



# Powerwave Series

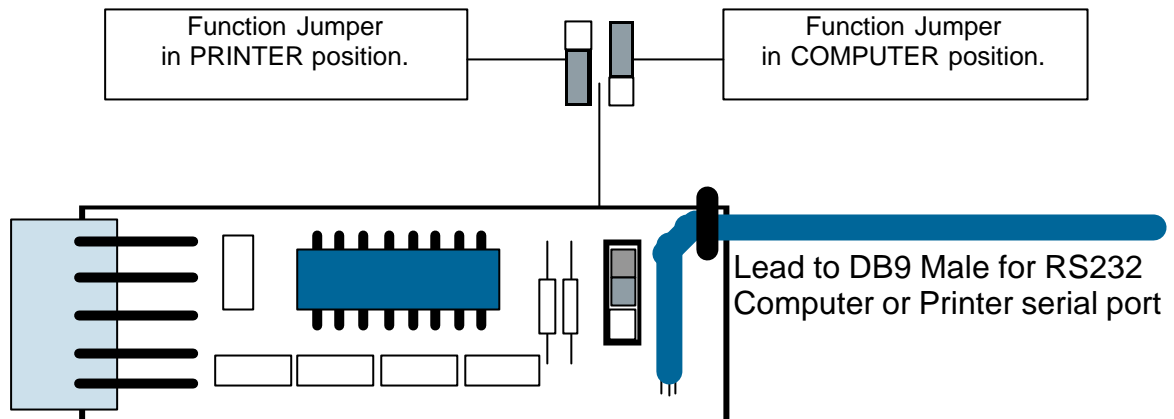
# Technical Manual

7 December 2001

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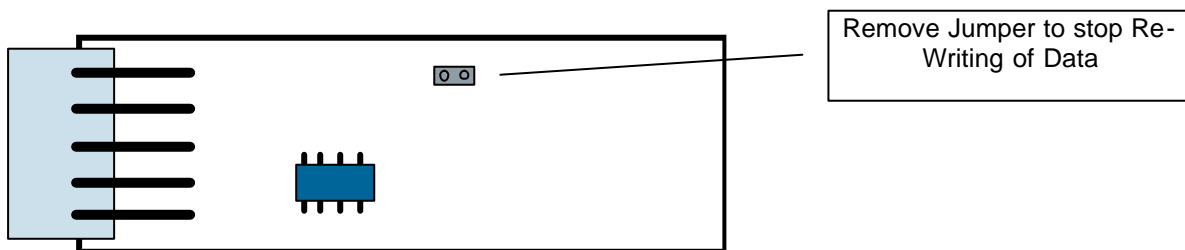
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# PRINTER/PC INTERFACE



**NOTE 1: Function Jumper**  
This Serial Interface board can be used to direct connect the PowerWave 8/16 panels either to a computer for up/download or a printer. The two position function jumper is used to select the required function. As shown above, the jumper is in the upper or "Computer" position. To change to the printer function, simply install the jumper in the lower position.  
**(Please ignore the circuit board markings which are wrong)**

## PROGRAMMING KEY



### **PowerWave-8**

Write to Key Address 628  
Read from Key Address 629

### **PowerWave-16**

Write to Key Address 736  
Read from Key Address 738

# Upload/Download Installation

## PW8 V8.61+ / PW16 V4.45 +

Before installing this version of upload/download software, please remove any existing PW8 or PW16 software first.

This is done by going to “Control Panel” then “Add/Remove Programs”. Next, select the “8 (or 16) zone panel upload download” option in the window then select “Add/Remove”. Once the old program has been removed you may proceed to install the new software. (NOTE: if you remove the old program as described above, all of your customer database files will be retained in the “Upload Download” folder, see below for the full directory tree).

To install the software, insert the disk labeled Disk 1 of 2 into the floppy drive.

Next, select “Run” from the start menu.

Then type in; A:\setup.exe(use B:\setup.exe if using the B drive).

The program will automatically install itself. When the installation process asks for Disk 2, remove Disk 1 from the floppy drive replacing it with disk 2 of 2 then press “enter”.

When finished, select the “restart the computer” option so that the installation process can be completed.

The software will automatically create a new folder called “8 Zone Panel Upload Download” or “16 Zone Panel Upload Download” and install itself in the following area on your computers “C:” drive;

C:\Program Files\Upload Download\8 Panel Zone Upload Download  
C:\Program Files\Upload Download\16 Panel Zone Upload Download

### Earlier Versions:

PW8 - If you are updating an existing version of the program with this version then you will probably want to transfer the existing database and event memory files from the old directory of “Upload Download” to the new directory called “8 Zone panel Upload Download”. These files have a .ALT or .ALV file extension.

PW - 16 The panel customer data files (with “.ELT” file extensions) will still be in the “Powerwave16” Folder. Move the “.ELT” files from the “Powerwave16” Folder to the new “Upload Download” Folder.

### ID Number:

The upload/download software will call for an ID number following installation and running of the program for the first time.

PW8 ID number is: AC17-3BB5-95E3.

PW16 ID number is: 3283-4074-7902.

PW16 ID number is: 3288-2072-7300 Restricts access to “PA” (Public Address) programming capabilities.

You should only have to enter this ID number once; from that time onwards the program will run without the need to enter the ID number.

