# EntraGuard® Titanium Telephone Entry Controller
## Quick Start Guide

This quick start guide provides, basic installation information, drawings, first time power-on instructions, and short descriptions of key terms and concepts for installing the EntraGuard Titanium Telephone Entry controller. The EntraGuard Titanium controller may be used alone or may be connected to a PXL-500/510 network. For instructions on how to install a postal lock, see the EntraGuard Titanium Postal Lock Installation Application Note (P/N 01964-001).

*NOTE: It is the responsibility of the installation organization to have only technically qualified personnel performing the installation.*

Section 01 - Specifications
Section 02 - Cable Requirements
Section 03 - When Installing Controllers
Section 04 - Wiring Instructions
Section 05 - Communication
Section 06 - Powering the Controller for the First Time
Section 07 - Setup Controller
Section 08 - General Information on Inputs
Section 09 - General Information on Safety versus Security with Door Locks
Section 10 - Contact Keri Systems
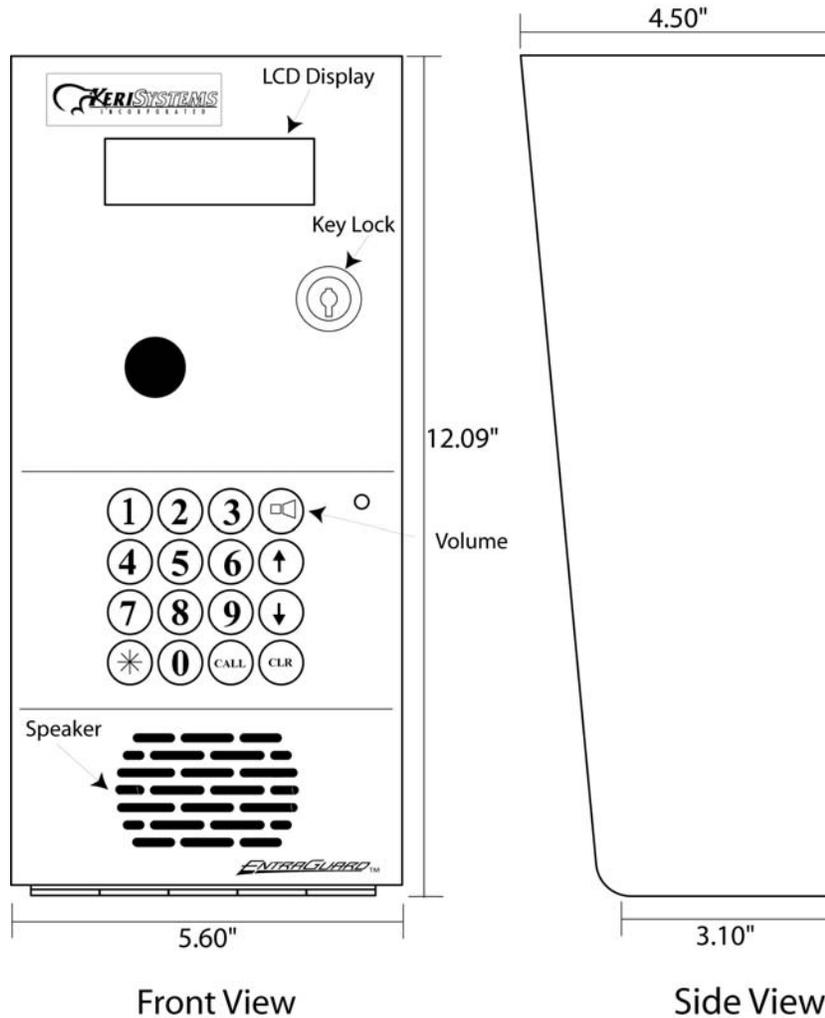


**Figure 1: The EntraGuard Titanium Telephone Entry Controller - Front Panel**

P/N: 01962-001 Rev. D

# EntraGuard® Titanium Telephone Entry Controller
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**TB4 - Inputs**
1 Door Switch - NC
2 Ground
3 Request To Exit - NO
4 - not available -
5 Ground
6 ┬ Global Unlock - NO
  └ Auxiliary RTE "A" - NO

**TB3 - Lock & Alarm Relays**
1 Lock - NO
2 Lock - Common
3 Lock - NC
4 Alarm - NO
5 Alarm - Common
6 Alarm - NC

**TB10 - General Purpose Outputs**
1 GP1 Output - NO
2 GP1 Output - Common
3 GP1 Output - NC
4 GP2 Output - NO
5 GP2 Output - Common
6 GP2 Output - NC

**TB2 - 12 VDC Power**
1 +12 VDC
2 Negative (Ground)
3 Earth Ground

**TB12 - RS232 Serial Port**
1 TxD
2 RxD
3 n/a
4 RTS (for modem only)
5 DTR (for modem only)
6 Ground

**TB1 - RS-485 Network**
1 TX/RX -
2 TX/RX +
3 Network Cable Shield

Figure 2: The Titanium Telephone Entry Controller

*NOTE: You must power down the unit before attempting to make or remove any connections. Failure to do so will damage the controller.*

# 1.0    Specifications

**Unit Dimensions (nominal)**
- 12.09 inches high by 5.60 inches wide by 3.10 inches deep, including hinges
- (30.71 cm by 14.22 cm by 7.87 cm)

**Operating Temperature/Humidity Range**
- -20°F to 140°F (-29°C to 60°C)
- 0% to 90% Relative Humidity, non-condensing

**Controller Power Requirements**
- 12 VDC @ 1 A

**Current Draw**
- maximum current draw 750 mA for a controller

*NOTE: If an electronic locking device (such as a magnetic lock, a door strike, or similar device) is to be driven by the same power supply as the EntraGuard Titanium controller, please ensure the power supply provides enough current to drive every device connected to that supply plus an adequate safety margin. AC power cannot be used.*

*NOTE: Isolation of power supplies may be required with high transient situations.*

**Controller Memory Retention**
- 5 year lithium battery back up to support controller RAM and real-time clock

**Output Relay Contact Rating**
- 1 Amp @ 24 VDC

**Input Device Configuration - 3 Inputs**
- Door Sense                    normally closed
- Request to Exit               normally open
- Global Unlock                 normally open (on master only), or
  Auxiliary RTE A-Door          normally open

**Users Allowed**
- 750 tenants maximum

**Event Storage Capacity**
- 3,640 events

## 2.0    Cable Requirements

**RS-232 Serial Cable**
- three conductor, shielded, stranded, AWG 24 wire (Belden 9533 or a larger gauge)
- 50 foot maximum length (per RS-232 industry specification - greater lengths are not recommended)

**RS-485 Network Cable**
- one twisted, shielded pair of conductors, stranded, AWG 24 wire (Belden 9501 or a larger gauge)
- 4,000 foot total network length (per RS-485 industry specification)
- extended network configurations are possible – refer to the Network Wiring Application Note (P/N 01824-002) for extended network configurations of up to 5,000 feet per star line and 16,000 feet total network length

**Telephone**
- 1 pair copper phone line

*NOTE: EntraGuard Titanium is not to be used with a Centrex, PBX, or digital phone line. Only use a Plain Old Telephone Service (POTS) analog phone line.*

**Input Power**
- two conductor, stranded, AWG 18 wire (Belden 8461 or a larger gauge)

*NOTE: On long power cable runs, the cable resistance causes a drop in voltage at the end of the cable run. Be sure your power supply does provide 12 VDC at the end of the cable run.*

**Earth Ground**
- Single conductor, AWG 18 wire (or a larger gauge)[1]

**Input and Output Connections**
- two conductor, stranded, AWG 22 (or a larger gauge)

*NOTE: The Lock Output relay may require a heavier gauge of wire depending upon the current demands of the lock and the length of the lock wiring run.*

*NOTE: If plenum cable is required, please reference the Belden plenum equivalent to the cables listed above.*

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1. Ground wire is green, with or without yellow tracer.

## 3.0    When Installing Controllers

**DO**
- since this is a telephone entry system at least one phone line will be necessary, it is important to plan ahead to meet power and telephone requirements for your system (if using a modem, the host computer will need 1 phone line, plus one for each master controller in each network or each EntraGuard unit)
- mount controllers in environmentally suitable areas - the EntraGuard Titanium unit is weather resistant, but care should be taken to avoid areas of weather/temperature/humidity extremes
- mount the controller at least 3 feet away from the controller's power supply to prevent EMI radiated from the power supply from affecting the controller
- use the enclosure as a mounting template to mark drilling holes for permanent mounting
- note the locations of the knockouts in the enclosures and remove the appropriate knockout for the easiest cable routing into the controller
- route all controllers in a network in a single, continuous daisy-chain (with the EntraGuard Titanium controller as the master)
- route cables in accessible areas for ease of maintenance
- connect all controllers to a quality earth ground[1]
- add transient suppression across electric devices attached to a controller output
- use an isolation relay (P/N IRP-1) if attaching to a parking gate, a turnstile, or any application using a large electric motor
- verify the controller's supply voltage is 12 VDC – long power line runs cause a drop in voltage at the end of the run
- verify proper operation of the host computer's COM port or Ethernet/LAN WAN connection.

