Hardware Training Manual

INHEP DIGITAL SECURITY

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Features

1. Auto arm / disarm
    1.1. Per partition
    1.2. By day of week
    1.3. Pre-determined time
    1.4. No movement
2. Four reporting numbers
    2.1. Dual reporting
    2.2. Split reporting
3. Medical Alarm on no movement
4. Maintenance code
    4.1. Siren time and delay
    4.2. Keypad lockout
    4.3. Day light savings
    4.4. No movement auto arm / disarm
    4.5. Auto arm
5. Selectable bypass via user code
6. Dynamic battery test
7. Low battery cut out
8. Improved power supply
9. Programmable zone loop response
10. Up & downloadable via software
11. Fax defeat to bypass fax / answering machines
12. Optional tamper reporting per zone
13. Non-volatile memory
14. Voice reporting and DTMF control
15. Wireless

X Series

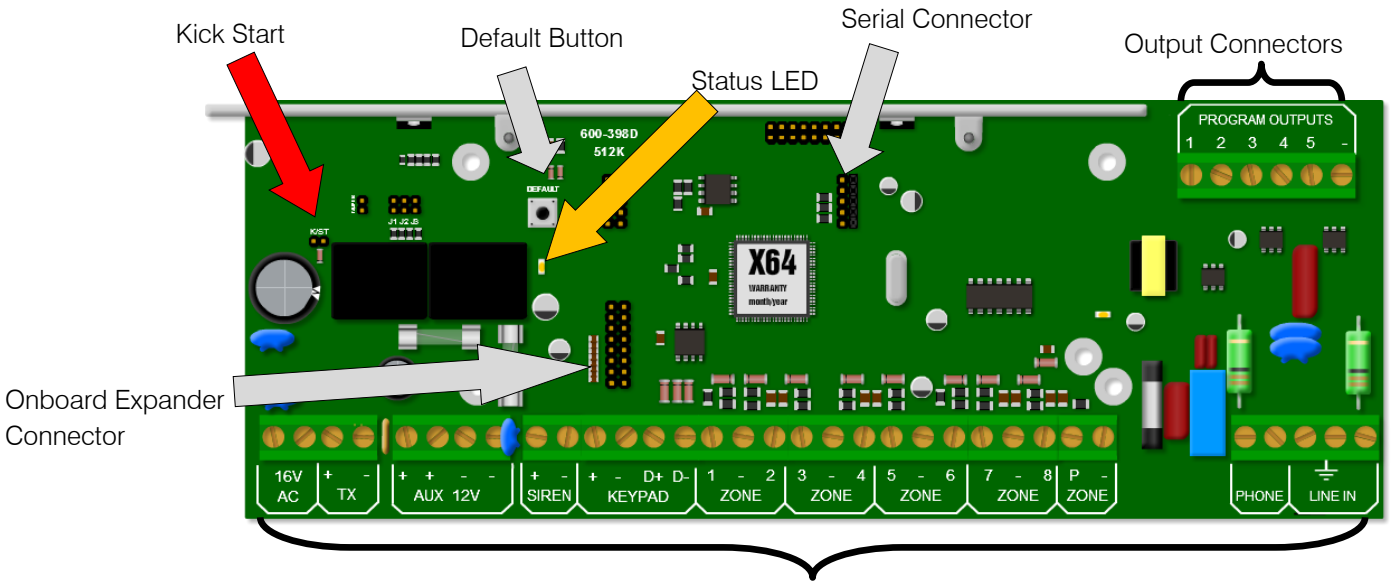
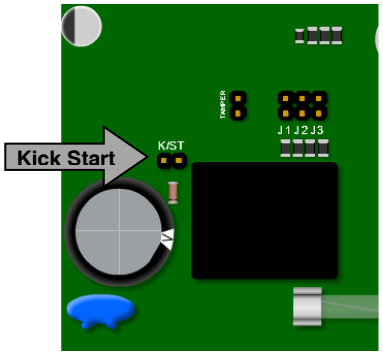


Figure 1: **X64 Alarm Panel**

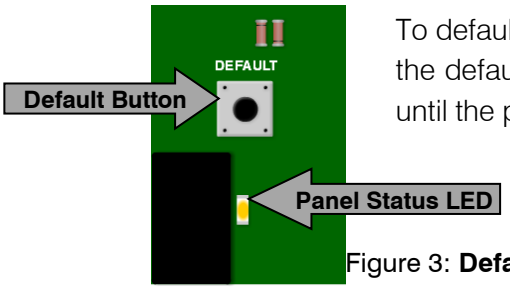
Kick Start Jumper



When connecting to a battery, without 16VAC connected, the X64 will not power up until the kick start jumper has been shorted for a second. This feature has been included so that if the battery voltage starts fluctuating and goes below 10.5 volts, without AC, the panel switches off, stopping the alarm from entering any undesirable states that could compromise the integrity of the system. When AC is applied the alarm will power up automatically

Figure 2: **Kick Start**

Default button



To default the panel, physically remove power from the unit and press down the default button. Replace power whilst still holding down the button. Wait until the panel status LED flashes once and then release the button.

Figure 3: **Default Button & Panel Status**

Panel status LED

The status LED indicates the condition of the operating system.

Off = Not running

Flashing once a second = normal operation

Flashing fast = Bus communication fault

Serial Connector

The serial output is for connecting the voice module and direct download device.

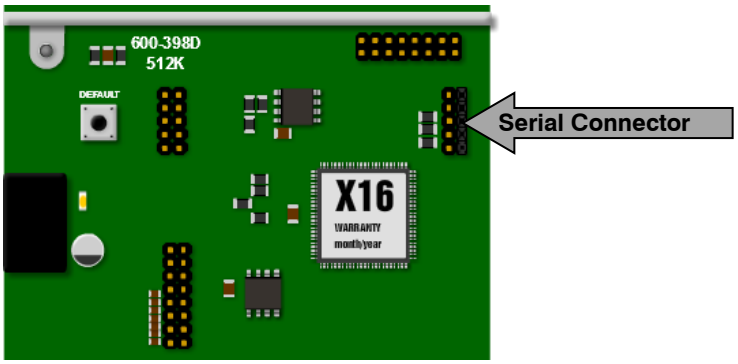
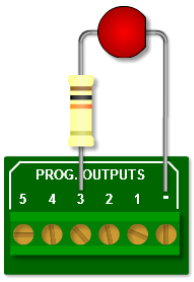


Figure 4: Serial connection

Note: Please be very careful to make sure that the pins are lined up with the connector of the device being plugged in.

Output Connectors

The outputs are positive 12V triggered, for triggering devices like, radios, LEDs, etc.



This is a diagram of an LED connected to output 3 to indicate arm status.

By default: Output 1 is set to pulse on panics and a duress being triggered
Output 2 will pulse if a burglary condition is triggered.
Output 3 will latch on when the system is away armed
Output 4 is set to pulse on a fire condition
Output 5 will trigger if a medical condition is triggered

Figure 5: Output 5 with LED

X64 Connectors

Figure 6: **X64 Main connectors**

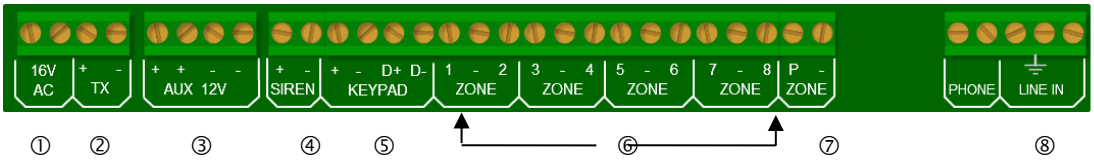


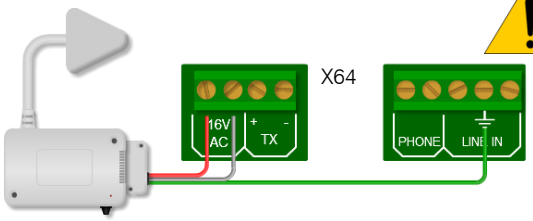
Figure 6 above shows how the X64 connectors are laid out. Each connection will be described individually throughout this section of the manual.

