



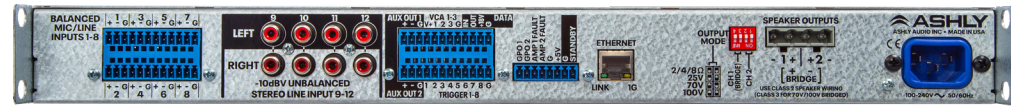
# mXa-1502

16 x 4 Mixer

Comprehensive DSP

Two channel Amplifier

# Operating Manual



## Important Safety Instructions • Consignes de sécurité à lire attentivement



1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
6. Do not use this apparatus near water.
7. Clean only with dry cloth.
8. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus.
10. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. Protect the power cord from being walked on or pinched particularly at plugs,

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons. The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the device.

convenience receptacles, and the point where they exit from the apparatus.

12. Only use attachments/accessories specified by the manufacturer.
13. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
14. Unplug this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Le symbole de la foudre dans un triangle équilatéral symbolisant la foudre est prévu pour sensibiliser l'utilisateur à la présence de tension de voltage non isolée à l'intérieur de l'appareil. Elle pourrait constituer un danger de risque de décharge électrique pour les utilisateurs. Le point d'exclamation dans le triangle équilatérale alerte l'utilisateur de la présence de consignes qu'il doit d'abord consulter avant d'utiliser l'appareil.

1. Lisez ces instructions.
2. Conservez ces instructions.
3. Observez les avertissements.
4. Suivez ces instructions.
5. Pour réduire le risque de feu ou la décharge électrique, ne pas exposer cet appareil pour pleuvoir ou l'humidité.
6. Ne pas utiliser l'appareil près de l'eau.
7. Le nettoyer à l'aide d'un tissu sec.
8. Ne pas bloquer les ouvertures de ventilation, installer selon les consignes du fabricant.
9. Eloigner des sources de chaleur tel: radiateurs, fourneaux ou autres appareils qui produisent de la chaleur.
10. Ne pas modifier ou amputer le système de la mise à terre. Une prise avec mise à terre comprend deux lames dont une plus large ainsi qu'une mise à terre: ne pas la couper ou la modifier. Si la prise murale

n'accepte pas la fiche, consulter un électricien pour qu'il remplace la prise désuète.

11. Protéger le cordon de secteur contre tous bris ou pincement qui pourraient l'endommager, soit à la fiche murale ou à l'appareil.
12. N'employer que les accessoires recommandés par le fabricant.
13. N'utiliser qu'avec les systèmes de fixation, chariots, trépied ou autres, approuvés par le fabricant ou vendus avec l'appareil.
14. Débrancher l'appareil lors des orages électriques ou si inutilisé pendant une longue période de temps.
15. Un entretien effectué par un centre de service accrédité est exigé si l'appareil a été endommagé de quelque façon: si il a été exposé à la pluie,, l'humidité ou s'il ne fonctionne pas normalement ou qu'il a été échappé.

**WARNING: THIS APPARATUS MUST BE GROUNDED (EARTHED)**

## **FCC Compliance**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **Unpacking**

As a part of our system of quality control, every Ashly product is carefully inspected before leaving the factory to ensure flawless appearance.

After unpacking, please inspect for any physical damage. Save the shipping carton and all packing materials, as they were carefully designed to reduce to a minimum the possibility of transportation damage should the unit again require packing and shipping. In the event that damage has occurred, immediately notify your dealer so that a written claim to cover the damages can be initiated.

The right to any claim against a public carrier can be forfeited if the carrier is not notified promptly and if the shipping carton and packing materials are not available for inspection by the carrier. Save all packing materials until the claim has been settled.

## **About Ashly**

Ashly Audio was founded in 1974 by a group of recording engineers, concert sound professionals, and electronics designers. The first products were elaborate custom consoles for friends and associates, but business quickly spread to new clients and the business grew.

The philosophy we established from the very beginning holds true today: to offer only the highest quality audio tools at an affordable cost to the professional user – ensuring reliability and long life. Years later, Ashly remains committed to these principles.

Ashly's exclusive five-year, worry-free warranty remains one of the most generous policies available on any commercial-grade product. The warranty covers every product with the Ashly brand name, and is offered at no extra cost to you.

Please read this entire manual to fully understand the features and capabilities of this product.

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## 1 Introduction

Thank you for your purchase of the mXa-1502 Mixer Amplifier. This product combines a state of the art Class D two channel multi-mode amplifier with eight mic inputs and 4 stereo line inputs for a total of 16 analog inputs.

The mXa-1502 also comes standard with comprehensive DSP processing including ducking, matrix mixing, tone generation, integrated Ethernet control using Ashly AquaControl™ software, remote control, triggered/scheduled events, auxiliary outputs, and more. Please read this entire manual to fully understand the features and capabilities of this product.

### 1.1 Product Overview

The mXa-1502 is a two-channel x 150W amplifier with selectable output modes for low impedance (2/4/8 Ohm), 25V, 70V or 100V and two AUX Outputs, plus 8 mic/line inputs and 4 stereo line inputs. Other features include comprehensive DSP, matrix routing and mixing, ducking, automixing, automatic feedback control, event scheduling/triggering, and remote control. There are four independent mixers for matrix mixing, plus event based logic outputs and fault logic outputs.

The mXa-1502 is configured and controlled using server-based Ashly AquaControl™ software, compatible with most browser enabled devices. Since AquaControl is pre-installed and served from every mXa-1502, it is unnecessary to install the application onto your computer, phone, or tablet.

### 1.2 Product Features

- Two 150W amplifiers, configurable for low-impedance, 25V, 70V, or 100V output
- Eight balanced Mic/Line inputs, +48V phantom power, four stereo -10dBV line level inputs using RCA jacks
- Four independent mixers, two Aux outputs
- Ashly AquaControl server-based software, runs on most web-browsers, no app to install
- Password protected security roles for admin, guest admin, operator, view only
- Presets, sub-presets
- DSP ducking, automixer, autoleveler, FIR filter, comp/limiter, EQ, crossover, more
- Real-Time-Clock for programming scheduled events or event sequences
- Eight programmable triggered event logic inputs, two event driven logic outputs, two amplifier fault logic outputs
- Remote DC level control VCA inputs
- Automatic sleep mode, less than 1W, defeatable, plus remote contact closure or event driven power standby
- Front panel LEDs for temp, current, signal, clip, mute, bridge mode, protect, sleep, com, and power switch disable
- Universal switch mode power supply with active power factor correction (PFC)
- Protection: Shorted output, over-temperature, power supply fault, output DC, mains fuse, in-rush current limiting
- Certifications: cTUVus, FCC, CE, RoHS
- Ashly Five year warranty

## 2 Installation Requirements

### 2.1 Electrical and Wiring

The mXa-1502 is designed with a universal power supply, compatible with 100-240VAC, 50-60Hz. Always use the power cord supplied with your unit. Do not remove AC ground.

Always use high quality shielded cable for input signals, and use a balanced input signal when possible. To avoid possible system noise or oscillation, avoid running low level signal wires parallel to speaker outputs or AC wiring, especially over long distance. Before testing the system, double check all connections and settings. Refer to the specifications section of this manual for input, output, Ethernet, and other amplifier properties to consider during installation.

### 2.2 Mechanical

The mXa-1502 is 1RU, and is designed to fit in a standard 19-inch equipment rack. Use four screws when mounting the amplifier to the front rack rails. Rear support is recommended for mobile or touring use (see mechanical drawing). In some installations where the sound system is exposed to a high level of RF noise or system-induced oscillation, it may be necessary to ground the amplifier's chassis to the rack enclosure. This is accomplished using star type lockwashers on the four rack mounting screws, placed between the amplifier chassis and the rack rails. These star washers will penetrate through the amplifier and rack rail finish to adequately ground the chassis to the rack.

### 2.3 Cooling

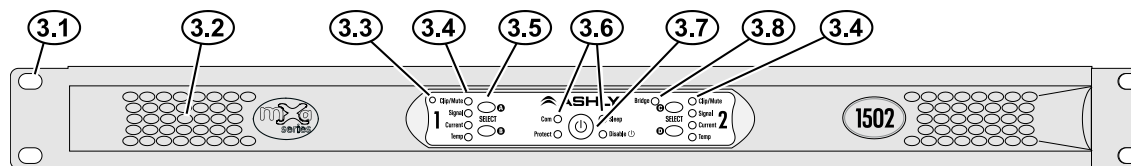
Air vents on the amplifier front and side panels must have access to free flowing room temperature air. Cool air is drawn in through the side and blown out the front. It is not necessary to leave empty rack spaces above or below the amplifier. See the BTU/hr table in the specifications section for thermal output characteristics.

### 2.4 Network

A standard 100MHz or faster network is required. Connect the mXa-1502 Ethernet jack to a network switch or router, or directly to a computer. Once a successful Ethernet connection has been made, a solid green LED (Link) lights up on the RJ-45 Ethernet port. If there is no green LED showing, there is either a problem with the cable or network connection which must be addressed before proceeding further. All RJ-45 Ethernet ports flash green when active, so backtrack through any other cables, routers, or switches to find the problem. The flashing yellow LED (Data) indicates that data is flowing to or from the device. See [section 5](#) for detailed instructions on mXa-1502 network discovery.

### 2.5 Browser and Resolution

Supported browsers include Chrome, Edge (Win 10 recommended), and Safari. The software requires a minimum screen resolution of 1024 x 768. For use with a tablet, a minimum screen size of 10" is recommended.



## 3 Front Panel Features

### 3.1 Mounting Holes

For rack mounting. Always use all four screws.

### 3.2 Cooling Vents

Cool air enters the sides and is vented out through the front.

### 3.3 Device Reset Switch

There are two levels of device reset, Admin reset or Factory Default reset, determined by how long you press and hold in this recessed switch during a cold-boot power-up.

A cold-boot power-up means that AC power is removed before initiating reset.

To initiate reset, first press and hold in the reset switch using a pencil-tip or paperclip, then insert the power cord or turn on the power outlet the device is plugged into. During the reset process, all channel LEDs will light up from bottom to top, followed by the four status LEDs.

*To cancel reset before it completes, release the reset switch before the green Signal LEDs turn on.*

**1) Admin reset** changes the Admin User ID password back to <secret>, but preserves all other user IDs/passwords, presets, and settings. Use this level if you forgot the admin password.

*To perform an Admin reset, release the reset switch after the green signal LEDs turn on, but before the red Clip/Mute LEDs turn on.*

**2) Factory Default reset** deletes all User IDs and passwords, deletes all presets, and restores all settings to factory default. Use this level to completely scrub the device clean of any previous programming.

*To perform a Factory Default reset, release the reset switch after the red Clip/Mute LEDs turn on.*

### 3.4 Channel LEDs

The red Clip/Mute LEDs flash when output voltage is 0.5V below the output power supply voltage, or when an input signal or DSP section is clipped. This LED also lights when the output channel is muted.

The green signal LEDs light when the output voltage reaches -18dBu below rated output.

The green current LEDs confirm that amplifier output is being delivered to a speaker load.

The yellow temp LEDs indicate that the amplifier channel has reached an excessively high operating temperature and will gradually attenuate the signal to compensate. If unable to sufficiently cool the channel, the amplifier will put itself into protect mode.

### 3.5 Select Buttons

The four select buttons are initially unassigned. They can be programmed in software to perform preset/sub-preset recall or source select. To program select buttons in AquaControl™ software, go to [[Settings>Panels>Front Button Settings](#)].

### 3.6 Status LEDs

**Com** LED indicates Ethernet activity.

**Protect** LED indicates the amplifier has encountered a fault condition and has shut down its power supply.

**Sleep** LED turns on when the amplifier is in sleep mode, as configured in software. To set sleep mode on/off and set the audio inactivity time before the amplifier goes to sleep, go to [\[Settings>Panels>Front Panel\]](#).

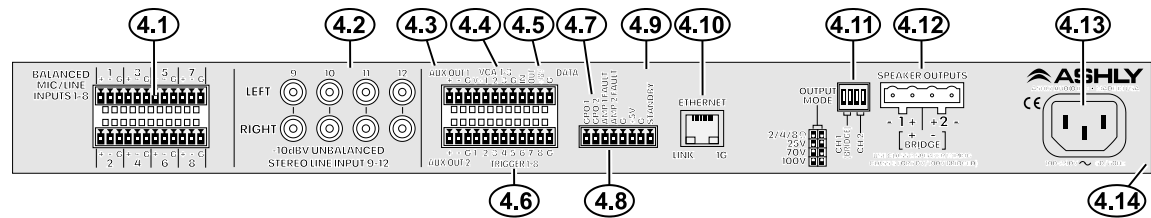
The **Disable** LED is lit when the power switch has been disabled from software.

### 3.7 Power Switch

The power switch turns the unit on or off, and also flashes when in standby. The power switch can be disabled in software. To disable the power switch, go to [\[Settings>Panels>Front Panel>Enable Front Panel Power Button\]](#).

### 3.8 Bridge LED

This green LED indicates the amplifier has been set to BRIDGE mode from software. To select Bridge mode, go to [\[Settings>Panels>Rear Panel>Bridge Mode\]](#).



## 4 Rear Panel Features

### 4.1 Balanced Mic/Line Inputs

This is used for a three wire (G, +, -) balanced analog input using 3.5mm Euroblock connectors. If an unbalanced input signal is to be connected here, wire the hot signal to (+), the input ground to (G), and connect the (-) pin to (G). Maximum input level is +21dBu.

### 4.2 -10dBV Unbalanced Stereo Line Inputs

These RCA jacks are used for stereo line level inputs (-10dBv). Note: Unbalanced line level sources may reference their outputs to a different ground than this amplifier, creating the potential for ground loop hum. Always use short cable lengths for unbalanced signals, routed away from AC, video, or data cables, and make every effort to use a common grounding point for all devices. In the event there is still ground loop hum, isolate the unbalanced input signal by using an in-line isolation transformer.

### 4.3 AUX Out 1 & 2

AUX outputs offer additional and independent post-DSP signals for driving other amplifiers or processors. AUX outputs are configured in the [Signal Chain>Routing](#) section. AUX outputs use balanced signals.

