

**dbx** PROFESSIONAL PRODUCTS

# DriveRack™

Complete Equalization & Loudspeaker Management System



**480  
481  
482  
480R**

**dbx**  
PROFESSIONAL PRODUCTS

***User Manual***

# IMPOR TANT SAFETY INSTRUCTIONS



**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.**

**CAUTION: EQUIPMENT IS NOT DISCONNECTED FROM MAINS WHEN SWITCH IS IN THE OFF POSITION**

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

CLEAN ONLY WITH A DAMP CLOTH.

DO NOT BLOCK ANY OF THE VENTILATION OPENINGS. INSTALL IN ACCORDANCE WITH THE MANUFACTURERS 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.

**WATER AND MOISTURE:** Appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**POWER SOURCES:** The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

**GROUNDING OR POLARIZATION:** Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

**POWER CORD PROTECTION:** Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

**SERVICING:** To reduce the risk of fire or electric shock, the user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

**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.

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

# 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 fejlagtig 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 apparattillverkaren. 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™ 480,481 and 482

Product option: None

conforms to the following Product Specifications:

Safety: EN 60065 (1993)  
IEC 60065 (1998)  
CAN/CSA E60065-99  
EMC: EN 55013 (1990)  
EN 55020 (1991)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC as amended by Directive 93/68/EEC.

dbx Professional Products  
Vice-President of Engineering  
8760 S. Sandy Parkway  
Sandy, Utah 84070, USA  
March 15, 2000

European Contact: Your Local dbx Sales and Service Office or  
Harman Music Group  
8760 South Sandy Parkway Sandy, Utah 84070 USA  
PH: (801) 568-8800 FX: (801) 568-7583

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™ 480P and 480R

Product option: None

conforms to the following Product Specifications:

Safety: EN 60065 (1993)  
IEC 60065 (1998)  
CAN/CSA E60065-99  
EMC: EN 55013 (1990)  
EN 55020 (1991)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC as amended by Directive 93/68/EEC.

dbx Professional Products  
Vice-President of Engineering  
8760 S. Sandy Parkway  
Sandy, Utah 84070, USA  
April 21, 2000

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# INTRO

CUSTOMER SERVICE INFO

Defining the  
DriveRack

WARRANTY INFO



## INTRODUCTION

Congratulations on your purchase of the dbx DriveRack™ Complete Equalization and Loudspeaker Management System! For over 25 years, dbx has been the industry leader in dynamics processing. With the introduction of the DriveRack™, dbx Professional Products has redefined the standard by which all other loud speaker management systems will be based

This manual will be your guide to understanding the full functionality of the powerful 480, 481, 482 and 480R DriveRack™ units. By combining the different components, the configuration possibilities are limitless. After you have become familiar with the unit, we encourage you to experiment and find the most effective and efficient way to run your system by utilizing the powerful processing of the DriveRack™.

## 1.1 Defining the DriveRack™ System

The dbx DriveRack™ is the most effective way to manage all aspects of post mix processing and signal routing. The following are just some of the features of the 480, 481, 482 and 480R.

480 DriveRack™ features:

- **4 Input and 8 Outputs with routing**
- **31 band graphic or 9 band parametric equalizer on every input (pre-crossover)**
- **Dual Real Time Audio Analyzers**
- **Butterworth, Bessel or Linkwitz-Riley crossover filters**
- **27 Different Crossover Configurations**
- **Time Alignment and Transducer Alignment Delays**
- **Compressor/Limiter on every output**
- **Speaker Compensation EQ (post crossover)**
- **Multi-level Security System**
- **Separate House and Show EQ with individual lockouts**
- **Triple redundant back up of all parameters when running network, 480R and PC GUI**
- **TYPE IV™ Conversion System**
- **Electronically balanced/RF filtered XLR Inputs and Outputs**
- **Proprietary RS-485 Control Network**
- **RS-232 PC Interface for computer display and configuration**

481 DriveRack™ features:

- **4 Input and 8 Outputs with routing**
- **31 band graphic or 9 band parametric equalizer on every input (pre-crossover)**
- **Dual Real Time Audio Analyzers**
- **Butterworth, Bessel or Linkwitz-Riley crossover filters**
- **27 Different Crossover Configurations**



- **Time Alignment and Transducer Alignment Delays**
- **Compressor/Limiter on every output**
- **Speaker Compensation EQ (post crossover)**
- **Multi-level Security System**
- **Separate House and Show EQ with individual lockouts**
- **Triple redundant backup of all parameters when running network, 480R and PC GUI**
- **TYPE IV™ Conversion System**
- **Electronically balanced/RF filtered Euroblock Inputs and Outputs**
- **Proprietary RS-485 Control Network**
- **RS-232 PC Interface for computer display and configuration**

482 DriveRack™ features:

- **4 Input and 8 Outputs with routing**
- **31 band graphic or 9 band parametric equalizer on every input (pre-crossover)**
- **Dual Real Time Audio Analyzers**
- **Butterworth, Bessel or Linkwitz-Riley crossover filters**
- **27 Different Crossover Configurations**
- **Time Alignment and Transducer Alignment Delays**
- **Compressor/Limiter on every output**
- **Speaker Compensation EQ (post crossover)**
- **Multi-level Security System**
- **Separate House and Show EQ with individual lockouts**
- **Triple redundant back up of all parameters when running network, 480R or GUI**
- **TYPE IV™ Conversion System**
- **Electronically balanced/RF filtered XLR Inputs and Outputs**
- **Proprietary RS-485 Control Network**
- **RS-232 PC Interface for computer display and configuration**

480R DriveRack™ features:

- **Dedicated remote interface to control all 480, 481 and 482 DriveRack™ units**
- **31 Motorized faders for equalization control**
- **32 assignable hot-keys with up to 64 different assignment capabilities**
- **Built-in Real Time Audio Analyzer (with rear-panel XLR connector)**
- **System Mute button**
- **Proprietary RS-485 Control Network**
- **RS-232 PC Interface for computer display and configuration**
- **480P Power Supply Included**
- **Responds to MIDI commands from mixing consoles including: Soundcraft™ SM20 and Series 5 and the Allen & Heath™ ML 4000 and ML5000**

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

The 480 DriveRack™ Loud Speaker Management System includes four balanced XLR inputs, as well as eight balanced XLR outputs, which can be routed for any configuration. The 481 and 482 DriveRack™ feature the identical processing power of the 480 DriveRack, but utilize streamline front panel interfaces. In addition, the 481 utilizes euroblock connectors as opposed to the XLR connectors found in the 480 and 482 DriveRack.

The 480, 481 and 482 DriveRacks™ include features such as: pre-crossover EQ, dual RTAs, notch filters, speaker delays, multiple crossovers and compression/limiting, as well as numerous other features. Dual RTA analyzers can be run simultaneously with RTA source inputs capable of being remotely switched on the fly. The 480 DriveRack™ is fully programmable from the front panel, and can control other devices in a network including the 481 and 482 slave units. In addition, the entire system can be controlled via the 480R DriveRack™ remote controller or through the included GUI interface.

## 1.2 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 rear 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 below, 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.

## 1.3 Warranty

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

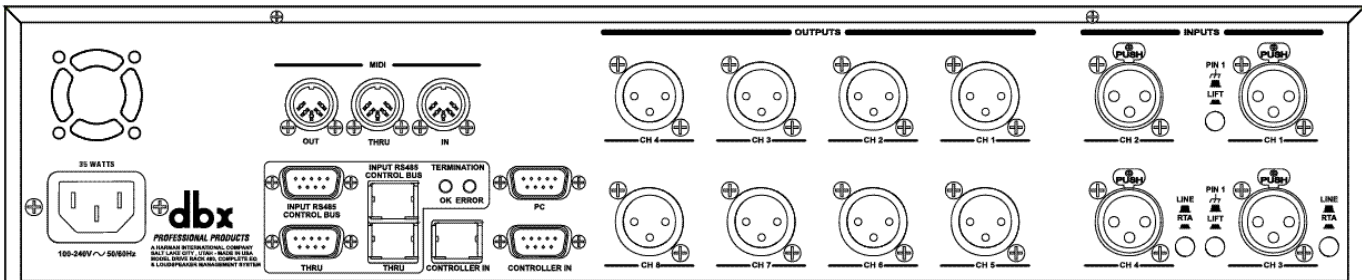
1. The warranty registration card that accompanies this product must be mailed within 30 days after purchase date to validate this warranty. Proof-of-purchase is considered to be the burden of the consumer.

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 (480)

**IEC Power Cord Receptacle**

The 480 comes with an International power supply that will accept voltages ranging from 100V-240V at frequencies from 50Hz-60Hz. An IEC cord is included.

**MIDI In, Out and Thru Connectors**

These connectors provide MIDI functionality to the 480 DriveRack™. The In, Out and Thru jacks allow you to use the 480 DriveRack™ at any point in the MIDI chain.

**RS485 Control Bus Input (DB-9 connector type)**

This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

**RS485 Control Thru Bus (DB-9 connector type)**

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

**RS485 Control Bus Input (RJ-45 connector type)**

This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

**RS485 Control Thru Bus (RJ-45 connector type)**

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

**Termination LEDs**

These LEDs indicate when network is properly terminated. The Green LED indicates that the network has been correctly terminated.

**Remote Controller In Connection**

This DB-9 type input connection is used to send and receive information from the 480R Remote Control unit.

**PC Connection**

This DB-9 type connection is used to send and receive information to and from the GUI interface.

**Outputs 1-8**

The output section of the 480 DriveRack™ offers eight electronically balanced XLR connectors.

### Inputs 1-4

The input section of the 480 DriveRack™ offers four electronically balanced XLR connectors. Inputs 3 and 4 offer Line/RTA switches that allow you to run a real time audio analyzer microphone directly into the input of the 480 DriveRack™. The four XLR inputs of the 480 DriveRack™ also offer Pin 1 lift switches which lift the ground of the selected XLR input pair when pressed.

