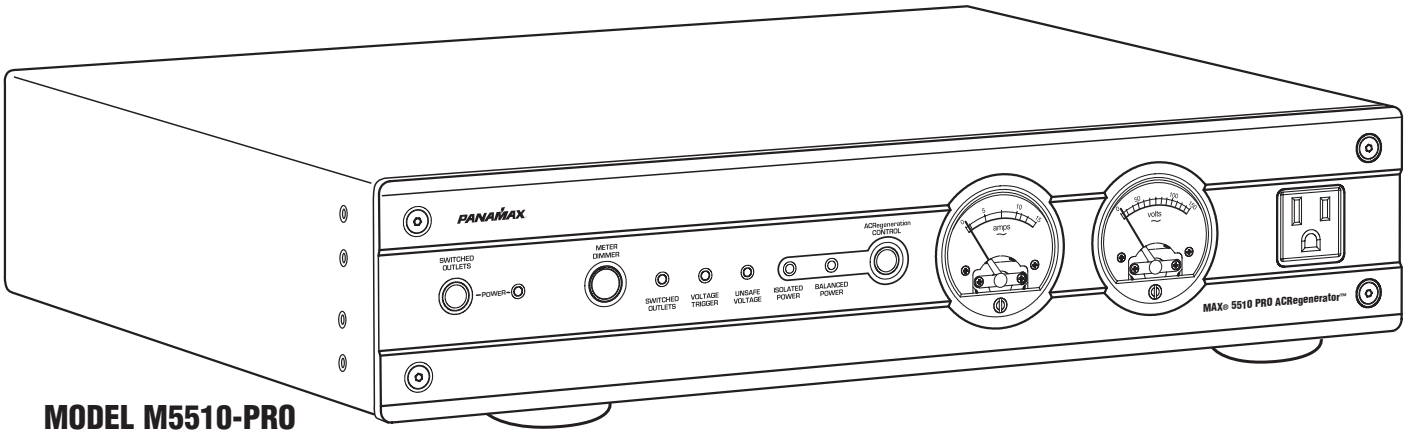
MAX® 5510 PRO ACRegenerator™
Owner's Manual



MODEL M5510-PRO

The Power Specialist Since 1975

PANAMAX®

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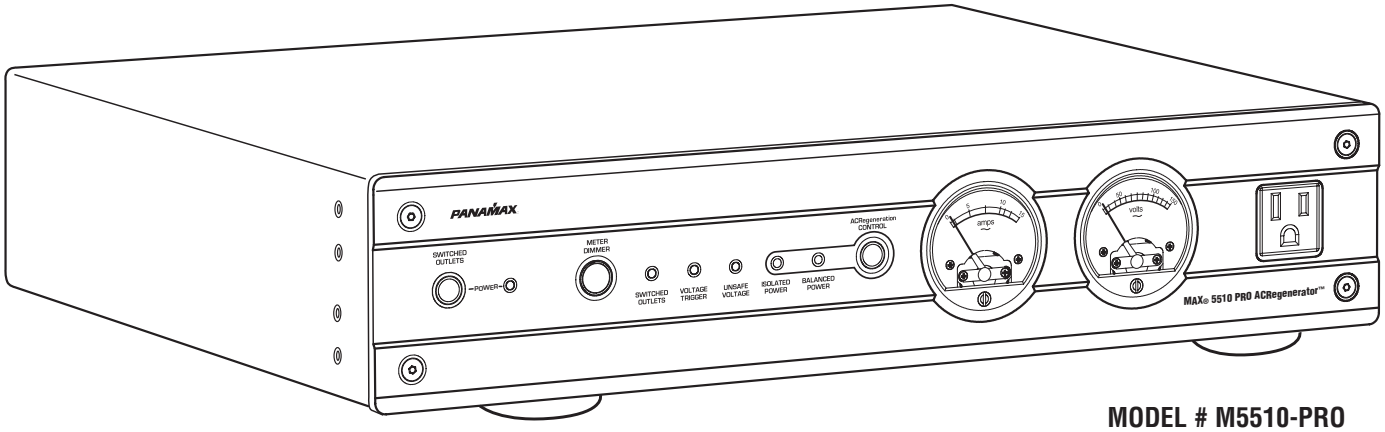
MAX® 5510 PRO ACRegenerator™ Owner's Manual

Thank you for purchasing this MAX® 5510 Pro, ACRegenerator™! You now own one of the finest line conditioning and power protection products on the market today. Over 25 years of power protection experience and more than 10 years of Audio/Video noise filtration experience were utilized during the development of this model. The MAX® 5510 Pro has been specifically engineered to enhance the performance and life expectancy of high-end Audio/Video entertainment gear. The combination of our sophisticated power conditioning and the world's finest power protection has resulted in an Audio/Video power center that meets the power quality needs for each piece of equipment in your entertainment system. This is truly a Firewall for Noise™! With power this clean, your audio/video or home theater system will finally be able to perform up to its full capabilities. Performance alone makes this a world-class product but we didn't stop there; its styling complements and completes even the most sophisticated Audio/Video showcase.



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PANAMAX®

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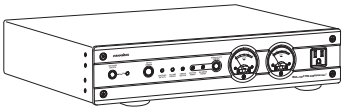
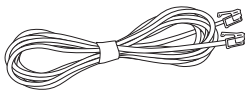
BEFORE YOU BEGIN

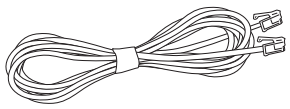
In addition to this owner's manual, items included with the MAX® 5510-PRO package are:



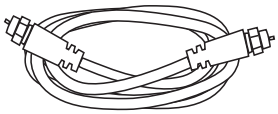
1 - MAX®5510-PRO



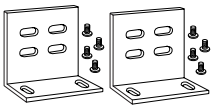
1 - RJ-11 Telephone Cable



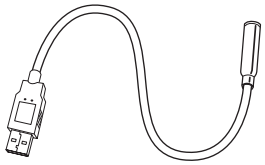
1 - CAT 5 Ethernet Cable



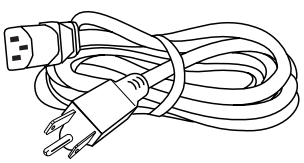
3 - Coax Cables for Satellite TV, Cable TV and/or Antennas



2 - Rack ears w/ screws for rack mounting option



1 - LED Convenience Lamp



1 - IEC 320, 120V/15A detachable power cord

Please verify that you have received all these items. If not, contact Panamax.

INTRODUCTION

Your Audio/Video components are constantly being bombarded by electromagnetic interference (EMI) and radio frequency interference (RFI) through their power cords. This contaminated power can affect analog and digital equipment and will degrade the overall performance of your entire system. Digital components can also introduce noise on their AC power lines, which can interfere with the performance of analog components. Common symptoms of contaminated power include pops, hisses, hums, visual artifacts, etc. Most power filtering devices will remove some of this interference but don't provide a comprehensive solution to the problem.

The MAX® 5510 Pro's Power Filtration System is the Complete Solution!

Level 1 - for Digital Source Components or Display Devices:
True isolation from contaminated power sources is the first level. The heart of the MAX® 5510 Pro is a 720VA, Isolation Transformer that provides power to four outlets for your digital source components or displays. AC Regeneration through electromagnetic coupling between the primary and secondary windings of the transformer allows only clean, pure AC power to reach your equipment. None of the EMI/RFI contamination gets past the isolation transformer! In addition, any noise generated by your digital source components is isolated and prevented from reaching the rest of your equipment through their power cords.

