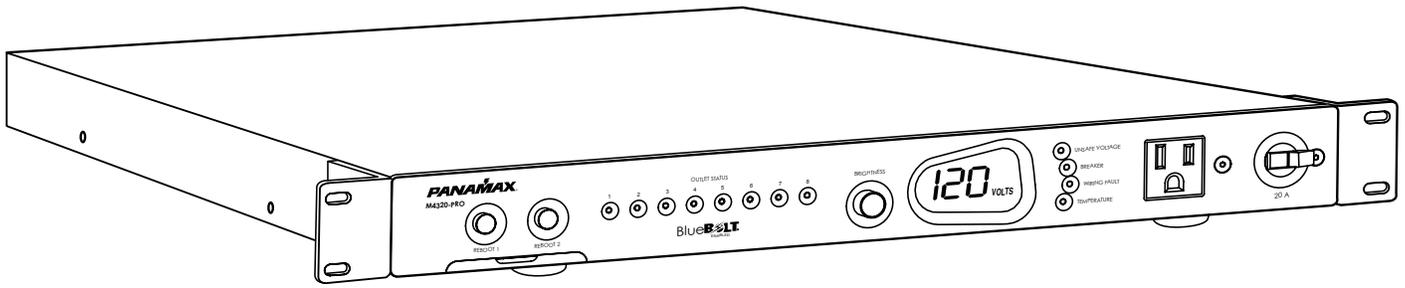


# M4320-PRO Instructions



## Power Management with Control System Interactive Functionality.

- 20 Amp Capacity M4320-PRO
- 8 Individually Controllable Rear Panel Outlets
- Fully Programmable
- TCP/IP (BlueBOLT™) Installed
- RS-232 Card (Included, not installed)
- Linear Filtration with 3 Isolated LiFT Filter Banks, 76db (5 kHz - 250 kHz), 46 db (250 kHz - 1 MHz)
- One Isolated Filter Bank for High Current Devices, 60db (5 kHz - 450 kHz), 46 db (450 kHz - 1 MHz)
- Front Panel Circuit Breaker
- Removable Front Rack Ears
- 12 Volt Input Triggering
- Detachable 10 ft. Power Cord - 20A plug
- AVM & Protect-or-Disconnect Circuitry



**Important:** You will need the BlueBOLT-CV1's unique MAC address and challenge key (provided on the 2 labels attached to the cover of the Quick Start Guide which is included in the M4320-PRO packaging). One label is permanently adhered to the Quick Start Guide and the other is removable for your convenience.

# Introduction

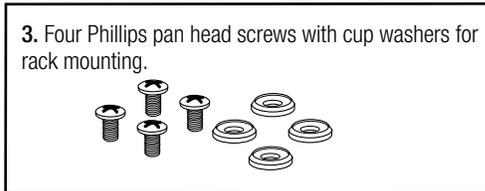
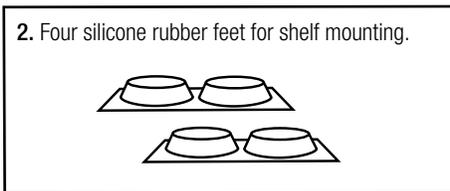
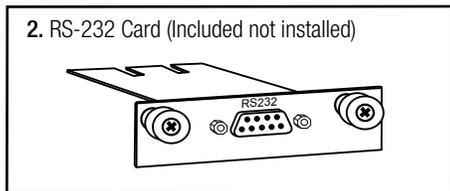
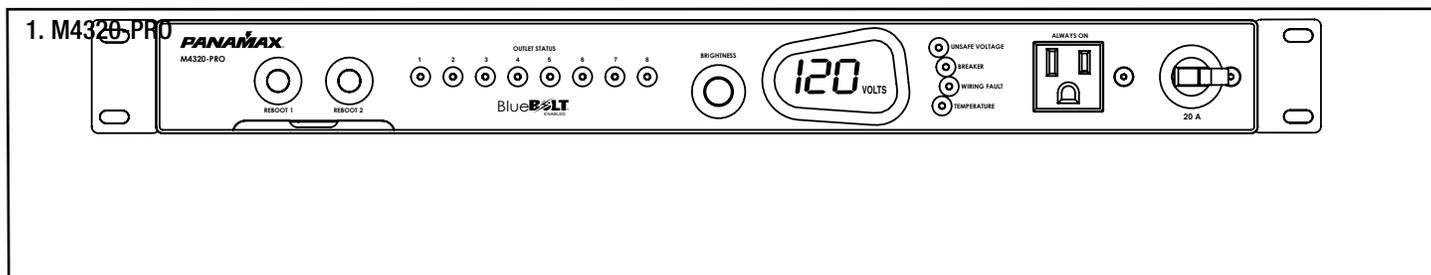
Thank you for purchasing a Panamax M4320-PRO Power Management with control system interactive functionality, and congratulations on your choice. The M4320-PRO features Panamax's revolutionary AVM (Automatic Voltage Monitoring) circuit, and our exclusive Linear Filtering Technology (LiFT). Together, these technologies comprise precisely what our customers have come to expect from Panamax: uncompromised AC protection and purification. Outlets: all rear panel outlets are separately controlled. They are grouped into four (4) filter-isolated banks. BlueBOLT™ is included, providing secure, hosted IP system control and monitoring for the M4320-PRO.

## Table of Contents

Feature Descriptions.....	pg. 1
Important Safety Instructions, Front Panel Features Overview.....	pg. 2
Preset Profile Information.....	pg. 3
Rear Panel Features Overview, Bubble of Protection.....	pg. 4
BlueBOLT™ Setup, Registration, Trouble Shooting.....	pg. 5
Diagram to Identify Connected Equipment, Additional Notes.....	pg. 6
RS-232 Installation, RS-232 and Telnet Command Set/Protocol Specification.....	pgs. 7, 8, 9, 10, 11
Product Specifications, FCC Notice, Contacting Customer Service.....	pg. 12

## Before You Begin Inspect Upon Receipt.

Box should contain the following, including the Quick Start Guide:



# Features Descriptions

## **BlueBOLT™:**

Remote Power Management technology provides secure, hosted IP (Internet Protocol) system control. With BlueBOLT™, custom electronics installers, integrators and end-users can remotely monitor and control power to home theater equipment by accessing power management components from anywhere in the world. From simple system reboots to comprehensive monitoring of power status, BlueBOLT™ provides the power to control complex A/V systems from their most fundamental level: their power source (M4320-PRO).

## **RS232 Communication Interface Card:**

For custom configuration and/or home automation control. (Included, not installed)

## **LiFT Technology EMI/RFI Noise Filtration :**

Your audio/video components are constantly being bombarded by electromagnetic interference (EMI) and radio frequency interference (RFI) through their AC power source. This contaminated power can affect audio/video equipment and will degrade the overall performance of your entire system. Common symptoms of contaminated power include loss of picture detail, dull colors, pops, hisses, hums and visual artifacts.

## **Automatic Over & Under Voltage Protection (AVM):**

Panamax's patented power monitoring circuitry constantly monitors the AC line voltage for unsafe voltage conditions such as momentary spikes or prolonged over-voltages and under-voltages (brownouts). These unsafe conditions pose a very dangerous threat to all electronic equipment within the home. If the M4320-PRO senses an unsafe power condition, it will automatically disconnect your equipment from the power to protect equipment from damage. Once the voltage returns to a safe level, the M4320-PRO will automatically reconnect the power.

- When subjected to a 6,000V (open circuit voltage) / 3,000A (short circuit current) surge, the M4320-PRO limits its voltage output to less than 330V peak, UL's lowest rating.
- If the magnitude of the surge is greater than the capacity of the surge protection components, the M4320-PRO's Protect or Disconnect Circuitry will disconnect your equipment in order to protect it. The M4320-PRO will need to be repaired or replaced by Panamax if this occurs within the product's 3 year warranty.