Please note that devices, especially between different manufactures, are different and the manuals should be thoroughly read and understood before attempting installation.

AC Power

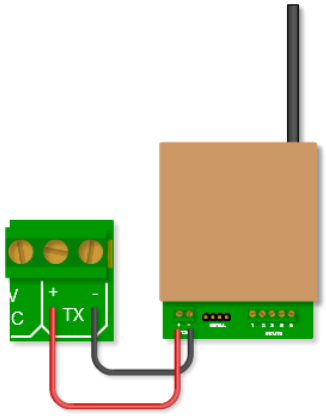
The X64 alarm panel requires 16V AC to be connected to the AC connector on the board. The minimum recommended transformer is a 16V 32VA, but the recommended transformer is a 16V 40VA transformer.

Figure 7 shows how to connect the power transformer to the X64 Alarm Panel.



Note: Please check the transformer connector carefully to see what connectors are for AC power and which one is for the ground connection (⏚).
The ground connector, on the alarm panel, is the centre connector located at the telephone connector, marked “line in”.

Radio Transmitter (Tx)



Power supply to any radio transmitter

While it may seem unnecessary to some, in order to carry the full transmit current without any significant volt drop in the cable length between the battery and the radio, it is necessary to use cable no thinner than two cores of a 5A rated mains cable.

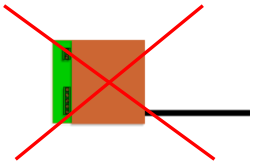
(While a few volts dropped from 220V AC may not be significant, a two volt drop from 12V DC is a very significant percentage – this is why a thicker cable is needed).

Measure the voltage at the radio (NOT across the battery). When transmitting, the supply voltage measured at the transmitter should not drop by more than a volt. A drop approaching two volts would indicate that either the cable is not satisfactory or the battery is not healthy.

NOTE: If you are connecting your radio directly to the battery, the dynamic battery test may fail.

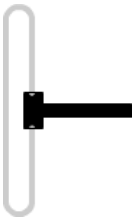
Tips on Radio Installations

Correct Antenna Orientation



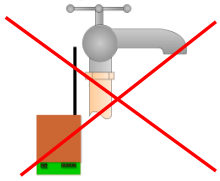
Radio transmitter antennas MUST be mounted VERTICALLY, unless otherwise stated by the manufacturer.
Mounting the antenna so that the whip lies horizontally will result in nearly all the output power being polarized in the WRONG direction. The small fraction of the power that is detectable by the receiver will be 20 dB lower than that coming from a correctly orientated transmitting antenna. This is effectively the same as attempting to communicate using a 50mW (or smaller) transmitter instead of the 5W unit

Antennas with Higher Gains.



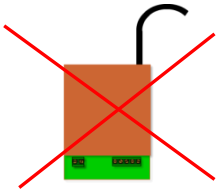
If range remains an issue (after eliminating all other likely causes), a folded dipole antenna will provide a 6dB improvement over a whip antenna. This would have an effect similar to increasing the transmitting power from 5W to 20W. Note that unlike a whip (which has an Omni directional, doughnut shaped radiation pattern) the folded dipole antenna has more gain in the direction away from its mounting – and a dead zone to the rear. So the dipole antenna should be mounted vertically, and pointing towards the base station.

No Metal Objects Near the Antenna



Copper pipes, geysers, metal poles etc. must all be kept at least 2m away from the antenna. Nearby metal objects can alter the antennas characteristics, causing power to be reflected back into the transmitter instead of being radiated.

Do Not Bend the Antenna



Bending an antenna to fit it into a confined space can also alter its characteristics and cause transmitter power to be reflected back into the transmitter, significantly reducing the quantity of power that gets radiated. If a whip connected directly to the radio does not fit, then it is recommended that a dipole (which comes with a suitable cable) is mounted somewhere near the radio.

Aux 12V

NOTE: The X64 Alarm Panel can supply 750mA of power to all peripherals, including keypads, expanders and receivers, etc. To check that the power consumption is not exceeded: Add all the devices current consumption, except the radio transmitter, that are connected to the X64 together and then subtract the total from 750mA. The result is the amount of current available for peripheral devices.

Device	Power Consumption
LED Keypad	90mA
LCD Keypad	110mA
Bus Expander	60mA
Receiver	115mA

This table shows the average power consumption of keypads, expanders and the remote receiver

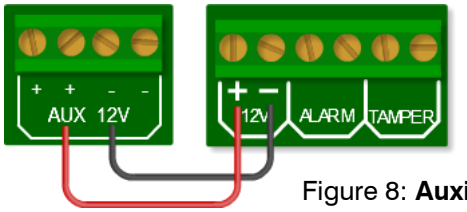
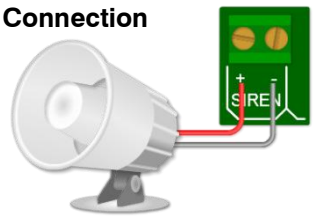


Figure 8 shows the connection diagram of how to connect 12V to a device that requires 12V DC.

Figure 8: **Auxiliary 12V**

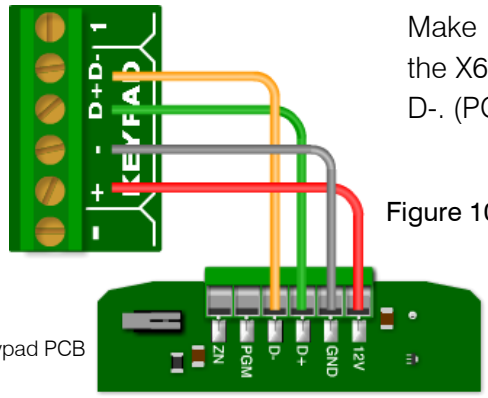
Siren Connector

Figure 9**: Siren Connection**



The siren connects directly to the siren output on the board with the positive of the siren to the + terminal, and the negative to the - terminal. The output can drive up to a 30 watt siren.

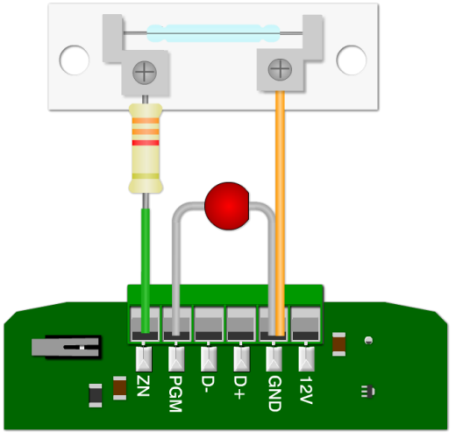
Keypad Bus



Keypad PCB

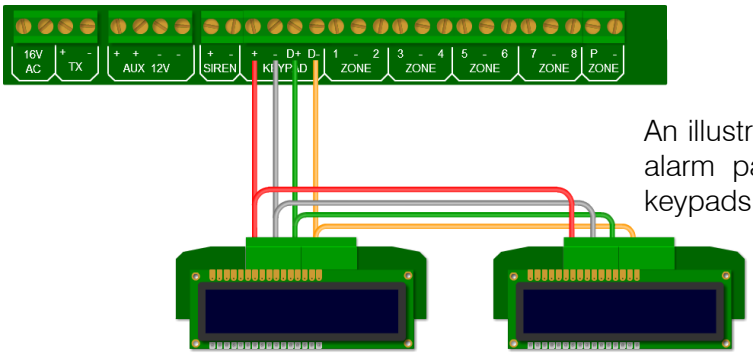
Make sure that when connecting the keypad bus that D+ on the X64 is connected to D+ on the keypad, and the same with D-. (PGM and ZN will be discussed separately.)