Two different power modes, Isolated and Balanced, are available as output from the isolation transformer. These are selected with the front panel AC Regeneration pushbutton. In the Isolated mode, the secondary (load side) of the transformer's winding is completely isolated from ground connections. Digital source components (with 2-blade power plugs) that are plugged into these outlets are also isolated, eliminating ground loops and hum.

In the Balanced mode, a center tap wire from the secondary winding is connected to ground. This creates a balanced voltage waveform (+60V Line-Ground & -60V Neutral-Ground, 180 degrees out of phase), which still provides 120VAC to your equipment but has the benefit of canceling any common mode noise between Line/Neutral and Ground.

The MAX® 5510 Pro allows you to switch between Isolated and Balanced modes since there is no way to categorically state that "Isolated Power" is better than "Balanced Power" or that "Balanced Power" is better than "Isolated Power". Both modes provide clean, regenerated power to your digital source components. One setting may provide better results than the other for your particular system but the only way to really know is to try both and use the one that sounds better to you. Results will depend upon the quality of your incoming power, noise sources close to your home or system, your combination of components and the quality and routing of interconnected cabling. Due to this, different results may be observed when comparing picture and sound quality from identical equipment in different physical locations.

Level 2 – for Analog Components:
The second level in the Power Filtration system features two banks of independently filtered outlets (2 outlets per bank) for your analog components. These outlet banks utilize "Balanced Double L" filter circuits which are far superior to any other design in filtering out all forms of electromagnetic and radio frequency interference in both common and normal modes. Cross-contamination between your components is also eliminated with this design.

Level 3 – for High-Current Components:
The third level of the system specifically addresses the unique power requirements of current hungry components such as amplifiers and powered subwoofers. These components rapidly draw large amounts of current to replenish their capacitors after thunderous bass notes. Line conditioners that utilize coils (inductors) in series with the AC power line can "choke" off this large in-rush current, thereby reducing the amplifiers' ability to operate at peak performance levels, resulting in a flat, dead sound. The MAX® 5510 Pro's high-current outlets are fed by noise filtration circuitry that does not utilize coils and provides full, unimpeded power for your amplifiers and powered subwoofers.

Other Convenience Features Enhance the Functionality:

Although the MAX® 5510 Pro's functionality revolves around noise filtration and power protection, many other exciting features enhance your overall entertainment experience, including:

• An analog, backlit voltmeter indicates the AC line voltage coming into your system.

• An analog, backlit ammeter shows the actual current draw of all your connected components, giving a visual reference as to how your system is functioning under a variety of conditions.

• A front panel pushbutton controls the meter lighting intensity (High, Low, Off) and color (Blue or Amber).

• A detachable rear panel LED convenience lamp simplifies system setup in low-light situations.

• An Always-On, convenience outlet on the front panel is for temporary AC connections.

As you read through the rest of this manual, you'll discover many more unique features. As home theater enthusiasts, we care about the quality of your listening and/or viewing experience. Our goals are to:

• Make power better (conditioning that allows your system to perform up to its full capabilities)

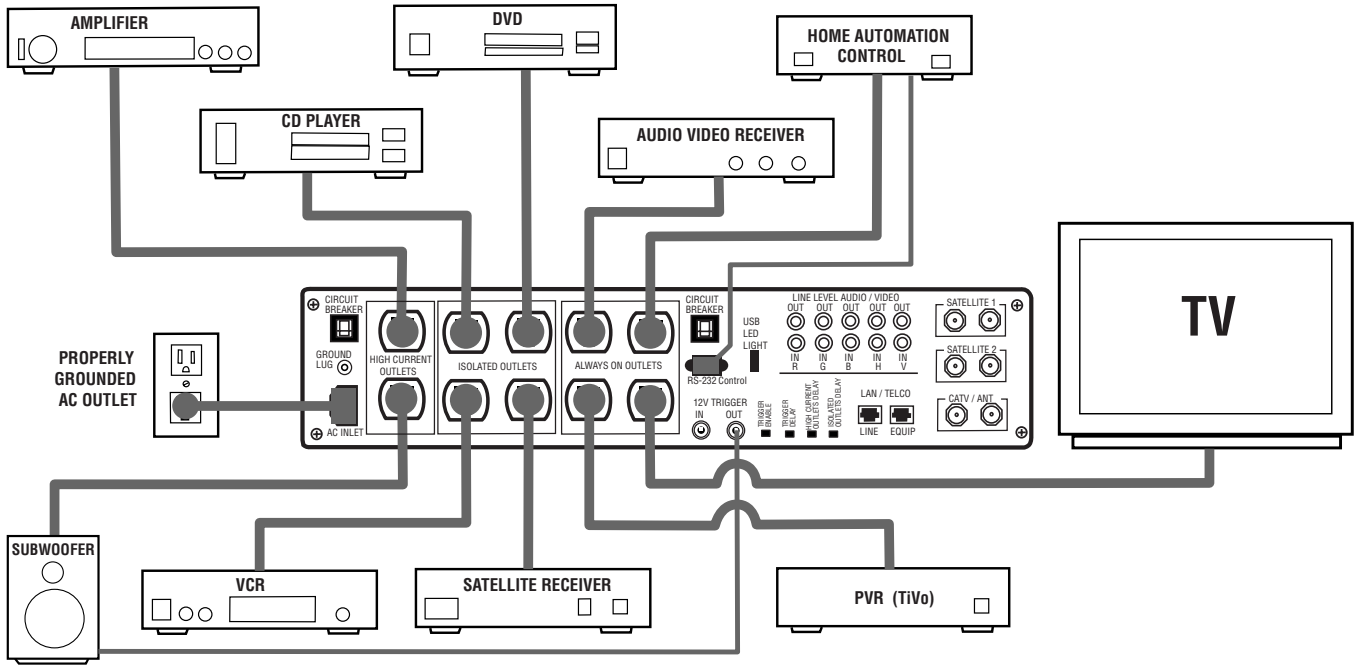
• Make power safer (protect your investment from damaging power disturbances)

