so that other entry doors which are open when arming may be reported during Security Check. Entry Doors do not cause immediate alarm during entry, even if their Entry/Exit Paths settings are off. They always cause an Entry Alert, which causes the speaker to beep to warn that the system must be disarmed.
- Step 5** Press 5 - ON Response. Enter a Response number and # key if opening the door should activate some action. If you want to turn on lights when the entry door is opened when the system is armed, it is better to enter a Response in the Entry Alert Alarm Type Response (See application on "Switching on Lights when entering the Premises" in an earlier section). Otherwise, enter 0# for No Response.
- Step 6** Press 6 - OFF Response. Enter a Response number and # key if closing the door should activate some action. Otherwise, enter 0# for No Action.

This completes the programming. Test the setting by arming to Away mode and leaving by either door. Make sure that the Entry Path settings are correct for the doors. The door with Entry Path setting OFF should be announced during Security Check if it is open already. See footnote¹. Check that if one door is open when exiting from the other door, that the open door is announced on the doorphone when the other door is closed.

| Engineer Menu - 1, Zone Settings | | | | | |
|----------------------------------|-----------------------------|----------------|------------|----------------|-----------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description 4 words max. | Zone Type | Entry Path | ON Response | OFF Response |
| | "front" "door" | 2 - Entry Door | 1 - ON | 0 | 0 |
| | "back" "door" | 2 - Entry Door | 0 - OFF | 0 | 0 |

¹During Security Check, entry path zones which are open are not announced on the phone (and on the Voice Station). However, after an Entry Door is closed, all open zones will be announced on the Doorphone

Arming & Disarming

3.7 Connecting an Exit Terminator (Push-to-set) Switch (UK Only)

Comfort may be configured to require an Exit Terminator button to complete the arming sequence for Away and Vacation mode.

When an exit terminator is set up, the exit sequence is changed so that after the entry door is closed (all protected zones have been closed), the 2 beeps from the siren will not be heard until the exit terminator button is pressed. The exit terminator has no effect when the system is not being armed ~~locally~~ or Vacation Mode. Pressing it at other times has no effect. It is not required when arming remotely or when arming to Night Mode. Action 06 (Exit Terminate) is used to perform the Exit Terminator function. Response 71 is set to do action 06 by default. If not, program action 06 into a Response. The Zone ON Response (or OFF response) is set to the Response to perform the exit terminator function.

- Step 1** To set the Away Arming method to Exit Terminator, program Location 1692 to 2 and press Reset (or reset from Engineer Menu 7,4,2).
- Step 2** A suitable switch or button (normally open) must be connected to a zone.
- Step 3** Program the zone as follows. Enter the Engineer Menu, 1 - Zone settings, enter zone number and # key.
- Step 4** Press 1 for description. Enter a suitable description of the exit terminator zone e.g. "Exit Switch". Remember to enter # after each word number.
- Step 5** Press 2 for Zone Type. Enter 8# for Momentary Switch.
- Step 6** Set 3 - Entry Path to OFF
- Step 7** Press 5 for ON Response. Enter 67# .

Test by arming to Away Mode and closing the entry door when protected zones are off. The system will not arm until the Exit Terminator button is pressed.

| Engineer Menu, Press 1 - Zone Settings | | | | | |
|--|-----------------|-----------|------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description | Zone Type | Entry path | ON Response | OFF Response |
| zone number 1 to 16 | "Exit" "Switch" | 8 | 0 - OFF | 67 | 0 |

| Response | Action code |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| 67 | 9 | 6 | 1 | 64 | 10 | 255 |

Comfort Door Station as Exit Terminator

If the Comfort Door Station is installed, the doorbell on the Door Station can be used as Exit Terminator when arming. At other times, the button behaves as a doorbell.

To program Door Station button as Exit Terminator, simply enter 67 in Location 1691. Location 1691 is for a Response to be activated when the Doorbell is pressed. This can be used to switch cameras and other useful functions. Response 67 causes the Exit Terminate.

Arming & Disarming

3.8 "Intelligent" Arming

The AWAY one touch arm key on the Keypad can be programmed for "Intelligent" Arming. This means that if the user exits via the front door, the system arms to Away, while if another interior zone, say the staircase PIR is triggered, the system arms to Night Mode instead.

Program the Interior Zone Response which will change arming to Night Mode as follows

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--|
| Response | Action | Action | Action | Action | Action | Action | Description |
| 93 | 73 | 9 | 12 | 73 | 0 | 68 | If Arming to Away Mode, change to Night Mode |
| | 1 | 72 | 2 | 255 | | | |

73,9 (Check Arming)

12 (Exit if Zero, i.e. Exit if not arming)

73,0 (Get Security Mode)

68,1 (Skip to Marker if not 1, i.e. Away)

72,2 (Arm to Night. 71,2 auto arm to Night has the same effect)

255 (End)

Assign this Response to the interior zone or zones which will cause Night Arming

The Night Arm One-touch Key may be freed for some other function (like Timed Exit and Rearm) in this section.

When the Away Key on the keypad is pressed, the system will begin arming to Away, and the Exit delay will start to count down. If the designated detector is activated, the system arms to Night mode instead.

Arming & Disarming

3.9 Automatically Arm and Switch Off Lights if No Movement for a preset period

In an office environment, people may forget to arm the security system when they leave, or they may not know that they are the last to leave. In such cases, the system can be programmed so that if not movement is detected in all monitored areas for a certain period, say 1 hour, then the system is automatically armed. This should be done only if there are sufficient detectors to ensure that if people remain in the premises, say in the toilets or in storerooms, they will be detected, so that the system is not armed by mistake.

Program a Response to start a Timer for the intended duration for arming (1 hour, say). Assign this Response to all the non-24 hour alarm Zones Off Response in the system so that whenever the zone goes on, the timer is restarted. Thus, the timer will expire only if there are no detectors triggered within the programmed duration. The timer expiry will activate the auto-arming process, which will force-arm the system if there are some zones still open. The Force Arm alarm type should be programmed to dial out to a designated staff to alert him/her of the force-arm status.

The Responses are programmed as follows. An unused Response, say 45 is programmed with the following actions:

194, 1, 14, 16, 90, 255. This is the Start Timer action for Timer 1, period = $14 \times 256 + 16 = 3600$ seconds or 1 hour, then go to Response 68

Response 68 is by default 71,1,255 which is auto-arm to Away Mode.

Program the Security Mode Response for Away Mode to Response 66, which by default switches off all appliances connected to X10 modules with housecode A and all Outputs, if required.

Program The Alarm Types Force arm Alarm (23) to dialout to one of the programmed numbers. If necessary, the Armed alarm type may also be programmed to dial out to monitor arming without force-arming.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|-------------|----|-----|----|-----|-----|---------------------------------------|
| Response | Action code | | | | | | Description |
| 66 | 195 | 65 | 0 | 13 | 255 | | All X10 housecode A Lights off |
| 45 | 194 | 01 | 14 | 16 | 68 | 255 | Start Timer 1 for 1 hour, then Res 68 |
| 68 | 71 | 1 | 255 | | | | Arm to Away |

| Security Mode Responses (Engineer Menu 3,5) | | |
|---|----------|-----------------------------|
| Mode | Response | Remarks |
| 1 - Away Mode | 66 | X10 house code A lights off |

| Engineer Menu - 1, Zone Settings | | |
|----------------------------------|-----------|--------------|
| Press | 2 | 6 |
| Zone | Zone Type | OFF Response |
| | 5 | 45 |
| | 5 | 45 |

Arming & Disarming

3.10 Time-zoned Disarm Alarm

When the security system is disarmed outside an allowed time, a silent alarm can be generated, which triggers a dialout to a pager, a phone or Monitoring Station.

A Time Zone for allowed disarm is set up using two Time programs. During this time zone, a counter or flag is set to 1. When the system is disarmed, the Security off response checks the counter or flag. If the counter or flag is 0, the alarm is triggered.

In this example, the system can be disarmed from 7 am to 7 PM each weekday. Program the Time programs and Responses as follows:

| Engineer Menu 3 - Control Settings, 3 - Time Programs | | | | | |
|---|--------------|--------------|----------------|----------|--------------------------------------|
| Press | 1 | 2 | | 3 | |
| Time Program | Days of Week | Time (Hours) | Time (Minutes) | Response | Description |
| 1 | 1,2,3,4,5 | 07 | 00 | 45 | Set counter 0 to 1 at 7 am, weekdays |
| 2 | 1,2,3,4,5 | 19 | 00 | 46 | Set Counter 0 to at 7 PM, weekends |

| Security Mode Response (Engineer Menu 3,5) | |
|--|----------|
| Security Mode | Response |
| 0 = Off | 47 |

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|--------------|---|----|-----|----|-----|--|
| Response | Action codes | | | | | | Description |
| 45 | 131 | 0 | 1 | 255 | | | Load Counter 0 with 1 |
| 46 | 131 | 0 | 0 | 255 | | | Load Counter 0 with 0 |
| 47 | 81 | 0 | 13 | 88 | 14 | 255 | Get Counter 0 value, skip if NZ, else do alarm type 30 |

| Alarm Types Menu (CS-Xpress) | | | | | | | |
|------------------------------|--------------|----------|--------------------|--------|------------|-------------|-------------|
| Alarm Type | Dial Setting | Response | Sentence | Strobe | siren type | Trouble arm | alarm state |
| 14, or 17 | ON | 0 | 20, "Security off" | off | Null | On | 0, Idle |

Alarm Type 14 may be customized for reporting unauthorized disarm. To complete the programming, set the dial indexes to dial to the desired phone 1 to 8. If it is required to dial to a Monitoring Station, set the appropriate report and restore codes

Alarm Type 17 (Disarm) can also be used instead of 14 or another alarm type, since 17 will not be used for normal routine disarm. If 17 is to be used, in CS-Xpress, set the Non Detector alarm 8 to 0 (instead of 17) so that alarm type 17 will not be activated for routine disarm.

Arming & Disarming

3.11 Timed Exit and Rearm

When the system is armed to Night Mode, and someone has to leave the home, it is not necessary to disarm and arm again, especially if other members of the home are asleep. A Keypad key can be programmed so that the front door is bypassed for the time required to leave the home, and to unby pass after that.

