

Kramer Electronics, Ltd.



USER MANUAL

Model:

PL-50

Power Controller - Monitor

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups¹ that are clearly defined by function.

Congratulations on purchasing your Kramer **PL-50** *Power Controller Monitor*.

The **PL-50** is ideal for power monitoring and security systems.

The package includes the following items:

- **PL-50** *Power Controller Monitor*
- A power cord and an infrared remote control transmitter (including the required battery and a separate user manual²)
- This user manual²
- P3K Wizard Software

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables³

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from the Internet at <http://www.kramerelectronics.com>

3 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside

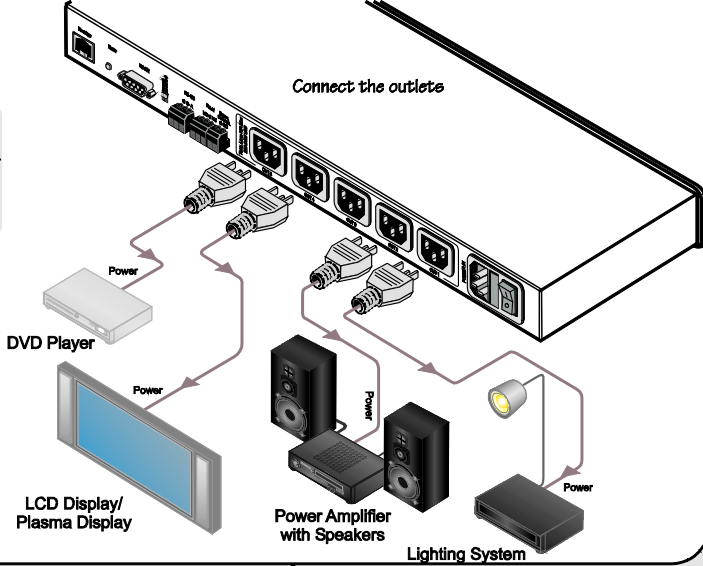


Step 2: Connect the Inputs and outputs - see section 6

Connect to Alarms



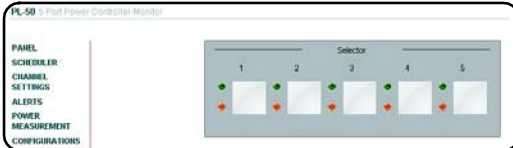
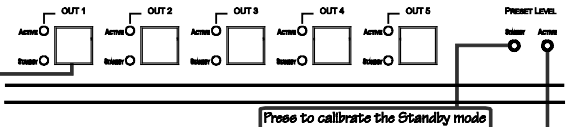
Connect the outlets



Step 3: Turn the power ON

Step 4: Operate the machine - see section 7

Select a button to calibrate to the Standby or Active mode



Use the embedded Web pages to control and operate the PL-50

Operate and control via the RS-232, RS-485, USB and the Ethernet

3 Overview

The **PL-50 Power Controller Monitor** can control up to five power channels at a total load of 10A. The **PL-50**, by measuring and then monitoring the standby and active modes of the connected units, can detect whether a unit is in the standby mode, the active mode or is disconnected.

Two versions of the **PL-50** are available, a European version and a version for the USA.

The **PL-50** features include:

- PRESET LEVEL buttons, for measuring the STANDBY mode and the ACTIVE mode for reference
- A green ACTIVE LED and an orange STANDBY LED per channel, indicating the status of the outlet
- The ability to detect a change in the state of any of the channels and then trigger an alarm by e-mail or via the RELAY and Digital control terminal blocks that can be connected to an alarm or any other room activity
- Control via embedded Web pages, letting you schedule the activity of the outlet, set a response in case of an event, set the status of each channel separately, and so on
- An Ethernet port and a USB port for unit configuration and control

Control the **PL-50** using the front panel buttons, or remotely via:

- USB, RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- ETHERNET
- The Kramer Infrared Remote Control Transmitter

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your **PL-50** away from moisture, excessive sunlight and dust

3.1 Terminology Used in this User Manual

[Table 1](#) defines some terms that are used in this user manual:

Table 1: Terminology Used in this User Manual

Term	Definition
802.3	The standard specification for ETHERNET that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet. Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number (or address) in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

4 Your PL-50 Power Controller - Monitor

[Figure 1](#) and [Table 2](#) define the **PL-50 Power Controller - Monitor**:

Your PL-50 Power Controller - Monitor

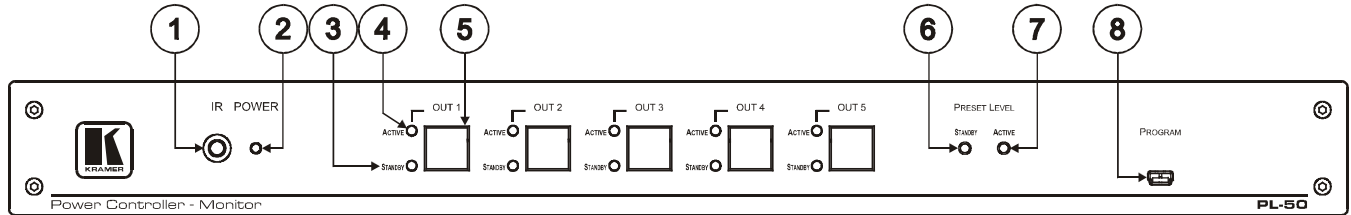


Figure 1: PL-50 Power Controller – Monitor Front Panel

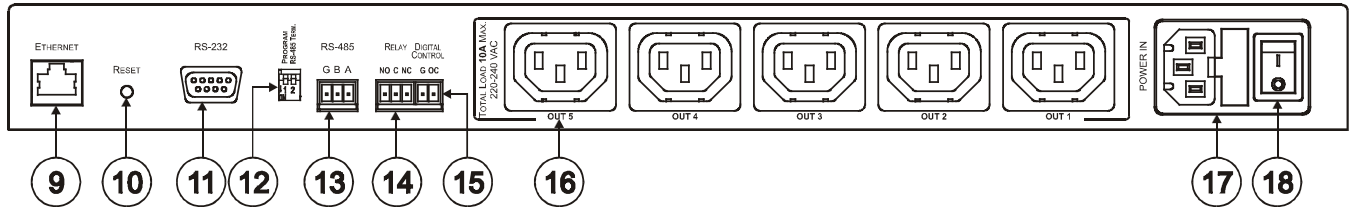


Figure 2: PL-50 Power Controller – Monitor (for Europe) Rear Panel

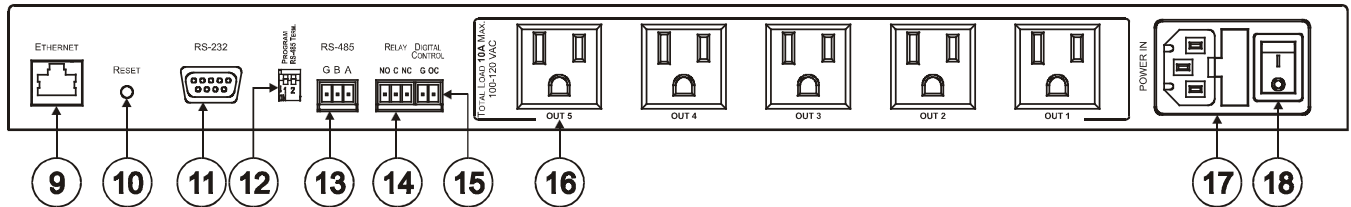


Figure 3: PL-50 Power Controller – Monitor (for USA) Rear Panel

Table 2: PL-50 Power Controller – Monitor Features

#	Feature		Function
1	IR Receiver Window		The red LED lights when receiving signals from the Kramer Infrared remote control transmitter
2	POWER LED		The red LED lights when the main power is ON
3	OUT Channel (from 1 to 5)	STANDBY LED	The orange LED lights when an outlet is connected to that power channel and active, and blinks when reading the preset active level
4		ACTIVE LED	The green LED lights when the channel outlet is in the standby mode, and blinks when reading the standby level
5		OUT Button	Press one or more buttons to select the power channel for calibrating
6	PRESET LEVEL	STANDBY	Press to read the standby mode
7	Buttons	ACTIVE	Press to read the active mode
8	PROGRAM USB connector		For configuring and programming the unit
9	ETHERNET Connector		Connects to the PC or other Serial Controller through computer networking
10	RESET		Press to reset the standby and active values for all the channels
11	RS-232 9-pin D-sub Port		Connect to the PC or other Serial Controller
12	DIP-switches		Program, for technical use only RS-485 TERM, for RS-485 termination
13	RS-485 Terminal Block Connector		Connect to the PC or other Serial Controller
14	RELAY terminal block connector		Connect to an alarm or other item (see section 6.1)
15	DIGITAL CONTROL (G, OC ¹) Terminal Block Connector		Connect to an alarm or other item
16	Power Outlets (from 1 to 5)		220-240V AC for European version (see Figure 2) 100-120V AC for USA version (see Figure 3)
17	POWER IN Connector with FUSE		AC connector enabling power supply to the unit
18	POWER Switch		Illuminated switch supplying power to the unit

¹ OC means Open Collector

5 Installing in a Rack

This section describes what to do before installing in a rack and how to rack mount.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5° to +45° C (41° to 113° F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20° to +70° C (-4° to 158° F)
Storage humidity range	5 to 95% RHL, non-condensing



CAUTION!!

