PowerDsine™
The **Power over Ethernet** Pioneers

Gigabit Power over Ethernet Midspans
PD-6006G, PD-6012G & PD-6024G
6/12/24-Port Models
IEEE 802.3af-compliant
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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Disclaimer

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The information in this guide refers to the 24-port Power over Gigabit Ethernet Midspan only. However this information and illustrations are also applicable for 6 and 12-port AC Power over Ethernet Midspans.

Note that the Midspan is designed for indoor use only.

Acknowledgements

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

Contents

Model Numbers Definition

PD-60**xx**G/AC/**M**

Where: **xx** represents the number of ports (6, 12 or 24)

M if present, indicates that the Midspan includes the Web Management feature (refer to Section 4).

Verifying Kit Contents

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

- The Gigabit Power over Ethernet Midspan
- Mounting brackets (for 19-inch racks)
- 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 GigaBit Midspan.

Serial Number

Electrical Compatibility Approvals

The PD-60xxG 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 PD-60xxG 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 Gigabit 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 Gigabit 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 Gigabit 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 Gigabit Midspans.

- Ultimate disposal of this product should be handled according to all local laws and regulations.

- The Gigabit 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.

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 Gigabit Midspan

PowerDsine's family of Gigabit Midspans, series 6000G, injects power over data-carrying Ethernet cabling. The PD-6006G/6012G/6024G Midspans, support 6, 12 and 24 ports respectively in a 10/100/1000BaseT Ethernet network, over TIA/EIA-568 Category 5/5e/6 cabling. DC operating power, for data terminal units, is fed over 2-pairs of the cabling (4/5 and 7/8).

The Gigabit Midspan normally powers devices that are Gigabit enabled or are equipped to receive power over Ethernet. These devices are called Powered Devices (PDs). Devices that are not equipped to receive power over Ethernet may require an external power adapter in order to be powered. Contact PowerDsine for such an adapter.

Gigabit Midspan main features:

- ■ Remote power feeding of Ethernet terminals
- ■ Eliminates the need for AC outlets, local UPS and AC/DC adapters
- ■ Universal range power input (100-240 VAC, 50/60 Hz)
- ■ Power management
- ■ Remote Web Manager
- ■ Independent overload and short-circuit protection per channel
- ■ Port status indications
- ■ Standard 19-inch rack mountable.

2.1 Power Management

When establishing a network, the total power required by PDs may exceed the total power available from the Midspan. The built-in Power Management feature will not allow the total power output to exceed the maximum power available (refer to the Technical Specifications). When the total power available is near maximum, attempts to connect an additional PD to a free port will cause the corresponding LED of the port to blink orange, indicating an out-of-power budget. This port will 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 Gigabit Midspan will start to turn off ports, starting from the last port down, until the total power is once again under the maximum limit.

2.2   10/100/1000Base-T Ports Definition

2.2.1   Data Input Ports

According to the model acquired, the Midspan has 6, 12 or 24 10/100/1000Base-T data input ports, configured in a non-crossover manner (straight-wired). These ports, shown in Figure 2-1 (bottom row of connectors), are designed to carry Ethernet data only (Tx/Rx) over the standard 4-wire pairs (pins 1/2, 3/6, 4/5 and 7/8) in case of 1000Base-T or 2-wire pairs (pins 1/2 and 3/6) in case of 10/100Base-T.

2.2.2   Data & Power Output Ports

The Midspan has 6, 12 or 24 Data & Power ports also configured in non-crossover manner (straight-wired). These ports are designed to carry Ethernet data over the standard 4-wire pairs (pins 1/2, 3/6, 4/5 and 7/8) in case of 1000Base-T, or 2-wire pairs (pins 1/2 and 3/6) in case of 10/100Base-T and DC power over the spare pairs (pins 4/5 and 7/8).