Program an unused Response as follows:

Response 225 (or any unused Response)=

73,0 (Get Security Mode)

12 (Exit if Zero, i.e.. Security Off, don't do anything if security is off)

67,1 (Skip if =1, i.e.. Away Mode, don't do anything if in Away Mode)

64,3 (Start Siren Type 3, i.e.. Slow beeps like arming)

75,1 (Bypass Zone 1, Front Door)

194, 6, 0, 30, 228 (Start Timer 6 or unused timer for 30 seconds then do Response 244)

255 (Terminator)

Response 228 (target for Timer) =

76,1 (Unbypass Zone 1, front door)

73,9 (get alarm state)

13 (Exit if trouble, alert or alarm state)

7 (Siren Off)

255

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|--------------|-----|-----|-----|----|----|--|
| Response | Action codes | | | | | | Description |
| 225 | 73 | 0 | 12 | 67 | 1 | 64 | If Night or Day Modes, bypass Zone 1, Start Timer 6 for 30 seconds then Response 244 |
| | 3 | 75 | 1 | 194 | 6 | 0 | |
| | 30 | 228 | 255 | | | | |
| 228 | 76 | 1 | 73 | 9 | 13 | 7 | Unbypass Zone 1, If idle state, siren off |
| | 255 | | | | | | |

Program the Keypad function key to Response 228 in Engineer Menu 4,4. When the key is pressed, and the system is in Day or Night Modes, the keypad will give slow beeps, bypasses the front door and starts a timer for 30 seconds or whatever time was set. At the end of the time, the front door is unby passed. If the door is still open, an entry alert is started which will cause an alarm if the code is not entered in time.

Arming & Disarming

3.12 One-Touch Night Mode Arm Key combined with Timed Exit/Rearm

The One-touch Night Mode Arm key can be used for both Night arming from Security Off and for allowing timed exit in Night Mode. When security is OFF or in Day Mode, pressing the key arms to Night Mode. In Night Mode, pressing the key allows timed exit and rearms afterwards. Program the Keypad Response as follows:

| Engineer Menu 3 - Control settings, 6 - Responses | | | | | | | |
|---|--------------|-----|-----|----|-----|----|---|
| Response | Action codes | | | | | | Description |
| 225 | 73 | 0 | 68 | 2 | 64 | 3 | If Night Mode, bypass Zone 1, Start Timer 6 for 30 seconds then Response 228. If not in Night, then Response 73 to arm to Night |
| | 75 | 1 | 194 | 6 | 0 | 30 | |
| | 228 | 193 | 74 | 73 | 255 | | |
| 228 | 76 | 1 | 73 | 9 | 13 | 7 | Unbypass Zone 1, If idle state, siren off |
| | 255 | | | | | | |

Keypad Response =

73,0 (Get Security Mode)

68,2 (Skip if not 2, i.e. not Night Mode)

64,3 (Night Mode - Start Siren Type 3, i.e.. Slow beeps like arming)

75,1 (Bypass Zone 1, Front Door)

194, 6, 0, 30, 228 (Start Timer 6 or unused timer for 30 seconds then do Response 228)

193 (Exit)

74,73 (Off or Day Mode - do Response 73, i.e. key arm to Night Mode if Sec Off or Day)

255 (Terminator)

Response 228, the target for Timer 6, remains the same

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Arming & Disarming

3.13 Return to Day Mode when disarming from other Modes

Some systems may require areas such as outbuildings or a building perimeter to be armed most of the time. This application has been written to automate the setting of the Day Mode allowing the 'one touch' keys to be used to switch from the various modes. Eg. While the system is in Day Mode Pressing Night, Away or Holiday keys can arm the system. When disarming the system from modes such as Night, Away and Holiday, a check is made to see if flag 14 is set, so that the system will re-arm to Day Mode to protect the 'out-buildings' when disarming from these other modes. If the system was already in Day Mode, entering your code then # will disarm the system to 'Security Off' to allow entry into the area protected by the Day Part Set upon disarming. Each Mode key needs a new modified response to replace their existing responses. We have tried to select response number which create minimum impact on existing used default responses.

Each of the following Mode key Responses enable a single key press to arm from Day Mode. Arming to Day Mode sets flag 14. Macros for Away Mode and Night Mode clear the flag 14. Security off Mode Response checks flag 14 and will either arm to Day Mode or do nothing if already in Day Mode allowing the systems normal functions to disarm the Day Mode area as normal.

Should a keypad be required within the area protected by Day Mode, then ensure that entry route zones have Response 54 as their Zone On response, this will cause the entry delay during Day Mode, but will cause an immediate alarm in all other modes such as during Night and Away.

Keypad Function Keys

Ensure that the new Function Key response numbers for Away Mode and Holiday Mode are entered into Keypad Control Station Menu via Engineer Menu 4,4 or CS-Xpress. Please refer to Table 39.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|-----|-----|-----|----|-----|
| Resp | Description | Action Codes | | | | | |
| 28 | Away Mode Macro - Clear Flag 14 | 74 | 118 | 132 | 14 | 0 | 255 |
| 31 | Night Mode Macro - Clear Flag 14 | 132 | 14 | 0 | 255 | | |
| 67 | Key Arm to Away from Day, or Security Off only | 73 | 0 | 67 | 1 | 72 | 1 |
| 69 | Key Arm to Holiday from Day, or Security Off only | 73 | 0 | 67 | 2 | 72 | 4 |
| 71 | KEY ARM Day from Security Off | 73 | 0 | 13 | 72 | 3 | 255 |
| 73 | KEY ARM Night from Day or Security Off Mode only | 73 | 0 | 67 | 1 | 72 | 2 |
| 77 | Security Off Mode Macro - Arm to Day Mode if Day Mode (Flag 14 = 0) not already set. | 85 | 7 | 132 | 14 | 2 | 13 |
| 216 | Day Mode Macro - Set Flag 14 | 132 | 14 | 1 | 255 | | |

Greyed numbers indicate existing default values

Response 77:

Check Flag 14, exit if flag value is 1 (allowing system to disarm as normal), if value is zero, arm to Day Mode.

 **Response numbers 67 and 68 on systems may already be in use, so check before you modify and use them.**

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Arming & Disarming

3.14 Disarming Day Mode when internal door is opened in Day Mode

This application has been created to allow an area such as a single room to be protected by a movement detector during Day Mode, but the opening of the internal door to the protected room such as a 'Snooker Room' will cause the room to be disarmed by the switching of the door contact and a disarming response allowing the owner entry. It assumes that only the owner is able to enter the room in this way, the purpose is to provide protection against entry into the room from the external windows etc. The room is armed by pressing the Day Mode key and disarmed by either opening the internal door or entering the user code.

The response will check first that the system is in Day Mode or if the system is in alarm otherwise it will do nothing and remain 'armed'.

The response should be attached to the door contacts 'On' response. Response 63 should first be checked to see if it is already being used.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|---|----|---|-----|---|
| Resp | Description | Action Codes | | | | | |
| 63 | Disarm to Security Off Mode <i>only</i> if in Day Mode but not if in alarm | 73 | 9 | 69 | 3 | 73 | 0 |
| | | 68 | 3 | 72 | 0 | 255 | |

- 1 Program Zone Type 22 as an "Instant in Day, Night & Away Modes" Zone type, using the following settings in Locations menu or CS-Xpress Zone Types Screen. In later systems, Zone Type 22 is already set up for Instant Day, Night, Away as default, but check anyway. Reset the panel after changing Locations or downloading from CS-Xpress

| Location (Eng Menu 7,4,1) | Value | Zone Type 22 Settings |
|---------------------------|-------|--|
| 2652 | 252 | Instant in Day, Night and Away Modes |
| 2653 | 6 | Normally Closed, not 24 Hr, Sensitivity No 6 500 ms) |
| 2654 | 1 | Normal Alarm Type 1 |
| 2655 | 1 | Trouble Alarm Type 1 |

Note: These Locations apply to File System 18. For File System 17, refer to Zone Types table for Locations.

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | | |
|---|--------------|-----------|-----------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | Entry/exit path | ON Response | OFF Response |
| zone | Snooker Room | 22 | 0 - OFF | 63 | 0 |

| Zone Type | Off | Away | Night | Day | Sensitivity |
|-----------------------------|----------|---------|---------|---------|-------------|
| 22, Instant Day, Night Away | Inactive | Instant | Instant | Instant | 500 ms |

 **Response numbers 63 may already be in use, so check before you modify and use them.**

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Author: Andrew Roberts, Comfort Home Controls

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4 AUTOMATION APPLICATIONS

- 4.1 Using Zone Responses to control Lights and Appliances
- 4.2 Two way switching of Lights, Appliances, Water Heaters
- 4.3 Programming Infrared Codes
- 4.4 Monitoring Movement for Lighting Control
- 4.5 Toggle X10 Lights from a Function Key
- 4.6 Simple using Time Programs and Human Thermostat
- 4.7 Using a Remote Thermostat

Automation Applications

4.1 Using Zone Responses to control Lights and Appliances

Zones may be used to control lights and appliances by means of their ON and OFF Responses. The ON Response is triggered when the zone comes on, and the OFF Response is triggered when the zone turns off. As each zone is defined as Normally Open (N/O) or Normally Closed (N/C) via its Zone Type, a N/O zone is ON when it is closed and OFF when it is open, and a N/C zone is ON when it is open and OFF when it is closed.

Step 1 Program a Response to perform the Actions required, e.g. turning on or off lights and appliances, using the outputs, X10 control or Infrared signals from the outputs. A Response can perform many actions, one after the other. Besides controlling lights and appliances, the actions can also arm and disarm the security system, perform a CMS Dial Test, activate a siren type on the speaker, control the strobe, the external siren (12V) etc. The Response can be conditional, i.e.. check for time, security mode, alarm state for certain values to determine if the following actions are to be activated. For example, a PIR can be set to turn on a light only if the time is after 8 PM and the security system is in Away Mode,

Step 2 Program the Response Number into the Zone ON or OFF Response.

