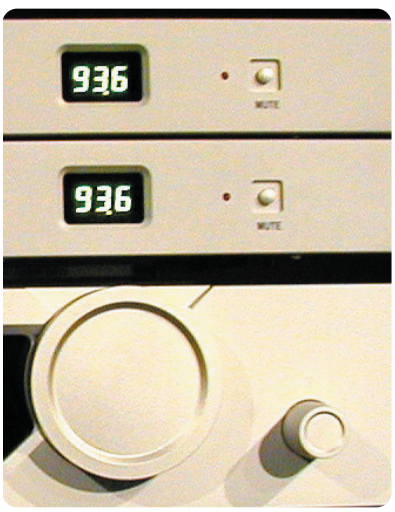
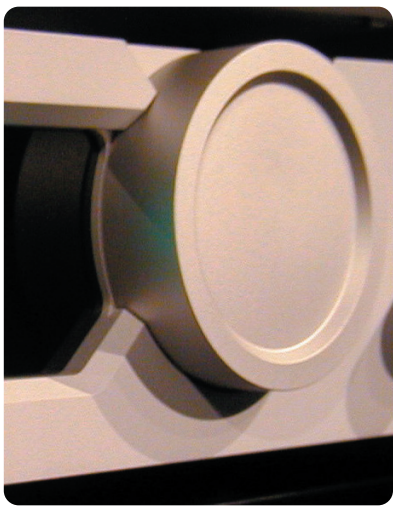
boz 216/2200

Owner's Manual

boz
216/2200





welcome

Thank you for choosing what we believe is the world's finest and most advanced digital amplifier. Every BOZ unit has been engineered to be an uncompromising listener's tool, designed to satisfy the most demanding enthusiast. You'll find that we devote considerable attention to satisfying your specific needs, no matter what your listening preferences may be.

The BOZ 216/2200 redefines amplification. The digital input is taken to the central processor where it is reformatted into a pulse width modulated signal of extreme precision. The pulse rate is measured at precisely 384,000 pulses per second. Each pulse can have 256 different widths, with the narrowest pulse being a mere 100 millionths of a second wide. The clock frequency therefore is 98 MHz. The central processor computes exactly the right combination of pulse widths to produce an incredibly accurate waveform.

Once the decision of the duration of the pulse is made, the central processor controls FET-switches at the output with extreme precision. Voltage and current are drawn from the power supply and are fed to the speakers.

The level of playback is controlled by adjusting the voltage of the power supply. As this voltage is switched directly to the speakers, it is of paramount importance that the power supply be totally free of ripple and noise. For BOZ digital amplifiers, a switch mode power supply of extreme precision with ripple rejection of more than 135 dB has been developed. At full volume the BOZ 216/2200 delivers 200 Watts into 8 ohms. To reduce the volume the voltage of the power supply is reduced. This means that the volume control is no longer part of an active circuit.

Exclusive technology

The most fundamental departure from conventional amplifiers is that the BOZ 216/2200 defines the waveform mathematically - it does not try to follow or emulate a waveform by using feedback or feed-forward.

So why hasn't anybody thought of this before? Why has this not been done before? Well, try to switch more than 60 volts DC 384,000 times per second without creating even a whisper of noise at a distance of 1" from the tweeter! Only in the past few years has it been possible to create a fully digital "amplifier".

Key Features

Ultra high precision DA conversion
Upsampling to 384,000 Hz before conversion
Full resolution at -30 dB
Software upgradable DSP section
DSP-based floating point electronic crossovers
Digital pre-amplification with 24-bit resolution at a playback level of -30 dB!
Output of 2x200W into 8 Ohm, or output of 2x400W into 4 Ohm load, with extreme load tolerance
NO feedback or feed-forward locally or globally is utilized in the signal path.

boz line introduction

The Tact Millennium

Tact Audio introduced the Tact Millennium, the world's first true digital amplifier, back in 1998. It was not only heralded as the most important technological breakthrough in decades, it was also immediately recognized as the greatest sonic improvement in amplification ever.

The audio press was unanimous in its praise: "Without any true competition," "It sounded much more like live music than anything else I had heard," and "Overwhelming transparency," were among the words of praise.

The Tact Millennium was awarded the prestigious iF Design Award in 2001 www.ifdesign.de

The M2150 & S2150

In 2002 Tact Audio introduced the second series of digital amplifiers, the M/S-2150. Until the arrival of the M/S-2150 series, no other digital amplifier came anywhere near the performance level of the Tact Millennium.

The M/S-2150 series amplifiers were designed in a more efficient way than the Millennium. They also feature major improvements in the digital signal processing section. Continuous research and development as well as advancements in technology have allowed us to reduce prices while maintaining quality. The significant improvements in the layout and digital design ensured that the 2150 reached a new level of excellence and became the world's best selling true digital power amplifier.

The TacT M2150 was awarded the Stereo-times Most Wanted Component Award for three consecutive years: 2003, 2004, and 2005. www.stereotimes.com

The Boz Line

With the 2005 introduction of the BOZ line of digital amplifiers, Tact Audio offers the world's first multi-channel digital amplifier with performance exceeding that of its predecessors, the Tact Millennium and Tact M/S-2150. The first product of the BOZ line is the BOZ 216/2200 true 16-channel digital amplifier.

The BOZ design is based on a separate power entry and control module, the BOZ-216 (referred to as the BOZ-216 control unit), combined with two channel power amplifier modules, the BOZ-2200 (refereed to as amplifier modules). The BOZ-216 control unit can handle up to 8 BOZ-2200 modules for a total of 16 channels of amplification.

The BOZ 216/2200 was awarded the Stereotimes Most Wanted Component Award for 2005 - a mere month after its initial release. www.stereotimes.com

The input AC power connects to the BOZ-216 control unit via two power entry modules. The power entry modules each have built in line filtering. Each power entry module can handle up to 1250 W of power. Both power entry modules combined together can deliver 2500 W of power. In this way twelve amplifier channels can simultaneously deliver 200 W of power.

While preserving the core design philosophy of the Tact Millennium and the Tact M/S-2150, the new BOZ 216/2200 amplifier is designed with the latest in digital signal processing technology. Special attention has been paid to board design and signal distribution between the modules inside the BOZ-2200. All digital audio signal routing is implemented with differential LVDS logic design. In order to further reduce system jitter the previously existing phase locked loops (as in the Millennium and M/S-2150) are completely eliminated.

characteristics of the 'boz' line

Mono Block Design

Each amplification channel in the BOZ-2200 is self contained with a separate processor-controlled power supply and a PWM circuit.

Floating Point Processing

High precision floating point processing. All real time audio signal processing algorithms are implemented with floating point arithmetic.

LVDS (Low Voltage Differential Signaling)

All digital audio signals in the BOZ-2200 are routed with LVDS (low-voltage differential signaling) drivers/receivers. This design ensures maximum signal integrity for all digital audio signals.

External Clock

Each BOZ-2200 can accept an external clock for jitter-less reception of AES/EBU and SPDIF signals.

Crossover Package

The crossover package running on the BOZ-216 control unit does not require computer support to implement Butterworth and Butterworth squared filters. The crossover package supports:

1. Low-pass filters
2. High-pass filters
3. Band-pass filters

The above are supported with a filter cutoff frequency anywhere between 15 Hz and 24000 Hz with filter slopes from 1-st to 12-th order.

Parametric Equalization package

The parametric equalizer package features 12-band parametric equalization per channel and ten presets per channel. The ParEq specs are:

1. Filter center frequency between 15Hz and 24000Hz
2. Filter level adjustment from -18.0 dB to +12 dB in increments of 0.1 dB
3. Filter bandwidth from 0.01 to 2.5 octaves

Room Correction Package

The room correction package running on the BOZ-216 control unit is assessable directly from the front panel. Front panel access lets you choose between 10 preset correction settings. The correction settings are loaded to the unit via the provided RS232 cable. The room correction technology utilized in the BOZ line is derived from the award winning room correction technology of the original Tact Audio RCS product line.

Multi Zone Support

Multi zone support - we call them groups. There are in total 9 groups. Eight groups are user configurable and the ninth group has all amplifiers assigned to it automatically. Each group can consist of any combination of the eight amplifiers. Master volume control will control the volume of the selected group only. If ALL is selected, then the volume control will affect amplifiers modules in each group.

unique technology

The Boz 216/2200 is not Really an Amplifier

The BOZ 216/2200 is not an amplifier at all. No signal amplification takes place whatsoever!

The BOZ-2200 modules are an ultra high precision D/A converters operating in PWM mode with a master clock set at a speed 2,222 times higher than the CD format, 1,024 times higher than DVD-Audio and 35 times higher than the SACD format. In contrast to conventional D/A converters, it operates at a switching voltage of more than 60 Volts, delivering the equivalent of 400 Watts per channel in 4 Ohms. All internal signal processing is performed at 96Kz

Conventional Amplification vs. Boz Amplification

The entire active analog signal path consists of a single coil and a single capacitor, forming a 12 dB per octave low-pass filter at 70 kHz. The voltage of the power supply determines the output level, thus eliminating the need for any passive volume control.

Compared to a normal amplification chain this is a massive reduction in complexity. In a normal chain, the output of the D/A converter is sent to an analog buffer stage, then to an analog pre-amplifier with relays, input stage, volume stage and output stage. It is then sent as a low-voltage analog signal to the power amplifier with an input stage, output stage and feedback loop. Finally, the signal is sent to the speakers.

In a conventional amplifier, all of this complex and costly circuitry requires hundreds of components. The BOZ 216/2200 digital amplifier replaces all this with just two components.

Added Benefits of the Boz System

In addition to the revolutionary amplifier design, the BOZ Series is equipped with the latest 192 kHz sample rate conversion technology at the digital inputs. All digital audio signal routing is performed by using LVDS logic for maximum signal integrity. All audio signal processing algorithms are implemented with floating point precision.

Your BOZ-216 control unit achieves total separation of the input AC power from the sensitive and extremely clean digital audio signals in the BOZ-2200 modules. Inherent to this setup is unparalleled system-wide noise reduction and maximum signal purity.

technological advantages

High Resolution at Normal Listening Levels

High resolution at normal listening levels: With a normal amplification chain, resolution is dependent on the volume setting. The power amp is always on maximum level - even when listening at low levels. In most cases, only the highest level of playback will give full resolution.

In the Boz amps, the playback level is controlled by the voltage of the power supply. At low levels, the supply is at low voltage but the signal remains identical. Starting at a level of 30 dB below maximum, DSP-controlled digital attenuation takes over. This is done with extreme precision using floating point arithmetic.

No Feedback

Feedback in normal amplifiers is known to cause ringing in the time domain. The BOZ-2200 approach uses no feedback or feed-forward in the signal path.

Immunity to Loudspeaker back-EMF

Total immunity to loudspeaker back-EMF: Any loudspeaker driven by an amplifier will send current back into the amplifier. This can make the amplifier behave in mysterious ways as it interacts with the feedback loops. But with the BOZ digital amplifier, zero feedback and steady-state voltage from the power supply means that back-EMF can have absolutely no effect on the sound.

Inherently Free From Ringing

Music is all transients, very few instruments produce anything that resembles pure sine waves. Conventional amplifiers will overshoot and undershoot transients to varying degrees – simply because transients are voltage swings. In the BOZ digital amplifier, the signal is determined by the timing of the switching, while the voltage remains constant. Time cannot resonate and when voltage remains constant, there is no risk at all that the design will produce any ringing.

Low Heat

BOZ digital amplifiers produce far less heat per W/cubic inch than conventional amplifiers. This will extend the product's lifetime considerably. The elimination of a mechanical volume control and relays adds further to the lifetime of the product and ensures that no sonic degradation will take place over time.

Lowest Ever Power Supply Noise Floor

The power supply has been designed with triple-stage supply noise suppression. The noise floor is at -135 dB. This is far below the level for any known power conditioning equipment in the industry.

Modular Design

The BOZ system is the epitome of modular efficiency: you decide how many channels of amplification you need and you specify your system accordingly. Optional system features, such as the Crossover, Room Correction, and Parametric Equalization packages, are also designed with flexibility in mind. All software can be easily added to your system at any time. Modular DSP design also allows us to provide you with firmware upgrades that you can easily download and install.

general index

Introduction

Getting Started

System Configurations

Boz Navigation System

Individual Menu Screens

registration

Please record your serial number here for future reference. You will need this for future upgrades and in the event that you should require any service on your BOZ 216/2200.

BOZ-216 serial number: _____

BOZ-2200 serial number: _____

contact information

Technical support is available via phone or e-mail.

Phone: +01-201-440-9300

E-mail: info@tactaudio.com

Tact Audio Inc.
201 Gates Road, Unit G
Little Ferry, NJ 07643
USA

resources

www.tactlab.com
www.bozaudio.com
www.roomcorrection.com

acknowledgments

getting started

- safety precautions
- safety instructions & maintenance
- unpacking the boz 216/2200
- boz-216 front panel
- boz-216 back panel
- boz-2200 front panel
- boz-2200 back panel
- connecting boz-2200 to boz-216
- the remote control

safety precautions

WARNING

To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

The lightning with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of "Dangerous Voltage" within the product's enclosure that maybe of sufficient magnitude to constitute a risk of electrical shock to a person.

Should you experience any mechanical problems, please contact your dealer or contact us directly. Aside from being potentially dangerous, opening the unit will void your warranty.

Tact Audio Support
phone:
+01-201-440-9300
E-mail:
info@tactaudio.com

important safety instructions

1. Read these instructions entirely before installing or operating this equipment.
2. Keep these instructions.
3. Heed all warnings.
4. Do not use this equipment near water or allow it to become wet.
5. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat; doing so may damage the unit and present a fire hazard.
7. 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. If the provided plug does not fit into your outlet, consult an electrician for replacement of the outlet to one that is polarized. To protect against electrical shock, match the wide blade of the polarized plug to the wide slot in the outlet and fully insert the plug.
8. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit the equipment. Do not use this unit with a damaged cord or plug.
9. Only use attachments/accessories specified by the manufacturer.
10. Unplug this equipment during lightning storms or when unused for long periods of time.

cleaning and maintenance

1. Always unplug the unit from the electrical outlet before cleaning.
2. Do not use abrasive cleaners. Simply wipe the exterior with a clean soft cloth. A small amount of non abrasive cleaner may be used on the cloth to remove excessive dirt or fingerprints.

unpacking the boz 216/2200

Carefully remove the Boz 216/2200 and the accessory kit from the carton and check for shipping damage. Contact both the shipper and TacT Audio immediately if the unit shows any sign of damage from rough handling. All TacT Audio equipment is carefully inspected before leaving our factory.

All Tact Audio products come with a standard two year warranty.

KEEP SHIPPING CARTON AND PACKING MATERIALS for future use or in the unlikely event that the unit needs servicing. If this unit is shipped without the original packing, damage could occur and void the warranty.

accessories

You should find the following items in the accessory kit:

- Two AC mains cords
- One RJ11 data cable
- One RJ11-to-RS232 adapter
- One 15' RS232 cable
- One power cable per BOZ-2200 module
  Power cables are the standard 4 feet
  Longer cable lengths are available upon request
- One RS232 interconnect cable per BOZ-2200 module
- One remote control
- Two AAA batteries
- One manual
- CD-ROM with software

operating voltage

The Boz 216/2200 amplifier is configured for either 110 or 220/240 volt operation. The operating voltage is clearly marked on the outside of the box and also on the rear panel next to the AC mains connector.

The Boz 216 control unit back panel diagram can be found on p. 16.