DEFAULT LOG IN PASSWORD = “PW8” (for PW8) or “PW16” (for PW16)

# Modem Configuration

## Modem Baud Rate Configuration Requirements

Your modem may have to be configured to talk to the Power Wave-8 in 300 bps rate. **Every modem is different, so you have to experiment with different “AT” commands (from your modem handbook) to do this.** The panels default coms format is set to Auto Detect either **Bell103** (300 bps) or **V21** (300 bps) protocols. Depending on how stable your phone line is and the type of modem you have, you may need to disable the panel’s “Auto-Detect Modem” (see Prog. Address 185, option 7 on Pg: 33 of Panel manual). You may also have to change the panel configuration to coms format **V21** (300 bps). To do this, simply enable (Turn On) Prog. Address 185, option 8 (See Pg: 33 of Panel manual).

## Modem Strings to try

### US Robotics Courier/Dynalink:

Initialise String—[AT&F0B1S10=255]

- [S10=255] is important otherwise the connection times out
- [B1] sets the modem to ‘Bell 103’
- [AT&F0] resets the modems registers

### 3COM:

[S27=1]

### Other suggestions:

- 56k External and Rockwell chipsets -  
[+MS=0,0,300,300,1,1] for V.21  
[+MS=64,0,300,300,1,1] for Bell103
- [\N0] at the end of a modems standard string
- Old modems try [ATB0] or [ATB1]
- Always put an [AT&F] (factory reset) or sometimes [AT&F0], [AT&F1], [AT&F2] before a string so other programs can’t leave crap in it’s registers.
- Laptop internal modems may need [+MS=64,0] (Bell103) or [+MS=0,0] (V.21)
- The end of the string must have a [^M]

# Speech/Phone Control Board

The 90 second Speech board is designed to work with the PowerWave 8 & 16 alarm panels. The Speech Board provides up to 90 seconds of speech storage. The speech messages are programmed via a handheld Speech Programmer. The voice board also has a Microphone input for connection of the optional Microphone Board. The MIC board allows the owner to listen to sounds within the protected premises to determine if an intruder is on-site. The speech messages can be used to announce different alarm types or to give status reports for Telephone Control. Telephone Control allows the user to Arm/Disarm the alarm or turn Outputs On/Off (with voice prompts) from a remote telephone by using secret 4 digit codes.

## Installation

The Speech board has 2 female sockets fitted on the underside of the board. The 18 way socket plugs into the opposite socket on the PowerWave 8 and the 24 way socket plugs into the expansion socket on the PowerWave 16. In both cases the board can only be installed one way. Please always ensure that the alarm panel is powered down while fitting the Speech Board to prevent damage from occurring.

## Programming the Voice Messages

You must have a Speech Programmer to set up the appropriate voice messages. The Speech Programmer plugs into the 10 way header pins on the Voice Board. The brown wire on the Speech Programmer must line up with the pin labelled "1" on the Voice board header pins. On the Speech Programmer there are two pushbuttons labelled "Record" and "Play".

To record a message onto the Speech Board first press the button labelled "Reset" to ensure that you will be starting at the beginning of the speech storage memory locations.

Then simply press the "Record" button (the record LED on the programmer & Speech Board will turn on) and speak clearly into the microphone on the Speech Programmer. When the message is finished release the "Record" button (the record LED on the programmer & voice board will turn off).

At this point if you press the "Record" button again you can now record a second message starting immediately following the first message recorded. Releasing the "Record" button will stop the recording again.

Continue with this process until all messages have been successfully recorded.

To review the messages, first press the "Reset" button on the Voice Board to return to the beginning of the message storage memory locations.

Then press the "Play" button momentarily to start the playback of the first message. When the message is finished the Speech Board will stop the playback mode. To listen to the next recorded message press the "Play" button again. Repeat this operation until all recorded messages have been reviewed. When all messages have been reviewed, press the "Reset" button to reset the Speech Board back to the beginning.

## Telephone Control Programming

Telephone Control messages are one's that are used to give voice status information during dial-in control of Arm/Disarm or Output's.

The Telephone Control Messages **Must** be recorded in the correct order for everything to work properly and must be recorded **After** all alarm messages have been recorded.

For example, if you required 5 alarm messages as listed below;

- 1-"Burglar alarm"
- 2-"Fire alarm"
- 3-"Panic alarm"
- 4-"Low Battery"
- 5-"Freezer alarm"

These messages would be recorded first. The next message would then be the first Telephone Control Message (please refer to the list below for the order of command control messages).

In this example, the Telephone Control Messages would begin at message number 6.

In the PowerWave-8 panel the address for the start message for Telephone Control is 250, in the PowerWave-16 it is 680.

The order for the Telephone Control Messages are as follow;

| Panel Type →<br>Message Number ↓ | PowerWave-8       | PowerWave-16      |
|----------------------------------|-------------------|-------------------|
| 1                                | Area "A" Armed    | Area "A" Armed    |
| 2                                | Area "A" Disarmed | Area "A" Disarmed |
| 3                                | Area "B" Armed    | Area "B" Armed    |
| 4                                | Area "B" Disarmed | Area "B" Disarmed |
| 5                                | Output # 1 On     | Area "C" Armed    |
| 6                                | Output # 1 Off    | Area "C" Disarmed |
| 7                                | Output # 2 On     | Output # 1 On     |
| 8                                | Output # 2 Off    | Output # 1 Off    |
| 9                                | Output # 3 On     | Output # 2 On     |
| 10                               | Output # 3 Off    | Output # 2 Off    |
| 11                               | Output # 4 On     | Output # 3 On     |
| 12                               | Output # 4 Off    | Output # 3 Off    |
| 13                               | Output # 5 On     | Output # 4 On     |
| 14                               | Output # 5 Off    | Output # 4 Off    |
| 15                               | Output # 6 On     | Output # 5 On     |
| 16                               | Output # 6 Off    | Output # 5 Off    |
| 17                               | Output # 7 On     | Output # 6 On     |
| 18                               | Output # 7 Off    | Output # 6 Off    |
| 19                               | Output # 8 On     | Output # 7 On     |
| 20                               | Output # 8 Off    | Output # 7 Off    |
| 21                               |                   | Output # 8 On     |
| 22                               |                   | Output # 8 Off    |

If some Telephone Control Messages are not used but other messages following these messages are to be used then "Dummy" messages must be recorded so that the order is maintained.