## **4 Isolated Outlet Banks**

The M4320-PRO is designed to provide noise isolation between the outlet banks so that any noise created by A/V components plugged into the M4320-PRO cannot contaminate the power going to equipment plugged into the other outlet banks of the M4320-PRO.

## **Sequential Startup/Shutdown:**

Complex audio/video systems may be susceptible to voltage transients generated internally at start-up/shutdown if all of the equipment is powered on or off at the same time. This can cause speaker "thumps", which are not only annoying, but can also damage the speakers and/or trip product circuit breakers. The M4320-PRO is designed to eliminate these transients by providing a "start-up" delay for the High-Current outlets and a "shut-down" delay for the Switched Outlet Banks. This minimizes inrush current issues by allowing the components plugged into the Switched Outlet Banks to power-up and stabilize before any amplifiers and powered subwoofers are turned on. This sequence is reversed during shut-down. The amplifiers and powered subwoofers turn off, their power supplies drain, and then the equipment plugged into the Switched Outlet Banks are turned off. Additionally, the start-up and shut-down delays can be adjusted for custom applications.

## **Voltage Sense Trigger:**

The M4320-PRO voltage sense trigger input uses a standard 3.5mm (1/8") mini-mono plug. This feature provides an ON/OFF trigger for the M4320-PRO using a Direct Current (DC) voltage signal. Many components such as pre-amplifiers and receivers have a DC trigger built in, and will transmit a constant power signal when turned on and in use. The presence of this power signal will turn on the M4320-PRO's switched outlets. When the source component is turned off, the voltage trigger signal is also turned off, and the M4320-PRO's shutdown sequence is initiated. An AC Adapter of the appropriate voltage (5-14V) plugged into a switched outlet may also be used if a DC trigger is not built in.

## **Cable/Satellite/Antenna TV signal protection:**

Coaxial protection circuits achieve optimum signal quality from our new coaxial protectors that have the smallest signal loss on the market - less than 0.5 db of attenuation from 0 Hz to 2.2 GHz. Our upgraded coaxial protection has been specifically designed to virtually eliminate signal loss. The clamping level of 75V will meet the demands of both cable and satellite voltage while minimizing exposure to damaging spikes and surges.

## **Telephone Line Protection:**

Digital video recorders and satellite TV receivers require a telephone line connection for TV show scheduling and/or Pay-Per-View services. The M4320-PRO also provides surge protection for this line. One pair of RJ-11 telephone jacks is provided for this. The circuitry utilizes auto-resetting PTCRs and solid state SIDACTors® for reliability and unsurpassed protection. The clamping level of the M4320-PRO's telephone protector is 260 volts. This will allow typical ring voltage (90-130VAC) and operating battery voltage (-48DC) to pass through the circuit and still protect the modem in your satellite receiver from damage. Incoming tel line must be plugged into the IN Jack. Patch cord to the equipment must be plugged into OUT.

## **LAN Protection:**

Protection circuits for 10/100/1000 baseT Ethernet lines. 8 wire protection, 62V clamping.

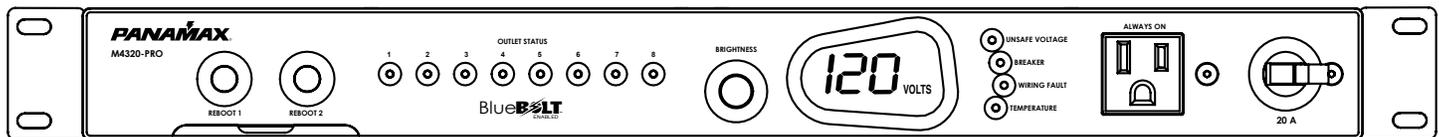
© Littlefuse, Inc.

# Important Safety Instructions

1. Read these instructions. 2. Keep these instructions.
3. Heed all warnings. 4. Follow all instructions.
5. **WARNING:** Do not use this apparatus near water. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
6. **CAUTION** - Contains Always On Receptacles. To reduce risk of shock - Disconnect M4320-PRO from power source before servicing any equipment connected to M4320-PRO.
7. Clean only with dry cloth.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatuses that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades, with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13. Where the power cord is used as the main disconnect device, the disconnect device shall remain readily accessible.
14. This device must be connected to a main socket outlet with a protective earthing connection.

## Front Panel Features Overview



**PULL OUT CARD:** Quick reference for default profile and device type list. Located under the reboot buttons.

**REBOOT 1 & 2:** Press either button for 2 seconds to initiate a “reboot” sequence of outlet 1 or 2 (default). Press both simultaneously for 2 seconds to initiate a full power-up or shut down sequence. The front panel outlet is always on, unless the circuit breaker is set to OFF.

**VOLTS/AMPS/BRIGHTNESS:** Rotate knob for front panel brightness control, and press to toggle the meter between VOLTS and AMPS mode.

**UNSAFE VOLTAGE:** If the line voltage is less than 100 Vac or greater than 134 Vac, the outlets will shut off and this light will flash red.

**BREAKER:** Flashes red if the circuit breaker is OFF.

**WIRING FAULT:** Illuminates red if the house wiring is reverse-wired or the ground is not connected.

**TEMPERATURE:** Flashes red if the internal microprocessor temperature is greater than 60 °C.

**PROFILES:** These are configurations that dictate outlet sequencing timings and trigger assignments.

To change the profile, set the circuit breaker to **OFF** (the **BREAKER** light will flash red) and press **REBOOT 1 & 2** simultaneously for 8 seconds.

The meter will show the current profile: P1-P4 (presets), or **PP** (personal profile). A “personal profile” is a configuration that has been changed from the presets by an external control (through the COMMUNICATIONS CARD)

To change the preset profile, press **REBOOT 1** repeatedly until the desired profile is displayed. To select the displayed profile and exit, press **REBOOT 2**. To exit without changing the profile, press **REBOOT 1** until “**PE**” (profile exit) is displayed, then press **REBOOT 2**. Turn breaker to **ON** when finished.

See the following page for detailed preset profile information.

Users of the TCP/IP (**BlueBOLT-CV1**) card may access an additional “IP” menu by pressing **REBOOT 1**, cycling past **PP** and P1-P4 until **IP** is displayed. Then pressing **REBOOT 2** will display the unit’s **IP** address, one octet at a time.

For example, if the **IP** address is **192.168.1.50**, then the meter will display **192**, followed in 2 seconds by **168**, then **1**, then **50**, and terminated by ---. The menu will then automatically exit and the unit will return to normal operation. If the unit has not yet obtained an IP address, the user should wait up to 2 minutes for DHCP to assign the address, or for the BlueBOLT-CV1 card to assign the default address (**192.168.1.169**) if DHCP fails.

**PLEASE NOTE:** The lights’ status is obvious, when the outlet is just plain “**ON**” or just plain “**OFF**”. However, there are transition states that cause the lights to blink. The lights will blink when performing a triggered cycle, but when a server initiated cycle command occurs, it just goes “**OFF**”, **delays**, then “**ON**”.

# Preset Profile Information

## PROFILE 1 (P1)

### DEFAULT OUTLET SEQUENCING (preset profile P1, by outlet #s):

With switching on and off BREAKER or holding both REBOOT buttons.

