TOPAZ ACURT2 & ACURT4

Hardware Installation Guide

UTC Fire & Security

A United Technologies Company

Document number **460933001G** (December 2010).

Intended use Use this product only for the purpose it was designed for; refer to the data sheet and user documentation. For the latest product information, contact your local supplier or visit us online at www.utcfireandsecurity.com.

FCC compliance This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Modems The Part 68 rules require the following or the equivalent information be provided to the end user of equipment containing a pre-approved modem module.

Type of Service The TOPAZ System operates on a UTC Fire & Security ACURT field panel and is designed to use a standard device telephone lines. It connects to the telephone line by means of a standard jack called the USOC RJ-11C (or USOC FJ45S.) Connection to the telephone company provided coin service (central office implemented systems) is prohibited. Connection to party line services is subject to state tariffs.

Telephone Company Procedures The goal of the telephone company is to provide you with the best service it can. In order to do this, it may occasionally be necessary for them to make changes in their equipment, operations, or procedures. These changes might affect your service or the operation of your equipment, the telephone company will give notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning what equipment you have connected to your telephone line. Upon request from the telephone company, provide the FCC registration number and the ringer equivalence number (REN); both of these items are listed on the equipment label. The sum of all the RENs on your telephone line should be less than five in order to assure proper service from the telephone company. In some cases, five may not be usable on a given line.

If problems Arise

If any of your telephone equipment is not operating, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you in advance of this disconnection. If advanced notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC. Contact your telephone company if you have any questions about your phone line. In the event repairs are ever needed on the UTC Fire & Security ACURT field panel they should be performed by UTC Fire & Security technicians or an authorized representative.

Contact Us

Returning Procedure

Contact the distributor where the product was purchased for return policy and procedures.

Correspondence:

Correspondence should be sent to the following address:

UTC Fire & Security

9 Farm Springs Road,

Farmington, CT 06034-4065

Technical Support:

Phone: 888 437 3287

Fax: 561 998 6224

Email: rs-bctsupport@fs.utc.com

UL Standards

The following has been determined by Underwriters Laboratories to be compatible with the ACURT2/ ACURT4.

- UTC Fire & Security Remote Input Modules (RIM)
- UTC Fire & Security Remote Relay Modules (RRM)
- UTC Fire & Security Keypad (K11)
- HID ProxPro Model 5355 with and without keypad
- HID ProxPoint Model 6005
- HID MiniProx Model 5365
- HID MiniProx Model 5375
- UTC Fire & Security Magstripe Extender

Note: Any reader or keypads other than the ones listed are not to be used on a UL listed system.

UL/CUL Specifications

TOPAZ Software Revision 1.4.9

In order to comply with UL 1076 and/or UL 294 the following items must be adhered to, if not, the installation site will be in violation of the UL requirements.

- The ACU panel must be powered by an Altronix AL400UL3 Power Supply. This must be located in the same room as the panel and no more than 25 feet (7.82 m) from the unit. See *Figure 1*
- The DC input rating on the ACURT2/ACURT4 is +24 VDC +-4 V @ 750 ma maximum, with all outputs at maximum load.
- Combined Auxiliary Power rating for all four readers on the ACURT4 must not exceed a maximum of 900 ma.
- Only UL listed equipment may be connected to the UTC Fire & Security system. This includes external power supplies, motion detector, door contacts, enclosures, etc.
- All RRM and RIM modules must be installed in the room with panel and no more than 25 feet from the unit.
- The End-Of-Line resistor must be located within the alarm zone sensor enclosure.
- Shielded cables must be used for all communication and read head runs.
- The use of the dial up modem or any other network connection on the ACURT2/ACURT4 must not be used for UL-certified Installations.

All Receiving equipment must meet the following conditions:

The Central Supervising Station Equipment shall have the following minimum system configuration: 400 Mhz Pentium II with 512 KB Cache, 128 MB of RAM, 6 GB hard drive and 2 MB video memory, Windows 2000 or XP Professional. (This is the minimum system requirements. However, a 1.2 Ghz Pentium IV with 512 MB of RAM is recommended.) *Data processing equipment and office appliance and business equipment used as central supervisory station equipment shall comply with;*

The Standard for Office Appliance and Business Equipment, UL 114;
The Standard for Information-Processing and Business Equipment, UL 478; or
The Standard for Safety of Information Technology Equipment, UL 60950.

Line transient protection complying with the Standard for Transient Voltage Surge Suppressors, UL 1449, with a maximum marked rating of 330 V shall be used.

Signal line transient protection complying with the Standard for Protectors for Data Communications and Fire Alarm Circuits, UL 497B, with a maximum marked rating of 50 V shall be used.

Communication circuits and network components connected to the telecommunications network shall be protected by secondary protectors for communication circuits. These protectors shall comply with the Standard for Secondary Protectors For Communications Circuits, UL 497A. These protectors shall be used only in the protected side of the telecommunications network.

Equipment shall be installed in a temperature controlled environment. A temperature controlled environment is defined as one that can be maintained between 55º – 95º F (13º – 35º C) by the HVAC system. Twenty-four hours of standby power shall be provided for the HVAC system. The standby power system for the HVAC system may be supplied by an engine driven generator alone. A standby battery is not required to be used.

All receiving equipment shall be completely duplicated with provision for switchover to the backup system within 30 seconds. The backup system shall be fully operational within 6 minutes of the loss of the primary system. This allows 30 seconds for the backup system to be fully energized and connected to necessary communication lines and other devices, followed by 5-1/2 minutes for the system to boot up, conduct memory tests, file system check, security verifications and prepare for full system operation. The backup computer shall have the capabilities of the primary, such as memory, speed and the like.

Failure of the main computer system, hard disk, and alarm monitor shall result in switchover to the backup system and shall be indicated by an audible or obvious visual indication.

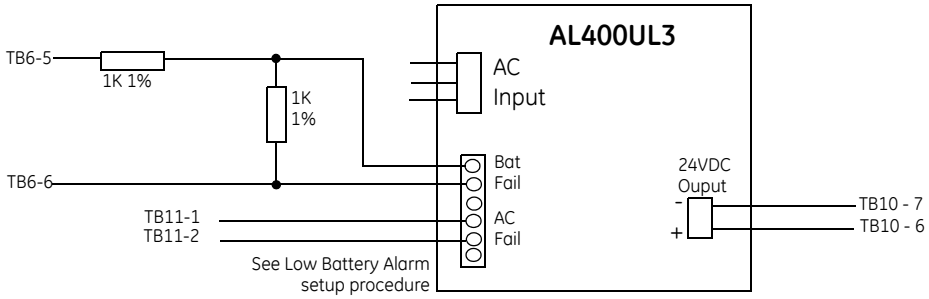
A fault tolerant system may be used in lieu of complete duplication of the system if every component in the fault tolerant system, including the software and the power supply, is duplicated.

In addition to the main power supply and secondary power supply that are required to be provided at the central supervisory station, the system shall be provided with an uninterruptible power supply (UPS) with sufficient capacity to operate the computer equipment for a minimum of 15 minutes. If more than 15 minutes is required for the secondary power supply to supply the UPS input power, the UPS shall be capable of providing input power for at least that amount of time.

The UPS shall comply with the Standard for Uninterruptible Power Supply Equipment, UL 1778, or the Standard for Fire Protective Signaling Devices, UL 1481.

In order to perform maintenance and repair service, a means for disconnecting the input to the UPS while maintaining continuity of power to the automation system shall be provided

Figure 1. Wiring Diagram for Altronix AL400UL3



For Canadian Certification installations, the model Brownsville or Easton 2 Computer must be used with this system and the installation must follow the Canadian Electrical Code, Part 1.

Low Battery Alarm Setup

1. From Topaz main screen go to **Hardware** then **Alarm Point** tab.
2. Click **Clear** then enter **Alarm Name**: *Low Battery Panel #.*
3. Select **Field Panel** (this procedure must be done for each ACURT panel.)
4. Select **Security Area**.
5. Select **Alarm Category**.
6. Select **Alarm Instruction**.
7. Select **Active**.
8. Select Input Number **22**.
9. Select Priority **5**.
10. Uncheck **User ACK Required** and **Alarm Can Be Masked**.
11. Set **Alarm Reporting Delay** to "0" and enter the **Description**.
12. Click **Save**.

NFPA Standard

National Fire Protection Association

1 Batterymarch Park
Quincy, MA 02169-7454
617-984-7000
www.nfpa.org
NFPA 70 Article 250, NEC

FOR YOUR SAFETY

The following **WARNINGS:** and **CAUTIONS:** appear here for your safety. They are general in nature and do not pertain to specific procedural steps. There are, however, additional safety precautions that do pertain to specific procedural steps. These precautions appear at the point in the installation and/or maintenance procedures where a hazard is most likely to be encountered.

BE SURE to read and follow all personal safety **WARNINGS** and equipment **CAUTIONS** appearing in this document PRIOR to beginning ACU installation.

WARNING: **The ACURT components described in this manual contain electrical shock hazard potential. Only qualified personnel should perform installation and maintenance. Use the appropriate procedures to remove power before proceeding with servicing.**

WARNING: **Do not use the ACURT Controller, Remote Input Module (RIM) or Remote Relay Module (RRM) to switch any voltage above 30 volts. Failure to heed this WARNING: can cause death, personal injury or damage to unit(s).**

WARNING: **Make certain that the AC power source circuit breaker is OFF BEFORE proceeding. Failure to heed this WARNING can cause damage to unit(s).**

CAUTION: The ACURT controllers must have separate conduit run to each enclosure. Only cables/wires that begin or terminate in the enclosure should run into the enclosure. DO NOT use the enclosure(s) as "pull-boxes" for any foreign wiring. The enclosures should be arranged for separate conduit runs.

NOTICE: Fire Safety Notice

WARNING: ***NEVER*** **connect any card reader devices or locks onto doors, gates or barriers that may be fire exits without first consulting and getting approval of applicable local officials. Use of push buttons to exit may be illegal. Single action exit may be required. Obtain proper permits and approvals in writing before installation.**

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Chapter 1 The TOPAZ ACURT

This chapter provides an overview and general information required for the installation of the TOPAZ ACURT2 and ACURT4. This will include system diagrams of each product.

In this chapter:

This section provides technical information on models ACURT2 and ACURT4. These intelligent networked devices provide access control, alarm monitoring and output control. The ACURT4 provides support for four (4) Wiegand output card readers and/or keypads, while the ACURT2 provides support for two (2) Wiegand output card readers and/or keypads. ACURT2 and ACURT4 models provide one (1) host serial port for connections to a server computer using either RS-485 or RS-232 communications and one (1) 10BaseT Ethernet port.

Each controller consists of a printed circuit board (PCB) assembly with optional battery backup. The processor is a 90 MHz Motorola 5307 Coldfire with 8 Mbytes of RAM memory. Additional program memory consists of 4 Mbytes FLASH ROM.

Communication to external devices is a polled serial protocol up to 4000 feet (1220 meters) for Remote Electronics Modules, such as inputs (RIM modules) or outputs (RRM modules).

Twelve (12) supervised inputs on the ACURT4 or six (6) supervised inputs on the ACURT2 are available for alarm monitoring. These supervised inputs are for exit push buttons and door contacts for the card readers, and for auxiliary monitor points.

Each model is also equipped with a low battery detection alarm and two (2) unsupervised alarms (AC power fail and cabinet tamper). Eight (8) Form-C relays are provided on the ACURT4 and four (4) for the ACURT2 for strike activation and/or remote control. All relay contacts are rated for 30 VDC at 2 amperes. DO NOT switch any voltages over 30 volts.

DIP Switches are used to set the device's communication baud rate and a rotary switch is used to set the device address. DIP Switches are also used to terminate alarm inputs and host communications ports.

General Specifications

Table 1. General Specifications ACURT2 and ACURT4 Networked Intelligent Controller

Characteristic	Specification
DIMENSIONS	
HEIGHT	16.25 in (41.28 cm)
WIDTH	16.375 in (41.59 cm)
DEPTH	4.125 in (10.48 cm)
WEIGHT	
WITH BATTERIES	19 lb. (8.6 kg)
WITHOUT BATTERIES	16 lb. (7.3 kg)
ENVIRONMENTAL	
MAXIMUM TEMPERATURE	+150°F (+65°C)
MINIMUM TEMPERATURE	+32°F (0°C)
HUMIDITY	0 to 95% Relative (non-condensing)
INPUT POWER VOLTAGE	24 VAC, 40 VA[1]
DC STANDBY BATTERY BACKUP	4-Hour Backup
Current Specification	
ACURT	
Main AC power	24 VAC, 40 VA, 1 amp Current Limited
Backup Battery	2@12 VDC, 4.0 amp/hr
Reader	Combined Max of 750ma
RRM	
Main Input	24 VDC@ .040 amp board
Relays	Add 0.013 amps for each energized relay.
RIM	
Main Input	24 VDC@ .140 amp board
Relays	Add 0.013 amps for each relay.

1. For UL Listed applications, the ACURT2/ACURT4 must be powered by a UL Listed Altronix power supply, model AL400UL3. If a Listed class 2 transformer is used, it is not a UL listed application.

Bandwidth requirements

The tables below provide the typical bandwidth requirements for the Topaz file server and workstations.

Table 2. Communication Bandwidth Reference

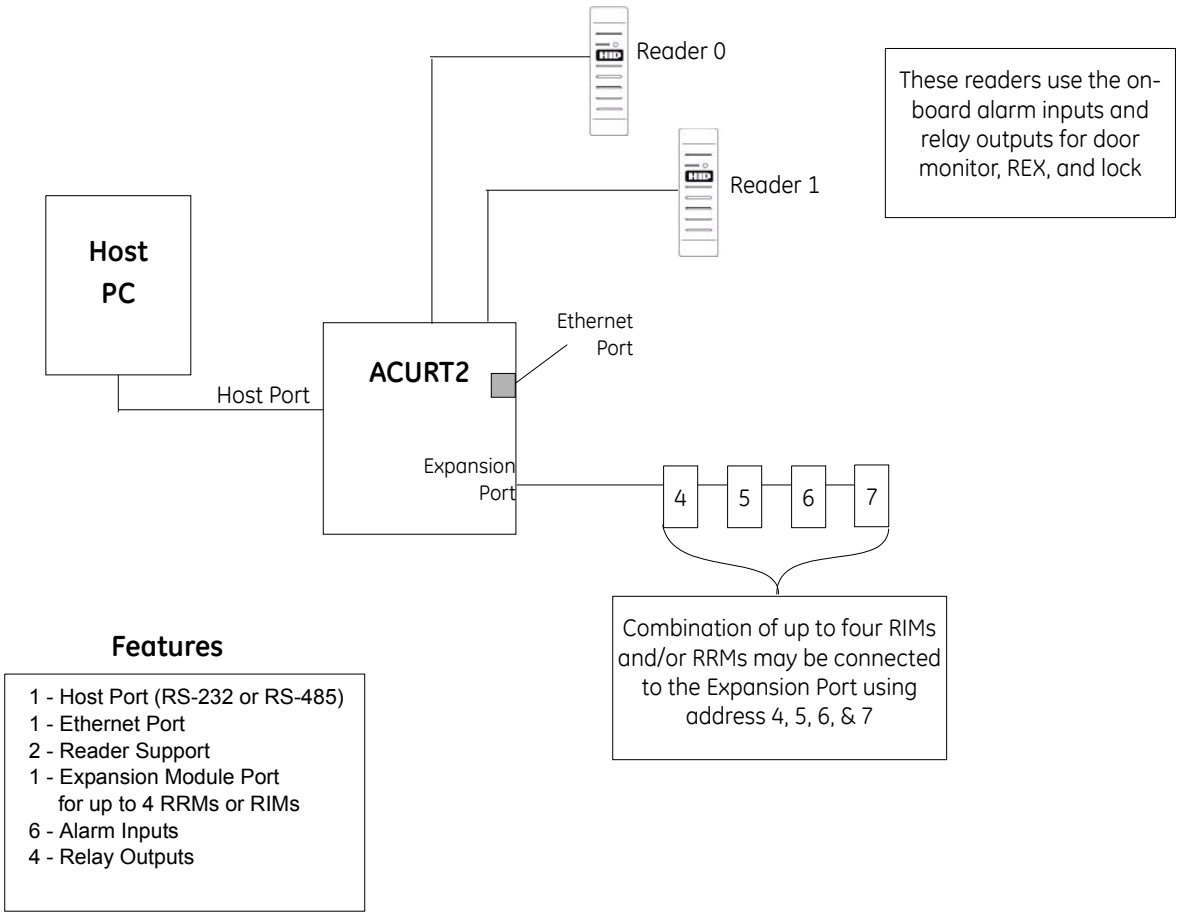
Description	Equation	Max Bandwidth
9,600 BPS - PPP	9,600 BPS x 60 sec ÷ 8 Bits =	72 KB per minute
14,400 BPS - PPP	28,800 BPS x 60 sec ÷ 8 Bits =	108 KB per minute
28,800 BPS - PPP	14,400 BPS x 60 sec ÷ 8 Bits =	216 KB per minute
57,600 BPS - PPP	57,600 BPS x 60 sec ÷ 8 Bits =	432 KB per minute
Ethernet	10,000,000 BPS x 60 sec ÷ 8 Bits =	7500 KB per minute

Table 3. General Data: Packet size

Description	Minimum	Maximum
Server to Workstation Polling - 10 Sec =	10 Bytes	10 Bytes
Server to Server Polling - 10 Sec =	10 Bytes	10 Bytes
Card Record (depends on number of fields used) =	2 KBytes	13.5 Kbytes
Alarm Condition Transaction =	2 Kbytes	2 Kbytes

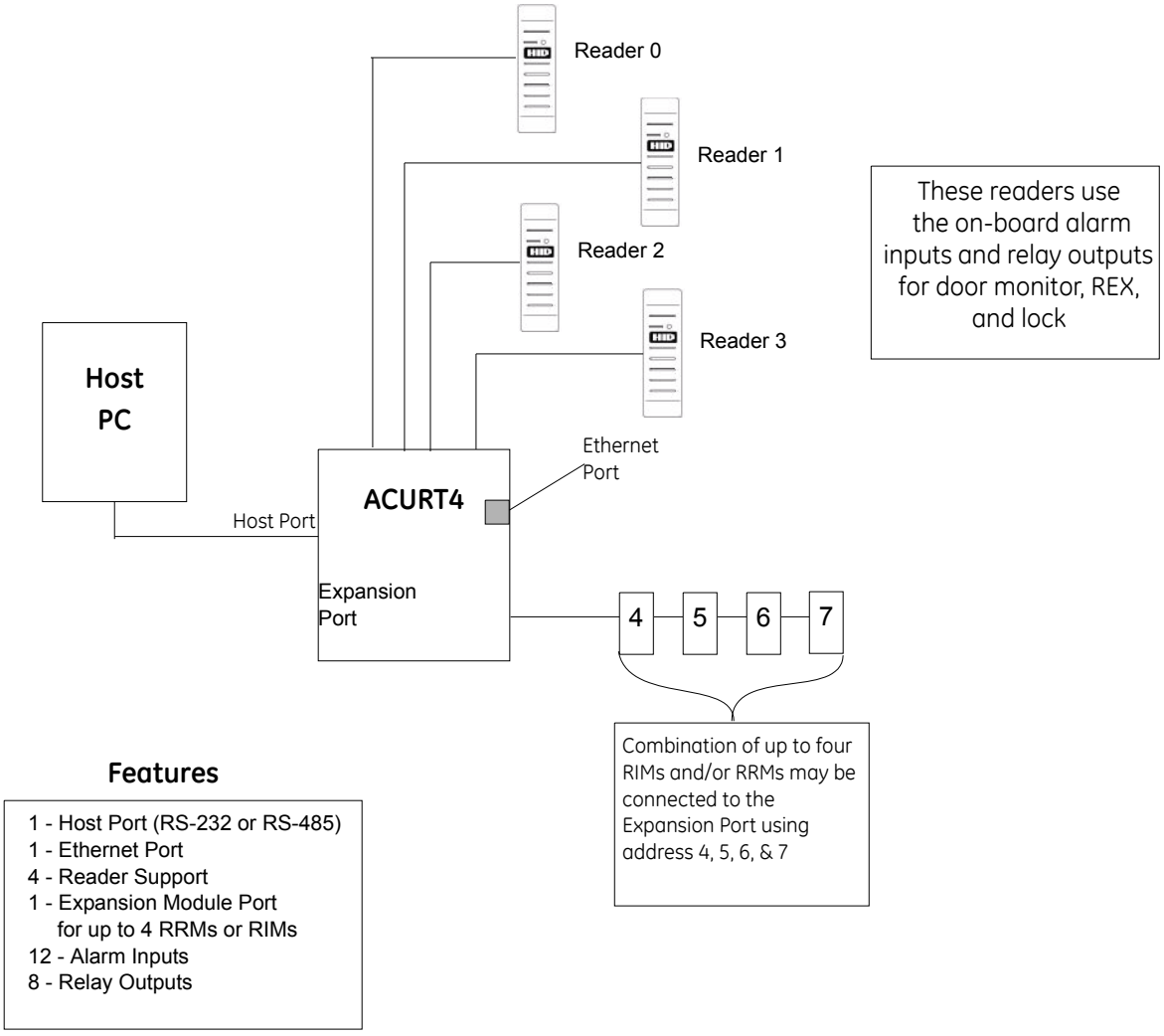
ACURT2 System Diagram

Figure 2. ACURT2 Block Diagram



ACURT4 System Diagram

Figure 3. ACURT2 Block Diagram



Chapter 2 Installing the ACURT Panel

In this chapter you will learn the basics of installing and wiring the ACURT2 and ACURT4 panels. This includes:

Running the Wire and Cable

The procedure for running the wire and cable is described in the following paragraphs.

Note:

1. In running wire and cable, be sure to observe and follow applicable building codes.
2. The dry relay contacts are rated at 2 amps at 30 AC/DC volts.
3. All wires should be stranded.
4. The maximum length of the wiring between the farthest Remote Module (RIM, or RRM) and the ACURT controller is 4000 feet (1220 meters) provided the remote module is locally powered.
5. Guard against lightning damage.
6. All bare Shields should be taped or protected against accidental shorting against electronic components.

RS-485 Communications

RS-485 is a differential voltage communication circuit. The impedance is 120 ohms. End-of-line terminators are required on both ends of the communications path. Multi-drop configurations are allowed with a maximum length of 4000 feet. ***Off the RS-485 cable, stubs can be dropped, but the length of any stub should not be longer than 10 feet.*** Stubs can connect to ACURT controllers or remote modules (RIM or RRM). Stubs must not be terminated***. We strongly recommend star configurations be avoided.*** (See *Figure 4*)

The ACURT2 and ACURT4 controllers are switch selectable for RS-485 termination on each host and expansion module port.

The UTC Fire & Security ACURT2/ACURT4 requires a RS-485 terminator at the NCIC-5 RS-485 converter. See *Figure 16* and *17*.

Figure 4. RS-485 Communication Wiring for ACURT2 and ACURT4.

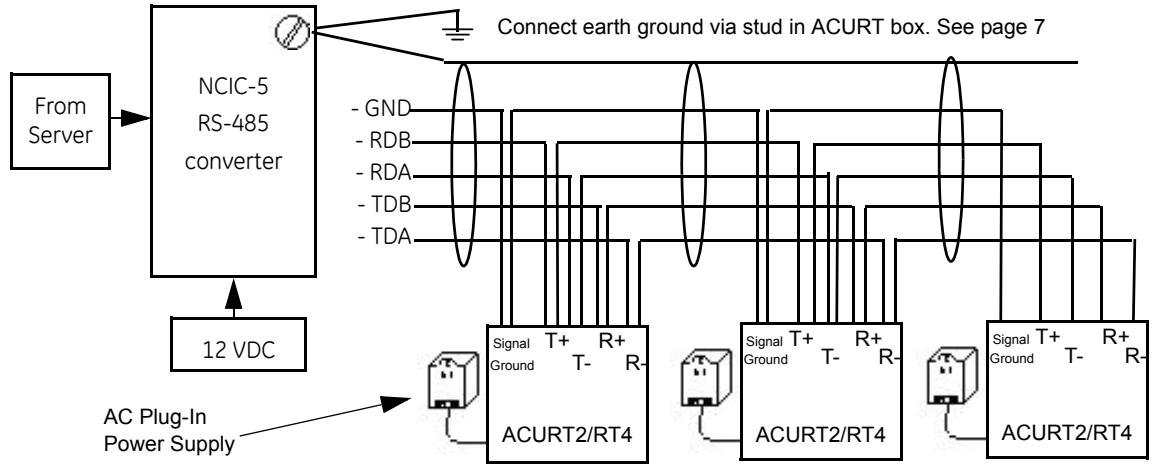
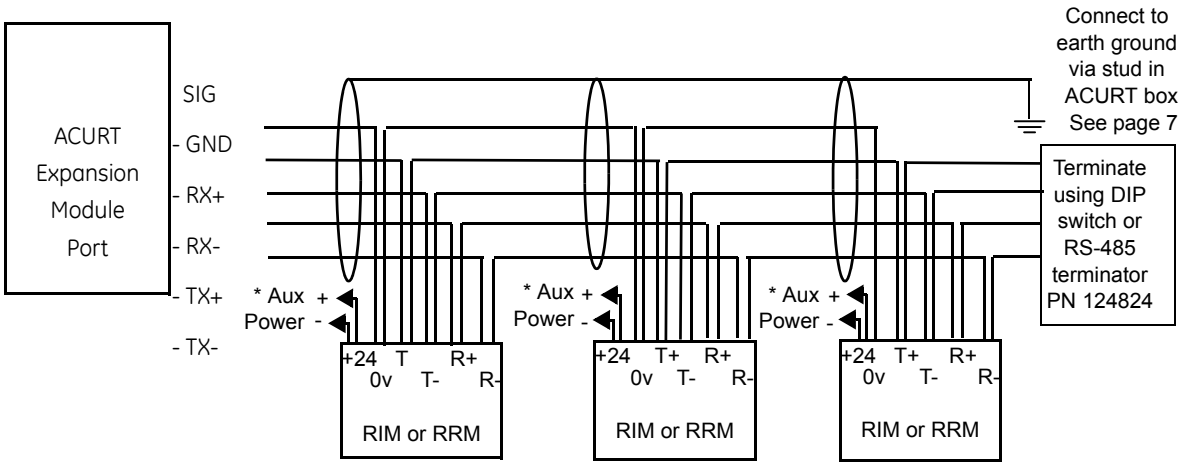


Figure 5. RS-485 Communication Wiring for Remote Modules



Notes:

- If Auxiliary power is not provided locally, another pair of wires will be required to each RIM / RRM.
- Shield refers to the over all braided shield, GND refers to the shield drain wire. Transmit should use one twisted pair and receive should use the other twisted pair.

