

Divina™

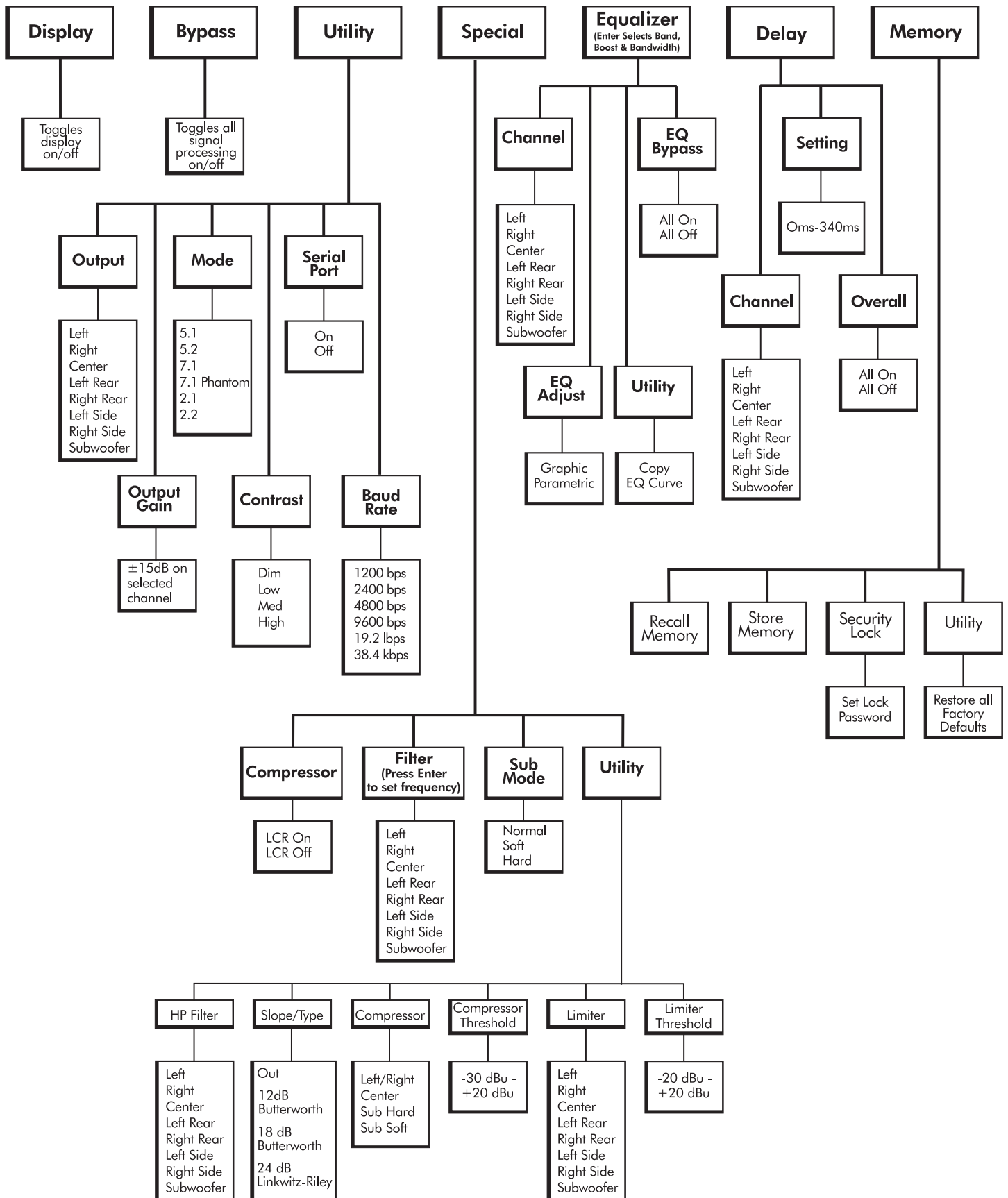
Digital Audio Enhancement System

*For those who consider
perfection is possible_{SM}*

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AudioControl®

22410 70th Avenue West • Mountlake Terrace, WA 98043
Phone 425-775-8461 • Fax 425-778-3166
www.audiocontrol.com



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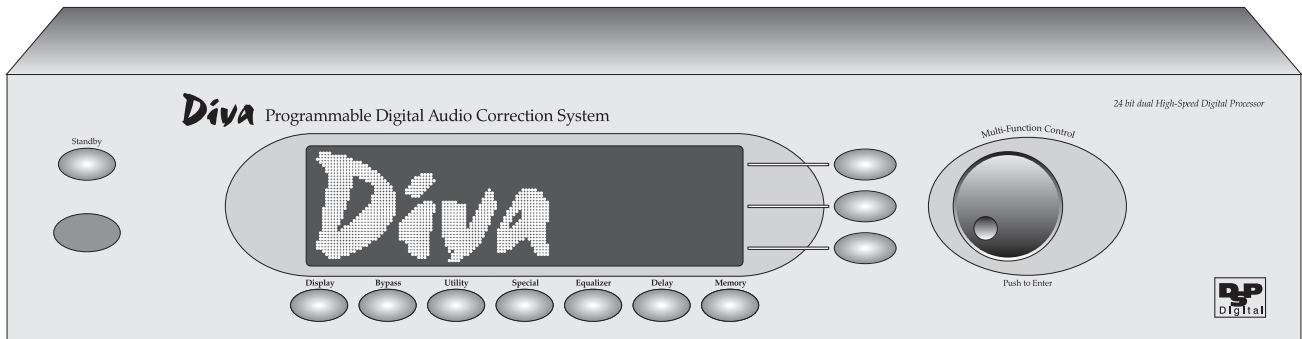
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Diva™ is a complete eight channel home theatre digital audio enhancement system. This powerful 24 bit digital workhorse contains Equalization, Digital Speaker Delays, and Dynamics Processing for up to eight channels. The fully programmable interface and multiple configuration scenes make Diva a natural to integrate with automation systems, even those with touch screens. Diva provides the ultimate in audio correction capabilities for your ultimate home theatre.

Great attention to system design and installation makes the difference between an average multiplex theatre and a great movie palace. In spite of all the engineering involved in creating a good sounding room, commercial movie theaters have racks full of electronics to perfect their sound. The Diva eight channel digital audio enhancement system provides an entire array of sound processing tools to improve the total sound of an entire theater installation.

This new digital audio enhancement system is made by the only consumer electronics company in the world that specializes in equalizers, signal processors and audio analyzers. AudioControl's passion for high quality, meticulous attention to detail and pro sound heritage shows itself in the dozens of awards we have won for our designs, products and service.

This manual is designed to help you get the most from Diva. So, even though you're dying to plug it in and start pushing buttons, please take thirty minutes or so to glance over this tome and learn about the Diva digital audio enhancement system. Any component that does as much as Diva does deserves all the explanation it can get.

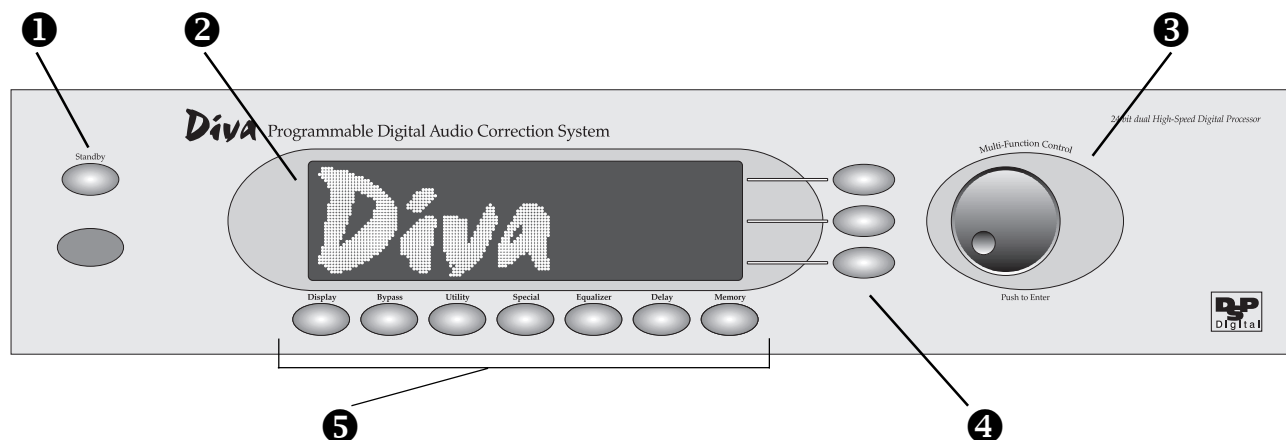
THE MOST IMPORTANT INSTRUCTION OF ALL...

Make certain the warranty card is filled out and mailed back us. Also, record the serial number and put the sales receipt in a safe place. This is very important in the unlikely event that Diva gets a sudden illness, or for proof of ownership if somebody takes a fancy to your theater system in the middle of the night. Insurance companies have no imagination when it comes to components like the Diva being part of the theater system. This concludes the nagging section of this manual.



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v



Front panel highlights

1 Standby switch (also known as the power button) - Hopefully, this switch is pretty self-explanatory. Pressing this button toggles Diva on and off. The button is illuminated when Diva is in the stand-by mode (off).

2 Bright Graphical VF Display - This screen is a bright, blue window onto the functions of Diva. The graphical format of this display makes it easy to see the frequency response curves of the equalizers or visually track the delay settings. If you want to suppress this fluorescent masterpiece, simply press the Display button.

3 Multi-function Control Knob - This knob allows easy access to the various menu functions. Rotating the multi-function knob varies the menu options, while press the knob functions as the enter key to move between selecting menu items and adjust parameters.

4 Menu Soft-keys - These buttons are used in conjunction with the graphical display to select various menu items. The function of these buttons varies depending on the menu screen.

5 Main Function Buttons

Display - Selects the main display between normal level meter operation, the Diva logo screen, and completely off for those who don't appreciate a good light show.

Bypass - Bypasses all signal processing.

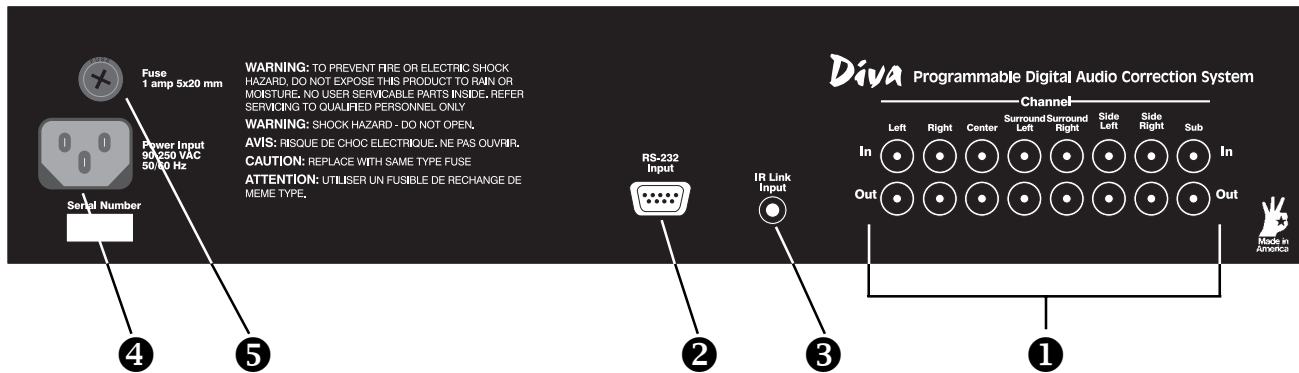
Utility - Activates the secondary function for the currently active screen.

Special - Allows control of the compressor/limiter and filter functions.


Equalizer - The graphic and parametric equalization functions are here.

Delay - Sets the digital delays for each channel and the overall time alignment.

Memory - Diva allows storing all of the operating parameters into memory scenes. The 20 different scenes are accessed here. The front panel security lock function is also located on this menu.

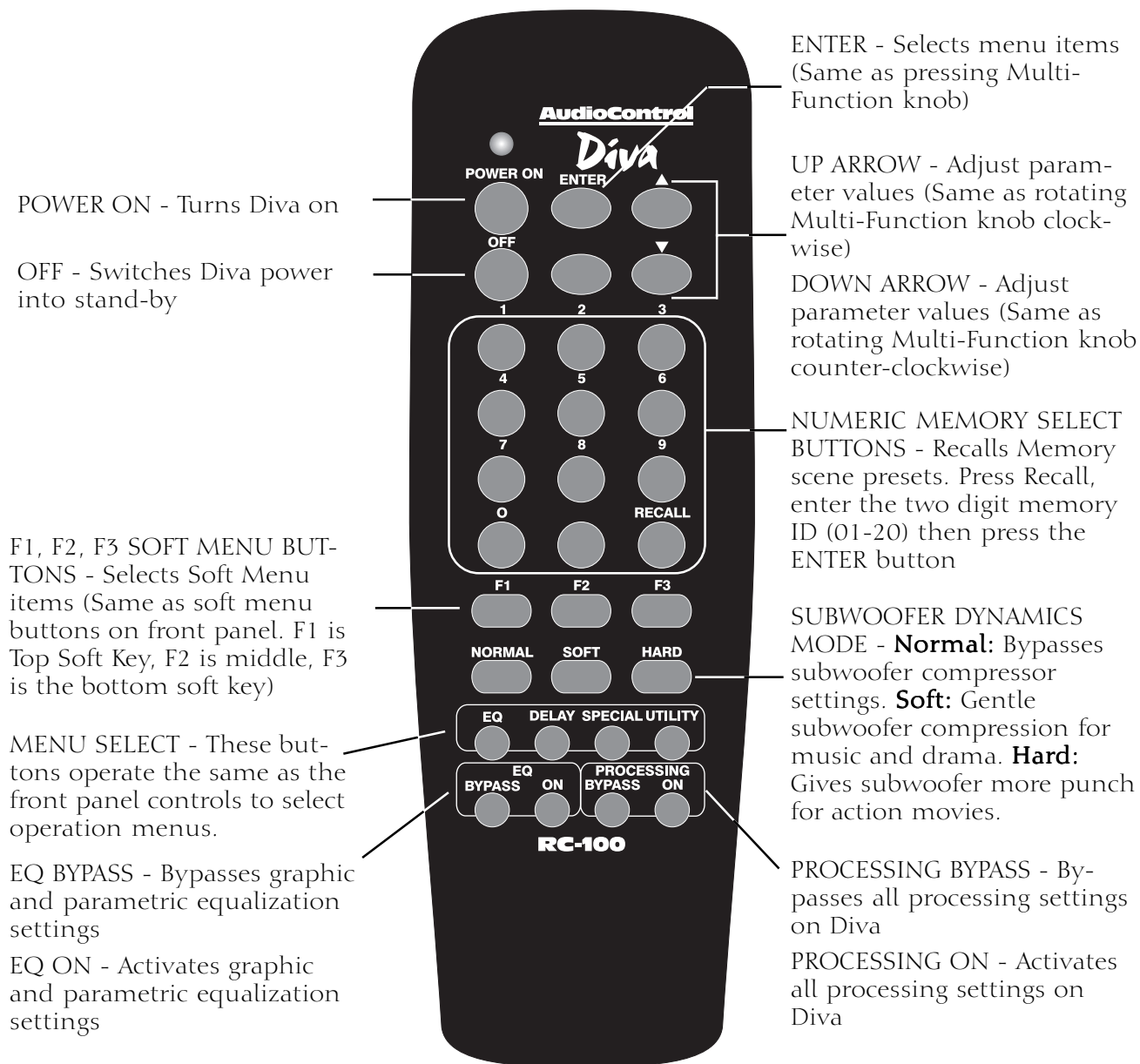


Rear panel highlights

- ❶ **RCA Audio Connections** - Diva is a digital audio processor, but it connects to the outside world in analog. These jacks connect the analog output of the surround processor/preamp to the analog inputs of the power amplifiers.
 - ❷ **RS-232 Serial Control** - This DB-9 connector links Diva to the RS-232 serial output of an automation or touch-screen system.
 - ❸ **External IR Control Link** - Diva provides an internal IR flasher for control by an IR repeater system. The 1/8" minijack connects to an internal IR LED and is connected to any IR system the same way you would use a normal IR Flasher.
 - ❹ **Power connector and cord** - This is a standard IEC-type power cord connection. Diva features a universal input power supply design, so Diva can be used with any AC line voltage from 90 volts to 250 volts without changing any switches or transformer settings.
-  **Note** - Do not plug Diva into a switched outlet.
- ❺ **Power fuse** - This is the main AC power fuse for Diva. It is a standard 5mm size.