Start up: 1→(1 sec)→2→(1 sec)→3→(1 sec)→4→(1 sec)→5→(1 sec)→6→(1 sec)→7→(5 sec)→8  
Shut down: 8→(5 sec)→7→(5 sec)→6→(1 sec)→5→(1 sec)→4→(1 sec)→3→(1 sec)→2→(1 sec)→1  
Reboot 1: 1(off)→(30 sec)→1(on)  
Reboot 2: 2(off)→(30 sec)→2(on)  
DC TRIGGER ON: 7(on)→(5 sec)→8(on)  
DC TRIGGER OFF: 8(off)→(5 sec)→7(off)

## PROFILE 2 (P2)

### A/V + MODEM OUTLET SEQUENCING (profile P2, by outlet #s):

With switching on and off BREAKER or holding both REBOOT buttons.

Start up: 1→(15 sec)→2→(1 sec)→3→(1 sec)→4→(1 sec)→5→(1 sec)→6→(1 sec)→7→(5 sec)→8  
Shut down: 8→(5 sec)→7→(5 sec)→6→(1 sec)→5→(1 sec)→4→(1 sec)→3→(1 sec)→2→(1 sec)→1  
Reboot 1: 1 and 2 (off)→(30 sec)→1 and 2 (on)  
Reboot 2: 3(off)→(30 sec)→3(on)  
DC TRIGGER ON: 7(on)→(5 sec)→8(on)  
DC TRIGGER OFF: 8(off)→(5 sec)→7(off)

## PROFILE 3 (P3)

### A/V + EXTENDED DELAYS OUTLET SEQUENCING (profile P3, by outlet #s):

With switching on and off BREAKER or holding both REBOOT buttons.

Start up: 1→(10 sec)→2→(10 sec)→3→(10 sec)→4→(10 sec)→5→(10 sec)→6→(10 sec)→7→(20 sec)→8  
Shut down: 8→(20 sec)→7→(20 sec)→6→(10 sec)→5→(10 sec)→4→(10 sec)→3→(10 sec)→2→(10 sec)→1  
Reboot 1: 1 and 6 (off)→(45 sec)→1 and 6 (on)  
Reboot 2: 3(off)→(45 sec)→3(on)  
DC TRIGGER ON: 5(on)→(20 sec)→7(on)→(20 sec)→8 (on)  
DC TRIGGER OFF: 8(off)→(20 sec)→7(off)→(30 sec)→5(off)

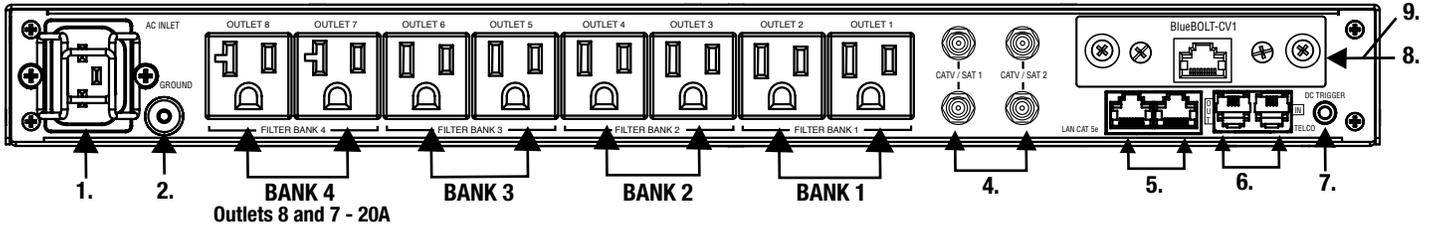
## PROFILE 4 (P4)

### NETWORK + CONTROL DELAYS OUTLET SEQUENCING (profile P4, by outlet #s):

With switching on and off BREAKER or holding both REBOOT buttons.

Start up: 1→(15 sec)→2→(15 sec)→3→(5 sec)→4→(5 sec)→5→(5 sec)→6→(5 sec)→7→(10 sec)→8  
Shut down: 8→(10 sec)→7→(10 sec)→6→(5 sec)→5→(5 sec)→4→(5 sec)→3 outlets 1 and 2 are always on  
Reboot 1: 1(off)→(30 sec)→1(on)  
Reboot 2: 2 and 3(off)→(30 sec)→2 and 3(on)  
DC TRIGGER ON: 7(on)→(10 sec)→8(on)  
DC TRIGGER OFF: 8(off)→(10 sec)→7(off)

# Rear Panel Features Overview



**1. Power inlet:** M4320-PRO (120 Vac/20 A, IEC 320 C20 do not remove steel retention clip. (20A plug)

**2. Ground lug:** connect to Panamax MOD-series signal protection module grounding busses with 14 AWG (<12" length) wire to expand signal protection capabilities.

**3. Outlets:** all rear panel outlets are separately controlled. They are grouped into four (4) filter-isolated banks.

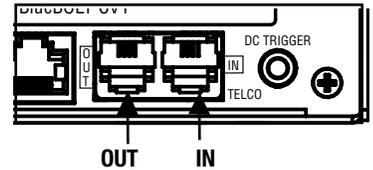
**BANKS 1-3: Filtered Outlets (Outlets 1, 2, 3, 4, 5, 6)**  
76dB (5 kHz – 250 kHz), 46dB (250 kHz - 1 MHz)

**BANK 4: High-Current Outlets (Outlets 7-8, 20A)**  
60dB (5 kHz – 450 kHz), 46dB (450 kHz - 1 MHz)

**4. CATV/SAT 1 & 2:** Universal voltage ( $\pm 75V$  clamping), HD 1080i/p ready, <0.5 dB @ 0 Hz - 2.2 GHz.

**5. LAN Cat 5e** (10/100/1000BASE-T compatible): RJ-45 (8P8C) Ethernet protection pass-through.

**6. Telco:** RJ-11 (6P2C) analog telephone/DSL protection pass-through. Do not connect in reverse



**OUT - Connects to Equipment**  
**IN - Comes in from the wall**

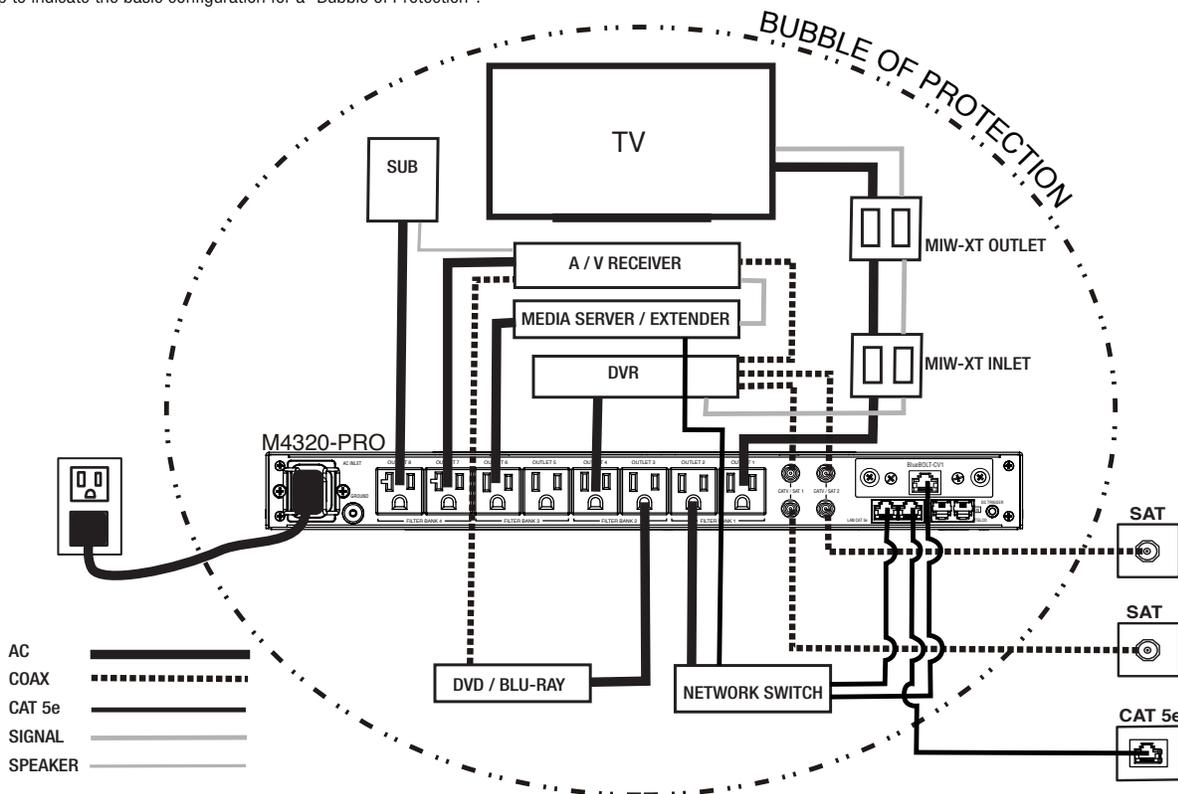
**7. DC Trigger Input:** 3.5mm mono jack,  $\pm$  (5-24 VDC) tip ring.