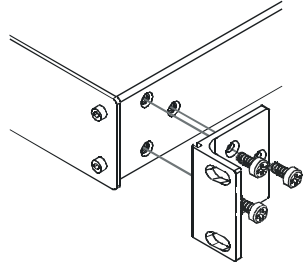
When installing in a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note that:

- **In some models, the front panel may feature built-in rack ears**
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions (you can download it at: <http://www.kramerelectronics.com>)

6 Connecting the PL-50 Power Controller - Monitor

To connect the **PL-50**, as illustrated in the example in [Figure 4](#), do the following¹:

1. Connect up to five² outlets (from 1 to 5). For example, connect:
 - OUT 1 to a DVD player
 - OUT 2 to an LCD display
 - OUT 4 to a power amplifier with speakers
 - OUT 5 to a Lighting system
2. Set the DIP-switches (see [Table 2](#)).
3. Connect an item (for example, an alarm) via the RELAY and/or DIGITAL CONTROL terminal block connectors (not shown in [Figure 4](#)).
4. As an option you can connect a PC and/or controller to the RS-232 port, RS-485 port and/or the ETHERNET connector (see section [6.2.1](#))
5. Connect the power cord³ (not shown in [Figure 4](#)).

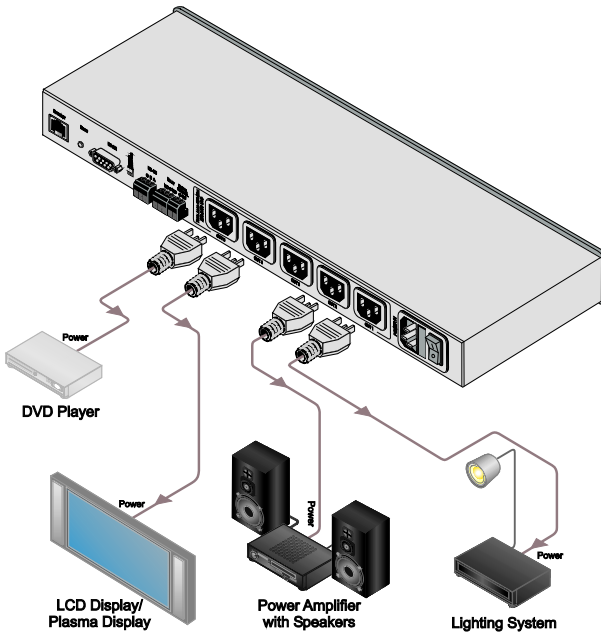


Figure 4: Connecting the PL-50

1 Be sure that the power is switched OFF on each device before connecting it to your PL-50. After connecting all the devices to your PL-50, switch on the power of the PL-50, and then switch on the power of each device

2 You do not have to connect all the outlets

3 We recommend that you use only the power cord that is supplied with this machine

6.1 Connecting the Relays

[Figure 5](#) shows how to connect the relay.

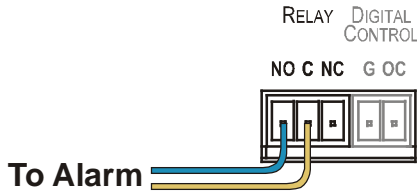


Figure 5: Relay Wiring

On each 3-pole terminal block connector, connect either: **C** to **NC**, or **C** to **NO**. [Table 3](#) defines the Relay PINOUT:

Table 3: Relay PINOUT

RELAY PINOUT	
C	Common
NO	Normally Open (relay is open by default and closes for activation)
NC	Normally Closed (relay is closed by default and opens for activation)

6.2 Controlling the PL-50 via the Ethernet Port

You can connect the **PL-50** via the ETHERNET in the following ways:

- For direct connection to the PC, use a crossover cable (see section [6.2.1](#))
- For connection via a network hub or network router, use a straight-through cable (see section [6.2.2](#))

6.2.1 Connecting the ETHERNET Port Directly to a PC (Crossover Cable)

You can connect the Ethernet port of the **PL-50** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **PL-50** with the factory configured default IP address

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.

The Local Area Connection Properties window appears.

5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see [Figure 6](#)).

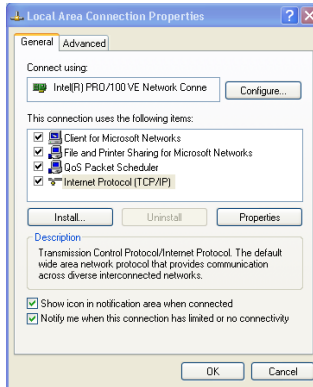


Figure 6: Local Area Connection Properties Window

6. Select Use the following IP address, and fill in the details as shown in [Figure 7](#).
7. Click **OK**.

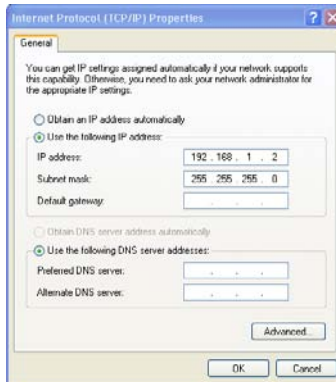


Figure 7: Internet Protocol (TCP/IP) Properties Window

6.2.2 Connecting via a Straight-Through Cable

You can connect the **ETHERNET** of the **PL-50** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

6.2.3 Configuring the Ethernet Port Initially

To initially configure the Ethernet port, download the *P3K Wizard* Ethernet configuration software¹. Extract the file to a folder and create a shortcut on your desktop to the file.

Follow these steps to configure the port:

1. Double click the desktop icon
The Connect screen appears as follows:



Figure 8: Connect Screen

2. Connect a USB cable from a USB port on the PC to the USB port on the **PL-50**.
3. Click OK.
The P3K Wizard screen appears².

1 From the Kramer Web site at <http://www.kramerelectronics.com>

2 Do not use P3K Wizard to upgrade the firmware. To upgrade the firmware, see section [8](#)

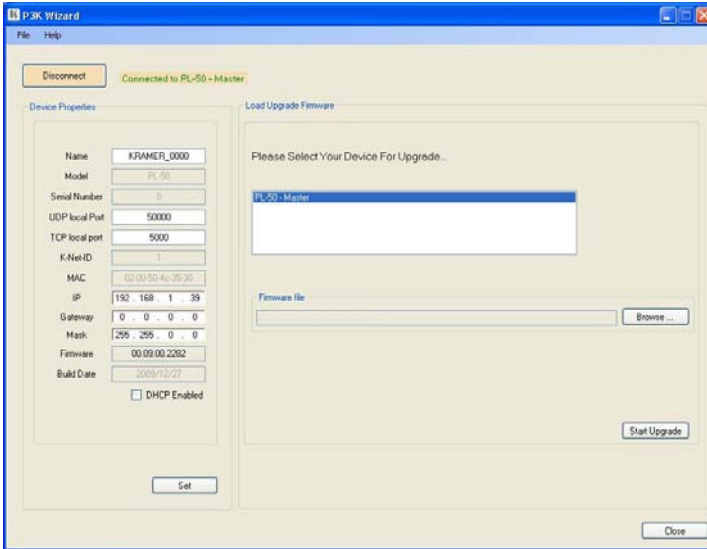


Figure 9: Device Properties Screen

4. If required, make changes and click Set. If not, click Close.

6.3 Controlling via the Embedded Web Pages

The embedded Web page can be used to remotely operate the **PL-50** via the Ethernet (see section [6.2](#)).

6.3.1 Setting the Embedded Web Page

Before you use the embedded Web pages to control the **PL-50** via the Ethernet, check that the Java™ software is installed on your computer. If not, download it from: www.java.com.

A help box is available for each screen when clicking the question mark that appears on the left side of the screen.