Figure 10: **Keypad Connection**



The keypad has a zone (ZN) and a programmable output (PGM).
The zone works exactly like a normal zone with an end-of-line resistor. When a zone number is allocated to the keypad zone, that zone is disabled on the alarm panel or expander.
The PGM functions the same as the onboard programmable outputs, except that it only triggers using 5V.

Figure 11: **Keypad Zone & PGM Connection**



An illustration on how to connect two keypads to the alarm panel and connecting peripherals onto the keypads

Figure 12**: Keypad Daisy chain**

Zone Connections

Devices that are connected to zones are divided into two categories, normally open (NO) or normaly closed (NC). Some devices have both and the installer can select either, depending on their preference.

Normally Open

Normally open as seen in Figure 13, is like a switch that by default is always off and no electricity can flow through it.

Figure 13**: Normally Open Diagram**

Normally Closed

Normally closed is like a switch that is by default always on and electricity will flow through it.

Figure 14: **Normally Closed Diagram**

Depending if the device is normally open or normally closed, will depend on how the end-of-line resistor is connected. The end-of-line resistor is what the alarm panel looks for to determine if there has been a violation or not. Therefore, it is very important to connect it correctly!

The end of line resistor must be 3K3Σ (Σ = ohm).

Resistors are identified by the colour bands, each colour represents a different value and the position of the band represents a different digit or multiplier.

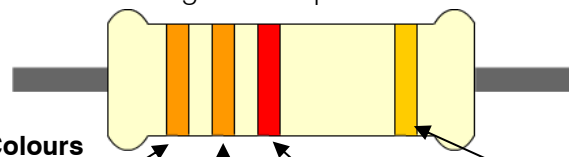


Figure 15: **Resistor Colours**

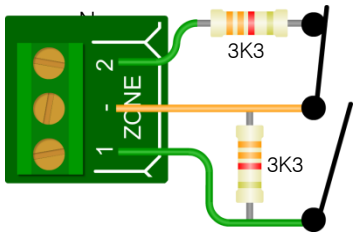
1st digit		2nd digit	Multiplier	
0	Black	0	1	
1	Brown	1	10	
2	Red	2	100	
3	Orange	3	1000	1K
4	Yellow	4	10000	10K
5	Green	5	100000	100K
6	Blue	6	1000000	1M
7	Violet	7	1000000	10M
8	Grey	8		
9	White	9		

Toleranc	
10%	Silver
5%	Gold
1%	Brown
2%	Red

Calculating the value from the diagram above, Figure 15:

1. The first band is orange which is 3
2. The second band is also orange which equals 3
3. Put the first two bands together which will be 33
4. The third band is red, which is equal to 100
5. To get the value of the resistor multiply the first two digits, 33, with the third digits value, 100.
6. The answer is 3300, which can also be 3.3K or 3K3 (K is placed in place of the dot)
7. The value of the above digram is 3K3Σ with a tolerance of 5%

Figure 16: **Resistor placement for NO & NC**



Normally closed devices must be wired in series with the end-of-line resistor

Normally open devices are wired in parrallel to the device

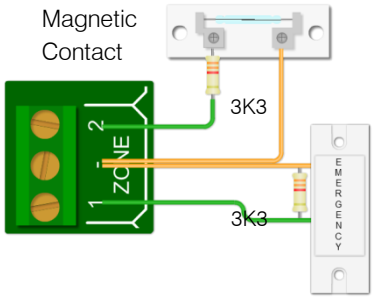
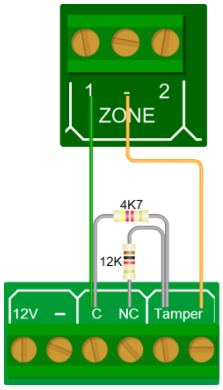


Figure 17 shows how a magnetic contact (NC) and a panic button (NO) are connected to a zone

Figure 17: **Example of NO & NC Devices**

Tamper Connections



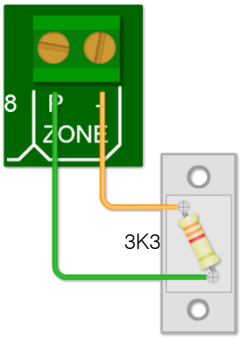
When doing an installation requiring tampers to be monitored, the 3K3 resistor is replaced with a 4k7 and a 12k in parallel. Figure 18 shows how this is done.

The 4K7 resistor represents the tamper and the 12k represents the zone, so depending on which resistor goes missing depends on what condition is reported.

Figure 18: **Tamper Resistors**

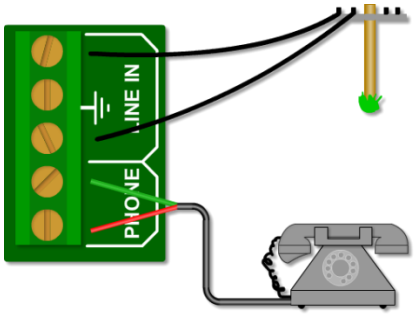
Panic Zone Connections

Figure 19 **: Panic Button End of Line Resistor**



Panic buttons are normally open therefore the end-of-line resistor must be in parallel.

Telephone Connections



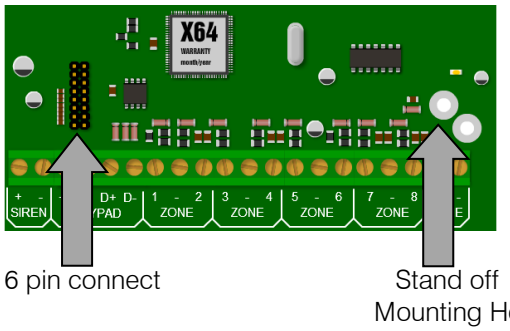
The line coming into the building must go directly to the Alarm Panel, and then onto any telephones. This will stop any attempt to disrupt communication by taking the phone off the hook.

Figure 20: **Telephone Line Connection**

Onboard Expander Connection

The X64 can be expanded via expanders. Zones 9 to 16 are added by plugging the onboard expander onto the PCB via this connector

Figure 21: **Onboard Expander Connection**



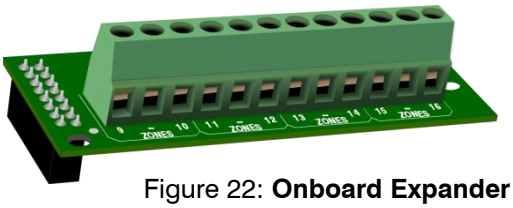


Figure 22: **Onboard Expander**

Note: A bus expander may be installed if there is no onboard expander, but then zones 9 to 16 cannot be used for hardwired zones but can if the expander is a wireless expander.

