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ABOUT DMX MANAGER PLUS

The DMX512 entertainment lighting control protocol standard has become accepted throughout the world as the standard for interoperability between equipment supplied by most manufacturers.

We designed *DMX Manager Plus* to permit the connection of up to four independent DMX512 data streams, in a number of popular configurations to suit the user's specific application. These include:

Stand Alone:

- **DMX Merger:** The most common stand-alone application, *DMX Manager Plus* accepts up to three incoming DMX512 data streams, merging them into one or two DMX output streams using a highest-level-takes-precedence (HTP) mode of operation.
- **DMX Patch:** Individual channels that make up each DMX universe can be selectively re-mapped between the inputs and outputs, allowing the user to create custom DMX universes from all available input channels.
- **DMX Splitter:** One incoming DMX data stream can be repeated from up to three output ports, allowing a "star" topology to be created.

Network:

- **DMX-Ethernet Gateway:** *DMX Manager Plus* can function as a four-port DMX512 gateway to or from an Ethernet control network. All merging and channel patching features are supported in this mode. Dual Ethernet ports allow daisy-chaining of two or more units on a single Ethernet cable segment. *DMX Manager Plus* supports Strand ShowNet, Pathport Protocol, WYSIWYG, streaming ACN and Artnet Ethernet protocols (firmware version 3.0.2.9 or higher).
- **DMX Router:** Together with other similar or compatible devices, *DMX Manager Plus* can function as a part of a sophisticated DMX distribution system where DMX input ports are selectively routed, or patched, to any DMX output port. All merging and channel patching features are supported in this mode.
- **WYSIWYG Interface:** *DMX Manager Plus* listens to up to four DMX universes to enable this popular lighting visualization software to monitor console activity in real time. Requires the Pathport plug-in from Cast Lighting, www.castlighting.com.
- **RDM Support:** *DMX Manager Plus'* bidirectional ports are designed to support the talkback required to configure and monitor RDM-enabled devices on a DMX512 based lighting system. Full RDM functionality will be supported in future firmware versions.

PROTOCOLS SUPPORTED

DMX Manager Plus supports the following lighting industry communication protocols:

DMX512 – Probably the most widely used protocol for controlling lighting and effects equipment, DMX512 was the first industry standard digital multiplex protocol. The DMX signal consists of 512 8-bit control packets sent asynchronously over a two-pair shielded cable at 250K Baud. The standard connector type is 5 pin XLR. Since its inception in 1986, there have been two revisions: USITT DMX512/1990 and the newer ANSI E1.11 DMX512-A (2005) version. *DMX Manager Plus* is designed to work seamlessly with these and all manufacturer-specific variants of the protocol.

RDM – A recent (2006) addition to the DMX512 protocol is ANSI E1.20 RDM (Remote Device Management), a separate, optional standard which is intended to enhance the value of DMX by adding command/query-and-response functionality on top of the basic streaming data structure of DMX. RDM requires that DMX ports are bi-directional. Features include remote DMX device addressing and status reporting.

Ethernet – *DMX Manager Plus* provides compatibility with Ethernet-based control networks that support Pathport[®] Protocol and the new ANSI E1.17 ACN (Architecture for Control Networks) Ethernet communications standard. *DMX Manager Plus* also supports Strand ShowNet, and Artnet Ethernet protocols.

DMX PORT CONNECTIONS

DMX Manager Plus provides the user with two connections, both male and female 5-pin XLR or terminal blocks, for each of its four DMX ports. Each pair of connectors is hard-wired in parallel. This feature allows any port to be used as an input or output without the need for gender-swapping adapter cables. Or, if a male-male or female-female cable is all that's available, it will always be a compatible cable!

It is also possible to use the second connector as a direct pass-thru for ports configured as inputs. All five pins of each DMX connection are supported.

All connections on the four DMX ports are fully optically isolated and protected from fault voltages.

ETHERNET PORT CONNECTIONS

For network applications, *DMX Manager Plus* has two 10/100 Ethernet ports, labeled "PATHPORT LINK OPTION" on the rear panel. The ports are connected through an internal Ethernet switch. Use the "UPLINK" port for the main system connection. The "ETHERNET" port is used to daisy-chain to the UPLINK port on the next unit in line.

Network configurations should be done using Pathport Manager software, a free download from the Pathway Connectivity website. See "Advanced Configuration" for more details.

