PowerDsine ™ The **Power over Ethernet** Pioneers

PowerDsine 6500 Series
PD-6506, PD-6512 & PD-6524

User Guide

Notice

The information contained herein is believed to be accurate and reliable at the time of printing. However, due to ongoing product improvements and revisions, PowerDsine cannot accept responsibility for inadvertent errors, inaccuracies, subsequent changes or omissions of printed material.

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The information in this guide refers to the 24-port (PD-6524) Power over Ethernet Midspan only. However this information and illustrations are also applicable for 6-port (PD-6506) and 12-port (PD-6512) Power over Ethernet Midspans.

Note that the Midspan is designed for indoor use only.

Acknowledgements

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The product(s) described by this manual is (are) a licensed product of PowerDsine.

Contents

Model Numbers Definition:
> *PD-65xx/AC/M*
> *PD-6524/AC/M/F*

Where: **xx** - represents the number of ports (6, 12 or 24).
> **M** - Indicates that the Midspan includes the Web
> Management feature (refer to Section 4).
> **F** – Indicates the Full Power Midspan

Verifying Kit Contents

Unpack the kit and verify that the following items are uncluded:

- The Power over Ethernet Midspan
- Mounting brackets (for 19-inch racks) and plastic cover
- Screws for assembling mounting brackets
- Self-adhesive rubber feet
- User Guide
- Power cord

Before proceeding, record the unit's serial number below for future reference. The serial number can be found on the information label at the rear of the Power over Ethernet Midspan.

Serial Number

Electrical Compatibility Approvals

The Powerdsine 6500 complies with the following standards:

- FCC Part 15, Class B, with FTP cabling; Class A with UTP cabling
- EN 55022 (CISPR 22), Class B with FTP cabling; Class A with UTP cabling
- EN 55024 (CISPR 24)
- Canadian ICES-003, Class B

Safety Standard Approvals

The Powerdsine 6500 meets the following safety standards:

- UL/cUL per EN60950
- GS mark per EN60950

CE Marking

The CE marking on this product indicates that this product is in compliance with 89/336/EEC (EMC Directive) and 73/23/EEC (Low Voltage Directive).

1   Safety Information

1.1   General Guidelines

You must read the following safety information before carrying out any installation, removal or any maintenance procedure on the Power over Ethernet Midspan. Warnings contain directions that must be followed for personal and product safety. Follow all directions carefully.

WARNINGS ⚠

- Read the Installation Instructions in Section 3 before connecting the Power over Ethernet Midspan to its power source.
- The Midspan must use a grounded power cord, as defined in paragraph 1.2.
- This product relies on the building installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 15 A for 120 VAC, (U.S.) 10 A for 230 VAC (international) is used.
- Do not work on the system, connect or disconnect cables during periods of lightning activity.
- A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from the power outlet voltage, do not connect the Power over Ethernet Midspan to this outlet.
- For shelf-mounted equipment, be certain that the surface is stable and strong enough to support the equipment. Do not stack more than four the Power over Ethernet Midspans.
- Ultimate disposal of this product should be handled according to all local laws and regulations.
- The Power over Ethernet Midspan "Data" and "Data + Power" ports are shielded RJ-45 data sockets. They cannot be used as Plain Old Telephone Service (POTS) telephone sockets. Only RJ-45 data connectors may be connected to these sockets.
- Associated ethernet wiring shall be limited to inside of the building.

1.2   Power Cord

In the event that the power cord is replaced, the replacement must meet local requirements.

- For reliable connection to an AC MAINS SUPPLY, equipment provides an appliance IEC60320 inlet for connection of a detachable power supply cord.

- The power socket outlet must be located near the Midspan and be easily accessible. *The only way to remove power from the unit is by disconnecting the power cord from the outlet*

- This unit operates under SELV (Safety Extra Low Voltage) conditions according to EN60950/IEC 950. The conditions are only maintained if the equipment to which it is connected, also operates under SELV conditions.