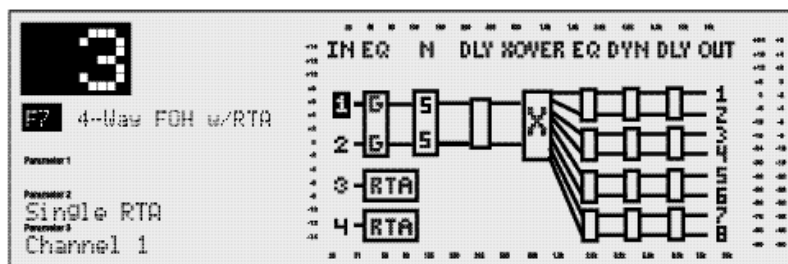
**WARNING -** For proper operation of the RTA microphone, the RTA button must be depressed and the ground /lift switch must be in the grounded position. When the RTA button on the back panel is depressed, 48V phantom power is applied to pins 2 and 3 of the XLR connector. To maintain a proper ground return for the phantom power, the ground/lift switch must be in the grounded position. This will prevent the possibility of electrical shock.

## 1.2 Front Panel (480)



### LCD Display

The large LCD display of the 480 DriveRack™ provides the user with all of the vital processing information of the DriveRack™ including: signal routing, configuration modes, effect block editing and RTA displays. The top left corner of the display indicates network device ID numbers. The reverse background number indicates the number of the slave unit being controlled, while Mst indicates that the unit is set to act as the master.



### Function Buttons

The function buttons of the 480 DriveRack™ allow access to all editing and navigating functions of the 480 DriveRack™.

### Parameter Knobs

The parameter knobs of the 480 DriveRack™ allow the user to edit parameters of selected effects of the 480 DriveRack™. The parameter knobs of the 480 and 480R DriveRack™ units also incorporate light display Logicators™ which surround the knob itself and indicate levels of parameter and effect activity. The parameter knobs of the 480 DriveRack™ also provide the

user with different modes of functionality including: coarse/fine encoding (successive presses will toggle the knob between a fast and slow mode of operation) and horizontal-vertical navigators, which allow the parameter buttons (when used in program and configuration mode) to navigate the program screen horizontally and vertically.

### Input Meters

The 480 DriveRack™ provides the user with four independent 12 segment Lightpipe™ input meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

### Threshold Meters

The threshold meters indicate that the threshold level has been exceeded within the dynamics section (compressor/limiter), and gain reduction is taking place within the specific output channel.

### Output Meters

The 480 DriveRack™ provides the user with eight independent 12-segment Lightpipe™ output meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

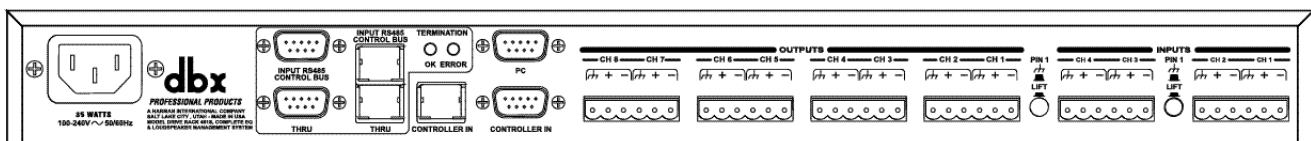
### Output Mutes

The eight output mute buttons are used for independently muting each output on all eight outputs of the 480 DriveRack™.

### Power Switch

Turns the 480 DriveRack™ on and off. **Note:** dbx Professional Products recommends that power amps connected to the DriveRack™, should be powered down prior to cycling the DriveRack™.

## 1.3 Rear Panel Connections (481)



### IEC Power Cord Receptacle

The 481 comes with an International power supply that will accept voltages ranging from 100V-240V at frequencies from 50Hz-60Hz. An IEC cord is included.

### RS485 Control Bus Input (DB-9 connector type)

This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

### RS485 Control Thru Bus (DB-9 connector type)

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

### RS485 Control Bus Input (RJ-45 connector type)



This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

### RS485 Control Thru Bus (RJ-45 connector type)

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

### Termination LEDs

These LEDs indicate when network is properly terminated. The Green LED indicates that the network has been correctly terminated.

### Remote Controller In Connection

This DB-9 type input connection is used to send and receive information from the 480 Remote DriveRack™ Unit.

### Outputs 1-8 (Euroblock Connectors)

The output section of the 481 DriveRack™ offers eight electronically balanced Euroblock connectors.

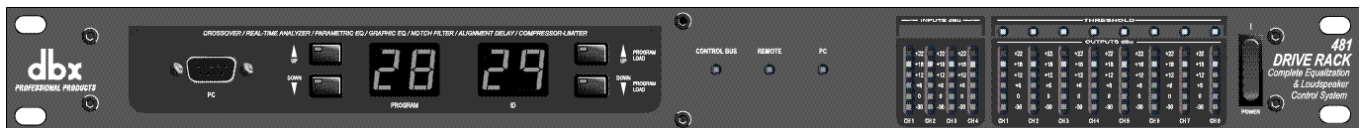
### Inputs 1-4

The input section of the 481 DriveRack™ offers four electronically balanced Euroblock connectors.

### Ground Lift Switch

This switch (when pressed in), is used to lift the Pin one ground on either inputs 1 and 2 or 3 and 4.

## 1.4 Front Panel (481)



### PC Connection

This DB-9 type connection is used to send and receive information to and from the GUI interface.

### Program Up and Down

These program up and down buttons are used to scroll through the program menu of the 481.

### Program Display

This program display is used to indicate the currently selected program of the 481.

### ID Display

This ID display is used to indicate the current assigned identification of the 481. This identification is essential for unit recognition when the 481 is used in a network system.

### Control Bus LED

This LED (when lit), indicates that the 481 is connected to the control bus. When it is flashing, the 481 is sending/receiving network information.

### Remote LED

This LED (when lit), indicates that the 481 is connected to the 480R. When it is flashing, the 481 is sending/receiving information from the 480R.

### PC LED

This LED (when lit), indicates that the 481 is connected to the PC. When it is flashing, the 481 is sending/receiving information from the PC.

### Input Meters

The 481 DriveRack™ provides the user with four independent 6-segment lightpipe™ input meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

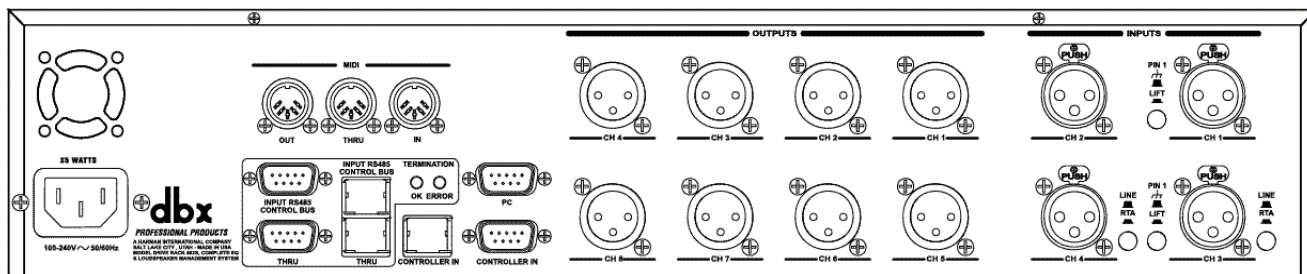
### Output Meters

The 481 DriveRack™ provides the user with eight independent 6-segment lightpipe™ output meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

### Power Switch

Turns the 481 DriveRack™ on and off. **Note:** dbx Professional Products recommends that power amps connected to the DriveRack™ should be powered down prior to cycling the DriveRack™.

## 1.5 Rear Panel Connections (482)



### IEC Power Cord Receptacle

The 482 comes with an International power supply that will accept voltages ranging from 100V-240V at frequencies from 50Hz-60Hz. An IEC cord is included.

### MIDI In, Out and Thru Connectors

These connectors provide MIDI functionality to the 482 DriveRack™. The In, Out and Thru jacks allow you to use the 482 DriveRack™ at any point in the MIDI chain.

### RS485 Control Bus Input (DB-9 connector type)

This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

### RS485 Control Thru Bus (DB-9 connector type)

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

### RS485 Control Bus Input (RJ-45 connector type)

This input network connection is used to receive information being sent from other units in the DriveRack™ network link.

### RS485 Control Thru Bus (RJ-45 connector type)

This Thru network connection is used to pass information to other units in the DriveRack™ network link.

### Termination LEDs

These LEDs indicate when network is properly terminated. The Green LED indicates that the network has been correctly terminated.

### Remote Controller In Connection

This DB-9 type input connection is used to send and receive information from the 480 Remote DriveRack™ Unit.

### PC Connection

This DB-9 type connection is used to send and receive information to and from the GUI interface.

### Outputs 1-8

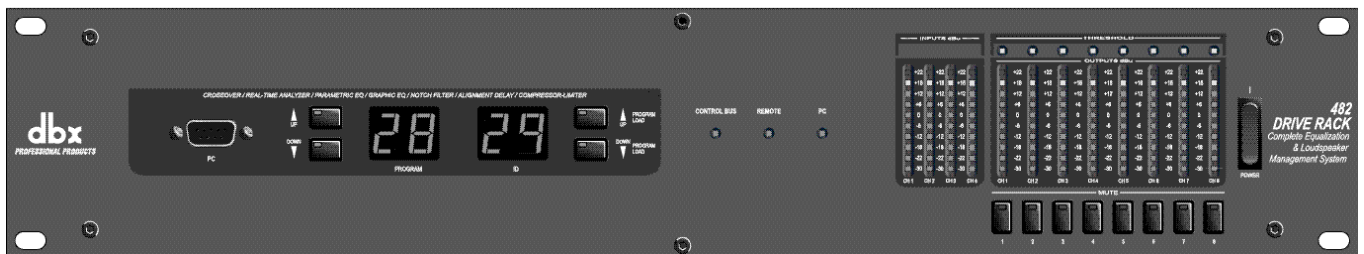
The output section of the 482 DriveRack™ offers eight electronically balanced XLR connectors.

### Inputs 1-4

The input section of the 482 DriveRack™ offers four electronically balanced XLR connectors. Inputs 3 and 4 offer Line/RTA switches that allow you to run a real time audio analyzer microphone directly into the input of the 482 DriveRack™. The four XLR inputs of the 482 DriveRack™ also offer Pin 1 lift switches which lift the ground of the selected XLR input pair when pressed.

Warning - For proper operation of the RTA microphone, the RTA button must be depressed and the ground /lift switch must be in the grounded position. When the RTA button on the back panel is depressed, 48V phantom power is applied to pins 2 and 3 of the XLR connector. To maintain a proper ground return for the phantom power, the ground/lift switch must be in the grounded position. This will prevent the possibility of electrical shock.