Pulling Wire and Cable

Pull the wiring to the remote module from the ACURT controller.

All the wires except the strike pair may be run as one cable. The cable should have low-capacitance twisted pairs and a shield. Attach pigtail to shield and connect to chassis ground. The following Belden cable numbers (or equivalent) are suggested:

Belden No. 9842-24 AWG for 1000 feet (305 meters) maximum distance

Pull a single pair of wires from the enclosure to the electric door strike. The following Belden cable number (or equivalent) is suggested:

Belden No. 9409-18 AWG

Pull the wires to the enclosure from each alarm zone sensor, door contact and exit push button. The following Belden cable number (or equivalent) is suggested:

Belden No. 9407-22 AWG

Pull the wires to the enclosure from passive exit device if the device requires power, otherwise use cable listed above. The following Belden cable number (or equivalent) is suggested:

Belden No. 8741-22 AWG

Baud Rates and Distances

The information in the table below may vary according to the quality of the cable used and the number of panels in a chain.

Table 4. Recommended baud rates

Baud rate	Distance
115,200	75 to 100 feet (23 to 30.5 meters)
57,600	800 to 1000 feet (244 to 305 meters)
38,400	1000 to 3000 feet (305 to 915 meters)

Grounding Connections

It is important to connect each ACU panel on the communication loop individually to earth ground, not to chassis or electrical ground. Grounding is imperative for proper data communications between panels and to ensure full functionality of the lighting and transient voltage protection devices. Voltage protection device are designed into all ACU panels and will channel most transient surges to ground if the panel is properly connected to earth ground. If the panels are not properly connected to ground, the surge suppression devices may not function and data communications may be erratic.

For proper grounding all ACUs should be connected to earth ground, not to chassis or electrical ground. Cold water pipes or a grounding rod usually make a good earth ground. The grounding wire should be as heavy as possible with as short and straight a run as possible. Avoid sharp bends in the wire because a large power surge might arc across the board.

Recommended Grounding Sources

- Cold Water Earth Ground
- Building Ground
- Electrical Ground

The UTC Fire & Security system should use a consolidated earth ground, in which the public utilities and the security system ground rods are bonded together. A consolidated earth ground eliminates the problem of step voltage blowout, in which measurable voltage potential exists between earth ground rods, resulting in a current flow path and damage to the system during a lighting strike.

It is recommended that 12 AWG wire be used to connect the earth ground in the shortest and straightest path possible. Avoid sharp turns and use a minimum radius of eight inches (203 mm) for bends. Ground wires should be run separate from other wires and be routed toward the earth. Use of eight-foot (2.4 m) copper clad ground rod is recommended.

Alarm Zone Sensor Wiring

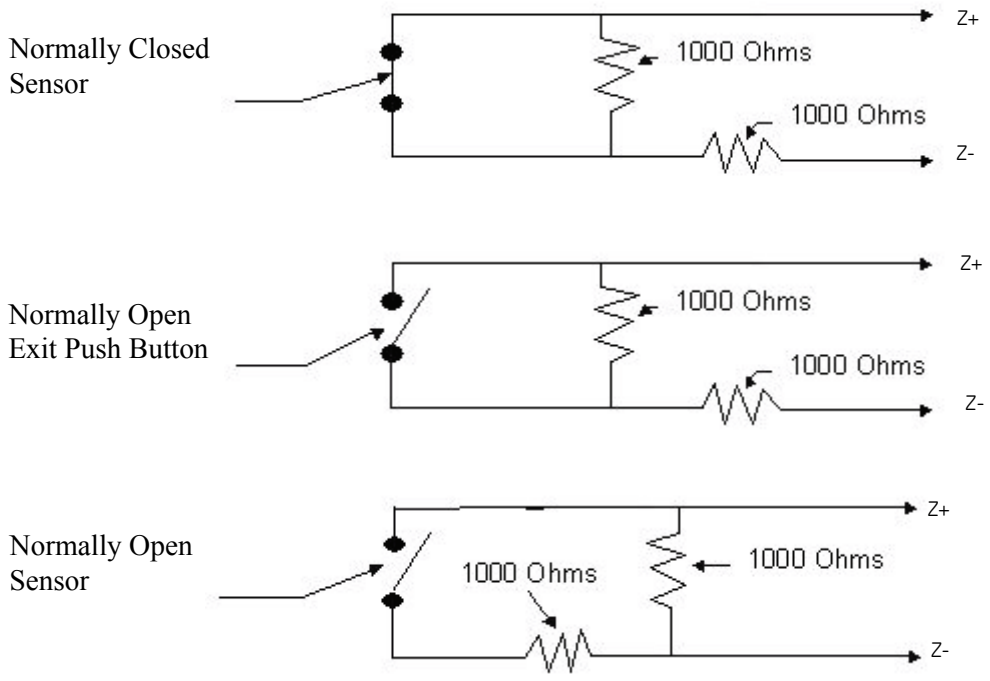
Pull twisted pair of wire (Belden 9407-22 AWG or equivalent) from each alarm zone sensor to the assigned input terminals on the ACURT controller or Remote Module (RIM). (See Terminal Block Tables in each section for alarm zone terminations.) End-of-line (EOL) resistor for the SECURE state is 1000 ohms. The EOL (End-Of-Line) resistor must be located within the alarm zone sensor enclosure, otherwise the alarm zone circuit will be considered unsupervised.

When 1000 ohms terminators are used, the sensors can be either normally closed contacts or normally open contacts providing the SECURE or inactive state is 1000 ohms. See *Figure 6*. (Note: A normally open exit-push-button is wired the same as a normally closed alarm).

Table 5. Alarm State Resistance

Zone Input State	Sensor Circuit in Ohms Normally Closed	Sensor Circuit in Ohms Normally Open
Secure	1000	1000
Active	2000	500
Open	> 50000	> 50000
Short	< 50	< 50

Figure 6. Zone Sensor with 1000-Ohm Resistors



Network Communications

This section provides guidelines for the network environment needed to support communication between a UTC Fire & Security Topaz Server and ACU Networked Intelligent Controller Field Panels. While it is not possible to address every variable that may exist in a customer's network environment, this highlights key network considerations.

The information in the following table is assuming a minimum Topaz server software revision of 1.47.

Table 6. Network communications guidelines

Port	The TCP/IP port number that the ACU panel listens to is 3000 plus the system WAN number (typically 3001).	
Protocol	TCP/UDP All messages are less than 255 bytes. The protocol is a simple command and response protocol with a sequence number retry mechanism.	
Timing	Polling Frequency	400 milliseconds per ACU panel (fixed)
	Server Wait and Delay Time	Wait time for the server to receive a response is 500 milliseconds. Networks should be able to respond to a ping for each panel within 500 milliseconds for optimum performance. Additional user-configurable delay time of up to 3000 milliseconds can be set for each panel. Typical additional delay is 500 milliseconds.
	Server Retry	If the server does not receive a response from the panel within the delay time described above, the server will re-send another poll to the panel. The default number of retries is 3. The Retry for each panel can be increased up to 10 by the system administrator. Setting the number of retries above three is usually for testing purposes only, and not intended for normal operation of the system.
	Panel Timeout	If a panel does not receive a correct message from the server within 10 seconds, the panel will no longer respond to the server (a "local panel off-line" condition). This could be caused by a network interruption or incorrect message(s). An example of an incorrect message might be if the network corrupts a server message, resulting in a checksum error. This causes the server to resynchronize communications with the panel. A corresponding message will be reported at the server as a "panel off-line".
	Timing Calculations	To determine proper panel settings for optimal communication, perform the following calculations for each panel. The total delay, including retries, should be less than 10 seconds (Panel Timeout); The lower the total, the more optimal system performance. ACU LAN Panel with no downline panels via serial connection: **#Retries X [Delay Time(secs) + Wait Time(secs)] = Total** For example: 3 X [1.2 + 0.5] = 5.1 ACU LAN Panel hosting down-line panels via serial connection: **#Down-line panels X #Retries X [Delay Time(secs) + Wait Time(secs)] = (Total)** For example: 3 x 3 x [0.5 + 0.5] = 9
Bandwidth Dynamics	It is important that allocated bandwidth remains consistent at all times and is not clamped down (or reduced) during off-hours such as at night or on weekends. Inconsistent or dynamic bandwidth can result in inconsistent on-line/off-line behavior of field panels, especially if network throughput is marginal.	
Network Hops	To ensure consistency, the number and distance of hops between a field panel's LAN port and it's hosting server should be kept to a minimum.	

Table 6. Network communications guidelines (continued)

Download Activity	Two types of download activity can occur: Full panel downloads or smaller downloads that occur during routine use of the system. During the download operation, the ACU is fully operational after power-up. Access requests are processed and normally, little delay is experienced. However, large amounts of activity have an adverse effect on system performance. A full panel download can be initiated manually by the system administrator, or automatically when: • A panel is powered-up or reset • A change is made to Access Groups • A panel definition is modified • A new reader is defined • An elevator floor definition is modified. **Note:** During a full panel download, the entire card database is downloaded to the panels, however only those cards which are authorized for access through doors controlled by a panel are downloaded to that panel, thus reducing per-panel traffic. Following a server restart, all alarm points, relays, time schedules, and other user-programmed settings and parameters are downloaded. The card database is only downloaded if, after a comparison, the server detects that cardholder changes were made at the server but not updated to the ACU. If an initial download from the server to the ACU is interrupted, the ACU waits for the download to restart. **Note:** ACU2X: After a successful download, the ACU2X saves the count of cards in its database. If a subsequent full card download is interrupted, the panel restores the original pointers so that a backup mechanism exists until a successful download is achieved.
ACU Comparison	The ACU2XL, ACURS, and ACURT panels are approximately 100 times faster for communication that an ACU2 or ACU2X panel with the LanTronix kit. This is because a panel using the LanTronix kit connects to the kit from the panel serial port that runs at an average of 9600 baud, whereas the ACU2XL, ACURS, and ACURT panels run at the 10 Mbps rate of their built in network card.

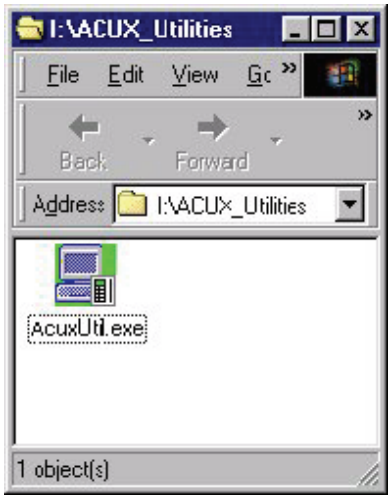
Setting IP Address

If the installation requires UL Listing, Network connections cannot be used.

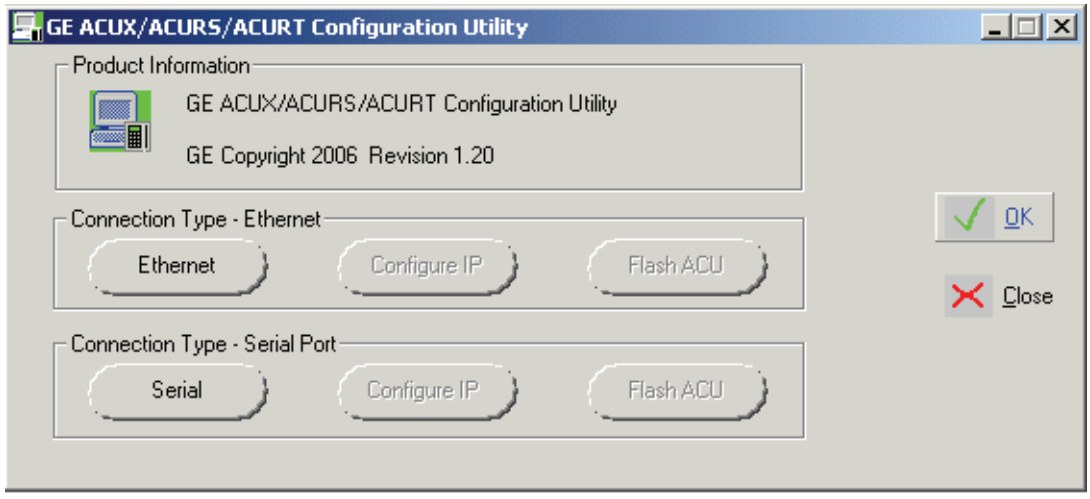
One of the simplest ways to set the IP address on the ACURT2 or ACURT4 is with a laptop computer in the field running the AcuxUtil.exe program.

If using the default IP address (SW3 switch 3 on) attach and configure only one ACURT at a time.

To set up the TCP/IP address for an ACURT field panel start by locating the **AcuxUtil.exe** file on the CD and start the utility by double-clicking on its icon.



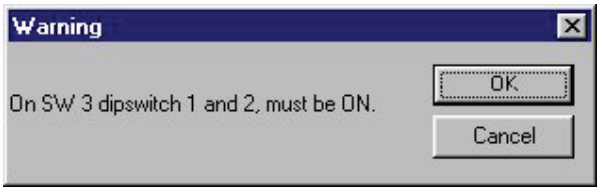
After starting the utility the following screen is displayed.



Set IP Address Through Ethernet

Before continuing make sure your PC has a network card installed with TCP/IP enabled. The IP address must able to communicate to the ACURT. In other words, the first three sets of numbers of the computer's IP address must match the first three sets on numbers of the ACURT IP address. The default IP address of the ACURT is 192.168.0.132

1. Click the **Ethernet** button.

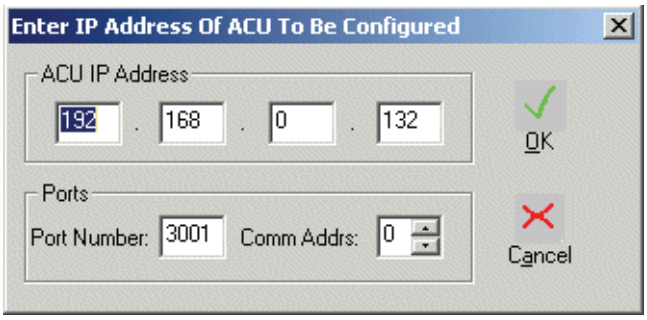


2. Make sure that SW3 DIP switches 1, 2, and 3 are ON before continuing.

Note: If you change switch settings, you must restart the ACU by powering down and back up.

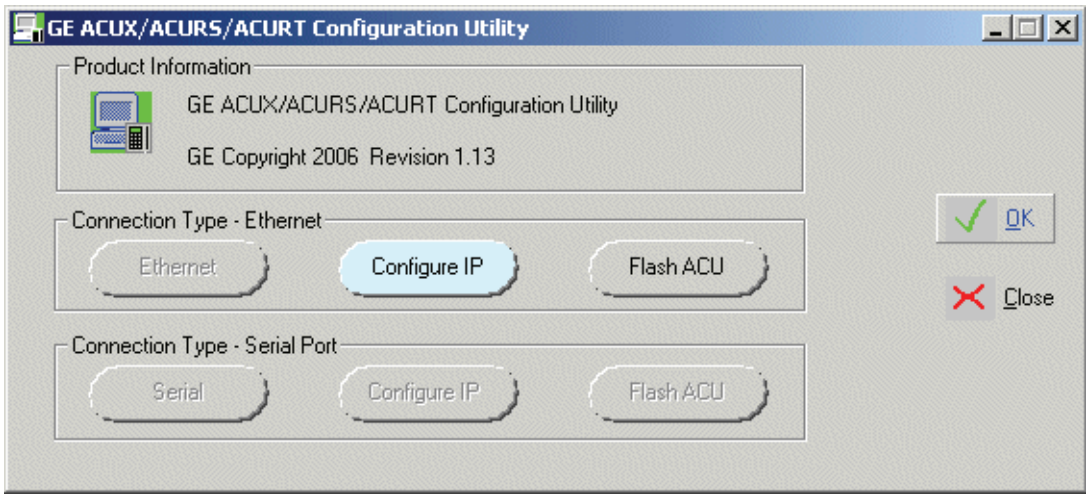
3. You must also know the IP address of the ACURT before continuing. If you do not know the current IP address for the ACURT, turn SW3 switch 3 ON to use the default IP address of 192.168.0.132.
4. Power must be cycled on the ACURT for the switches to be read.
5. After the switches are set properly, click **OK**

.



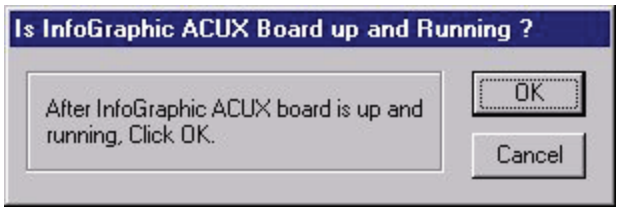
The IP Address of the ACURT is set at the factory default of 192.168.0.132.

6. Enter the **IP address** for the ACURT.
7. The **Port Number** will be left at the default 3001 unless you have multi servers on your system. If using multi server, change the last three digits (3000 plus the LAN number) of the Port Number to reflect the server number. For server number two the Port Number would be 3002.
8. Click **OK** to continue.

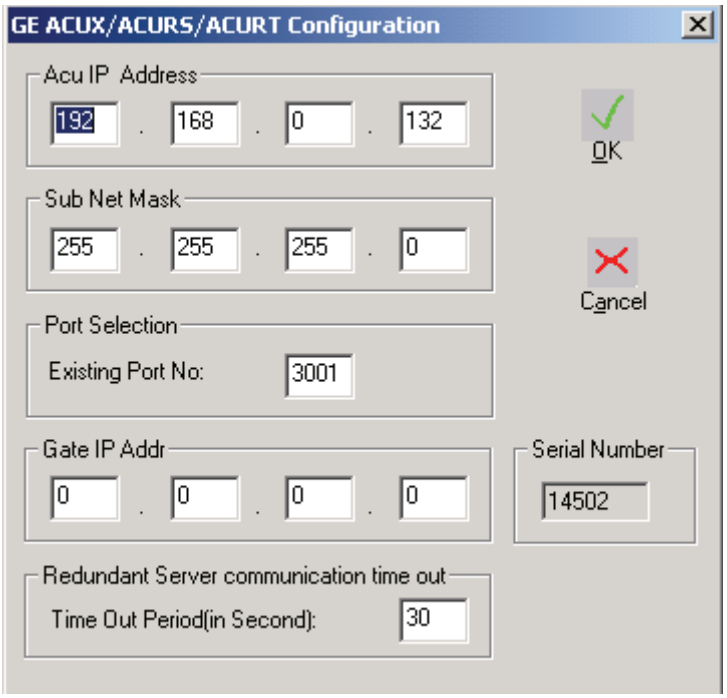


9. Click **Configure IP** to start the configuration of the IP Address

.



10. Make sure SW3 DIP Switches 1 and 2 are turned ON at the ACURT and click **OK**.



The addresses for this screen must be obtained from your MIS department.

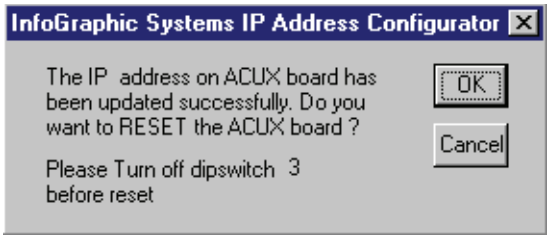
11. Enter the new **ACURT IP Address**, **Sub Net Mask**, **Gate IP Address,** (Gateway or Router).
12. The **Existing Port No.** will be left at its default 3001 unless you have multi servers on your system. Change the last three digits of the Port No. to reflect the server number (3000 plus the LAN number). For server number two the Port No. would be 3002.

    The **Time Out Period** is used for redundant systems only. The default is 30 Sec.
13. Click **OK** to continue.

The ACURT was updated successfully.

14. Click **OK** to continue

.



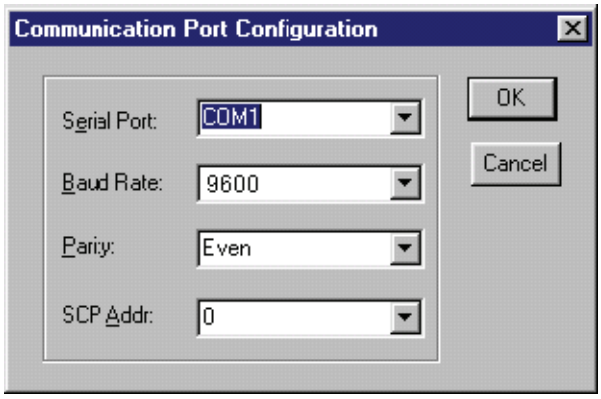
15. Before continuing, make sure DIP switch 3 at the ACURT is turned OFF.
16. Click **OK** to continue and reset the ACURT. The ACURT is updated with the new IP address.
17. Click **OK** to complete the setup.

Set IP Address Through Serial Connection

The ACURT must be able to connect to the computer and power to the ACURT must be turned on.

1. Click the **Serial** button.

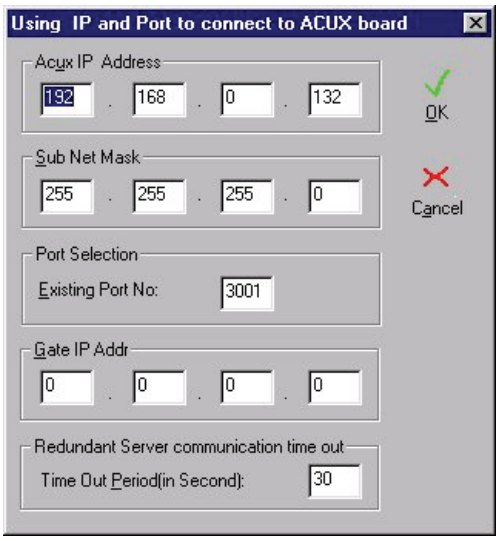
2. Turn SW3 DIP switch 1 OFF and 2 ON at the ACURT.
3. Power must be cycled on the ACURT for the switches to be read.
4. Click **OK** to continue.



5. Select the Communication port to which the ACURT is connected.
6. Select the Baud Rate at which the ACURT is set to communicatet. The default is 9600.
7. Parity should be left at Even.
8. The SCP Address is the communication address at which the ACURT is set with SW4.
9. Click **OK**.

   If the ACURT is not communicating the following message will appear.

10. Click **OK**, check your Serial connection, and try again.

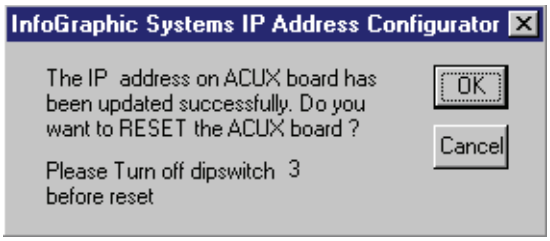


The addresses for this screen must be obtained from your MIS department. The IP Address of the ACURT has been set at the factory to 192.168.0.X. The X number is different for each ACURT.

11. Enter the new **ACURT IP Address**, **Sub Net Mask**, **Gate IP Address,** (Gateway or Router).
12. The **Existing Port No.** will be left at its default 3001 unless you have multi servers on your system. Change the last three digit of the Port No. to reflect the server number (3000 plus the LAN number). For server number two the Port No. would be 3002.
13. The **Time Out Period** is used for redundant systems only. The default is 30 Sec.
14. Click **OK** to continue.

The ACURT was updated successfully.

15. Click **OK** to continue.



16. Before continuing, make sure DIP switches 2 and 3 at the ACURT are turned OFF.
17. Click **OK** to continue and reset the ACURT to update the new IP address.
18. Click **OK** to continue.

    Note: The panel will ping at 100mbsp, but it will only come online at 10mbsp.

Determining the MAC address

The IGS IEEE assigned MAC address for the ACU XL LAN unit is: `00 06 0e 00 00 00`

where the last 4 digits are the serial number in hexadecimal.

For example, a serial number of 1000 would be: `00 06 0e 00 03 e8`

Troubleshooting LAN Communication

LAN panels do not come online:

1. Access the Command Prompt screen. From the taskbar, click Start → Programs → Accessories → Command Prompt.
2. Type the following commands to troubleshoot your LAN communication:

   `IPCONFIG`
   This command will tell you what the IP Address of your PC is.

   `PING 192.168.0.132`
   192.168.0.132 is the default panel address.

   - If you are connected to the panel with a cross over cable and SW3 switch 3 is On, you should be able to ping the panel at the default IP address assuming your PC's IP address starts with an address of 192.168.0. If you can't ping the default panel, you may have a faulty cable or the network jack on PC/panel may have a problem.
   - If you are not using the default IP address, insert your panel's IP address in place of the 192.168.0.132 address and verify the connection.
   - If you unplug the network cable from the panel but can still ping the panel address from the server than you have a duplicate address on your network and need to contact your System Administrator.
   - You can also type `ping -t` and the IP address to do a continual ping to see if the connection between your PC and your panel is stable.

Flashing the ACURT with new PROM

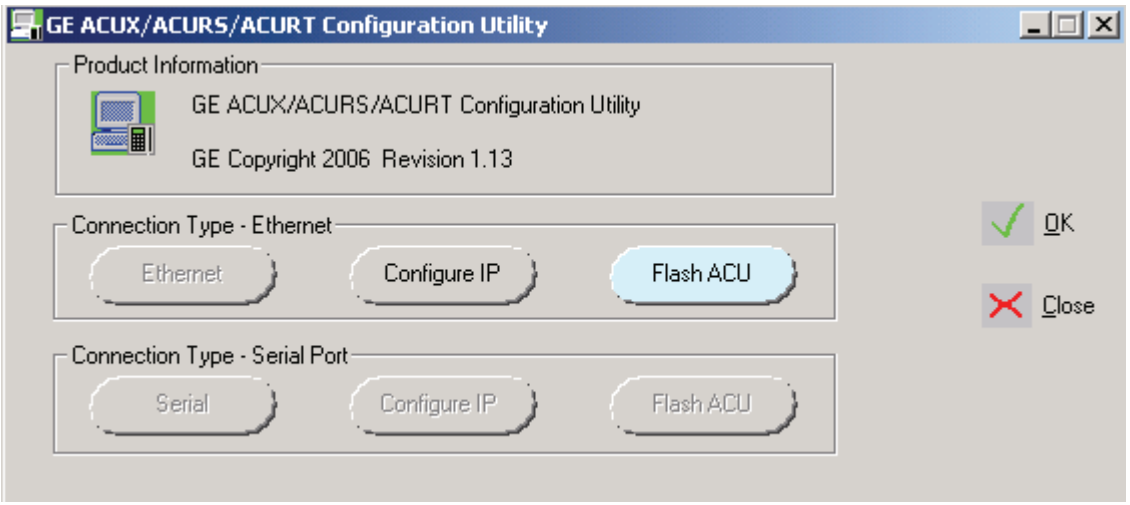
TOPAZ supports firmware levels 3.49 to series 8.xx.xx or later.