U.S.A. and Canada	▪ The cord must be UL-approved or CSA certified.
	▪ The minimum specification for the flexible cord is:
	    No. 18 AWG
	    Type SV or SJ
	    Three-conductor.
	▪ The cord set must have a rated current capacity of at least 10 A.
	▪ The attachment plug must be an earth-grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

Denmark	▪ The supply plug must comply with section 107-2-D1, standard DK2-1a or DK2-5a.
Switzerland	▪ The supply plug must comply with SEV/ASE 1011.
France and Peru	▪ This unit cannot be powered from IT supplies. If your supplies are of the IT type, this unit must be powered by 230 V (2P+T), via an isolation transformer with a 1:1 ratio and with the secondary connection point labeled Neutral, connected directly to ground
U.K	▪ The Power over Ethernet Midspan is covered by General Approval, NS/G/12345/J/100003, for indirect connection to a public telecommunications system

2 About the Power over Ethernet Midspan

PowerDsine's family of Power over Ethernet Midspans, series 3500 & 6500, injects power over data-carrying Ethernet cabling. The PD-6506/6512/6524 Midspans, support 6, 12 and 24 ports respectively in a 10/100BaseTx Ethernet network, over TIA/EIA-568 Category 5/5e/6 cabling. DC operating power, for data terminal units, is fed over unused pairs of the cabling (7/8 and 4/5). The Power over Ethernet Midspan normally powers devices that are 'Power over Ethernet Enabled'or are equipped to receive power over Ethernet. These devices are called Powered Devices (PDs). Devices that are not can receive power over Ethernet, may require an external power adapter in order to be powered. Contact PowerDsine for such an adapter.

Power over Ethernet Midspan main features:

■ Safe and reliable power over existing Ethernet infrastructure

■ Eliminates the need for AC outlets, local UPS & AC/DC adapters near PDs

■ Remote Management using Web control and/or SNMPv3

■ Highest level of Network Security

■ Safe solution that protects network infrastructure

■ Standards compliant.

2.1 Power Management

When establishing a network, the total power required by the PDs may exceed the total power available from the Midspan. The built-in Power Management feature does not allow total power output to exceed maximum power available (refer to the Technical Specifications). When total power available is near maximum, attempts to connect an additional PD to a free port cause the corresponding LED of the port to blink orange, indicating an out-of-power state. This port does not deliver power. Power distribution is based on "first come, first served" logic.

Sometimes, connected and operating PDs significantly increase or suddenly raise their power requirements. If the power required exceeds the power available, the Midspan starts turning off ports, starting from the last port down, until the total power is once again under the maximum

available limit.

2.2   10/100BASE-TX Ports Definition

2.2.1 Data Input Ports

The Midspan has 6, 12 or 24 x 10/100Base-T Data In ports, located on the PoE rear panel (Figure 2-1), configured in a non-crossover manner (straight-wired).

These ports are located on the PoE's rear panel designed to carry Ethernet data only (Tx/Rx) over the standard 2-wire pairs (pins 1/2 and 3/6) and are typically connected to an existing Ethernet switch.

2.2.2 Data & Power Output Ports

The Midspan has 6, 12 or 24 x 10/100Base-T **Data & Power Out** ports, located on the front panel (Figure 2-2). These ports are configured in a non-crossover manner (straight-wired) and are designed to carry Ethernet data over the standard 2-wire pairs (pins 1/2 and 3/6) and DC power over the spare pairs (pins 4/5 and 7/8). Each output port corresponds to an opposite input port located on the PoE rear panel..

> The Power over Ethernet Midspan is not a repeater. As such, the maximum distance from the Ethernet switch must not exceed 100 meters (328 ft). As specified in the IEEE 802.3 standard, the Power over Ethernet Midspan is guaranteed to work up to this distance.
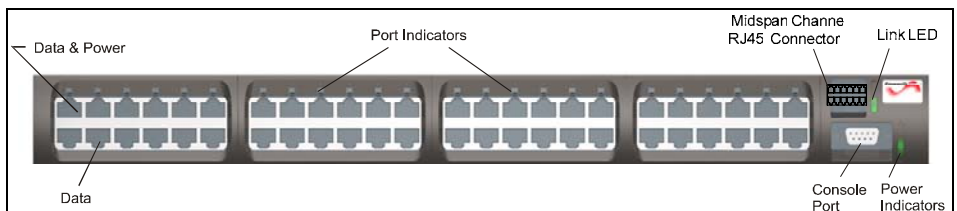

Figure 2-2: Power over Ethernet Midspan, Front View (PD-6524)

2.3   Indicators

A set of indicators provide the status of the Power over Ethernet Midspan and its ports. Refer to Table 2-1 and Table 2-2 for status information during operation.