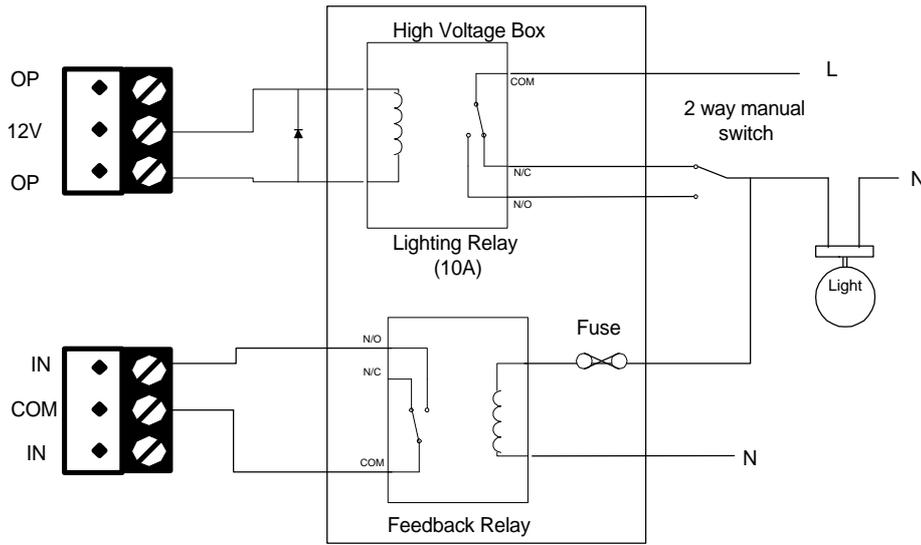
Test the response by making the zone go ON or OFF. A Zone may be a PIR, a magnetic contact or other security sensor, or a switch.

Automation Applications

4.2 Two way switching of Lights, Appliances, Water Heaters

If Lights and appliances are connected to Comfort using appliance relays, it is usually necessary to provide for manual control as well. The diagram below shows one way of connecting the lights and switches and relay to provide 2 way (manual and Comfort-controlled) switching of lights.

The appliance relay and the manual switch are connected in a standard two-way switching arrangement. Both relay and switch will change the state of the light/appliance. A feedback relay is connected in the circuit to sense whether the appliance is on or off. The feedback relay contacts go to one of the zones. Optionally, one or two EOL resistors may be connected across the contact to supervise the wiring. (The header for the zone must be set correctly for none, one, or two EOL resistors - see Section 5.8 in the Installation Manual).



The zone is programmed as zone type 9 (Toggle switch). Programming is as follows: In this example, output 1 controls the appliance relay, and Input 5 is used for feedback.

| Engineer Menu, Press 1 - Zone Settings | | | | | |
|--|-------------|-----------|------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone | Description | Zone Type | Entry path | ON Response | OFF Response |
| zone number # | "light" | 9 | 0 - OFF | 0 | 0 |

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|-----------------|----------------|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 0 to 9, * | "Lights" | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | | "Off" | 10 | "On" | 9 |

The Control Key is programmed to turn on the appliance using Response 9 and Turn it off using Response 10.

| Engineer menu, 3 - Control Settings, 6 - Responses, enter Response number and # | | | | | | | Description |
|---|---------------|---------------|---------------|---------------|---------------|---------------|--|
| Response | Action code 1 | Action code 2 | Action code 3 | Action code 4 | Action code 5 | Action code 6 | |
| 9 | 79 | 1 | 13 | 78 | 5 | 255 | Read Input 1. If on (1), exit. If Off (0), toggle output 5 |
| 10 | 79 | 1 | 12 | 78 | 5 | 255 | Read Input 1. If off (0), exit. If On (1), toggle output 5 |

Response 9 turns on the appliance connected to output 5. It checks Input 1 (79,1). If the input is ON, the response exits (13- Exit if NZ) and does nothing. If it is OFF, output 5 is toggled (78,5). This response switches the state of Output 5 only if the Input 1 is Off.

Automation Applications

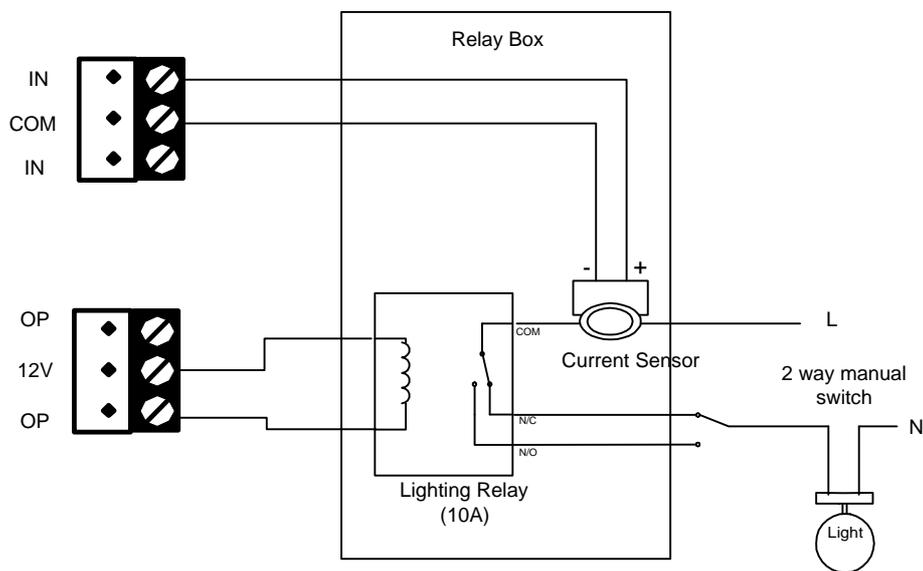
Response 10 turns off the appliance connected to output 5. It checks Input 1 (79,1). If the input is OFF, the response exits (12- Exit if Z) and does nothing. If it is ON, output 5 is toggled (78,5). This response switches the state of Output 5 only if the Input 1 is On.

To control hot water heaters for bath water, contactors are normally used. The corresponding electrical circuit is as shown below:

A 12 volt relay switches a 3 pole heater contactor. 2 of the poles are used to switch the supply to the heater, while the remaining pole gives the status to the feedback input. programming is the same as for the lights and appliances

Using Current Sensors instead of Feedback Relays

Cytech manufactures current sensors which can be used to sense the appliance current. This can be used instead of an AC relay to sense the appliance on/off status. With current sensors, there is no direct contact with the live voltage, as one of the Mains wire supplying the appliance is routed through the current sensor coil. More than one turn may be used to improve sensitivity. The connection circuit is shown in the figure below



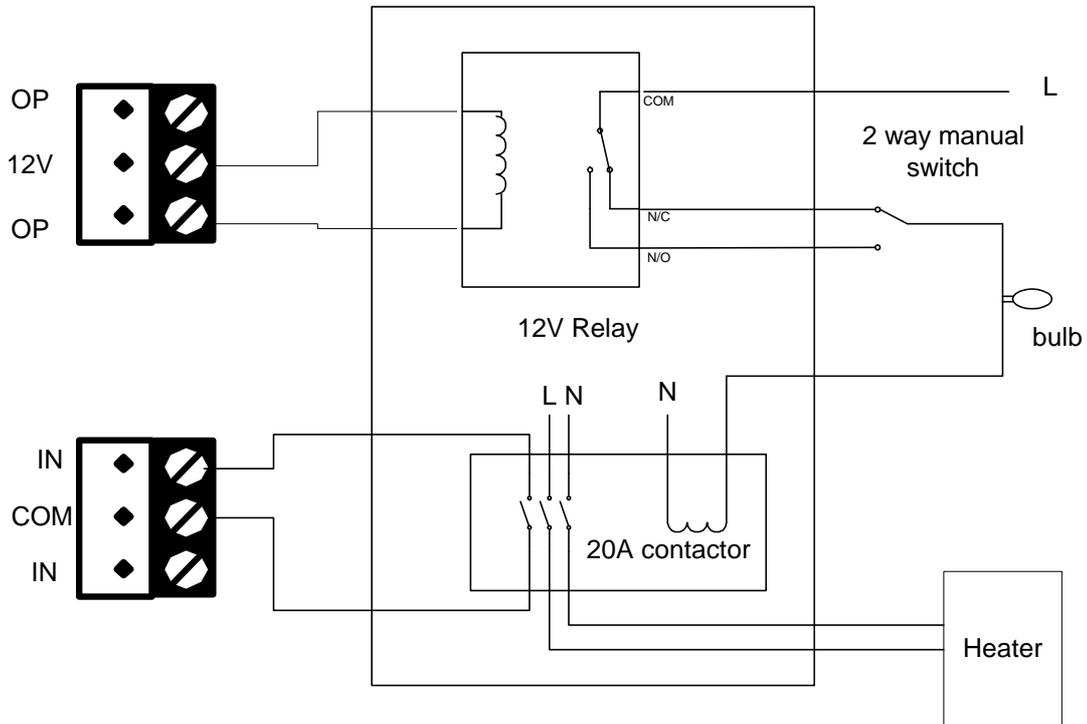
One difference to note between the use of current sensors and feedback relays is that the current sensor senses current while the feedback relay senses voltage. If the appliance or light which is controlled is disconnected and power is applied, the current sensor will report OFF status while the AC relay will report ON status.

Automation Applications

Controlling Water Heaters

A contactor rated at 20A is required for switching the high current required for a water heater. A relay is used to switch the contactor by applying mains voltage to the contactor coil. A 3 pole contactor is required. One of the poles supplies the feedback status to the Comfort panel so a feedback relay or current sensor is not required.

The normal Heater wall switch cannot be used as it is not a two way type. A two way lighting switch and a bulb to indicate the status is needed.



Announcing Appliance Status

The Home Control Menu can announce the status of the controlled appliance based on the feedback inputs. In the Worksheet Table 26, each Control Key has a Location for the Input number where the feedback is connected. If a valid Input number 1 to 16 or 64 is programmed in the location, the menu will announce the status of the input, on or off. The words used for ON and OFF depend on the words programmed in the Action Keys 0 and 1. For example, Control Key 3 controls a curtain using a pulse on output 1 to open and close. The status of the curtain, open or closed is sensed by a contact provide by the curtain motor which is connected to Input 14. According to Table 26, the feedback input location for Control Key 3 is 1822. Program 14 (the input number) into Location 1822.

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|------------------------|--|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 3 | "Curtain" Word = 12 | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | Location 1822 | "Closed" | 79 | "Open" | 79 |
| | | 14= Input number for feedback from current sensor or relay | | | |

When the control key 3 is pressed, the menu will announce

"Curtain Open (or Closed), Press 0 for Closed, 1 for open,"

The words for "Open" and "Closed" are taken from the action keys words for 0 and 1. Action key 0 is used for the off or inactive state, while action key 1 is used for the On or active state, depending on the zone type Normally open or closed.. If the words "ON" and "OFF" were used for action keys 1 and 0, the menu would announce

"Curtain ON (or OFF)"

Automation Applications

Announcing Appliances On and Off

When lights and appliances are switched on and off, Comfort can be programmed to announce

"(appliance name) " when turned on

Or

"(appliance name) OFF" when turned off.

This is not the same as announcing the status in the home control menu described above. In this case, the announcement is made whenever the appliance is activated, even with a manual switch or remote control or Time Program, when the menu is not in use.

