Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

IPL T CR48

IP Link® Tools

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrian implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de le contourner ni de le désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'il y a remplactment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

⚠️ 这个符号提示用户该设备用户手册中有重要的操作和维护说明。

⚡ 这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。 必须使用与厂家推荐的相同或相近型号的电池。 按照生产厂的建议处理废弃电池。

声明

所使用电源为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

FCC Class A Notice

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. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*
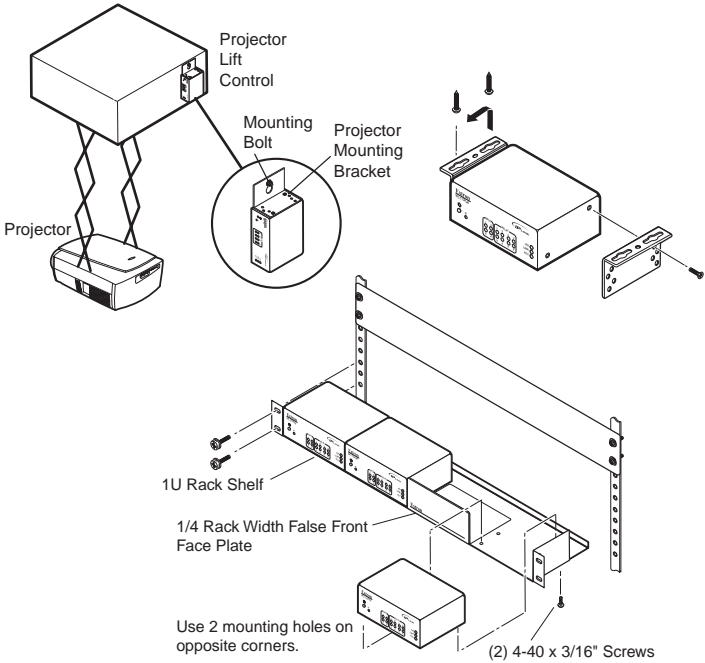
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Quick Start Guide — IPL T CR48

To install and set up an IPL T CR48 interface, follow these steps:

Step 1

Turn all of the equipment off and disconnect it from the power source.
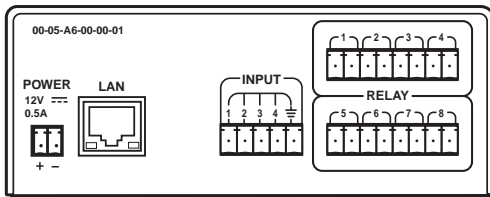

Step 2

Mount the IPL T CR48 interface near a screen, screen lift, lighting system, or projector lift, as illustrated below.

Step 3

Attach the network (LAN) cable to the IPL T CR48 unit and to a host PC, switch, hub, or router. See *Ethernet connection* in chapter 3 for more information on this connection.

Extron IPL T CR48 Ethernet Control Interface

Quick Start Guide — IPL T CR48, cont'd

Step 4

Attach the input and relay connections to the IPL T unit.

Step 5

Connect power cords and turn on the equipment in the following order: output devices (projector lift, screen lift, lights, etc.), IPL T CR48 interface, serial controller or computer (PC), then input devices (motion detector, alarms, photo eyes, etc.).

Step 6

Configure the IPL T interface using the ARP command. Refer to "IPL T CR48 interface configuration" in chapter 3 for more information.

Step 7

Communicate with the IPL T CR48 interface via the default Web pages. Refer to "Communication with the interface" in chapter 4 for more information.
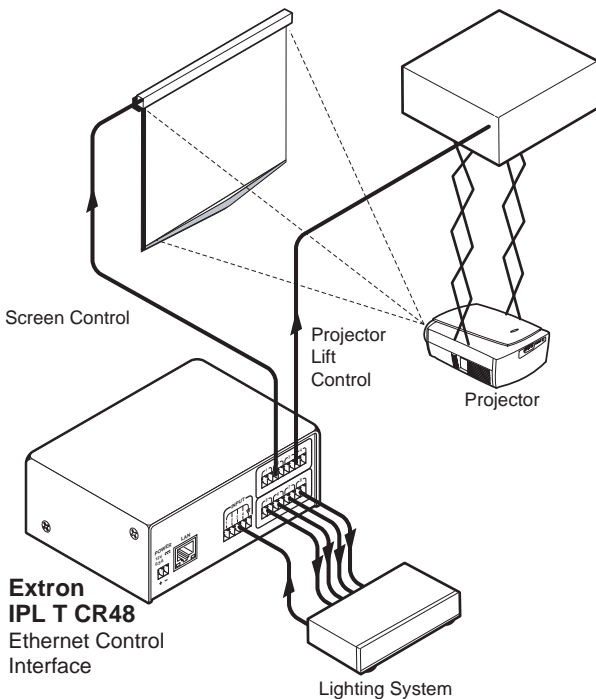

Screen Control

Projector Lift Control

Projector

Extron IPL T CR48 Ethernet Control Interface

Lighting System

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Chapter One

Introduction

About this Manual

About the IPL T CR48 Interface

Features

Introduction

About this Manual

This manual contains information about the Extron IPL T CR48 (Extron part #60-544-05) Ethernet-based relay control interface, including how to install, configure, and operate it.

About the IPL T CR48 Interface

The Extron IPL T CR48 is an Ethernet-based relay control interface designed to be used as one of many nodes in a distributed control system environment, or as a stand-alone control interface allowing legacy products to link to today's IP-based networks.

The IPL T CR48 has a single, 5-pole captive screw connector for contact closure input and two, 8-pole captive screw connectors for relays. The contact closure input and relay ports are fully software configurable using a Web-based interface connected via an Ethernet port.

The IPL T CR48 interface will host its own Web pages, stored in flash memory within the device, and can accept power over a LAN (Local Area Network). The interface will support Telnet, SMTP (Simple Mail Transfer Protocol), ICMP (Internet Control Message Protocol) or Ping, and DHCP (Dynamic Host Configuration Protocol).

The IPL T CR48 interface is 1U high and one quarter rack wide. It is rack-mountable, using either a VersaTools™ Rack Shelf Kit (#60-190-20) or a Universal 1U Rack Shelf (#60-190-01). It can also be mounted near a screen or projector lift.

The IPL T CR48 interface ships with an external, desktop, 12 V, 1 A power supply (#70-055-01), that accepts 100-240 VAC input.

Features

High speed — Constant high speed data throughput, with a 6 Mbit/second transfer rate.

User customizable — Tailor the on-board Web pages with advanced programmability, e-mail alerts, and storage to suit your needs and requirements. Or, develop your own Web pages using off-the-shelf Web authoring software.

GlobalViewer® — Can be used to manage multiple IP Link® products over the Web.

Direct port access — Use existing software programs to control a device that has no Ethernet support. Any existing Extron product with a serial control port can be interfaced with a LAN.

Built-in multi-level security — User controls the access to devices attached to the interface. Two levels of password

protection provide appropriate security.

Contact closure input ports — Can be used to sense when a switch or relay has been activated.

Easily connected — Provides RJ-45 auto-sense 10/100 Mbs Ethernet LAN connection.

Easily configured and controlled —

- Using a standard Web browser (Microsoft® Internet Explorer® V5.5, Netscape® Navigator V6.0 or higher) and Web-based interface.

- Using a standard Telnet client application.

- Requires no centralized processor to operate within a system.

Choice of mounting options — Can be mounted near a screen or projector lift or on a rack shelf.

Remote management — The IPL T CR48 allows you to remotely activate and deactivate projector lifts, screens, and lighting systems.

Multiple protocols supported — The IPL T CR48 supports Telnet, SMTP, ICMP, ARP, and DHCP.

Introduction, cont'd

Chapter Two

Installation and Operation

Installation Overview

Mounting the IPL T CR48

Rear Panel Features and Cabling

Operation

Installation and Operation

Installation Overview

To install and set up an IPL T CR48 relay control interface, follow these steps:

1. Turn all of the equipment off. Make sure that the input devices (motion detectors, alarms, photo eyes, etc.), the IPL unit, the output devices (projector or screen lifts, etc.) and the serial controller are all turned off and disconnected from the power source.

2. Mount the IPL T CR48 unit. See "Mounting the IPL T CR48" below.

3. Attach the cables. See "Connecting the Hardware" in chapter 3.

4. Connect power cords and turn on the devices in the following order: output devices (projector lifts, screen lifts, lighting system, etc.), IPL T unit, serial controller or computer (PC), then input devices (DSS, cable boxes, etc.).

