User Guide

IP Link®

IPL T CR48

IP Link Ethernet Control Interface

Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

68-738-05 Rev. C
08 10

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.

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.

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.

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 la contourner ni de la 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'll y a remplacment 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.

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.

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.

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 especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

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 sobrecalientamiento 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。

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.
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.

In this user guide, the following are used:

WARNING: A Warning informs of things that might cause injury, death, or other severe consequences.

CAUTION: A Caution warns of things that might damage the equipment.

NOTE: A Note draws attention to important information.

Trademarks

All trademarks mentioned in this guide are the properties of their respective owners.

Contents

Introduction

This section gives an overview of the user guide and describes the Extron® IPL T CR48 IP Link® Ethernet Control Interface and its features. Topics that are covered include:

- **About this Guide**
- **About the IPL T CR48**
- **Features**

About this Guide

This guide describes the function, installation, configuration, and operation of the IPL T CR48 Ethernet Control Interface.

About the IPL T CR48

The IPL T CR48 is an Ethernet controller designed to be used as one of many nodes in a distributed control system environment, or as a stand-alone controller allowing legacy products to link to 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 unit hosts its own Web pages, stored in flash memory within the device. The IPL T CR48 supports Telnet, SMTP (Simple Mail Transfer Protocol), ICMP (Internet Control Message Protocol) or Ping, and DHCP (Dynamic Host Configuration Protocol).

The IPL T CR48 is 1U high and one quarter rack wide. It is rack-mountable, using either an RSF 123 Rack Shelf Kit (part #**60-190-20**) or an RSU 129 Universal Rack Shelf Kit (part #**60-190-01**). It can also be mounted near a screen or projector lift.

The interface ships with an external, desktop, 12 V, 1 A power supply (part #**70-775-01**), that accepts 100-240 VAC input.

Features

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

User customizable — You can tailor the on-board Web pages with advanced programmability, e-mail alerts, and storage to suit your needs and requirements. You can also 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 — You can control the access to devices attached to the unit. 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

Supports Ethernet device drivers — Allows for control of up to six Ethernet-enabled A/V devices

> **NOTE:** Ethernet driver support requires Global Configurator 3.0 and firmware version 1.15 or higher.

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

Easily configured and controlled —

- Using a standard Web browser (Microsoft® Internet Explorer® version 6.0 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 — The controller 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.

Installation and Operation

This section describes the installation and the operation of the IPL T CR48. Topics that are covered include:

- **Installation Overview**
- **Mounting the IPL T CR48**
- **Rear Panel Features and Cabling**
- **Operation**

Installation Overview

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

1. Turn all of the equipment off. Make sure that the input devices (such as motion detectors and alarms), the IPL T CR48, and the output devices (such as projectors or screen lifts) are all turned off and disconnected from the power source.
2. Mount the IPL T CR48 unit (see **Mounting the IPL T CR48**).
3. Attach the cables (see **Connecting the Hardware** in the "Connection and Configuration" section.
4. Connect power cords and turn on the devices in the following order: output devices (projector lifts, screen lifts, lighting system, and so on), IPL T CR48, serial controller or computer (PC), then input devices (DSS, cable boxes, and so on).
5. Configure the IPL T CR48 through Telnet, then access the unit using an Internet browser.

Mounting the IPL T CR48

Optional rack shelves and an assortment of mounting kits (furniture and projector mount) are available for use with the IPL T CR48 controller. See the **Specifications and Part Numbers** section for the part numbers of these accessories. Read the instructions provided with the rack shelf or mounting kit for installation procedures.

The IPL T CR48 includes rubber feet so that it can be set on a table. If you are going to mount the unit to a rack shelf, furniture, or pole, and these feet were attached to the controller, remove the feet before mounting.

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of an IPL T CR48 unit onto a rack.

1. **Elevated operating ambient —** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer [Tma = +32 to +122 °F (0 to +50 °C)].
2. **Reduced air flow —** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading —** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading —** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding) —** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack Mounting

For optional rack mounting, mount the unit on an RSF 123 Rack Shelf (part #**60-190-20**) (**figure 1**) or an RSU 129 Universal Rack Shelf (part #**60-190-01**) (**figure 2**).

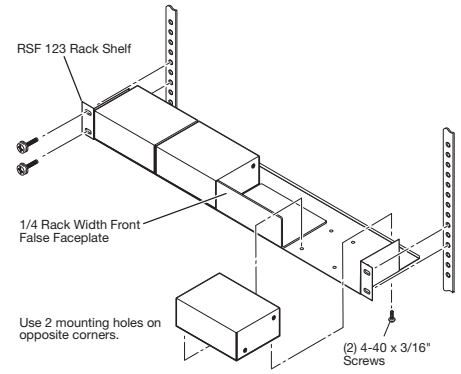


Figure 1. Mounting the Unit on the RSF 123 Rack Shelf

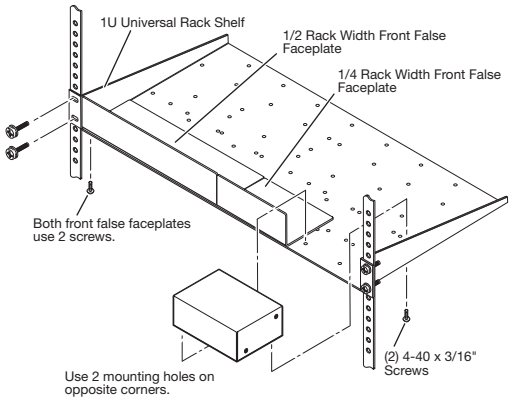


Figure 2. Mounting the Unit on the RSU 129 Universal Rack Shelf

Furniture or Projector Mounting

In addition to using the IPL T CR48 unit on a rack, it can be furniture or projector mounted. You can furniture mount the IPL T CR48 using an optional MBU 123 Under-Desk Mount Kit (part #**70-212-01**) (**figure 3**). You can also mount the controller to a projector mount pole using an optional PMK 100 Projector Mount (part #**70-217-01**) (**figure 4**).

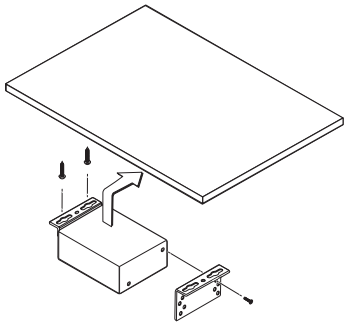


Figure 3. Furniture Mounting the IPL T CR48

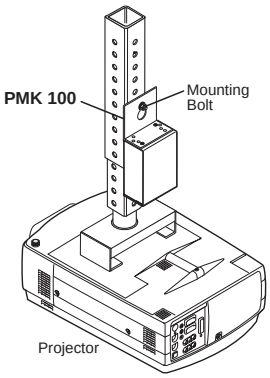


Figure 4. Projector Mounting the IPL T CR48

Rear Panel Features and Cabling

All connections, including power, input and output, and control, are on the rear panel of the IPL T CR48 (**figure 5**).

