BRYSTON

# BRYSTON OWNERS MANUAL


## BAX-2 ACTIVE DSP ELECTRONIC CROSSOVER

# IMPORTANT SAFETY INSTRUCTIONS

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 (servicing) instructions in the literature accompanying the product.

1.Read these instructions. 2. Keep these instructions. 3. Heed all warnings.

4. Follow all instructions. 5. Do not use this apparatus near water.

6. Clean only with dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Unplug this apparatus during lightning storms or when unused for long periods of time.

13. 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.

# WELCOME

**Thank you for your purchase of a Bryston BAX-2 DSP Electronic Crossover.**

**Our Bryston class leading active loudspeakers and our ultra high performance DSP based BAX-2 crossover platform combine with your choice of Bryston amplification forms a unique high performance playback system through which you can hear details you never thought possible.**

**We welcome your feedback and hope you enjoy your new BAX-2 in combination with your Bryston Active Loudspeakers for many years to come.**

## BRYSTON FACTORY

# OVERVIEW

Fully active loudspeakers dispense with passive crossovers that are built into conventional loudspeakers in favor of an electronic crossover inserted before amplification is applied.

The BAX-2 electronic crossover benefits are many, including increased flexibility with filter shapes, the ability to make fine-grained adjustments which result in improved on and off axis response and the optimization of the 'Listening Window' and 'Sound Power' (these are competing objectives in passive loudspeakers). This direct coupling of the loudspeaker driver to the amplifier significantly avoids losses inherent in passive crossovers.

Bryston fully Active Loudspeakers combine decades of research into acoustics, electronics, amplification as well as 'state of the art' components to recreate your recordings with stunning realism.

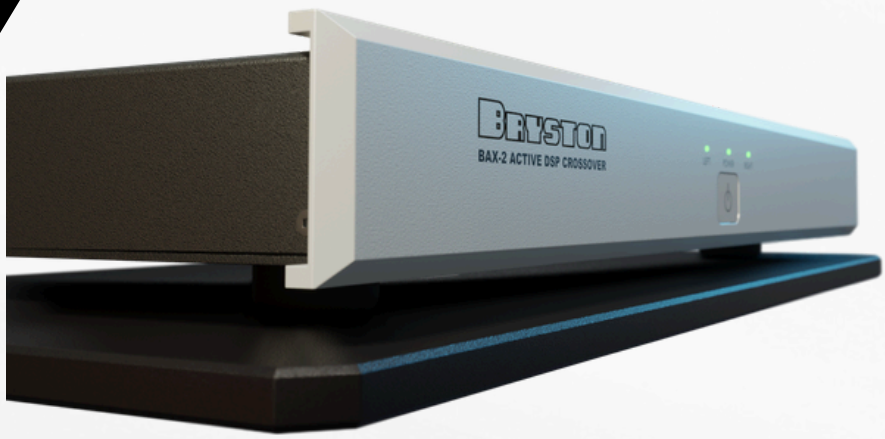
The BAX-2 Active DSP Active Crossover is a core component of this high resolution system.

# BAX-2

**The BAX-2 is a state of the art DSP crossover that has been specially programmed at the factory for compatibility with your specific model of Bryston Active Loudspeakers.**

**It is comprised of two channels of analog to digital conversion which convert incoming full range analog audio from your preamplifier to an equivalent digital audio signal sampled at 96kHz and decimated to 24 bits. This signal passes to a high powered DSP core which performs the 2 or 3 or 4-way crossover function for each channel and any user selected filters desired for altering the bass response of the loudspeakers in the room. Three or Four bands of audio per channel are then passed to 8 digital to analog converters followed by fully discrete balanced analog outputs which in turn feed 2, 3 or 4 amplifier channels per loudspeaker. For optimum performance the BAX-2 only accepts balanced input and provides balanced output. No single ended audio connections are available. If you require single ended connections, XLR to RCA adapters can be used.**

**The system can be user controlled through a simple and intuitive web-application for setup. Network connection is required for those who desire to tailor the bass response of the loudspeaker to the room and for firmware updates but is not otherwise necessary**




## FEATURES

- 8 DACs
- 1 ADCs by AKM
- 96K Sample 24 Bit Rate
- Trigger On Input
- Network for control and firmware updates
- Balanced XLR input and output
- Available in 17 inch or 19 inch faceplate

**THE BAX-2 SHIPPED WIITH YOUR SPEAKERS IS PRE-PROGRAMMED WITH THE APPROPRIATE SOFTWARE**

## Shipping Box and Packing Material

Please keep the original shipping box and all packing material. This will ensure the BAX-2 is protected in future transport. In the unlikely event you have a problem and must return it for service, you must use the proper packing material.