### 4.4 VCA 1-3

A VCA (voltage controlled amplifier) is used to remotely control one or more [VCA gain blocks](#) placed in the software signal chain. Ashly WR-1, WR-1.1, and WR-1.5 remotes can be wired to VCA 1-3 input pins to control the assigned VCA gain. See [section 7](#) for example.

### 4.5 Data

These four pins offer serial data control for future remote control development.

### 4.6 Trigger 1-8

Eight contact closure pins can be used for triggering mXa-1502 events or event sequences that have been programmed in software. See [section 6.1c](#), [6.4](#), and [7.2](#) for details and available event action types.

### 4.7 GPO 1 & 2

These two pins provide logic outputs that are referenced to the closest ground (G) and +5V pins on the same connector. Logic outputs are generated from presets or amplifier events, and can be assigned high or low in software. See [section 7.3](#) for example.

### 4.8 Amp 1 & 2 Fault

Fault output pins are logic-high (+3V) when the amp channel is on and ok, but transition to logic-low (0V) when the amp channel is off or in a protect/fault state. See [section 7.4](#) for details.

#### 4.9 Standby

The Standby pin gets wired to a remote switch in order to place the amp into standby mode. The power switch LED will flash when the amp is in standby. Standby pin contact polarity can be set in software for standby when closed or standby when open. See section [7.5](#) for details.

#### 4.10 Ethernet Port

The RJ-45 connects to a network for Ashly AquaControl™ software control.

#### 4.11 Output Mode

This DIP switch independently configures channels 1 & 2 for low impedance, 25V, 70V, or 100V output. When the amplifier is set to bridge mode, channel 1 DIP switch settings determine bridge output mode.

#### 4.12 Speaker Outputs

Use this connector for wiring amplifier outputs to speakers or constant voltage line transformers. These are 7.62mm removable Euroblock connectors which can accept up to 12 ga. speaker wire.

#### 4.13 AC Inlet

Used for the detachable AC cord. Use only the factory supplied AC cord. **WARNING: Do not remove or lift the AC mains ground connection.**

#### 4.14 Model Information

A sticker placed on the side of the amp shows serial number, MAC address, mains voltage, and mains power/current consumption.

## 5 Network Discovery

The mXa-1502 has a built-in web server delivering AquaControl™ software application to your device. The software may be used on most computers and mobile devices with a web browser.

Supported browsers include Chrome, Edge (Win10 recommended), and Safari.

The software requires a minimum screen resolution of 1024 x 768.

For use with a tablet, a minimum screen size of 10" is recommended.

The mXa-1502 comes configured with automatic IP assignment as the default setting. This means you will initially need to connect the mXa's Ethernet jack to a router or other device capable of automatic (DHCP) IP assignment.

**Through a router:** Connect your computer or mobile device to the same router/LAN that the mXa is connected to, using WiFi or a wired network cable. Apply power to each device, and wait for them to boot up and receive IP assignments from the router. It may take up to a minute for the DHCP server to assign IP addresses to each device.

**Directly to a computer:** The mXa-1502 also supports Link Local for connecting directly to a computer. When the Network setting is set to Automatic (DHCP) and no DHCP server is available, the unit will default to a Link Local IP address of 169.254.100.100. Connect the mXa-1502 directly to your computer's Ethernet jack and wait about a minute, then type the Link Local IP address shown above into your computer's browser URL to gain access.

**DHCP vs Static IP:** *If a computer, tablet, or mobile device is controlling the mXa-1502 through a network router, the mXa-1502 should be assigned a Static IP address after its initial discovery. Otherwise a new discovery process may be required every time you launch the software, since DHCP routers can arbitrarily re-assign IP addresses.*

*- To assign static IP from AquaControl software, go to [Settings>Network>Network Configuration] and select [Manual Configuration]. Save your settings and note the IP address for future use.*

*- Static IP must also be provisioned in the router(s) to guarantee a reserved IP address for the mXa-1502 and any of its deployed remote mixer or remote DCA devices.*

*- Once the mXa-1502 has been assigned a static IP address, the address can be entered into any browser.*

**For initial network discovery,** use the following steps to automatically discover the mXa-1502: In all cases, the initial default login credentials will be:

**User ID:** admin  
**Password:** secret



## 5.1 Windows 10:

1) Open Computer or Windows Explorer and click on the Network folder. The list of Network devices should start populating. Wait for it to complete and skip to step 3 (this could take several minutes).

If the list doesn't populate, you probably need to enable Windows Network Discovery - go to step 2.

2) Click on the yellow warning text at the top of the Network folder to enable Windows Network Discovery. Repeat Step 1.

3) Find the mXa-1502 device in the SSDP Plug'N'Play devices section. (If you do not see an mXa device in the SSDP section go to step 4.

Note: the MAC address is appended to the device name, and is also printed on the unit's serial number sticker. Double-click on the device icon to automatically launch the software in your default web browser. Skip to step 7.

4) Find the mXa-1502 device in the NetBIOS (Samba) computing devices section. Double-click on it and proceed to step 5.

5) Double-click on the AquaControl shared folder and proceed to step 6.

6) Double-click on the index.html file and the web server software will launch in your default web browser. Proceed to step 7.

7) Log in to AquaControl software. Enter your username and password, and click or touch the Log In button. If this is the first log-in to a new unit, use the factory default credentials.

## 5.2 OSX

1) From the desktop, click <Go>, then click on <Network>. The list of all Network devices will start populating. Wait for it to complete (this could take several minutes).

2) Find the mXa-1502 device in the network device list. The device MAC address is appended to the device name, and is also printed on the unit's serial number sticker. Double-click on the mXa device name .

3) Double click on the resulting <AquaControl> icon.

4) Double-click on the resulting <index.html> file and the web server software will launch in your default web browser.

5) Log in to AquaControl software. Enter your User ID and Password, then click or touch the Log In button. If this is the first log-in to a new unit, use the factory default credentials.

## 5.3 iOS

1) Use a network device discovery app such as "Flame" to see all available network devices.

2) Find the mXa-1502 in the list. It will have its MAC address added after the device name.

3) Tap on the mXa-1502 device to launch the software. Depending on the app used, additional address or type lines may need to be tapped before the software will launch.

4) Log in to AquaControl software. Enter your User ID and Password, then tap the Log In button. If this is the first log-in to a new unit, use the factory default credentials.

## 5.4 Android

1) Install an Android application that can discovery Network Plug'n'Play devices. There are several apps that can do this. For example, "UPnP Tool" is a free discovery app available on the Google Play Store.

2) Launch the (UPnP Tool) network discovery application, and it will provide a list of all Plug'n'Play devices on your network. You should see the MXA1502 listed, with its MAC address appended to the name.

3) Click on the (info) information icon, ("i" in a circle), to the right of the item to bring up the details of the product. Then click on the <presentationURL> link or the <IP address> link to launch AquaControl. Your default browser will launch and connect to the device. It is recommended to use Chrome, Edge or Safari. Other browsers are not supported, and may not show content correctly.

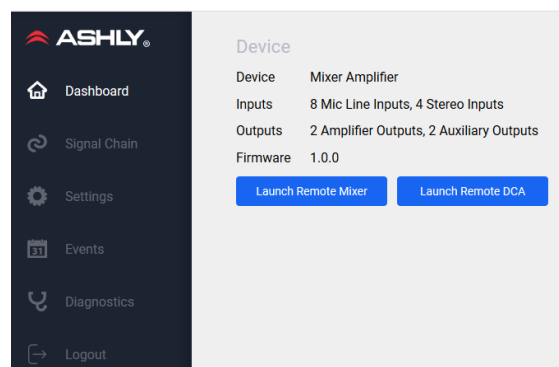
If this is the first log-in to a new unit, use the default factory default credentials.

## 6 AquaControl™ Software

The mXa-1502 uses Ashly's proprietary built-in server based software for setup and control. It is not necessary to install the application onto your computer or mobile device because the program is already resident on the mXa-1502 and runs on your device browser.

A brief AquaControl software summary is presented below:

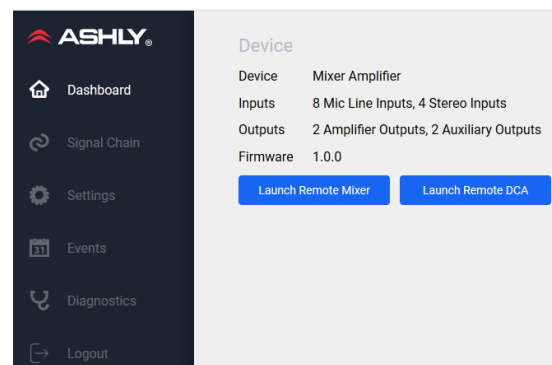
### 6.1 Dashboard



The dashboard is the software screen where the mXa-1502 first appears after logging in with your browser. The dashboard shows the Ashly device, number of inputs and outputs, and firmware revision.

Remote Mixer and Remote DCA functions can be deployed onto a remote tablet or mobile device after they have been configured and assigned to a limited-access operator profile by the admin. Go to [\[Settings>Security\]](#) to set up a new user profile and permissions, or use [Launch Quick Setup](#) to similarly create a new user account.

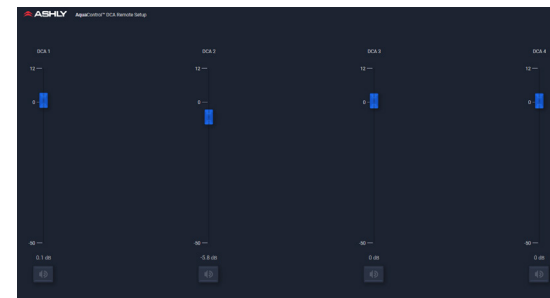
### 6.1a Launch Remote Mixer



A remote mixer would typically get launched from a tablet or mobile device, granting an operator limited permission to control mixer levels for a specific zone.

In the [\[Settings>Security\]](#) or [Launch Quick Setup](#) screen, a new user profile is set up for the operator whereby they are granted limited access to the mixer used for that zone's output. The operator would log in then launch the remote mixer. The remote operator should additionally check [\[Remember Me\]](#) when first logging in order to retain the network link.

### 6.1b Launch Remote DCA



DCA groups are used to globally adjust the relative levels of all channels assigned to that group. In the DSP signal chain, a [DCA block](#) must first be placed on every channel you wish to assign to a DCA group, then enabled and adjusted for each DCA group as desired. A remote operator profile can be created granting limited permission to use Remote DCA on a tablet or mobile device.

### 6.1c Launch Quick Setup

Launch the Quick Setup, then run the wizards to create a new user account, set up the network, schedule an event, or trigger events.



Welcome to Ashly AquaControl™ software.  
You can use Quick Setup to easily get up and running.

[Launch Quick Setup](#)

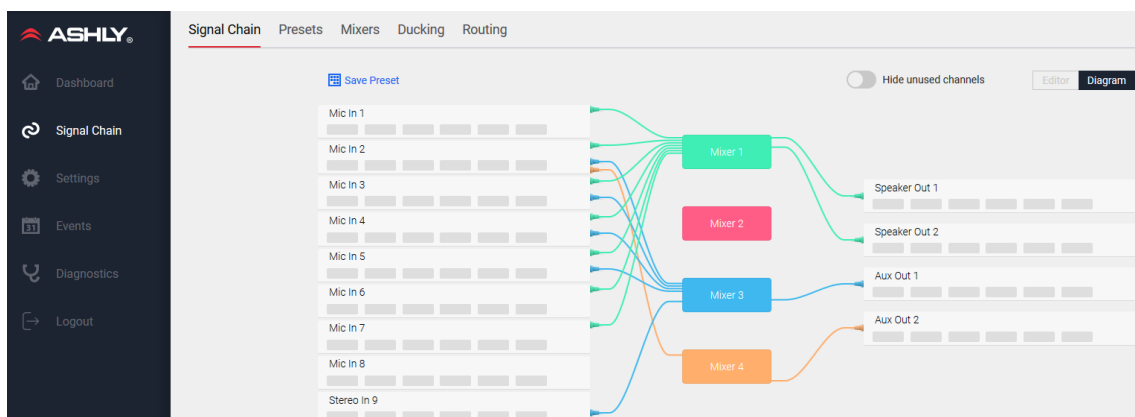
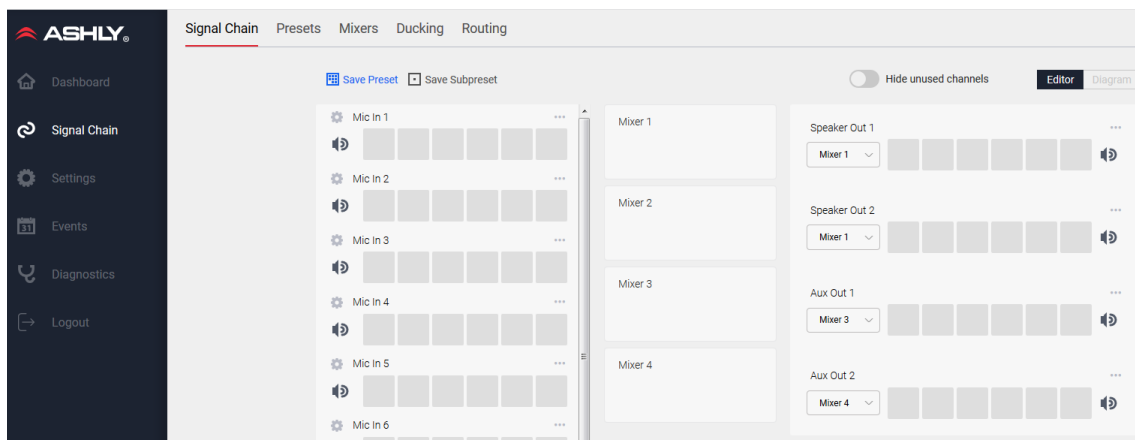
Dashboard > Quick Setup

- [Create account](#)
- [Network Setup](#)
- [Scheduled Event](#)
- [Triggered Event](#)

[Run selected wizards](#)

## 6.2 Signal Chain

The core features of AquaControl are in its signal chain, where pluggable DSP blocks are placed and edited as needed on input and output channels. Input signals can be routed into any of the four mixers, then from the mixers to power amp outputs or the two aux outputs. The signal chain has an Editor view and a Diagram view as shown below. Unused channels can be hidden from the display.



### 6.2a Mic inputs 1-8

- Set Gain, +48V phantom power, mute, DSP. Also see [Settings>Panels>Rear Panel](#) screen.