• Enhance the pleasure you get from your A/V system

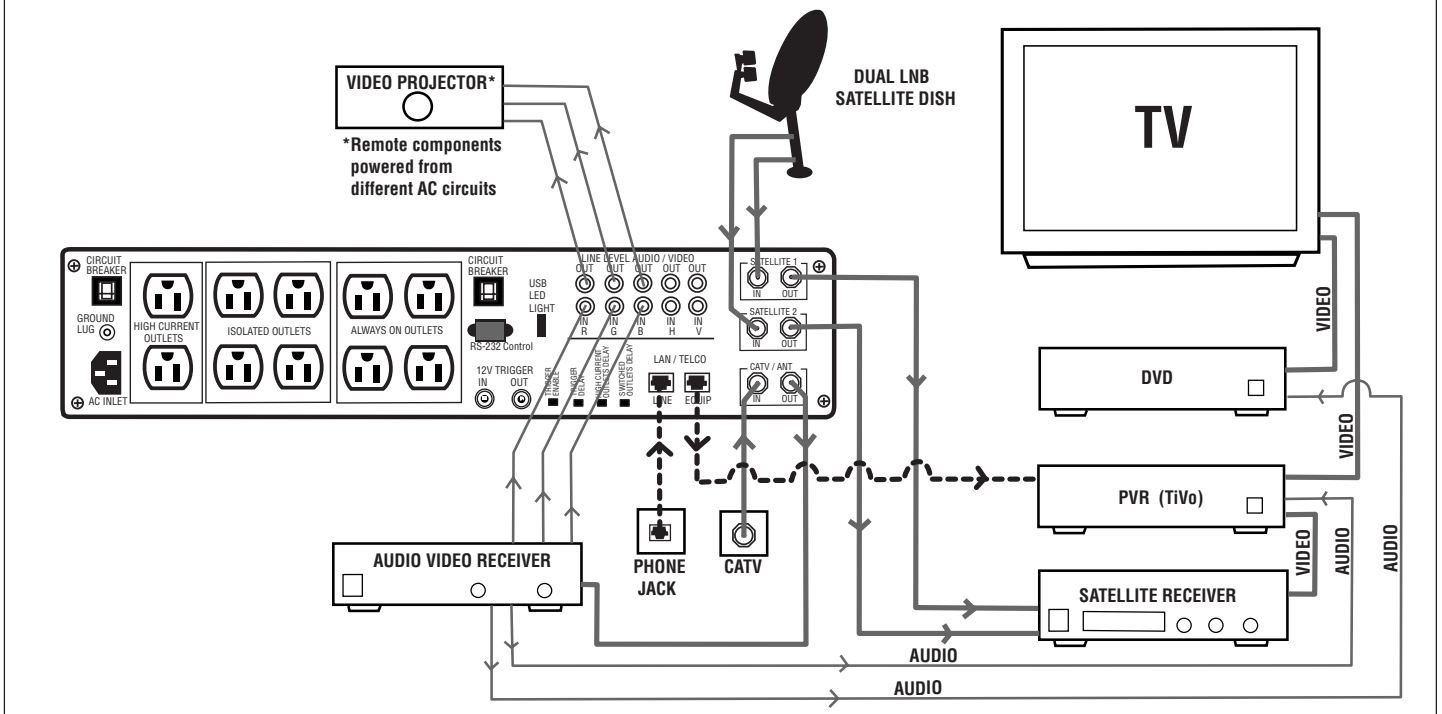
Thank you for choosing Panamax for your power quality needs. Please finish reading the instructions, install the MAX® 5510 Pro and enjoy the full potential of your entertainment system.

CONNECTION DIAGRAM

STEP 1 Typical AC Power, RS232 and 12V Trigger Connections



STEP 2 Basic Signal Line Connections



FEATURE OVERVIEW

1. Power Switch and LED: Pushbutton; activates a turn-on or shutdown sequence for the Isolated and High-Current outlets. The Green LED will be illuminated when the unit is plugged into an AC outlet and the power switch is in the "ON" position. The LED flashes during the outlet turn-on and turn-off delay periods.

2. Meter Lights Switch: Pushbutton; controls brightness of the Ammeter and Voltmeter backlighting. Cycles among five settings; High Blue, Low Blue, High Amber, Low Amber, OFF

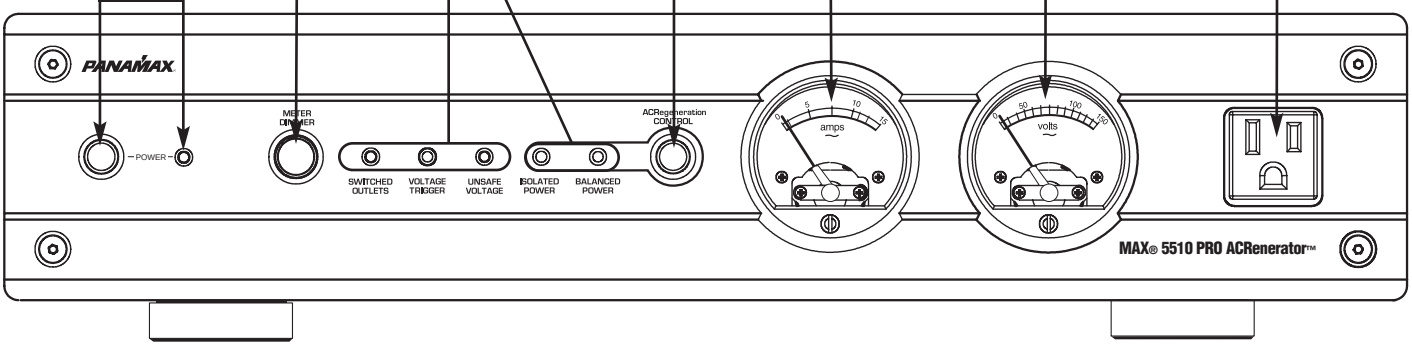
3. LED Indicators: Switched Outlets, Voltage Trigger, Unsafe Voltage, Isolated Power and Balanced Power status indicators.

4. AC Regeneration Control and LED Indicators: Select either Isolated Power Mode and Balanced Power Mode for your digital source components or video display device

5. Ammeter: Backlit analog meter measures current draw for connected equipment.

6. Voltmeter: Backlit analog meter measures incoming voltage source from 0-150 VAC.

7: Convenience Outlet: Provides a quick convenient way to plug in components such as camcorders and video game systems.



1. 15A Main Circuit Breaker: Opens in the event that equipment plugged into the MAX 5500 draws too much current. When white is visible, the breaker has opened. Reduce the load and push to reset.

2. High Current Outlet Bank: Two delayed outlets designed for high current components such as amplifiers and powered subwoofers. The current available to connected equipment is not limited by the noise filtration components.

3. Isolated (Switched) Outlets: Four outlets provide complete isolation for digital source components such as DVD players or display devices like plasma TVs or DLP projectors. These outlets are completely isolated from the rest of the system.

4. Filtered Outlet Banks 1& 2: Four, Always-On, Balanced Double L filtered outlets for low current analog audio components such as pre-amplifiers, receivers, VCR's and tape decks. Two outlets per filter bank.

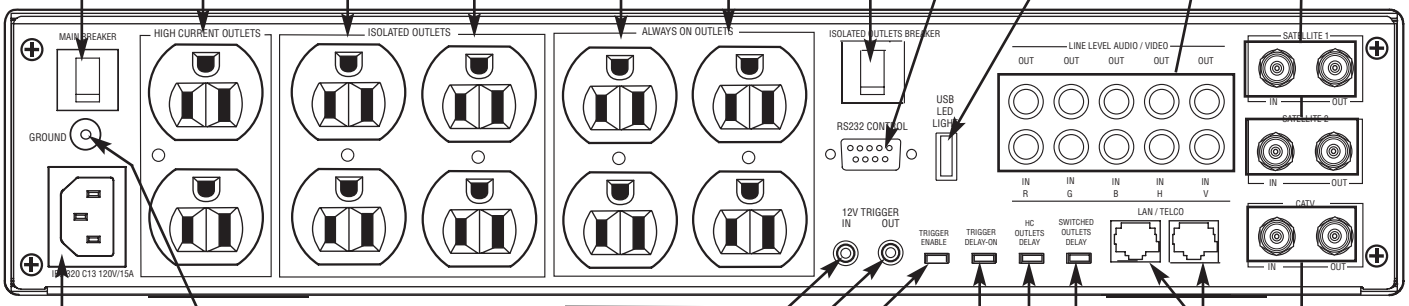
5. Isolated Outlets Circuit Breaker: Opens in the event that equipment connected to the Isolation Transformer Outlets exceeds 6 amps current draw. When white is visible, the breaker has opened. Reduce the load and push to reset.

6. RS232 Control Interface: DB-9 male connector. Use to connect the M5510-Pro to a home automation system.

7. Lamp Receptacle: USB jack. The convenience lamp included with the M5510-Pro is to illuminate the rear panels of other components during setup.