To control the **PL-50** via the embedded Web page, make sure that it is connected to the Ethernet port of your computer and do the following:

1. Open your Internet browser.
2. Type the unit's IP number¹ in the Address bar of your browser (or the name, if using DHCP):



Figure 10: Typing the IP Number

The following window appears:

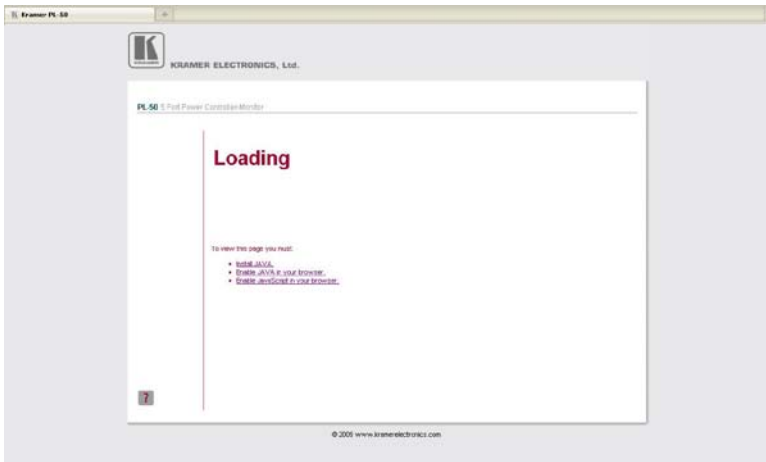


Figure 11: Loading the Embedded Web Pages

¹ The default IP number is 192.168.1.39, and may be changed by the system integrator

Check that Java and JavaScript is enabled in your browser. The following window appears:



Figure 12: Running the Application

3. Click Run.

The **PL-50** front panel is displayed on your screen (see [Figure 13](#)).

The Web embedded screens let you control the **PL-50** via the Ethernet. The menu appears on the left side of the screen.

6.3.2 The PANEL Screen

The PANEL screen lets you select one or more channels in order to read the Standby or Active values the channels and set the power ON/OFF:

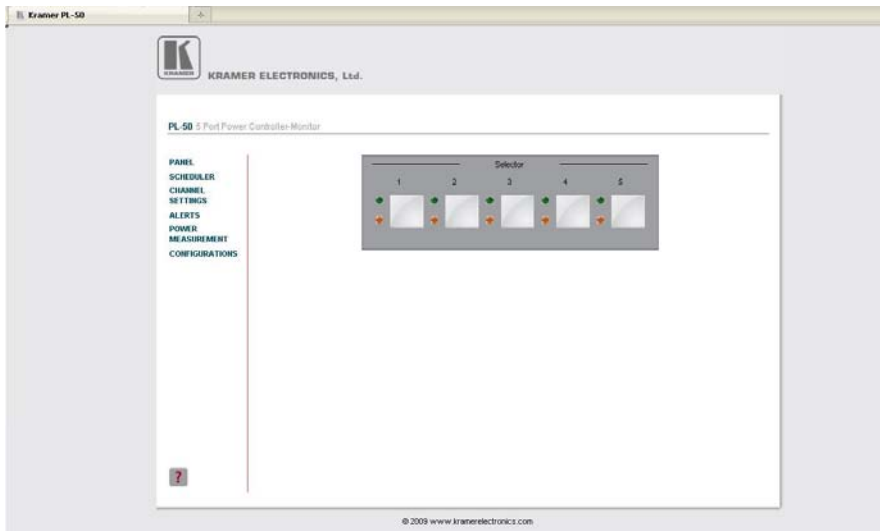


Figure 13: HOME Embedded Web Page

- Click the on-screen buttons:

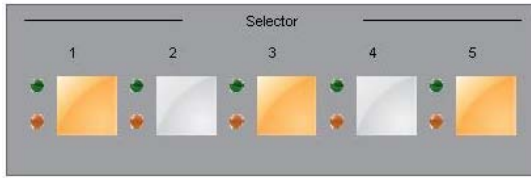


Figure 14: Selecting a Channel

The Help Box

This is the main panel window. In this window you can control the channels.

6.3.3 The SCHEDULER screen

The Scheduler screen lets you schedule the operation of the outlets on a weekly basis. [Figure 15](#) and [Table 4](#) define the Scheduler Screen:

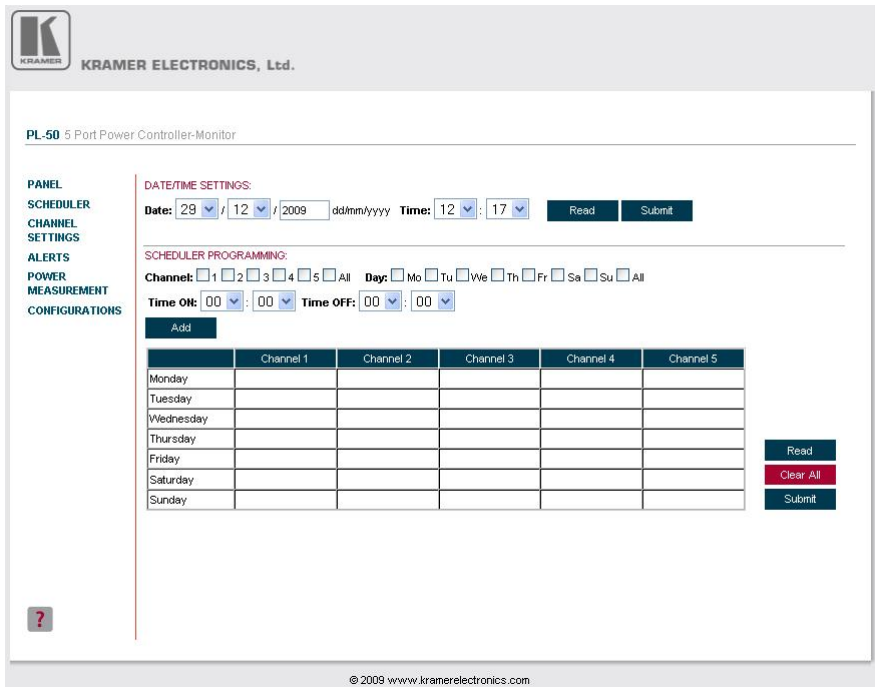


Figure 15: The Scheduler Screen

Table 4: The Scheduler Screen Features

Feature	Function
DATE/TIME SETTINGS	Set the current date and time Click Read to read the machine settings Click Submit to accept the date and time settings
SCHEDULER PROGRAMMING	Select a channel for scheduling ¹ Select the day or days of the week for scheduling Select the time schedule for the selected channel(s): the ON time and the OFF time You can select more than one active period per channel, per day Click Add to add the schedule for the selected channel(s) Click Submit to save the current scheduling table Click Read ² to read the current schedule stored in the machine Click Clear All to clear the scheduling table

After scheduling the outlets, the Scheduler screen appears as follows:

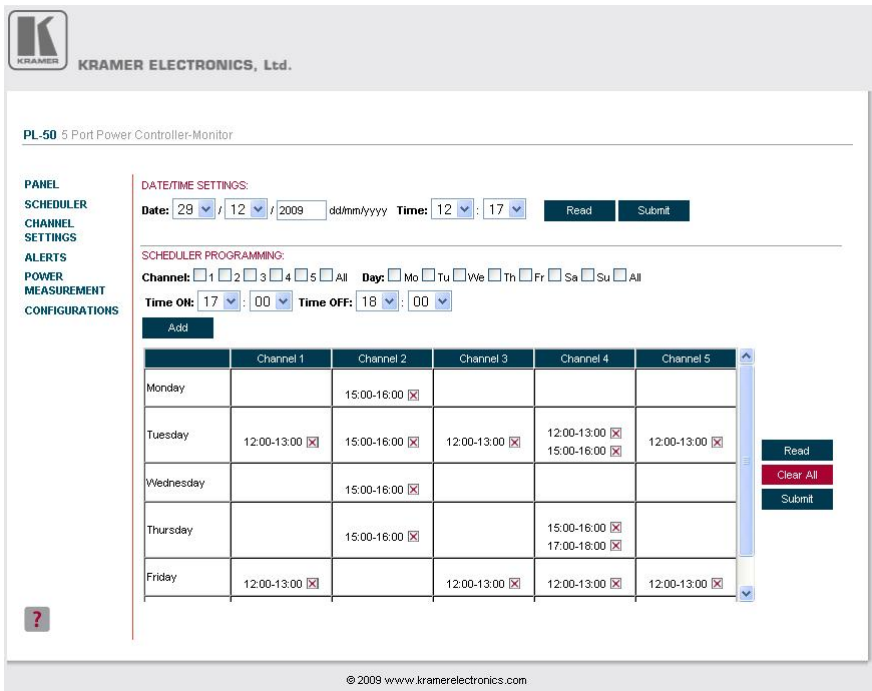


Figure 16: Scheduling the Outlets

1 Or several channels, or all the channels

2 The scheduled store overwrites the data displayed on the scheduler

In [Figure 16](#), the channels are scheduled at different times (for example, on Monday, Channel 3 will be ON from 12:00 to 13:00, and on Thursday, channel 2 is scheduled to be ON between 15:00 and 16:00, and Channel 4 is scheduled to be ON from 15:00 to 16:00 and then from 17:00 to 18:00).