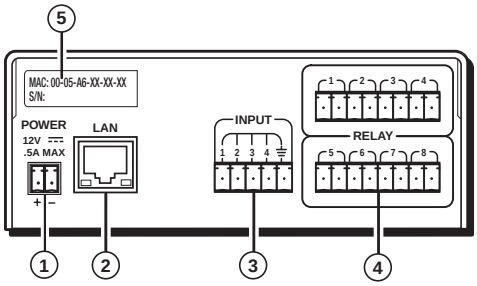


Figure 5. IPL T CR48 Rear Panel

Power

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

WARNING: When wiring, the two power cord wires must be kept separate while the power supply is plugged in. Remove power before continuing.

CAUTION: Always use a power supply supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product. Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 75 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.

When connecting the power supply, voltage polarity is extremely important. Applying power with incorrect voltage polarity could damage the power supply and the unit. Identify the power cord negative lead by the ridges on the side of the cord.

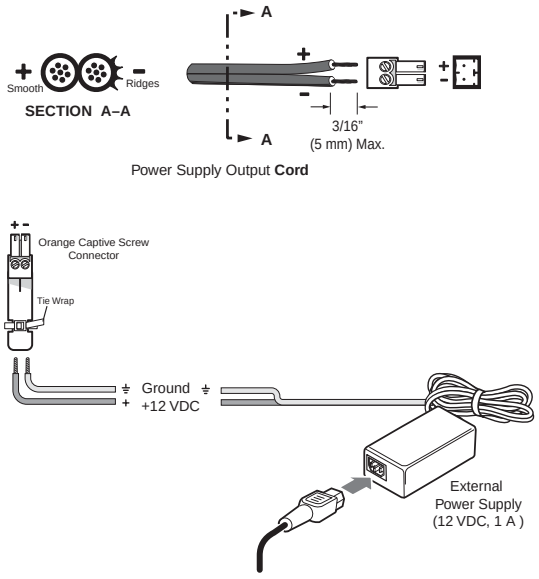


Figure 6. Power Connector Wiring

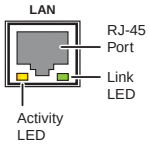
NOTE: Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could pull out.

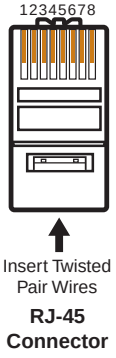
To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

Ethernet/LAN

② **LAN port —** 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, and a crossover cable to connect directly to a PC.

Activity LED — A blinking yellow LED indicates LAN activity.
Link LED — A green LED lights to indicate a good LAN connection.





Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure 7. RJ-45 Connector Wiring

Connections

③ **Contact closure —** Four inputs permit connection of switches and sensors to provide input (trigger events) to the system.

④ **Relay ports —** Eight relay ports provide contact closure activation of relays for power, screen projector lift control, drapes, and so on, when trigger events occur.

Indentification

⑤ **MAC address —** The unique hardware ID number (MAC address) of the unit (for example, 00-05-A6-00-00-01)

Operation

Connect power cords and turn on the output devices (such as projector lifts, screen lifts, and lights), input (trigger) devices (such as motion detectors, and alarms), controller, and network devices (PC, laptop, and network equipment).

Check indicator LEDs on the PC or laptop, on the unit, on the network hub or router, and so on, to ensure that all devices are plugged in and communicating. The IPL T CR48 is ready to be configured (see the **Connection and Configuration** section).

See **Troubleshooting** in the "Connection and Configuration" section for information if connection or communication problems occur. If the troubleshooting tips do not help, check with your local network administrator, or call the Extron S3 Sales and Technical Support Hotline.

Front Panel Indicators

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

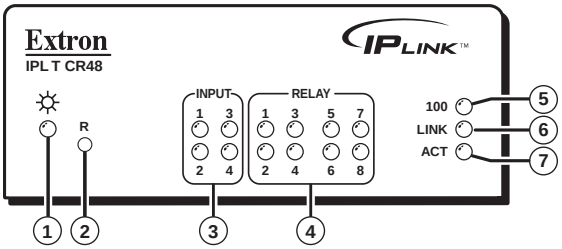


Figure 8. IPL T CR48 Front Panel

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

② **Reset button —** Recessed multiple function Reset button. See **Resetting the Controller** later in this section.

③ **Input LEDs —** A green LED lights to indicate that the port is active.

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

⑤ **100 LED —** A green LED lights to indicate that the connection speed is 100 Mbps. If the LED is not lit, the connection speed is 10 Mbps.

⑥ **LINK LED —** A green LED lights to indicate that the unit is connected to an active network.

⑦ **ACT LED —** A yellow LED lights to indicate that data is being sent or received.

Resetting the Controller

There are four reset modes (numbered 1, 3,4, and 5 for the sake of comparison with other Extron IPL products) 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.

IPL T CR48 Reset Mode Summary				
	Mode	**Activation**	**Result**	**Purpose and Notes**
Use Factory Firmware	**1**	Hold down the recessed Reset button while applying power to the IPL T CR48. **NOTE:** After a mode 1 reset is performed, update the firmware of the unit to the latest version. **Do not** operate the IPL T CR48 firmware version that results from the mode 1 reset. This mode temporarily resets the unit to factory default until power is recycled. If you want to use the factory default firmware, you must upload that version again.	**The IPL T CR48 reverts to the factory default firmware.** Event scripting does not start if the unit is powered on in this mode. All user files and settings (such as drivers, adjustments, and IP settings) are maintained. **NOTE:** If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the unit to return to the firmware version that was running prior to the mode 1 reset. Use the 0Q SIS™ command to confirm that the factory default firmware is no longer running (look for asterisks following the version number).	Use mode 1 to revert to the factory default version if incompatibility issues arise with user-loaded firmware. **NOTE:** User-defined Web pages may not work correctly if using an earlier firmware version.
Run/Stop Events	**3**	Hold down the Reset button for about 3 seconds until the Power LED blinks once, then release and press Reset momentarily (<1 second) within 1 second*.	**Mode 3 turns events on or off.** If the events are currently stopped following the momentary press, the power LED flashes twice, indicating the starting of events. If the events are currently running following the momentary press, the Power LED flashes three times indicating the stopping of events.	Mode 3 is useful for troubleshooting.
Reset All IP Settings	**4**	Hold down the Reset button for about 6 seconds until the Power LED blinks twice (once at 3 seconds, again at 6 seconds). Then, release and press Reset momentarily (for <1 second) within 1 second*.	**Mode 4:** • Enables ARP capability • Sets the IP address back to factory default (192.168.254.254) • Sets the subnet back to factory default • Sets the default gateway address to the factory default • Sets port mapping back to factory default • Turns DHCP off • Turns events off	Mode 4 enables you to set IP address information using ARP and the MAC address.
Reset to Factory Defaults	**5**	Hold down the Reset button for about 9 seconds until the Power LED blinks three times (once at 3 seconds, again at 6 seconds, again at 9 seconds). Then, release and press Reset momentarily (for <1 second) within 1 second*.	**Mode 5 performs a complete reset to factory defaults (except the firmware).** • Does everything mode 4 does • Clears driver-port associations and port configurations • Removes button/touchpanel configurations • Resets all IP options • Removes scheduling settings • Removes/clears all files from the IPL T CR48	Mode 5 is useful if you want to start over with configuration and uploading, and also to replace events.