**8. TCP/IP card (BlueBOLT) installed**

**9. Communications Card: RS-232** (female DB-9) included, not shown.

## The Bubble of Protection

Sample setup to indicate the basic configuration for a "Bubble of Protection".



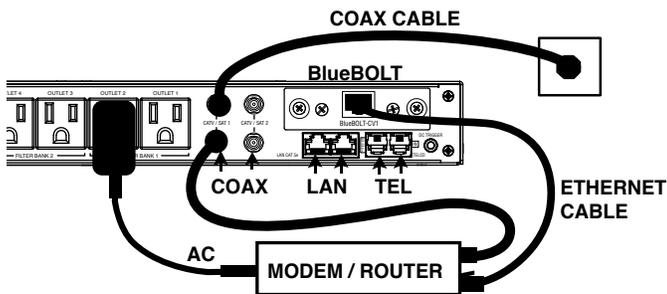
# GETTING SETUP For BlueBOLT™

**Note:** You will need the BlueBOLT-CV1's unique **MAC ADDRESS** and **CHALLENGE KEY** (duplicate labels provided in packaging on cover of Quick Start Guide as well as on the card itself) in order to register the BlueBOLT™ device online.

## SYSTEM SETUP #1

### Network Equipment Powered by M4320-PRO (devices in same room)

- Step 1.** Connect the power supply for the modem/router into the M4320-PRO.
- Step 2.** Connect the coaxial line or telephone DSL line from the wall, to M4320-PRO signal line pass-through protection circuits.
- Step 3.** Route coaxial cable line or telephone DSL line from the M4320-PRO back to modem/router's input.
- Step 4.** Plug in and switch on M4320-PRO.



## BlueBOLT Online Registration

**Note:** Make sure to complete system setup #1 or #2 before registering.

- Step 1.** Log into <http://www.mybluebolt.com> for online registration.

Your BlueBOLT™ enabled M4320-PRO Power Management Component is completely plug-and-play and does not require any software installation or network configuration (including configuring of network ports). The online BlueBOLT™ control interface is operated through your web browser.

- Step 2.** Using any Internet connected computer go to [www.mybluebolt.com](http://www.mybluebolt.com) in your standard Internet browser. Please make sure your browser is up to date with the latest software for best BlueBOLT interface performance.

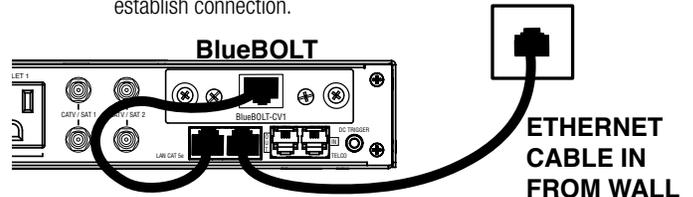
- Step 3.** Follow the on screen instructions to create an account and/or take control of your BlueBOLT™ enabled product.

Once you input the **MAC ADDRESS** and included **CHALLENGE KEY**, if BlueBOLT™ cannot detect your device (please allow up to 60 seconds), please follow the on-screen troubleshooting guide. Also confirm an Internet connection by accessing a general website – example [www.panamax.com](http://www.panamax.com).

## SYSTEM SETUP #2

### Network Equipment NOT-Powered by M4320-PRO (devices in separate rooms)

- Step 1.** Connect network Ethernet cable from PoE/network adapter or wall plate to the Ethernet pass-through protection port on M4320-PRO.
- Step 2.** Connect second Ethernet cable from pass-through protection port to BlueBOLT-CV1 card.
- Step 3.** Power on M4320-PRO. (Note: adding a device to your home/office network may require a power cycle of the router/modem to establish connection.)



### Advanced Operation

Besides providing access to Panamax/Furman's hosted BlueBOLT platform, the included BlueBOLT-CV1 card also supports the following networking protocols:

- Telnet (default port 23), for interfacing to control and automation systems within the local network.
- HTTP (web server at default port 80) for configuring the network settings for stand-alone "static IP" operation.

For more information, see the application note BlueBOLT Advanced Networking, available online at [www.mybluebolt.com](http://www.mybluebolt.com).

### POWER CYCLE COMMAND USING TELNET PROTOCOL WITH BlueBOLT-CV1

#CYCLE Turns an outlet off, then delays before turning it back on.

**(NOTE - THIS COMMAND IS ONLY AVAILABLE WHEN USING THE TELNET PROTOCOL WITH THE BlueBOLT-CV1 INTERFACE. IT IS NOT SUPPORTED OVER SERIAL (RS-232) CONNECTION).**

Command: #CYCLE **outlet:delay**<CR>

**outlet** = {1..8}

**delay** = {1..65535} seconds

Example: #CYCLE 2:28 This turns outlet 2 off for 28 seconds, then back on.

Action: Turns off outlet then waits for **delay** seconds and finally turns **outlet** back on.