5. Configure the IPL T CR48 through Telnet, then access the unit using an Internet browser.

Mounting the IPL T CR48

Rack mounting

For optional rack mounting, mount the unit on a VersaTools 19" 1U Rack Shelf (Extron part #60-190-20) (figure 2-1) or a standard Universal 1U Rack Shelf (Extron part #60-190-01) (figure 2-2). On the standard rack shelf, the unit mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

1. If feet were previously installed on the bottom of the IPL T CR48 unit, remove them.

2. Mount the unit on the rack shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the interface to the shelf.

3. Install blank panel(s) or other unit(s) to the rack shelf.

4. Insert the shelf into the rack, aligning the holes in the shelf with those in the rack.

5. Secure the shelf to the rack using the supplied machine screws.

1U Rack Shelf

1/4 Rack Width False Front Face Plate

Use 2 mounting holes on opposite corners.
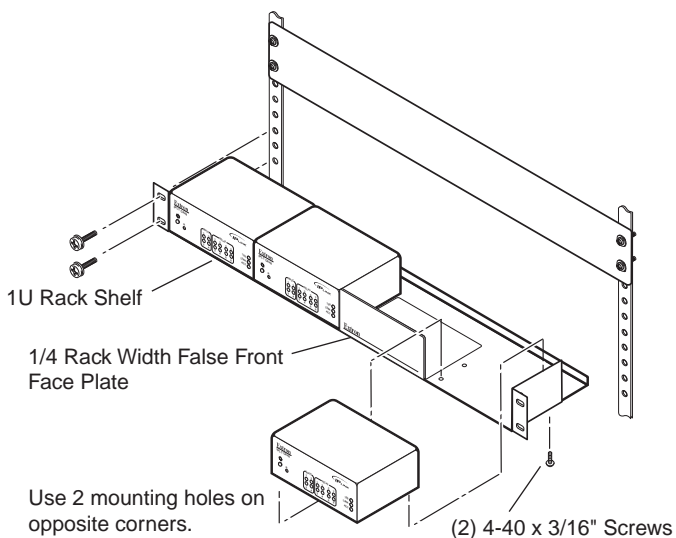
(2) 4-40 x 3/16" Screws

Figure 2-1 — Mounting the interface on the VersaTools shelf

NOTE   *Only products in the IP Link® or VersaTools™ lines can be mounted to a VersaTools shelf. Any 1U rack-mountable Extron product can be mounted on the standard shelf (Extron part #60-190-01).*
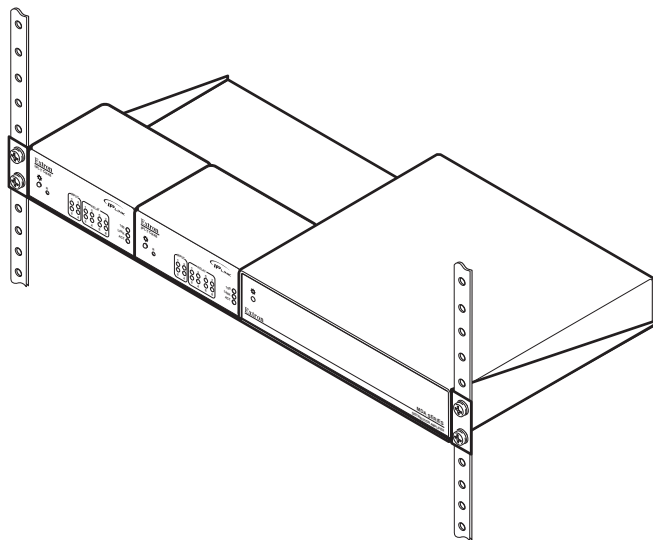

Figure 2-2 — Mounting the interface on the standard shelf

Furniture or projector mounting

In addition to using the IPL T CR48 unit on a rack, it can also be furniture or projector mounted. Furniture mount or projector mount the interface using the optional mounting kit (Extron part #70-212-01, furniture, or Extron part #70-217-01, projector) as follows:

1. Attach the mounting brackets to the interface with the machine screws provided (figure 2-3).

2. If feet were previously installed on the bottom of the interface, remove them.

3. **For furniture mounting,** hold the interface with the attached brackets against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.

4. **For furniture mounting,** drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.

5. **For furniture mounting,** insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw head protrudes.

6. **For furniture mounting,** align the mounting screws with the slots in the brackets and place the interface against the surface, with the screws through the bracket slots.

7. **For furniture mounting,** slide the unit slightly forward or back, then tighten all four screws to secure it in place.

8. **For projector mounting,** secure the interface to a projector mount or other surface by inserting the mounting bolt through the bracket's slotted hole.
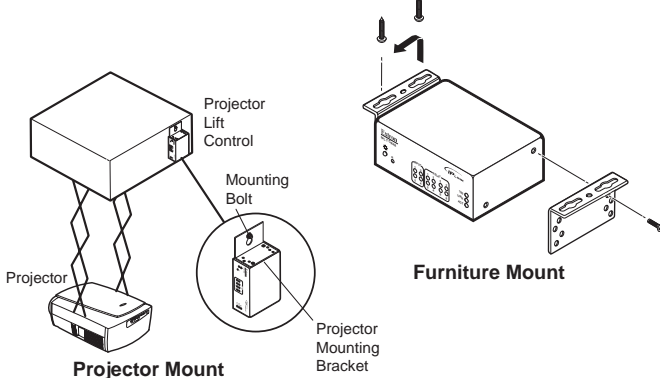
Figure 2-3 — Furniture and projector mounting for the IPL T CR48

Rear Panel Features and Cabling

All connections, including power, input and output, and control, are on the back panel of the IPL T CR48 interface.
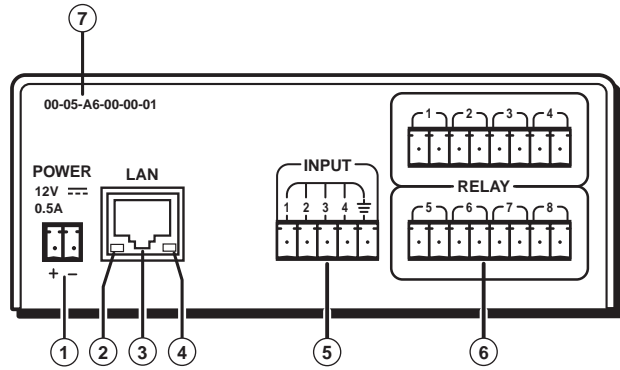
Figure 2-4 — IPL T CR48 interface back panel

Power

① **Power connection —** Plug the external 12 V power supply into this connector. The power supply is included with the unit.

CAUTION *When connecting the power supply, voltage polarity is extremely important. Applying power with incorrect voltage polarity could damage the power supply and the interface. Identify the power cord negative lead by the ridges on the side of the cord.*
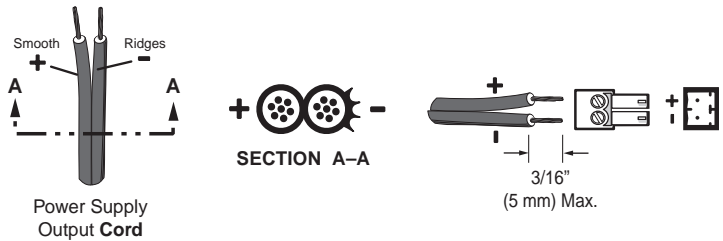
Figure 2-5 — Power connector wiring

NOTE *Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could pull out.*

Installation and Operation, cont'd

WARNING *The two power cord wires must be kept separate while the power supply is plugged in. Remove power before continuing.*

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

Ethernet/LAN

② **LAN Activity LED —** Yellow LED blinks to indicate LAN activity.

③ **LAN connector —** Plug an RJ-45 jack into this socket to connect the unit to a computer network. Use a straight-through cable to connect to a switch, hub, or router, or a crossover cable to connect directly to a PC.

Pins:
1 2 3 4 5 6 7 8

Insert
Twisted
Pair Wires

| Straight-through Cable (for connection to a switch, hub, or router)				Crossover Cable (for direct connection to a PC)			
End 1		**End 2**		**End 1**		**End 2**	
Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-orange	1	white-orange	1	white-green
2	orange	2	orange	2	orange	2	green
3	white-green	3	white-green	3	white-green	3	white-orange
4	blue	4	blue	4	blue	4	blue
5	white-blue	5	white-blue	5	white-blue	5	white-blue
6	green	6	green	6	green	6	orange
7	white-brown	7	white-brown	7	white-brown	7	white-brown
8	brown	8	brown	8	brown	8	brown

Figure 2-6 — RJ-45 connector wiring

④ **Link LED —** Green LED lights to indicate a good LAN connection.

Connections

⑤ **Contact closure** — Four inputs permit connection of switches and sensors to provide input (trigger events) to the system.

⑥ **Relay ports** — Eight relay ports provide contact closure activation of relays for power, screen projector lift control, drapes, etc., when trigger events occur.

Identification

⑦ **UID # —** The unique User ID Number (MAC address) of the unit (for example, 00-05-A6-00-00-01).
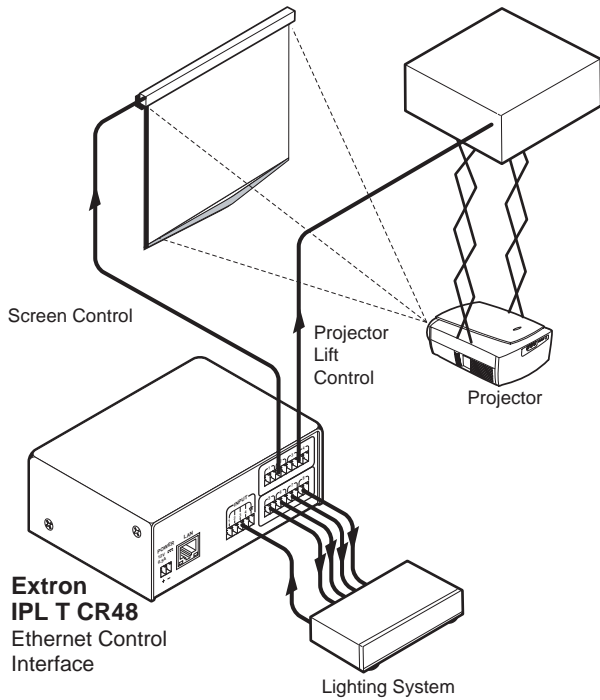
Figure 2-7— Example application using input and relay ports

Operation

Connect power cords and turn on the relay controlled output devices (projector lifts, screen lifts, lights, etc.), input (trigger) devices (motion detectors, alarms, photo eyes, etc.), relay interface, and network devices (PC, laptop, network equipment).