Bus Expander and connection

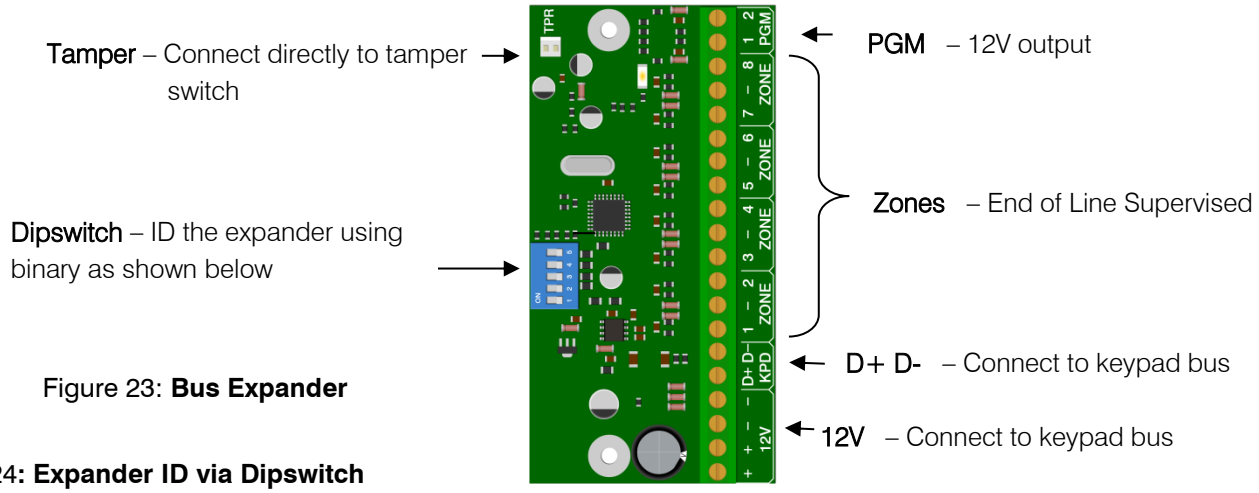


Figure 23: **Bus Expander**

Figure 24**: Expander ID via Dipswitch**

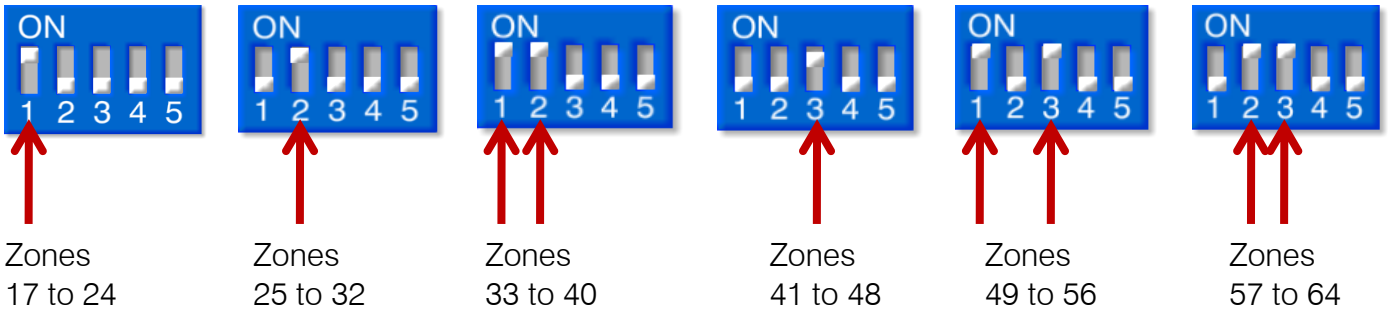
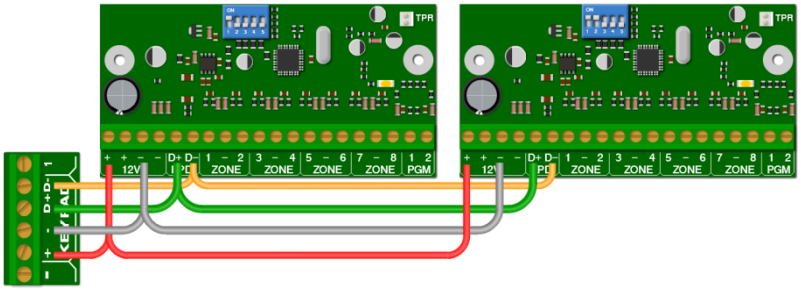


Figure 25**: Expanders connected**

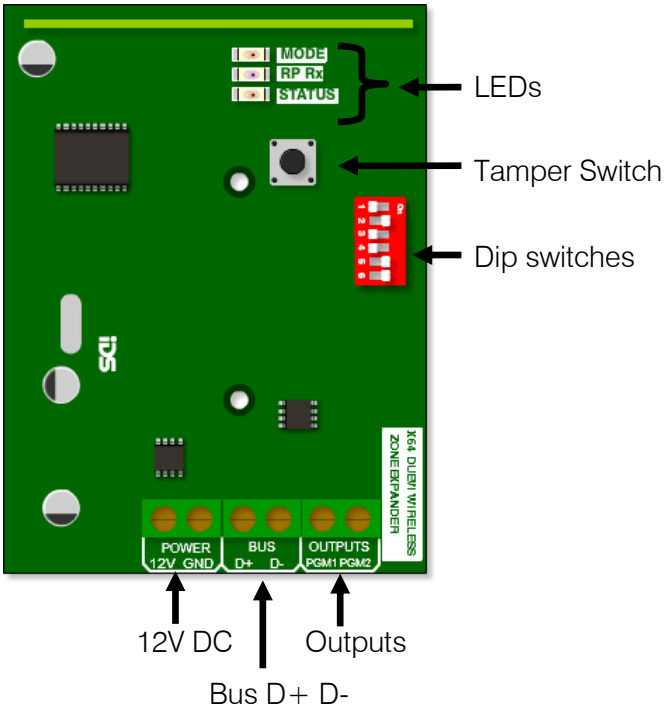


Expanders connected to the X64 with their ID's set.

Wireless Integration

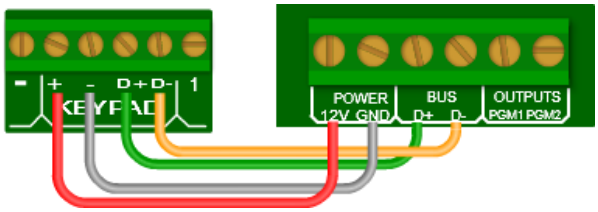
Note: Older wireless hardware devices will not work with the X64, Duevi integration. Please make sure that you have the correct devices.

