MAX® 5510 ACRegenerator™
Owner's Manual

PANAMAX
The Power Specialist Since 1975

1690 Corporate Circle, Petaluma, CA 94954 • www.panamax.com

MAX® 5510 ACRegenerator™ Owner's Manual

Congratulations, you now own one of the finest line conditioning and power protection products on the market today, the **MAX® 5510 ACRegenerator™**! Over 25 years of power protection experience and more than 10 years of Audio/Video noise filtration experience went into the design and development of the MAX® 5510. This model has been specifically engineered to enhance the performance and life expectancy of high-end Audio/Video entertainment gear. The combination of our sophisticated Tri-Power Filtration System 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, you'll wonder how you ever used your system without it. Performance alone makes this a world-class product but we didn't stop there. The understated elegance of the MAX® 5510's styling complements and completes even the most sophisticated Audio/Video showcase.

MODEL # M5510

PANAMAX
The Power Specialist Since 1975

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BEFORE YOU BEGIN

Items included with the MAX® 5510 ACRegenerator™:

1 - MAX®5510 ACRegenerator™

1 - RJ-11 Telephone Cable

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

1 - Convenience Lamp with 5W halogen bulb

1 - IEC 320, 120V/15A 10 ft. power cord

2 - Rack mount brackets and mounting screws

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, among others, pops, hisses, hums, and visual artifacts. Most power filtering devices remove some of this interference but don't provide a comprehensive solution to the problem.

The MAX® 5510 ACRegenerator's Tri-Power Filtration System is the Complete Solution!

Level 1 - for Digital Source Components:
True isolation from contaminated power sources is the first level. The heart of the MAX® 5510 is a 500VA, Isolation Transformer that provides power to four outlets for your digital source components. 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 connected equipment.

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.

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.

The MAX® 5510 allows you to switch between Isolated and Balanced modes as there is no way to categorically state that either filter mode is better than the other. Both modes provide clean, regenerated power to your digital source components. Results will depend upon the quality of incoming power, noise sources close to your home or system, the combination of components and the routing of interconnected cabling. 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.

Level 2 – for Analog Components:
The second level in the Tri-Power Filtration system features two banks of independently filtered outlets (2 outlets per bank) for analog components. These outlet banks utilize "Balanced Double L" filter circuits that 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. The MAX® 5510's high-current outlets are fed by noise filtration circuitry that does not utilize coils. It provides full, unimpeded power for your amplifiers and powered subwoofers for maximum performance and the optimum listening experience.

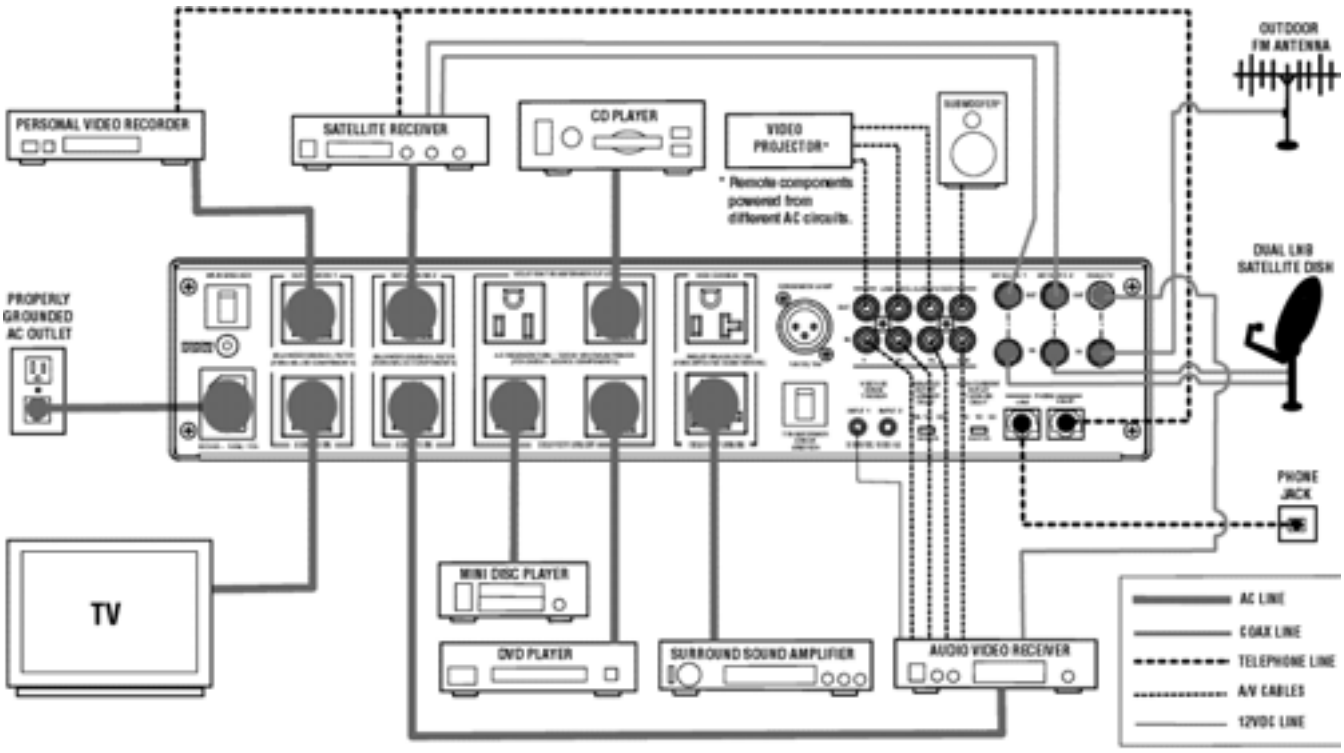
Other Convenience Features Enhance the Functionality:
Although the MAX® 5510's functionality revolves around noise filtration and power protection, many other exciting features enhance your overall entertainment experience, including:

- 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 detachable convenience lamp simplifies changing CD's or DVD's and making other system adjustments in low-light situations. A rear panel connector for the lamp also allows for its use during system setup.
- A combination ON/OFF/Dimmer switch controls both the meter lighting and convenience lamp.
- An Always-On, convenience outlet on the front panel is for temporary AC connections.

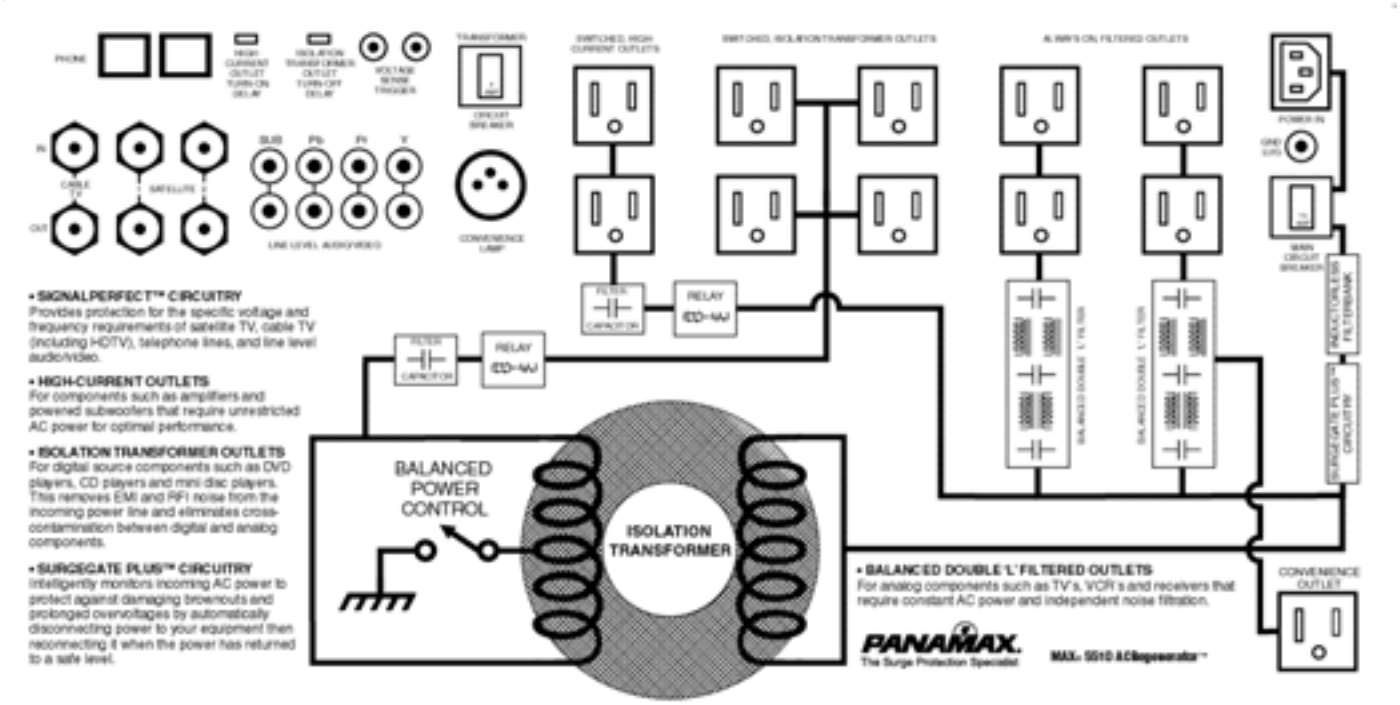
As you read through the rest of this manual, you'll discover many more unique features. As audiophiles, we care about the quality of your listening and/or viewing experience. Our goals are to:
- Provide clean, pure power
- Protect your investment
- Enhance the pleasure you get from your A/V system

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

CONNECTION DIAGRAM



Tri-Power Filtration System



FEATURE OVERVIEW

Switched Outlets Pushbutton: 1 of 2 Triggers that can activate a turn-on or shutdown sequence for the Isolated and High-Current outlets.

