

dbx[®] *PROFESSIONAL PRODUCTS*

DriveRack[®]

Complete Equalization & Loudspeaker Control System

PA



Featuring

JBL



CROWN[®]

Custom Tunings

User Manual

IMPORTANT SAFETY INSTRUCTIONS



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



ATTENTION: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

The symbols shown above are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowpoint in an equilateral triangle means that there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for the user to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during storms to prevent damage.

SAFETY INSTRUCTIONS

NOTICE FOR CUSTOMERS IF YOUR UNIT IS EQUIPPED WITH A POWER CORD.

WARNING: THIS APPLIANCE MUST BE EARTHED.

The cores in the mains lead are coloured in accordance with the following code:

GREEN and YELLOW - Earth BLUE - Neutral BROWN - Live

As colours of the cores in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The core which is coloured green and yellow must be connected to the terminal in the plug marked with the letter E, or with the earth symbol, or coloured green, or green and yellow.
- The core which is coloured blue must be connected to the terminal marked N or coloured black.
- The core which is coloured brown must be connected to the terminal marked L or coloured red.

This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. If the attachment plug needs to be changed, refer servicing to qualified service personnel who should refer to the table below. The green/yellow wire shall be connected directly to the units chassis.

CONDUCTOR		WIRE COLOR	
		Normal	Alt
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E	EARTH GND	GREEN/YEL	GREEN

WARNING: If the ground is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury or death can then result if the chassis and earth ground are touched simultaneously.

WARNING FOR YOUR PROTECTION

PLEASE READ THE FOLLOWING:

KEEP THESE INSTRUCTIONS

HEED ALL WARNINGS

FOLLOW ALL INSTRUCTIONS

THE APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING LIQUID AND NO OBJECT FILLED WITH LIQUID, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.

CLEAN ONLY WITH A DRY CLOTH.

DO NOT BLOCK ANY OF THE VENTILATION OPENINGS. INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

DO NOT INSTALL NEAR ANY HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTERS, STOVES, OR OTHER APPARATUS (INCLUDING AMPLIFIERS) THAT PRODUCE HEAT.

ONLY USE ATTACHMENTS/ACCESSORIES SPECIFIED BY THE MANUFACTURER.

UNPLUG THIS APPARATUS DURING LIGHTNING STORMS OR WHEN UNUSED FOR LONG PERIODS OF TIME.

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 third prong are provided for your safety. If the provided plug does not fit your outlet, consult an electrician for replacement of the obsolete outlet.

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

Use only with the cart stand, tripod bracket, or table specified by the manufacture, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



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.

POWER ON/OFF SWITCH: The Power switch used in this piece of equipment DOES NOT break the connection from the mains.

MAINS DISCONNECT: The plug shall remain readily operable. For rack-mount or installation where plug is not accessible, an all-pole mains switch with a contact separation of at least 3 mm in each pole shall be incorporated into the electrical installation of the rack or building.

FOR UNITS EQUIPPED WITH EXTERNALLY ACCESSIBLE FUSE RECEPTACLE: Replace fuse with same type and rating only.

MULTIPLE-INPUT VOLTAGE: This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. Connect this equipment only to the power source indicated on the equipment rear panel. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel or equivalent.

This Equipment is intended for rack mount use only.

IMPORTANT SAFETY INSTRUCTIONS

LITHIUM BATTERY WARNING

CAUTION!

This product may contain a lithium battery. There is danger of explosion if the battery is incorrectly replaced. Replace only with an Eveready CR 2032 or equivalent. Make sure the battery is installed with the correct polarity. Discard used batteries according to manufacturer's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

ADVARSEL!

Lithiumbatteri - Eksplosjonsfare ved feilagtig håndtering. Udsiftning må kun ske med batteri av samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

VAROITUS!

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

WARNING!

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparatleverkaren. Kassera använt batteri enligt fabrikantens instruktion.

ELECTROMAGNETIC COMPATIBILITY

This unit conforms to the Product Specifications noted on the Declaration of Conformity. Operation is subject to the following two conditions:

- **this device may not cause harmful interference, and**
- **this device must accept any interference received, including interference that may cause undesired operation.**

Operation of this unit within significant electromagnetic fields should be avoided.

- **use only shielded interconnecting cables.**

U.K. MAINS PLUG WARNING

A molded mains plug that has been cut off from the cord is unsafe. Discard the mains plug at a suitable disposal facility. **NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAINS PLUG INTO A 13 AMP POWER SOCKET.** Do not use the mains plug without the fuse cover in place. Replacement fuse covers can be obtained from your local retailer. Replacement fuses are 13 amps and **MUST** be ASTA approved to BS1362.

DECLARATION OF CONFORMITY

Manufacturer's Name: dbx Professional Products
Manufacturer's Address: 8760 S. Sandy Parkway
Sandy, Utah 84070, USA

declares that the product:

Product name: dbx DriveRack PA
Note: Product name may be suffixed by the EU.

Product option: None

conforms to the following Product Specifications:

Safety: IEC 60065 (1998)
EMC: EN 55013 (1990)
EN 55020 (1991)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC as amended by Directive 93/68/EEC.

Vice-President of Engineering
8760 S. Sandy Parkway
Sandy, Utah 84070, USA
Date: April 19, 2002

European Contact: Your local dbx Sales and Service Office or

Harman Music Group
8760 South Sandy Parkway
Sandy, Utah 84070 USA
Ph: (801) 566-8800
Fax: (801) 568-7583

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DriveRack® PA

INTRODUCTION

INTRO

CUSTOMER SERVICE INFO

Defining the DriveRack

WARRANTY INFO



dbx[®]
PROFESSIONAL PRODUCTS

INTRODUCTION

Drive your PA to a whole new level of performance with the DriveRack® PA Complete Equalization & Loudspeaker Control System. The DriveRack PA from dbx Professional Products represents a complete integration of the key elements that help ensure optimal loudspeaker system management in PA-specific applications. Capitalizing on the legendary 480 DriveRack technology, the DriveRack PA is able to provide its user with top-tier, pro-level loudspeaker management specifications, yet still remain appealing to the budget-conscious audiophile who requires a tried and true utilitarian workhorse. With its all-inclusive, no-compromise design, the DriveRack PA has been systematically developed and designed to grow with your system needs for years to come.

0.1 Defining the DriveRack® PA

The dbx DriveRack® PA is the most effective way to manage all aspects of Loudspeaker management for Public Address system applications. The DriveRack PA essentially becomes the only device that you will need between the mixer and the power amps. The following are just some of the features of the DriveRack® PA.

DriveRack® PA features:

- Stereo Feedback Elimination with 12 feedback notch filters
- Dual 28-band Graphic EQ
- Classic dbx® Compressor
- 120A Sub-harmonic Synthesizer
- 2x3, 2x4, 2x5, 2x6 Crossover Configurations
- Stereo Multi-band Parametric EQ
- Stereo Output Limiters
- Alignment Delay
- Pink Noise Generator
- Auto-EQ with 28-Band RTA
- JBL® Speaker and Crown® Power Amp Tunings with Setup Wizard
- 25 User Programs / 25 Factory Programs
- 2 Channel XLR Input and 6 Channel XLR Output
- Front panel RTA-M XLR input with phantom power
- 24-Bit ADC/24-Bit DAC, >110 dB Dynamic Range
- TypeIV® Conversion System
- Full Graphic LCD Display

By including every form of processing necessary to drive the signal from the mixer to the power amp, the DriveRack® PA allows you to eliminate all other processing devices normally found in large and cumbersome traditional drive rack systems of the past.

The DriveRack® PA Loud Speaker Management System includes two balanced XLR inputs, as well as six balanced XLR output connectors.

0.2 Service Contact Info

If you require technical support, contact dbx Customer Service. Be prepared to accurately describe the problem. Know the serial number of your unit - this is printed on a sticker attached to the top panel. If you have not already taken the time to fill out your warranty registration card and send it in, please do so now.

Before you return a product to the factory for service, we recommend you refer to the manual. Make sure you have correctly followed installation steps and operation procedures. If you are still unable to solve a problem, contact our Customer Service Department at (801) 568-7660 for consultation. If you need to return a product to the factory for service, you **MUST** contact Customer Service to obtain a Return Authorization Number.

No returned products will be accepted at the factory without a Return Authorization Number.

Please refer to the Warranty information on the following page, which extends to the first end-user. After expiration of the warranty, a reasonable charge will be made for parts, labor, and packing if you choose to use the factory service facility. In all cases, you are responsible for transportation charges to the factory. dbx will pay return shipping if the unit is still under warranty.

Use the original packing material if it is available. Mark the package with the name of the shipper and with these words in red: DELICATE INSTRUMENT, FRAGILE! Insure the package properly. Ship prepaid, not collect. Do not ship parcel post.

0.3 Warranty

This warranty is valid only for the original purchaser and only in the United States.

1. The warranty registration card that accompanies this product must be mailed within 30 days after purchase date to validate this warranty. Proof-of-purchase is considered to be the burden of the consumer.
2. dbx warrants this product, when bought and used solely within the U.S., to be free from defects in materials and workmanship under normal use and service.
3. dbx liability under this warranty is limited to repairing or, at our discretion, replacing defective materials that show evidence of defect, provided the product is returned to dbx WITH RETURN AUTHORIZATION from the factory, where all parts and labor will be covered up to a period of two years. A Return Authorization number must be obtained from dbx by telephone. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.
4. dbx reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same additions or improvements on products previously manufactured.
5. The foregoing is in lieu of all other warranties, expressed or implied, and dbx neither assumes nor authorizes any person to assume on its behalf any obligation or liability in connection with the sale of this product. In no event shall dbx or its dealers be liable for special or consequential damages or from any delay in the performance of this warranty due to causes beyond their control.



1.1 Rear Panel Connections



IEC Power Cord Receptacle

The DriveRack® PA comes with a power supply that will accept voltages ranging from 100V-120V at frequencies from 50Hz-60Hz. An IEC cord is included. EU version accepts 220V-240V at frequencies from 50Hz-60Hz.

Outputs 1-6

The output section of the DriveRack® PA offers six electronically balanced XLR connectors.

Inputs 1-2

The input section of the DriveRack® PA offers two electronically balanced XLR connectors.

+4/-10dBv Switch

This switch changes the level from either +4 or -10dBv.

Ground Lift Switch

The ground lift switch lifts the pin 1 chassis ground of both input XLR connectors.

1.2 Front Panel



RTA Input Jack

This balanced XLR input is used for the connection of an RTA microphone, which allows the user to “Pink” and optimize the EQ settings of any room through the use of the Auto EQ in the Wizard setup assistant.

RTA MIC Input Selector

Pressing the RTA MIC input button will engage the front panel RTA input XLR connector.

Data Wheel

The Data wheel of the DriveRack® PA is used to scroll through the program menu, load programs, select parameters and edit parameter values.

LCD Display

The backlit LCD display of the DriveRack® PA provides the user with all of the vital processing information of the DriveRack® PA including: signal routing, effect block editing and Wizard Setup functions. The display will also notify the user if any internal clipping is taking place within the unit. The following message will appear: **CLIP**.

Function Buttons

The function buttons of the DriveRack® PA allow direct access to all editing and navigating functions of the DriveRack® PA. The functions of the aforementioned buttons are as follows:

- <PREV PG> - is used to navigate back through the various pages of any module block.
- <NEXT PG> - is used to navigate forward through the various pages of any module block.
- <EQ> - is used to move to the EQ modules. Successive presses will move you through the EQ modules in the input section and through EQ modules located in the output section.
- <SUBHARMONIC> - This button is used to move to the Subharmonic Synthesizer module.
- <XOVER> - is used to move to the Crossover module.
- <FEEDBACK> - is used to move to the feedback elimination module.
- <COMP/LIMITER> - is used to move to the Compressor or Limiter modules.
- <DELAY> - is used to move to the Delay module.
- <PROGRAM> - is used to enter program mode when pressed.
- <UTILITY> - is used to access the the Utility menu.
- <STORE> - is used to store any program changes.
- <WIZARD> - is used to enter the Wizard section which includes: SYSTEM SETUP, AUTO EQ WIZARD and AFS WIZARD.