2.3.1 Primary Power Indicators

The "Main" LED on the front panel provides the Power over Ethernet Midspan power status. When the Main indicator is illuminated in green, the Midspan receives AC power. Refer to Table 2-1 for additional information.

2.3.2 Port Indications

One uni-color indicator (green), per port, provides port status:

■ Green indicates that the terminal unit (PD) has been identified as "Power over Ethernet Enabled", is active and receives power.
■ Blinking green indicates that the port does not supply power and is inactive.

Refer to Table 2-2 for additional information.

Note	Due to the standard detection process performed on each PoE port, power will not be delivered (LED is off) to a PD. PDs that are not of the PoE-enabled type are not affected by this connection

Table 2-1: Power Status Indications

Indicator	Color	Main Power Status	Remarks
Main	Off	Internal power supply unit is unplugged.	Internal power supply voltage is too low. All ports are disconnected.
	Green	AC power input active	Internal power supply voltage is within limits.

Table 2-2: Port Status Indications

Port LED Color	Port Load Conditions	Port Voltage
Off	Inactive load or unplugged port	Power to the port is disconnected. No DC voltage present on port output lines.
Green	Active load is plugged in and complies with normal load conditions	Continuous nominal DC voltage is present on the spare pairs.
Green blinks at a 1 sec. rate	Overload or short circuit	Power to the port is disconnected. No DC voltage is present on port output lines.
Green blinks at a 0.5 sec. rate	Valid load Total aggregated power exceeds pre-defined power budget (400w by default)	Power to the port is not connected. No DC voltage is present on port output lines

2.4   Connectors

The Midspan's front panel has a Console port (DB-9 connector). The user may connect a terminal and perform software loading via this connector, using a standard null modem cable.

The console port is set to 19,200-baud, 8 data bits, no parity and 1 stop bit. Pin connections for this connector are:

- Pin 2 is Receive (RXD)

- Pin 3 is Transmit (TXD)

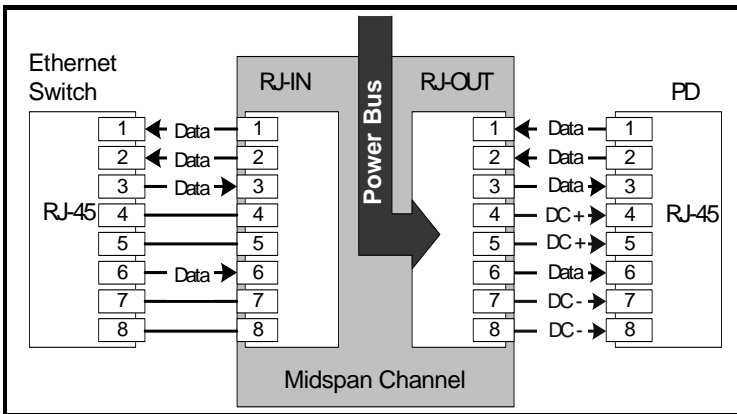- Pin 5 is Ground

- Pins 1 and 6 are shorted

Figure 2-3: Connecting to the Midspan

Each data port is configured as shown in Figure 2-3, as data "Pass-Through" ports for all data pins (pins 1, 2, 3 and 6). Ensure that Category 5 or higher cabling is used, as shown in the above figure.