You can clear a checkbox next to a time period setup in the scheduler table to delete a scheduled ON time. Click Submit to save the schedule to the **PL-50**.

HELP BOX ?

This page lets you view and set the ON/OFF scheduling of the channel. Note, that the device will store the new scheduling only after you click "Submit".

You can also view and set the current time.

6.3.4 The CHANNEL SETTINGS screen

[Figure 17](#) and [Table 5](#) define the CHANNEL SETTINGS screen:

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PL-50 5 Port Power Controller-Monitor


	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	
Power Control:	<input type="radio"/> Manual	<input checked="" type="radio"/> Manual	<input type="radio"/> Manual	<input checked="" type="radio"/> Manual	<input type="radio"/> Manual	<input type="button" value="Set"/>
	<input checked="" type="radio"/> Schedule	<input type="radio"/> Schedule	<input checked="" type="radio"/> Schedule	<input type="radio"/> Schedule	<input type="radio"/> Schedule	
Groups:	<input type="radio"/> None	<input type="radio"/> None	<input type="radio"/> None	<input type="radio"/> None	<input checked="" type="radio"/> None	<input type="button" value="Set"/>
	<input checked="" type="radio"/> 1	<input type="radio"/> 1	<input checked="" type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	
	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	
	<input type="radio"/> 3	<input checked="" type="radio"/> 3	<input type="radio"/> 3	<input checked="" type="radio"/> 3	<input type="radio"/> 3	
						<input type="button" value="Read"/>

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Figure 17: The Channel Settings Screen

Table 5: The Channel Settings Screen Features

Feature	Function
Power Control:	Set, for each channel whether it will be controlled manually (by the PANEL screen or the front panel buttons) or by the scheduler
Groups:	Assign the channel to one of three groups only in the manual mode ¹ . For example, in Figure 17 Channel 1 and Channel 3 are assigned to group 1 and will operate concurrently in the manual setting. The same applies to Channels 2 and 4 that are assigned to group 3

HELP BOX 

In this page you can view and set the channels Power Control (Manual or Schedule) you can also view and set Groups of channels to act together.

6.3.5 The ALERTS Screen

[Figure 18](#) and [Table 6](#) define the ALERTS screen:

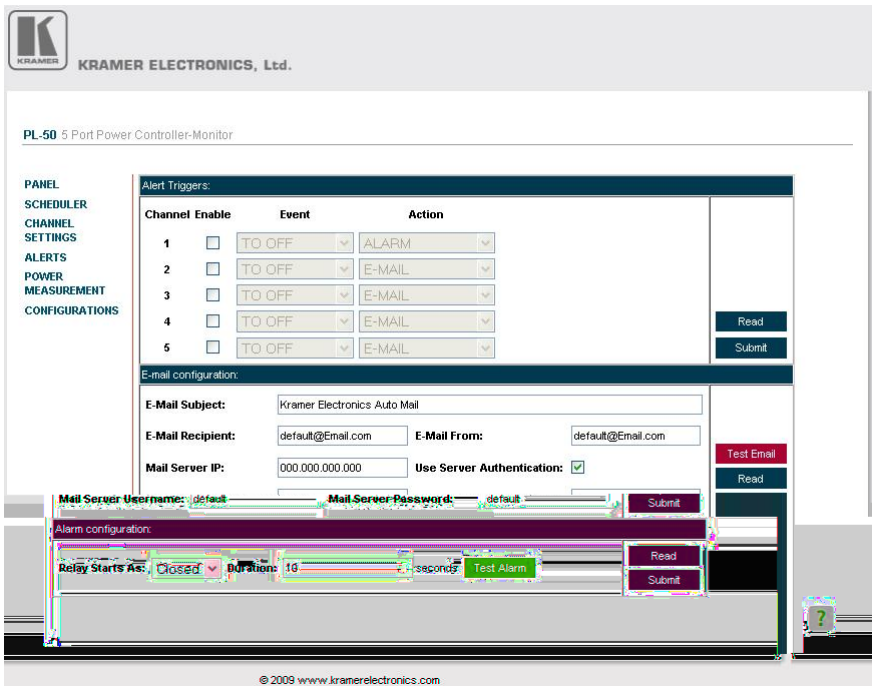


Figure 18: The Alerts Screen

¹ A channel that is scheduled overrides the group manual setting

Table 6: The Alerts Screen Features

Feature	Function
Alert Triggers:	Select the event that will trigger an action: Check the Enable box to enable the event and action taken or clear to disable The events: TO OFF – the outlet turns OFF (the channel button is off) TO ON – the outlet turns ON (the channel button is on) TO ACTIVE – the green LED is ON TO STANDBY – the orange LED is ON TO NONE – the outlet is disconnected ANY CHANGE – any change in the current status The action taken: EMAIL – an e-mail is sent to a predefined mail address ALARM – an alarm is turned ON (via the relay and/or digital control ports) EMAIL + ALARM – both an e-mail is sent and the alarm turns ON
E-mail configuration:	Set the e-mail definitions: E-Mail Subject: set the subject of the received e-mail E-Mail Recipient: to whom the e-mail is sent E-Mail From: identify the sender Mail Server IP: the SMTP server address through which the e-mail is sent ¹ Use server Authentication: check to enable ¹ Mail server Username: the name by which the user is identified Mail server password: the user password Test e-mail: to receive a test e-mail Read: click to read the e-mail data on the machine Submit: click to submit changes
Alarm configuration:	Relay Starts As: set the relay status to closed or open according to the relay installation. If the alarm is installed so that in the closed state the alarm is off set it to Closed Duration: set the duration of the alarm in seconds Test the alarm: click this button to test the alarm, click again to silence it. An alarm icon appears on the screen. Stop the alarm by clicking the Stop Alarm button (see below) Read: click to read the data stored in the machine Submit: click to submit changes

After setting the alarms, the Alerts screen appears as follows:

¹ Consult your IT administrator

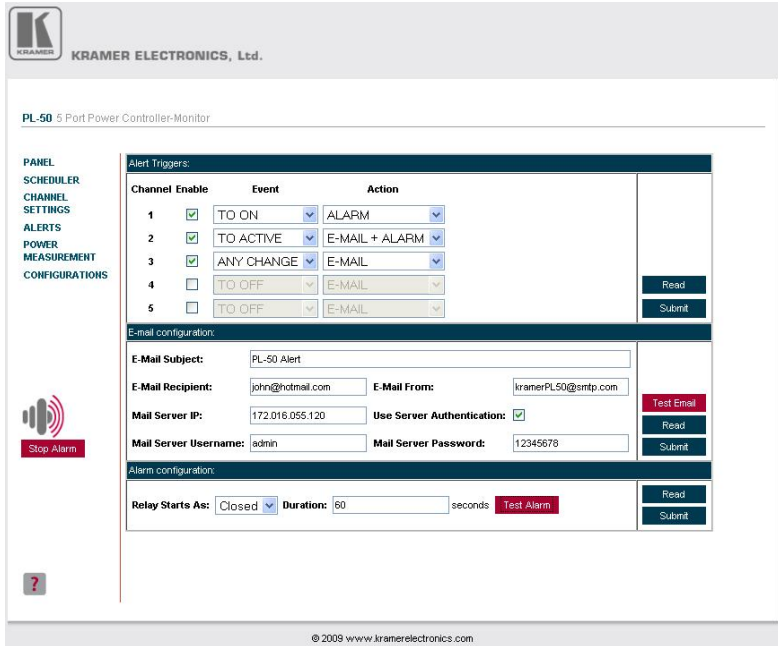


Figure 19: Setting the Alarms

In this example, Channels 1, 2 and 3 are enabled. The events (TO ON, TO ACTIVE and TO CHANGE), trigger the ALARM, E_MAIL + ALARM and E_MAIL, respectively.

The duration of the alarm is 60 seconds and it will activate both the relay alarm and the digital control alarm. Click Test Alarm to test the alarm.