BEFORE CONNECTING THE POWER, MAKE SURE THAT THE LABEL INDICATING THE VOLTAGE MATCHES THE VOLTAGE FOR YOUR COUNTRY

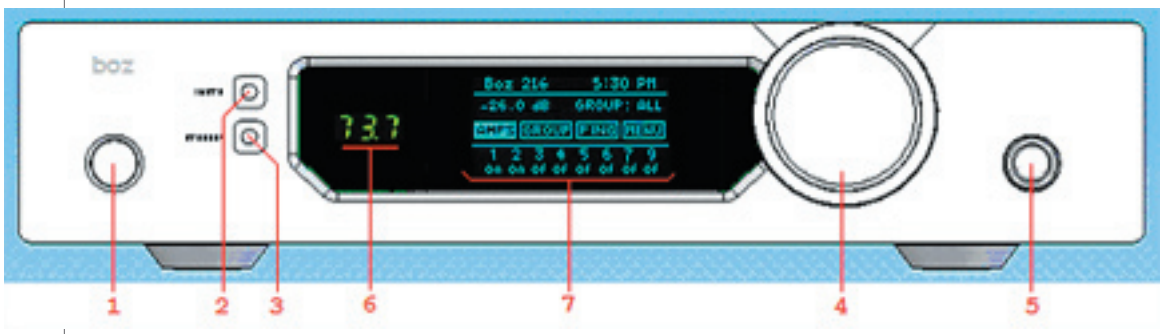
The Boz 216/2200 has three operating modes:

OFF: AC mains power is cut off, either via the front panel mains switch, or by unplugging the amplifier from the wall outlet.

STANDBY: The unit is powered but all outputs are muted and the display is off. All BOZ-2200 modules are OFF and the BOZ-216 is in "sleep" mode, using very little current while it is "idling". Use the remote "STANDBY" button to toggle between ON and STANDBY.

ON: The system is powered and ready to use.

boz - 216 front panel



STANDBY mode: All BOZ-2200 modules are OFF, all outputs are muted, and all displays are off.

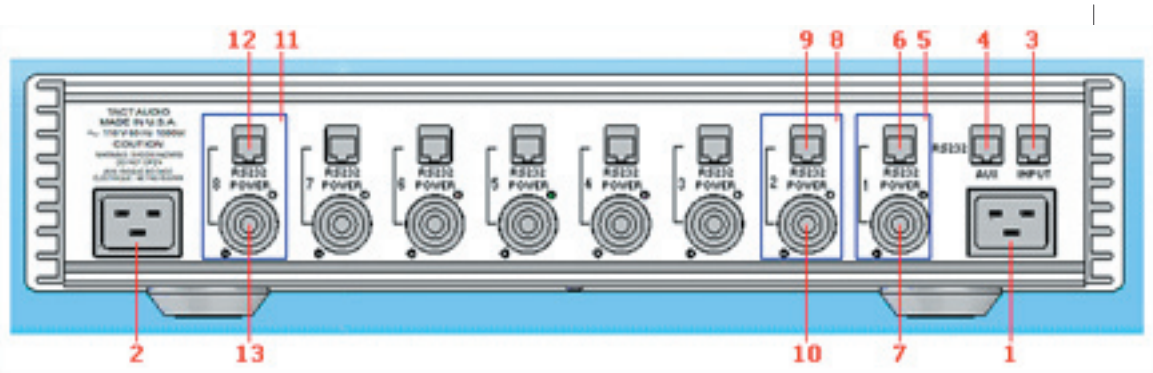
Volume control knob: Controls the master volume for amplifiers in the selected group. The selected group is indicated in the front panel display. To adjust an individual amplifier, or module's level, you need to access its specific LEVEL menu. See p. 44.

Rotary Control Knob: Can be used to click through all menu options. For instructions please see p.33.

1. Main power switch. Use this switch to turn the BOZ 216/2200 ON and OFF.
2. Mute button. Push this button to mute and un-mute entire system.
3. Standby button. Push this button to place the BOZ-216 into standby mode and to turn it back on again. When in standby mode, all the BOZ-2200 modules are powered down. However, the BOZ-216 will not be completely powered down. It will be placed into low power mode and will still be able to receive some IR and RS232 commands.
4. Volume control knob.
5. Rotary control knob. Turn and push this knob to scroll through menu options, change system parameters and select options.
6. Master level display. Displays the master level form 0.0, the minimum value, to 99.9, the maximum value.
7. Main display. All system menus are displayed here.

Before trying to access BOZ 216/2200 via your PC make sure that your system is properly connected.

boz - 216 back panel



The back panel connectors consist of two AC power connectors, INPUT and AUX RS232 connectors, and eight blocks of RS232 and power connectors labeled 1 through 8. These blocks are referred to as BOZ-216 I/O blocks.

1. First AC connector. Note that the BOZ-216 has two AC connectors, one on the left side of the unit and another one on the right side of the unit. This connector provides **filtered AC power** for the BOZ-2200 modules connected to power connectors 1,2,3 and 4.
2. Second AC connector. This power entry module provides filtered AC power for the BOZ-2200 modules connected to power output connectors 4,5,6 and 7.
3. RS232 connector. This is where your PC, or any other RS232 based controller, should be connected
4. RS232 connector. This connector is used to pass RS232 signal connected to (3) to other units, such as the Tact-2.2 X, Tact TCS, and Tact-2.0 S.
5. BOZ-216 I/O block #1.
6. RS232 connector of I/O block #1.
7. Filtered AC POWER connector of I/O block #1.
8. BOZ-216 I/O block #2.
9. RS232 connector of I/O block #2.
10. Filtered AC POWER connector of I/O block #2.
11. BOZ-216 I/O block #8.
12. RS232 connector of I/O block #8.
13. Filtered AC power connector of I/O block #8.

Each BOZ-2200 module is connected to one of the eight BOZ-216 I/O blocks. The RS232 connector has to be connected to the BOZ-2200 RS232 connector with the supplied six wire cable. The POWER connector has to be connected to the POWER connector of BOZ-2200 module with the supplied cable. For proper operation it is necessary to connect both the RS232 and the POWER connectors to the corresponding BOZ-2200 connectors.

Note: Only the supplied cables can be used to connect BOZ-2200 modules to the BOZ-216 control unit.

RS232:
For more communications information, please see p. 61.

The first AC Connector (1) is used for Boz-216 internal logic has to be connected at all times, even if I/O blocks 1-4 are not in use.

The second AC Connector (2) has to be connected if any I/O Blocks 5-8 are being used.

The I/O Blocks do not have to be connected consecutively. They can be used in any order and in any combination.

boz - 2200 front panel

Power Switch: Information on turning the modules ON/OFF via the AMP menu can be found on p.42.

Peak Detector: The peak detection level can be set individually for each module from its OPT menu. For more information see p. 59.

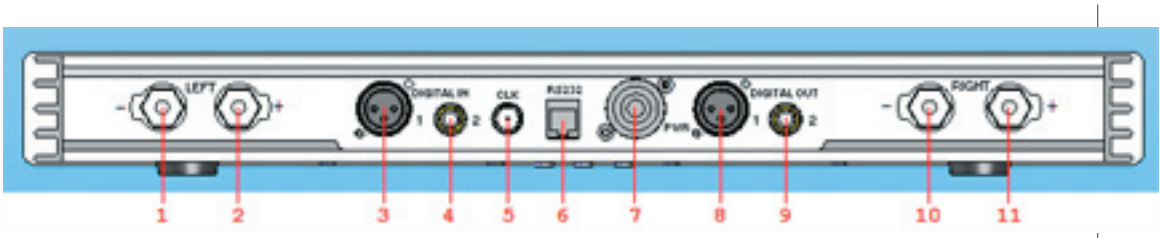
Display: Choosing between level display and sampling frequency display (Fs) is found on p.48.

Level Display & PING: When editing groups it is extremely useful to be able to quickly see what each module's designated AMP number is. Clearly, the more modules you have, the harder it is to keep track. The PING command can be access from the First Screen and from the AMPS menu.

1. Power switch. This switch can be used to turn a BOZ-2200 module OFF. However, it is recommended that a BOZ-2200 be turned OFF through the BOZ-216 control unit's front panel display. Individual BOZ-2200 modules can be turned OFF or ON via the AMP menu. The power status of the modules is displayed in the bottom row of the First Screen display of the BOZ-216 control unit.
2. Power LED. When lit indicates that power is applied to a BOZ-2200 module.
3. Input 1 LED. When lit indicates that digital input 1 (XLR - connector, AES/EBU) is selected.
4. Input 2 LED. When lit indicates that digital input 2 (RCA - connector, SPDIF) is selected.
5. External clock LED. When lit, indicates that the external clock is selected. If the external clock is selected and there is no clock present at the input, this light will flash.
6. Peak detector light. If the digital input signal exceeds the signal threshold level as set in the corresponding amplifier OPT menu, this light will turn on.
7. Display. Displays either the level or the sampling frequency of the input signal. The level is shown from a minimum value of 0.0 to a maximum value of 99.9. Choosing between the two display options is performed through a module's OPTIONS menu.

   Additionally, when a system PING is initiated, this screen will display the AMP number designated to the module. The AMP number corresponds to the BOZ-216 I/O block that the module is connected to.
8. Mute light. When lit indicates that the BOZ-2200 is muted.
9. Mute button. Each individual BOZ-2200 module can be mute through its mute button. The mute button on BOZ-216 control unit's front panel will mute the entire system.

boz - 2200 back panel



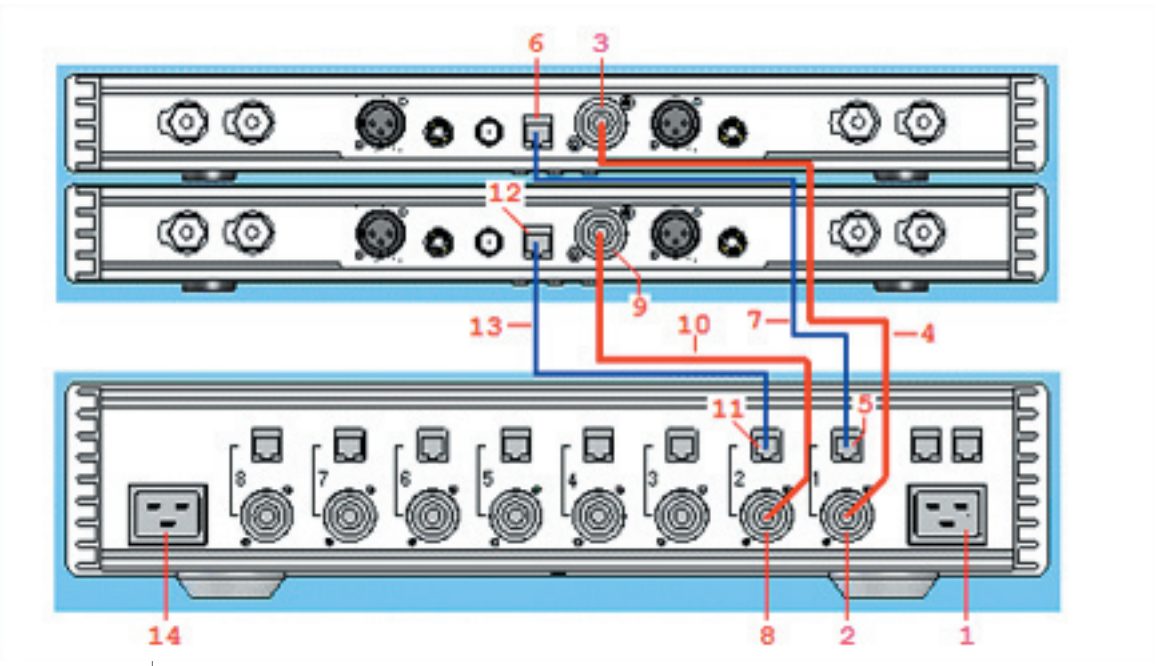
1. Right channel output - negative terminal. Connect this output to the corresponding loudspeaker input.
2. Right channel output - positive terminal. Connect this output to the corresponding loudspeaker input.
3. Digital input 1. This is the modules AES/EBU digital input.
4. Digital input 2. This is the module's SPDIF digital input.
5. External clock input.
6. RS-232 input. Using the included RS232 cable, connect to a selected BOZ-216 I/O Block.
7. Power connector. Using the included power cable, connect to a selected BOZ-216 I/O Block.
8. Digital output 1. This an AES/EBU digital pass-through signal.
9. Digital output 2. This an SPDIF digital pass-through signal.
10. Left channel output - negative terminal. Connect this output to the corresponding loudspeaker input.
11. Left channel output - positive terminal. Connect this output to the corresponding loudspeaker input.

Make sure that a BOZ-2200 module's RS-232 input and Power Connector are connected to corresponding connectors within the same Power Block on the BOZ-216.

The digital pass-through is what is called an electrically repeated output. It passes through exactly what was put into the inputs. The input is available for pass-through on both the AES/EBU and SPDIF digital pass-through outputs on the back panel; you pick which one you want to use.

The pass-through signals is not affected by any internal signal processing, such as level, polarity, etc...

connecting boz-2200 to boz-216



This connection example is for a Boz system that consists of two BOZ-2200 amplification modules, for a total of four channels of amplification. Connection procedures for systems that consist of additional BOZ-2200 modules are easily extrapolated.

Always turn the power off first before making any new connections or changes to existing connections. Power-off by using the BOZ-216 main power switch and then disconnect the two supplied AC power cords from the wall power outlet. When connections or changes to the existing connections are completed, plug the AC power cords into the wall outlet and then turn the main BOZ-216 power switch on.

BOZ-216 Master Unit	Cables	BOZ-2200 Module 1
(1) AC Power Connector for blocks 1-4 (2) Block-1 AC power connector (5) Block-1 RS232 connector (8) Block-2 AC power connector (11) Block-2 RS232 connector (14) AC Power Connector for blocks 5-8	(4) Supplied power cable (7) Supplied RS232 cable (10) Supplied power cable (13) Supplied RS232 cable	(3) BOZ-2200 power connector (6) BOZ-2200 RS232 connector
		BOZ-2200 Module 2 (9) BOZ-2200 power connector (12) BOZ-2200 RS232 connector

1. Connect AC power to this connector. Note that in this example there are only two BOZ-2200 modules and that they are connected to power blocks 1 and 2. Since power blocks 1-4 are powered by the transformer connected to AC power through this connector(1), there is no need to use the other AC connector (14).

2. Power Block-1 Connections:
   - A) Use the supplied cable (4) to connect the power block (2) to the module's power connector (3).
   - B) Use the supplied RS232 cable (7) to connect the power block's RS232 connector (5) to the module's RS232 connector (6).

3. Power Block-2 Connections:
   - A) Use the supplied cable (10) to connect the power block (8) to the module's power connector (9).
   - B) Use the supplied RS232 cable (13) to connect the power block's RS232 connector (11) to the module's RS232 connector (12).

remote control

To use the remote control, you must first ENABLE IR Control. This is done in the OPTIONS menu. The OPTIONS menu is accessed from the First Screen by selecting the MENU option. For more information on the OPTIONS menu, see p. 54.

Arrow Keys: The navigational arrow keys on the remote correspond in functionality to the Optical Control Knob found on the front panel of the BOZ-216 control unit. For detailed navigation instructions, see p. 28.

1-STANDBY

The STANDBY button will turn the BOZ-216/2200 "ON" or it will place it into "STANDBY" mode. When in standby mode, the unit is placed into a lower power "idling' state.

2-DIGITAL

The DIGITAL button is not used with this unit.

3-ANALOG

The ANALOG button is not used with this unit.

4-CORRECTION BLOCK

The CORRECTION buttons are not used with this unit.

5-MENU

The MENU button will switch the front panel display from the status screen to the main menu screen.

6-VIDEO

The VIDEO button is inactive with this unit.

7-UP

The UP navigational button is used to select menu options and/or to change their values.

8-DOWN

The LEFT navigational button is used to select menu options and/or to change their values.