Figure 26: **Wireless Integration PCB**



Wireless Bus Connection

Figure 27 **Wireless Bus Connection**

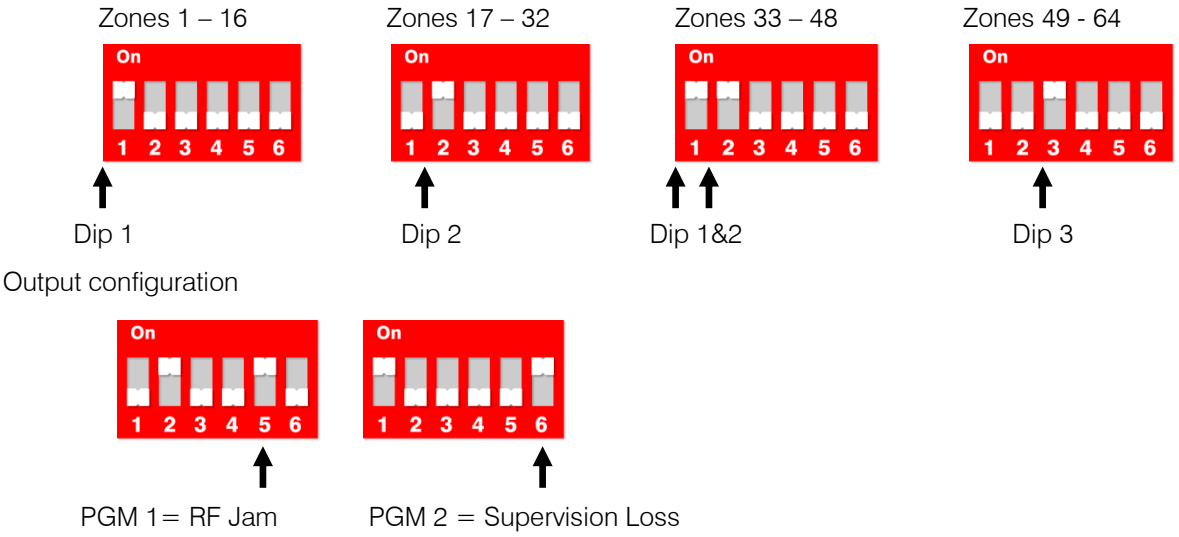


Up to four wireless expanders can be connected onto the RS485 keypad bus. Each expander can connect up to 16 wireless devices. Each expander must have the correct ID to map the correct zone numbers desired.

Wireless Expander DIP switch operation

The Dipswitch currently has only two operations. The first is to set the device address on the X64 bus. This is done in binary the same as was done for the wired expander save for one difference. That is that these expanders each cater for 16 zones and not 8 like the wired expander.

Figure 28: **Wireless Expander Dip switch Settings**



Note: When dip switch 5 and 6 are:
OFF the outputs are then programmable.
ON the outputs are by default set to output 1 RF jam and output 2 supervision loss

Default

The second operation is a standalone default feature. If all Dip-switches are ON during power-up then the unit will default. Please power down after, set appropriate address and power up to resume normal operation.

Wireless Expander LED Operation

There are 3 LEDs on the board marked “MODE”, “RF RX” and “STATUS”.

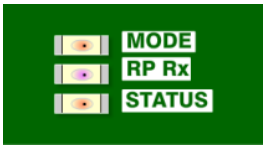


Figure 29: **LEDs**

STATUS: LED that will indicate whether it is connected to the X64 properly. If the receiver notices X64 communications then it will stay ON.

RF RX: LED that will indicate when the receiver received a message from a learnt detector.

MODE: LED that indicates current operating errors. Errors are indicated much the same as the wired expander. If the LED is ON continuously then there are no errors. However if there are errors it will start pulsing the error number. These error pulses will be separated by a 1sec pause with the LED OFF.

Pulse error number:

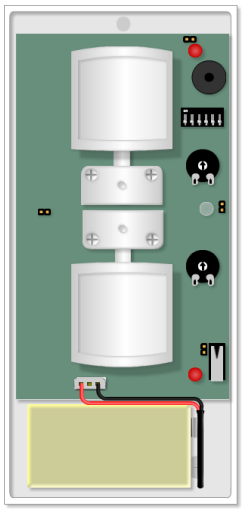
1. Duevi receiver module not responding
2. No activity on the X64 serial bus
3. No X64 messages detected
4. No messages for this peripheral detected from X64
5. Not used
6. Expander not yet registered on the X64
7. Expander tamper violated
8. Unsupported DIP address configured

Each device can be set to check-in every 90 minutes or every 12 hours. The X Series alarm panel can be set to 12 hours or 24 hours, meaning that it must receive a supervision check-in signal from each device within the period set in location 260 sub-location 4.

Note: The import thing to remember is that when you have chosen the supervision time of 3Hrs on the X64 is to make sure the detectors are also set to 90min.
The correct hardware must be used as the older Duevi wireless detectors will not learn to the integrated receiver

Duevi Outdoor Wireless Dual Head PIR - 866-DX-OPWF

Figure 30 Outdoor Dual PIR

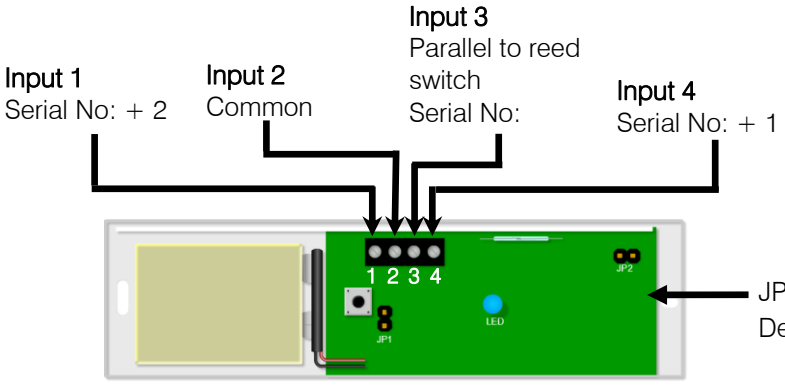


Dip switch 5: On = 12 Hrs Off = 90 min
Default: 90 minutes check in

Note: To learn the dual PIR to the X64 first get both PIR heads to detect movement then press the tamper switch when in location 260 sub location 1 and the correct zone number has been selected

Duevi Wireless Door Contact including input - 866-DX-PWF

Figure 31 Door Mag

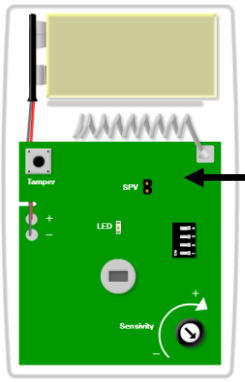


JP2 jumper: On = 12Hrs Off = 90min
Default: 12 hours

Note: To learn the door contact to the X64 press the tamper switch when in location 260 sub location 1 and the correct zone number has been selected

Duevi Wireless Indoor Wireless pet tolerant (18kg) PIR - 866-DX-PWF

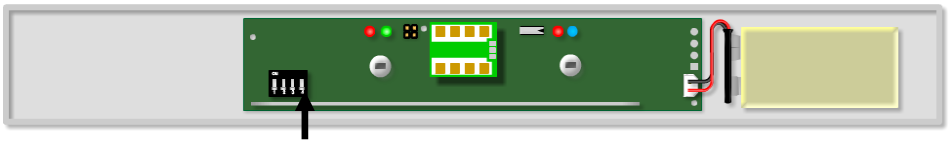
Figure 32 Indoor PIR



SPV jumper: On =12Hrs Off = 90min
Default: 12 hours

Note: To learn the indoor PIR to the X64 press the tamper switch when in location 260 sub location 1 and the correct zone number has been selected