3 Installing the Power over Ethernet Midspan

3.1 Background Information

As shown in Figure 3-1, the Midspan is connected in series with an Ethernet switch/hub. The data outputs from the switch are connected to the Midspan. The Midspan delivers power over the spare twisted pairs (pins 7/8 and pins 4/5) of the Category 5 cabling, without degrading the quality of data. Most installations require the Midspan to be rack mounted as described below.
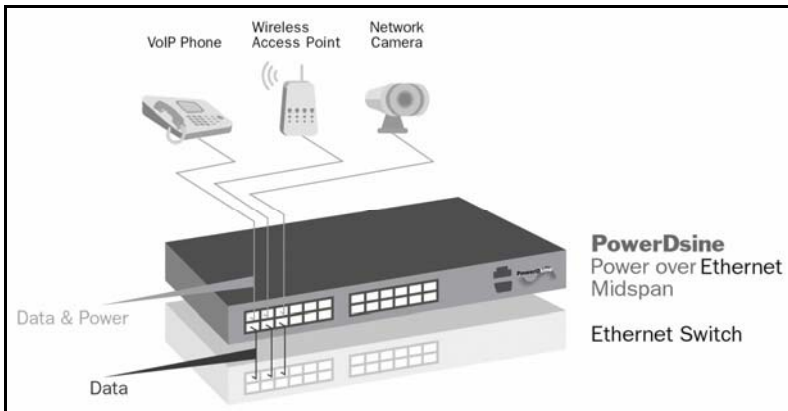

Figure 3-1: Typical Installation

3.2   Rack Mounting Brackets

The Midspan comes with 19-inch mounting brackets and screws. To install the Midspan into a 19-inch rack, first remove the self-adhesive rubber feet from the bottom surface. Install the brackets using two screws per side. Rack-mounting screws are not provided.
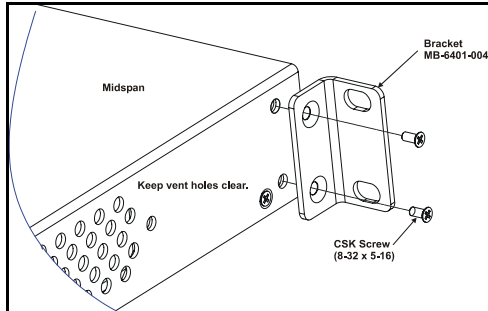

Figure 3-2: Installing Mounting Brackets

3.3   General Hazards

a) Elevated Operating Ambient Temperature — if installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

b) 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.

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

d) 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.

e) 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 (e.g., use of power strips)

3.4   Connecting Ethernet Cables

The ports on the Midspan's front panel are configured as "Pass Through" ports for four (1,2, 3 & 6) conductors of the RJ-45 connectors. Use Category 5 cabling when making the connections.

1. Connect cables from the Ethernet Switch to the **Data In** ports (lower row on the front panel).
2. Connect the cables from the IEEE 802.3af ready terminals (PDs) to the corresponding **Data & Power Out** ports (upper row on the front panel).

3.5   Connecting Power Cables

When using AC source to power the Midspan, plug in the provided power cord at the rear AC connector.

3.6   Powering up

The Power over Ethernet Midspan has no on/off switch. To apply power to the Midspan or remove power from the Midspan, insert or remove the power cable from the receptacle (AC) on the rear panel of the unit.

With power applied, the Midspan powers-up and the internal fan operates; then, the device runs its Power-On Self-Test (POST), which takes less than 10 seconds. During the POST, all ports are disabled and the indicators illuminate in the following sequence:

1. Port indicators and Main indicators illuminate green.
2. Main indicator remains lit green; port indicators are off.

Ports are now ready (enabled) for normal operation.

4 Troubleshooting

4.1 Preliminary Steps

If you encounter problems, verify the following:

- Power is applied to the Midspan
- A crossover-type Ethernet cable has not been used
- The Ethernet cable from the network is connected to the Data port
- The Ethernet cable to the PD is connected to the Data & Power port
- Cable pairs are attached to corresponding ports.

4.2 Troubleshooting Guide

This paragraph provides a symptom and resolution sequence in order to assist in the troubleshooting of minor operating problems. If the steps given do not solve your problem, do not hesitate to call your local dealer for further assistance. Refer to Table 4-1.

Table 4-1: Troubleshooting Steps

Symptom	Corrective Steps
Midspan does not power up	1. Establish that the power cord is viable. 2. Verify that the voltage at the power inlet is between 100 and 240 Vac. 3. Remove and re-apply power to the device and check the indicators during power up sequence..
A port indicator is not lit and the corresponding PD does not operate.	1. The Midspan did not detect a PD and therefore the port is not enabled. 2. Verify that the PD is designed for Power over Ethernet operation. 3. Verify that you are using a standard Category 5/5e/6, straight-wired cable, with four pairs. 4. If an external power splitter is in use, replace it with a viable splitter. 5. Verify that the PD is connected to the Data & Power output port. 6. Try to reconnect the same PD to a different port on the same or into another Midspan. If it works, there is probably a faulty output port or RJ-45 connection. 7. Verify that port shutdown command was not issued via the Web manaegment.