*For modes 3, 4, and 5, nothing happens if the momentary press does not occur within 1 second.

Connection and Configuration

This section discusses how to connect and configure the IPL T CR48. Topics that are covered include:

- **Connecting the Hardware**
- **Configuring the Hardware**

Connecting the Hardware

To connect the IPL T CR48, connect the input and output devices to the unit using **figure 9** as a guide.

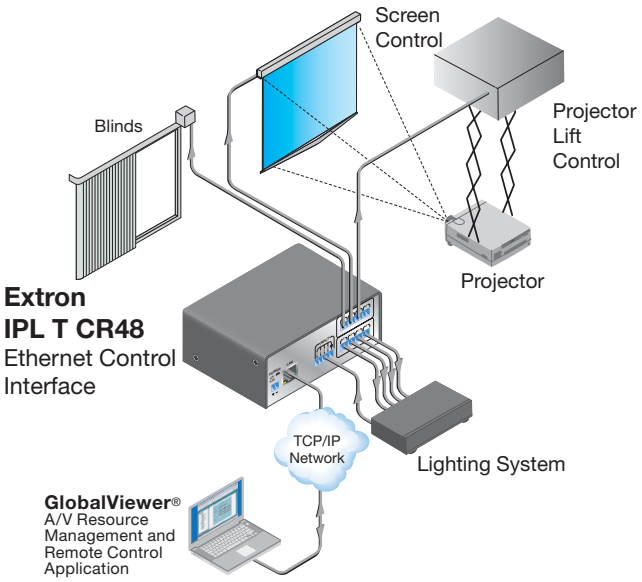


Figure 9. Example Application

Ethernet Connection

This type of connection is used on an ongoing basis to connect the IPL T CR48 to a LAN 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. See **figure 7** 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 the Web address that you set up on the IPL T CR48 (see **IPL T CR48 Interface Configuration** later in this section) in the Address field of the browser. The IPL T CR48 default Web page is displayed.

Contact Closure Input and Relay Connections

Contact closure input connections

The IPL T CR48 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 1k ohm pull-up resistor and must be wired with a ground. This allows the input to be tied to devices such as motion detectors and alarms. You can define what this input triggers via control software.

1. Connect one end of the input cable to a 3.5 millimeter, 5-pole captive screw connector, wired appropriately, and plug it into the rear panel input port connector of the unit.
2. Connect the other end of the input cable to the input relay device that will provide a triggering signal.

Relay connections

The IPL T CR48 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, and screen or drape controllers. You can define what triggers this action via control software.

1. Connect one end of the relay cable to an 8-pole captive screw connector, wired appropriately, and plug it into the rear panel relay port connector of the unit.
2. Connect the other end of the relay cable to the device that 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 guide assumes that you have a Microsoft® Windows® PC equipped with an operating network adapter. To allow your PC to work with Extron 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 for DHCP (Dynamic Host Configuration Protocol) to have an address assigned automatically when you sign on.

Initial start up

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

- Use the ARP (Address Resolution Protocol) command method.
- Use the direct PC method.

The default Web pages that are preloaded on the IPL T CR48 provide a way to reconfigure the unit once it has an active network connection with IP access. These Web pages are compatible with Internet Explorer® (version 6.0 or higher). See **Communication with the Interface** in the "Communication and Control" section for information on accessing and configuring the controller.

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

IPL T CR48 Interface Configuration

Configuring the IPL T CR48 using the ARP command

You can make use of the ARP command to set up an IP address for your IPL T CR48. The ARP command tells your computer to associate the MAC address of the IPL T CR48 with the assigned IP address. You must then use the ping command to access the IPL T CR48 unit, at which point the IP address of the device server is reconfigured.

NOTE: To use this setup method, both your computer and IPL T CR48 must be connected to the same LAN. Or, you can use a crossover Ethernet cable to connect the device server directly to the Ethernet card of the computer.

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 MAC address of the IPL T CR48 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. See **Resetting the Controller** in the "Installation and Operation" section for detailed information on reset modes.

CAUTION: The IPL T CR48 unit must be configured with the factory default IP address — 192.168.254.254 — before executing the ARP command, as described in the following steps.

4. On the PC, access the command prompt (from the Windows desktop, click **Start**, then **Run**, and type `Telnet` in the Run dialog box) then execute the `arp -s` command. Enter the desired new IP address for the IPL T CR48 and the MAC address (located on the rear panel of the controller). For example:

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

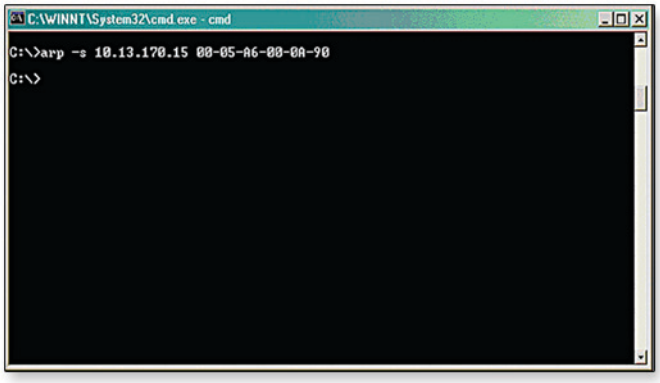


Figure 10. Executing the ARP Command

5. Execute a ping command by typing `ping` followed by a space and the new IP address at the command prompt. For example:

   ```
   ping 10.13.170.15
   ```

   After issuing this command, the unit changes to the new address and starts responding to the ping requests, as shown below. You must ping the IPL T CR48 in order for the IP address change to take place.

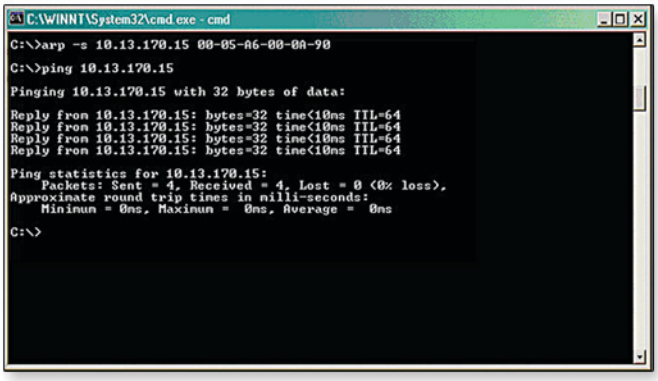


Figure 11. Unit Response to a Ping Request

   You can reconnect using either Telnet or a Web browser to verify that the update was successful.