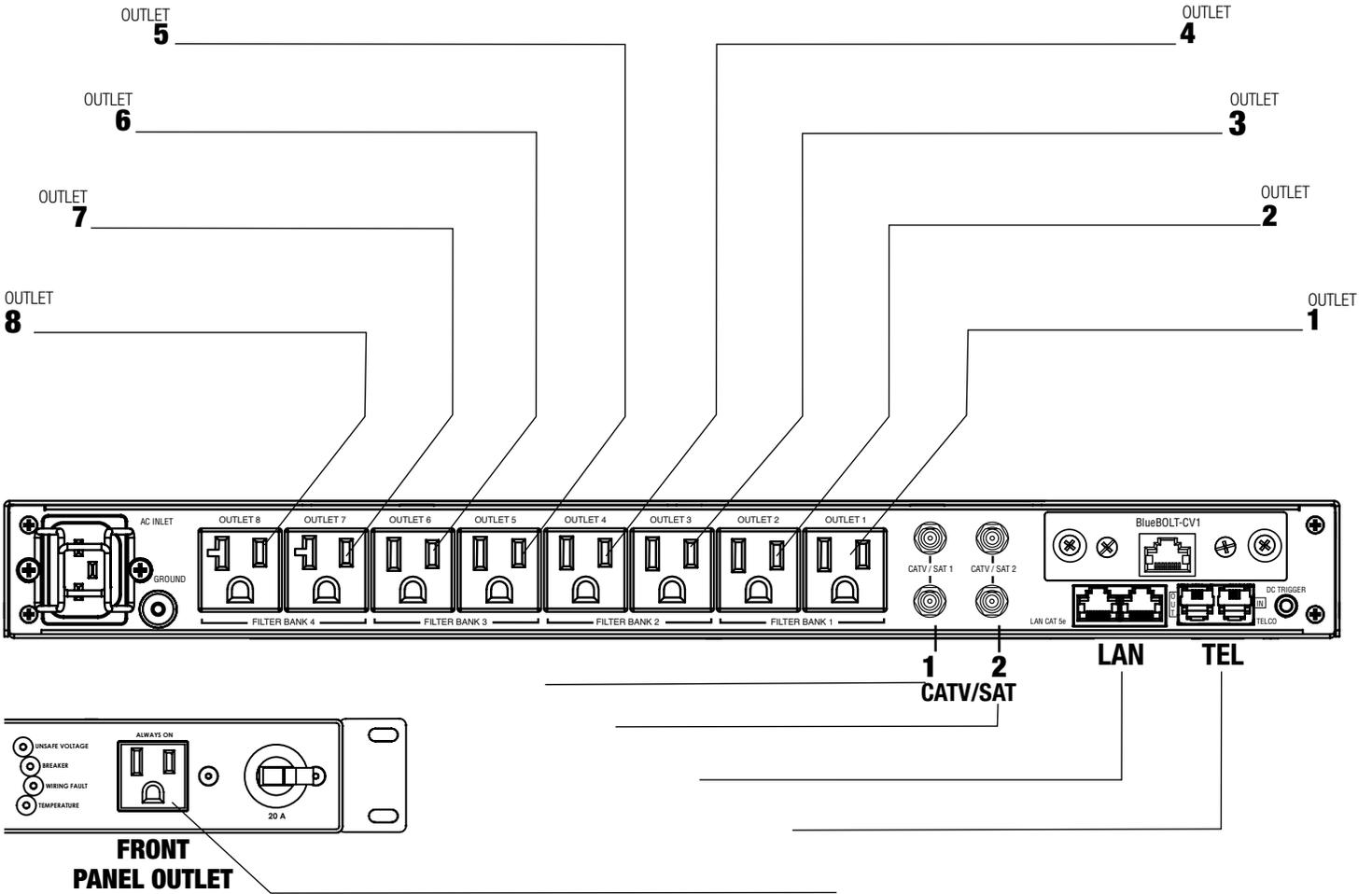
Response: There are no direct responses from this command, but the outlet status change messages will be sent as the outlet changes state:  
\$OUTLETn = status  
Where n = {1..8}  
Status = {ON, OFF}

## Troubleshooting

- Is your Power Management Component receiving power? Check the power cable and confirm the unit's breaker is in the ON position.
- Is your BlueBOLT-CV1 card installed properly? The "Link" light should be illuminated (solid green) and the "Activity" light should be blinking intermittently (green).
- Is your Internet connection functioning? Can you access a general web page?
- Is your BlueBOLT-CV1 card connected to your internet router or modem? Check the Ethernet cable and confirm that the unit is connected to an active Internet connection, and make sure those connected devices are receiving power.
- If you have answered "Yes" to all of these questions and are still unable to connect your M4315-PRO component, please contact Panamax customer service at 1-800-472-5555.

# Identify Connected Equipment

Use this diagram to write in what pieces of equipment are plugged into each outlet for an easy reference. Please note that the outlets start at No. 8 on the left. The outlet indicator lights on the front panel are numbered 1 through 8 left to right.



## Additional Notes:

**Name / Location of Installation**

---



---



---



---

**MAC ADDRESS**    \_ \_ - \_ - \_ - \_ - \_ -

**CHALLENGE KEY**    \_ \_ - \_ - \_ - \_ -

**Phone Number(s)**

---



---



---



---



---



---



---



---



---

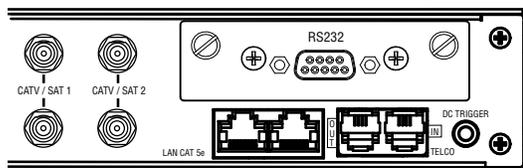


---

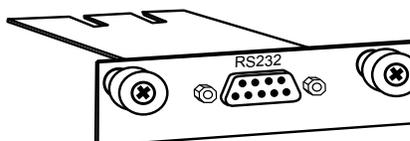
## RS-232 Installation (optional)

It is recommended that you read the entire instructions list before proceeding. The BlueBOLT-CV1 should already be factory installed in this Panamax M4320-PRO component. To switch from BlueBOLT™ functionality to RS-232 connectivity, follow these steps:

1. Unplug M4320-PRO Power Management Component from AC wall outlet.
2. If already connected, unplug Ethernet cable from BlueBOLT-CV1 card.
3. Remove the BlueBOLT-CV1 card using thumbscrews. **Note:** minimal torque should be applied in removal of the existing card.



4. Remove RS-232 card from protective packaging.
5. Noting the two guiding channels within the card slot, gently slide the RS-232 card into the card slot, making sure to screw the thumbscrews down for a snug and secure fit.
6. Connect RS-232 cable (sold separately) to the RS-232 card to establish a connection between the M4320-PRO Component and an RS-232 enabled Home Theater control device.
7. Plug in M4320-PRO Component to an AC wall outlet power receptacle.



## RS-232 Command Set and Telnet/ Protocol Specification

### Command Set/Status Messaging

The following commands are applicable when communicating with your M4320-PRO via direct connection using Telnet protocol or the included RS-232 interface.

#### 0. OVERVIEW

The purpose of this document is to outline the command set used to communicate with and control the M4320-PRO. The data communication feature will most often be used to interface with automation systems. It may also be used to control and configure the unit manually using a standard terminal emulation program (i.e. Windows Hyper-Terminal)

#### 1. MESSAGE CONSTRUCTS

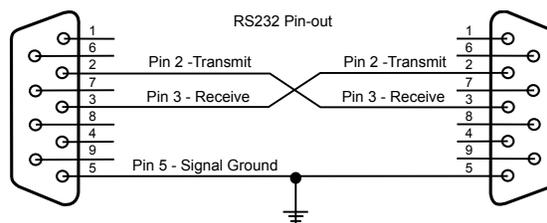
All messages are in the form of ASCII character strings that start with a symbol (!,?,\$,) to indicate the type of message and are terminated with a carriage return <CR> ASCII character 0Dh (hex), 13d (decimal).

- 1.0 The M4320-PRO unit will discard the incoming message under the following conditions:
  - 1.0.1 Invalid start character or parameter
  - 1.0.2 If a message overruns the receiver buffer (32 characters) it will be truncated.
- 1.1 There are three data types transmitted between the M4320-PRO and the controller hardware:
  - 1.1.1 **COMMAND:** A message sent to the M4320-PRO unit from the controller requesting a specific action by the M4320-PRO unit. Command strings start with an exclamation point (!, 21h, 33d). Some commands require a parameter to be included in the message. The parameter must be separated from the command with a space character (<SP>, 20h, 32d). In the command descriptions, parameters will be described in bold italic font.

- 1.2.1 **QUERY:** A message sent to the M4320-PRO unit from the controller requesting a status message to be returned. Query strings start with a question mark (? , 3Fh, 63d).
- 1.2.2 **RESPONSE:** A message sent from the M4320-PRO unit to the controller indicating the current status. Response strings start with a dollar sign (\$ , 24h, 36d).
- 1.2.3 The command prompt (>) is displayed when ready for next command/query.

#### 2. RS232 CONFIGURATION

- 2.1 Connector Type: DB-9 Female
- 2.2 Connector Pin-out:
  - Pin 2, Transmit. M4320-PRO transmits data on this pin.
  - Pin 3, Receive. M4320-PRO receives data on this pin.
  - Pin 5, SG (signal ground).