Note: To update surface mount panels with firmware earlier than version 5.85.00, first flash the ACU with firmware with version 5.85.00. Then flash it with the 8.xx.xx series or later PROM.

The ACU Utility (`AcuxUtil.exe`) can be used to upload program information to the ACURT.

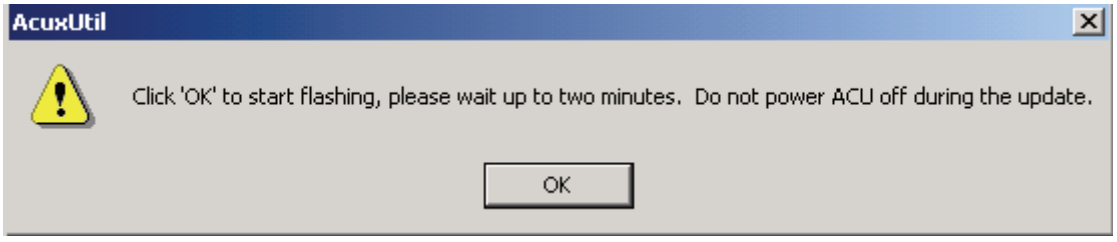
From a PC running the utility, attach to the Field Panel you want to upload. In order to flash a panel with the ACU Utility, you must first have a connection between the Utility and the panel. See *Setting IP Address* on page 15 for steps on connecting the ACURT to the ACU Utility.

Figure 7. ACU Utility: Flash ACURT



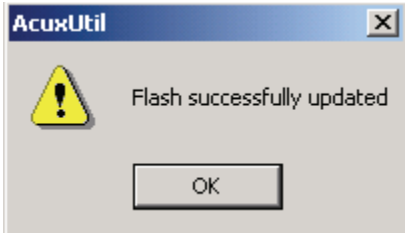
3. Click **FlashACU** and browse to the file containing the firmware. A confirmation dialog, similar to the following displays.

Figure 8. ACU Utility: Confirmation dialog



4. Click **OK** to continue. As instructed, do not power off the ACU during the update. You may need to wait up to two minutes. When the update is complete, the following dialog displays:

Figure 9. ACU Utility: Flash successful



Installing UPS Batteries

WARNING: Be sure to observe battery manufacturer's instructions:

- Danger Explosive Gases
- Can cause blindness or severe injury.
- Use in a well ventilated area away from open flame, cigarettes, sparks, and other sources of ignition.
- Shield eyes and face when working around battery.
- Do not make direct contact between the positive and negative terminals.
- Do not puncture, disassemble, or incinerate batteries.
- Dispose of in accordance with environmental regulations.

Poison - contains lead compounds and corrosive acid.

Contains sulfuric acid which can causes severe burns. In the event of contact, flush with water and obtain immediate medical attention.

Keep out of reach of children.
Charge in accordance with manufacturer's instructions.

WARNING: Make certain that the AC power source circuit breaker(s) is OFF before proceeding. Failure to heed this WARNING can cause death, personal injury, or damage to unit(s).

CAUTION: To avoid an electrical short, do not let the contacts on the batteries touch any part of the enclosure or mounting plate.

Installing and Connecting

The UPS battery installation and wiring connection to the assembly is made as follows:

1. Place the two 12 VDC rechargeable batteries in the bottom of the cabinet.
2. Connect the battery cables (AFTER all other wiring is connected) to the battery to TB10 terminal 6 (Battery, 24V+) and terminal 7 (Battery, 24V-).
3. The operating voltage of the batteries will be approximately 27.5 VDC. When the battery voltage drops to 24 VDC the ACURT will generate an AC Fail alarm and when the voltage level drops to 21 VDC it will generate a Low Battery alarm.

Note: If the ACURT is to be powered from a 27.5 VDC UPS, connect the output of the power source to the battery connection on the ACURT, TB10-6(+), and TB10-7(-). The 24 VAC plug in transformer and internal ACURT UPS batteries are no longer required.

Dial-up Modem

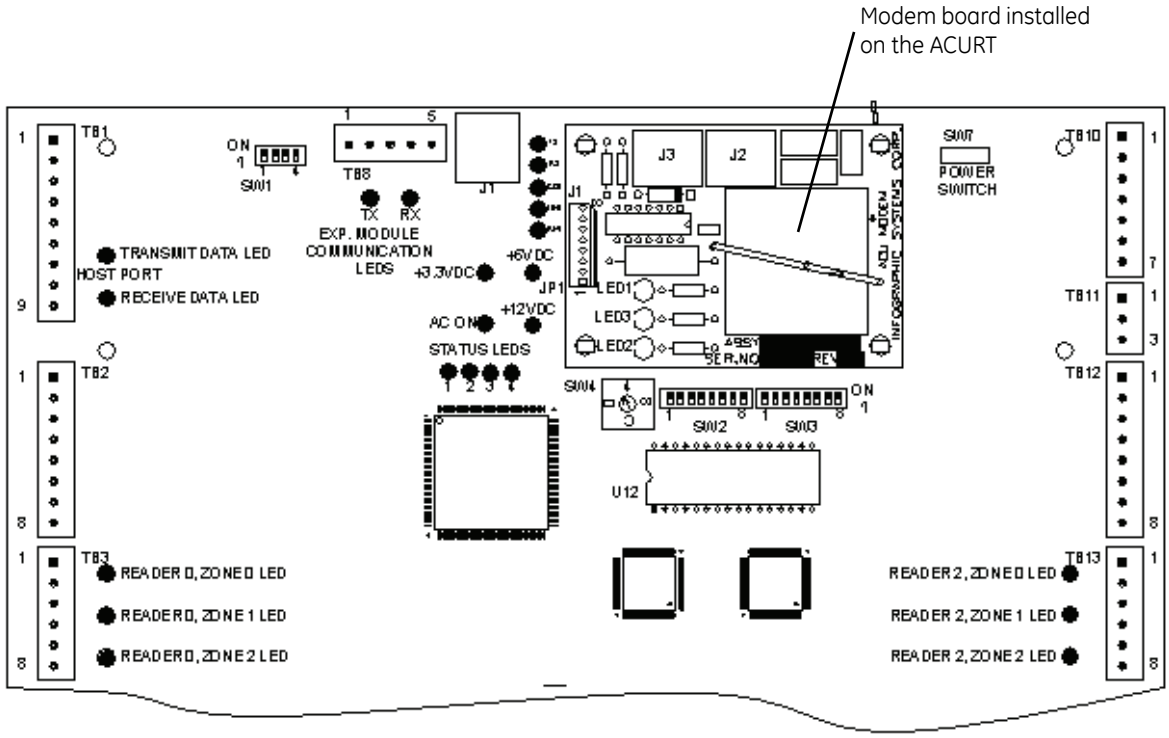
Installing Dial-up Modem

If the installation requires UL Listing, the Dial-up modem cannot be used.

The Dial-up modem allows the TOPAZ server to communicate over standard dial phone lines to the ACURT2 and ACURT4 when LAN or direct connections with RS-232 and RS-485 are not available.

The modem board mounts on the ACURT board near the top by plugging the J1 connector on the modem board into the PJ1 connector on the ACURT board, as shown below.

Figure 10.Dial-up Modem Installed on Top of the ACURT Board



Install the modem board by aligning connectors JP1 and J1 and the four (4) plastic standoffs (already installed on the modem board) with the holes on the ACURT board. While making sure that connectors J1 and JP1 are lined up, gently snap the standoffs into the holes.

Note: When using dial-up modems the baud rates MUST be set to 9600 with no parity. Also **a Robotics Sportster external modem (Model 0459 or 0701) must be used at the host computer**. See *Installing Server External Modem* later in this chapter for more details.

WARNING: Make certain that the AC power source circuit breaker(s) is OFF before proceeding. Failure to heed this WARNING can cause death, personal injury, or damage to unit(s).

Connecting the Dial-up Modem

After installing the modem board connect the frame ground wire to the grounding lug in the cabinet just above the board. See *Figure 13* on page 28.

Connect the modem to a standard dial type telephone line by plugging the phone line's RJ45 connector into J3. A telephone instrument for testing can be connected to J2.

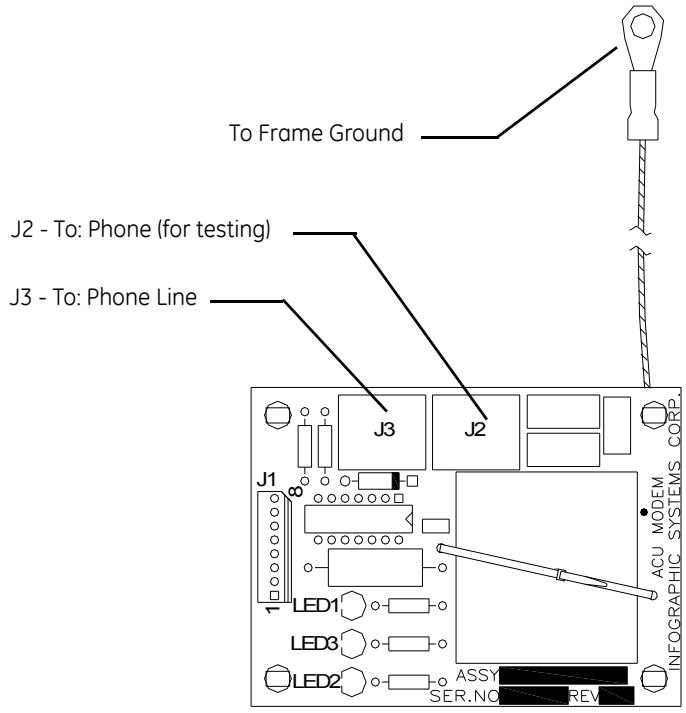
Note: DO NOT use PBX or Key Switch type phone lines.

SW2 on the ACURT2 or ACURT4 should be set as follows: **1**, **2**, **3**, **5**, and **8** set to "**ON**".

The Topaz systems administrator will need to know the ACURT2 or ACURT4 Controller's Serial Number.

Component Layout

Figure 11. Component Layout of the Dial-up Modem Board



LEDs on Modem Board

The LEDs will show the modem status and help in trouble shooting the modem.

Table 7. Dial-up Modem LED Indicators.

LED's on Modem	Description
LED1	Power - Lights when modem is "powered".
LED2	Ring Detect - Lights when the modem has called.

Table 7. Dial-up Modem LED Indicators.

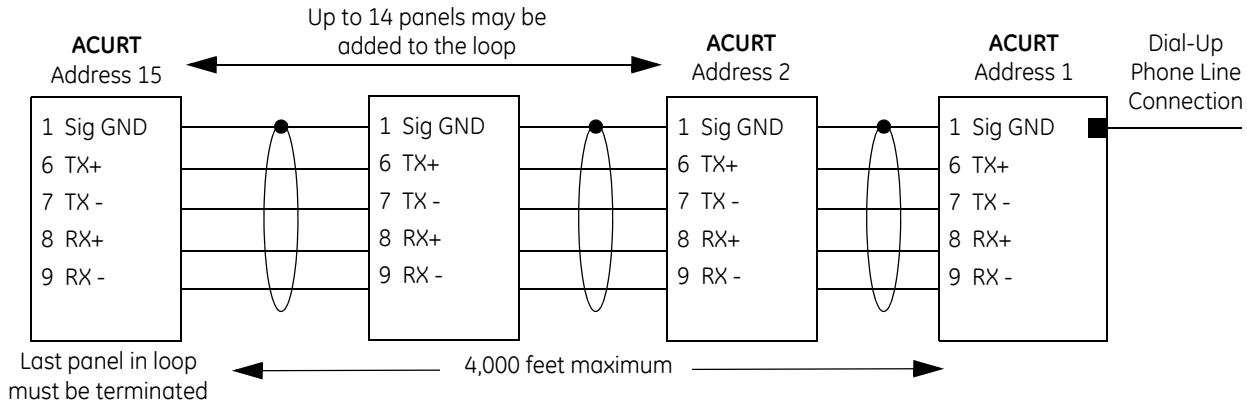
LED's on Modem	Description
LED3	Carrier Detect - Lights when the Modem has established communication with the host modem.

Connecting (MDD) Multi-Drop Dial-Up Panels

The dial-up ACURT panel may have up to 14 additional ACURT panels multi-dropped to its RS485 port as shown below. The additional panels must be configured in Topaz software as dial-up panels with the same phone number as the ACURT panel with the dial-up modem card installed.

Note: DO NOT use PBX or Key Switch type phone lines.

Figure 12.RS485 Port Wiring For Multi-Drop Dial-Up Panels



In the above configuration the panel with the dial-up modem installed must be set as address "1" and each additional panel on the RS485 port must be addressed starting with "2" then "3" and so on up to address 15.

Modem Board Replacement

Make sure that power is removed from the ACURT before removing the modem board. Disconnect the phone lines(s) from the modem. While squeezing the tip the standoff, protruding through the board with a pair of needle nose pliers, gently lift the modem board off of the plastic standoffs. Unplug the board from the ACURT.

While aligning the new board with the J1 and JP1 connectors, gently snap the board on to the plastic standoffs. Plug the phone line back into J3. If there was a telephone instrument (for testing) connected, plug it back into J2.

Installing Server External Modem

When using Dial-up communications to an ACURT field panel you must install an external modem at the server. The Topaz Software will ONLY support the following modems:

(USR) US Robotics 33.6 faxmodem	Such as the Sportster 0459 (00083907)
USR) US Robotics 56K V.90 faxmodem	Such as the Sportster 0701 (005686-03)

Model information is located on the back of the modem near the FCC logo sticker.

Note: DO NOT use internal modem cards or external modems without dipswitchs.

Information on these modems may be found at the US Robotics web site, **www.usr.com**.

External Modem Setup

The switches on the back of the modem must be configured with switches 5 and 6 set to the UP position, all others should be in the down position as shown to the right.

Note: You will NOT need to install the modem or drivers in Windows.

When you power up the external modem LEDs AA, TR, and CS should be illuminated, all other should be off.

Software Setup

After installing the modem make sure dial-up panels are configured in the Topaz server software as SCP Dial-Up, set to 9600 baud, No parity and Active.

From Control and Service Functions, you must setup the modem. Choose Initialize - Test Modem and Serial Port and say Go. The modem LEDs SD and RD should blink several time. This sends the correct AT commands necessary for the modem to work correctly.

Note: It is recommended you use a minimum of two dial-up ports/modems for data and alarms. As the system grows or as the alarm load increases, it may be necessary to use more Server modems to handle the traffic.

The Topaz systems administrator will also need to know the ACURT2 or ACURT4 Controller's Serial Number.

Troubleshooting

Be sure the external dial-up modem at the server is connected correctly.

Check the dial-up modem board in the ACURT to make sure it is firmly install on the pins J1 and no pins are bent over.

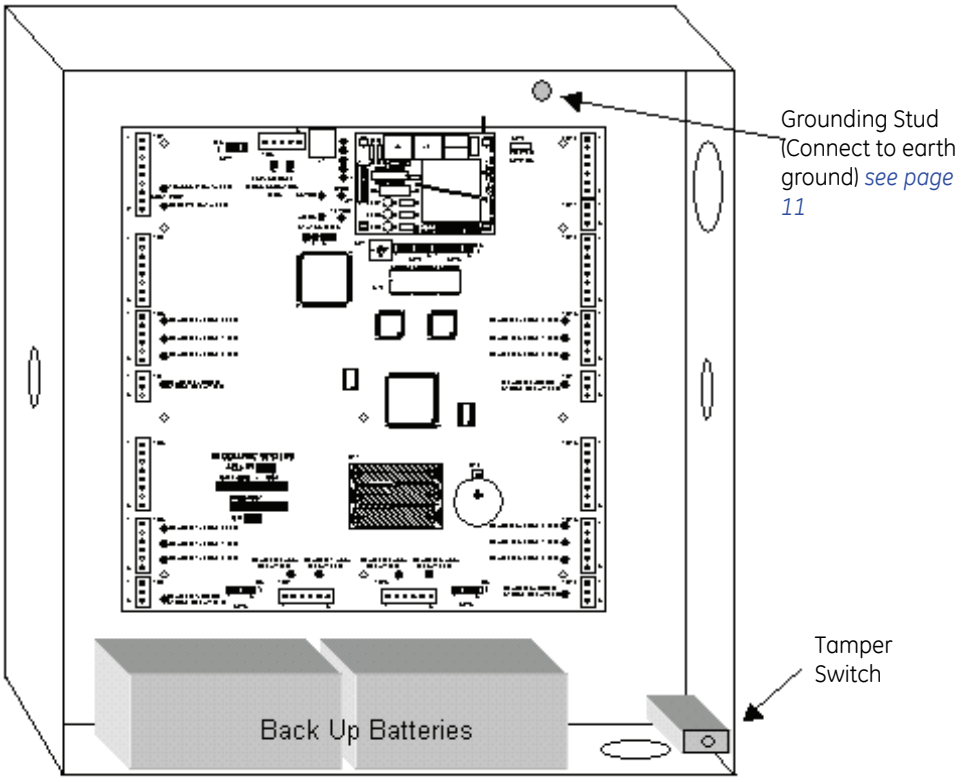
Make sure the ACURT modem board is properly grounded.

You may have to clear memory on the ACURT board.

Note: Be aware this action will leave the ACURT without any configuration.

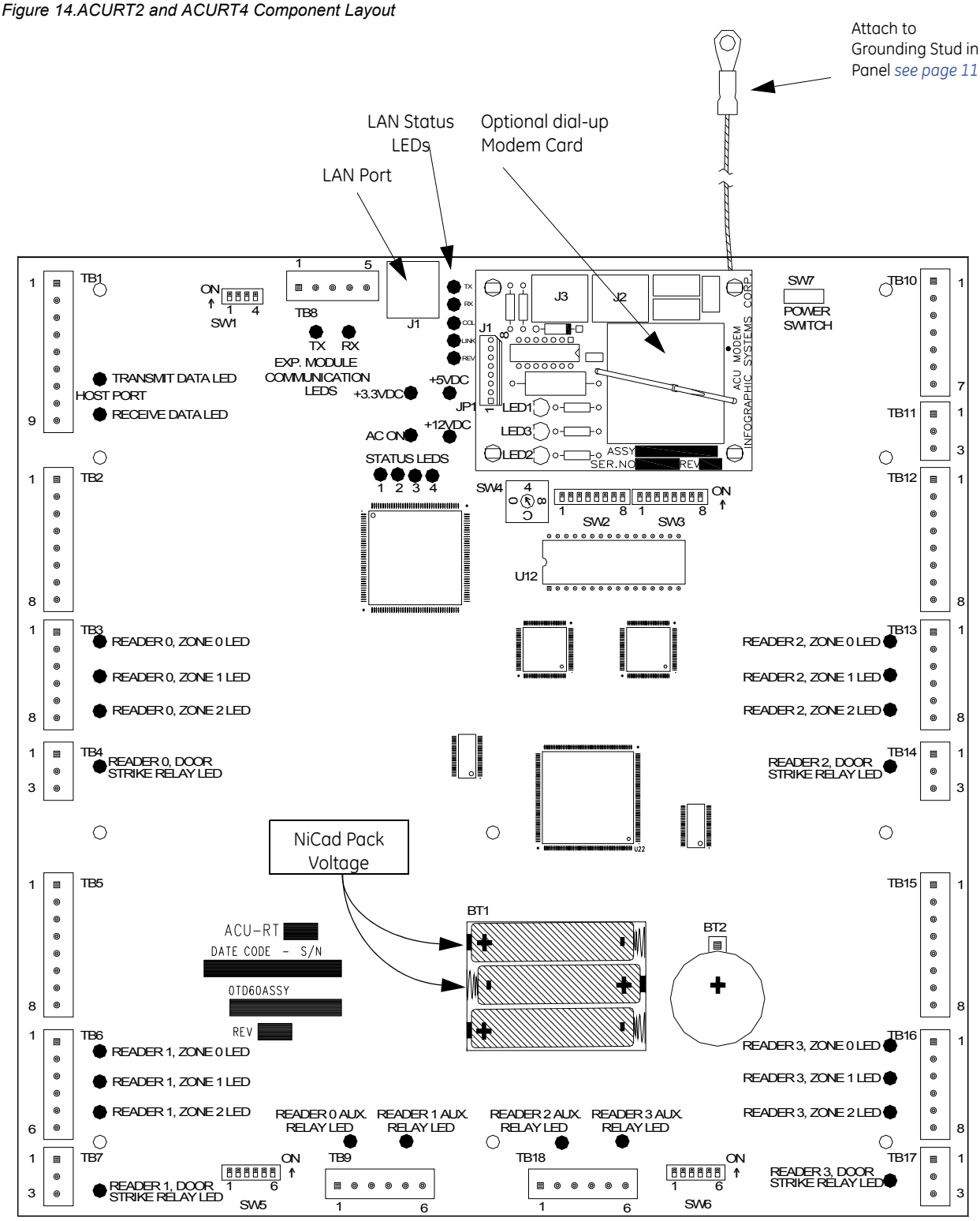
ACURT2 and ACURT4 Enclosure Layout

Figure 13.Components Mounted Inside the ACURT Controller Enclosure



ACURT2 and ACURT4 Component Layout

Figure 14.ACURT2 and ACURT4 Component Layout



Terminal Connector Pin Numbers

Table 9 through *Table 18* show cable types and connections to terminal blocks TB1 through TB18. Explanations of the table column headings are as follows:

Table 8. Explanation of Table Headings

Heading	Description
TB#	Identifies the terminal block number on the ACURT2 and ACURT4 circuit board.
Pin#	Identifies the pin number of the applicable terminal block.
Terminal Strip ID#	Identifies the abbreviation of the terminal on the printed template.
Description	Identifies the description of the terminal.
Maximum distance and Belden or Equivalent Cable #	Identifies the cable number, the maximum distance when applicable.

Connections for Terminal Block 1

Host Communication Port

Table 9. Terminal Block TB1 Pin Number Identification

TB#	Pin#	Term. Strip ID	Description	Maximum Distance and Belden or Equivalent Cable No.
1	1	SIG GND	Host Port Signal Ground	9608-24 (3 conductor) AWG, 50 feet 9609-24 (4 conductor) AWG, 50 feet
1	2	TXD	Host Port RS-232 Transmit Data	
1	3	RXD	Host Port RS-232 Receive Data	
1	4	RTS	Host Port RS-232 RTS	
1	5	CTS	Host Port RS-232 CTS	
1	6	TX+	Host Port RS-485 Transmit Data (+)	9842-24 AWG / 9368-18 AWG 4000 feet (1220 meters) maximum
1	7	TX-	Host Port RS-485 Transmit Data (-)	
1	8	RX+	Host Port RS-485 Receive Data (+)	
1	9	RX-	Host Port RS-485 Receive Data (-)	

Connections for Terminal Block 2, 3, and 4 (ACURT2 and ACURT4)

Reader 0 Connections

Table 10. Terminal Block TB2, 3, and 4 Pin Number Identification

TB#	Pin#	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
2	1	+12 VDC	Fused 12 VDC Output	9514-22 AWG
2	2	+5 VDC	Fused 5 VDC Output	
2	3	0 V	0 Volts	
2	4	DATA 0	Reader Data 0 (Green)	
2	5	DATA 1	Reader Data 1 (White)	
2	6	RED LED	Red LED	
2	7	GREEN LED	Green LED	
2	8	BUZZER	Buzzer	
3	1	Z0+	Normally Closed Door Contact	9407-22 AWG / 9409-18 AWG 1000 feet (305 meters) / 4000 feet (1220 meters)
3	2	Z0-		
3	3	Z1+	Normally Open Request-to-Exit Contact	9407-22 AWG / 9409-18 AWG 1000 feet (305 meters) / 4000 feet (1220 meters)
3	4	Z1-		
3	5	Z2+	Normally Closed Spare Input	9407-22 AWG / 9409-18 AWG 1000 feet (305 meters) / 4000 feet (1220 meters)
3	6	Z2-		
4	1	NC	Door Strike Relay Normally Closed	9409-18 AWG (See Warning)
4	2	C	Door Strike Relay Common	
4	3	NO	Door Strike Relay Normally Open	

WARNING: DO NOT switch any voltage over 30 VDC on these relays.

Connections for Terminal Block 5, 6, and 7 (ACURT2 and ACURT4)

Reader 1 Connections

Table 11. Terminal Block TB5, 6, and 7 Pin Number Identification

TB#	Pin#	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
5	1	+12 VDC	Fused 12 VDC Output	9514-22 AWG
5	2	+5 VDC	Fused 5 VDC Output	
5	3	0 V	0 Volts	
5	4	DATA 0	Reader Data 0 (Green)	
5	5	DATA 1	Reader Data 1 (White)	
5	6	RED LED	Red LED	
5	7	GREEN LED	Green LED	
5	8	BUZZER	Buzzer	
6	1	Z0+	Normally Closed Door Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
6	2	Z0-		
6	3	Z1+	Normally Open Request-to-Exit Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
6	4	Z1-		
6	5	Z2+	Normally Closed Spare Input	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
6	6	Z2-		
7	1	NC	Door Strike Relay Normally Closed	9409-18 AWG (See Warning)
7	2	C	Door Strike Relay Common	
7	3	NO	Door Strike Relay Normally Open	

WARNING: The plug in AC power supply can only be used to power one ACURT board.