9-LEFT

The LEFT navigational button is used to select menu options and/or to change their values.

10-RIGHT

The RIGHT navigational button is used to select menu options and/or to change their values.

11-ENTER

The ENTER button will select the menu option currently marked by the blinking cursor. It is also used to enter an edited parameter.

12-VOLUME Block

The VOLUME block consists of three buttons.
The MUTE button will mute/un-mute all enabled channels.
The UP button will increase the master volume level.
The DOWN button will decrease the master volume level.

specifications

Power (RMS. per channel) 8 ohm	2 x 200 W *
Power (RMS. per channel) 4 ohm	2 x 400 W *
Output current (peak, per channel)	>50 A
Signal-to-noise ration (A-weighted)	>110 dB
Dynamic range (20 Hz - 20 kHz)	>130 dB
THD+N (all power levels 10 Hz - 20 kHz)	<0.01 %
Digital resolution	16 - 24 bit
Linearity (-120 dB)	+/- 0.2 dB
Dimensions (WxHxD)	Boz-216: 17.75 x 3.88 x 16.5 in. 45.1 x 9.9 x 41.9 cm. Boz-2200 17.75 x 2.25 x 16.5 in. 45.1 x 5.7 x 41.9 cm.
Weight (shipping)	BOZ-216: 33 kg, 73 lbs BOZ-2200: 10 kg, 22 lbs

* For maximum power, it is necessary to provide proper ventilation.

system configurations

- speaker configurations
- active & passive configurations
- normal operation
- daisy-chaining and signal flow
- horizontal bi-amping
- vertical bi-amping

speaker configurations

The modular design of the BOZ system means that you can configure it to virtually any active or passive speaker configuration.

If you are using two or more BOZ-2200 amplifier modules, and your speakers allow for multi-amping, you can configure the system to run in bi-amped, tri-amped mode and even further multi-amped configurations. This type of setup allows for one amplifier channel to drive a specific driver or frequency region.

Passive Setup: Crossovers are handled within the physical speakers.

Active Setup: Crossovers are handled digitally by the amplification system.

Active and Passive Configurations

The system with its standard features (the crossover package is not standard) can be configured to a maximum of 16 channels of passive amplification in up to 8 different groups, or zones.

In addition, with its advanced DSP control, the BOZ-216 can enable digital crossovers (high-, low-, and band-pass), making it possible to configure the BOZ-2200 amplifiers to virtually any system. With the addition of the SPCRO-CRO (software programmed crossovers) the system can be configured to support 16 channels of active amplification in up to 8 different groups, or zones.

Normal Operation

Each BOZ-2200 amplifier module has one pair of high quality speaker terminals. These terminals will accept both spade- and banana-plugs. When connecting your speakers, please make sure that the RED/HOT terminal is connected to your speaker's POSITIVE terminal and that the BLACK/COLD terminal is connected to your speaker's NEGATIVE terminal.

daisy chaining and signal flow

For a labeled diagram of the BOZ-2200 back panel, see p. 18.

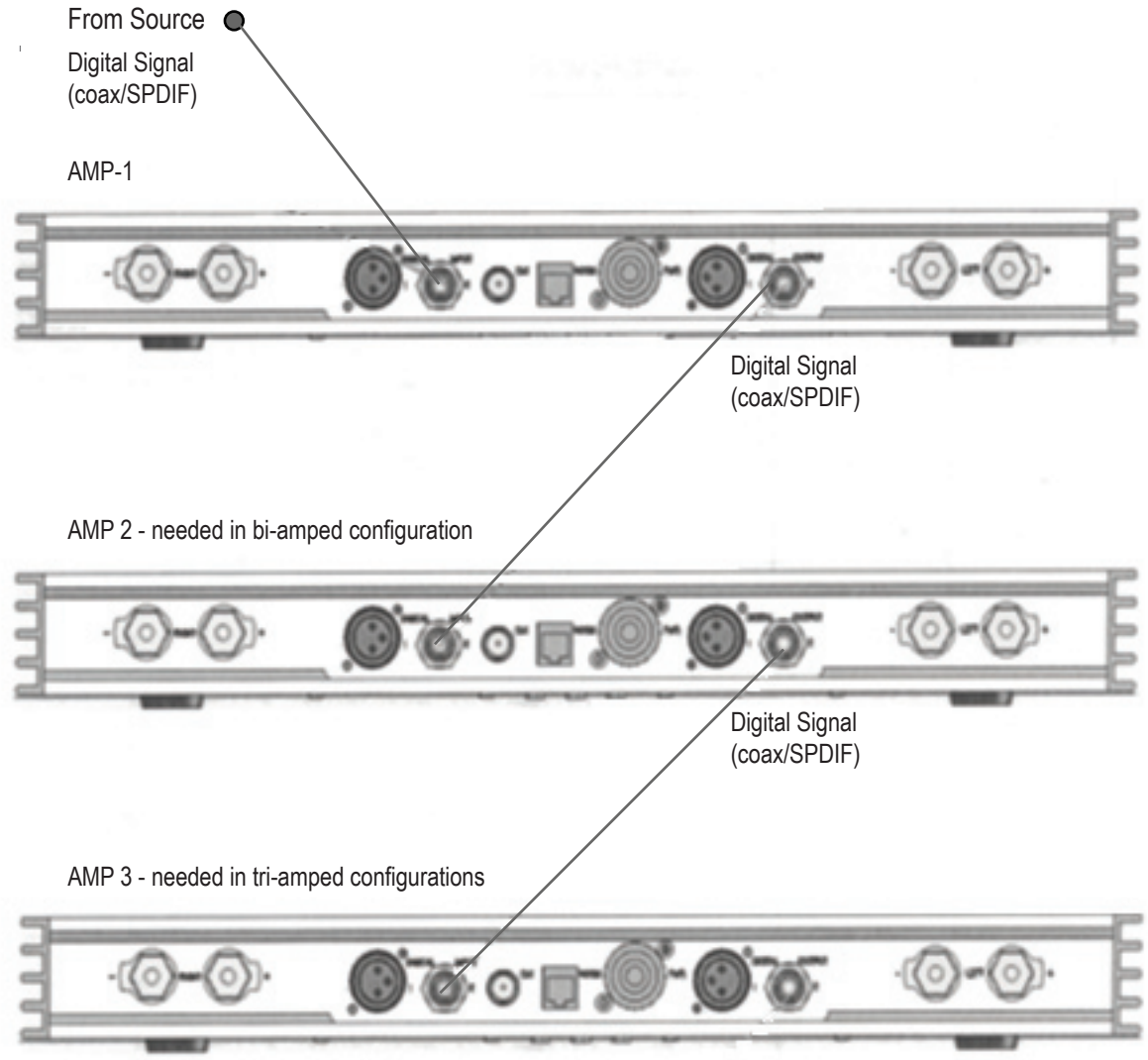
The digital pass-through is what is called an electrically repeated output. It passes through exactly what was put into the inputs. The input is available for pass-through on both the AES/EBU and SPDIF digital pass-through outputs on the back panel; you pick which one you want to use.

The pass-through signals is not affected by any internal signal processing, such as level, polarity, etc...

When two or more BOZ-2200 amplifiers are configured in a bi-/tri-amped setup, the signal must be daisy chained between the amplifiers.

Daisy-chaining is performed by connecting BOZ-2200 modules to each over via their digital pass-through outputs and inputs. Each module has two digital inputs: and two digital outputs for either AES/EBU or SPDIF connections.

The most commonly used setup is bi-amped (two channels to each speaker: high and low). However, the same signal flow is applicable to bi-amped, tri-amped, and further multi-amped configurations.



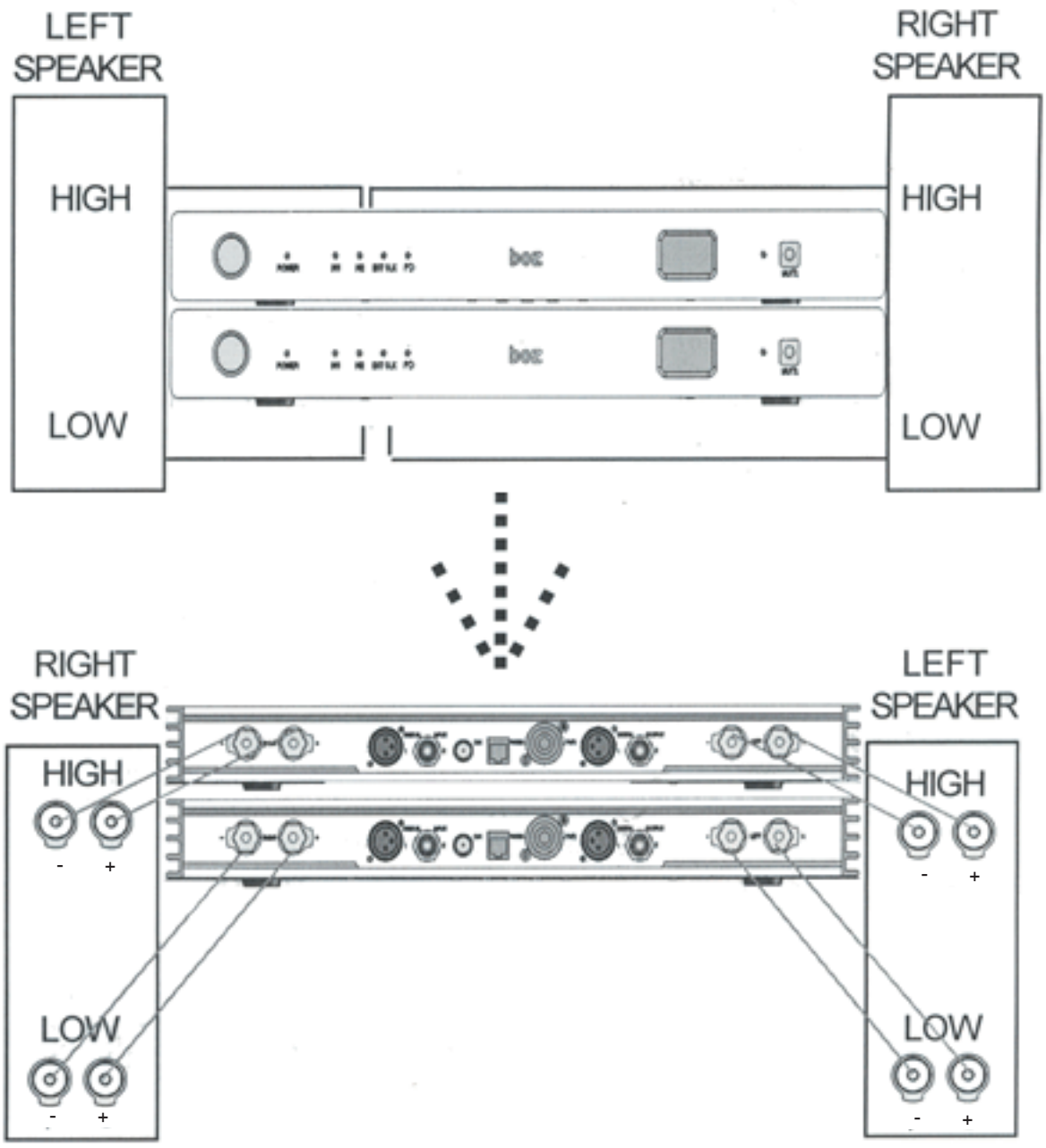
Additional amplifiers can be daisy-chained to accommodate for multi-amped configurations.

- +

- +

horizontal bi-amplification

In horizontal bi-amping, one BOZ-2200 amplifier drives the low-frequency drivers in both speakers. The other BOZ-2200 amplifier drives the high-frequency drivers in both speakers.



The InOut menu is described on p. 46.

It is accessed via the front panel through the AMPS menu.

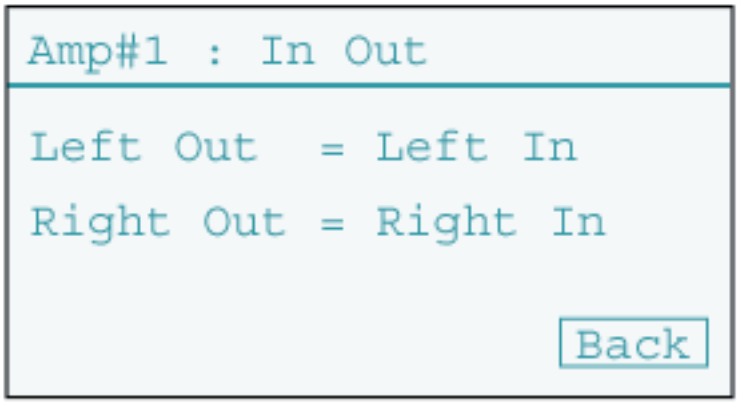
In/Out menu Setup

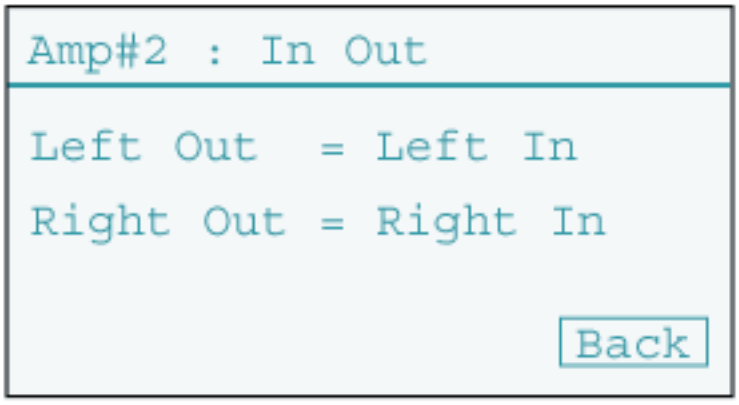
For horizontal bi-amplification, each BOZ-2200 module is set to the following specifications:

Left Out = Left In

Right Out = Right In

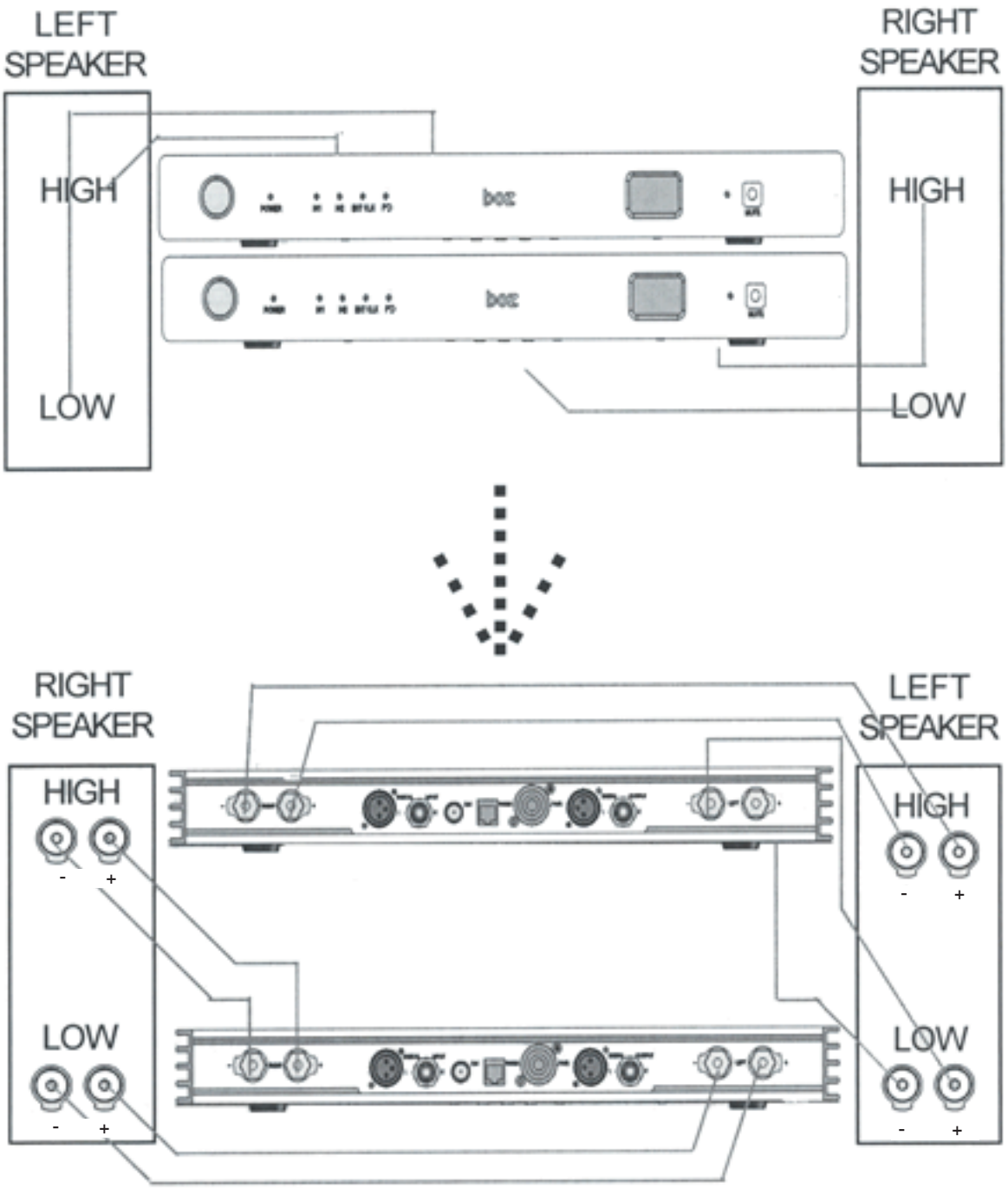
The InOut Menu needs to be set accordingly:





vertical bi-amplification

In vertical bi-amping, one amplifier drives both the high and low frequency drivers of the left channel. The other amplifier drives both the high and low frequency drivers of the right channel.