8. Line Level Audio/Video Jacks: Color-coded RCA jacks, female, 5 pair. Use to protect the main system from backdoor surges coming in on the signal lines.

9. Satellite Coax Jacks: Two pairs of F-Connectors optimized for Satellite TV signal line protection.



10. IEC Main Power Receptacle: Detachable power cord connects to this receptacle.

11. Ground Lug: Provides a common grounding point for equipment with separate ground leads

12. DC Trigger Input: 3.5mm (1/8") Mini-Plug jack. Connect to a remote trigger device that uses a DC voltage signal to initiate a startup/shutdown sequence.

13. DC Trigger Output: 3.5mm (1/8") Mini-Plug jack. The M5510-Pro can generate its own 12VDC trigger to control another device.

14. Trigger Enable Switch: Enables or disables the DC Trigger input function.

15. High-Current Outlet Delay Switch: 3-position slide switch. Allows adjustment of the Turn-On delay for the 2 Delayed High Current Outlets. Choose between 0 and 10 seconds.

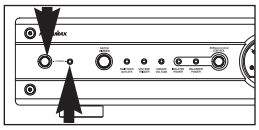
16. Trigger Delay Switch: Sets the delay time (0 or 10 seconds) between receiving a DC trigger input signal and when the M5510-Pro sends its DC Trigger output signal.

17. Isolated Outlets Delay Switch: 3-position slide switch. Allows adjustment of the Turn-Off delay for the 4 Isolation Transformer Outlets. Choose between "always-on", and 10 seconds.

18. LAN/Telephone Jacks: In/Out connections for Ethernet, telephone line or pay-per-view line protection.

19. CATV Coax Jacks: One pair of F-Connectors optimized for Cable TV, Antenna or Cable Modem signal line protection.

FEATURE DETAILS

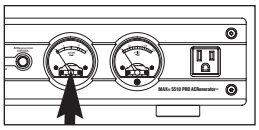


Power Switch and LED Indicator: Momentary Pushbutton (non-locking); activates a turn-on or shutdown sequence for the Isolated (Switched) and High-Current outlet banks. The Green LED will be illuminated when the unit is plugged into an AC outlet and the power switch is in the "ON" position.

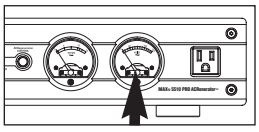
Press and hold the button >2 seconds to turn the High Current and Isolated outlet banks On/Off.

If the unit is already on and the power button is pressed quickly (< 2 seconds), the High Current and Isolated Outlet banks are turned Off, then back On (sequenced according to the delay settings). This prevents accidentally turning the connected equipment Off and provides an easy method of cycling power to reboot components that may lock up.

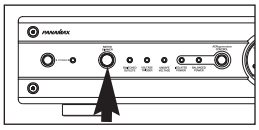
Meters: The analog meters are backlit to provide the ability to view readings in a dark room. LEDs (light emitting diodes) are used in order to provide durability and long life.



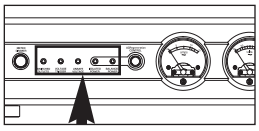
The **Voltmeter** samples the incoming voltage from the wall outlet and provides a visual representation of the available power. The Voltmeter is Always-On and indicates the incoming line voltage even during an unsafe voltage condition. Readings above 150V will not be accurate due to the meter's damping characteristics.



The **Ammeter** measures the amount of current being drawn by the connected equipment and the M5510-Pro. The Ammeter needle will fluctuate as music or movie soundtracks call upon the amplifiers to reproduce thunderous bass notes. During an unsafe voltage condition, the Ammeter will continue measuring the amount of current being drawn by the Max 5510-Pro, but since all of the connected equipment has been disconnected by the protection circuitry, the needle will be only slightly above zero.

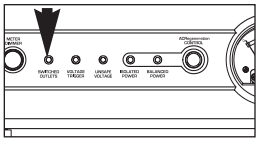


Meter Lighting: The front panel pushbutton controls the meter lighting and cycles among five settings; High Blue, Low Blue, High Amber, Low Amber, OFF

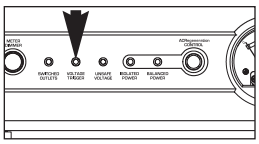


Diagnostic Indicator Lights: The MAX 5510-Pro is loaded with special features to save your connected equipment from many different forms of dangerous power disturbances. Diagnostic lights on the front panel inform you in the event of either a power disturbance or when a special feature is activated.

The indicators are:



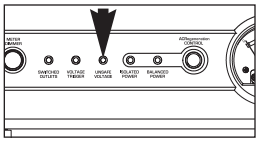
Switched Outlets: Green LED. This light indicates the status of the Isolated (Switched) and High-Current outlet banks. When the LED is ON, both outlet banks are on and providing power. When the LED is OFF, the power to these two outlet banks is also OFF.



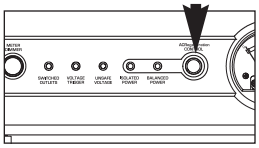
Voltage Trigger: Green LED. This light indicates status of the DC voltage trigger.

When enabled by the rear-panel switch and a DC voltage is sensed by the input trigger circuitry, this LED turns ON along with the switched outlets. Both the LED and the outlets will be OFF when the DC voltage trigger is not receiving a signal.

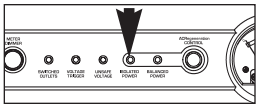
When disabled by the rear-panel switch, the LED will remain ON and front-panel power switch will control the On/Off status of the switched outlets.



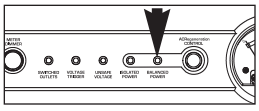
Unsafe Voltage: Red LED. Under normal voltage conditions, this light stays off. When this light is flashing slowly (once every 2 seconds), it indicates an under-voltage or over-voltage condition. When the light is flashing quickly (twice per second), it indicates a 10 second recovery period from an under/over-voltage condition. This LED will flash quickly when the MAX 5510-Pro is first plugged in to the wall outlet.



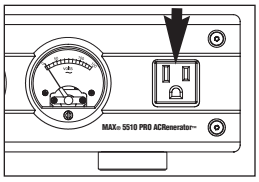
AC Regeneration Control: Pushbutton switch used for selecting the power supply mode for the digital source components. One of the adjacent LEDs for Isolated Power and Balanced Power will illuminate to indicate the active switch position.



Isolated Power: Green LED. When this light is ON, it indicates that the Isolated Power Mode has been selected for the power supply to the Isolated/Switched Outlets.



Balanced Power: Green LED. When this light is ON, it indicates that the Balanced Power Mode has been selected for the power supply to the Isolated/Switched Outlets.



Convenience Outlet: A single outlet on the front panel of the Max 5510-Pro provides an easy-to-reach power source for electronic equipment typically used on a part time basis. Such equipment includes anything from video game systems to camcorders. Do not use this outlet for household appliances like vacuum cleaners!

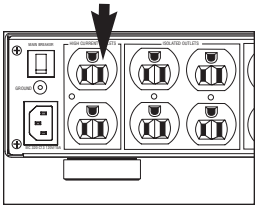
The convenience outlet provides clean, protected power for your sensitive electronic equipment. This outlet is Always-On and will continually supply a steady source of power. It is important to remember that power will be disconnected only in the event of an unsafe voltage condition.

FEATURE DETAILS (continued)

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. The MAX 5510-Pro is designed to eliminate these transients by providing a "start-up" delay for the High Current outlets and a "shutdown" delay for the switched Isolation Transformer Outlets. This allows the components plugged into the switched outlets to power-up and stabilize before any amplifiers and powered subwoofers are turned on. This sequence is reversed during shutdown. The amplifiers and powered subwoofers turn off, their power supplies drain, and then the equipment plugged into the switched outlets is turned off.