Lamp Receptacle: For the 5W-halogen Convenience Lamp. Use to illuminate working area & other components.

Lamp and Meter Dimmer: Controls brightness of the Ammeter, Voltmeter backlighting and Convenience Lamp.

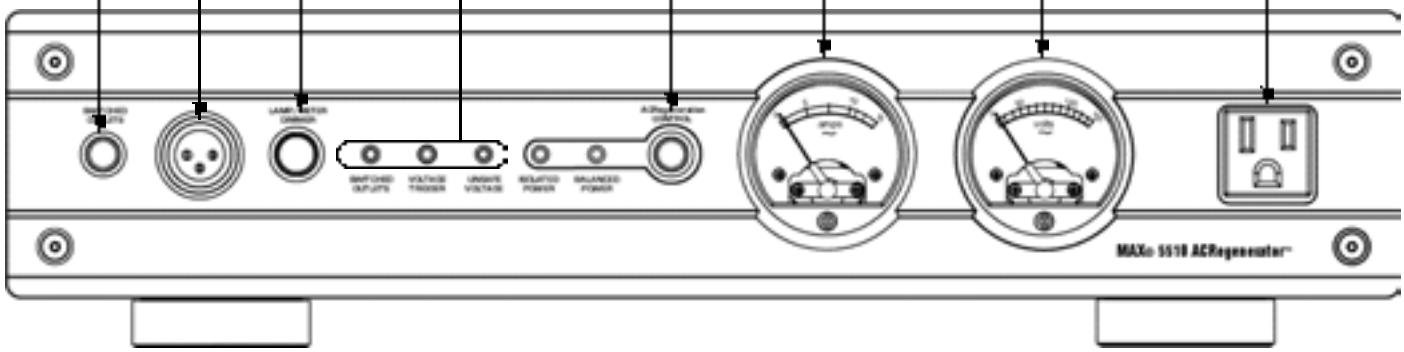
LED Indicators: Status indicator lights for Switched Outlets, DC Voltage Triggers, and Unsafe Voltage

AC Regeneration Control and LED Indicators: Select either Isolated or Balanced power for your digital source components.

Ammeter: Backlit analog meter measures current draw for connected equipment up to 15 Amps.

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

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



15A Circuit Breaker: Opens in the event that equipment plugged into the MAX® 5510 draws too much current. When white is visible, the breaker has opened. Reduce the load and push to reset.

Filtered Outlet Bank 1: Two Always-On, Balanced, Double L filtered outlets for Low-Current analog components such as pre-amplifiers, receivers, VCRs and tape decks.

Isolation Transformer Outlets: Four outlets provide either Isolated or Balanced power for digital source components such as DVD or CD players. Use the front panel AC Regeneration pushbutton to select the desired power mode.

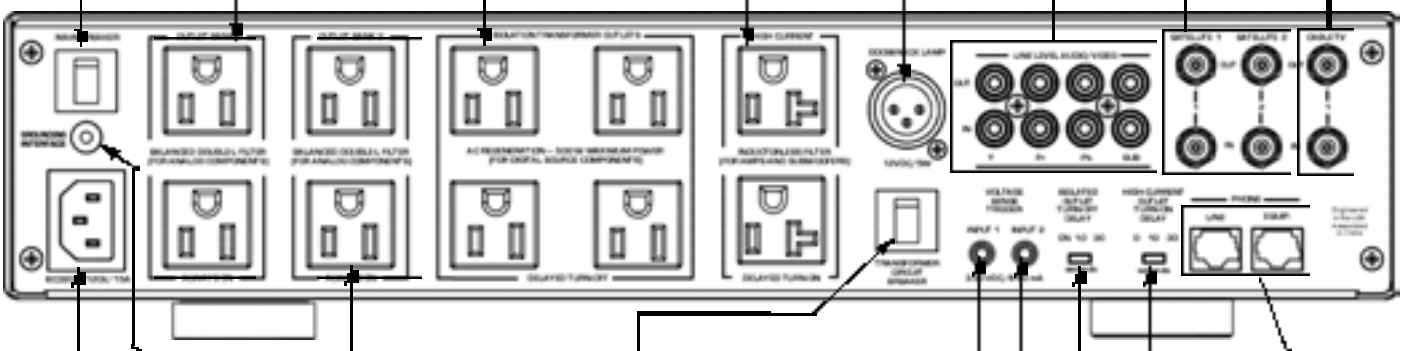
High-Current Outlet Bank: Two delayed outlets designed for High-Current components such as amplifiers and powered subwoofers. The current available to connected equipment is not limited by the noise filtration components.