Input Meters

The DriveRack® PA provides the user with two independent six segment Lightpipe™ input meters that range from -30 to +20 dBu. These meters monitor the signal level right after the input module.

Threshold Meters

The threshold meters indicate that the threshold level has been exceeded within the Limiter section, and gain reduction may be taking place within the specific output channel.

Output Meters

The DriveRack® PA provides the user with six independent six-segment Lightpipe™ output meters that range from -30 to +20 dBu.

Power Switch

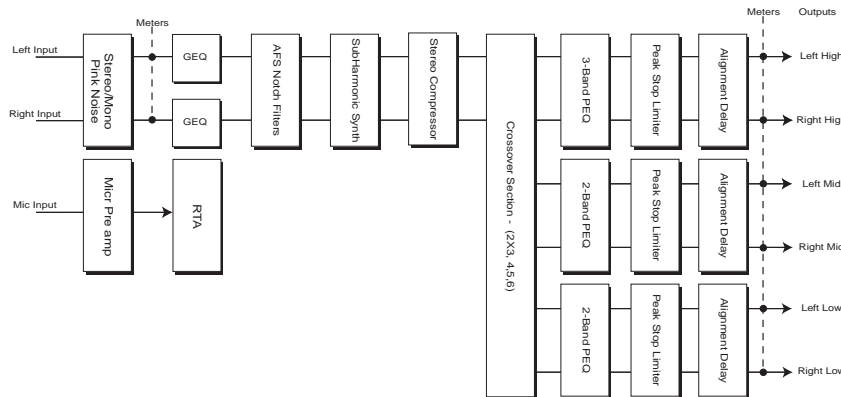
The Power Switch turns the DriveRack® PA on and off. **Note:** dbx Professional Products strongly recommends that power amplifiers connected to the DriveRack® PA, should be powered down prior to cycling the power on the DriveRack® PA.

1.3 Quick Start

For those of you that wish to jump right in, the following information has been provided to act as a quick start guide for optimizing performance of the DriveRack® PA.

Signal Path Block Diagram

The following diagram shows the logical and intuitive signal path of the input, effect modules, and output of the DriveRack® PA.



Connections

- When setting up the DriveRack® PA, make connections as follows:
- Always make connections prior to applying power to the unit.
- Connect the output from the sending device (mixer) to either of the two XLR inputs connectors shown below.
- Make output connections from any one of the six output XLR connectors shown below to the input of the selected power amps.



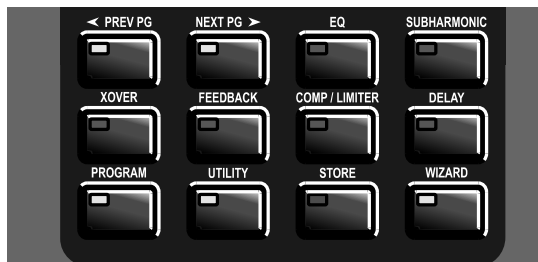
- If you will be “pinking” the room through the use of the RTA, connect the selected RTA microphone to the front-panel XLR input, and press the RTA input button.
- **IMPORTANT**- It is imperative that the power amps are turned off prior to cycling power to the Driverack® PA. Always make sure that your power amps are the last item turned on and the first turned off.

Once all of the connections have been made and the unit is powered up, you can navigate through the entire signal path of the DriveRack PA from the front panel of the unit. The display provides you with a clear and concise overview of each aspect of the signal path from the input to the output section.



The features of the front panel of the DriveRack® PA are as follows from left to right.
RTA MIC Input- This XLR input is used for the connection of a RTA microphone.

The RTA MIC input button is used to engage the RTA input connector. **LCD Display**- All operational information of the DriveRack® PA is displayed here. The display will also notify the user if any internal clipping is taking place within the unit. The following message will appear: **CLIP**. **Data Wheel** - The data wheel is used to scroll through the program menu of the DriveRack® PA. The Data Wheel is also used to perform editing functions to effects and utility menu features. **Button Array** - Operational editing is done using this 12 button array. A complete description of each button's functionality is listed below. **Input meters**- These two 6-segment LED meters monitor the input level of the DriveRack® PA directly after the input mixer. **Output meters** - These six 6-segment meters monitor the output levels of the DriveRack® PA directly after the output gain stage. **Threshold meters** - These six 1-segment meters (when lit) show that threshold level of the limiters has been exceeded.



DriveRack PA Wizard

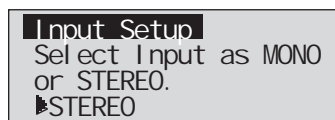
Now that you have made all of your audio connections and have made yourself familiar with the front-panel navigation of the unit, you can easily optimize your system through the use of the DriveRack® PA Wizard setup system. This feature of the DriveRack® PA allows for quick and hyper-accurate venue setups. The menu section of the Wizard offers System setup, Auto EQ and AFS (Advanced Feedback Suppression). The following will walk you through your venue setup.

- From program mode, press the **<WIZARD>** button and the display will appear as follows:



System Setup


- The arrow will indicate the selected Wizard setup. To select any one of the three options, rotate the **<DATA>** wheel. If you are performing the System setup, press either the **<NEXT PG>** button or the **<DATA>** wheel and the display will appear as follows:




- Simply rotate the **<DATA>** wheel to select either a Mono or Stereo input configuration. Once you have selected your input option, press the **<NEXT PG>** button and the display will appear as follows:

Graphic EQ Setup
 Select GEQ as Dual
 Mono or Stereo
 ▸Dual Mono

- Simply rotate the <DATA> wheel to select either a Dual Mono or Stereo linked 28-band Graphic EQ. Once you have selected your EQ option, press the <NEXT PG> button and the display will appear as follows:

Main Speaker
 Select Main PA 
 JBL SRX
 ▸SR4702X Passive

- Rotate the <Data> wheel to select any one of the numerous custom-tuned MAIN speaker options available. If the speaker being used is not specified in the menu, select CUSTOM. Once you have selected your Main speaker option, press the <NEXT PG> button and the display will appear as follows:

Sub Speaker
 Select Sub PA 
 ▸None

- Rotate the <Data> wheel to select any one of the numerous custom-tuned SUB speaker options available. Once you have selected your SUB speaker option, press the <NEXT PG> button and the display will appear as follows:

High Amplifier
 Select an amplifier
 ▸Crwn MacroTech 1202

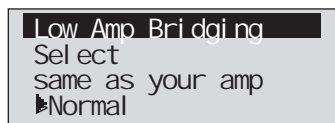
- You are now prompted to select a power amp by rotating the <DATA> wheel to select any one of the numerous custom-tuned Amplifier options available. Note that the top line of the display will either read High, Mid or Low depending on your selected speaker setup selections. Once you have selected your Amp tuning option (depending on the amp type), you will select the specified amplifier sensitivity setting if applicable.

High Amplifier
 Select Sensitivity
 Crwn MacroTech 1202
 ▸0.775 Volts

- Rotate the <DATA> wheel to select the amplifier manufacturer's specified amplifier sensitivity setting. Once set, press the <NEXT PG> button, and you will now be given the option of optimizing your amp levels with the DriveRack PA. The page will appear something like this:

High Amp Level
 Adjust Level
 same as your amp 
 ▸25

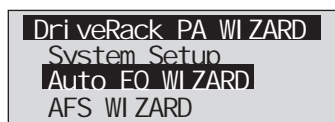
- You will now rotate the <DATA> wheel to match the same setting as your amplifier of choice. Note that based on your amp selection, the DriveRack® PA will initially display the recommended setting of that particular amp for obtaining maximum headroom. This is done to match unity gain from the DriveRack® PA and your amplifier. Note that if Sub Speakers are included in the speaker selection, you will be asked if the sub woofer is bridged or mono. For more information regarding Amplifier gain settings, please refer to the **System Setup and Gain Structure** information located in the appendix section.
- Once you have completed your amp level settings, you will press the <NEXT PG> button, where you will be asked to select a bridged or normal setting for your low amp (if used). The display will appear as follows:



- Once you have made a bridged or mono selection, press the <NEXT PG> where the unit will prompt <DATA> wheel to load your new settings. If you do not wish to load the settings either press the <PROGRAM> button or use the <PREV PG> button to re-edit your settings. By using your selections, the DriveRack® will automatically generate a new program and speaker selection which are used to choose the correct crossover type, parameters, speaker compensation EQ and delay are also adjusted by the speaker selection. Amplifier parameters are used to set the limiters to stop amplifier clipping and balance out the crossover levels. You may find that you want to re-adjust the crossover levels based on your taste and type of music.

Auto EQ WIZARD

- Once you have custom-tailored your system setup, you can now proceed to EQ your system. The Auto EQ Wizard automatically adjusts the response of the system by producing pink noise and adjusting the Graphic EQ until the RTA matches a selected response. From the DriveRack® PA Wizard menu, rotate the <DATA> wheel until the display appears as follows:

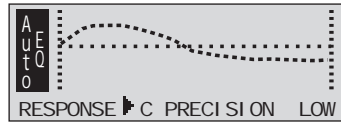


- Either press the <NEXT PG> button or rotate the <DATA> wheel and the display will read:



- The display is prompting you to connect an RTA-specific microphone to the front-

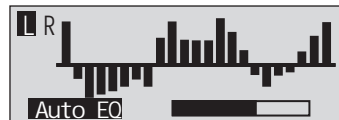
panel RTA XLR input, and press the **<RTA Input>** button. It is recommended that you use the optional dbx RTA-M microphone. If you wish to bypass the previous steps all together, from program mode, press the **<RTA Input>** button, or press the **<NEXT PG>** button and the display will appear something like this:



- You can now select any one of the several different Frequency responses for the Auto EQ. The options are: Flat (0), and Response A-D, and Low, Medium and High Precision. Once you have selected your desired EQ Frequency response, press the **<NEXT PG>** button and the display will appear as follows:



- You will now proceed to “Pink” the room by adjusting the Pink level. The range of bar graph is -30dBu to +20dBu. Be certain to raise the pink noise level to the level to be used during the performance. Once the Pink level has been adjusted to the desired volume, press the **<NEXT PG>** button and the Auto EQ sequence will begin. The display will either show the graphic EQ or the RTA. Rotating the **<DATA>** wheel clockwise and counter clockwise will toggle between the two modes. You can also select either mode to default to in the Utility menu. Regardless, the display will appear something like this:



- At this point, the DriveRack® PA will automatically EQ the room. If you are using independent left and right graphic EQs, you will auto EQ each side independently. If you are using a stereo-linked EQ, both sides will be EQ'd simultaneously. Auto EQ can be aborted at any point in the process by pressing the **<NEXT PG>** button. Upon completion of the Auto EQ Wizard, you can return to program mode by releasing the **<RTA Input>** button and pressing the **<PROGRAM>** button.

For more information regarding the Auto EQ section, please refer to the Auto EQ Optimization Tips information located in the Appendix section.

AFS WIZARD

- The DriveRack® PA also offers its exclusive AFS (Advanced Feedback Suppression) module. This unique feature now makes unwanted feedback in a PA system a thing of the past. The AFS Wizard will lead you through the setup of of the fixed filters of the AFS module. From DriveRack® PA Wizard menu, rotate the **<DATA>** wheel until the display appears as follows:


```
DriveRack PA WIZARD
System Setup
Auto EQ WIZARD
AFS WIZARD
```

- Press the <NEXT PG> button and the display will read:

```
AFS
Please turn down the
mixer gain. Press
NEXT PG when done.
```

- Once the gain level of the mixer has been turned down, press the <NEXT PG> button and the display will read:

```
AFS
Select Number of
fixed filters. ▶ 6
F F F F F L L L L L L L
```

- You will now use the <DATA> wheel to select the number of fixed filters. This will range from values 0-12. The total number of filters will stay at 12, and the number of live filters will be = Total Num Filters – Num Fixed. Live and Fixed filter types differ in that FIXED mode filters are automatically assigned to a frequency creating feedback, thus remaining at that frequency until cleared by the user. In LIVE mode, live filters automatically detect and remove feedback frequencies in the presence of audio (music or speech). When all of the live filters have been used, they begin to round robin. Essentially this means that the first filter set is replaced where a new feedback is detected and notched out. This mode is useful because feedback frequencies may change as the microphone is moved, and/or as the characteristics of the venue change.

