
AlterPath PM User Guide

Version 1.5.0
Revision 2

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AlterPath PM Version 1.5.0 User Guide

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Product Version 1.5.0

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Preface

Purpose

The purpose of this guide is to provide instruction for users to independently install, configure, and maintain the AlterPath PM.

The AlterPath PM can be used in one of three configurations:

- Standalone - independent of any other hardware device.
- With a Cyclades-TS or AlterPath ACS.
- With any other console/terminal management device.

When used with the ACS/TS family, the AlterPath PM will yield a superior feature set. With this usage, the configuration will be different and the ACS/TS manual should be referenced for the setup.

Audience and User Levels

This guide is intended for the user who is responsible for the deployment and day-to-day operation and maintenance of the AlterPath PM. It assumes that the reader understands networking basics and is familiar with the terms and concepts used in Local and Wide Area Networking. Each configuration task will be separated into a section (a clickable link on the PDF file) for each user type.

How to use this Guide

This guide is organized into the following sections:

- [Chapter 1 - Introduction and Overview](#) contains an explanation of the product and its default setup. It also includes safety guidelines to be followed.
- [Chapter 2 - Installation, Configuration, and Usage](#) explains how the AlterPath PM should be connected. It describes the basic configuration process to get the AlterPath PM up and running for its most common uses.
- [Appendix A - Hardware Specs](#) gives a product overview, circuit breaker trip times, and electrical specifications for the AlterPath PM.

Additional Documentation and Help

There are other Cyclades documents that contain background information about Console Port Management and the Cyclades product line. These are:

- *AlterPath Console Server User Manual*
- *AlterPath Console Server Reference Guide*
- *Cyclades-TS User Guide*
- *Cyclades' Console Management in the Data Center*
- *Cyclades' Product Catalog*

The *ACS User Manual*, *ACS Reference Guide* and *TS User Guide* are available from the following site:

<http://www.cyclades.com/support/downloads.php>

Preface

Conventions and Symbols

This section explains the significance of each of the various fonts, formatting, and icons that appear throughout this guide.

Fonts

This guide uses a regular text font for most of the body text and `Courier` for data that you would input, such as a command line instruction, or data that you would receive back, such as an error message. An example of this would be:

```
telnet 200.200.200.1 7001
```

Hypertext Links

References to another section of this manual are hypertext links that are [underlined](#) (and are also blue in the PDF version of the manual). When you click on them in the PDF version of the manual, you will be taken to that section.

Glossary Entries

Terms that can be found in the glossary are [underlined and slightly larger](#) than the rest of the text. These terms have a hypertext link to the glossary.

Quick Steps

Step-by-step instructions for installing and configuring the AlterPath PM are numbered with a summarized description of the step for quick reference. Underneath the quick step is a more detailed description. Steps are numbered 1, 2, 3, etc. Additionally, if there are sub-steps to a step, they are indicated as Step A, B, C, and are nested within the Step 1, 2, 3, etc. For example:

Step 1: Modify files.

You will modify four Linux files to let the AlterPath PM know about its local environment.

Step A: Modify `pslave.conf`.

Open the file `pslave.conf` and add the following lines . . .

Note Box Icons

Note boxes contain instructional or cautionary information that the reader especially needs to bear in mind. There are five levels of note box icons:



Tip. An informational tip or tool that explains and/or expedites the use of the AlterPath PM.



Important! An important tip that should be read. Review all of these notes for critical information.



Warning! A very important type of tip or warning. Do not ignore this information.



DANGER! Indicates a direct danger which, if not avoided, may result in personal injury or damage to the system.

Chapter I - Introduction and Overview

Introducing Cyclades

Cyclades is a data center fault management company that enables remote management of servers, network equipment, and automation devices. Its products help data center managers at enterprise, telecommunication, and Internet companies to maximize network and server availability. This results in decreased maintenance costs, increased efficiency and productivity, along with greater control, freedom, and peace of mind. Cyclades' advantage is providing scalable products leveraging Linux technology for flexibility and ease of customization.

The AlterPath PM

The AlterPath PM is an Intelligent Power Distribution Unit (IPDU) that enables remote power control of servers and network gear. When used in conjunction with Cyclades console servers, the AlterPath PM delivers easier management capabilities and faster problem solving by integrating console access and power control into one single interface.

IT professionals can power off, power on, and reboot network devices using the same console management session from any location via telnet, Secure Shell (SSHv2) or through a secure Web session, which significantly streamlines the process. This can all be done without the need for physical access to the hardware.

The AlterPath PM delivers accurate, real-time global current monitoring of all connected devices via the user interface screen or locally through an LED digital display. Users have the ability to set a current alarm threshold that, once exceeded, will cause the AlterPath PM to sound an alarm or send a notification message, or both. The LED current display also blinks when the alarm threshold is exceeded.

The AlterPath PM also incorporates a sequential power-up feature that prevents all power outlet receptacles from turning on at once, eliminating the potential of current surges that could render the equipment inoperable. Together with the global current monitoring, the sequential power-up feature lets users safely install more equipment on existing power circuits without the worry of current overloads.

The IPDU has a fixed number of power-outlet receptacles, but with daisy-chaining capabilities, users can increase capacity by connecting the control interfaces of several AlterPath PMs in a series.

The AlterPath PM

The AlterPath PM allows one administrator and up to eight users (not simultaneously) to connect to it through its RS-232 serial port. After a successful authentication it performs the following functions:

- Reads and displays the total current being used by the entire AlterPath PM.
- Manages power outlets (by powering them on and off, locking and unlocking them, and/or power cycling them).
- Manages users.
- Monitors power variables.
- Can be used as a stand-alone IPDU (independent of any other hardware) and controlled by any simple terminal access program like Minicom on Linux or HyperTerminal on Microsoft operating systems.
- Ethernet connection is available through the Cyclades-TS or AlterPath ACS to which the AlterPath PM is connected. When used with the ACS/TS family, the AlterPath PM allows you, via a configurable hotkey, to reboot servers without leaving your telnet/ssh session. To do so, all you need to do is to press the hotkey and select a power management option from the displayed menu.
- When used with the ACS/TS family, the AlterPath PM inherits the security of the console server to which it is connected.

Chapter I - Introduction and Overview

Standalone Configuration

In this configuration, the console port of the AlterPath PM is connected to a computer running HyperTerminal or Minicom. In this example, the AlterPath PM operates independently of any other hardware such as the TS/ACS.

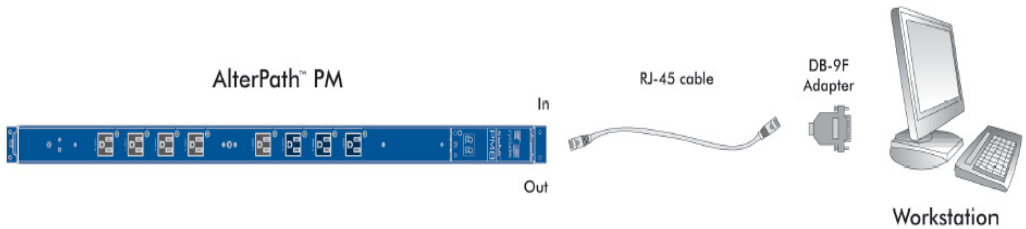


Figure 1: Standalone Configuration

Daisy-chained Configuration

This example shows three AlterPath PMs operating in a daisy-chained environment. They are configured to be used independently from any other hardware such as the AlterPath ACS or Cyclades-TS. The connections between the first PM and the computer with HyperTerminal/Minicom will be the same as in Figure #1.

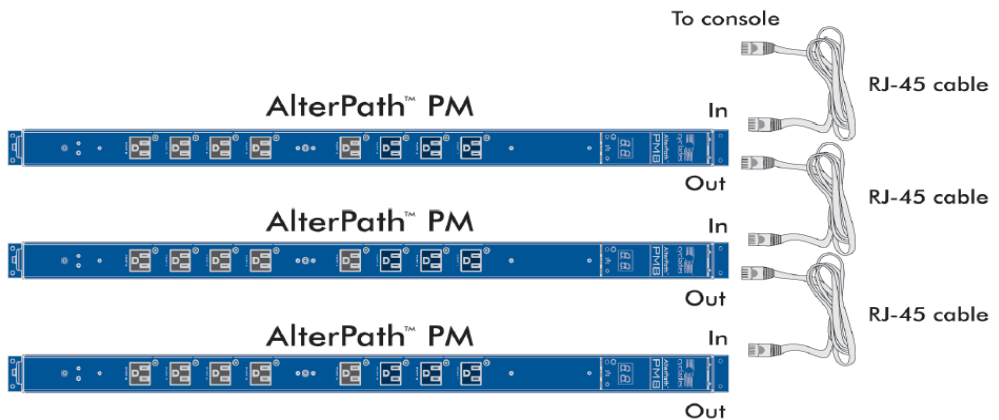


Figure 2: Daisy-chained Configuration

Integrated Configuration

In this configuration, the AlterPath PM is configured to work in conjunction with the AlterPath ACS/Cyclades-TS. A user connects to the AlterPath PM by accessing the appropriate console port of the TS/ACS. The setup/configuration for the ACS/TS can be found in the AlterPath Console Server User Manual and the Cyclades-TS User Guide respectively. No software configuration is needed on the AlterPath PM itself in this setup.