Rear Panel Convenience Lamp Receptacle:

AV RCA Jacks: Four pair of RCA style connectors. Circuits are optimized for audio and video signal line protection.

Satellite Coax Jacks: Two pair of gold plated F-Connectors optimized for Satellite TV signal line protection.

Cable TV Coax Jacks: Gold plated F-Connectors optimized for Cable TV or non-amplified Rooftop Antenna signal line protection.



IEC Main Power Receptacle: Power cord connects to this receptacle.

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

Filtered Outlet Bank 2: Two Always-On, Balanced Double L filtered outlets for Low-Current analog components such as pre-amplifiers, receivers, VCR's and tape decks.

Isolation Transformer Circuit Breaker: Opens in the event that equipment connected to the Isolated Outlets exceeds 4 amps current draw. When white is visible, the breaker has opened. Reduce the load and push to reset.

Voltage Sense Trigger Inputs: 3.5 mm Mono Mini-Plug jacks. Connect to a remote trigger device that provides 12VDC to trigger a startup / shutdown sequence. This is the second trigger that will activate the MAX® 5510 turn-on or shutdown sequence. (See switched outlets pushbutton on front panel).

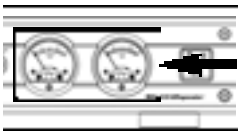
Isolation Transformer Outlets Turn-Off Switch: 3-position slide switch. Allows adjustment of the Turn-Off delay for the 4 Isolation Transformer Outlets. Choose between "Always-On", 10 and 30 seconds.

High-Current Outlets Turn-On Switch: 3-position slide switch. Allows adjustment of the Turn-On delay for the 2 High-Current Outlets. Choose between 0, 10 and 30 seconds.

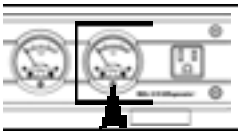
Telephone Jacks: In/Out connections for telephone line or pay-per-view line protection.

FEATURE DETAILS

Meters



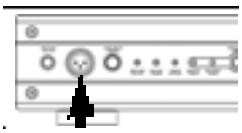
The analog meters are backlit to provide the ability to view readings in a dark room. LEDs (light emitting diodes) are used in order to provide durability and long life. An On/Off Dimmer switch controls the brightness. Please note that this switch also controls the Convenience Lamp described in the next section.



The Voltmeter samples the incoming voltage from the wall receptacle 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 MAX® 5510. The MAX® 5510 does use a small amount of power and its current is included. 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, but since all of the connected equipment has been disconnected by the SurgeGate Plus™ circuitry, the needle will be only slightly above zero.

Convenience Lamp



The convenience lamp included with your MAX® 5510 plugs into an industry standard XLR receptacle on the front or rear panel. The lamp is approximately 14" in length and will bend to provide illumination of other audio/video equipment.

Warning

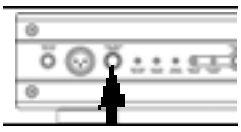
1. DO NOT use lamps in both front and rear panel receptacles at the same time. This will overload the lamp's power supply and cause damage not covered by the MAX® 5510's warranty.

2. USE ONLY A 12V DC, 5W-HALOGEN BAYONET BASE, ANSI T-3 REPLACEMENT BULB. Use USHIO JC12V-5W/BA9S or equivalent. A higher rated bulb will overload the lamp power supply and cause damage not covered by the warranty.

3. Make sure the protruding lamp does not interfere with cabinet or glass doors. The lamp may be removed and stored next to the unit if interference does occur.

4. DO NOT PLUG ANY OTHER TYPE OF EQUIPMENT INTO THE LAMP RECEPTACLE! XLR receptacles are also used on some audio equipment such as microphones. Damage will occur if other types of equipment are plugged into this receptacle.

On/Off/Dimmer Switch



The rotary switch located next to the lamp receptacle controls the meter backlighting and the convenience lamp. When the knob is turned completely to the left, it is in its OFF state. Turning the knob to the right will turn the lamp and meter lights ON and increase their brightness.