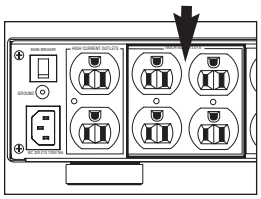
Information on setting the delay times is included in the Isolated/Switched Outlets and High Current Outlets sections that follow.



High-Current Outlet Bank:

The two high-current outlets allow amplifiers and powered subwoofers to work to their full potential. When the movie thunders with a terrific explosion or when the music reaches a climactic crescendo, an amplifier has to rapidly draw large amounts of current to replenish its capacitors. Traditional line conditioners impede this current draw, in effect, starving an amplifier and resulting in a flat, dead sound. The High-Current Outlet Bank provides clean, filtered power to amplifiers but has no current limiting components to impede performance.

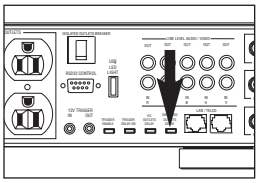
The high current outlets are designed with a turn-on delay option of 0 or 10 seconds. The 2-position, HC Outlet Delay switch on the back of the MAX 5510-Pro is used to select the desired time delay. When a delay is selected, the high-current outlets will turn-on after the Isolated/switched outlets and turn-off before the Isolated/switched outlets (if they're not set to always-on). With a delay, the connected equipment will not power up simultaneously, thus preventing loudspeaker noises such as "thumping".



Isolated/Switched Outlet Bank:

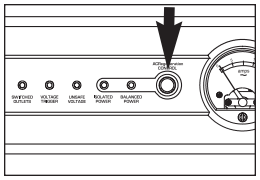
Four outlets (one bank of four) are fed power through the heart of the MAX 5510-Pro, the Isolation Transformer. These outlets should be used for digital components such as DVD players or display devices like Plasma TVs or DLP projectors.

Pure, clean power is obtained by using the isolation transformer to regenerate the AC current. The power from a typical wall outlet is contaminated with electromagnetic (EMI) and radio frequency (RFI) interference (noise) picked up by the power lines between the power utility's generating plant and the wall outlet. This contaminated power feeds the isolation transformer's primary windings and is regenerated (through electromagnetic induction) as clean power on the isolated secondary windings. The outlets are connected to the secondary windings, which have no physical connection to the primary windings. This is True Isolation! Not only will it isolate your digital source equipment from contaminated power, but also prevent any noise generated in the digital components from flowing back to other connected equipment.



A 2-position slide switch **(Switched Outlets Delay)** located on the rear panel controls the timing for the Isolation Transformer Outlets. Together, these outlets can be set as "always-on" or with a turn-off delay of 10 seconds to prevent speaker "thump". This switch provides the option of having a total of eight always-on outlets (4 Filtered Outlets and 4 Isolation Transformer Outlets).

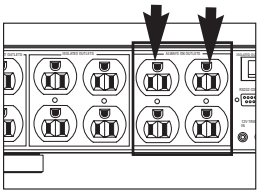
When set to the 10 second delay position, the Isolation Transformer Outlets will remain as Switched outlets, controlled by the Power pushbutton and/or the DC Voltage Sense Trigger. In this situation, the Isolation Transformer Outlets will not power down until after the selected time delay has elapsed.



Two different power modes, Isolated and Balanced, are available as output from the isolation transformer. These are selected with the front panel **AC Regeneration** pushbutton. In the Isolated mode, the secondary (load side) of the transformer's winding is completely isolated from ground connections. Digital source components (with 2-blade power plugs) that are plugged into these outlets are also isolated, eliminating ground loops and hum.

In the Balanced mode, a center tap wire from the secondary winding is connected to ground. This creates a balanced voltage waveform (+60V Line-Ground & -60V Neutral-Ground, 180 degrees out of phase), which still provides 120VAC to your equipment but has the benefit of canceling any common mode noise between Line/Neutral and Ground.

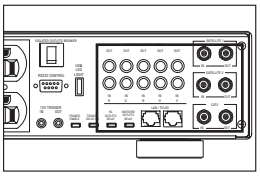
FEATURE DETAILS (continued)



Filtered Outlet Banks 1 & 2:

Four outlets (two banks / two outlets per bank) are fed through separate “Balanced, Double L” noise filtration circuits. These circuits are designed to eliminate the AC contamination that is most detrimental to the performance of analog or video components like stereo receivers, VCRs or televisions. The two dedicated filters are carefully engineered to provide power filtration and inter-component "noise isolation" for both "common-mode" (line/neutral-to-ground) and "normal-mode" (line-to-neutral) EMI/RFI. This means that high-frequency interference will be drastically reduced not only from the incoming power but also from equipment plugged into the other outlet banks, regardless of what "mode" it occurs in. Even equipment with ungrounded, 2-blade plugs, receives clean power.

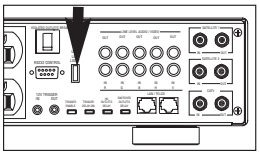
Each outlet bank is specifically engineered to remain ON continually to provide a constant power source for programmable analog or video components. A digital video recorder and VCR are two examples of components that require constant power. A digital video recorder relies on continual power to record the cable signal and retain its programmed information. A VCR should be connected to one of these always-on, filtered outlets to maintain correct clock time and programmed recording information.



A/V signal Line Protection:

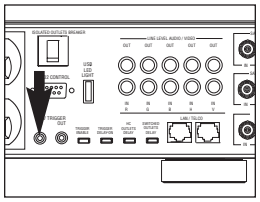
In the event of a power surge, system components plugged into different AC receptacles and/or circuits can create voltage differentials that result in “ground-skew” surges on the signal lines. These “backdoor” surges can be as damaging to your equipment as an externally generated surge. Examples of this type of equipment include ceiling mounted video projectors or powered subwoofers located away from the main system components. The MAX® 5510 Pro provides five line level protection circuits that are optimized for audio and video signals. The clamping level is 7.5 VDC. Attenuation is less than 1db from 20 Hz to 6 MHz so that optimal performance is achieved and signal integrity is not compromised. Although the circuits are individually labeled for R, G, B, H & V video signals, they may be used for any combination of audio or video signal lines. The circuitry is compatible with High Definition component video, S-Video, composite video or audio signals.

Convenience Lamp:

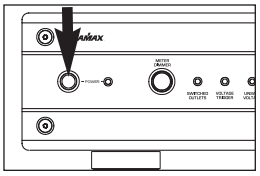


The convenience lamp included with your MAX® 5510-Pro plugs into an industry standard USB jack on the rear panel. Its purpose is to provide better visibility of other components and their A/V connections during system setup. **Warning:** The USB jack only provides power. The lamp will be ON whenever it is plugged in. ***DO NOT*** use this jack for other USB devices.

DC Triggers:

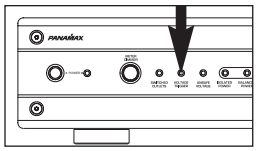


Input Trigger: This feature provides an ON/OFF trigger for the MAX 5510-Pro using a DC voltage control signal. Many components such as pre-amplifiers and receivers have a 12VDC trigger built-in, and will transmit a constant power signal when turned on and in use. This power signal will initiate the startup or shutdown sequence of the MAX 5510-Pro’s isolated/switched and high current outlets. An AC adapter of the appropriate voltage, plugged into a switched outlet on the receiver, may also be used if a 12V trigger is not built in.