**DO NOT**
- make modem phone line connections through PBX telephone switching systems - most modems are not compatible with PBX systems leading to disconnection problems with the modem
- locate the EntraGuard Titanium controller near EMI sources - EMI sources can affect the performance of the controller
- use switching power supplies - they are EMI sources
- route network cables beside power cables - transients on the power cables may be picked-up by network and reader cables
- stretch or over-tension cables
- route over sharp objects
- let the wires get tangled
- route the EntraGuard Titanium controller as a slave to a PXL-250 master
- route all controllers in a network in spur, hub, or loop configurations
- connect earth ground[1] to the network cable shield - the EntraGuard Titanium automatically connects earth ground to the shield at one point on the network to prevent ground loops
- use gender changer plugs when making RS-232 serial communication connections (unless you know it is a "straight-through" plug) - gender changers may have internal wiring changes that can disrupt communications

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1. Ground wire is green, with or without yellow tracer.

# 4.0 Wiring Instructions

Refer to Figure 2 on page 2 for all wiring connections.

## 4.1 Terminal Blocks

Strip away 1/4 inch of insulation and place the wire in the appropriate slot.

1/4 "
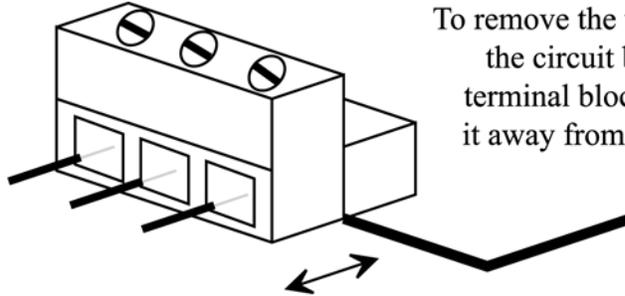
To remove the terminal block from the circuit board, grasp the terminal block and gently pull it away from the circuit board.

**Figure 3: Connecting Wires and Removing Terminal Blocks**

*NOTE: Screws on terminal blocks must be tightened securely.*

## 4.2 Connecting the Earth Ground and the 12 VDC Power

12 VDC + Power -

+12 VDC to Pin 1 on TB-2

Ground to Pin 2 on TB-2

This must be a **nonswitching** Power Supply

Earth Ground to Pin 3 on TB-2 (ground wire is green with or without yellow tracer)

TB-2
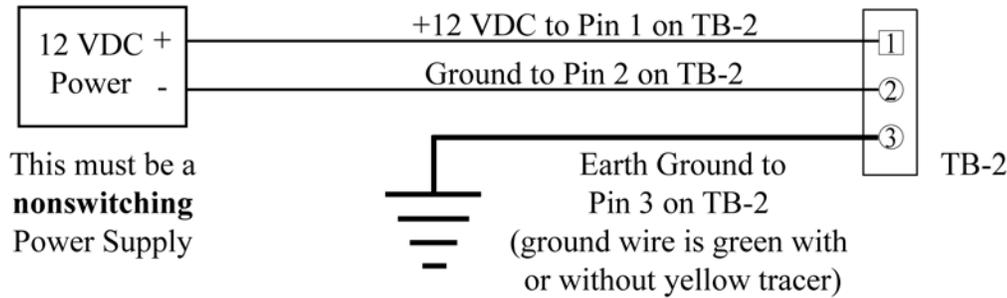
**Figure 4: Earth Ground and 12 VDC Power Connections**

## 4.3    Connecting a Door Status Input

Each EntraGuard Titanium controller is shipped with an installation kit including all necessary terminal blocks and transorbs. One of these terminal blocks has a jumper across pins 1 and 2. This terminal block is designated for use on TB-4. If a door switch is not used on the controller, this jumper prevents a continuous door open status alarm from being received by the controller. If a door switch is used, simply remove this jumper and install the door switch leads.

Open Door to Open Circuit and Activate Door Switch Input

Signal to Pin 1 on TB-4

Ground/Common to Pin 2 on TB-4

① Signal
② Ground/Common
③
④
⑤
⑥ TB-4

Normally Closed Input Device
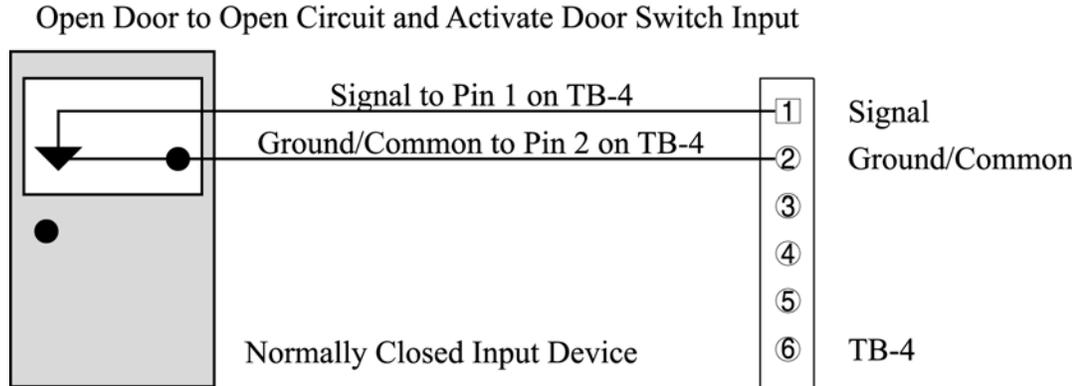
**Figure 5: Door Status Input Connections**

## 4.4    Connecting a Request to Exit (RTE) Input

Press Button to Close Circuit and
    Activate RTE A-Door Input

Ground/Common to Pin 2 on TB-4

Signal to Pin 3 on TB-4

① TB-4
② Ground/Common
③ Signal
④
⑤
⑥

Normally Open Input Device
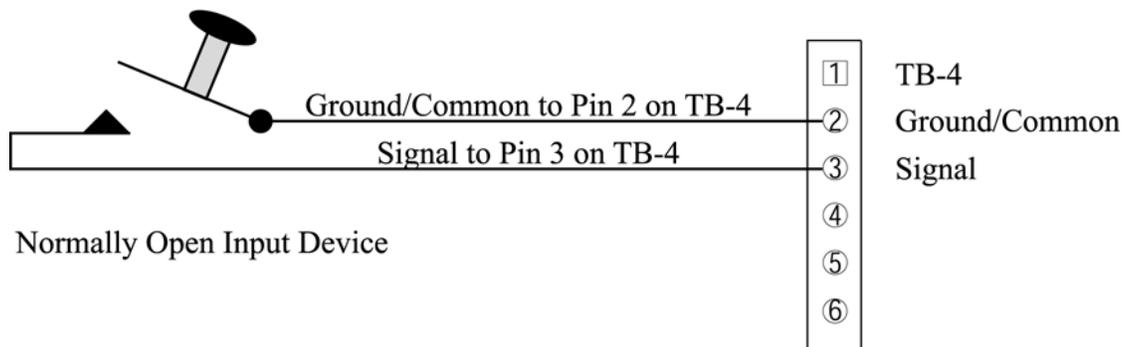
**Figure 6: Request to Exit Input Connections**

## 4.5      Connecting a General Purpose Input

The general-purpose input is used in conjunction with the programmable input/output feature of the *Doors* access control software. There are two possible uses for the general-purpose input.

