



Mux Expander

Installation Instructions



PTI Integrated Systems

THE NEXT LEVEL OF SECURITY SYSTEMS
AND MANAGEMENT SOFTWARE:
INTEGRATION.

EASY TO IMPLEMENT. SIMPLE TO USE.



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I. Introduction

The PTI Mux Expander allows you to add up to 96 additional PTI Door Alarm Multiplexers on auxiliary lines to your PTI Falcon or Master Security Access Control Systems. The PTI Mux Expander is only required when you have more than 30 total remote keypads, wiegand boards, relay boards, or door alarm multiplexers. These quick installation instructions will help you to setup the PTI Mux Expander. You will need to reference the Falcon Installation Manual or the Master Security Manual for further system installation and maintenance instructions. Please read this entire document before proceeding. Please follow all steps in order. If you need assistance or have questions about this installation, please contact our technical support department by telephone at (480) 941-1513 or by email at support@ptiaccess.com.

II. Disclaimers and Warnings

We strongly recommend that installation and setup of any PTI equipment be done by a certified, licensed, qualified, and competent person. PTI Integrated Systems can recommend local dealers and installers, but it is up to the customer to verify their qualifications and negotiate any pricing or contracts unless PTI has been specifically contracted in writing to do so for the customer. These guidelines are subject to change without notice. With any setup or configuration, some troubleshooting and adjustment of the configuration may be required. This will differ with every installation depending on many outside and site-specific variables. This troubleshooting and configuration may include purchasing additional equipment. In no circumstances will PTI Integrated Systems be responsible for any damages either incidental or consequential based on these recommendations. All installation of electronics and electrical systems must be in compliance with local, municipal, state, and National Electrical Code.

Warning – Incorrect installation of electrical components can result in damage to electronics as well as personal injury.

Warning – Cross-wiring the AC power with DC power will damage the electronics.

Warning – Cross-wiring the Power wires with the Data wires will damage the electronics.

Warning – Cross-wiring the positive and negative on the DC part of the system will damage the electronics.

Warning – Do not run low voltage system wires in the same conduit as high voltage wiring.

III. Installation and Wiring Instructions

1. The PTI Mux Expander should be mounted similar to any other PTI Multiplexer. The weather resistant box should be mounted in a secure location that is out of reach of the general public but still accessible for maintenance. If you mount the box on the exterior of a building, be sure to mount it under a protected overhang, making sure that there are no downspouts draining directly over the box. Be sure to use appropriate anchors and screws to mount the box to the wall.
2. PTI recommends that you use 18 awg, 4 conductor, shielded wire to run power and data lines for the PTI Mux Expander and PTI Door Alarm Multiplexers. Contact PTI Technical Support or visit our website for more information on PTI recommended wiring. You can purchase this wire from PTI if needed. Wiring can be run through any of the knockouts on the box. Generally all wiring should be run in conduit. Refer to the wiring diagram in this document.
3. The PTI Mux Expander runs on 12 – 18 volts DC. PTI recommends that all PTI remotes be powered by a PTI Power Supply to allow reset for maintenance and troubleshooting purposes. Connect the incoming DC + line to the 12VDC+ terminal on the lower left side of the board. Connect the incoming DC – line to the Batt – terminal also located in the lower left side of the board. These wires should be crimped tightly into the provided connectors
4. The RS485 data line to the PTI Mux Expander should be run in series from a convenient point along the main data lines leading back to the Falcon RS485 Terminal block or the Master Security RES box. Generally this will be from the data terminal block of the closest PTI remote keypad or multiplexer. Avoid splicing RS485 data lines whenever possible. For more information on correct splicing techniques for PTI Access Controls, contact PTI Technical Support or refer to our website.
5. Connect the RS485 data lines to the P6 terminal block on the lower left side of the board. Connect the Data – line to the first pin, the Shield/common ground to the second pin, and the Data + to the third pin. **NOTE: this wiring sequence is opposite of the wiring sequence on most other PTI devices.** This is necessary to allow proper communications to the additional multiplexers.
6. P7 and P8 terminal blocks on the lower right side of the board are the outgoing data ports for the auxiliary data lines leading to the additional multiplexers. Each terminal block has two ports on it consisting of three pins each. The first three pins on P7 are Port # 1 and the second three pins are Port # 2. The first three pins on P8 are Port # 3 and the second three pins are Port # 4. Port #'s 1 – 3 can be connected to an additional 29 PTI Door Alarm Multiplexers each. Port # 4 can be connected to an additional 9 PTI Door Alarm Multiplexers.
7. To connect the RS485 Data line for the first 29 additional PTI Door Alarm Multiplexers, run an 18 awg, 4 conductor, shielded wire from Port # 1 on the PTI Mux Expander to the first of the additional multiplexers. The other multiplexers can be run in series. The Data + line is connected to Pin 1 of P7 terminal block. The Shield line is connected to Pin 2 of P7 terminal block, and the Data – line is connected to Pin 3 of P7 terminal block. **Note that the wiring sequence on each of the Ports is the same as the standard PTI wiring sequence.**
8. Repeat step # 7 for Ports 2, 3, and 4. The first pin of each port is for the Data + line, the second pin is for the Shield, and the third pin is for the Data – line. Remember that Ports 1, 2, and 3 can connect to an additional 29 PTI Door Alarm Multiplexers each and Port # 4 can be connected to an additional 9 PTI Door Alarm Multiplexers.