# RS-232 and Telnet Command Set / Protocol Specification (Continued)

2.3	Comm. System:	Asynchronous, half-duplex
2.4	Baud Rate:	9600bps
2.5	Start Bits:	1
2.6	Data Bits:	8
2.7	Stop Bits:	1
2.8	Parity:	None
2.9	Flow Control:	None

### 3. CONTROLLER COMMANDS

The following are commands sent by the controlling equipment to the M4320-PRO unit.  
**Note:** Responses are only transmitted if unsolicited feedback (§3.9) is enabled.

#### 3.0 GREEN BUTTON

3.0.1	Command:	!GREEN_BUTTON<CR>
3.0.2	Action:	Power down or up, all outlets controlled by this trigger. Has the same effect as if someone pressed both REBOOT Button #1 and #2 at the same time for 2 seconds.
3.0.3	Response:	If turning off outlets: \$ENTERING GREEN MODE<CR> If turning on outlets: \$LEAVING GREEN MODE<CR>

#### 3.1 REBOOT 1

3.1.1	Command:	!REBOOT_1<CR>
3.1.2	Action:	Power cycle the outlets controlled by this trigger Has the same effect as if someone pressed the reboot button #1 for 2 seconds. Default is outlet 1
3.1.3	Response:	\$BUTTON_1 = TRIGGERED<CR>

#### 3.2 REBOOT 2

3.2.1	Command:	!REBOOT_2<CR>
3.2.2	Action:	Power cycle the outlets controlled by this trigger Has the same effect as if someone pressed the reboot button #2 Default is outlet 2
3.2.3	Response:	\$BUTTON_2 = TRIGGERED <CR>

#### 3.3 ALL OFF

Turns off all outlets including those designated as always on. Turn off is immediate with no delay.

3.3.1	Command:	!ALL_OFF<CR>
3.3.2	Action:	All outlet relays turn OFF. Terminates any running turn on or turn off sequence. Overrides the DC trigger input.
3.3.3	Response:	\$PWR = OFF<CR>

#### 3.4 ALL ON

Turns on all outlets. Turn on is immediate with no delay.

3.4.1	Command:	!ALL_ON<CR>
3.4.2	Action:	All outlet relays turn ON. Terminates any running turn on or turn off sequence. Overrides the DC trigger input.
3.4.3	Response:	If successful: \$PWR = ON<CR> If over-voltage fault: \$PWR=OVERVOLTAGE<CR> If under-voltage fault: \$PWR =UNDERVOLTAGE<CR>

#### 3.5 SWITCH OUTLET

Turns a specific outlet on or off. Switching is immediate with no delay.

3.5.1	Command:	!SWITCH <i>outlet state</i> <CR>
		<i>outlet</i> = {1..8}
		<i>state</i> = {ON, OFF}
		Example: !SWITCH 2 ON<CR> (turns on outlet 2)
3.5.2	Action:	Immediately switches <i>outlet</i> to <i>state</i> .
3.5.3	Response:	If <i>outlet</i> or <i>state</i> are invalid, \$INVALID_PARAMETER<CR> If <i>outlet</i> and <i>state</i> are valid, and no fault exists, a confirmation message is sent. Refer to §5.1.2. If over-voltage fault: \$PWR = OVERVOLTAGE<CR> If under-voltage fault: \$PWR = UNDERVOLTAGE<CR> If no fault: \$OUTLET1 = ON<CR>

#### 3.6 SET TRIGGER

Assigns the trigger(s) for an outlet.

3.6.1	Command:	!SET_TRIGGER <i>outlet triggersource</i> <CR>
		<i>outlet</i> = { 1..8 }
		<i>triggersource</i> = { NONE, BUTTON_1, BUTTON_2, BUTTON_GREEN, TRIGIN }
		where
		NONE = Outlet is always ON
		BUTTON_n = Trigger on front panel button n where n is {1,2}.
		BUTTON_GREEN = Both buttons 1 & 2 being pressed.
		TRIGIN = Trigger on DC input trigger.
		Example: !SET_TRIGGER 3 TRIGIN<CR> (sets outlet 3 to be controlled by the DC trigger input).
3.6.2	Action:	Sets the trigger for <i>outlet</i> to <i>triggersource</i> . Trigger commands are additive, Eg. !SET_TRIGGER 3 TRIGIN<CR> !SET_TRIGGER 3 BUTTON_GREEN<CR> Sets DC trigger and green button for outlet 3. <b>To clear triggers the NONE command must be used.</b>
3.6.3	Response:	If <i>outlet</i> and <i>triggersource</i> are valid: \$TRIGGER FOR outlet = triggersource<CR> If <i>outlet</i> or <i>triggersource</i> are invalid, \$INVALID_PARAMETER<CR>

# RS-232 and Telnet Command Set / Protocol Specification (Continued)

## 3.7 SET REBOOT DELAY

Assign the delay between the last outlet turning off and the beginning of the turn on sequence in a reboot cycle.

3.7.1 Command: `!SET_REBOOT_DELAY button_1 button_2<CR>`

Example: `!SET_REBOOT_DELAY 30 5<CR>`  
 (sets the reboot delay for `Button_1` to 30 seconds and the delay for `button_2` to 5 seconds.)

3.7.2 Response: If `button_1` `button_2` are valid:  
`$BUTTON_1 DELAY = button_1<CR>`  
`$BUTTON_2 DELAY = button_2<CR>`

If `button_1` or `button_2` are not valid:  
`$INVALID_PARAMETER<CR>`

Where `button_1` = { 1-255 } (seconds)  
`button_2` = { 1-255 } (seconds)

## 3.8 SET DELAY

Assigns the turn on and turn off delays for an outlet OUTLET or DC trigger output.

3.8.1 Command: `!SET_DELAY outlet ondelay offdelay<CR>`

`outlet` = { 1..8 }  
`ondelay` = { 0-255 } (seconds)  
`offdelay` = { 0-255 } (seconds)

Example: `!SET_DELAY 4 5 1<CR>`  
 (sets outlet 4 turn-on delay to 5 sec. and turn-off delay to 1 sec.)

3.8.2 Action: Sets the turn on delay for `outlet` to `ondelay`  
 Sets the turn off delay for `outlet` to `offdelay`

3.8.3 Response: If `outlet`, `ondelay` and `offdelay` are valid:  
`$DELAY FOR outlet = ondelay offdelay<CR>`

If `outlet`, `ondelay` or `offdelay` are invalid:  
`$INVALID_PARAMETER<CR>`

## 3.9 SET FEEDBACK MODE

Sets the feedback to ON (unsolicited) or OFF (polled). When ON, a message will be sent to the controller every time the status of an input (i.e. trigger), output (i.e. outlet) or power state (i.e. overvoltage) changes. If feedback is OFF, the controller must poll for state changes.

3.9.1 Command: `!SET_FEEDBACK mode<CR>`

`mode` = { ON, OFF }

3.9.2 Action: Sets the feedback mode to `mode`.

3.9.3 Response: If `mode` = ON, `$FEEDBACK = ON<CR>`  
 If `mode` = OFF, `$FEEDBACK = OFF<CR>`  
 If `mode` is invalid, `$INVALID_PARAMETER<CR>`

## 3.10 SET LINEFEED MODE

Controls the linefeeds (ASCII: 10d, 0Ah) sent with each response. When ON, each response will end with a linefeed. When OFF, all responses will not end with a linefeed.

3.10.1 Command: `!SET_LINEFEED mode<CR>`

`mode` = { ON, OFF }

3.10.2 Action: Sets the linefeed mode to mode.

3.10.3 Response: If `mode` = ON, `$LINEFEED = ON<CR>`  
 If `mode` = OFF, `$LINEFEED = OFF<CR>`  
 If `mode` is invalid, `$INVALID_PARAMETER<CR>`

## 3.11 RESET FACTORY SETTINGS

Resets all of the custom configuration settings (i.e. triggers, delays, feedback mode, & linefeed mode) to their original factory settings listed below.