- the master controller may be configured for either Global Unlock (see Figure 7) or Auxiliary A-door RTE (see Figure 8)
- the slave unit can only be configured for Auxiliary A-door RTE (see Figure 8)

**Make the following connections for a Global Unlock input. (For a master controller only.)**
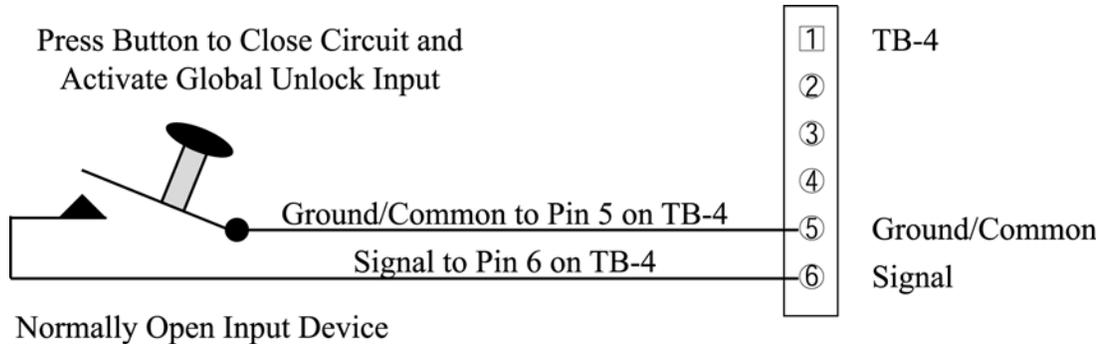


**Figure 7: Global Unlock Input Connections**

**Make the following connections for an Auxiliary RTE A-door input.**
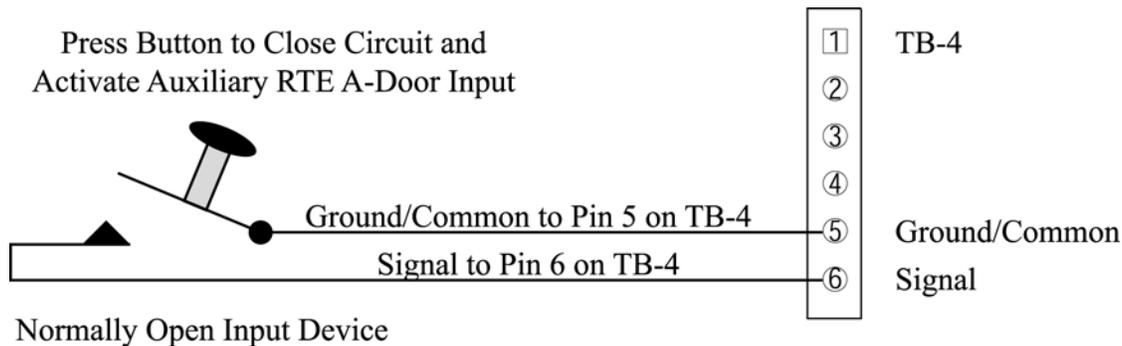


**Figure 8: Auxiliary A-Door RTE Input Connections**

## 4.6    Connecting an Alarm Output Relay
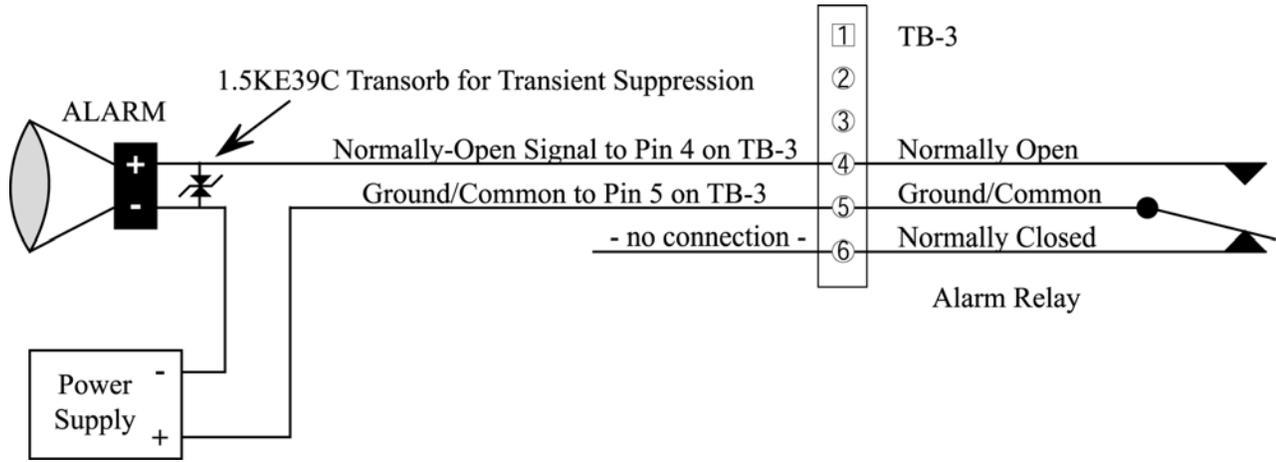


**Figure 9: Alarm Output Relay Connections**

## 4.7    Connecting a Fail-Safe Lock Output Relay
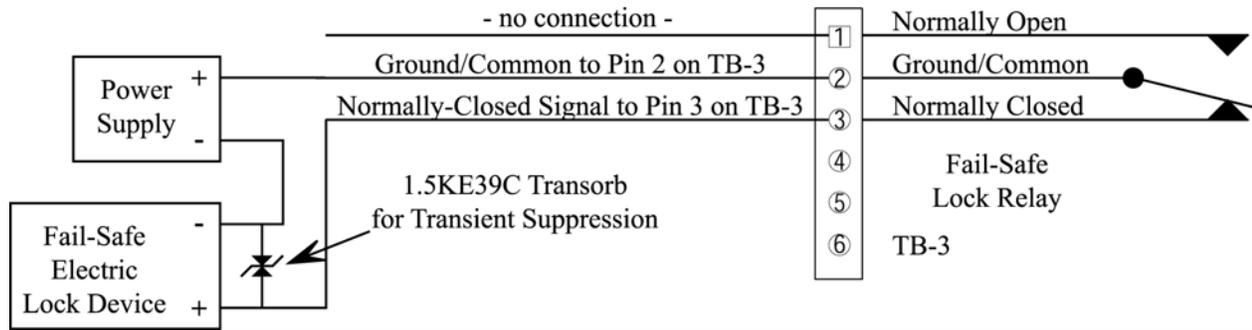


**Figure 10: Fail-Safe Lock Output Relay Connections**

## 4.8 Connecting a Fail-Secure Lock Output Relay
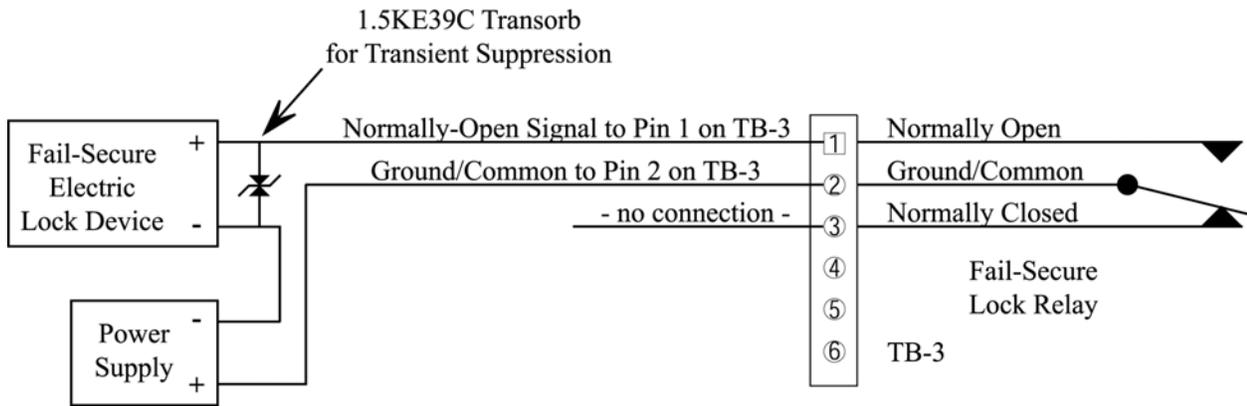


**Figure 11: Fail-Secure Lock Output Relay Connections**

# 5.0    Communication

The communication section handles three different, but related, topics:

- Communication between EntraGuard Titanium controller and tenants
- Communication between the master EntraGuard Titanium controller and the host computer for programming
- Communication between networked EntraGuard Titanium/PXL-500/510 controllers

*NOTE: Keri Systems recommends performing a bench test on each unit prior to installation to rule out any phone line problems.*

## 5.1    Between EntraGuard Titanium Unit and Tenants

The telephone communication is done via a copper phone line to TB-15. Connect the TIP line to either Pin 1 or Pin 2 then connect the Ring line to the other Pin (see Figure 12).
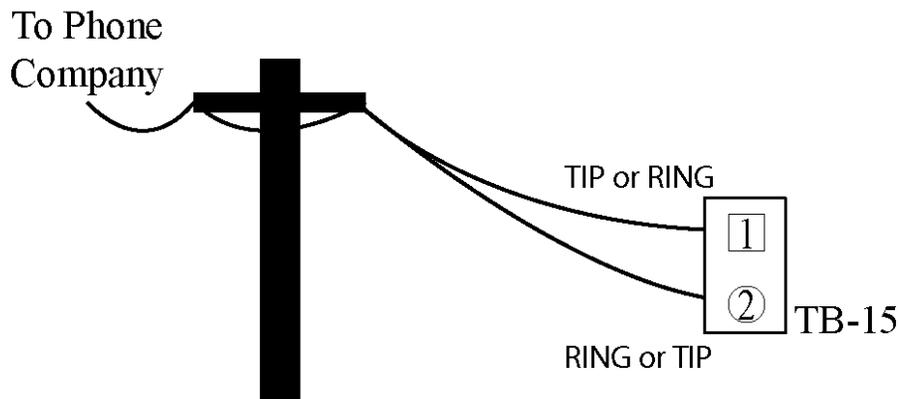


**Figure 12: TB-15 Phone Line Wiring Connection**

There are three ways of connecting the phone line for communication between the EntraGuard Titanium unit and the tenants.