## 1.6 Front Panel (482)



### PC Connection

This DB-9 type connection is used to send and receive information to and from the GUI interface.

### Program Up and Down

These program up and down buttons are used to scroll through the program menu of the 482.

### Program Display

This program display is used to indicate the currently selected program of the 482.

### ID Display

This ID display is used to indicate the current assigned identification of the 482. This identification is essential for unit recognition when the 482 is used in a network system.

### Control Bus LED

This LED (when lit), indicates that the 482 is connected to the control bus. When it is flashing, the 482 is sending/receiving network information.

### Remote LED

This LED (when lit), indicates that the 482 is connected to the 480R. When it is flashing, the 482 is sending/receiving information from the 480R.

### PC LED

This LED (when lit), indicates that the 482 is connected to the PC. When it is flashing, the 482 is sending/receiving information from the PC.

### Input Meters

The 482 provides the user with four independent 12 segment lightpipe™ input meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

### Threshold Meters

The threshold meters indicate that the threshold level has been exceeded within the dynamics section (compressor/limiter), and gain reduction is taking place within the specific output channel.

### Output Meters

The 482 DriveRack™ provides the user with eight independent 12-segment lightpipe™ output meters that range from -30 to +22 dBu. **Note:** These meters are calibrated for the +22dBu setting of the gain jumpers.

### Output Mutes

The eight output mute buttons are used for independently muting each output of the 482 DriveRack™.

### Power Switch

Turns the 482 DriveRack™ on and off. **Note:** dbx Professional Products recommends that power amps connected to the DriveRack™ should be powered down prior to cycling the DriveRack™.

# EDITING FUNCTIONS



## Editing Functions

The 480 DriveRack™ has been carefully designed and engineered to ensure that all aspects of operation are intuitive and logical. Simply stated, the 480 DriveRack™ operating system was designed with user's best interest in mind. Editing the 480 DriveRack™ can be done by utilizing key functions and tools. This section will provide you with detailed information on all of the tools used to optimize the editing performance of your DriveRack™. This intuitive front panel interface can also be used to control other units (481 and 482) which are used within a DriveRack™ network system.

### 2.1 Basic Navigation Modes

Navigational aspects of the 480 DriveRack™ are clear, concise and more important: flexible. The DriveRack™ provides you with essentially three different modes of navigation when performing programming edits. **1. FX buttons** - This array of 12 FX buttons is your primary mode of 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. PARAMETER KNOBS** - In addition to editing parameter values with the PARAMETER knobs, the PARAMETER 2 & 3 knobs (when used in program mode) will move the cursor throughout the display horizontally and vertically. For more information on this unique feature, please see section 2.4.



### 2.2 FX Button Array Overview

The following sections will provide you with detailed information for accurate navigation of the FX button section of the 480 DriveRack™. Each diagram indicates the functionality of each FX button and its ability to guide the user through each operational menu.



### 2.2 FX Button Array Overview (cont.)



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. Successive presses will rotate through the various EQ modules.



XOVER - Selects the Cross over menu. Successive presses will toggle between the various crossovers



RTA - Enters the RTA mode of the DriveRack. Successive presses will toggle between the RTA modules.



DELAY - Selects the DELAY effect menu. Successive presses will toggle between the various delay modules.



DYNAMICS - Selects the Compressor/Limiter effect menu. Successive presses will move through the dynamics modules.



OTHER - Selects the Input and Output editing sections of the DriveRack™.



PROGRAM/CONFIG - This button will load a selected program, loads the Program mode or enters the Configuration edit mode when pressed and held.



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

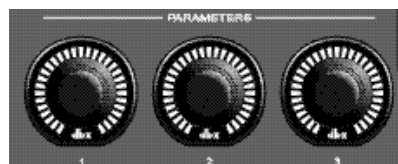


UTILITY - Selects the Utility edit menu of the DriveRack.



COMPARE - The Compare button is used to compare program edits to the original (unedited) program.

PARAMETER KNOBS - The parameter knobs perform various functions including: program changes (parameter 1), parameter value edits and cursor navigation utilizing the parameter knobs 2 and 3.

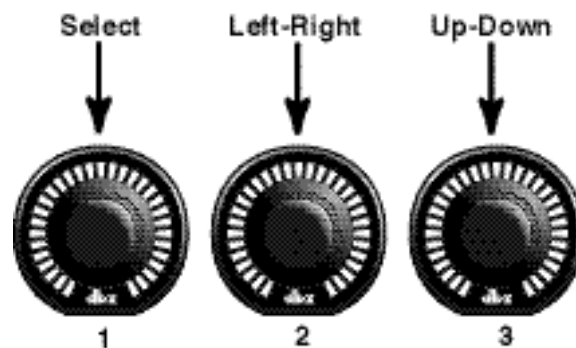


### 2.3 Parameter Knob Encoders Coarse/Fine Operation

The parameter knob encoders of the 480 and 480R DriveRack™ Remote provide the user with the option of coarse or fine performance modes. This means that the parameter knobs can be set to either move or change values at a rapid (coarse) or slower (fine) rate. This option can be selected in any mode by simply pressing the selected parameter knob. Successive presses will toggle between coarse and fine mode.

### 2.4 Parameter Knobs (Horizontal-Vertical Navigation Mode)

The 480 DriveRack™ offers the horizontal-vertical navigation feature which helps streamline navigation and editing of the unit. The Horizontal-Vertical Navigation mode allows the user to use the parameter knobs (2&3) to quickly navigate through the program/configuration menu of any DriveRack™ unit. This feature can be used to navigate the display screen in program or configuration mode. To utilize this feature, simply select the high-lighted cursor, then use the PARAMETER 2 knob to move the cursor left and right, and use the PARAMETER 3 knob to move the cursor up and down while the unit is in Program or Configuration mode.