Figure 33 E-wall



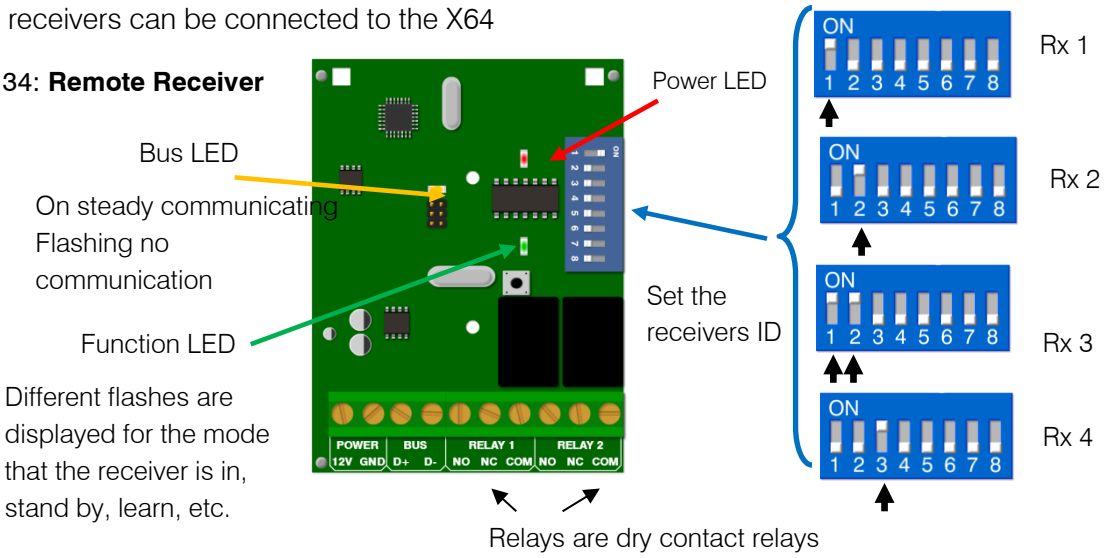
Dip switch 4: On = 12Hrs Off = 90min
Default: 90 minutes

Note: To learn the door contact to the X64 press the tamper switch when in location 260 sub location 1 and the correct zone number has been selected

Remote Receiver and Connections

4 remote receivers can be connected to the X64

Figure 34: **Remote Receiver**



Two remote receivers connected to an X64 alarm system

Figure 35 **Remote receiver connections**

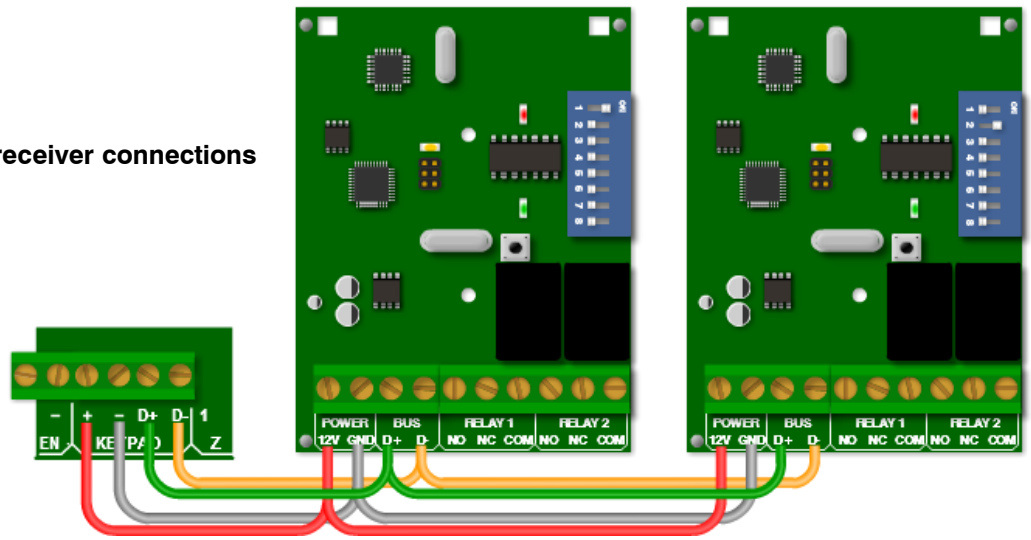


Figure 37 shows an example of what the relay can be used for. In this example it is connected to a gate motor.

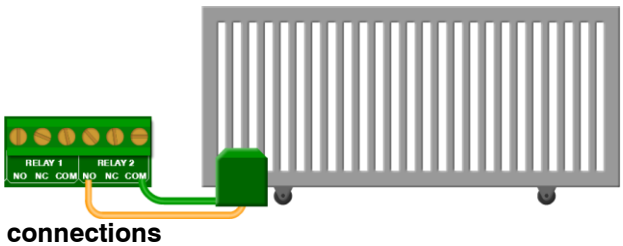
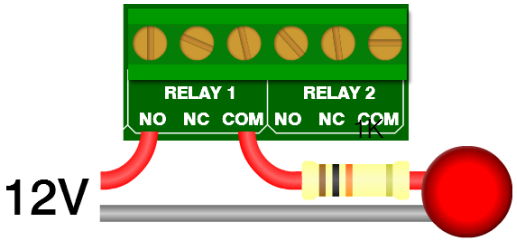


Figure 36: **Relay connections**

Note: Depending on the gate motor the pulse time may have to be changed

Figure 38 shows how an LED can be connected to the receiver's relay, so that when the relay is triggered the LED will come on.

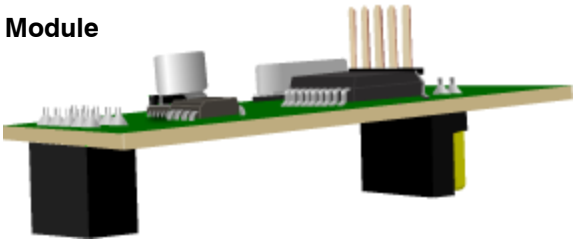
Figure 37: **Relay connected to an LED**



Voice Module Connection

The voice module plugs onto the X64 panel via the, 5 pin serial connector. When setup correctly a message will be delivered to each telephone number entered into the system. The voice module also allows a user to dial into the alarm system and control it via DTMF tones.
The controls are: Arm/Disarm, bypass zones, trigger an output, query status of the partition

Figure 38: **Voice Module**



Note: The voice module only works on version "D" X64 boards and firmware version 1.08 and up.