The InOut menu is described on p. 46.

It is accessed via the front panel through the AMPS menu.

In/Out menu Setup

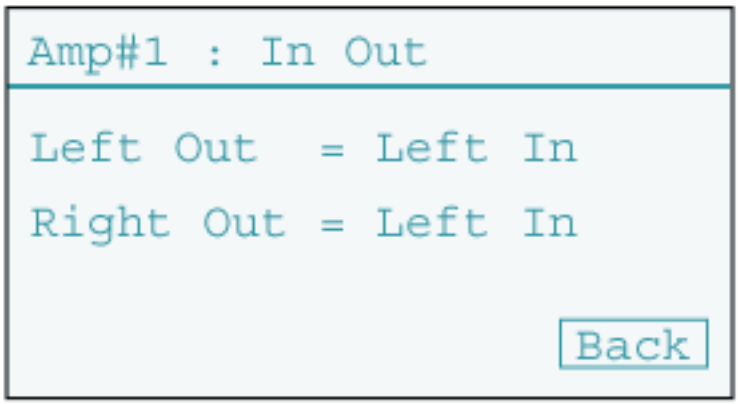
In vertical bi-amplification, the InOut menus for the left and right amplifiers have to be set as follows:

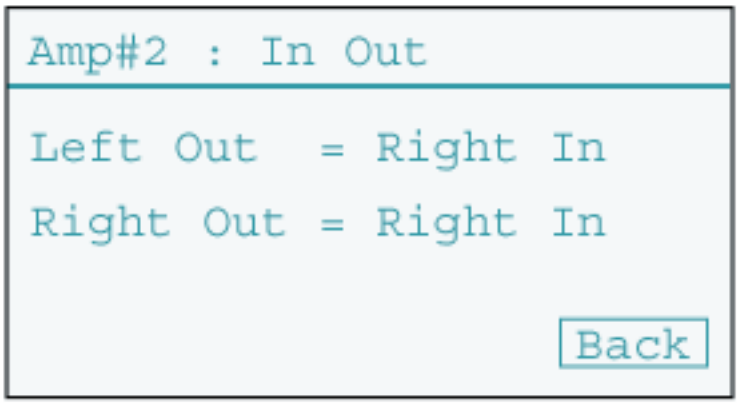
Left channel amplifier has to be set to LEFT on both outputs.

Right channel amplifier has to be set to RIGHT on both channels.

In this way, the left channel amplifier will operate on the left channel only and the right channel amplifier will operate on the right channel only.

The InOut Menu needs to be set accordingly:





boz navigation system

- accessing the menus
- navigating the menus
- the hierarchical menu system

accessing your boz system

All of your Boz system's features are accessible through a unique Flow-Menu system. Settings for the system as a whole as well as for individual BOZ-2200 modules are made through the BOZ-216 control unit. The BOZ-216 control unit can be accessed and controlled through its front panel and by the supplied IR controller.

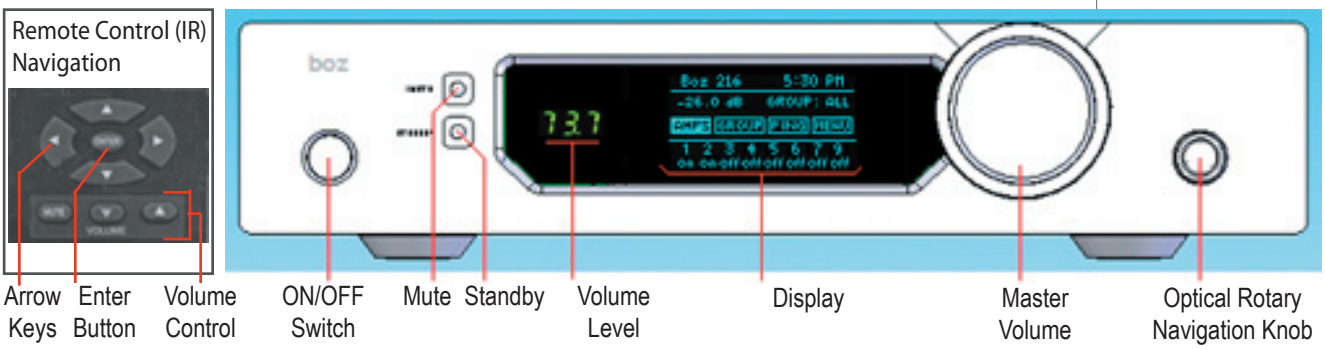
Boz 216 Front Panel Controls

The front panel controls of the BOZ-216 control unit allow you to control all of your Boz system's main features.

The front panel design is extremely clean and consists of the volume control knob, the optical rotary control knob, the mute button, the standby button and the power switch. The exclusive "**BOZ Wheel"** is the master volume control.

We designed the intuitive click-through menu system with the aim of providing you with the cleanest possible of interfaces. We believe we have succeeded. The optical rotary knob is all you need to navigate your way through the myriad features and settings of the BOZ 216/2200 amplification system.

For a comprehensive explanation of al the BOZ-216 control unit front panel controls, see p.15.



IR Controller Buttons

The included remote control comes with four directional navigation arrows: LEFT, RIGHT, UP, and DOWN. These buttons allow you to scroll through menu options. The arrow keys serve the same functional purpose as the navigation knob on the front panel.

For the complete remote control diagram, see p.20.

To make a selection using the remote control, press the ENTER button located in the middle of the arrow buttons.

Before using the remote control, make sure that "IR Control" is enabled.

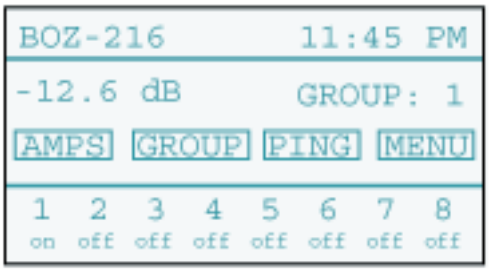
To enable IR Control, you must access the OPTIONS menu. The OPTIONS menu can be found on p.59.

navigating the menus

The First Screen is described in detail on p.40.

The First Screen

When you turn on your system, the "First Screen" will be visible in the front panel display. This first screen gives you access to your entire Boz system through four portals:



AMPS: Access to menus for setting individual BOZ-2200 module settings; access to individual amplifier controls.

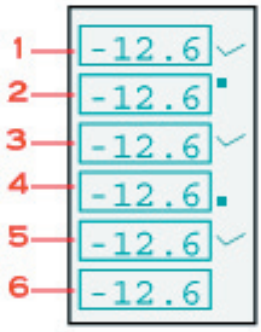
GROUP: Access to menus for selecting groups and for editing the group settings of your Boz system.

PING: Not a menu option, but rather is a command. This command allows you to 'ping', or send out a signal to verify how many BOZ-2200 modules are connected to your BOZ-216 control unit. The front panel of each BOZ-2200 module will display the AMP number designated to it.

MENU: Access to menus that control system wide settings, such as time, display illumination, "BOZ Wheel" sensitivity, etc...

Using the Optical control Knob

The optical rotary control knob can be turned clockwise and counter-clockwise and can also be pushed in. While being turned or pushed in, the rotary control knob produces distinct clicks. The clicks are designed to give feedback to the user by indicating when changes take place. The rotary control knob is used to scroll through menu options, select menu options, and to set or modify system parameters.



Throughout this manual term "CLICK" refers to an action performed by the rotary control knob; "CLICK" means that the knob was pushed in. To select a menu option, turn the rotary knob to position the cursor over the desired menu option and then click to select. If the menu option consists of a modifiable value that you desire to change, follow the example below.

1. Move the cursor over the modifiable menu option and CLICK the rotary knob. When this action is executed a check mark will appear on the right side of the menu option.
2. To increase a parameter's value, turn the rotary knob clockwise. The check mark will disappear and a dot will be displayed in the upper right corner. To further increase the selected parameter, keep turning the rotary knob clockwise. In many cases you can push the knob in and hold it down for fast parameter changes.
3. To decrease a parameter's value, turn the rotary knob counterclockwise once to display the check mark.
4. Turn the knob once more time counterclockwise to display a dot in the lower right corner. To further decrease the selected parameter keep turning the rotary knob counterclockwise. In many cases you can push the knob in and hold it down for fast parameter changes.
5. After the change is completed turn the knob clockwise once to display the check mark.
6. To finish editing the selected parameter, CLICK the knob once and the system will return to normal mode.

hierarchical menu system

The First Screen display of the BOZ-216 control unit presents you with four main options: AMPS, GROUP, PING, and MENU. These four options are your portals to all the features of your BOZ amplification system. The options they lead to are arranged in a hierarchical manner that you can easily click through using either the optical navigation knob or the supplied IR controller. The AMPS, GROUP, and MENU options lead to menu screens, while the PING option is a command and is addressed separately on p.36.

AMPS Menu Hierarchy

AMPS MENU Choices: Amp1 Amp2 Amp3 Amp4 ... Amp8 PING

Purpose: Allows you to select which BOZ-2200 module you want to alter settings for. The 9 menus shown below are available for all individual amps.

The AMPS option menus are individually described starting on p.41.

The following menus alter settings for individual BOZ-2200 amplifier modules

DELAY MENU

Allows you to set the delay times for each modules left and right channel. It is used for system time alignment.

LEVEL MENU

Allows you to set each amplifiers Left and Right channel level. It is used for system level balancing.

POLARITY MENU

Allows you to set an amplifier's Left and Right channel polarity.

InOut MENU

Use to set an amplifier's internal signal routing. Useful for systems that use bi-amplification.

OPT MENU

Allows you to set an amplifier's: Display, Peak Detection, Gain, and External Clock Settings.

MODE MENU

Use to set an amplifier's mode of operation: CRO-SPCRO (crossover mode) or RCS (room correction mode).

RCS MENU

Use to select desired room correction preset or to put in bypass mode. Note: not a standard feature.

CRO MENU Submenu breakdown on next page.

Crossover filter selection.

ParEq MENU Submenu breakdown on next page.

Parametric equalization settings.

The CRO menu and RCS menus are accessible only if your unit has the Crossover and Room Correction packages installed; they are not standard features.

The EDIT BUTT and EDIT BUTT SQ menus are sub-menus of the CRO menu.

The TABLE LEFT and TABLE RIGHT menus are sub-menus of the ParEq menu.

CRO MENU

Use to set an amplifier's crossover filter type: Bypass, Butterworth, or Butterworth Squared. Also use to designate a preset.

ParEq MENU

Use to select one of ten programmed ParEq filter settings.

EDIT BUTT MENU

Use to set an amplifier's Butterworth filter parameters.

TABLE LEFT MENU

Use to edit the parametric equalization filter parameters for the LEFT channel.

EDIT BUTT SQ MENU

Use to set an amplifier's Butterworth Squared filter parameters.

TABLE RIGHT MENU

Use to edit the parametric equalization filter parameters for the RIGHT channel.

GROUP Menu Hierarchy

SELECT GROUP MENU Choices: 1,2,3,4 ... 8, ALL, EDIT

Purpose: Allows you to select an amplifier group. Volume control affects only amps in the selected group. Also allows you to EDIT group settings.

EDIT GROUP MENU

Use this screen to edit all of the eight possible amplifier groups. Here you designate amplifiers to groups, in any combination. This is analogous to setting system zones.

hierarchical menu system

MAIN MENU HIERARCHY

AMPS | **GROUP** | **MENU**

MAIN MENU Choices: OPTS, DISP, COMM, LOCK, VER, TIME, LIC1, LIC2, LIC3

Purpose: This menu gives you access to system control parameters. Unlike in the AMP menu, changes made here will affect the whole system, i.e. all groups and all amplifier modules.

The following menus alter settings for your entire Boz system.

OPTS MENU

Allows you to set the following parameters for the system: Max Level, Power On settings, IR Control (enable on or off), and volume control wheel sensitivity.

DISP MENU

Allows you to set the following display parameters: On Brightness, OFF Brightness, Timeout (on or off), Time out in sec, and Screen Saver (on or off).

COMM MENU

Allows you to set the following communication parameters: Device Address (used by PC program), RS232 (enable on or disable), and TCS/2.2X (enable or disable).

LOCK MENU

Allows you to lock the menu options. This is useful in preventing accidental changes to your Boz system.

VER MENU

Displays your Boz serial number and the version of the BOZ-216 firmware software you are running.

TIME MENU

Use to set the system's time. Time is displayed in the top right corner of the start up screen.

LIC1 MENU

Correction package license status.

LIC2 MENU

ParEq package license status.

LIC3 MENU

Room Correction license status.

the ping command

BOZ-216 back panel I/O Blocks are explained on p.16.

The PING command is used to "ping", or send out a signal to, every BOZ-2200 amplification module that is connected to your system.

The purpose of this function is to identify for you which BOZ-2200 module corresponds to which AMP number in the BOZ-216 control unit. A module's AMP number is determined by which I/O Block it is connected to on the back panel of the BOZ-216 control unit. There are a total of 8 I/O blocks that correspond to a total of 8 possible modules, for a maximum of 16-channels of amplification.

The bottom row of the BOZ-216 front panel display indicates to you which I/O Blocks have powered-on BOZ-2200 modules connected to them.

Example:

In the above example, I/O Blocks 1 and 5 are in use. The BOZ-2200 modules connected to them will have AMP numbers 1 and 5 designated to them, respectively.

WHAT HAPPENS WHEN YOU "PING"

When you click on PING, either through the First Screen or through the AMPS menu, a signal is sent out to each BOZ-2200 module.

The BOZ-216 front panel will show a text box that indicates that the PING command is under way.