Connections for Terminal Block 8 (ACURT2 and ACURT4)

Expansion Module Communication Port RS-485 Connections

Table 12. Terminal Block TB8 Pin Number Identification

Pin No.	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
1	SIG GND	Signal Ground	9842-24 AWG 4000 feet (1220 meters) maximum
2	TX+	Transmit +	
3	TX-	Transmit -	
4	RX+	Receive +	
5	RX-	Receive -	

Connections for Terminal Block 9 (ACURT2 and ACURT4)

Reader 0 and 1 Auxiliary Relay Connections

Table 13. Terminal Block TB9 Pin Number Identification

Pin No.	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
1	NC	Reader 0 Aux Relay Normally Closed	9409-18 AWG See WARNING
2	C	Reader 0 Aux Relay Common	
3	NO	Reader 0 Aux Relay Normally Open	
4	NC	Reader 1 Aux Relay Normally Closed	9409-18 AWG See WARNING
5	C	Reader 1 Aux Relay Common	
6	NO	Reader 1 Aux Relay Normally Open	

Connections for Terminal Block 10 (ACURT2 and ACURT4)

Power Connections

Table 14. Terminal Block TB10 Pin Number Identification

Pin No.	Term. Strip ID	Description
1	24 VAC INPUT	24 VAC Input 40 Volt Amps (from plug in transformer)
2	24 VAC INPUT	
3	Frame Ground	Frame Ground (connected to cabinet stud)
4	0 V	Ground
5	0 V	Ground
6	Battery 24 V+	UPS Batteries Positive
7	Battery 24 V-	UPS Batteries Negative

WARNING: The ACURT board requires 24 AC power. The plug in AC power supply can only be used to power one ACURT board.

Connections for Terminal Block 11 (ACURT2 and ACURT4)

Cabinet Tamper Connections

Table 15. Terminal Block TB11 Pin Number Identification

Pin No.	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
1	ACPF	AC Power Fault Input	24 Gauge
2	0 V	Power Fault & Tamper Input Common	Not Applicable – Factory Wired
3	CTSW	Cabinet Tamper Switch	24 Gauge

Connections for Terminal Block 12, 13, and 14 (ACURT4 Only)

Reader 2 Connections

Table 16. Terminal Block TB12, 13, and 14, Pin Number Identification

TB#	Pin#	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
12	1	+12 VDC	Fused 12 VDC Output	9514-22 AWG
12	2	+5 VDC	Fused 5 VDC Output	
12	3	0 V	0 Volts	
12	4	DATA 0	Reader Data 0 (Green)	
12	5	DATA 1	Reader Data 1 (White)	
12	6	RED LED	Red LED	
12	7	GREEN LED	Green LED	
12	8	BUZZER	Buzzer	
13	1	Z0+	Normally Closed Door Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
13	2	Z0-		
13	3	Z1+	Normally Open Request To Exit Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
13	4	Z1-		
13	5	Z2+	Normally Closed Spare Input	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
13	6	Z2-		
14	1	NC	Door Strike Relay Normally Closed	9409-18 AWG See WARNING
14	2	C	Door Strike Relay Common	
14	3	NO	Door Strike Relay Normally Open	

Connections for Terminal Block 15, 16, and 17 (ACURT4 Only)

Reader 3 Connections

Table 17. Terminal Block TB15, 16, and 17, Pin Number Identification

TB#	Pin#	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
15	1	+12 VDC	Fused 12 VDC Output	9514-22 AWG
15	2	+5 VDC	Fused 5 VDC Output	
15	3	0V	0 Volts	
15	4	DATA 0	Reader Data 0 (Green)	
15	5	DATA 1	Reader Data 1 (White)	
15	6	RED LED	Red LED	
15	7	GREEN LED	Green LED	
15	8	BUZZER	Buzzer	
16	1	Z0+	Normally Closed Door Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
16	2	Z0-		
16	3	Z1+	Normally Open Request-to-Exit Contact	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
16	4	Z1-		
16	5	Z2+	Normally Closed Spare Input	9407-22 AWG at 1000 feet (305 meters) 9409-18 AWG at 4000 feet (1220 meters)
16	6	Z2-		
17	1	NC	Door Strike Relay Normally Closed	9409-18 AWG See WARNING
17	2	C	Door Strike Relay Common	
17	3	NO	Door Strike Relay Normally Open	

Connections for Terminal Block 18 (ACURT4 Only)

Reader 2 and 3 Auxiliary Relay Connections (ACURT4 Only)

Table 18. Terminal Block TB18 Pin Number Identification

Pin No.	Term. Strip ID	Description	Maximum Distance Belden or Equivalent Cable No.
1	NC	Reader 0 Aux Relay Normally Closed	9409-18 AWG See WARNING
2	C	Reader 0 Aux Relay Common	
3	NO	Reader 0 Aux Relay Normally Open	
4	NC	Reader 1 Aux Relay Normally Closed	9409-18 AWG See WARNING
5	C	Reader 1 Aux Relay Common	
6	NO	Reader 1 Aux Relay Normally Open	

Relay Numbering for ACURT2 and ACURT4

Relay Numbers for Readers

Table 19. Relay Numbers for ACURT2 and ACURT4 Readers

Reader Number	ACURT2 Relay Number	ACURT4 Relay Number
Reader 0 Door Strike Relay Reader 0 Aux Relay	16 17	16 17
Reader 1 Door Strike Relay Reader 1 Aux Relay	18 19	18 19
Reader 2 Door Strike Relay Reader 2 Aux Relay	Not Available	20 21
Reader 3 Door Strike Relay Reader 3 Aux Relay	Not Available	22 23

Relay Numbers for RIM Remote Input Module

Table 20. Relay Numbers for RIM Remote Input Module

Relay Numbers	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
K1	32	34	36	38
K2	33	35	37	39

Relay Numbers for RRM Remote Relay Module

Table 21. Relay 128 Numbers for RRM Remote Relay Module

Relay Numbers	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
K1	112	128	144	160
K2	113	129	145	161
K3	114	130	146	162
K4	115	131	147	163
K5	116	132	148	164
K6	117	133	149	165
K7	118	134	150	166
K8	119	135	151	167
K9	120	136	152	168
K10	121	137	153	169
K11	122	138	154	170
K12	123	139	155	171
K13	124	140	156	172
K14	125	141	157	173
K15	126	142	158	174
K16	127	143	159	175

Alarm Numbering for ACURT2 and ACURT4

Alarm Numbers for Readers

Table 22. Physical to Logical Zone Numbering

	Relays		Physical Alarm Zones			Logical Alarm Zones				
Reader Number	Strike	AUX	Zone 0 D.C.[2]	Zone 1 REX[2]	Zone 2 SPARE	Lock Monitor[1]	F.O.[2]	H.O.[2]	R.T.[2]	OFFL[2]
0	16	17	16	17	18	48	64	65	66	67
1	18	19	20	21	22	50	68	69	70	71
2[3]	20	21	24	25	26	52	72	73	74	75
3 [3]	22	23	28	29	30	54	76	77	78	79

1. Lock monitor/Bond sensor: if used must be connected to Z2
2. FO=ForcedOpen,HO=Held Open,RT=Reader Enclosure Tamper,OFFL=Reader Off Line,DC=Door Contact,REX=Request to Exit
3. Readers 2 and 3 are only available on the ACURT4

Alarm Numbers for RIM Remote Input Module

Table 23. RIM Alarm Numbers for UTC Fire & Security's TOPAZ

Zone Input	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
IN1	128	144	160	176
IN2	129	145	161	177
IN3	130	146	162	178
IN4	131	147	163	179
IN5	132	148	164	180
IN6	133	149	165	181
IN7	134	150	166	182
IN8	135	151	167	183
IN9	136	152	168	184
IN10	137	153	169	185
IN11	138	154	170	186
IN12	139	155	171	187
IN13	140	156	172	188
IN14	141	157	173	189
IN15	142	158	174	190
IN16	143	159	175	191
IN17	96	100	104	108
IN18	97	101	105	109
IN19	98	102	106	110
RIM Off-line	99	103	107	111

Alarm Numbers for RRM Remote Relay Module

Table 24. RRM Alarm Numbers

Zone Number	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
I1	97	101	105	109
I2	98	102	106	110
RRM Off-line	99	103	107	111

Connections for IFS fiber communication

Host PC to ACURT Panel (Model D1010 RS232/RS422 only)

Table 25. Host PC to/from D1010 Transciever connections

From Host PC to D1010 Transciever		D1010 to D1010	From D1010 Transciever to ACURT Panel	
DB9 Connector PINs	D1010 Transciever Pins	XTMR to REC REC to XTMR	D1010 Transciever Pins	ACURT Connections
3	3 (RS232 Out)		7 (+ DATA IN)	TB1-8 (RX+)
2	7 (+ DATA IN)		6 (- DATA IN)	TB1-9 (RX-)
5	8 (|||----)		5 (+ DATA OUT)	TB1-6 (TX+)
			4 (- DATA OUT)	TB1-7 (TX-)

Multi-drop ACURT Panel to ACURT Panel (Model D1315 4 Wire RS485 only)

Table 26. Multi-drop ACURT to/from D1315 Fiber Converter connections

ACURT to D1315 Fiber Converter		D1315 to D1315	D1315 Fiber Converter to ACURT	
ACURT Connections	D1315 Connections	DATA REC to DATA XTMR DATA XTMR to DATA REC	D1315 Connections	ACURT Connections
TB1-8 (RX+)	PIN 4 (D-4)		PIN 4 (D-4)	TB1-8 (RX+)
TB1-9 (RX-)	PIN 6 (D-6)		PIN 6 (D-6)	TB1-9 (RX-)
TB1-6 (TX+)	PIN 1 (D-1)		PIN 1 (D-1)	TB1-6 (TX+)
TB1-7 (TX-)	PIN 3 (D-3)		PIN 3 (D-3)	TB1-7 (TX-)

ACURT Panel to RIM or RRM (Model D1315 4 Wire RS485 only)

Table 27. RIM/RRM to/from D1315 Fiber Converter connections

ACURT to D1315 Fiber Converter		D1315 to D1315	D1315 Fiber Converter to ACURT	
ACURT Connections	D1315 Connections	DATA REC to DATA XTMR DATA XTMR to DATA REC	D1315 Connections	RIM/RRM Connections
TB8-4 (RX+)	PIN 4 (D-4)		PIN 4 (D-4)	(TX+)
TB8-5 (RX-)	PIN 6 (D-6)		PIN 6 (D-6)	(TX-)
TB8-2 (TX+)	PIN 1 (D-1)		PIN 1 (D-1)	(RX+)
TB8-3 (TX-)	PIN 3 (D-3)		PIN 3 (D-3)	(RX-)

Wiring the Host Communications

Connecting RS-232C Interface to ACURT2 and ACURT4 Controllers

The RS-232 interface is a simple communications interface used between computers or modems and ACURT2 or ACURT4 controllers. The maximum overall length of the wires from the host computer to the ACURT2 or ACURT4 controller is 50 feet (15 meters). Only one device per RS-232 path is supported.

Provide a shielded cable (three wires and shield) from the host computer's serial port to the ACURT2 or ACURT4 controller. *Table 28* and *Table 29* show the cable connections. The shield attaches to chassis ground.

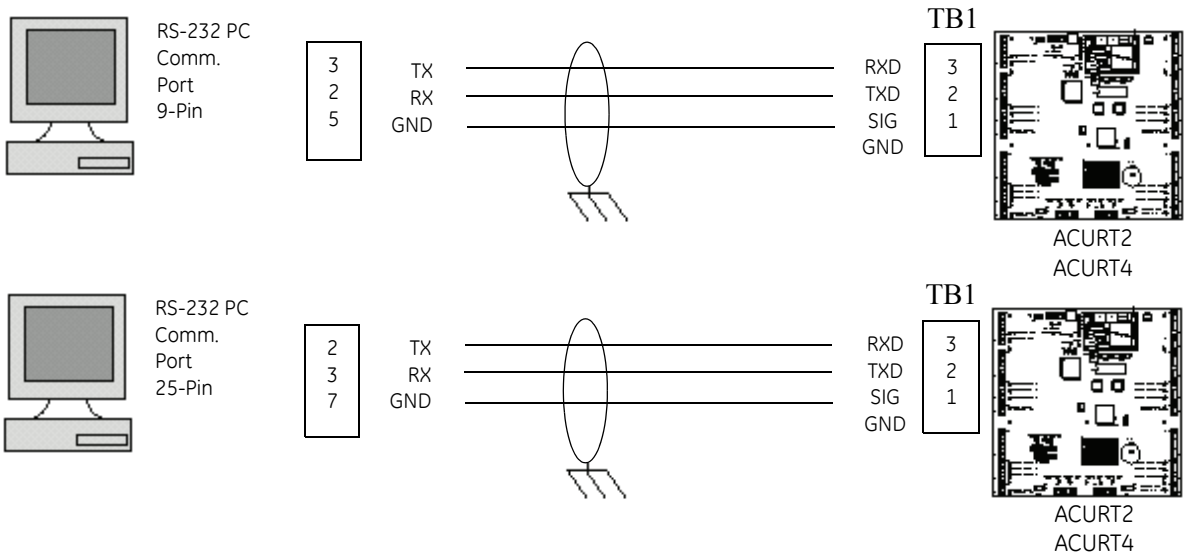
Table 28. PC (9-pin) to ACURT2 or ACURT4 (RS-232)

DB-9 DTE Pin Numbers	ACURT2 and ACURT4 Controller	Description
2	TXD (TB1-2)	Transmit Data
3	RXD (TB1-3)	Receive Data
5	SIG GND (TB1-1)	Signal Ground

Table 29. PC (25-pin) to ACURT2 and ACURT4 (RS-232)

DB-25 DTE Pin Numbers	ACURT2 and ACURT4 Controller	Description
2	RXD (TB1-3)	Receive Data
3	TXD (TB1-2)	Transmit Data
7	SIG GND (TB1-1)	Signal Ground

Figure 15.Typical RS-232C Interface Wiring from PC to ACURT2 or ACURT4 Controller



Connecting RS-485 Converter to the ACURT2 or ACURT4

Provide a two-pair shielded cable (Belden 9842 or equivalent required) between the server's communication port to the ACURT2 or ACURT4 controller.

RS-485 communications must be used if the server is more than 50 feet (15 meters) from an ACURT controller, or if there are multiple controllers.

Use the supplied RS-232C-to-RS-485 converter with the six-foot DB9 to DB25 cable to make this connection.

Installing the NCIC-5 RS-485 Converter

Configure the ACURT2 or ACURT4 controller for RS-485 communication and wire the units as shown in *Figure 4*. An RS-485 terminator must be installed at the RS-485 (NCIC-5) converter as well as the farthest ACURT2 or ACURT4 device on the communication line. The maximum overall length of this cable (from RS-485 converter to the last ACURT2 or ACURT4 controller) is 4000 feet (1220 meters) using Belden 9842 or equivalent cable. Beyond this distance a modem must be used. For Dial up to the ACU panels, **a Robotics Sportster external modem must be used at the host computer**.

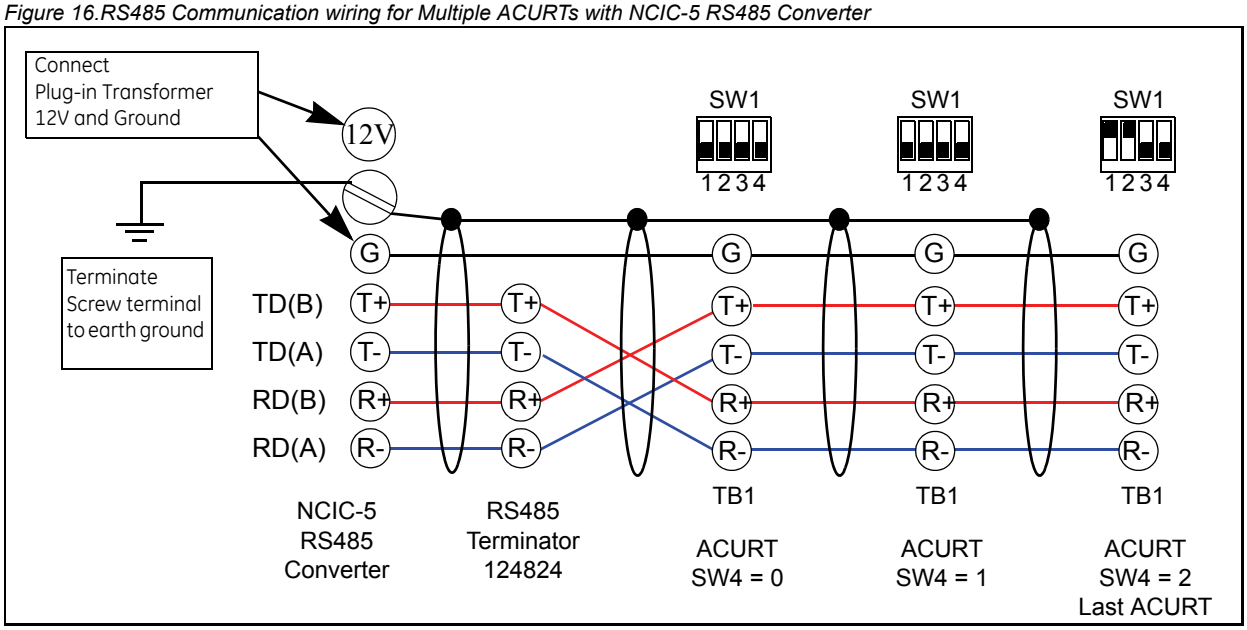
Table 30. Model NCIC-5 RS-485 Converter to ACURT2 or ACURT4

RS-485 Converter	RS-485 Terminator	ACURT2 and ACURT4 Controller	Description
FR. GND			Shield
RD(B)	RD+	TX+ (TB1-6)	Transmit Data (+)
RD(A)	RD2	TX- (TB1-7)	Transmit Data (-)
TD(B)	TD+	RX+ (TB1-8)	Receive Data (+)
TD(A)	TD2	RX- (TB1-9)	Receive Data (-)
+12VDC			+12 Volt
GND		SIG GND (TB1-1)	Power Supply Common

Jumpers on NCIC-5

Echo = ON
Control = No Jumper

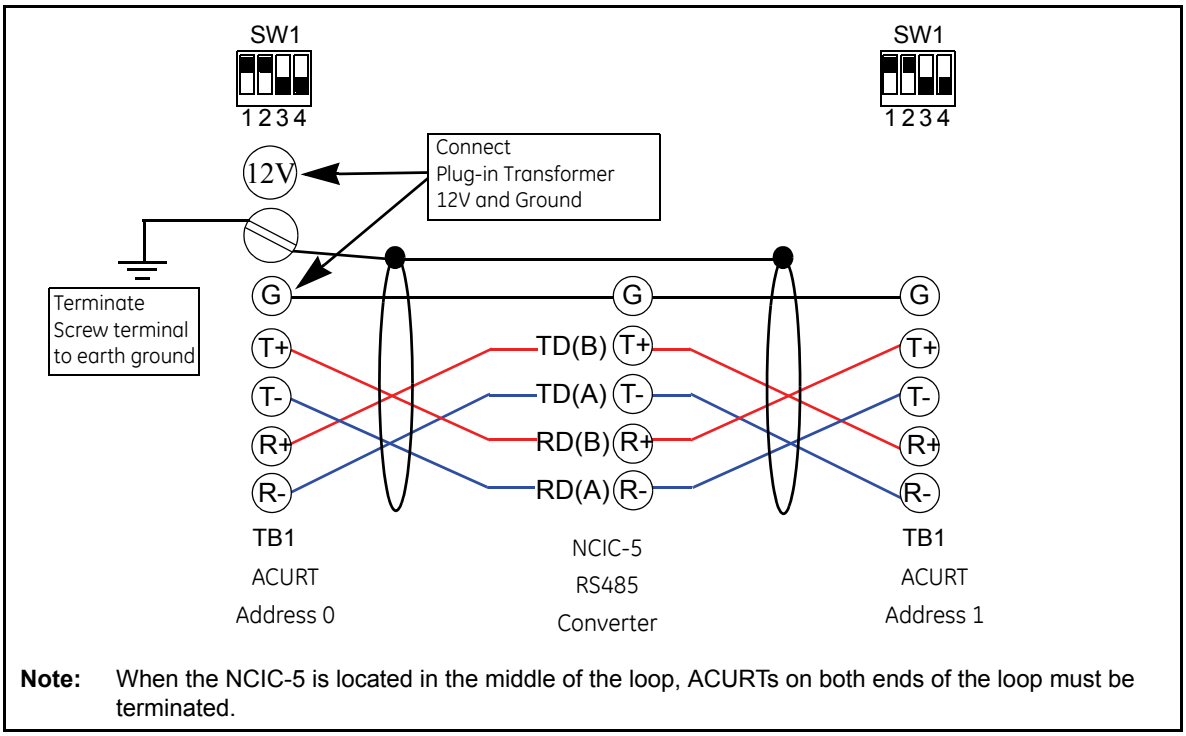
Figure 16.RS485 Communication wiring for Multiple ACURTs with NCIC-5 RS485 Converter



SW2 - Set to 9600 Baud - Dip Switches 1,2,3 On (All ACURTs)
SW3 - All ACURTs set Dip Switch 7 On

NCIC Jumper Settings: Echo = On, Control = No Jumper

Figure 17.RS485 wiring for the ACURTs with NCIC-5 RS-485 converter in the middle of the loop



Note: When the NCIC-5 is located in the middle of the loop, ACURTs on both ends of the loop must be terminated.

Note: Shield refers to the over all braided shield, GND refers to the shield drain wire. Transmit should use one twisted pair and receive should use the other twisted pair.

Wiring a NCIC-5 RS-485 Converter to the Server

If you do not have the 6-foot cable covered above you may wire the RS-485 converter as shown below

Table 31. Connecting DB-9 RS-485 Converter

DB-9 Pin Numbers Male	RS-485 Converter NCIC-5 25-Pin Female
2	3
3	2
5	7

The model NCIC-5 RS-485 converter can be plugged into the communication port via the supplied DB9 to DB25 six-foot cable.

Troubleshooting the Converter/COM port

The converter has four fuses. If any of these fuses blow, the converter will not communicate effectively. To test your COM port on the PC:

1. Remove the echo jumper on your converter on place it on SD Control.

2. Shutdown the UTC Fire & Security Application, then go into Hyper-Terminal in windows. (Start → Programs → Accessories → Communications → Hyper-Terminal.)

Figure 18.Hyper-Terminal

3. Type in the COM port to which the converter is wired and test as shown below

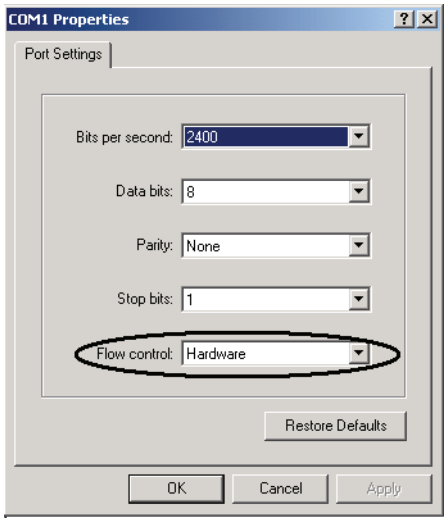
Figure 19.Connection Description.

4. On the next screen, select the COM port the converter is wired to in the drop down box and click **Ok**.

   Note: If it does not appear it is in use by another application on the PC or the COM port is bad and you may need to contact the manufacturer.

5. On the next screen, change the Flow control drop down box to **None** and click **Ok**.

Figure 20.Port Settings

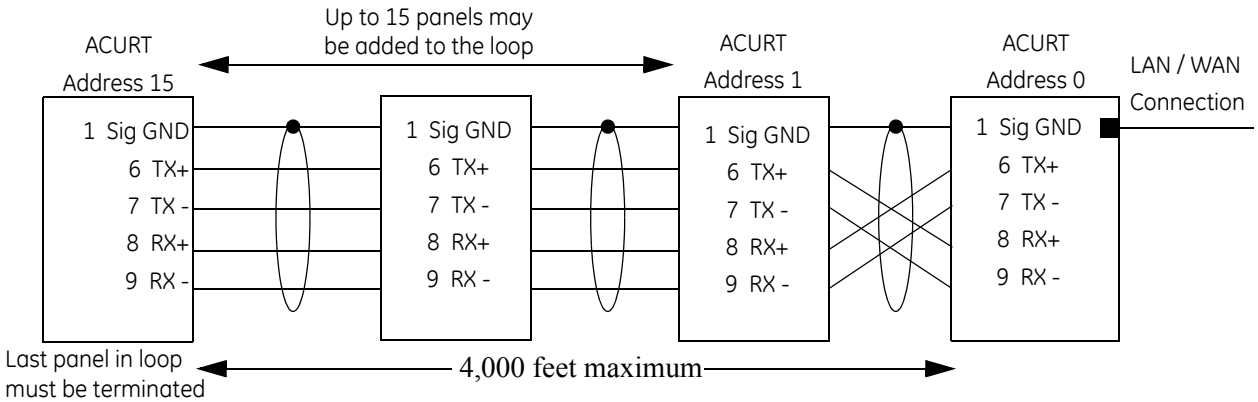


6. Type any letter on the keyboard you want into the Hyper-Terminal window. As you type the lights on the 485 converter should flash indicating the information is being transmitted out. If they do not flash either the converter or the COM port is bad.
7. After completing the test successfully, shutdown Hyper-Terminal before you restart your UTC Fire & Security application. If you do not, Hyper-Terminal will control the port so that you will not be able to communicate out of it.
8. Return the echo jumper back to its original location of **Echo = ON** and **Control = No Jumper**.on your converter.

Multi-dropping RS-485 from a LAN Connected ACURT

You may still multi-drop any ACURT panel from an ACURT connected to the LAN via RS-485 up to a maximum of 4,000 feet to the last ACURT from the LAN connected ACURT. See the wiring diagram below and the wiring table that follows.

Figure 21.Multi-Drop RS-485 Wiring from a LAN Connected ACURT.



Notes:

- SW3 DIP switch 1 must be ON to enable the LAN connection.
- Use SW1 to terminate the last ACURT panel in the RS484 loop.

DIP Switch Settings for ACURT2 and ACURT4

The locations of the various DIP switches on the ACURT2 and ACURT4 are shown in *Figure 14*. *Table 32* through *Table 38* describe how each DIP switch (SW1- SW7) is set. The rotary switch (SW4) described in *Table 35* provides sixteen addresses 0 to 15 (0 to 'F' hexadecimal) for ACURT addressing.

Note: Switches SW2, SW3 and SW4 are read only at power-up and are ignored thereafter. When switch settings are changed, power MUST be turned OFF then turned ON AFTER the settings are changed. You can use SW7 to cycle power on the board.