Check indicator LEDs on the PC/laptop, on the interface, and on the network hub/router, etc., to ensure that all devices are plugged in and communicating. The IPL T CR48 is ready to be configured (see chapter 3, "Connection and Configuration").

If connection or communication problems occur, see "Troubleshooting" in chapter 4. If the troubleshooting tips do not help, check with your local network administrator, or call the Extron S³ Sales & Technical Support Hotline.

Front panel indicators

The front panel of the IPL T CR48 has several indicator LEDs which show the current status of communications to and from the unit. A reset button is also available from the front panel, in a small recess next to the Power LED (①).
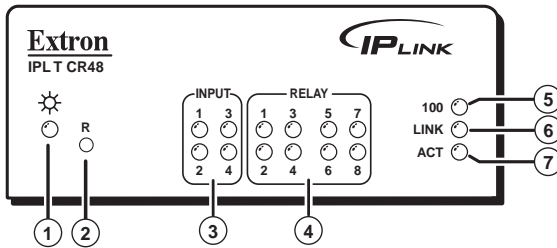
Figure 2-8— IPL T CR48 front panel

① **Power LED** — A green LED lights to indicate that the interface is receiving power.

② **Reset button (recessed)** — See "Resetting the unit" later in this chapter for details on this multiple function reset button.

③ **Input LEDs** — A green LED indicates that the port is active.

④ **Relay LEDs** — A green LED indicates that the relay is closed and activated.

⑤ **100 LED** — A green LED indicates that the connection speed is 100 Mbs. If the LED is not lit, the connection speed is 10 Mbs.

⑥ **Link LED** — A green LED indicates that the unit is connected to an active network.

⑦ **Act (Activity) LED** — A yellow LED lights to indicate that data is being sent/received.

Resetting the unit

There are five reset modes available by using the Reset button (②) on the front panel. The Reset button is recessed, so use of a pointed stylus, ballpoint pen, or Extron Tweeker is suggested.

CAUTION   *Review the reset modes carefully. Use of the wrong reset mode may result in unintended loss of flash memory programming, reassignment of ports, or a unit reboot.*

CAUTION   *The listed reset modes (with the exception of Mode 2) will close all open IP and Telnet connections and close all sockets.*

NOTE   *If the reset button is continuously held down, every 3 seconds the LED will pulse (blink) and put the unit in a different mode, corresponding to the underscored notes in Modes 3 through 5. The Mode 5 LED blinks three times, the third blink indicating that it's the last mode. The following modes are listed as separate functions, not a continuation from Mode 1 to Mode 5.*

Mode 1 — Holding the Reset button while applying power defaults the unit back to the base firmware that shipped with the unit from the factory. Event scripting does not start when the unit is powered on in this mode. This allows you to recover a unit that has incorrect code or updated firmware running. All user files and settings are maintained. User Web pages may not work correctly if using an earlier firmware version.

Mode 2 — Not applicable.

Mode 3 — Holding the Reset button until the Power LED blinks once (3 seconds) followed by a momentary (<1 second) press will turn events either on or off, depending on the current state of the events:

If the events are currently stopped following the momentary (<1 second) press, the Power LED will *flash twice* indicating the starting of events.

or

If events are currently running following the momentary (<1 second) press, the Power LED will *flash three times* indicating the stopping of events.

Each flash will last for .25 seconds. Nothing happens if the momentary press does not occur within 1 second.

Mode 4 — Holding the Reset button until the Power LED blinks twice (6 seconds) followed by a momentary (<1 second) press resets IP settings. The Power LED will blink four times in quick succession, confirming a Mode 4 reset. This mode

1. Enables ARP program capability
2. Sets IP back to factory IP
3. Sets Subnet back to factory default
4. Sets Gateway back to factory default
5. Sets port mapping back to factory default
6. Turns DHCP off
7. Turns events off

Nothing happens if the momentary press does not occur within one second.

Mode 5 — Holding the Reset button until the Power LED <u>blinks three times</u> (9 seconds) followed by a momentary (<1 second) press causes an absolute system reset back to factory default conditions. Nothing happens if the momentary press does not occur within 1 second. The power LED will *blink four times in quick succession,* confirming a Mode 5 reset.

3

Chapter Three

Connection and Configuration

Connecting the Hardware

Configuring the Hardware

Connection and Configuration

Connecting the Hardware

To connect the IPL T CR48 unit, connect the input and output devices to the unit using figure 3-1 as a guide.
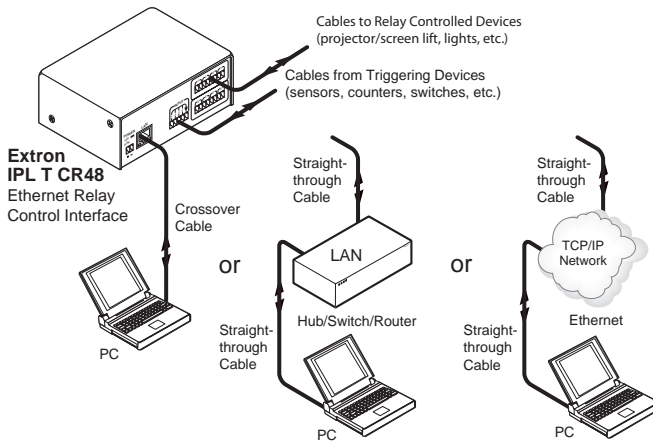
Figure 3-1 — IPL T CR48 connections

Ethernet connection

This type of connection is used on an ongoing basis to connect the IPL T CR48 and to control switching and display devices through the unit.

1. Plug one end of a Cat 5, straight-through Ethernet cable into the rear panel Ethernet connector on the IPL T CR48. Refer to figure 2-6 for RJ-45 connector wiring.

2. Plug the other end of the Ethernet cable into a network switch, hub, or router connected to an Ethernet LAN or to the Internet.

3. Launch your Web browser on your PC and type in the Web address that you set up on the IPL T CR48 interface (refer to "IPL T CR48 interface configuration" later in this chapter). The IPL T CR48 default Web page should be displayed.

Contact closure input and relay connections

Contact closure input connections

The IPL T CR48 relay control interface can be connected to any relay providing a closure to ground (closed = logic 1 and open = logic 0). The contact closure inputs are connected to 5 VDC via a

1 kohm pull-up resistor and must be wired with a ground. This allows the input to be tied to devices such as motion detectors, alarms, photo eyes, etc. Users define what this input triggers via control software.

1.   Connect one end of the input cable to a 3.5 mm, 5-pole captive screw connector, wired appropriately, and plug it into the rear panel input port connector of the interface unit.

2.   Connect the other end of the input cable to the input relay device which will provide a triggering signal.

Figure 3-2 — Typical IPL T CR48 relay control interface operating configuration

Relay connections

The IPL T CR48 relay control interface can be connected to any device that can be activated by a relay closure. This allows the relay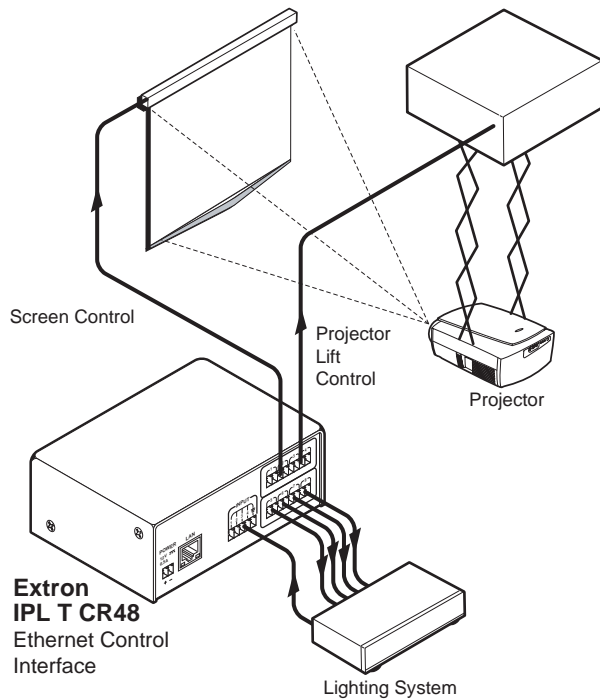 to be tied to devices such as lights (preset recall), projector lifts, screen or drape controllers, etc. Users define what triggers this action via control software.

1. Connect one end of the relay cable to a 8-pole captive screw connector, wired appropriately, and plug it into the rear panel relay port connector of the interface unit.

2. Connect the other end of the relay cable to the device which will be activated when the triggering signal is received.

Configuring the Hardware

To function together properly, both the controlling PC and the IPL T CR48 must be configured correctly. The PC must be network-capable, with the proper protocols installed and the hardware configured correctly. The IPL T CR48 must be set to recognize and accept commands and pass them through to the projector lift, screen lift or other controlled device.

PC configuration

This manual assumes that you have a Windows® PC equipped with an operating network adapter. To allow your PC to work with Extron's Ethernet-controlled products, the TCP/IP protocol must be installed and properly configured.