6. After verifying that the change was successful, enter and issue the `arp -d` command at the command prompt. For example:

   `arp -d 10.13.170.15` removes 10.13.170.15 from the arp table

   - or -

   `arp -d*` removes 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. The default settings of the unit (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. See **figure 7** for RJ-45 connector wiring.
2. Plug the other end of the Ethernet cable into the Ethernet port on your PC.
3. Right-click on 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 and click on **Properties**.

   - or -

   If you are using Windows 2000:

   a. Right-click **Local Area Connection** and select **Properties** from the menu.
   b. Select **Internet Protocol (TCP/IP)** from the list.
   c. Click on **Properties**.

   If **Internet Protocol (TCP/IP)** is not on the list, it must be added (installed). Refer to your Windows user guide 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 (Internet Explorer), and type `http://192.168.254.254/index.html` in the Address field of the browser. The IPL T CR48 default Web page is displayed. See **IPL T CR48 Interface Configuration**, earlier in this section, for more information on configuring your unit.
9. After configuring your IPL T CR48, repeat steps **3** and **4** to 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 upgrade are available for download from the Extron Web site. See **Upgrading the firmware** in the "Communication and Control" section for more information on upgrading the firmware.

Communication and Control

This section describes communication with the IPL T CR48 as well as A/V device control. Topics that are covered include:

- **Ports Overview**
- **Communication with the Interface**
- **Programmer's Guide for the Telnet and Web Browser**
- **Device Control**
- **Troubleshooting**

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 use a 1k ohm pull-up resistor in a TTL (5 VDC) 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.

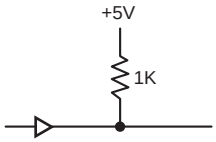


Figure 12. Equivalent Circuit for Contact Closure Input

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:

1. The Port Settings default Web page found under the **Configuration** tab (**figure 16**)
2. Telnet
3. An event script running on the IPL T CR48

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

Telnet allows you to send SIS™ commands (see **Programmer's Guide for the Telnet and Web Browser**, later in this section, 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 power for the unit 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 controller. Web browsers such as 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 and the unit should be connected to your local intranet or the Internet.

If you have established passwords for the unit, you will be shown a Password window when your browser accesses the IPL T CR48 (but not when you initially access the Web server since no passwords have been established). Your level of control over the unit depends on the password you enter in this Password window. If you enter the administrator password, you have control of all matters of configuration. If you enter a user password, you are restricted to control of only A/V devices and viewing status.

Accessing and using the Web server

To log on and view 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 the "Connection and Configuration" section) in the Address field at the top of the screen and press the **Enter** key on your keyboard. The Enter Network Password dialog box (**figure 13**) is displayed if a password has been set (this will not happen the first time you access the unit, as no password is set at the factory).

Figure 13. Enter Network Password Dialog Box

The System Status page (**figure 14**) is displayed, showing the current IP and port settings of the unit.

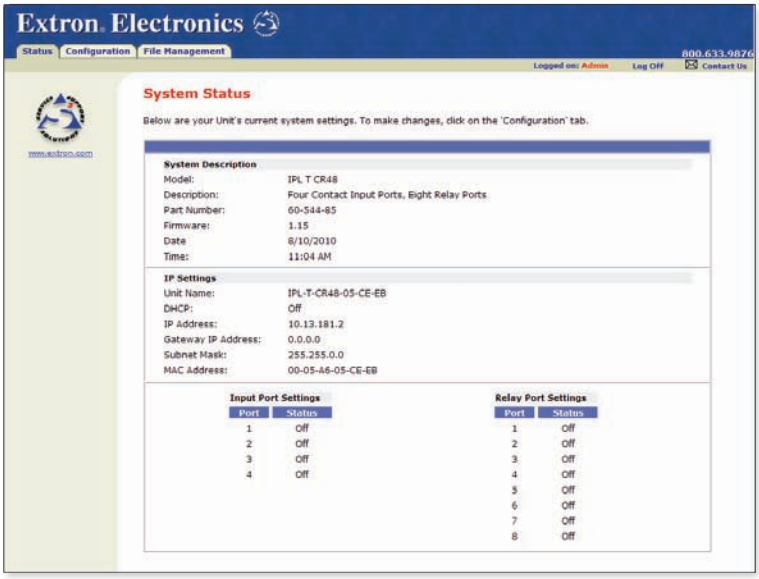


Figure 14. System Status Screen

Establishing or changing system or port settings

The System Settings screen is used to initially configure or change the configuration of the IPL T CR48. 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 15**) is displayed.

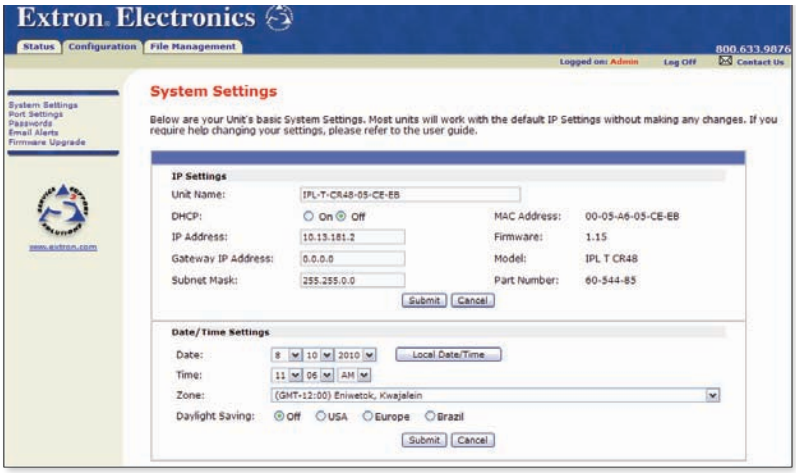


Figure 15. System Settings Screen

2. Make changes to the IP settings or the date and time settings, as necessary.
3. Click **Submit** to enter the changes or click **Cancel** 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 16**) is displayed.

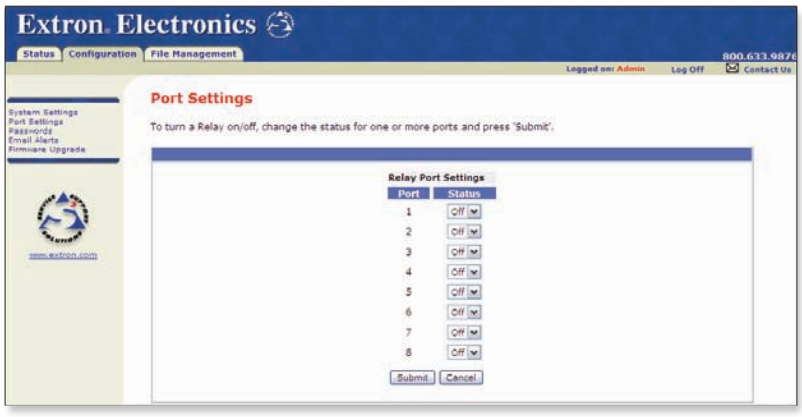


Figure 16. Port Settings Screen

5. Select the desired port and make changes to the port settings, as necessary.
6. Click **Submit** to enter the changes or click **Cancel** 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 schedules basis. If passwords have been set, you must log on as an administrator to change the passwords.