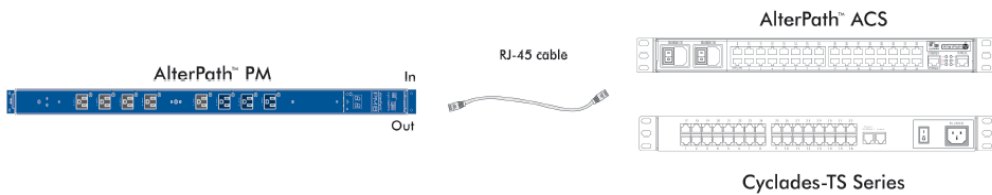


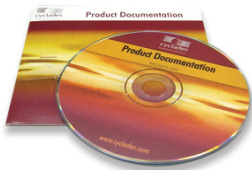
Figure 3: The AlterPath PM with an ACS or TS

If you want to daisy-chain with the AlterPath ACS or Cyclades-TS, the chain setup is similar to the Daisy-chained Configuration, with the difference that the first AlterPath PM is connected to the TS/ACS (instead of the workstation).

Chapter I - Introduction and Overview

What's in the box

The AlterPath PM comes with one adapter and one RJ-45 cable. The RJ-45 cable connects to Cyclades Console Servers, to another AlterPath PM in a daisy-chain solution, or to a PC (in this case, along with an adapter). The RJ-45 - DB-9F adapter is used along with the RJ-45 cable to connect to a PC's COM port.



User Guide CD



RJ-45 straight-through cable



RJ-45 to DB-9F
straight-through adapter

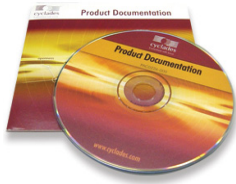


RJ-45 loopback connector



Figure 4: The AlterPath PM8, its cables, connectors and other box contents

What's in the box



User Guide CD



RJ-45 straight-through cable



RJ-45 to DB-9 F
straight-through adapter

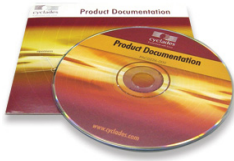


RJ-45 loopback connector



Figure 5: The AlterPath PM10, its cables, connectors, and other box contents.

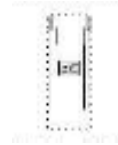
Chapter I - Introduction and Overview



User Guide CD



RJ-45 straight-through cable



RJ-45 to DB-9 F
straight-through adapter

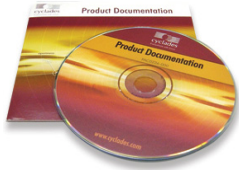


RJ-45 loopback connector



Figure 6: The AlterPath PM10i, its cables, connectors, and other box contents.

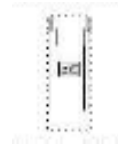
What's in the box



User Guide CD



RJ-45 straight-through cable



RJ-45 to DB-9 F
straight-through adapter

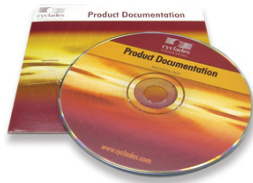


RJ-45 loopback connector



Figure 7: The AlterPath PM20, its cables, connectors and other box contents

Chapter I - Introduction and Overview



User Guide CD



RJ-45 straight-through cable



RJ-45 to DB-9 F
straight-through adapter



RJ-45 loopback connector

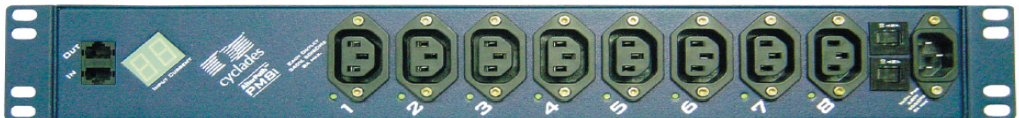


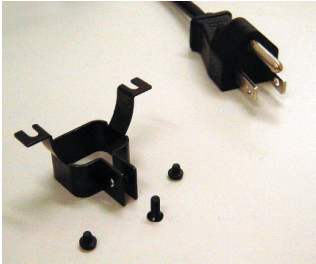
Figure 8: The AlterPath PM8i, its cables, connectors and other box contents

Depending on your site's location, the input power cables included in the box will vary. Following are the various cables listed with their corresponding countries.

Input Power Cable Options for the AlterPath PM8i and PM10i

- CAB0089: 8.2ft 3-pin power cable for the US.
- CAB0055: 8.2ft. 3-pin power cable for Australia & New Zealand.
- CAB0087: 8.2ft. 3-pin power cable for Continental Europe.
- CAB0088: 8.2ft. 3-pin power cable for the UK & Ireland.

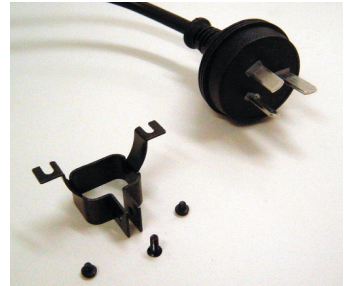
NOTE: There are more options available. Please consult the Cyclades website (www.cyclades.com) for more details.



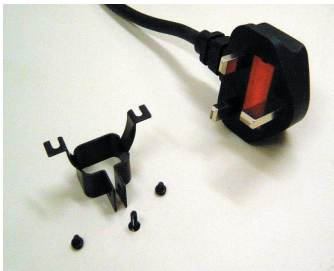
CAB0089 US Power Cord



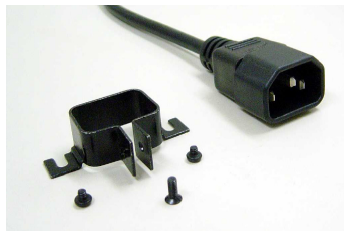
CAB0087 Continental Europe Power Cord



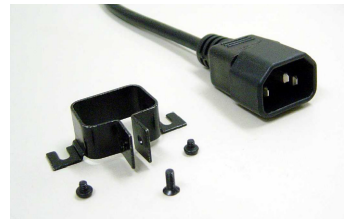
CAB0055 Australia/New Zealand Power Cord



CAB0088 UK & Ireland Power Cord



Input Power Cable and Harness



Output Power Cable and Harness

Figure 9: Input Power Cables for the AlterPath PM8i

Optional Outlet Cable Package

8-outlet cables (C13 male to C14 female) with retaining clips (ACS0040). See above figure.

Chapter I - Introduction and Overview

Safety Instructions

Read all the following safety guidelines to protect yourself and your AlterPath PM.



DANGER! All outlets of the AlterPath PM output high voltage. Necessary precautions should be taken.



DANGER! To help prevent electric shock, plug the AlterPath PM into a properly grounded power source. The power cord is equipped with a three-prong plug to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from the cable. Do not use extension cords with AlterPath PM.



Important! AlterPath PM is intended for enterprise and indoor use only.



Important! To help protect the AlterPath PM from electrical power fluctuations, use a surge suppressor, line conditioner, or uninterruptible power supply.



Important! Be sure that nothing rests on the cables of the AlterPath PM and that they are not located where they can be stepped on or tripped over.



Important! Do not spill food or liquids on the AlterPath PM. If it gets wet, disconnect the power immediately and contact Cyclades.

Chapter I - Introduction and Overview



DANGER! Do not push any objects through the openings of the AlterPath PM. Doing so can cause fire or electric shock by shorting out interior components.



Important! Keep your AlterPath PM away from heat sources.



DANGER! There is a possibility of live feed for either Line or Neutral even if one of the circuit breakers is disabled.

FCC Warning Statement

The AlterPath PM has been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Installation & Service 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 is required to correct the problem at his or her own expense.

Canadian DOC Notice

The AlterPath PM does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

L'AlterPath PM n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Chapter 2 - Installation, configuration and usage

Introduction

This chapter will allow you to install and configure the AlterPath PM. This information refers to the standalone and daisy-chained modes only. For information about integrated use with the ACS/TS, please consult the AlterPath ACS User Guide or the Cyclades-TS User Guide respectively.

This chapter is divided into the following sections:

- [Functional Overview and Command Set](#)
- [System Requirements](#)
- [Pre-Install Checklist](#)
- [The Installation Process](#)
- [Default Configuration Parameters](#)
- [The Configuration Process](#)

System Requirements

Cyclades recommends either of the following specifications for configuring the AlterPath PM:

- Standalone, independent of any other hardware, accessed via a terminal access program such as Minicom or HyperTerminal.
- In conjunction with a console server such as the AlterPath ACS or Cyclades-TS.

Pre-Install Checklist

The AlterPath PM can be daisy-chained either while attached to a dumb terminal or PC emulating a terminal, or while attached to an ACS/TS. If it is attached to an ACS/TS, there is no need for a DB-9F straight-through adapter.

There are several things you will need to confirm prior to installing and configuring the AlterPath PM:

1. One or more RJ-45 - RJ-45 straight-through cables.
2. A RJ-45 - DB-9F straight-through adapter (if the AlterPath PM is used in standalone or daisy-chained mode only).
3. A PC running a terminal emulation program (if the AlterPath PM is used in standalone or daisy-chained mode only).