For use on an existing Ethernet LAN intranet, your network administrator can provide you with a unique IP address or confirm whether you need to set up the IPL T CR48 unit for DHCP (Dynamic Host Configuration protocol) to have an address assigned automatically when you sign on.

IPL T CR48 interface configuration

When you power on the IPL T CR48 unit for the first time, there are two ways to set up the IP address:

1. Use the ARP command method.

2. Use the direct PC method.

The default Web pages that are pre-loaded on the IPL T CR48 provide a way to reconfigure the IPL T unit once it has an active network connection with IP access. These Web pages are compatible with Netscape® Navigator (version 6.0 or higher), or Microsoft® Internet Explorer (version 5.5 or higher). See "Communication with the Interface" in chapter 4 for information on accessing and configuring the interface.

Once the unit has been reconfigured, an Ethernet (intranet or Internet) connection can subsequently be used to contact or control it. Refer to "Ethernet connection" earlier in this chapter for additional information.

Configuring the IPL T CR48 using the ARP command

You can make use of the ARP (Address Resolution Protocol) command to set up an IP address for your IPL T CR48 interface. The ARP command tells your computer to associate the IPL T CR48 unit's MAC address with the assigned IP address. You must then use Ping to access the IPL T CR48 unit, at which point the device server's IP address will be reconfigured.

NOTE *In order to use this setup method, both your computer and IPL T CR48 interface must be connected to the same LAN. Or, you may use a crossover Ethernet cable to connect the device server directly to your computer's Ethernet card.*

Use ARP to configure the IP address as follows:

1. Obtain a valid IP address for your IPL T CR48 from your network administrator.

2. Obtain the IPL T CR48 unit's MAC address (UID #) from the label on its back panel.

3. If the unit has never been configured and is still set for factory defaults, go to step 4. If not, perform a Mode 4 system reset. For detailed information on reset modes, see "Resetting the unit" in chapter 2.

CAUTION *Your IPL T CR48 unit must be configured with the factory default IP address — 192.168.254.254 — before executing the ARP command, as described below.*

4. Access the MS-DOS command prompt, then execute the 'arp –s' command.

   Enter the desired new IP address and the MAC address (the MAC address is located on the rear panel's upper left corner) for the IPL unit. For example:

   arp –s 10.13.170.15 00-05-A6-00-0A-90

Connection and Configuration, cont'd

Figure 3-3 — Executing the ARP command

5. Execute a Ping command by typing your new IP address at the command prompt. For example:

    ping 10.13.170.15

    After issuing this command, the unit will change to the new address and start responding to the Ping requests, as shown below. The IPL unit's IP address should now be updated to the new address, and then you can reconnect using either Telnet or the Web to verify that the update was successful.

Figure 3-4 — Unit response to a Ping request

6. After verifying that the change was successful, issue the arp –d command at the DOS prompt. For example:

    arp –d 10.13.170.15 will remove 10.13.170.15 from the arp table

    or

    arp –d* to remove all static IP addresses from the arp table.

Configuring the IPL T CR48 using direct PC connection

This type of connection is used initially to connect to and configure the IPL T CR48 unit. The unit's default settings (IP address, subnet mask, and (optional) administrator name and password) must be changed in order to use the unit on an intranet (LAN) or on the Internet (WAN).

1. Plug one end of a CAT 5, crossover Ethernet cable into the rear panel Ethernet connector on the IPL T CR48 unit. Refer to figure 2-6 for RJ-45 connector wiring.

2. Plug the other end of the Ethernet cable into the Ethernet port on your PC.

3. Right click the Network Neighborhood or My Network Places icon on your Windows (98, 2000, NT®, ME, XP) desktop and select Properties from the menu.

4. Select Internet Protocol (TCP/IP) from the list then select Properties. (If you are using Windows 2000, right-click Local Area Connection and select Properties from the menu, then select Internet Protocol (TCP/IP) from the list and select Properties again.) If Internet Protocol (TCP/IP) is not on the list, it must be added (installed). Refer to your Windows user's manual or the online Help system for information on how to install the TCP/IP protocol.

5. Write down your current IP address and Subnet Mask below. If your PC is set to "Obtain an IP address automatically," make a note of that, instead.

    IP Address:

    .   .   .

    Subnet Mask:

    .   .   .

6. Click "Specify an IP address" or "Use the following IP address" (depending on your operating system), and leave the default gateway blank. Enter the following values:

    IP address: **192.168.254.253**

    Subnet mask: **255.255.0.0**

7. Save the changes and exit the Network setup. Reboot the PC, if required, for the changes to become effective.

8. Launch your Web browser (Netscape Navigator or Internet Explorer), and type "http://192.168.254.254/index.html" in the browser's Address field. The IPL T CR48 default Web page is displayed. Refer to "IPL T CR48 configuration," in this chapter, for information on configuring your unit.

Connection and Configuration, cont'd

9. After configuring your IPL T CR48, repeat steps 3 and 4 and change your TCP/IP settings back to their original configuration.

Firmware upgrades

Firmware upgrades become available as improvements are made to the versatility and functionality of the IPL T CR48. These upgrades will be available for download from the Extron Web site. For information on upgrading the firmware, see "Upgrading the firmware" in chapter 4.

4

Chapter Four

Communication and Control

Communication and Control

Ports Overview

Contact closure input ports

The contact closure inputs on the IPL T CR48 are able to detect a closed circuit between any of the inputs and ground. The contact closure input ports utilize a 1 kohm pull-up resistor in a TTL (5VDC) circuit to sense external switch or contact closure.

By connecting one side of an external switch or relay to the contact closure ground port and the other side to one of the four contact closure input ports, logic 1 (closed) can be produced. Logic 0 (open) can be produced by disconnecting either side of the external switch or relay from the IPL T CR48.
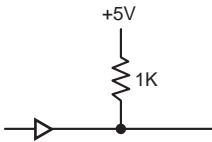
Figure 4-1 — Equivalent circuit for control closure input

Relay ports

The relay ports can be used for remote switching of low level signals. The relays can be activated via software in three ways, through

1. the Port Settings default Web page found under the Configuration tab (see figure 4-5)

2. Telnet

3. an event script running on the IPL T CR48

The Port Settings Web page allows the user to turn any of the eight relays "on" or "off."

Telnet allows the user to send SIS commands (Refer to the "Command/response table" later in this chapter) to turn the relays "on" or "off" directly.

Event scripting allows an event script to turn the relays "on" or "off" based on the state of the four inputs on the IPL T CR48, or any other event script conditions.

States of the relay ports are volatile; if a given relay port is "on" and the unit's power is turned off, the state of the port is not remembered. When the unit is powered on, the relay ports are open and the corresponding LED will be "off."

Communication with the Interface

Web server

The on-board Web server is displayed as a set of default Web pages which can be accessed via a Web browser. These pages are the primary means of communication with, and control through, the IPL T CR48 interface. Web browsers such as Netscape® Navigator (version 6.0 or higher), or Microsoft® Internet Explorer (version 5.5 or higher) can be used, but if using Internet Explorer, you must also have Microsoft Script (version 5.6 or higher).

The PC used to access the Web server must have a connection in common with the IPL T CR48 interface. In other words, both the unit and the PC should be connected to your local intranet or Internet.

If you have established passwords for the interface, you will be shown a Password window when your browser accesses the IPL T CR48 unit (but not when you initially access the Web server, since no passwords have been established). Your level of control over the interface depends on the password you enter in this password screen. If you enter the *administrator's* password, you will have control of all matters of configuration. If you enter a *user* password, you will be restricted to control of only contact closure and relay setting devices, and/or view status.

Accessing and using the Web server

Logon and system status

1. Double-click the Web browser icon on your Windows® desktop to launch your Web browser.

2. Enter the IP address of the unit (see "IPL T CR48 interface configuration" in chapter 3) in the Address field at the top of the screen and press the Enter key. The Password window (figure 4-2) is displayed if a password has been set (this will not happen the first time you access the interface, as no password is set at the factory).
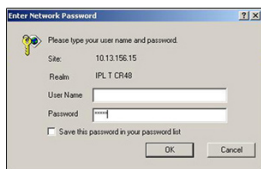
Figure 4-2 — Web server password window

3. The System Status page (figure 4-3) is displayed, showing the current IP and Port settings of the unit.

Figure 4-3 — Web server system status screen

Establishing or changing system or port settings

The System Settings screen is used to initially configure or change configuration of the IPL T CR48 interface. You may be required to change system settings if your network changes, or if port settings change as you add or change display devices or switchers.

To configure system or port settings:

1. Select the Configuration tab and the System Settings screen (figure 4-4) is displayed.

Figure 4-4 — Web server system settings screen

2. Make changes to the IP settings or Date/Time settings, as necessary.

3. Click the Submit button to enter the changes, or click the Cancel button to revert to the previous settings.

4. Click Port Settings on the menu (on the left side of the window) and the Port Settings screen (figure 4-5) is displayed.
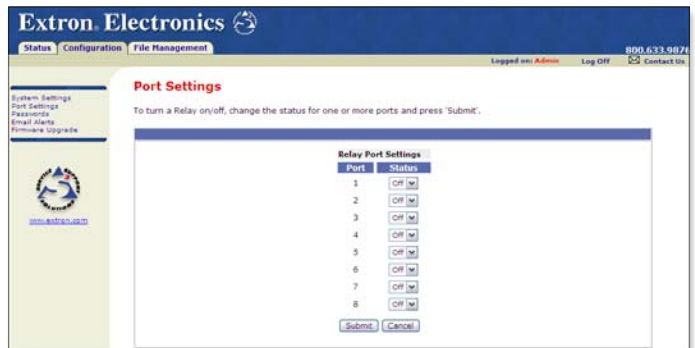
Figure 4-5 — Web server port settings screen

5. Select the desired port and make changes to the port settings, as necessary.

6. Click the Submit button to enter the changes, or click the Cancel button to revert to the previous settings.

Setting and changing your passwords

For security reasons you may want to set passwords initially, or change passwords either periodically or on a scheduled basis. If passwords have been set, you must log on as an administrator to change passwords.