3.11.1 Command: `!RESET_ALL<CR>`

3.11.2 Action: Resets the configuration below:

TRIGGER FOR 1	=	BUTTON_1, GREEN_BUTTON
TRIGGER FOR 2	=	BUTTON_2, GREEN_BUTTON
TRIGGER FOR 3	=	GREEN_BUTTON
TRIGGER FOR 4	=	GREEN_BUTTON
TRIGGER FOR 5	=	GREEN_BUTTON
TRIGGER FOR 6	=	GREEN_BUTTON
TRIGGER FOR 7	=	DC_TRIGGER, GREEN_BUTTON
TRIGGER FOR 8	=	DC_TRIGGER, GREEN_BUTTON

DELAY FOR 1	=	1,16
DELAY FOR 2	=	2,15
DELAY FOR 3	=	3,14
DELAY FOR 4	=	4,13
DELAY FOR 5	=	5,12
DELAY FOR 6	=	6,11
DELAY FOR 7	=	7,6
DELAY FOR 8	=	12,1

REBOOT1 DELAY	=	30
REBOOT2 DELAY	=	30

FEEDBACK	=	ON
LINEFEED	=	ON
PROFILE	=	1

3.11.3 Response: `$FACTORY SETTINGS RESTORED<CR>`

## 3.12 SET PROFILE

Sets all of the custom configuration settings (i.e. triggers, delays, feedback mode, & linefeed mode) to the profile selected. The settings are listed below.

3.12.1 Command: `!SET_PROFILE n<CR>`  
 Where `n` is 1,2,3,4

3.12.2 Action: P1 configuration is the same as `!RESET_ALL`

3.12.3 Action: P2 configuration below:

TRIGGER FOR 1	=	BUTTON_1, GREEN_BUTTON
TRIGGER FOR 2	=	BUTTON_1, GREEN_BUTTON
TRIGGER FOR 3	=	BUTTON_2, GREEN_BUTTON
TRIGGER FOR 4	=	GREEN_BUTTON
TRIGGER FOR 5	=	GREEN_BUTTON
TRIGGER FOR 6	=	GREEN_BUTTON
TRIGGER FOR 7	=	DC_TRIGGER, GREEN_BUTTON
TRIGGER FOR 8	=	DC_TRIGGER, GREEN_BUTTON

DELAY FOR 1	=	1,16
DELAY FOR 2	=	16,15
DELAY FOR 3	=	17,14
DELAY FOR 4	=	18,13
DELAY FOR 5	=	19,12
DELAY FOR 6	=	20,11
DELAY FOR 7	=	21,6
DELAY FOR 8	=	26,1

# RS-232 and Telnet Command Set / Protocol Specification (Continued)

3.12.4 Action: REBOOT1 DELAY = 30  
 REBOOT2 DELAY = 30

FEEDBACK = ON  
 LINEFEED = ON  
 PROFILE = 2

P3 configuration below:  
 TRIGGER FOR 1 = BUTTON\_1, GREEN\_BUTTON  
 TRIGGER FOR 2 = GREEN\_BUTTON  
 TRIGGER FOR 3 = BUTTON\_2, GREEN\_BUTTON  
 TRIGGER FOR 4 = GREEN\_BUTTON  
 TRIGGER FOR 5 = DC\_TRIGGER, GREEN\_BUTTON  
 TRIGGER FOR 6 = BUTTON\_1, GREEN\_BUTTON  
 TRIGGER FOR 7 = DC\_TRIGGER, GREEN\_BUTTON  
 TRIGGER FOR 8 = DC\_TRIGGER, GREEN\_BUTTON

DELAY FOR 1 = 1,90  
 DELAY FOR 2 = 10,80  
 DELAY FOR 3 = 20,70  
 DELAY FOR 4 = 30,60  
 DELAY FOR 5 = 40,50  
 DELAY FOR 6 = 50,40  
 DELAY FOR 7 = 60,20  
 DELAY FOR 8 = 80,1

REBOOT1 DELAY = 45  
 REBOOT2 DELAY = 45

FEEDBACK = ON  
 LINEFEED = ON  
 PROFILE = 3

3.12.5 Action: P4 configuration below:  
 TRIGGER FOR 1 = BUTTON\_1  
 TRIGGER FOR 2 = BUTTON\_2  
 TRIGGER FOR 3 = BUTTON\_2, GREEN\_BUTTON  
 TRIGGER FOR 4 = GREEN\_BUTTON  
 TRIGGER FOR 5 = GREEN\_BUTTON  
 TRIGGER FOR 6 = BUTTON\_1, GREEN\_BUTTON  
 TRIGGER FOR 7 = DC\_TRIGGER  
 TRIGGER FOR 8 = DC\_TRIGGER

DELAY FOR 1 = 1, 0  
 DELAY FOR 2 = 16, 0  
 DELAY FOR 3 = 31, 36  
 DELAY FOR 4 = 36, 31  
 DELAY FOR 5 = 41, 26  
 DELAY FOR 6 = 46, 21  
 DELAY FOR 7 = 51, 11  
 DELAY FOR 8 = 61, 1

REBOOT1 DELAY = 30  
 REBOOT2 DELAY = 30

FEEDBACK = ON  
 LINEFEED = ON  
 PROFILE = 4

3.12.3 Response: \$PROFILE n SELECTED<CR>

**PLEASE NOTE:**  
 Zero in the First Position before the comma (0,) equates to **ALWAYS OFF**.  
 Zero in the Second Position after the comma (,) equates to **ALWAYS ON**.

## 4. QUERIES

### 4.0 IDENTIFY

Request that the unit identify itself.

4.0.1 Query: ?ID<CR>

4.0.2 Response: \$PANAMAX<CR>  
 \$MAX 4315-PRO<CR>  
 \$FIRMWARE: revision<CR>

### 4.1 FAULT STATUS

Request the on/off status of the outlets and output trigger.

4.1.1 Query: ?FAULTSTAT<CR>

4.1.2 Response: \$PWR = status<CR>  
 \$BREAKER = status<CR>  
 \$WIRE FAULT = status<CR>  
 \$TEMPERATURE = status<CR>  
 \$AVM = status<CR>

status = { FAULT, OK }

### 4.2 TRIGGER STATUS

Request the on/off status of the input trigger.

4.2.1 Query: ?TRIGSTAT<CR>

4.2.2 Response: For trigger ON:  
 \$TRIGIN = ON<CR>  
 For trigger OFF:  
 \$TRIGIN = OFF<CR>

### 4.3 OUTLET STATUS

Request the on/off status of the outlets.

4.3.1 Query: ?OUTLETSTAT<CR>

4.3.2 Response: \$OUTLET1 = **status**<CR>  
 \$OUTLET2 = **status**<CR>  
 \$OUTLET3 = **status**<CR>  
 \$OUTLET4 = **status**<CR>  
 \$OUTLET5 = **status**<CR>  
 \$OUTLET6 = **status**<CR>  
 \$OUTLET7 = **status**<CR>  
 \$OUTLET8 = **status**<CR>

**status** = { ON, OFF }

### 4.4 POWER STATUS

Request the status of the input voltage.

4.4.1 Query: ?POWERSTAT<CR>

4.4.2 Response: if input voltage is within limits: \$PWR = NORMAL<CR>  
 during overvoltage: \$PWR = OVERVOLTAGE<CR>  
 during undervoltage: \$PWR = UNDERVOLTAGE<CR>  
 during recovery: \$PWR = RECOVERY<CR>

# RS-232 and Telnet Command Set / Protocol Specification

## 4.5 VOLTAGE

Request line voltage.