### 5.1.1    Single Phone Line for a Single EntraGuard Titanium Unit

For a single EntraGuard Titanium unit, connect the phone line to TB-15 on the EntraGuard Titanium board (see Figure 2 on page 2).

### 5.1.2    Individual Phone Lines for each EntraGuard Titanium Unit on a Network

The set up for individual phone lines for each EntraGuard unit is the same as for a single phone line for a single EntraGuard Titanium controller. Each phone line is connected to TB-15 on each EntraGuard Titanium board.

### 5.1.3    Shared Phone Line for Multiple EntraGuard Titanium Units on a Network

A single phone line may be shared for communication between multiple EntraGuard Titanium units and tenants. The phone line is plugged into TB-15 on the master EntraGuard Titanium unit with the phone line then going out of the TB-15 phone plug to the next unit's TB-15 and so on to all the networked EntraGuard units (see Figure 13 on page 12).

*NOTE: Sharing a phone line for multiple EntraGuard units is limited to a maximum of 6 units per phone line.*

**Telephone Line**

**Networked Slave EntraGuard Controller**
TB-15

**Networked Slave EntraGuard Controller**
TB-15

**All connections to Terminal 1 are TIP and All connections to Terminal 2 are RING**

**OR**

**All connections to Terminal 1 are RING and All connections to Terminal 2 are TIP**

**Networked Slave EntraGuard Controller**
TB-15

**Networked Slave EntraGuard Controller**
TB-15

**Continue for all Controllers (to a maximum of 6)**
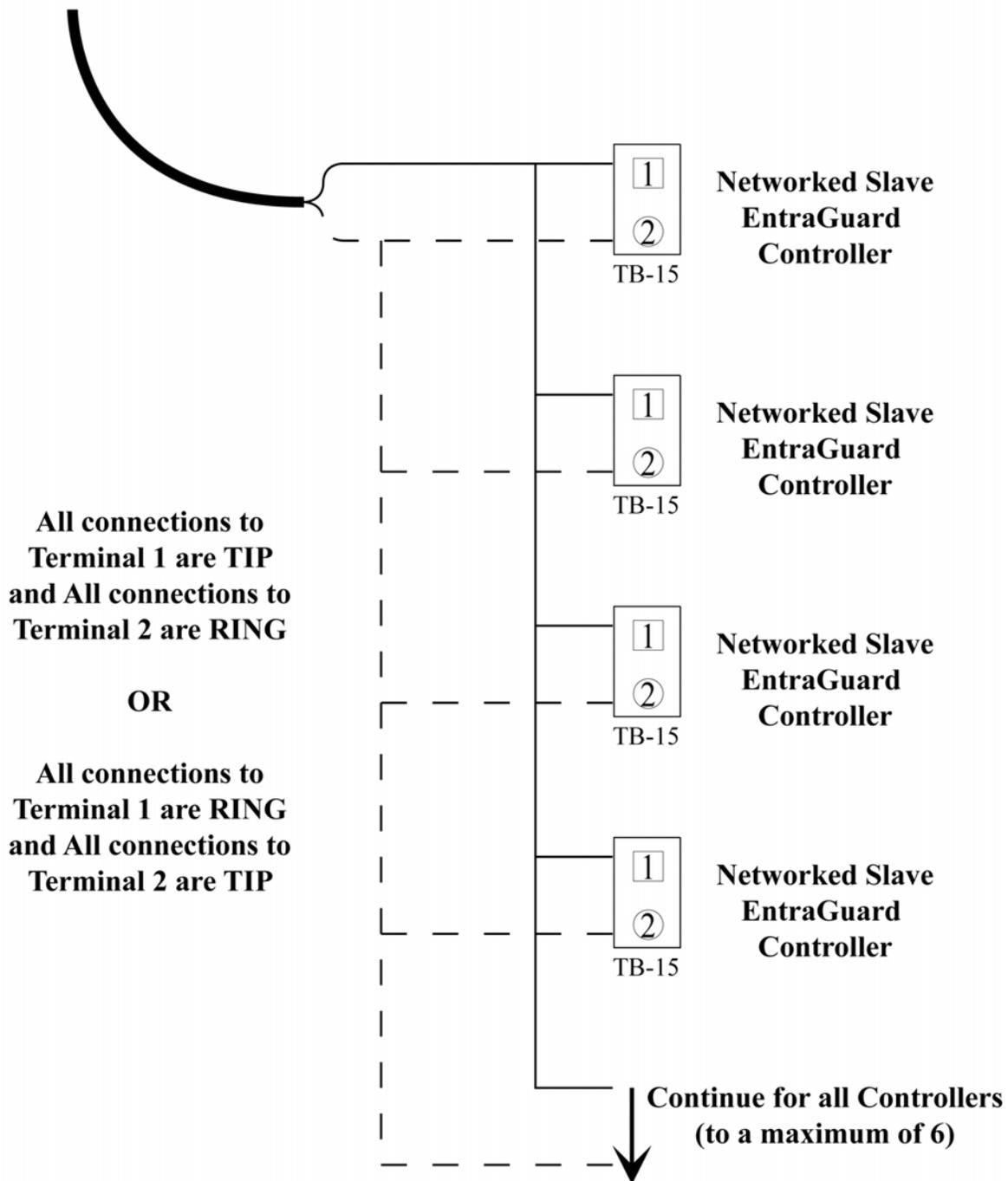
**Figure 13: Single Phone Line for a Multiple EntraGuard Titanium Unit Network**

## 5.2    Between EntraGuard Network and Host Computer

A communication link between the EntraGuard network and the host computer is provided via one of two ways.

- using the phone line connected to TB-15
- using the RS-232 serial port

*NOTE: In order for monitor mode to work, the RS-232 serial port method must be used (see Section 5.2.2 on page 14).*

### 5.2.1    Phone line (Internal Modem)

The EntraGuard Titanium controller's internal modem may be used for communication between the master controller and an external modem[1] connected to the host computer. To use the EntraGuard's internal modem, attach the phone line to TB-15 located on the master controller's board (see Figure 2 on page 2).

*NOTE: If you are using two separate phone lines, one for communication with the tenants and one for programming, you will not be able to use the internal modem for programming and must use an external modem connected to the RS-232 as described in Section 5.2.2.2 on page 16.*

Once the phone line has been attached, the J11 jumper must be set for proper operation. When using TB-15 phone line connection for communication with the host computer, place the jumper on the INT_MODEM jumper (see J11 on Figure 2 on page 2).

The *Doors* software must also be configured for using the internal modem. In the *Doors* software, click on the button, then select the **Network Config** tab. In the "Modem Init String" field type in **AT&K0**[2] (see Figure 14). Click on the button.
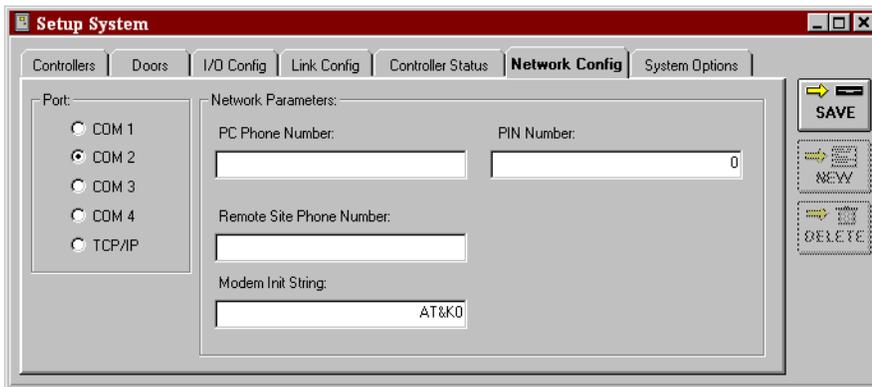


**Figure 14: Modem Init String Set**

*NOTE: For wiring of an external modem to the host computer, see Section 5.2.3 on page 18.*

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1. You must use a Keri Systems modem for proper communication.
2. Although it is not necessary to enter this code with every type of modem, Keri Systems recommends you enter it in all situations for proper communication between the master controller and the host computer.