Table 4-1: Troubleshooting Steps

Symptom	Corrective Steps
The end device operates, but there is no data link.	1. Verify that the port indicator on the front panel is continuously lit.
	2. If an external power splitter is in use, replace it with a viable splitter.
	3. Verify that for this link, you are using a standard UTP/FTP Category 5 straight (non-crossover) cabling, with all four pairs. Verify that the link is 100 m or less.
	4. Try to re-connect the same PD to a different port on the same midspan or to a different unit: if it works, there is probably a faulty port or faulty RJ-45 connection.
Is it safe to keep the Midspan running while a port indicator is orange?	This is a safe condition. The orange indication is due to:
	1. A device not compliant to IEEE 802.3af, is detected.
	2. Terminals 4/5 and 7/8 are shorted together.
	3. Forced external power fed into the port.
	During these conditions, port power is disconnected.

5   Technical Specifications

5.1   Physical Specifications

Dimensions   44 x 435 x 271 mm
(h x w x l)   (1.75 x 17.2 x 10.7 inch)
Weight   5Kg (11lb)

5.2   Environmental Specifications

Temperature
 - Operating   0 to 40 °C (32 to 104 °F)
 - Storage   -20 to 70 °C (-4 to 158 °F)
Humidity   10 to 90% (non-condensing)

5.3   Electrical Specifications

Parameter	PD-6506/6512/6524/AC/M	PD-6524/AC/M/F
AC Input Voltage	90 to 264 VAC at 47-63 Hz	
Input Current @ 115 VAC	4 A max.	5.5 A max.
Total Output Power	200W max.	400W max.
Output Power, per Port	15.4 W (not to exceed Total Output Power)	
Nominal Output Voltage	44 to 57 VDC	

6   PowerDsine's PowerView Pro

PowerDsine PowerView Pro is a secure remote management system offering real time monitoring and control, with graphical representation, status indicators, and alarms. PowerView Pro manages Midspans via a Internet browser interface or via a Network Management System (NMS). One of the most beneficial features is the remote power enable/disable functionality on each of the Midspan ports, supporting "hard resets" of remote terminals such as WLAN Access Points and VoIP Phones PowerView Pro allows monitoring and controlling at Network and Element levels, as shown in Figure 6-1. For further details, refer to PowerDsine's PowerView Web Manager User Guide.
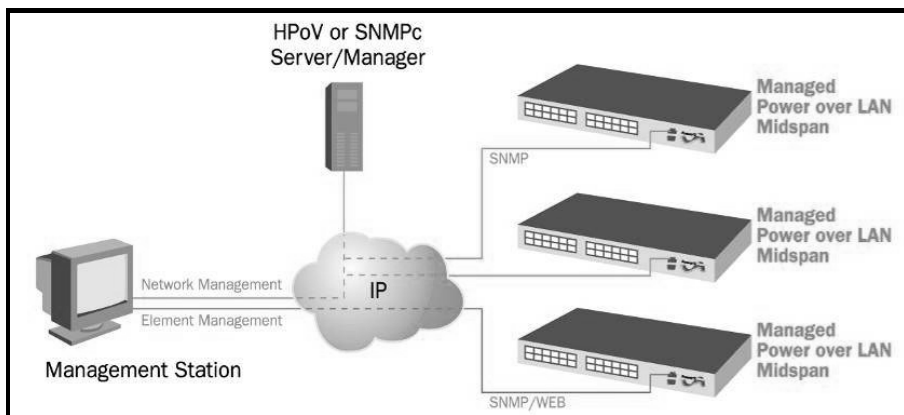

Figure 6-1: Management Deployment

The PowerView Pro provides a number of unique features for Midspan management:

- Remote Web Management of PoE for monitoring and configuration

- Configuration using graphical representations of remote devices

- Real time monitoring and configuration with visual status indicators and alarms

- Multi-manager capabilities

- Event and performance data recording

- Runs on a PC platform with Windows graphic user interface (GUI).

Covered under US Patent 6,473,608.
Other Patents pending.

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