For example; If the Arm/Disarm feature for Area "A" is being used but there is no Area "B" (because the system is not partitioned) but outputs 1 & 2 will have remote Telephone Control functions then 2 very short messages must be added in following Telephone Control mes-

sage # 2 (Area "A" Disarm message). These 2 short messages are for the Area "B" arm/disarm messages that although are not being used, must be recorded to maintain the correct order.

Then the messages for output 1 & 2 can be recorded. The "Dummy" messages do not have to be very long, a quick momentary press of the "Record" that is enough to bring on the record LED's will be sufficiently long to serve the purpose.

## **Operating Instructions**

### **Acknowledging Speech Alarm Messages.**

If an alarm occurs that is set for Speech Reporting, the panel will call the pre-programmed telephone number/s. When the call is answered, the Speech message will be sent. The panel will then wait for 5 seconds looking for a DTMF tone on the line (a DTMF tone is generated when any key on a normal pushbutton telephone is pressed). If the panel receives a DTMF tone it will hang-up and cancel any further calls for that particular alarm event. If not it will repeat the Speech message a further 3 times with the 5 second pause in between waiting to hear a DTMF tone that will stop the alarm reporting. If no DTMF tone was received after the total of 4 attempts the panel will dial the next pre-programmed number on the list and repeat the sequence again.

### **Telephone Control Operation**

If Telephone Control is set up then a valid code holder can call the alarm using any standard pushbutton telephone. When the panel answers the in-coming call it will generate 2 different tones for approximately 2 seconds each. When the tones have finished the panel will be looking for a valid 4 digit DTMF code e.g 1, 2, 3, 4. If the code entered in at the keypad on the telephone matches one of the valid DTMF codes programmed into the panel the appropriate voice message will be sent. For example; If the code 1,2,3,4 was the Arm/Disarm code for Area "A" and the code holder entered this code in at their telephone, the alarm panel will respond with the Speech Message relating to the current status of Area "A".

Now by pressing the " \* " button at the remote telephone the panel will change the status of Area "A" (if already Armed it will Disarm the panel or vice versa) and give the corresponding Speech Message relating to this new state.

Output Control is very similar with the exception that the output number you wish to control must be entered in after the valid 4 digit code e.g if the output control code was 2,5,8,0 and you wanted to control output # 2 then the code 2,5,8,0,2 must be entered in at the remote telephone. Once again, if this was a valid code to control the outputs the panel will respond with the Speech Message relating to the current status of the output concerned (in this case output 2). By pressing the " \* " button the state of the output will be changed and the message relating to the new status will be sent.

At any time if an incorrect code is accidentally entered a single press of the " # " button at the telephone will reset all digits sent ready for a new sequence of 4 digits.

## Microphone Control

If the optional microphone is connected to the Speech Board, it is possible to dial into the alarm panel from any telephone and turn on the Microphone input to allow audible verification of an intruder on-site.

To do this, once the panel has answered the in-coming call as before, all you have to do is enter in the valid 4 digit Microphone code followed by the “ \* “ button.

If the panel is currently in alarm at the time of turning on the microphone, all alarm outputs are turned off so that any foreign sounds may be heard. To turn the microphone input off you simply press the “ \* “ button again. If the microphone is not turned off properly it is automatically turned off when the call is terminated and the outputs are returned to their previous state. The various Telephone Control program address codes for both panels are listed in the chart below.

| <b>Panel Type →<br/>Telephone Control<br/>Function ↓</b> | <b>PowerWave-8<br/>Addresses</b> | <b>PowerWave-16<br/>Addresses</b> |
|--|----------------------------------|-----------------------------------|
| <b>Area “A” Arm/Disarm</b>                               | 334                              | 262                               |
| <b>Area “B” Arm/Disarm</b>                               | 335                              | 263                               |
| <b>Area “C” Arm/Disarm</b>                               | -                                | 264                               |
| <b>Output Control</b>                                    | 336                              | 261                               |
| <b>Microphone Control</b>                                | 337                              | 265                               |

# 4-Way output Expander

## Introduction

The OUTPUTX4 board has been designed to work with the Powerwave 8 & 16 alarm panels. The board connects to either panel via the 4 wire keypad buss. This Output board may therefore be remote from the main control panel. The board provides four independent changeover relay contacts that can be used to interface to other devices such as garage doors, automatic gates, etc.

## Operation Instructions

Both the Powerwave8 & 16 alarm panels allow for up to 8 programmable alarm outputs. Some of these outputs are available as standard on-board but the additional outputs can only be accessed via this optional relay board.

There are 4 shorting links supplied with the Output board. These shorting links are used to select the output you require a relay to follow.