To set or change the passwords:

1. Click Passwords on the menu (on the left side of the window) and the Passwords screen (figure 4-5) is displayed.

2. Enter the passwords for administrator and/or user, then re-enter the same passwords to confirm. Passwords should have a minimum of 4 characters and a maximum of 12 characters.

3. Click the Submit button to enter the changes, or click the Cancel button to revert to previous settings. If fields are blank, no passwords have been assigned.

Communication and Control, cont'd

Figure 4-6 — Web server passwords screen

4. Once passwords have been set, you will be required to enter a password (figure 4-2) whenever you log on to the unit.

   NOTE *To clear a password, enter a single space, repeat the entry, and click the Submit button.*

   NOTE *If there is no administrator password, your password will not be saved.*

Editing and adding e-mail alerts

If you have created scheduled events or monitoring tasks on the IPL T CR48 interface, you can write an e-mail alert with a message corresponding to that event or task (e.g., a timer notification indicating it's time to replace a projector light bulb). The e-mail alert can notify up to eight recipients at one time.

To edit notification e-mail addresses from the Email Alerts page:

1. Click Email Alerts on the menu (on the left side of the window) and the Email Alerts screen (figure 4-7) is displayed.

2. Click the Edit button to go into edit mode.

3. Add, update, or change the IP address and domain name of your mail server under Email Settings.

4. Click the Save button to keep changes.

5. Click on the Edit buttons to independently edit each e-mail address and file name.

   a. Enter the e-mail address of the alert recipient in one of the numeric mailboxes under E-mail Address.

   b. Enter the name of the file containing the alert message under File Name.

   c. Click the Save button to keep changes to recipient e-mail addresses and file names.

   CAUTION *File names must end with a .eml extension.*

Figure 4-7 — Email alerts screen

NOTE	*Due to the 7 character limit for full file names, it's advised that you use numeric titles (e.g., 1.eml, 24.eml). Numeric titles reduce the characters of the file name, and assist in keeping the alert files organized. However, alphabetical titles are permitted.*

To finalize your new e-mail alerts within the Web server, do the following:

6. Obtain your gateway IP address from your system administrator.

7. Click System Settings on the menu (figure 4-4) on the left side of the window.

8. Place the gateway IP address into the Gateway IP Address field.

Sending an e-mail alert through Telnet

To complete the process of sending an e-mail alert, you must send it through a Telnet session and receive confirmation. To do so

1. Open a Telnet session. For instructions on how to do this, see "Accessing and using Telnet" later in this chapter.

2. Use the "Send email" SIS command to send the alert to the e-mail address of a numeric mailbox (see figure 4-7). Refer to the "Command/response table for Simple Instruction Set (SIS) commands" later in this chapter for specific command code.

For example, the code for sending an alert from the 4th numeric mailbox would be **Esc 4 SM**←

Communication and Control, cont'd

Upgrading the firmware

Firmware upgrades become available as improvements are
made to the versatility and functionality of the IPL T CR48
interface. These upgrades are available for download from the
Internet.

CAUTION   *The firmware file you select to upload must have the
extension ".S19". Uploading the incorrect file may
cause your unit to stop working.*

To upgrade the firmware:

1.   Click Firmware Upgrade on the menu (on the left side of
the window) and the Firmware Upgrade screen
(figure 4-8) is displayed.

Figure 4-8 — Web server Firmware Upgrade screen

2.   Click the Browse button to find the most current available
version of the firmware.

If you find a later version than the one shown above the
box, click the Upload button to upgrade to the newer
version.

CAUTION   *If you leave the page before upload is complete, the
upload will be cancelled.*

Managing files

File Management is a useful tool that allows you to use and
upload existing and custom Web pages. Custom pages can be
developed using a third-party Web page development program
such as FrontPage® or Dreamweaver®. File management also
allows you to remove unnecessary or outdated files when they
are no longer needed.

To add or update files:

1. Select the File Management tab and the File Management screen (figure 4-9) is displayed.

Figure 4-9 — Web server File Management screen

2. Click the Browse button to locate the file you want to upload.

3. Click the Upload File button to upload the file.

The file is added to the list of files under the Files column. After ten files have been loaded, additional file management pages appear in the page navigation area (on the right side of the screen).

To delete unwanted files:

1. Select the File Management tab and the File Management screen (figure 4-9) is displayed.

2. Find the file you wish to delete under the Files list.

3. Click the Delete button of the file to be deleted. If you wish to delete additional files, wait for the screen to refresh before clicking the Delete button of the next file.

If you wish to delete all files, click the Delete All button. The file count will revert to 0 and all subsequent pages will be deleted.

Programmer's Guide for the Telnet and Web Browser

Using the command/response table

The following are either Telnet (port 23) or Web browser (port 80) commands. There are some minor differences when implementing these commands via Telnet or via URL encoding using a Web browser. All commands listed below will work using either connection method, but due to some limitations of the Web browser, the encapsulation characters are modified to make sure that the Web browser will properly handle them. All examples in the command/response table show the proper implementation in a Telnet or Web browser session.

NOTE *For Web browsers: all non-alphanumeric characters must be represented as their hex equivalent such as %xx where xx equals the two character representation of the hex byte that needs to be sent (e.g., a comma would be represented as %2C).*

Telnet	Web Browser
Escape (Hex 1B)	W [must **not** be encoded]
Carriage Return (Hex 0D)	Pipe Character (|) [must **not** be encoded]

When using these commands through a Web browser, the URL reference is used below to shorten the examples. This would, in practice, be the full URL of the control interface and Web page reference including all path information (e.g., http://192.168.100.10/myform.htm).

To send any of the commands using a Web browser you need to prefix them with the full URL followed by ?cmd= (See *URL Encoding* later in this chapter).

NOTE *With Telnet you can use either the "Escape" commands or the "W" commands, and the carriage return or the pipe character. With the Web browser, you are required to use the "W" commands and the pipe character.*

In either method {Data} = Data will be directed to a specified port and **must** be encoded if non-alphanumeric.

The table on pages 4-15 through 4-19 lists the commands that the IPL T interface recognizes as valid, the responses that are returned to the host, a description of the command's function, or the results of executing the command.

NOTE	*Upper and lower case text can be used interchangeably except where noted.*

Symbol definitions are shown below. An ASCII to HEX conversion table is also provided in figure 4-10.

ASCII to HEX Conversion Table														Esc	1B	CR	0D	LF	0A
	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	l	7C	}	7D	~	7E	DEL	7F

Figure 4-10— ASCII-to-HEX conversion table

Symbol definitions

↵ = CR/LF (carriage return/line feed)

← = Carriage return (no line feed)

• = Space (hard) character

X1 = Specific port number (01-99)

The port number will be represented as two ASCII characters (2 bytes) [example: port 05 would be represented as 30 35 in hex] 00 = All ports

X2 = Command data section

NOTE	*For Web encoding only - Data will be directed to a specified port and **must** be encoded (URL encoding) if non-alphanumeric. Since data can include either command terminator, they must be encoded as follows when used within the data section: space (hex: 20) would be encoded as %20 and Plus sign (hex: 2B) would be encoded as %2B.*

X3 = Greenwich Mean Time (GMT) offset value (-12.0 to +14.0)

X5 = On/off status: 0 = off/disable; 1 = on/enable

X6 = Dirty status: 1 = RAM needs to be saved to Flash; 0 = RAM has been saved to Flash (OK to power off/reset)

▣11 = Unit version number

▣12 = Name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and/or a minus sign/hyphen (-). No blank or space characters are permitted as part of a name. No distinction is made between upper and lower case. The first character must be an alpha character. The last character can **not** be a minus sign/hyphen.

▣13 = Set local date and time format (MM/DD/YY-HH:MM:SS, e.g., 06/21/02-10:54:00)

Read local date and time format (day of week, date month year HH:MM:SS, e.g., Thu, 20 Feb 2003 18:19:33)

▣14 = IP address (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values, and are suppressed in returned values.

▣15 = Domain name (e.g., extron.com, icia.org)

▣18 = Hardware (MAC) address (xx-xx-xx-xx-xx-xx)

▣19 = Subnet mask (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values, and are suppressed in returned values.

▣22 = Status: 0 = working; 1 = fail

▣23 = Priority status for receive timeout: 0 = priority set to Send Data String command parameters; 1 = priority set to Configure rcv timeout command parameters.

▣33 = Password: maximum length of 12 characters and no special characters.

> **NOTE** *User password cannot be assigned if no administrator password exists and returns E14. If an admin password is cleared, then the user password is removed too.*

▣34 = Daylight saving time: 0 = off/ignore; 1 = on (use in northern hemisphere)

▣35 = Event number: range = 0 - 99 (Max.)