DMX Manager Plus supports the following DMX-over-Ethernet protocols: Pathport[®] Protocol, Strand ShowNet, WYSIWYG, streaming ACN and Artnet protocols (firmware version 3.0.2.9 and higher).

BASIC STANDALONE CONFIGURATION

Plug in the power cord. The internal power supply will automatically sense and accommodate any voltage and frequency from 100VAC to 240VAC and 50 to 60 Hz. The front panel liquid-crystal display (LCD) and the keypads will light up, and the display should look similar to the following once boot-up is complete:

Port A	Input A
Port B	Input B
Port C	Input C
A + B + C	Output D

This is the **Port Status Screen**. The example above shows the factory default configuration as a 3-to-1 merger. Ports A, B and C are configured as inputs, and Port D is an output.

The right hand column will alternate between configuration and DMX status. For example:

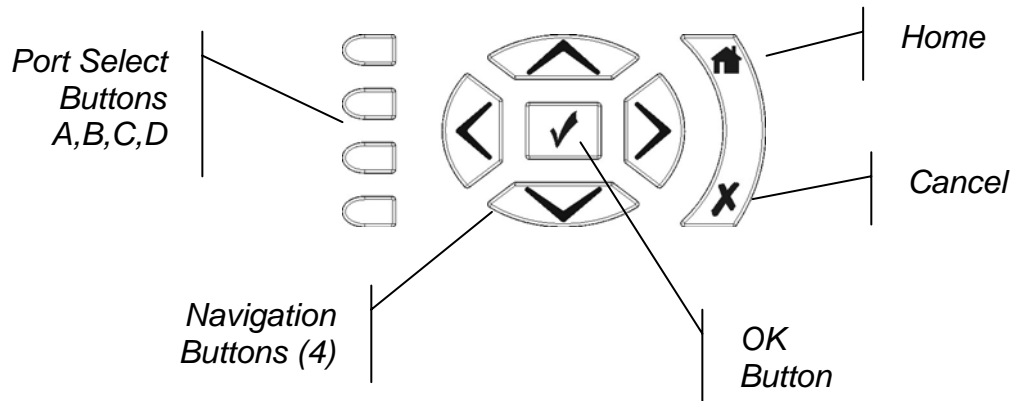
Port A	No DMX A
Port B	Active B
Port C	Active C
A + B + C	Active D

In this example, Port A is not receiving DMX signal (e.g. no input, console unplugged, faulty cable), while Port B and C are receiving signal which is being

output by Port D. See “Port Properties and Assignments” for other configuration options.

Navigation

The LCD screen also displays menus and information for configuring the *DMX Manager Plus*. Common merge, split and patch functions are set and edited using the four port-select buttons and the menu keypad.



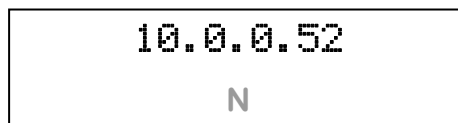
The typical function of each key is as follows:

- Port Select** – Choose the port or menu item displayed next to the button
- Up, Down** – Scroll through menu options (highlight bar moves)
- Left, Right** – Moves cursor or go to Node Information screen
- OK** – Select highlighted item for editing or accept menu selection
- Cancel** – Do not accept menu selection
- Home** – Deselect highlighted item or move up one menu level

During configuration and editing, the rear illumination of each pushbutton changes. This is intended as a contextual aid for the user. Only those buttons that will do something are illuminated – look for back-lit port-select buttons as shortcuts to choosing menu items.

NODE INFORMATION SCREEN

Node information can be displayed by pressing < or > while in the Port Status Screen.



There are up to three lines of information.

The top line is the node's name, which by default is its IP (Internet Protocol) address as set by the factory.

The second line is blank. Press the ∇ or \blacktriangle keys to scroll through the following items:

- Blank line (default)
- Internet protocol (IP) address and netmask
e.g: "10.1.134.167/8"
- Media Access Control (MAC) address
e.g: "0:4:a1:1:86:a7"
- Pathway serial number
e.g.: "PP200007"

The third line is a stylized "N". This icon blinks to indicate network activity, otherwise it is simply on. If Ethernet protocols other than Pathport are active, these indicators appear beside the N: "S" for ShowNet, "sA" for streaming ACN, and "A" for Artnet.