This requires a current sensor or feedback relay from the appliance to be connected to an input.

In the Zone programming for the feedback input, set the Zone Response and Off Response to Response 59 (Announce Zone) and program the Zone Description accordingly. This causes Comfort to announce the Zone Description whenever the zone is turned on and restored. To announce "OFF" when the zone is restored, program a word number in Location 1689. If word number 229 = "OFF" is used, Comfort will say (Zone Description) OFF when the zone is restored. If no word is programmed in the location, Comfort will announce the zone description only when the zone comes on and off.

Note that the zone description in the Zone needs to be programmed as well as the Control Key description. The Zone description is announced when the zone is activated, and the Control key description is used when the control key is selected.

Revised March 1999

Automation Applications

4.3 Programming Infrared Codes

Up to 16 Infrared Codes (depending on the size of the code) may be stored in Comfort's nonvolatile memory. These codes are referenced by index number 1 to 16. As there are a large number of appliances ranging from TVs, VCRs, Hi-fis, Airconditioners, cable boxes etc. which are remote-controlled, it is not possible to put every possible code into the memory. The codes loaded into the system are customized to cater for only the remote control appliances in the particular home or office. A nonvolatile memory (EEPROM or Electrically Erasable Programmable Read Only Memory) chip may be supplied with the IR. codes required. When the CS-Xpress software is available, the appropriate IR. codes can be selected from a library of codes into the EEPROM.

The selected IR. code is sent out from one of the outputs (1 to 16). An Infrared LED or probe, which is an optional accessory with the Comfort system is connected to the output terminals as shown in the installation manual. The Infrared probe may be attached to the Infrared receiver of the receiving appliance.

The Infrared code and the output to which the IR. signal is sent is specified in the Infrared control Action 129. The format of the Action code is as follows:

03, IR. Number (1 to 16), Output number (1 to 16)

The 2nd byte is the Infrared number in the EEPROM, while the 3rd byte is the output number 1 to 16.

To program a Response to send out an Infrared signal to an output, use one of the default Infrared Responses 17 to 32. This series of Responses send IR. number 1 to 16 to Outputs 1 to 8. If necessary modify one of these Responses to change the IR. number or output number. Add more IR. codes and other actions to the Response if necessary.

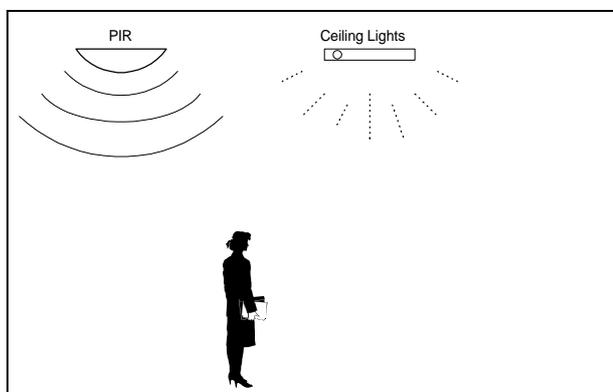
The Response may be called from the Home Control Menu, Zone Responses, Alarm Types, Security Mode Responses, Time Programs, Vacation programs. Refer to other application notes in this manual.

Automation Applications

4.4 Monitoring Movement for Lighting Control

The system can be programmed so that when someone enters or remains in a room, the lights turn on. When no movement is detected for a period of time, say 10 minutes, the lights turn off. This provides convenience as well as energy saving.

One or more PIRs are connected in series to any zone in order to provide sufficient coverage of the area to be monitored. The Lights may be connected to an X10 module or to an Output through a relay. In this example, we shall use X10 control. A Response is programmed to turn on the lights when the zone is ON, if the light is not already on. If the light is connected to an X10 module, one of the 16 User Flags is used to indicate that it has been turned on, to avoid sending unnecessary X10 commands. Flags have two states, off and on. When motion is detected, if the flag is off, the light is turned on, and the flag is turned on. If the flag is already on, the light is not turned on. When the PIRs detect no movement, the zone OFF response starts a Timer (8 Timers are available) for 10 minutes. At the end of the time delay, the light is turned off, and the Flag is also turned off. As long as there is movement in the room or area, the light is kept on, but when movement ceases, the timer starts. If the timer expires without the PIRs being activated, the light turns off. In an area where there is a lot of activity, the zone where the PIRs is connected may not have an opportunity to restore for long periods, hence the timer is turned off using the ON response to prevent the timer from running down while the PIR zone is in the activated state.



Response 43 in this example has the following actions: 85, 1 (Stop Timer 1), 132,1,2,(Check User Flag 1), 13 (Skip if Not Zero, i.e. Skip to marker if Flag is ON), 132,1,1 (Set User Flag 1 ON), 195,65,1,5 (X10 code A1 ON), 255. This Response turns on X10 device code A1 if the User Flag is OFF. Response 88 is assigned to the Zone ON response, i.e. it is activated when the Zone turns ON.

Response 46 has the actions: 194, 1, 2, 88, 91 (Start Timer 1 for 600 seconds, and then Response 47. This is assigned to the Zone OFF Response, i.e. it is activated when the Zone turns OFF.

Response 47 (activated by timer in Response 46) is 165, 65, 1, 7 (X10 A1 OFF) 132, 1, 0 (User Flag 1 OFF), 255. This turns off the light and the Flag to indicate the light is off

| Engineer Menu - 1, Zone Settings | | | | |
|----------------------------------|-------------|------------------------|-------------|--------------|
| Press | 1 | 2 | 5 | 6 |
| Zone | Description | Zone Type | ON Response | OFF Response |
| | | 5 - Immediate Movement | 43 | 46 |

| Engineer menu, 3 - Control Settings, 6 - Responses, enter Response number and # | | | | | | | |
|---|-------------|-----|-----|-----|-----|-----|---|
| Response | Action code | | | | | | Description |
| 43 | 85 | 1 | 132 | 1 | 2 | 13 | Stop Timer 1. If Flag 1 is 0, set Flag and send X10 A1 ON |
| | 132 | 1 | 1 | 195 | 65 | 1 | |
| | 5 | 255 | | | | | |
| 46 | 194 | 1 | 2 | 88 | 91 | 255 | Start Timer 1 for 600 seconds, then Response 47 |
| 47 | 195 | 65 | 1 | 7 | 132 | 1 | X10 A1 OFF, Flag 1 Off |
| | 0 | 255 | | | | | |

Automation Applications

If outputs are used to control the lights instead of X10 modules, the programming is simpler. The flags to indicate light status is not needed, as output on commands can be sent repeatedly to the outputs without any problems.

For example, to control Output 1;

| Engineer menu, 3 - Control Settings, 6 - Responses, enter Response number and # | | | | | | | |
|---|-------------|---|----|----|-----|-----|---|
| Response | Action code | | | | | | Description |
| 43 | 85 | 1 | 74 | 1 | 255 | | Stop Timer 1. Do Response 1 to turn on Output 1 |
| 46 | 194 | 1 | 2 | 88 | 2 | 255 | Start Timer 1 for 600 seconds, then Response 2 to turn off output 1 |

For each area to be monitored, 1 or more outputs (depending on how many lights are independently controlled) and 1 zone input for all the PIRs as well as 1 timer is needed,

Updated March 1999

Automation Applications

4.5 Toggle X10 Lights from a Function Key

This is quite a useful response which allows you to alternately switch an appliance or Light ON and Off (toggle action) by pressing a function key. The toggle can be used with a Radio Remote control connected to a zone input (zone type 8 or 24), as a keypad function key response or as Home Control Menu Response.

The response uses flags and a skip action to determine whether to switch on or off. By setting the flag when the light is switched ON and clearing the flag when the light is switched OFF, you can then use the check flag action to switch between the two points.

In this example, the Day key is assigned Response 241 as an alternative to Day Mode (location 1816).

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|----|---|-----|-----|-----|
| Resp | Description | Action Codes | | | | | |
| 160 | All Outside Lights X10 L1 ON | 195 | 76 | 1 | 5 | 255 | |
| 159 | All Outside Lights X10 L1 OFF | 195 | 76 | 1 | 7 | 255 | |
| 241 | Toggle Outside Lights L1 dependent upon Flag 11. Operate the Response from the One Touch Function Key for 'Day Mode' | 132 | 11 | 2 | 15 | 74 | 159 |
| | | 132 | 11 | 0 | 193 | 74 | 160 |
| | | 132 | 11 | 1 | 255 | | |

| Engineer menu, 4 , 4 Keypad Control Station | |
|---|-------------------------------|
| Key 'Day' | Response |
| Location 1816 | 241, Toggle Lights On and Off |

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Author: Andrew Roberts, Comfort Home Controls

Automation Applications

4.6 Simple HVAC application using Time Programs and Human Thermostat

This application is designed to give manual control of whether Heating (Central Heating) or Air Conditioning is the default. HVAC application via Home Control Menu 2. This allows the user to determine if heating or air conditioning is appropriate for the current ambient weather conditions. The response is also conditional, it will not operate during Holiday Modes, equally the response can also be overridden using the Home Control Menu. The method used for switching the air conditioning and heating ON is X-10. The appliance should be left in the ON position allowing the X10 module such as the AD10, AM12 and AW10 to apply the mains voltage.

The responses first check if it is a Holiday (73,1,13) and will exit the response if it returns a value of 1. Then the override flag is checked (132,15, 2) again it will leave the response if the returned value is 1 (13).

Flag 14 is used to determine if the heating or air conditioning is to be switched ON. If flag 14 = 1 the air conditioning (H2) will switch on, if flag 14 = 0, the heating will switch ON. Check flag 14 (132,14,2) if the value returned is not 0, it will skip to the next marker (16) otherwise it will do the heating ON response (74, 214), the actions after (193) marker will be carried out if the previous value checked was 1, (74,186) which will switch the air conditioning ON.