Rack Installation

Connecting the Hardware

This section explains how to connect the PM to equipment for initial testing. It is a two-step process:

1. Connect the AlterPath PM to an AC power source.
2. Connect a device to one of the AlterPath PM's outlets.



Important! The suggested minimum screw size for wall-mounting the AlterPath PM units is #10 (4.8 mm or 0.19 in or 3/16 in) or larger.

The RJ-45 cable included in the AlterPath PM package is minimum flame rated VW-1 or FT-1 and has a maximum length of 10.00656 feet (3.05 meters).

Chapter 2 - Installation, configuration and usage



Important! Install your AlterPath PM near the power managed equipment and in an easily accessible location.

Connecting the Power Cable

Connect the AlterPath PM's power cable to a wall outlet.



Important! The following figure shows the AlterPath PM 0U model mounted on a wall. When mounting to a stud, securely mount using a #10 or larger screw or use a drywall fastener rated min. 25 lbs. (11.34 kg).



Figure 10: Connecting the AlterPath PM to a power source



Important! Install the AlterPath PM 0U model in a location where there is an adjacent and accessible wall socket outlet.



Important! The wall socket outlet shall be installed near the equipment and shall be easily accessible.



Important! The AlterPath PM OU model unit must be plugged into a receptacle protected by an appropriate Listed circuit breaker.

Connecting to the Serial Port

Plug one end of the RJ-45 cable into the AlterPath PM “In” (also labeled as “Console” in older PM units) port. The other end of the RJ-45 cable should be connected to either a Cyclades console server or to the RJ-45 to DB-9F adapter shipped with the product. In the latter case, the adapter can then be connected to a DB-9 serial port in the workstation that will control the AlterPath PM.

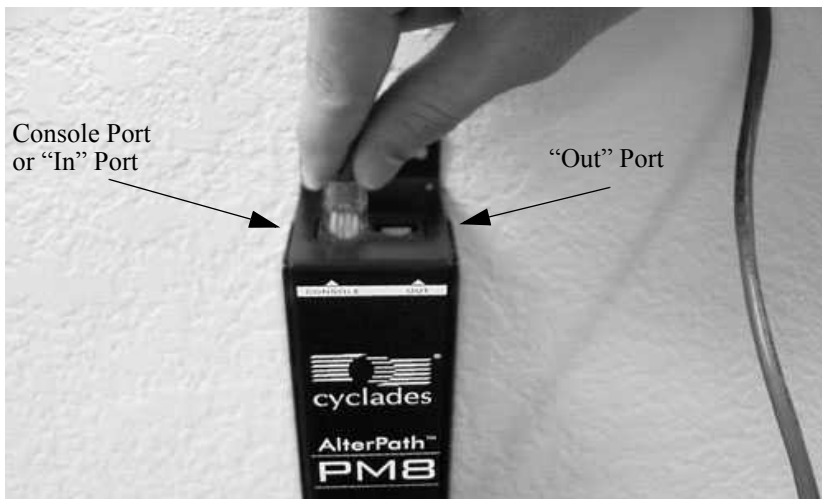


Figure 11: Connecting an RJ-45 cable to the AlterPath PM

Chapter 2 - Installation, configuration and usage

Accessing the System Console

There are several ways to access the AlterPath PM. These methods are dependent on whether you are using the AlterPath PM as a standalone device, or in conjunction with the Cyclades-TS or AlterPath Console Server.

In standalone mode, local users can connect directly to the system console port (the “In” port) of the AlterPath PM using the console cable with the corresponding adapter.

In TS/ACS integration mode, remote users can access the AlterPath PM's control port through one of the following interfaces:

1. Menu-driven interface: after using telnet or SSH to access the console port equivalent to the managed device on the console server, you should type the power management hot-key (CTRL+P by default) and this will bring up a power management menu on the same screen.
2. Web interface: once you are logged into the Web interface of the console server, you can access the power management functionality from the “Power Management” tab on the Web interface.

For more details, please refer to the section called [The Installation Process](#).

Rack-Mounting

The following considerations should be taken into account when rack-mounting the AlterPath PM:

Temperature

The manufacturer's maximum recommended ambient temperature for the AlterPath PM is 122 °F (50 °C).

Elevated Operating Ambient Temperature

If the AlterPath PM is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature. See above.

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.

Mechanical Loading

Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Earthing

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 power strips or extension cords.

Rack Mounting of the AlterPath PM8i, PM10 or PM10i

Step 1: Mount or place the AlterPath PM8i in a secure location.

Step 2: Connect the power cord to a power outlet.

Step 3: Connect your ACS/TS to the “In/Console” RJ-45 connector.

Step 4: Connect your serial devices to the AlterPath PM’s outlets.

Step 5: Set the power switch to ON.

Chapter 2 - Installation, configuration and usage

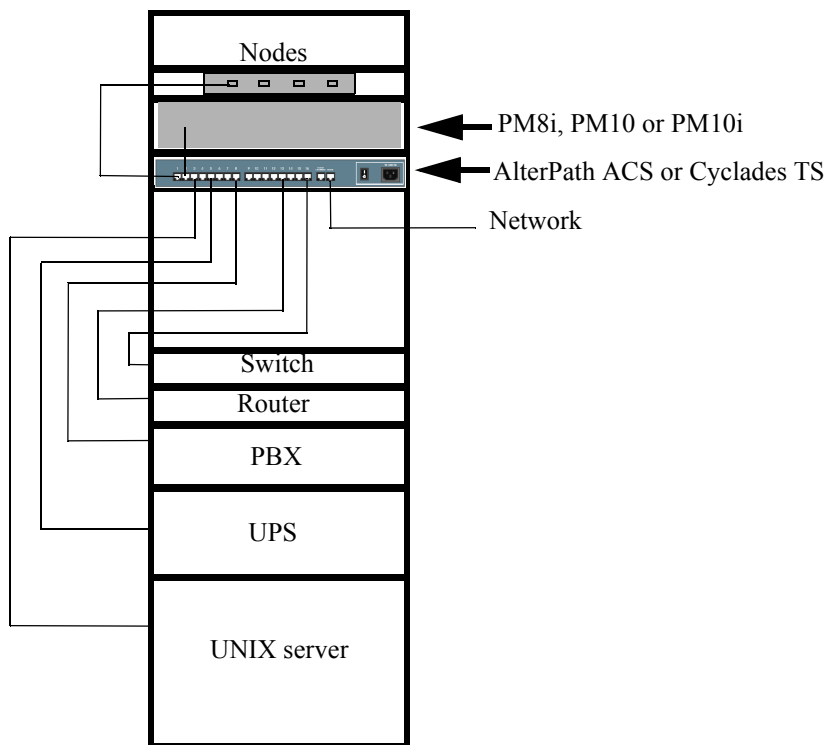


Figure 12: Rack mount for the AlterPath PM8i

The Installation Process

Following are the steps that you will need to perform to install the AlterPath PM for either the standalone or the daisy-chained configuration. For more details and diagrams for these configurations, please refer to the section called [The AlterPath PM](#) in Chapter 1.

Standalone Configuration

Step 1: Connect the DB-9F adapter to the PC/workstation running the Terminal Emulation Program.

Step 2: Connect one end of the RJ-45 cable to the DB-9F adapter.

Step 3: Connect the other end of the RJ-45 cable to the AlterPath PM.

Step 4: Configure the terminal access program (HyperTerminal/Minicom) with the following parameters:

- 9600 baud
- No flow control
- 8 data bits
- 1 stop bit

Daisy-Chained Configuration

Step 1: Follow steps 1 - 4 above.

Step 2: Connect one end of the RJ-45 cable to the output port of the main AlterPath PM (Master).

Step 3: Connect the other end of the RJ-45 cable to the console port of the secondary AlterPath PM (Slave).

A maximum of 128 outlets can be daisy chained from any AlterPath PM unit.

Chapter 2 - Installation, configuration and usage

Default Configuration Parameters

The AlterPath PM's default configuration is as follows:

1. User *admin* with pm8 password.
2. All outlets un-named.
3. All outlets *unassigned to user*.
4. All outlets turned on.
5. All outlets unlocked.

The Configuration Process

You can configure the AlterPath PM by any one of three methods:

- Command Prompt
- Browser (available only when used with TS/ACS)
- Text-based menu (available only when used with TS/ACS, this menu allows you to invoke the various PM operations such as cycling, switching on/off and more)

Configuration using the Command Prompt

Step 1: Login to the AlterPath PM.

Use the factory default username/password pair *admin/pm8*.

Step 2: Change the password for user *admin*.

Step 3: Create up to eight users using the *adduser* command.

Step 4: Assign outlets to users using the *assign* command.

Step 5: (Optional) Name the outlets using the *name* command.

Functional Overview and Command Set

Step 6: Save the configuration using the *save* command.

Configuration using a Web Browser

Refer to the AlterPath Console Server User Guide for the ACS or the Cyclades-TS User Guide.

Configuration using the Text-Based Menu

Refer to the AlterPath Console Server User Guide for the ACS or the Cyclades-TS User Guide.