The Fixed/Live filter usage will be indicated at the bottom of each page of the feedback elimination effect. 'F' indicates an available fixed filter, and 'L' indicates an available live filter. A blocked out F or L indicates a filter that is set, or in use. Once the desired number has been selected, press the <NEXT PG> and the display will read:

```
AFS
Select fixed type
▶ Speech
```

- These types pertain to the Q, sensitivity, and algorithm type. The filter is established by using the formula: $Q = \text{Freq} / \text{Bandwidth}$. This means that a higher Q will produce a filter that is more narrow. Values are: Speech (Bandwidth = 1/5 octave and $Q=7.25$) Music Low (Narrow notch filter, Bandwidth = 1/10 octave and $Q=14.5$), Music Medium (Very Narrow notch filter, Bandwidth = 1/20 octave and $Q=29$) Music High (Ultra Narrow notch filter, Bandwidth = 1/80 octave and $Q=116$). To guarantee that feedback is suppressed at lower frequencies, the AFS may place wider notch filters at these lower frequencies (below 700 Hz). Once the desired fixed

type has been selected, press the <NEXT PG> button and the display will read:

```
Slowly Increase the  
mixer gain to  
desired level.  
F F F F F L L L L L L
```

- You are now prompted to raise the output gain of the mixer to the level of the performance. Note that you are raising the mixer gain without an input signal running through the mixer. Once the desired level has been set and all of the fixed filters have been assigned, the unit will automatically move you to the page that indicates the fixed filter setup has been completed. If you have reached the performance level setting and all of the fixed filters have not been used, you may want to return to the page that selects the number of fixed filters and re-adjust the number of fixed in order to provide you with additional live filters. Regardless, once you have completed the setup, the display will read:

```
AFS  
Fixed Filter Setup  
Done  
F F F F F L L L L L L
```

- To return to program mode, simply press the <PROGRAM> or <NEXT PG> button. For more information regarding feedback elimination, please see the AFS parameters of the Detailed parameters section.

EDITING FUNCTIONS



Editing
Functions

The DriveRack® PA has been carefully designed and engineered to ensure that all aspects of operation are intuitive and logical. Simply stated, the DriveRack® PA operating system was designed with user's best interest in mind.

2.1 Basic Navigation Modes

Navigational aspects of the DriveRack® PA are clear, concise and more important: flexible. The DriveRack® PA provides you with essentially three different modes of navigation when performing program edits. **1. FX buttons** - This array of 12 FX buttons is your primary mode of directly accessing any effect module. **2. NEXTPG & PREVPG** page buttons - Successive presses of the **NEXTPG** or **PREVPG** page buttons will move the user from one page to the next in an effect block. **3. Data Wheel** - The Data Wheel is used to move through the program menu of the DriveRack® PA. The Data wheel is also used to change the values of the selected parameter by simply rotating the wheel. Pressing the Data wheel will toggle between the available parameters on any selected page of the currently selected effect module.

2.2 FX Button Array Overview



PREVIOUS PAGE - Moves to the previous page in the currently selected effect menu.



NEXT PAGE - Moves to the next page in the currently selected effect menu.



EQ - Selects the EQ effect menu. This is the EQ section located prior to the crossover section. Successive presses will rotate through the various pre-crossover 28 band EQ and Post-xover PEQ section modules.



SUBHARMONIC - Selects the Subharmonic Synthesizer section.



XOVER - Selects the Crossover section.



FEEDBACK - Selects the Advanced Feedback Suppression (AFS) effect section.



COMP/LIMITER - Selects the Compressor and the Limiter effect section. Successive presses will move from the Compressor (pre-xover) to the Limiter (post-xover).



DELAY - Selects the Alignment Delay effect module.



PROGRAM - This button is used to enter the Program screen from any sub section within the unit when pressed.



UTILITY - Selects the Utility menu of the DriveRack PA.



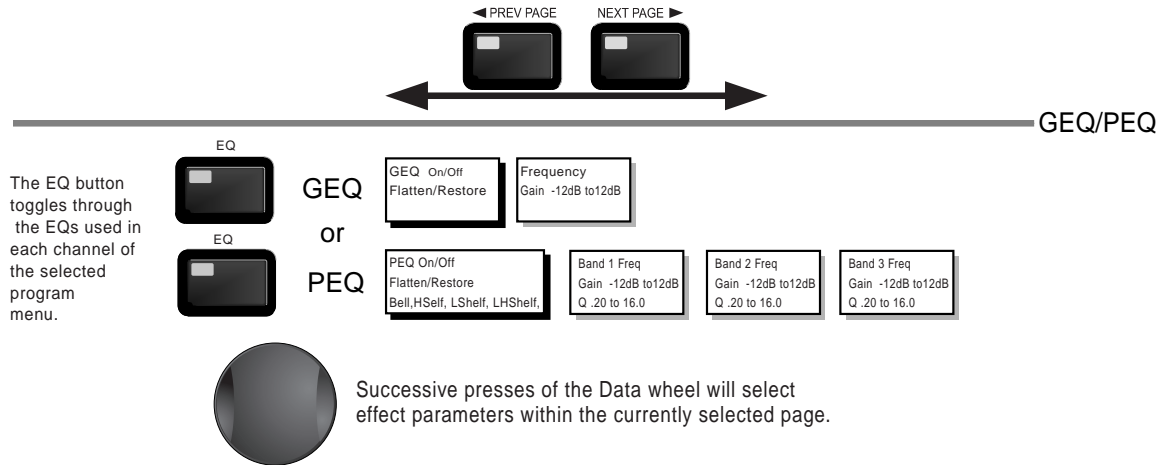
STORE - The store button is used to store program edits.



WIZARD - Enters the DriveRack PA Wizard setup menu which includes: System Setup, Auto EQ setup and AFS Wizard.

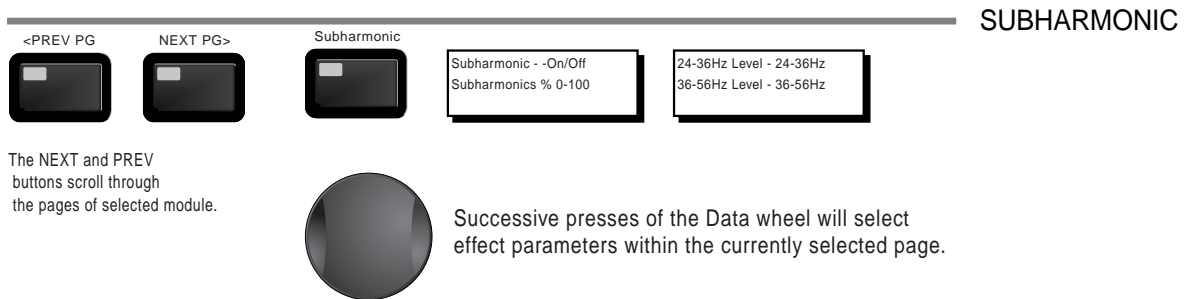
2.3 Navigating the EQ Section (28-GEQ and PEQ)

To edit the parameters of the EQs used in a selected program, simply use the following procedure. From program mode, press the EQ button to reach the EQ module to be edited. Successive presses of the EQ button will move through each channel. Navigate through the Pages of the selected EQ section by depressing "Next Page" or "Prev Page" successively until arriving at the desired Page.



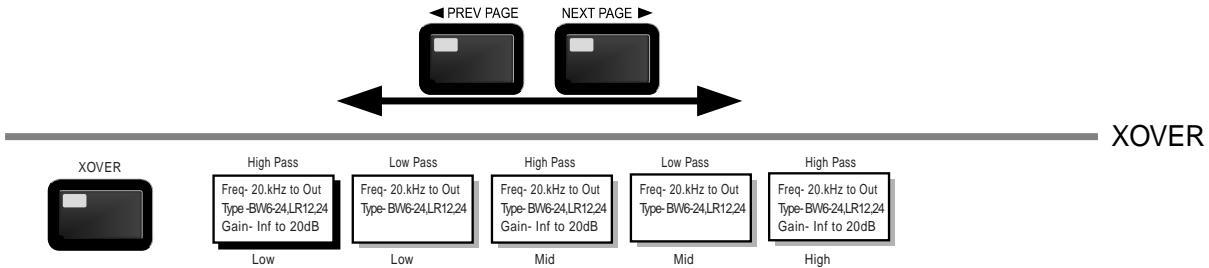
2.4 Navigating the Subharmonic Section

From program mode, press the SUBHARMONIC button. Pressing the Data Wheel will select the effect parameter to be edited.



2.5 Navigating the XOVER Section

To edit the parameters of the Crossover used in a selected program, simply use the following procedure. From program mode, press the X-OVER button. Once you have reached the Crossover module, Navigate through the Pages of the selected Crossover module by pressing the "Next Page" or "Prev Page" buttons successively until arriving at the desired Page.



Successive presses of the Data wheel will select effect parameters within the currently selected page.

2.6 Navigating the Feedback Suppression Section

From program mode, press the FEEDBACK button. Pressing the Data Wheel will select the effect parameter to be edited.



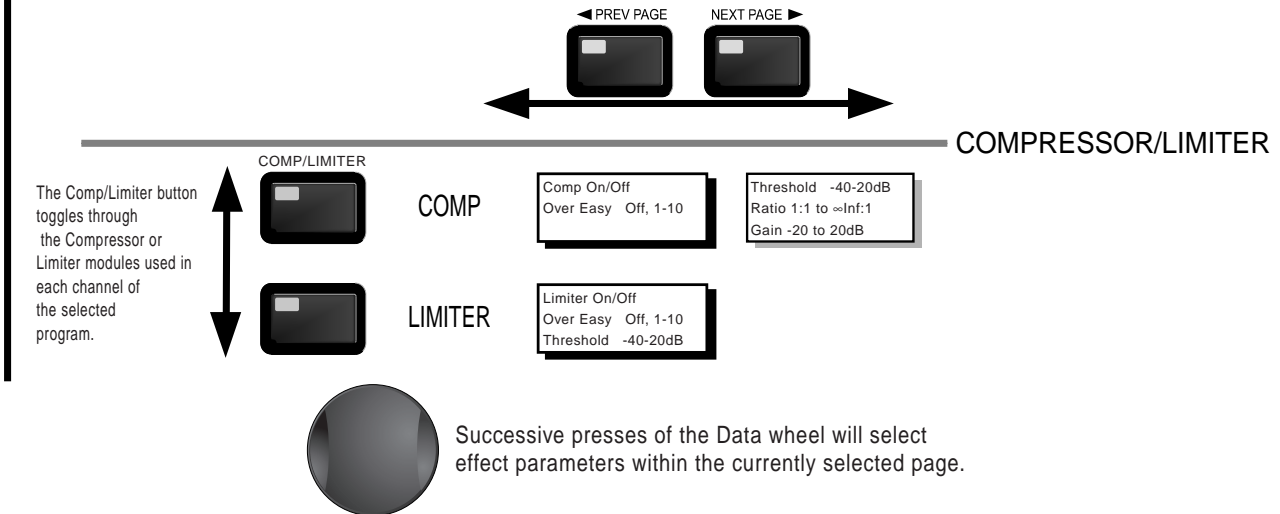
The NEXT and PREV buttons scroll through the pages of selected module.