Each BOZ-2200 module will show in its front panel display its designated AMP number. Recall that this number is determined by the I/O block that it is hooked up to.

This command offers an extremely efficient way of determining which modules are powering which channels. It is very useful in large or complex systems.

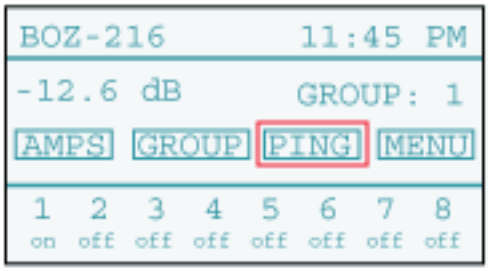
If a system determined by the above example were "pinged", one BOZ-2200 module would show "1" in its front panel display and the other BOZ-2200 module would read "5" in its front panel display.

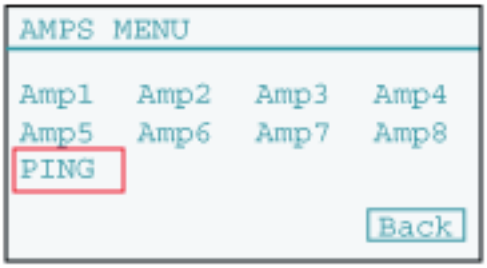
ACCESSING THE PING COMMAND

The PING command can be accessed via the First Screen and the AMPS menu. In both cases, you can CLICK on it with either the rotary control knob or you can press the ENTER button on the remote control.

The First Screen is diagramed on p.40.

The AMPS menu is diagramed on p.41.

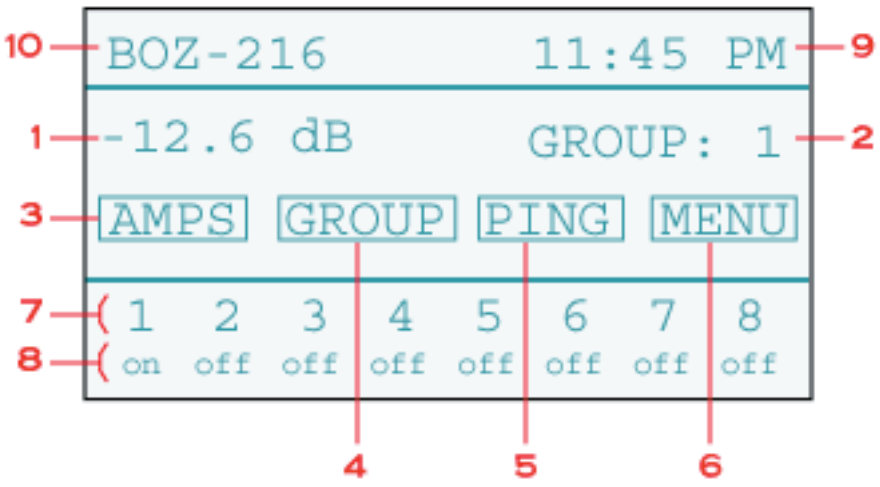




the individual menus

the first screen

When powered up the BOZ-216 will display the following screen:



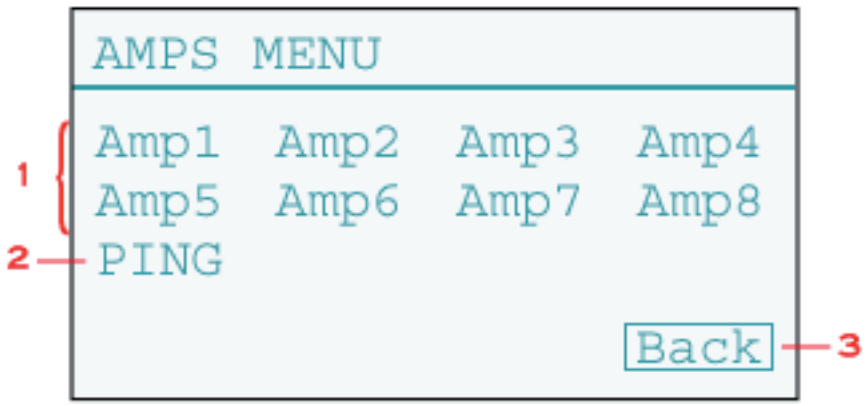
To move the cursor use the front panel navigational knob or the remote control navigational button. To select an option, either press the navigational knob or press the ENTER key on the remote control.

1. Displays the master level in dB. The BOZ-216 keeps track of nine master levels. There is a unique master level assigned to each group (there are 8 groups). One master level is assigned to the whole system when group ALL is selected.
2. Displays the selected group. The master level controls the signal level only for the amplifiers (BOZ-2200 modules) assigned to this group. All other amplifiers assigned to other groups are not affected.
3. Select this option to enter the AMPS menu.
4. Select this option to enter the GROUP menu.
5. Select this option to ping all the BOZ-2200 modules connected to BOZ-216 control unit. All connected amplifier modules with power turned ON will display their AMP number on their display screens. This is very useful to quickly identify individual amplifier numbers.
6. Select this option to enter the MENU screen.
7. This line displays numbers from 1 to 8 referring to the amplifiers (BOZ-2200 modules) connected to corresponding BOZ-216 back panel POWER/RS232 connectors, or BOZ-216 I/O Blocks.
8. This line displays the individual BOZ-2200 module power status.
9. Displays current time.
10. Displays the product ID.

BOZ-216 I/O Blocks: There is a total of 8 input/output blocks on the back panel of the BOZ-216 control unit. The blocks consist of one RS232 connector and one POWER connector. The BOZ-2200 modules connect to the BOZ-216 via these blocks. The AMP number of a module is determined by the I/O Block it is plugged in to. A diagram can be found on p.16.

amps menu

Use this screen to enter individual BOZ-2200 module screens. You can also ping all of the amps to check for the total number of connected amplifiers.



This menu serves as your conduit to manipulating the individual amplifier modules.

PING:
The ping command here serves the same purpose as it did on the First Screen. It is included here again to assist you in selecting the proper module for specific manipulation.

Highlight the desired Amp with the "Left" and "Right" navigation buttons on the remote. Select it by pressing the ENTER button. This will open an Amp setup display screen. This can also be done from the front panel with the navigation knob.

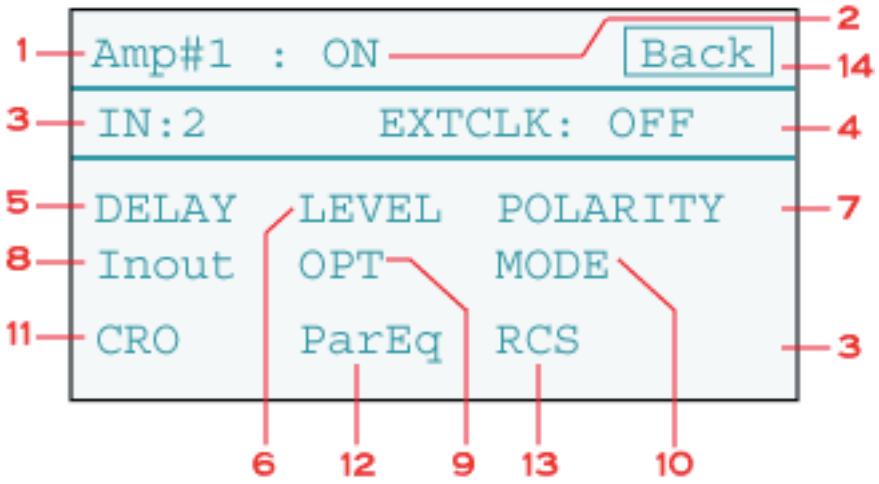
1. Amp selection. Using the rotary control knob highlight the desired amplifier and push the rotary knob to enter selected amplifier menu.

2. PING command. Highlight the PING option and then push rotary knob to ping all of the BOZ-2200 modules connected to BOZ-216 controller. All connected and powered amplifier modules will respond by briefly displaying their number on their front panel displays.

3. Highlight Back and push the rotary control knob to go back to the first screen.

amp menu < amps option

Use this screen to set individual amplifier parameters. Each BOZ-2200 amplifier module connected to the BOZ-216 control unit has its own set of parameters that are controlled by this menu.



Use the "Left" and "Right" navigational buttons to highlight an option. Pressing ENTER on the remote will open a menu. This can also be done from the front panel with the Navigational knob.

1. Indicates the amplifier number. The amplifier number is determined by the connector number, or I/O Block on the back of BOZ-216 to which the amplifier is connected.
2. Amplifier power status. If this particular amplifier is not powered up or the amplifier is not connected, this field will display OFF. If the amplifier power is turned ON this field will display ON. To turn the selected BOZ-2200 ON/OFF, position the cursor over this field and CLICK.
3. Displays the selected digital input. Note that the BOZ-2200 modules (amplifiers) each have two digital inputs. Number 1 refers to the balanced XLR AES/EBU input, and number 2 refers to the single ended RCA-SPDIF input. To select the desired input, position the cursor over this field and push the rotary control knob to toggle the input selection between 1 and 2.
4. External Clock. Place the cursor over this field and push the rotary knob to enable/disable the external clock selection. Note that if EXTCLK is set to ON and the amplifier detects that there is no external clock present, the ExtClk light on the front of BOZ-2200 module will start blinking. If the clock is detected the light will stay ON.
5. Click on this option to enter the amplifier DELAY time screen.
6. Click on this option to enter the amplifier LEVEL balancing screen.
7. Click on this option to enter the amplifier POLARITY selection screen.
8. Click on this option to enter the amplifier InOut selection screen.
9. Click on this option to enter the amplifier OPTION selection screen.
10. Click on this option to enter the amplifier MODE selection screen.
11. Click on this option to enter the amplifier CRO selection screen.
12. Click on this option to enter the amplifier ParEq selection screen.
13. Click on this option to enter the amplifier RCS selection screen.

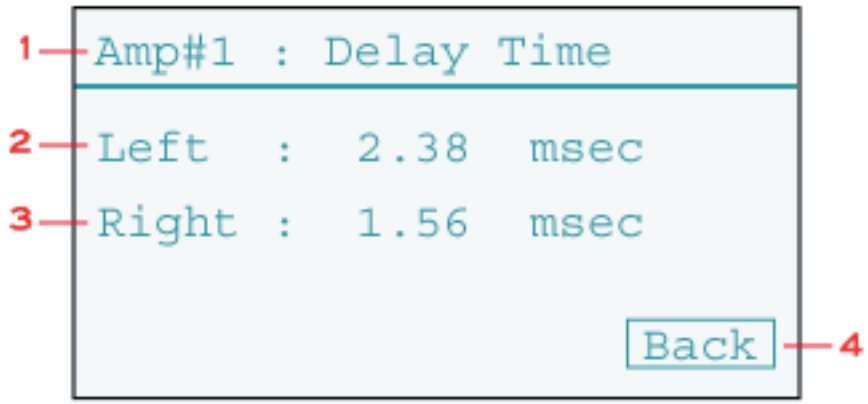
BOZ-2200 ON/OFF: Although the BOZ-2200's all have front panel power buttons, using the AMP menu is the recommended way to individually turn the modules ON/OFF.

delay menu < amps option

DELAY menu usage: If your system is loaded with the Room Correction Package, you will not need to manually set the channel delay times. The RCS technology will calibrate proper correction settings for every channel in your system.

If your system does not have RCS, use this menu to manually adjust system time alignment.

Use this screen to set a BOZ-2200's Left and Right channel delay times. Delay time can be set in increments of 10 usec. The maximum delay time per channel is 40.95 msec.



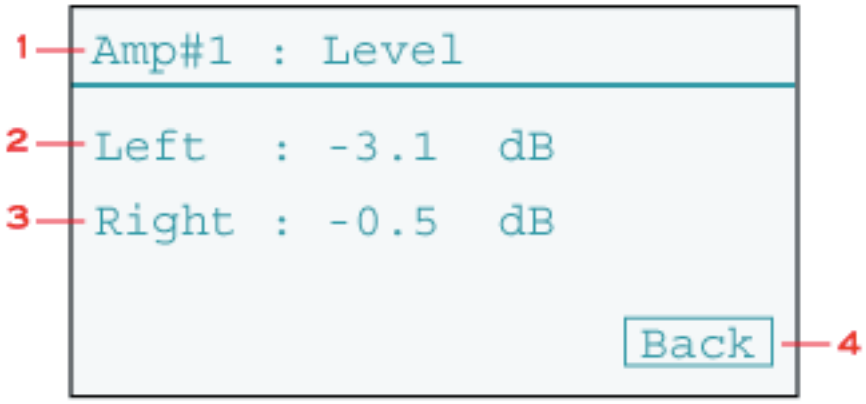
To adjust the delay time, position the cursor over the desired channel. CLICK and turn the rotary control knob either clockwise or counterclockwise

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier in question is connected.
2. Left channel delay time.
3. Right channel delay time.
4. Highlight Back and push the rotary control knob to go back to the first screen.

level menu < amps option

Use this screen to set a BOZ-2200's Left and Right channel level. The channel level can be changed in increments of 0.1 dB. The maximum channel level is 0 dB and the minimum is -99.9 dB.

Use this menu to perform system level balancing.



To adjust the channel level, position the cursor over the desired channel. CLICK and turn the rotary control knob clockwise to increase and counterclockwise to decrease.

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of BOZ-216 to which the amplifier in question is connected.
2. Left channel level.
3. Right channel level.
4. Highlight Back and push the rotary control knob to go back to the first screen.

polarity menu < amps option

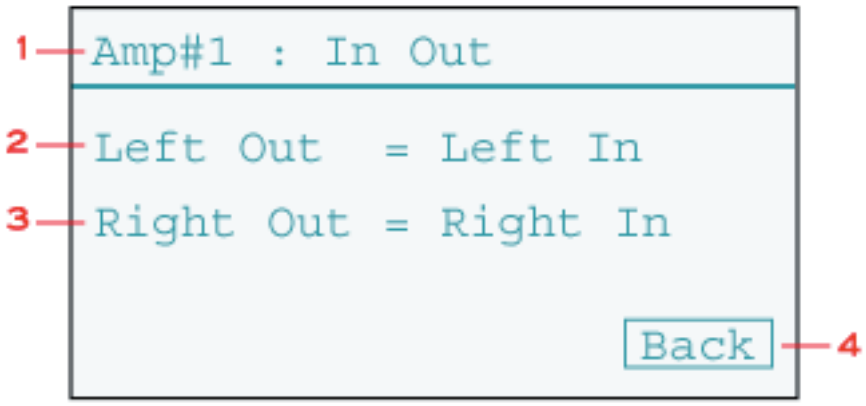
Use this screen to set a BOZ-2200's Left and Right channel polarity. A "+" sign indicates that the output signal is in phase with the input signal. A "-" sign indicates that the output signal is out of phase with respect to the input signal.

To adjust the channel polarity, position the cursor over the desired channel. CLICK the rotary control knob to toggle between "+" and "-"

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier in question is connected.
2. Left channel polarity.
3. Right channel polarity.

InOut menu < amps option

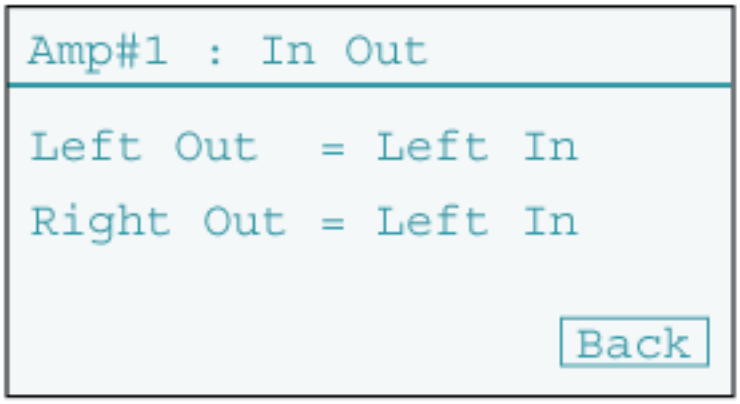
Use this screen to set a BOZ-2200's internal routing. This feature is useful for systems that use bi-amplification



To change the Left Out and Right Out settings, position the cursor over the desired setting and CLICK the rotary control knob to toggle between the Left In and Right In options.