Remote Control

Diva's infrared remote control features discrete commands for many of the primary functions. This helps to minimize command confusion when interfacing Diva with an IR learning control system.



FEATURES

Dual Motorola 56303 24 Bit DSP Digital Audio Processors

Powerful DSP audio processors provide Diva with over 160 Million Instructions per Second (MIPS) of 24 Bit audio processing. Coupled with the highest quality 24 bit digital to analog converters, Diva gives you the highest performance possible and a superior audiophile sound quality.

Eight Channels of Sound Processing

Up to Eight analog audio channels can be routed through Diva. All current analog and digital surround formats are compatible with Diva, including those with extra side channels.

Fully Compatible With Dolby Digital[®] and DTS[®] Surround Formats

The multi-channel digital signal processing in Diva is compatible with any surround format up to eight channels. This means Diva works with all of today's formats and is future protected for tomorrow's formats.

High Resolution Digital Delays

Eight independent 24 bit digital delays allow up to 340 milliseconds of speaker alignment with 10 microsecond (1/8") accuracy. You get clearer imaging and more solid bass reproduction from every installation. Diva also provides total source delay to ensure that the audio signal is always in sync with the video image.

Multiple Configurations For Different Surround Modes and Sources

Having complete control of the theatre's sound is great, but not every source (or movie for that matter) needs the same adjustment. Diva has multiple scene memories for different configuration settings. These scenes contain all of the adjustable parameters within Diva including channel configurations, equalization adjustments, speaker delay timing, and sound dynamics control. You can even create different settings for musicals versus action flicks.

Large Bright VFD Graphical Display

Even with all of this power, Diva is simple to use. The user is guided through simple on-screen menus to setup all of the functions. There is direct one-button access to the primary functions to further simplify operation.

Comprehensive System Equalization

Simultaneous parametric and fixed graphic, constant-Q equalizers are combined to give Diva the ultimate in frequency response control. Every channel features independent graphic equalization control along with 2 bands of parametric equalization adjustable anywhere from 20 Hz to 20,000 Hz. With this level of control you can handle even the most demanding surround installations.

Digital Sound Dynamics Control

An item often overlooked in many audio installations is a compressor/limiter. With this processor you can bring more life into older soundtracks, tame down overly dynamic soundtracks for late-night listening, and make certain that the subwoofer won't jump out of its enclosure when the train crashes. You get better sound, a stronger performance and a longer lasting system.

Easy Automation Integration

A built-in RS-232 serial port allows complete control over all of Diva's functions. This makes it simple to integrate into a theatre automation system. You can automatically recall the perfect equalization, time delays and dynamics settings for each video source or surround mode. The scene memories in Diva make this task even simpler since you only have to recall your desired adjustments from memory.

Non-volatile User Scene Memories

To make the Diva easy to use, all of the channel configurations, equalizer settings, delay timings and other parameters are stored together in easy to use scene memories. These configurations and user scene memories are stored in non-volatile flash memory. This means that all of your settings within Diva are safe through all kinds of power outages (both natural and man-made) and there is never any need to worry about replacing a backup battery.

Award-Winning Quality

A product of AudioControl - an award winning manufacturer of high-quality audio components since 1977. Backed up by a comprehensive Five-year warranty.

Features

SETTING THE STAGE - HOOKING UP THE DIVA DIGITAL AUDIO ENHANCEMENT SYSTEM

Placement

The Diva can be placed almost anywhere in your audio equipment stack although the wiring runs will be the shortest if it is near the surround decoder. Make certain not to block the ventilation slots on any other component. Also, avoid placing Diva directly over a large power amplifier. These amps can get pretty hot and have big power transformers that can induce hum into other audio components like Diva.

Power

Like many of today's intelligent home electronics, Diva should be plugged into an unswitched AC outlet so that it always has power. This allows the RS-232 and remote control features to work even when Diva is in standby. It is also a good idea to use a high quality surge protection device to keep all of your electronics safe from the evils of public power systems.

Connection Tips

If you're an electronics veteran, this part may seem repetitive, but some things can never be repeated too many times (just ask our Customer Support Department)!

- Don't stand in a bucket of water
- Turn off all components before making any connections.
- When making connections, make sure that "left goes to left" and "right goes to right." The obvious and time-honored way to assure this is to assign RED plugs to Right and WHITE/GREY/BLACK plugs to the left (yellow is usually used for video cables).
- Wherever possible, keep power cords away from signal cables (i.e., inputs from disk players, VCRs, etc.) to prevent induced hum. Notice that we have placed Diva's power cord on the opposite side from the audio jacks. This helps you bundle all power cords down one side of your equipment cabinet and all the signal cables down the other.
- Use high quality interconnect cables. We're not going to get into the debate about whether \$100 per meter interconnects improve the sound and picture quality of your system. We do know from experience however that really, REALLY cheap connections can cause problems. They tend to corrode, oxidize, and disconnect inside; causing a hum or loss of signal. This not only degrades the sound quality, but it will also lead to call-backs to repair the system later.

Diva Reference Card

Basic Setup

This reference is designed to help you get most from the Diva Digital Audio Enhancement System. The basic order of setup with Diva is:

1. Set the channel mode (Utility Menu)
2. Set the channel filters (Special Menu)
3. Adjust the channel delay times (Delay Menu)
4. Adjust the Graphic Equalization (Equalizer Menu)
5. Adjust the Parametric Equalization (Equalizer Menu)
6. Adjust the Compressor/Limiter settings (Special Menu)
7. Store the setting parameters into a memory scene (Memory Menu)

Note: You can overwrite any of the default memories with your new settings.

Default Memory Configurations

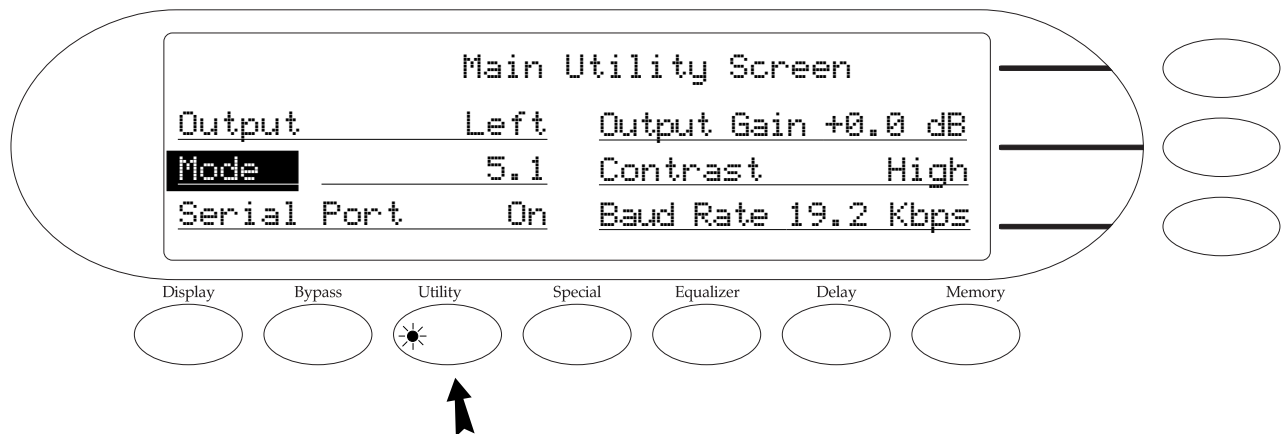
The default memories speed installation of the Diva by quickly getting the Channel Mode, Equalization, Delays and Dynamics parameters set up for your system. To begin, select the memory that best fits your application and then use these base adjustments to fine tune the theatre.

Memory	Description
1. 51SDRAMA	5.1 Channel Mode, Small Main Speakers, Drama Movies
2. 51SACTIO	5.1 Channel Mode, Small Main Speakers, Action Movies
3. 51SMUSIC	5.1 Channel Mode, Small Main Speakers, Musical Movies
4. 51LDRAMA	5.1 Channel Mode, Large Main Speakers, Drama Movies
5. 51LACTIO	5.1 Channel Mode, Large Main Speakers, Action Movies
6. 51LMUSIC	5.1 Channel Mode, Large Main Speakers, Musical Movies
7. 71SDRAMA	7.1 Channel Mode, Small Main Speakers, Drama Movies
8. 71SACTIO	7.1 Channel Mode, Small Main Speakers, Action Movies
9. 71SMUSIC	7.1 Channel Mode, Small Main Speakers, Musical Movies
10. 71LDRAMA	7.1 Channel Mode, Large Main Speakers, Drama Movies
11. 71LACTIO	7.1 Channel Mode, Large Main Speakers, Action Movies
12. 71LMUSIC	7.1 Channel Mode, Large Main Speakers, Musical Movies
13. 2.1ROCK	2.1 Channel Mode, Rock Music
14. 2.1CLASS	2.1 Channel Mode, Classical Music
15. 2.1JAZZ	2.1 Channel Mode, Jazz Music
16. 2.2ROCK	2.2 Channel Mode, Rock Music
17. 2.2CLASS	2.2 Channel Mode, Classical Music
18. 2.2JAZZ	2.2 Channel Mode, Jazz Music

DOING THE DEED

Configuring Diva for you system

The first thing you need to determine before beginning to set up Diva is your system's channel configuration. That is, the number of channels and how they are arranged. You can have different configurations for each scene memory in Diva, but typically you will have the same channel configuration for most of your listening scenes.

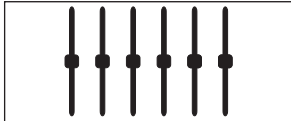


The following pages explain the differences between Diva's operating modes. See page 4-1 for a table showing the equalizer bands in each of the operating modes.

Block Diagram Modules

There are several 24 bit digital signal processing modules within Diva for each channel. Here is a brief description about each of these modules along with their adjustment ranges and default settings. Each of the eight channels in Diva have independent adjustments for each of these sound processing modules.

Graphic Equalizer



Equalizers are basically refined tone controls. They allow the user to increase or decrease the signal level at various frequency points. These fixed frequency center controls simplify the task of smoothing out a rough frequency response by having the filter frequencies and bandwidths preset. The only adjustment available to the user is the boost/cut gain of each frequency band. These bands are generally set on standard spacings (Octave, $\frac{2}{3}$ octave, and $\frac{1}{3}$ octave), although more specialized equalizer bands can be used for specific applications (like surround and fill speakers). The total number of graphic equalizer bands and the frequency centers vary in Diva depending upon the configuration mode chosen. Most of the eq control is focused on the critical LCR channels and subwoofer frequencies.

The parameter settings for the graphic equalizer in Diva are:

All channels/Modes: Gain Range +6dB, -15dB (default 0 dB)

Number of bands / Bandwidth

LCR channels

2.1 and 2.2 modes - 30 bands One-third-octave

5.1 mode - 28 bands One-third-octave

5.2, 7.1, 7.1 Phantom modes - 15 bands Two-third-octave

Subwoofer channels

All modes - 8 bands One-sixth-octave plus 2 bands One-third-octave

Fill channels

2.1 and 2.2 modes - Not applicable

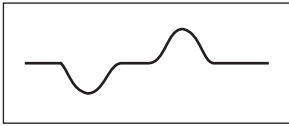
5.1, 5.2, 7.1, 7.1 Phantom modes - 6 bands Custom-contoured

Side channels

2.1, 2.2, 5.1 and 5.2 modes - Not applicable

7.1 and 7.1 Phantom modes - 6 bands Custom-contoured

Parametric Equalizer



Parametric equalization is similar to graphic, but allows more subtle tweaking to smooth out your sonic painting or make very accurate cuts for notch filtering. Since you have control over the center frequency, boost/cut amplitude and bandwidth (in octaves) it is possible to adjust specific frequency bands in the room. Each channel in Diva features two parametric equalizer bands in addition to the graphic eq control. The parameter settings for the parametric equalizer in Diva are:

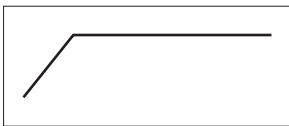
Band 1

Gain Range: +6dB, -15dB (default 0 dB)
 Frequency Center: 20Hz - 20kHz (default 60 Hz)
 Bandwidth: 0.05 - 3.00 Octave (default 1.00 Octave)

Band 2

Gain: +6dB, -15dB (default 0 dB)
 Frequency Center: 20Hz - 20kHz (default 1 kHz)
 Bandwidth: 0.05 - 3.00 Octave (default 1.00 Octave)

Filters



Even though the speaker manufacturers specify their designs to operate from 20Hz to 20,000Hz, few speakers are truly happy reproducing that entire range. The lower bass frequencies are especially troublesome for most speakers. There are two types of filters in Diva: Highpass - which cuts off frequencies below a specified point and Lowpass - which cuts off frequencies above the set frequency. By limiting the frequency range sent to a particular speaker, you can increase the overall performance and reduce the chance of damage to a speaker at higher volumes. The power amplifiers will also operate cooler by not trying to reproduce the extended bass frequencies.