Successive presses of the Data wheel will select effect parameters within the currently selected page.

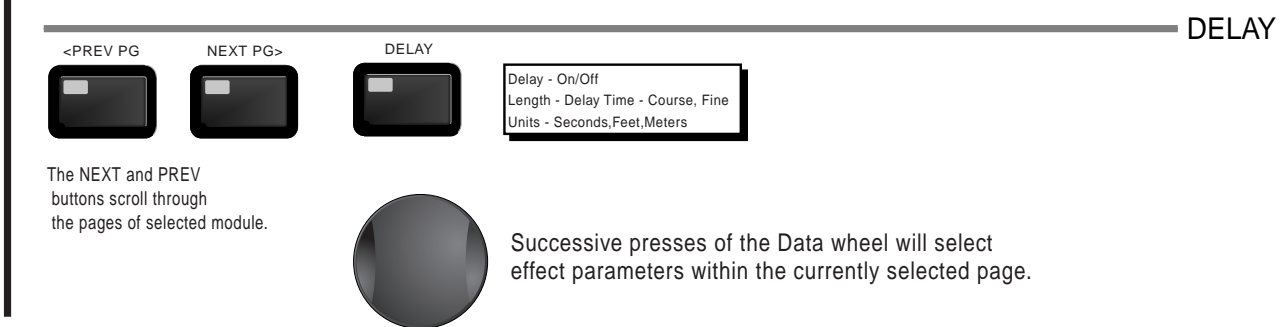
2.7 Navigating the Comp/Limiter Section

From program mode, press the comp/limiter button to move to either the Compressor or Limiter module. Once you have reached the Crossover module, successive presses of COMP/LIMITER button will move through each channel that utilizes either a Compressor (pre Crossover) or Limiter (post-crossover) module. Navigate through the Pages of the selected compressor or Limiter module by pressing the "Next Page" or "Prev Page" buttons successively until you arrive at the desired Page.



2.8 Navigating the Delay Section

From program mode, press the Delay button. Pressing the Data Wheel will select the effect parameter to be edited.



2.9 Navigating the Utility Section

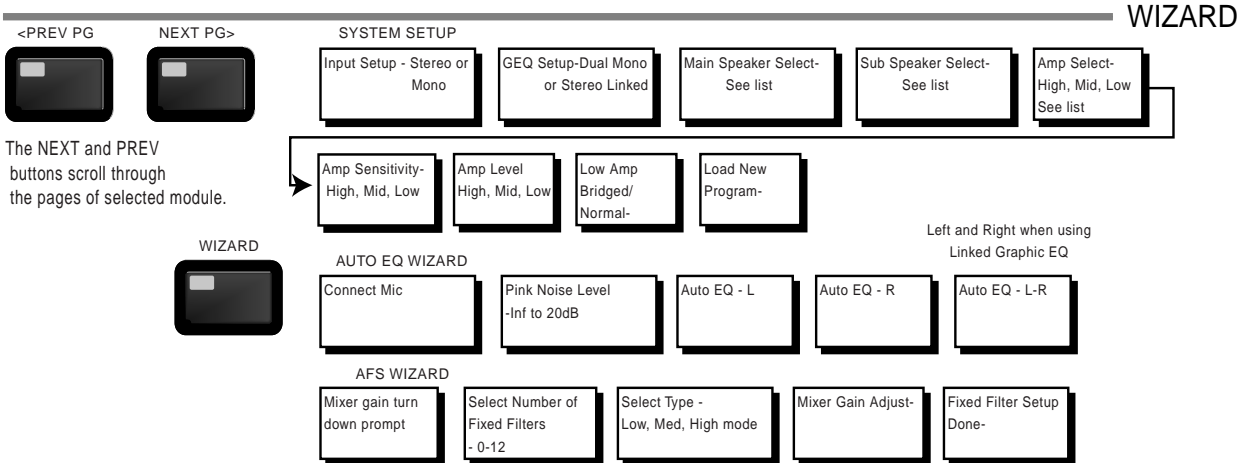
From program mode, press the UTILITY button. Pressing the Data Wheel will select the effect parameter to be edited.



Successive presses of the Data wheel will select effect parameters within the currently selected page.

2.10 Navigating the Wizard Section

From program mode, press the WIZARD button. Pressing the Data Wheel will select the effect parameter to be edited.



The NEXT and PREV buttons scroll through the pages of selected module.



Successive presses of the Data wheel will select effect parameters within the currently selected page.

OPERATING FUNCTIONS



The Operation section of the DriveRack® PA will be your key to successful navigation of the operation of the DriveRack® PA. The following information provides descriptions about program functions and operating functions of the DriveRack® PA.

3.1 Program Definition

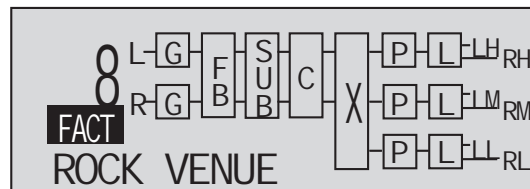
The first step in understanding the thorough programming capabilities of the DriveRack® is to understand the elements involved, that when combined, define a complete “program.” Within an individual program, there are several levels of editing that make up the complete program. After turning the unit on, you will be at the “program” mode level. This level supplies the user with current program information such as: current signal path, effect usage, and program name. From this point, the DriveRack® PA gives you the option of entering subsequent levels of operation that are dedicated to program editing. The Utility menu mode is accessed via the utility menu, and is not part of a single program.

3.2 Navigating Factory Programs

From the factory, the DriveRack® PA is shipped with 25 factory programs that utilize carefully constructed routing configurations that have been designed to accommodate virtually any sound reinforcement and installation application. The factory programs offer a clear and concise explanatory title to help get you up and running in a timely manner. These programs can also be used as templates or starting points for the user to create custom programs.

Selecting Programs:

The quickest way to get up and running with the DriveRack® PA is to use any one of the factory programs that are available in the box. When you reach the factory program, a FACT icon will appear above the factory program name. From program mode, use the <DATA> wheel to scroll through the various programs. As each factory program is selected, the display will clearly indicate the title that is directly related to a specific application. Once a program is selected, press the <DATA> wheel to load the program. The display will appear something like this:



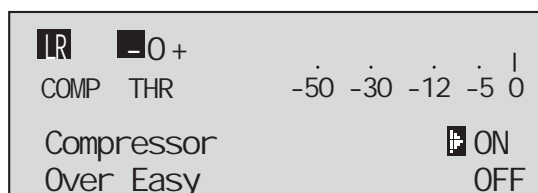
Navigation Modes

The function buttons of the DriveRack® PA allow direct access to all editing and navigating functions of the DriveRack® PA. The functions of the aforementioned buttons are as follows:

- <PREV PG> - is used to navigate back through the various pages of any module block.
- <NEXT PG> - is used to navigate forward through the various pages of any module block.
- <EQ> - is used to move to the EQ modules. Successive presses will move you through the EQ modules in the input section and through EQ modules located in the output section.
- <SUBHARMONIC> - This button is used to move to the Subharmonic Synthesizer module.
- <XOVER> - is used to move to the Crossover module.
- <FEEDBACK> - is used to move to the feedback elimination module.
- <COMP/LIMITER> - is used to move to the Compressor or Limiter modules.
- <DELAY> - is used to move to the Delay module.
- <PROGRAM> - is used to enter program mode when pressed.
- <UTILITY> - is used to access the the Utility menu.
- <STORE> - is used to store any program changes.
- <WIZARD> - is used to enter the Wizard section which includes: SYSTEM SETUP, AUTO EQ WIZARD and AFS WIZARD.

3.3 Editing Factory Programs

Once you have reached the module that you wish to edit, simply use the <PREV PG> and <NEXT PG> buttons to move through the pages within the module. The <DATA> wheel is used to edit parameter values. The following illustration shows an example of the Comp module in edit mode:



Note that the arrow indicates the currently selected parameter for editing. To select parameters to edit from the current page, simply press the <DATA> wheel until the arrow is pointing to the parameter that you wish to edit.

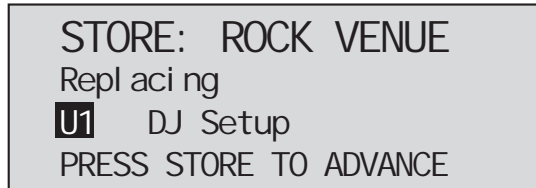
Once you are satisfied with the changes that have been made to a factory or user program, the DriveRack® allows you to save these changes as a custom USER program by pressing the <STORE> button, and the display will appear as follows:

```

NAME:  ROCK VENUE
DATA - SELECTS CHAR
PREV/NEXTPG - LEFT/RI GHT:
PRESS STORE TO ADVANCE

```

- Rotating the <DATA> wheel will change the icons on the currently selected position.
- Pressing the <DATA> wheel will toggle between upper and lowercase letters, numbers or symbols.
- Use the <PREV PG> and <NEXT PG> button to move icon positions.
- Once the desired title has been written, press the <STORE> button again and the display will now appear something like this:



STORE: ROCK VENUE
Replaci ng
U1 DJ Setup
PRESS STORE TO ADVANCE

- Rotate the <DATA> wheel to select the program to be replaced and press the <STORE> button and the existing program will be replaced with the new program.

The DriveRack® PA will store 25 user programs in addition to the 25 factory programs. Note: Factory programs cannot be over-written. When storing changes to a Factory program, you must replace an existing User program.

DETAILED PARAMETERS



The DriveRack® PA offers complete editing flexibility, by offering in-depth control over every parameter within each effect module. The following section will provide you with descriptions and explanations of all parameters within the DriveRack® PA.

4.1 Pre-Crossover

The DriveRack® PA's Pre-Crossover EQ section may be configured as a single or linkable 28 band graphic EQ.

EQ On/Off

Turns the GEQ on and off.

Flatten/Restore

This parameter either flattens the GEQ or restores the GEQ to the last setting before flattening. The DriveRack unit allows you to leave the EQ edit window and return without losing the edited EQ settings.

Frequency (F) 31.5Hz to 16.0kHz

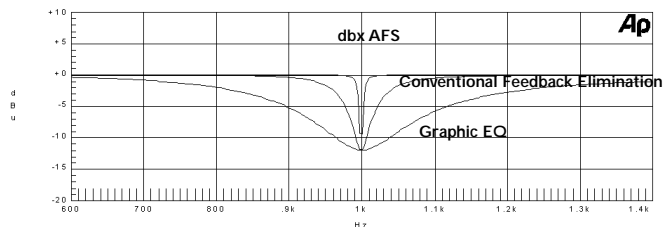
This parameter allows you to select any one of the 28 available frequencies.

Gain (G) -12 to +12 dB

This parameter allows you to adjust the level of any one of the 28 bands of the GEQ in .5 dB increments.

4.2 Feedback Eliminator

The DriveRack® PA is the first product in the dbx family to offer the exclusive patent pending AFS (Advanced Feedback Suppression) feedback elimination module. Feedback is caused when a microphonic signal such as a guitar pickup or microphone is reproduced by an amplification and is repeatedly picked up in phase. The AFS uses Precision Frequency Detection and state-of-the-art processing to determine the exact portions of a given frequency of your feedback that need to be removed (instead of taking out large sections of your sound). The AFS module of the DriveRack® PA allows the user to optimize the elimination of feedback. In the past, graphic equalizers were used to eliminate feedback from a system. This was an acceptable method for eliminating feedback, but when this method was precision tested, the result clearly showed that a single 1/3 octave EQ slider was removing approximately half of the signal power. With the AFS, the module removes the feedback automatically and the proprietary, precision AFS filters remove only a fraction of the frequency spectrum. The following diagram shows AFS as opposed to competing, competitive feedback eliminators and conventional graphic EQs:



AFS On/Off

Turns the AFS module on and off. If AFS is Off, the filters are bypassed, and the algorithm is halted (the filters are not updated). If AFS is On, the filters are active, and they are updated according to the current selected mode (Fixed or Live).