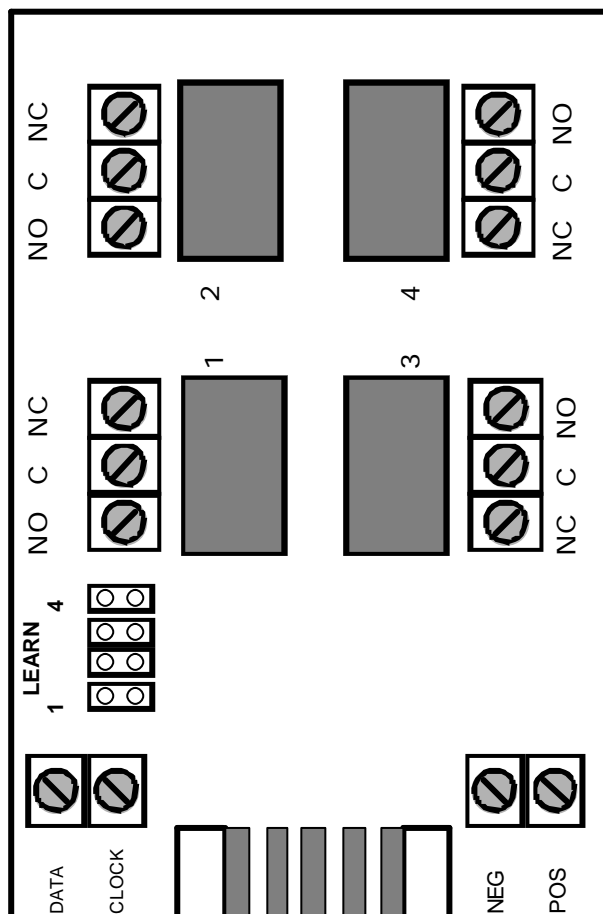
The links labelled "Learn 1-4" are used for this purpose. The first link labelled as "1", relates to Relay #1, through to the link labelled "4" that relates to Relay #4.

If the link is OFF at position #1 then relay #1 will follow the programmed options for output #1. If this link is ON (shorted) then relay #1 will follow the programmed options for output #5.

If link 2 is OFF then relay #2 follows output #2, if ON then relay 2 follows output # 6, etc , up to link 4 making relay #4 follow output 4 or 8.

Please refer to the chart below for more details:

| LINK<br>↓ | RELAY #1<br>LINK #1 | RELAY #2<br>LINK #2 | RELAY #3<br>LINK #3 | RELAY #4<br>LINK #4 |
|-----------|---------------------|---------------------|---------------------|---------------------|
| OFF       | O/P1                | O/P2                | O/P3                | O/P4                |
| ON        | O/P5                | O/P6                | O/P7                | O/P8                |



# Night-Arm Keypad

## Introduction

The Night-Arm Keypad is designed to provide simple arming / disarming of Stay mode and panic facilities when connected to a Powerwave-8/16 panel.

## Installation & Programming

The Night-Arm Keypad connects to the Powerwave-8 alarm panel through the keypad buss (Pos, Neg, Clk & Data). The keypad unit mimics the operation of keypad number 4. Therefore any options programmed to keypad 4 at the panel will affect its operation. (e.g if keypad 4 was programmed to partition 'B' only then the Night-Arm Keypad will only be able to set & unset Stay Mode for Partition 'B'). By default there is no need to do any special programming to make this Keypad work.

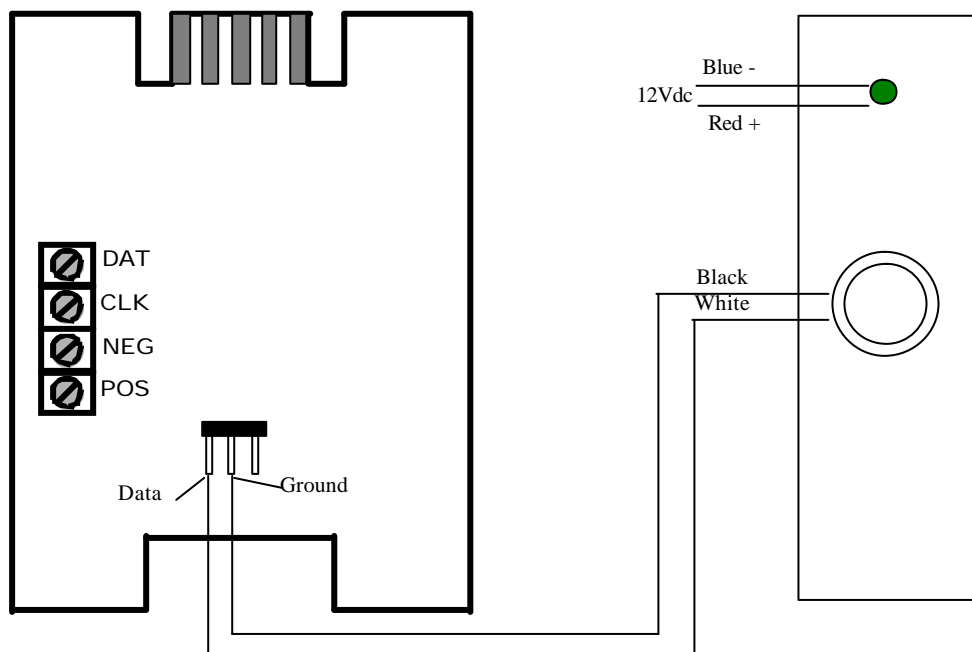
## Operation

If all zones are sealed then the green ready LED will be ON. Pressing either of the silver Night Monitor buttons for at least 1/2 second will put the panel into Stay Mode and the Green LED will turn off and the red armed LED will Flash to indicate monitor mode is on. Pressing either button again for 1/2 sec will turn Stay mode off. To create a Panic alarm press both of the silver buttons simultaneously. Once a panic alarm has been created at the Night-Arm Keypad the two buttons are locked out permanently and a valid code-holder must reset the alarm at the system keypad/s.

# Dallas Key Reader

The Dallas key interface board wires into the keypad bus of the Powerwave 8&16. When learning in dallas keys, learn them in as Remote Buttons. Program the Remote Buttons accordingly to eg. operate an output, arm/disarm etc.

The LED on the Reader plate has an in-line resistor enabling 12V to be wired directly from an appropriate output.