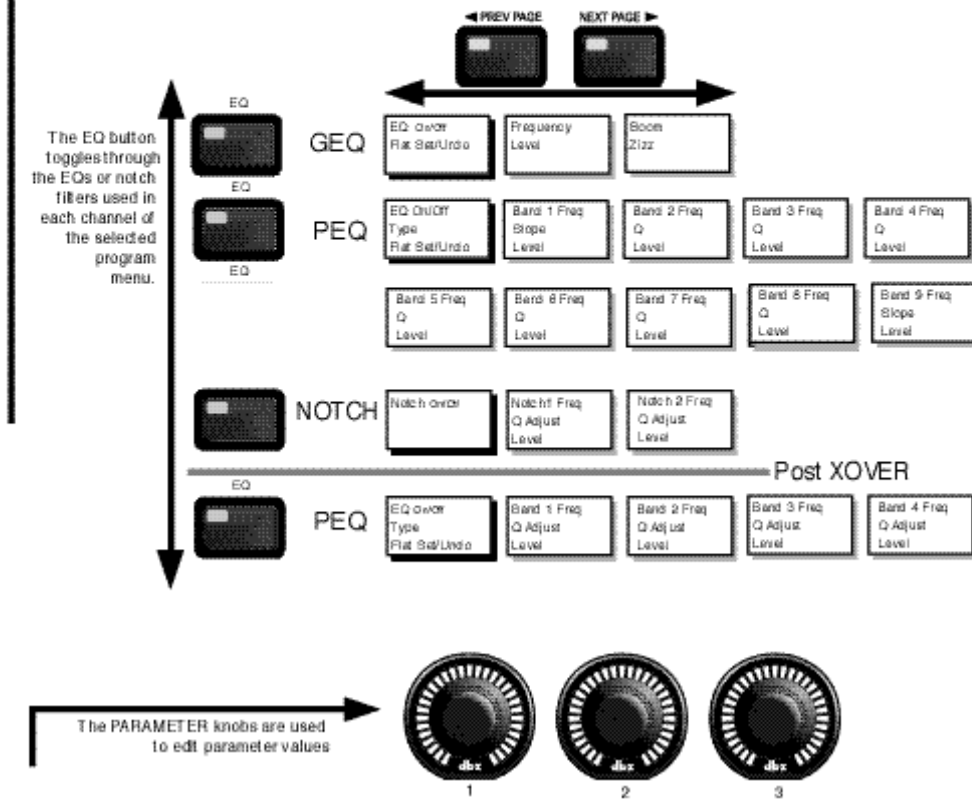




### 2.5 Navigating the EQ Sections

#### Navigating the "EQ and Notch Filter Sections"

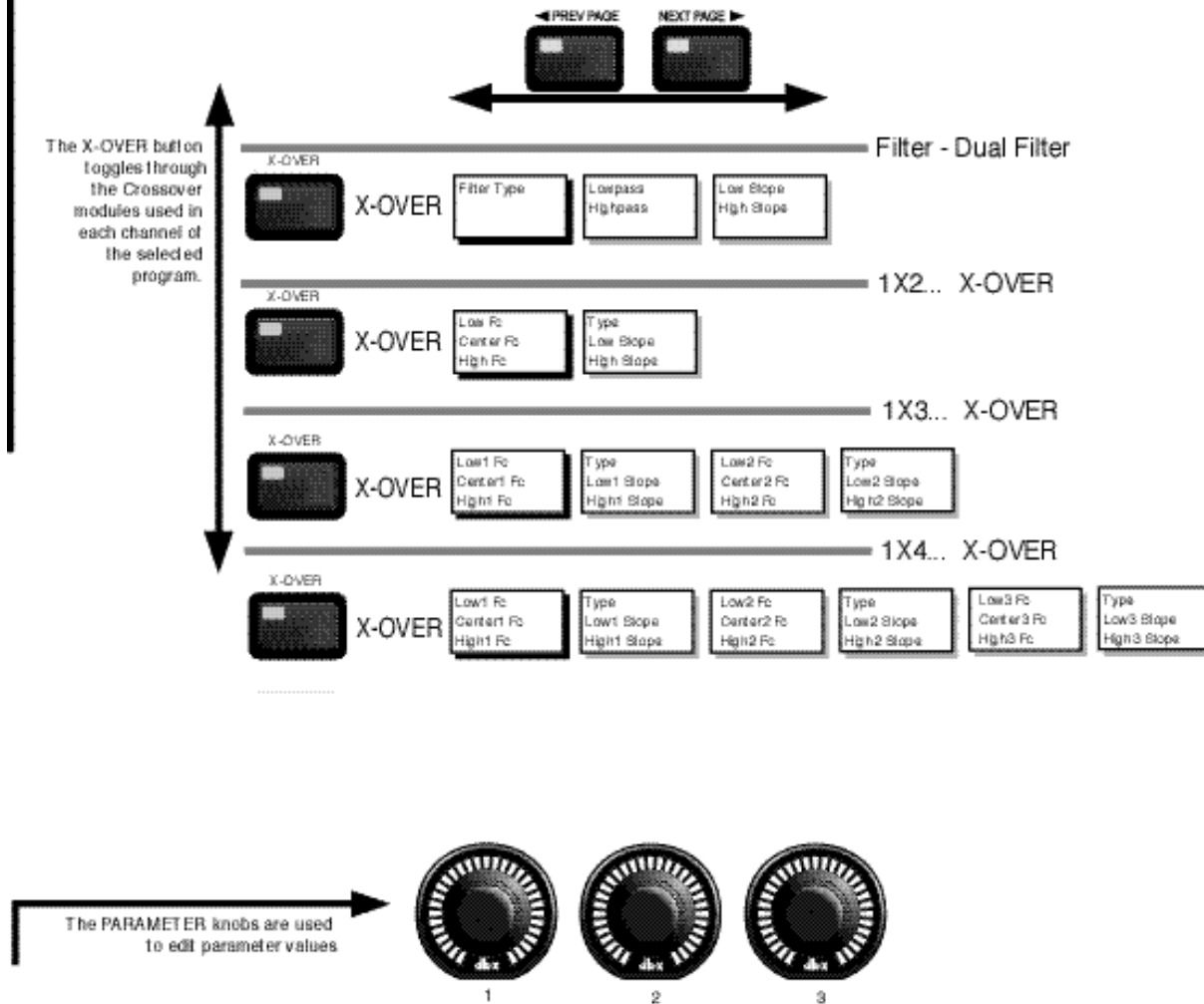
To edit the parameters of the EQs and Notch Filters used in a selected program, simply use the following procedure. From program mode, either press the EQ button or use the Parameter 2 or 3 knobs to move to EQ module to be edited. Once you have reached the desired EQ, press the Parameter 2 or 3 knob. Successive presses of the EQ button will move through each channel (input or output) that utilizes an EQ module. Navigate through the Pages of the selected EQ section by pressing "Next Page" or "Prev Page" successively until arriving at the desired Page.



### 2.6 Navigating the XOVER

#### Navigating the "X-OVER Section"

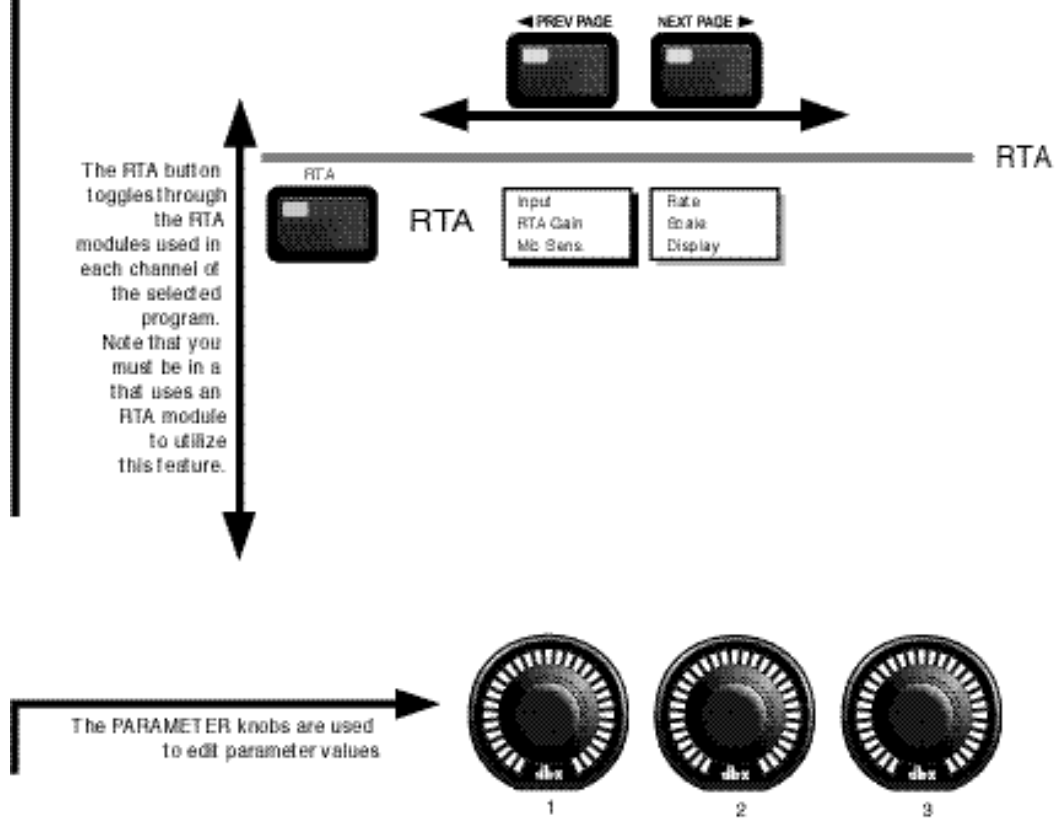
To edit the parameters of the Crossover used in a selected program, simply use the following procedure. From program mode, either press the X-OVER button or use the Parameter 2 or 3 knobs to move to Crossover module. Once you have reached the Crossover module, press the Parameter 2 or 3 buttons to access the editing pages of the 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.



### 2.7 Navigating the RTA

## Navigating the "RTA" Section

To edit the parameters of the Real Time Audio Analyzer used in a selected program, simply use the following procedure. From program mode, either press the RTA button or use the Parameter 2 or 3 knobs to move to RTA module. Navigate through the Pages of the selected RTA module by pressing the "Next Page" or "Prev Page" buttons successively until arriving at the desired Page.



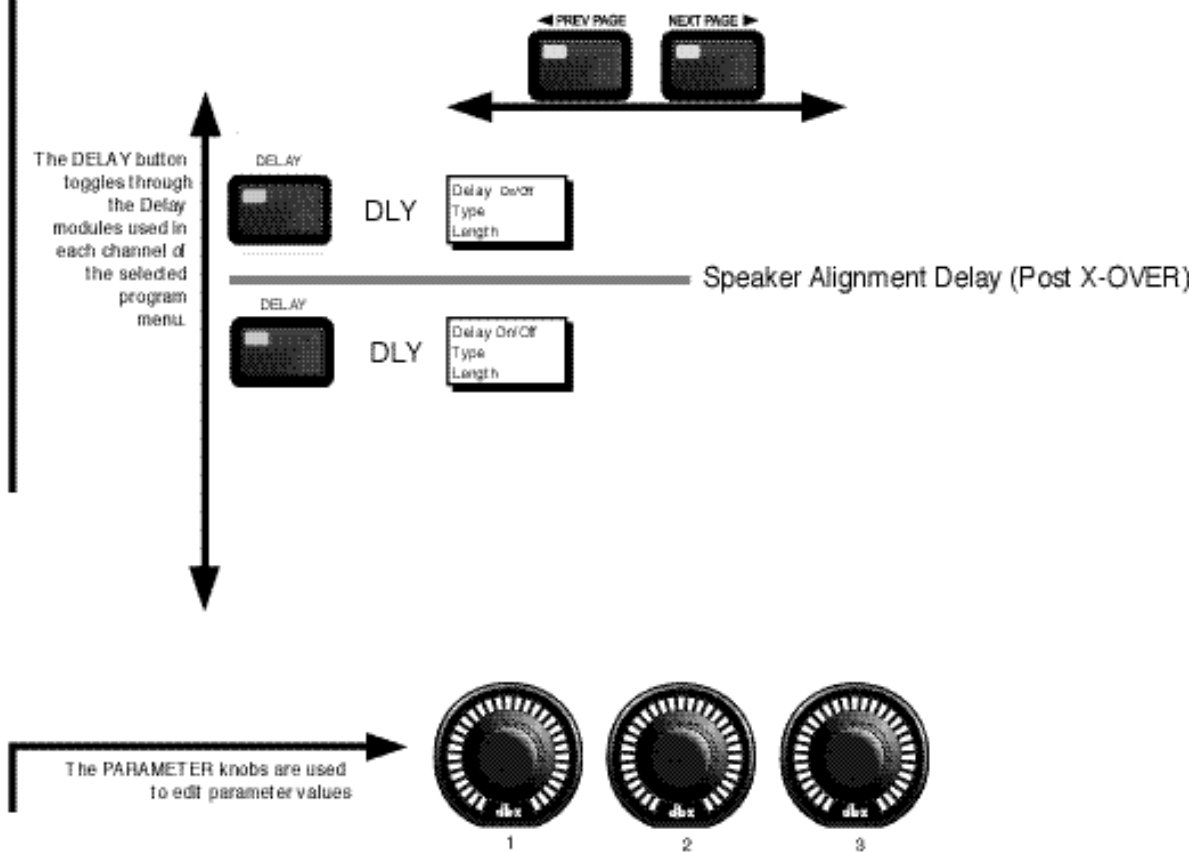
### 2.8 Navigating the Delay

## Navigating the "Delay" Section

To edit the parameters of the Delay and Speaker Alignment Delay used in a selected program, simply use the following procedure.

From program mode, either press the DELAY button or use the Parameter 2 or 3 knobs to move to Delay module to be edited.