In the above example, the Left output channel will receive the Left input channel signal and the Right output channel will receive the Right input channel signal.

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier in question is connected.
2. Left output channel input signal assignment.
3. Right output channel input signal assignment.
4. Highlight Back and push the rotary control knob to go back to the first screen.



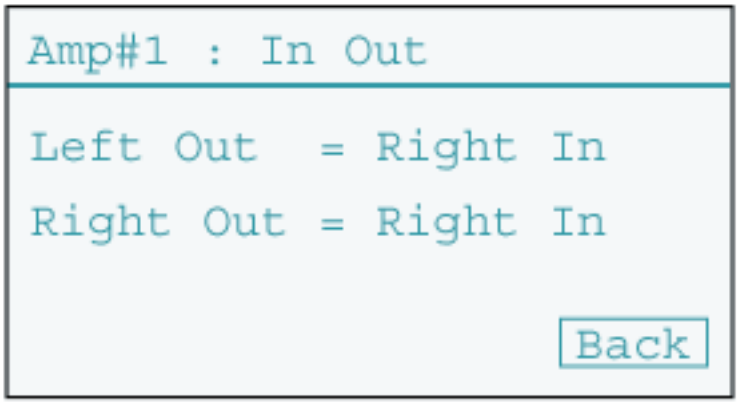
In the above example both the Left output channel and the Right output channel will receive the Left input channel signal.

Bi-Amplification: A diagram of horizontal bi-amplification can be found on p.26. A diagram of vertical bi-amplification can be found on p.28.

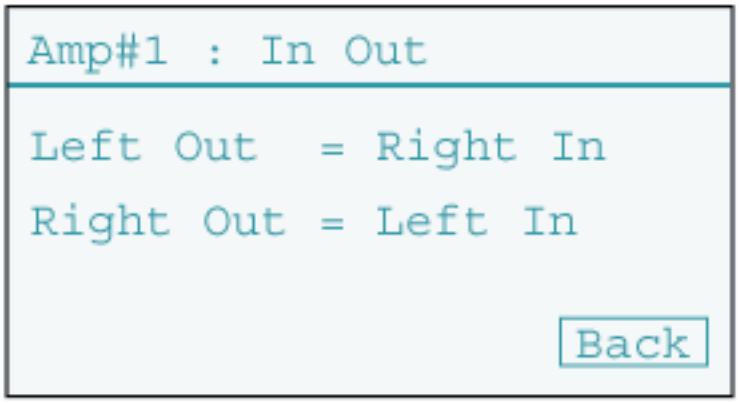
The Left Out = Left In Right Out = Left In configuration is specified for one of the two amplifiers within a vertically bi-amped systems Full diagram on p..29

The Left Out = Left In Right Out = Left In configuration is specified for one of the two amplifiers within a vertically bi-amped systems Full diagram on p..29.

In the example below, both the Left output channel and the Right output channel will receive the Right input channel signal.

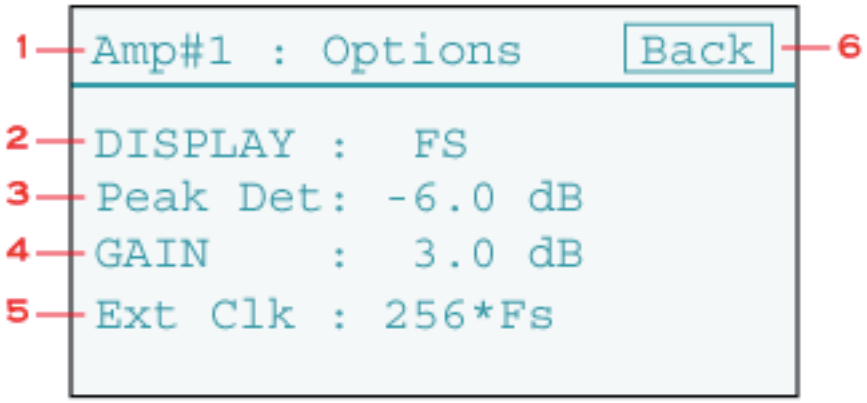


In the example below, the Left output channel will receive the Right input channel signal and the Right output channel will receive the Left input channel signal.



options menu < amps option

Use this screen to set a BOZ-2200's options. A unique set of amplifier options is assigned to each amplifier module connected to the BOZ-216 control unit.



To change a setting, position the cursor over the desired property and CLICK the rotary control knob. Depending upon the property, you will be able to either toggle between options or use the rotary control knob to incrementally decrease or increase a numerical value.

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier in question is connected.

2. This option is used to control the amplifier's front panel display. CLICK the rotary knob to toggle between "Fs" and "LEVEL". When "Fs" is selected, the display will show input signal sampling frequency. If there is no signal detected "---" will be displayed. When "LEVEL" is selected, the display will show the amplifier's level.

3. This option sets the peak detector threshold. This value can be set from 0 dB to -99.9 dB. To completely turn it of go one step past 0 dB to display "---".

4. Use this option to set amplifier's gain. The gain can be set from 0 dB to 18.0 dB in increments of 0.1 dB.

   Note that this is digital gain and that it will digitally amplify you audio signal. This feature is very useful for listening to CD's that are not fully modulated. If the CD is not fully modulated, increasing the amplifier's gain will compensate for loss of loudness due to partial CD modulation. If the CD is fully modulated, then increasing the amplifier gain will result in occasional signal clipping.

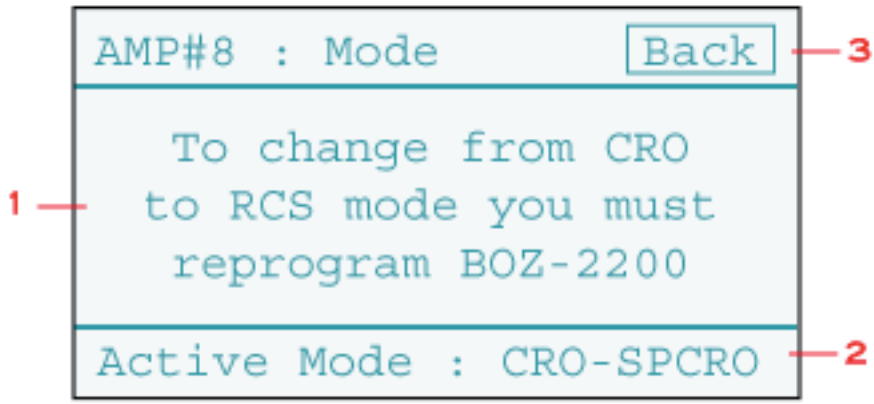
5. Click on this option to enter the external clock menu. This option displays the current external clock selection.

6. Highlight Back and push the rotary control knob to go back to the first screen.

mode menu < amps option

Both the Crossover Package and Room Correction package are add-on options and do not come standard with the BOZ system. They can be purchased and easily installed by the user at any time.

Use this screen to view the selected amplifier's mode of operation. Each BOZ-2200 is capable of operate in either CRO-SPCRO (crossover-software programmed crossover mode) or RCS (room correction mode).

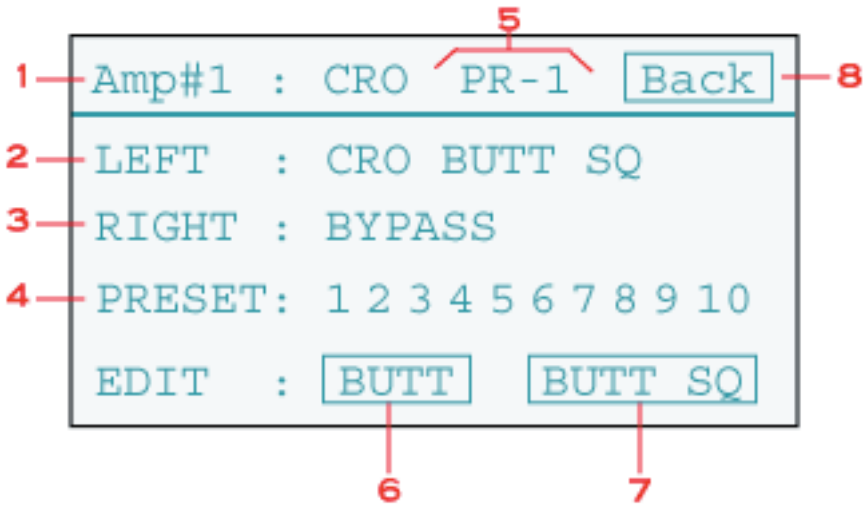


This screen serves no function other than to inform you of the chosen module's mode of operation. No system changes can be made via this screen. As is indicated in the screen above, in order to operate in a different mode, the unit must be repogrammed through a PC.

1. Indicates that to change from the current mode, the BOZ-2200 must be reprogrammed.
2. Displays the current mode of operation. The example above indicates that the module is in Crossover mode. (CRO-SPCRO = Crossover-Sofware Programmed Crossover)
3. Highlight Back and push the rotary control knob to go back to the previous screen.

CRO menu < amps option

Use this screen to set a BOZ-2200's crossover filter type. Settings are made individually for each channel.



Presets:
A system preset will specify a filter type for both the Left and Right channel - in any combination of BYPASS, BUTT, or BUTT SQ.

CRO Usage:
Crossover Mode and Room Correction mode can not occur simultaneously.

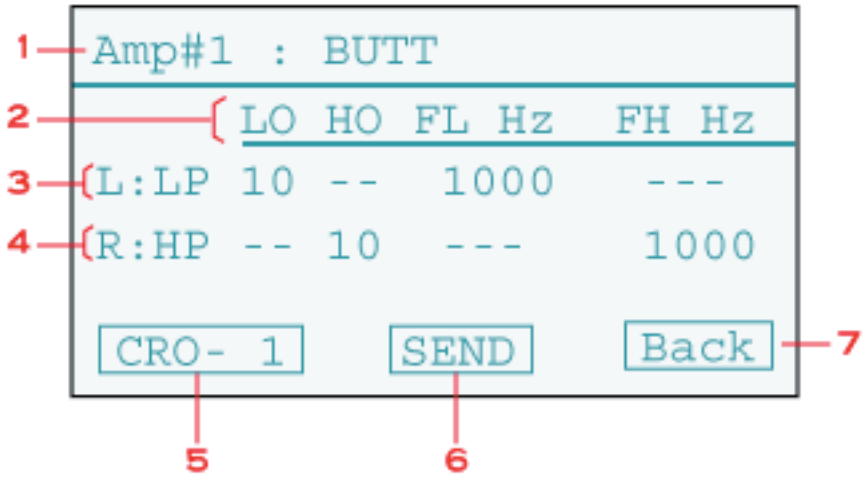
To change a setting, position the cursor over the desired property and CLICK the rotary control knob. Depending upon the property, you will be able to either toggle between options, use the rotary control knob to select a preset option, or click to enter a submenu (BUTT and BUTT SQ).

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier is connected.
2. Place the cursor over this field and click to select a filter type for the Left channel.
3. Place the cursor over this field and click to select a filter type for the Right channel
4. Place the cursor over the desired CRO preset and click to select it. The selected crossover preset will be displayed on the top of the screen.
5. Displays the current CRO preset.
6. Click on this option to edit the Butterworth crossover filter parameters.
7. Click on this option to edit the Butterworth squared crossover filter parameters.
8. Highlight Back and push the rotary control knob to go back to the first screen.

Butterworth squared filters are designed as two cascaded sections of Butterworth filters. Maximum Butterworth squared filter order is 1/2 of the maximum of regular Butterworth filter. However, since two sections are cascaded together Butterworth squared filter of order N will produce same filter slope as regular Butterworth filter of order 2*N.

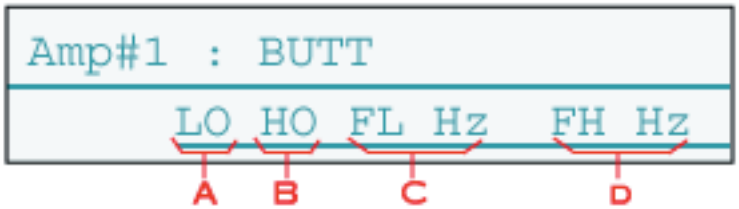
edit butt and edit butt sq menu

Use this screen to set the amplifier's Butterworth and Butterworth Squared filter parameters. In this manual section, only the editing of Butterworth filters is described. Editing of Butterworth squared filter is the same.



1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier is connected.

2. This line indicates filter parameters:



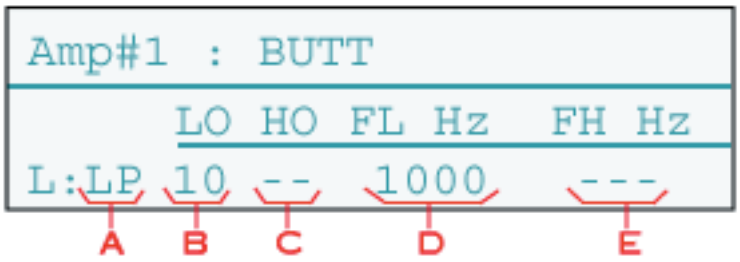
A. Lowpass filter order field or left side filter order for bandpass filter.

B. Highpass filter order field or right side filter order for bandpass filter.

C. Lowpass filter cutoff frequency in Hz, or left side bandpass filter cutoff frequency.

D. Highpass filter cutoff frequency in Hz, or right side bandpass filter cutoff frequency.

3. Left channel filter selection and filter parameter adjustment:



   A. Click on this field to toggle between LP-lowpass, HP-highpass, BP-bandpass and "---" no filtering.

   B. Use this fields to set LO filter order as described in "2"

   C. Use this fields to set HO filter order as described in "2"

   D. Use this fields to set FL filter cutoff as described in "2"

   E. Use this fields to set FH filter cutoff as described in "2"

4. Right channel filter selection and filter parameter adjustment procedure is the same as for the left channel.

5. Crossover preset selection.

6. Click on this option to send filter parameters to the amplifier whose number is displayed in "1".

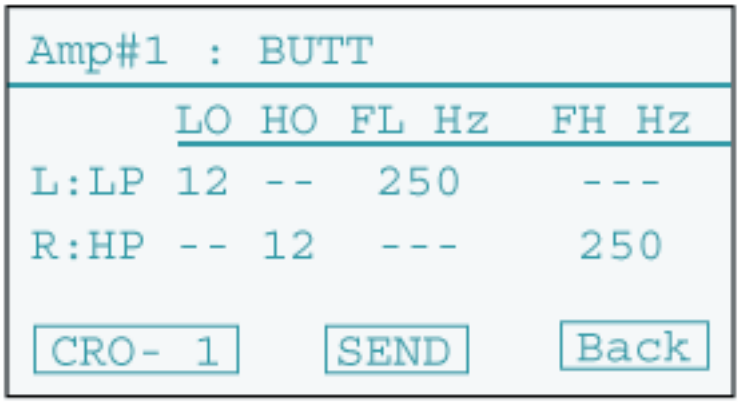
7. Highlight Back and push the rotary control knob to go back to the first screen.