# Learning in Wireless Detectors

The RX-24/40 Receiver is very powerful in that it can learn in many different types of detectors/remotes using anywhere from 8 - 40 bit combinations.

Therefore, it is sometimes important in areas where there is strong RF signals from outside sources, that detectors are learnt in up close to the receiver, with the 2 antenna connectors shorted out (ie. reducing it's range).

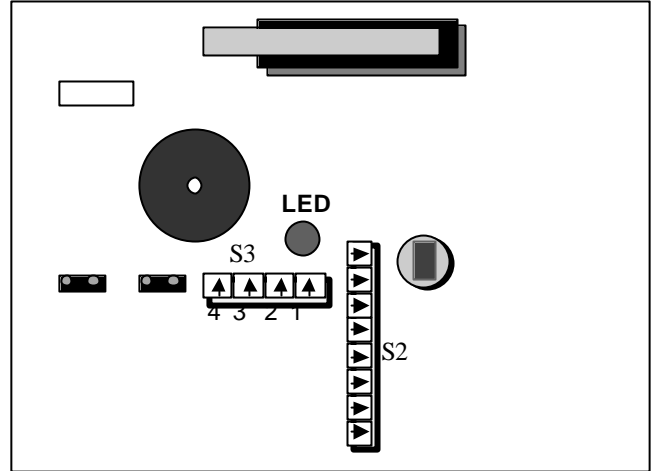
## E.L. 'Cougar' WIRELESS PIR/Reed - 433MHz

The Cougar Wireless PIR is a battery powered motion detector designed for use with the Powerwave 8/16 panels.

This PIR is also available in a 'President' style case with a look down lens.

### Learning of Detector to RX-40 Receiver:

1. Set SW2 (8-way SIP switch) to a unique Combination for every Detector
2. Set SW3 (4-way SIP switch):  
**2 - 4 OFF**  
**1 ON**  
(This stops low battery reporting to the Tamper channel, and sends Low Battery signals to the on-board buzzer)
3. **Plug in the battery, wait for 3 minutes for the PIR to become active. Put it into walk test mode by putting the link across J2.**
4. Program the Zone as a wireless Zone, and set the Wireless Detector Type to a '21'. Go to the Zone 'Learn' address of the panel (keypad beeping) and make the detector transmit by releasing the tamper switch or activating the PIR.
5. Remove the PIR's battery (so it doesn't accidentally transmit when learning in other PIR's).
6. Repeat steps 1-5 with the other detectors
7. Mount PIR's, install batteries and do a walk test with the Panel in Walk Test Mode.
8. Remove Walk test jumper to preserve battery life (up to 18 Months).



## AE WIRELESS PIR - 303MHz

The AE Wireless PIR is a battery powered motion detector, with adjustable pulse count, unique walk test features, 65000 factory preset codes designed for use with the Powerwave panels.

### Learning of Detector to RX-40 Receiver:

1. **Plug in the battery. Put it into walk test mode by putting the APS jumper to OFF.**
2. Program the Zone as a wireless Zone, and set the Wireless Detector Type to a '1'. Go to the Zone 'Learn' address of the panel (keypad beeping) and make the detector transmit by activating the PIR.
3. Remove the PIR's battery (so it doesn't accidentally transmit when learning in other PIR's).
4. Repeat steps 1-3 with the other detectors
5. Mount PIR's, install batteries and do a walk test with the Panel in Walk Test Mode.
6. Put the APS jumper to ON to preserve battery life (up to 2 years).

# Learning in Wireless Detectors Cont...

## AE Wireless Smoke Detector - 303MHz

The AE Wireless Smoke Detector is battery powered, and has 65000 factory preset codes. Designed for use with the Powerwave panels.

### Learning of Detector to RX-40 Receiver:

1. Plug in the 2 batteries..
2. Program the Zone as a wireless Zone, and set the Wireless Detector Type to a '1'. Go to the Zone 'Learn' address of the panel (keypad beeping) and make the detector transmit by holding down the Test Button.
3. Mount Smoke Detector and test with a 'can of smoke' with the Panel in Walk Test Mode.

### Extra Range:

Extra transmission range can be achieved by using a 25cm piece of shielded wire as an aerial attached to the internal antenna socket. See the Detector instruction sheet for further details.

## Visonic Smoke Detector - 433MHz

### Learning of Detector to RX-40 Receiver:

1. Plug in the 2 batteries.
2. Set 8-way SIP switch to a unique combination for every Detector
3. Set the 4-way SIP switch at factory default:  
**2 - 4 OFF**  
**1 ON**
4. Program the Zone as a wireless Zone, and set the Wireless Detector Type to a '31'.
5. Hold down the test button. This detector sends out a signal 60 seconds after the it's on-board beeper starts. Go to the Zone 'Learn' address of the panel (keypad beeping) with around 10 seconds to go before it transmits (or the zone learning will time out).
6. Mount Smoke Detector and test with a 'can of smoke' with the Panel in Walk Test Mode.

# Powerwave 8/16 Panel Receivers

## Aerial Angles:

Remote controls typically transmit their signal on a horizontal plane. To get extra reception range you can try pulling the aerial horizontally out from the side of the box or bending it left out of the top of the box.

Remember that the steel box acts as an RF shield to any signal trying to reach the aerial wire.

## Aerial Length:

Receivers (apart from the 27MHz version) are supplied with a tuned length including a few extra centimetres that will be shielded inside the metal enclosure.

If necessary the aerial wire can be brought out the bottom of the box to get better line of sight reception to Wireless detectors/Remotes - remember to extend it's length in order make sure the exposed wire is the correct length.