Press $\sqrt{}$ to edit configuration options.

NODE AND NETWORK CONFIGURATION OPTIONS

If the *DMX Manager Plus* is to be connected to a network, you may need to change some of the node properties. Press $\sqrt{}$ while in the node information display and for firmware versions up to 3.0.2.6, the following menu will be displayed:

```
Node Settings
IP Address...
Factory Settings...
Node Name
```

Use ∇ or \blacktriangle to highlight and the $\sqrt{}$ key to select an item.

IP Address

Changes only apply in a network setting. The nature of the IP address and the address itself can be edited from this menu using the navigation keys to select and scroll through the options. If the IP address is set to dynamic, the address must be set by a DHCP or Bootp network server whenever the power is cycled.

Factory Settings

Use this option to return all settings back to the Pathway factory defaults. Sometimes this may be the easiest way to clear a patch configuration but it will also change the node's name back to its IP address default.

It is also possible to reboot the *DMX Manager Plus* from this menu without losing configuration information, which may be useful during trouble shooting.

Node Name

NOTE: Changing the node name does not change the unit's IP address, only the displayed text.

After selecting this option, the following information screen appears:

```
Letters.....A-Z, a-z
Digits.....0-9
Punctuation.....-
Space.....
```

Use the appropriate port select button to choose for letter, number or symbol. Use ▼ or ▲ to scroll to the exact character desired. Use ► to go to the next character and ◀ to backspace and erase. At any time, use the port select keys to change character types or to insert a space. Although multiple lines of text can be entered, only the last line will actually be displayed. Approximately 15 – 20 characters will fit on one line. Press √ when done or ✖ to cancel.

Firmware 3.0.2.9 and later

Slightly different menus are displayed but the functions are essentially the same.

```
Configuration
Node Settings
Factory Settings...
```

Then, under Node Settings:

```
Node Settings
IP Address...
Node Name
Pathport Protocol
```

Use \sqrt to select "Pathport Protocol", then the ∇ and \blacktriangle keys to choose between the following transmit protocols for DMX-over-Ethernet: Pathport, Strand ShowNet, Artnet, or streaming ACN. Press \sqrt to accept. This selection applies when the *DMX Manager Plus* is used as an Ethernet gateway node.

PORT PROPERTIES AND ASSIGNMENTS

The *DMX Manager Plus* ships as a three-in/one-out merger, using highest-level-takes-precedence (HTP). This common set-up allows a console or remote to be plugged into the system at various locations. It also allows multiple DMX transmitters, for example an architectural controller and a lighting console, to operate at the same time.

Because each port can be set to either input or output, the *DMX Manager Plus* can be reconfigured as a one-in/three-out opto-splitter or, particularly when used with the channel patching features described further below, can combine two input universes into either one or two unique and different outputs.

To reconfigure the ports, first the direction must be set, then a universe or channel patch must be selected. While reconfiguring, menu options are dependent on whether the port direction is set as an input or output.



If starting from factory default settings, Port D must be reconfigured first.

The following example shows how to change the *DMX Manager Plus* from its default merger configuration to a one-in, three-out splitter application.

The initial Port Status Screen looks as follows (alternating with DMX status):

```
Port A      Input  A
Port B      Input  B
Port C      Input  C
A + B + C   Output D
```

Push the bottom port select button to choose Port D for editing. This is the port properties screen:

```
Port D  Output
Patch...
DMX options...
DMX output
```

Patch changes should be made after setting the port direction. DMX options will be discussed later. Press the bottom port select button to select DMX

output. The screen will change to “DMX Output”. Press either \blacktriangle or \blacktriangledown to change the screen to “DMX Input”, then press \checkmark to accept the change. The screen will return to the previous menu, which will have changed:

```
Port D  Ineut
Patch...
Terminated
DMX input
```

Select “Patch”.

```
Port D  Patch
xDMX source 4
Quick Patch 4
```

xDMX sources are input universes and are more fully discussed in “Channel Patching”. Quick Patch is a universe patch, where incoming DMX is assigned in contiguous blocks of 512 channels.

Channels 1-512	=	Quick Patch 1
Channels 513-1024	=	Quick Patch 2
Channels 1025-1536	=	Quick Patch 3
Channels 1537-2048	=	Quick Patch 4

In this example, we want one universe to be split and repeated to three outputs so we will use only xDMX 1 and Quick Patch 1.