Functional Overview and Command Set

User Interface

When you power on or exit the AlterPath PM, the following login prompt is displayed:

```
AlterPath PM
Copyright (c) 2002-2003 Cyclades Corporation
V 1.5.0 Oct 25, 2004
```

```
[PM]: IPDU: 1
```

```
[PM]: Out: 8 [NOTE: The outlet value should vary according to the PM type.]
```

Username:

When the unit is first powered on, the only existing user is the administrator with username *admin*. Therefore, the user would have to type in:

```
admin<cr>
```

The following string would then be presented:

Password:

Type in the password 'pm8' (factory default), and a command prompt will be shown.

```
pm>
```

After logging in, the administrator can choose to change his or her password through the *passwd* command (seen later). Passwords can be set to null (i.e., no password).

Chapter 2 - Installation, configuration and usage

Some commands allow specifying the outlet number (e.g. 5), outlet name (e.g. sunfire), or group of outlets (e.g. 1, 3-5). For any case, the reference to <outlet> will be used throughout this document. To know all the commands supported by the PM, the administrator would need to type in *help* (seen later).

Commands

All commands are available to the administrator, and some commands are available to regular users. Unless otherwise noted, the commands below are available to any system user.

Commands implemented in the current version areas follows: *adduser*, *alarm*, *assign*, *buzzer*, *current*, *currentprotection*, *cycle*, *deluser*, *exit*, *factory_defaults*, *help*, *interval*, *list*, *lock*, *name*, *off*, *on*, *passwd*, *reboot*, *restore*, *save*, *status*, *syslog*, *temperature*, *unassign*, *unlock*, *ver*, and *whoami*.

The detailed functional description for each of these commands is shown below.

Adduser

Adds one username to the internal database. A maximum of eight characters (not case sensitive) is allowed, and a maximum of eight individual users is allowed. This command is available to the administrative user *only*. For example, to add the user *popper*:

```
pm>adduser popper
Password:
Re-enter password:
Username/password set for user popper.
pm>
```

Alarm

Sets and reads the current threshold. The current threshold is the maximum allowed current on the power strip. This command is available to administrator.

To set the threshold, use:

```
alarm <ipdu#> <threshold>
```

Example:

```
pm>alarm 1 5.6
Setting alarm threshold on IPDU #1 to 5.6A
pm>alarm 2 7.8
Setting alarm threshold on IPDU #2 to 7.8A
```

Functional Overview and Command Set

To get the threshold of a single unit, use:

```
alarm <ipdu#>
```

Example:

```
pm>alarm 1
Alarm threshold on IPDU #1 is 5.6A
pn>alarm 2
Alarm threshold on IPDU #2 is 7.8A
```

To get the threshold of the whole daisy-chain, use:

```
alarm
```

Example:

```
pm>alarm
Alarm threshold on IPDU #1 is 5.6A
Alarm threshold on IPDU #2 is 7.8A
```

Assign

Assigns one outlet or group of outlets to a given user. This command is available to the administrator user *only*. For example, to assign outlet 2 to user *russel*:

```
pm>assign 2 russel
Outlet 2 assigned to russel.
pm>
```

Buzzer Status

Displays or changes the buzzer notification status. The possible status values are: on (meaning, sound the buzzer when there is an overcurrent situation) and off.

To get the current status of the buzzer notification, use: buzzer status

Example:

```
pm>buzzer status
Buzzer is ON on IPDU #1
Buzzer is ON on IPDU #2
pm>
```

To turn on or off the buzzer notification, use: buzzer on or buzzer off

Example:

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```
pm>buzzer on
Buzzer turned ON on IPDU #1
Buzzer turned ON on IPDU #2
pm>buzzer off
Buzzer turned OFF on IPDU #1
Buzzer turned OFF on IPDU #2
```

Current

Displays the total current drawn by AlterPath PM units and the maximum current the unit has drawn (current peak). It can also be used to clear the saved peak current value.

Example:

```
pm> current
IPDU #1: True RMS current: 2.2A. Maximum current: 9.4A
IPDU #2: True RMS current: 2.0A. Maximum current: 10.2A
```

You can get this information for a specific unit by providing the unit number as an argument.

Example:

```
pm> current 2
IPDU #2: True RMS current: 2.4A. Maximum current: 10.2A
```

You can reset the maximum current drawn by giving 'reset' as an argument to the command current.

Example:

```
pm>current reset
IPDU #1: Clearing maximum recorded current to zero.
IPDU #2: Clearing maximum recorded current to zero.
```

Currentprotection

Turns on and off the over current protection feature. The overcurrent protection does not let any outlet to be turned on if the current drawn by the unit is bigger then the current threshold configured with the command alarm. This command can also be used to display the status of this feature by adding “status” to the command (i.e., currentprotection status).

Example:

```
pm>currentprotection ON
IPDU #1: Overcurrent protection turned ON.
IPDU #2: Overcurrent protection turned ON.
pm>currentprotection off
IPDU #1: Overcurrent protection turned OFF.
IPDU #2: Overcurrent protection turned OFF.
pm>currentprotection status
IPDU #1: Overcurrent protection is OFF.
IPDU #2: Overcurrent protection is OFF.
```

Cycle

Power cycles an outlet or groups of outlets. You can use the outlet number or the outlet name (see command name for details).

Example:

```
pm> cycle 3
3: Outlet turned off.
3: Outlet turned on.
pm>cycle 2, 3, 5-7
2: Outlet turned off.
3: Outlet turned off.
5: Outlet turned off.
6: Outlet turned off.
7: Outlet turned off.
2: Outlet turned on.
3: Outlet turned on.
5: Outlet turned on.
6: Outlet turned on.
7: Outlet turned on.
pm>cycle router
2: Outlet turned off.
2: Outlet turned on.
```

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Deluser

Deletes one username from the internal database. This command is available to the administrative user *only*. For example, to delete the user *new*:

```
pm>deluser new
Username deleted.
pm>
```

Exit

Exits the session. For example, to exit the current session:

```
pm>exit
AlterPath PM
Copyright (c) 2002-2003 Cyclades Corporation
V 1.5.0 Oct 25, 2004
```

Username:

Factory_defaults

Brings the unit to its factory configuration. That means: all outlets are on, unlocked, unnamed, and no users are created. When in daisy chain, this command will reset all units in the chain.

```
pm>factory_defaults
Setting configuration to defaults on IPDU #1
1: Outlet turned on.
2: Outlet turned on.
3: Outlet turned on.
4: Outlet turned on.
5: Outlet turned on.
6: Outlet turned on.
7: Outlet turned on.
8: Outlet turned on.
Saving configuration to flash on IPDU #1 ... done.
pm>
```

Functional Overview and Command Set

Help

Displays the system help message.

```
pm>help
```

Available commands:

adduser	alarm	assign
buzzer	current	currentprotection
cycle	deluser	factory_defaults
interval	list	lock
help	name	off
on	passwd	reboot
restore	save	status
syslog	temperature	ver
unassign	unlock	whoami

NOTE: To get detailed help on the commands listed above type
'<command> help';

NOTE: Some commands accept as input a data type called <outlet-String>.

<outletString> is a string representing one or more outlets.
This string can be:

- one single outlet.

Examples: on 3 (turn on outlet 3);
 off router (turn off the outlet called router).

- a group of outlets.

Examples: status 1,3,5 (get status of outlets 1, 3 and 5);
 cycle 2-7 (cycle the outlets 2, 3, 4, 5, 6, 7)
 lock 2,5-7 (lock the outlets 2, 5, 6 and 7).

```
pm>
```

Interval

Configures the power up interval for each outlet in the system. The power up interval of an outlet is the time the unit will wait, after turning this outlet on, to turn on any other outlet. The syntax of this command is:

```
interval <outlet String>
```

Displays the power up interval of the outlets.

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`interval <outlet String> <interval>`

Sets the power up interval of outlets. (Default value is 0.5.)

Example:

```
pm>interval 1
1: Outlet cycle interval is 0.50.
pm>interval 1, 3-5
1: Outlet cycle interval is 0.50.
3: Outlet cycle interval is 0.50.
4: Outlet cycle interval is 0.50.
5: Outlet cycle interval is 0.50.
pm>interval 2, 4-6 2.4
2: Outlet cycle interval set to 2.40.
4: Outlet cycle interval set to 2.40.
5: Outlet cycle interval set to 2.40.
6: Outlet cycle interval set to 2.40.
```

List

List users created and outlets assigned to each user (for the administrator), or just the outlets assigned to the user logged in at the moment (for the regular user). For example, for the Admin to list user names in the internal database:

```
pm>list
-----
User                Outlets
-----
kant                 1,5
diderot              2,6
russel               3,7
tao                  4,8
-----
pm>
```

For a regular user to list the usernames in the internal database:

```
pm>list
-----
User                Outlets
-----
```

Functional Overview and Command Set

```
kant 1,5
```

```
-----  
pm>
```

Lock

Locks an outlet or group of outlets in the current state. The response to this command is a list of status lines, one per power port. For example, to lock outlets 1, 2, and 6:

```
pm>lock 2,6,1  
1: Outlet locked.  
2: Outlet locked.  
6: Outlet locked.
```

Name

Names an outlet. A maximum of eight characters (not case sensitive) is allowed. Spaces and special characters (e.g. %, *, \$, #) are NOT allowed. This command is available to the administrator user only. For example, to name outlet 4 as *nowhere*:

```
pm>name 4 nowhere  
4: Outlet now named nowhere  
pm>
```

NOTE: In daisy-chained PM units, you can assign the same outlet name to different IPDU outlet numbers. This, however, is not possible in a standalone unit.

Off

Turns an outlet or group of outlets off. For example, to turn all outlets off:

```
pm>off all  
1: Outlet turned off.  
2: Outlet turned off.  
3: Outlet turned off.  
4: Outlet turned off.  
5: Outlet turned off.  
6: Outlet turned off.  
7: Outlet turned off.  
8: Outlet turned off.
```

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To turn off all outlets but 1 and 8:

```
pm>off 2-7
2: Outlet turned off.
3: Outlet turned off.
4: Outlet turned off.
5: Outlet turned off.
6: Outlet turned off.
7: Outlet turned off.
```

On

Turns an outlet or a group of outlets on. If more than one outlet are selected there will be an interval between outlets being powered on, the interval is defined by the command interval.

Example:

```
pm>on 1, 3-5
1: Outlet turned on.
3: Outlet turned on.
4: Outlet turned on.
5: Outlet turned on.
```

Passwd

Sets a password. The Administrator has a default password (pm8), which can be changed. A maximum of eight characters (not case sensitive) is allowed. Regular users can change or set only their own password. The Administrator can change his or her own password or any regular user's password.

For the admin to change the password for user *alpha*:

```
pm>passwd alpha
Password:
Re-enter password:
Username/password set for user alpha.
pm>
```

And for example, for the admin to change his or her own password (s)he would type in:

```
pm>passwd
Password: <new password>
Re-enter password:
Username/password set for user admin.
pm>
```

Reboot

Reboots the PM units. To reboot the first unit of the chain, or to reboot the unit in stand alone mode, just type in: reboot. When in daisy chain you can type in:

```
reboot <ipdu#>
```

This reboots the unit number <ipdu#>.

Example:

```
pm>reboot
```

```
-----  
Copyright (c) 2003 Cyclades Corporation  
PM/KVM Boot Loader Version 1.1  
-----
```

Boot Menu

1. Upgrade Firmware.
2. Boot Firmware.

```
-----  
Enter choice (1 or 2): Timeout...  
Booting...
```

```
Starting AlterPath PM  
Retrieving configuration
```

- 1: Outlet turned on.
- 2: Outlet turned on.
- 3: Outlet turned on.
- 4: Outlet turned on.
- 5: Outlet turned on.
- 6: Outlet turned on.
- 7: Outlet turned on.
- 8: Outlet turned on.

```
AlterPath PM  
Copyright (c) 2002-2003 Cyclades Corporation  
V 1.5.0 Oct 25, 2004
```

```
[PM]: IPDU: 1  
[PM]: OUT: 8  
Username:
```


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Restore

Restores the configuration currently saved in flash. Example:

```
pm>restore
1: Outlet turned on.
2: Outlet turned on.
3: Outlet turned on.
4: Outlet turned on.
5: Outlet turned on.
6: Outlet turned on.
7: Outlet turned on.
8: Outlet turned on.
pm>
```

Save

Saves the current configuration in the flash device built in to all AlterPath PM units. This command saves the username/password database and the specific information pertaining to each outlet such as outlet name, outlet assignments, outlet state.

If you save your configuration to flash it will be restored after the next reboot. If you don't save your configuration to flash you will lose it all after the next reboot.

Example:

```
pm>save
Saving configuration files to flash...done.
pm>exit
```

An error message will be displayed if there is an error while writing the configuration to flash. The save command saves the username/password database and the specific information pertaining to each outlet such as outlet number, outlet name, outlet owner, state (on/off) of the outlet, whether the outlet is locked or unlocked, etc. Upon next reboot or login the AlterPath PM retrieves the saved configuration and initializes the outlets according to the saved configuration.

Functional Overview and Command Set

Status

Displays the status of selected outlets.

Examples:

```
pm>status 4
```

Outlet	Name	Status	Users	Interval (s)
4	router	Unlocked ON	john	2.40

```
pm>status 2, 5-7
```

Outlet	Name	Status	Users	Interval (s)
2	firewall	Unlocked ON		2.40
5	mailSrv	Unlocked ON		2.40
6		Unlocked ON	jef, john	2.40
7		Unlocked ON		0.50

Syslog

Displays or changes the syslog notification status. The possible status values are: on (meaning that a message will be displayed in the console when there is an over current situation) and off.

To get the current status of the syslog notification use: `syslog`

Example:

```
pm>syslog
```

```
Syslog is ON on IPDU #1
```

```
Syslog is ON on IPDU #2
```

To turn on and off the syslog notification use: `syslog on` or `syslog off`

Example:

```
pm>syslog on
```

```
Syslog turned ON on IPDU #1
```

```
Syslog turned ON on IPDU #2
```

```
pm>syslog off
```

```
Syslog turned OFF on IPDU #1
```

```
Syslog turned OFF on IPDU #2
```

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Temperature

This command displays the temperature in the AlterPath PM unit surrounding and the maximum temperature the unit has registered (temperature peak). It can also be used to clear the saved peak temperature value.

Example:

```
pm> temperature
IPDU #1: Temperature: 36.1°C (96.9°F). Maximum: 36.1°C (96.9°F).
IPDU #2: Temperature: 20.0°C (68.0°F). Maximum: 25.0°C (77.0°F).
```

You can get this information for a specific unit by providing the unit number as an argument.

Example:

```
pm> temperature 2
IPDU #2: Temperature: 20.0°C (68.0°F). Maximum: 25.0°C (77.0°F)
```

You can reset the maximum temperature registered by giving 'reset' as an argument to the command temperature.

Example:

```
pm>temperature reset
IPDU #1: Clearing maximum recorded temperature to zero.
IPDU #2: Clearing maximum recorded temperature to zero.
```

Unassign

Removes the assignment of an outlet or group of outlets from a given user. This command is available to the administrator user only. For example, to unassign outlet 2 and 4 from user diderot:

```
pm>unassign 2,4 diderot
2: Outlet no longer assigned to diderot.
4: Outlet no longer assigned to diderot.
pm>
```

Functional Overview and Command Set

Unlock

Unlocks an outlet or group of outlets in the current state. The response to this command is a list of status lines, one per power port. For example, to unlock outlets 2, 3, and 8:

```
pm>unlock 2,3,8
2: Outlet unlocked.
3: Outlet unlocked.
8: Outlet unlocked.
```

Ver

Shows the current software version.

Example:

```
pm>ver
IPDU 1 Hw with 8 outlets 15 AMPS max Sw V 1.5.0 Oct 25, 2004
pm>
```

You can get this information for a specific unit by providing the unit number as an argument.

Example:

```
pm> ver 2
IPDU 2 Hw with 8 outlets 15 AMPS max Sw V 1.5.0 Oct 25, 2004
pm>
```

Whoami

Shows who is the user currently logged in. Example with the admin user logged in:

```
pm>whoami
admin
pm>
```

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Emergency Reset of the Administrator Password

In the event the administrator wants to reset the password for the AlterPath PM (e.g. he/she forgot the password), then the procedure below should be followed:

Step 1: If you are currently logged into the AlterPath PM as a regular user, log out by typing in: exit

If you are already logged into the AlterPath PM as an administrator, proceed to step 2.

Step 2: Attach loopback connector.

Connect the loopback connector shipped with the product to the OUT port of the AlterPath PM. If necessary, disconnect any cables connected to the OUT port of the AlterPath PM to allow for the connection of the loopback.

Step 3: Wait for one minute, then check the display.

Wait for one minute. If you are watching the AlterPath PM's console output (using HyperTerminal or Minicom), messages like the ones shown below will be displayed:

```
[ALTERPATH PM]: DCD went ON on output port of IPDU #1
```

```
[ALTERPATH PM]: Trying to detect loopback cable on OUT port  
of ipdu #1
```

```
[ALTERPATH PM]: Loopback detected. Changing administrator  
password to default.
```

```
[ALTERPATH PM]: Please remove the loopback cable now.
```

Step 4: Remove the loopback connector.

After one minute, you can remove the loopback connector from the OUT port of the AlterPath PM. Now the password for the user *admin* will be reset to the default (*pm8*), and you should be able to log into the AlterPath PM using this username/password.

Upgrading the AlterPath PM Firmware

Step 5: Change the password for the *admin* if desired.

If you wish, log into the AlterPath PM and change the password for the *admin* user by issuing the following command:

```
passwd
```

Step 6: Execute “save” to complete the procedure.

Before rebooting or switching off the power, for the system to save your password to Flash, you must type in:

```
save
```



Note: If you need to recover the password of many AlterPath PMs connected in a daisy-chain configuration, the above procedure needs to be executed on each AlterPath PM in the chain.

Upgrading the AlterPath PM Firmware

The upgrade procedure described here is only valid for units that are currently running firmware versions 1.3.0 or greater. If your AlterPath PM unit is running an older firmware version, please follow the manual correspondent to the firmware that is currently installed in the AlterPath PM. Older versions of this manual can be found at:

<ftp://ftp.cyclades.com/pub/cyclades/alterpath/pm/doc/>

Starting with version 1.1.0, the AlterPath PM firmware can be upgraded through its “IN” port. To upgrade the AlterPath PM firmware, the procedure below should be followed:

Step 1: Download the new AlterPath PM firmware from the Cyclades Web site.

The latest AlterPath PM firmware is available in the download section of the Cyclades Web site, at <http://www.cyclades.com/support/downloads.php>

After downloading the AlterPath PM firmware file, save it to the workstation connected to the AlterPath PM console (IN port).

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Step 2: Using either Hyperterminal or Minicom, log into the AlterPath PM as *admin* and type in the command *upgrade* <ipdu number>.

<ipdu number> is the number of the IPDU to which you want to upgrade the firmware. If you have only one AlterPath PM unit, you can type in '*upgrade 1*'. If you have, for instance, three units in daisy-chain, you can type in '*upgrade 3*', or '*upgrade 2*' depending on which unit you want to upgrade.

If you have a daisy chain and you want to upgrade all units, Cyclades advises you to start from the last unit and work your way towards the first.

If you are currently logged in as a different user, log out and then login as *admin*. Once you see the AlterPath PM command prompt, reboot the unit by executing the following command:

```
# reboot
```

Step 3: At the boot loader menu, select the option to upgrade the firmware.

After the *upgrade* command is executed, the boot loader menu will be displayed at the console, as shown below:

```
pm>upgrade <ipdu number>
AlterPath PM
Copyright (c) 2002-2003
Cyclades Corporation V 1.5.0 Oct 25, 2004
```

```
-----
Copyright (c) 2003 Cyclades Corporation
AlterPath PM/KVM Boot Loader Version 1.1
-----
```

```
Boot Menu
1. Upgrade Firmware.
2. Boot Firmware.
```

```
-----
Enter choice (1 or 2):
```

To upgrade the firmware, select option 1 by typing 1 <ENTER>. The boot loader will then erase the firmware currently in the unit, and ask you to upload the new firmware, as shown below:

```
-----
Copyright (c) 2003 Cyclades Corporation
```

Upgrading the AlterPath PM Firmware

```
AlterPath PM/KVM Boot Loader Version 1.1
-----
Boot Menu
1. Upgrade Firmware.
2. Boot Firmware.
-----
Enter choice (1 or 2): 1
Erasing firmware...done.
Downloading image. Please send file in 10 seconds.
```

Step 4: Upload the new AlterPath PM firmware to the unit.

Now you should use your terminal emulator program to upload the AlterPath PM firmware file to the AlterPath PM using the Xmodem protocol.

If you are using HyperTerminal in Windows, the procedure is as follows:

- Go to the *Transfer* menu. Select *Send*. A popup window will be displayed.
- Set the proper path for the AlterPath PM firmware file, and select Xmodem as the protocol. Once this is done, click on the *Close* button.

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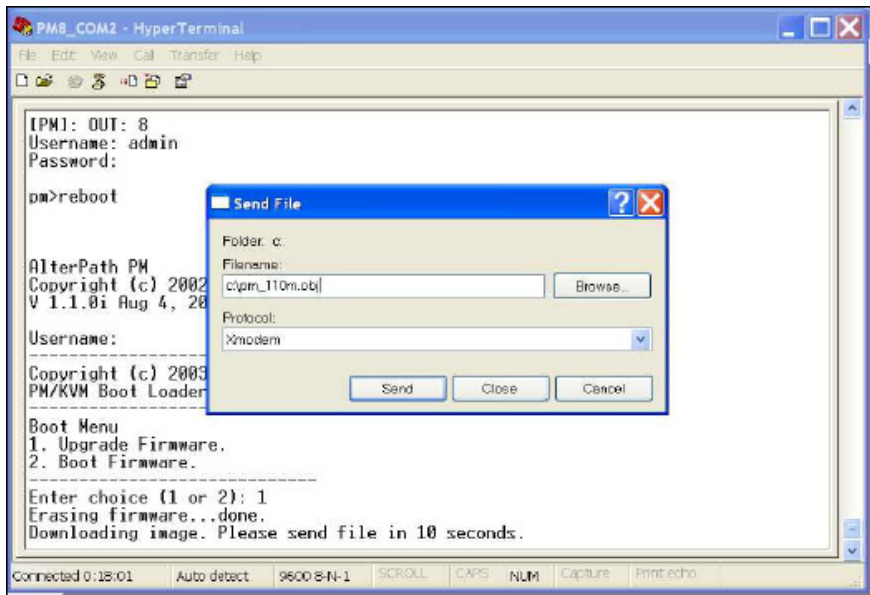


Figure 13: Uploading the AlterPath PM firmware with HyperTerminal

If you are using Minicom in Linux, the procedure is as follows:

- From the main screen, press CTRL-A + S (for sending files), and then select *xmodem* as the protocol in the *Upload* popup window.
- In the next window displayed, select the AlterPath PM firmware file for upload by highlighting it through browsing, and then pressing SPACE to tag it. Once this is done, press ENTER to start the file transfer.

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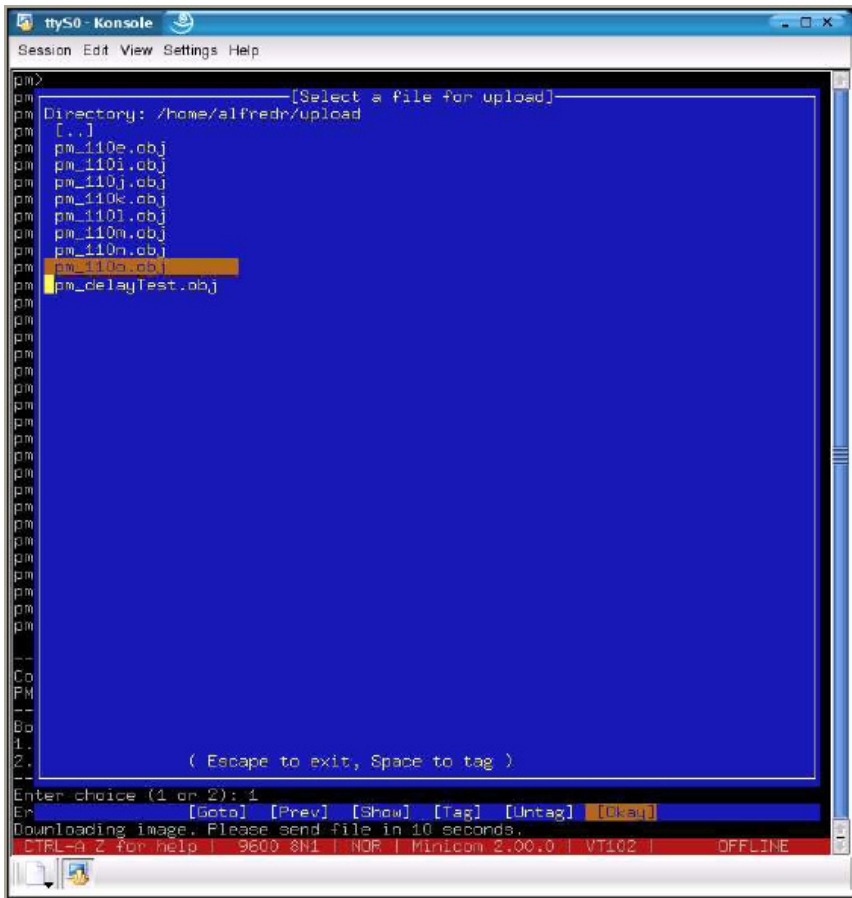


Figure 14: Uploading the AlterPath PM firmware with Minicom

If you use a different terminal emulator, please refer to the documentation provided by the manufacturer on how to transfer files using the Xmodem protocol.

If the file transfer fails, you will get an error message on the AlterPath PM console, and the boot loader menu will be displayed again so you can redo the process. The screen would be similar to the one shown below:

Erasing firmware...done.

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Downloading image. Please send file in 10 seconds.