## Receiver Frequencies:

Receivers are available on 303, 433 and 27MHz to suit the frequency of the transmitting device.

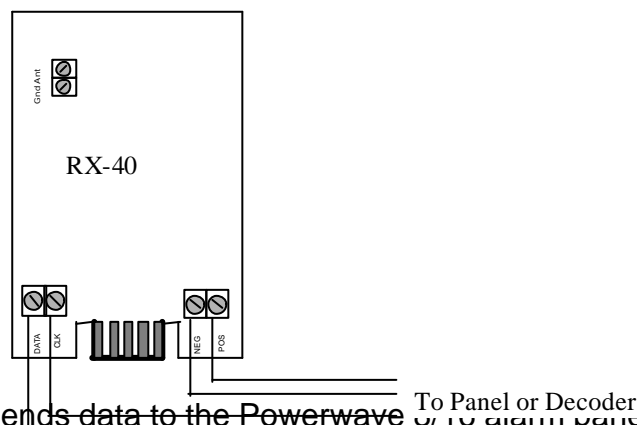
## Receiver Placement:

The receiver should normally be placed at the top left of the cabinet as close to the knockout as possible (to get maximum aerial length exposed).

To get better reception range, the receiver can be taken out of the box and placed anywhere where it can be wired to a keypad cable. Make sure it is mounted inside an insect proof container.

Multiple receivers can be wired off the keypad bus to increase reception range (eg. Concrete building with Wireless PIR's, increased range for Medical remotes outside a house.)

## Receiver Wiring:



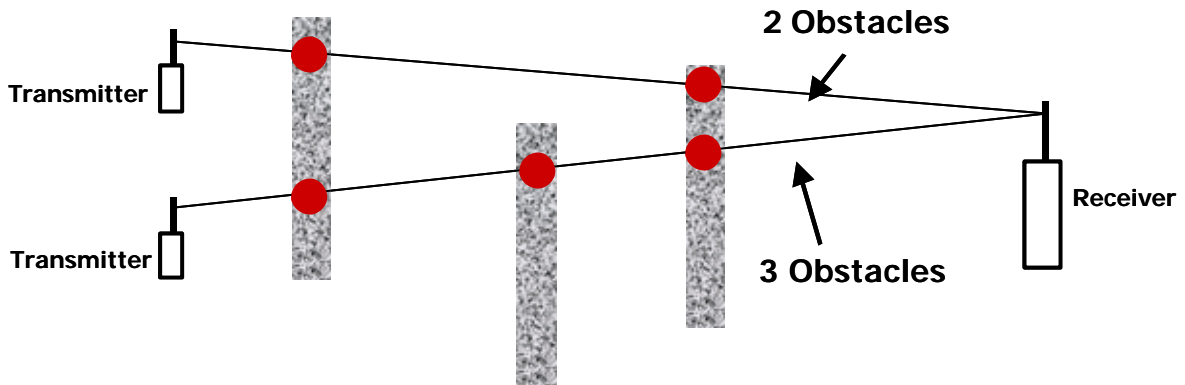
## RX Decoder:

The RX40 Receiver normally sends data to the Powerwave or to a standalone Decoder. It can also be wired to a standalone Decoder with 4 relay outputs. Devices such as remote controls can be learnt to these relays via the receiver.

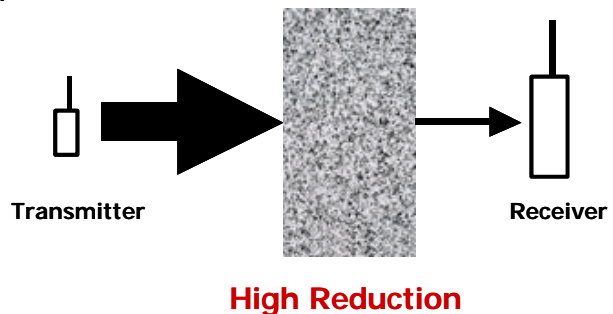
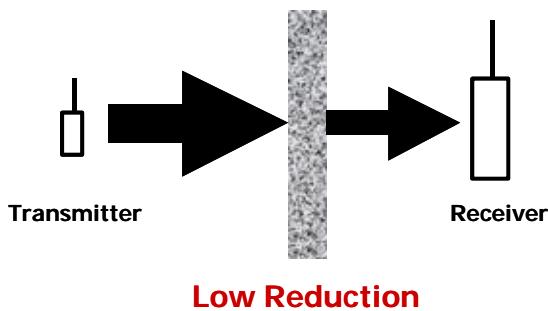
Multiple receivers can be wired to the decoder in order to get better RF reception, and similarly multiple decoders can be wired to the receiver/s to increase the amount of outputs.

# Wireless Reception Theory

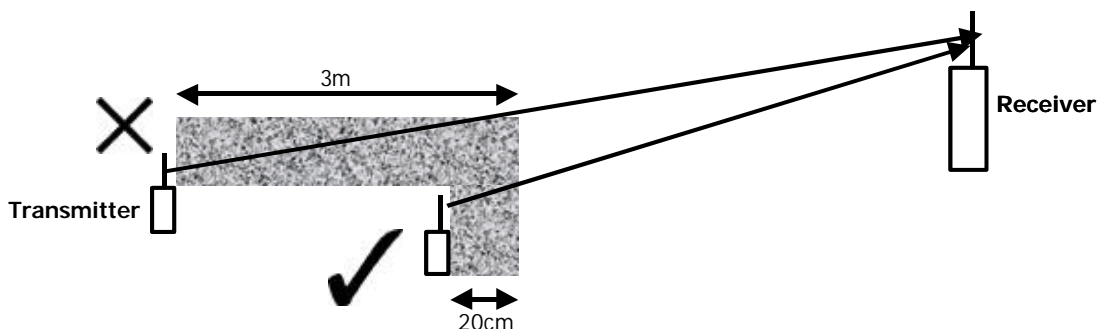
- The number of obstacles between a transmitter and a receiver can be determined by drawing an imaginary line between them.