### 5.2.2    RS-232 Serial Port

Using the RS-232 serial port for communication between the EntraGuard unit and the host computer may be done one of two ways:

- by direct connect
- through an external modem.

For either of these options, the INT_MODEM J11 jumper should not have a jumper across it. Verify there is no jumper set across J11 (see Figure 2 on page 2) when using the RS-232 serial port for communication.

*NOTE: Do not use male/female gender changer plugs or 25-pin to 9-pin adapters when making RS-232 serial port connections. These devices may have internal wiring changes that can disrupt communications when implemented in conjunction with the Keri Systems serial wiring instructions. If you must use a gender changer plug, ensure it is a "straight-through" plug.*

*NOTE: When using 56K modems to communicate with remote access control networks, all modems must use the same communication format - either X2 or Flex. Incompatibilities between the two formats make some modems of one format incapable of reliable communication with modems of the competing format. Modems using the V.90 specification are compatible regardless of whether they are from an X2 or Flex manufacturer.*

### 5.2.2.1    Direct Serial Connection – Controller to PC

To make the connection between the EntraGuard master controller and the host computer you will use one cable.

- If the host computer has a male DB-9 connector on the serial port, you must use a Keri Systems KDP-252 cable or create a cable according to the drawing in Figure 15.
- If the host computer has a male DB-25 connector on the serial port, you must use a Keri Systems KDP-251 cable or create a cable according to the drawing in Figure 16 on page 15.

The Keri Systems part number for this cable is KDP-252.
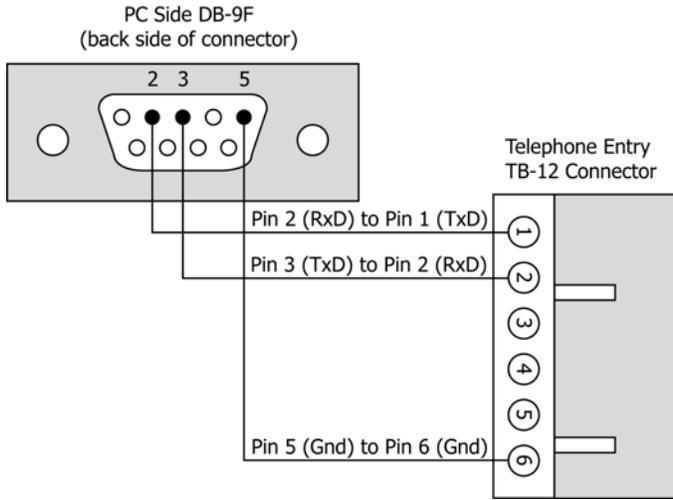


**Figure 15: PC/DB-9F to Telephone Entry/TB-12 RS-232 Direct Serial Connections**

The Keri Systems part number for this cable is KDP-251.
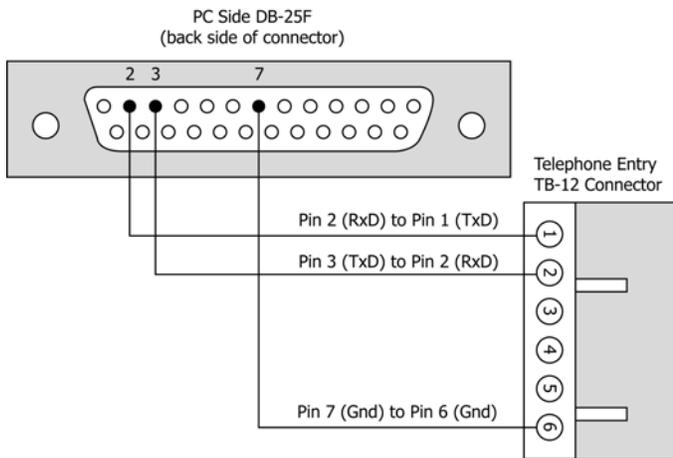


**Figure 16: PC/DB-25F to Telephone Entry/TB-12 RS-232 Direct Serial Connections**

### 5.2.2.2    Modem to Controller

To make the connection between the master controller and the host computer you will use two cables: one between the host computer and its modem (see Section 5.2.3 on page 18), and one between the master controller and its modem.

- If the modem has a female DB-25 connector, you must use a Keri Systems KDP-336 cable or create a cable as shown in Figure 17.
- If the modem has a female DB-9 connector, you must create a cable as shown in Figure 18.
- If the modem was purchased from Keri Systems, it comes with an adapter that accommodates a female DB-9 connector (should the modem have a DB-9 instead of a DB-25 connector). Use this adapter cable in conjunction with a KDP-336 cable to make the modem/controller connection. See Figure 19 on page 17.

The Keri Systems part number for this cable is KDP-336.
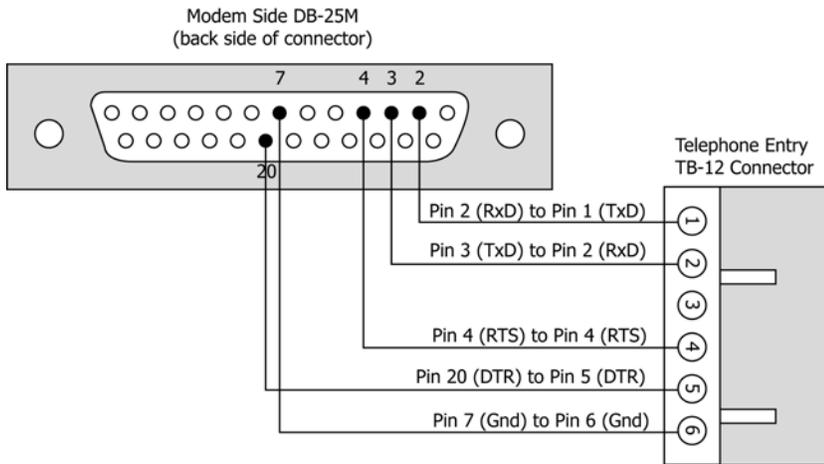


**Figure 17: Modem/DB-25M to Telephone Entry/TB-12 Serial Port Connections**

The Keri Systems part number for this cable is KDP-929M.
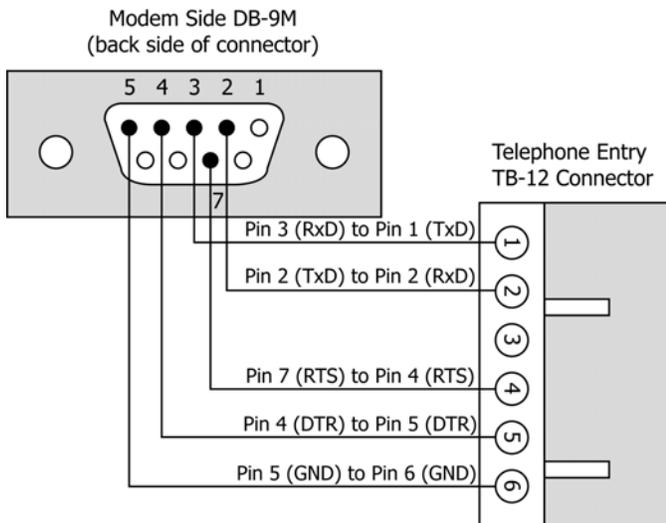