DIP switch SW1 Communication Port Termination

To be switched on to terminate communications line when panel is last on the RS-485 loop.

Table 32. Switch SW1 Settings on the ACURT2 and ACURT4

Switch SW1	Description
S1	ON = Host TX Line Terminated
S2	ON = Host RX Line Terminated
S3	ON = Expansion Module Port TX Line Terminated
S4	ON = Expansion Module Port RX Line Terminated

DIP Switch SW2 Settings Baud Rate, Dial-up, Parity, and Com Type

Table 33. DIP Switch SW2 Settings on the ACURT2 and ACURT4 Controller

Switch SW2	Switch Setting			Function
	S1	S2	S3	Host Communication Baud Rate
	OFF	OFF	OFF	19200
S1	ON	OFF	OFF	38400
	OFF	ON	OFF	57600
through	ON	ON	OFF	1200
	OFF	OFF	ON	115200
S3	ON	OFF	ON	2400
	OFF	ON	ON	4800
	ON[1]	**ON**[1]	**ON**[1]	9600
S4	OFF[1]			DES Encryption Enabled
S5	ON			Dial-Up Host Communications
	OFF[1]			Dedicated Host Communications
S6	ON			Use 5-wire RS-232 using RTS & CTS
	OFF[1]			Use RS-485 or 3-wire RS-232

Table 33. DIP Switch SW2 Settings on the ACURT2 and ACURT4 Controller

Switch SW2	Switch Setting	Function
S7	OFF[1]	Spare - Set OFF
S8	ON	Host Communication uses No Parity (modem)
	OFF[1]	Host Communication uses Even Parity

1. Denotes default setting

DIP Switch SW3 Settings

Table 34. DIP Switch SW3 Settings on the ACURT2 and ACURT4 Controller

Switch SW3	Description
S1	ON = LAN Enabled
S2	ON = Allow LAN IP Parameters Update
S3	ON = Default LAN IP Parameter
S4	ON = Triple DES Encryption Enabled
S5	ON = Spare – Leave OFF
S6	ON = Magnetic Stripe Cards
S7	ON = Battery Backed Up RAM [1]
S8	ON = Disable Watch Dog Timer

1. Denotes default setting

Dip Switch SW4 (rotary switch) Settings ACURT Panel Addressing

Table 35. Rotary Switch SW4 Settings on the ACURT2 and ACURT4

Switch SW4	Description
0	ACURT field Panel # 0
1	ACURT field Panel # 1
2	ACURT field Panel # 2
3	ACURT field Panel # 3
4	ACURT field Panel # 4
5	ACURT field Panel # 5
6	ACURT field Panel # 6
7	ACURT field Panel # 7
8	ACURT field Panel # 8
9	ACURT field Panel # 9
A	ACURT field Panel # 10
B	ACURT field Panel # 11
C	ACURT field Panel # 12
D	ACURT field Panel # 13
E	ACURT field Panel # 14
F	ACURT field Panel # 15

DIP Switch SW5 and SW6 Settings Alarm Zone Termination for Readers

Table 36. DIP Switch SW6 settings alarm termination for readers

Switch SW5	ON Position = Terminated – No Input Device Present OFF Position = Not Terminated – Zone In Use With End Of Line Resistor
S1	Terminates Zone Input Reader 0 Zone 0 with a 1k-ohm resistor
S2	Terminates Zone Input Reader 0 Zone 1 with a 1k-ohm resistor *
S3	Terminates Zone Input Reader 0 Zone 2 with a 1k-ohm resistor
S4	Terminates Zone Input Reader 1 Zone 0 with a 1k-ohm resistor
S5	Terminates Zone Input Reader 1 Zone 1 with a 1k-ohm resistor *
S6	Terminates Zone Input Reader 1 Zone 2 with a 1k-ohm resistor

Table 37. DIP Switch SW6 settings alarm termination for readers

Switch SW6	
S1	Terminates Zone Input Reader 2 Zone 0 with a 1k-ohm resistor
S2	Terminates Zone Input Reader 2 Zone 1 with a 1k-ohm resistor [1]
S3	Terminates Zone Input Reader 2 Zone 2 with a 1k-ohm resistor
S4	Terminates Zone Input Reader 3 Zone 0 with a 1k-ohm resistor
S5	Terminates Zone Input Reader 3 Zone 1 with a 1k-ohm resistor [1]
S6	Terminates Zone Input Reader 3 Zone 2 with a 1k-ohm resistor

1. If exit push button is not connected, (reader zone 1) another 1000 ohm resistor must be installed across the zone input

DIP Switch SW7 Power Switch

Table 38. Switch SW7 Power Switch on the ACURT2 and ACURT4

Switch SW7	Description
Slide Switch	Turns on Boards Power Supply

Status LEDs on the ACURT2 and ACURT4

ACU Power-Up Self-test

The ACURT2 and ACURT4 should always be tested after installing any module. The power-up self-test indicators are for both the ACURT2 and ACURT4 controller. The LEDs will light as follows: at power-up, all ON, at hardware reset, all OFF.

Table 39. Power-Up LED Status

Status LED	Description
1	ON indicating power-up
2	ON indicating successful RAM test
3	ON indicating successful PROM test
4	ON indicating initialization complete (1 second)

ACURT Online Status

The normal operating indicators for the ACURT Controllers are indicated by LEDs 1 – 4. The LEDs on the ACURT Controller's PCB will light as follows:

Table 40. ACURT Online Status LEDS

Status LED	Description
1	Flashes at a 1 Hz rate
2	ON while transmitting to the Remote Modules (Firmware earlier than 8.14.00) ON while communicating with Topaz (Firmware 8.14.00 or later)
3	Two seconds OFF, then blinks once if Reader 0 is online, followed by blinking twice if Reader 1 is online, etc.
4	ON if zone voltage reference is ever out of range (indicates board or power supply failure)

LAN LED Status

Table 41. LAN LED Status

Status LED	Description
TX	ON Transmitting
RX	ON Receiving
COL	ON Collision
Link	ON Cable connected
Rev	ON Cable reversed

Host Port LED Status

Table 42. Host Port LED Status

Status LED	Description
Transmit Data	ON transmitting data to host computer
Receive Data	ON Receiving data from host computer

Reader Zones LED Status

Table 43. Reader Zone LED Status

Status LED	Description
Reader 0-3 Zone 0,1, & 2	OFF - Secure ON - Active Alarm Fast Flashing - Trouble (open or short, etc.) Slow Flashing- Masked

Relay and Door Strike LED Status

Table 44. Relay and Door Strike LED Status

Status LED	Description
All Relays	ON Relay is energized

Defaulting the Memory on the ACURT2 and ACURT4

To clear memory, first power off the ACURT2 and ACURT4. Set the *even* switches (positions 2, 4, 6, & 8) on DIP switch SW2 to **ON** and the *odd* switches (positions 1, 3, 5, & 7) to **OFF**. Set the polling address of the Rotary Switch SW4 to **F**. Apply power to the ACURT2 or ACURT4. LEDs 1-4 will blink together indicating that the operation is complete. Turn power off and reset switches SW2 and SW4 to the desired settings.

Chapter 3 Reader Installation

This chapter provide in depth information about how readers are installed and wired to the TOPAZ ACURT2 and ACURT4 Panels. This includes:

Overview of Reader Installation

UTC Fire & Security's TOPAZ system comes standard with either one set of two (2), or one set of four (4) of the following standard readers.

Standard Readers:

- HID ProxPoint Plus 6005
- HID MiniProx 5365

Optional Readers and Keypads:

- HID ProxPro (with Keypad) 5355
- HID MaxiProx 5375 Long Range
- UTC Fire & Security K11L Keypad
- UTC Fire & Security Transition Reader Series[1]
- RMS-10 Reader[1]

This section covers the installation and wiring for the standard and optional readers/keypads for the UTC Fire & Security TOPAZ system.

If the reader you are installing is not covered in this manual or you need additional information, please refer to the documentation that was shipped with the reader.

Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

1. Not tested with Topaz by UL.

Reader Installation Direct Connection

The following readers can only be connected to the ACURT Reader Ports.

See the installation sheets packaged with the reader for specifications and other reader information.

Wiring HID ProxPoint Plus 6005

Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

Figure 22.HID ProxPoint Plus 6005

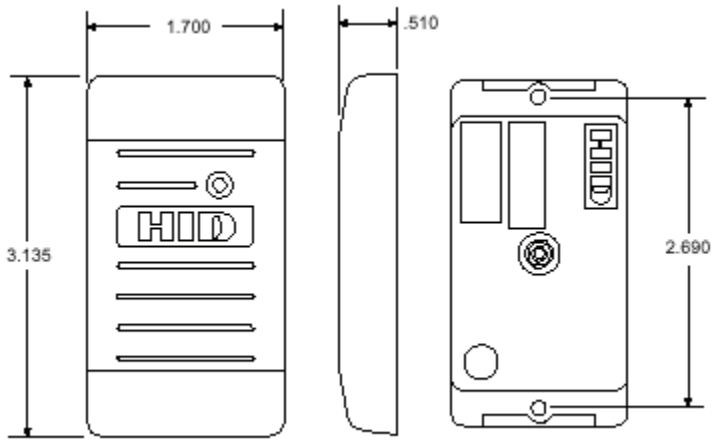


Table 45. Wiring HID ProxPoint Reader to the ACURT

Reader Wire Color	Description	Connection to ACURT2 TB2 or TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12 or TB15 Reader 2 or Reader 3	
Red	+12 Volts	Pin 1	+12 VDC	Pin 1	+12 VDC
Black	Ground	Pin 3	0V	Pin 3	0V
Green	Data 0	Pin 4	Data 0	Pin 4	Data 0
White	Data 1	Pin 5	Data 1	Pin 5	Data 1
Shield	Shield Ground	Pin 3	0V	Pin 3	0V
Orange	Green LED	Pin 7	Green LED	Pin 7	Green LED
Brown	Red LED	Pin 6	Red LED	Pin 6	Red LED
Yellow	Beeper	Pin 8	Buzzer	Pin 8	Buzzer
Blue	Data Hold	No Connection		No Connection	
Violet	Card Present	No Connection		No Connection	

The reader can be installed up to a maximum cable distance of 500 feet (152 meters) from the ACURT2 or ACURT4 using Belden cable #9514 or equivalent (4 pairs) 22 AWG, over-all foil shield.

HID ProxPoint Plus 6005 Point to Point Wiring

Figure 23.HID ProxPoint Plus 6005 Point to Point Wiring (ACURT2 and 4)

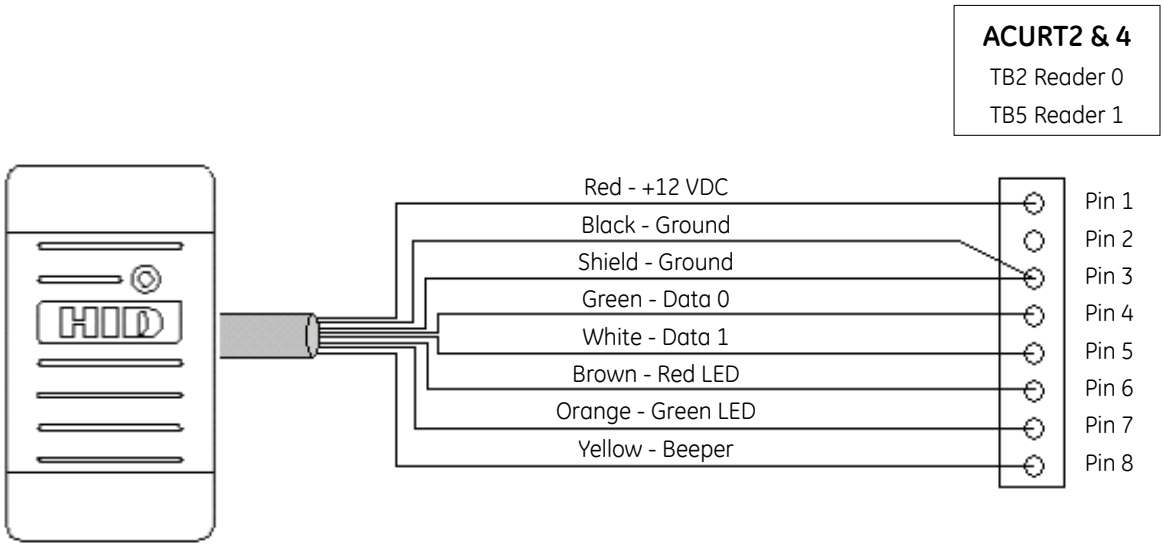
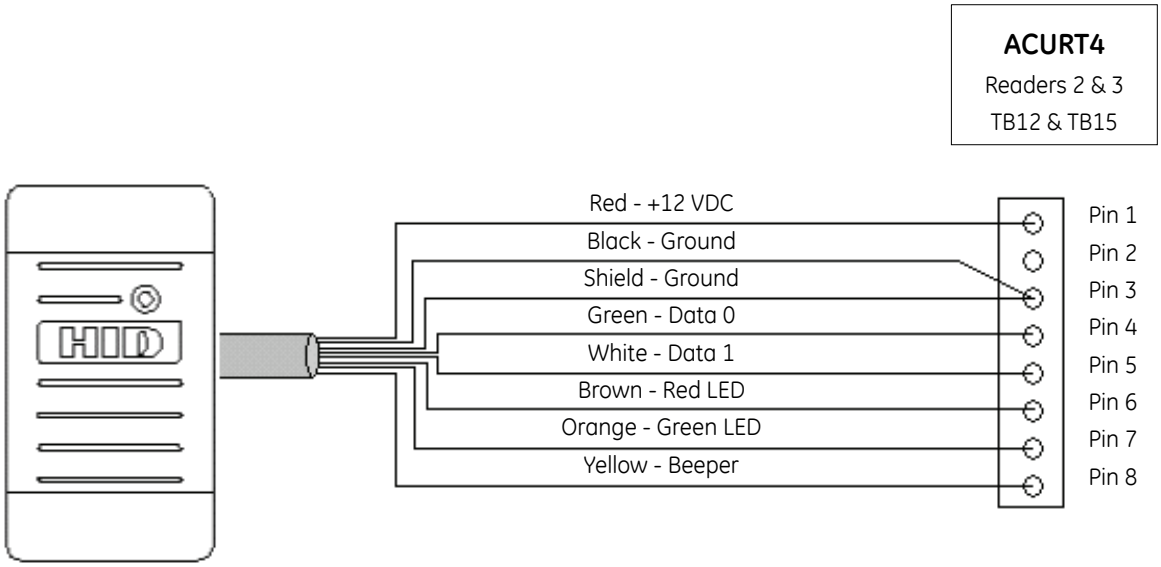


Figure 24.HID ProxPoint Plus 6005 Point to Point Wiring - ACURT4 Only



Wiring HID MiniProx Model 5365 Reader

See the installation sheets packaged with the reader for specifications and other reader information.

Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

Figure 25.HID MiniProx 5365

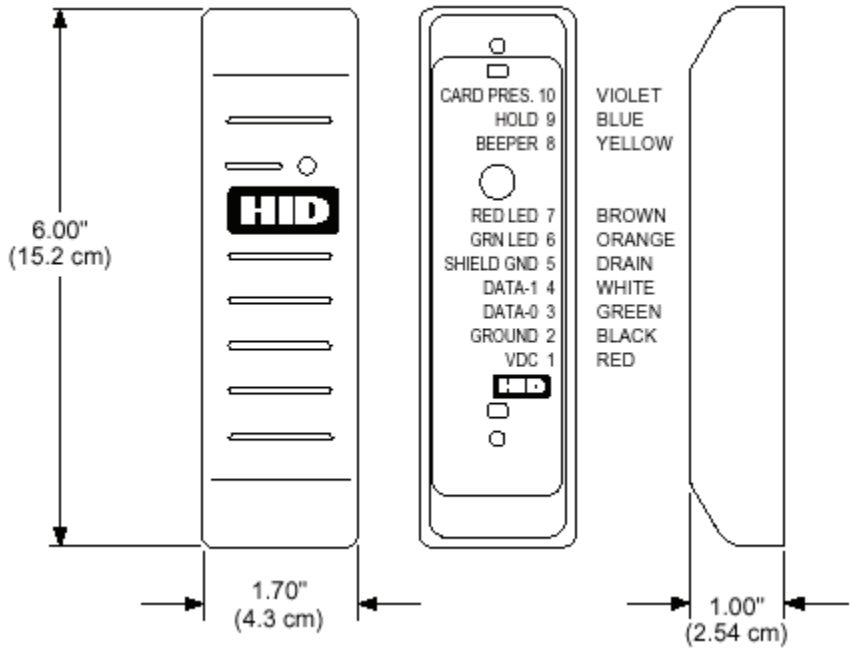


Table 46. Wiring HID MiniProx Model 5365 Reader to the ACURT

Reader Wire Color	Description	Connection to ACURT2 TB2 or TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12 or TB15 Reader 2 or Reader 3	
Red	+12 Volts	Pin 1	+12 VDC	Pin 1	+12 VDC
Black	Ground	Pin 3	0V	Pin 3	0V
Green	Data 0	Pin 4	Data 0	Pin 4	Data 0
White	Data 1	Pin 5	Data 1	Pin 5	Data 1
Shield	Shield Gnd	Pin 3	Ground	Pin 3	Ground
Orange	Green LED	Pin 7	Green LED	Pin 7	Green LED
Brown	Red LED	Pin 6	Red LED	Pin 6	Red LED
Yellow	Beeper	Pin 8	Buzzer	Pin 8	Buzzer
Blue	Data Hold	No Connection		No Connection	
Violet	Card Present	No Connection		No Connection	

The reader can be installed up to a maximum cable distance of 500 feet (152 meters) from the ACURT2 or ACURT4 using Belden cable #9514 or equivalent (4 pairs) 22 AWG, over-all foil shield.

HID MiniProx Model 5365 Point to Point Wiring

Figure 26.HID MiniProx Model 5365 Point to Point Wiring (ACURT2 and 4)

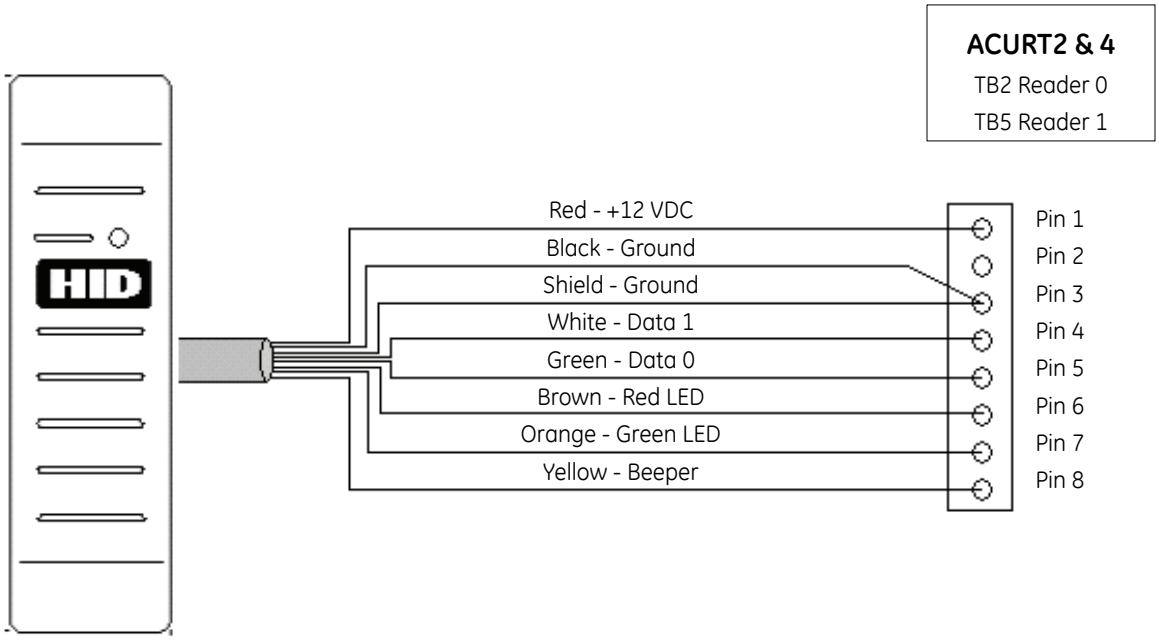
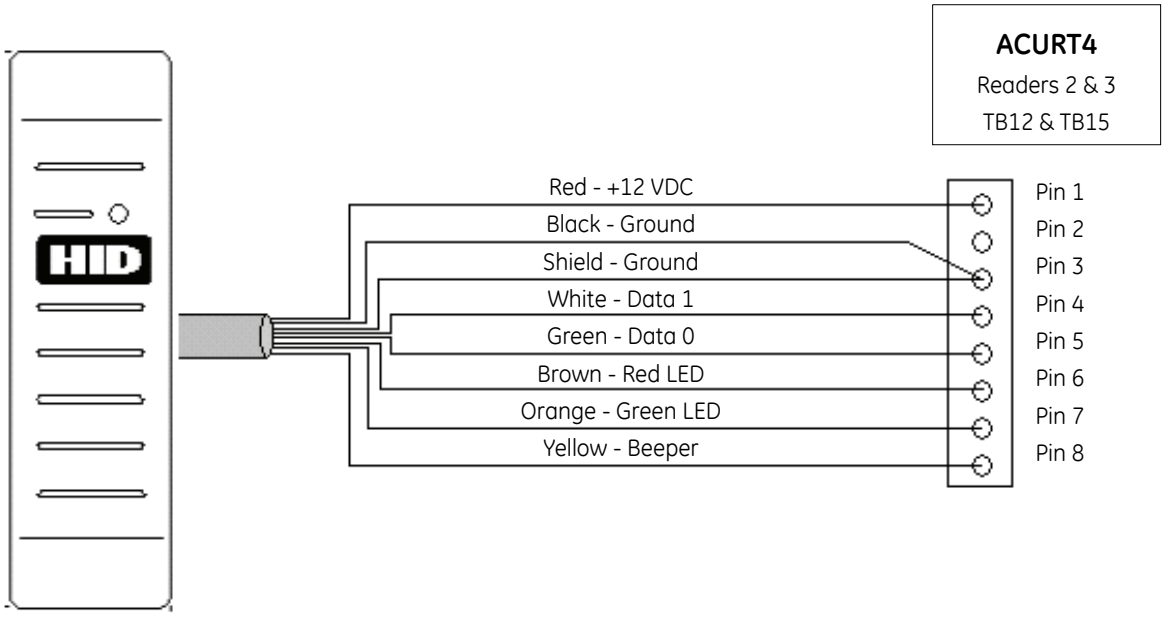


Figure 27.HID MiniProx Model 5365 Point to Point Wiring - ACURT4 Only



Wiring Optional HID ProxPro Model 5355 Reader

See the installation sheets packaged with the reader for specifications and other reader information. Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

Figure 28.HID ProxPro 5355

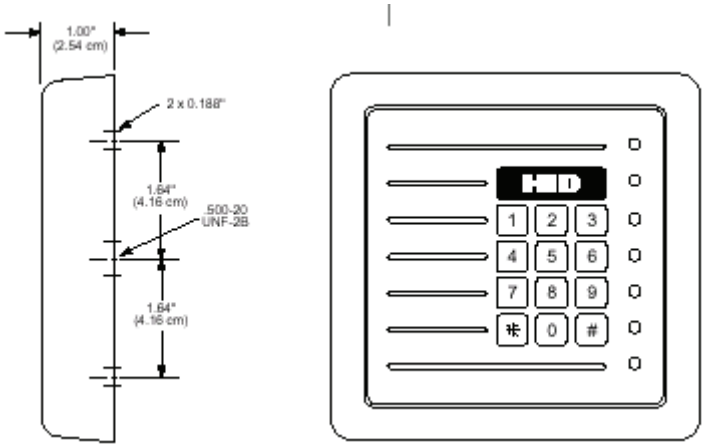


Table 47. Wiring HID ProxPro Model 5355 Reader to the ACURT

Reader TB1	Description	Connection to ACURT2 TB2 or TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12 or TB15 Reader 2 or Reader 3	
1	+12 Volts DC	Pin 1	+12 VDC	Pin 1	+12 VDC
2	Ground	Pin 3	0V	Pin 3	0V
3	Data 0	Pin 4	Data 0	Pin 4	Data 0
4	Data 1	Pin 5	Data 1	Pin 5	Data 1
5	Return	No Connection		No Connection	
6	Green LED	Pin 7	Green LED	Pin 7	Green LED
7	Red LED	Pin 6	Red LED	Pin 6	Red LED
8	Beeper	Pin 8	Buzzer	Pin 8	Buzzer
9	Hold/Card Present	No Connection		No Connection	
10	Tamper Common	No Connection		No Connection	
11	Tamper Select	No Connection		No Connection	

The reader can be installed up to a maximum cable distance of 500 feet (152 meters) from the ACURT2 or ACURT4 using Belden cable #9514 or equivalent (4 pairs) 22 AWG, over-all foil shield.

DIP Switch SW1 should be set as listed below.

Table 48. DIP Switch SW1 Settings

SW1	ON	OFF	Function Description
1	X		Hardware Identity
2	X		Beeper Control
3		X	Green LED Control
4	X		Keypad
5	X		Single/Dual LED Control
6	X		Wiegand Data 1 Bias
7	X		
8	X		Not Used

P1 jumper 1 and 2 when mounted on a metallic surface other wise jumper 2 and 3.
P2 jumper should be on 2 and 3.

Wiring Optional HID MaxiProx Model 5375 Long Range Reader

See the installation sheets packaged with the reader for specifications and other reader information.

Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

Figure 29.HID MaxiProx 5375 Long Range Reader

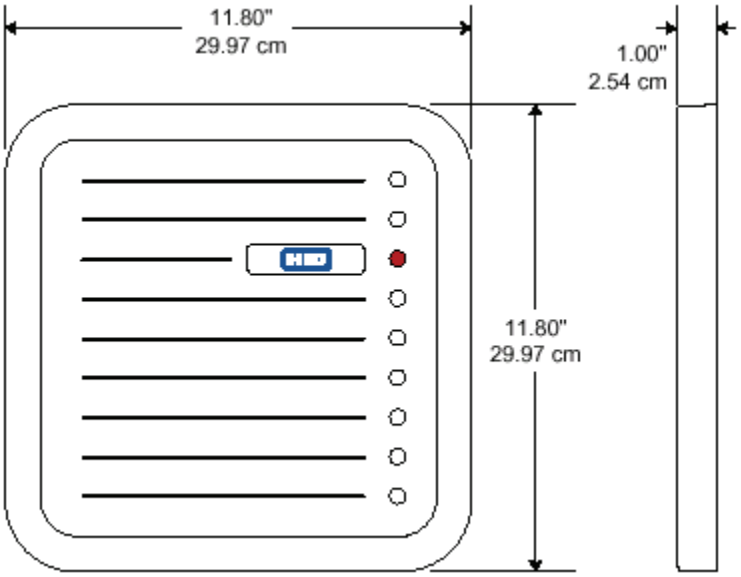


Table 49. Wiring HID MaxiProx Model 5375 Reader TB1 to the ACURT

5375 Reader TB1	Description	Connection to ACURT2 TB2 or TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12 or TB15 Reader 2 or Reader 3	
1	+24 Volts	24 VDC (2-Amp minimum) Aux power required		24 VDC (2-Amp minimum) Aux power required	
2	Shield Do not connect at reader	Pin 3	Ground	Pin 3	Ground
3	Ground	Pin 3	Ground	Pin 3	Ground

Table 50. Wiring HID MaxiProx Model 5375 Reader TB1 Tamper to the ACURT

5375 Reader TB1	Description	Connection to ACURT2 TB3 or TB6 Reader 0 or Reader 1		Connection to ACURT4 TB13 or TB16 Reader 2 or Reader 3	
4	Tamper	Pin 5	Z2 spare input	Pin 5	Z2 spare input
5	Tamper	Pin 6		Pin 6	

Table 51. Wiring HID MaxiProx Model 5375 Reader TB2 to the ACURT

5375 Reader TB 2	Description	Connection to ACURT2 TB2/TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12/TB15 Reader 2 or Reader 3	
1	Data 0	Pin 4	Data 0	Pin 4	Data 0
2	Data 1	Pin 5	Data 1	Pin 5	Data 1
4	Green LED	Pin 7	Green LED	Pin 7	Green LED
5	Red LED	Pin 6	Red LED	Pin 6	Red LED
6	Beeper	Pin 8	Buzzer	Pin 8	Buzzer
3, 7, 8, & 9	Not Used				

Note: The reader can be installed up to a maximum cable distance of 500 feet (152 meters) from the ACURT2 or ACURT4.

Table 52. DIP Switch SW1 Factory Defaults

SW1	ON	OFF	Function Description
1	X		Wiegand Data Mode
2	X		Wiegand Data Mode
3	X		Wiegand Data Mode
4	X		Beep on Valid Card Read
5		X	Flash Green After Valid Card Read
6	X		External Dual LED control
7		X	Not Used
8		X	Not Used

Table 53. DIP Switch SW2 Settings

SW2	ON	OFF	Function Description
1	X		Leave as shown; not used.
2		X	
3		X	
4		X	
5		X	
6		X	
7		X	
8		X	

Table 54. DIP Switch SW 5 Settings

SW 5	ON	OFF	Function Description
1	X		Wiegand Data 0 Non-Isolated Output
2	X		Wiegand Data 1 Non-Isolated Output
3	X		Leave as shown; not used.
4		X	
5		X	
6		X	
7		X	
8		X	

Jumper Pins on 5375 Reader

Table 55. Jumper Pin settings

Pin Jumper No.	Function	Position	Comment
P1	Tamper NC	2 & 3	Closed circuit tamper; tamper use optional; must run alarm wire to Z2
P2	DC Voltage	No Jumper	Factory default +24 VDC
P3	Interface jumpers (Wiegand Format)	1 & 2	Used with Dip switches SW1 & SW5; See mode chart below
P4		1 & 2	

Notes:

Factory default is no jumper on P2. The reader uses 24 VDC in this configuration.

Use a quality 24 VDC **linear type power** supply; the minimum current requirement is 2 Amperes per 5375 reader. See page 5 of 20, #9 of the Parts List in the HID installation manual.

The ground of the reader and the ground of the power supply must be common. Do this by connecting 0V (negative) of the **linear power supply** to TB2-3 or TB5-3 of the ACURT2 or TB12-3 or TB15-3 of the ACURT4.

Use of a tamper switch is optional; if one is used, it is not internal and requires a wired alarm zone.

Pins 3 and 4 jumpers are use in conjunction with the settings on SW 1 and SW 5 to provide a Wiegand format output. See Mode Chart table below.

The HID installation manual 5375-901 that comes with the 5375 reader should be used as an additional guide.

Mode Chart

Table 56. 5375 Reader Switch Settings For Wiegand Mode

Mode	SW1 - 1	SW1 - 2	SW1 - 3	SW5 - 3	SW5 - 4	SW5 - 5	P3 & P4 Jumpers
Wiegand	ON	ON	ON	NA	NA	NA	1 & 2

Wiring Optional K11L Keypad

Figure 30.UTC Fire & Security K11L Keypad

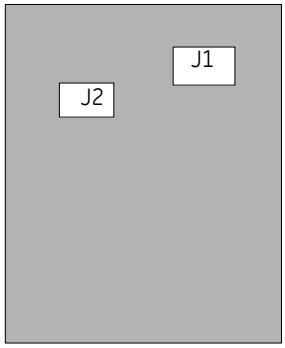
Refer to *Table 10 on page 31*, *Table 11* on page 32, and *Table 13* on page 33 for reader 0 and 1 connections and *Table 16* on page 35 through *Table 18* on page 37 for readers 2 and 3 connections, available only on the ACURT4 controller.

The keypad can be installed up to a maximum cable distance of 500 feet (152 meters) from the ACURT2 or ACURT4 using Belden cable #9514 or equivalent (4 pairs) 22 AWG, over-all foil shield.

Table 57. Wiring UTC Fire & Security K11L Keypad to the ACURT

J1 on K11L	Description	Connection to ACURT2 TB2 or TB5 Reader 0 or Reader 1		Connection to ACURT4 TB12 or TB15 Reader 2 or Reader 3	
Pin 1	0V	Pin 3	0V	Pin 3	0V
Pin 2	Data 1	Pin 5	Data 1	Pin 5	Data 1
Pin 3	Data 0	Pin 4	Data 0	Pin 4	Data 0
Pin 4	+5V	Pin 2	+5 VDC	Pin 2	+5 VDC
Pin 5	Green LED	Pin 7	Green LED	Pin 7	Green LED
Pin 6	Yellow LED	No Connection		No Connection	
Pin 7	Red LED	Pin 6	Red LED	Pin 6	Red LED
Pin 8	Buzzer	Pin 8	Buzzer	Pin 8	Buzzer

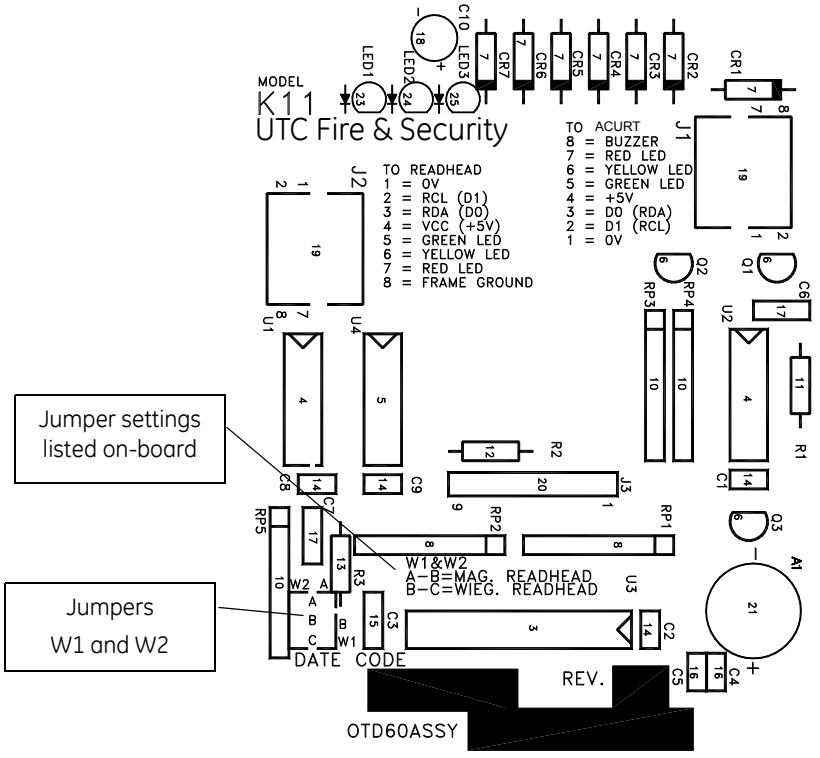
Figure 31.Rear View of the K11 Keypad.



Jumper Configuration For Reader Support

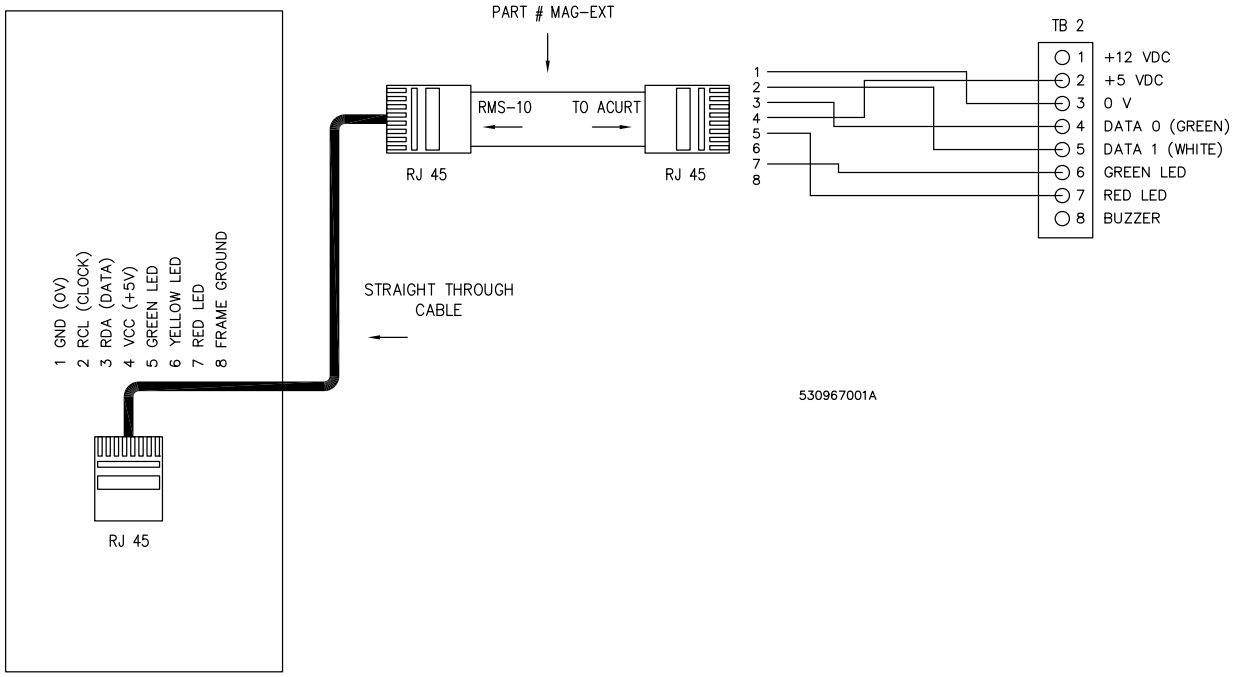
Jumpers W1 and W2 must be set to position B-C for Wiegand (typical) or A-B for magnetic stripe

Figure 32.K11L Board Only with Jumper Locations



Wiring the RMS-10 to the ACURT 2/4[1]

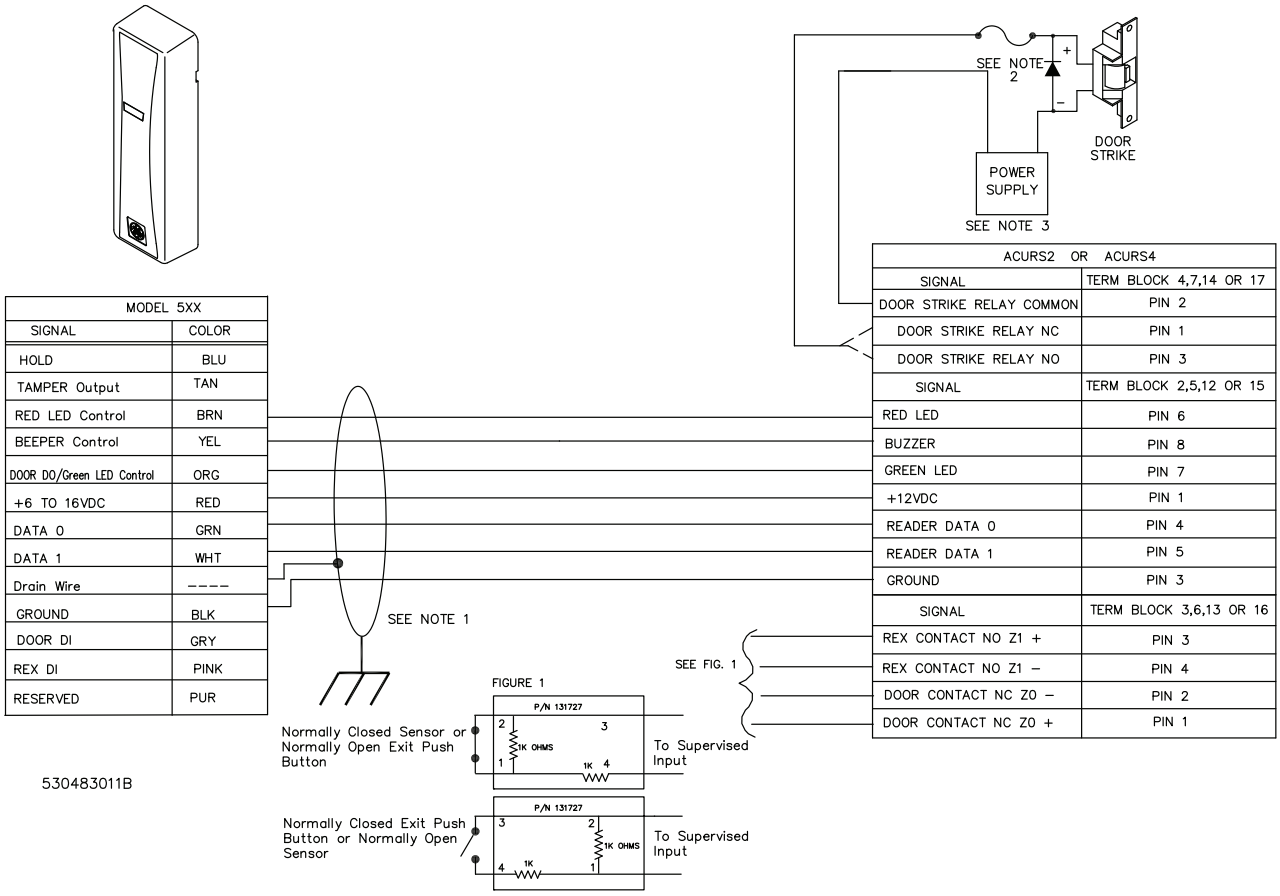
Figure 33.Wiring the RMS-10 to the ACURT



1. Not tested with Topaz by UL.

Wiring Transition Series readers to the ACURT 2/4

Figure 34.Wiring Transition Series readers to the ACURT



MODEL 5XX	
SIGNAL	COLOR
HOLD	BLU
TAMPER Output	TAN
RED LED Control	BRN
BEEPER Control	YEL
DOOR DO/Green LED Control	ORG
+6 TO 16VDC	RED
DATA 0	GRN
DATA 1	WHT
Drain Wire	----
GROUND	BLK
DOOR DI	GRY
REX DI	PINK
RESERVED	PUR

ACURS2 OR ACURS4	
SIGNAL	TERM BLOCK 4,7,14 OR 17
DOOR STRIKE RELAY COMMON	PIN 2
DOOR STRIKE RELAY NC	PIN 1
DOOR STRIKE RELAY NO	PIN 3
SIGNAL	TERM BLOCK 2,5,12 OR 15
RED LED	PIN 6
BUZZER	PIN 8
GREEN LED	PIN 7
+12VDC	PIN 1
READER DATA 0	PIN 4
READER DATA 1	PIN 5
GROUND	PIN 3
SIGNAL	TERM BLOCK 3,6,13 OR 16
REX CONTACT NO Z1 +	PIN 3
REX CONTACT NO Z1 –	PIN 4
DOOR CONTACT NC Z0 –	PIN 2
DOOR CONTACT NC Z0 +	PIN 1

Chapter 4 Remote Expansion Modules

This chapter provide in depth information about how Remote Expansion Modules (RIMs and RRMs) are installed and wired to the TOPAZ ACURT2 and ACURT4 Panels.

This includes:

Remote Input Module

The Remote Input Module (RIM) provides the interface from the ACURT controller and additional alarm sensors. The RIM consists of the electronic circuit board, and the screw terminal connector board, connected together by a ribbon cable. The RIM can be installed in its own tampered enclosure.

Each RIM provides 16 supervised inputs, 3 unsupervised inputs, and 2 relay outputs (dry contact relays (SPDT) Single Pole Double Throw).

The Remote Input Module connects to the expansion port on the ACURT. The ACURT2 and ACURT4 expansion port can support four (4) remote modules (RIM, RRM).

Note: The Remote Input Module requires optional 24 VDC (±15%) power supply.

Each of the 16 alarm inputs is supervised as 4-states: Alarm, Secure, Open, and Short.

A pair of 1 K ohm resistors, at the sensor end of each alarm circuit, ensures that the line resistance is typically 1 K ohm when the alarm is in the secure state.

Table 58. Alarm Zone Resistance Value

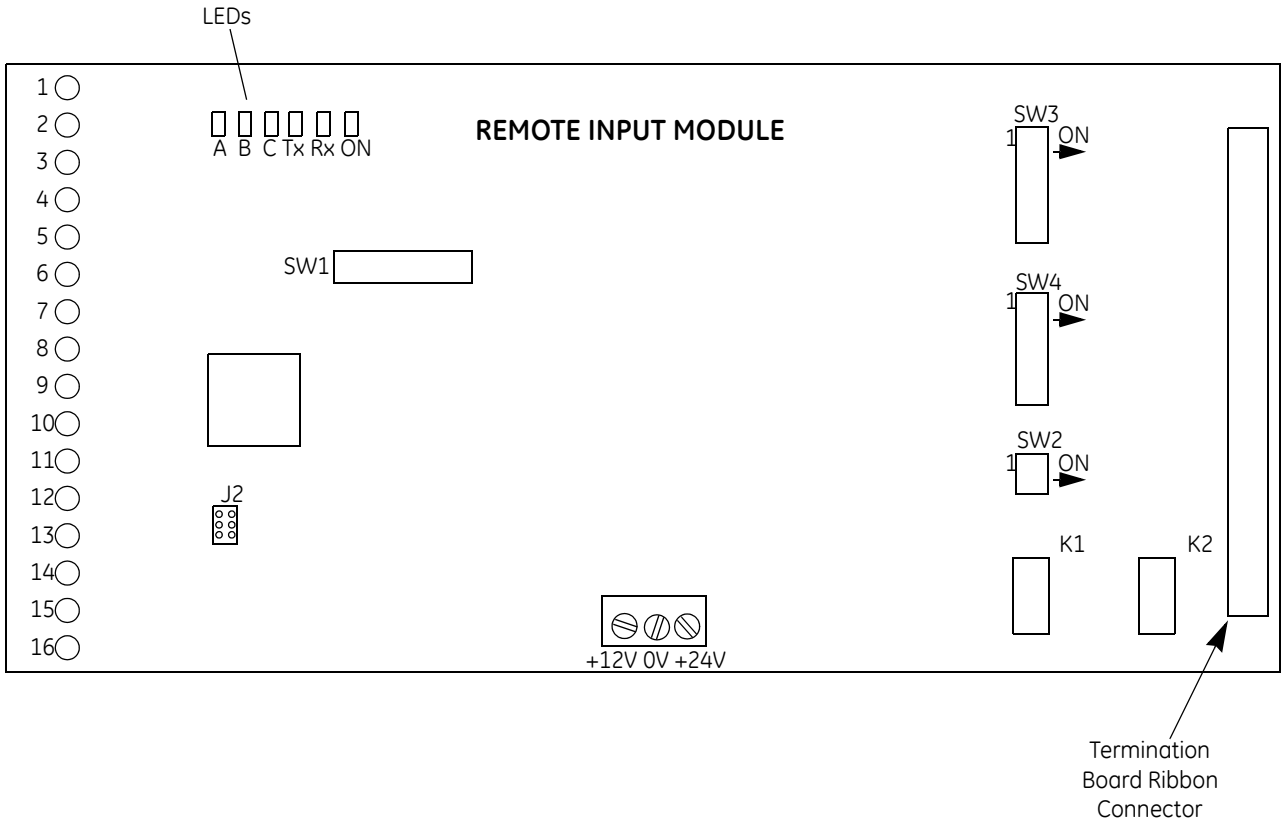
Zone Input State	Sensor Circuit in Ohms Normally Closed	Sensor Circuit in Ohms Normally Open
Secure	1000	1000
Active	2000	500
Open	> 50000	> 50000
Short	< 50	< 50

WARNING: Do not use the ACURT controller, Remote Input Module (RIM) or Remote Relay Module (RRM) to switch any voltage above 30 volts. Failure to heed this WARNING: can cause death, personal injury, or damage to unit(s).

Remote Input Module Circuit Board Layout

Figure 35 shows the location of components discussed in this section for Remote Input Module.

Figure 35. RIM Component Location



RIM Terminal Block Connector Pin Numbers

Table 59 through *Table 64* show RIM terminal block wiring connections. Refer to *Table 9* on page 30 for applicable ACURT controller connections and cable identifications.

RIM Connections for Expansion Port

Table 59. RIM Wiring Connections for Expansion Port 1

Pin No.	Term. Strip	Description	(Filled in by Installer) Connected to:	Cable Color (Filled in by Installer)
1	K2 N.O.	Aux Relay 2 Normally Open		
2	K2 N.C.	Aux Relay 2 Normally Closed		
3	K2 C.	Aux Relay 2 Common		
4	K1 N.O.	Aux Relay 1 Normally Open		
5	K1 N.C.	Aux Relay 1 Normally Closed		
6	K1 C.	Aux Relay 1 Common		
7	+24V	+ 24 VDC In	Aux Power	
8	GND	0 V	Aux Power	
9	R-	From ACURT TX (-)	ACURT TB8-3	
10	R+	From ACURT TX (+)	ACURT TB8-2	
11	T-	To ACURT RX (-)	ACURT TB8-5	
12	T+	To ACURT RX (+)	ACURT TB8-4	

- For cable from the RIM to ACURT, the Belden cable numbers suggested:

  No. 9842-24 AWG for 4000 feet (1220 meters) maximum distance.
- Install one RS-485 terminator on each expansion port.
- Install RS-485 terminator on the farthest expansion module.

Note: Remote Modules should be multi-dropped with no more than a 10-foot stub.

CAUTION: The Remote Input Module requires 24 V DC power. An optional DC power supply is available. DO NOT use the plug in power supply to power this board. It produces 24V AC Power and will damage the board.

RIM Connections for TB1 - TB3

Zones Inputs 1-6

Table 60. RIM Wiring Connections for TB1 - TB3

Pin No.	Term. Strip	Description	(Filled in by Installer) Connected to:	Cable Color (Filled in by Installer)
1	IN1	Zone Input 1		
2	IN1	Zone Input 1		
3	IN2	Zone Input 2		
4	IN2	Zone Input 2		
5	IN3	Zone Input 3		
6	IN3	Zone Input 3		
7	IN4	Zone Input 4		
8	IN4	Zone Input 4		
9	IN5	Zone Input 5		
10	IN5	Zone Input 5		
11	IN6	Zone Input 6		
12	IN6	Zone Input 6		

Note: Refer to *Figure 6* on page 12 for wiring and terminating the field device to the RIM input.

RIM Wiring Connections for TB4 - TB7

Zone Inputs 7-12

Table 61. RIM Wiring Connections for TB4 - TB7

Pin No.	Term. Strip	Description	(Filled in by Installer) Connected to:	Cable Color (Filled in by Installer)
1	IN12	Zone Input 12		
2	IN12	Zone Input 12		
3	IN11	Zone Input 11		
4	IN11	Zone Input 11		
5	IN10	Zone Input 10		
6	IN10	Zone Input 10		
7	IN9	Zone Input 9		
8	IN9	Zone Input 9		
9	IN8	Zone Input 8		
10	IN8	Zone Input 8		
11	IN7	Zone Input 7		
12	IN7	Zone Input 7		

Zone Input Resistance States

Table 62. Input Zone Status By Resistance

Zone Input State	Sensor Circuit in Ohms Normally Closed	Sensor Circuit in Ohms Normally Open
Secure	1000	1000
Active	2000	500
Open	> 50000	> 50000
Short	< 50	< 50

Note: Refer to *Figure 6* on page 12 for wiring and terminating the field device to the RIM input.

LEDs for Alarm Zone Status

Table 63. Alarm Zone Status LED indicators.

LEDs 1 - 16	Status of 16 Alarm points	Green - Secure Red - Active Yellow - Trouble (open or short, etc.)

RIM Connections for TB8 - TB10

Zone Inputs 13-19

Table 64. RIM Wiring Connections for TB8 - TB10

Pin No.	Term. Strip	Description	Connected to:	Cable Color
1	IN13	Zone Input 13		
2	IN13	Zone Input 13		
3	IN14	Zone Input 14		
4	IN14	Zone Input 14		
5	IN15	Zone Input 15		
6	IN15	Zone Input 15		
7	IN16	Zone Input 16		
8	IN16	Zone Input 16		
9	IN17	Unsupervised Zone Input 17		
10	GND	Ground		
11	IN18	Unsupervised Zone Input 18		
12	GND	Ground		
13	IN19	Unsupervised Zone Input 19		
14	GND	Ground		

Note: Refer to *Figure 6* on page 12 for wiring and terminating the field device to the RIM input.