EXAMPLE

Set amplifier 1 crossover to the following setting:

1. Left channel to lowpass Butterworth filter with cutoff frequency of 250 Hz and filter order of 12.

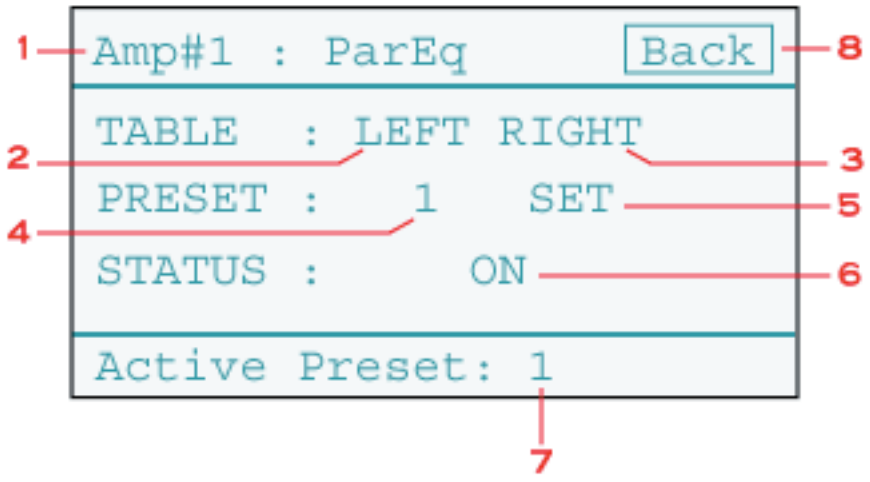
2. Right channel to highpass Butterworth filter with cutoff frequency of 250 Hz and filter



Note: In this example we assume that amplifier 1 crossover mode was set to CRO-BUTT in the MODE screen.

pareq menu < amps option

Use this screen to either select one of ten pre-programmed ParEq filter settings or to bypass them.

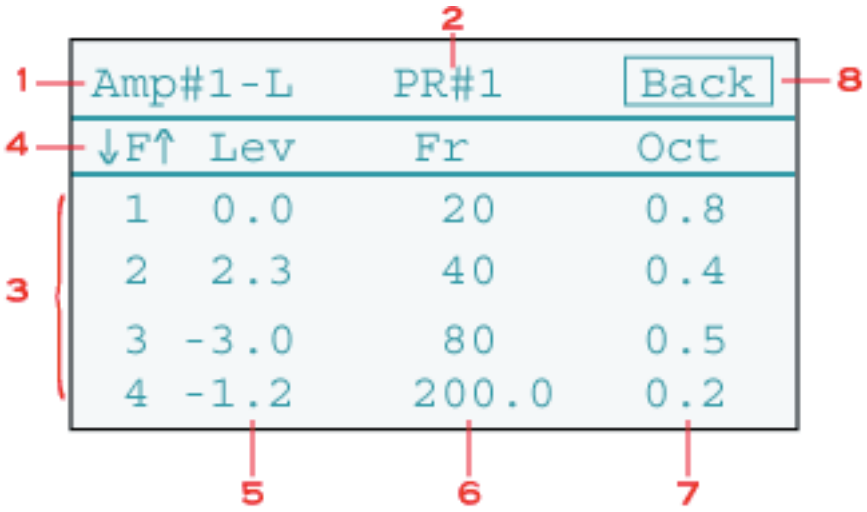


1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier is connected.
2. Place the cursor over this field and click to enter the Left channel filter parameter table screen.
3. Place the cursor over this field and click to enter the Right channel filter parameter table screen.
4. Use this field to select one of 10 ParEq filter presets.
5. Click on this field to load the selected ParEq preset. The selected preset will be displayed on (7).
6. Click on this field to toggle between ParEq is engaged and BYPASS ParEq is bypassed.
7. Displays the current preset.
8. Highlight Back and push the rotary control knob to go back to the first screen.

.

pareq left & right channel table menu

Use this screen to edit the parametric equalizer filter parameters. The properties are displayed in table format, with four rows per display.



To change a setting, position the cursor over the desired property and CLICK the rotary control knob. Hold down the knob and turn clockwise to incrementally increase a value, or counterclockwise to incrementally decrease a value.

1. Indicates the amplifier number and channel. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier is connected.

2. Indicates the ParEq preset number.

3. ParEq filters. There are in total 12 filters per channel. One display page can display 4 filters.

4. Place the cursor on the down pointing arrow and click to the next page of 4 filters. Use the up pointing arrow to go back to the previous page of four filters.

5. This column displays the ParEq filter level in dB. Maximum filter gain is +12.0 dB and maximum filter attenuation is -18.0 dB.

6. This column displays the ParEq filter center frequency. Minimum frequency is 15 Hz and maximum filter frequency is 20,000.0 Hz.

7. This column displays the ParEq filter width in octaves - calculated as 1/Q factor. Minimum filter width is 0.05 octaves (Q factor = 20) and maximum filter width is 2.5 octaves (Q factor = 0.4).

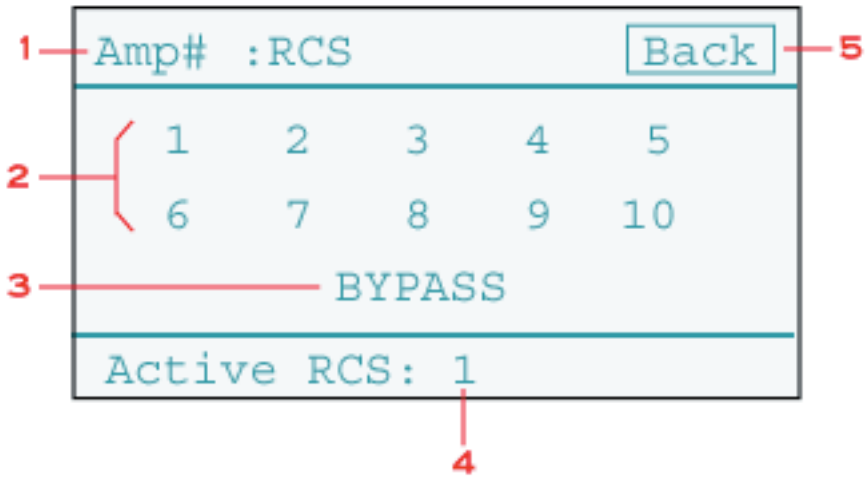
8. Highlight Back and push the rotary control knob to go back to the first screen.

.

rcs menu < amps option

Room Correction Presets:
Presets are defined on a computer and are transferred to your system via the RS232 connection.

Use this screen to select the desired room correction preset or to bypass the room correction algorithm.



To make a selection, position the cursor over the desired preset and CLICK the rotary control knob. Your selection will be displayed in the bottom of the screen (4).

1. Indicates the amplifier number. The amplifier number is determined by the connector number on the back of the BOZ-216 to which the amplifier is connected.

2. The numbers in these fields represent the room correction presets. Place the cursor over desired room correction preset and click on it to load the room correction algorithm with filters saved in this preset.

3. Highlight Back and push the rotary control knob to go back to the first screen.

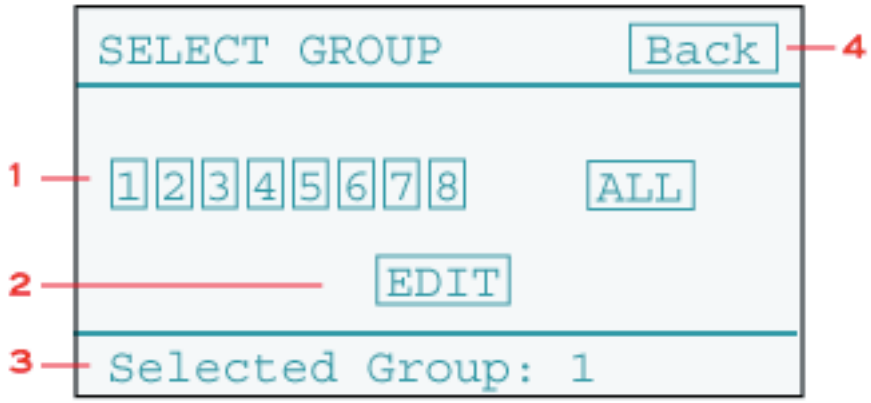
Note that before using this option the selected amplifier has to be placed into Room Correction Mode.

.

select group menu < group option

Use this screen to select one of eight amplifier groups or to select the ALL group option. If one of the eight groups is selected, the volume control will affect only amplifiers assigned to that particular group. If the ALL group option is selected that volume control will affect all of the amplifiers (BOZ-2200 modules) connected to BOZ-216 control unit.

The "BOZ Wheel" controls the master volume settings - it alters the level of all the amplifiers in the selected group.



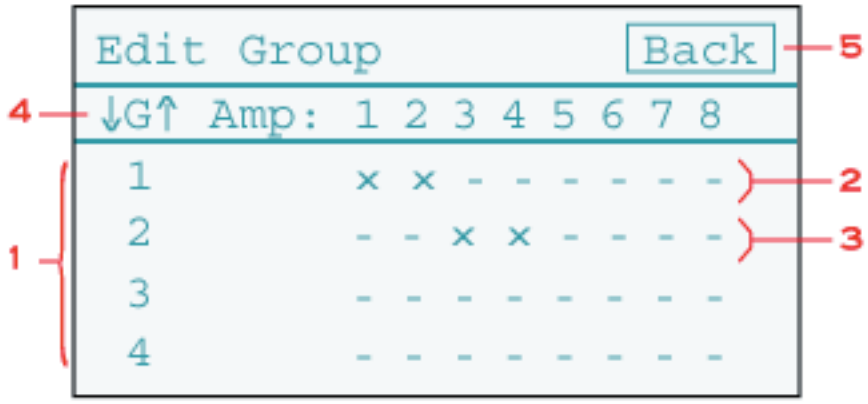
To make a selection, position the cursor over the desired preset and CLICK the rotary control knob. Your selection will be displayed in the bottom of the screen (3), or you will be taken to the EDIT GROUP menu.

1. The numbers in these fields represent groups of BOZ-2200 modules.
2. Edit menu. This option will take you to the EDIT GROUP menu, where you can individually place amplifiers into one of the eight possible groups.
3. Displays the currently selected group.
3. Highlight Back and push rotary control knob to go back to the first screen.

.

edit group menu

Use this screen to edit all of the eight groups. You can assign to each group any combination of eight amplifiers (BOZ-2200 modules) connected to the BOZ-216 control unit.



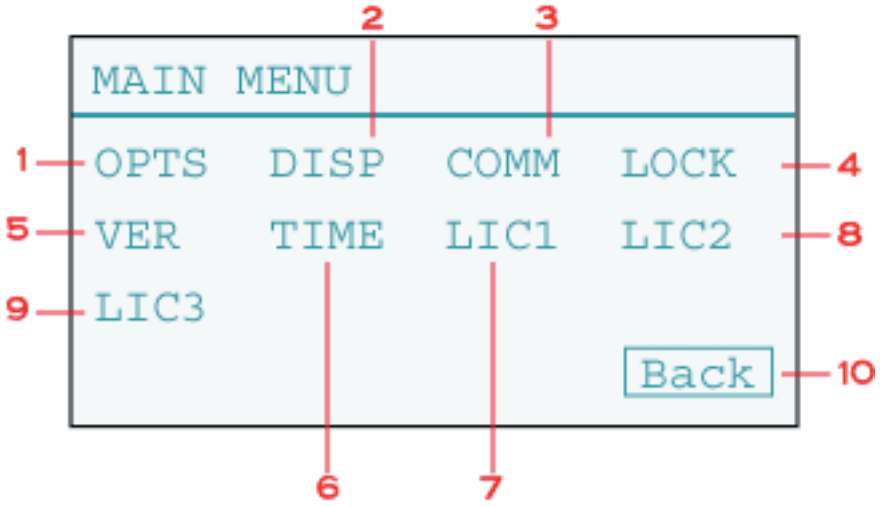
To assign an amplifier to a group or to remove an amplifier from a group, highlight that amplifier and push the rotary control button over the desired slot. You can also press the SELECT key on the remote control. If an amplifier is assigned to a group, an "X" will be displayed. Otherwise a "-" will be displayed.

1. Group number
2. Amplifier selection assigned to group number 1. In this particular example, amplifiers 1 and 2 are assigned to group number 1. If this group were selected (in the previous screen) then the volume control changes would affect only amplifiers 1 and 2.
3. Amplifier selection assigned to group number 2. In this example amplifiers 3 and 4 are assigned to group number 2. If this group were selected then the volume control changes would affect only amplifiers 3 and 4.
4. Use the up and down arrow controls to toggle between the two group pages.
5. Select this option to go back to the previous screen.

.

main menu < menu option

The Main Menu screen is designed to provide easy access to system control parameters. Unlike the AMP menu, the changes made in this menu will affect the whole system.



To enter a menu, position the cursor over the desired option and CLICK the rotary control knob. You can also use the navigational keys on the remote. If using the remote, press the ENTER key to make a selection.

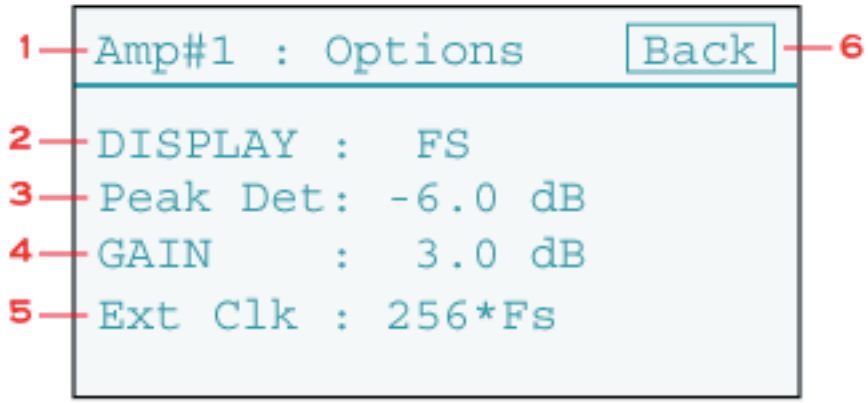
1. Click on this option to enter the system OPTIONS menu.
2. Click on this option to enter the DISPLAY menu.
3. Click on this option to enter the COMMUNICATION menu.
4. Click on this option to enter the LOCK menu. It is used to lock/unlock the use of all menu options.
5. Click on this menu to view the system firmware VERSION and to get the BOZ-216 serial number.
6. Click on this menu to enter the TIME setting screen.
7. Click on this option to enter the CRO license screen.
8. Click on this option to enter the ParEq license screen.
9. Click on this option to enter the RCS-room correction license screen.
10. Select this option to go back to the previous screen.

.

options menu < menu option

Standby Mode vs. ON: When in standby mode, the BOZ-216 is not completely powered down. It is in low power mode and is still able to receive some IR and RS232 commands. All the BOZ-2200 modules are powered down in standby mode.

The Options Menu allows you to change four global properties: Maximum Level (signal level measured in dB), Power On (toggles between ON and Standby), IR Control (toggles between ON and OFF), and Wheel settings (sensitivity).

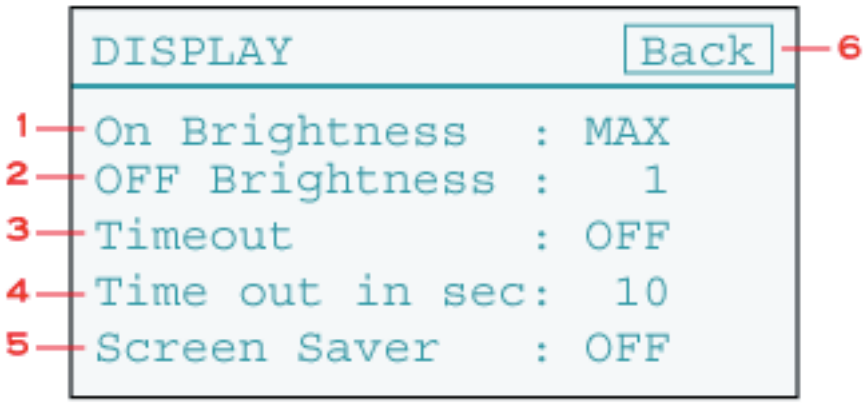


To make a change a value, position the cursor over the desired preset and CLICK the rotary control knob. Depending upon the property you selected, you will be able to either incrementally scroll through numerical values or to toggle between options.