Clear Live/All

This parameter clears the filters. If Clear Live is selected, then (if invoked) the live filters are reset. If Clear All is selected, then (if invoked) all of the filters are reset. When either Clear Live or Clear All is selected, the third parameter row displays "Start w/ Data Wheel." If Clear (none) is selected, then nothing is displayed on this row. When the user moves to this third row and turns the Data Wheel (when Clear Live or Clear All is selected) then the filter reset is invoked.

Mode - Live or Fixed

When the mode is Fixed, the algorithm updates only the fixed filters. When the mode is Live, the algorithm updates only the live filters. In FIXED mode, the filters are automatically assigned to a frequency creating feedback, thus remaining at that frequency until cleared by the user. Fixed mode is used before the performance without any input signal. In LIVE mode, the live filters automatically detect and remove feedback during the performance. When all of the live filters have been used, they begin to round robin. Essentially this means that the first filter set is replaced where a new feedback is detected and notched out. This mode is useful because feedback frequencies may change as the microphone is moved, and/or as the characteristics of the venue change.

Type - Speech, Low Music, Medium Music and High Music

If Fixed or Live mode is chosen, the text will read "Type." The options will be Speech, Music Low, Music Medium and Music High. These types pertain to the Q, sensitivity, and algorithm type. Values are; Speech (Bandwidth = 1/5 octave and Q=7.25) Music Low (Bandwidth = 1/10 octave and Q=14.5) Music Medium (Bandwidth = 1/20 octave and Q=29) Music High (Bandwidth = 1/80 octave and Q=116). Note: To guarantee that feedback is suppressed at lower frequencies, the AFS may place wider notch filters at these lower frequencies (below 700 Hz).

Number Fixed - 0-12

This will range from values 0-12. The total number of filters will stay at 12, and the number of live filters will be = Total Num Filters - Num Fixed. If this is changed before the filters are reset, then the filters will be reset one by one as the number changes. For example, if the number of Fixed filters goes down, then the last fixed filter set will be reset. Likewise, if the number of Fixed filters goes up (and thus the number of live filters goes down), then the last live filter set will be reset. The Fixed/Live filter usage will be indicated at the bottom of each page of the feedback elimination effect. 'F' indicates an available fixed filter, and 'L' indicates an available live filter. A blocked out F or L indicates a filter that is set, or in use.

Live Filter Lift (On/Off)

This parameter turns the Live Filter Lift on and off.

Lift After - 5 sec to 60 min

This parameter allows the user to setup the box so that the Live filters will automatically be removed after a set time (as indicated by the "Lift After" parameter). It ranges from 5 seconds to 60 minutes. This feature is useful if the microphone being used is moved or the characteristics of the venue change over time. As example; a filter placed minutes ago will not be presently preventing feedback. This feature removes unnecessary filters from the spectrum to increase sonic quality. If the feedback is still there (after the filter is removed), it will catch it and notch it out the same.

4.3 Subharmonic Synthesizer

The Subharmonic Synthesizer module has been specifically optimized to enhance Bass audio material for use in a variety of professional applications, including nightclub and dance DJ mixing, theatre and film sound, music recording, live music performance and broadcasting. The Subharmonic Synthesizer module's two separate bands of subharmonic synthesis provide the best combination of smoothness and control, and the independent low frequency boost circuit is designed to get the most out of high-performance low frequency speaker systems.

Sub-Harmonic Synth - On/Off

Turns the Subharmonic Synth module on and off.

Sub-Harmonics Synth - 0 to 100%

This parameter sets the overall level of the Subharmonic Synthesizer.

24-36Hz and 36-56Hz (Subharmonic Synthesis) Level - 0 to 100%

These controls individually let you customize the amount of the respective synthesized frequencies to be added in, tuning the ultimate bass response of your system to taste. For example, if the sound is too woofy or growly, try turning down the 36Hz-56Hz level. If your woofers are bottoming out (making a ticking, popping sound), try turning down the 24Hz-36Hz level. You may find that a setting produces fine results in one room, but produces too much boominess in another. If this occurs, adjust the controls as needed, (e.g., increase one or the other of the band levels). Experimentation will pay off with smooth, full, deeply extended bass. Remember, you are not selecting a frequency. You are controlling the overall level of each band.

4.4 Crossover

The Crossover is used to divide the input signal into several frequency bands. This allows the user to drive the speaker in its optimum frequency range and send each output separately for more efficient use of amplifier power. The DriveRack® PA Crossover can be configured as a 2x3, 4, 5, or 6. Appendix A.5 illustrates each of the available crossovers. The High frequency output is created using a High-Pass filter. The Mid and Low outputs are created using Band Pass filters consisting of Low-Pass and High-Pass filters. When editing Crossover parameters the frequency band is indicated by the highlighted H, M, or L in the top left corner of the screen. The High-Pass or Low-Pass filter being edited is indicated by the highlighted edge in the graphics area. For each Low-Pass filter there are two parameters:

Frequency

Adjusts the frequency of the Low Pass filter from 20 to 20KHz.

Type

Selects the filter type. Selections are BW 6,12,18,24 for Butterworth type filter with slope of 6, 12, 18 or 24 dB/Octave and LR12, 24 for Linkwitz-Riley type with slope of 12 or 24 dB/Octave.

For each High Pass filter there are three parameters and they are follows:

Frequency

Adjusts the frequency of the High Pass filter from 20 to 20KHz.

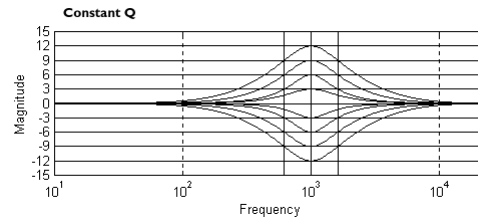
4.5 Post-CROSSOVER PEQ

In addition to the pre-crossover EQ options within the signal path, the DriveRack® PA also offers a 2 or 3-band parametric EQ after the crossover section. The parameters for the post-crossover EQ are as follows and are user adjustable.

PEQ On/Off

Turns the PEQ band on and off.

The following figure shows the constant Q parametric filter.

**Flatten/Restore**

This parameter either flattens the PEQ or restores the PEQ to its original shape.

Type

This parameter selects the PEQ type. Types include: 1. Bell-All parametrics are bell-shaped 2. HShelf - One shelf is High, while all others are bell 3. LShelf - One shelf is Low, while all others are bell and 4. LHSshelf - One shelf is High and one is Low, and the others are bell.

Band (1-3) Frequency 20Hz to 20kHz

Selects the frequency of the selected band of the parametric EQ.

Level (1-3) -12dB to 12dB

Sets the peak level of the selected parametric EQ.

Q (1-3) 0.20 to 16 dB

Sets the Q or Bandwidth of the selected Parametric EQ.

4.6 Compressor/Limiter

The DriveRack® PA also offers Compression and Limiter modules. The Compressor is a full bandwidth Stereo Compressor located prior to the Crossover. The Compressor is the perfect tool for tightening uneven signal sources such as vocals and guitars. The Limiters are located on each stereo output channel and have been strategically placed for speaker and amplifier protection. Note that Compressor/Limiter threshold metering can be observed on page two of the Utility section. The parameters for the Compressor/Limiter are as follows and are user adjustable.

COMPRESSOR

Compressor On/Off

Turns the Compressor module on and off.

OverEasy (O) Off to 10

There are ten levels of OverEasy® that can be used for the limiters. The point when the compressor starts to compress is the "knee." When the compressor starts to reduce the level of a signal abruptly as it passes over the threshold, this is called "hard knee" compression. OverEasy® (soft knee as it is sometimes called) is when the volume of the sound is compressed gradually. OverEasy® compression starts to compress before the level of the signal reaches the threshold and reaches full compression after the level has gone above the threshold. OverEasy® compression, by its very nature, sounds much smoother and more natural and will be used for most applications. When it is gentle (natural sounding or light) compression that you are looking for, the compressor offers VariKnee™. VariKnee™ gives you ten levels of OverEasy® compression to choose from (1 being almost hard knee and 10 being the most OverEasy®). This lets you choose the exact knee that is needed for the dynamic effect you are looking for.

Threshold (T) -40 to +20dBu

Threshold is the signal level at which the unit starts to compress the signal. If the level is set to -10 dBu, than any signal larger than -10 dBu is compressed while any signal that has a level that is lower than -10dBu is left at the same signal level. Light compression is where only the loudest parts of the signal go over the threshold. Very heavy compression can be achieved by setting the threshold low enough that almost the entire signal content is over the threshold. For most signals the most natural compression is achieved when most of the signal content remains just below the threshold and only the peaks cross the threshold.

Ratio (R) 1.0 to Inf:1

Ratio is the amount the unit reduces the signal level of the sound that is above the threshold. A 2:1 ratio means that if the incoming signal is 2dB over the threshold the unit will compress the signal, and outputs a signal that only goes 1dB over the threshold. For light compression choose a lower ratio, while a heavy compression requires a higher ratio. A setting of Inf:1 makes the compressor act as a limiter.

Gain (G) -20 to +20 dB

This parameter is used to compensate for the gain lost during compression. By using heavy compression on a signal and then boosting the signal with the output gain, the user can create a signal that sounds much louder than it actually is.

LIMITER

Limiter On/Off

Turns the Limiter module on and off.

OverEasy (O) Off to 10

There are ten levels of OverEasy® that can be used for the limiters. The point when the compressor starts to compress is the "knee." When the compressor starts to reduce the level of a signal abruptly as it passes over the threshold this is called "hard knee" compression. OverEasy® (soft knee as it is sometimes called) is when the volume of the sound is compressed gradually. OverEasy® compression starts to compress before the level of the signal reaches the threshold and reaches full compression after the level has gone above the threshold. This OverEasy® compression, by its very nature sounds much smoother and more natural and will be used for most applications. When it is gentle (natural sounding or light) compression that you are looking for, the compressor offers VariKnee™. VariKnee™ gives you ten levels of OverEasy® compression to choose from (1 being almost hard knee and 10 being the most OverEasy®). This lets you choose the exact knee that is needed for the dynamic effect you are looking for.

Threshold (T) -40 to +20dBu

Threshold is the signal level at which the unit starts to compress the signal. If the level is set to -10 dBu, any signal larger than -10 dBu is compressed while any signal that has a level that is lower than -10dBu is left at the same signal level. Light compression is where only the loudest parts of the signal go over the threshold. Very heavy compression can be achieved by setting the threshold low enough that almost the entire signal content is over the threshold. For most signals, the most natural compression is achieved when most of the signal content remains just below the threshold and only the peaks cross the threshold.

4.7 Alignment Delay

The DriveRack® PA offers alignment delay to use for compensating signal delay that occurs due to internal speaker components such as horns, speakers and subwoofers within speaker cabinets. The alignment delay is also ideal to compensate for the difference in high and low frequency speed. The parameters for the alignment delay are as follows and are user adjustable:

Delay On/Off

Turns the Speaker Alignment delay on and off.

Units - Seconds, Feet or Meters

Selects the unit of measurement for the delay.

Length

Sets the amount of Speaker Alignment delay time. Delay times include: Seconds- 0.00-10.00 ms, Feet- 0.00-11.3 and Meters - 0.00-3.43. Fine adjustments are made in 20uS increments. Coarse adjustments are made in 21uS increments.

USER NOTES

APPLICATION GUIDE



This Application guide section is provided to offer suggested installation applications of the DriveRack® PA that will allow you to optimize peak performance of the units. Note that the 25 included application programs represent the extensive flexibility of the DriveRack® units. These applications can be used verbatim, or as sample reference guide templates for designing countless audio applications.