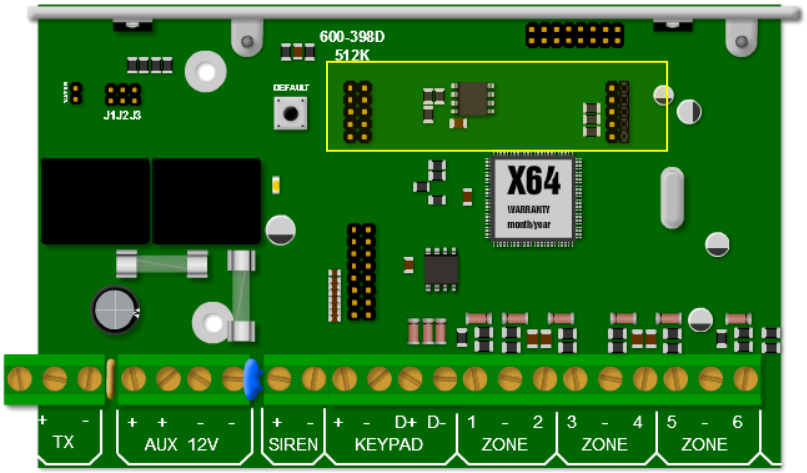


Figure 39: **Serial connector**

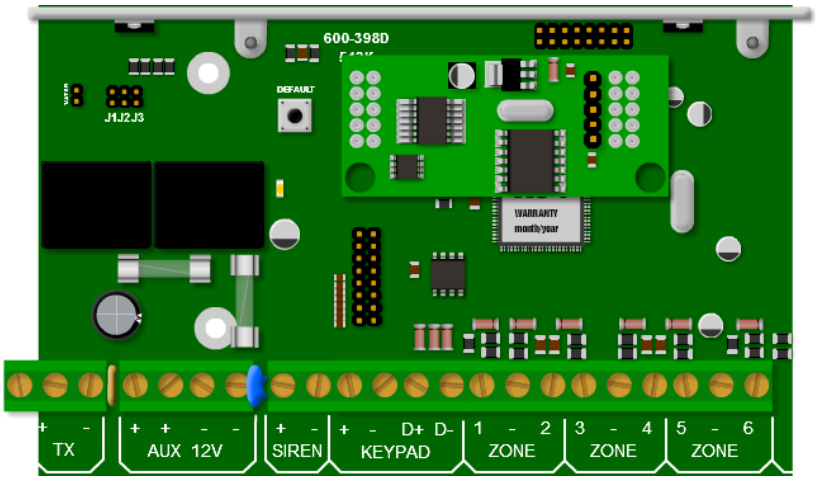
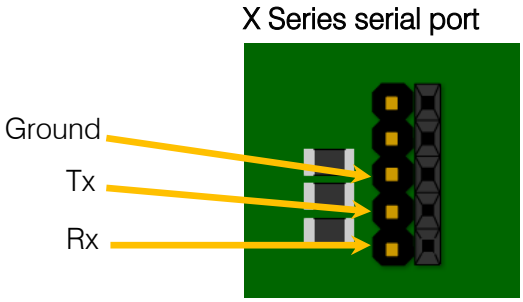


Figure 40: **Voice Module connected to serial Connector**

Serial Communication

The serial connection on the X Series alarm panel can communicate with any device that has the IDS Serial Protocol incorporated into it. (Version 2.10 and up.)



The example below is the Alarm Link GPRS unit connected via the serial output

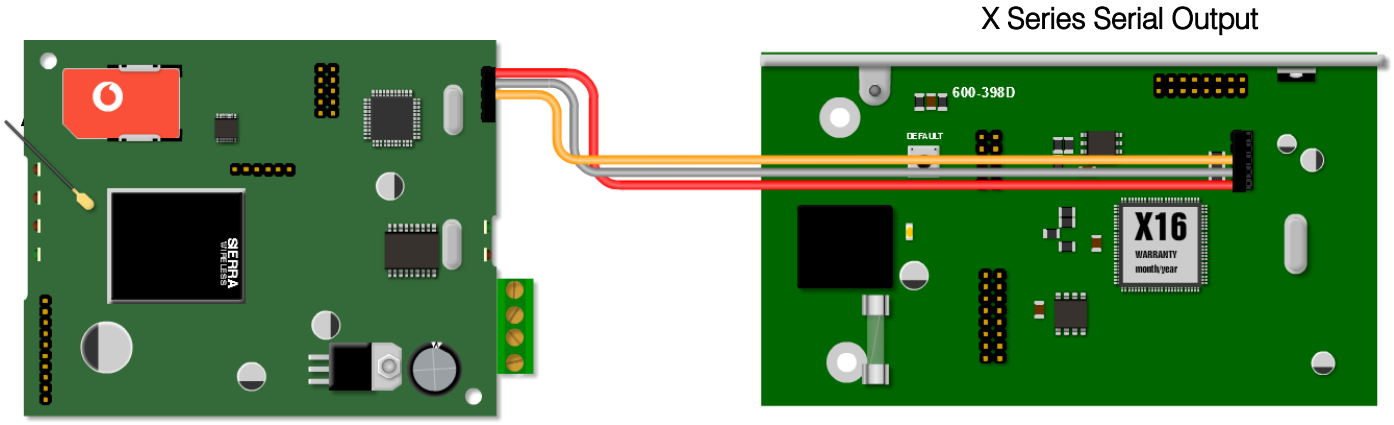


Figure 41: **Serial Connection to a communication**

J1 open = direct download enabled; closed = serial reporting

Connecting Directly to the X64 System Board with the Panel Interface Device

There are three reasons why you may want to connect to the alarm panel:

1. To up or download the programming of the system, via the IDS up and download software.
2. To upload the event log to verify a burglary.
3. To upgrade the firmware of the system.
    a. This will be distributed as an encrypted file.

To do this: a direct connection board must be connected serially to a computer and the IDS software must be loaded on the computer.

The PCB is then connected to the alarm panel via the serial connector on the board.

1. While panel is powered down. Place a jumper onto pins J3.

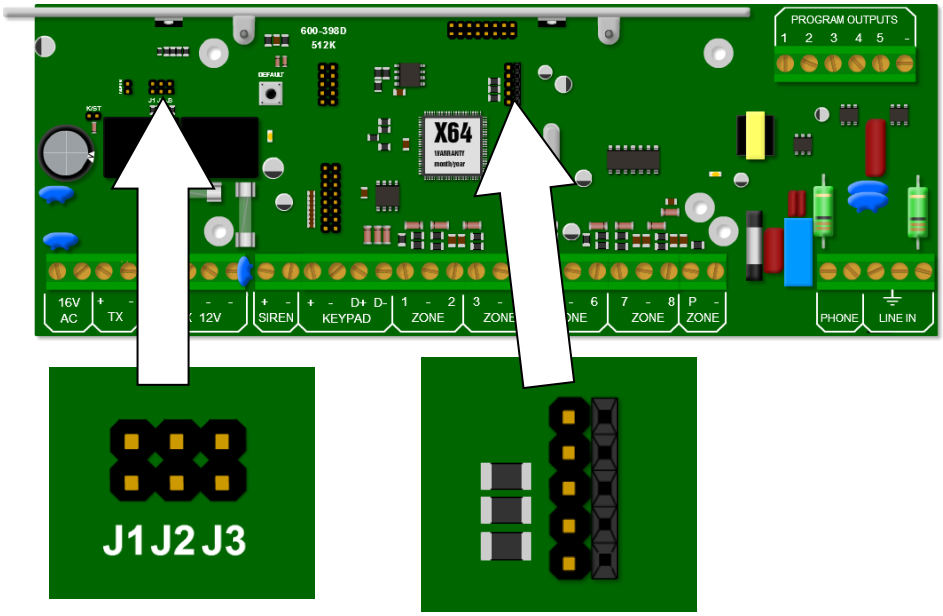
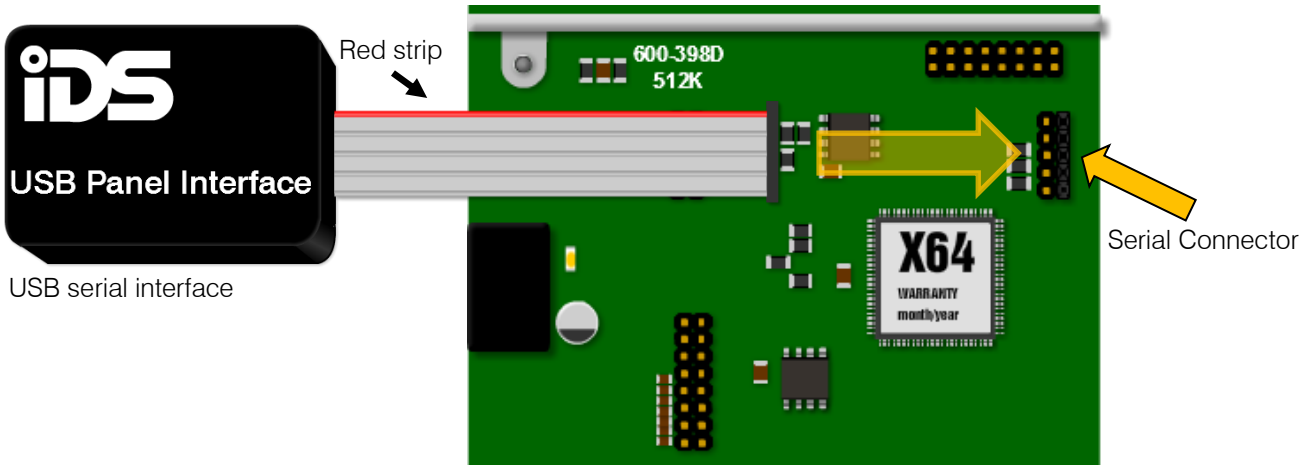


Figure 422: **Firmware Upgrade Jumper**

Note: If the panel is powered up with J3 on, for more than a minute the X64 will reset and go into normal working mode as a security precaution.