▣36 = Event buffer: 0 = receive; 1 = user (absolute); 2 = user (relative); 3 = NVRAM

▣37 = Event buffer offset: range = 0 - MaxBufferSize

▣38 = Event data size: b = bit; B = byte (8 bit); S = short (16 bit); L = long (32 bit)

> **NOTE** *This parameter is case sensitive.*

$\boxed{\text{X39}}$ = Event data to write

$\boxed{\text{X43}}$ = Input state: 0 = off; 1 = on

$\boxed{\text{X44}}$ = Number of bytes to read

$\boxed{\text{X45}}$ = E-mail event number: Range = 1-64 (Max)

$\boxed{\text{X46}}$ = E-mail recipient address: Maximum number of characters for a full e-mail address is 31 characters.

$\boxed{\text{X47}}$ = Name of e-mail file to be sent: first line of file is subject, the rest is the body of the e-mail.

> **NOTE**   *E-mail files must have the file extension .eml.*

$\boxed{\text{X48}}$ = Event Status fields (8): event_type, event_state, event_paused, error_status, RcvBuff_startptr, RcvBuff_endptr, UsrBuff_startptr, UsrBuff_endptr

$\boxed{\text{X49}}$ = Default Name: Combination of model-name and last 3 pairs of MAC address (e.g., IPL-T-CR48-00-02-3D)

$\boxed{\text{X51}}$ = Direct access: 0 = direct access not in use; 1 = direct access in use

$\boxed{\text{X52}}$ = Connection's security level: 0 = not logged in, 1 = user, 2 = administrator

$\boxed{\text{X53}}$ = Timeout for data pass-through mode, after which event data can be inserted into the transmit buffer.

$\boxed{\text{X54}}$ = ASCII digit(s) representing numeric value of data element read from event buffer; leading zeros are suppressed.

$\boxed{\text{X63}}$ = Pulse time in 20 ms per count. If parameter is missing or = 0, pulse length = default (25 counts = 500 ms), max (65536 counts)

$\boxed{\text{X64}}$ = Time in seconds to keep sending the broadcast message (0-255, default 10)

> **NOTE**   *Zero (0) clears broadcast mode.*

Copyright information

↵© COPYRIGHT 2003, EXTRON ELECTRONICS IPL T CR48, Vx.xx↵
Mon, 17 Feb 2003 11:27:33↵
The copyright message is displayed upon connecting to IP Link® product via TCP/IP or Telnet. Vx.xx is the firmware version number. The current date and time is displayed. This is followed by a Password prompt.

Communication and Control, cont'd

Password information

The "↵Password:" prompt requires a password (administrator level or user level) followed by a carriage return. The prompt is repeated if the correct password is not entered.

If the correct password is entered, the unit responds with "↵Login Administrator↵" or "↵Login User↵", depending on the password entered. If passwords are the same for both administrator and user, the unit will default to administrator privileges.

Error responses

When the IPL T CR48 interface receives a valid command, it executes the command and sends a response to the host device. If the unit is unable to execute the command because the command contains invalid parameters, it returns an error response to the host.

E10 — Invalid command

E12 — Invalid port number

E13 — Invalid parameter

E14 — Not valid for this configuration

E17 — System timed out

E22 — Busy

E24 — Privilege violation

E25 — Device not present

E26 — Maximum number of connections exceeded

E27 — Invalid event number

E28 — Bad filename/file not found

References to errors (at command descriptions on the following pages)

[24] = Commands that give E24 (privilege violation) if not administrator level

[27] = Commands that may give E27 (invalid event number)

[28] = Commands that may give E28 (file not found)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Relay functions			
Pulse relay	1*3*[X63]O	[X1]%2A3%2A[X63]O	Cpn[X1] • Rly3↵
Toggle relay	[X1]*2O	[X1]%2A2O	Cpn[X1] • Rly2↵
Turn relay ON	[X1]*1O	[X1]%2A1O	Cpn[X1] • Rly1↵
Turn relay OFF	[X1]*0O	[X1]%2A0O	Cpn[X1] • Rly0↵
View relay status	[X1]O	[X1]O	[X5]↵
Input Contact Closure port			
View the input state or value	[X1]]	[X1]%D+	[X43]↵
Firmware Version/Part Number/Information			
Query firmware version	Q	Q	[X11]↵
Query verbose version information	0Q	0Q	sum of responses from 2Q-3Q-4Q↵
Query firmware version	1Q	1Q	[X11]↵
Query bootstrap version	2Q	2Q	[X11]↵

NOTE

[X1] = Specific port number (01-99)

[X6] = On/off status: 0 = off/disable; 1 = on/enable

[X11] = Unit version number

[X43] = Input state: 0 = off; 1 = on

[X63] = Pulse time in 20 ms per count. If parameter is missing or = 0, pulse length = default (25 counts = 500 ms), max (65536 counts)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Query factory firmware version	3Q	3Q	[X11] (plus web ver.-desc-UL date/time)↵
Query updated firmware version	4Q	4Q	[X11] (plus web ver.-desc-UL date/time)↵

NOTE *An asterisk (*) placed after the version number indicates which version is currently running. A question mark (?) indicates that only the factory firmware version is loaded. A caret (^) after the version number indicates the firmware version that should be running, but a Mode 1 reset was executed. The default factory firmware version is loaded. An exclamation point (!) after the version number indicates corrupted firmware.*

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Request part number	N	N	60-544-05↵
Request model number	1I	1I	IPL T CR48
Request model description	2I	2I	Four contact input ports, Eight relay ports↵
Request system memory usage	3I	3I	# bytes used out of # kbytes↵
Request user memory usage	4I	4I	# bytes used out of # kbytes↵
IP Setup Commandsz			
Set Unit name	[Esc][X12]CN↵	W[X12]CN|	Ipn • [X12]↵
Set Unit name to factory default[24]	[Esc]•CN↵	W%20CN|	Ipn • [X49]↵

NOTE
[X11] = Unit version number

[X12] = Name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and/or a minus sign/hyphen (-).

[X49] = Default Name: Combination of model-name and last 3 pairs of MAC address (e.g., IPL-T-CR48-00-02-3D)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Read Unit name	[Esc]CN	WCN⏎	[X12]⏎
Set time / date[24]	[Esc][X13]CT⏎	W[X13]CT⏎	Ipt • [X13]
Read time / date	[Esc]CT⏎	WCT⏎	[X13]⏎
Set GMT offset[24]	[Esc][X3]CZ⏎	W[X3]CZ⏎	Ipz[X3]⏎
Read GMT offset	[Esc]CZ⏎	WCZ⏎	[X3]⏎
Set daylight savings time[24]	[Esc][X34]CX⏎	W[X34]CX⏎	Ipx[X34]⏎
Read daylight savings time	[Esc]CX⏎	WCX⏎	[X34]⏎
Set DHCP on[24]	[Esc]1DH⏎	W1DH⏎	Idh1⏎
Set DHCP off[24]	[Esc]0DH⏎	W0DH⏎	Idh0⏎

NOTE

[X3] = Greenwich Mean Time (GMT) offset value (-12.0 to +14.0)

[X5] = On/off status: 0 = off/disable; 1 = on/enable

[X12] = Name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and/or a minus sign/hyphen (-).

[X13] = Set local date and time format

= Read local date and time format

[X14] = IP address

[X34] = Daylight saving time: 0 = off/ignore; 1 = on (use in northern hemisphere)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
View DHCP mode	`Esc` DH ←	WDH |	X5 ←
Set IP address[24]	`Esc` X14 CI ←	W X14 CI |	Ipi • X14 ←
Read IP address	`Esc` CI ←	WCI |	X14 ←
Read hardware address (MAC)	`Esc` CH ←	WCH |	X18 ←
Set subnet mask	`Esc` X19 CS ←	W X19 CS |	Ips • X19 ←
Read subnet mask	`Esc` CS ←	WCS |	X19 ←
Set gateway IP address	`Esc` X14 CG ←	W X14 CG |	Ipg • X14 ←
Read gateway IP address[24]	`Esc` CG ←	WCG |	X14 ←
Set administrator password[24]	`Esc` X33 CA ←	W X33 CA |	Ipa • X33 ←
Clear administrator password[24]	`Esc` •CA ←	W%20CA |	Ipa • ←

NOTE

X5 = On/off status: 0 = off/disable; 1 = on/enable

X14 = IP address

X18 = Hardware (MAC) address (xx-xx-xx-xx-xx)

X19 = Subnet mask (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values, and are suppressed in returned values.

X33 = Password: maximum length of 12 characters and no special characters. See Note on pg. 4-12.

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Read administrator password[24]	Esc CA ←	WCA |	X33 ←
Set user password[24]	Esc X33 CU ←	W X33 CU |	Ipu • X33 ←
Clear user password[24]	Esc • CU ←	W%20CU |	Ipu • ←
Read user password[24]	Esc CU ←	WCU |	X33 ←
Set verbose mode[24]	Esc X5 CV ←	W X5 CV |	Vrb X5 ←
Read verbose mode	Esc CV ←	WCV |	X5 ←
Read connection's security level	Esc CK ←	WCK |	X52 ←
Configure Broadcast mode	Esc X64 EB ←	W X64 EB |	Bmd X64 ←
View Broadcast mode	Esc EB ←	WEB |	X64 ←
Get connection listing	Esc CC ←	WCC |	Number of connections

NOTE

X5 = On/off status: 0 = off/disable; 1 = on/enable

X33 = Password: maximum length of 12 characters and no special characters. See Note on pg. 4-12.