Ship the BAX-2 only in the original packing material as the unit is not insurable by carriers otherwise.

Replacement packing materials consisting of a shipping carton with plastic foam inserts is available from Bryston for a small fee.

# INSTALLATION

### Ventilation

The BAX-2 is a cool-running line level component. It generates far less heat than amplifiers and many other components. It can be safely placed inside furniture or an equipment rack. However, it should not be tightly enclosed. Some airflow is desired.

### Connecting to A/C Power

Please check the Data Plate on the right rear of the crossover to verify power requirements agree with your location. Plug the IEC-320 C14 end of the power cord into the BAX-2, then plug the other end into an approved and grounded A/C receptacle.

### Connecting to an Audio System

Though the BAX-2 is a DSP driven digital audio component, all audio connections are analog only. This is to accommodate a broad range of pre-amps and front-ends while operating the digital circuitry at optimum conditions. Contrary to some beliefs, converting analog to digital inside the crossover does not create a compromised sonic experience.

From your stereo preamplifier, connect the left and right outputs to the BAX-2 left and right inputs using good quality balanced XLR cable. The left and right channels each have 4 outputs marked Low, Mid, High, and Sub. The low output for each channel goes to the amplifier designated to drive the bass section, mid should drive the midrange, high drives the tweeters and the Sub will drive Subwoofers.

# 3-WAY ACTIVE

## Connection Diagram

**The connection diagram below shows 3 Channels of Amplification to one channel of a Bryston Active Loudspeaker. An additional 2 channels of amplification are required if Sub Towers are utilized.**

## Choosing Amplification

**Bryston Active Loudspeakers have been optimized for use with Bryston amplifiers however other brand amplifiers may be suitable as well. Each amplifier used must have 'identical gain' as there is currently no provision to compensate for mis-matched amplifiers within the DSP.**

## Connect to Network

**Connect the BAX-2 to your network router using a CAT-5 or better ethernet cable**

# 4-WAY ACTIVE

## Connection Diagram

**The diagram below shows the connections for the BAX-2 from the Preamplifiers Left and Right input to the 4 channels of Left and Right outputs to your Power Amplifiers. Depending on which active crossover application you are using ... 2, 3 or 4 channels will determine which outputs are utilized.**

## Choosing Amplification

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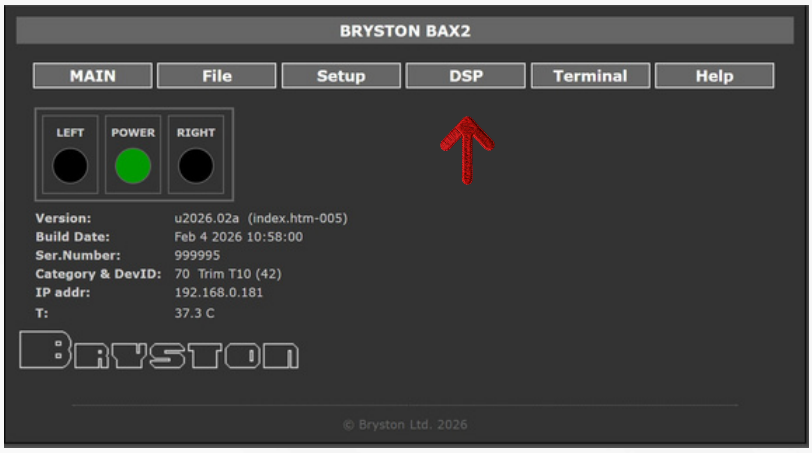
- **The left and right channels each have 4 outputs marked Low, Mid, High, and Sub.**
- **The low output for each channel goes to the amplifier designated to drive the bass section, mid should drive the midrange, high drives the tweeters and the Sub will drive Subwoofers.**

# DSP FILTER SETUP




### DSP Filter Setup

**Bass equalization (Page 10) can be access through the web user interface (MYBRYSTON) by clicking the DSP tab.**

**This can be done from the listening position from most modern web enabled devices.**

## AVAILABLE ADJUSTMENTS

### 10 Band Parametric EQ

**For each band you would like to edit, enter desired center frequency, boost or cut in dB, and width. Center frequency can be the preset value or raised by up to 10Hz. Boost cut range is -10.0 to +3.0 dB, and Q is 1.0 to 5.0 where 1 is the widest and 5 is narrowest.**

### Increase / Decrease

**Especially useful when making adjustments from a touchscreen device, these buttons will increase or decrease the selected value by the precision shown with each button press or tap.**