**Figure 18: Modem/DB-9M to Telephone Entry/TB-12 Serial Port Connection**

### 5.2.2.3    Modem Cable Connection

- An adapter cable is provided, when needed, with a modem purchased from Keri Systems. Connect the adapter cable between the modem and the KDP-336 cable as shown in side A of Figure 19.
- To use the KDP-929M cable see side B of Figure 19.
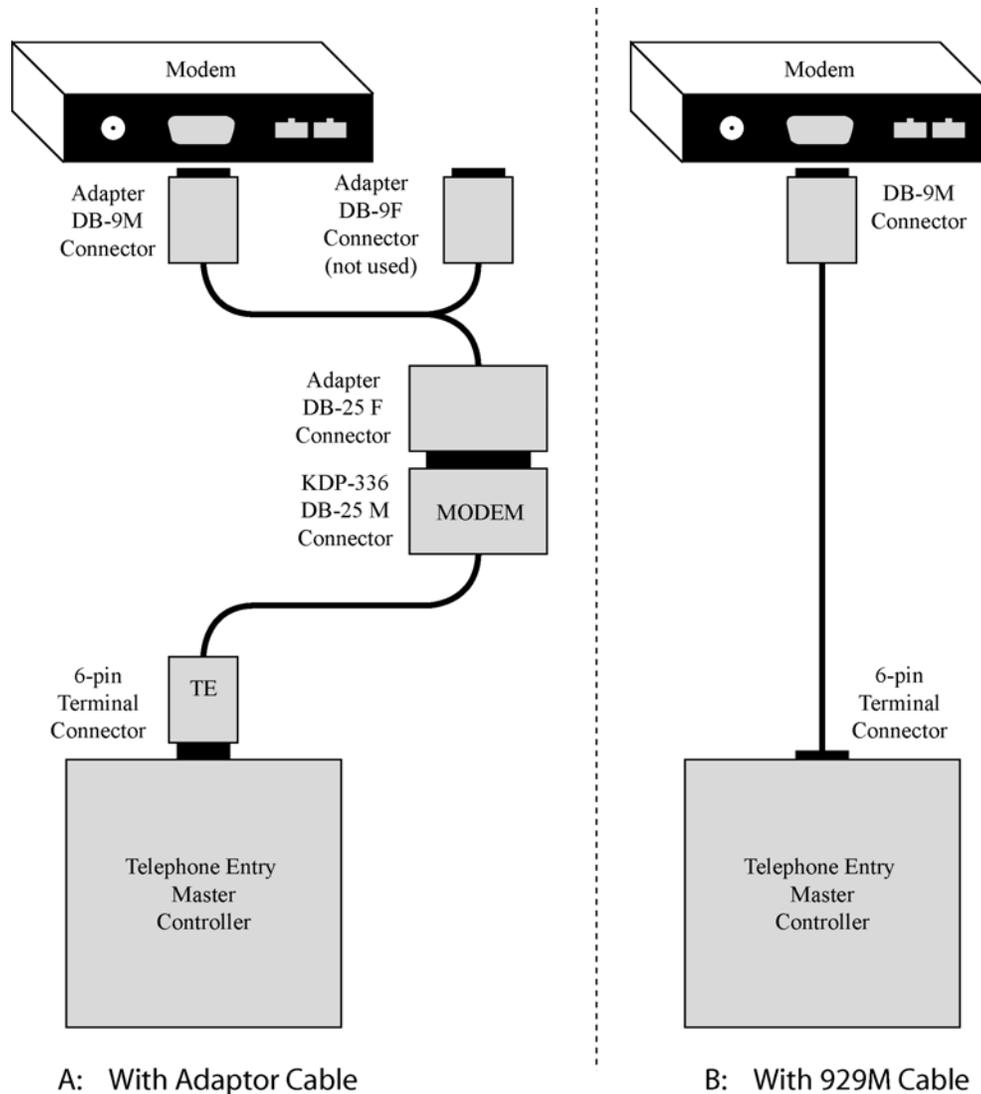


**Figure 19: Modem Cable Connection**

### 5.2.3    Modem to PC Serial Connection

Keri Systems does not provide this cable. It is an off-the-shelf item from any computer supplier or electronics store, and its configuration is dependent upon the configuration of the serial port on the host computer. Based on the serial port, there are four possible cables.

- If the modem has a male DB-25 connector and the host computer's serial port has a female DB-9 connector, purchase or create a cable as shown in Figure 20.
- If the modem has a male DB-25 connector and the host computer's serial port has a female DB-25 connector, purchase or create a cable as shown in Figure 21.
- If the modem has a male DB-9 connector and the host computer's serial port has a female DB-9 connector, purchase or create a cable as shown in Figure 22 on page 19.
- If the modem has a male DB-9 connector and the host computer's serial port has a female DB-25 connector, purchase or create a cable as shown in Figure 23 on page 19.

*NOTE: Keri Systems requires using modems from the same manufacturer at both the host computer and the access control network. This eliminates the possibility of incompatibilities between modems from two different manufacturers from affecting the communication between access control network and host computer. Keri Systems cannot be held responsible for problems caused by incompatibilities between modems from two different manufacturers.*
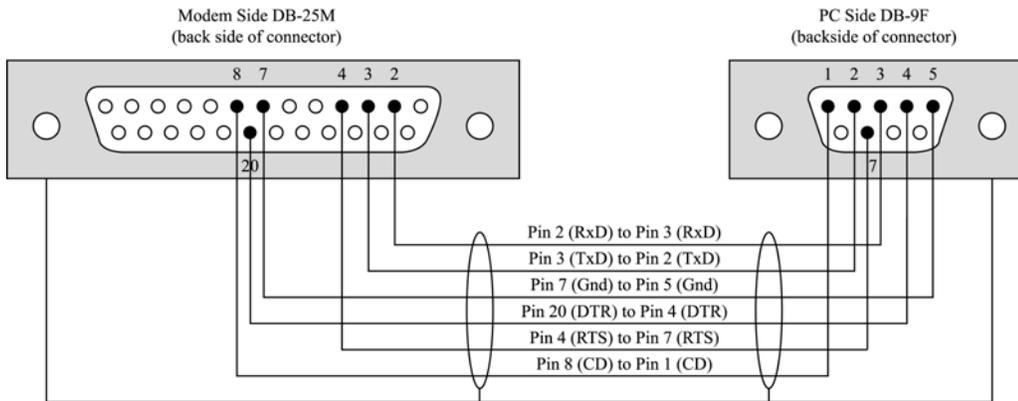