The parameter settings for the filters in Diva are:

Highpass filters: (default 35 Hz, 24dB/Octave, Linkwitz-Riley alignment)

Cutoff frequency - 20 Hz- 1 kHz

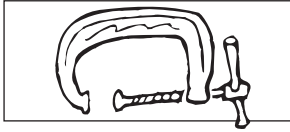
Filter - 12dB/oct Butterworth, 18dB/oct Butterworth, 24dB/oct Linkwitz-Riley

Lowpass filters (2 channel mode subwoofers): (default 90Hz, 24dB/Octave, Linkwitz-Riley alignment)

Cutoff frequency - 20 Hz- 1 kHz

Filter - 12dB/oct Butterworth, 18dB/oct Butterworth, 24dB/oct Linkwitz-Riley

Compressor



A compressor is an audio processing circuit that compresses the dynamic range of an audio signal. The loud peaks are made quieter and the quiet passages are made louder. In this digital age, where ever-increasing dynamic range seems to the Holy Grail, it may seem that a compressor is the last item that you would want to add to the signal path. Actually, a judicious application of dynamics compression can make your system sound louder and hit harder. The compressor design in Diva features a Progressive Knee so the compression ratio is applied more gently near the threshold to create a more musical sounding result. Compressors have five adjustment parameters (although typically you only need to worry about the Threshold setting): Threshold - The signal level the compressor kicks in at. Ratio - Adjusts how much compression is applied to the signal (i.e. a 2.0:1 ratio equals 2 dB Input for 1 dB Output). Gain - This is an adjustment of make-up gain to compensate for the difference between the compressed output signal and a direct bypass. Attack Time - How quickly the compressor reacts to a signal over the threshold voltage. Release Time - How long after the signal has dropped below the threshold does the compressor returns the signal to full dynamic range.

The parameter settings for the compressor in Diva are:

LCR Channels

Threshold: -30 dBu - +20 dBu (default -17 dBu)

Ratio: 1-20:1 (default 3.0:1)

Gain: -20 dB - +8dB (default 0 dB)

Attack: 0.05 mS - 200 mS (default 0.2 mS)

Release: 5 mS - 2 Sec (default 5.0 mS)

Subwoofer - Soft Mode

Threshold: -30 dBu - +20 dBu (default -20dBu)

Ratio: 1-20:1 (default 2.0:1)

Gain: -20 dB - +8dB (default +2 dB)

Attack: 0.05 mS - 200 mS (default 5 mS)

Release: 5 mS - 2 Sec (default 250 mS)

Subwoofer - Hard Mode

Threshold: -30 dBu - +20 dBu (default -15 dBu)

Ratio: 1-20:1 (default 4.0:1)

Gain: -20 dB - +8dB (default +5 dB)

Attack: 0.05 mS - 200 mS (default 0.05 mS)

Release: 5 mS - 2 Sec (default 10 mS)

Limiter



A limiter is a circuit that which limits the maximum level of an audio signal when it reaches a specified threshold. Limiters help prevent speaker damage by preventing too much signal from being fed into the amplifiers. There are two main methods of killing speakers: Excessive cone excursion - The speaker cone tries to move further than it is capable of to reproduce the audio signal. This can result in anything from the voice coil hitting the bottom of the magnet and denting to actually tearing the surround or support spider material. Neither of which sounds very good, and...Driver overheating - When you operate a speaker, the voice coil heats up. Feeding too much power into a speaker causes the heat to build up faster than the voice coil can dissipate and the speaker burns up. In a subwoofer, the voice coil wire is large enough it can take several minutes of overheating before it complains. The wire in a tweeter however is so small that it can burn out in less than a second when you overdrive it. Limiters have three parameters to adjust: Threshold - The signal level the limiter kicks in at. Attack Time - How quickly the limiter reacts to a signal over the threshold voltage. Release Time - How long after the signal has dropped below the threshold does the limiter returns the system to full gain.

The parameter settings for the limiters in Diva are:

Threshold: -20 dBu - +20 dBu (default 0dBu)

Attack Time: 0.02 mS - 200 mS (default 10 mS)

Release Time: 1 mS - 1 Sec (default 1 mS)

Digital Delay



Delays can be used to create the illusion of a larger room by increasing the amount of time delay between the front speakers and rear speakers in a surround sound system. They can also be used with more subtle adjustments to improve the imaging of a speaker system by aligning the acoustic sound output of the LCR and subwoofer channels. With an alignment precision of 1/8", speakers can be brought into perfect alignment. Another function of the delay is to synchronize the audio and video portions of the system. This overall global delay is applied equally to every channel in the system.

The parameter settings for the delay in Diva are:

Individual channel delay: 0 mS - 340 mS (default 0.00 mS)

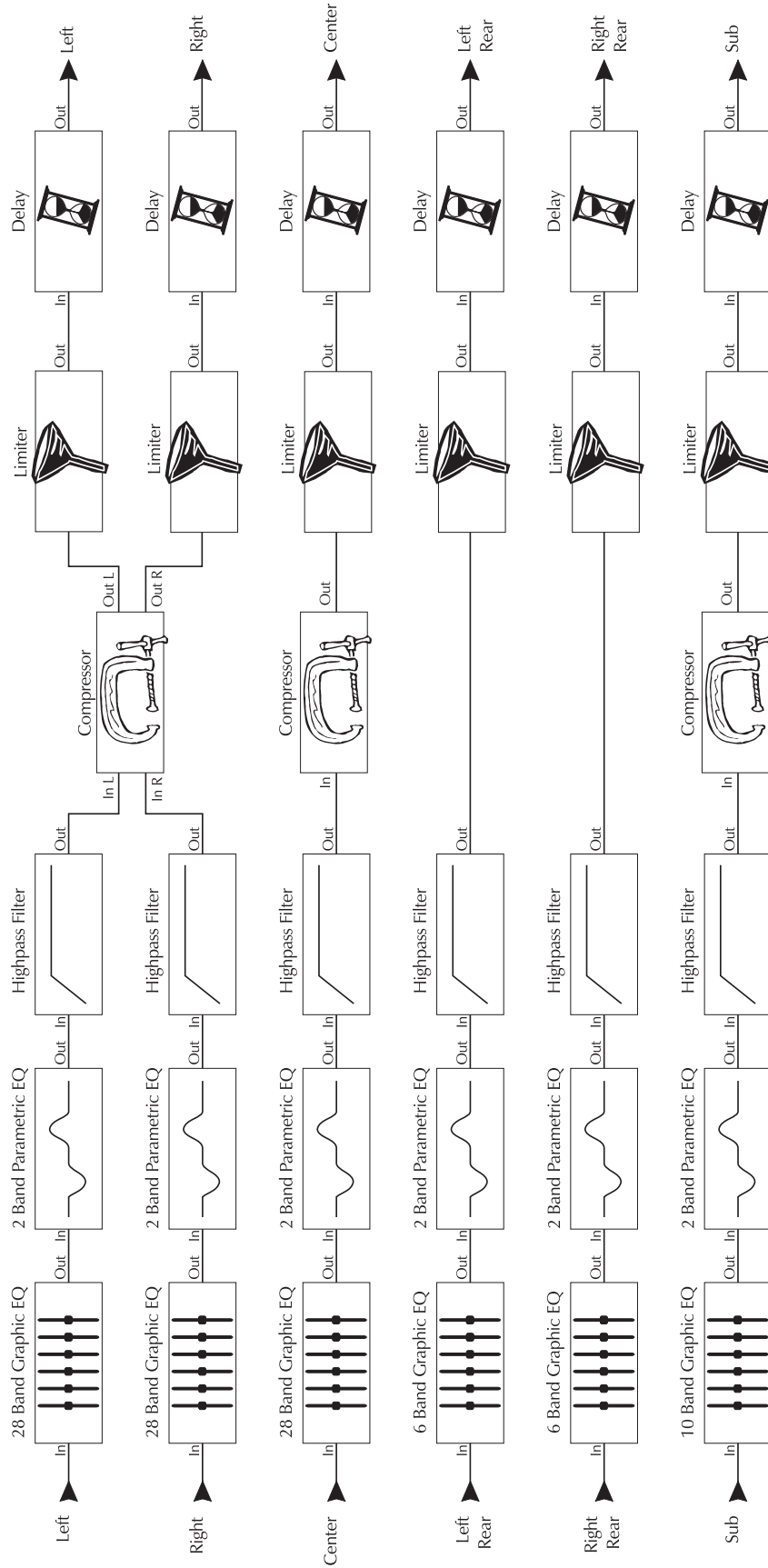
Overall alignment delay: 0 mS - 340 mS (default 0.00 mS)

5.1 Channel Mode

The 5.1 configuration is designed for standard 6 channel AC-3, Dolby Digital, DTS and other surround formats using left, center, right, rear left, rear right and a mono bass channel. This mode features:

- 2 Band Parametric equalization on all channels
- 28 Band one-third-octave graphic equalization on the LCR channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- 6 Band custom-contoured graphic equalization on the rear channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope high-pass filters on all channels
- Dynamic Compression on LCR and Subwoofer channels
- Level Limiter on all channels
- Output gain control on all channels

5.1 Channel Mode

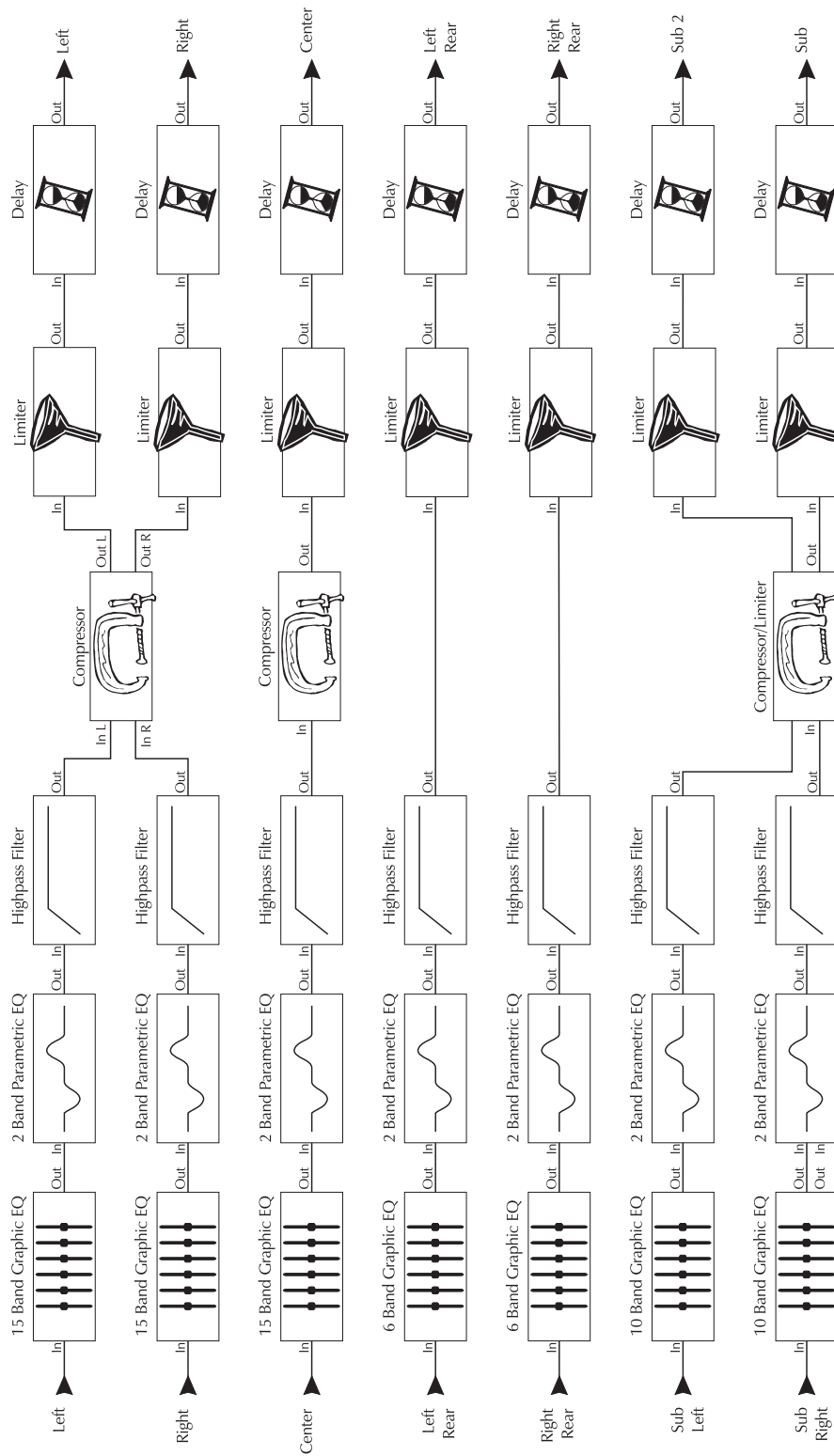


5.2 Channel Mode

The 5.2 mode adds the capability for a stereo subwoofer to the 5.1 mode. This mode features:

- 2 Band Parametric equalization on all channels
- 15 Band two-third-octave graphic equalization on the LCR channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- 6 Band custom-contoured graphic equalization on the rear channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope high-pass filters on all channels
- Dynamic Compression on LCR and Subwoofer channels
- Level Limiter on all channels
- Output gain control on all channels

5.2 Channel Mode

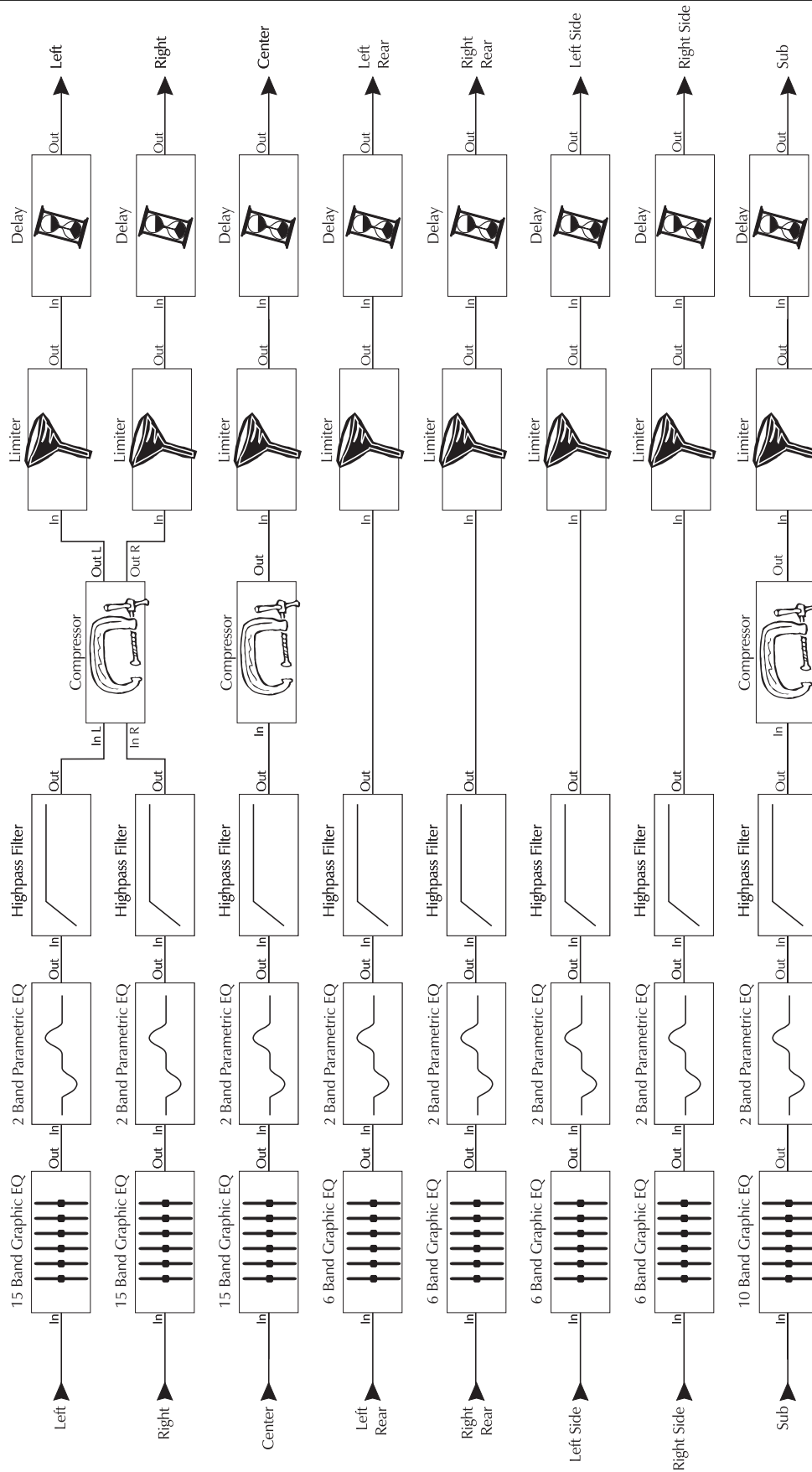


7.1 Channel Mode

The 7.1 format adds room correction for the side fill channels but it has fewer equalizer bands than the 5.1 configuration. This mode features:

- 2 Band Parametric equalization on all channels
- 15 Band two-third-octave graphic equalization on the LCR channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- 6 Band custom-contoured graphic equalization on the side and rear channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope high-pass filters on all channels
- Dynamic Compression on LCR and Subwoofer channels
- * Level Limiter on all channels
- * Output gain control on all channels

7.1 Channel Mode

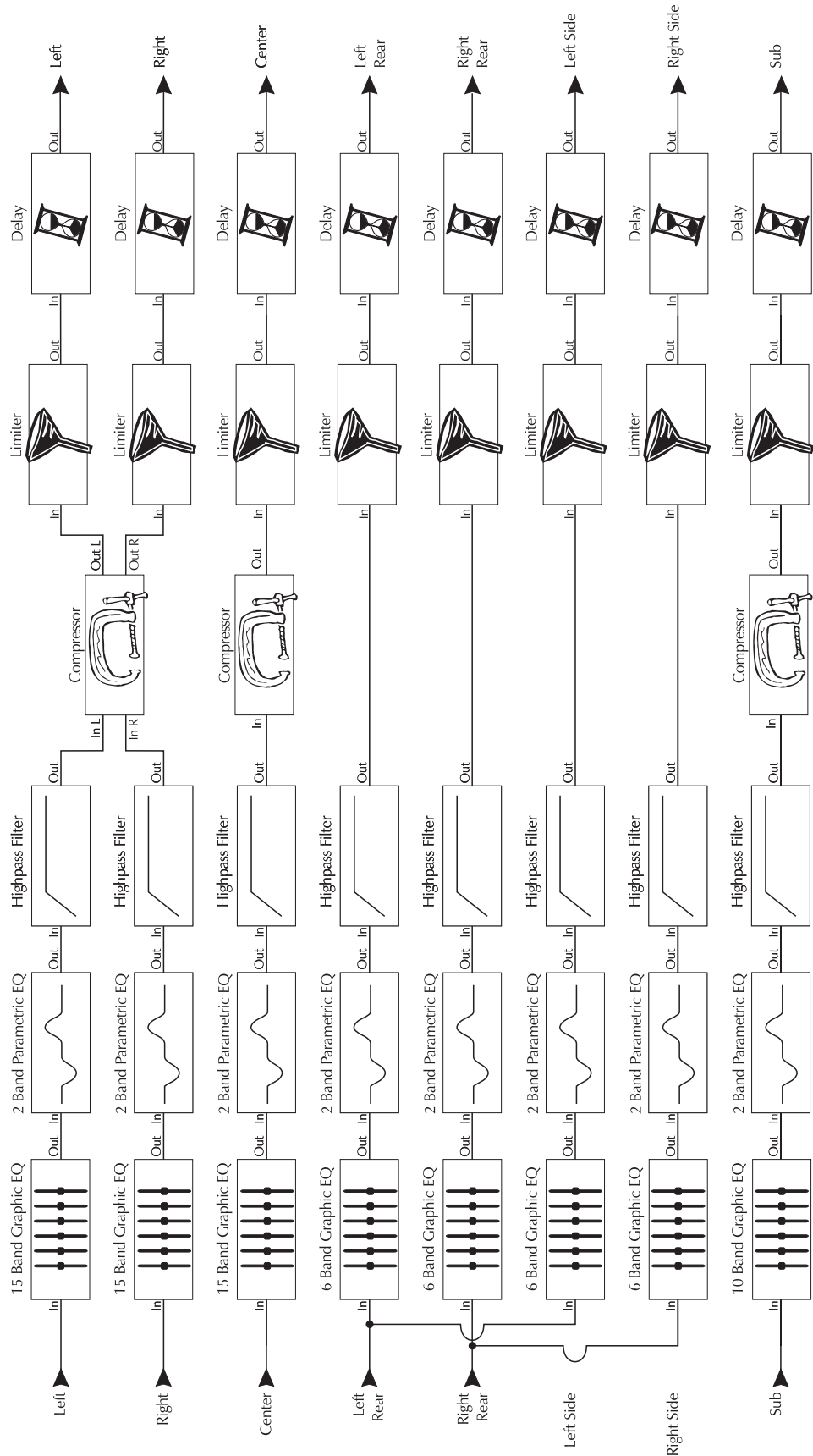


7.1 Phantom Side Fill Mode

In a larger room, it is difficult to keep good surround imaging for all of the seats. One of the ways to overcome this problem is with the addition of side fill channels. Not all surround decoders have this capability. Diva allows you to create these extra channels to ensure that everyone in the house hears the sound as it was meant to be. This mode features:

- 2 Band Parametric equalization on all channels
- 15 Band two-third-octave graphic equalization on the LCR channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- 6 Band custom-contoured graphic equalization on the side and rear channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope high-pass filters on all channels
- Dynamic Compression on LCR and Subwoofer channels
- Level Limiter on all channels
- Phantom side channel outputs
- Output gain control on all channels

7.1 Phantom Side Channel Mode

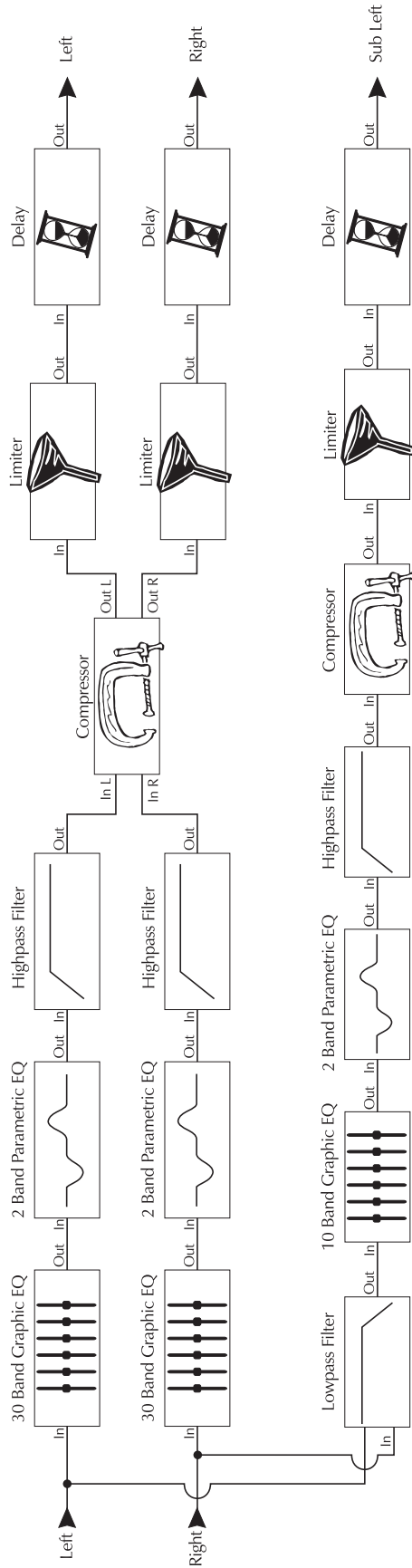


2.1 Channel Music Mode

Diva contains two special modes designed for stereo (two channel) music listening. The 2.1 mode has Left, Right and mono subwoofer. This mode features:

- 2 Band Parametric equalization on all channels
- 30 Band one-third-octave graphic equalization on the Left and Right channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope crossover on the subwoofer channel
- Variable slope high-pass filters on all channels
- Dynamic Compression on all channels
- Level Limiter on all channels
- Output gain control on all channels

2.1 Channel Mode

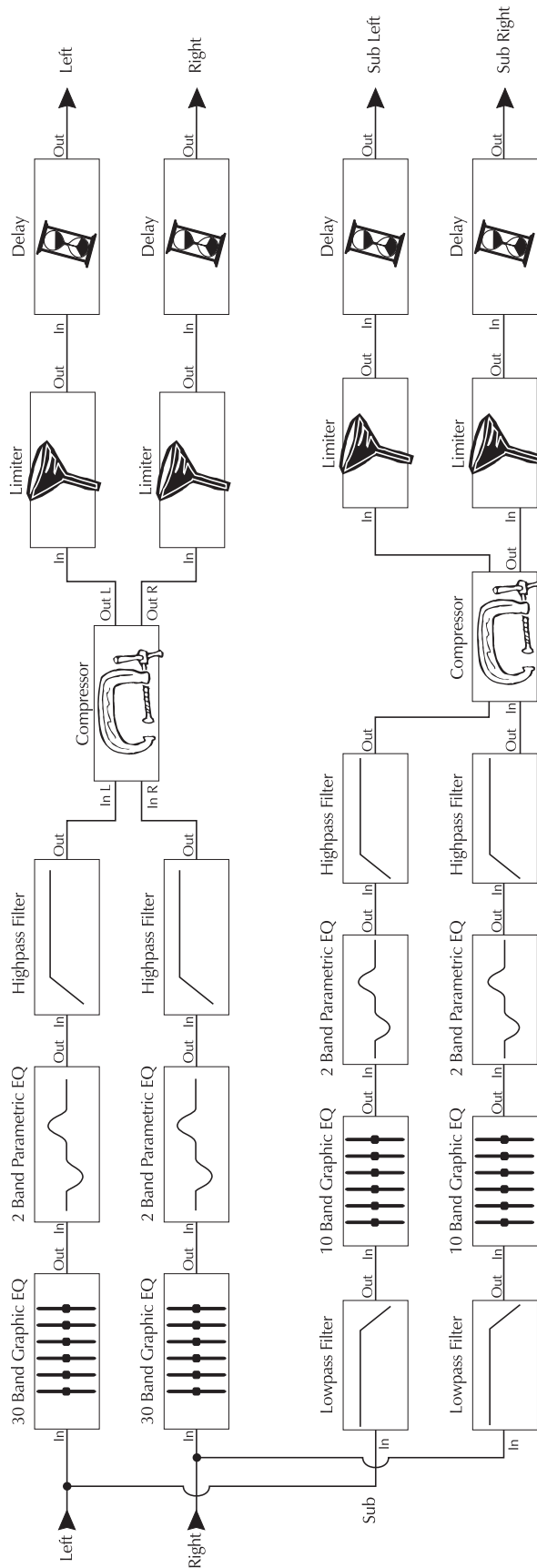


2.2 Channel Music Mode

The 2.2 configuration adds stereo subwoofer capability to the 2.1 mode. This mode features:

- 2 Band Parametric equalization on all channels
- 30 Band one-third-octave graphic equalization on the Left and Right channels
- 8 Band one-sixth-octave & 2 band one-third-octave graphic equalization on the subwoofer channels
- Independent 24 Bit digital audio delays on all channels
- Variable slope electronic crossover on the subwoofer channels
- Variable slope high-pass filters on all channels
- Dynamic Compression on all channels
- Level Limiter on all channels
- Output gain control on all channels

2.2 Channel Mode



Adjusting Your Equalization

An important fact to remember when equalizing a system is that the human ear is much more sensitive to abrupt changes in frequency response than to the overall curve. Your ear is also more sensitive to having too much of something than too little. With this in mind, try and make most of your EQ changes by cutting frequencies, rather than boosting them. Through much experience, acoustic experts have determined a “curve” that is tipped with the bass (low frequency) end up is much more desirable for sound reproduction. It’s sometimes referred to as a “House Curve”, a term that comes from the fact that adjusting sound systems in theaters and auditoriums to achieve the most “listenable” sound tends to produce curves like this with the bass boosted and the higher frequencies significantly reduced. This is also the idea behind the Lucasfilm Re-Equalization circuit in THX certified surround decoders.

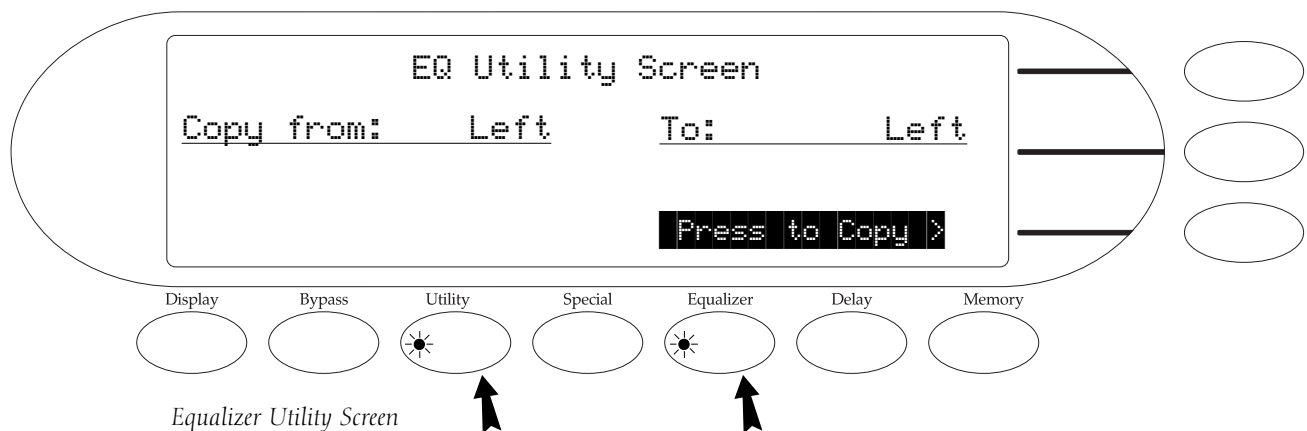
Each set of speakers in your surround system has different equalization requirements. The main front speakers reproduce the majority of the sound and have the widest frequency range. Equalize them with the “House Curve” in mind, gradually rolling off the higher frequencies. Of course you will want to keep in mind whether the speakers are set to the Large or Small mode in your surround processor. There is no use trying to equalize the lower frequency bands below 100Hz on the LCR channels if your surround processor is set to Small and is cutting off the lower bass from those channels.