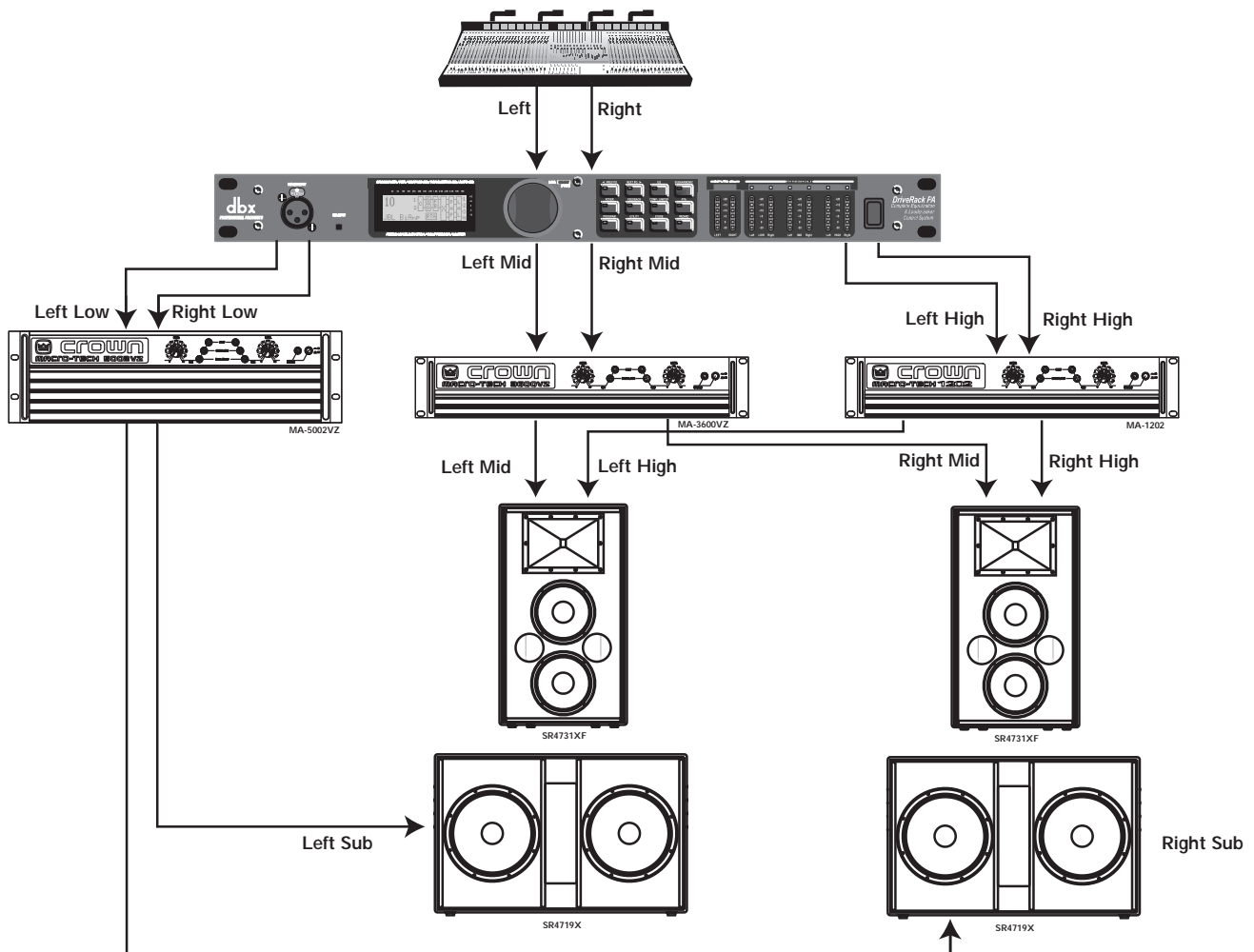
5.1 2X6 Crossover

Hardware

1. Connect the outputs from the mixer to the inputs of the DriveRack®.
2. Connect the outputs of the DriveRack® PA and run to the selected speaker amplifier.
3. Make sure that the mixer and power amps are turned off prior to powering up the DriveRack® PA.

Software

1. From Program mode, select factory program #F10 (SR4702 2X6) as a template, or use the Wizard to setup the specific program.
2. Once the program has been chosen, press the DATA wheel to load the program.



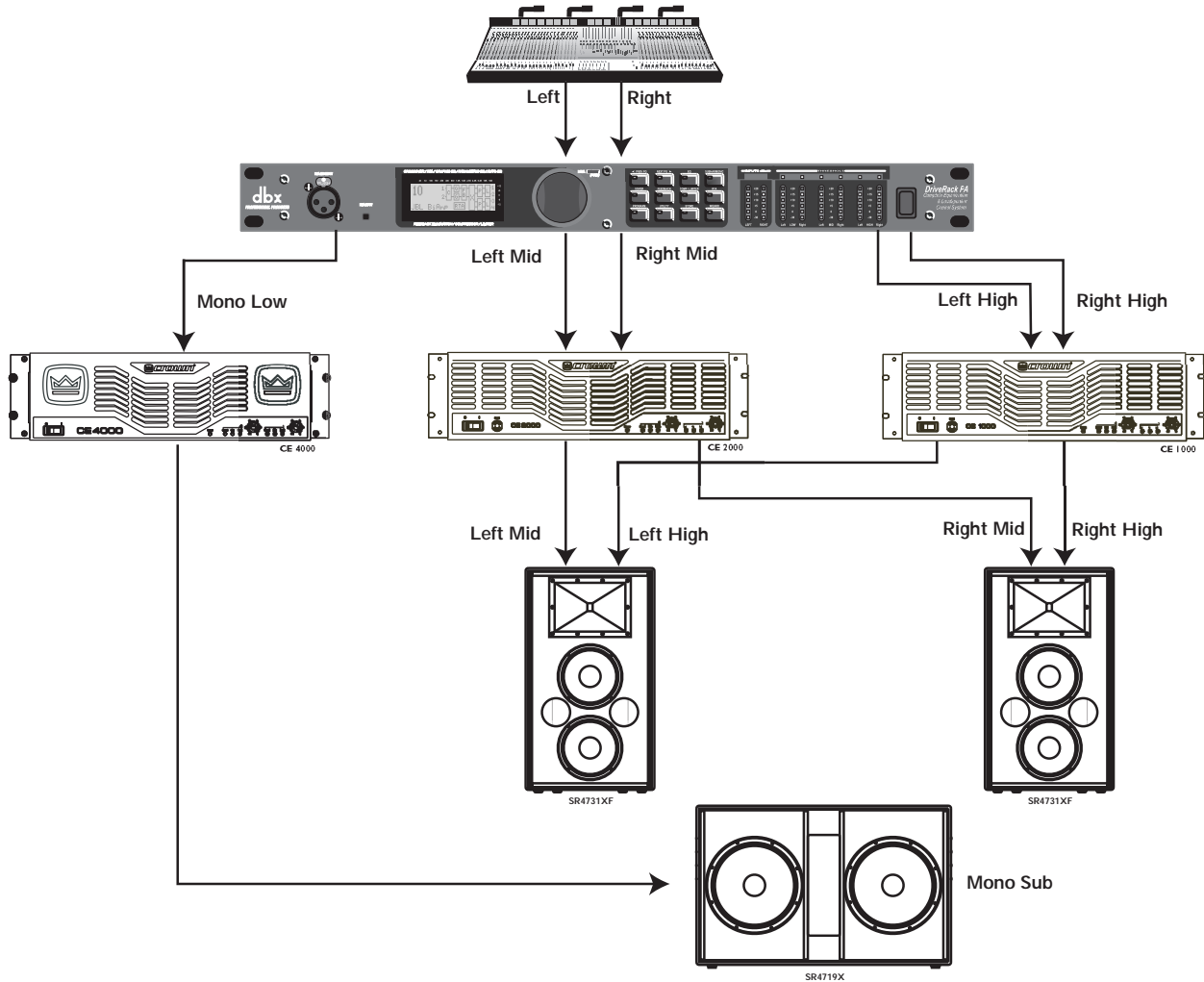
5.2- 2X5 Crossover

Hardware

1. Connect the outputs from the mixer to the inputs of the DriveRack®.
2. Connect the outputs of the DriveRack® PA and run to the selected speaker amplifier.
3. Make sure that the mixer and power amps are turned off prior to powering up the DriveRack® PA.

Software

1. From Program mode, select factory program #F2 (3 Way w/mSub) as a template, or use the Wizard to setup the specific program.
2. Once the program has been chosen, press the DATA wheel to load the program.



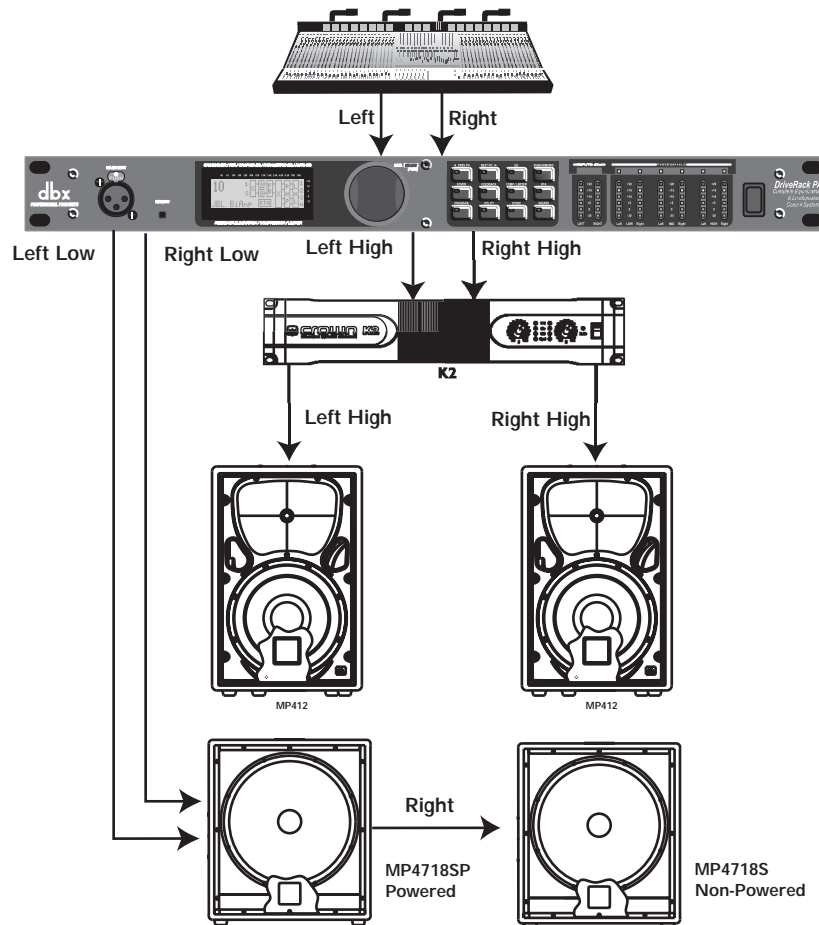
5.3 2X4 Crossover

Hardware

1. Connect the outputs from the mixer to the inputs of the DriveRack®.
2. Connect the outputs of the DriveRack® PA and run to the selected speaker amplifier.
3. Make sure that the mixer and power amps are turned off prior to powering up the DriveRack® PA.

Software

1. From Program mode, select factory program #F14 (MP212 2X4) as a template, or use the Wizard to setup the specific program.
2. Once the program has been chosen, press the DATA wheel to load the program.