> The Gigabit Midspan is not a repeater. As such, the maximum distance from the Ethernet switch is not to exceed 100 meters (328 ft). In accordance with the IEEE 802.3 standard, the Gigabit Midspan is guaranteed to work up to this distance.
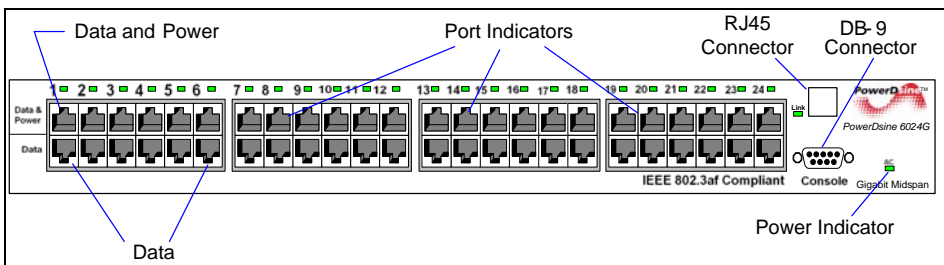

Figure 2-1: Gigabit Midspan, Front View (PD-6024G)

2.2.3   Indicators

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

2.2.4   Primary Power Indicators

There is one LED on the front panel, marked by "AC", to provide the Gigabit Midspan power status. When the indicator is illuminated in green, the Gigabit Midspan is receiving AC power. The "AC" indicator are lit in orange to indicate an internal fault. Refer to Table 2-1 for additional information.

2.2.5   Port Indications

One bi-color indicator (green and orange), per port, provides port status (Table 2-1):

- ■   Green indicates that the terminal unit has been identified as "Power over Ethernet Enabled" and is active and receiving power.
- ■   Orange indicates that the port is not supplying power and is not active.

| Note | Due to standard detection process performed on each PoE port, power is not supplied to an Ethernet device, that is not PoE-enabled (indicated in orange or off). In this way, Ethernet devices (not PoE-enabled) are not affected by this connection. |

Table 2-1: Power and Port Status Indications

Power Status Indications			
Indicator	**Color**	**Main Power Status**	**Remarks**
AC	Off	Internal power supply unit is unplugged or faulty.	Internal power supply voltage is too low. All ports are disconnected.
	Green	Indicates AC power input active.	Internal power supply voltage is within tolerance.
	Green blinking	Internal power supply voltage is out of range.	All ports are disconnected.
AC	Orange	Internal problem alarm.	Built in Test (BIT) failed.

Port Status Indications		
Port LED Color	**Port Load Conditions**	**Port Voltage**
Off	Non-active load or unplugged port.	Power to the port is disconnected.No DC voltage present on spare pairs.
Green	Active load is plugged in and complies with normal load conditions.	Continuous nominal DC voltage is present on the spare pairs.
Orange	Overload conditions; or short; or forced external voltage feed (constant DC) into the port.	Power to the port is disconnected. No DC voltage is present on the spare pairs.
Green blinking	Transitional mode in which load detection is in process.	Power to the port is disconnected. No DC voltage is present on the spare pairs.
Orange blinking	Total aggregated power exceeds pre-defined power budget.	Power to the port is disconnected. No DC voltage present on spare pairs.

2.3   Connectors

The Midspan's front panel includes a Console port (DB-9 connector) that can be utilized by the user to connect a terminal and perform software loading, 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 5 is Ground
- Pin 3 is Transmit (TXD)
- Pins 1 and 6 are shorted