Convenience Outlet

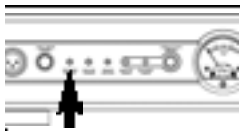
A single outlet on the front panel of the MAX® 5510 provides an easy-to-reach power source for electronic equipment typically used on a part time basis. Such equipment includes anything from video game systems to camcorders. *Do not use this outlet for household appliances like vacuum cleaners!*

The convenience outlet not only provides superior surge suppression, but also taps into one of the Balanced Double L Filter Circuits to provide clean power for your sensitive electronic equipment. This outlet is an Always-On outlet and will continually supply a steady source of power for your connected equipment. *It is important to remember that power will be disconnected only in the event of an unsafe voltage condition.*

FEATURE DETAILS

Diagnostic/Indicator Lights

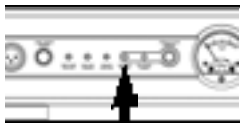
The MAX® 5510 is loaded with special features to save your connected equipment from many different forms of dangerous power disturbances. Five diagnostic lights on the front panel inform you in the event of a power disturbance or when a special feature is activated. The indicators are:



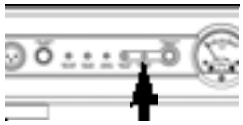
Switched Outlets: Green LED. This light indicates the status of the "Switched Outlets" pushbutton on the front panel and corresponds with the switch position. When the button is in the "ON" position, the light is ON. When the button is in the "OFF" position, the light is OFF. "Switched Outlets" refers to the Isolation Transformer Outlets and the High-Current Outlets. See their respective sections for switching options.

DC Voltage Trigger: Green LED. This light indicates status of the DC voltage triggers on the back panel of the MAX® 5510. The light is ON when a DC voltage trigger is activated and OFF when a DC voltage trigger is not receiving a signal. This light will also be ON if nothing is plugged into a DC voltage trigger input jack. This indicates that the DC voltage trigger is being bypassed.

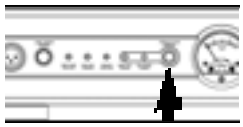
Unsafe Voltage: Red LED. Under normal voltage conditions, this light stays OFF. When this light is FLASHING slowly (once per second), it indicates an undervoltage (<95 VAC) or overvoltage (>137VAC) condition. When the light is flashing quickly (4 times per second), it indicates a 10 second recovery period from an under/overvoltage condition. This light will flash quickly when the MAX® 5510 is first plugged into the wall outlet.



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 digital source components.



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 digital source components.



AC Regeneration Control: Pushbutton switch used for selecting the power supply mode for the digital source components connected to the Isolation Transformer Outlet Bank. One of the adjacent LEDs for Isolated Power or Balanced Power will illuminate to indicate the active switch position. See the **Isolation Transformer Outlets** section on the next page for more information.

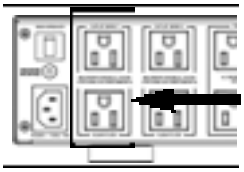
Sequential Startup/Shutdown

Complex audio/video systems are susceptible to internally generated surges if all of the system components are powered on or off at the same time. One of the symptoms of this condition is speaker "thump" (which can damage the speakers). The MAX® 5510 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, then the equipment plugged into the switched outlets is turned off.

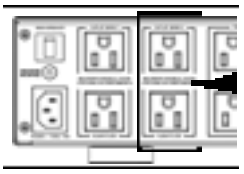
Information on setting the delay times is included in the **Isolation Transformer Outlets** *and* **High-Current Outlet Bank** sections that follow.

FEATURE DETAILS

Filtered Outlet Banks 1 & 2

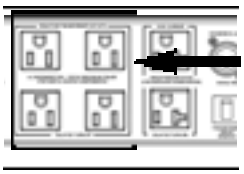


Four outlets (two banks / two outlets per bank) are fed through separate "Balanced, Double L" noise filtration circuits. These circuits are designed to eliminate the noise contamination of the AC power that is most detrimental to the performance of analog or video components like stereo receivers, VCRs 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-bladed plugs receives clean power.



Both banks remain ON continually (Always-On) to provide a constant power source for programmable analog or video components. A personal video recorder (such as TiVo™) and VCR are two examples of components that require constant power. A TiVo™ video recorder relies on continual power to monitor 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.

Isolation Transformer Outlet Bank



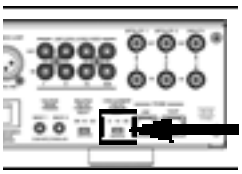
Four outlets are fed power through the heart of the MAX® 5510, the Isolation Transformer. These outlets should be used for digital components like DVD players, CD players, and laser disc players.

Pure, clean power is obtained by using the isolation transformer to regenerate AC current. The power from a typical wall outlet is often 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 winding and is regenerated (through electromagnetic induction) as clean power on the isolated secondary winding. The outlets are connected to the secondary winding, which has no conductive connection to the primary winding. This isolates your digital source equipment from contaminated power, and prevents any noise generated in the system's digital components from flowing back to other connected equipment.

Two different power filtration 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.

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), that still provides 120VAC to your equipment.

