

## PowerDsine 3500 Series



and

## PowerDsine 6500 Series



**User Guide**

## Notice

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*The information in this guide refers to the 24-port (PD-3524G/AC) Power over Ethernet Midspan only. However this information and illustrations are also applicable for all PD-6500 and PD-3500 family Power over Ethernet Midspans.*

Note that the Midspan is designed for indoor use only.

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# 1 Front Matter

## 1.1 Model Numbers Definition:

***PD-35xxG/AC/F***

***PD-65xxG/AC/M/F***

Where: **xx** - represents the number of ports (06, 12 or 24).

- M represents managed Midspan
- F represents Full Power in 24 port Midspans
- G represents 10/100/1000 Mbps

**Table 1: Model Selection**

P/N	# OF PORTS	DATA RATE [MBIT/SEC]	MANAGED	POWER SCHEME
PD-3506/AC	6	10/100		Full Power
PD-3512/AC	12	10/100		Full Power
PD-3524/AC	24	10/100		Power Management
PD-3506G/AC	6	10/100/1000		Full Power
PD-3512G/AC	12	10/100/1000		Full Power
PD-3524G/AC	24	10/100/1000		Power Management
PD-3524G/AC/F	24	10/100/1000		Full Power
PD-6506/AC/M	6	10/100	V	Full Power
PD-6512/AC/M	12	10/100	V	Full Power
PD-6524/AC/M	24	10/100	V	Power Management
PD-6524/AC/M/F	24	10/100	V	Full Power
PD-6506G/AC/M	6	10/100/1000	V	Full Power
PD-6512G/AC/M	12	10/100/1000	V	Full Power
PD-6524G/AC/M	24	10/100/1000	V	Power Management
PD-6524G/AC/M/F	24	10/100/1000	V	Full Power

## 1.2 Electrical Compatibility Approvals

The PowerDsine 3500 and 6500 Midspans comply with the following standards:

- FCC Part 15, Class B, with FTP cabling; Class A with UTP cabling

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

### 1.3 Safety Standard Approvals

The PowerDsine meets the following safety standards:

- UL/cUL per CSA/UL 60950-1
- GS mark per IEC60950-1

### 1.4 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).

## 2 Safety Information

Read the following safety information before using your Power over Ethernet Midspan unit.

### 2.1 General Guidelines

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 Section 2.2.
- This product relies on the building installation for short-circuit (overcurrent) protection. Use a fuse or circuit breaker no larger than 15 A for 120 VAC, (U.S.) 10 A for 230 VAC (international).
- Do not work on the system, or connect or disconnect cables during periods of lightning.
- A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from a 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 Power over Ethernet Midspans units.
- Final 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.

## 2.2 Power Cord

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

- To ensure a reliable connection to an AC mains supply, the 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 EN60950-1/IEC60950-1. 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.

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<b>France and Peru</b>	This unit cannot be powered from IT supplies. If your supplies are 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
<b>U.K</b>	The Power over Ethernet Midspan is covered by General Approval, NS/G/12345/J/100003, for indirect connection to a public telecommunications system

## 3 Power over Ethernet Midspan

PowerDsine's Midspans Series 3500 and 6500 inject power over Ethernet cabling, providing both Ethernet data and power.

PowerDsine's PD-3506G/3512G/3524G unmanaged Midspans offer 6/12/24 PoE ports respectively, and support 10/100/1000BaseTx Ethernet networks over TIA/EIA-568 Category 5/5e/6 cabling.

PowerDsine's PD-65xxG managed Midspans offers same PoE functionality as 35xxG Midspan series, plus remote network management capabilities as SNMPv1/v2/v3, Web interface for easy configuration & status report, Telnet and SSH, Secure Web (SSL), and more.

DC operation power for Power over Ethernet (PoE) PD (Powered Devices) devices is fed over Ethernet cable pin pairs 7/8 and 4/5.

Midspan devices can power non PoE network devices by using a PowerDsine external Power-Splitter which appears to the Midspan as a PD. Incoming power and data are split into two separate connectors. One connector provides only data, while the other connector provides only power. For more information please contact PowerDsine.

The Midspan main features are:

- Safe and reliable power over existing Ethernet infrastructure.
- "Add Power only" option in case remote device is PoE PD compliant.
- Eliminates the need for AC outlets, local UPS and AC/DC adapters near PDs.
- Optional remote Network Management (65xxG Midspan series) over SNMPv1/v2/v3, Web, secure Web (SSL), Telnet, SSH, etc.
- Protects network infrastructure by providing power only whenever PoE PD is connected.
- IEEE-802.3af standard compliant.