```
-----  
Copyright (c) 2003 Cyclades Corporation  
AlterPath PM/KVM Boot Loader Version 1.1  
-----
```

```
Boot Menu  
1. Upgrade Firmware.  
2. Boot Firmware.  
-----
```

```
Enter choice (1 or 2):
```

In this case, you should go back to Step 3 and follow the upgrade steps again. If the problem persists, you shall contact Cyclades Technical Support for assistance.

If the file transfer is successful, the AlterPath PM console will display the login prompt. At this point, the upgrade process of the unit is complete; you may log in to the AlterPath PM and perform actions as usual.

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Appendix A - Hardware Specs

General

Major features of the AlterPath PM family are listed below:

- 128 KB flash memory
- 8 KB RAM
- Two RJ-45 RS-232 interfaces
- 2-digit 7-segment display monitoring global current
- LED monitoring ON/OFF for each port
- Audible over current alarm
- 8-bit Microcontroller-equipped

The AlterPath PM8 has the following additional features:

- One 125VAC/15A power plug (NEMA 5-15P) or
- One 125VAC/20A power plug (NEMA 5-20P) or
- One 125VAC/20A power plug (NEMA L5-20P)
- Eight 125VAC/15A power receptacles (NEMA 5-15R)
- 125VAC/20A circuit breaker with “press to reset” function
- Vertical mounting (zero U)

The AlterPath PM8i has the following additional features:

- One 250VAC/8A power plug (IEC320-C14)
- Eight 250VAC/8A power receptacle (IEC320-C14)
- 250VAC/10A supplementary protector with “press to reset” function
- Vertical (zero U) & Horizontal (1.5 U) mounting

The AlterPath PM10 has the following additional features:

- One 125VAC/15A power plug (NEMA 5-15P) or
- One 125VAC/20A power plug (NEMA 5-20P) or
- One 125VAC/20A power plug (NEMA L5-20P) or
- One 125VAC/30A power plug (NEMA L5-30P)
- Ten 125VAC/15A power receptacles (NEMA 5-15R)
- 125VAC/15A/20A/30A circuit breaker with “press to reset” function
- Horizontal mounting (1U)

The AlterPath PM10i has the following additional features:

- One 250VAC/10A power plug (IEC320-C14) or
- One 250VAC/16A power plug (IEC320-C20)
- Ten 250VAC/10A power receptacle (IEC320-C13)
- 250VAC/10A/20A supplementary protector with “press to reset” function
- Horizontal (1U) mounting

The AlterPath PM10i 30A has the following additional features:

- 30A input power cord. L6-30P plug (USA model)
- Ten 250VAC/10A power receptacle (IEC320-C13)
- 250VAC/15A Magnetic Circuit Breakers with Accidental-off protection function
- Horizontal (1U) mounting

The AlterPath PM20 has the following additional features:

- One 125VAC/15A power plug (NEMA 5-15P) or
- One 125VAC/20A power plug (NEMA 5-20P) or

Appendix A - Hardware Specs

- One 125VAC/20A power plug (NEMA L5-20P) or
- One 125VAC/30A power plug (NEMA L5-30P)
- 20 125VAC/15A power receptacles (NEMA 5-15R)
- 125VAC/20A circuit breaker (15A, 20A and 30A models) with “press to reset” function
- Vertical mounting (zero U)

The AlterPath PM20i has the following additional features:

- One 250VAC/16A power plug (IEC320-C20) or
- One 250VAC/20A power plug (IEC320-C20)
- Twenty 250VAC/10A power receptacle (IEC320-C13)
- 250VAC/20A supplementary protector with “press to reset” function (16A and 20A models)
- 250VAC/15A Branch Circuit Breaker with accidental-off protected feature (30A model)
- Vertically (0U) mounting"

Electrical Specifications

Electrical Specifications

The following tables illustrate the AlterPath PM's electrical specifications:

Table 1: AlterPath PM8 Electrical Specifications - 15 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	12A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	6.1 lbs (2.8 kg)
Physical Dimensions (W x D x H)	39.6 x 1.7 x 2.2 in (100.6 x 4.3 x 5.6 cm)

Table 2: AlterPath PM8 Electrical Specifications - 20 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	16A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	6.1 lbs (2.8 kg)
Physical Dimensions (W x D x H)	39.6 x 1.7 x 2.2 in (100.6 x 4.3 x 5.6 cm)

Appendix A - Hardware Specs

Table 3: AlterPath PM8i Electrical Specifications - 10 Amp version

Characteristics	Specifications
Input Voltage	200 - 240 VAC
Max Output Current Total	8A
Max Output Current Each Outlet	8A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	5 lbs (2.3 kg)
Physical Dimensions (W x D x H)	17 x 3.7 x 2.63 in (43.2 x 9.4 x 6.7 cm)

Table 4: AlterPath PM10 Electrical Specifications - 15 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	12A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	7.8 lb (3.5 kg)
Physical Dimensions (W x D x H)	1.75 x 8 x 9 in (4.4 x 20.3 x 22.9 cm)

Electrical Specifications

Table 5: AlterPath PM10 Electrical Specifications - 20 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	16A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	8.4 lbs (3.8 kg)
Physical Dimensions (W x D x H)	1.75 x 8 x 9 in (4.4 x 20.3 x 22.9 cm)

Table 6: AlterPath PM10 Electrical Specifications - 30 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	24A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	9 lbs (4 kg)
Physical Dimensions (W x D x H)	1.75 x 8 x 9 in (4.4 x 20.3 x 22.9 cm)

Appendix A - Hardware Specs

Table 7: AlterPath PMI0i Electrical Specifications - 10 Amp version

Characteristics	Specifications
Input Voltage	100 - 240 VAC
Max Output Current Total	8A
Max Output Current Each Outlet	8A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	5 lbs (2.3 kg)
Physical Dimensions (W x D x H)	19 x 8 x 1.75 in (48.3 x 20.3 x 4.4 cm)

Table 8: AlterPath PMI0i Electrical Specifications - 15 Amp version

Characteristics	Specifications
Input Voltage	100 - 240 VAC
Max Output Current Total	12A
Max Output Current Each Outlet	8A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	7.8 lbs (3.5 kg)
Physical Dimensions (W x D x H)	19 x 8 x 1.75 in (48.3 x 20.3 x 4.4 cm)

Appendix A - Hardware Specs

Table 9: AlterPath PMI0i Electrical Specifications - 16 Amp version

Characteristics	Specifications
Input Voltage	100 - 240 VAC
Max Output Current Total	13A
Max Output Current Each Outlet	8A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	n lb (n kg)
Physical Dimensions (W x D x H)	19 x 8 x 1.75 in (48.3 x 20.3 x 4.4 cm)

Table 10: AlterPath PMI0i Electrical Specifications - 20 Amp version

Characteristics	Specifications
Input Voltage	100 - 240 VAC
Max Output Current Total	16A
Max Output Current Each Outlet	8A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	8.4 lbs (3.8 kg)
Physical Dimensions (W x D x H)	19 x 8 x 1.75 in (48.3 x 20.3 x 4.4 cm)

Appendix A - Hardware Specs

Table 11: AlterPath PM10i Electrical Specifications - 30 Amp version

Characteristics	Specifications
Input Voltage	100 - 240 VAC
Max Output Current Total	30A (International model), 24A USA (model)
Max Output Current Each Outlet	10A (International model), 8A USA (model)
Operating Temperature	32 - 122 ° F (0 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	8.4 lbs (3.8 kg)
Physical Dimensions (W x D x H)	19 x 1.75 x 11.5 in (48.3 x 4.4 x 29.2 cm)

Table 12: AlterPath PM20 Electrical Specifications - 20 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	16A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	6.1 lbs (2.8 kg)