To set or change the passwords:

1. Click the **Passwords** link on the menu (on the left side of the window). The Passwords screen (**figure 17**) is displayed.
2. Enter the passwords for the administrator, user, or both, then re-enter the same passwords to confirm.
3. Click **Submit** to enter the changes of click **Cancel** to revert to previous settings. If the fields are blank, no passwords have been assigned.

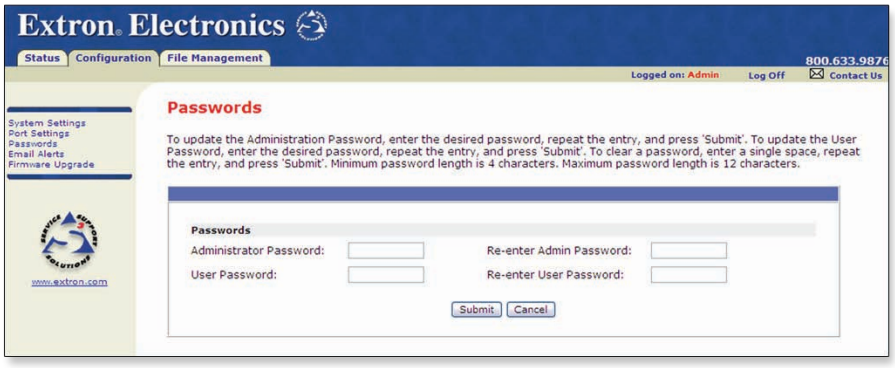


Figure 17. Passwords Screen

4. Once passwords have been set, you will be required to enter a password (**figure 13**) whenever you log on to the unit.

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

If there is no administrator password, your user 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, you can write an e-mail alert with a message corresponding to that event or task (for example, a timer notification indicating it is 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). The Email Alerts screen (**figure 18**) is displayed.

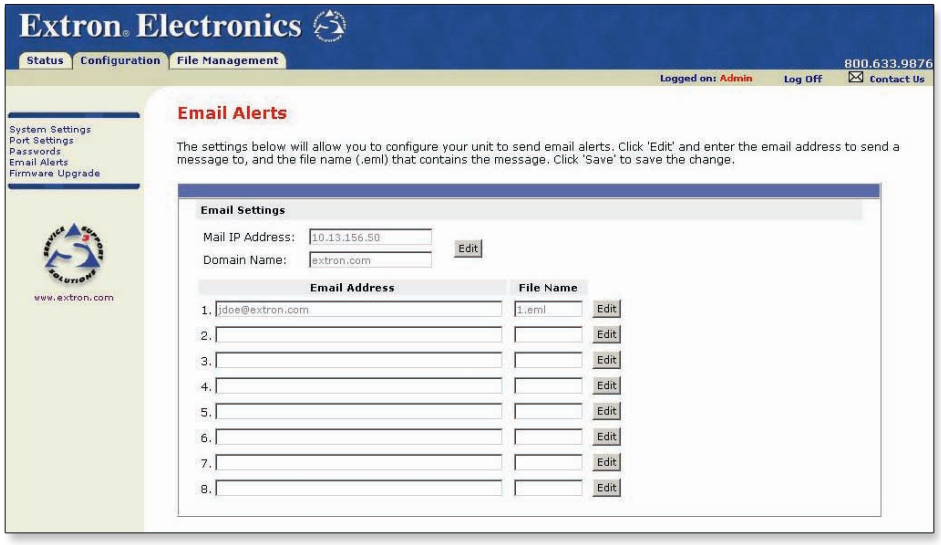


Figure 18. Email Alerts screen

2. Click **Edit** 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 **Save** to keep the changes.
5. Click 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 Email Address.
   b. Enter the name of the file containing the alert message under File Name.
   c. Click **Save** to keep changes to recipient e-mail addresses and file names.

NOTES: File names must end with an *.eml extension.

Due to the 7-character limit for full file names, it is advised that you use numeric titles (such as 1.eml or 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 on the left side of the window.
8. Within the System Settings screen (**figure 15**), enter 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. See **Accessing and using Telnet**, later in this section, for instructions on how to do this.
2. Use the "Send e-mail" SIS command to send the alert to the e-mail address of a numeric mailbox (**figure 18**). See **Programmer's Guide for the Telnet and Web Browser**, earlier in this section, for specific command code.

For example, the code for sending an alert from the 4th numeric mailbox would be:

```
Esc 4 SM←
```

Refer to the *Global Configurator Help* file for detailed information on monitoring and scheduling.

Upgrading the firmware

Firmware upgrades become available as improvements are made to the versatility and functionality of the IPL T CR48. These upgrades are available for download from the Extron Web site (**www.extron.com**).

CAUTION: The firmware file you select to upload must have an *.S19 extension. 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). The Firmware Upgrade screen (**figure 19**) is displayed.

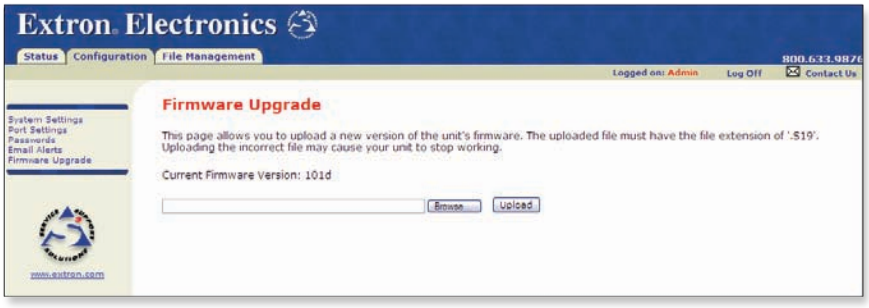


Figure 19. Firmware Upgrade Screen

2. Click **Browse** to find the most current available version of the firmware that has been downloaded on your PC.
3. If you find a later version than the one shown above the box, click **Upload** 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. The File Management screen (**figure 20**) is displayed.