If you have a good match between your main front speakers and the center channel, the curves should be very similar. That is why the bigwigs of surround recommend a matched set of speakers for the left, center and right channels. Since the center speaker produces primarily dialog (voice), you may want to boost the midrange (1KHz through 4KHz) on the center channel equalizer controls to bring the voices forward.

Since the surround channel speakers are generally small, 2-way designs, boosting the 2.5kHz equalizer control will help fill in their cross-over notch. Also, try dropping the 12kHz if the surrounds seem a bit bright.

⚠ Important Note: When using dipole surround speakers, make certain you are in the null area of the speakers when equalizing. The response will sound very different outside of the null area.

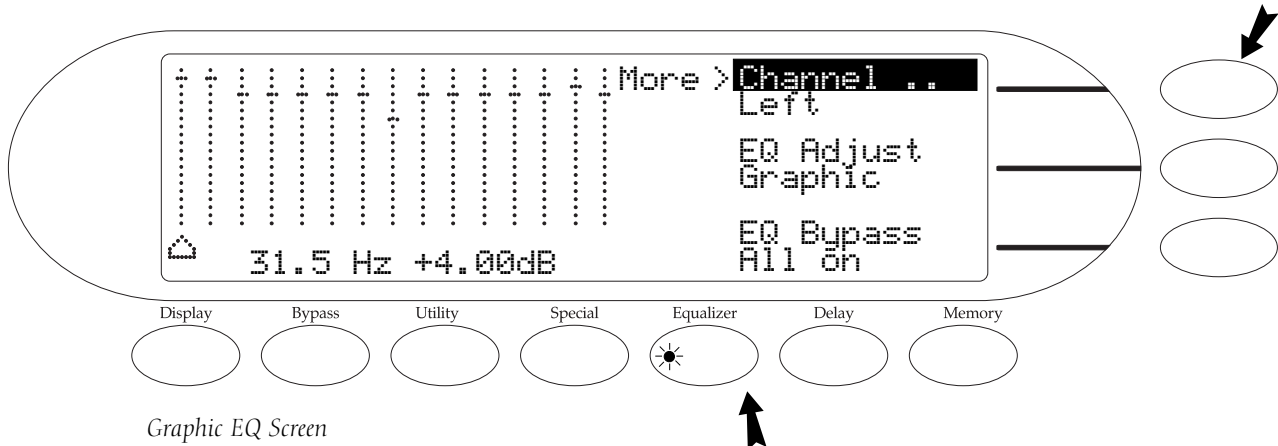
Diva features simultaneous Graphic and Parametric equalization. You do not have to choose between one or the other. Since both of these equalizer functions affect the sound, it is recommended to make the majority of your equalization adjustments with the graphic equalizer first and then make your final tweaks with the parametric eq. To move between these two equalizer modes, press the EQ Adjust button and rotate the Multi-function control. The Equalizer Utility function allows you to copy eq adjustments from one channel to another.



From the main Equalizer screen, press the Utility button. This brings up the EQ Copy function screen. Pressing the Multi-Function control IN (enter) toggles selection between adjusting the Copy From channel and the Copy To channel. Once you have the channels selected, press the Copy button.

Graphic Equalization

Graphic equalization is the workhorse of sound control. These fixed frequency center controls simplify the task of flattening out a rough frequency response by having the filter frequencies and bandwidths preset. These filters are generally set on standard spacings (Octave, $\frac{2}{3}$ octave, $\frac{1}{3}$ octave), although more specialized equalizer bands can be used for specific applications (like small surround speakers). By minimizing the variables you need to adjust, graphic equalizers are quick to set up and very repeatable.

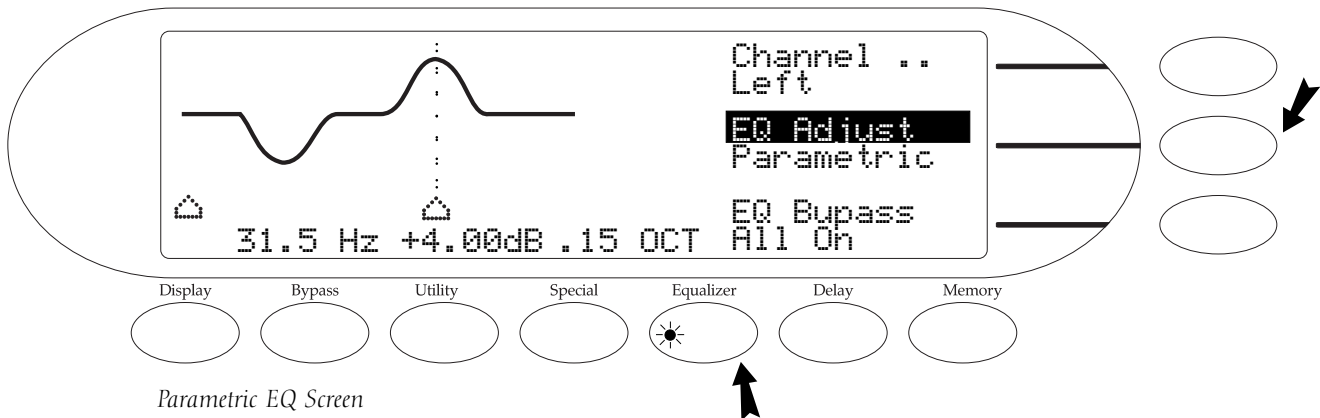


Graphic EQ Screen

Pushing the Multi-function control IN moves the selection between the equalizer band you are adjusting and the boost/cut for that frequency. Press the Channel button to select which channel you are adjusting the equalization on.

Parametric Equalization

Parametric eq allows the subtle tweaking to smooth out your sonic painting or make very accurate cuts (see Notch Filtering below). You have control over the center frequency, boost/cut amplitude and bandwidth (in octaves).



Parametric EQ Screen

Every channel in Diva features two parametric equalizer bands. Pushing in on the Multi-function control knob moves the selection between choosing EQ band 1 or 2, The frequency of the selected band, the amplitude and the filter bandwidth. When you have the item highlighted that you want to adjust, press and release the Multi-function control in again and rotate the knob to adjust the parameter.

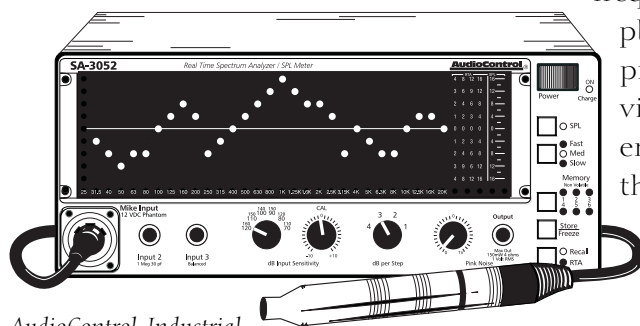
Notch Filtering

A very useful application of parametric equalizers is the surgical removal of a specific, offensive frequency. When the parametric equalizer filter bandwidth is set to minimum (0.05 octave), you are adjusting an equalizer band that is only 1/20th of an octave wide. By using the Parametric eq in this manner, you can help eliminate unwanted room or speaker resonances. A sinewave signal generator is useful for determining the frequency of a resonance. Play the sinewave tone through the speakers. Slowly sweep the frequency of the tone and listen for rattles around the room or sudden jumps in the test tone volume. Make a note of the tone frequency and set the parametric equalizer band to the same frequency. If the frequency is in the range above your subwoofer crossover point, it may be necessary to apply the same notch filter to LCR and surround channels to completely eliminate your room problem.

Analysis

To get the most unbiased opinion of your theater's sound system, you should use a real-time audio analyzer to check the frequency response. These analyzers will typically show thirty one-third-octave bands of sound levels. This analysis helps get the sound system into perfect alignment. The AudioControl Industrial SA-3052 is an excellent choice to get the theatre's sound system tuned.

To set the Diva with a real-time audio analyzer, you will need to get a flat frequency response reference sound like pink noise playing through the speakers. One method to get pink noise into your system is with a reference videodisk or DVD that has pink noise surround encoded. This allows the test noise to be played through one channel at a time. Another method is to connect a pink noise generator into the inputs of Diva one channel at a time. Make certain your noise generator has adjustable output levels if you use this method, since you will be feeding the test tone into your system AFTER the volume control. Turning down the volume knob on your preamp will not have any affect.



AudioControl Industrial
SA-3052 Analyzer

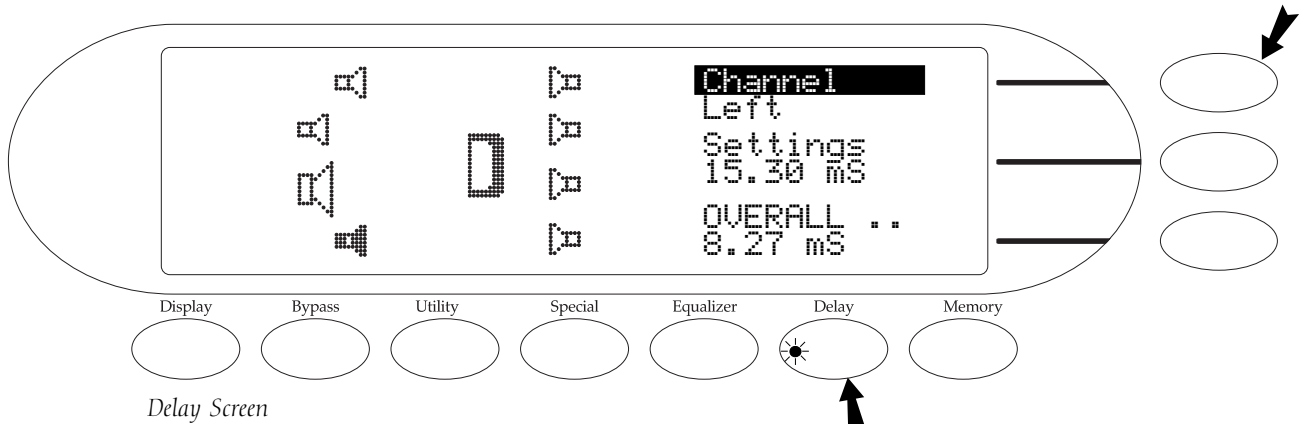
Start with the microphone for the analyzer in your main listening position. If the analyzer has the ability to average several readings, move the mike around and get an average of a couple listening positions (i.e. both ends of the couch) to set the Diva. Use the averaging function of the analyzer and smooth out one channel at a time (front, sub, center, and surrounds).

Digital Delay / Speaker Alignment

Delays can be used to create the illusion of a larger room by increasing the amount of time delay between the front speakers and rear speakers in a surround sound system. They can also be used with more subtle adjustments to improve the imaging of a speaker system by aligning the acoustic sound output of the LCR and subwoofer channels. With an alignment precision of 1/8", speakers can be brought into perfect alignment. Another function of the delay is to synchronize the audio and video portions of the system. This overall global delay is applied equally to every channel in the system.

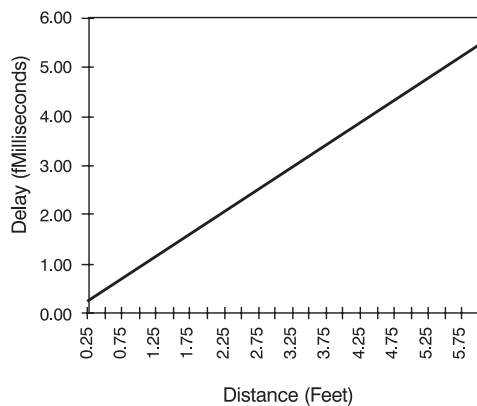
Setting Speaker Delays

Diva allows you to independently adjust the delay time for each channel. This alignment is not a substitute for poor speaker placement, but it can significantly improve the imaging and overall system sound quality.



Press the Delay button to access functions in Diva. From this menu, the Top function button allows channel selection with the Multi-Function control. The middle function button is for adjusting individual channel delay times. The bottom function button controls the overall delay time that is applied equally to all channels (see Audio/Video Synchronization below). Pressing In on the Multi-Function Knob (Enter) quickly toggles between selecting channel and setting delay times without pressing the function buttons.

There are two methods for figuring delay times: 1) Using a tape measure to measure the physical distance between the listening position and the speaker or 2) Using a test instrument such as the AudioControl Industrial Iasys to acoustically measure actual delay times. The easiest way to do the tape measure method is to have an assistant hold one end of the tape at the main listening position while you check the



distance to each speaker. The important piece of information we need is the Relative distances between speakers, not the absolute distance from the listening location. Starting with the farthest speaker measurement (since you cannot move a speaker ahead in time without some serious help from Dr. Einstein), calculate the difference between that measurement and every other speaker. This gives you the relative distance difference between each of the speakers. Now you must convert these measurements into delay times. Since sound travels at approximately 1100 feet per second, you could calculate the delay times, but it is easier to use this chart to change the relative measurements into relative delay times. With delay times in hand, you are ready to adjust Diva. An example of setting the front stage speakers for a surround system is:

From the main listening location you have measured the following distances for the Left, Center and Right channel speakers:

Left Speaker	13.5'
Center Speaker	12'
Right Speaker	14'

Since the Right speaker is the farthest, it is our reference to calculate the relative distances.

Left to Right	0.5'
Center to Right	2'

Looking at our delay time chart, we see that

0.5' =	0.45 Milliseconds
2' =	1.8 Milliseconds

So if we set the Left channel delay time to 0.45 Milliseconds, the Center channel delay to 1.8 Milliseconds and leave the Right channel at 0 milliseconds; the sound should arrive at the same time from all three speakers.

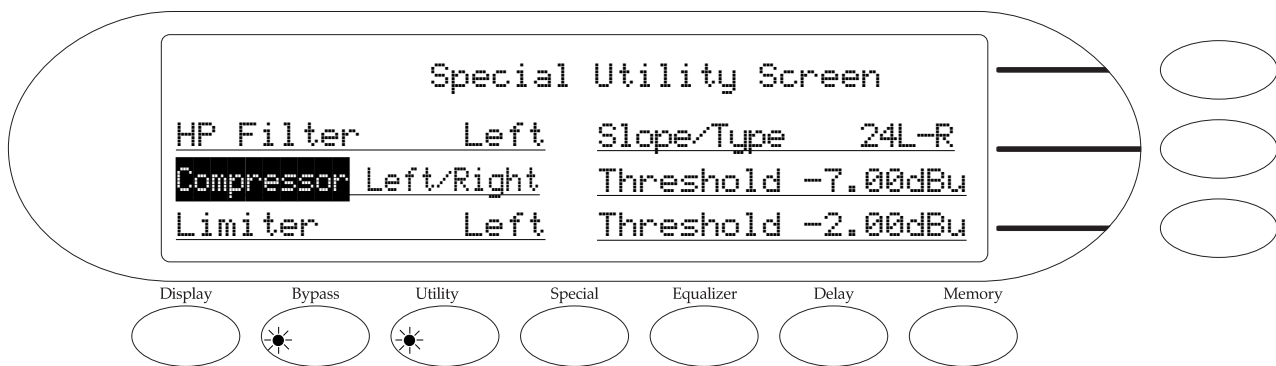
How Do I Set My Delays and Limiters?