4.5.1 Query: ?VOLTAGE<CR>

4.5.2 Response: \$VOLTAGE = *xxx*<CR>

where *xxx* is the input line voltage expressed in decimal format.

\$VOLTAGE = 92<CR>

## 4.6 CURRENT

Request the input current draw.

4.6.1 Query: ?CURRENT<CR>

4.6.2 Response: \$CURRENT = *xxx*<CR>

where *xxx* is the input current expressed in decimal format.  
For example, a current of 3.3A would be expressed as:

\$CURRENT = 33<CR>

## 4.7 HELP

Request a list of all commands and queries.

4.7.1 Query: ?HELP<CR>

4.7.2 Response: Transmit a listing of all commands and queries.

## 4.8 LIST CONFIGURATION

Request a list of all configurable parameters and current settings.

4.8.1 Query: ?LIST\_CONFIG<CR>

4.8.2 Response: \$TRIGGER FOR 1 = *triggersource*<CR>  
\$TRIGGER FOR 2 = *triggersource*<CR>  
\$TRIGGER FOR 3 = *triggersource*<CR>  
\$TRIGGER FOR 4 = *triggersource*<CR>  
\$TRIGGER FOR 5 = *triggersource*<CR>  
\$TRIGGER FOR 6 = *triggersource*<CR>  
\$TRIGGER FOR 7 = *triggersource*<CR>  
\$TRIGGER FOR 8 = *triggersource*<CR>  
\$DELAY FOR 1 = *ondelay, offdelay*<CR>  
\$DELAY FOR 2 = *ondelay, offdelay*<CR>  
\$DELAY FOR 3 = *ondelay, offdelay*<CR>  
\$DELAY FOR 4 = *ondelay, offdelay*<CR>  
\$DELAY FOR 5 = *ondelay, offdelay*<CR>  
\$DELAY FOR 6 = *ondelay, offdelay*<CR>  
\$DELAY FOR 7 = *ondelay, offdelay*<CR>  
\$DELAY FOR 8 = *ondelay, offdelay*<CR>  
\$FEEDBACK = *fb*<CR>  
\$LINEFEED = *lf*<CR>  
\$PROFILE = *n*  
\$REBOOT\_DELAY1 = *offdelay*  
\$REBOOT\_DELAY2 = *offdelay*

*triggersource* = { NONE, BUTTON\_1, BUTTON\_2, TRIGIN }

*ondelay* = { 0-255 } (seconds)

*offdelay* = { 0-255 } (seconds) 0 = Always on

*fb* = { ON, OFF }

*lf* = { ON, OFF }

*n* = { 1,2,3,4 }

## 5. Responses and Warning Messages

If unsolicited feedback is enabled, the following warning messages will be transmitted under the conditions outlined in their description.

### 5.1 OUTLET STATUS CHANGE

5.1.1 Condition: Outlet or trigger output changes (on/off) state.

5.1.2 Message: \$OUTLETn = *status*<CR>  
n = { 1..8 }  
*status* = { ON, OFF }

### 5.2 TRIGGER STATUS CHANGE

5.2.1 Condition: When either front panel button or input trigger status changes, a status message is sent to the controller.

5.2.2 Message: For BUTTON\_1 press: \$BUTTON\_1 = TRIGGERED<CR>  
For BUTTON\_2 press: \$BUTTON\_2 = TRIGGERED<CR>  
If input trigger is switched ON: \$TRIGIN = ON<CR>  
If trigger input is switched OFF: \$TRIGIN = OFF<CR>  
If Green mode is switched ON: \$GREEN MODE = ON<CR>  
If Green mode is switched OFF: \$GREEN MODE = OFF<CR>

### 5.3 OVERVOLTAGE

5.3.1 Condition: Input voltage rises above the overvoltage threshold.

5.3.2 Message: \$PWR = OVERVOLTAGE<CR>

### 5.4 UNDERVOLTAGE

5.4.1 Condition: Input voltage falls below the undervoltage threshold.

5.4.2 Message: \$PWR = UNDERVOLTAGE<CR>

### 5.5 RECOVERY

5.5.1 Condition: Input voltage falls within safe operating range following an over-voltage or under-voltage condition.

5.5.2 Message: \$PWR = RECOVERY<CR>

### 5.6 NORMAL

5.6.1 Condition: Upon leaving the recovery mode following an over-voltage or under-voltage condition.

5.6.2 Message: \$PWR = NORMAL<CR>

### 5.7 FAULT STATUS

5.7.1 Condition: When the breaker changes status, a message will be sent indicating the status of the indicator.

5.7.2 Message: \$BREAKER = *status*<CR>

5.7.3 Condition: When a wire fault is detected a message will be sent to indicate the status of the indicator.

5.7.4 Message: \$WIRE FAULT = *status*<CR>

5.7.5 Condition: When the temperature exceeds the upper safe operating limit, a message will be sent.

5.7.6 Message: \$TEMPERATURE = *status*<CR>

*status* = { FAULT, OK }

# M4320-PRO Specifications

<b>AC Power</b>		<b>LAN Protection</b>	
Line Voltage.....	120V, 60Hz	Clamping Level.....	62 ± 6V
Isolated Banks.....	4	Compatibility.....	10/100/1000BASE-T
Voltage Regulation.....	No	Jacks.....	RJ-45
Total Outlets.....	9 Outlets	Wires Protected:.....	8-Wires
High Current Outlets.....	2 Outlets	<b>Telco Protection</b>	
Total Current Capacity.....	M4320-PRO 20 A (2400W)	Fuseless/Auto-resetting.....	Yes
Voltage Protection Rating (UL 1449 3rd Edition, 3,000A):.....	330V	Clamping Level.....	260V
Protection Modes.....	L-N, L-G, N-G	Capacitance.....	30pf (approx.)
Initial Clamping Level.....	200V Peak, 141V RMS	Suppression Modes.....	Metallic & Longitudinal
Energy Dissipation.....	2700 Joules	Connectors.....	RJ-11
Peak Impulse Current.....	135,000 Amps	Lines Protected.....	2-Wire, Pins 4 & 5
Catastrophic Surge Circuit.....	Yes	<b>Universal Coax Protection</b>	
Thermal Fusing:.....	Yes	HD 1080 i/p Ready.....	Yes
Auto-resetting Over-voltage shutoff.....	134 VAC ± 2 VAC	Bidirectional.....	Yes
Auto-resetting Under-voltage shutoff.....	100 VAC ± 2 VAC	Shielded.....	Yes
12v trigger input 5-24 volts DC , 820 ohms Jacks 3.5mm (1/8") mono mini-plug.		Clamping Level.....	75V
		Frequency Range.....	.0Hz - 2.2 GHz
		Insertion Loss.....	< 0.5 dB
		Connectors.....	Female "F", Gold Plated

Specifications subject to change due to product upgrades and improvements.

## FCC Notice

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (1) Reorient or relocate the receiving antenna.
- (2) Increase the separation between the equipment and receiver.
- (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (4) Consult the dealer or an experienced radio/TV technician for help. Any special accessories needed for compliance must be specified in the instruction.

**CAUTION:** A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect RS-232 devices to this equipment.

**CAUTION:** Any changes or modifications not expressly approved by the guarantee of this device could void the user's authority to operate the equipment.

## Contacting Customer Service

If you require technical support or equipment service, please contact the Panamax Service Department at 800-472-5555. You may also email [info@Panamax.com](mailto:info@Panamax.com).

All equipment being returned for repair must have a Return Authorization (RA) number. To get an RA number, please call the Panamax Service Department.

Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.



DIN-00002-C 101/1/12

© 2011 Panamax LLC, 1690 Corporate Circle, Petaluma, CA 94954 • [www.panamax.com](http://www.panamax.com) • 707-283-5900 • Fax 707-283-5901