Select xDMX 4. Use \blacktriangledown to scroll to xDMX 1. Note if you go too far, the option will wrap to xDMX 64. Use \blacktriangle to scroll in the other direction. Press \checkmark to accept, then do the same for Quick Patch 4:

```
Port D  Patch
xDMX source 1
Quick Patch 1
```

Press ‘Home’ twice to return to the Port Status Screen. Select Port C and the screen should look like this:

```
Port C  Ineut
Patch...
Terminated
DMX input
```

Select DMX input and use the ▲ or ▼ button to change it to output. Press √ to accept. The menu choices will have changed:

```

Port C  Output
Patch...
DMX options...
DMX output
  
```

Select 'Patch':

```

Port C  Patch
Offset patch
Soft patch
Quick patch disabled
  
```

Offset and soft patch will be discussed in "Channel Patching". Select "Quick patch disabled" and then use ▲ to change to Quick Patch 1 and press √ to accept. Press 'Home' twice to return to the Port Status Screen.

Repeat the last three steps for Ports A and B and the Port Status Screen should look like this:

```

Quick 1      Output A
Quick 1      Output B
Quick 1      Output C
Port D       Input  D
  
```

Although this example simply reversed the port directions from their factory settings, in practice any port can be the input with the others as the outputs. It is also possible to have two input and two output ports and, by varying the channel patch, to use the *DMX Manager Plus* as a patch bay.

DMX OPTIONS

If "DMX options" is selected from the output menu of any port, the following screen is displayed:

```

Port A  DMX options
Fast speed
Terminated
  
```

Speed: The speed option specifies the refresh rate or how often the 'dimmer' levels are updated. The maximum DMX refresh rate is about 44 Hertz (Hz), but some equipment behaves erratically at that rate. The *DMX Manager Plus*

can operate at four different refresh rates: slow (31 Hz), medium (36Hz), fast (40 Hz) and maximum (44 Hz). The default is fast.

Termination: The DMX512 protocol requires that the last device on each DMX line be terminated with an appropriate resistor (usually 120 ohm) to prevent signal reflection. A port configured as an input (with no pass-thru connection) on the *DMX Manager Plus* is effectively the end of that run (the signal is optically isolated at that point) and so needs to be terminated.

But what about outputs? With the implementation of Remote Device Management (RDM), all DMX transmitters must also be able to act as receivers – and therefore are required to be terminated as well. The DMX Manager Plus supports the bi-directional requirements of RDM.

The only time termination should be disabled is when a port is configured as an input and the signal is daisy-chained through the female output connector of the same port to another device.

PORT AND CHANNEL PATCHING

The real power of the *DMX Manager Plus* lies in its ability to merge and soft-patch channels both within and across universes.

Although it is possible to enter all the patch information from the front panel keypad, this interface is intended more for use in editing than for full-blown configuration. The easiest way to create or extensively modify a patch is to use the Pathport Manager software, either directly to the UPLINK port of the *DMX Manager Plus*, or over a network. See “Advanced Configuration” for further discussion.



If you are patching your DMX Manager Plus from the front panel, please bear in mind the limitations imposed by the use of a small LCD display.

There are three types of patching used by **DMX Manager Plus**: quick patch, offset patching and soft patching.

Quick Patch

This option is a basic universe patch, where a port's incoming channels are mapped as a 512 channel block. Although the DMX Manager Plus supports 64 Quick Patch universes, to act as a 3-to-1 merger or a 1-to-3 splitter, all four ports must be set to the same Quick Patch, usually Quick Patch 1. As a merger, channel levels are set on a highest-takes-precedence (HTP) basis.

To assign a quick patch to a port, go to the patch menu for that port. Select "Quick Patch" and then use the ▲ or ▼ buttons to cycle through to the desired patch number.

A quick patch will override an offset or soft patch and must be disabled to use those other options. If the quick patch is disabled and no other patch has been recorded, the output will appear as "Available" on the Port Status Screen (except for Port D which defaults to 'A + B + C').

Offset Patch

Offset patches are applied at the output port only. An offset patch is a refined form of quick patch that takes a specified range of input channels and remaps those channels to a desired output range. This ability can be useful to ensure all controllers correctly address architectural or house lighting, for example.