### 3.1 Power Management

Power Management is the prioritization of powered devices, whereby certain devices receive electrical power whenever the overall power consumption exceeds the power supply. Power Management kicks in whenever a Midspan network's overall power consumption exceeds the

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Midspan maximum power. In the Midspan GUI, a PoE PD which is not powered is symbolized by blinking green LED switching at a rate of 0.5 seconds.

- **Midspan PD-3524G/AC versus PD-3524G/AC/F:** The PD-3524G/AC Midspan uses an internal 220 watt power supply, while the PD-3524G/AC/F uses an internal 450 watt power supply. A 220 watt power supply may not be sufficient to power 24 PoE ports. .
- **Midspan PD-6524G/AC/M versus PD-3524G/AC/M/F:** The PD-6524G/AC/M Midspan uses an internal 220 watt power supply, while the PD-6524G/AC/M/F uses an internal 450 watt power supply. A 220 watt power supply may not be sufficient to power 24 PoE ports.
- The Midspan Network Management Module may reduce total power to lower values by SNMP or whenever 'Dynamic UPS Power Management' is enabled and the Midspan UPS operates on battery power.

For more information refer to *PowerView\_Pro3 User Guide*, 056-0051-06 which can be found on the product's webpage and its CD.

## 3.2 10/100/1000Base-TX Ports Definition

The following sections detail the 35xxG and 65xxG ports and their functions.

### 3.2.1 Data Input Ports

The Midspan has 6, 12 or 24 10/100/1000Base-T Data In ports, located on the PoE front panel (Figure 3-1), configured in a non-crossover manner (straight-wired). These ports are designed to carry Ethernet data only:

- Standard 4-wire pairs (pins 1/2, 3/6, 4/5 and 7/8) (1000Base-T)
- 2-wire pairs (pins 1/2 and 3/6) (10/100Base-T)

### 3.2.2 Data & Power Output Ports

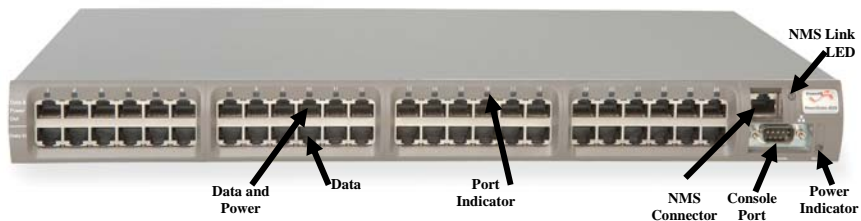
The Midspan has 6, 12 or 24 x 10/100/1000Base-T Data and Power Out ports, located on the front panel (Figure 3-1). These ports are configured in a non-crossover manner (straight-wired) and are designed to carry:

- Ethernet data over standard 4-wire pairs (pins 1/2, 3/6, 4/5 and 7/8) (1000Base-T) and DC power over the pin pairs 4/5 and 7/8.

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- 2-wire pairs (pins 1/2 and 3/6) (10/100Base-T) and DC power over pin pairs 4/5 and 7/8.

The maximum distance between the Ethernet switch and the Powered Device (PD) **must not** exceed **100 meters (328 ft)**. Installing a Midspan does not extend this range because a Midspan does not function as a data repeater.



**Figure 3-1: Power over Ethernet Midspan, Front View (PD-6524G)**

### 3.3 Indicators

A set of indicators displays the Power over Ethernet Midspan status and its ports. Refer to Table 3-1 and Table 3-2 for status information during operation.

#### 3.3.1 Primary Power Indicators

The “Main” LED on the front panel displays the Power over Ethernet Midspan power status. When the Main indicator is illuminated in green, the Midspan is receiving AC power. Refer to Table 3-1 for additional information.

#### 3.3.2 Port Indicators

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 is receiving power.
- Blinking green indicates that the port does not supply power and is inactive.

Refer to Table 3-2 for additional information.

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**Note** Data+Power RJ45 outputs connectors marked by turned-Off LED don't provide any power or voltage

**Table 3-1: Power Status Indications**

Indicator	Color	Main Power Status	Remarks
Main	Off	No 110/220VAC power	Internal power supply unit is unplugged.
	Green	110/220VAC power.	Internal power supply voltage is within limits.