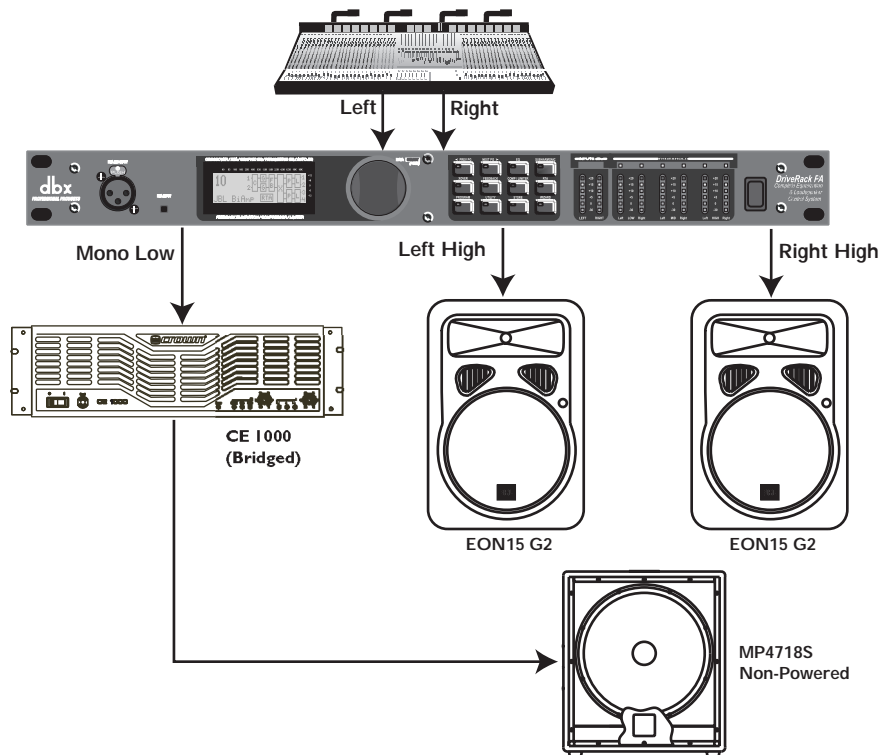
5.4 - 2X3 Crossover

Hardware

1. Connect the outputs from the mixer to the inputs of the DriveRack®.
2. Connect the outputs of the DriveRack® PA and run to the selected speaker amplifier.
3. Make sure that the mixer and power amps are turned off prior to powering up the DriveRack® PA.

Software

1. Use the Wizard to setup the specific program.
2. Once the program has been chosen, press the DATA wheel to load the program.



USER NOTES



A.1 Factory Reset

In the event that a reset is required, the DriveRack® PA offers you the option of performing a “Soft” or “Hard” reset. The Soft Reset resets all operating parameters except user programs. The Hard Reset Procedure will reset all programmable information back to the factory defaults.

All Power-Up Functions require a button(s) to be pressed and held as the unit power is turned on.
DriveRack PA Power-Up Button Functions

Factory (“Hard”) Reset.

Press and hold the <STORE> button at power-up until the following message appears:

```
“! HARD RESET?”
“Yes <PREV PAGE>”
“No <PROGRAM>”
```

- Pressing the <PREV PAGE> button will start a Factory Reset (All User Programs will become copies of the Factory Programs, all Utility settings will be defaulted, and all Security settings will be defaulted).
- Pressing the <PROGRAM> button will abort the Factory Reset sequence and the unit will reset normally.

System (“SOFT”) Reset

- Press and hold the <UTILITY> button at power-up until the following message appears:

```
“! SOFT RESET?”
“Yes <PREV PAGE>”
“No <PROGRAM>”
```

- Pressing the <PREV PAGE> button will start a System Reset (All Utility settings will be defaulted.)
- Pressing the <PROGRAM> button will abort the System Reset sequence and the unit will reset normally.

A.2 Power Up Quick Key Options

The DriveRack® PA offer several “Quick Key” options for initial power up and are as follow:

Change Initial Program Number

- To change the initial power program number, Press and hold the <PROGRAM> button at power-up until the following message appears:

Use Wheel to “Change Restart” Program Number”

- Turning the <DATA> wheel will select the program you wish to load at initial reset.
- Press the <PROGRAM> button again when the selection is complete. Normal resetting will continue.

System Lock Out

- Press and hold <WIZARD> at power-up until one of the following messages appears:

System Unlocked All user input will be accepted
 or

System Locked No user input will be accepted

- Rotating the <DATA> wheel to select either Lock, Unlock or Filter Unlocked the system.
- Pressing <PREV PAGE> will unlock the system if it were locked or it will lock the system if it were unlocked.
- If you wish to leave the system locked with the exception of being able to clear the feedback filters, follow the same procedure on power up and then rotate the <DATA> wheel to select the feedback filter unlock feature.
- Pressing any other button will abort the System Lockout sequence and the unit will reset normally.

A.3 Specifications

Analog Inputs:

Number of Inputs:	(2) Line inputs. (1) RTA Mic input
Connectors:	(2) Female XLR line inputs, XLR RTA Mic input
Type:	Electronically balanced/RF filtered
Impedance:	> 40k Ω
Max input line level:	+20dBu
CMRR:	> 45dB
RTA Mic Phantom Voltage:	+15VDC
RTA Mic EIN:	< -117dBu, 22Hz-22kHz, 150 Ω

Analog Outputs:

Number of Outputs:	(6) Line Outputs
Connectors:	Male XLR
Type:	Electronically balanced, RF filtered
Impedance:	120 ohms
Max Output Level:	+20dBu
Alignment Delay:	10ms per channel (60ms total)

A/D Performance:

Type:	dbx Type IV conversion system
Dynamic Range:	>107 dB unweighted, >110 dB A-weighted
Type IV dynamic range:	123 dB with transient material, A-weighted, 22kHz BW 121 dB with transient material, unweighted, 22kHz BW 115 dB typical with program material, A-weighted, 22kHz BW
Sample Rate:	48kHz

D/A Performance:

Dynamic Range:	112 dB A-weighted, 110dB unweighted
----------------	-------------------------------------

System Performance:

Dynamic Range:	110 dB unweighted, >107dB weighted,
THD+N:	0.002% typical at +4dBu, 1kHz, 0dB input gain
Frequency Response:	20Hz - 20kHz, +/- 0.5dB
Interchannel Crosstalk:	>110dB, 120dB typical
Crosstalk input to output:	>100dB

Power Supply:

Operating Voltage:	DO: 100-120VAC 50/60 Hz - EU: 220-240 VAC 56/60 Hz,
Power Requirements:	25 Watts

Physical:

Weight:	5.5 lbs.(2.5 kg) Shipping weight 7 lbs. (3.18 kg)
Dimensions:	1.75" H x 5.75" D x 19" W

A.4 Auto EQ Optimization Tips

By using the setup wizard, cross over output gains and post cross over parametric EQ settings are set to match your system. The Auto-EQ can be used to adjust your system to compensate for room effects, and adjust the response of the entire system to your liking. After allowing Auto EQ to “pink the room” your system will sound tighter. The low end will have more definition, the mids will be more intelligible, and the highs can be tamed. Here are two things to look for to get the best performance from the Auto-EQ.

Look out for Modes

Some speaker and RTA microphone positions will result in certain frequencies canceling out. The resulting modes can not be corrected with equalization. The Auto-EQ does not detect modes in the frequency response, so may try to boost a band to compensate for a mode with

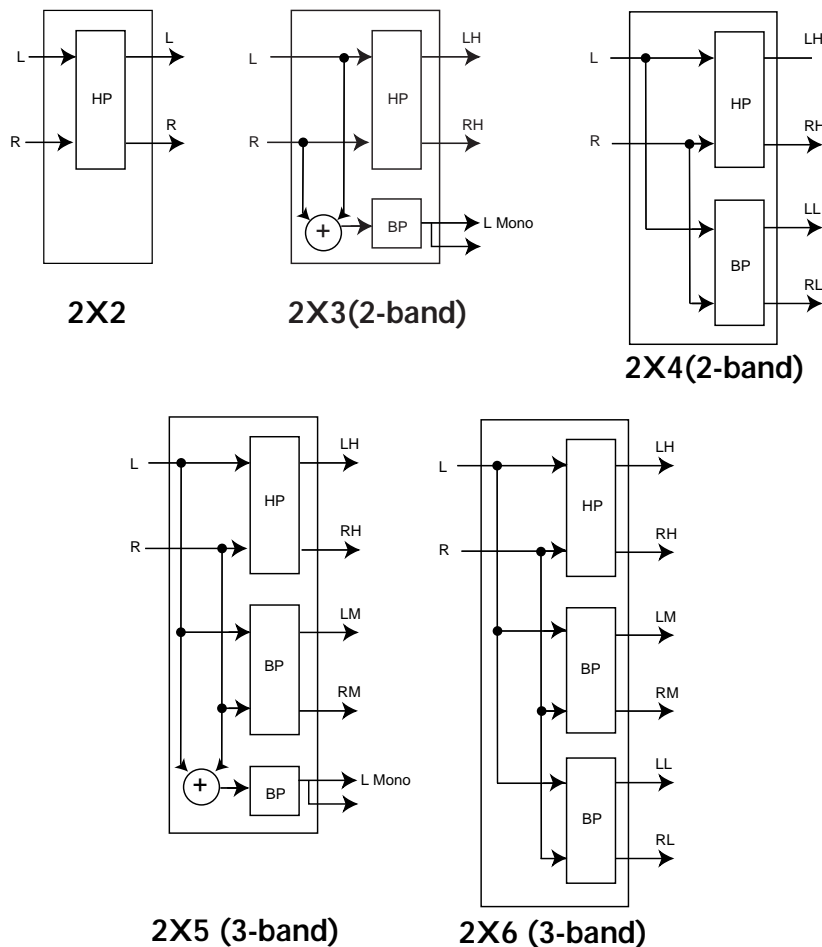
out positive affect. You may be able to see if a lifted band is a mode by manually adjusting a lifted EQ band - if no change in the EQ is perceived, you probably are seeing a mode in your frequency response. To reduce the effect of this mode, try different microphone positions and adjust the location of your speakers, then repink the room for a more effectual Graphic EQ adjustment.

Adjust Cross Over Output Gains

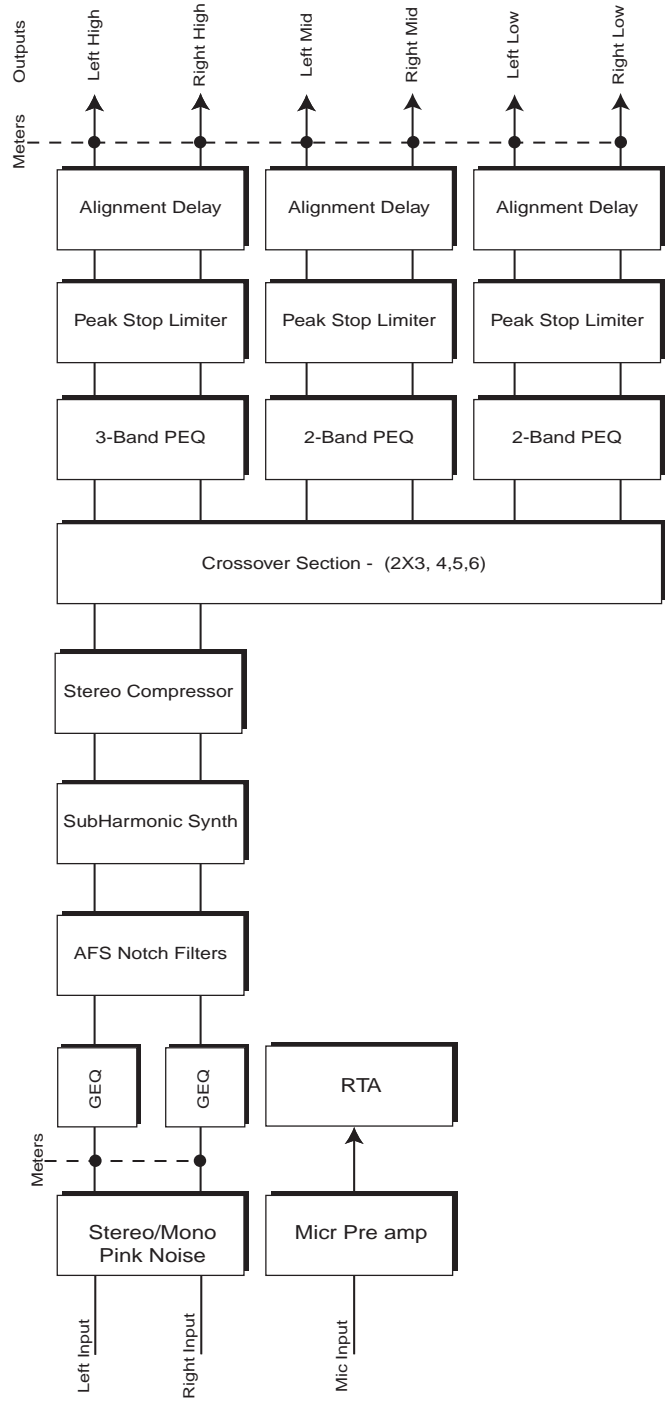
If your system setup or the response you have chosen results in the Auto-EQ lifting or cutting a number of consecutive bands of the Graphic EQ, you can adjust the level of the associated cross over output gain to match the average boost or cut in the graphic EQ and repink your room. This time, the adjustment of the Graphic EQ bands will be less “heavy handed” and the

system will sound better having fewer phase problems and a lower noise floor than a more aggressively adjusted Graphic EQ. With the rest of your system properly adjusted, the Auto EQ can compensate for room resonance and adjust to suit personal taste without large excursions in the Graphic EQ bands.