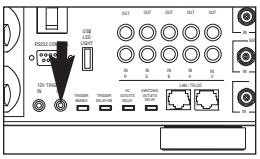


The trigger input uses a standard 3.5mm mono mini-plug jack. **Please note:** The front panel pushbutton must be left in the **“ON”** position if you are using the DC Input Trigger and not connected to a Home Automation system through the RS232 port.

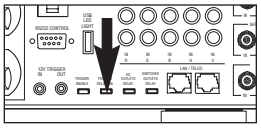
Input Trigger Enable Switch: This switch is used to disable or enable the Input Trigger feature. The circuitry for the voltage sense trigger also controls the Voltage Trigger Diagnostic LED on the front panel. When disabled, the front panel Trigger LED remains lit and the front panel pushbutton controls the ON/OFF state of the switched and high current outlets.



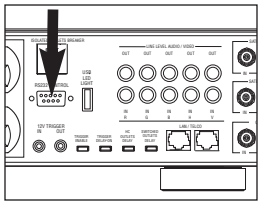
When enabled, and a DC voltage is sensed by the Input Trigger circuitry, the front panel Trigger LED will light to indicate that the voltage sense circuit is ON and the MAX 5510-Pro’s switched outlets are ON.



Output Trigger: The MAX 5510-Pro is capable of generating its own 12VDC remote signal to control other components. In its default state, this output turns ON when the Input Trigger receives a signal and OFF when the input trigger signal is turned off. This output also uses a standard 3.5mm mono mini-plug jack.

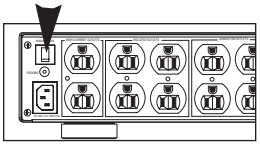


Output Trigger Delay Switch: This switch allows the selection of 0 or 10 second delay in turning on the 12VDC output signal. There is no delay when it turns off.



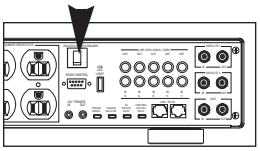
RS232 Trigger Control: The MAX 5510-Pro’s command set default is “ATTACHTRIG” (Trigger Attached), meaning that the ON/OFF state of the Output Trigger is dependent on the Input Trigger. When connected to a Home Automation system through the RS232 port, operation of the Output Trigger can be divorced from the Input Trigger and the automation system can control the ON/OFF state of the Output Trigger. This is accomplished through the “DETACHTRIG” (Trigger Detached) command.

FEATURE DETAILS (continued)

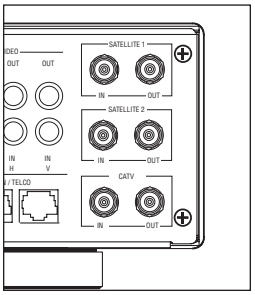


Circuit Breakers:

There are two separate circuit breakers on the back panel of the MAX 5510-Pro. The **main circuit breaker** will trip only if the total current draw exceeds the maximum current rating (15A). This means that collectively, all outlets must draw more than 15 Amps before the circuit breaker will trip.



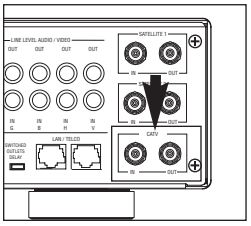
There is also a **6 Amp circuit breaker** to protect the 720 VA Isolation Transformer and its circuitry. The Isolation Transformer provides pure power for digital source components, which require very little current to operate at peak performance.
Please note: ***Do not plug high-powered amplifiers or powered subwoofers into the Isolation Transformer Outlets. Their current requirements may exceed the 6 Amp limit and cause the circuit breaker to trip.***



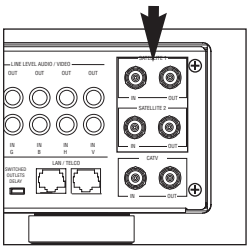
Coaxial Line Protection:

All coaxial cable sheaths from outdoors must be grounded to the building grounding electrode system where they enter the building (per applicable NEC/CEC code). A driven ground rod is not adequate.

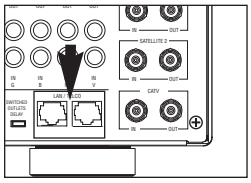
Panamax's exclusive SignalPerfect™ Technology provides application specific protection for your satellite and cable TV equipment. The satellite connections are for coaxial cables connected to a DBS (single or dual LNB) satellite dish. The CATV connection is for a non-amplified rooftop antenna or cable TV line. Alternatively, it may be used to protect the equipment plugged into the MAX 5510-Pro from "backdoor" surges in situations where the video signal is run to another room for a 2nd television.

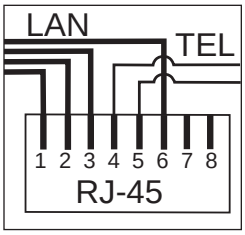


Cable TV (Including HDTV) & Cable Modems: TV tuners operate at approximately 500 millivolts (1/2 volt) and utilize the frequency spectrum of 50 MHz to 950 MHz. Digital cable boxes and cable modems typically operate at slightly higher voltages while cable modems utilize the frequency range below 50 MHz. The clamping level of the MAX 5510-Pro's CATV protection circuitry is 1400 millivolts (1.4 volts). The circuitry is shielded to prevent interference and has been optimized to have less than 1dB of signal loss throughout the entire frequency range up to 950 MHz.



Satellite TV: Satellite dish LNB's can require up to 24 volts to operate and utilize the frequency range of 950 MHz to 2.2 GHz. The clamping level of the MAX 5510-Pro's satellite protection circuitry is 27 volts; just 3 volts above the maximum operating voltage. The circuitry is shielded to prevent interference and has been optimized to have less than 1dB of signal loss throughout the entire 950 MHz to 2.2 GHz range.

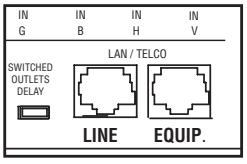




Telephone/LAN Line Protection:

This unit provides both telephone and LAN protection on one set of RJ-11/45 jacks. The telephone circuit uses pins 4 & 5 while the LAN circuit uses pins 1, 2, 3 & 6. Adapters or custom cables (not included) must be used when utilizing both protection circuits at the same time.

Satellite TV receivers and DVR's (digital video recorders) require telephone line connections for subscription services. The MAX 5510-Pro provides surge protection for this line. The circuitry utilizes auto-resetting PTCRs and solid-state SIDACtors" for reliability and unsurpassed protection. The clamping level of the MAX 5510-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 or DVR from damage.



To protect a telephone modem line (DVR or Satellite TV receiver) or network cable, connect a telephone cable or network cable from the wall jack outlet to the **LINE** jack of the 5510-PRO. Then connect a telephone cable or network cable from the **EQUIP.** jack on the UPS to the equipment's telephone jack or network device.

Please Note: The protection circuitry will not work if the phone lines are reversed. The incoming phone cable must be connected to the **"LINE"** jack and the cable to the audio/video equipment must be connected to the **"EQUIP"** jack.

AC Surge Protection:

When the MAX 5510-Pro AC Regenerator is subjected to a high voltage surge, its voltage output is limited to a safe level and the high levels of surge current are diverted away from the connected equipment.

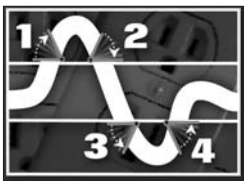
• When subjected to a 6,000V (open circuit voltage) / 500A (short circuit current) surge, the MAX 5510-Pro limits its voltage output to less than 330V peak, UL's best rating.