Each data port is configured as shown in Figure 2-2. as data pass through ports for all data pins (pins 1/2, 3/6, 4/5, 7/8).Be certain to use Category 5 or higher cabling, as shown in the figure.
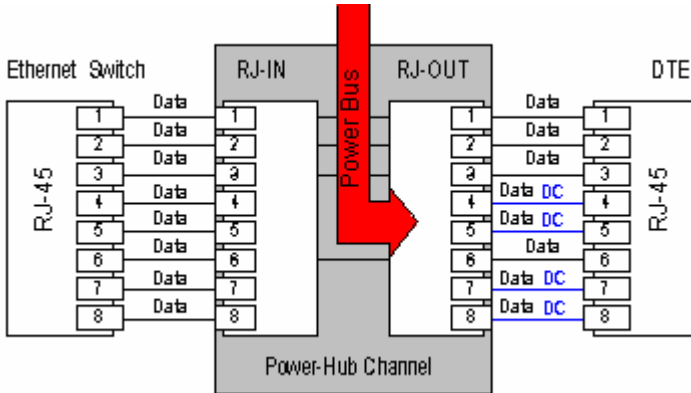
Figure 2-2: Connecting to the Midspan

3 Installing the Gigabit Midspan

3.1 Background Information

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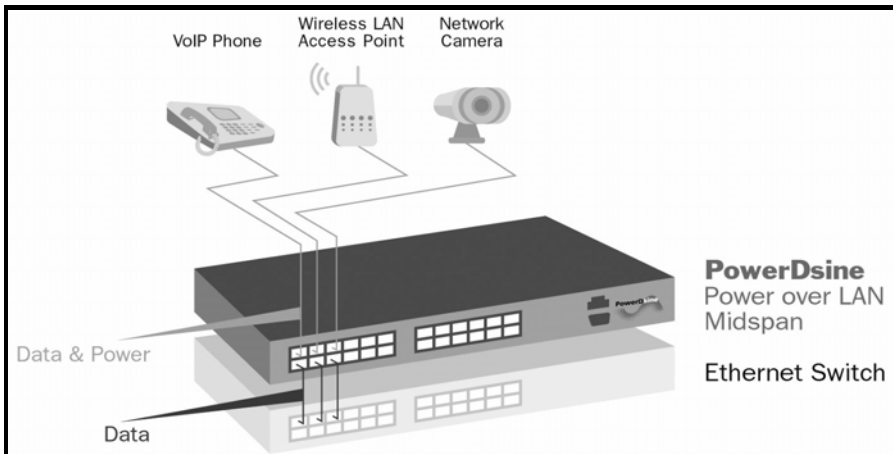

Figure 3-1: Typical Installation

3.2 Rack Mounting Brackets

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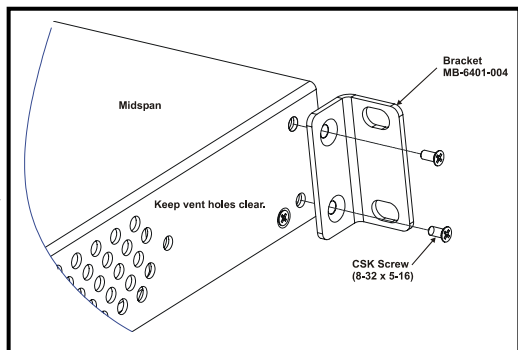

Figure 3-2: Installing Mounting Brackets

3.3   Connecting Ethernet Cables

The ports on the front panel of the Midspan are configured as "route through" ports for all eight conductors of the RJ-45 connectors. Use Category 5 cabling in making connections.

1. Connect cables from the Ethernet Switch to the Data ports (bottom row on Midspan).
2. Connect the cables from the IEEE 802.3af ready terminals (PDs) to the corresponding Data & Power ports (top row on Midspan).

3.4   Connecting Power Cables

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

3.5   Powering up

The Gigabit Midspan has no on/off switch. To apply or remove power to 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 through 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 power indicators (AC) illuminate green.
2. Port indicators and the AC indicator illuminate orange.
3. Main (AC) indicator remains lit green; port indicators are out.

Ports are now enabled for normal operation.

3.6   Troubleshooting

3.6.1   Preliminary Steps

If you encounter problems, check 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.

3.6.2   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 3-1.