A.5 Crossover Diagrams



A.6 Block Diagram



A.7 Program List / Speaker Tunings / Power Amp Tunings

PROGRAM LIST

1)	Stereo 3Way	
2)	Stereo 2Way	
3)	Full Range	
4)	DJ Setup	
5)	Rock Venue	
6)	JRX112M	2X4
7)	JRX115	2X4
8)	JRX125	2X4
9)	MRX512M	2X4
10)	MRX515	2X4
11)	MRX525	2X4
12)	EON10G2	2X4
13)	EON15G2	2X4
14)	SRX712M	2X4
15)	SRX712M	2X6
16)	SRX715	2X4
17)	SRX715	2X6
18)	SRX722	2X4
19)	SRX722	2X6
20)	SRX725	2X4
21)	SRX725	2X6
22)	VRX928	2x4
23)	VRX928	2x6
24)	VRX932	2x4
25)	VRX932	2x6

SPEAKER TUNINGS

1)	JBL	JRX112M
2)	JBL	JRX115
3)	JBL	JRX125
4)	JBL	JRX118S
5)	JBL	JRX118SP
6)	JBL	SF12M
7)	JBL	SF15
8)	JBL	SF25
9)	JBL	SF225P
10)	JBL	MP212
11)	JBL	MP215
12)	JBL	MP225
13)	JBL	MP410
14)	JBL	MP412
15)	JBL	MP415
16)	JBL	MP255SP
17)	JBL	MP418S
18)	JBL	MP418SP
19)	JBL	MRX512M
20)	JBL	MRX515
21)	JBL	MRX525
22)	JBL	MRX518S
23)	JBL	MRX528S
24)	JBL	EON1500
25)	JBL	EON10G2
26)	JBL	EON15G2
27)	JBL	EONSUBG2
28)	JBL	SRX712M
29)	JBL	SRX715
30)	JBL	SRX722
31)	JBL	SRX725
32)	JBL	SRX738
33)	JBL	SRX718S
34)	JBL	SRX728S
35)	JBL	SRX4702X

36)	JBL	SRX4722X
37)	JBL	SRX4725X
38)	JBL	SRX4726X
39)	JBL	SRX4731X
40)	JBL	SRX4732X
41)	JBL	SRX4733X
42)	JBL	SRX4735X
43)	JBL	SRX4715X
44)	JBL	SRX4718X
45)	JBL	SRX4719X
46)	JBL	PRX512M
47)	JBL	PRX515
48)	JBL	PRX525
49)	JBL	PRX535
50)	JBL	PRX518S
51)	JBL	VRX928LA
52)	JBL	VRX932LA
53)	JBL	VRX915M
54)	JBL	VRX915S
55)	JBL	VRX918S
56)	Cerwin Vega	V152
57)	Cerwin Vega	V122
58)	Cerwin Vega	Sub18B
59)	Cerwin Vega	Sub15
60)	EAW	FRZ129z
61)	EAW	FRZ153z
62)	EAW	FRZ159z
63)	EAW	FRZ250z
64)	EV	Elim i
65)	EV	Elim iS
66)	Mackie	C300
67)	Mackie	S500
68)	Mackie	SRM350
69)	Mackie	SRM450
70)	Peavey	PR10
71)	Peavey	PR12
72)	Peavey	PR15
73)	Peavey	PRSub
74)	Peavey	PV112
75)	Peavey	PV115
76)	Peavey	PV215
77)	Peavey	PV12M
78)	Peavey	PV15M
79)	Peavey	PV118
80)	Yamaha	S112IV
81)	Yamaha	S115IV
82)	Yamaha	S215IV
83)	Yamaha	SW118IV
84)	Yamaha	SW215IV
85)	Yamaha	BR10
86)	Yamaha	BR12
87)	Yamaha	BR15
88)	Yamaha	BR12M
89)	Yamaha	BR15M
90)	Yamaha	S112V
91)	Yamaha	S115V
92)	Yamaha	S215V
93)	Yamaha	SM10V
94)	Yamaha	SM12V
95)	Yamaha	SM15V
96)	Yamaha	SW15V
97)	Yamaha	SW18V
98)	Yamaha	SW218V
99)	Yamaha	C112V

100)	Yamaha	C115V
101)	Yamaha	C215V
102)	Yamaha	CM10V
103)	Yamaha	CM12V
104)	Yamaha	CM15V
105)	Yamaha	CW15V
106)	Yamaha	CW18V
107)	Yamaha	CW218V

AMPLIFIER TUNINGS

1)	Crown	XLS 202
2)	Crown	XLS 402
3)	Crown	XLS 602
4)	Crown	XLS 802
5)	Crown	Xs 500
6)	Crown	Xs 700
7)	Crown	Xs 900
8)	Crown	Xs 4300
9)	Crown	XTi 1000
10)	Crown	XTi 2000
11)	Crown	XTi 4000
12)	Crown	CE 1000
13)	Crown	CE 2000
14)	Crown	CE 4000
15)	Crown	PowerTech 1.1
16)	Crown	PowerTech 2.1
17)	Crown	PowerTech 3.1
18)	Crown	K1
19)	Crown	K2
20)	Crown	MacroTech 1202
21)	Crown	MacroTech 2402
22)	Crown	MacroTech 3600
23)	Crown	MacroTech 5000
24)	Crown	I-Tech 4000
25)	Crown	I-Tech 6000
26)	Crown	I-Tech 8000
27)	Peavey	PV900
28)	Peavey	PV1500
29)	Peavey	PV2600
30)	Peavey	PV3800
31)	QSC	RMX850
32)	QSC	RMX1450
33)	QSC	RMX1850HD
34)	QSC	RMX2450
35)	QSC	RMX4050HD
36)	QSC	RMX5050
37)	QSC	PLX1104
38)	QSC	PLX1804
39)	QSC	PLX1802
40)	QSC	PLX2502
41)	QSC	PLX3102
42)	QSC	PLX3602
43)	Yamaha	P2500S
44)	Yamaha	P3500S
45)	Yamaha	P5000S
46)	Yamaha	P7000S

A.8 System Setup and Gain Structure

The DriveRack PA offers a wide range of tools for sound system design and setup. These tools can make your system more efficient and better sounding, but to get the best possible sound it is important to use these tools properly. In the DriveRack PA we have included a Wizard setup tool to help in system setup. If you use the Wizard to set up your DriveRack PA it will automatically set the limiters for some amplifier selections. If your amplifiers are not available in the Wizard, you should choose the Custom setting. The following section explains how to maximize system gain and how to use the limiters to protect your amplifiers from clipping.

In traditional system design, the output of your console would be routed to a system EQ, a compressor, and a crossover with output level control. From the crossover, there may be additional filters that are employed to improve the response of your speakers. There may also be limiters set up to keep your amplifiers from going into clipping and protect your speakers from the hazards of a clipped signal. Your amplifiers play a vital role in system setup, because they are last item in the chain before your speakers and offer the greatest amount of gain (that is their job after all). If your amplifiers are incorrectly setup you will not be using your system to its fullest potential and could be harming your speakers.

One thing that is critical to system setup is maximizing gain structure. Gain structure refers to aligning the gain of each device so that they all clip at the same point, and the noise floor of the entire system is at its absolute minimum. Quite often PA systems are setup with the amplifier input controls turned all the way up in the incorrect assumption that this is the only way to get the maximum output level. Amplifiers are fixed gain devices, turning down the amplifier input attenuators does not change the potential output of the amplifier; it only requires more input voltage to get full output power. Many amplifiers will clip with an input level greater than +6 dBu when the input attenuators are turned all the way up. Most mixing consoles can deliver over +18 dBu of output level before clipping. This means that with your amps tuned all the way up you are sacrificing 12 dB of headroom, resulting in poorer noise performance and the potential of system clipping. By adjusting the amplifier controls properly, you can maximize your system performance.

A way to set up your amplifiers for maximum gain structure is to use the clip indicators of the console and amplifiers themselves. Disconnect the output of the amplifier from the speakers. Run a continuous signal (pink noise or sine waves – many test CDs are available that have these types of signals) through your console. Turn up the output of the console until it begins clipping. If there is no clip indicator on the console then use the output meters; most reputable console manufacturers use red LEDs at the top of the meters to show the onset of clipping. Once the console is clipping, back the output gain down slightly until the clip indicator turns off. Run this signal through the DriveRack PA and into the amplifiers with the crossovers and output gain section in the DriveRack PA set for your particular speakers. Make sure that the output limiters are turned off. Run this signal into the amplifiers and turn up the input attenuators until the amplifier clip indicator begins to turn on. Turn the attenuators down slightly, so the clip indicator no longer is on. You have just maximized the gain through your system. This amplifier setting should give you maximum gain without clipping, another way of say this is that when the output of your console is clipping you will also be at the clip point of your amplifiers.

Once you have found the clip point of your amplifiers, you can mark this position and turn the amplifiers back up to the point where they are clipping. You can now use the output limiters in the DriveRack PA to protect the amplifier from clipping no matter what you do at the console. With the amplifiers clipping, now go to the Limiter page of the DriveRack PA and turn the limiter for each output band on. Make sure that the threshold is all the way up to +20dB. Now slowly reduce the threshold until the clip indicator of the amplifier turns off. You have successfully set the output limiter up and the amplifier will not be able to go into clipping no matter what the input is. You should now proceed to the next output band and go through the same process. If you are using a sine wave to create clipping in your amplifier you should make sure that the sine wave is within the frequency range of the output band that you are working with. Once all the limiters are set up you can now turn the amplifiers back down to the gain maximized position. The Wizard will automatically set your limiters based on your choice of amplifier. Because of component variances within the amplifier circuitry, you may need to adjust the limiter settings by a few dB after running the Wizard to ensure that they are set correctly.

Once all the limiters are set up and the gain is maximized, reduce the output of your console and reconnect your speakers. Now for the fun part, sit back and send your favorite music through the system. If your system is not loud enough, you may want to consider an amplifier or amplifiers with greater output power. Most loudspeaker manufacturers recommend an amplifier that can provide 1.5 to 2 times the rated RMS power of the speaker. If this setting is too loud when your speakers are reconnected you can turn down the amplifier input attenuators even more.

USER NOTES



PROFESSIONAL PRODUCTS

8760 South Sandy Parkway • Sandy, Utah 84070

Phone: (801) 568-7660 • Fax (801) 568-7662

Int'l Fax: (801) 568-7583

**E-mail us at: customer@dbxpro.com or visit us on
the web at: www.dbxpro.com**

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