**Figure 20: Modem/DB-25M to PC/DB-9F PC Serial COM Port Connection**
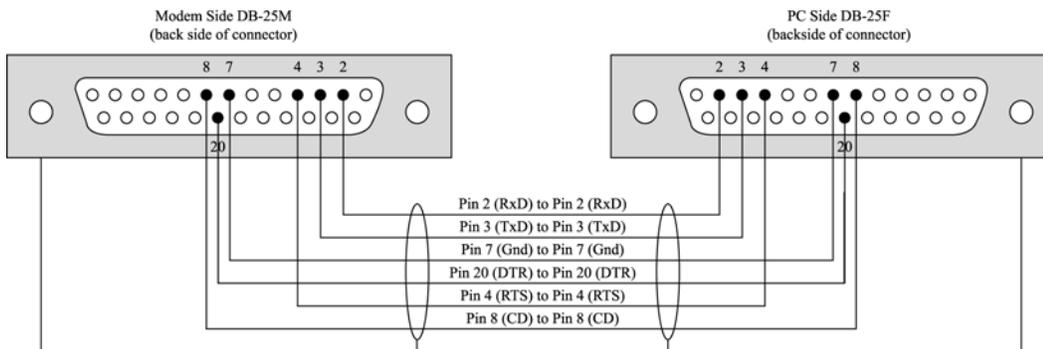


**Figure 21: Modem/DB-25M to PC/DB-25F PC Serial COM Port Connection**

**Figure 22: Modem/DB-9M to PC/DB-9F PC Serial COM Port Connection**
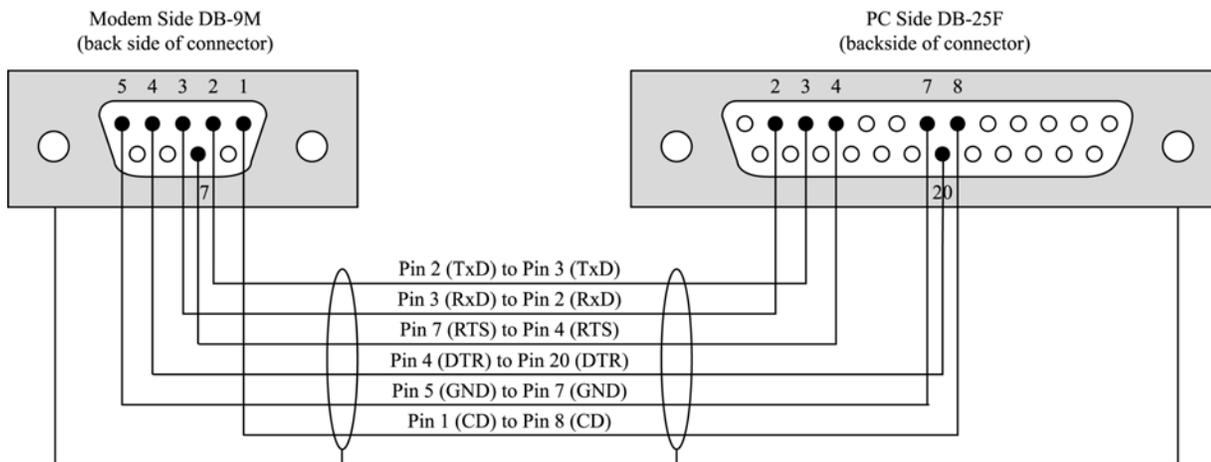


**Figure 23: Modem/DB-9M to PC/DB-25F PC Serial COM Port Connection**

# EntraGuard® Titanium Telephone Entry Controller
## Quick Start Guide

## 5.3    Network Communication

### 5.3.1    RS-485 Access Control Network Connection

The following figure shows how to connect more than one controller to the access control network.
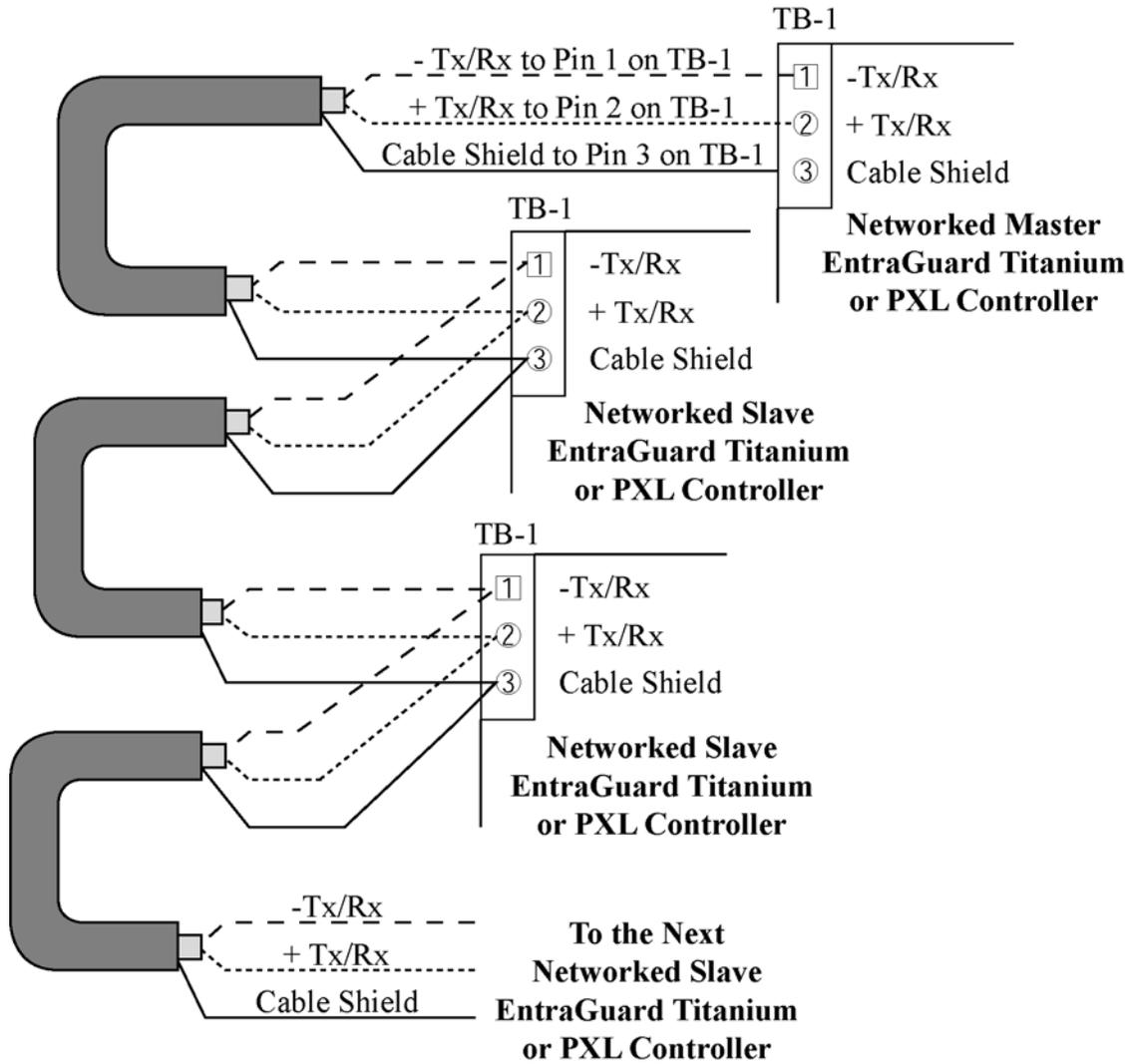


**Figure 24: RS-485 Network Connections**

# 6.0    Powering the Controller for the First Time

*NOTE: Verify the earth ground has been connected at pin 3 of TB-2 before turning the power on for the first time.*

## 6.1    Verify the 12 VDC Supply Voltage

To verify the 12 VDC supply voltage:

1.    Turn system power on.
2.    Set the DVM to a DC volt scale capable of reading 12 VDC.
3.    Place the Red DVM lead on Pin 1 of TB-2.
4.    Place the Black DVM lead on Pin 2 of TB-2.
5.    Check the DVM reading. It should read +12 VDC +/- 2 volts.

If the DVM does not read 12 VDC (+/- 1.5 V), verify the power supply is of the correct voltage, verify the cable length does not exceed 200 feet, and verify the cable gauge is AWG 18.

*NOTE: On long power cable runs, keep in mind the resistance in the cable itself causes a drop in voltage at the end of the run. The power supply must be able to account for this voltage drop.*

# 7.0    Setup Controller

If you're turning system power on for the first time, certain tasks must be performed prior to entering access control information from *Doors*. On the EntraGuard Titanium main board (see Figure 2 on page 2), hold the Reset Button (SW1) down and turn the controller's power on. After the controller beeps once, indicating the controller's firmware is ready for programming, release the SW1 button. The LCD on the front panel will display the Reset Menu (see Figure 25). From this menu you may perform different tasks such as set the controller's address, clear the controller's memory, set the microphone gain, and check diagnostics.

```
SET UNIT ADDRESS       1
CLEAR MEMORY           2
SET MICROPHONE VOL  3
DIGNOSTICS             4
```
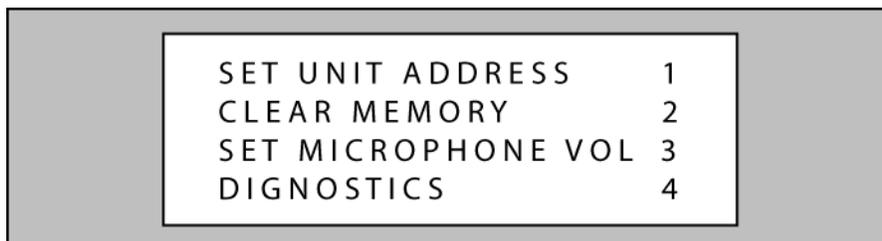
**Figure 25: Reset Menu**

*NOTE: If no keys have been selected within 60 seconds, the unit will time out and go directly to the default message. In order to reach the Reset Menu, the unit must be powered up again.*

# EntraGuard® Titanium Telephone Entry Controller
## Quick Start Guide

## 7.1    Set Unit Address

The controller's address may only be set through the Reset Menu. Once you have performed the necessary steps to reach the Reset Menu as described above, if the EntraGuard Titanium unit has an alpha/numeric keypad, the keypad will default to the numeric keypad (if the alpha keypad is lit instead, press the #/A key to return to numeric mode). To set the desired operating address for the controller, press 1 on the keypad. The Set Panel Address screen appears on the LCD (see Figure 26).

```
SET NEW UNIT ADDRESS
CURRENT:             001
NEW (1-128):
CLR or  *  WHEN DONE
```
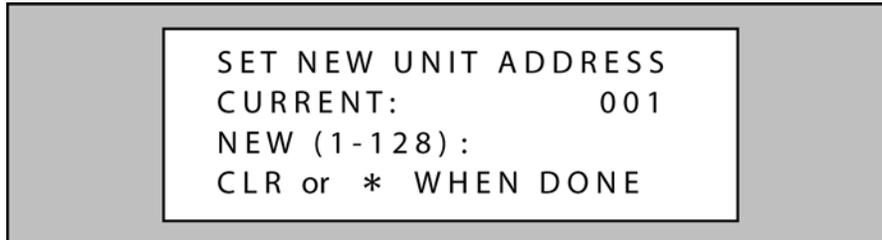
**Figure 26: Set Unit Address**

The address range is from 1 to 128. The Master Controller must be set to address 1. Other slave EntraGuard/PXL-500/510 controllers may be assigned any number from 2 to 128. If the network is made up of PXL-250s, the EntraGuard Titanium must be set as the Master.