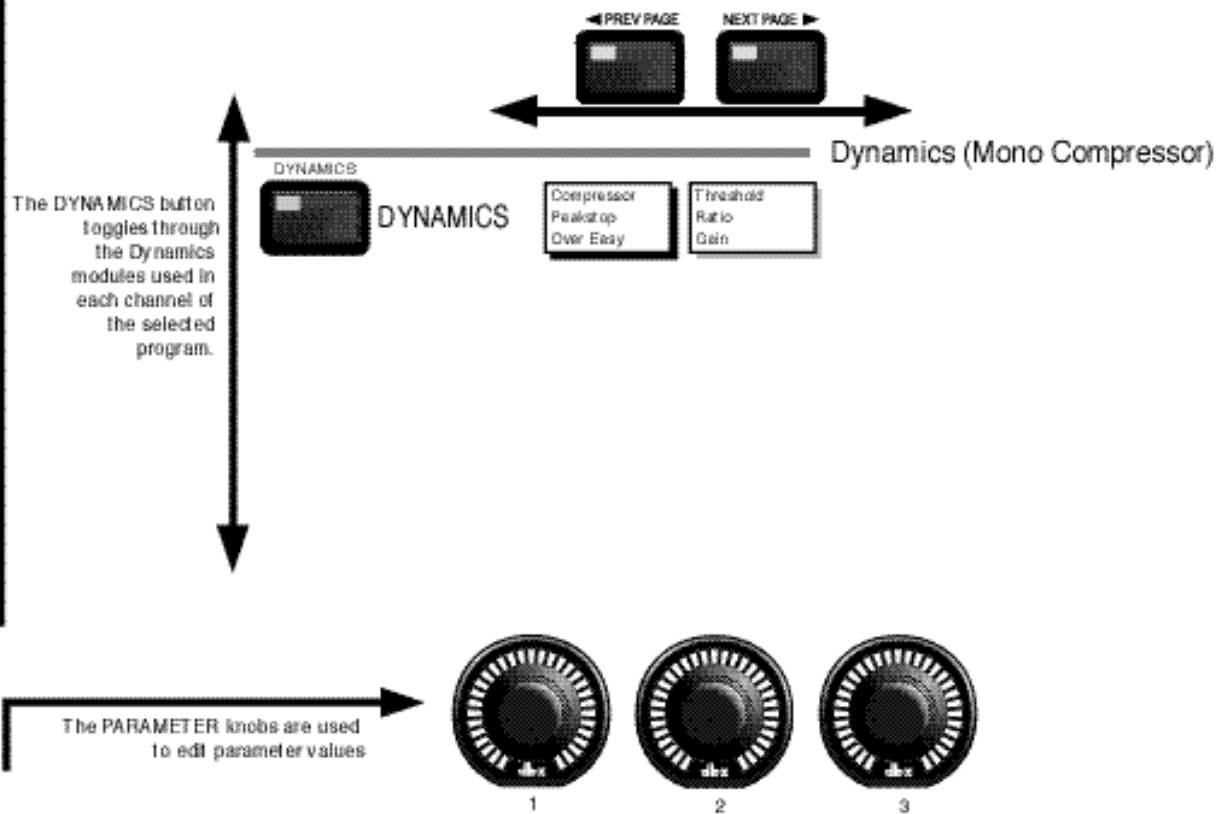
Navigate through the Pages of the selected Delay module by depressing the "Next Page" or "Prev Page" buttons successively until arriving at the desired Page.



### 2.9 Navigating the Dynamics Section

## Navigating the "Dynamics" Section

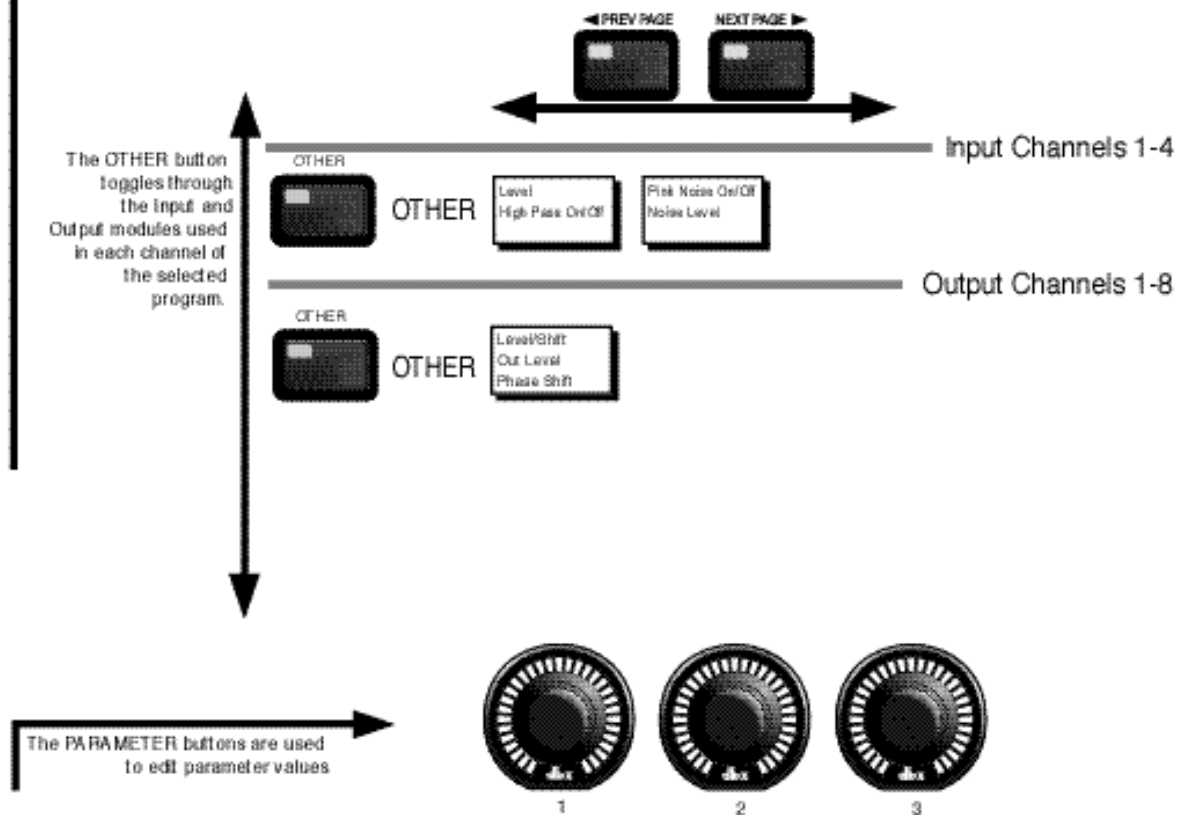
To edit the parameters of the Dynamics module used in a selected program, simply use the following procedure. From program mode, either press the X-OVER button or use the Parameter 2 or 3 knobs to move to the Dynamics module. Once you have reached the Crossover module, press either Parameter button to enter the module. Successive presses of DYNAMICS button will move through each channel that utilizes a Dynamics module. Navigate through the Pages of the selected Dynamics module by pressing the "Next Page" or "Prev Page" buttons successively until you arrive at the desired Page.



### 2.10 Navigating the Other Section

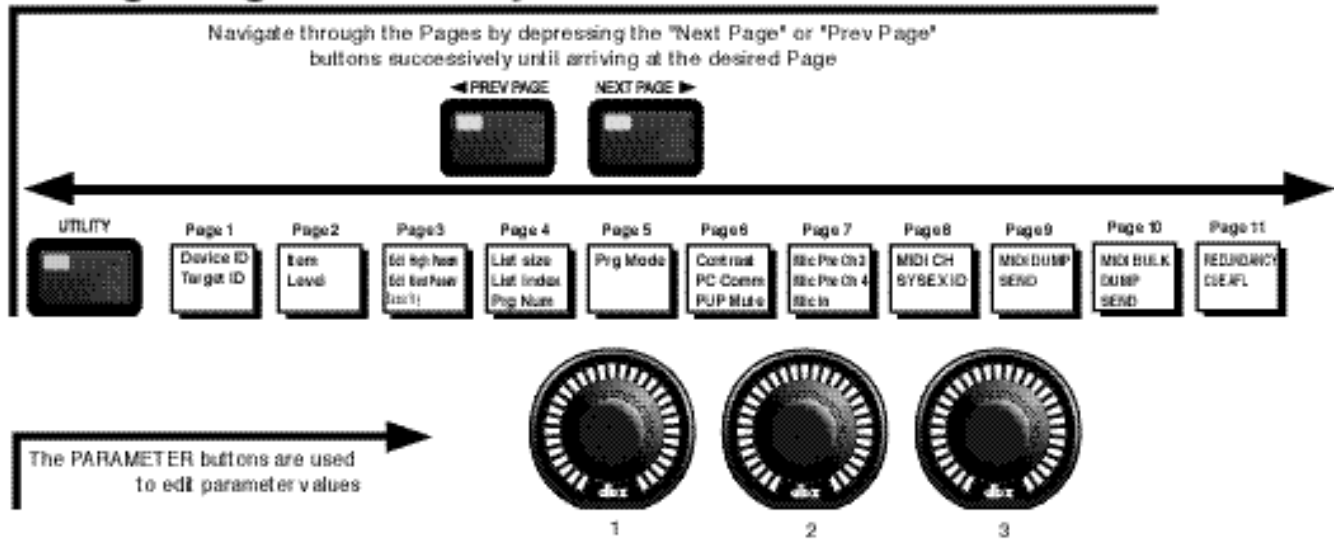
## Navigating the Other (Input and Output) Sections

To edit the parameters of the Input and Outputs used in a selected program, simply use the following procedure. From program mode, either press the OTHER button or use the Parameter 2 or 3 knobs to move to Input or Output modules. Once you have reached the Input and Output modules, press the next pg and prev pg buttons to access the editing pages of the module. Successive presses will move through each of the Input and Output editing modules. Navigate through the Pages of the selected Input or Output module by pressing the "Next Page" or "Prev Page" buttons successively until arriving at the desired Page.



### 2.11 Navigating the Utility Section

## Navigating the "Utility" Section







# CONFIGURATION FUNCTIONS



The Configuring section of the 480, 481 and 482 DriveRack™ units will be your key to successful navigation of the configuration functions of the DriveRack™. The following information provides descriptions about program functions and in depth configuration options of the 480, 481 and 482 DriveRack™ units.

### 3.1 Program Definition

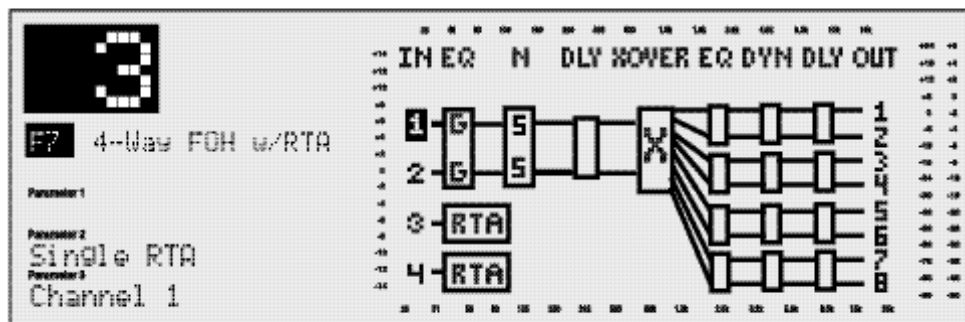
The first step in understanding the complex programming capabilities of the DriveRack™ is to understand the elements involved that combined, define a complete “program.” Within an individual program, there are several levels of editing that make up the complete program. When initially entering a program, 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 480, 481 and 482 DriveRack™ units give you the option of entering subsequent levels of operation that are dedicated to program editing. The levels include: Configuration mode, Effect Edit mode. The key element to remember is that all of these components combined, make up the conventional “program”, and that they are all unique to each individual program. The utility menu mode and Network setup and management and setup are accessed via the utility menu, and are not part of the program.