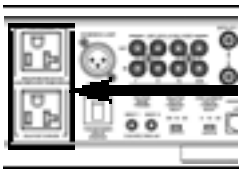
More information regarding the Isolated and Balanced power filtration modes may be found in the Introduction on page 2 and the Technical Descriptions on page 12.



A 3-position slide switch (Isolation Transformer Outlets Turn-Off) 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 either 10 or 30 seconds to prevent internally generated surges. This switch provides the option of having a total of eight Always-On outlets (4 Filtered Outlets and 4 Isolation Transformer Outlets). See the **Sequential Startup/Shutdown** section for more information.

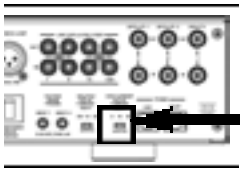
When set to one of the delay positions (10 or 30 seconds), the Isolation Transformer Outlets are controlled by the Switched Outlets pushbutton and/or the DC Voltage Sense Triggers. In this setting, the Isolation Transformer Outlets will not power down until after the selected time delay has elapsed.

FEATURE DETAILS



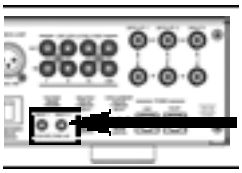
High-Current Outlet Bank

The two high-current outlets allow amplifiers and powered subwoofers to perform 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 power supply 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, 10 or 30 seconds. The 3-position, High-Current Outlets Turn-On Switch on the back of the MAX® 5510 is used to select the desired time delay. When a delay is selected, the high-current outlets will turn on after the isolated outlets and turn off before the isolated outlets (if they are not set to Always-On). With a delay, the connected equipment will not power up simultaneously, thus preventing loudspeaker noises such as "thumping". See the **Sequential Startup/Shutdown** section for more information.

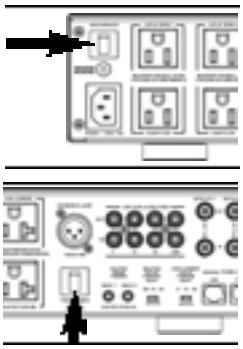
Voltage Sense Triggers



This feature provides two ON/OFF triggers for the MAX® 5510 using a 12VDC remote 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's switched outlets. An AC Adapter of the appropriate voltage, plugged into a switched outlet on the receiver, may also be used if a 12VDC trigger is not built in.

The MAX® 5510 Voltage Sense Trigger input uses standard 3.5 mm mono mini-plug jacks. These jacks have electrically isolated switches built in. If nothing is inserted into the input jacks, the voltage sense is bypassed and the MAX® 5510 Switched Outlets button on the front panel controls the startup/shutdown sequence. If a plug is inserted into either one of the input jacks, the voltage sense becomes the startup/shutdown trigger. *Please note: The Switched Outlets pushbutton on the front panel must be left in the "ON" position if you are using a DC trigger.*

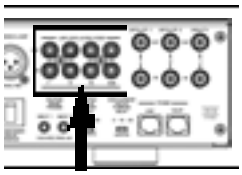
The DC Voltage Trigger indicator LED (on the front panel) indicates the status of the Voltage Sense Triggers. When at least one 3.5 mm mono mini-plug is connected to the voltage sense input jacks and a DC voltage signal is present, the LED will light to indicate that the voltage sense circuit is ON and the MAX® 5510's switched outlets are ON. When the source component is turned off and there is no DC signal, the indicator LED will also be off.



Circuit Breakers

There are two separate circuit breakers on the back panel of the MAX® 5510. The main circuit breaker will trip only if the total current draw exceeds the maximum current rating (15A). This means that, collectively, all loads must draw more than 15 Amps before the circuit breaker will trip. There is also a 4 Amp circuit breaker to protect the 500 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 4 Amp limit and cause the circuit breaker to trip.*

FEATURE DETAILS

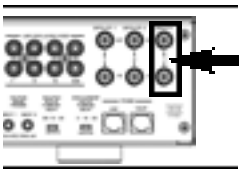


SignalPerfect™ A/V Signal Line Protection

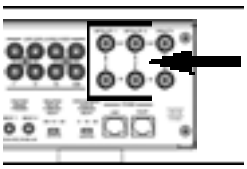
In the event of a power surge, system components plugged into different AC receptacles and/or circuits can create voltage differentials that result in "rogue" surges on the signal lines. These "backdoor" surges can be as damaging to your equipment as an externally generated surge. Equipment that typically provides “backdoor” access for damaging surges includes, ceiling mounted video projectors or powered subwoofers located away from the main system components. The MAX® 5510 provides four line-level protection circuits that are optimized for audio and video signals. The clamping level is 6.5 VDC. Although the circuits are individually labeled for video and audio signals (Y, PR, PB, SUB), performance is identical and they may be used for any combination of audio or video signal lines.