### 6.2b Stereo inputs 9-12

- Mute, DSP

### 6.2c Mixers 1-4

- Edit mixer routing, levels, ducker, automixer, show/hide chains, add to sub-preset

### 6.2d Speaker & Aux 1-2

- Source mixer select, mute

### 6.2e Presets

Presets and Sub-Presets are saved to the mXa-1502 for scheduled or triggered recall.

### 6.2f Input DSP blocks

The following DSP functions are available on input channels.

- Audio Meter
- Autoleveler
- Brick Wall Limiter
- Compressor
- DCA gain
- Delay
- Gain
- Gate
- Graphic Equalizer
- High-Pass Filter
- Low-Pass Filter
- Parametric Equalizer
- Signal Generator
- VCA Gain

### 6.2g Output DSP blocks

All input DSP blocks except for Feedback Suppressor are available on output channels, plus the following:

- Ambient Noise Compensation
- Crossover
- FIR Filter

## DSP Blocks

### Audio Meter

The audio meter allows the signal to be monitored at any location in the signal chain. Display range is -60dBu to +20dBu.

### Autoleveler

The auto leveler is a dynamics processor used to automatically boost or cut a signal to a user-defined target level.

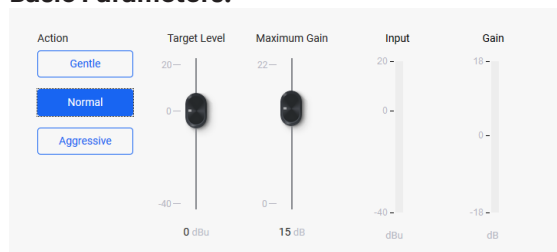
The target level is the primary setting in the autoleveler, as it determines the constant level to which an input is boost or cut.

The autoleveler can be used in situations such as speech re-enforcement, where an unknown source level needs to be maintained at a specific output level. For example, a podium microphone where different speakers will be presenting may have an auto-leveler applied to ensure that strong or soft speakers' voices are amplified appropriately.

The controls for the auto leveler are split into two categories, basic and advanced. It is recommended you start with the basic controls, and if fine tuning is required, use the advanced controls.

Warning: Depending on the settings, it is possible to apply up to 27dB of gain with the auto leveler.

#### Basic Parameters:



**Target Level** - The desired continuous output level of the signal.

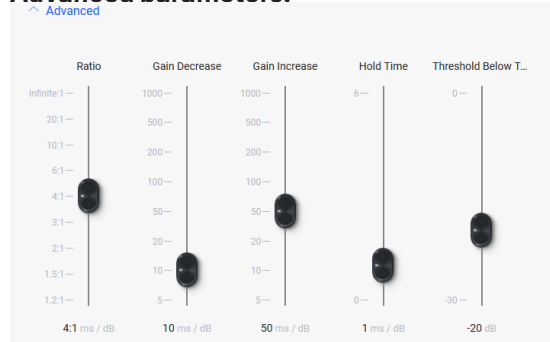
**Action** - Sets the ratio, hold time, and gain change rates (see table for definitions). These settings are general starting points for how the auto leveler should behave. Action can also be user defined under advanced controls, with three drag points available for a more visual adjustment.

| Action     | Ratio | Hold Time | Gain Increase | Gain Decrease |
|------------|-------|-----------|---------------|---------------|
| Aggressive | 10:1  | 0 Seconds | 20 ms/dB      | 5 ms/dB       |
| Normal     | 4:1   | 1 Second  | 50 ms/dB      | 10 ms/dB      |
| Gentle     | 2:1   | 2 Seconds | 100 ms/dB     | 20 ms/dB      |

**Maximum Gain** - This is the total amount of gain the auto leveler may apply before it stops affecting the signal. Maximum gain controls the threshold below target using the following formula:

$$\text{Threshold Below Target} = \text{Max Gain} \div ((1 \div \text{ratio}) - 1)$$

#### Advanced parameters:



**Threshold Below Target** - Determines the relative input signal level above which the autoleveler increases gain, below which no action is taken.

**Ratio** - This is the ratio of the input level change in dB to output level change in dB. It determines the degree of boost or cut applied to a signal to maintain the target level. The higher the ratio, the closer the signal above threshold will approach the target level. However, a higher level also increases how aggressive the autoleveler maintains that gain.

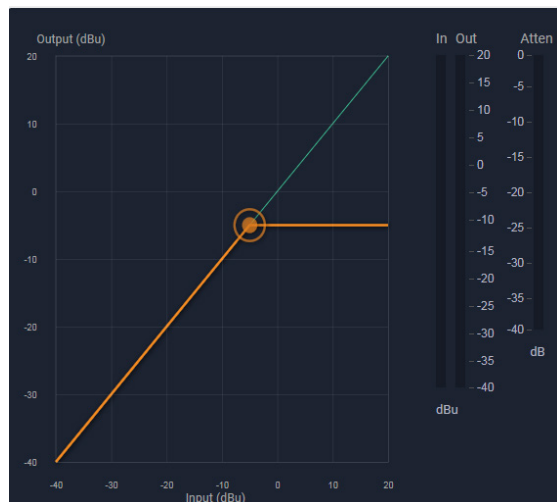
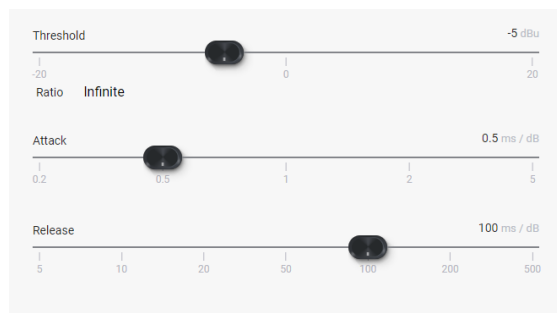
**Gain Change Rate** - Prevents sudden, choppy-sounding level changes to an input signal having a wide dynamic range.

**Hold Time** - This is the time after the input signal falls below the threshold during which the autoleveler's gain is held constant before it returns to unity gain. Hold time is used in conjunction with gain change rate to arrive at a natural-sounding auto leveler action.

Both the advanced and basic control views have a visible meter bar. It shows the gain or attenuation applied by the auto leveler in 1 dB steps.



### Brick Wall Limiter



The brick wall limiter is a compressor with a fixed infinite ratio. Use a brick wall limiter to prevent signal from exceeding a designated peak level. The limiter function allows for threshold, attack time and release time adjustments.

For a more natural sounding gain reduction that allows some signal above threshold, use the compressor function.

#### Parameters:

**Threshold** - The signal level at which the limiter begins to apply gain reduction to the signal. Threshold range is -20dBu to +20dBu.

**Ratio** - There is no ratio control, ratio is fixed at infinite. No signal increase above threshold.

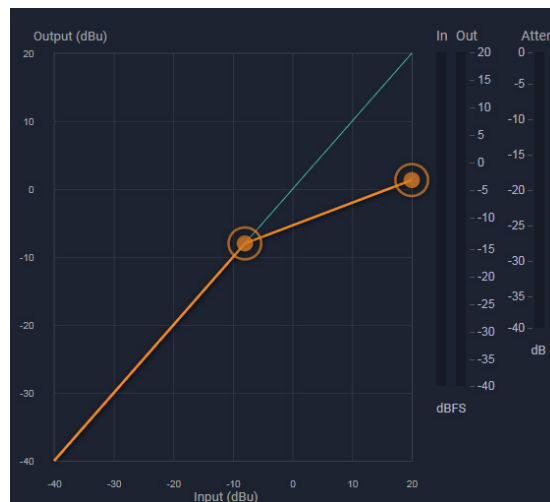
**Attack Time** - The rate in mS/dB that gain reduction occurs after the signal level crosses threshold.

**Release Time** - The rate in mS/dB that any gain reduction stops after the signal level drops below threshold.

**Detector Type** - The detector type is fixed at peak detect for the brick wall limiter

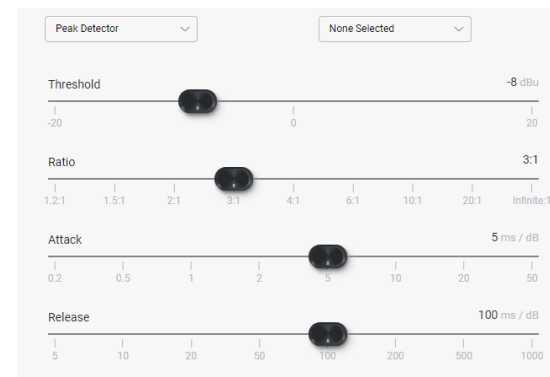
### Compressor

The compressor function allows for user-adjustable threshold, ratio, attack time, release time and detector type.



An attenuation bus assignment is provided to allow multiple limiters to force their gain reductions to track each other, ie for stereo signals. For peak limiting with infinite ratio, use the brick wall limiter function.

#### Parameters:



**Threshold** - The signal level at which the compressor begins to apply gain reduction to the signal. Threshold range is -20dBu to +20dBu.

**Ratio** - The amount of gain reduction applied to signal level above threshold. Range is 1.2:1 to infinite.

**Attack Time** - The rate in mS/dB that gain reduction occurs after the signal level crosses threshold.

**Release Time** - The rate in mS/dB that any gain reduction stops after the signal level drops below threshold.

**Attenuation Bus** - All compressors assigned to the same attenuation bus will apply the largest amount of gain reduction from any one of the assigned compressors. This is typically used for tracking compression across stereo signals.

**Detector Type** - This selects between peak or average detector operation:

- **Peak Detector** - Setting the detector type as peak means that only the peak level of a signal is used to trigger the compressor. Peak detect is typically used for limiter applications where any signal level above a certain point is undesirable. In peak detect mode, attack and release times are both adjustable.
- **Average Detector** - Setting the detector type to average means that a computed average signal level is used as the compressor trigger instead of peak levels. The averaging detector is more musical and natural sounding and typically used to "thicken" vocals. When using the average detector, attack and release controls are replaced with a single average rate control which adjust the speed at which compressor action occurs.

## DCA Gain



A DCA gain block can be placed on any channel in order to assign that channel to DCA groups 1-4. The channel's overall level to all DCA groups, plus the level to each of the four DCA groups is individually adjustable.

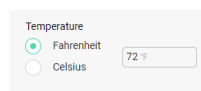
A DCA is typically set up and deployed to a remote operator who has limited software access but simply needs to control a zone's overall volume via mobile device or tablet. See section [6.1b](#) for deploying a DCA to a remote control operator.

## Delay



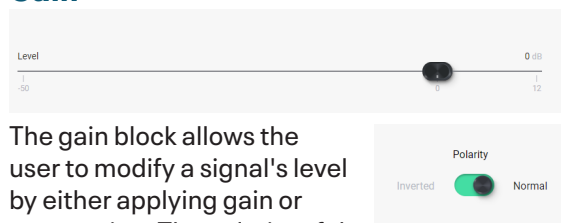
Delay can be used on any input or output channel. Delay range is from 0-682ms.

Delay can be input by time (ms) or by distance (ft, m), using the scroll bar or by manually entering a numerical value. Ambient air temperature can be entered to automatically adjust for the speed of sound in hotter or colder air.



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### Gain



The gain block allows the user to modify a signal's level by either applying gain or attenuation. The polarity of the signal may also be inverted. The level control allows for gain adjustment between +12dB and -50dB and OFF. The level fader can be adjusted in 0.1 dB increments.

#### Gain Parameters:

**Level:** Off, -50dB to +12dB in 0.1 dB increments

**Polarity:** Normal or inverted

### Gate



A noise gate can be used to minimize unwanted, low level ambient sounds from getting through on an individual input channel. Threshold is the level above which an input signal will pass through, below which its signal is attenuated by the range value. Attack and release control the time characteristics of the gating action. Attack sets the amount of time used to ramp the gain to unity. Release sets the time required to attenuate the signal. The gate may be assigned to a link group to link its parameters with other channel gates.

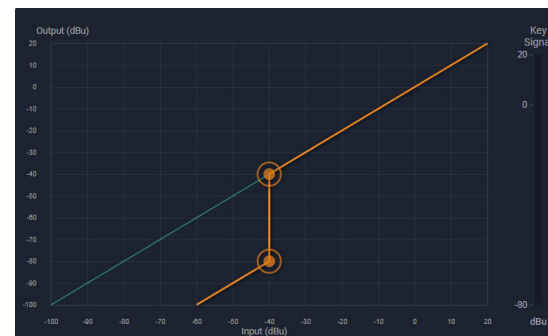
#### Gate Parameters:

**Threshold:** The minimum input signal level (also called key signal) required to open the noise gate and allow signal to pass through. Threshold can be set using the slide fader, text entry box, or a drag point on the graph.

**Attack:** The rate at which input signal level rises to unity gain after reaching the gate threshold.

**Range:** The amount of attenuation applied to the gated signal when it remains below threshold, sometimes referred to as "floor".

**Release:** The rate at which attenuation is applied to the signal after it falls back below gate threshold.



#### Advanced Mode Parameters:

Advanced mode allows the user to employ a key filter for the gate. A key filter does not EQ the signal passing through the gate, but rather allows the gate threshold detector to respond only to a frequency band within the signal as determined by the filter. The key filter is a band-pass filter with selectable center frequency and bandwidth.