**Table 3-2: Port Status Indications**

Port LED Color	Port Load Conditions	Port Voltage
Off	Unplugged port	No port power. No DC voltage present on port output lines.
Green	Valid PD device was detected, and is being powered by the Midspan.	Continuous nominal DC voltage and power is present on RJ45 pins 4/5 and 7/8.
Green blinking once every second	Overload or short circuit – PD power consumption is too high.	No port power. No DC voltage is present on port output lines.
Green blinking once every 0.5 seconds	Valid PD was detected, but no power is provided to PD devices since total aggregated power exceeds Midspan maximum power.	No port power. No DC voltage is present on port output lines

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### 3.4 Connectors

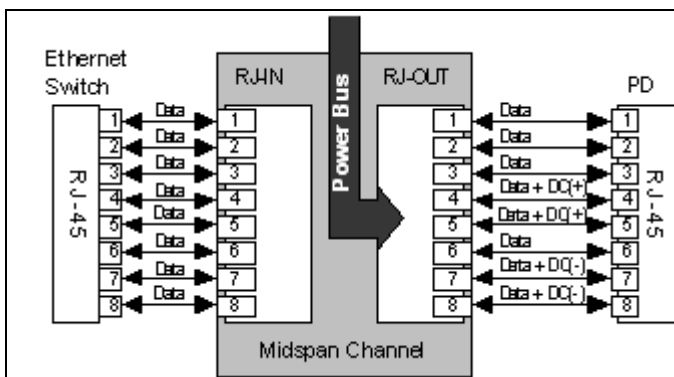
The Midspan devices have a DB-9 RS232 connector, which perform the following functions:

- **35xxG Midspan:** Not in use.
- **65xxG Midspan:** Used for initial IP address configuration, software maintenance, upload/download configuration, and other task.

Use cross null modem cable. Set your terminal application to Baud rate of 38,400, 8 data bits, 1 stop bit, no parity, and flow control-Off.

Pin 2 (RXD) ↔ Pin 3 (TXD)

Pin 5 (GND) ↔ Pin 5 (GND)



**Figure 3-2: Connecting to the Midspan**

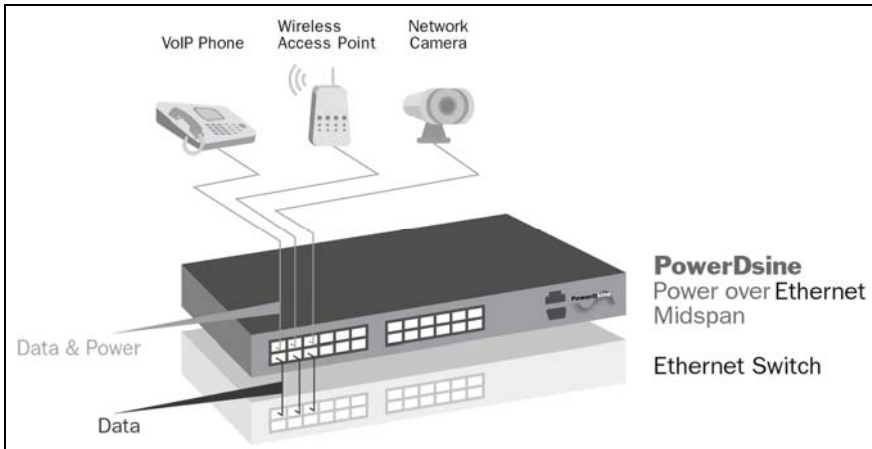
On the Midspan device, each data port is configured as data flow on pins 1 to 8. Power is added to pins 4, 5, 7, and 8. Ensure that Category 5 or higher cabling is used, as shown in Figure 3-2.

## 4 Installing the Power over Ethernet Midspan

The following sections describe how to install your Power over Ethernet Midspan unit.

### 4.1 Background Information

As shown in Figure 4-1, 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.



**Figure 4-1: Typical Installation**

### 4.2 Verifying Kit Contents

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

- 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

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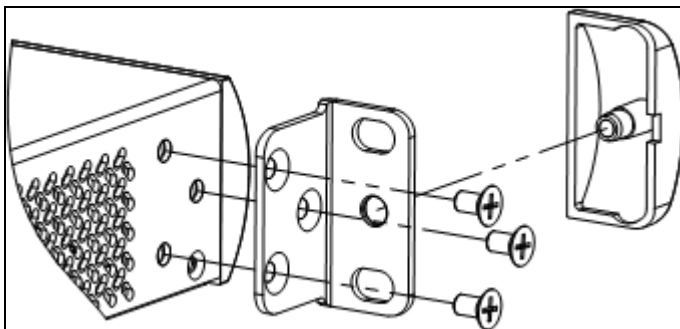
Before proceeding, record the unit's serial number in the box below for future reference. The serial number can be found on the information label at the rear of the Power over Ethernet Midspan.

Serial Number

### 4.3 Rack Mounting Brackets

The Midspan comes with 19-inch mounting brackets and screws. To install the Midspan into a 19-inch rack:

1. Remove the self-adhesive rubber feet from the bottom surface.
2. Install the brackets using two screws per side. Rack-mounting screws are not provided.