### Memory

**Store a preset by creating a correction curve, then pressing SAVE ALL. Reset all filters to flat by pressing RESET ALL. Recall a saved preset by pressing RECALL ALL.**

### Audio Output

**Normal function of the BAX-2 is to pass audio received at the input jacks on the back of the unit. You can also engage a built in sine single tone generator and pink noise generator for testing. Press the desired audio source then press 'Click to Update Source' to engage the desired audio source.**

### Peak Gain Indicator

**A maximum aggregate gain of 3dB can be achieved by the system. If two filters with overlapping bands are engaged and maximum gain would exceed 3dB, the 2nd filter is restricted to a figure that maintains no more than 3dB peak gain. It's highly recommended to pull down a peak frequency rather than boost a dip.**

### Correction Curve

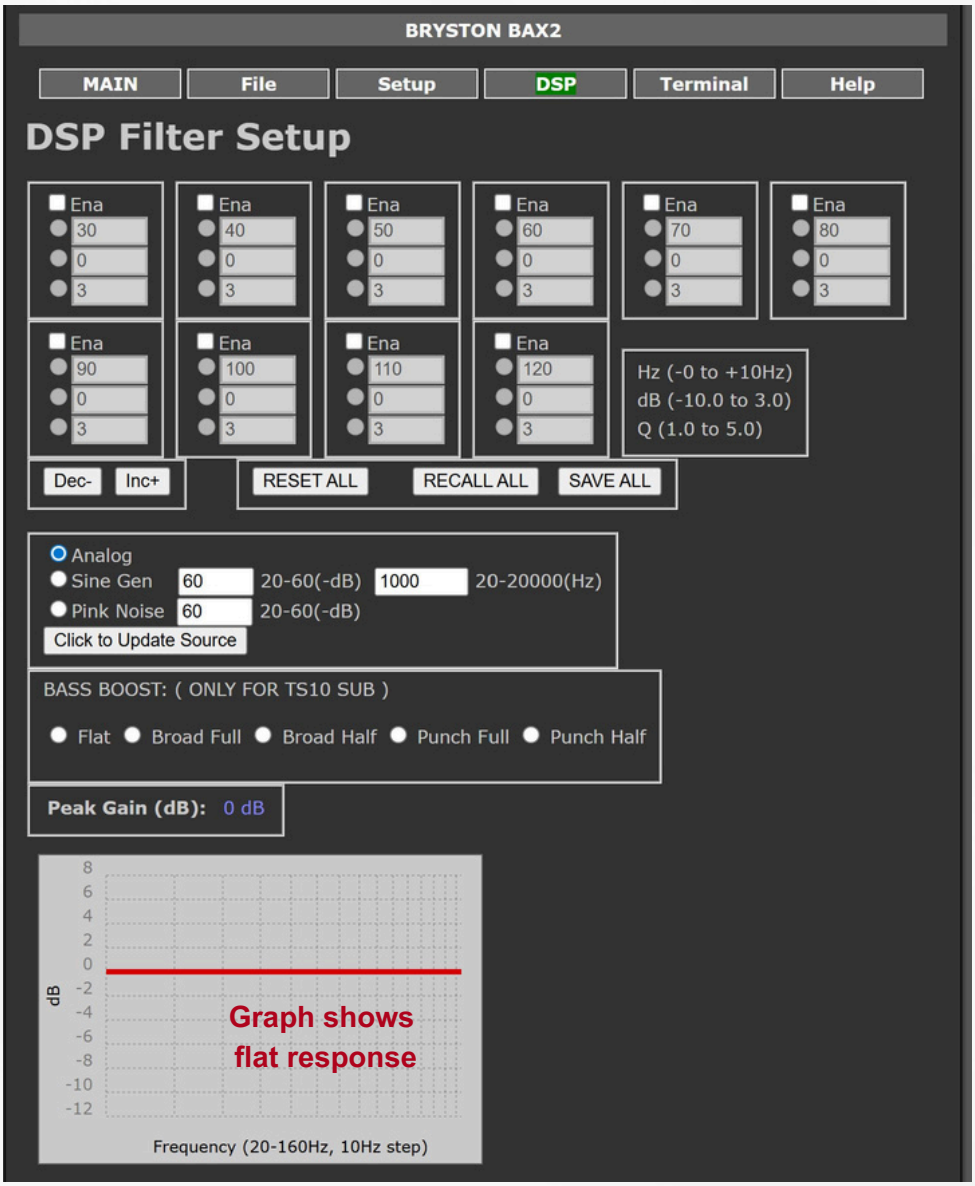
**The result of your applied filters is indicated in graphical form below - page 10.**