1. Maximum Level. This option allows you to set the maximum level for the entire system.
2. Power On. This option toggles between ON and Standby. If set to ON, powering up the system will automatically put it to full power. If set to Standby, powering up the system will put it in "idle", or Standby mode.
3. IR Control. This setting allows you to toggle ON and OFF the IR Control option. When set to OFF, the system will not respond to any commands from the IR Controller.
4. Wheel Sensitivity. This property determines how easily the "Boz Wheel" turns as you change the master volume. The minimum value is 1 and the maximum value is 15, with 15 being the most sensitive setting.
5. Click on this option to go to the previous screen.

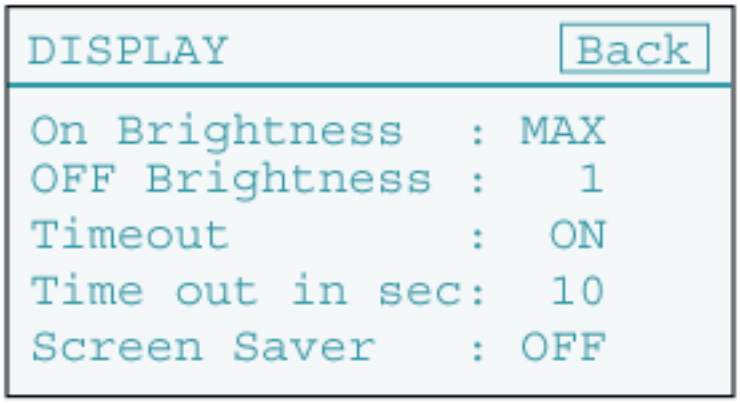
display menu < menu option

The DISPLAY menu allows you to change the visual properties of the displays. Changes made to the BOZ-216 control unit's display properties are also reflected in each BOZ-2200's display.



1. Place the cursor over this menu option to adjust the display's "ON" brightness. The brightness level can be set from 1 to 16, where 16 is displayed as MAX. Note that this brightness level will affect all the BOZ-2200 modules connected to the BOZ-216 control unit.
2. Use this field to adjust the "OFF" brightness. The value of OFF brightness can be set from 0 to 16, where 0 is displayed as OFF and 16 is displayed as MAX.
3. Use this field to enable or disable the display timer.
4. Use this field to set the display timer timeout value. This value is set in seconds and can be set from 5 to 20 seconds.
5. Use this field to turn ON and OFF the display screen saver. The screen saver displays an animated version of the master level.

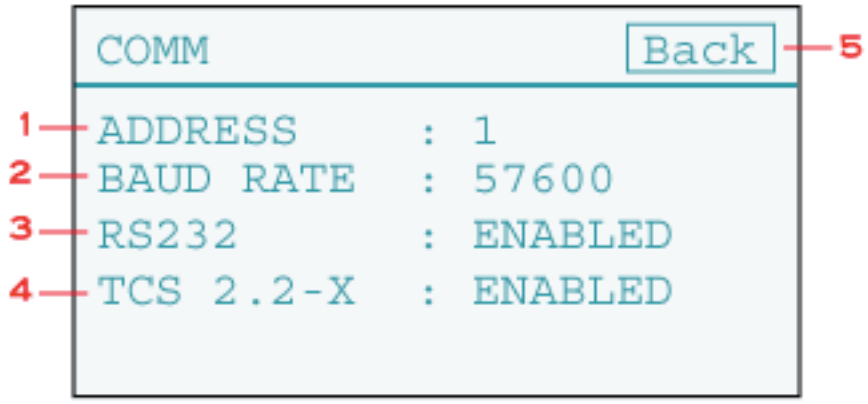
Let us consider the following example:



Note that if the Timeout option is set to "ON", it is indicating that the display timer is enabled. After 10 seconds (Time out in sec: 10) the display brightness will be set to level 1 – this will affect the displays of all BOZ-2200 modules. The display will stay in this condition until any command either by the rotary knob or by IR is initiated. The initiated command will turn the display back to the brightness level as set by the ON Brightness option.

communication menu < menu option

The Communications menu is used to specify how your Boz system sends and receives information between a computer, a Tact TCS, or a TacT RCS 2..2X.



1. Use this field to set the BOZ-216 device address. This address is used by the PC program to communicate with the BOZ-216 controller and the BOZ-2200 modules. The value of this field can be set from 1 to 255.

2. This field displays the RS232 baud rate. This field can not be modified.

3. Place the cursor over this field and click to toggle between ENABLE and DISABLE. In order to communicate with PC this field has to be set to ENABLE.

4. Place the cursor over this field and click on it to ENABLE/DISABLE TCS and RCS-2.2 X volume control of the BOZ-216. If you have a TCS MKII or an RCS-2.2 X set this option to ENABLE and connect TCS MKII/RCS-2.2 X RS232 AUX output to the BOZ-216 RS232 input. In this way, your TCS MKII/RCS-2.2 X will take control over the BOZ-216 master volume. When doing this make sure to set the AMP menu option in both TCS MKII and RCS-2.2 X to "ENABLE". If the TCS MKII or the RCS-2.2 X are not used this option should be set to DISABLED.

Note: When the TCS MKII/RCS-2.2 X feature is set to "ENABLE", IR control of the BOZ-216 is disabled. When the TCS MKII/RCS-2.2 X feature is set to "DISABLE", IR control of the BOZ-216 is enabled. If after the TCS MKII/RCS-2.2 X feature is set to "ENABLE" you manually enable IR control by using the MAIN MENU - OPTION menu, then the first transmitted control signal from the TSC MKII/RCS-2.2 X will disable the BOZ-216 IR control.

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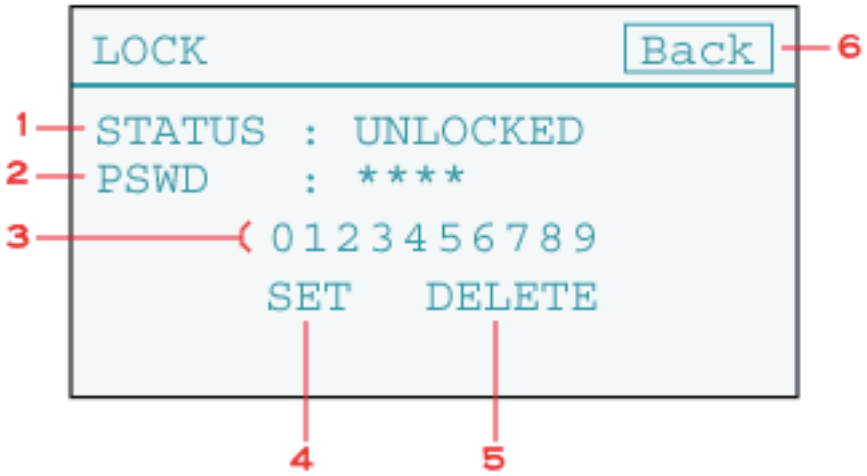
lock menu < menu option

The LOCK menu is used to disable the remote control and front panel buttons of your BOZ system.



1. Displays the Lock status. If Lock status is set to LOCKED, all the menu options, with the exception of this one, are disabled.

2. Use this field to enter the Lock password.

3. Use these fields to enter the password code.

4. After the password is entered, click on this option to LOCK or UNLOCK the unit.

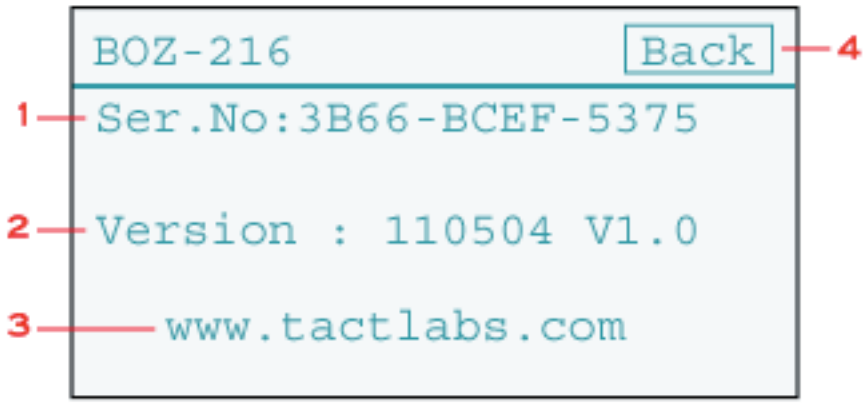
5. Click on this option to delete the number entered in the PSWD field.

All units come with a factory preset password of "1234". Use the rotary knob to enter the password. Place the cursor over number 1 and click on it. The number 1 will be displayed in the PSWD field. Repeat this for 2,3, and 4. When all four numbers are displayed (1234) place the cursor over the SET option and click on it. This will lock or unlock the unit.

Please note that this password is not intended to provide any security access to the system parameters. It is provided as a small protection against unintentional changes to the system parameters.

versions menu < menu option

The Versions menu displays your serial number, the version of BOZ-216 firmware you are running, and the website address for Tact Audio Inc.



1. This field displays you BOZ-216 serial number. You will need this number if you decide to purchase the Crossover, Parametric EQ or Room Correction software options. This number is used by Tact Audio to generate your proper license.

2. This field displays BOZ-216 firmware version number.

3. Tact Audio Inc, official web site. Product updates, news, reviews, and events are regularly posted. Our website is also a convenient place for you to leave us your input. Please check in with us often!

time menu < menu option

The TIME menu is used to set the time for your system. The time is displayed on the top right corner of the First Screen.

To change the current time setting, position the cursor over the desired preset field (hour or minute) and CLICK the rotary control knob. Turn the knob either clockwise or counterclockwise to incrementally decrease or increase the numerical value. To finalize your selection, CLICK on the SET field.

1. This field displays the system's current time setting. Once you click on SET, any changes made will be reflected in this field.

2. Displays the current time in editable fields. To change the time setting, place the cursor over the desired field and use the navigation knob to either increase or decrease its value.

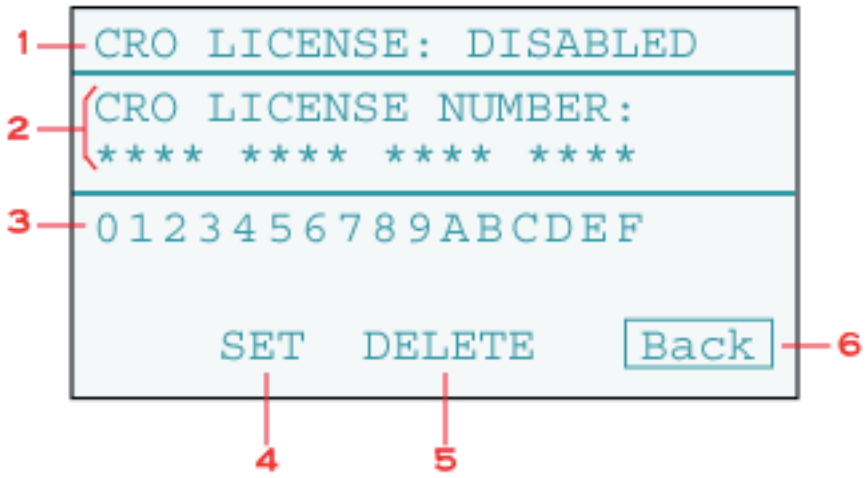
3. Click on the SET field to program the unit with a new time setting.

4. Select this option to go back to the previous screen.

lic1 menu < menu option

The Crossover Package can be installed very easily and quickly at any time after your initial purchase.

The License 1 menu stores your Crossover Package license number.



1. This field displays current your unit's license status. If this field displays DISABLED you will not have access to the BOZ-216 crossover feature. If this is the case, please contact Tact Audio to purchase proper licensing.
2. License number field.
3. Use these fields to enter your license number. Note that the license number is composed of numbers from 0 to 9 and from six letters: A,B.C,D,E and F. To enter the license number, use the rotary knob to highlight the desired number and click on it. The number will be displayed in field 2.
4. After the license number is completely entered, click on this option to activate the cross over package.
5. Use this option to delete a number entered by mistake.
6. Click on this option to go back to the previous screen.

Note: In order to complete the license setup procedure, after the license is set ENABLED you must place the BOZ-216 into STANDBY mode and turn it back ON again. To place it in stand by mode use the STANDBY switch found on the front panel of the unit.

lic2 menu < menu option

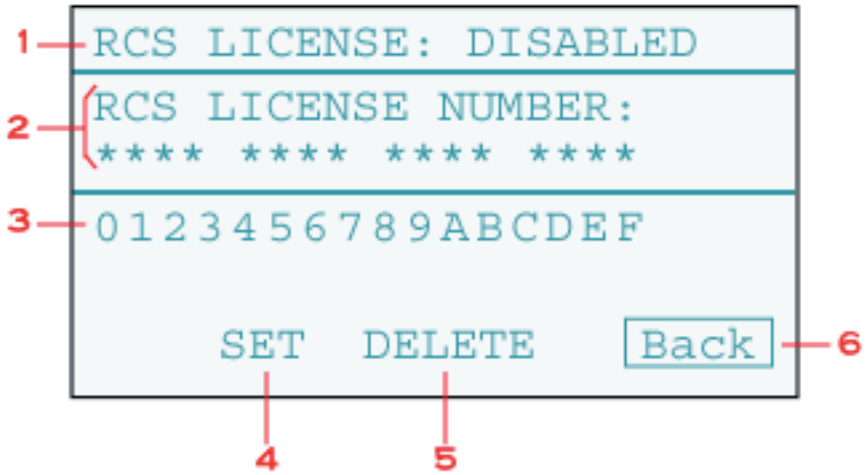
The License 2 menu stores your Parametric Equalizer Package license number.

1. This field displays your current license status. If this field displays DISABLED you will not have access to the BOZ-216 parametric equalizer feature. If this is the case, please contact Tact Audio to purchase a proper license.
2. License number field.
3. Use these fields to enter the license number. Note that license number is composed of numbers from 0 to 9 and from six letters: A,B.C,D,E and F. To enter the license number, use the rotary knob to highlight desired number and click on it. The number will be displayed in field 2.
4. After the license number is completely entered, click on this option to activate the parametric equalizer package.
5. Use this option to delete a number entered by mistake.
6. Click on this option to go back to the previous screen.

Note: In order to complete license setup procedure, after the license is set to ENABLED you must place the BOZ-216 into STANDBY mode and then turn it back ON again. To place it in standby mode use the STANDBY switch found on the front panel of the unit.

lic3 menu < menu option

The License 3 menu stores your Room Correction Package license number.



1. This field displays your current license status. If this field displays DISABLED you will not have access to the BOZ-216 room correction feature. If this is the case, please contact Tact Audio to purchase proper license.
2. License number field.
3. Use these fields to enter the license number. Note that license number is composed of numbers from 0 to 9 and from six letters: A,B.C,D,E and F. To enter the license number, use the rotary knob to highlight desired number and click on it. The number will be displayed in field 2.
4. After the license number is completely entered click on this option to activate the room correction package.
5. Use this option to delete a number entered by mistake.
6. Click on this option to go back to the previous screen.

Note: In order to complete the license setup procedure, after the license is set to ENABLED you must place the BOZ-216 into STANDBY mode and then turn it back ON again. To place it in stand by mode use the STANDBY switch found on the front panel of the unit.

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