Although these adjustments can be done by ear or using a tape measure. Neither of these methods is very repeatable and requires many years of experience to consistently get good results. The AudioControl Industrial IASYS is a new class of audio measurement and system setup tool. It is extremely sophisticated, yet very easy to use. "Answers, Not Just Data" is more than just a sales slogan for Iasys. The automatic tests gives you specific answers on where to set crossover frequencies, exact delay times for aligning speakers and precise levels for the compressor/limiter settings in Diva.

Audio/Video Synchronization

In this era of digital video processing, an old headache of film projectors and phonographs has reemerged; the picture and the soundtrack get out of sync. We don't have the problem with Vivian Leigh speaking in Clark Gable's voice, but enough delay between the video picture and soundtrack can be caused through scan enhancement or digital video decoding to be distracting. The Overall Delay function in Diva allows the same time delay be added to all of the audio channels. This is much simpler than going through each delay channel and manually adding 0.57 milliseconds to the channel delay time you have already set.

Sound Dynamics Control



Special Screen

Compressors

A compressor is an audio processing circuit that compresses the dynamic range of an audio signal. The loud peaks are made quieter and the quiet passages are made louder. In this digital age, where ever-increasing dynamic range seems to be the Holy Grail, it may seem that a compressor is the last item that you would want to add to the signal path. Actually, a judicious application of dynamics compression can make your system sound louder and hit harder. The compressor design in Diva features a Progressive Knee so the compression ratio is applied more gently near the threshold so create a more musical sounding result. Compressors have five adjustment parameters (although typically you only need to worry about the Threshold setting): **Threshold** - The signal level the compressor kicks in at. **Ratio** - Adjusts how much compression is applied to the signal (i.e. a 2.0:1 ratio equals 2 dB Input for 1 dB Output). **Gain** - This is an adjustment of make-up gain to compensate for the difference between the compressed output signal

and a direct bypass. **Attack Time** - How quickly the compressor reacts to a signal over the threshold voltage. **Release Time** - How long after the signal has dropped below the threshold does the compressor returns the signal to full dynamic range.

Limiter

A limiter is a circuit that which limits the maximum level of an audio signal when it reaches a specified threshold. Limiters help prevent speaker damage by preventing too much signal from being fed into the amplifiers. There are two main methods of killing speakers: Excessive cone excursion - The speaker cone tries to move further than it is capable of to reproduce the audio signal. This can result in anything from the voice coil hitting the bottom of the magnet and denting to actually tearing the surround or support spider material. Neither of which sounds very good, and...Driver overheating - When you operate a speaker, the voice coil heats up. Feeding too much power into a speaker causes the heat to build up faster than the voice coil can dissipate and the speaker burns up. In a subwoofer, the voice coil wire is large enough it can take several minutes of overheating before it complains. The wire in a tweeter however is so small that it can burn out in less than a second when you overdrive it. Limiters have three parameters to adjust: **Threshold** - The signal level the limiter kicks in at. **Attack Time** - How quickly the limiter reacts to a signal over the threshold voltage. **Release Time** - How long after the signal has dropped below the threshold does the limiter returns the system to full gain.

Secret Note to the Adventurous

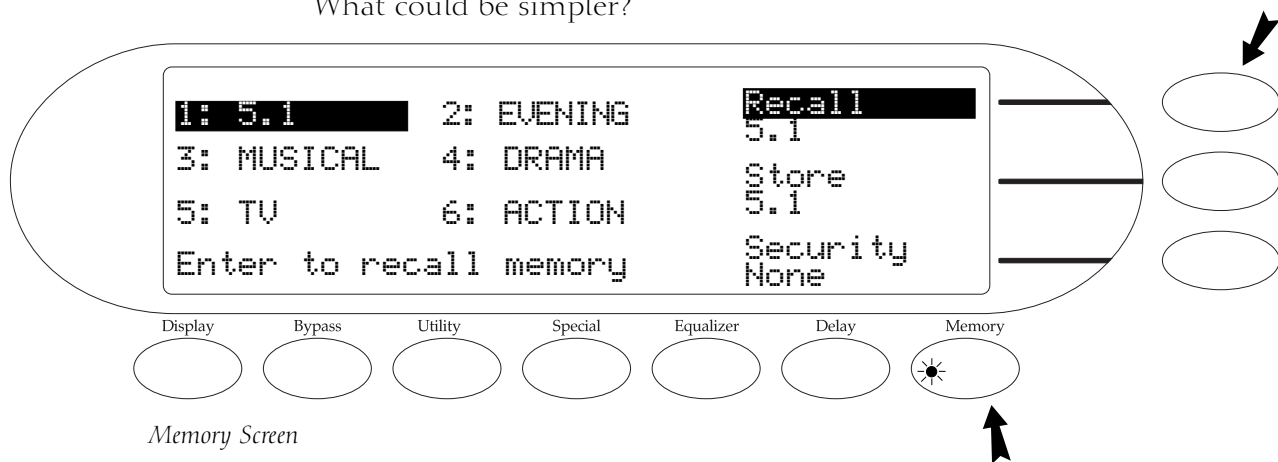
The more advanced features of the Compressors and Limiters such as Compression Ratio and Attack/Release times are available through a secret buried menu. To access this menu, go to the Special Utility screen (press Special and then press Utility). Now Press & Hold the top soft function button F1 for 2 seconds. Viola, you're in. Remember, these parameters are for experienced individuals only.

Subwoofer Mode

The subwoofer dynamics adjustment controls how the subwoofer responds to bass transients. This is done with different adjustments of the Compression Ratio along with various Attack and Release Times. The Hard mode is designed for action movies where the bass is used for thrill and impact. The Soft mode brings out a fullness in the low end to set a mood. The Normal mode maintains the level limiters, but defeats the subwoofer dynamics enhancement.

Using Scene Memories

The memory presets in Diva store more than adjustments, they are a snapshot scene of every setting in Diva. Each of these 20 memories contain all of the parameters including the channel configuration, compressor/limiter settings, subwoofer mode, equalizer adjustments, delay times, highpass filters, everything right down to the display brightness is stored in each of the memory scenes. The memory scenes are a very powerful way to simplify the daily use of Diva. Different scenes can be programmed for Music Television, Sunday Football and Saturday Night at the Movies and recalled with a single command. What could be simpler?



Factory Programmed Memory Scenes

To make your initial adjustment of Diva easier, we have included a number of pre-programmed memory scenes for various room and channel configurations. These presets are great starting points to begin adjustments for your installation. Just recall a preset scene that is closest to your system and start fine-tuning the settings to your requirements.

Default Memory Configurations

The default memories speed installation of the Diva by quickly getting the Channel Mode, Equalization, Delays and Dynamics parameters set up for your system. To begin, select the memory that best fits your application and then use these base adjustments to fine tune the theatre.

Memory	Description
1. 51SDRAMA	5.1 Channel Mode, Small Main Speakers, Drama Movies
2. 51SACTIO	5.1 Channel Mode, Small Main Speakers, Action Movies
3. 51SMUSIC	5.1 Channel Mode, Small Main Speakers, Musical Movies
4. 51LDRAMA	5.1 Channel Mode, Large Main Speakers, Drama Movies
5. 51LACTIO	5.1 Channel Mode, Large Main Speakers, Action Movies
6. 51LMUSIC	5.1 Channel Mode, Large Main Speakers, Musical Movies
7. 71SDRAMA	7.1 Channel Mode, Small Main Speakers, Drama Movies
8. 71SACTIO	7.1 Channel Mode, Small Main Speakers, Action Movies
9. 71SMUSIC	7.1 Channel Mode, Small Main Speakers, Musical Movies
10. 71LDRAMA	7.1 Channel Mode, Large Main Speakers, Drama Movies
11. 71LACTIO	7.1 Channel Mode, Large Main Speakers, Action Movies
12. 71LMUSIC	7.1 Channel Mode, Large Main Speakers, Musical Movies
13. 2.1ROCK	2.1 Channel Mode, Rock Music
14. 2.1CLASS	2.1 Channel Mode, Classical Music
15. 2.1JAZZ	2.1 Channel Mode, Jazz Music
16. 2.2ROCK	2.2 Channel Mode, Rock Music
17. 2.2CLASS	2.2 Channel Mode, Classical Music
18. 2.2JAZZ	2.2 Channel Mode, Jazz Music

Recalling Memory Scenes

Press the Memory button to enter the main memory screen. To recall a memory, Press the Recall Memory soft function button and rotate the Multi-function knob to highlight the desired memory. Press the Multi-function knob in (enter) to recall the memory. There is a few second pause while the new settings are loaded from memory.

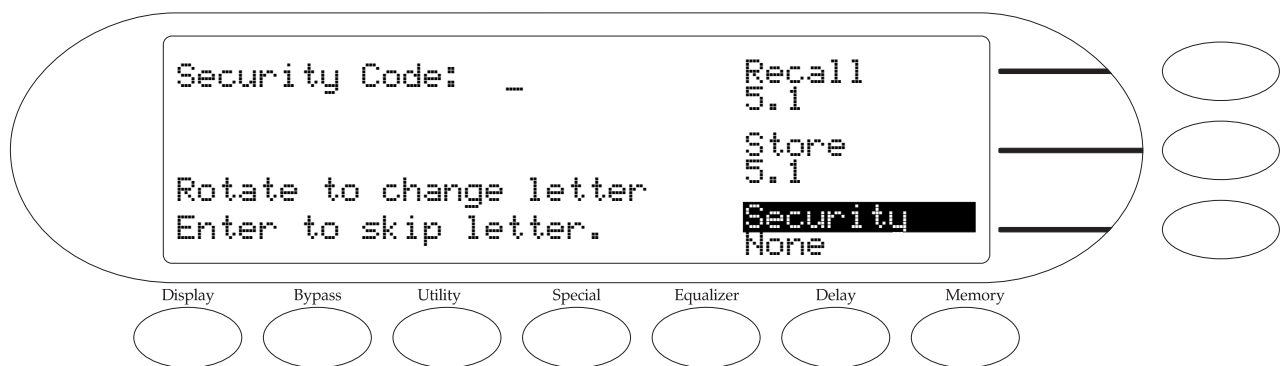
Storing Memory Scenes

Once you have made all of the adjustments to Diva for a particular setup (for example: DVD Musical Movie with the center channel midrange brought up a touch to clarify singing voices, the soft subwoofer mode and an overall delay of 0.55 mS to sync the video and audio) then you are ready to store the settings into a memory. Press the Memory button to enter the main memory screen. To store a memory, Press the Store Memory soft function button and rotate the Multi-function knob to highlight the desired memory location. Press the Multi-function knob in (enter) to select the memory. You will be prompted to enter a name for the memory. It is very useful to make the name something relating to the stored information and easy to remember. Pressing the Multi-function knob toggles between selecting the letter position with the wheel turn and selecting a desired letter. Press the Store button when you have entered the name you want.

Front Panel Security Lock

To protect all of the hard work and effort you have gone to in tweaking every aspect of Diva for the best possible sound from the installation; Diva features a front panel lock out function. This security lockout functions as an electronic security cover to protect Diva from stray fingers tampering with settings. There are three password protected security level settings in Diva:

- 1 - None All functions fully operational
- 2 - Minimum Memory Recall and Display control through front panel
- 3 - Maximum Only Memory Recall available through front panel



Security Menu

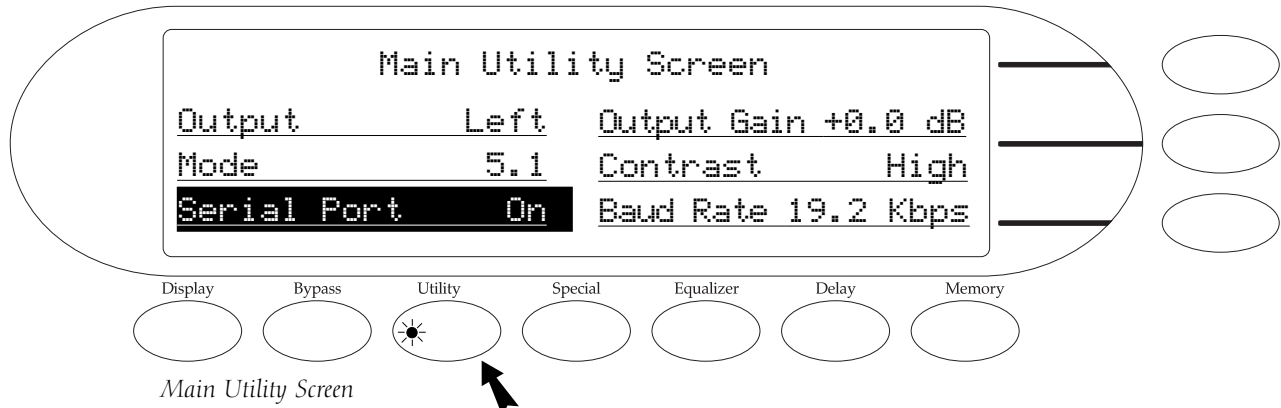
To activate the security function: Select the Security option of the Memory menu by pressing the bottom (F3) soft menu button. Use the Multi-Function control to enter your security code password. The factory default password is DIVA. Use this default security code initially to set the security lockout level. Once you have entered the security code, press the F3 soft menu button then use the Multi-Function control to change the security level. Press IN (enter) on the Multi-Function control to activate the new security setting. Diva will ask for a new security code password. Once you are finished entering the new security level and code, press the Memory button to exit the Security Menu.

Note To The Forgetful

In addition to the security code password you enter for the security lockout, Diva also has a master password that cannot be changed. This password is DIVA. If you forget your password, the master password is always functional.

External Serial Control

Diva is easily integrated with an automation system by a simple set of RS-232 serial commands. This serial control protocol allows the external system complete control over Diva. To enable external control of Diva through the serial port, you must turn ON the Serial Port and set the appropriate Baud Rate for your automation system from Diva's Main Utility Screen.



For the purposes of the descriptions below of the various aspects of the messages that may be sent to Diva, the following conventions apply:

ASCII text messages are shown in quotation marks for the purposes of clarity in this manual. The quotes are not actually used in the commands transmitted to Diva. Only a single command can be issued at a time. Multiple commands in a single command string will result in an error message.

All ASCII values shown are given in decimal unless otherwise indicated.

The <cr> symbol means Carriage Return or Enter. Equivalent to ASCII 13 (Hex 0D).

The serial command message format is:

COMMAND<cr>

Where 'COMMAND' represents the desired command from the list below, and <cr> represents a carriage return, ASCII 13 as a command terminator. Diva returns the text string "OK<cr>" upon completion of the command. If there is an error in the command message sent to Diva, it will respond with the ASCII text string "ERROR<cr>".