Click the TEST EMAIL button to send a test e-mail:

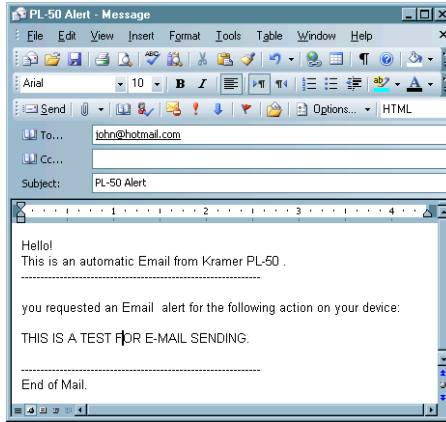


Figure 20: E-mail Alert Test

When an event is triggered, the following e-mail is received:

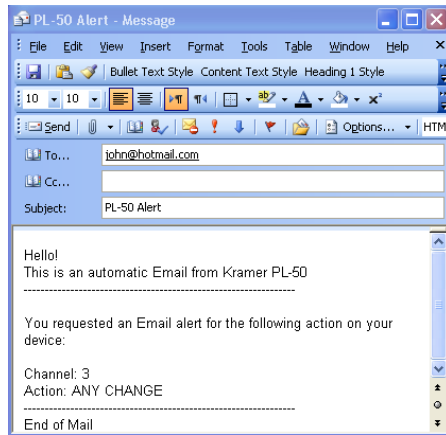


Figure 21: E-mail Alert

HELP BOX

This page lets you view and set all the Alerts the device will trigger. You can also view and set the E-mail and alarm configuration.

6.3.6 The POWER MEASUREMENT Screen

Figure 22 and Table 7 define the POWER MEASUREMENT screen:

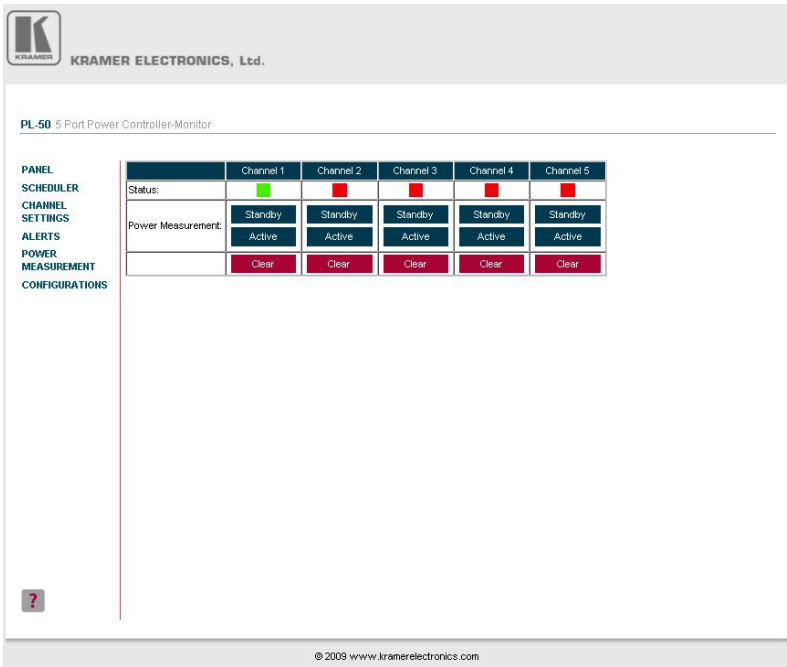


Figure 22: The Power Measurement Screen

Table 7: The Power Measurement Screen Features

Feature	Function
Status	Status indicator per channel: Green if the standby and active values are available Red if one or both of the values were not measured
Power measurement	Click Standby or active to measure the standby and/or Active values for an outlet connected to a channel (once measured, the status changes from red to green) Click clear to clear the Standby and Active data for that channel ¹

HELP BOX ?

This page lets you start the "Standby" and "Active" mode measurement process. You can also clear the current "Standby" and "Active" thresholds.

¹ You can also reset the data for all the channels by pressing the reset button located on the rear panel of the machine (see Figure 2 and Figure 3) and plugging the power ON while pressing

6.3.7 The CONFIGURATIONS Screen

The CONFIGURATIONS page lets you view some Ethernet settings¹ and change others (see [Figure 23](#)).

To change CONFIGURATION definitions:

1. Click the CONFIGURATIONS button. The CONFIGURATIONS Web page appears.
2. Change the definitions as required.
3. Click the Submit button to apply changes². A window appears asking if you are sure you want to change the network settings.
4. Click Yes.
A window appears announcing that the configuration has been successfully changed.
5. Click OK
6. If the IP number had been changed, close the browser and reload the Web page.

The screenshot shows the 'CONFIGURATIONS' page for the PL-50 5 Port Power Controller Monitor. The page is titled 'KRAMER ELECTRONICS, Ltd.' and 'PL-50 5 Port Power Controller Monitor'. On the left, there is a navigation menu with options: PANEL, SCHEDULER, CHANNEL SETTINGS, ALERTS, POWER MEASUREMENT, and CONFIGURATIONS (which is selected). The main content area contains the following configuration fields:

- Name: KRAMER_0000
- Model: PL_50
- Serial Number: 0
- Firmware version: 00.09.00.2252
- MAC Address: 02-00-50-4c-35-30
- IP Address: 192.168.0.01.000
- DHCP:
- Gateway: 000.000.000.000
- Subnet Mask: 255.255.000.000

At the bottom of the configuration fields, there are two buttons: 'Submit' (blue) and 'Cancel' (red). A small red question mark icon is visible in the bottom left corner of the page. The footer of the page reads '© 2000 www.kramerelectronics.com'.

Figure 23: CONFIGURATIONS Embedded Web Page

HELP BOX

This page lets you view and set the device configuration.

¹ The model name, serial number, firmware version and MAC address

² Or Cancel to cancel changes

6.4 DIP-switch Settings

[Figure 24](#) and [Table 8](#) define the DIP-switches:



Table 8: DIP-switch Definitions

DIP	Function:
1	PROGRAM, for factory use only
2	ON for RS-485 Line Termination with 120Ω; OFF for no RS-485 Line Termination

Figure 24: SETUP DIP-switches

7 Operating Your PL-50 Power Controller – Monitor

You can operate your **PL-50** via:

- The front panel buttons, as section [7.1](#) describes
- Remotely, by USB, RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Ethernet
- Remotely, from the Kramer Infrared Remote Control Transmitter or the infrared remote extension cable transmitter

Powering up **PL-50** unit, recalls the previous settings (that is, the state of the unit when it was powered down) from the non-volatile memory.

7.1 Operating via the Front Panel Buttons

Prior to monitoring the **PL-50** outlets, each outlet needs to be measured for its standby and Active modes.

To set the Active mode, do the following:

1. Press one or more OUT buttons to select the channels for which you want to measure the standby or active modes.
The selected buttons illuminate.
2. Set the connected units to the Active mode.
3. Press the PRESET LEVEL ACTIVE button.
The selected orange OUT buttons, and their related ACTIVE green LEDs blink.
4. Press each of the selected orange blinking buttons to initialize the measurement.
The ACTIVE green LED blinks until measurement is complete.

To set the Standby mode¹, do the following:

1. Press one or more OUT buttons to select the channels for which you want to measure the standby or active modes.
The selected buttons illuminate.
2. Set the connected units to the Standby mode
3. Press the PRESET LEVEL STANDBY button.
The selected orange OUT buttons, and their related STANDBY orange LEDs blink.
4. Press each of the selected orange blinking buttons to initialize the measurement.
The STANDBY orange LED blinks until measurement is complete.

To reset the active and standby values on all channels, press the RESET button on the rear panel while turning the power ON.

You can measure the Active and Standby values as well as reset individual channels via the embedded Web pages (see section [6.3.2](#)).

8 Flash Memory Upgrade

The **PL-50** uses a microcontroller that runs firmware located in FLASH memory. The latest version of firmware can be downloaded from the Kramer Web site at www.kramerelectronics.com and updated in minutes using the PK3 Wizard and the following procedures.

To update the **PL-50** firmware:

1. Download the firmware file from the Internet (see section [8.1.1](#))
2. Connect a PC to the **PL-50** (see section [8.1.2](#))
3. Update the firmware using the P3K Wizard (see section [8.1.3](#))

8.1.1 Downloading the Firmware

To download the latest firmware file² from the Internet:

1. Go to the Kramer Web site at www.kramerelectronics.com.
2. Navigate to SUPPORT / Software Firmware Updates.
3. Click on the link of the firmware that applies to your product. Download it and save it to disk.
4. Extract the file to a folder (for example, C:\Program Files\Kramer Flash).