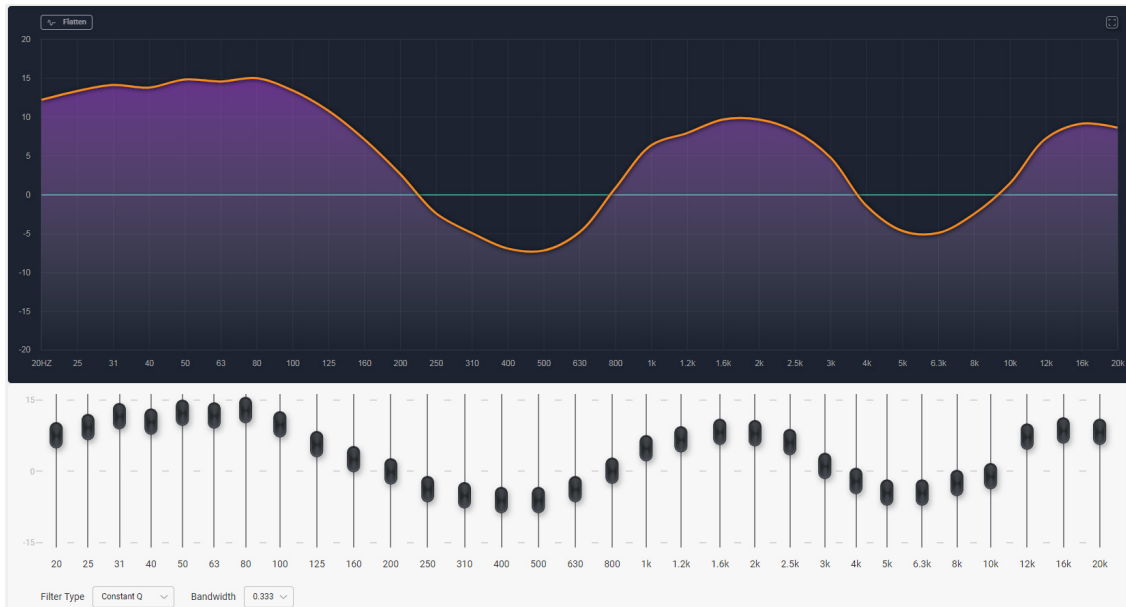
**Key Frequency:** This is the center frequency of the key filter.

**Key Bandwidth:** This sets the bandwidth used for the key filter, and is always on. The default bandwidth setting is a very wide 15 octaves, and as such has no frequency-specific effect.

To use frequency selective key threshold detection, adjust the key bandwidth to a lower setting and set the frequency and bandwidth as desired.



## Graphic Equalizer



The graphic equalizer offers 31 standard ISO center frequency controls with constant Q or proportional Q filters, as well as adjustable filter bandwidth.

### GEQ Parameters:

**Faders:** Graphic representation of the 31 EQ filter controls. Adjust faders one at a time, or drag across any region of the graph to adjust faders.

To return all GEQ faders to their "0" setting, click or tap the "Flatten" button in the upper left corner of the graphic display.

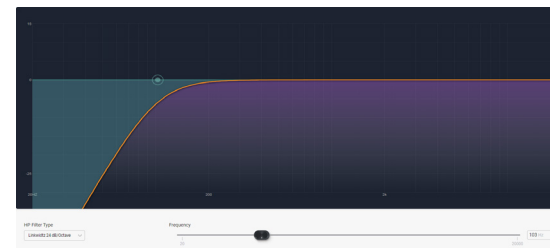
**Filter Type:** This selects proportional Q or constant Q (default) filters.

- Constant Q filters have consistent Q/ bandwidth regardless of the amount of boost or cut.
- Proportional Q filters get narrower with increasing boost/cut.

Differences in filter shapes can be observed on the frequency response display.

**Bandwidth:** This sets the bandwidth of all GEQ filters to the same value within a range of 1/4 octave to 1/2 octave (before proportional adjustment). The default bandwidth is 1/3 octave.

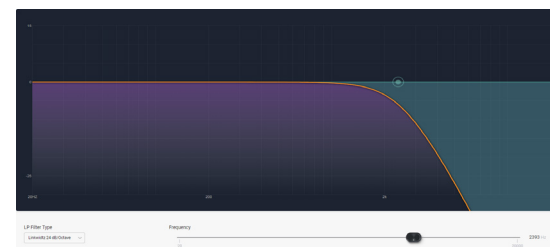
## High-Pass Filter



A high-pass filter (HPF) is a single ended filter without a level control, passing only signal above the selected corner frequency. Filter types include Bessel, Butterworth, Linkwitz, and Linkwitz Notch, including a variety of filter slopes.

**HPF Parameters:** filter type, frequency

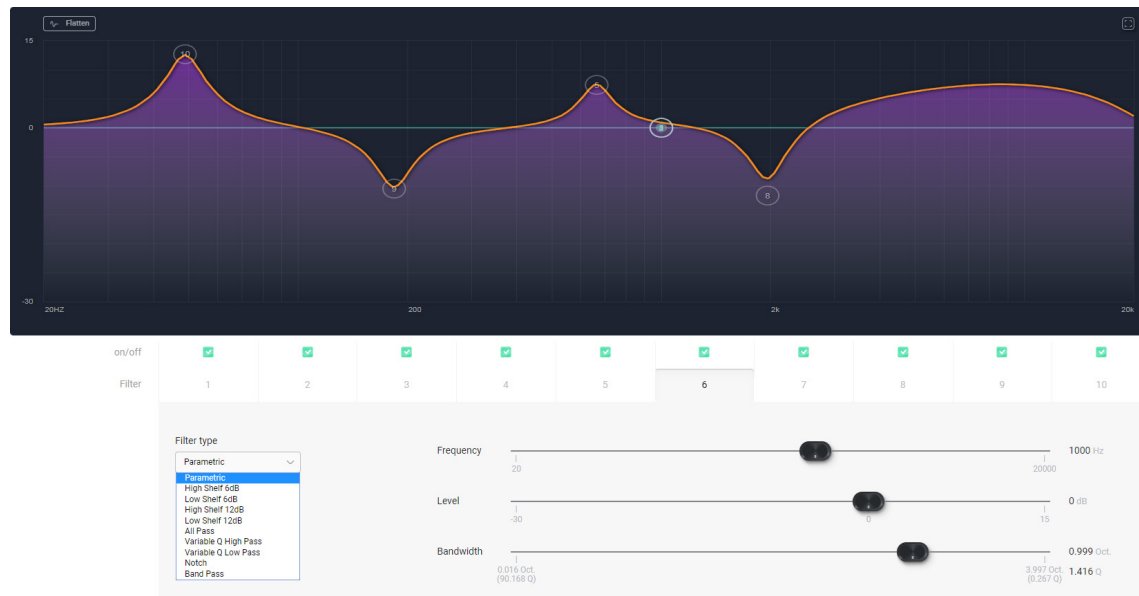
## Low-Pass Filter



A low-pass filter (LPF) is a single ended filter without a level control, passing only signal below the selected corner frequency. Filter types include Bessel, Butterworth, Linkwitz, and Linkwitz Notch, including a variety of filter slopes.

**LPF Parameters:** filter type, frequency

## Parametric Equalizer



The PEQ parametric equalizer provides a variety of powerful filters for adjusting signal response with precision. A master on/off button enables/disables the PEQ block.

10 individual filters are available for every PEQ block, and each filter is capable of the following types: Parametric, high-shelf and low-shelf at 6dB/octave or 12dB/octave, all-pass, variable-Q high-pass, variable-Q low-pass, notch, and band-pass.

Select a filter number, then choose a filter type, then adjust dragging its control node, by using the slide-controls, or by entering parameter values in the text boxes to the right of each control.

### PEQ Parameters:

**Filter 1-10:** filter On/Off, active selection

**Filter Types:** Parametric: Symmetric boost/cut, allowing individual adjustment of center frequency, level and bandwidth.

- High-Shelf: Asymmetric boost or cut with "shelving" shape. Allows adjustment of the corner frequency and amplitude. Slope can be selected as 6 dB/octave or 12 dB/octave.
- Low-Shelf: Mirror-image of high-shelf.
- All Pass: Provides no change in amplitude, but -180 degrees of phase shift at corner frequency.
- Notch: Infinite cut at specified center frequency, with adjustable bandwidth or Q.

- Variable Q HPF: Second order high pass filter with adjustable Q.
- Variable Q LPF: Second order low pass filter with adjustable Q.
- Band Pass: This will pass signals within the filter's response region. It allows adjustment of center frequency and bandwidth/Q. Gain is 0 dB at the center frequency.

**Frequency:** Selected filter center/corner frequency.

**Level:** Selected filter boost/cut amplitude.

**Bandwidth:** Selected filter bandwidth (or Q).

### Filter Type Details

#### Parametric EQ Filters

Parametric EQ uses peak filters with the ability to control boost or cut, frequency center, and bandwidth. Think of one band of parametric EQ as a single graphic equalizer fader, except that the frequency is variable, and that the bandwidth, or how "wide" the filter affects the frequency spectrum at the center frequency, is also variable. The smaller the bandwidth, the less the audio signal on either side of the frequency center is boost or cut, whereas a larger "wider" bandwidth produces an audible change to the overall tone of a signal.

Parametric filters are best used to hunt down and eliminate problem feedback frequencies, add or remove a characteristic "hot spot" from microphones, or clean up room resonance situations. It is well worth the time becoming proficient with parametric EQ filters, as they offer the best solution to many EQ problems.

Parametric filters have a boost/cut range of +15dB to -30dB. There is more cut than

boost because one of the more common uses for parametric filters is to dramatically cut, or "notch out", very narrow frequencies (low bandwidth) in order to eliminate system feedback problems.

Every instance of a parametric EQ filter has a center frequency selected. Each filter's center frequency is adjustable from 20Hz to 2000Hz in 1/96 octave steps. Carefully sweeping a narrow bandwidth filter through a problem feedback area, with just a slight boost, is a quick way to find the exact frequency causing trouble. Once the offensive frequency has been found, cut the filter's level, and then adjust the bandwidth as narrow as possible while still eliminating the feedback problem.

Bandwidth is adjustable from about 1/64 octave to four octaves, and the lower the bandwidth, the less audible the filter action will be. Finding the problem frequency is relatively easy, but finding the best combination of cut and bandwidth takes a little practice. Again it is well worth the time getting comfortable with the notching procedure, so that problems can be quickly addressed with a sufficient but minimal amount of correction.

### Shelving EQ Filters

1st order filters use a gentle 6dB per octave slope, while 2nd order filters use a 12dB per octave slope for a more pronounced boost or cut. All shelving filters have a boost/cut range of +/- 15dB and frequency range from 20Hz through 20kHz. Shelving filters are most useful as broad tone controls to boost or cut the high end or low end of an audio signal's frequency content. Because they affect a wider spectrum of audio, they are not as suitable for feedback control as parametric filters.

### All-Pass Filters

The all-pass option is a 2nd order all-pass filter which provides a -180 degree phase shift at the corner frequency. At very high frequencies the phase delay approaches -360 degrees. All-pass filters may be used to add frequency dependent phase shift or phase delay to the audio signal path. It does not produce a measurable effect on the magnitude response of the signal.

### Signal Generator



The signal generator creates pink noise, white noise or a sine wave output.

When a signal generator is placed in an input signal chain and turned on, audio input for that channel becomes disabled.

When placed in an output signal chain and turned on, the mixer signal selected for that output channel becomes disabled.

White noise is randomly generated broadband noise.

Pink noise is bandwidth-limited 20Hz - 20kHz to contain equal energy in any octave (-6 dB per octave low-pass filtered).

The sine wave has adjustable frequency. All three signal types can be generated at any level from -50dBu to +20dBu.

### Signal Generator Parameters

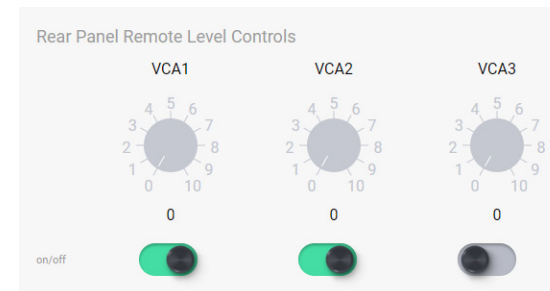
**Signal Type:** Pink noise, white noise, or sine wave

**Frequency:** Frequency of signal to be generated (sine wave only).

**Level:** RMS level of signal generated.

**Bypass:** Turns off generated signal and allows audio signal to pass through.

### VCA Gain



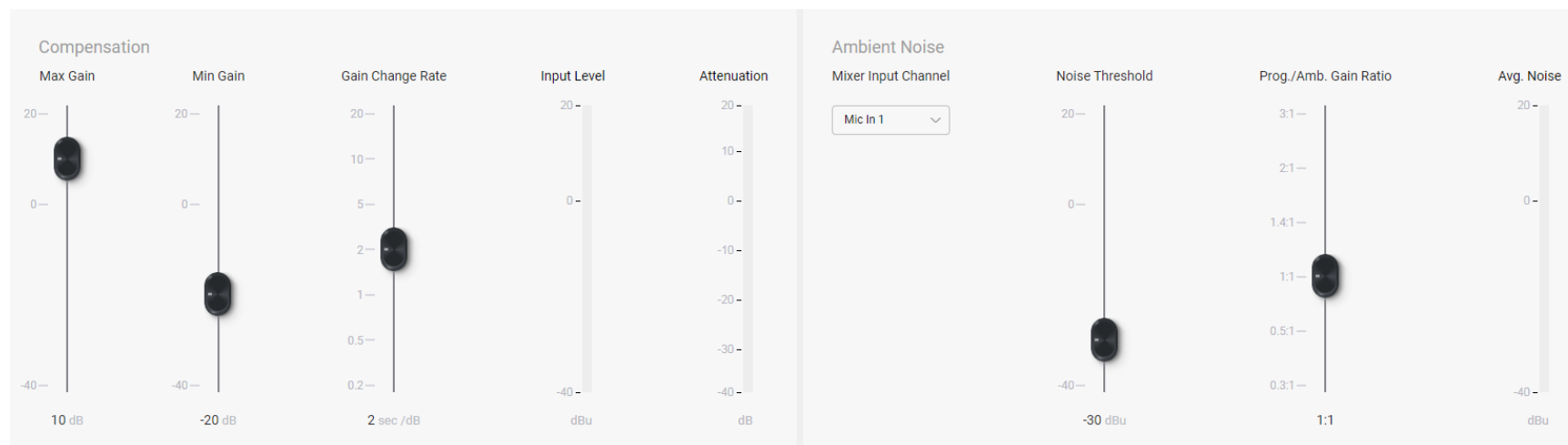
The three back-panel VCA (voltage controlled amplifier) input pins are used to remotely control the level of assigned inputs or outputs using a simple potentiometer circuit.

In order to use the VCA inputs, one or more VCA gain blocks must first be placed in the signal chain, then assigned to VCA inputs 1-3. A single VCA input pin can control multiple VCA Gain blocks, as long as they are all assigned in software to the same VCA input pin.

Use the Ashly [WR-1](#) or equivalent to send a variable DC voltage to any of the three [VCA pins](#). The current position of each potentiometer is shown in the software. Individual VCA inputs can be enabled or disabled.