Setting the DIP Switches on the RIM

SW1 Switch Settings

The 8-position DIP switch (SW1) located on the RIM (*Figure 35*) should be set according to *Table 65*

Table 65. RIM DIP Switch Settings

Switch Number				Description
SW-1	SW-2			Module address:
Off	Off			Addr 4
On	Off			Addr 5
Off	On			Addr 6
On	On			Addr 7
SW-4				Alarm Latching:
On				Enables latching – Associated LEDs for zones 1-16 will latch on alarm. Zone 18 will reset cleared zone LEDs.
Off				Disables latching
SW-3	SW-5	SW-6	SW-8	Zone Termination:
Off	Off	Off	Off	0.5K alarm, 1K safe, 2K alarm
On	Off	Off	Off	75 ohms alarm, 150 safe, 300 alarm
Off	On	Off	Off	1K safe, 3K alarm, 5-7K ground
On	On	Off	Off	1K safe, 3K alarm
Off	Off	On	Off	6.8K safe, 24K alarm
On	Off	On	Off	1.5K safe, 3K alarm
Off	On	On	Off	10K safe, 5K alarm
On	On	On	Off	5K safe, 10K alarm
				8 spares

SW2 Switch Settings for RS485 Termination

The 2-position DIP switch (SW2) located on the RIM (*Figure 35*) is used to terminate the RIMs RS485 communication.

Note: The switches on the RIM can be changed while power is still applied to the board and take effect immediately.

Table 66. RIM Switch SW2 for RS485 Terminations.

Switch SW2	Description
SW1	Received Pair Termination
SW2	Transmit Pair Termination

SW3 and SW4 Switch Settings for Input Zone Termination

The 8-position DIP switches (SW3 and SW4) located on the RIM (*Figure 35*) are used to terminate the RIMs Inputs.

Note: The switches on the RIM can be changed while power is still applied to the board and take effect immediately.

Table 67. RIM Switch SW3 for Input Terminations.

Switch SW3	Description
SW1	Zone 0 Termination[1]
SW2	Zone 1 Termination[1]
SW3	Zone 2 Termination[1]
SW4	Zone 3 Termination[1]
SW5	Zone 4 Termination[1]
SW6	Zone 5 Termination[1]
SW7	Zone 6 Termination[1]
SW8	Zone 7 Termination[1]

1. Switch in ON position will terminate the zone with 1K resistor

Table 68. RIM SW4 input terminations

Switch SW4	Description
SW1	Zone 8 Termination[1]
SW2	Zone 9 Termination*
SW3	Zone 10 Termination*
SW4	Zone 11 Termination*
SW5	Zone 12 Termination*
SW6	Zone 13 Termination*
SW7	Zone 14 Termination*
SW8	Zone 15 Termination*

1. Switch in ON position will terminate the zone with 1K resistor

Setting the Jumper on the RIM

Jumper W1 and W2 Settings

Jumpers W1 and W2 located on the RIM (*Figure 35*) are used to select if 27VDC will be supplied by relays K1 and K2 on the RIMs RS485 communication.

Table 69. RIM Jumpers W1 and W2.

Jumper	Description
W1	2 & 3 (K1 Dry) 1 & 2 (K1 +27V on K1C)
W2	2 & 3 (K2 Dry) 1 & 2 (K2 +27V on K2C)

Alarm Numbers for the Remote Input Module

Table 70. RIM Alarm Numbers for UTC Fire & Security's TOPAZ

Zone Input	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
IN1	128	144	160	176
IN2	129	145	161	177
IN3	130	146	162	178
IN4	131	147	163	179
IN5	132	148	164	180
IN6	133	149	165	181
IN7	134	150	166	182
IN8	135	151	167	183
IN9	136	152	168	184
IN10	137	153	169	185
IN11	138	154	170	186
IN12	139	155	171	187
IN13	140	156	172	188
IN14	141	157	173	189
IN15	142	158	174	190
IN16	143	159	175	191
IN17	96	100	104	108
IN18	97	101	105	109
IN19	98	102	106	110
RIM Off-line	99	103	107	111

Relay Numbers for RIM Remote Input Module

Table 71. RIM Relay Numbers

Relay Number	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
K1	32	34	36	38
K2	33	35	37	39

Field Testing the RIM

Field Wiring Test on the RIM

After making all connections and prior to connecting the ribbon cable to the RIM, the following tests should be made. Connections should already be completed at the ACURT and external power supply.

Table 72. RIM Test Points and Voltages

From	To	Voltage	Tolerance
GND	+24V	+ 24 VDC	3.5 VDC
T+	T-	+ 4.0 VDC *	0.5 VDC
R+	R-	+ 2.5 VDC *	0.5 VDC
+24V	Bldg. Gnd.	24 VDC	3.5 VDC
GND	Bldg. Gnd.	0 VDC	0.5 VDC
T+	Bldg. Gnd.	Less than 6.0 VDC	N/A
T-	Bldg. Gnd.	Less than 6.0 VDC	N/A
R+	Bldg. Gnd.	Less than 6.0 VDC	N/A
R-	Bldg. Gnd.	Less than 6.0 VDC	N/A

Notes:

- After the first reader is connected, these voltages will modulate due to data on the line.
- Most digital voltmeters should indicate about 2.0 VDC.

Power-Up Self Test on the RIM

The Remote Input Module should always be tested after installation. The indicators for the RIM are the red LEDs located on the component board. See *Figure 35* for the locations of LEDs. The LEDs will light as shown in *Table 73*.

Table 73. Power-up LED Indicators on the RIM

LED	Description
A	ON at power-up
B	ON when successful RAM test is finished
C	ON when successful PROM test and initialization completed
ON	ON when power is applied
LEDs 1 - 16	All green, then all yellow, then all red

Normal Operation Test on the RIM

The LED's on the Remote Input Module will light as follows:

Table 74. RIM and RIM Normal LED Status

LED	Description	
A	On when board is Communicating to ACU	
B	Heart 1 Hz Flash-CPU is Active	
C	(Always Off)	
Tx	Flashing when transmitting data to ACU	
Rx	Flashing when receiving data from ACU	
ON	ON when Power is applied to board	
D57	ON when relay 2 is energized	
D52	ON when relay 1 is energized	
LED's 1 - 16	Status of 16 Alarm points	Green - Secure Red - Active Yellow - Trouble (open or short, etc.)

Replacing The RIM

This procedure enables the user to replace the RIM.

WARNING: Be sure to remove all power from the RIM to avoid personal injury or damage to the unit.

1. Remove all power from the RIM (from auxiliary power source).
2. Open RIM cover to access the wiring.

CAUTION: The printed circuit boards or modules contain static-susceptible devices. Prior to handling them, be sure to follow the two rules below to avoid damaging these devices by static electricity:

- Handle all static-sensitive components at a static-safeguarded work area.
- Transport all static-sensitive components in static-shield containers or packages.

3. Note the orientation and disconnect the ribbon cable on the RIM.
4. Note the positions of the DIP switches (*Figure 35*). Set the switch settings on the replacement PCB to the required positions.
5. Note the revision level of PROM U3 located on the RIM. See *Figure 35*. The revision letter should be the same or higher.
6. Release the board from the standoffs by squeezing the pit of the standoff with a pair of needle nose pliers, then pull (gently) the RIM circuit board from each of the snap-in standoffs and remove the circuit board.
7. Position the replacement circuit board on the snap-in standoffs until the circuit board firmly rests in place on the standoffs.
8. Reconnect the ribbon cable removed in step 3 and set DIP switches.
9. Perform *Power-Up Self Test on the RIM* on page 78 and *Normal Operation Test on the RIM* on page 79.

Optional Remote Relay Module

The Remote Relay Module (RRM) provides eight (8) single pole double throw (SPDT) and eight (8) double pole double throw (DPDT) dry contact relays. Each relay is rated 2 Amps at 30 VDC.

Three LEDs provide heartbeat feedback and online status. Nineteen hardware controlled LEDs provide communication, power, and relay status.

Two unsupervised inputs are available for power fault and cabinet tamper.

The Remote Relay Module connects to the expansion port on the ACURT. The ACURT expansion port can support four (4) remote modules (RIM, RRM).

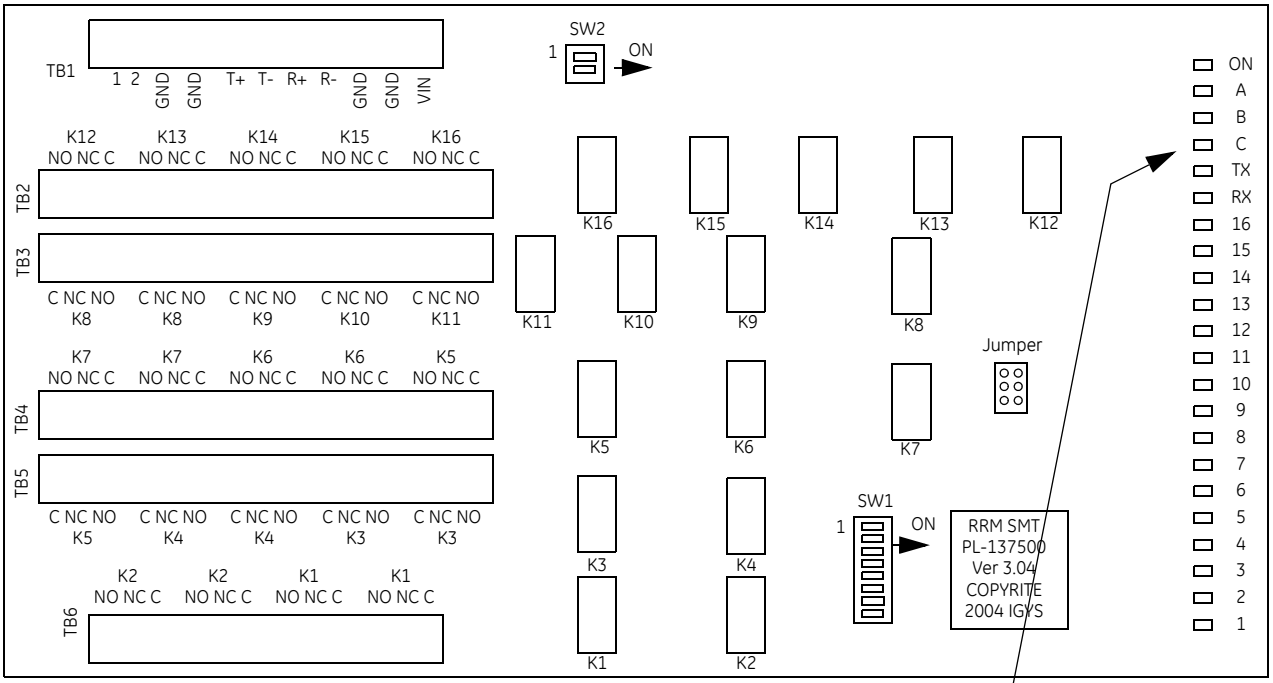
Note: The Remote Relay Module requires optional 24 VDC (±15%) power supply.

WARNING: Do not use the ACURT controller, Remote Input Module (RIM) or Remote Relay Module (RRM) to switch any voltage above 30 volts. Failure to heed this WARNING can cause death, personal injury, or damage to unit(s).

Remote Relay Module Circuit Board

Figure 36 shows the location of components discussed in this section for the RRM.

Figure 36. Locations of Components on RRM



LED Communication Status
ON - Power is applied to the board
A - On When Board is Communicating to ACU
B - Heart beat 1 Hz Flash - CPU is Active
C - (Always Off)
Tx - Flashing when transmitting data
Rx - Flashing when receiving data

RRM Terminal Block Connector Pin Numbers

Table 75 though *Table 80* show RRM terminal block wiring connections. Refer to *Table 9* for applicable ACURT controller connections and cable identifications.

RRM Connections for Expansion port 1

Table 75. RRM Wiring Connections for Expansion port 1

Term. Strip	Description	Connected to:	Cable Color
I1	Unsupervised alarm 1		
I2	Unsupervised alarm 2		
GND	Alarm common ground		
GND	Alarm common ground		
T+	Transmit +	ACURT TB8-4	
T-	Transmit -	ACURT TB8-5	
R+	Receive +	ACURT TB8-2	
R-	Receive -	ACURT TB8-3	
GND	Signal ground	ACURT TB8-1	
GND	Ground	Aux power	
VIN	+ 24 VDC In	Aux power	

Notes:

- ACURT2 controller has one (1) expansion port and the ACURT4 has two (2) expansion ports. Four (4) expansion modules Remote Relay Modules (RRM) and Remote Input Modules (RIM) may be multi-dropped on each port.
- Belden cable numbers suggested:

  No. 9824-24 AWG for 4000 feet (1220 meters) maximum distance.
- Install one RS-484 terminator on each expansion port.
- Install RS-485 terminator on the farthest ACURT expansion cable.
- Remote Modules should be multi-dropped with no more than a 10-foot stub.

WARNING: The Remote Relay Module requires 24 V DC power. An optional DC power supply is available. DO NOT use the plug in power supply to power this board. It produces 24V AC Power and will damage the board.

RRM Connections for Relays 1 & 2

Table 76. RRM Wiring Connections for Relays 1 & 2

Term. Strip	Description	Connected to:	Cable Color
K2 NO	Relay 2 Normally Open		
K2 NC	Relay 2 Normally Closed		
K2 C	Relay 2 Common		
K2 NO	Relay 2 Normally Open		
K2 NC	Relay 2 Normally Closed		
K2 C	Relay 2 Common		
K1 NO	Relay 1 Normally Open		
K1 NC	Relay 1 Normally Closed		
K1 C	Relay 1 Common		
K1 NO	Relay 1 Normally Open		
K1 NC	Relay 1 Normally Closed		
K1 C	Relay 1 Common		

Note: Relay 1-7 on the RRM is DPDT (double pole double throw) and both poles are available.

RRM Connections for Relays 3 - 5

Table 77. RRM Wiring Connections for Relays 3 - 5

Term. Strip	Description	Connected to:	Cable Color
K5 C	Relay 5 Common		
K5 NC	Relay 5 Normally Closed		
K5 NO	Relay 5 Normally Open		
K4 C	Relay 4 Common		
K4 NC	Relay 4 Normally Closed		
K4 NO	Relay 4 Normally Open		
K4 C	Relay 4 Common		
K4 NC	Relay 4 Normally Closed		
K4 NO	Relay 4 Normally Open		
K3 C	Relay 3 Common		
K3 NC	Relay 3 Normally Closed		
K3 NO	Relay 3 Normally Open		
K3 C	Relay 3 Common		
K3 NC	Relay 3 Normally Closed		
K3 NO	Relay 3 Normally Open		

Note: Relay 1-7 on the RRM is DPDT (double pole double throw) and both poles are available.

RRM Connections for Relays 5-7

Table 78. RRM Wiring Connections for Relays 5-7

Term. Strip	Description	Connected to:	Cable Color
K7 NO	Relay 7 Normally Open		
K7 NC	Relay 7 Normally Closed		
K7 C	Relay 7 Common		
K7 NO	Relay 7 Normally Open		
K7 NC	Relay 7 Normally Closed		
K7 C	Relay 7 Common		
K6 NO	Relay 6 Normally Open		
K6 NC	Relay 6 Normally Closed		
K6 C	Relay 6 Common		
K6 NO	Relay 6 Normally Open		
K6 NC	Relay 6 Normally Closed		
K6 C	Relay 6 Common		
K5 NO	Relay 5 Normally Open		
K5 NC	Relay 5 Normally Closed		
K5 C	Relay 5 Common		

Note: Relay 1-7 on the RRM is DPDT (double pole double throw) and both poles are available.

RRM Connections for Relays 8-11

Table 79. RRM Wiring Connections for Relays 8-11

Term. Strip	Description	Connected to:	Cable Color
K8 C	Relay 8 Common		
K8 NC	Relay 8 Normally Closed		
K8 NO	Relay 8 Normally Open		
K8 C	Relay 8 Common		
K8 NC	Relay 8 Normally Closed		
K8 NO	Relay 8 Normally Open		
K9 C	Relay 9 Common		
K9 NC	Relay 9 Normally Closed		
K9 NO	Relay 9 Normally Open		
K10 C	Relay 10 Common		
K10 NC	Relay 10 Normally Closed		
K10 NO	Relay 10 Normally Open		
K11 C	Relay 11 Common		
K11 NC	Relay 11 Normally Closed		
K11 NO	Relay 11 Normally Open		

RRM Connections for Relays 12-16

Table 80. RRM Wiring Connections for Relays 12-16

Term. Strip	Description	Connected to:	Cable Color
K12 NO	Relay 12 Normally Open		
K12 NC	Relay 12 Normally Closed		
K12 C	Relay 12 Common		
K13 NO	Relay 13 Normally Open		
K13 NC	Relay 13 Normally Closed		
K13 C	Relay 13 Common		
K14 NO	Relay 14 Normally Open		
K14 NC	Relay 14 Normally Closed		
K14 C	Relay 14 Common		
K15 NO	Relay 15 Normally Open		
K15 NC	Relay 15 Normally Closed		
K15 C	Relay 15 Common		
K16 NO	Relay 16 Normally Open		
K16 NC	Relay 16 Normally Closed		
K16 C	Relay 16 Common		

Setting the DIP Switches on the RRM

The RRM has an 8-position DIP Switch (SW1) located on the RRM (*Figure 36*). It should be set according to *Table 81*.

Note: The switches are read at power-up and will be ignored thereafter. If it is necessary to change a setting, power MUST be cycled OFF then, AFTER the settings are changed, back ON.

Table 81. RRM DIP Switch Settings

Switch Number	Function
Switches 1, 2 - Communication	1 = OFF 2 = OFF Address 4 1 = ON 2 = OFF Address 5 1 = OFF 2 = ON Address 6 1 = ON 2 = ON Address 7
Switch 3	Spare
Switch 4	Spare
Switch 5	Spare
Switch 6	Spare
Switch 7	Spare
Switch 8	Spare

SW2 Settings on the RRM

The 2-position DIP switch (SW2) located on the RRM (*Figure 36*) is used to terminate the RS-485 communications and should be set according to *Table 82.*

Note: The switches on the RRM can be changed while power is still applied to the board and take effect immediately.

Table 82. RRM DIP Switch SW2 Settings

Switch Number	Function
SW1	Receive Pair Termination
SW2	Transmit Pair Termination

Relay Numbers for the RRM

Table 83. Relay 128 Numbers for RRM Remote Relay Module

Relay Numbers	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
K1	112	128	144	160
K2	113	129	145	161
K3	114	130	146	162
K4	115	131	147	163
K5	116	132	148	164
K6	117	133	149	165
K7	118	134	150	166
K8	119	135	151	167
K9	120	136	152	168
K10	121	137	153	169
K11	122	138	154	170
K12	123	139	155	171
K13	124	140	156	172
K14	125	141	157	173
K15	126	142	158	174
K16	127	143	159	175

Alarm Numbers for the RRM

Table 84. RRM Alarm Numbers

Zone Number	Expansion Port Address 4	Expansion Port Address 5	Expansion Port Address 6	Expansion Port Address 7
I1	97	101	105	109
I2	98	102	106	110
RRM Off-line	99	103	107	111

Field Testing The RRM

RRM Field Wiring Test

After making all connections and prior to connecting the ribbon cable to the RRM, the following tests should be made. Connections should already be completed at the ACURT and external power supply.

Test points and expected voltages:

Table 85. RRM Test Points and Voltages

From	To	Voltage	Tolerance
GND	VIN	+ 24 VDC	3.5 VDC
T+	T-	+ 4.0 VDC *	0.5 VDC
R+	R-	+ 2.5 VDC *	0.5 VDC
+24V	Bldg. Gnd.	24 VDC	3.5 VDC
GND	Bldg. Gnd.	0 VDC	0.5 VDC
T+	Bldg. Gnd.	Less than 6.0 VDC	N/A
T-	Bldg. Gnd.	Less than 6.0 VDC	N/A
R+	Bldg. Gnd.	Less than 6.0 VDC	N/A
R-	Bldg. Gnd.	Less than 6.0 VDC	N/A

Notes:

- After the first reader is connected these voltages will modulate due to data on the line.
- Most digital voltmeters should indicate about 2.0 VDC.

Power-Up Self-Test on the RRM

The Remote Relay Module should always be tested after installation. The indicators for the RRM are the red LEDs located on the component board. The LEDs will light as follows:

Table 86. Power-up LED Indicators on the RRM

LED	Description
A	ON at power-up
B	ON when successful RAM test is finished
C	ON when successful PROM test and initialization is completed
ON	ON when power is applied

After all three LEDs have lit, LED B will flash at a 1 Hz rate.

Normal Operation Test on the RRM

The operation and status LEDs will light as follows:

Table 87. Normal LED Indicators on the RRM

LED	Description
A	ON steady when board is on-line with the ACURT controller
B	Heart beat 1 flash per second
C	Flashing when board is off-Line
Tx	Flashing when transmitting data to ACURT
Rx	Flashing when receiving data from ACURT
ON	ON when power is applied
LEDs 1 - 16	One LED per relay LED is ON when relay is energized

Replacing The RRM

This procedure enables the user to replace the RRM.

WARNING: Be sure to remove all power from the RRM to avoid personal injury or damage to the unit.

1. Remove all power from the RRM (from the ACURT controller or other auxiliary power source).
2. Open RRM cover to access the wiring.

CAUTION: The printed circuit boards or modules contain static-susceptible devices. Prior to handling them, be sure to follow the two rules below to avoid damaging these devices by static electricity:

- Handle all static-sensitive components at a static-safeguarded work area.
- Transport all static-sensitive components in static-shield containers or packages.

3. Tag and note the orientation of the 6 terminal connectors then disconnect the terminal connectors on the RRM.
4. Note the positions of the DIP switches. Set the switch settings on the replacement PCB to the same positions.
5. Note the revision level of PROM U1 located on the RRM (*Figure 36* on page 80). The revision letter should be the same or higher.
6. Release the board from the standoffs by squeezing the pit of the standoff with a pair of needle nose pliers, then pull (gently) the RRM circuit board from each of the snap-in standoffs and remove the circuit board.
7. Position the replacement circuit board on the snap-in standoffs until the circuit board firmly rests in place on the standoffs.
8. Reconnect the terminal connectors removed in step 3.
9. Perform *Power-Up Self-Test on the RRM* and *Normal Operation Test on the RRM* on page 87.

RRM Parts Replacement

Table 88. Parts Replacement Chart for RRM

Part Number	Description
133563	RRM Printed Circuit Board Assembly
137480	RRM Printed Circuit Board Assembly

Elevator Control Relay Interface[1]

The Elevator Control Software (ECS) is an enhancement that allows TOPAZ to manage floor access. This feature is turned on in the Field Panel configuration page. TOPAZ associates cab and floor numbers with a security area and relay.

Once a field panel is configured for the elevator control function it can only be used for elevator control. The relays on an elevator control field panel are always in the activated (on) state. A valid access will deactivate the relay(s) for the authorized floor(s) on the cab being used.

The Elevator Control Software (ECS) can support up to all 32 readers configured as elevator cabs even if the cabs are in different buildings. Elevator cabs used in conjunction with this feature should be equipped with card readers, which may or may not have keypads. Two (2) elevator cabs are supported on the ACURT2 and four (4) cabs on the ACURT4 field panels.

ECS controls access to different floors for each badge holder using security area(s)/group and time schedules per card per floor. The software verifies that the cardholder has access to the cab and floor combination. If access is allowed the system will send a momentary relay deactivation command to the elevator control panel.

Configuring the Elevator Control is a five-step process:

1. Install the specific hardware that supports elevator control. Install card readers in the elevator cabs and connect the control relays as the interface to the elevator control panel.
2. Define the field panel configuration used with the elevator cabs. You can configure any reader on an Elevator ACURT2 or ACURT4 as an elevator cab reader. There is no special elevator configuration needed in the Reader Setup.

Note: Once an ACURT is configured for Elevator Control is can only be used for Elevator Control.

3. Configure a Security Area for each floor that the elevator cab(s) will control access to.
4. Define the elevator cabs and floors accessible by the cab. Up to 40 floors can be configured by adding two (2) RRMs (address 6 and 7) to the ACURT4. For more information on this step, see *Elevator Floor Definition* on page 90.
5. Setup and configure the Elevator Control itself.

1. Not verified or tested by UL.

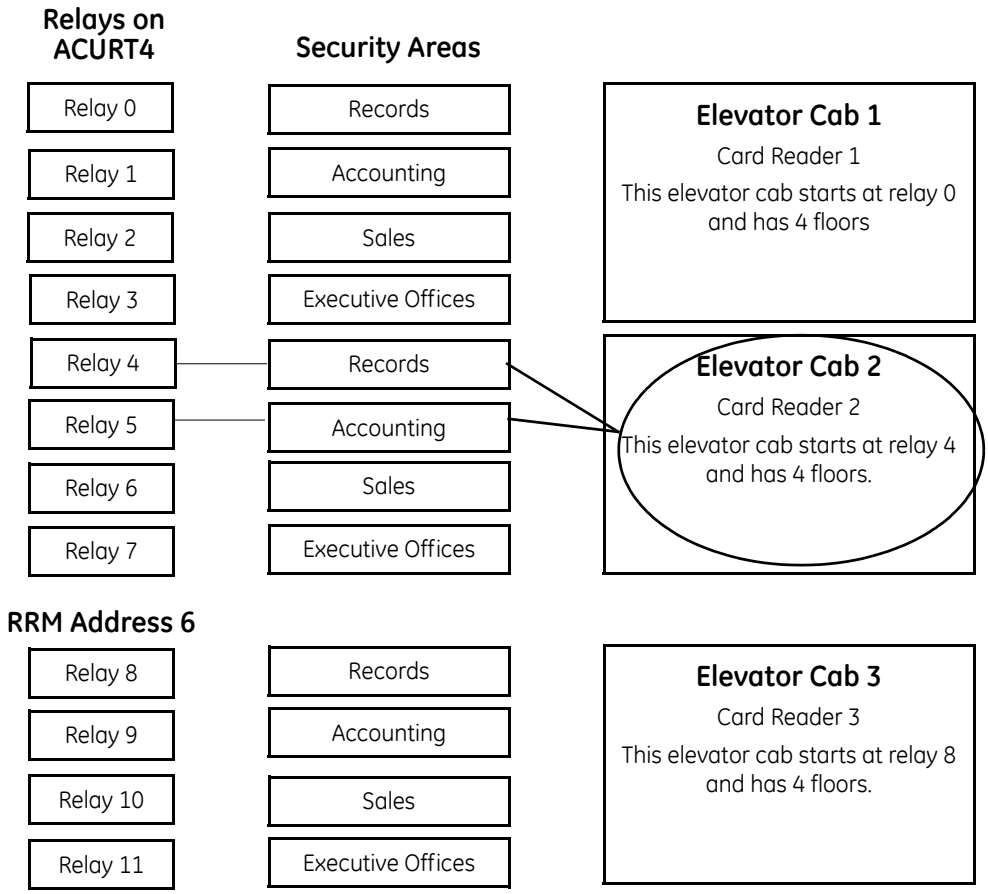
Elevator Floor Definition

The ACURT2 field panel has 4 onboard relays and the ACURT4 has 8 onboard relays. The ACURT2 and ACURT4 can have two (2) RRMs added for a maximum of 36 or 40 relays maximum for elevator control. The relay numbering will be different depending on which ACURT is used, see the relay numbering chart on the next page.