The format used to create offsets follows the Pathport xDMX channel patching philosophy. Incoming channels are identified by the letter of the input port, or universe, and the DMX channel within that universe, separated by a decimal – for example A.52 refers to channel 52 in Universe A.

The offset command looks like this:

Universe<dot>channel start – channel end@offset channel start – end

On screen it will appear like this:



A.11-17@52-58

Universe: The letter of the input port – A, B, C or D. DMX Manager Plus will not allow you to select a port that is not configured as an input.

<dot>: The period or decimal place, used as a delimiter.

Channel start: The first input channel of the range to be offset. If not specified, defaults to channel 1.

Channel end: The last channel in the range to be offset. If not specified, defaults to channel 512 or the highest channel possible. The default value is not displayed unless selected for editing.

Offset channel start: Specifies the output channel to start at. Defaults to output channel 2. It is possible to specify an output range lower than the input range, as long as output doesn't start at channel 1.

End: Automatically calculated from the other parameters. The end channel value is not displayed if the default offset is used, or if the end channel is 512.

Setting an offset patch:

First the port must be configured as an output from the port properties screen. (Remember: Port D must be set as an input before Ports A, B and C can be set as outputs.)

Second, from the same menu, select 'Patch', then 'Offset patch'. If a quick patch is set, *DMX Manager Plus* will ask "Port X: Disable quick patch?" The offset patch will not take effect unless the quick patch is disabled, so press ✓ to accept.

The port select buttons for those ports configured as inputs will light up. Select the one you want and the screen will change to show the choice.

For firmware versions below 3.0.2.8, only the universe letter will appear, and the channels must be entered and edited as follows.

Press ➤ to begin. Use the ▼ and ▲ buttons to edit the channel start. Numbers will wrap from 1 to 512. Press ➤ again to access the channel end. Editing is done the same way. Once those channels are set, use the ◀ or ▶ key to highlight the port letter. Press ▲ to insert the @ character.

The offset channel start is also edited using the ▲ and ▼ keys. The end channel will change automatically. If the offset results in the end channel being higher than 512, no number will be displayed.

Starting with firmware version 3.0.2.8, the universe letter and the full channel and offset ranges are displayed. Edit with the navigation keys.

Once the range is set for this input universe, press another port select button to add a range in another universe. The range for the new port is edited the same way. Press ✓ to accept the patch.

Only one range per universe can be offset.

To clear an offset range, from the offset editing screen, press the port select button for the universe you want to clear, then press ✓. It may be necessary to do this twice.

SOFT PATCH

Soft patching is the full implementation of the Pathport patching philosophy, and allows any DMX input channel in any universe to be mapped or patched to any output channel in any universe. Complete flexibility is possible, especially in a networked system.

All incoming channels are placed in a pool and are referred to as xDMX channels. Each is uniquely identified by the number of the source universe and its channel number within that universe, separated by a decimal – for example 4.354 refers to channel 354 in universe number 4. *DMX Manager Plus* and Pathport Manager software support up to 64 universe for a total of 32,768 channels. Please note that *DMX Manager Plus* universes A, B, C and D refer to signal input through the XLR ports.

Up to four XDMX channels can be soft-patched to one output channel. The channels will be merged on a highest-takes-precedence (HTP) basis.

Quick patch must be disabled for the port for the soft patch to take effect.

From the patch menu of the output port, select 'Soft patch'. Down the left side of the screen are channel numbers.

```
1:
2:
3:
4:
```

The ▼ and ▲ buttons are used to scroll up and down the channel list. All four of the port select buttons are backlit. Press the button beside the channel number to be patched.

A cursor will appear and now only the port select buttons for ports configured as inputs will be backlit. Press a button to select an input or use the ▼ and ▲ buttons to scroll through the source universe numbers. Press ➤ to highlight the channel number then use ▼ and ▲ to edit. Press ➤ again to insert a + character and to specify another channel. Multiple channels from the same universe are allowed. The screen will look something like this:

```
1: A.1 + B.2
2:
3:
4:
```

Press ✓ to accept the patch for this channel, then press the port select button next to another channel number to enter a patch for it. Press ✓ twice to save soft patch and the home button to return to the patch menu.



If an offset patch has already been created for the port, it will appear in the soft patch. This feature can be used to speed up soft patch creation. Conversely, if an offset patch is created after a soft patch, it will erase the soft patch.