See sec. [4.4](#) or section [7.1](#) for more details.

## Ambient Noise Compensation - ANC (output only)



Ambient noise compensation (ANC) is an automatic output level control that uses a microphone input to monitor background noise in a specific zone, then adjusts the overall output level for that zone accordingly in order to maximize intelligibility above the ambient noise.

*The ambient sensing microphone input can not be routed to the zone's mixer.*

The ambient noise sensing mic is processed similar to a slow-responding SPL meter, which is then used as the control signal for the automatic level control of the program audio.

The ambient sensing microphone doesn't need to be a high-quality microphone. It is only used to detect the overall noise level in the room and is not used for the direct program audio or paging.

The placement location of the noise-detecting microphone is very important for the ambient noise compensation function to work well. A

unidirectional microphone pointed toward the noise sources *but away from any speakers* works best.

### ANC Parameters:

**Max Gain:** This sets the maximum gain the ANC can apply to the program audio. A typical starting value is 10 dB.

**Min/Base Gain:** This sets the base level of the program audio before any ANC action affects it. When the noise detecting mic exceeds the noise threshold, ANC applies gain above the minimum gain setting according to the Program/Ambient Gain Ratio setting. A typical starting value for minimum gain is -20 dB.

**Gain Change Rate:** This is the rate at which the ANC will adjust the gain, measured in seconds per dB. A typical starting value is 2 seconds/dB.

**Input Level Meter:** This indicates the level of the program audio before any ANC gain or attenuation is applied.

**ANC Gain Meter:** This shows the current gain or attenuation being applied to the program audio by the ANC function.

**Mixer Input Channel:** This selects the input channel to be used for the ambient noise detecting microphone. The microphone signal is taken after any input signal path processing.

**Noise Threshold:** This sets the ambient noise mic level above which the ANC will begin increasing the program audio gain above the minimum gain setting. A typical starting value is -30 dBu. Keep in mind that any changes to the noise-sensing microphone gain will affect the action of the noise threshold control.

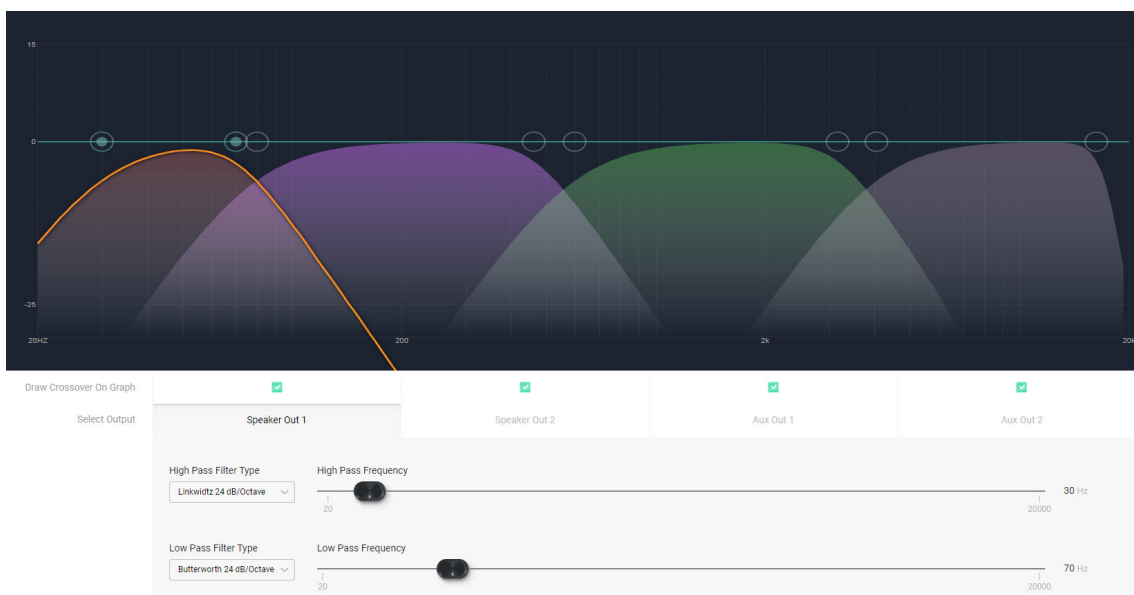
**Program/Ambient Gain Ratio:** The ratio of dB increase in program audio level for every 1 dB increase in ambient noise level. A typical starting value is 1.0 which means that for every 1 dB increase in ambient noise above the threshold, the ANC will increase the gain of the program audio by 1 dB.

**Average Noise Meter:** This meter indicates the average level of the selected ambient noise detecting microphone.

### ANC Setup Procedure

- In software, place an ANC block on the output channel to be used for background music or voice paging in that zone.
- Open the ANC block to edit its control window. Set the ANC controls to the typical settings described above, which are the default settings of a new ANC block when it is first placed.
- Turn the ANC function ON.
- Select the noise-sensing microphone input from the drop-down box labeled "Mixer Input Channel".
- Physically locate the noise-sensing microphone in the zone by pointing it toward the primary noise sources such as groups of people, HVAC equipment, vehicle traffic etc, but pointed away from the sound system speakers or their direct reflections.
- Add appropriate mic preamp gain to the ambient-sensing mic channel, add gain, EQ, HPF or LPF, compression, or even a noise gate if desired. The noise-detecting microphone signal will appear on the Average Noise input level meter. To adjust ANC controls for good-sounding operation without people present, a pink noise source or even a portable stereo can be placed near the expected ambient noise source to simulate anticipated volumes.
- Beginning at -40dBu, adjust the Noise Threshold control to respond to the average noise input level above which point you want the program audio to begin increasing.
- Increase the zone noise source volume until you see the average noise meter rise above your noise threshold setting. You should begin to see the ANC Gain meter slowly rise above the minimum gain setting.
- Slowly increase the noise source further and adjust the program/ambient gain ratio for the desired amount of noise compensation.
- Continue to increase the noise source volume to the highest anticipated level. Adjust the max gain to a level which limits the maximum gain that the ANC applies to the program audio so it will not become too loud or clip.
- The gain change rate can be adjusted according to how fast you would like the gain changes to take place in response to changes in ambient noise.
- Be aware that an improperly setup ANC can result in runaway gain where the program audio is picked-up by the noise-sensing microphone as background noise. The result is not necessarily feedback squeals, but the gain of the program audio could ramp up to the max gain value even with no ambient room noise. The best remedy for this problem is to locate the noise-sensing microphone closer to the expected noise sources and further away from the sound system speakers or their reflections. A baffle can be constructed between the speaker and microphone to block direct or reflected sound pickup. Also, the Program/Ambient Gain Ratio can be lowered to reduce the susceptibility to gain runaway.

## Crossover (output only)



Crossover blocks can be placed on both speaker and Aux output channels. A high-pass and low-pass frequency is applied for each crossover filter, along with filter type, to band-limit the signal for that output.

Outputs populated with a crossover block will be shown on the edit screen for clear visual representation of the crossover settings. Select any output to edit its filter parameters.

The default filter type is 24dB/oct Butterworth, but can be changed to any of the following:

### Available Filter Types:

**Bessel:** 2nd, 3rd, 4th and 8th order (12, 18, 24, 48 dB/octave)

**Butterworth:** 2nd, 4th and 8th order (12, 24, 48dB/octave)

**Butterworth/Linkwitz:** 3rd order (18dB/oct.)

**Linkwitz:** 2nd, 4th and 8th order (12, 24, 48dB/octave)

**Linkwitz Notch:** 4th and 8th order (24, 48dB/octave)

The following details summarize filter types offered:

### Butterworth

Butterworth filters individually are always -3dB at the displayed crossover frequency and have a "maximally flat" passband and sharpest transition to the stop-band. When a Butterworth HPF and LPF of the same corner frequency are summed, the combined response is always +3dB. Note that when 12dB/octave Butterworth HPF and LPF filters are used to create a crossover, the polarity of one of the outputs may need to be inverted to compensate for the phase shift of the filter.

### Bessel

These filters as implemented in Ashly devices are always -3dB at the displayed crossover frequency. Bessel filters have a maximally flat group delay. Stated another way, Bessel filters have the most linear phase response. When a Bessel HPF and LPF of the same corner frequency are summed, the combined response is +3dB for 12dB/oct, 18dB/oct, and 48dB/oct Bessel filters, and -2dB for 24dB/oct Bessel filters. One of the outputs may need to be inverted when using either 12dB/oct or 18dB/oct Bessel HPF and LPF's to create a crossover to compensate for the phase shift of the filter.

### Linkwitz

The 12 dB/oct, 24dB/oct, an 48dB/oct Linkwitz-Riley filters individually are always -6dB at the displayed corner frequency. When a Linkwitz-Riley HPF and LPF of the same corner frequency are summed, the combined response is always flat. With 12dB/oct Linkwitz-Riley crossover filters, one of the outputs must be inverted or else the combined response will have a large notch at the crossover frequency.

### Linkwitz Notch

4th and 8th order filters are offered.

### Crossover Notes

When used in a crossover, filter type will affect the way adjacent pass-bands interact near the crossover point. When electrically summed, 24dB/octave Linkwitz-Riley filters produce a flat transition through the crossover region, assuming that the HPF and LPF are set to the same corner frequency. This makes 24 dB/octave Linkwitz-Riley filters quite

popular. However, crossover filter types must be carefully selected to match the acoustic response of the specific loudspeaker system. Please consult the manufacturer of the loudspeaker system for recommended crossover frequencies and filter types.

### FIR Filter (output only)

|                 |                                   |
|-----------------|-----------------------------------|
| Sample Rate     | 48 kHz                            |
| Number of Taps  | 0                                 |
| Filename Loaded | FIR source filename not available |

+ Add FIR File or drag and drop file here

A FIR (finite impulse response) filter is typically used when a speaker manufacturer develops and provides a proprietary FIR coefficient file that corresponds directly to their own loudspeaker or speaker cabinet, addressing frequency and phase issues based on their own measurements and formulations.

Plugging in a FIR filter DSP block then clicking on it will prompt the user for a \*.fir or \*.csv text file, which is then loaded and applied to the output DSP. The two file types will have identical coefficient code, however the \*.fir file may add comments (designated by a semi-colon) or a key=value pair definition such as sample rate. Either file type will work.

#### \*.fir file example:

```
; comments section
sampleRate = 48000
+0.0000042920
+0.0000030236
-0.0000040482
```

#### \*.csv file example:

```
+0.0000042920
+0.0000030236
-0.0000040482
```

The software does not offer the ability to view or edit the EQ curve as produced by a FIR filter. FIR filters on this device can have from 2 up to 512 taps.

## 6.2h Signal Chain > Mixers 1-4

Four independent mixers can be assigned to the two amplifier outputs or two aux outputs. Each mixer offers independent input channel routing, level control, mute, ducking enable, input automix assignment and response time. Stereo line inputs can be set for left input only, right input only, or summed mono for that channel.

### Automixer

The automixer is used to automate the mixing of multiple speech microphones to follow the dynamic nature of the speech dialog and attenuate idle microphones. The automixer may also be used in conjunction with the autoleveler, compressor, or gate on the input signal paths. This gives the user more advanced control of varied input signal levels

produced by different talkers. A feedback suppressor function may also be used on the inputs to further help control feedback problems.

### Ashly Auto Mixer Technology

The automixer function is a "gain-sharing" type which automatically makes smooth gain transitions on all automixer input channels to achieve a constant total system gain. This gain-



sharing method of automixing has been found to be superior to gating automixers due to the following characteristics:

- The automatic gain action has a smooth transparent sound as though a person were mixing the inputs to follow the audio program rather than rapid gating on-and-off of channels.
- Properly designed gain-sharing automixers correctly adjust for mixing of coherent versus non-coherent signals for a more consistent final mix level without feedback as channel gains are automatically changing.
- A gain-sharing automixer is easier to setup and adjust without the need for threshold, attack, release, depth, and number-of-open-mics (NOM) controls.

Mixer input channels can be individually selected as auto-mixed or manual mixed, all summed together to the same mixer output. Channels which are selected as auto will participate in the automix in that they will contribute to the automatic adjustment of other automix channel gains. Likewise, their channel gain will be affected by the signal level present on other automix channels. Manual mixer channels (not selected as auto) will mix independently of the automixer channels into the output, only controlled by their fader setting. The fader on auto channels still controls the input level before automatic mixing takes place so that more of the system gain can be applied to one channel versus another.

### Automixer Setup

Setting-up the Ashly gain-sharing automixer is quite simple compared to other gating-type automixers. The following procedure is recommended for most multi-microphone speech applications.

- Start with all mixer faders off and the automixer response time set to 0.1 seconds.
- Configure the mixer input channel routing as desired and select <Automix> on the channels to be automixed.
- Start with one of the main speech channels, or one which is centrally located. Slowly increase the fader for this one channel just until feedback starts, then lower the fader approximately 3 dB to stay comfortably below feedback. This sets the total mixer system gain.
- Now increase the level of the other automix-enabled input channels to approximately the same position as the first channel. The system will not feedback because the automixer will slowly attenuate the active channels as more channels are turned-on to maintain a constant total system gain.
- During the program, individual channel faders may be raised or lowered to adjust for the weakness or strength of the respective talkers while the automixer is active.

## 6.2i Signal Chain > Ducking

| Input | Name         | Priority | Filibuster | Depth     | Release    | Trigger Threshold |
|-------|--------------|----------|------------|-----------|------------|-------------------|
| 1     | Mic In 1     | 1        | Off        | undefined | 50 ms / dB | -80               |
| 2     | Mic In 2     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 3     | Mic In 3     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 4     | Mic In 4     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 5     | Mic In 5     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 6     | Mic In 6     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 7     | Mic In 7     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 8     | Mic In 8     | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 9     | Stereo In 9  | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 10    | Stereo In 10 | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 11    | Stereo In 11 | 1        | Off        | 5 dB      | 50 ms / dB | -80               |
| 12    | Stereo In 12 | 1        | Off        | 5 dB      | 50 ms / dB | -80               |

This dedicated ducking setup screen is used for easy editing and at-a-glance visibility.