The example below is using an ACURT4 with one RRM (addressed #6). There are 3 Elevator Cabs controlling 4 floors each. Each relay would be given a security area for access authorization. Each elevator cab must have its own reader. When a card is read in Elevator Cab 2 and the user has access to areas “Records” and “Accounting” then only relays 4 and 5 would operate.

Note: Only RRMs addressed 6 and 7 can be used for an ACURT that is configured for elevator control.

Figure 37. Elevator Floor Definition



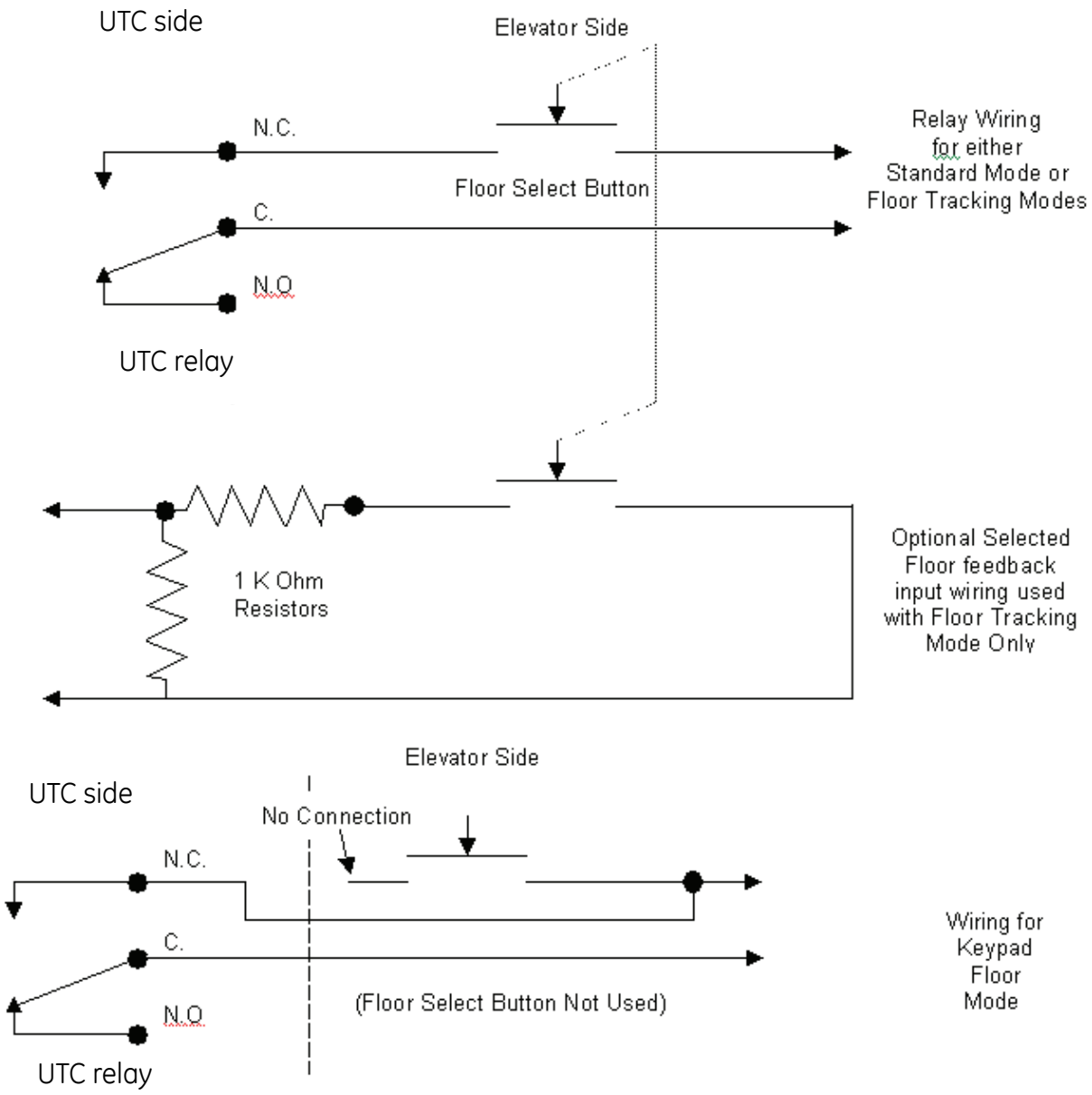
Elevator Relay Numbering

Table 89. Parts Replacement Chart for RRM

Relay Numbering for Elevator Control		
	ACURT2	**ACURT4**
Onboard ACURT	0 – 3	0 – 7
RRM Address 6	4 – 19	8 – 23
RRM Address 7	20 - 35	24 - 39

Standard Elevator Wiring

Figure 38. Elevator Control Relay Interface



Note: When an ACURT is used for elevator control, all of its relays are set to energize when not selected. If the ACURT were to fail, all floors will be enabled (Fail Safe).

Chapter 5 Optional Accessories

This chapter details the configuration of the ACURT2 and ACURT4 for communication on a LAN Network.

It includes:

Altronix Power Supply Charger

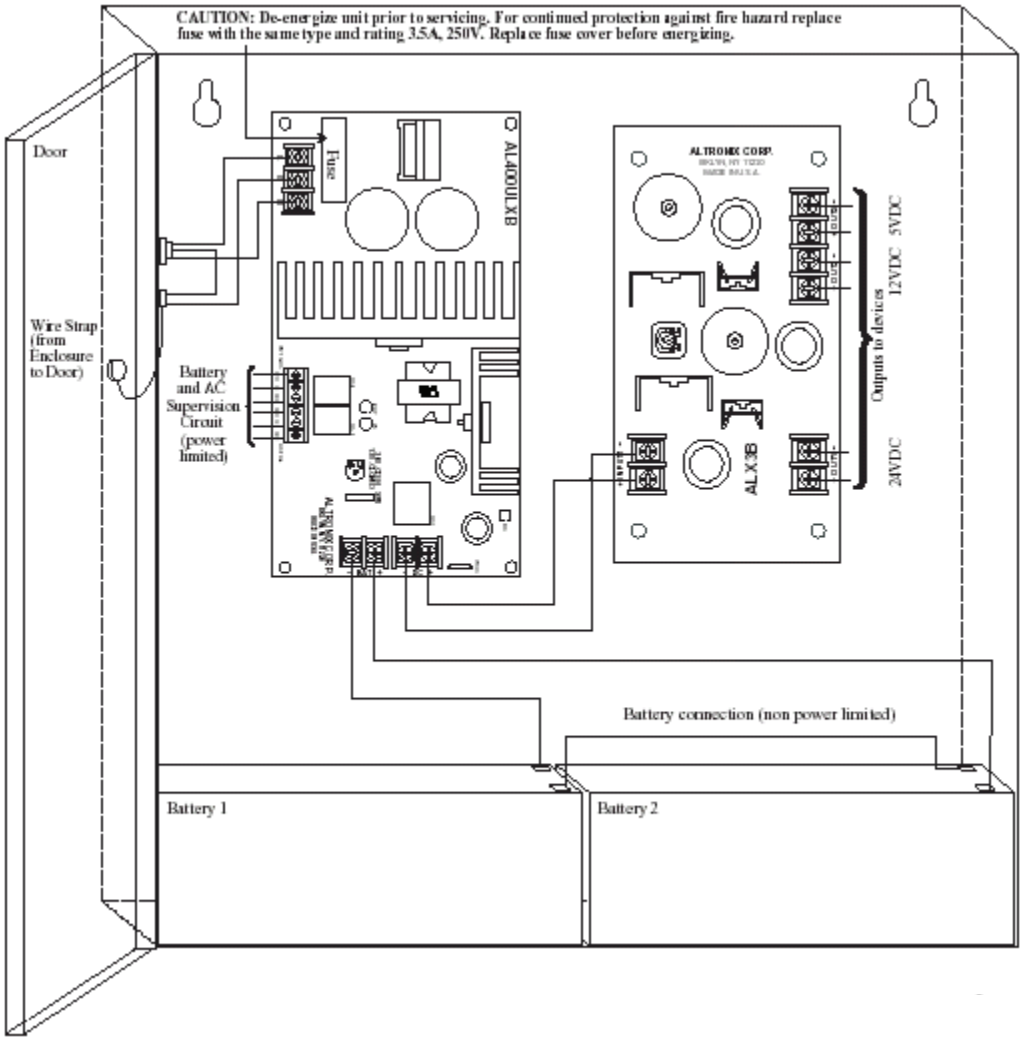
The Altronix AL400UL3 is a recommended additional power source. It is a multi-output access control power supply/charger that is specifically designed for use with access control systems and accessories. The AL400UL3 converts a 115 VAC 50/60Hz input into three individually regulated 12 VDC or 24 VDC power limited outputs. Each output will supply power to the RIM, RRM, magnetic locks, electric strikes, magnetic door holders, etc. These outputs will operate in both fail-safe and fail-secure modes for door locks.

With the optional batteries installed (required for UL listed installations), will back up power to the connected remote devices including RIM and RRM panels.

Note: On UL certified installations, batteries are required.

Panel Layout

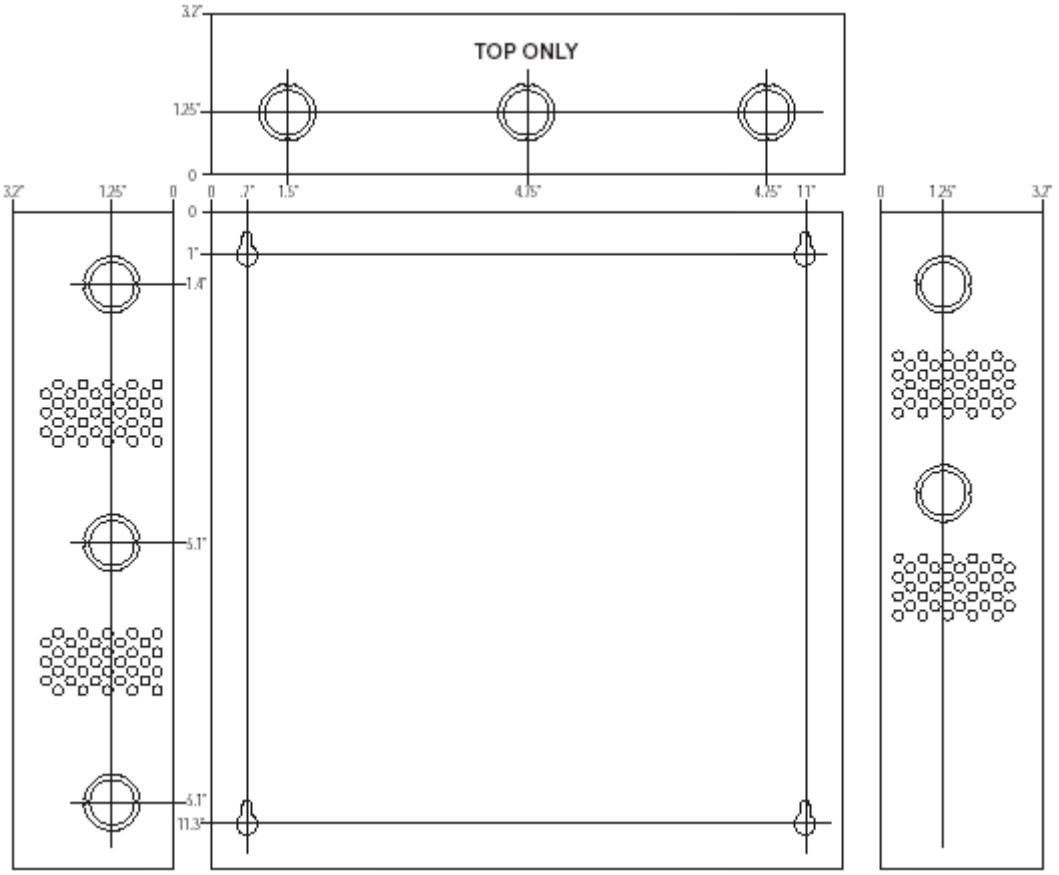
Figure 39.Altronix AL400UL3 Power Supply/Charger Cabinet layout



Enclosure Dimension

13.5”H x 13”W x 3.25”Ds

Figure 40.Altronix AL400UL3 Power Supply/Charger Enclosure Dimensions



Altronix Specifications

- NFPA 72 compliant.
- All outputs are Class 2 rated.
- Input 115VAC 50/60Hz, 1.45 amps.
- 1.75 amps continuous supply current at 5VDC.
- 1.75 amps continuous supply current at 12VDC.
- 1.5 amps continuous supply current at 24VDC.
- Filtered and electronically regulated outputs.
- 51 mV p/p output ripple.
- Maximum charge current .7 amp.
- Built-in charger for sealed lead acid or gel type batteries.
- Automatic switch over to stand-by battery when AC fails.
- Zero voltage drop when switching over to battery backup.
- Thermal and short circuit protection with auto reset.
- DC output LED indicators.
- AC fail supervision (form "C" contact rated 1amp @28VDC).
- Battery fail and battery presence supervision (form “C” contact rated 1amp @ 28VDC).
- Power supply is complete with enclosure, cam lock, and battery leads.
- Enclosure accommodates up to two (2) 7AH batteries.
- Enclosure dimensions: 13.5"H x 13"W x 3.25"D

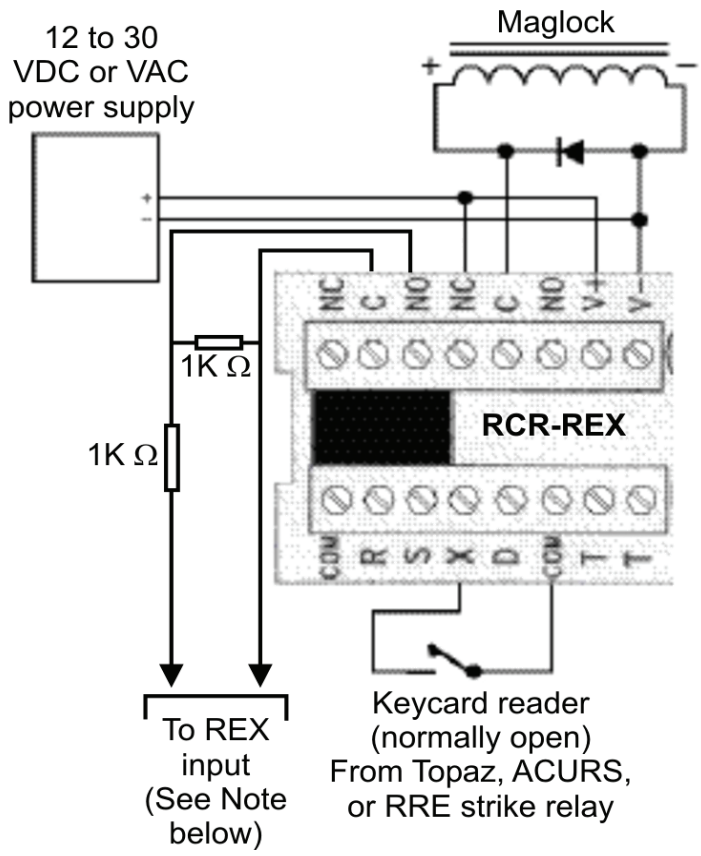
Note: Before installing, refer to the datasheet packed with the AL400UL3 for latest information and specifications for the Altronix AL400UL3.

Wiring an RCR-REX Request to Exit Dual Technology Motion Sensor[1]

The UTC Fire & Security Dual Technology motion sensor (Models RCR-REX-W, RCR-REX-B, and RCR-REX-G) is used for request to exit. It can be ceiling or wall-mounted and wired to a magnetic lock and a reader. A typical wiring configuration where the reader is on one side of the door and the RCR-REX is on the other side of the door is shown in *Figure 41*. Both swiping a card or the detection of motion by the RCR-REX removes power from the magnetic lock.

For more detailed mounting and wiring instructions, refer to the RCR-REX Request-to-Exit Dual Technology Motion Sensor Installation Instructions (P/N 1048889_) included with your motion sensor.

Figure 41.Typical RCR-REX/reader configuration



Note: Zone 1, the REX, resistance on the ACURT, requires 2K or .5K in a normal state and should be wired normally open. When the REX is triggered it should go to a 1K state. You can verify these states on the ACURT by looking at the LED for zone 1:

- 2K or .5K resistance = light on.
- 1K resistance = light off.
- Any other resistance = light flashes indicating trouble.

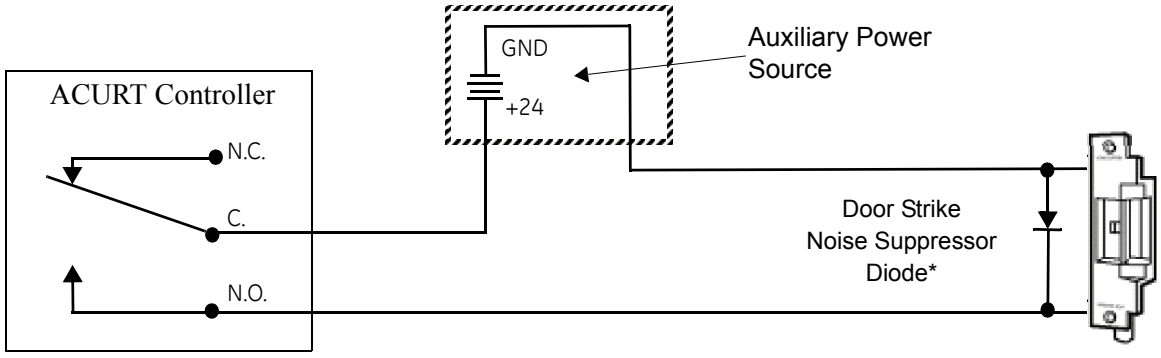
1. Not tested with Topaz by UL.

Door Strike

Figure 42 shows door strike power wiring for the ACURT. See the terminal block connection table for the relay terminals. **Always use a spike suppression diode on DC door strikes.** The noise suppressor diode is a 1N4933 or use the optional noise suppressor unit part number 122610 as shown in *Figure 43*. Use Belden cable #9409 (1 pair 18 AWG unshielded) or equivalent. The dry relay contacts for the strike power are rated at 2 amps at 30 AC/DC volts maximum.

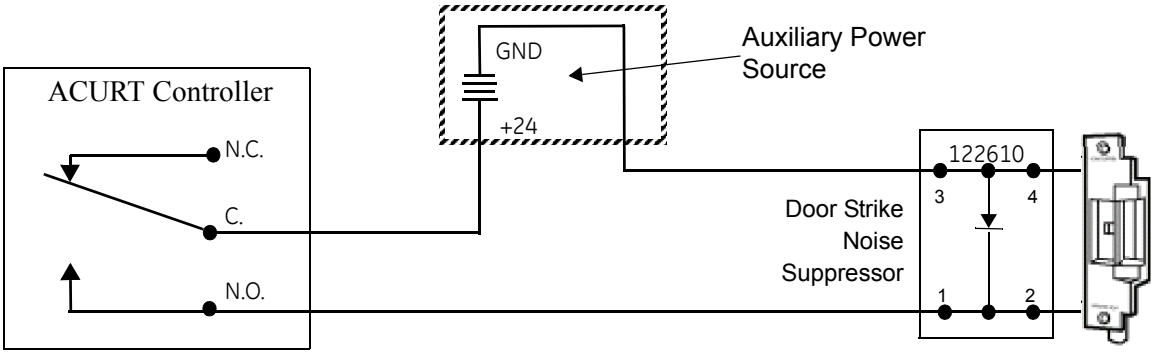
Auxiliary power source is required to power door locks.

Figure 42.Door Strike Wiring for ACURT with Supplied Diode



*Install Noise Suppressor Diode as close to the door strike as possible.

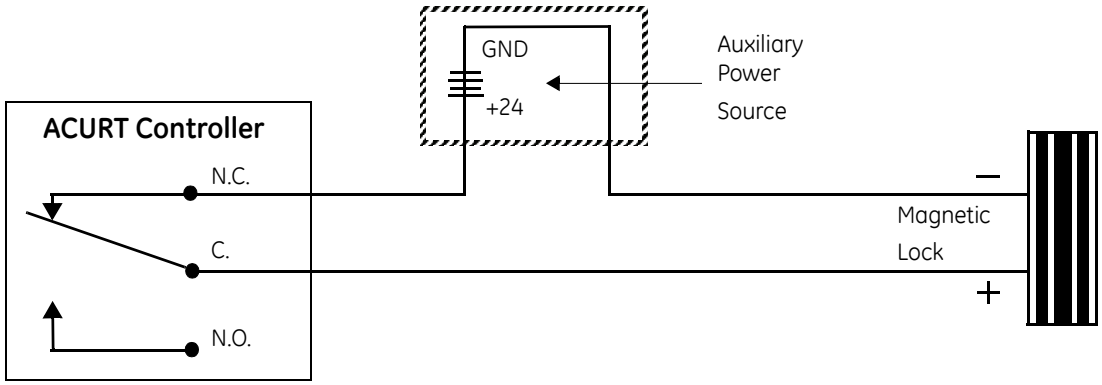
Figure 43.Door Strike Wiring for ACURT with Optional Door Strike Noise Suppressor #122610



Magnetic Lock

Figure 44 shows magnetic lock power wiring for the ACURT. See the terminal block connection table for the relay terminals. Use Belden cable #9409 (1 pair 18 AWG unshielded) or equivalent. The dry relay contacts for the lock power are rated at 2 amps at 30 DC volts maximum.

Figure 44.Door Lock Wiring for ACURT with Supplied Diode



Note: Do Not install a diode for noise suppression on magnetic type locks. Locks like the Securitron Magnalocks already have internal inductive kickback protection, so addition of a reverse diode is pointless. A diode would recirculate current flow through the magnet coil and thereby considerably slows release of the lock.

WARNING: Door Locks must be install according to building and life safety codes for the location in which the installation is taking place!

Appendix A Alarm Input and Relay Numbers

This appendix provides tables detailing addressing information for alarm inputs and relays.

In this appendix:

Alarm Input Numbers

Reader Physical Alarm Zone Numbers

Physical Alarm Zone			
Reader Address	*** Zone 0 Door Contact**	*** Zone 1 Request to Exit (REX)**	**Zone 2 Spare**
0	16	17	18
1	20	21	22
2	24	25	26
3	28	29	30

* Zone-0 is default for Door Contact.
* Zone-1 is default for Exit Push Button.

Reader Logical Alarm Zone Numbers

Lock Monitor / Bond Sensor = If used, must be connected to Z2.

F.O. = Forced open, H.O. = Held Open,
R.T. = Reader Enclosure Tamper, OFFL = Reader Off Line

Logical Alarm Zone					
Reader Address	**Lock Monitor**	**F.O.**	**H.O.**	**R.T.**	**OFFL**
0	48	64	65	66	67
1	50	68	69	70	71
2	52	72	73	74	75
3	54	76	77	78	79

RIM Zone Input Numbers

Expansion Port

Zone Number	Address 4	Address 5	Address 6	Address 7
IN1	128	144	160	176
IN2	129	145	161	177
IN3	130	146	162	178
IN4	131	147	163	179
IN5	132	148	164	180
IN6	133	149	165	181
IN7	134	150	166	182
IN8	135	151	167	183
IN9	136	152	168	184
IN10	137	153	169	185
IN11	138	154	170	186
IN12	139	155	171	187
IN13	140	156	172	188
IN14	141	157	173	189
IN15	142	158	174	190
IN16	143	159	175	191
IN17	96	100	104	108
IN18	97	101	105	109
IN19	98	102	106	110
Remote Module Off-Line	99	103	107	111

Relay Numbers

ACURT2 and ACURT4 Relay Numbers

Relay Numbers

Reader Relays	Door Strike Relay Numbers
Reader 0 Door Strike Output Reader 0 Aux Relay	16 17
Reader 1 Door Strike Output Reader 1 Aux Relay	18 19
Reader 2 Door Strike Output Reader 2 Aux Relay	20 21
Reader 3 Door Strike Output Reader 3 Aux Relay	22 23

RIM Expansion Port Relay Numbers

Expansion Port	Relay K1	Relay K2
Reader Address 4	32	33
Reader Address 5	34	35
Reader Address 6	36	37
Reader Address 7	38	39

RRM Expansion Port Relay Numbers

Relay Number	Address 4	Address 5	Address 6	Address 7
K1	112	128	144	160
K2	113	129	145	161
K3	114	130	146	162
K4	115	131	147	163
K5	116	132	148	164
K6	117	133	149	165
K7	118	134	150	166
K8	119	135	151	167
K9	120	136	152	168
K10	121	137	153	169
K11	122	138	154	170
K12	123	139	155	171
K13	124	140	156	172
K14	125	141	157	173
K15	126	142	158	174
K16	127	143	159	175

ACURT2 and ACURT4 Relay Numbers for RRM with Elevator Control

Elevator Relay Numbers

ACURT2/4 Relays	Elevator Relay Numbers	
	ACURT2	**ACURT4**
Reader 0 Door Strike Output Reader 0 Aux Relay	0 1	0 1
Reader 1 Door Strike Output Reader 1 Aux Relay	2 3	2 3
Reader 2 Door Strike Output Reader 2 Aux Relay	N/A	4 5
Reader 3 Door Strike Output Reader 3 Aux Relay	N/A	6 7

RRM Expansion Port Relay Numbers (with elevator control)

Relay Number	Address 6		Address 7	
	ACURT2	**ACURT4**	**ACURT2**	**ACURT4**
K1	4	8	20	24
K2	5	9	21	25
K3	6	10	22	26
K4	7	11	23	27
K5	8	12	24	28
K6	9	13	25	29
K7	10	14	26	30
K8	11	15	27	31
K9	12	16	28	32
K10	13	17	29	33
K11	14	18	30	34
K12	15	18	31	35
K13	16	20	32	36
K14	17	21	33	37
K15	18	22	34	38
K16	19	23	35	39

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