**Figure 4-2: Installing Mounting Brackets**

### 4.4 Installation Factors

- **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 the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature ( $T_{mra}$ ).
- **Reduced Air Flow:** Install the equipment in a rack in a manner that does not compromise the amount of air flow required for safe operation of the equipment.
- **Mechanical Loading:** When mounting the equipment in the rack, ensure that the mechanical loading is even.

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- **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. Ensure that appropriate equipment nameplate ratings are used when to address this concern.
- **Reliable Grounding (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 (for example, use of power strips).

### 4.5 Connecting Ethernet Cables

The ports on the Midspan's front panel are configured as "Pass Through" ports for 8 (1, 2, 3, 6, 4, 5, 7 and 8) 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).

### 4.6 Connecting Power Cables

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

### 4.7 Powering up the Unit

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. The device then 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:

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

All Ports are now ready (enabled) for normal operation. If the LEDs are not lit, refer to Troubleshooting, page 18.

## 5 Troubleshooting

The following sections describe the troubleshooting procedures to be used if you encounter any problems with your unit.

### 5.1 Preliminary Steps

If you have a problem, first verify that:

- 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.

### 5.2 Troubleshooting Steps

This section provides a symptom and resolution sequence 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 5-1.

**Table 5-1: Troubleshooting Steps**

Symptom	Corrective Steps
<i>Midspan does not power up</i>	<ol style="list-style-type: none"> <li>1. Establish that the power cord is viable.</li> <li>2. Verify that the voltage at the power inlet is between 100 and 240 Vac.</li> <li>3. Remove and re-apply power to the device and check the indicators during power up sequence.</li> </ol>

**Table 5-1: Troubleshooting Steps**

Symptom	Corrective Steps
<i>A port indicator is not lit and the corresponding PD does not operate.</i>	<ol style="list-style-type: none"> <li>1. Verify that the port is enabled (the Midspan did not detect a PD).</li> <li>2. Verify that the PD is designed for Power over Ethernet operation.</li> <li>3. Verify that you are using a standard Category 5/5e/6, straight-wired cable, with four pairs.</li> <li>4. If an external power splitter is in use, replace it with a viable splitter.</li> <li>5. Verify that the PD is connected to the Data &amp; Power output port.</li> <li>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.</li> <li>7. Verify that port shutdown command was not issued via the Web management.</li> </ol>
<i>The end device operates, but there is no data link.</i>	<ol style="list-style-type: none"> <li>1. Verify that the port indicator on the front panel is continuously lit. <ul style="list-style-type: none"> <li>. If an external power splitter is in use, replace it with a viable splitter.</li> <li>. Verify that for this link, you are using a standard UTP/FTP Category 5 straight (non-crossover) cabling, with all four pairs and that the link is 100 m or less.</li> <li>. 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.</li> </ul> </li> </ol>
Is it safe to keep the Midspan running while a port indicator is green and blinking?	<p>This is a safe condition. The blinking green indication is due to:</p> <ol style="list-style-type: none"> <li>1. A device not compliant to IEEE 802.3af has been detected. <ul style="list-style-type: none"> <li>. Terminals 4/5 and 7/8 are shorted together.</li> <li>. Forced external power fed into the port.</li> </ul> </li> </ol> <p>Midspan total power consumption was reached</p> <ul style="list-style-type: none"> <li>. During these conditions, port power is disconnected.</li> </ul>

## 6 Specifications

The following sections detail the units' specifications.

### 6.1 Physical Specifications

Dimensions (H x W x D) :	44 x 435 x 271 mm (1.75" x 17.2" x 10.7")
Weight	5 Kg (11 lb)

### 6.2 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)

### 6.3 Electrical Specifications

Parameter	PD-35xxG and PD-65xxG families
AC Input Voltage	100 to 240 VAC at 50/60 Hz
Input Current @ 115 VAC	4A maximum
Total Output Power	200W max. ( <i>PD-35xxG/AC</i> ) 400W max. ( <i>PD-3524G/AC/F</i> ) 200W max. ( <i>PD-65xxG/AC/M</i> ) 400W max. ( <i>PD-6524G/AC/M/F</i> )
Maximum Output Power, per Port	16.8 W (not to exceed Total Output Power)
Nominal Output Voltage	44 to 57 VDC

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### Revision History

Revision Level / Date	Para. Affected	Description
1.0 March. 08	-	Initial Release
A00 27-Jul-09		Formatting, English editing
A02 03-Jan-10		Added 6500 series

Covered under one or more of US Patents Numbers: 6,473,608; 6,986,071; 7,006,815; 7,254,734; 7,257,724; 7,305,573; 7,325,150; 7,437,21, 7,421,290. Other Patents pending.

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