SignalPerfect™ Coaxial Line Protection

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 antenna connection is for a non-amplified rooftop antenna or cable TV line. It may also be used to protect the equipment plugged into the MAX® 5510 from “backdoor” surges in situations where the video signal runs to another room for an additional television.

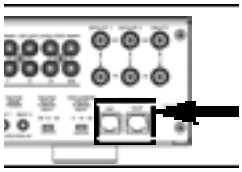


Cable TV (Including HDTV) – TV tuners operate at approximately 10 millivolts (0.01 V) and utilize the frequency spectrum of 50Mhz to 950Mhz. The clamping level of the MAX® 5510's cable TV protection circuitry is 700 millivolts (0.7 volts). That's less than 1 volt above normal operating levels. The circuitry is shielded to prevent interference and has been optimized to have less than 1dB of signal loss throughout the entire 50Mhz to 950Mhz range.



Satellite - Satellite dish LNB's can require up to 24 volts to operate and utilize the frequency range of 950Mhz to 2.2Ghz. The clamping level of the MAX® 5510'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 950Mhz to 2.2Ghz range.

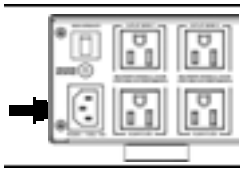
Please note: *All coaxial cable sheaths from outdoors must be grounded to the building grounding electrode system where they enter the building (per applicable NEC/CEC code). A driven ground rod is not adequate and may be dangerous.*



SignalPerfect™ Telephone Line Protection

Satellite TV receivers require a telephone line connection for Pay-Per-View services. The MAX® 5510 also provides surge protection for this line. One pair of RJ-11/45 compatible 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 MAX® 5510'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.

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.*



Power Cord

The MAX 5510 comes equipped with a UL recognized, 10 foot, IEC320 power cord rated for 120V, 15-Amps, minimum 14 gauge wire and the cord secured to the enclosure with a cord retention bracket. The cord is not intended to be removed.

FEATURE DETAILS

The MAX® 5510 provides protection against common problems on the AC power line. This includes spikes/surges **and** sustained overvoltages or undervoltages. Panamax's exclusive Protect or Disconnect™ circuitry is designed to protect against spikes/surges while the SurgeGate Plus™ circuitry is for sustained over/under voltage protection.

1. *Voltage reaches an unsafe level.*

2. *If surge is greater than MAX® 5500 capacity, it* ***disconnects.***

Protect or Disconnect™ AC Surge Protection

When the MAX® 5510 ACRegenerator™ is subjected to a high voltage surge, 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 limits voltage output to less than 330V peak, UL's lowest rating. The MAX® 5510 will withstand without damage, multiple 12,000A surges, far exceeding the UL maximum requirement of only 3,000 Ampere surges.

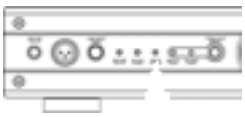
- If the magnitude of the surge is greater than the capacity of the surge protection components, the MAX® 5510's Protect or Disconnect™ Circuitry will disconnect your equipment in order to protect it. The MAX® 5510 will need to be repaired or replaced by Panamax if this occurs.

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.***



SurgeGate Plus™ Protection

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

If the line voltage exceeds the overvoltage threshold (137VAC) or falls below the undervoltage threshold (95VAC), the MAX® 5510 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 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/Undervoltage Recovery". The safe operating range is considered 5V above the under-voltage threshold (~100V) and 5V below the overvoltage threshold (~132V). Once this safe operating range is reached, the MAX® 5510 will perform the following functions:

1. Unsafe Voltage LED will blink 4 times per second for Over/Undervoltage Recovery.
2. Power is restored to all connected equipment after the 10-second delay. The normal start-up sequence as determined by the "High-Current Outlets Turn-On Switch" and "Isolated Outlets Turn-Off Switch" will be followed.

TECHNICAL SPECIFICATIONS

GENERAL

Dimensions.....17" W x 12" D x 3.5" H, (4.1" H including feet)
Weight.....26 lbs.