- The reduction of the RF signals' strength is directly proportional to the thickness of the obstacle. (assuming the obstacles are identical in material)

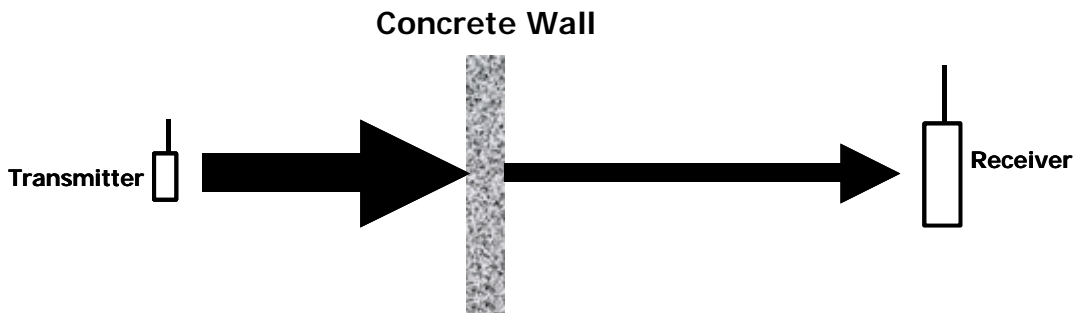


- When selecting the best location for the transmitter, take into consideration that a minor change of location could make a major difference to the RF signals' effectiveness. For example, the thickness of a wall can vary according to the mounting location thus affecting the signal.

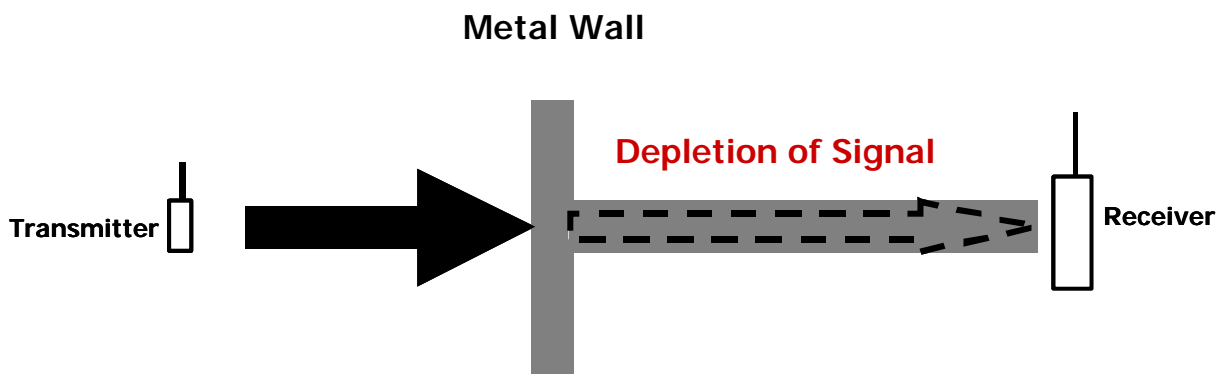


# Wireless Reception Theory Cont...

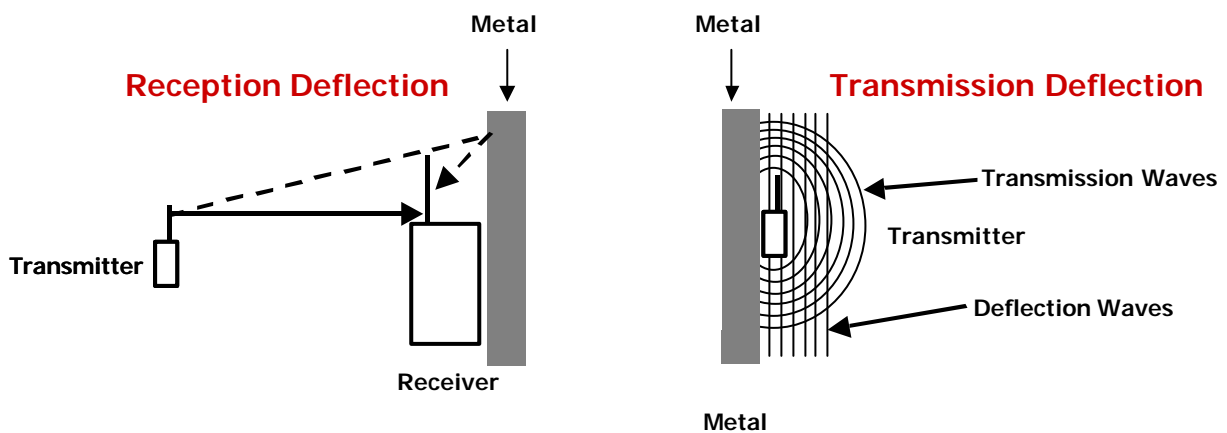
•The type of obstacle and the material from which it is made of, will affect the transmission signal. It is therefore useful to note the following commonalities:



•**Concrete Walls**: These act as a screen and will reduce the signal.