### 3.2 Navigating Factory Programs

From the factory, the 480, 481 and 482 DriveRack™ units are shipped with 20 factory programs that utilize carefully constructed routing configurations that have been designed to accommodate virtually any sound reinforcement and installation application. These configurations are laid out in an intuitive straight forward manner on the 480. The 480 display shows the entire signal route from the input section to the output section.

#### Selecting Programs:

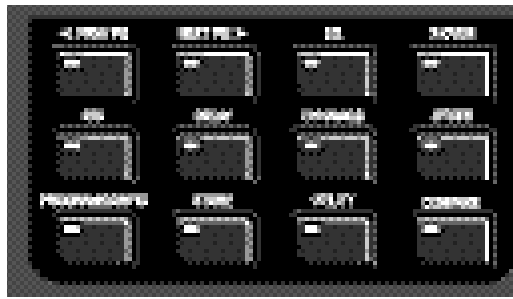
The quickest mode for getting up and running with the DriveRack™ is to simply use any one of the factory programs that are available in the box. To select a factory program, (from program mode), use the PARAMETER 1 knob to scroll through the various factory programs. This is an ideal method of selection because when each factory program is scrolled to, the display will clearly indicate the routing matrix, as well as all of the effects that are being used for the selected program. Once a program is selected, press the PROGRAM/CONFIG button to load the program. The display will appear something like this:



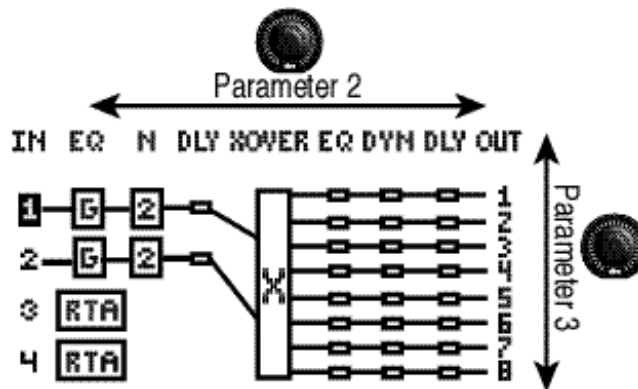
### Navigation Modes

Once you have selected a program that utilizes a configuration that accommodates your application, the DriveRack™ offers different modes of navigation to access and edit effect types within the selected configuration.

To instantly access an effect module, simply press the corresponding button in the button array for the desired module. The following buttons will access the following modules: EQ = PEQ, GEQ and Notch filters (successive presses will you move through each input and output which utilizes an EQ type module). X-OVER = Crossover(s) and filters, RTA = Real Time Audio Analyzer, DELAY = Delay and Driver Alignment Delay (successive presses will you move through each input and output which utilizes the Delay type module). DYNAMICS = Compressor/Limiter (successive presses will you move through each output compressor module). OTHER = Input and Output modules (successive presses will you move through each input and output channel).

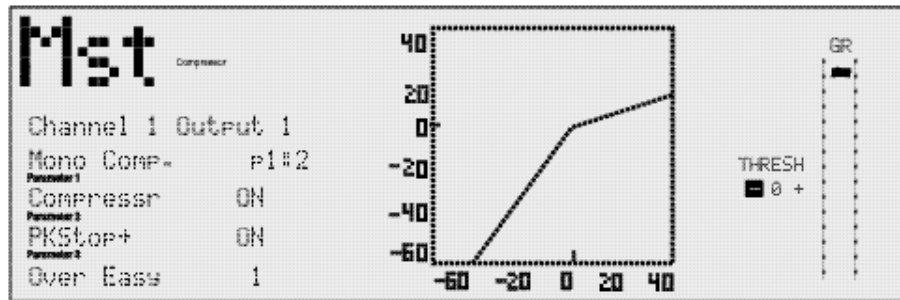


To roam through a program configuration, simply use the PARAMETER 2 knob to move from left or Right within the configuration, and use the PARAMETER 3 knob to move Up and Down within the configuration. Once you have reached the module to be edited, press either the PARAMETER 2 or 3 knob to access the editing parameters of the modules.



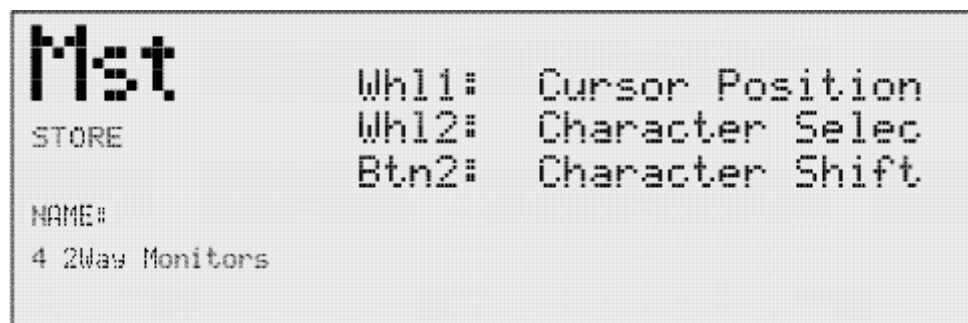
## 3.3 Editing Factory Programs

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 PARAMETER knobs are used to edit parameter values. The following illustration shows an example of the Compressor/Limiter module in edit mode:



## 3.4 Saving Factory Program Changes

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 to the program as a custom USER program by simply pressing the STORE button, and the display will appear something like this:

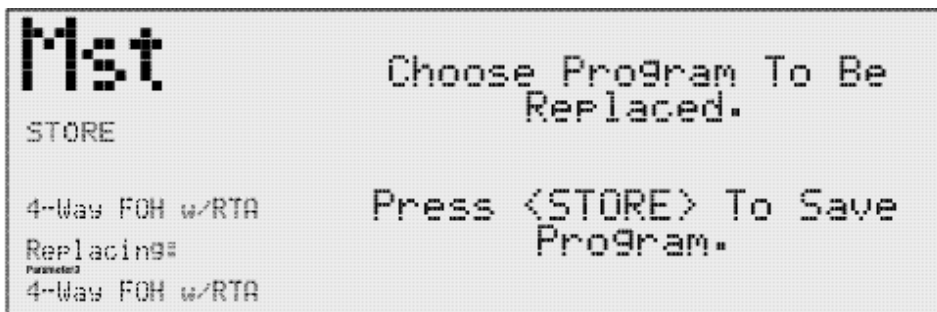


Rotate the Parameter 2 knob to move the cursor position. Rotate the Parameter 1 knob to select the desired character. Push the PARAMETER 2 knob to toggle between upper and lower case characters.

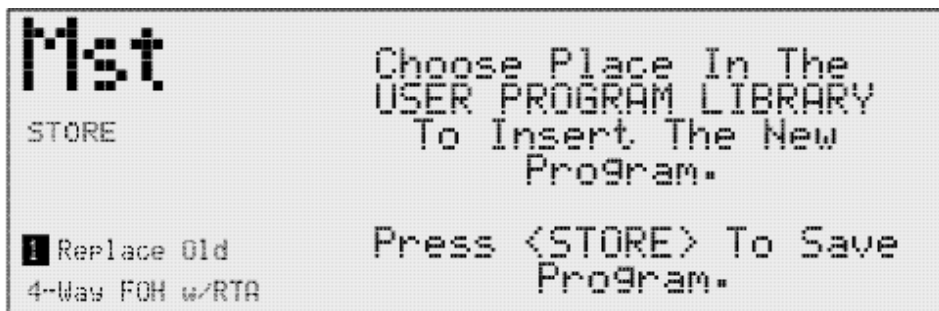
- Once you are satisfied with the selected name, press the STORE button again and the screen will appear something like this:



- If you wish to replace an existing User program, press the PARAMETER 1 knob and the display will appear as follows:



- Use the Parameter 3 knob to select the USER program to be replaced. Once the program to be replaced has been selected, press the STORE button once again and the program will then be replaced.
- To store a program as a new USER program, press the STORE button and then press the Parameter 2 knob to store as new and the display will appear as follows:



- At this point, use the Parameter 2 knob to select the position where the new USER program will be stored.

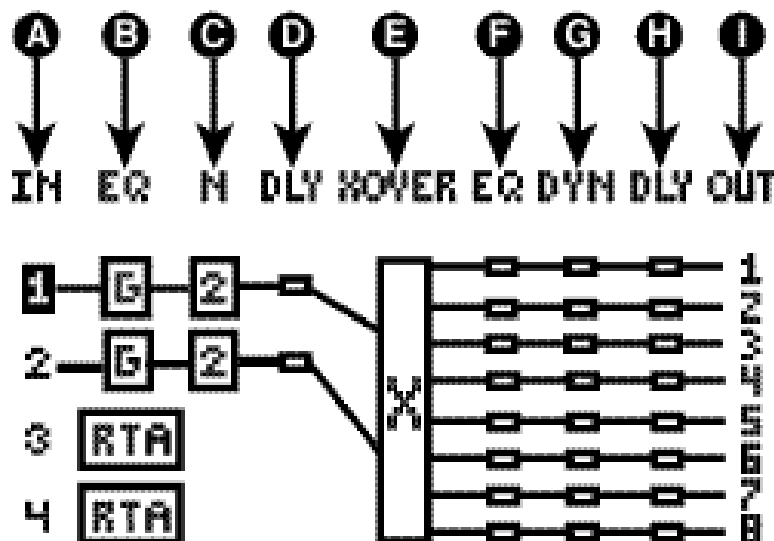
### 3.5 Creating a User Configuration

User Configuration creation is an ideal feature available in the DriveRack™ line. Even with the versatility of the Factory configurations within the DriveRack™, there may be an application that requires a unique “custom” program. The DriveRack™ gives you the ability to create a custom routing configuration by selecting and modifying the modules including: Inputs (naming), pre-crossover EQ, Notch Filter, Crossovers and Output Naming. The procedure for this process is as follows:

- From Program mode, press and hold the PROGRAM/CONFIG button until the top left side of the display reads:

```
CONFIGURATION
MODE: Select FX
```

- At this point, you can navigate the signal route to move to the module that you wish to edit by using the PARAMETER 2 knob to move the cursor left and right, and use the PARAMETER 3 knob to move the cursor up and down.
- Once you have reached the module that you wish to edit and the module has been high lighted, simply use the PARAMETER 1 knob to select the various options for the selected module. The following illustration and sub sections offer information about each section of the signal path within the DriveRack™ unit.