The navigation buttons allow access to all 64 XDMX universes while creating or editing the soft patch. They also give access to ports A, B C and D, even if they are not configured as inputs. Beware that it is relatively easy to map invalid channels as inputs.

LCD BACKLIGHT

The *DMX Manager Plus* display backlight is normally off. To turn the backlight on, press and hold the Home button until “Backlight on” appears. To turn off the backlight, press the Home button until “Backlight timeout” appears. The backlight will turn off after approximately 30 seconds.

SECURITY LOCKOUT

There may be situations where you do not want the settings of the *DMX Manager Plus* modified. The Security Lockout feature allows you to prevent other users from modifying any settings.

To secure the *DMX Manager Plus*, press and hold the cancel (X) button pad until “Keypad locked” is displayed. The navigation buttons will now be back-lit red. It is still possible to review the port settings, patch and node configuration. However, any attempt to change the values will cause “Keypad locked” to be displayed.

To turn security off, press and hold the cancel (X) button pad until “Keypad unlocked” is displayed.



WARNING! *This function is not intended to provide a high level of security. It is simply provided as a flag to users that settings should not be casually modified, and as a passive deterrent to unauthorized users.*

ADVANCED CONFIGURATION

The *DMX Manager Plus* can be viewed and configured as a Pathport device on a standard 10/100 TCP/IP Ethernet network, using a personal computer with Pathport Manager software installed. The computer's LAN card can be plugged directly into the UPLINK port without the need of a crossover cable or Ethernet switch.

The following features can only be configured using Pathport Manager software:

- universe and channel prioritization (different than HTP)
- selecting an Ethernet receive protocol other than Pathport
- firmware upgrades (Pathport Manager 3)
- importing csv-format universe patches (PM4)

For a free download of Pathport Manager and complete user instructions, visit the Pathway Connectivity website.

For WYSIWYG support contact Cast Lighting, www.castlighting.com.

UPDATING YOUR DMX MANAGER PLUS

Features, enhancements and updates for your *DMX Manager Plus* are available from Pathway Connectivity's website www.pathwayconnect.com.

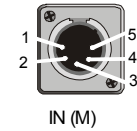
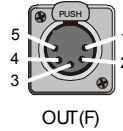


WARNING! This function should only be undertaken by a qualified service technician, versed in communications protocols. Contact the factory for operational details.

APPENDIX A – XLR CONNECTOR PINOUTS

DMX512A

- 1 – Common
- 2 – Data –
- 3 – Data +
- 4 – Aux Data -
- 5 – Aux Data +



APPENDIX B – MENU REFERENCE

Port Status

Port A	Input A
Port B	Input B
Port C	Input C
A + B + C	Output D

Port Properties Input

Port X – Input
Patch...
Terminated
DMX Input

Port Properties Output

Port X – Output
Patch...
DMX Options
DMX output

Input Patch

Port X Patch
XDMX source x
Quick Patch x

Output Patch

Port X Patch
Offset Patch
Soft Patch
Quick Patch

DMX Options

Port X DMX Options
Fast Speed
Terminated

The following menus reflect firmware 3.0.2.9, but the content is similar to earlier firmware versions.

Node Information

```
10.0.0.52
N
```

Node Configuration

```
Configuration
Node Settings...
Factory Settings...
```

Node Settings

```
Node Settings
IP Address...
Node Name
Pathport Protocol
```

Factory Settings

```
Factory Settings
Factory default
Reboot
```

APPENDIX C – SPECIFICATIONS

Ethernet Transmit Protocols: Pathport Protocol, ShowNet, streaming ACN, and ArtNet
Ethernet Receive Protocols: Pathport Protocol, ShowNet, streaming ACN, and ArtNet.

Connectors:

Ethernet: 2 – female RJ45 to internal 10/100 Ethernet switch

DMX: 4 – male 5-pin XLR, 4 – female 5-pin XLR (1 each per port)

or 8 – Phoenix-style 5-position terminal blocks

Isolation: 2500V opto-isolation per port, 250V fault protection on DMX connectors

Fuses: Self-resetting thermal fuse

Power: 100-240VAC, 50-60Hz

Size: 432 x 152 x 44mm (17 x 6 x 1.75in)

Weight: 1.6kg (3.5lb)

Operating Temperature: 0°C - 40°C (32° to 104° F)

Operating Humidity: 10%-95% relative humidity, non-condensing