IV. Programming and Setup Instructions

1. After the PTI Mux Expander and all the additional PTI Door Alarm Multiplexers have been mounted and wired, they must be setup correctly to work with the rest of the access control and door alarm systems.
2. The PTI Mux Expander is automatically programmed to be remote # 31 on the main system lines. To prevent conflicts, no other remote on the main system lines can be set as remote 31.
3. Each of the first three Ports on the PTI Mux Expander will have a separate auxiliary line of Door Alarm Multiplexers that will be addressed in order from 1 – 21 and 23 – 30. Port # 4 will have a separate auxiliary line of Door Alarm Multiplexers that will be addressed in order from 1 – 9. There must not be any duplicate addresses within each auxiliary line. For example, Port # 1 can have a multiplexer addressed as remote unit 9, even though there is a remote unit # 9 on the main lines and on each of the other Ports. However, you cannot have two remote units addressed as # 9 connected to Port # 1. Also, you cannot address any remote units as 0 or 22 anywhere in the PTI main lines or the auxiliary lines.
4. Mux and Channel assignments for each of the door alarm multiplexers on the auxiliary lines are handled differently than door alarm multiplexers connected to the main lines. When entering mux and channel assignments into a door alarm table, ALL multiplexers on mux expander auxiliary lines will be treated as # 31 the number of the Mux Expander they are connected to (even though they will each have a different address). Channel assignments for each channel are calculated as follows:

$$[(\text{Port\#} - 1) \times 3000] + (\text{mux address\#} \times 100) + (\text{mux channel number})$$

Example # 1: The first door alarm multiplexer connected to Port 1 would actually be addressed as # 1. The first channel on that door alarm multiplexer would be calculated as follows: $[(1-1) \times 3000] + (1 \times 100) + (1) = 101$. Therefore, the mux and channel information entered into the Falcon or Master Security access control systems would be Mux 31 Channel 101.

Example # 2: The last door alarm multiplexer connected to Port 4 would actually be addressed as # 9. The sixteenth channel on that door alarm multiplexer would be calculated as follows: $[(4-1) \times 3000] + (9 \times 100) + (16) = 9916$. Therefore, the mux and channel information entered into the Falcon or Master Security access control systems would be Mux 31 Channel 9916.

5. Tamper Alarms for each of the door alarm multiplexers on the auxiliary lines are also handled differently than the door alarm multiplexers connected to the main lines. You will need to create false units in the Falcon or Master Security System. These false units could be numbered X0100 or some similar combination to set them aside from the regular building units. Then, these false units must be associated with a mux and channel just like other units. The tamper alarm mux information for each door alarm multiplexer on a mux expander auxiliary line is always 31 even though the multiplexer may will actually have a different address. The tamper alarm channel for each door alarm multiplexer on a mux expander auxiliary line is always the first 'hundred' channel and is calculated as follows:

$$[(\text{Port\#} - 1) \times 3000] + (\text{mux address\#} \times 100)$$

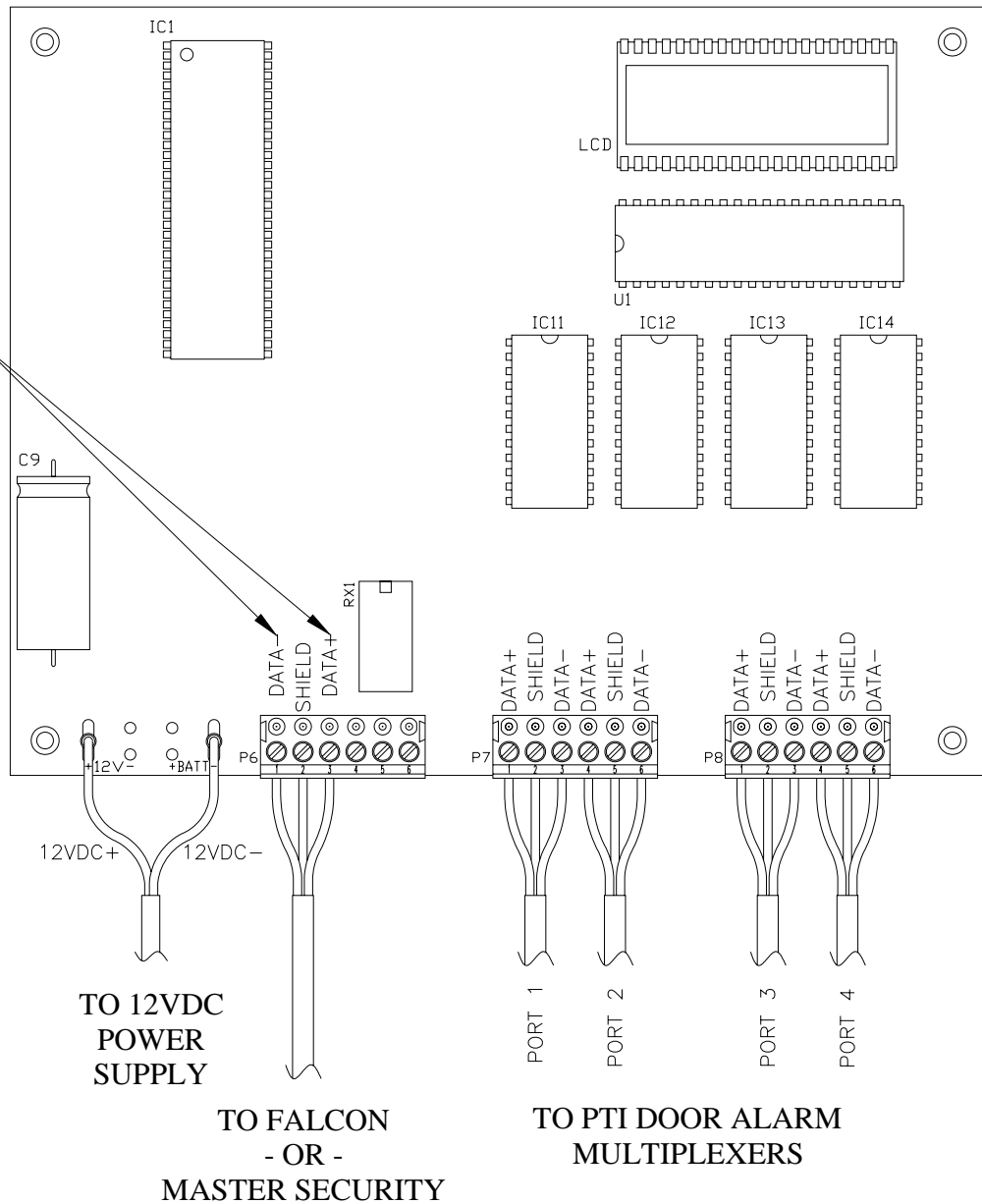
Example # 1: The first door alarm multiplexer connected to Port 1 would actually be addressed as # 1. The tamper alarm for that multiplexer would be $[(1-1) \times 3000] + (1 \times 100) = 100$. Therefore, the mux and channel information entered into the Falcon or Master Security access control systems for the tamper alarm would be Mux 31 Channel 100.

Example # 2: The last door alarm multiplexer connected to Port 4 would actually be addressed as # 9. The tamper alarm for that multiplexer would be $[(4-1) \times 3000] + (9 \times 100) = 9900$. Therefore, the mux and channel information entered into the Falcon or Master Security access control systems for the tamper alarm would be Mux 31 Channel 9900.

6. The display on the Mux Expander will continually scroll through the following information: Current Time, Remote Unit # (always 31), the last event that occurred on any of the door alarm multiplexers attached to it, and the version number of the Mux Expander.

V. Wiring Diagram

NOTE: DATA IS OPPOSITE OF MOST PTI DEVICES.



NOTES:

- 1) REMOTE NUMBER OF BOARD IS PRESET AT FACTORY TO 31.
- 2) REMOTES ATTACHED TO THIS BOARD START WITH ADDRESS #1.
- 3) REMOTE ADDRESS #22 CANNOT BE USED.
- 4) EXPANDED MUX CHANNEL ASSIGNMENTS ARE DETERMINED AS FOLLOWS:

$$\text{EXPANDED MUX CHANNEL} = [(\text{PORT\#} - 1) * 3000] + (\text{MUX\#} * 100) + \text{MUX CHANNEL\#}$$
- 5) PORT 4 IS LIMITED TO MUX NUMBERS 1 THROUGH 9.