AC CIRCUIT

NOISE FILTRATION:

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

SURGE PROTECTION:

UL 1449 Surge Suppression Rating.....330V
Protection Modes..... L - N, L - G, N - G
Initial Clamping Level.....200V Peak, 141V Rms
Response Time.....<1ns
Joule Rating.....2325 Joules
Peak Impulse Current.....91,000A
Catastrophic Surge Circuit .....YES

AC:

Line Voltage.....120VAC
Max Current Rating.....15A (1800 Watts)
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

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

DC TRIGGER

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

SATELLITE CIRCUIT

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

ANT/CATV CIRCUIT

Clamping Level.....0.7V
Attenuation.....<1 dB from 5MHz -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

LINE LEVEL A/V

Clamping Level.....6.5VDC
Attenuation.....<0.01dB from 1Hz to 6MHz
<0.06dB from 6MHz to 38MHz
<2.0dB from 38MHz to 100MHz
Connections.....RCA, Female

CONTACTING PANAMAX

For product and warranty information, dealer information, and other general information contact Customer Relations at:

- Email: **custrelations@panamax.com**
- **www.panamax.com**
- Fax **707-283-5901**
- **800-472-5555** or **707-283-5900**, 7:30 a.m.- 5 p.m. PST

ISOLATED vs. BALANCED POWER

Power Modes in the MAX® 5510

Single-phase grounded-neutral power

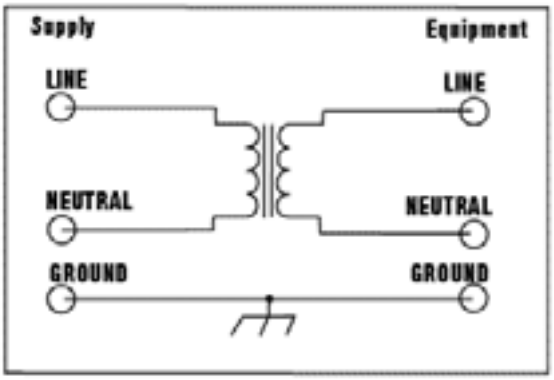
The standard method of residential power delivery in the U.S. The neutral, or "grounded" conductor, is bonded to the earth, or "grounding" conductor. The N-G panel bond creates a severe imbalance with respect to common-mode currents, which can lead to "hum" in A/V equipment. There are three problems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

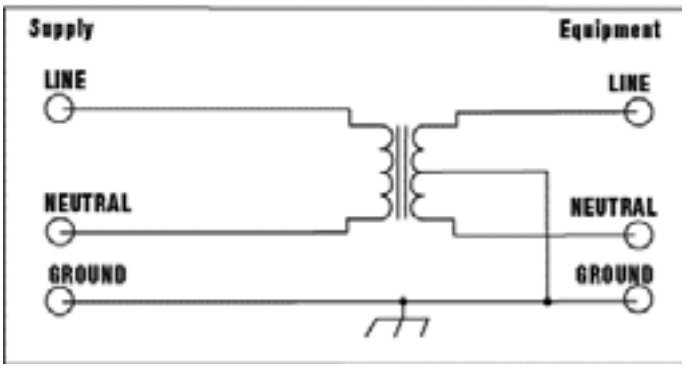
3. Line and neutral voltage imbalance. Unbalanced voltages from line and neutral to ground can cause connected power cords to radiate electrical fields, which can couple capacitively to nearby A/V cables.

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.

FAQs

My MAX® 5510 power cable does not reach the wall outlet. Can I use an extension cord to make it reach?

Yes, but you must use only Panamax extension cords to keep your warranty valid. Ask for **Part # GEC1410** (10 feet long) or
 # P12X10NEMA5-15 (Premium Grade)

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 meets the warranty requirements.

The 4 Amp, Isolation Transformer circuit breaker continually trips. What is the problem?

The four Isolation Transformer Outlets share the 500 VA Isolation Transformer for their power source. The connected equipment plugged into the four outlets is drawing more than 4 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. How can I fix this?

These outlets may be set as either switched or always-on outlets. The 3-position, Isolated Outlet Turn-Off Delay switch on the back panel controls this. Change the setting of this switch from Always-On to a delayed setting. This will allow the Isolation Transformer Outlets to become Switched Outlets.

The MAX® 5510 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 ON or OFF. If the control knob is turned OFF, turn it ON and continue turning until you have reached the desired light level. If the control knob is turned ON and there is no light, turn the knob to maximum. If you still have no light, call Panamax Customer Service for help.

I connected the 5W Convenience Lamp and the lamp will not work. What is the problem?

1. Check to see if the bulb is burned-out.

2. If the bulb is good, if the unsafe voltage LED is OFF and the light control knob is turned on and the light is still not on, call Panamax Customer Service for help.

The halogen light on the Convenience Lamp is dead. What type of light do I replace it with?

The halogen light must be replaced with a 12VDC, 5-Watt bulb or damage to lamp power supply may occur. Use USHIO JC12V-5W/BA9S or equivalent.

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

This is the result of a DC Bias that is usually introduced in your circuit 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 introduce a small DC bias placed on the AC supply. Some audio equipment- especially amplifiers with toroidal power transformers- may react unfavorably to this DC voltage, and buzz. The MAX® 5510 isolation transformer will remove this waveform distortion and protect the loads plugged into the isolated outlets. If the distortion is bad, you may actually hear the MAX® 5510 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.

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