1. *Voltage reaches an unsafe level.*

2. *If surge is greater than MAX® 5510-Pro capacity, it* ***disconnects.***

• If the magnitude of the surge is greater than the capacity of the surge protection components, the MAX 5510-Pro's Protect or Disconnect Circuitry' will disconnect your equipment in order to protect it.

FEATURE DETAILS (continued)

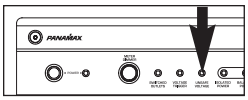


1. *Voltage reaches an unsafe high level and the SurgeGate Plus™* ***disconnects.***

2. *Voltage reaches a safe level and SurgeGate Plus™ automatically* ***reconnects.***

3. *Voltage reaches an unsafe low level and SurgeGate Plus™* ***disconnects.***

4. *Voltage reaches a safe level and SurgeGate Plus™ automatically* ***reconnects.***



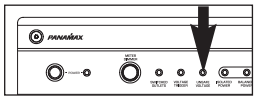
Patented Over/Under Voltage Protection:

The MAX 5510-Pro constantly monitors the AC line voltage for unsafe voltage conditions such as prolonged over voltages and under voltages (brownouts). These unsafe conditions pose a very dangerous threat to all electronic equipment within the home. If the MAX 5510-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 MAX 5510-Pro will automatically reconnect the power.

If the line voltage exceeds the over voltage threshold or falls below the under voltage threshold, the MAX 5510-Pro will perform the following tasks until line voltage returns to a safe level:

1. Disconnects power to all connected equipment.

2. Unsafe Voltage LED is activated and will blink once per second during the unsafe voltage condition.



The MAX 5510-Pro requires line voltage to return to within the safe operating range for 10 seconds before returning to normal operating mode. This is referred to as "Over/Under Voltage Recovery". The safe operating range is considered 5V above the under-voltage threshold and 5V below the over voltage threshold. Once this safe operating range is reached, the MAX 5510-Pro will perform the following functions:

1. Unsafe Voltage LED will flash 4 times per second for Over/Under voltage Recovery.

2. Power is restored to all connected equipment after the 10-second delay.

TECHNICAL SPECIFICATIONS

GENERAL

Dimensions.....17.25" W x 12" D x 3.5" H, (4.1" H including feet)
Weight.....31 lbs.

AC CIRCUIT PROTECTION AND FILTRATION

Initial Clamping Level.....200V
UL 1449 Surge Suppression Rating.....330V
Protection Modes..... L - N, L - G, N - G
Line Voltage.....120VAC
Max Current Rating.....15A (1800 Watts)
Response Time.....<1ns
Joule Rating.....2325 Joules
Peak Impulse Current.....91,000A
Catastrophic Surge Circuit .....YES
Thermal Fuse.....YES
Over/Under Voltage Protection.....YES
Over-voltage shutoff threshold / Response time.....137±4 VAC, 10 milliseconds
Under-voltage shutoff threshold / Response time.....95±4 VAC, 500 milliseconds

NOISE FILTRATION:

Filtered Outlet Banks.....55 dB (100 KHz - 1 MHz)
Isolation Transformer Outlets
Common Mode.....120 dB (100 KHz - 1 MHz)
Normal Mode.....50 dB (100 KHz - 1 MHz)
High-Current Outlets
Normal Mode.....50 dB (100 KHz - 1 MHz)

DC TRIGGER INPUT

Connection.....3.5 mm mono mini-plug
Voltage and Polarity.....3-18VDC nominal, bi-directional
Current Requirement.....>25mA

DC TRIGGER OUTPUT

Connection.....3.5 mm mono mini-plug
Voltage and Polarity.....12V DC, + Center Pin
Current 350mA

SATELLITE CIRCUIT

Clamping Level.....27V
Attenuation.....<1 dB from 950MHz - 2.2GHz
Shielded.....YES
Connections.....Gold plated, Female "F"

ANT/CATV CIRCUIT

Clamping Level.....1.4V
Attenuation.....<1 dB up to 950MHz
Shielded.....YES
Connections.....Gold plated, Female "F"

TELEPHONE CIRCUIT

Clamping Level.....260V
Capacitance.....30pf (approx.)
Suppression Modes.....Metallic & Longitudinal
Wires Protected.....2 wire/ 1 pr. (pins 4,5)
Fuseless/Auto-Resetting.....YES
Connections.....RJ-11/45

LAN CIRCUIT

Compatibility.....10/100 baseT Ethernet
Clamping Level.....8V
Wires Protected.....pins 1, 2, 3 and 6
Connections.....RJ-45

Design and specifications subject to change without notice due to product improvement.

MAX PRO-SERIES RS-232 COMMAND SPECIFICATIONS

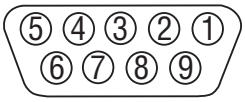
1. OVERVIEW

The Panamax Pro-Series product family has a RS232 interface that allows it to communicate with a wide variety of equipment.

The purpose of this document is to outline the command set used to communicate with the Pro-Series (PS) products.

Commands and responses are in the form of ASCII character STRINGS TERMINATED with ASCII 13, line feed (ASCII 10) or NULL (ASCIØ).

DB9 Pinout Diagram



PIN NO.	SIGNAL
1	-
2	RECEIVE DATA
3	TRNSMIT DATA
4	-
5	GROUND
6	-
7	-
8	-
9	-

2. PORT SETTINGS

Baud Rate: 9600bps
Data Bits: 8
Start Bits: 1
Stop Bits: 1
Flow Control: None
Null modem cable not required.

3. CONTROLLER COMMANDS

The following are commands made by the controller to Pro-Series products.

Command String		Description / Response
2.1	**POWERON**	Changes the front panel button status to ON. Initiates a power-on sequence if the previous state is OFF.
2.2	**POWEROFF**	Changes the front panel button status to OFF. Initiates a power-off sequence if the previous state is ON. **(Default)**
2.3	**CYCLESW**	Initiates a power cycle sequence for the Switched Outlets only.
2.4	**CYCLEHC**	Initiates a power cycle sequence for the High Current Outlets only.
2.5	**CYCLE**	Initiates a power-cycle sequence. Switched & high-current outlets turn off, followed by a 10 second delay, followed by a power-on sequence.
2.6	**ALLOFF**	Turns off all outlets. Forces front panel button status to OFF.
2.7	**DETACHTRIG**	Disconnects 12V trigger output from 12V trigger input
2.8	**ATTACHTRIG**	12V trigger input passes through to 12V trigger output **(Default)**
2.9	**TRIGOUTLO**	Forces the 12V trigger output to 0V. Does not work when trigger is attached to 12V trigger input.
2.10	**TRIGOUTHI**	Forces the 12V trigger output to 12V. Does not work when trigger is attached to 12V trigger input.