2. Connect the USB Panel Interface to the serial connector displayed in figure 39. The red strip on the USB device is pin 1 and is connected to the top of the connector



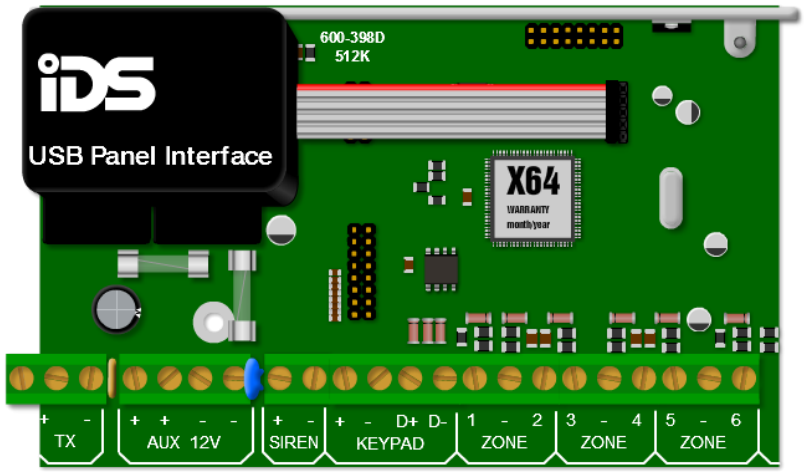
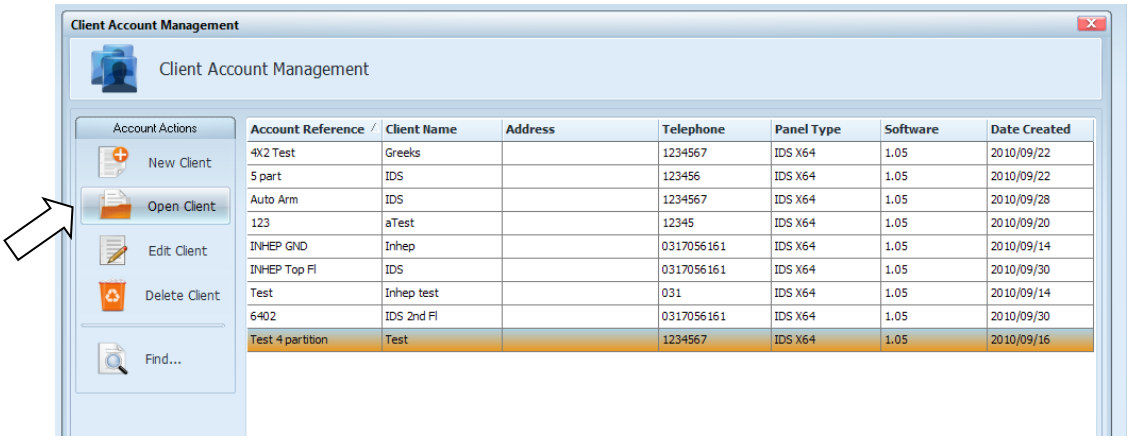


Figure 43: **USB Panel Interface**

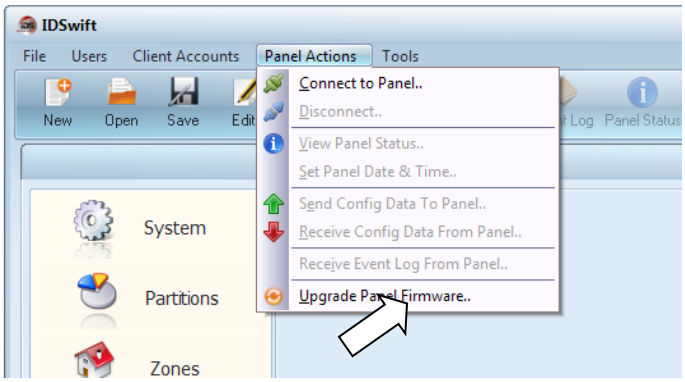
3. Double on the IDSwift software icon to run the software and login. Default user name is “admin” and password is “admin”.

4. Open the client window.

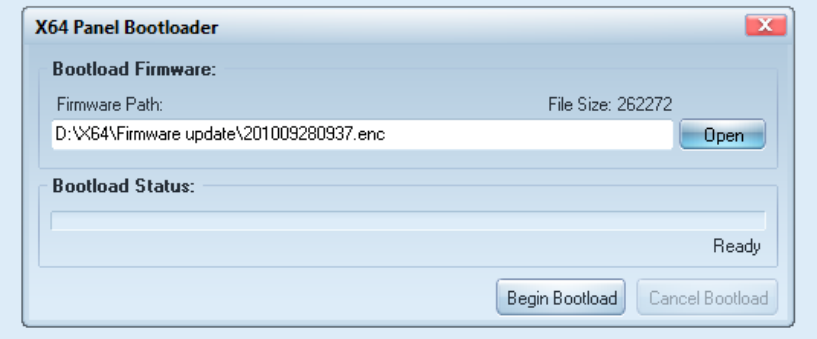
5. Choose the client and then open the client.



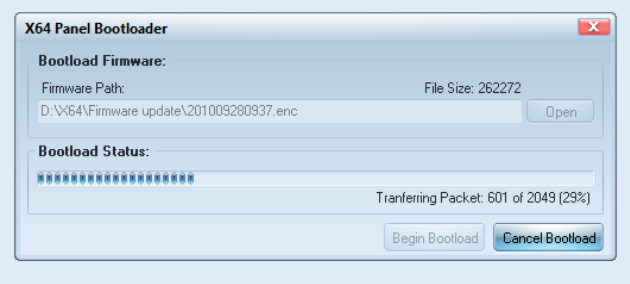
6. Click on panel actions and then firmware upgrade



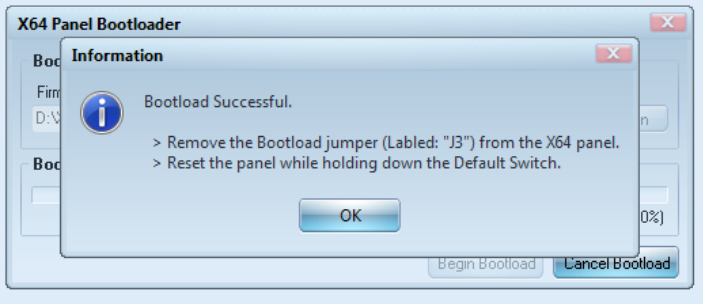
7. Navigate to where the firmware file is located



8. Power up the panel and click on the Begin "Bootload" button and the progress bar will indicate progress of the upgrade.



9. When complete and successful, read and follow the instructions.



Note: The alarm panel must be defaulted after the upgrade.

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