- Each of the four mixers (zones) have their own independent ducking setup.
- Stereo inputs 9-12 sum both inputs to duck other channels.
- **Priority:** Each input can be assigned a ducking priority from 1 to 12, with 1 being highest priority. Multiple channels can share the same priority level.
- **Filibuster:** Filibuster On means that channel will maintain control over all other channels until its input signal is no longer present, even if other channels have a higher priority.
- **Depth:** Ducking depth is the reduction in signal level for that channel when it is ducked by another channel with a higher priority. Ducking depth can be set from 0dB to -inf.
- **Release:** Ducking release time is how long

it takes for ducked signals to return to their normal level. Release time can be set from 50ms/dB to 1000ms/dB.

- **Trigger Threshold:** Trigger threshold determines the signal level required to activate that channel's ducking control over other lower priority channels. To prevent an input channel from ducking other channels, set its priority to 12, or set its trigger threshold to maximum.

### 6.2j Signal Chain > Routing

The screenshot shows the 'Routing' configuration page in the Ashly AquaControl software. It features a sidebar on the left with navigation options: Dashboard, Signal Chain, Settings, Events, Diagnostics, and Logout. The main interface has tabs for 'Signal Chain', 'Presets', 'Mixers', 'Ducking', and 'Routing', with 'Routing' selected. Below the tabs is a routing matrix table and an output source assignment table.

| Input   | 1<br>Mic In 1                       | 2<br>Mic In 2                       | 3<br>Mic In 3                       | 4<br>Mic In 4                       | 5<br>Mic In 5                       | 6<br>Mic In 6                       | 7<br>Mic In 7                       | 8<br>Mic In 8            | 9<br>Stereo In 9                    | 10<br>Stereo In 10       | 11<br>Stereo In 11       | 12<br>Stereo In 12       |
|---------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|
| Mixer 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mixer 2 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mixer 3 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mixer 4 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Output | Name          | Source  |
|--------|---------------|---------|
| 1      | Speaker Out 1 | Mixer 1 |
| 2      | Speaker Out 2 | Mixer 1 |
| 3      | Aux Out 1     | Mixer 3 |
| 4      | Aux Out 2     | Mixer 4 |

The signal chain routing screen allows fast setup and review of all input and mixer signal routings, plus mixer source assignment for the two amplifier channels and two aux outputs.

### 6.3 Settings

The settings screens are where general settings, device panel settings, network settings, and security settings are configured.

#### 6.3a Settings > General Settings (not shown)

This shows the current device, its firmware/hardware revision, allows naming the device and group, and configures the Real Time Clock. This is also where you export/import all settings to back up or clone your device, and where you perform firmware update if one is available on the Ashly website.

#### 6.3b Settings > Panels > Front Panel (shown below)

The screenshot displays the 'Front Panel' settings in the Ashly AquaControl software. The interface includes a sidebar with navigation options: Dashboard, Signal Chain, Settings, Events, Diagnostics, and Logout. The main content area has tabs for 'General settings', 'Panels', 'Network', and 'Security'. Under 'Panels', there are sub-tabs for 'Front Panel', 'Front Buttons Settings', and 'Rear Panel'. The 'Front Panel' sub-tab is active, showing various settings: 'Enable Front Panel Power Button' (on), 'Enable Front Panel Lights' (on), 'Sleep on/off' (off), 'Sleep timeminutes' (0), 'Power Mode' (Power on/off), and 'Rear Panel Standby Pin' (Disengaged). A table at the bottom shows button assignments for Button A, B, C, and D. A diagram on the right shows two LED status indicators with their current assignments.

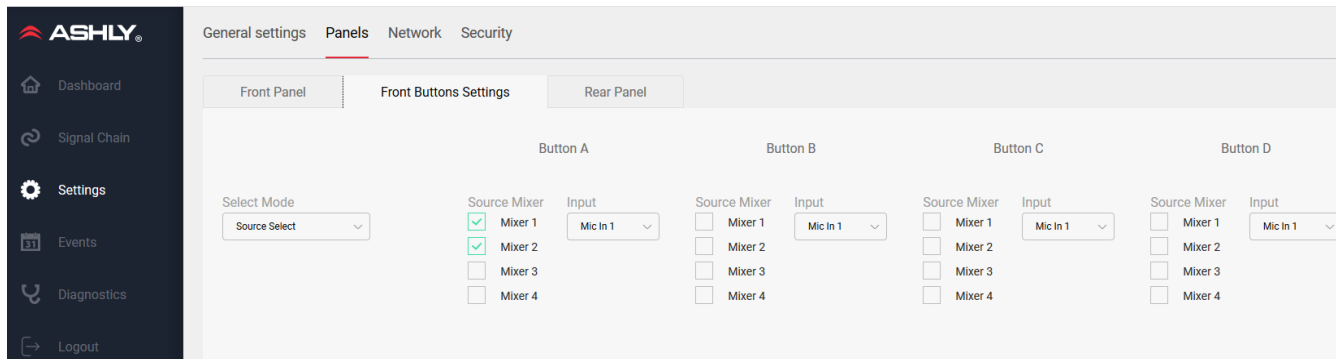
| Button   | Assignment |
|----------|------------|
| Button A | Mixer 1    |
| Button B | Unassigned |
| Button C | Unassigned |
| Button D | Unassigned |

- Enable Front Panel Power Button On/Off
- Enable Front Panel Lights On/Off
- Enable Sleep Mode On/Off plus sleep time setting. Note: Sleep time of "0" = 15 seconds.

- Enable Power On/Off
- Enable Software Standby On/Off
- Shows Rear Panel Standby Pin status

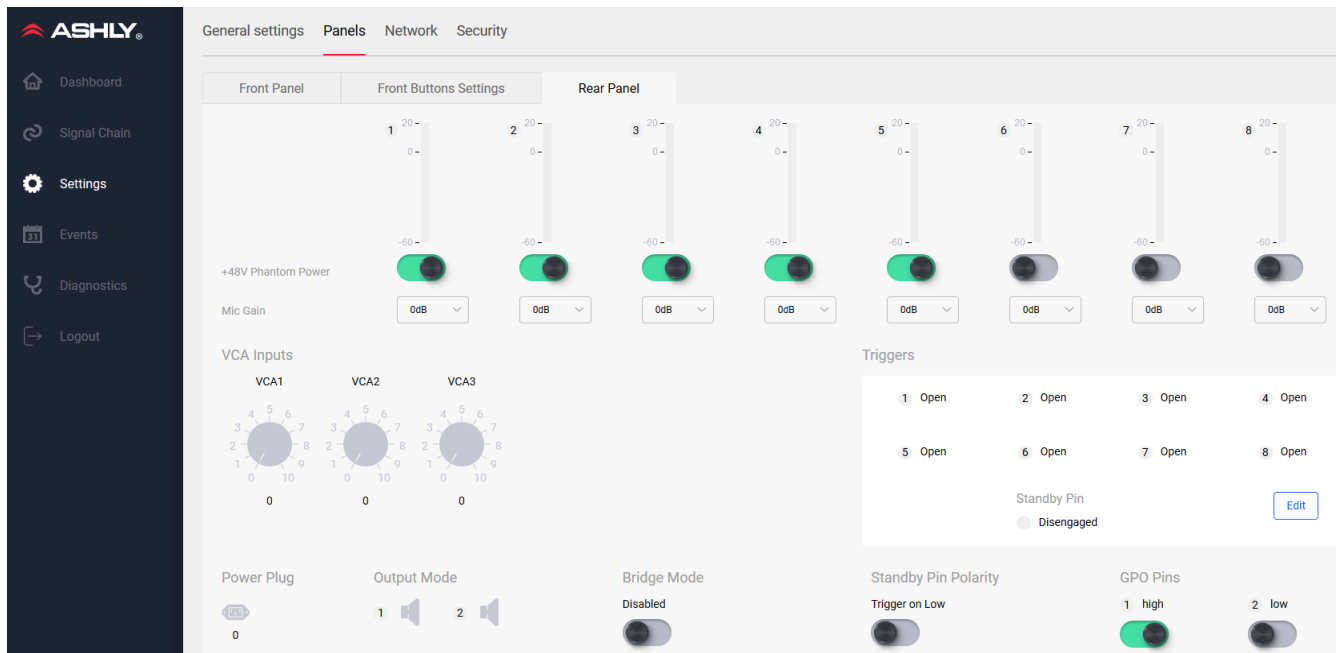
- Shows current front panel LED status
- Shows front panel select buttons A-D current assignment status

### 6.3c Settings > Panels > Front Button Settings



- Select Mode: Front panel buttons A-D can be configured as a group to: None (default), Source Select, Preset Recall, Sub-Preset Recall.
- Presets/Sub-presets are chosen from drop down list.
- Source Select: each button can select one exclusive input to any mixer.

### 6.3d Settings > Panels > Rear Panel



- Set +48V phantom power On/Off, mic preamp gain from 0dB to 66dB, view mic input signal level
- VCA Inputs (1-3): Shows current control position
- Trigger 1-8 status, press the [Edit] button in the Triggers section to view all current trigger events
- Output mode as set from rear panel DIP switches to Low-Z, 25V, 70V, or 100V
- Bridge mode: Enabled, disabled (default)
- Standby pin polarity: Trigger on high, or trigger on low (default)
- GPO 1-2 pins: Set/display current GPO pin status

### 6.3e Settings > Network

Network configuration can be set and saved as automatic (DHCP) or manual (Static IP). The device MAC address is also displayed. An "Identify Device" button pings the device to visually identify itself by turning its COM LED on for 10 seconds. The Reset button sets all network parameters back to defaults.

The screenshot shows the 'Network' settings page in the Ashly AquaControl software. The interface includes a sidebar with navigation options like Dashboard, Signal Chain, Settings, Events, Diagnostics, and Logout. The main content area is titled 'Network Configuration' and features two radio buttons: 'Automatic Configuration (DHCP)' (selected) and 'Manual Configuration (Static IP)'. Below these are several input fields: IP Address (192.168.1.111), Subnet Mask (255.255.255.0), Gateway Address (192.168.1.1), and DNS (8.8.8.8). An 'Advanced' section is collapsed, showing fields for Access IP Address, Enable Access Address, and Port No. At the bottom, there are 'Save' and 'Reset' buttons.

### 6.3f Settings > Security (not shown)

There are four levels of security roles: Admin, Guest Admin, Operator, and View Only.

Usernames and accounts are first defined by the Admin using the New Profile button, then given a security role and password.

- Admin always has full access. There can be only one admin role.
- Guest Admin roles can be granted full access, but each permission must be individually authorized by the primary admin. Guest Admin permissions include:
  - Edit Accounts
  - Edit Device Misc.
  - Event Log Clear
  - Event Scheduler edit
  - Front Panel Controls edit
  - Rear Panel Controls edit
  - Network Settings edit
  - Paging Ducking edit
  - Preset edit
  - Preset Recall
  - System Time edit
  - Trigger Settings edit
  - Edit Signal Chain
  - Import/Export Setting
- Operator roles have a shorter list of permissions which must first be authorized by the Admin. Use the Operator role to deploy Remote Mixer or Remote DCA control. Operator permissions include:
  - Edit Signal Chain
  - Front Panel Controls View
  - Preset Recall
  - DCA Remote
  - Mixer 1-4 Remote
- View Only user roles are denied editing access to all controls and settings.

## 6.4 Events

Events can be scheduled using the internal real-time-clock (RTC), or triggered by a logic input connected to rear panel Trigger Input 1-8. Multiple actions can be included in a single event, and a delay time can be added after each action as the event sequence is executed.

Use the New Event command to create events. Events can also be cloned, edited, and deleted.

### Events > Event List

All programmed events, scheduled or triggered, are listed here by event name, event type, and event actions. Click on any event in the list to test, clone, edit, or delete that event. New events can be added from this screen.

### Events > Scheduled Events

Scheduled events are programmed and saved within the unit, then executed based on the real time clock. Events can be scheduled for one time, daily, weekly, or yearly.

Several actions can be grouped together in sequence, but still be part of a single scheduled event. A delay time up to 99 seconds can be inserted after each individual action within the sequence.

Scheduled event action types include the following:

- Cancel Today's Events - over-rides all other scheduled events for the day, ending at midnight.
- Channel Mute - Mutes selected input or output channels, but does not mute mixers
- GPO High - Sets GPO pin 1 or pin 2 to logic high
- GPO Low - Sets GPO pin 1 or pin 2 to logic low

- Gain Decrement - Sets the value of - gain change for all selected input or output channels
- Gain Increment - Sets the value of + gain change for all selected input or output channels
- Mixer Mute - Mutes selected mixer channels, but does not mute input or output channels
- Power On - Turns the amplifier on
- Preset Recall - Recalls one preset from device memory
- Source Select - Sets designated input channels for one or all four mixers
- Standby - Puts the unit in standby mode
- Sub Preset Recall - Recalls one sub-preset from memory

### Events > Triggered Events

Triggered events are assigned to one of eight rear panel trigger input pins. The event is triggered when the input pin is connected to the ground pin.

Triggered event action types include the following:

- A/B Source Select - For each or all four selected mixers, this toggles between two sets of selected input channels
- Action Sequence - Select multiple actions for one event trigger. Delay time can be added following each action
- Channel Mute - Mutes selected input or output channels, but does not mute mixers
- General Purpose Output Toggle - Toggles

the logic output state of selected general purpose output 1 or 2

- Mixer Mute - Mutes selected mixer channels, but does not mute input or output channels
- Paging - Selects one channel to be used as a paging input, also selects one or more mixers to apply the paging input t
- Pause/Resume Schedules - Interrupts scheduled events, resumes scheduled events when open
- Power On/Off - Toggles between power on and power off
- Preset Toggle - Toggles between two selected presets

## 6.5 Diagnostics

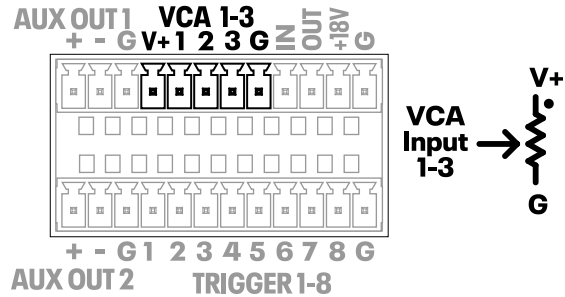
Diagnostics monitor and record a log of selected activity, useful for debugging system issues or viewing user activity. The log can be exported as \*.csv file.