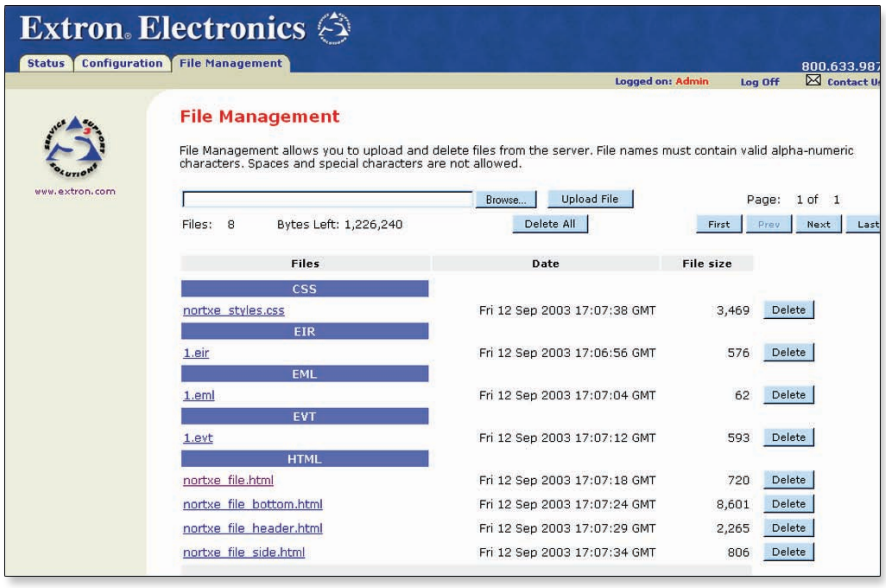


Figure 20. File Management Screen

2. Click **Browse** to locate the file you want to upload.
3. Click **Upload** File 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 20**) is displayed.
2. Find the file you want to delete in the Files list.
3. Click **Delete** for the file to be deleted. If you want to delete additional files, wait for the screen to refresh before clicking **Delete** for the next file.

   If you want to delete all files, click **Delete All**. The file count reverts to zero and all subsequent pages are 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 (for example, 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 (for example, 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 section).

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

In either method {Data} signifies that data will be directed to a specified port and must be encoded if it is non-alphanumeric.

The table on pages 28 through 32 lists the commands that the IPL T CR48 recognizes as valid, the responses that are returned to the host, a description of the function of each command, and 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 21**.

Space →

ASCII to Hex Conversion Table																Esc	1B	CR	ØD	LF	ØA
	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27						
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F						
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37						
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F						
@	4Ø	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	5Ø	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						
`	6Ø	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	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77						
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F						

Figure 21. 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)

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

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

X11 = Unit version number

X12 = Name is a text string up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and 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 must not be a minus sign/hyphen.

X13 = Set local date and time format (MM/DD/YY-HH:MM:SS) for example, 06/18/10-10:54:00;
Read local date and time format (day of week, date month year HH:MM:SS) for example, Fri, 18 Jun 2010 18:19:33

X14 = IP address (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values and are suppressed in returned values

X15 = Mail Domain name (for example, extron.com, icia.org)

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

X22 = Verbose/response mode status: 0 = clear, default for Telnet connections; 1 = verbose mode is on; 2 = send tagged responses for queries; 3 = verbose mode is on and tagged responses are sent for queries

> **NOTE:** If tagged responses are enabled, all read commands return the constant string + the data or value, the same as in responses for setting a value. For example, for Esc CN ←, the response is Ipn• X12 ↵ rather than just the data (X12 ↵).

X23 = Priority status for receive timeout: 0 = priority set to Send Data String command parameters; 1 = priority set to configure received timeout command parameters.

X33 = 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 the administrator password is cleared, then the user password is also removed.

X34 = Daylight saving time: 0 = off/ignore; 1 = on (use in northern hemisphere) (USA) ; 2 = on (Europe); 3 = on (Brazil)

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**it; **B**yte (8-bit); **S**hort (16-bit); **L**ong (32-bit) (only first letter is required)

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

X39 = Event data to write

X43 = 0 = off; 1 = on; value = 0-4095, based on 12-bit A to D

X44 = Number of bytes to read

X45 = E-mail event number: range = 1-64 max

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

X47 = Name of e-mail file to be sent: the first line of the file is the subject, the rest is the body of the e-mail.

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

X49 = Default name: Combination of model name and last 3 pairs of MAC address (for example, IPL-T-CR48-00-02-3D)

X51 = Direct access: 0 = Direct access not in use; 1 = direct access in use

X52 = Connection security level: 0 = not logged in; 11 = user; 12 = administrator

X53 = Timeout for data pass-through mode, after which event data can be inserted into the transmit buffer

X54 = ASCII digits representing numeric value of data element read from event buffer (leading zeros are suppressed)

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

X64 = Broadcast repetition rate in seconds (0 - 255, default = 0)

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

Copyright information

↵(c) COPYRIGHT 2009, EXTRON ELECTRONICS IPL T CR48, V*x*.*xx*, 60-544-*x*5↵
Tue, 10 Aug 2010 16:29:10↵

The copyright message is displayed upon connecting to the IP Link® product via TCP/IP or Telnet. V*x*.*xx* is the firmware version number. The part number of the unit, the current date, and time are displayed as well. This is followed by a password prompt.

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 defaults to administrator privileges.

Error responses

When the IPL T CR48 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
E31 — Attempt to break port pass-through when not set (A user or software attempted to disable the port redirect feature when it wasn't already set or active.)

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)

URL Encoding

URL encoding is the method of using ASCII hexadecimal characters to display specific characters in a URL. URL encoding is used for several reasons. On some operating systems, certain characters are unsafe or not available, and others are reserved by the HTML or URL specification. URL encoding is used to ensure compatibility and functionality with most Internet browsers. As a general rule, use the URL hexadecimal encoding method shown in the following tables when these characters appear in your URLs.

The following types of characters do not require encoding in a URL.

Alphanumerics	0-9 a-z A-Z
Special characters	$ _ _ . + ! * ( ) ,
Reserved characters	; / ? : @ = & When used for their reserved purposes, these characters do not require encoding within a URL.

Reserved characters

Reserved characters should not be encoded when they appear in their conventional meaning in a URL. For example, do not encode the slash (/) when using it as part of the URL syntax. Only encode unsafe characters (defined below) in your URLs.

The following table lists reserved characters.

Characters		Hex	Dec
$	Dollar	24	36
&	Ampersand	26	38
+	Plus	2B	43
,	Comma	2C	44
/	Forward slash / virgule	2F	47
:	Colon	3A	58
;	Semi-colon	3B	59
=	Equal	3D	61
?	Question mark	3F	63
@	“At” symbol	40	64

Unsafe characters

URLs use some characters for “special use” in defining their syntax and should be encoded. For various reasons, these characters present the possibility of being misunderstood within a URL and are therefore considered “unsafe.”

The following table lists unsafe characters.

Characters		Hex	Dec
	Space	20	32
" "	Quotation marks	22	34
<	“Less than” symbol	3C	60
>	“Greater than” symbol	3E	62
#	Pound	23	35
%	Percent	25	37
Miscellaneous characters			
{	Left curly brace	7B	123
}	Right curly brace	7D	125
|	Vertical bar / pipe	7C	124
\	Backslash	5C	92
^	Caret	5E	94
~	Tilde	7E	126
[	Left square bracket	5B	91
]	Right square bracket	5D	93
`	Grave accent	60	96

Command/response table for SIS commands

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Relay Functions			
Pulse Relay	X1*3*X63O	X1%2A3%2AX63O	CpnX1•RlyX5↵
Toggle Relay	X1*2O	X1%2A2O	CpnX1•RlyX5↵
Turn relay ON	X1*1O	X1%2A1O	CpnX1•Rly1↵
Turn relay OFF	X1*0O	X1%2A0O	CpnX1•Rly0↵
View relay status	X1O	X1O	X5↵
Input Contact Closure Port			
View the input state or value	X1]	X1%5D	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↵
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)↵
Request part number	N	N	60-544-*x*5↵
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/Kbytes used out of # Kbytes↵
Request user memory usage	4I	4I	# Bytes/Kbytes used out of # Kbytes↵

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.