Time Programs should be used to initiate the heating or air conditioning ON and an OFF response. The ON response uses Response 235 and the OFF Response is 188 which switches both H1 and H2 OFF. This same response could also be used to switch OFF when arming the system to Night and Away Modes.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|---|--------------|-----|----|-----|-----|----|
| Resp | Description | Action Codes | | | | | |
| 182 | Flag 14 ON - Enable Air Conditioner in HVAC Menu | 132 | 14 | 1 | 255 | | |
| 183 | Flag 14 OFF - Enable Heating in HVAC Menu | 132 | 14 | 0 | 255 | | |
| 184 | Flag 15 ON - Override Heating and Air Con in HVAC | 132 | 15 | 1 | 255 | | |
| 185 | Flag 15 OFF - Enable Heating and Air Con in HVAC | 132 | 15 | 0 | 255 | | |
| 186 | X10 H2 ON (Air Conditioner) | 195 | 72 | 14 | 5 | 255 | |
| 187 | X10 H2 OFF (Air Conditioner) | 195 | 72 | 14 | 7 | 255 | |
| 188 | H2 OFF (Air Conditioner, X10 H1 OFF Heating) | 74 | 187 | 74 | 215 | 255 | |
| 235 | HVAC Macro - Heater X10 H1 ON if Cold Temp, X10 H2 ON (Air Conditioning) if Warm Temp (but not if in Holiday Mode or 'Off Mode' is selected in Home Control Menu 2) | 73 | 19 | 13 | 132 | 15 | 2 |
| | | 13 | 132 | 14 | 2 | 16 | 74 |
| | | 214 | 193 | 74 | 186 | 255 | |
| 214 | X10 H1 ON (Heater) | 195 | 72 | 1 | 5 | 255 | |
| 215 | X10 H1 OFF (Heater) | 195 | 72 | 1 | 7 | 255 | |

| Programming Table for Control Menu, 3,1 | | | | |
|---|------------------|------------|----------------|----------|
| Key | Description | Action Key | Action Word | Response |
| | | (0 to *) | (0-255) | (0-255) |
| 2 | "HVAC MODE MENU" | 0 | OFF MODE | 184 |
| | | 1 | NORMAL MODE | 185 |
| | | 2 | LOW TEMP MODE | 183 |
| | | 3 | WARM TEMP MODE | 182 |
| | | 4 | HEATING ON | 214 |
| | | 5 | HEATING OFF | 215 |
| | | 6 | AIR CON ON | 186 |
| | | 7 | AIR CON OFF | 187 |

WARNING NO circumstances should any kind of exposed element type heater such as a hot air blower or bar element fire be used with any Comfort based or automated applications whatsoever, this is HIGHLY dangerous and could cause a fire.

 Response numbers 236 and 237 may already be in use, so check before you modify and use them.

Created 2 May 1999

Author: Andrew Roberts, Comfort Home Controls

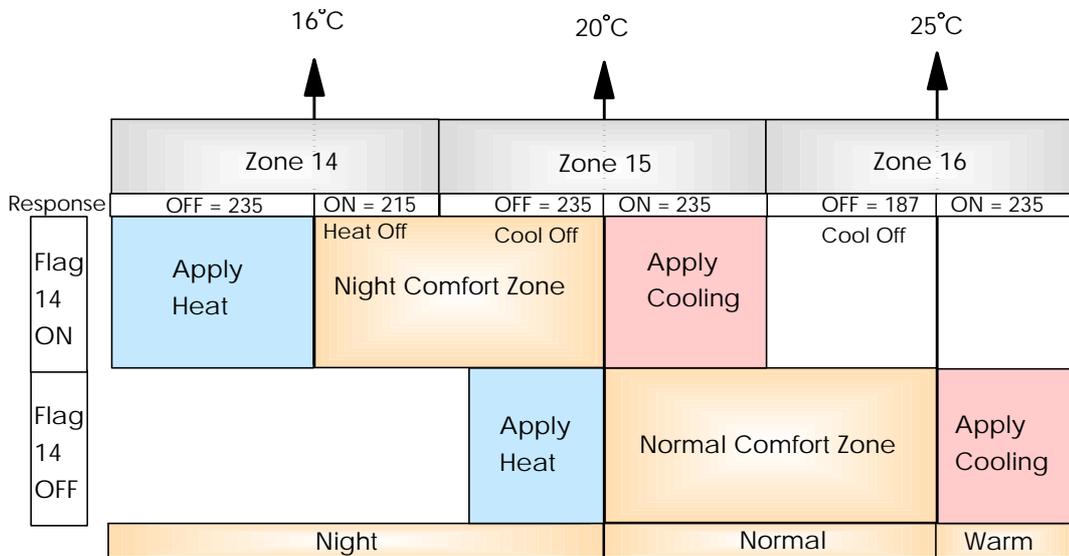
Automation Applications

4.7 Advanced HVAC using Three Thermostatic Set-points for Night, Normal and Warm.

This application uses temperature measurement and desired set-points to provide heating and cooling of the property automatically using Central Heating and Air Conditioning. Three normally closed zones are used for each set-point, the changing state of the zone will operate a response which checks for certain conditions. The responses 235(Day, Normal) and 179(Night) provides two 'Comfort zones' which are intended to be comfortable room temperature where neither heating or cooling takes place one for Night Time and one during the Day. The design assumes that heating or cooling is required all of the time even at night, where the temperature is controlled at the lower set-point temperature of between 16 and 19 degrees Celcius. The 'Normal' set-point controls between 20 and 25 deg.C. If it is desired for no HVAC to operate, then an override response (184) has been provided which can be used in a Time Program or Home Control Menu 2, 0 for 'Off Mode'. The temperatures 16, 20 and 25 degrees are only a guide and can be altered to suite using the potentiometers on each thermostat module.

The response is also conditional, it will not operate during Holiday Modes or if the override flag 15 has been set using Response 184. There are two main responses, one for the Day (235) and another for Night (179). The Night Mode response may also be used for Away Mode as a 4 deg. C set-back control. Response 235 checks if it is a holiday and if the override flag 15 is set before continuing. It then checks if the Night Mode Flag 13 has been set before continuing to check zone 15 OFF = apply heat and if Zone 16 = ON start the air conditioning. The check for Night Mode flag will call Response 179 which works between the lower temperatures of 16 degrees on Zone 14 and 20 degrees on Zone 15. The method used for switching the air conditioning and heating ON is X-10. The appliance should be left in the ON position allowing the X10 module such as the AD10, AM12 and AW10 to apply the mains voltage.

Time Programs can be used to override the heating or air conditioning using Response 184 ON and 185 to remove the override. To switch both heating and air conditioning OFF when setting to Away Mode, use Response 188 within Away Mode Macro Response 28 or for temperature set-back use response 182.



Heating and Air Conditioning Control Schematic using thermostats on 3 zones

No Air Conditioning Installed

If there is no requirement for Air Conditioning, the application may still be used, just make sure that X-10 address H2 is not used for anything else.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|---|--------------|----|---|-----|-----|
| Resp | Description | Action Codes | | | | |
| 182 | Flag 14 ON - Night Mode Control HVAC Menu | 132 | 14 | 1 | 255 | |
| 183 | Flag 14 OFF- Normal Mode Control HVAC Menu | 132 | 14 | 0 | 255 | |
| 184 | Flag 15 ON - Override Heating and Air Con in HVAC | 132 | 15 | 1 | 255 | |
| 185 | Flag 15 OFF - Enable Heating and Air Con in HVAC | 132 | 15 | 0 | 255 | |
| 186 | X10 H2 ON (Air Conditioner) | 195 | 72 | 2 | 5 | 255 |

Automation Applications

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|-----|-----|-----|-----|-----|
| Resp | Description | Action Codes | | | | | |
| 187 | X10 H2 OFF (Air Conditioner) | 195 | 72 | 2 | 7 | 255 | |
| 188 | H2 OFF (Air Conditioner, X10 H1 OFF Heating) | 74 | 187 | 74 | 215 | 255 | |
| 179 | HVAC Control in Night Mode - Add to Response 31 | 79 | 14 | 16 | 74 | 214 | 193 |
| | Macro control of Heating X10 H1 if below 16 deg C and | 79 | 15 | 15 | 74 | 186 | 193 |
| | X10 H2 Air Conditioning if above 20 deg C | 74 | 187 | 255 | | | |
| 235 | Advanced HVAC Macro control of Heating X10 H1 if below 20 deg C and X10 H2 Air Conditioning if above 25 deg C (but not if in Holiday Mode or Off 'Mode' selected in Home Control Menu 2) | 73 | 19 | 13 | 132 | 15 | 2 |
| | | 13 | 132 | 14 | 2 | 15 | 74 |
| | | 179 | 193 | 79 | 15 | 16 | 74 |
| | | 214 | 193 | 79 | 16 | 12 | 74 |
| | | 186 | 255 | | | | |
| 31 | Night Mode Response, HVAC flag 14 On | 74 | 182 | 255 | | | |
| 28 | Away Mode Response, HVAC flag 14 On | 74 | 118 | 74 | 182 | 255 | |
| 77 | Security Off Mode Response HVAC flag 14 Off | 85 | 7 | 74 | 183 | 255 | |

| Engineer Menu - 1, Zone Settings, enter Zone number and # key | | | | | |
|---|------------------|-----------|-----------------|-------------|--------------|
| Press | 1 | 2 | 3 | 5 | 6 |
| Zone 1 - 16 | Description | Zone Type | Entry/exit path | ON Response | OFF Response |
| Zone 14 16C | Night Set-point | 24 | 0 - OFF | 215 | 235 |
| Zone 15 20C | Normal Set-point | 24 | 0 - OFF | 235 | 235 |
| Zone 16 25C | Warm Set-point | 24 | 0 - OFF | 235 | 187 |

| Programming Table for Control Menu, 3,1 | | | | |
|---|------------------|------------|-------------|----------|
| Key | Description | Action Key | Action Word | Response |
| | | (0 to *) | (0-255) | (0-99) |
| 2 | "HVAC MODE MENU" | 0 | OFF MODE | 184 |
| | | 1 | NORMAL MODE | 183 |
| | | 2 | NIGHT MODE | 182 |
| | | 3 | HVAC ON | 185 |
| | | 4 | HEATING ON | 214 |
| | | 5 | HEATING OFF | 215 |
| | | 6 | AIR CON ON | 186 |
| | | 7 | AIR CON OFF | 187 |
| | | | | |

| Engineer Menu, 3 - Control Settings, 5 - Security Mode Responses | |
|--|-------------------------|
| 1 - Away Mode Response | 2 - Night Mode Response |
| 28 | 31 |

WARNING

Under NO circumstances should any kind of exposed element type heater such as a hot air blower or bar element fire be used with any Comfort based or automated applications whatsoever, this is HIGHLY dangerous and could cause a fire.

Response numbers 236 to 239 may already be in use, so check before you modify and use them.