Command String		Description / Response
2.13	**?TRIGSTAT**	Request the status of the 12V trigger input. PS responds with: **a**) **12VINHI** if voltage is sensed on the12V input **b**) **12VINLO** if 0V is sensed on the 12V input **c**) **BUTTONON** if the ON/OFF button status is ON. **d**) **BUTTONOFF** if the ON/OFF button status is OFF. **e**) **12VOUTHI** if the trigger output is ON (+12V) **f**) **12VOUTLO** if the trigger output is OFF (0V)
2.14	**?OUTLETSTAT**	Request the status of the outlet banks. PS responds with: **a**) **MAINACON** if all outlets (main relay) are ON **b**) **MAINACOFF** if all outlets are OFF **c**) **SWITCHEDON** if the switched outlets are ON **d**) **SWITCHEDOFF** if the switched outlets are OFF **e**) **HICURRENTON** if the high-current (delayed) outlets are ON **f**) **HICURRENTOFF** if the high-current outlets are OFF
2.15	**?PWRSTAT**	Request the status of the input voltage **a**) **NORMAL** if the voltage is within limits **b**) **OVERVOLTAGE** if the voltage is greater than 132VAC **c**) **UNDERVOLTAGE** if the voltage is less than 95VAC **d**) **RECOVERY** if recovering from an over/undervoltage state but has not yet restored power to outlets.
2.18	**?ID**	Request that the unit identify itself. Returns the following: **PANAMAX: MAX 5510-PRO** **FW: SFW5510** **REV: revision**
2.19	**HELP**	All commands and queries listed above are transmitted.

ISOLATED vs. BALANCED POWER

Power Modes in the MAX® 5510

Single-phase grounded-neutral power

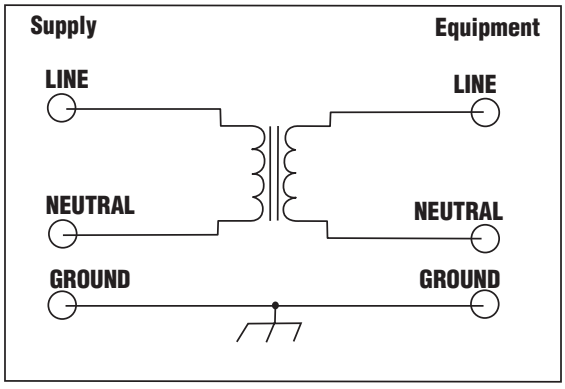
The standard method of residential power delivery in the U.S. The neutral, or "grounded" conductor, is bonded to the earth, or "grounding" conductor. The N-G panel bond creates a severe imbalance with respect to common-mode currents, which can lead to "hum" in A/V equipment. There are three problems with this configuration that are specifically targeted by our "Isolated" and "Balanced" power modes:

1. Line and neutral current imbalance. Unbalanced currents in the L-N can radiate magnetic fields, which can couple inductively from connected power cords to nearby A/V cables.

2. Ground skew. Voltage drops due to common-mode current flowing into the earth ground can cause a skew between signal ground references in interconnected A/V equipment.

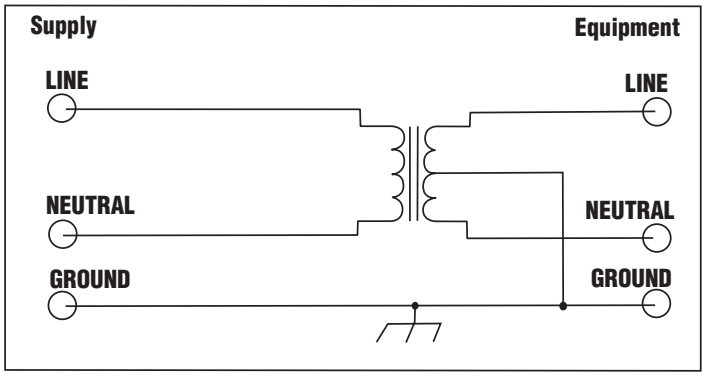
3. Line and neutral voltage imbalance. Unbalanced voltages from line and neutral to ground can cause connected power cords to radiate electrical fields, which can couple capacitively to nearby A/V cables.

Isolated Power



With **"Isolated Power"** the N-G panel bond is broken by floating the line and neutral, and the ground reference voltage is driven to neutralize the hum-producing ground leakage currents (2). Consequently, L-N currents are equalized, effectively eliminating magnetic field radiation from connected power cords through current phase cancellation (1). Radiated electrical fields can still be evident (but to a much lesser degree than with grounded-neutral power), unless the impedances from L-G and N-G in the connected equipment are equal.

Balanced Power



With **"Balanced Power"**, the asymmetric, zero-volt N-G reference at the panel is replaced by a symmetric ground reference between line and neutral. Hum-producing common-mode currents (2) and radiated electrostatic fields in the connected power cords (3) are both eliminated by voltage phase cancellation. Radiated magnetic fields can still be evident (but to a much lesser degree than with grounded-neutral power), unless the impedances from L-G and N-G in the connected equipment are equal.

Conclusion

"Balanced" and "Isolated" Power are both exceedingly efficient at overcoming the inherent problems of the unbalanced earth ground reference in domestic single-phase power systems, with small but definable distinctions. They are both effective in reducing common mode currents and radiated magnetic and electrostatic fields from connected power cords. The primary difference is simple: "Isolated Power" is better at reducing the magnetic (inductive) component, and "Balanced Power" is better at reducing the electrical (capacitive) component. Because all A/V cables have some amount of inductance and capacitance (defined collectively as "impedance"), they are susceptible to both types of interference, and the trade-offs will vary with the system configurations.

TROUBLESHOOTING

My power cable does not reach the wall outlet. Can I use any extension cord to make it reach?

No, Panamax extension cords are the only extension cords that you can use while keeping your warranty valid.

The provided coax or telephone jumper cables are not long enough to reach my equipment. Can I use other cables?

Yes, any length cable of the same type is fine.

There is an audible buzz/hum coming from my Max 5510-Pro. What is the cause of this and how do I make it go away?

This can be caused by certain appliances; most commonly lamps with High-Low dimmer switches and some room heaters, which use only half of the AC sine wave. These appliances distort the AC wave through a small DC bias placed on the AC supply. Some custom audio equipment-especially amplifiers with toroidal power transformers, may react unfavorably to this distortion, and buzz. The Max 5510-Pro's isolation transformer will remove this waveform distortion and protect the loads plugged into the transformer-isolated outlets. If the distortion is bad, you may actually hear the Max 5510-Pro buzzing slightly as it works to correct the AC power. The best way to stop the buzz is to find the source of the disturbance (most likely a quartz lamp) and plug it into a different branch circuit. Panamax Technical Support will be glad to help you if you have any questions about this.

The 6 Amp, Isolation Transformer circuit breaker continually trips. What is the problem?

The four Isolation Transformer outlets share the 720 VA Isolation transformer for their power source. The connected equipment plugged into the four outlets are drawing more than 6 Amps collectively, causing the circuit breaker to trip. These four outlets are designed specifically for low-current, digital source components. Check to see if you have connected a high current amplifier or subwoofer to the Isolation Transformer Outlets. If so, unplug the high current components and plug them into the High Current Outlet Bank.

The Isolation Transformer Outlets are not switching ON or OFF with the MAX 5510-Pro. How can I fix this?

These outlets may be set as either switched or always-on outlets. The 2-position, Switched Outlets Delay switch on the back panel controls this. Change the setting of this switch from always-on to a 10 second delay. This will allow the Isolation Transformer Outlets to become switched outlets.

The MAX 5510-Pro is ON but the Voltmeter and Ammeter are not lit up. What is the problem?

Check the Meter Light Dimmer control to see if the lighting is turned OFF. The pushbutton switch cycles between High-Amber, Low-Amber, High-Blue, Low-Blue and OFF. Call Panamax Customer Service for help if the switch has no affect.

I connected the LED Convenience Lamp and the lamp will not work. What is the problem?

Check to see if the MAX 5510-Pro is in an unsafe voltage condition by looking to see if the unsafe voltage LED is lit. If the LED is lit, then wait until voltage is back to normal and the light will turn back on. If the unsafe voltage LED is OFF and the light is still not on, call Panamax Customer Service for help.

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