# BASS ADJUSTMENT & ROOM TUNING

**The BAX-2 permits some degree of loudspeaker tuning below approximately 150Hz. Many competing systems provide full bandwidth adjustments, or attempt to automatically tune loudspeaker response based on measurements taken by a microphone. Bryston certainly advocates tuning loudspeaker performance based on measurements, but electrically altering loudspeaker response (EQ) is a last step, not a first step.**

**DSP application is most certainly not a replacement for proper loudspeaker placement, well informed gear choices, proper room construction and wise room treatment. In other words, take care to choose upstream equipment and cables wisely, and position your speakers carefully in the room before attempting corrections with the BAX-2. It is for this reason we limit the adjustment window to 3dB per band increase and 10dB decrease and only at very low frequencies.**

**Further, 'narrow bandwidth' anomalies are less audible than 'wide bandwidth' anomalies. Your focus should be on correcting 'broadband' deviations from zero before attempting to correct narrow band issues.**



# CONTROLS


## FRONT PANEL

### 1. Power Button

**Press this button to toggle the BAX-2 on or into standby mode. Unlit BAX-2 is not receiving power. Plug unit into AC mains power. Red Plugged into AC Mains but in standby mode. Green or Blue BAX-2 is on and operational. Blinking Red Secondary power supply failure. Contact Bryston technical support.**

### 2. Audio Channel Indicators

**The left and right channels both feature LEDs which indicate the incoming audio status of each channel. Unlit BAX-2 is not receiving audio to the indicated channel Green or Blue BAX-2 is receiving audio at the indicated channel Blinking Orange Audio received is too loud to be processed without distortion. Reduce preamplifier volume.**

### 6. Status LED

**LED lights to indicate the following status: Red (Standby), Green (On), Amber (Starting up), Blinking Amber (Updating firmware), Blue (Self programing / Do not power off)**

## REAR PANEL

### 3. Channel Input Output

**The BAX-2 includes Left and Right channel input and output. Analog audio is received through a balanced audio interconnect from a stereo preamplifier to the left and right channel inputs respectively. The internal DSP divides and processes that signal into 3 bands - low, mid and high to drive the bass, midrange, and high frequency amplifier channels respectively. Preamplifiers and amplifiers that do not feature balanced audio connections can be connected to the BAX-2 by using commonly available XLR to RCA adapters. The tip is +12V and sleeve is GND. When the BAX-2 is powered on either by actuating the front power button or through the trigger input, voltage is applied to the trigger outputs.**

### 4. RS-232 Input

**The BAX-1 can be controlled via two-way RS232 using a connector terminated by a 3.5mm TRS ‘stereo mini plug’. Terminate the plug as follows: Tip: Transmit Ring: Receive Sleeve: Ground**

# CONTROLS


### 5. USB Control Input

**USB is provided for diagnostic information by Bryston technicians.**

### 7. Ethernet Input

**Ethernet connectivity is provided for user access to a web based interface which is useful for firmware updates and control over the internal DSP. Discrete commands can also be sent by custom integration systems.**

### 8. Trigger Input Power/Standby

**Can be toggled from a master component such as a preamp using this input. The connector is a standard 3.5mm tip sleeve commonly referred to as a "mono mini plug". Signal should be AC or DC between 3 and 12 volts. When voltage is present at the tip, the BAX-2 will remain powered on. The BAX-2 powers off when voltage is removed.**

### 9. IEC Power Inlet:

**The IEC-320 C14 power inlet accepts IEC-320 C13 equipped power cords such as the unit provided. Use only appropriate power cords that have been approved for your region.**

BAX-2

# ACTIVE SPEAKER MODELS

**THE BRYSTON BAX-2 CAN BE USED WITH ANY OF THESE BRYSTON ACTIVE SPEAKERS**

- Model T10 Active no Model TS10
- Model T10 Passive with Model TS10
- Model T10 Active with Model TS10
- Middle T10 Active no Middle/Trim TS10
- Middle T10 Passive with Middle/Trim TS10
- Middle T10 Active with Middle/Trim TS10
- Trim T10 Active no Middle/Trim TS10
- Trim T10 Passive with Middle/Trim TS10
- Trim T10 Active with Middle/Trim TS10
- Mini T10 Active
- Compact T10 Active
- Tiny T10 Active
- Model TC10 Active
- Middle/Trim TC10 Active
- Compact TC10 Active
- Tiny TC10 Active