¹ The unit should be powered up and running under typical conditions when the measurements are made

² The files indicated in this section are given as an example only. File names are liable to change from time to time

8.1.2 Connecting a PC to the PL-50

To connect a PC to the **PL-50**, make any one of the following connections:

- Connect a serial cable from an RS-232 9-pin D-sub rear panel port on the PC to the **PL-50**.
- Connect a USB cable from a USB port on the PC to the USB port on the **PL-50**
- Connect an RJ-45 Ethernet cable from the Ethernet port on the PC to the Ethernet port on the **PL-50** as explained in section [6.2](#)

8.1.3 Updating the Firmware

To update the firmware, perform the following steps:

1. Open the Kramer P3K Wizard¹ by double-clicking the desktop icon **P3K Wizard**.

The *P3K Wizard* screen appears²:

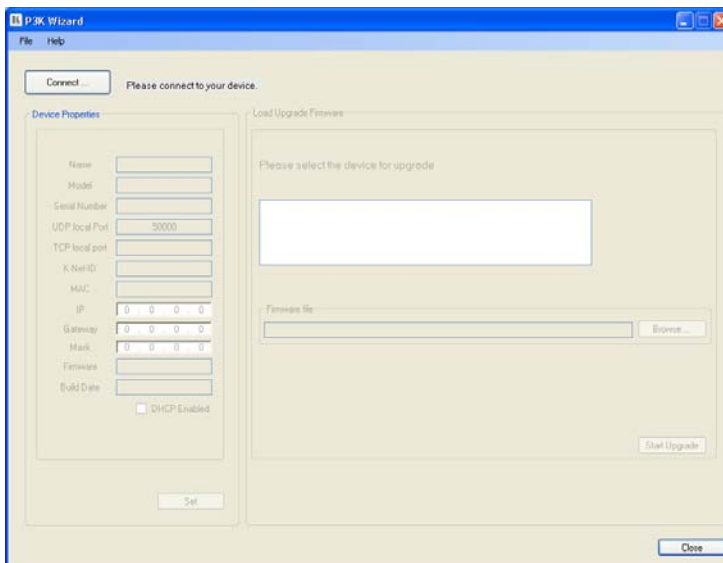


Figure 25: P3K Wizard Screen

2. Click the **Connect** button.
The *Connect Window* appears.

¹ You can download and install the latest version of the P3K Wizard from <http://www.kramerelectronics.com>.

² The screens appearing in this manual are examples of the process. The actual screens may differ in their content.

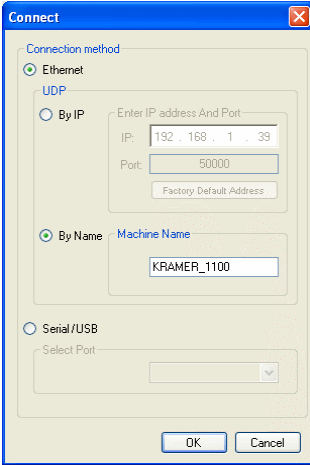


Figure 26: Connect Ethernet by Name

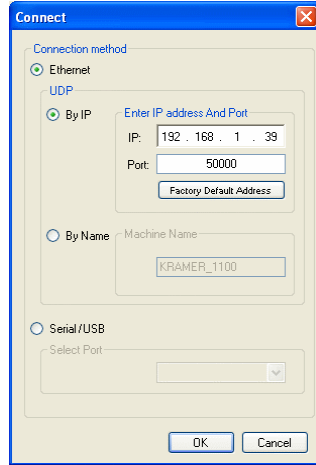


Figure 27: Connect Ethernet by IP

3. If you are upgrading using an Ethernet connection, click **Ethernet**.
 - To identify the device by specifying the device name, click **BY NAME** (see [Figure 26](#)), enter the name of the device under Machine Name and click **OK**
 - To identify the device by specifying the IP address and port, click **BY IP** (see [Figure 27](#)), enter the IP address and port of the device and click **OK**
Note: To upgrade **BY NAME**, the device must be DHCP Enabled (see [Figure 30](#))
 - To reset the device address to the factory default address, click **Factory Default Address** (in **BY IP**) and the address 192.168.1.39 appears. Click **OK**

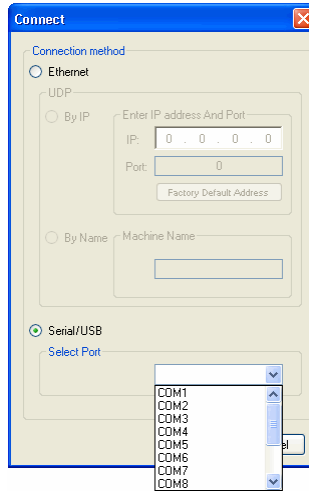


Figure 28: Connect Serial/USB

4. If you are upgrading using an RS-232 or USB connection, click **Serial/USB** (see [Figure 28](#)) and then:
 - Click the drop-down box to show the COM ports, and
 - Select a COM port to connect (from COM1 to COM13) and click **OK**

Note: If you try to connect to a device and it does not respond, the following error message appears. Click **OK**. Verify that the device is powered on, the cable connection is good, the switch on the device is set to “Program”, and that you are trying to connect by the correct method.

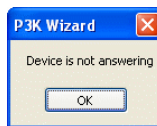


Figure 29: Error Message

5. After pressing **OK** on the *Connect Window*, the wizard searches the line for connected devices. All detected devices are displayed in the device list box under “Please select the device for update”:

Note: In the *Device Properties* section, you can update any of the active fields that have a white background. After making any changes, click **Set**.

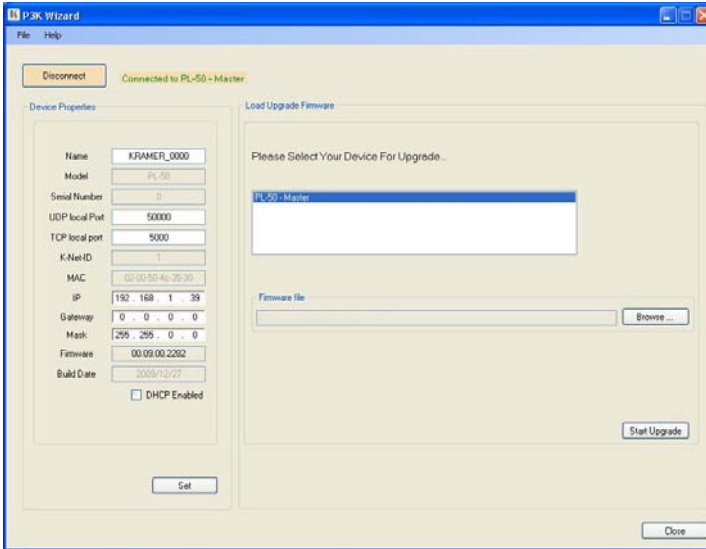


Figure 30: Device Selection

6. In the device list box, click to select the target device.
7. Next, select the firmware file to upgrade by clicking **Browse** next to the *Firmware file* box.

The *Open File* window opens:

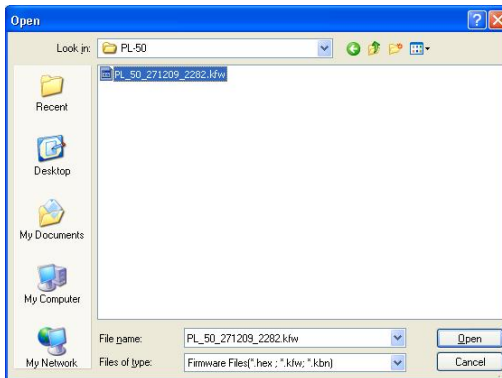


Figure 31: Open File Window

8. Navigate to the folder containing the firmware file (for example, C:\Program Files\Kramer Flash).
9. Select the firmware file you downloaded in section [8.1.1](#) and click **Open**. The firmware file appears in the *Firmware file* box.