The log feature can monitor and record the following activity categories, and can display results within a specified date range.

- Status
- Operation
- Events
- Presets
- Security
- Network

## 7 Remote Control

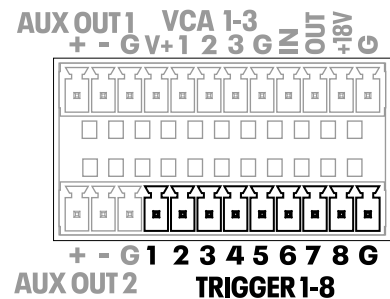
### 7.1 VCA Level Control Inputs



Remote DC level control is available on these three VCA (voltage controlled amplifier) inputs. A VCA Gain block is first placed in any input or output signal chain, then assigned to a VCA input. Multiple VCA gain blocks can be assigned to the same VCA input pin.

Ashly WR-1, WR-1.1, or WR-1.5 remotes can be used for DC level control, or a custom control can be made using a 10k Ohm potentiometer and wired as shown. The dot indicates the potentiometer clockwise position, full volume.

### 7.2 Trigger Logic Inputs



Eight programmable trigger inputs are available for use with contact closure switches.

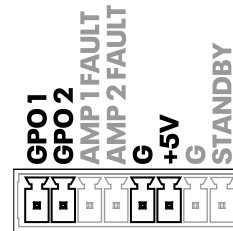
Triggered events are programmed in the software Events screen, [Events>Triggered Events> New event].

Triggered events include: A/B Source Select, Action Sequence, Channel Mute, GPO Logic Toggle, Mixer Mute, Paging, Pause/Resume Schedules, Power On/Standby, and Preset Toggle. Connecting a trigger input to the [G] pin (ground) triggers the event.

Current trigger status can be viewed in the [Settings>Panels>Rear Panel] screen.

### 7.3 GPO Logic Outputs

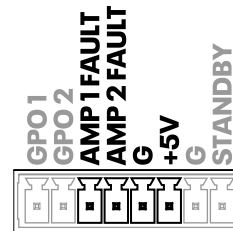
Two GPO (general purpose output) pins are available for driving external device logic inputs to effect a lighting change, motorized curtain, projector screen, etc. GPO logic status can be toggled as part of a preset, or can be toggled from a scheduled or triggered event.



Current logic High or Low status is viewed or set in the [Settings>Panels>Rear Panel] screen.

### 7.4 Amp Fault Logic Outputs

An amplifier fault is any condition that places the amplifier into a protect state. Faults can include output overcurrent, thermal, mains over-voltage, internal mains fuse, and output DC. If an amplifier channel goes into protect mode, the amp fault output pin for that channel goes logic low.

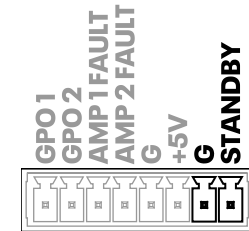


### 7.5 Remote Standby

Standby mode puts the amplifier into a reduce power state. Standby mode can be activated via software, scheduled or triggered events, or with the standby pin Euroblock connection.

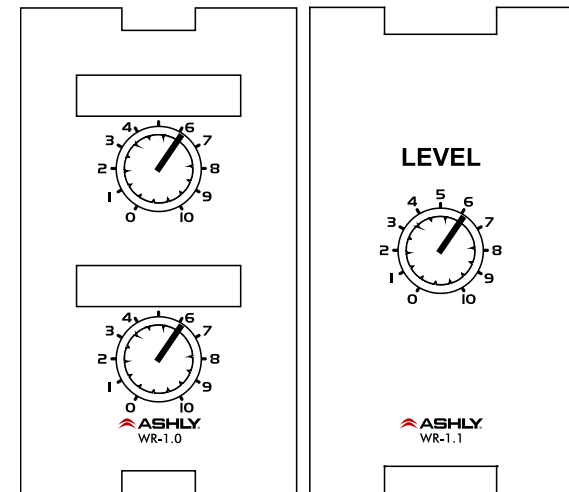
Standby pin polarity can be set in software to Trigger on Low or Trigger on High [Settings>Panels>Rear Panel].

The Standby contact closure always has priority over software or event driven standby.



### 7.6 Ashly Remotes

#### WR-1.0 and WR-1.1



The WR-1 and WR-1.1 are remote level controllers used for DC level control inputs. The WR-1.0 (dual potentiometer) and WR-1.1 (single potentiometer) mount to a standard North America electrical wall box. The remote is

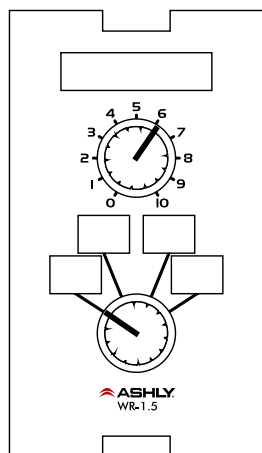


wired to the mXa-1502 Euroblock VCA pins V+, 1, 2, or 3, and ground, then associated in Ashly AquaControl™ software with a VCA Gain block placed anywhere in the signal chain.

If using a potentiometer other than the WR-1, use 10k Ohm and wire the mXa V+ pin to the potentiometer's clockwise terminal, GND to the counter-clockwise terminal, and VCA pin 1-3 to the wiper. *Do not connect the WR-1 ground connection to any external grounds.*

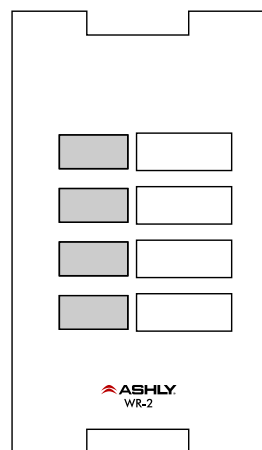
### WR-1.5

The WR-1.5 offers a single rotary potentiometer for DC level control, plus with a four-position rotary switch for triggering events using mXa-1502 trigger inputs.



### WR-2 Event Trigger Switches

The WR-2 lockout push-button remote can trigger up to four different events that have been programmed into the mXa-1502. Each pushbutton switch gets connected to a trigger input pin. When a switch is pressed, it triggers the event programmed for that trigger input.



## 8 Amplifier Protection

**Over Current Protection** - When the output current exceeds the amplifier's safe operating limits. This occurs in the amplifier output stage.

**Thermal Protection** - The amplifier senses output device temperature and adjusts fan speed to keep the operating temperature within acceptable limits. If device temperatures exceed that limit, the input level to that channel is first reduced, and as a last resort the power supply will be switched off while the fan continues to run.

**Mains Protection** - Protection within the power supply includes:

- In-rush Current Limitation during power up
- Mains Over Voltage Detection
- Internal Mains Fuse Protection

To protect the Mains fuse against AC overcurrent due to excessive audio output current, there is a protection scheme indicated on the front panel which reduces audio output level until the overcurrent condition is no longer present.

**DC Output Protection** - If the amplifier senses DC on an output it shuts down the power supply.

## 9 Troubleshooting

### No AC Power

- Is the detachable AC power cord properly installed? Is it plugged into a known live outlet?
- Has the power switch been disabled?

### No Amplifier Output

- Is the amplifier in protect or standby mode?
- Is the input signal properly wired to either a mic/line input or RCA line input?
- Are remote control or software level controls turned down?
- Is the signal muted from DSP, remote control, mixer, or a triggered/scheduled event?
- Are dynamics or gain tool settings in the signal chain allowing signal to pass properly?
- Is signal routed to the correct output channel in the mixer matrix?
- Are level controls set properly in the mixer?
- Has a scheduled or triggered event changed settings?

### Still Not Working?

- Contact Ashly technical support at 1-800-872-0010 x124, or email [service@ashly.com](mailto:service@ashly.com)

## Specifications

**Maximum Output Power**  
CEA-2006/490A, 20ms 1kHz 1%THD+N, 480ms  
1kHz -20dB, 120VAC all channels driven at  
rated load ow Z output, per channel

**Low Z output, per channel**

|       |      |
|-------|------|
| 8 Ohm | 150W |
| 4 Ohm | 150W |
| 2 Ohm | 150W |

**Low Z output, per bridged channel pair**

|       |      |
|-------|------|
| 8 Ohm | 300W |
| 4 Ohm | 300W |

**Hi-Z output, per channel**

|      |      |
|------|------|
| 25V  | 150W |
| 70V  | 150W |
| 100V | 150W |

**Hi-Z output, per bridged channel pair**

|      |       |
|------|-------|
| 25V  | 300W  |
| 70V  | 300W* |
| 100V | 300W* |

\*May require Class 3 speaker wiring,  
all others use Class 2 wiring.

**Total AC Mains Power Draw**  
Typical input, all channels driven, 120VAC

|                      |      |
|----------------------|------|
| Sleep                | <1W  |
| Standby              | 15W  |
| Idle (no signal)     | 33W  |
| 1/8 max power, 2 Ohm | 133W |

**AC Mains Current Draw**  
Typical input, all channels driven  
120VAC (divide in half for 240V)

|                    |        |
|--------------------|--------|
| Sleep mode         | 0.094A |
| Standby mode       | 0.2A   |
| Idle (no signal)   | 0.35A  |
| 1/8 max power, 70V | 1.16A  |

**Thermal Dissipation**  
in BTU/hour with typical input, all channels  
driven, 120VAC

|                      |           |
|----------------------|-----------|
| Sleep mode           | 2.14BTU/h |
| Standby              | 51BTU/h   |
| Idle (no signal)     | 112BTU/h  |
| 1/8 max power, 2 Ohm | 325BTU/h  |

|  |                        |
|--|------------------------|
| Damping Factor ,<br>8 ohm load, <1kHz            | >250                   |
| Distortion,<br>SMPTE, typical                    | <0.5%                  |
| Distortion,<br>THD-N, typical                    | <0.5%                  |
| Channel Separation,<br>dB from full output, 1kHz | -75 dB                 |
| Signal to Noise,<br>20Hz-20KHz, unweighted       | >99 dB                 |
| Frequency Response                               | 20Hz-20kHz, +/- 0.05dB |

### General Specifications

|  |  |
|--|--|
| <b>Mic/Line Input</b>                        | Euroblock 3.5mm  |
| Input Impedance                              | Active balanced, 18kΩ  |
| Maximum Input Level                          | +21 dBu  |
| Input Gain Range                             | 0dB to +66dB   |
| Phantom Power                                | +48V, software<br>switchable per channel   |
| <b>Stereo Line Input</b>                     | Dual RCA, unbalanced   |
| Input Impedance                              | 10.0KΩ   |
| Maximum Input Level                          | -10dBv (-7dBu)   |
| <b>AUX Output</b>                            | Aux 1, Aux 2, Euroblock<br>3.5mm, balanced   |
| AUX Out Maximum Level                        | +21 dBu  |
| Speaker Output                               | Euroblock 7.62mm   |
| VCA 1-3 input                                | Euroblock 3.5mm<br>+1.8V, VCA pins 1-3, G  |
| Data Connection<br>(reserved for future use) | Euroblock 3.5mm<br>Data In/Out, +18V, Gnd  |
| Trigger 1-8<br>contact closure input         | Euroblock 3.5mm<br>assignable function   |
| GPO 1 & 2 general<br>purpose outputs         | Euroblock 3.5mm<br>assignable function<br>High (+3V) when amp<br>channel is on and ok,<br>low (0V) when amp<br>channel is off or in a<br>protect/fault state |
| Amplifier Fault 1 & 2<br>logic outputs       |  |

|                                       |   |
|---------------------------------------|---|
| Remote Standby<br>Contact Closure     | Euroblock 3.5mm<br>close to engage standby                  |
| Ethernet                              | RJ45, 100MB/1GB   |
| Output Mode select<br>per amp channel | 4 pos. DIP switch<br>Lo-Z - 4Ω, 8Ω<br>Hi-Z - 25V, 70V, 100V |

### Front Panel LED Features

|                               |   |
|-------------------------------|---|
| Clip/Mute LED                 | Red, ON at max output<br>power, mute, level fully off             |
| Signal LED                    | Green, ON at 18dB<br>below full output                            |
| Current LED                   | Green, ON when 0.5A<br>current delivered to<br>speaker load       |
| Temp LED                      | Yellow, ON when<br>countermeasures<br>applied for excess heat     |
| Power LED                     | White, ON, OFF,<br>Flashing for Standby                           |
| Com LED                       | Green, ON during<br>Ethernet activity                             |
| Protect LED                   | Red, ON for amp fault<br>causing shut-down                        |
| Sleep LED                     | Blue, ON for sleep mode   |
| Disable LED                   | Yellow, ON when power<br>switch disabled                          |
| Bridge LED                    | Green, ON when amp<br>is in bridge mode                           |
| Front Panel<br>Select Buttons | A, B, C, D, programmable<br>for source select or<br>preset recall |
| Factory reset switch          | see section 3.3   |

### Processors

|                   |                       |
|-------------------|-----------------------|
| Input A/D:        | 24 bit                |
| Output D/A:       | 24 bit                |
| DSP Processors:   | 32-bit floating point |
| Sample Rate:      | 48kHz                 |
| Propagation Delay | 1.42 ms               |

## Ashly AquaControl™ Software Specifications

### Miscellaneous

|   |  |
|---|--|
| Compatible Ashly Remote Control Devices | WR-1, WR-1.1, WR-1.5, WR-2   |
| Amplifier Protection                    | inrush current, output DC, temperature monitoring, output over-current protection, internal mains fuse |
| Cooling Fan                             | Variable, air flows in the sides and out the front   |
| Software Control                        | Ashly AquaControl™ Software, served from amplifier   |
| Power Requirements                      | 100-240VAC ±10%, 50/60Hz   |
| Power Cable Connector                   | 15A Edison, detachable   |
| Unit Weight                             | 11.6 lbs (5.26 kg)   |
| Unit Dimensions                         | 19"W x 1.75"H x 14.6"D (483 x 44.5 x 371mm)  |
| Shipping Weight                         | 14.5 lbs (6.58 kg)   |
| Shipping Dimensions                     | 25.2"W x 2.5"H x 19.5"D<br>641mm x 64mm x 495mm  |
| Environmental                           | 40°-120°F (4°-49°C)<br>noncondensing   |
| Safety/Compliance                       | cTUVus, CE,<br>FCC Class B, RoHS   |