Created 2 May 1999

Author: Andrew Roberts, Comfort Home Controls

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Keypad Applications

5 KEYPAD/DOOR STATION APPLICATIONS

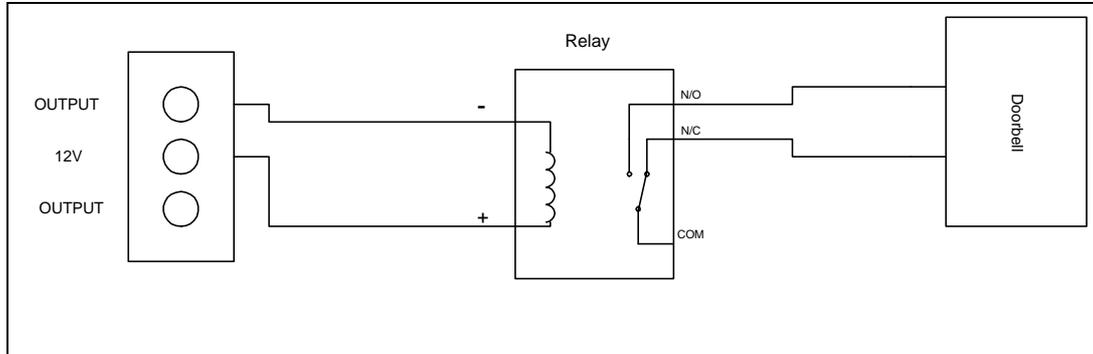
- 5.1 Connecting a normal doorbell chime in addition to the Door Station
- 5.2 Audio Verification with Keypads
- 5.3 Setting Voice Message Volume on Keypad
- ~~5.4~~ Doorphone Control Menu (Record and/or
- ~~5.5~~ Doorphone Control Menu (Record or
- 5.6 Playing a Warning message on a Keypad

Keypad Applications

5.1 Connecting a normal doorbell chime in addition to the Door Station

When the Door Station button is pressed in Security Off, day and Night Modes when people are at home, a chime is heard on the Keypads The local phone or Keypad can be used to talk to the visitor at the door or gate, If the Keypad chime is too soft, it is also possible to connect a normal door chime

Use an output to switch on a relay which is connected to the doorbell input, as shown in the figure below:



Enter a Response number in Location 1691 which sends a pulse to one the Door Chime output. When the Door Station push-button is pressed, the Response entered in Location 1691 is activated.

If Output 1 is used for the Door chime output relay, use Response 79, which is Output 1 Pulsed for 1 second. Responses 79 to 84 by default are programmed to output 1 second pulsed to outputs 1 to 6 respectively.

Note: By default, a doorbell Chime siren type is also activated by the Doorbell alarm type. This can be heard by connecting a speaker (8W) to the SPK +/- terminals on the main board . This provides high volume to a 5 W (minimum) speaker.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
| Response | Action code 1 | Action code 2 | Action code 3 | Action code 4 | Action code 5 | Action code 6 |
| 79 | 130 | 20 | 01 | 255 | | |
| 80 | 130 | 20 | 02 | 255 | | |

Keypad Applications

5.2 Audio Verification with Keypads

When Comfort dials to a Voice phone during an alarm, the user is able to select any Keypad for 2 way communication. The Voice Menu says "Select Station 1 to .. ". During the two way mode, the sirens are silenced so that sounds can be heard more clearly. It is possible to link zones with the nearest Keypad so that when the zone is tripped, the corresponding Keypad is turned on automatically. Action 94 which selects a Keypad for monitoring is used.

Example:

Zone 1,2 are linked to Keypad 1, Zones 3,4 to Keypad 2 and Zones 5 and 6 to Keypad 3 for monitoring purposes

Program a Response for linking to each Keypad

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|-------------|---|-----|--|--|--|
| Response | Action code | | | | | |
| 112 | 94 | 1 | 255 | | | |
| 113 | 94 | 2 | 255 | | | |
| 47 | 94 | 3 | 255 | | | |

Action Code 94, N activates Keypad N where N = Keypad number.

Program the Zones to the appropriate Responses as follows

| Engineer Menu - 1, Zone Settings | | | | |
|----------------------------------|-----------------|------------|-------------|--------------|
| Press | 2 | 3 | 5 | 6 |
| Zone | Zone Type | Entry Path | ON Response | OFF Response |
| 1 | 2 | 1 | 112 | |
| 2 | 5, Instant Away | | 112 | |
| 3 | | | 113 | |
| 4 | | | 113 | |
| 5 | | | 47 | |
| 6 | | | 47 | |

This completes the programming. The Keypads only get activated for monitoring only in Voice Station Mode during alarm, and not when the zones are triggered in normal circumstances when the security is off.

Keypad Applications

5.3 Setting Voice Message Volume on Keypad

The volume of the voice on the KEYPAD may be adjusted using the trimmers VR3 for the Doorphone and VR4 for the Voice Station. This adjustment affects both Voice Messages and 2 way voice volume. Voice messages include zone announcements during arming, security mode announcements (e.g. "away mode"), and incoming calls when call screening is turned on. The volume of the 2 way voice is dependent on the relative positioning of the microphone and speaker, and how far they are from each other. The further the microphone and speaker are away from each other, the louder it is possible to adjust the volume of the voice without positive feedback (which is heard as howling). It is possible to adjust the volume of voice messages independently of the 2 way voice using the Locations Menu. From the Engineer Menu, press 7 - System Settings, 4 - Star Menu, 1 - Locations. Enter 54# for Location. The value in this location is the KEYPAD Voice Message Volume. The range is from 0 to 12, with 5 as the factory preset level. A higher number will increase the volume, while a lower number decreases it. The system must be reset before the new setting takes effect.. Experiment with various settings to get the optimum value to use.

Keypad Applications

5.4 Doorphone Control Menu (Record and/or Dial-out)

It is possible to enable the user to determine if the doorphone will cause a dial-out and also if a message is to be taken at the doorphone following an unsuccessful dial-out. For certain reasons, a user may wish to disable these doorphone functions. Maybe, it could be to minimise the nuisance caused by 'pranksters' pressing the doorbell and shouting abuse just for fun (none of us have ever done that, have we?)

Comfort's default response includes the ability to take a message at the door. This uses response 95 in Doorbell Response 221 which is triggered by the doorbell Alarm Type 25 Response. In this application the doorphone alarm type 25 is also set to perform a dial-out to telephone numbers 3 and 4. Both of these functions may now be controlled using a combination of flags, conditions and skips. The flags (12 & 13) are switched on and off by the user in the Home Control Menu 9.

There needs to be programming carried out in the Responses Menu, Home Control Menu (9) and Doorbell Alarm Type (25) response.

The calling response 221 is placed in the doorphone alarm type 25. This Alarm Type is only activated when the system is armed to Away or Holiday Modes and as a default action it will dial-out or take a message. Flag 13 is used to control if a Record action will occur and Flag 12 if clear (unset), determines if the dial-out will occur. The response first checks if Flag 13 is set and will skip Response 95 (Record a Message) if it is. It will then check flag 12, if set the response will carry through (13) and will skip (100,0) all the dial-outs.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|---|--------------|-----|----|-----|----|-----|
| Resp | Description | Action Codes | | | | | |
| 178 | FLAG 12 ON DOOR DIAL OFF | 132 | 12 | 1 | 255 | | |
| 179 | FLAG 12 OFF DOOR DIAL ON | 132 | 12 | 0 | 255 | | |
| 180 | FLAG 13 ON DOOR RECORD OFF | 132 | 13 | 1 | 255 | | |
| 181 | FLAG 13 OFF DOOR RECORD ON | 132 | 13 | 0 | 255 | | |
| 221 | Doorphone Control of all Doorphone Dial-Outs & Record (used in Alarm Type 25 Response) and controlled by user via Home Control Menu 9 by changing flags 12 & 13 (Responses 178 - 181) | 132 | 13 | 2 | 16 | 74 | 95 |
| | | 192 | 132 | 12 | 2 | 12 | 100 |
| | | 0 | 255 | | | | |
| 95 | Doorbell Recording M'box1 after 30s , use in Alarm Type 25 or Doorbell Macro R233. | 135 | 1 | 30 | 255 | | |

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|---------------------|----------------|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 0 to 9, * | "Doorphone Control" | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | | " Dial Off" | 178 | "Dial On" | 179 |
| | | Action Key 2 | | Action Key 3 | |
| | | Description | Response | Description | Response |
| | | "Record Off" | 180 | "Record On" | 181 |

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|----------------------------|
| Alarm Type | 2 - Response |
| 25, Doorphone | 221, Doorbell User Control |

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Author: Andrew Roberts, Comfort Home Controls

Keypad Applications

5.5 Doorphone Control Menu (Record or Dial-out)

This is a variation of the previous Doorphone Control Menu. This one has the doorphone taking a message when the doorbell is pressed in Away/Holiday Modes as the normal operation, instead of dialling out. Should the user wish to change the function from Record to Dial-out, then they can do so by keying in Dial ON in the Home Control Menu 9.

Comfort's default response includes the ability to take a message at the door after 30 seconds, but here, we are modifying the response 95 to operate after only 5 seconds after the doorbell is pressed. In this application the doorphone alarm type 25 is also set to perform a dial-out to telephone numbers 3 and 4. Both of these functions may now be controlled using a combination of flags, conditions and skips. The flags (12 & 13) are switched on and off by the user in the Home Control Menu 9. After disarming the system, the flags are reset so that the Record operation of the doorphone is restored.

There needs to be programming carried out in the Responses Menu, Home Control Menu (9) and Doorbell Alarm Type (25) response.

The calling response 221 is placed in the doorphone alarm type 25. This Alarm Type is only activated when the system is armed to Away or Holiday Modes and as a default action it will take a message. Flag 13 is used to control if a Record action will occur and Flag 12 if clear (unset), determines if the dial-out will occur. The response first checks if Flag 13 is set and will skip Response 95 (Record a Message) if it is. It will then check flag 12, if set the response will carry through (13) and will dial-out instead. The only difference with this Response 221 and the previous is the change of action code condition (13) from (12) and the variations in the Control Menu with the flags.