Flash Memory Upgrade

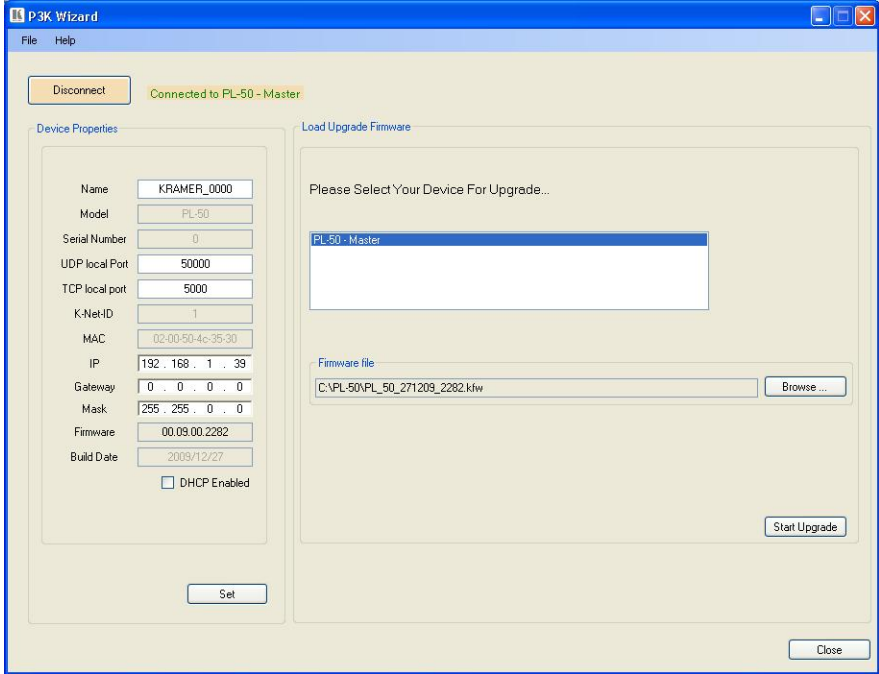


Figure 32: Device and File Selected

- Click the **Start Upgrade** button to begin the file transfer.
The *Warning* window appears:

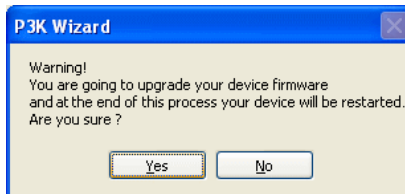


Figure 33: Warning Window

Before firmware upgrade:
Close the embedded Web pages
Do not press the front panel buttons

- Click **Yes** to continue.
Load Progress appears in the lower box:

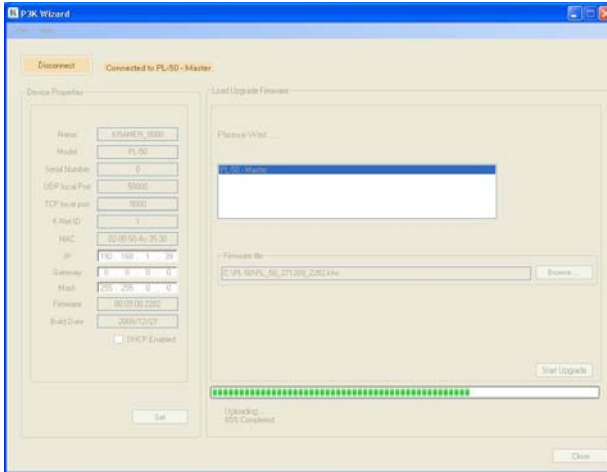


Figure 34: Load Progress

- When the upload is finished, the completion message appears:

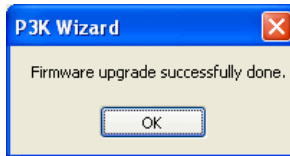


Figure 35: Completion Message

- Click **Close** to close the P3K Wizard and remove the cable that connects the **PL-50** to the PC.

8.2 Changing the Device Parameters

To change the device parameters do the following:

- Connect a PC to the **PL-50** (see section [8.1.2](#)).
- Open the P3K Wizard (see [Figure 25](#)).
- Click the **Connect** button to open the *Connect* window (see [Figure 26](#)).
- Choose on the appropriate type of connection: Ethernet BY IP, BY NAME, or SERIAL/USB, and click **OK**.
The Connect window disappears and the Device Properties become visible.
- Change the parameters as required and click **SET**.

9 Technical Specifications

[Table 9](#) includes the technical specifications:

Table 9: Technical Specifications¹ of the PL-50

INPUT POWER SOURCE:	For Europe: 230V AC, 50/60Hz, 10VA, internal For the USA 130V AC, 130V AC, 50/60Hz, 10VA, internal
OUTPUTS:	For Europe: 5 x 220-240V AC outputs, total load of 10A Max. For the USA: 5 x 100-120V AC outputs, total load of 10A Max.
DIMENSIONS:	19-inch (W), 7-inch (D) 1U (H) rack-mountable
WEIGHT:	2.7kg (6lbs) approx.
ACCESSORIES:	Power cord, Windows®-based Kramer control software, Infrared remote control transmitter

¹ Specifications are subject to change without notice

10 Kramer Protocol 3000

This RS-232/RS-485 communication protocol¹ lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal Application) and uses a data rate of 115200 baud, with no parity, 8 data bits, and 1 stop bit.

10.1.1 Protocol 3000 Syntax

Host message format:

Start	Address (optional)	Body	Delimiter
#	<i>Destination_id@</i>	message	CR

Simple command (commands string with only one command without addressing):

start	body	delimiter
#	Command SP Parameter_1,Parameter_2,...	CR

Commands string (formal syntax with commands concatenation and addressing):

```
# Address@ Command_1 Parameter1_1,Parameter1_2,... |Command_2
Parameter2_1,Parameter2_2,... |Command_3
Parameter3_1,Parameter3_2,... |...CR
```

Device message format:

Start	Address (optional)	Body	Delimiter
~	<i>Sender_id@</i>	message	CR LF

Device long response (**Echoing command**):

Start	Address (optional)	Body	Delimiter
~	<i>Sender_id@</i>	command SP [<i>param1 ,param2 ...</i>] result	CR LF

CR = Carriage return (ASCII 13 = 0x0D)

LF = Line feed (ASCII 10 = 0x0A)

SP = Space (ASCII 32 = 0x20)

¹ Not available at the time of printing. Refer to our Web site at <http://www.kramerelectronics.com> for details

10.1.2 Command Parts Details

Command:

Sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').

Command will separate from parameters with at least single space.

Parameters:

Sequence of Alfa-Numeric ASCII chars ('0'-'9','A'-'Z','a'-'z' and some special chars for specific commands), parameters will be separated by commas.

Message string:

Every command must to be entered as part of message string that begin with **message starting char** and end with **message closing char**, note that string can contain more then one command separated by pipe ("|") char.

Message starting char:

'#' for host command/query.

'-' for machine response.

Device address (Optional, for Knet):

Knet Device ID follow by '@' char.

Query sign = '?', will follow after some commands to define query request.

Message closing char =

Host messages - Carriage Return (ASCII 13), will be referred to by **CR** in this document.

Machine messages - Carriage Return (ASCII 13) + Line-Feed (ASCII 10), will be referred to by **CRLF**.

Spaces between parameters or command parts will be ignored.

Commands chain separator char:

When **message string** contains more than one command, commands will be separated by pipe ("|").

Commands entering:

If terminal software used to connect over serial \ ethernet \ USB port, that possible to directly enter all commands characters (**CR**) will be entered by Enter key, that key send also **LF**, but this char will be ignored by commands parser).

Sending commands from some controllers (like Crestron) require coding some characters in special form (like \X##).

Anyway, there is a way to enter all ASCII characters, so it is possible to send all commands also from controller.

(Similar way can use for URL \ Telnet support that maybe will be added in future).

Commands forms:

Some commands have short name syntax beside the full name to allow faster typing, response is always in long syntax.

Commands chaining:

It is possible to enter multiple commands in same string by '|' char (pipe).

In this case the **message starting char** and the **message closing char** will be entered just one time, in the string beginning and at the end.

All the commands in string will not execute until the closing char will be entered.

Separate response will be sent for every command in the chain.

Input string max length:

64 characters.

Backward support:

Design note: transparent supporting for protocol 2000 will be implemented by switch protocol command from protocol 3000 to protocol 2000, in protocol 2000 there is already such a command to switch protocol to ASCII protocol (#56 : H38 H80 H83 H81).

Table 10: Instruction Codes for Protocol 3000

Switch Channel commands		
Command	Syntax	Response
Channel switch query	SWITCH? CHNL	SWITCH? CHNL ,STATUS
Channel switch	SWITCH CHNL ,STATUS	ALERT-REG CHNL ,STATUS RESULT
CHNL = (1-5) STATUS = (0=OFF,1=ON,2=ON-SCHEDULER,3=OFF-SCHEDULER ,4=ACTIVE-MEASURE,5=STANDBY-MEASURE)		

Command	Syntax	Response
Protocol handshaking	# CR	-OK CRLF

Command	Syntax
Command ran successfully, no error.	COMMAND PARAMETERS OK
<i>Protocol Errors:</i>	
Syntax error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (command run without the matching login).	ERR004

Command	Syntax	Response
Reset device	RESET	RESET OK

Command	Syntax	Response
Protocol handshaking	# CR	-OK CRLF
Read device model	MODEL?	MODEL MACHINE_MODEL
Read device serial number	SN?	SN SERIAL_NUMBER
Read device firmware version	VERSION?	VERSION MAJOR MINOR BUILD REVISION
Set machine name	NAME MACHINE_NAME	NAME MACHINE_NAME RESULT
Read machine name	NAME?	NAME MACHINE_NAME
Reset machine name to factory default*	NAME-RST	NAME-RST MACHINE_FACTORY_NAME RESULT

***Note:** The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on).

MACHINE_NAME = Up to 14 alphanumeric chars.