Status query message: This message is used to Diva to get the status for a specific command mode. Diva responds to the status query with a string matching the serial commands current state.

The message format is:

COMMAND?<cr>

Where 'COMMAND' represents the letter at the beginning of the serial command you are querying the status of, and <cr> represents a carriage return, ASCII 13. As an example: 'M?' represents the request for Diva's currently selected memory scene. Diva will respond with the following string:

M03<cr>

OK<cr>

In the above example, memory scene #3 is currently active. The response from Diva is terminated by a carriage return <cr>. After the successful completion of the status query message, Diva returns the text string "OK<cr>". If there is an error in the command message sent to Diva, then Diva will reply with the text string "ERROR<cr>".

Serial Control Commands

Command	Description
P00	Power Off (Stand-by)
P01	Power On
M01 - M20	Recall Memory scene #01 through #20
B00	Bypass Off
B01	Bypass All Processing
S00	Subwoofer Soft Mode
S01	Subwoofer Hard Mode
S02	Subwoofer Normal Mode
D00	Turn the display off
D01	Turn the display on
D02	Lock display to Diva logo screen
C00	Display Brightness Dim
C01	Display Brightness Low
C02	Display Brightness Med
C03	Display Brightness High

Equalizer Configurations

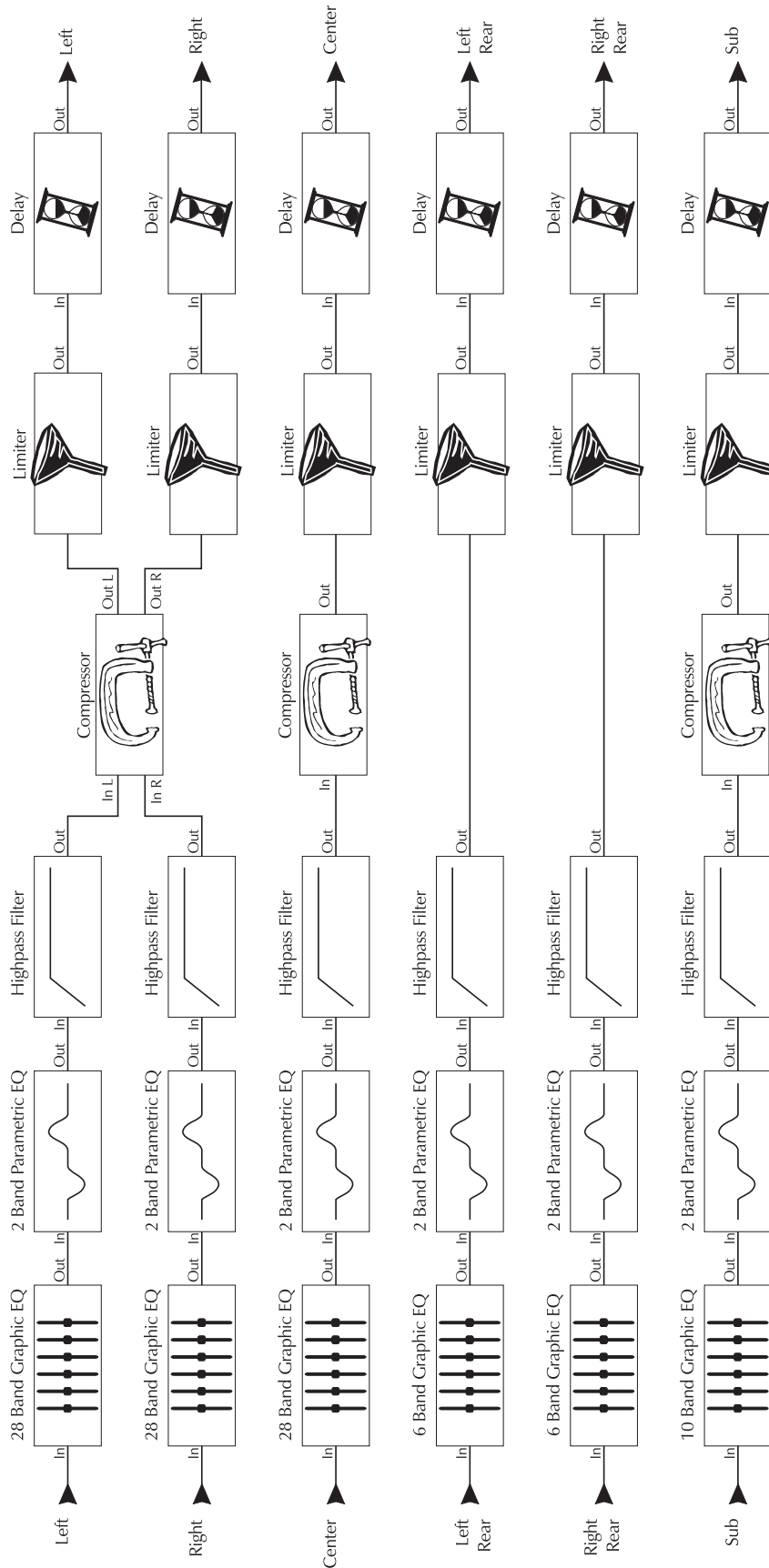
Left, Right and Center Channels

Mode	2.1	2.2	5.1	5.2	7.1	7.1 Phantom
Parametric Bands	2	2	2	2	2	2
Graphic Bands	Center Frequencies					
1	25	25	31.5	25	25	25
2	31.5	31.5	40	40	40	40
3	40	40	50	63	63	63
4	50	50	63	100	100	100
5	63	63	80	160	160	160
6	80	80	100	250	250	250
7	100	100	125	400	400	400
8	125	125	160	630	630	630
9	160	160	200	1k	1k	1k
10	200	200	250	1.6k	1.6k	1.6k
11	250	250	315	2.5k	2.5k	2.5k
12	315	315	400	4k	4k	4k
13	400	400	500	6.3k	6.3k	6.3k
14	500	500	630	10k	10k	10k
15	630	630	800	16k	16k	16k
16	800	800	1k			
17	1k	1k	1.25k			
18	1.25k	1.25k	1.6k			
19	1.6k	1.6k	2k			
20	2k	2k	2.5k			
21	2.5k	2.5k	3.15k			
22	3.15k	3.15k	4k			
23	4k	4k	5k			
24	5k	5k	6.3k			
25	6.3k	6.3k	8k			
26	8k	8k	10k			
27	10k	10k	12.5k			
28	12.5k	12.5k	16k			
29	16k	16k				
30	20k	20k				

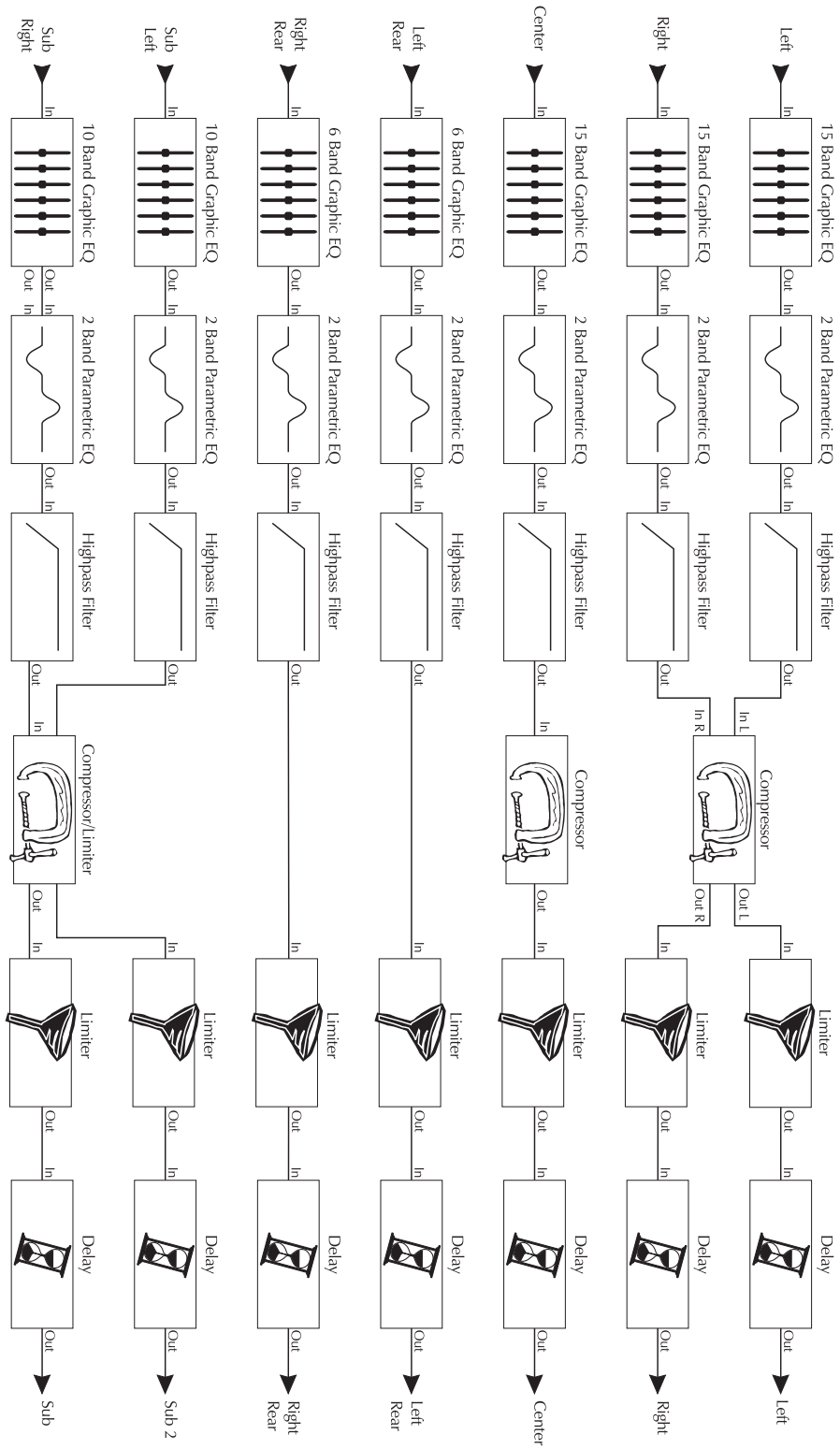
Equalizer Configuration

Subwoofer Channels						
Mode	2.1	2.2	5.1	5.2	7.1	7.1 Phantom
Parametric Bands	2	2	2	2	2	2
Graphic Bands	EQ Frequencies					
1	22.4	22.4	22.4	22.4	22.4	22.4
2	25	25	25	25	25	25
3	28	28	28	28	28	28
4	31.5	31.5	31.5	31.5	31.5	31.5
5	35.5	35.5	35.5	35.5	35.5	35.5
6	40	40	40	40	40	40
7	45	45	45	45	45	45
8	50	50	50	50	50	50
9	63	63	63	63	63	63
10	80	80	80	80	80	80
Rear and Side Channels						
Parametric Bands			2	2	2	2
Graphic Bands	Center Frequencies					
1			45	45	45	45
2			150	150	150	150
3			300	300	300	300
4			700	700	700	700
5			2500	2500	2500	2500
6			2k	12k	12k	12k