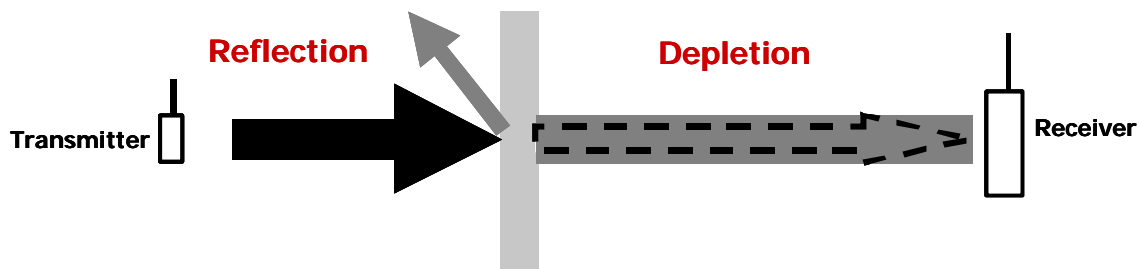
•**Metal Walls**: These act as a solid screen and will dramatically reduce or even eliminate the reception of RF signals



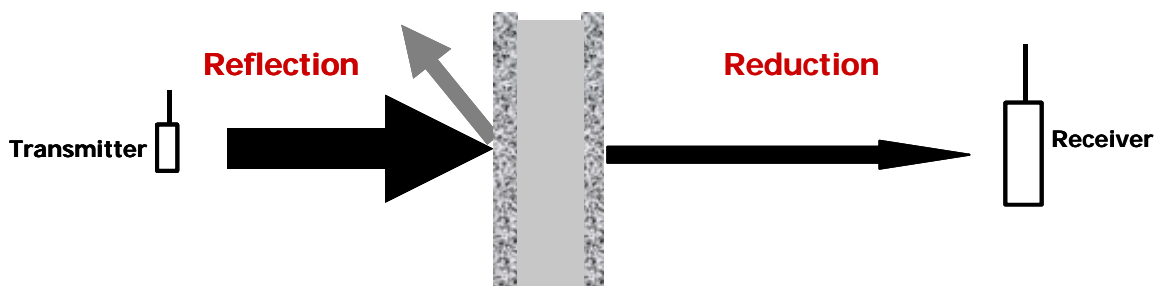
•**Metal Walls**: If the receiver or the transmitter is placed directly in front of or close to the wall, the wall will act as a reflector adding waves which will create saturation and distortion.

# Wireless Reception Theory Cont...

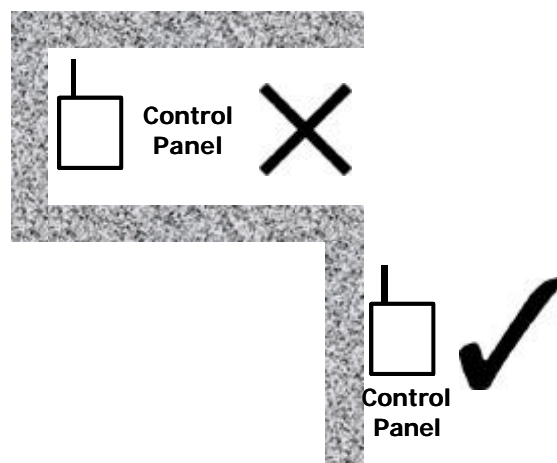
•**Wire Fence:** This fence can either act similarly to a metal wall, reflecting the signal or can simply reduce the RF signals. This variation is dependant on the size of each eye within the fence.



•**Reinforced Concrete Walls:** This combines the effects of both concrete walls and wire fences.

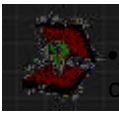
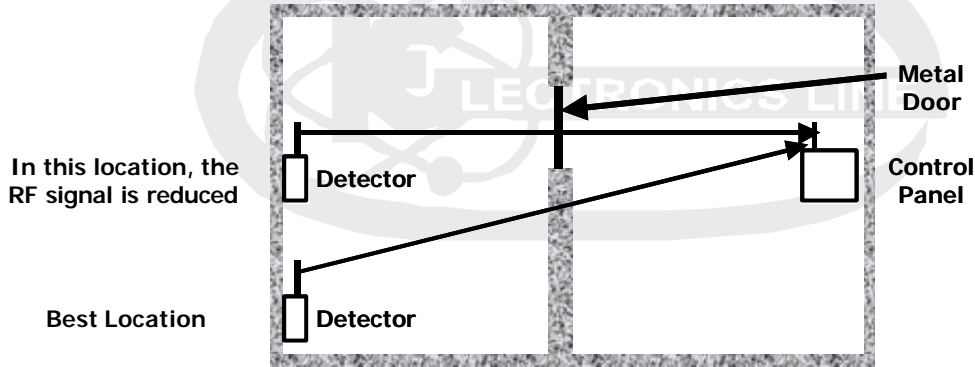


•While the receiver should be in a protected area, it is highly recommended that it should not be totally enclosed whereby it would weaken the signals that it should receive.



# Wireless Reception Theory Cont...

- Wherever possible, find the most permissible route to the control panel and avoid obstacles that cause heavy signal loss.

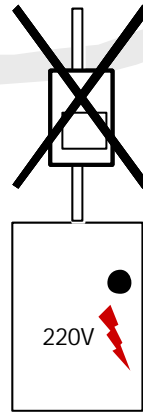


A small change of mounting location will increase the effectiveness of the signal without compromising security.

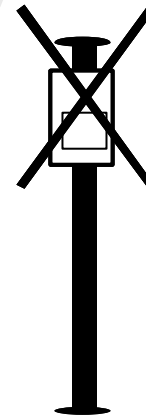
- Avoid installing the Transmitters in close proximity to magnetic fields or sources of radio interference.



220V Duct



Iron Pole



- Choose the best location for optimum reception of Transmitters.

- Wherever possible, it is recommended that the Receiver should be at least 1.70m above the floor and 50cm under the ceiling.