### Dashboard

| General  |  |
|----------|--|
| Display  | current device, number of inputs, number of outputs, firmware revision |
| Controls | Launch Remote Mixer, Launch Remote DCA, Launch Quick Setup             |

### Signal Chain

| General              |                         |
|----------------------|-------------------------|
| Screen Display Mode  | Editor or Diagram       |
| Hide Unused Channels | On/Off                  |
| Presets              | Save Preset / SubPreset |

### Mic Inputs 1-8

|                     |                         |
|---------------------|-------------------------|
| +48V Phantom Power  | per channel, On/Off     |
| Mic 1-8 Preamp Gain | 0dB to +66dB, 6dB steps |
| Mute                | per channel, On/Off     |

### Stereo Line Inputs 9-12

|      |                     |
|------|---------------------|
| Mute | per channel, On/Off |
|------|---------------------|

### Mixer 1-4

|                      |                            |
|----------------------|----------------------------|
| Input Level Controls | -50dB to +12dB, Off        |
| Input Level Meters   | -60dBu to +20dBu           |
| Mute                 | mute per channel, mute all |

|                  |                                   |
|------------------|-----------------------------------|
| Route Enable     | per input channel, enable/disable |
| Automix Assign   | per input channel, enable/disable |
| Automix Response | 0.01s to 1.2s                     |
| Ducker           | per mixer, On/Off                 |

### Output Channels 1-4

|      |                     |
|------|---------------------|
| Mute | per channel, On/Off |
|------|---------------------|

### Ducking

|                          |                   |
|--------------------------|-------------------|
| Ducker                   | per mixer, On/Off |
| Available Input Channels | 1-12              |

|                   |                      |
|-------------------|----------------------|
| Priority          | 1-12                 |
| Filibuster        | On/Off               |
| Depth             | 0dB to 30dB          |
| Release           | 50ms/dB to 1000ms/dB |
| Trigger Threshold | -80dBu to +20dBu     |

### Routing

|                         |                 |
|-------------------------|-----------------|
| Available Matrix Inputs | 12              |
| Available Mixers        | 4               |
| Available Outputs       | 4               |
| Output Source Select    | mixer 1-4, none |

### Signal Chain > Pluggable DSP Blocks

#### Ambient Noise Compensation (outputs only)

*On/Off, Compare*

| Compensation:     |                   |
|-------------------|-------------------|
| Max Gain          | -20dB to +20dB    |
| Min Gain          | -40dB to +20dB    |
| Gain Change Rate  | 0.2s/dB to 20s/dB |
| Input Level       | -40dBu to +20dBu  |
| Attenuation Meter | -40dB to 0dB      |

#### Ambient Noise:

|                     |                           |
|---------------------|---------------------------|
| Mixer Input Channel | Mic 1-8, Stereo Line 9-12 |
| Noise Threshold     | -40dBu to +20dBu          |
| Avg. Noise Meter    | -40dBu to +20dBu          |

### Audio Meter

|       |                  |
|-------|------------------|
| Range | -60dBu to +20dBu |
|-------|------------------|

### Autoleveler (On/Off, Compare)

|              |                            |
|--------------|----------------------------|
| Action       | gentle, normal, aggressive |
| Target Level | -40dBu to +20dBu           |
| Maximum Gain | 0dB to +22dB               |
| Metering     | Input, Gain                |

### Advanced Autoleveler Controls:

|                        |                     |
|------------------------|---------------------|
| Ratio                  | 1.2:1 to ∞          |
| Gain Decrease Rate     | 5ms/dB to 1000ms/dB |
| Gain Increase Rate     | 5ms/dB to 1000ms/dB |
| Hold Time              | 0-6 sec             |
| Threshold Below Target | -30dB to 0dB        |

| <b>Brick Wall Limiter</b><br><i>On/Off, Compare</i> |                     |
|---|---------------------|
| Threshold   | -20dBu to +20dBu    |
| Ratio   | infinite            |
| Attack  | 0.2ms/dB to 50ms/dB |
| Release   | 5ms/dB to 500ms/dB  |

| <b>Compressor</b> <i>(On/Off, Compare)</i> |  |
|--|--|
| Detector Type                              | Peak/Average   |
| Attenuation Bus                            | none, 1-4 available  |
| Threshold                                  | -20dBu to +20dBu   |
| Ratio                                      | 1.2:1 to infinite  |
| Attack                                     | 0.2ms/dB to 50ms/dB  |
| Release                                    | 5ms/dB to 1000ms/dB  |
| Metering                                   | Input & Output,<br>total attenuation,<br>superimposed on graph |

| <b>Crossover</b> (outputs only) |                              |
|---------------------------------|------------------------------|
| Output Select                   | Speaker Out 1-2, Aux Out 1-2 |
| Filter Frequency                | 20Hz-20kHz                   |

| <b>Filter Types:</b>     |                      |
|--------------------------|----------------------|
| Bessel                   | 12/18/24/48 dB/oct   |
| Butterworth              | 12/24/48 dB/oct      |
| Butterworth/<br>Linkwitz | 18 dB/oct            |
| Linkwitz-Riley           | 12/24/48 dB/oct      |
| Linkwitz Notch           | 4th order, 8th order |

| <b>DCA Gain</b> <i>(On/Off, Compare)</i> |                  |
|--|------------------|
| Level                                    | -50dB to +12dB   |
| Polarity                                 | normal, inverted |

| <b>DCA Groups 1-4 (per group):</b> |                |
|------------------------------------|----------------|
| Level                              | -50dB to +12dB |
| Mute                               | On/Off         |
| Enable for channel                 | On/Off         |

| <b>Delay</b> <i>(On/Off, Compare)</i> |                   |
|---------------------------------------|-------------------|
| Delay Time                            | 0-682 ms          |
| Delay Length (at 22°C)                | 0-770 ft, 0-234 m |
| Temperature                           | -25°F to +122°F   |
| Compensation                          | (-30°C to +50°C)  |

| <b>FIR Filter</b> (outputs only)<br><i>On/Off, Compare</i> |              |
|--|--------------|
| Sample Rate  | 48kHz        |
| Number of Taps   | up to 512    |
| Loadable File Types  | *.csv, *.fir |

| <b>Gain</b> <i>(On/Off, Compare)</i> |                                 |
|--------------------------------------|---------------------------------|
| Range                                | -50dB to +12dB, polarity invert |

| <b>Gate</b> <i>(On/Off, Compare)</i> |                      |
|--------------------------------------|----------------------|
| Threshold                            | -80dBu to +20dBu     |
| Attack                               | 0.2ms/dB to 50 ms/dB |
| Range                                | 0dB to 100dB, off    |
| Release                              | 5ms/dB to 1000ms/dB  |
| Metering                             | Key Signal, Gate LED |

| <b>Advanced Gate Controls:</b> |                    |
|--------------------------------|--------------------|
| Key Engage                     | enable/disable     |
| Key Frequency                  | 20Hz-20kHz         |
| Key Bandwidth                  | 0.016 to 3.995 oct |

| <b>Graphic Equalizer</b> <i>(On/Off, Compare)</i> |                            |
|---|----------------------------|
| Number of Filters                                 | 31                         |
| Filter Type                                       | constant Q, proportional Q |
| Bandwidth   | 0.499 to 0.25 oct          |

| <b>High Pass Filter</b> <i>(On/Off, Compare)</i> |                      |
|--|----------------------|
| <b>Filter Types:</b>                             |                      |
| Bessel   | 12/18/24/48 dB/oct   |
| Butterworth                                      | 12/24/48 dB/oct      |
| Butterworth/Linkwitz                             | 18 dB/oct            |
| Linkwitz-Riley                                   | 12/24/48 dB/oct      |
| Linkwitz Notch                                   | 4th order, 8th order |

| <b>Low Pass Filter</b> <i>(On/Off, Compare)</i> |                      |
|---|----------------------|
| <b>Filter Types:</b>                            |                      |
| Bessel  | 12/18/24/48 dB/oct   |
| Butterworth                                     | 12/24/48 dB/oct      |
| Butterworth/Linkwitz                            | 18 dB/oct            |
| Linkwitz-Riley                                  | 12/24/48 dB/oct      |
| Linkwitz Notch                                  | 4th order, 8th order |

| <b>Parametric Equalizer</b> <i>(On/Off, Compare)</i> |    |
|--|----|
| Number of filter bands                               | 10 |

| <b>Filter Types:</b> |                    |
|----------------------|--------------------|
| <b>Parametric</b>    |                    |
| Frequency            | 20-20kHz           |
| Level                | -30dB to +15dB     |
| Q Value              | 0.016 to 3.997 oct |

| <b>Hi or Low Shelf, 6 or 12 dB</b> |                |
|------------------------------------|----------------|
| Frequency                          | 20Hz-20kHz     |
| Level                              | -30dB to +15dB |

| <b>All Pass</b> |            |
|-----------------|------------|
| Frequency       | 20Hz-20kHz |

| <b>Variable Q HP/LP</b> |                    |
|-------------------------|--------------------|
| Frequency               | 20Hz-20kHz         |
| Q Value                 | 90 to 0.267        |
| Bandwidth Value         | 0.016 to 3.997 oct |

| <b>Notch</b>    |                    |
|-----------------|--------------------|
| Frequency       | 20Hz-20kHz         |
| Q Value         | 90 to 0.267        |
| Bandwidth Value | 0.016 to 3.997 oct |

| <b>Bandpass</b> |                    |
|-----------------|--------------------|
| Frequency       | 20Hz-20kHz         |
| Q Value         | 90 to 0.267        |
| Bandwidth Value | 0.016 TO 3.997 OCT |

| <b>Signal Generator (On/Off, Compare)</b> |                                    |
|---|------------------------------------|
| Signal Type                               | pink noise, white noise, sine wave |
| Signal Level:                             | off, -50dBu to +12dBu              |
| Sine Wave Frequency                       | 20Hz-20kHz                         |
| <b>VCA Gain (Compare)</b>                 |                                    |
| Controls                                  | On/Off, VCA 1-3 position           |

### Settings Specifications

| <b>General</b>  |                  |
|-----------------|------------------|
| Real Time Clock | Automatic/Manual |

#### Panels - Front Panel

|                          |                      |
|--------------------------|----------------------|
| Enable Power Button      | On/Off               |
| Enable LEDs              | On/Off               |
| Enable Sleep Mode        | On/Off               |
| Sleep Mode Timer         | minutes up/down, off |
| Power On/Off             | On/Off               |
| Software Standby         | On/Off               |
| Standby Pin Disengaged   | On/Off               |
| Source Select Button A-D | current status shown |

#### Panels - Front Button Settings

|               |   |
|---------------|---|
| Select Mode   | preset, sub-preset, source select, none |
| Presets       | user defined                            |
| Sub-Presets   | user defined                            |
| Source Select | source mixer 1-4, exclusive input 1-12  |

#### Panels - Rear Panel Settings

|                    |                              |
|--------------------|------------------------------|
| Mic Input 1-8      | +48V phantom power, mic gain |
| VCA Inputs 1-3     | current position shown       |
| Trigger Inputs 1-8 | open/closed status shown     |

|                        |                                 |
|------------------------|---------------------------------|
| Power plug             | present/missing                 |
| Speaker Output Mode    | low impedance, 25V, 70V, 100V   |
| Bridge Mode            | enabled/disabled                |
| Standby Pin Polarity   | trigger on low, trigger on high |
| Standby Pin Disengaged | On/Off                          |
| GPO Pins 1-2           | current state shown             |

#### Network Settings

|                       |                                      |
|-----------------------|--------------------------------------|
| Network Configuration | automatic (DHCP), manual (static IP) |
|-----------------------|--------------------------------------|

#### Security Settings

|               |   |
|---------------|---|
| Profile Roles | Admin, Guest Admin, Operator, View Only |
|---------------|---|

### Event Specifications

|                       |  |
|-----------------------|--|
| Scheduled Event Types | None, Cancel Today's Events, Channel Mute, GPO High, GPO Low, Gain Decrement, Gain Increment, Mixer Mute, Power On, Preset Recall, Source Select, Standby, Sub Preset Recall |
| Triggered Event Types | A/B Source Select, Action Sequence, Channel Mute, GPO Toggle, Mixer Mute, Paging, Pause/Resume Schedules, Power On/Off, Preset Toggle  |

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### LIMITED WARRANTY (USA ONLY)

(Other countries please contact your respective distributor or dealer.)

For units purchased in the USA, warranty service for this unit shall be provided by ASHLY AUDIO, INC. in accordance with the following warranty statement.

ASHLY AUDIO, INC. warrants to the owner of this product that it will be free from defects in workmanship and materials for a period of FIVE years from the original-date-of-purchase, with the exception of touch-screen displays and motorized faders which are warrantied for THREE years from the original-date-of-purchase.

ASHLY AUDIO INC. will without charge, repair or replace at its discretion, any defective product or component parts upon prepaid delivery of the product to the ASHLY AUDIO, INC. factory service department, accompanied with a proof of original-date-of-purchase in the form of a valid sales receipt. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

**EXCLUSIONS:** This warranty does not apply in the event of misuse, neglect, or as a result of unauthorized alterations or repairs made to the product. This warranty is void if the serial number is altered, defaced, or removed. ASHLY AUDIO, INC. reserves the right to make changes in design, or make additions to, or improvements upon, this product without any obligation to install the same on products previously manufactured.

Any implied warranties, which may arise under the operation of state law, shall be effective only for FIVE years (THREE years for touch-screen displays and motorized faders) from the original-date-of-purchase of the product. ASHLY AUDIO, INC. shall be obligated to only correct defects in the product itself. ASHLY AUDIO, INC. is not liable for any damage or injury, which may result from, or be incidental to, or a consequence of, such defects. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion, or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

### OBTAINING WARRANTY SERVICE:

For warranty service in the United States, please follow this procedure:

1) Return the product to ASHLY AUDIO, INC. freight prepaid, with a written statement describing the defect and application that the product is used in. ASHLY AUDIO, INC. will examine the product and perform any necessary service, including replacement of defective parts, at no further cost to you.

2) Ship your product to:

ASHLY AUDIO, INC.

Attention: Service Department

847 Holt Road

Webster, NY 14580-9103

ASHLY AUDIO INC. 847 Holt Road Webster, NY 14580-9103, USA

Phone: (585) 872-0010 Fax: (585) 872-0739

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