Table 3-1: Troubleshooting Steps

Symptom	Corrective Steps
Midspan does not power up	1. Verify that a known-good power cord is used. 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.
AC indicator lit orange	Power-on self-test failed: the Midspan detected an internal fault. In this case, contact your local dealer.
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 Gigabit or 10/100 Base-T 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 known-good splitter. 5. Verify that the PD is connected to the Data & Power port. 6. Try to reconnect the same PD to a different port on the same or into different Midspan. If it works, there is probably a faulty port or RJ-45 connection.
The end device operates, but there is no data link.	1. Verify that the port indicator on the front panel is continuously lit. 2. Verify that **Data In** Ethernet cable is well connected to the Midspan. 3. If an external power splitter is in use, replace it with a known-good splitter. 4. Verify that for this link, you are using standard UTP/FTP Category 5 straight (non-crossover) cabling, with all four pairs. Check that the link is 100 m or less. 5. Try to re-connect the same end device into a different port on the same unit or into different unit – if it works, there is probably a faulty port or RJ-45 connection.

Table 3-1: Troubleshooting Steps

Symptom	Corrective Steps
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, was 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.

Technical Specifications

Physical Specifications

Dimensions   44 x 433 x 302 mm
  (h x w x l)   (1.75 x 17 x 11.9 inch)
Weight   4 kg (8.8 lb)

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)

Electrical Specifications

Parameter	PD-6006G	PD-6012G	PD-6024G
AC Input Voltage	90 to 264 VAC at 47-63 Hz		
Input Current @ 115 VAC	4 A max.		
Total Output Power	92 W max.	200 W max.	200 W max.
Output Power, per Port	15.4 W (not to exceed Total Output Power)		
Nominal Output Voltage	44 to 57 VDC		

4 Remote Power Management

SNMP Remote Management is an optional feature, for monitoring and control of the device. For further details, refer to PowerDsine's, Web Manager User Guide, catalog number 06-6911-056. Web-Manager Midspans via an Web Manager or via a remote Network Management station. The system provides direct on-line power supervision, configuration, monitoring and diagnostics . It also provides for complete monitoring, control and configuration of PowerDsine products.

PowerDsine Web-Manager allows for monitoring and controlling at Network and Element levels, as shown in Figure 4-1:
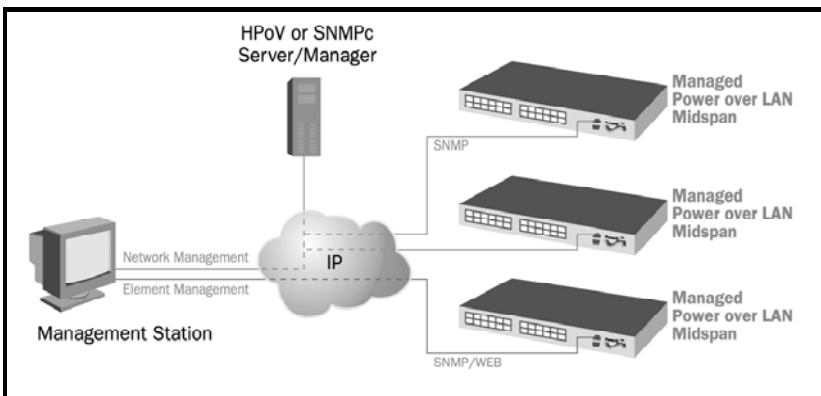

Figure 4-1: Management Deployment

PowerDsine PowerView provides a number of unique features for PoE Midspan management:

- Web-based application for remote management of Gigabit devices

- Web management capabilities for network element management
- Configuration using graphical representations of remote device
- Real time monitoring with visual status indicators and alarms
- System status display
- Real time power parameters, in a flowing graph mode
- Optional DHCP enabled-client
- Runs on a PC platform with Windows graphic user interface (GUI).

Visit our web site at: www.powerdsine.com

For technical support, call: +972-9-7755123
In the USA: +631-756-4680 or 1-877-4-802-3AF

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