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|---|--------------|-----|----|-----|-----|-----|
| Resp | Description | Action Codes | | | | | |
| 176 | FLAGS 12 & 13 ON DOOR DIAL OFF | 74 | 178 | 74 | 180 | 255 | |
| 177 | FLAGS 12 & 13 OFF DOOR DIAL OFF | 74 | 179 | 74 | 181 | 255 | |
| 178 | FLAG 12 ON DOOR DIAL OFF | 132 | 12 | 1 | 255 | | |
| 179 | FLAG 12 OFF DOOR DIAL ON | 132 | 12 | 0 | 255 | | |
| 180 | FLAG 13 ON DOOR RECORD OFF | 132 | 13 | 1 | 255 | | |
| 181 | FLAG 13 OFF DOOR RECORD ON | 132 | 13 | 0 | 255 | | |
| 221 | Doorphone Control of all Doorphone Dial-Outs & Record (used in Alarm Type 25 Response) and controlled by user via Home Control Menu 9 by changing flags 12 & 13 (Responses 178 - 181) | 132 | 13 | 2 | 16 | 74 | 95 |
| | | 192 | 132 | 12 | 2 | 13 | 100 |
| | | 0 | 255 | | | | |
| 95 | Doorbell Recording M'box1 after 5s , use in Alarm Type 25 or Doorbell Macro R233. | 135 | 1 | 5 | 255 | | |
| 77 | Security Off Macro Response | 85 | 7 | 74 | 177 | 255 | |

| Engineer menu, Press 3 - Control Settings, 1 - Control Menu | | | | | |
|---|---------------------|----------------|----------|--------------|----------|
| Control Key | 1 - Description | 2 - Action Key | | | |
| 0 to 9, * | "Doorphone Control" | Action Key 0 | | Action Key 1 | |
| | | Description | Response | Description | Response |
| | | " Dial Off" | 177 | "Dial On" | 176 |
| | | Action Key 2 | | Action Key 3 | |
| | | Description | Response | Description | Response |
| | | "Record Off" | 180 | "Record On" | 181 |

| Engineer menu, 2 - Alarm Type | |
|-------------------------------|----------------------------|
| Alarm Type | 2 - Response |
| 25, Doorphone | 221, Doorbell User Control |

| Security Mode Responses (Engineer Menu 3,5) | | |
|---|----------|--|
| Mode | Response | Remarks |
| 0 - Security Mode | 77 | X10 Flashing Lights Timer Off / Reset Flags 12 & 13. |

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Author: Andrew Roberts, Comfort Home Controls

Keypad Applications

5.6 Playing a Warning message on a Keypad

When movement is detected in a zone, a warning message can be played on any keypad. Record the warning message as a Reminder message. The Time and days of week do not need to be set, and the Reminder does not need to be turned on. Program the Zone response of the movement detector for a Response using actions 133, reminder # (1-8), keypad 1-8. This will cause the reminder to be played on the keypad when the zone is triggered.

| Engineer Menu - 1, Zone Settings | | | | |
|----------------------------------|-----------------|------------|-------------|--------------|
| Press | 2 | 3 | 5 | 6 |
| Zone | Zone Type | Entry Path | ON Response | OFF Response |
| 3 | 5, Instant Away | | 116 | |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | |
|--|-----------------------------|--------------|---|---|-----|--|
| Resp | Description | Action Codes | | | | |
| 116 | Play Reminder 8 on keypad 1 | 133 | 8 | 1 | 255 | |

Record Reminder message 8 in User menu 2 for message, 5 for Reminders, enter 8#, 4 for message, 1 to Record message.

When Zone 3 detects movement, Reminder Message 8 will be played on Keypad 1

The Response can be changed so that the reminder is played only when the system is armed, but not cause an alarm. This can be used for giving warning message when outside movement is detected.

| Engineer Menu - 1, Zone Settings | | | | |
|----------------------------------|----------------|------------|-------------|--------------|
| Press | 2 | 3 | 5 | 6 |
| Zone | Zone Type | Entry Path | ON Response | OFF Response |
| 3 | 24, switch N/C | | 116 | |

| Engineer menu, 3 - Control Settings, 6 - Responses | | | | | | | |
|--|--|--------------|---|----|-----|---|---|
| Resp | Description | Action Codes | | | | | |
| 116 | Play Reminder 8 on keypad 5 when armed | 73 | 0 | 12 | 133 | 8 | 5 |
| | | 255 | | | | | |

73,0 Get Security Mode

12 Exit from Response if zero, ie not armed

133,8,5 Play Reminder 8 on keypad 5

In this example, the Zone is programmed as Zone Type 24 (switch normally closed). This does not cause an alarm, but will play Reminder message 8 on keypad 5 only when the system is armed. A Door Station can be set as a keypad by putting the shunt on JP5 on positions 1-2. This "keypad" has no buttons so cannot be used to sign in.

Reminder message on Door Station

From v4.101, reminder messages can be played on Door Stations by putting in the Door Station id 49 to 51 for Door Station 1 to 3.

For example, 133,8,49 plays reminder message 8 on Door Station 1 (id=49)

This can also be used to play a message to tell the visitor to wait when they press the door bell. Put the programmed Response in Location 1691 (doorbell Response location)

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Paging & Telephone Services

6 PAGING & TELEPHONE SERVICES

This sections shows how to set up parameters to page to various paging systems, as well as how to activate or disable special telephone services like Call waiting and Phone Locking.. Comfort is able to detect confirmation tones from those systems which provide them. This provides for very reliable paging, as variations in timing between different systems and operators do not matter, and busy tones can be detected. The pager number may occasionally be busy, if it has been just paged. If a busy tone is heard, the system will try again after it has dialed to the other programmed numbers and after a minimum redial delay. If the paging system does not provide a distinct confirmation tone, then fixed delays must be used in the dialing sequence.

6.1 Setting Up Paging Parameters

6.2 Human Operator Paging Systems

6.3 Singapore

6.4 Kuala Lumpur (Malaysia)

6.5 Call Waiting, Phone Locking services

Paging & Telephone Services

6.1 Setting Up Paging Parameters

In order to configure Comfort to page to a particular paging network, the following parameters must be determined. The table gives the parameters and the corresponding locations

| 7 - System Settings, 4 - Star Menu, 1 - Locations, Enter Location and # key | | |
|---|----------|-------|
| Parameter | Location | Value |
| Pager Upper Frequency | 48 | |
| Pager Lower Frequency | 49 | |
| Pager Start Key | 260 | |
| Pager Separator Key | 261 | |
| Pager End Key 1 | 262 | |
| Pager End Key 2 | 263 | |

Pager Start Key

This is the key which is used to start the paging sequence after dialing the pager number. Usually it is a * or # key. * is represented as 11, while the # key is represented by 12.

Pager End Keys

This is the key or keys which end the paging sequence after the message is sent. This is usually *, #, **, or some other combination of the two keys. * is represented as 11, while the # key is represented by 12. If only one end key is needed, set the second end key value to 255.

Pager Separator Keys

This is the key which displays as a space or '-' character in the pager message. It is used to separate the 3 fields in the message. Again, it is usually the * or # key. * is represented as 11, while the # key is represented by 12. If the paging system does not support separator characters, set this to 255.

Pager Upper and Lower Frequencies

This is the tricky part!. Comfort waits for a tone of a certain frequency band before sending the alarm message, and again after the end of the message to indicate that the page has been successful. This is usually a series of high pitched beeps which tell you that you can start to enter the message, and is also heard after the page has been accepted.

The Pager Upper Frequency is the top limit of the frequency of the tone, while the Pager Lower Frequency is the lower limit of the tone frequency. The value entered into the frequency parameter locations is the frequency in Hz multiplied by 0.03

For example, for a 2000 hz tone, multiply 2000 by 0.03 to give the center value, , i.e. 60. For the lower frequency use 55 (1833 Hz) and for the upper frequency, use 65 (2167 Hz). This gives a frequency band to detect the acknowledgment tone.

If you do not know the frequency of the acknowledgment tone, you can start with a value of 2000 Hz with a wider band of upper and lower frequency, say lower frequency value of 30 (1000 Hz) and upper value of 90 (3000 Hz). If the page is successful, reduce the band, by increasing the lower frequency and decreasing the upper frequency, until the page fails. Then adjust the upper and lower frequencies in turn to see which limit is exceeded. The center frequency assumption can be moved accordingly, until the actual frequency is found.

Paging & Telephone Services

6.2 Human Operator Paging Systems

Some paging systems are manned by operators which answer the call, and send the message to the pager. This is often used for alphanumeric pagers including Chinese display pagers. For this kind of system, assign the Dial Setting not to a Pager Phone Type (i.e. Phone Type 2), but use the Alarm Voice Message (Phone Type 3) instead. This Phone Type waits for the call to be answered by a human voice, and says the Alarm Type e.g. "Fire Alarm", "Intruder Alarm", and then gives a fixed recorded message, for example,

"Fire Alarm"

"Alarm at No 3 Science Park Drive. Please call 92047892"

"Press 1 to Repeat this message,

0 to end"

The instructions to press 1 to repeat or 0 to end are not part of the recorded message, but are part of the Voice Menu. Pressing # acknowledges and ends the call. If # is not pressed, the system will redial the number until the # is pressed after the message.

This Phone Type is also used for Security Guardhouses in housing estates, condominiums, commercial buildings and factories. Unlike the Voice Phone Type, it does not require the person answering the call to know the user code and sign-in

Paging & Telephone Services

6.3 Singapore

Singtel

This paging system gives a series of beeps after dialing the pager number. A * and then the message is entered, followed by ** to end the message. The page is confirmed by a series of beeping tones. The # key causes the '-' character to be displayed. The parameters are set using The Locations menu (Engineer Menu 7 - System Settings, 4 - Star Menu, 1 - Locations) as follows:

| 7 - System Settings, 4 - Star Menu, 1 - Locations, Enter Location and # key | | |
|---|----------|------------|
| Parameter | Location | Value |
| Pager Upper Frequency | 48 | 65 |
| Pager Lower Frequency | 49 | 55 |
| Pager Start Key | 260 | 11 (* key) |
| Pager Separator Key | 261 | 12 (# key) |
| Pager End Key 1 | 262 | 11 (* key) |
| Pager End Key 2 | 263 | 11 (* key) |

The above parameters are set by default in all systems sold in Singapore.