NOTE:
- X1 = Specific port number (01-99)
- X5 = On/off status: 0 = off/disable; 1 = on/enable
- X11 = Unit firmware version
- X43 = 0 = off; 1 = on; value = 4095, based on a 12-bit A to D
- X63 = Pulse time in 20 milliseconds per count

Command/response table for SIS commands (continued)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
IP Setup Commands			
Set Unit name[24]	Esc X12 CN←	W X12 CN|	Ipn • X12 ↵
Set Unit name to factory default[24]	Esc • CN←	W %20 CN|	Ipn • X49 ↵
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 saving time	Esc X34 CX←	W X34 CZ|	Ipx X34 ↵
Read daylight saving time	Esc CX←	WCX|	X34 ↵
Set DHCP on[24]	Esc 1DH←	W1DH|	Idh1 ↵
Set DHCP off[24]	Esc 0DH←	W0DH|	Idh0 ↵
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 %20 CA|	Ipa • ↵
Read administrator password[24]	Esc CA←	WCA|	X33 ↵
Set user password[24]	Esc X33 CU←	W X33 CU|	Ipu • X33 ↵

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 up to 24 characters drawn from the alphabet, digits, minus sign/hyphen. No blank or space characters are permitted.
- X13 = Set local date and time format (MM/DD/Y-HH:MM:SS); Read local date and time format (day of week, date month year HH:MM:SS)
- X14 = IP address
- X18 = Hardware (MAC) address
- X19 = Subnet mask
- X33 = Password: maximum length of 12 characters and no special characters
- X34 = Daylight saving time: 0 = off/ignore; 1 = on (use in northern hemisphere) (USA); 2 = on (Europe); 3 = on (Brazil)
- X49 = Default Name: combination of model name and last 3 pairs of MAC address.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Clear user password[24]	Esc • CU↵	W%20CU|	Ipu •↵
Read user password[24]	Esc CU↵	WCU|	X33↵
Set verbose mode[24]	Esc X22 CV↵	W X22 CV|	Vrb X22↵
Read verbose mode	Esc CV↵	WCV|	X22↵
Read connection 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 count	Esc CC↵	WCC|	*Number of Connections*↵
File Commands			
Stream files via port 80			
Load file to user 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|		{The response is raw data from the file}
Example:	http://192.168.254.254/mypage.html?cmd=WSF|		{data from the file *mypage.html*}
Stream files via Telnet			
Load file to user flash memory[24 28]	Esc+UF, *filesize*, *filename*↵ {raw unprocessed data from the file up to filesize}		Upl↵
Retrieve file from user flash memory[24 28]	Esc *filename* SF↵	1B *filename* 53460D	{4 bytes of *filesize*, and then raw 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#*↵

NOTE: Duplicate port number assignments are not permitted (Telnet and Web cannot be the same) and will result in an E13 (invalid parameter) error. Remapping of the port number (other than to "Reset" to default assignment of 80/23 or "Disable" by setting to 0) must be to ports 1024 or higher.

NOTE: X22 = Verbose/response mode status: 0 = clear, default for Telnet connections; 1 = verbose mode is on; 2 = send tagged responses for queries; 3 = verbose mode is on and tagged responses are sent for queries
X33 = Password: maximum length of 12 characters and no special characters
X52 = Connection security level: 0 = not logged in; 11 = user; 12 = administrator
X64 = Broadcast repetition rate in seconds (0-255. 0 = disable)

Command/response table for SIS commands (continued)

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 %2C X46 %2C 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↵
Read mail server IP, domain name	Esc CM←	WCM|	X14, X15↵
Event Control			
Read event buffer memory[27]	Esc X35, X36, X37, X38 E←	W X35 %2C X36 %2C X37 %2C X38 E|	X54↵
Write event memory[24 27]	Esc X35, X36, X37, X39, X38 E←	W X35 %2C X36 %2C X37 %2C X39 %2C X38 E|	Evt X35, X36, X37, X39↵
Read string from event memory [27]	Esc X35, X36, X37, X44 FE←	W X35 %2C X36 %2C X37 %2C X44 FE|	*string*↵
Write string to event memory[24 27]	Esc *string** X35, X36, X37 FE←	W *string* %2A X35 %2C X36 %2C X37 FE|	Evt X35, X36, X37 *string*↵
Start events[24 27]	Esc 1AE←	W1AE|	Ego↵
Stop events[24 27]	Esc 0AE←	W0AE|	Est↵
Read number of events running	Esc AE←	WAE|	Enm#####↵

NOTE:
- X14 = IP address
- X15 = Mail 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**it; **B**yte (8-bit); **S**hort (16-bit); **L**ong (32-bit) (only first letter is required)
- X39 = Event data to write
- X44 = Number of bytes to read
- X45 = E-mail recipient number: range = 1 - 64 max
- X46 = E-mail recipient address: max number of characters for full e-mail address is 31 characters
- X47 = Name of e-mail file to be sent
- X54 = ASCII digits representing numeric value of data element read from event buffer

Command/response table for SIS commands (continued)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Reset (Zap)/Erase Commands			
Erase user-supplied Web page or file[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, but retain IP[24]	Esc ZY↵	WZY|	Zpy↵
NOTE: This command is the same as the ZQQQ command except that it excludes IP settings such as IP address, subnet mask, gateway IP address, unit name, DHCP setting, and port mapping (Telnet/Web/direct access) in order to preserve communication with the device. This reset is recommended after a firmware update. It also erases the files ystem and passwords.			
Absolute system reset[24]	Esc ZQQQ↵	WZQQQ|	Zpq↵
NOTE: This command resets all settings/memories. The ZQQQ command resets everything (all settings, adjustments, the IP address, and subnet mask) to the factory default values. Files in flash memory are also erased by this command. The firmware version does not change. The IP address is reset to 192.168.254.254 and the subnet mask is reset to 255.255.0.0.			

Device Control

Control of A/V devices can be accomplished in several ways once the IPL T CR48 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 can be loaded with the Web server File Manager (see **Managing files** earlier in this section).

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 CR48) on a network. Once connected via Telnet, you can send ASCII serial commands (see **Programmer's Guide for the Telnet and Web Browser** earlier in this section) to control devices connected to the IPL T CR48.

Accessing and using Telnet

1. From the Windows desktop, click **Start**, then **Run**.
2. In the Run dialog box, type `Telnet`.
3. Click **OK**. The Telnet program starts (**figure 22**).