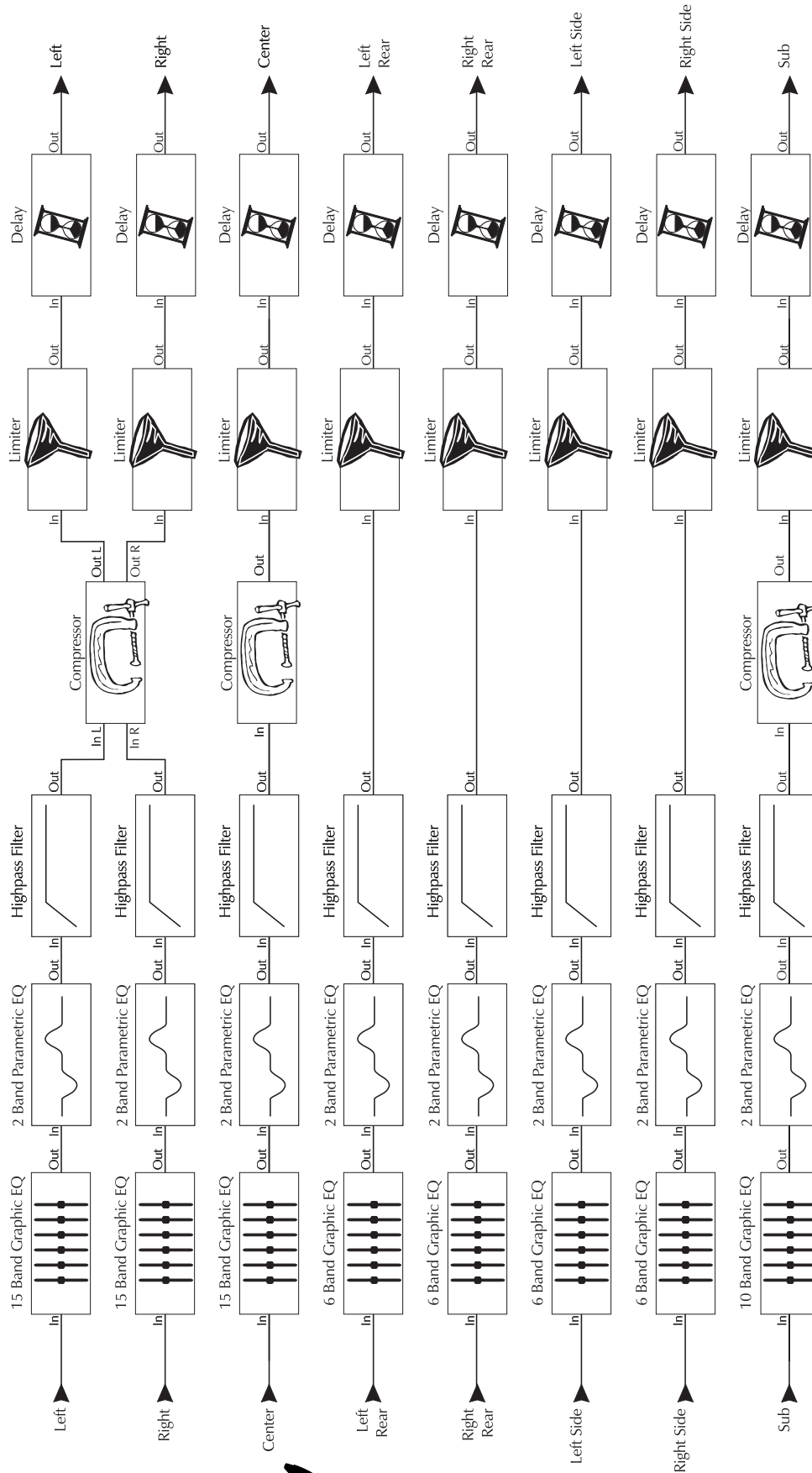
5.1 Channel Mode



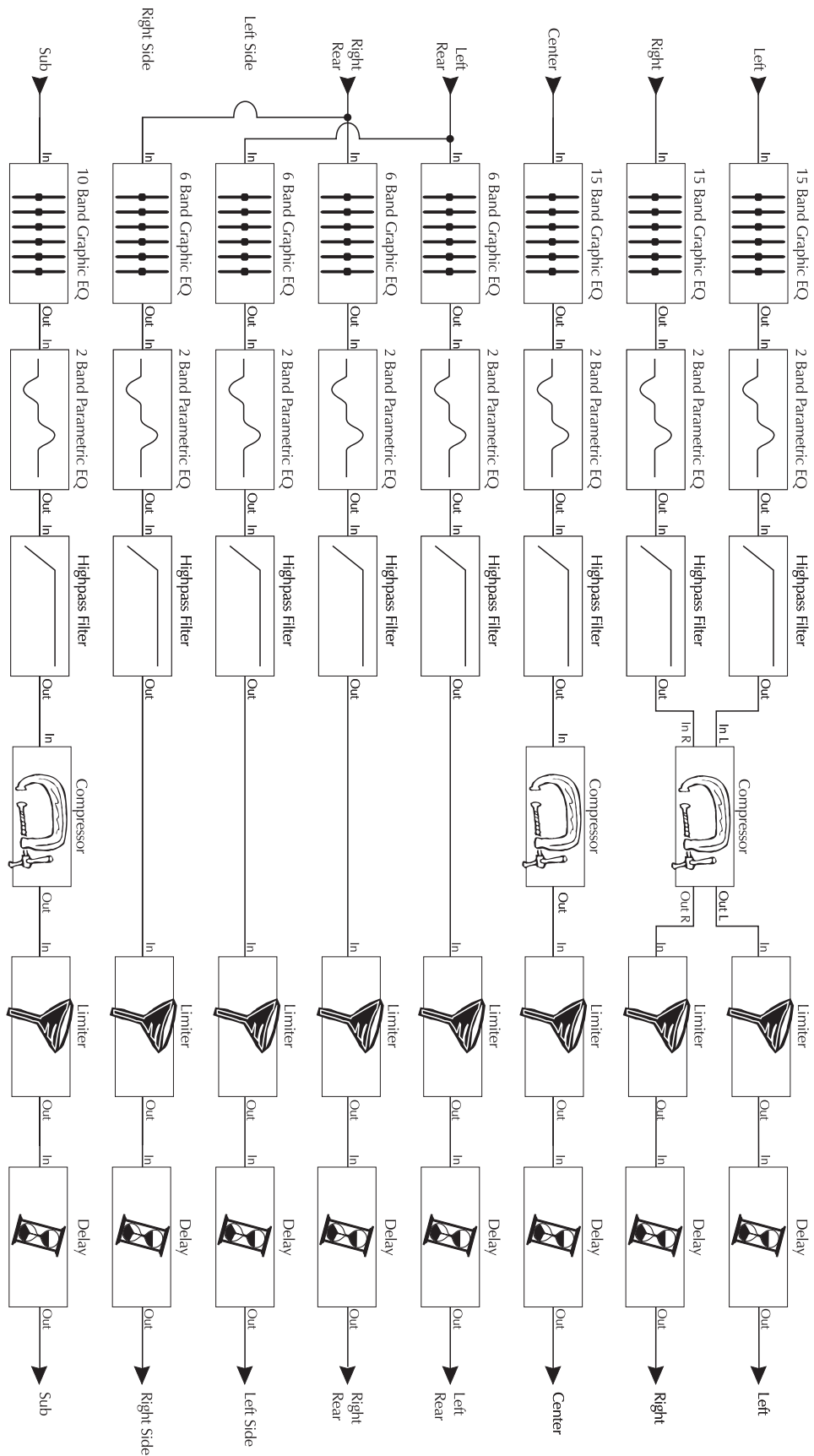
5.2 Channel Mode



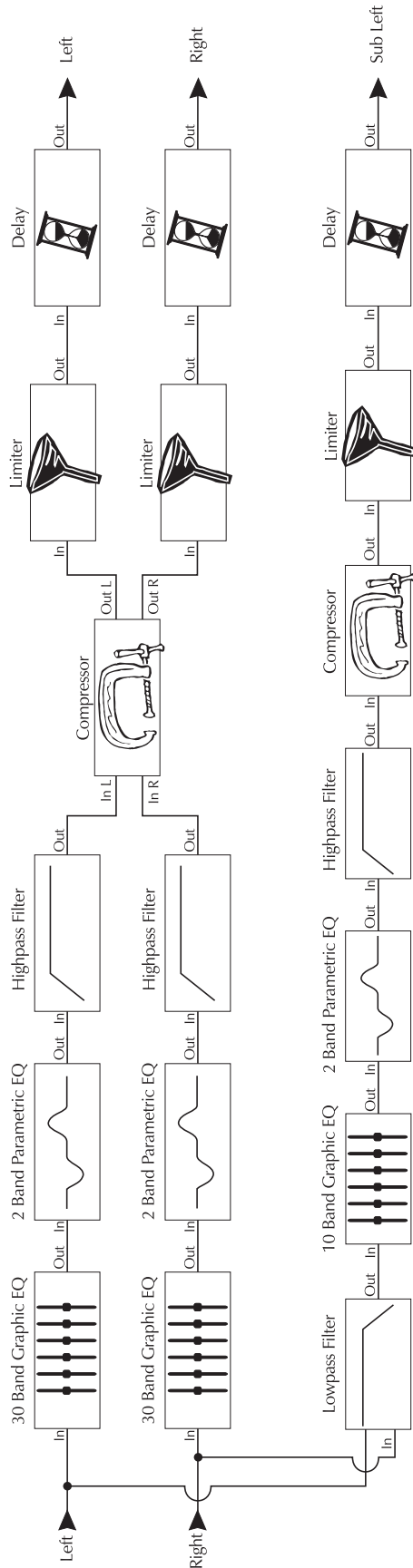
7.1 Channel Mode



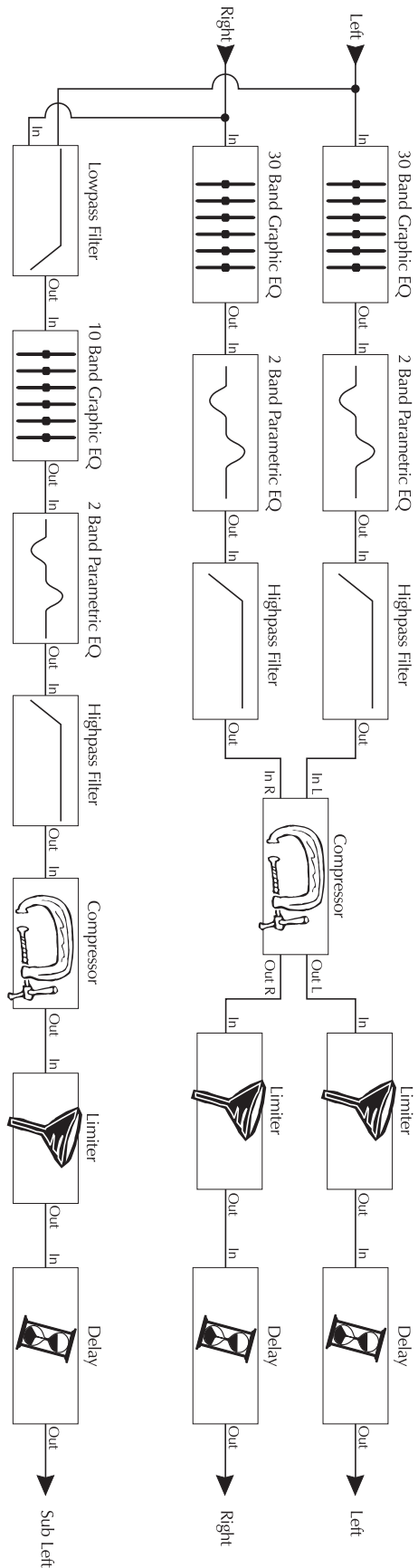
7.1 Phantom Side Channel Mode



2.1 Channel Mode



2.1 Channel Mode



Frequently Asked Questions

Q: How do I connect a digital audio signal to Diva.

A: Diva is designed to connect between the surround processor and the power amplifiers. Since this connection is almost exclusively analog, Diva was designed with only analog inputs and outputs.

Q: How do I set my delays?

A: The delays in Diva should be used for speaker alignment, instead of spatial effects such as the surround processor modes. To calculate the amount of delay required for speaker alignment, you can either use a tape measure or a delay measurement device such as the AudioControl Industrial IASYS system setup analyzer.

Q: Can I bypass the limiters?

A: For safety reasons, there is no way to bypass the limiter function in Diva. From the Special Utility screen, you can increase the limiter threshold if you need a higher maximum signal level from a channel.

Q: Is there a security cover available?

A: You can electronically lock the front panel functions on Diva to prevent unwanted adjustment of parameters. Access the security lock command by pressing the Memory button and select Security. Use the Multi-function knob to enter a password and lock the front panel. Make a note of the password so you can unlock the functions at a later date.

Q: I forgot the security lock password. How do I unlock Diva?

A: The master password is DIVA. Regardless of the security code that you entered the master password is always active and cannot be changed.

Q: Can I adjust the compression ratio?

A: Yes, see the Secret Sidebar note in the compressor section of this manual.

Q: What is the IR Link input used for?

A: This jack connects to an internal infrared LED identical to the type used in the IR Emitters. Connect an IR control system to this jack just like any other emitter. This makes the front of Diva look cleaner than sticking a little black emitter to the face.

Frequently Asked Questions

and now a word from the legal department...

The WARRANTY

People are scared of warranties. Lots of fine print. Months of waiting around. Well, fear no more. This warranty is designed to make you rave about us to your friends. It's a warranty that looks out for you and helps you resist the temptation to have your friend, who's "good with electronics", try to repair your AudioControl product. So go ahead, read this warranty, then take a few days to enjoy your new Diva digital audio enhancement system before sending in the warranty card and comments.

"Conditional" doesn't mean anything ominous. The Federal Trade Commission tells all manufacturers to use the term to indicate that certain conditions have to be met before they'll honor the warranty. If you meet all of these conditions, we will warrant all materials and workmanship on the Diva for five (5) years from the date you bought it, and we will fix or replace it, at our option, during that time.

Here are the conditional conditions:

1. You have to fill out the warranty card and send it to us within 15 days after purchasing the Diva equalizer.
2. You must keep your sales receipt for proof of purchase showing when and from whom the unit was bought. We're not the only ones who require this, so it's a good habit to get into with any major purchase.
3. The Diva equalizer must have originally been purchased from an authorized AudioControl dealer. You do not have to be the original owner, but you do need a copy of the original sales slip.
4. You cannot let anybody who isn't: (A) the AudioControl factory; (B) an authorized service center; or (C) somebody authorized in writing by AudioControl to service the Diva equalizer. If anyone other than (A), (B) or (C) messes with the Diva equalizer, that voids your warranty.
5. The warranty is also void if the serial number is altered or removed, or if the Diva equalizer has been used improperly. Now that sounds like a big loophole, but here is all we mean by it:
 1. Unwarranted abuse is: (A) physical damage (don't use the Diva equalizer to level your projection TV); (B) improper connections (120 volts into the RCA jacks can fry the poor thing); (C) sadistic things. This is the best product we know how to build, but if you strap it to the front bumper of your Range Rover, something will break.

Assuming you conform to 1 through 5, and it really isn't all that hard to do, we get the option of fixing your original unit or replacing it with a new one.

Legalese Section

This is the only warranty given by AudioControl. This warranty gives you specific legal rights that vary from state to state. Promises of how well the Diva equalizer will perform are not implied by this warranty. Other than what we have covered in this warranty, we have no obligation, express or implied. Also, we will not be obligated for direct or indirect consequential damage to your system caused by hooking up the AudioControl Diva.

Failure to send in a properly completed warranty card negates any service claims.

What to do if you need service

First, contact AudioControl, either by phone 425/775-8461 or FAX 425/778-3166 or by e-mail at service@audiocontrol.com. We'll verify if there is anything wrong that you can fix yourself, or arrange to have it sent back to our factory for repair. Please include the following items with the returning unit:

- 1 A copy of your proof of purchase (that sales receipt we've been harping about). No originals please. We cannot guarantee returning them to you.
- 2 A brief explanation of the trouble you are having with the Diva. (You'd be surprised how many people forget this.)
- 3 A return street address. (No PO Boxes, please)
- 4 A daytime phone number in case our technician has a question about the problem you are having.

You're responsible for the freight charges to us, but we'll pay the return freight back. We match whatever shipping method you send it to us, so if you return the unit overnight freight, we send it back overnight. We recommend UPS for any shipments.

CREDITS (specifications)

Number of channels	8
Frequency response	20 Hz - 20 kHz \pm 1 dB
Total harmonic distortion	0.008%
Signal to Noise ratio (at full output)	113 dB
Maximum output level	6 Vrms
DSP	Dual Motorola 56303 Processors
Conversion resolution	24 Bits
Total DSP Calculation Power	160 MIPS
Internal sampling rate	48 kHz
Internal dynamic range	144 dB

Graphic equalizer section

Gain Range All channels/Modes: +6dB, -15dB
Number of EQ bands / Bandwidth:

LCR channels

2.1 and 2.2 modes 30 bands One-third-octave
5.1 mode 28 bands One-third-octave
5.2, 7.1, 7.1 Phantom modes 15 bands Two-third-octave

Subwoofer channels

All modes 8 bands One-sixth-octave plus 2 bands One-third-octave

Fill channels

2.1 and 2.2 modes Not applicable
5.1, 5.2, 7.1, 7.1 Phantom modes 6 bands Custom-contoured

Side channels

2.1, 2.2, 5.1 and 5.2 modes Not applicable
7.1 and 7.1 Phantom modes 6 bands Custom-contoured

Parametric equalizer section

Bands per channel 2
Gain Range +6 dB, -15 dB
Frequency Center 20 Hz - 20 kHz
Bandwidth 0.05 - 3.00 Octave

Audio filters

Frequency adjustment range 20 Hz - 1 kHz
Slope 12dB/oct Butterworth, 18dB/oct Butterworth,
24dB/oct Linkwitz-Riley

Compressors

Response Progressive Knee
Threshold range -30 dBu - +20 dBu
Ratio range 1:1 - 20:1
Gain range -20 dB - +8dB
Attack time range 0.05 mS - 200 mS
Release time range 5 mS - 2 Sec

Limiters

Threshold level -20 dBu - +20 dBu
Attack time range 0.02 mS - 200 mS
Release time range 1 mS - 1 Sec

Digital Delay

Individual channel delay range 0 mS - 340 mS
Overall alignment delay range 0 mS - 340 mS
Delay adjustment resolution 0.01 mS (1/8")

Power draw 18 Watts

Size 3.5"h x 15"d x 17"w (19"w with optional rackmounts)

Weight 18 lbs

Country of origin USA

Y2K Compliant Yes

Epilogue

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This manual was written, designed, and printed while fighting a life-and-death struggle with mutant jujubes and drinking a double-tall vanilla latté.



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