Note initiate the sending of pager information and to end the page only upon detection of the beeping tones, the Pager Upper and Lower frequency limits may be tightened to 65 and 55 respectively. This setting will ignore the voice answering the page and listen for the beeping tones only

Hutchison Paging

When the paging network answers, a voice comes on the line offering the option to enter the message or wait for an operator. The message to be displayed can be entered immediately, but there are no beeping tones after the voice. After the message is entered, the beeping tone does come on to confirm that the page is accepted. This requires a different set of parameters from Singtel. The pager lower frequency must be set lower to detect voice instead of the beeping tone, while the upper frequency can remain the same as for Singtel. Once the voice is heard, Comfort will send the paging message. It will detect the confirmation tone after the message. These parameters can also work for Singtel pagers, except that the page is sent when the voice comes on instead of waiting for the beeping tone to start. For a system where there are a combination of both Singtel and Hutchison pagers, these parameters can be used.

| 7 - System Settings, 4 - Star Menu, 1 - Locations, Enter Location and # key | | |
|---|----------|------------|
| Parameter | Location | Value |
| Pager Upper Frequency | 48 | 65 |
| Pager Lower Frequency | 49 | 20 |
| Pager Start Key | 260 | 11 (* key) |
| Pager Separator Key | 261 | 12 (# key) |
| Pager End Key 1 | 262 | 11 (* key) |
| Pager End Key 2 | 263 | 11 (* key) |

Paging & Telephone Services

6.4 Hutchison Paging (Malaysia)

To page, the caller dials to the telephone number of the paging system. A voice message answers which tells the caller to dial the pager number. Then the voice message tells the caller to enter the message, and the # key to end the call. Because of the lack of confirmation tones, fixed delays must be used to make the call. After dialing the paging system number, a fixed delay of 10 seconds is inserted, then the subscribers pager number. To insert a delay in the pager number, press the <NIGHT> key on the keypad followed by the delay in seconds. The paging message is sent automatically after this. To disable the detection of confirmation tones, Locations 48 and 49 are set to 255 and 0 respectively. The pager separator key is 11 (which is the * key). There is no Pager Start Key, so 255 is entered in Location 260. The pager parameters are given in the table below:

| 7 - System Settings, 4 - Star Menu, 1 - Locations, Enter Location and # key | | |
|---|----------|------------|
| Parameter | Location | Value |
| Pager Frequency | 48 | 255 |
| Pager Frequency | 49 | 0 |
| Dial Pause Time | 50 | 10 |
| Pager Start Key | 260 | 255 |
| Pager Separator Key | 261 | 11 (* key) |
| Pager End Key 1 | 262 | 12 (# key) |
| Pager End Key 2 | 263 | 255 |

To dial to a pager number 9876543 with ID345678, the phone number is programmed as follows:

| Engineer Menu 4 - Security Settings, 1 - Phone Settings, or User Program Menu, 4 - Change Phone Number Enter Phone 1 to 8 | |
|--|---------------------------|
| Phone Type | 2 (pager) |
| Phone Number | 9876543 <NIGHT> 10 345678 |

A delay of 10 seconds is entered using <NIGHT> 10 between the Pager access number and the pager id.



The Use of NIGHT key for entering a delay is applicable from firmware version 4.46 and above.

Paging & Telephone Services

6.5 Call Waiting, Phone Locking services

When doing a dialout to a Central Station, Call Waiting may disrupt the communications. Phone Locking is a feature provided by the telephone company to prevent unauthorized users from making telephone calls. When dialing out, these features have to be disabled

This usually requires a special code sequence to be entered before the telephone number. To disable Call Waiting for a single call, a sequence like 70# is used, depending on the telephone company. Similarly, to disable Phone Locking for a particular call, a typical sequence is #570+PIN# is entered before the number.

Comfort (from version 4.46 onwards) allows these special characters * and # to be entered as part of a telephone number, by means of the <DAY> key on the keypad. * and # by them selves have special functions. * will clear whatever digits were entered, while # terminates the entry itself. Entering <DAY> + * or # will allow these keys to be entered in the telephone number without activating their built-in functions

For example to disable Call waiting using 70#, and dial 273 5682 enter 70 <DAY> # 273 5682. In the telephone number.

To disable Phone locking using code #570 code=1234 #, enter <DAY> # 5701234<DAY>#2735682 in the telephone number.

Each of Comfort's 8 programmed telephone numbers accepts 20 digits

7 INDUSTRIAL APPLICATIONS

7.1 Monitoring Equipment Breakdown

Industrial Applications

7.1 Monitoring Equipment Breakdown

Comfort can be installed in factories, Computer rooms, Generator Rooms, Cold Rooms, automatic processing plants and any location where there are unattended equipment operating. If any equipment breaks down, the system can page or telephone to service staff. The equipment which triggered the dialout will be indicated on the pager. Service staff can dial in to activate standby equipment and do other control functions. This eliminates the need for maintenance staff to be always present on the premises. Up to 8 telephones or pagers can be programmed. The programmed telephones can be divided in different working shifts so that only those staff working on the current shift can be called.

Here's how it is done.

- 1 Each equipment to be monitored must be configured to supply a contact open or closure when the event (e.g. breakdown or activation) occurs. Such contact outputs may be already available in the equipment. If not, the signals must be obtained using current sensors, relays or other means.
- 2 Connect each contact output to an input on the panel. Program Normally Closed contacts as Zone Type 17 and Normally Open contacts as Zone Type 9. Set the following properties for Zone Types 9 and 17 using either the Locations Menu or CS-Xpress software

| Location (Eng Menu 7,4,1) | Value | Zone Type | Properties |
|---------------------------|-------|-----------|--|
| 1332 | 255 | 9 | Instant in Off, Away, Night, Day |
| 1333 | 38 | | Normally Open, Not 24 Hour, Sensitivity = 6 (500 ms) |
| 1334 | 14 | | Alarm Type = 14 |
| 1335 | 5 | | If Trouble, Alarm Type 5 |
| 1364 | 255 | 17 | Instant in Off, Away, Night, Day |
| 1365 | 6 | | Normally Closed, Not 24 Hour, Sensitivity = 6 (500 ms) |
| 1366 | 26 | | Alarm Type = 26 |
| 1367 | 5 | | If Trouble, Alarm Type 5 |

Zone Type 9 (Normally Open) triggers Alarm Type 14 and Zone Type 17 triggers Alarm Type 26.

- 3 Program the Alarm Types as follows:

| Alarm Type | Dial-out | Dial Indexes | Description | Alarm State |
|-------------------|----------|-----------------------------|---------------------|-------------|
| Engineer Menu 2.. | (2,1) | (2,1,1) | (2,3) | (2,8) |
| 14 | 1 = ON | Program phones 1 to 8 as ON | 106 = "Zone Alert" | 0 |
| 26 | 1 = ON | Program phones 1 to 8 as ON | 20 = "Security Off" | 0 |

Alarm Type 14 is triggered when the zone (normally open or closed) is activated. Description is programmed as "Zone Alert" for report to Voice phone and event log.. Alarm State is set to 0 (idle). Set the dial-out to ON and set phones 1 to 8 as ON. Alarm Type 26 is triggered when the zone is restored (Normally open or closed) . Description is programmed as "Security Off" for report to Voice phone and event log. Alarm State is set to 0 (idle). Set the dial-out to ON and set phones 1 to 8 as ON. Alarm Type 26 is needed only if Zone Restore has to be reported

- 4 Program the pager or telephone numbers using Program Menu 4. When any input is activated, the system will dial to the programmed phones. On pagers, the display will be NNNN-14-ZZ, where NNNN is the Pager Report Code identifying the system, 14 is the Alarm Type, and ZZ is the Zone which caused the trigger. If dialing to Voice Phone, the system reports the Alarm Description "Zone Alert", but not the zone. To find out which inputs are activated, go to Security Check (User 3,4,2)
- 5 If Zone Restore is required, program an unused Response as follows: 102,26 (Do Alarm 26, report Zone), 255 (Terminator). (The Action 88,.. also activates Alarm type but will report User number instead of Zone).



Action 102 is available only in firmware version 4.21 and above

- 6 Assign this Response number to the Off Response for all the zones used for monitoring (Engineer Menu 1,6 - OFF Response). When the input is restored, the system will dial to all programmed phones. On pagers, the display will be NNNN-26-NN where NNNN is the Pager report Code, 26 is the Alarm type for Restore, and ZZ is the restored zone.

Industrial Applications

- 7 It is possible to dial to different sets of phones for different shifts using Time Programs. For example, if one shift of service staff is on call from Monday to Friday from 7 am to 7 PM, another shift from Monday to Friday from 7 PM to 7 am, and a third shift on Weekends 7 AM to 7 PM and a 4th shift on Weekends 7 PM to 7 AM, set up Time Programs as follows:

| Time Program Eng Menu 3,3 | Days of Week Eng Menu 3,3,1 | Time Eng Menu 3,3,2 | Response Eng Menu 3,3,3 |
|------------------------------|--------------------------------|------------------------|----------------------------------|
| 1 | 1,2,3,4,5 | 7:00 AM | 86 = 132,1,1,255 (Set Flag 1 ON) |
| 2 | 1,2,3,4,5 | 7:00 PM | 87 = 132,1,0,255 (Clear Flag 1) |
| 3 | 1,2,3,4,5 | 7:00 PM | 88 = 132,2,1,255 (Set Flag 2) |
| 4 | 2,3,4,5,6 | 7:00 AM | 89 = 132,2,0,255 (Clear Flag 2) |
| 5 | 6,7 | 7:00 AM | 90 = 132,3,1,255 (Set Flag 3) |
| 6 | 6,7 | 7:00 PM | 91 = 132,3,0,255 (Clear Flag 3) |
| 7 | 6,7 | 7:00 PM | 92 = 132,4,1,255 (Set Flag 4) |
| 8 | 7,8 | 7:00 AM | 91 = 132,4,0,255 (Clear Flag 4) |

User Flags 1 to 4 are used to indicate which shift is on. Phone numbers for shift 1 can be programmed in phone 1 and 2, shift 2 in 3 and 4, shift 3 in phones 5 and 6, and shift 4 in phones 7 and 8.

- 8 In the Alarm Type Responses (Eng Menu 2,2) for Alarm types 14 and 26, assign the following Response = 132,1,2 (Check Flag 1), 15 (Skip if Zero), 100, 3 (Allow Dialout to Phones 1 and 2), 192 (Marker), 132,2,2 (Check Flag 2), 15 (Skip if Zero), 100, 12 (Allow Dialout to Phones 3 and 4), 192 (Marker), 132,3,2 (Check Flag 3), 15 (Skip if Zero), 100, 48 (allow dialout to phones 5 and 6), 132, 4,2 (check flag 4), 15 (skip if zero), 100, 192 (allow dialout to phones 7 and 8), 255. This Response allows only the phones allotted to the current shift to be called. This response also handles overlapping shifts.

Page 14 **Which** For applications which are meant solely for monitoring of equipment,

Page 15 **Matop** **Matop** has no alarm function, is more suitable.

Page 16 **Matop** **Matop** numeric and numeric pagers, and is expandable to 64 inputs and outputs. Contact Cytech for brochures and specifications

Revised March 1999. Applicable V4.21 and above.