#### 3.5- A Input Routing

From the Configuration creation mode, the DriveRack™ gives you the option of routing any physical analog input to any digital input. This means that a connection can be made at any one of the four inputs on the rear panel of the unit and then routed to any one of the four digital input sections within the unit. This routing feature will also allow you to number the

Input in a manner that will accommodate your application. The inputs of the DriveRack™ units can also mix audio from any one, or all of the analog inputs. Options for selecting and numbering Inputs include: Input names 1–4 and M.

### 3.5- B Pre Crossover EQ

At the pre crossover section of the signal path, the DriveRack™ units give you the option of utilizing either a 31 band graphic or 9 band parametric EQ on each channel of the selected input. The DriveRack™ will also accommodate a dual 31 band graphic EQ, dual (Show and House) 31 band graphic, or 9 band graphic EQs on each input. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected input of the pre-crossover EQ section. Once you are there, use the PARAMETER 1 knob to select either the 31 band graphic (G), Show/House (SH) 31 band, or the 9 band parametric (P) equalizer. In addition to the equalizers available in this section, inputs 3 and 4 offer real time audio analyzers which can be selected by using the same procedure.

### 3.5- C Notch Filter

At the Notch filter section of the signal path, the DriveRack™ units give you the ability to use a 1-5 band notch filter on any input within the section, while not exceeding 10 bands within the unit. The notch filter is the perfect tool for removing unwanted frequencies from the signal path. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected input of Notch filter section. Once you are there, use the PARAMETER 1 knob to select the desired Notch filter.

### 3.5- D Delay Section

The DriveRack™ units offer two unique delay sections within the signal path. The first Delay section can be used for setting overall room delay settings. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected input of Delay section.

### 3.5- E Crossover

The Crossover section of the DriveRack™ unit offers 27 different crossover options that can accommodate any audio application. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the Crossover section. Once you are there, use the PARAMETER 1 knob to select the desired Crossover module. Section 3.7 provides you with in-depth information for selecting and moving crossover types.

### 3.5- F Post Crossover Parametric EQ

After the Crossover section, the DriveRack™ units offer an additional 4 band Parametric EQ module. This EQ is often used to compensate for non-linearities in speaker response. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected output EQ section.

### 3.5- G Dynamics (Compressor/Limiter)

The Dynamics section of the DriveRack™ signal path provides you with compression/limiting on any one (or all) of the eight outputs of the signal path. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected output Dynamics section.

### 3.5- H Driver Alignment Delay

The second Delay section of the DriveRack™ units is used to fine tune delay times within an enclosed speaker or an array of speakers. Enter the Configuration creation section of the DriveRack™ by pressing and holding the PROGRAM/CONFIG button. Now use the PARAMETER 2 and 3 knobs to move to the selected output Delay section.

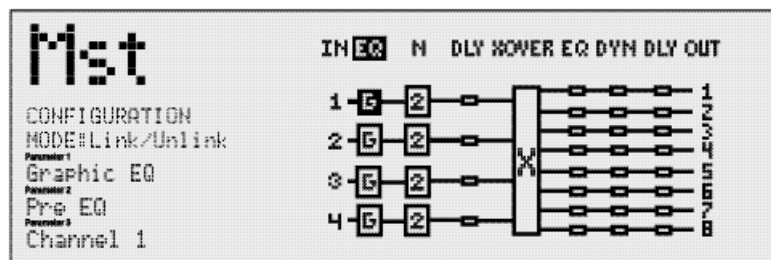
### 3.5- I Output Routing and Phase Compensation

From the Configuration creation mode, the DriveRack™ gives you the option of routing any digital output to any of the eight analog outputs of the DriveRack™ unit. This means that the digital output signal can be routed to any one of the eight physical outputs. Options for numbering Outputs names include: 1-8. This means that two signals that are sent to the same output, will be summed to one output that shares the same name. In addition to output routing, each output section of the DriveRack™ unit offers phase compensation within the selected output module.

## 3.6 Linking Modules

The DriveRack™ provides the user with an option to link like modules together (ie; four 31 band Graphic EQs and so on) so that when a change is made in a selected program to one module, the change will affect all of the like modules. This linking feature can be applied to every module used in any single configuration. The following procedure will illustrate how to perform this feature.

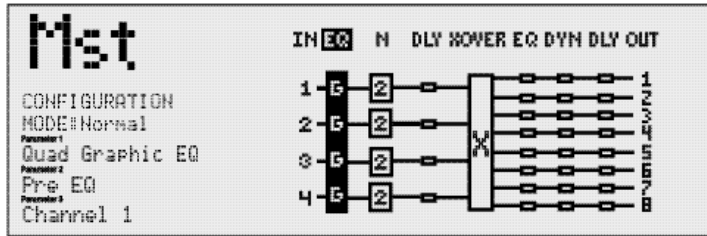
- While you are in Configuration mode, use the PARAMETER 2 and 3 to scroll to the module section that you wish to link. For this example, we will use the Graphic (G) EQ modules. Once a single Graphic EQ module has been selected, you can select all of the Graphic EQ modules by pressing the PARAMETER 3 knob, and the display will appear something like this:



- At this point, rotate the PARAMETER 3 knob to select all four Graphic EQ modules, then press the PARAMETER 2 knob to link the modules together. Once this has been done,



the display will appear something like this:

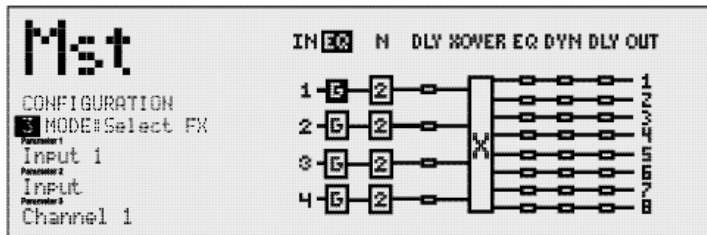


Note: Linking modules past the crossover section will be dictated by the selected crossover type. For example, if a two-way crossover is used, you will be limited to linking the effect modules past the crossover to highs and lows.

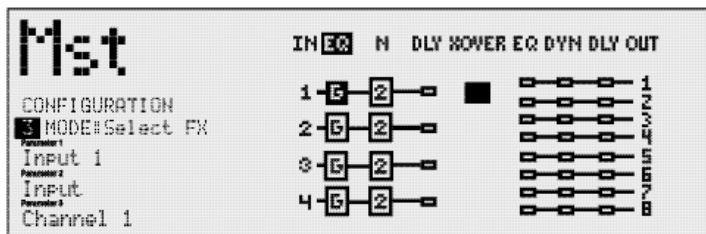
### 3.7 Selecting and Moving Crossovers

The user has the ability to select and position the desired crossover within the crossover module section. You also have the ability to change the crossover output route while you are selecting and moving crossovers. The procedure is as follows:

- From Program mode, press and hold the PROGRAM/CONFIG button until you are in Configuration mode. The display will appear as follows:



- At this point use the Parameter 2 and 3 knobs to move to the crossover section.
- Once the crossover section has been selected, use the PARAMETER 1 knob to select the desired crossover type.
- If you wish to move a crossover type, simply rotate the PARAMETER 1 knob counter clockwise until the display appears something like this:



- Now use the PARAMETER 3 knob to move the crossover module to the desired position.
- Once the desired position has been selected, use the PARAMETER 1 knob to select the desired crossover type.
- To change the crossover output route, press the PARAMETER 1 knob until the display reads: 1 MODE:Route XOVER. Proceed to rotate the PARAMETER 1 knob until the desired route is selected. Successive presses of the PARAMETER 1 knob will toggle between select fx and route Xover
- Repeat this procedure to add additional, and output route crossovers.

### 3.8 Saving Configuration Changes

Once changes have been made to the current Configuration, changes can be saved by pressing the NEXT PG button and the display will appear like this:



If you are satisfied with your Configuration changes, press the PARAMETER 1 knob. If you wish to abort, press the PREV PG button and the DriveRack™ will return to Configuration mode. Note that if you press the PARAMETER 1 knob to apply the changes, the DriveRack™ will return to Program mode. You will still need to save the program changes before you move to the next program.

# DETAILED PARAMETERS



The DriveRack™ units (480, 481 and 482) offer 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 available within the DriveRack™ units.

## 4.1 Input Routing (IN)

The signal routing begins at the INPUT ROUTING block of the DriveRack™ units. The input may be configured as a signal router or a mixer. Please see section 3.5A for more information. These parameters are user adjustable on all programs. Please see section A.9 of the Appendix section for a complete input signal routing diagram.

### Level -Inf to 20dB (Router Module)

Adjusts the input level of the selected input.

### Input (Mixer module)

This parameter is used to select the input channel.

### Level Inf to 20dB (Mixer module)

This parameter is used to adjust the level for the selected channel.

### Master level Inf to 20dB (Mixer module)

This parameter is used to control the overall output level of the mixed input signals.

### High Pass Off, 15 - 118Hz (Mixer and Router)

Turns the High Pass filter on and off and selects the desired frequency from 15 to 118 Hz in 1/12 octave steps.

### Pink Noise On/Off (Mixer and Router)

Turns the pink noise generator on and off.

### Noise Level -10 to 10 (Mixer and Router)

Adjusts the overall level of the pink noise generator.

## 4.2 Pre-Crossover (EQ)

The 480, 481 and 482 DriveRack™ EQ sections may be configured as a single 31 band, dual 31 Show/House, 9 band parametric or a real time analyzer (ch. 3 and 4). For more information on these configuration options, please see section 3.5B.

### 4.2.1 - 31 BAND GRAPHIC EQ (G)

#### EQ On/Off

Turns the GEQ on and off.