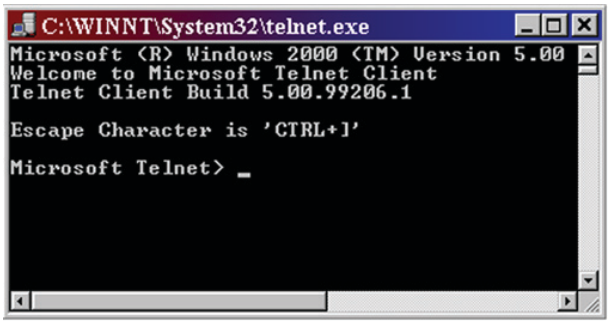


Figure 22. Telnet Command Prompt

4. At the command prompt, type `open` and press **Enter** on the keyboard.
5. At the `<to>` prompt, type the IP address of the IPL T CR48. (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.

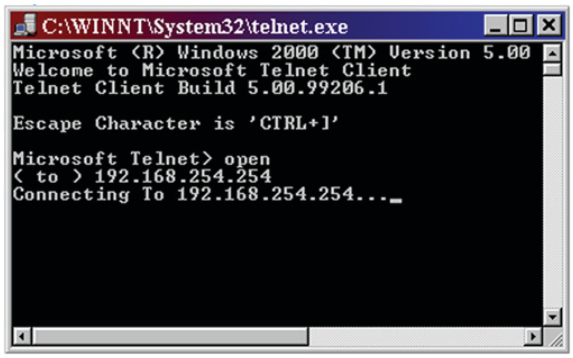


Figure 23. Connecting to the IP Address

6. If passwords were set up for the connected system, you will be prompted to log in as Administrator or User. Otherwise, the system responds with a `<cr/lf>`.
7. Once you are connected, you can enter serial (ASCII) commands as desired.
8. When you are through entering commands to the IPL T CR48, type `quit` at the command prompt to quit Telnet.

Troubleshooting

For best results, make connections in the following order. Turn on:

1. Control devices (such as a PC or laptop)
2. IPL T CR48
3. Output devices (such as projector lifts, screen lifts, and lighting systems)

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

Power Connections

1. Ensure that all devices are plugged in.
2. Ensure that each device is receiving power. The power LED on the front panel of the IPL T CR48 lights if the device is receiving power.

Data Connections

1. Check the cabling connections and make adjustments as needed. The LINK LEDs on the IPL T CR48 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 (see **Connecting the Hardware** in the "Connection and Configuration" section).
2. Try to ping the unit by typing `ping 192.168.254.254` at the Windows command prompt, or use the Web address provided to you by your system administrator. If you get no response:
   a. Ensure that your unit is using the appropriate subnet mask (check with your system administrator).
   b. Ensure that your PC does not have a software firewall program that might block the IP address of the unit.
3. If contact is established with the unit but the unit Web pages cannot be accessed by your Web browser, verify (in the Options or Preferences menu of the browser) 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 the **Connection and Configuration** section).

NOTE: If the unit is not new (for example, out of the box), please see **Resetting the Controller** in the "Installation and Operation" section for instructions on how to reset the IP back to factory default.

Specifications and Part Numbers

This section discusses:

- **Specifications**
- **Part numbers for included parts and accessories**

Specifications

Ethernet control interface

Connectors	1 RJ-45 female connector
Data rate	10/100Base-T, half/full duplex with autodetect
Protocols	ARP, ICMP (ping), IP, TCP, UDP, DHCP, HTTP, SMTP, Telnet
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 7.25 MB nonvolatile user memory
Program control	Extron 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
Cooling	Convection, no vents

Mounting
- Rack mount ..... Yes, with optional 1U rack shelf
- Furniture mount ..... Yes, with optional under desk mounting kit
- Pole mount ..... Yes, with optional mini pole mount kit

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, c-UL, 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

MTBF ..... 30,000 hours

Warranty ..... 3 years parts and labor

NOTE: All nominal levels are at ±10%.

NOTE: Specifications are subject to change without notice.

Part Numbers

Included Parts

Included Parts	Replacement Part Number
IPL T CR48	60-544-85
12 VDC, 1A external power supply (US, Can, Int'l)	70-775-01
IEC power cord	
Rubber feet (4)	
Hook and loop fasteners	
2 male 3.5 millimeter, 8-pole captive screw connectors	10-319-16
1 male 3.5 millimeter, 5-pole captive screw connector	10-319-10
Tweeker	10-014-01
IPL T Series Setup Guide	

Accessories

Accessories	Part Number
RSF 123 1U 3.5-inch Deep Rack Shelf Kit	60-190-20
RSU 129 1U 9.5-inch Deep Rack Shelf Kit	60-190-01
MBU 125 Under-Desk Mount Kit	70-077-01
PMK 100 Mini Projector Mounting Kit	70-217-01

Glossary

This section provides definitions of terms related to the IPL T CR48.

10/100Base-T — Ethernet that uses Unshielded Twisted Pair (such as UTP - CAT 5) 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) — ARP is a protocol which assigns an IP address to a device based on the MAC or physical machine address of the device.

Contact Closure — An encapsulated switch containing two metal wires that serve as the contact points. When these contact points meet, it creates a complete circuit (for example, ports 1 through 4 to ground on the IPL T CR48).

Custom Web page — Any file that can be loaded into an IPL T CR48 and served by the unit's internal Web server. A custom Web page can provide control of devices attached to the IPL T CR48 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 T CR48, 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 T CR48 functions like a small computer with a Web server — you can use it for various Web tasks.

DHCP — 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 a network for an organization.

Driver — A GC compatible package. It includes the event script that controls devices.

Ethernet — 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 — A program that runs on an IPL T CR48 controller, 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). GC performs this compilation. The compiled result is loaded onto the IPL T CR48. 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 unit.

Global Configurator (GC) — 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 GV and event scripts onto the box. When using GC, you 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® units to appear in the same GV, all the units must be configured at the same time, using GC.

GlobalViewer (GV) — A set of Web pages (HTML, XML, JS) and graphics that are loaded into the memory of an IPL T CR48. These pages provide an interface for control of devices attached to the IPL T CR48. They communicate with the event scripts running on the unit, 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 T CR48. GV is initially created by GC; however, it is possible to edit the GV HTML, XML, and JavaScript files outside of Global Configurator. This edited GV is called "hard-coded" or manually generated GV.

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

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

IP address — 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 — 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 — A unique hardware number given to devices that connect to the Internet. When your computer or networking device (such as a router, hub, or interface) is connected to the Internet, a table (see "ARP") relates the IP address of the device to its corresponding physical (MAC) address on the LAN.

Pass-through — Allows control systems to work with the IPL T CR48 and provides a link between two ports.

Ping — 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 — 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.

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

Static IP — An IP address that has been specifically (instead of dynamically [see "DHCP"]) 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) — 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 — A utility available on most PCs that allows the computer system to communicate with one of its remote users or 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® 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 Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

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

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
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 modifications made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500 **Europe**: +31.33.453.4040
Asia: +65.6383.4400 **Japan**: +81.3.3511.7655

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.

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