If the address shown as Current is correct, you may either enter the same address and press *, or just press * to return to the reset menu. If you do not enter a new address, or enter the same address that is already assigned to this unit, you will need to clear the memory separately (see "Clear the Controller's RAM" on page 24).

*NOTE: Changing the address of an EntraGuard Titanium controller completely erases all information within the controller. It is vitally important that you collect all data from the controller before changing the address. Once the address is changed (and the RAM is automatically cleared) the information in the controller is lost and cannot be recovered.*

If the address shown as Current needs to be changed, enter the new address by pressing the numbers on the keypad. The number selected will show in the New line. If you enter the wrong number, simply press CLEAR to erase what has been entered. When you are satisfied with the address entered, press *. If you have changed the number from what is shown as Current, the controller will automatically clear the memory as it changes the address (see Figure 27).

```
CLEARING MEMORY
```

**Figure 27: Clearing Memory**

Once the memory has been cleared, the unit is ready to be configured. The LCD will display a warning that the unit has not been initialized (see Figure 28 on page 23). This display will rotate with the EntraGuard Default display (see Figure 29 on page 23) until a Total Update from *Doors* has been performed on the unit. Once an update has been performed, only the default will be displayed.
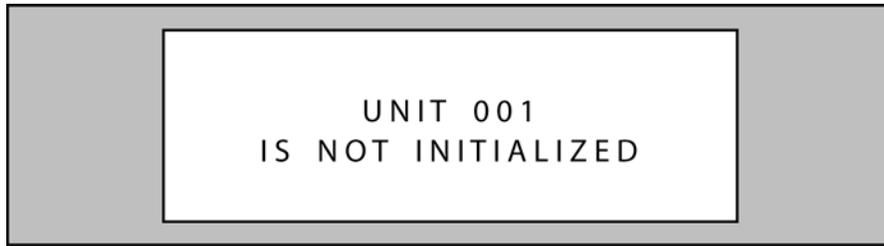
**Figure 28: Not Initialized Unit Warning**

*NOTE: Any time the "Not Initialized Unit Warning" appears on the LCD display, the unit needs a Doors update.*



**Figure 29: EntraGuard Titanium Default LCD Display**

*NOTE: The default display will remain until a message banner has been created (for instructions on how to create a message banner see the <u>Doors Users Guide</u> - P/N 01914-100). Doors treats the Entraguard Gold and Entraguard Titanium the same, so this message will show the EntraGuard Gold banner in an Entraguard Titanium unit.*

### 7.1.1 The Master Controller[1]

The Master Controller must be set to address 1 so that all slave controllers on the access control network can identify the master controller. For the Master Controller to correctly identify all slave controllers on the network, one of two things must be done.

1. The master controller must be the last unit on the network to be powered on. This ensures that when the Master Controller begins polling the network to see what slave units are connected for system configuration, all slave units are ready to communicate their unique addresses and their configuration information.

2. The Auto-Configuration routine within the *Doors* program must be run. This instructs the Master Controller to poll all controllers on the network for addresses and configuration information.

*NOTE: An auto-configuration must be performed any time changes are made to the 485 network.*

---

1. The EntraGuard Titanium Controller **must** be installed as the Master Controller **only** in a mixed EntraGuard/ PXL-250 network.

# EntraGuard® Titanium Telephone Entry Controller
## Quick Start Guide

## 7.2 Clear the Controller's RAM

When turning system power on for the first time, the controller's memory needs to be cleared of any spurious information that may be in the RAM. If you changed the controller address, the memory is automatically cleared. However, if you did not change the address, you will need to clear the controller's RAM separately. From the Reset Menu (see Figure 25 on page 21), press 2 to Clear Memory. The Clear Memory screen will appear on the LCD (see Figure 30).

```
ERASE ALL USER DATA?
    PRESS 1 for YES
    PRESS 2 for NO
```
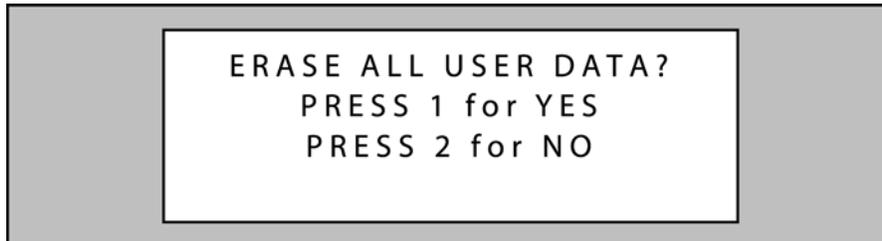
**Figure 30: Clear Memory**

From the Clear Memory Screen you may either:

1. Press 1 to clear the controller's RAM. The LCD will change to show the memory is being cleared (see Figure 27 on page 22). Once the controller's RAM has been cleared, the unit is ready for use. The LCD will rotate between the Initialization Warning and EntraGuard Default screens (see Figure 28 on page 23 and Figure 29 on page 23) until a Total Update from *Doors* has been performed on the unit.

or

2. Press 2 to return to the Reset Menu without clearing the controller's RAM.

*NOTE: Clearing the system RAM completely erases all information within the EntraGuard Titanium controller, except for the controller address. If there is any information in system RAM from an access control installation and the system RAM is cleared, the information in the controller is lost and cannot be recovered.*

## 7.3 Set Microphone Volume

When turning system power on for the first time, the microphone volume should be left as it has been set in the factory. However, if the microphone volume needs to be changed, see the "Set Microphone Volume" section in the EntraGuard Troubleshooting and Diagnostics Guide (P/N 01912-001).

## 7.4 Diagnostics and Troubleshooting

For information regarding the diagnostics screens and troubleshooting the EntraGuard Titanium Controller, see the EntraGuard Troubleshooting and Diagnostics Guide (P/N 01912-001).

# 8.0     General Information on Inputs

A controller input detects a state change generated by a device outside the controller that may prompt a response from the controller. Input devices that generate a state change may be normally closed or normally open. This section provides a brief description of normally closed versus normally open inputs.

## 8.1     Normally-Closed

A normally closed input device continually keeps a circuit active or complete. A state change is generated when the normally closed input device is forced open, breaking the circuit. In an access control system, a door switch is a typical example of a normally closed device. While the door remains closed, the switch remains closed. When someone opens the door, the door switch is opened, breaking the circuit and generating a state change. The controller then responds to the state change and generates an output (such as sounding an alarm if the door is a secure door).

## 8.2     Normally-Open

A normally open input device continually leaves a circuit open, or incomplete. A state change is generated when the normally open input device is forced closed, completing the circuit. In an access control system, a request-to-exit (RTE) button is a typical example of a normally open device. In an access control installation, an RTE button is located on the secure side of a door. While there is no one there pressing the button, the switch remains open. When someone desires to exit through a secure door, they press the RTE button, closing the circuit and generating a state change. The controller then responds to this state change and generates an output (such as unlocking the door to allow egress).

# 9.0     General Information on Safety versus Security with Door Locks

When installing a door lock there are two things to consider: safety versus security, or should the door be "fail-safe" or "fail-secure".

## 9.1     Fail-Safe Door Lock

Fail-safe means that if the power should fail at a door (perhaps due to a power outage or equipment failure), the door will automatically unlock allowing entrance or egress. Power is required to keep the door locked. A fail-safe door ensures people will be able to enter and exit a secured area through that door in the case of an emergency. A typical fail-safe application may use a magnetic lock. In this application, the controller energizes the lock relay, causing the lock relay to change its state. In its new state the normally closed circuit is opened breaking the power to the magnetic lock and allowing the door to be opened.

## 9.2     Fail-Secure Door Lock

Fail-secure means that if the power should fail at a door (perhaps due to a power outage or equipment failure), the door will automatically lock and not allow entrance but will continue to allow egress. Power is required to unlock the door. A fail-secure door ensures a secured area remains secure regardless of the situation. A typical fail-secure application may use a door strike. In this application, the controller energizes the lock relay, causing the lock relay to change its state. In its new state the normally open circuit is closed activating the release mechanism for the door strike on the door to be opened.

## 10.0    Contact Keri Systems

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