* **Machine factory name** = Model name + last 4 digits from serial number.

Set machine ID number	MACH-NUM MACHINE_NUMBER	MACH-NUM OLD_MACHINE_NUMBER NEW_MACHINE_NUMBER RESULT
-----------------------	--------------------------------	---

* A response is sent after the machine number was changed. The response with the header is:

NEW_MACHINE_NUMBER @MACH-NUM **OLD_MACHINE_NUMBER** **NEW_MACHINE_NUMBER** OK

SCHEDULER Commands		
Command	Syntax	Response
Query saved scheduling	SCHED? <u>CHNL</u> <u>DAY</u>	SCHED? <u>CHNL</u> <u>DAY</u> <u>SCHEDULINGS</u>
<u>CHNL</u> = (1-5) <u>DAY</u> = (1-7) OR (SUN,MON,TUE,WED,THU,FRI,SAT) <u>SCHEDULINGS</u> = (start-end) example: 8 : 29 – 8 : 3 2		

Alert Registration Commands		
Command	Syntax	Response
Alert Registration query	ALERT-REG? <u>CHNL</u>	ALERT-REG? <u>CHNL</u> <u>EVENT</u> <u>ACTION</u>
Alert Registration	ALERT-REG <u>CHNL</u> <u>EVENT</u> <u>ACTION</u>	ALERT-REG <u>CHNL</u> <u>EVENT</u> <u>ACTION</u> <u>RESULT</u>
<u>CHNL</u> = (1-5) <u>EVENT</u> = (TO_OFF,TO_ON,TO_FULL,TO_STBY,TO_NONE,ANY_CHANGE) <u>ACTION</u> = (NO_ALERT,ALARM,E_MAIL,ALL_ALERTS)		

E-Mail commands		
Command	Syntax	Response
Set mail from	MAIL-FROM <u>E-MAIL</u>	MAIL-FROM <u>E-MAIL</u> <u>RESULT</u>
Query mail from	MAIL-FROM?	MAIL-FROM <u>E-MAIL</u>
Set mail recipient	MAIL-TO <u>E-MAIL</u>	MAIL-TO <u>E-MAIL</u> <u>RESULT</u>
Query mail recipient	MAIL-TO?	MAIL-TO <u>E-MAIL</u>
Set mail Subject	MAIL-SUBJECT <u>TXT</u>	MAIL-SUBJECT <u>TXT</u> <u>RESULT</u>
Query mail Subject	MAIL-SUBJECT?	MAIL-SUBJECT <u>TXT</u>
Set mail Server IP	MAIL-SERVER-IP <u>IP_ADDRESS</u>	MAIL-SERVER-IP <u>IP_ADDRESS</u> <u>RESULT</u>
Query mail Server IP	MAIL-SERVER-IP?	MAIL-SERVER-IP <u>IP_ADDRESS</u>
Set mail Server PASSWORD	MAIL-SERVER-PASSWORD <u>PASSWORD</u>	MAIL-SERVER-PASSWORD <u>PASSWORD</u> <u>RESULT</u>
Query mail Server PASSWORD	MAIL-SERVER-PASS- PASSWORD?	MAIL-SERVER-PASSWORD <u>PASSWORD</u>
Set mail Server USER name	MAIL-SERVER-USER <u>USERNAME</u>	MAIL-SERVER-USER <u>USERNAME</u> <u>RESULT</u>
Query mail Server USER name	MAIL-SERVER-USER?	MAIL-SERVER-USER <u>USERNAME</u>
Set mail Server USER name	MAIL-SERVER-AUTH <u>1/0</u>	MAIL-SERVER-AUTH <u>1/0</u> <u>RESULT</u>
Query mail Server USER name	MAIL-SERVER- AUTH?	MAIL-SERVER-AUTH <u>1/0</u>
Send Test Mail	MAIL-TEST <u>1/0</u>	MAIL-TEST <u>RESULT</u>
<u>E-MAIL</u> = an Email address, when the @ sign is changed by * sign <u>1/0</u> = On Or Off		

Alarm commands		
Command	Syntax	Response
Set alarm duration	ALARM-DURATION <u>SECONDS</u>	ALARM-DURATION <u>SECONDS</u> <u>RESULT</u>
Query alarm duration	ALARM-DURATION?	ALARM-DURATION <u>SECONDS</u>
Set alarm ON	ALARM-ON	ALARM-ON <u>RESULT</u>
Query alarm status	ALARM-ON?	ALARM-ON <u>1/0</u>
Set alarm OFF	ALARM-OFF	ALARM-OFF <u>RESULT</u>
Set alarm Relay mode start.	ALARM-START-AS <u>1/0</u>	ALARM-START-AS <u>1/0</u> <u>RESULT</u>
Query alarm Relay mode start.	ALARM-START-AS?	ALARM-START-AS <u>1/0</u>
Device notification	ALARM <u>1/0</u>	

1/0 = On OR Off

Power level commands		
Command	Syntax	Response
Power level query	PWR-LVL?	PWR-LVL <u>LVL</u>
Device notification	MEASURE <u>CHNL</u> <u>MES-MODE</u>	

Query the "full" and "standby" leds status. (device will report to all protocol ports on any change)

LVL = (0 = no leds, 1 = standby led on, 2 = full led on)

CHNL = (1-5)

MES-MODE = (0 = MEASURE_START, 1 = MEASURE_DONE, 2 = MEASURE_TIMEOUT)

Command	Syntax	Response
Set IP address	NET-IP <u>IP_ADDRESS</u> Short form: NTIP	NET-IP <u>IP_ADDRESS</u> <u>RESULT</u>
Read IP address	NET-IP? Short form: NTIP?	NET-IP <u>IP_ADDRESS</u>
Read MAC address	NET-MAC? Short form: NTMC	NET-MAC <u>MAC_ADDRESS</u>
Set subnet mask	NET-MASK <u>SUBNET_MASK</u> Short form: NTMSK	NET-MASK <u>SUBNET_MASK</u> <u>RESULT</u>
Read subnet mask	NET-MASK? Short form: NTMSK?	NET-MASK <u>SUBNET_MASK</u>
Set gateway address	NET-GATE <u>GATEWAY_ADDRESS</u> Short form: NTGT	NET-GATE <u>GATEWAY_ADDRESS</u> <u>RESULT</u>
Read subnet mask	NET-GATE? Short form: NTGT?	NET-GATE <u>GATEWAY_ADDRESS</u>
Set DHCP mode	NET-DHCP <u>DHCP_MODE</u> Short form: NTDH	NET-DHCP <u>DHCP_MODE</u> <u>RESULT</u>
Read subnet mask	NET-DHCP? Short form: NTDH?	NET-DHCP <u>DHCP_MODE</u>

Kramer Protocol 3000

DHCP_MODE = '0' – Don't use DHCP (Use IP set by factory or IP set command). '1' – Try to use DHCP, if unavailable use IP as above.		
Change protocol Ethernet port	ETH-PORT PROTOCOL , PORT Short form: ETHP	ETH-PORT PROTOCOL , PORT RESULT
Read protocol Ethernet port	ETH-PORT? PROTOCOL Short form: ETHP?	ETH-PORT PROTOCOL , PORT
PROTOCOL = TCP/UDP (transport layer protocol) PORT = Ethernet port that accepts Protocol 3000 commands 1-65535 = User defined port 0 - Reset port to factory default (50000 for UDP, 5000 for TCP)		

Command	Syntax	Response
Set device time and date	TIME DATE_TIME	TIME DATE_TIME RESULT
Read device time and date	TIME?	TIME? DATE_TIME
Note: Time setting commands require administrator authorization.		

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
 - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
 - ii) Product modification, or failure to follow instructions supplied with the product
 - iii) Repair or attempted repair by anyone not authorized by Kramer
 - iv) Any shipment of the product (claims must be presented to the carrier)
 - v) Removal or installation of the product
 - vi) Any other cause, which does not relate to a product defect
 - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);
generic emission standard.
Part 1: Residential, commercial and light industry"
- EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.
Part 1: Residential, commercial and light industry environment".
- CFR-47: FCC* Rules and Regulations:
Part 15: "Radio frequency devices
Subpart B Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
 - Use the supplied DC power supply to feed power to the machine.
 - Please use recommended interconnection cables to connect the machine to other components.
- * FCC and CE approved using STP cable (for twisted pair products)



For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found. We welcome your questions, comments and feedback.



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



Kramer Electronics, Ltd.

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P/N: 2900-000576 REV 3