X52 = Connection's security level: 0 = not logged in, 1 = user, 2 = administrator

X64 = Time in seconds to keep sending the broadcast message (0-255, default 10). See Note on pg. 4-13.

Command	ASCII (Telnet)	URL Encoded (Web)	Response
File Commands			
Stream files via port 80			
Load file to use flash memory	Use a POST on port 80, followed by the delimited data to be written to the flash file memory		
Retrieve file from user flash memory	Send a page GET on port 80 followed by: WSF‖ {responds with raw, unprocessed data in file} (e.g., http://192.168.254.254/mypage.html?cmd=WSF‖)		
Stream files via Telnet			
Load file to user flash memory[24 28]	`Esc` + UF, *filesize, filesize* ← {raw unprocessed data from the file up to filesize} Up1↵		
Retrieve file from user flash memory [24 28]	`Esc` *filename* SF {responds with a 4 byte filesize and raw unprocessed data from the file}		
Re-map port designations			
Set Telnet port map[24]	`Esc`[port#]MT↵	W[port#]MT‖	Pmt[port#]↵
Reset Telnet port map[24]	`Esc`23MT↵	W23MT‖	Pmt00023↵
Disable Telnet port map[24]	`Esc`0MT↵	W0MT‖	Pmt00000↵
Read Telnet port map[24]	`Esc`MT↵	WMT‖	{port#}↵
Set Web port map[24]	`Esc`[port#]MH↵	W[port#]MH‖	Pmh[port#]↵

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Reset Web port map[24]	Esc|80MH↵	W80MH|	Pmh00080↵
Disable Web port map[24]	Esc|0MH↵	W0MH|	Pmh00000↵
Read Web port map[24]	Esc|MH↵	WMH|	{port#}↵
Web Browser Specific			
Read response from last URL cmd	Esc|UB↵	WUB|	response from command↵
E-mail			
Configure e-mail events[24]	Esc|X45|,|X46|,|X47|CR↵	W|X45|,|X46|,|X47|CR|	Ipr|X45|,|X46|,|X47|↵
Read e-mail events	Esc|X45|CR↵	W|X45|CR|	|X46|, |X47|↵
Send e-mail (event)[24]	Esc|X45|SM↵	W|X45|SM|	Eml|X45|↵
Set mail server IP, domain name[24]	Esc|X14|, |X15|CM↵	W|X14|%2C|X15|CM|	Ipm|X14|,|X15|↵

NOTE

X14 = IP address

X15 = Domain name

X45 = E-mail event number: Range = 1-64 (Max)

X46 = E-mail recipient address: Maximum number of characters for a full e-mail address is 31 characters.

X47 = Name of e-mail file to be sent: first line of file is subject, the rest is the body of the e-mail. See Note on pg. 4-13.

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Read mail server IP, domain name	Esc CM ↵	W[X14]%2C[X15]CM|	[X14],[X15] ↵
Event Control			
Read event buffer memory[27]	Esc [X35][X36][X37][X38]E ↵	W[X35][X36][X37][X38]E|	[X5] ↵
Read event status[27]	Esc [X35]E ↵	1BW[X35]E|	<see [X48]> ↵
Write event memory[24][27]	Esc [X35][X36][X37][X39][X38]E ↵	W[X35][X36][X37][X39][X38]E|	Ewr[X35],[X39] ↵
Read string from event memory	Esc [X35][X36][X37][X44]FE ↵	W[X35][X36][X37][X44]FE|	{string} ↵
Write string to event memory	Esc {string}[X35][X36][X37]FE ↵	W[X39]%2A[X35][X36][X37]FE|	Ewr[X35],{string} ↵
Start Events[24][27]	Esc 1AE ↵	W1AE|	Ego ↵

NOTE

[X5] = On/off status: 0 = off/disable; 1 = on/enable

[X14] = IP address

[X15] = Domain name

[X35] = Event number: range = 0 - 99 (Max.)

[X36] = Event buffer: 0 = receive; 1 = user (absolute); 2 = user (relative); 3 = NVRAM

[X37] = Event buffer offset: range = 0 - MaxBufferSize

[X38] = Event data size: b = bit; B = byte (8 bit); S = short (16 bit); L = long (32 bit). See Note on pg 4-12.

[X39] = Event data to write

[X44] = Number of bytes to read

[X48] = Event Status fields

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Stop Events[24][27]	Esc 0AE↵	W0AE|	Est↵
Read number of events running	Esc AE↵	WAE|	Enm#↵
Reset (ZAP)/Erase Commands			
Erase user-supplied Web page and files[24][28]	Esc *filename*EF↵	W*filename*EF|	Del • *filename*↵
Erase flash memory[24]	Esc ZFFF↵	WZFFF|	Zpf↵
Reset all device settings to factory[24]	Esc ZXXX↵	WZXXX|	Zpx↵
Absolute System Reset[24] (Includes IP address=192.168.254.254, subnet mask=255.255.0.0)	Esc ZQQQ↵	WZQQQ|	Zpq↵
Commit RAM to Flash	Esc 1FF↵	W1FF|	Nvr X6↵ (responds when done)
View whether RAM needs to be saved to Flash	Esc FF↵	WFF|	X6↵

NOTE X6 = Dirty status: 1 = RAM needs to be saved to Flash; 0 = RAM has been saved to Flash (OK to power off/reset)

Device Control

Control of devices may be accomplished in any of several ways once the IPL T interface has been connected and configured. These include Web pages, Telnet, and direct port access.

Custom Web pages

These pages can either be modified versions of the existing Web pages, or new Web pages developed in the field.

Web page development can be done with a Web site development tool such as Frontpage or Dreamweaver. Custom Web pages are loadable with the Web server File Manager (see "Managing files" earlier in this chapter).

Telnet (port 23)

Telnet, short for Telecommunications Network, provides a way for you to connect to a computer or server (in this case the IPL T interface) on a network. Once connected via Telnet, you can send ASCII serial commands (see "Command/Response Table" in this chapter) to control devices connected to the interface.

Accessing and using Telnet

1. Click Start, then Run, then type in "telnet" and click OK. The Telnet program starts (see figure 4-11)

2. At the command prompt, type "open" and press Enter.

3. At the <to> prompt, type the IP address of the IPL T unit. (The default IP address is 192.168.254.254, but it may have been changed in the setup or configuration process. If it was changed, use the new address.) Telnet defaults to port 23.
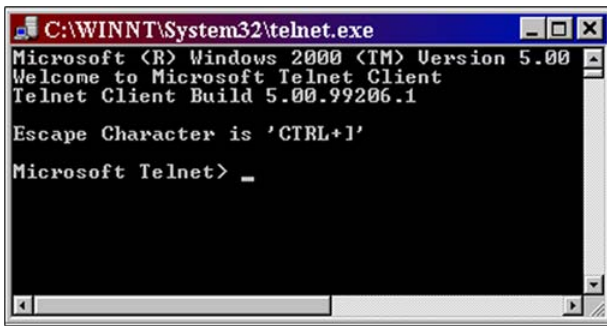

Figure 4-11— Telnet command prompt

4. If passwords were set up for the connected system, you will be prompted to log in as Administrator or User. Otherwise the system will respond with a <cr/lf>.
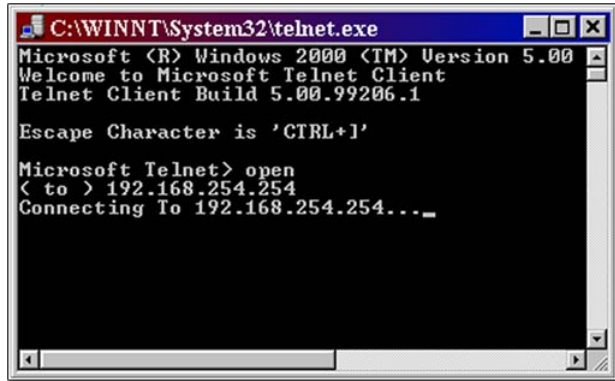

Figure 4-12— Connecting to the IP address

5. Once you are connected, you can enter serial (ASCII) commands as desired.

6. When you are through entering commands to the interface, type "quit" at the command prompt to quit Telnet.

Troubleshooting

For best results, make connections in the following order: turn on the control devices (PC, laptop, etc.), then the IPL T control interface, and lastly the output device(s) (projector lifts, screen lifts, lighting systems, etc.).

If the output A/V device cannot be remotely controlled, check the following:

Power connections

1. Ensure that all devices are plugged in.

2. Make sure that each device is receiving power. If the device is receiving power, the interface's front panel power LEDs will light.

Communication and Control, cont'd

Data connections

1. Check the cabling connections and make adjustments as needed. The Link LEDs on the IPL T control interface and the computer should be solid green if a network connection is detected. If these LEDs are not lit, either the cable is faulty or not plugged in, or the wrong type of cable is being used (refer to "Connecting the Hardware", in chapter 3).

2. Try to "ping" the unit by typing "ping 192.168.254.254" at the DOS command prompt, or use the Web address provided to you by your system administrator. If you get no response:

   a. Make sure your unit is using the appropriate subnet mask (check with your system administrator).

   b. Make sure your PC does not have a software firewall program which might block the IP address of the unit.