Physical Dimensions (W x D x H)	1.8 x 2.2 x 66 in (4.6 x 5.6 x 167.6 cm)

Appendix A - Hardware Specs

Table 13: AlterPath PM20 Electrical Specifications - 30 Amp version

Characteristics	Specifications
Input Voltage	100 - 127 VAC
Max Output Current Total	24A
Max Output Current Each Outlet	10A
Operating Temperature	50 - 122 ° F (10 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	6.1 lbs (2.8 kg)
Physical Dimensions (W x D x H)	1.8 x 2.2 x 66 in (4.6 x 5.6 x 167.6 cm)

Table 14: AlterPath PM20i Electrical Specifications - 30 Amp version

Characteristics	Specifications
Input Voltage	100 - 240VAC
Max Output Current Total	24A
Max Output Current Each Outlet	8A
Operating Temperature	32 - 122 ° F (0 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	13.5 lbs (6.1 kg)
Physical Dimensions (W x D x H)	2.2 x 2.8 x 66 in (5.6 x 7.1 x 167.6 cm)

Appendix A - Hardware Specs

Table 15: AlterPath PM20i Electrical Specifications - 20 Amp version

Characteristics	Specifications
Input Voltage	100 - 240VAC
Max Output Current Total	16A
Max Output Current Each Outlet	8A
Operating Temperature	32 - 122 ° F (0 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	13.5 lbs (6.1 kg)
Physical Dimensions (W x D x H)	2.2 x 2.8 x 66 in (5.6 x 7.1 x 167.6 cm)

Table 16: AlterPath PM20i Electrical Specifications - 16 Amp version

Characteristics	Specifications
Input Voltage	100 - 240VAC
Max Output Current Total	12.8A
Max Output Current Each Outlet	8A
Operating Temperature	32 - 122 ° F (0 - 50 °C)
Relative Humidity	5% to 95%, non-condensing
Weight	13.5 lbs (6.1 kg)
Physical Dimensions (W x D x H)	2.2 x 2.8 x 66 in (5.6 x 7.1 x 167.6 cm)

Appendix A - Hardware Specs

Interface Pinouts

The following table illustrates the AlterPath PM's pinouts for the IN and OUT RS-232 serial ports (RJ-45F connectors).

Table 17: Pinouts for IN and OUT RS-232 serial ports

Signal	Name/Function	I/O	IN Pin	OUT Pin
RTS	Request to Send	(O)	5	1
DTR	Data Terminal Ready	(O)	7	2
TxD	Transmit Data	(O)	6	3
Gnd	Ground		4	4
CTS	Clear to Send	(I)	1	5
RxD	Receive Data	(I)	3	6
DCD	Data Carrier Detect	(I)	2	7
DSR	Data Set Ready	(I)	8	8

Appendix B - Circuit Breakers

Circuit Breaker Mechanism

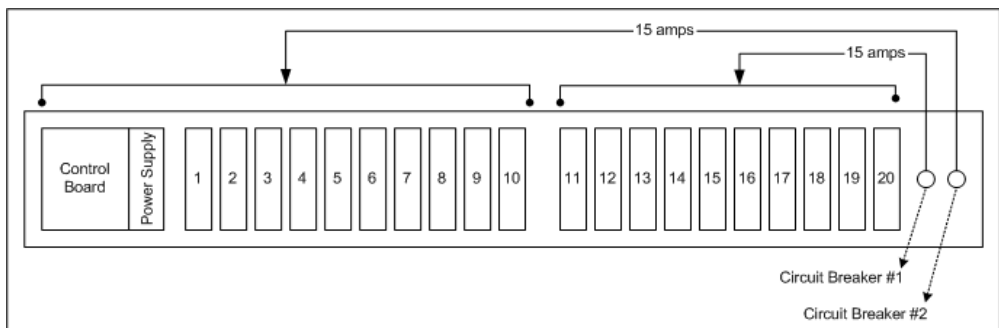
This section explains the circuit breaker mechanism for each type of PM unit.

PM20 (30A Version)

The PM20 (30 amps version) has two 15-amp circuit breakers. The first circuit breaker controls outlets 11 through 20; the second controls outlets 1 through 10 as well as the power supply to the logic board. In the event that the total current flow to outlets 11 through 20 exceeds 15 amps due to equipment connected to these outlets, then the first circuit breaker will trip causing outlets 11 through 20 to shutdown. This does not affect outlets 1 through 10 which is controlled by the second circuit breaker.

If, however, current overload causes the second circuit breaker to trip, then the entire power unit shuts down because the power supply is also tied to the second circuit breaker.

Refer to Table 1: Circuit Breaker Trip Time to determine the time it takes for the circuit breaker to trip based on the amount of current overload.



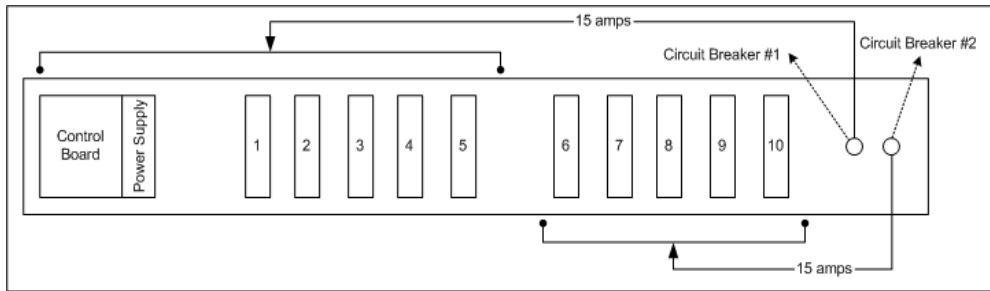
PM10 (30A Version)

The PM10 (30 amps version) has also two 15-amp circuit breakers. The first circuit breaker controls outlets 1 through 5 and the power supply to the logic board; the second controls outlets 6 through 10. If the total current flow to outlets 6 through 10 exceeds 15 amps due to equipment connected to these outlets, then the second circuit breaker will trip causing outlets 6 through 10 to shut down. This does not affect outlets 1 through 5 which is controlled by the first circuit breaker.

Circuit Breaker Mechanism

If, however, current overload causes the first circuit breaker to trip, then the entire power unit shuts down because the power supply is also tied to the first circuit breaker.

Refer to Table 1: Circuit Breaker Trip Time to determine the time it takes for the circuit breaker to trip based on the amount of current overload.



PM Units with One Circuit Breaker

Only one circuit breaker is used for the following units:

- PM8 (15A)
- PM8 (20A)
- PM8 (L20)
- PM10 (15A)
- PM10 (20A)
- PM10 (L20)
- PM20 (20A)
- PM20 (L20)

In the event of a current overload in any of these units, the entire unit shuts down causing all outlets to disconnect.

PM8i and PM10i

PM8i and all versions of PM10i (10, 15, 16, 20 and 30 amps) have two circuit breakers each. Both circuit breakers are designed to protect different phases of the same circuit inside the unit. If either one of the two circuit breakers trips, the entire unit will shut down.

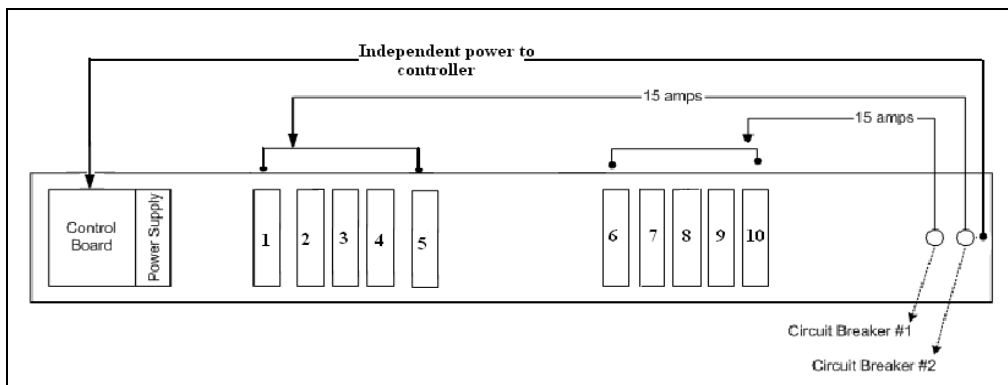
Appendix B - Circuit Breakers

PM10i (30A Version)

The PM10i (30 amps version) has two 15-amp circuit breakers. The first circuit breaker controls outlets 6 through 10; the second controls outlets 1 through 5. In the event that the total current flow to outlets 6 through 10 exceeds 15 amps due to equipment connected to these outlets, then the first circuit breaker will trip causing outlets 6 through 10 to shutdown. This does not affect outlets 1 through 5 which is controlled by the second circuit breaker.

As the PM10i-30A has the controller (see Control Board in the figure below) powered from the line side of one of the circuit breakers, the whole unit will be inoperative only if both circuit breakers trip, but the controller will still function.

When either circuit breaker trips, only the power outlets of that segment will be affected, and half of the outlets remain operative.



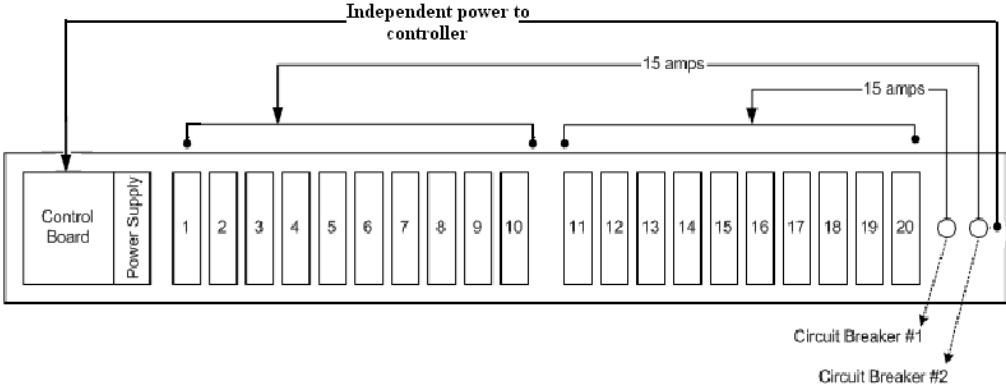
PM20i (30A Version)

The PM20i (30 amps version) has two 15-amp circuit breakers. The first circuit breaker controls outlets 11 through 20; the second controls outlets 1 through 10. In the event that the total current flow to outlets 11 through 20 exceeds 15 amps due to equipment connected to these outlets, then the first circuit breaker will trip causing outlets 11 through 20 to shutdown. This does not affect outlets 1 through 10 which is controlled by the second circuit breaker.

As the PM20i-30A has the controller (see Control Board in the figure below) powered from the line side of one of the circuit breakers the whole unit will be inoperative only if both circuit breakers trip, but the controller will still function.

Circuit Breaker Trip Time

When either circuit breaker trips, only the power outlets of that segment will be affected, and half of the outlets remain operative.



Circuit Breaker Trip Time

The AlterPath PM uses a 10 Amp (PM8i), 20 Amp (PM8-15A, PM8-20A, PM8-L20A, PM20-20A and PM20-L20A) or 30A (PM20-L30A) circuit breaker. The following table shows the circuit breaker trip time for all PM models.

Table 18: Circuit Breaker Trip Time

Current Load	Trip Time
200%	5 - 30 seconds
300%	1.8 - 10 seconds
400%	0.9 - 5 seconds
500%	0.5 - 3.3 seconds
600%	0.38 - 2.3 seconds
800%	0.2 - 1.3 seconds
1000%	0.15 - 0.9 seconds