3. If contact is established with the unit, but the unit's Web pages cannot be accessed by your Web browser, verify (in the Options or Preferences menu) that your Web browser is configured for direct network connection and not set up to use a proxy server.

If you are still experiencing problems, call the Extron S³ Sales & Technical Support Hotline.

Configuration

If, when configuring a unit, the MAC address on the rear panel is not visibly accessible and the IP address is not known, use the direct PC connection method (see chapter 3, "Connection and Configuration").

NOTE   *If the unit is not new (i.e., out of the box), please refer to Resetting the unit in chapter two for instructions on how to reset the IP back to factory default.*

Appendix A

Specifications, Part Numbers, and Accessories

Specifications

Part Numbers and Accessories

Specifications, Part Numbers, Accessories

Specifications

Ethernet control interface

Connectors .... 1 RJ-45 female connector

Data rate .... 10/100Base-T, half/full duplex with autodetect

Protocols .... ARP, DHCP, ICMP (ping), TCP/IP, UDP/IP, Telnet, HTTP, SMTP

Default settings.............................. Link speed and duplex level = autodetected
IP address = 192.168.254.254
Subnet mask = 255.255.0.0
Gateway = 0.0.0.0
DHCP = off

Web server..................................... Up to 200 simultaneous sessions
1.25 MB nonvolatile user memory

Program control.............................. Extron's Simple Instruction Set (SIS™)

Global Viewer requirements........ Microsoft® Internet Explorer ver. 6 or higher

Relay control interface

Quantity/type .... 8 normally open relays

Relay control connectors.............. (2) 3.5 mm captive screw connectors, 8 pole

Relay control contact rating......... 24 V, 1 A

Contact closure control interface

Quantity/type .... 4 contact closure inputs

Contact input control connector . (1) 3.5 mm captive screw connector, 5 pole

Contact closure (input only)

    Input voltage range........... 0 to 5 VDC, clamped at +5.1 V

    Input impedance .... 10k ohms

    Threshold............................ 1.6 VDC

Pin configurations......................... 1, 2, 3, 4 = inputs 1, 2, 3, 4; 5 = GND

General

Power .... Supplied by an included external power supply

External power supply .... 100 VAC to 240 VAC, 50/60 Hz, external; to 12 VDC, 1 A, regulated

Power input requirements........... 12 VDC, 0.5 A

Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing
	Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Mounting	
Rack mount	Yes, with optional 1U 9.5" deep rack shelf kit, part #60-190-01 (RSU 129); or 1U 3.5" deep VersaTools® rack shelf kit, part #60-190-20 (RSF 123)
Furniture mount	Yes, with optional under desk mounting kit #70-212-01 (MBU 123)
Pole mount	Yes, with optional mini pole mount kit, part #70-217-01 (PMK 100)
Enclosure type	Metal
Enclosure dimensions	1.7" H x 4.3" W x 3.0" D (1U high, quarter rack wide)
	(4.3 cm H x 10.9 cm W x 7.6 cm D)
	(Depth excludes connectors.)
Product weight	0.7 lbs (0.3 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, CUL, UL
	UL rated for use in plenum airspaces: meets UL 2043 for heat and smoke release, excluding the power supply; meets UL 60950 for safety.
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI

Part Numbers and Accessories

Included parts

Included parts	Replacement part number
IPL T CR48	60-544-05
12 VDC, 1A external power supply (U.S., Can)	70-055-01
12 VDC, 1A external power supply (Int'l)	70-055-02
IEC power cord	27-044-01
Rubber feet (4)	25-020-02
Industrial strength Velcro®	
2 male 3.5 mm, 8-pole captive screw connectors	10-319-16
1 male 3.5mm, 5-pole captive screw connectors	10-319-10
Tweeker	10-014-01
IPL T CR48 User's Manual	

Accessories

Accessories	Part number
19" 1U VersaTools® Rack Shelf kit	60-190-20
19" 1U Universal Rack Shelf kit	60-190-01
Under-desk mount kit	70-077-01
Mini projection mount kit	70-217-01

Appendix B

Glossary

Glossary

Glossary

Glossary

10/100Base-T is Ethernet which uses Unshielded Twisted Pair (UTP - Cat 5, etc.) cable, where the amount of data transmitted between two points in a given amount of time is equal to either 10 Mbps or 100 Mbps.

Address Resolution Protocol (ARP) is a protocol which assigns an IP address to a device based on the device's MAC or physical machine address.

Contact closure refers to an encapsulated switch containing two metal wires that serve as the contact points. When these contact points meet, it creates a complete circuit (e.g., ports 1-4 to ground on the IPL T CR48).

Custom Web page is any file that can be loaded into an IPL box and served by the IPL's internal Web server. A custom Web page can provide control of devices attached to the IPL without use of the GlobalViewer® (GV) or Global Configurator (GC). This is true with or without an accompanying event script. Any number and size of graphics can be used, but if they are too large to fit on the IPL, you can write your Web page so that they can be served from another Web server. If you install Microsoft® Internet Information Services (IIS) on your desktop, you can serve any page on its hard disk. The IPL functions like a little computer with a Web server—you can use it for various Web tasks.

DHCP is the Dynamic Host Configuration Protocol (DHCP), which is a standardized communications protocol that enables network administrators to locally and automatically manage the assignment of IP addresses in an organization's network.

Driver is a Global Configurator (GC) compatible package. It includes the event script that controls devices.

Ethernet is a network protocol that uses MAC addresses instead of IP addresses to exchange data between computers. Using ARP (see above), with TCP/IP support, Ethernet devices can be connected to the Internet. An Ethernet LAN typically uses unshielded twisted pair (UTP) wires. Ethernet systems currently provide transmission speeds of 10 Mbps or 100 Mbps.

Event script is a program that runs on an IPL box, and issues queries and commands to the attached devices. Event scripts are written in the "Extron C" language (.sc), and compiled into an event script (.evt). The Global Configurator performs this compilation. The compiled result (.evt) is loaded onto the IPL box. The Extron C language is similar to ANSI C, with some differences. As long as event scripts are turned on, event scripts run continuously on the box.

Global Configurator (GC) is a windows program that, based on user input, creates a GlobalViewer (GV). GC requests system information such as which devices you have and your current list of IP addresses. With this information, GC creates a GlobalViewer for your specific devices. GC also compiles the event scripts and loads the GlobalViewer and event scripts onto the box. When using GC, the user must specify the port number for each device (for attached devices to be controlled, they must be on that port). In order for multiple IP Link® boxes to appear in the same GlobalViewer, all the boxes must be configured at the same time, using Global Configurator.

GlobalViewer (GV) is a set of Web pages (HTML, XML, JS) and graphics that are loaded into the memory of an IPL box. These pages provide an interface for control of devices attached to the IPL. They communicate with the event scripts running on the box, and the event scripts issue the commands and queries. This communication between the Web pages and the event scripts occurs through predetermined memory locations in the IPL box. GlobalViewer is initially created by Global Configurator (GC); however, it is possible to edit the GlobalViewer HTML, XML, and JavaScript files outside of GC. This edited GV is called "hard-coded" or manually generated GV.

HTTP is an acronym for the HyperText Transfer Protocol (HTTP), a Web protocol based on TCP/IP, that is used to fetch HyperText objects from remote Web pages.

Internet Protocol (IP) is the protocol or standard used to send information from one computer to another on the Internet.

IP address is a unique, 32-bit binary number (12 digit decimal number, xxx.xxx.xxx.xxx) that identifies each sender and each receiver of information connected to a LAN, WAN, or the Internet. IP addresses can be static (see Static IP) or dynamic (see DHCP).

IP Netmask is a 32-bit binary number (12 digit decimal number, xxx.xxx.xxx.xxx) used on subnets (smaller, local networks) to help the router determine which network traffic gets routed internally to local computers and which network traffic goes out on the Internet.

Media Access Control (MAC) Address is a unique hardware number given to devices that connect to the Internet. When your computer or networking device (router, hub, interface, etc.) is connected to the Internet, a table (see ARP) relates the device's IP address to its corresponding physical (MAC) address on the LAN.

Pass-through allows control systems to work with the IPL and provides a link between two ports.

Glossary, cont'd

Ping is a utility that tests network connections. It is used to determine if the host has an operating connection and is able to exchange information with another host.

Port number is a preassigned address within a server that provides a direct route from the application to the Transport layer or from the Transport layer to the application of a TCP/IP system.

Powered Ethernet is a standard (802.3af) that provides power to network devices by utilizing the existing Ethernet connection, thereby eliminating the need for additional, external power supplies.

Relay refers to an electromechanical device that opens or closes electrical contacts when energized by an isolated electrical coil circuit.

Static IP refers to an IP address that has been specifically (instead of dynamically—see DHCP above) assigned to a device or system in a network configuration. This type of address requires manual configuration of the actual network device or system and can only be changed manually or by enabling DHCP.

Transmission Control Protocol/Internet Protocol (TCP/IP) is the communication protocol (language) of the Internet. Computers and devices with direct access to the Internet are provided with a copy of the TCP/IP program to allow them to send and receive information in an understandable form.

Telnet is a utility available on most PCs that allows the computer system to communicate with one of its remote users/clients. A user who wishes to access a remote system initiates a Telnet session, using the address of the remote client. The user may be prompted to provide a user name and password if the client is set up to require them.

URL encoding allows you to send information and commands to the unit to change its configuration or provide you with feedback.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America,
and Central America:
Extron USA
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

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Middle East:
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United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.