#### Flat Set/Undo

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

#### Frequency 20Hz to 20kHz

This parameter allows you to select any one the 31 available frequencies.

#### Level -12 to +12 dB

This parameter allows you to adjust the level of any one of the 31 bands of the GEQ in .5 dB increments.

### Boom -6dB to 6dB

The Boom parameter allows you add an additional low-end boost or cut to the Graphic EQ.

### Zizz -6dB to 6dB

The Zizz parameter allows you add an additional high-end boost or cut to the Graphic EQ.

## 4.2.2 - SHO W/HOUSE 31 BAND GRAPHIC EQ (S or H)

### EQ On/Off

Turns the show or house GEQ on and off.

### Flat Set/Undo

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

### Fr equency 20Hz to 20kHz

This parameter allows you to select any one the 31 available frequencies.

### Level -12 to +12 dB

This parameter allows you to adjust the level of any one of the 31 bands of the GEQ in .5 dB increments.

## 4.2.3 - P ARAMETRIC EQ (P)

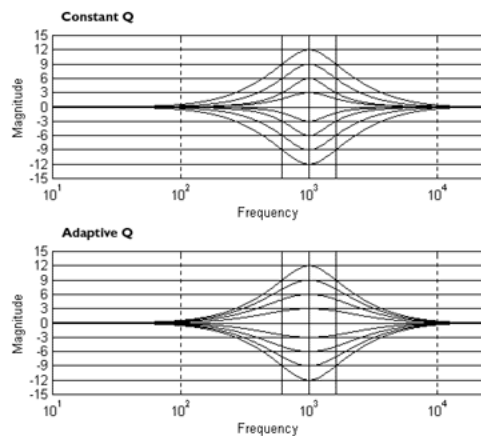
### EQ On/Off

Turns the PEQ on and off.

### Type Const Q / Adapt Q

Const Q operates similar to an analog graphic EQ where the Q is constant regardless of cut or boost. Whereas, Adaptive Q, operates similar to the EQ that is found on a mixing console where the width of the band is constant regardless of the cut or boost.

The following figure shows the difference between constant and adaptive Q parametric filters.



**Flat Set/Undo**

This parameter either flattens (set) or restores (undo) all bands to their original settings.

**Band 1 F frequency 20 to 20kHz (Low Shelf)**

Selects the frequency of the low pass shelf parametric EQ.

**Slope 1 3-12dB/Octave**

Sets the slope of the low shelf parametric EQ.

**Level 1 -12 to 12 dB**

Sets the overall gain of the shelf EQ.

**Band (2-8) F frequency 20 to 20k**

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

**Q (2-8) 0.20 to 16.0**

Adjusts the Q of the selected band of the parametric EQ.

**Level (2-8) -12 to 12 dB**

Sets the overall level of the selected parametric EQ frequency.

**Band 9 F frequency 20 to 20k (High Shelf)**

Selects the frequency of the high shelf parametric EQ.

**Slope 9 3-12dB/Octave**

Sets the slope of the high shelf parametric EQ.

**Level 9 -12 to 12 dB**

Sets the overall gain of the high shelf parametric EQ.

**4.2.4 - REAL TIME ANALYZER (RTA)**

The DriveRack™ units offer two built-in Real Time Audio Analyzers. This RTA feature is an ideal tool for helping optimize the sound quality of any audio application. For more information on how to use an RTA and pinking a room, please see sub sections 3.5B and A.8.

**Input Chan 1-4, 1+2, 2+3, 3+4**

This parameter is used to select which input channel is used as the RTA input source.

**RTA Gain -20 to 20db**

This parameter is used to set the overall input level of the RTA.

**Mic Sens. Off, 1 to 25.0 mv/pascal**

This parameter is used to input the sensitivity of the selected RTA microphone in units of millivolts/pascal. Please see section A.8 for more information on mic sensitivity.

**Rate Slow/Med/Fast**

The rate parameter selects the decay time of the peak indicators. Slow will hold the indicator longer, while a fast setting is removed sooner.

### Scale 62dB or 24db

The scale parameter is used to select the resolution and range of the display. A setting of 62db has a greater range but the 24dB setting displays at a higher resolution.

### Display Run/Hold

The display parameter is used to either let the RTA display run or hold the display for a more accurate reading.

## 4.3 Notch Filters (N)

All four inputs of the 480, 481 and 482 DriveRack™ offer assignable Notch Filters. The notch filter is the perfect tool for dropping out undesirable frequencies that may appear in the input signal. Ten Notch filters are available, and up to 5 can be used on a single channel.

### Notch On/Off

Turns the notch filters on and off.

### Frequency (1 to 5) 20 to 20K

Selects the desired notch filter frequency of the selected notch filter.

### Q 16 to 128

Selects the Q of the selected notch filter.

### Level -36 to 6 dB

Sets the level of the selected notch filter. Set to +6dB to help find unwanted feedback, then set to -3dB to -36dB to remove.

## 4.4 Pre Crossover Delay (DLY)

Each input channel of the 480, 481 and 482 DriveRack™ units offer a room channel delay effect. The channel delay effect can be used to compensate signal delay drop-out, which results from distance separation of loudspeakers.

### Delay On/Off

Turns the delay on and off.

### Units - Seconds, Feet or Meters

Selects the unit of measurement for the delay.

### Length

Selects the amount of delay. Delay length will correspond directly with the selected unit of measurement. Delay lengths include: 682.65 milliseconds, 769.35 feet or 234.15 meters. Adjustments can be in 20 micro-second increments.

## 4.5 CROSSOVER (XOVER)

To accommodate any audio application, the 480, 481 and 482 DriveRack™ units offer numerous crossover options. There are three main types of configurations found in the crossover section. They are: Wires, Filters and Crossovers. The Wire modules simply route the signal to the appropriate output with no processing. The filter module allows the user to select a Wire,

Lowpass, Highpass or band pass filter with adjustable frequency and slope. The Dual filter is a case that splits the signal with a filter on each channel. The Crossover options are grouped into 2, 3 or 4 band categories. Each Crossover give control of 1, 2 or 3 crossover points respectively. A crossover point is where the Lowpass and Highpass filter meet. The user may control the Lowpass edge, Highpass edge or both using the Center fc parameter. The Crossover type allows selection of Butterworth, Bessel or Linkwitz-Riley filter types with roll-off or slopes of 6-24dB/Octave (Butterworth and Bessel) or 12-48dB/Octave (Linkwitz-Riley). In traditional analog Crossovers using Linkwitz-Riley filters, the low and high frequencies and slopes are set equal. With the Crossover menu, the following parameters are available with various Crossovers.

A complete diagram of each crossover used in the 480,481 and 482 DriveRack™ units can be found in section A.7 of the Appendix.

#### 4.5.1 1X1, 2X2, 3X3, 4X4 FILTERS

Filter Type - Wire, Lowpass, Highpass and Bandpass

Selects the desired filter type.

Lowpass - 20Hz to 20kHz

Selects the desired Lowpass crossover frequency.

Highpass - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Low Slope - 6-24dB/Octave

Sets the Lowpass slope of the crossover filter.

High Slope - 6-24dB/Octave

Sets the Highpass slope of the crossover filter.

#### 4.5.2 DUAL FILTER

Filter Type 1 - Wire, Lowpass, Highpass and Bandpass

Selects the desired filter type.

Lowpass 1 - 20Hz to 20kHz

Selects the desired Lowpass crossover frequency.

Highpass 1 - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Low Slope 1 - 6-24dB/Octave

Sets the Lowpass slope of the crossover filter.

High Slope 1 - 6-24dB/Octave

Sets the High pass slope of the crossover filter.

Filter Type 2 - Wire, Lowpass, Highpass and Bandpass

Selects the desired filter type.

Lowpass 2 - 20Hz to 20kHz



Selects the desired Lowpass crossover frequency.

Highpass 2 - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Low Slope 2 - 6-24dB/Octa ve

Sets the Lowpass slope of the crossover filter.

High Slope 2 - 6-24dB/Octa ve

Sets the Highpass slope of the crossover filter.

#### 4.5.3 2-BAND CR OSSO VERS - 1X2, 2X3, 2X4, 3X4, 3X6, 4X8

Low Fc - 20Hz to 20kHz

Selects the desired Lowpass crossover frequency.

Center Fc - 20Hz to 20kHz

Adjusts the Low Fc and High Fc together.

High Fc - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Type - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)

Selects the desired crossover filter type.

Low Slope - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)

Sets the Lowpass slope of the crossover filter.

High Slope - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)

Sets the Highpass slope of the crossover filter.

#### 4.5.4 3-BAND CR OSSO VERS - 1X3, 2X4W/SUB , 2X5, 2X6, 3X5, 3X8, 3X7W/SUB

Low Fc 1 - 20Hz to 20kHz

Selects the desired Lowpass crossover frequency.

Center Fc 1 - 20Hz to 20kHz

Adjusts the Low Fc and High Fc together.

High Fc 1 - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Type 1 - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)

Selects the desired cross-over filter type.

Low Slope 1 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)

Sets the Lowpass slope of the crossover filter.

High Slope 1 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)  
Sets the Highpass slope of the crossover filter.

Low Fc 2 - 20Hz to 20kHz  
Selects the desired Lowpass crossover frequency.

Center Fc 2 - 20Hz to 20kHz  
Adjusts the Low Fc and High Fc together.

High Fc 2 - 20Hz to 20kHz  
Selects the desired Highpass crossover frequency.

Type 2 - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)  
Selects the desired crossover filter type.

Low Slope 2 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)  
Sets the Lowpass slope of the crossover filter.

High Slope 2 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)  
Sets the Highpass slope of the crossover filter.

#### 4.5.5 4-BAND CR OSSO VERS - 1X4, 2X6W/DU AL SUB , 2X7, 2X8, 3X7W/DU AL SUB , 3X8 W/DU AL SUB

Low Fc 1 - 20Hz to 20kHz  
Selects the desired Lowpass crossover frequency.

Center Fc 1 - 20Hz to 20kHz  
Adjusts the Low Fc and High Fc together.

High Fc 1 - 20Hz to 20kHz  
Selects the desired Highpass crossover frequency.

Type 1 - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)  
Selects the desired crossover filter type.

Low Slope 1 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)  
Sets the Lowpass slope of the crossover filter.

High Slope 1 - 6-24dB/Octa ve (BW , Bessel) 12-48dB/Octa ve (L-R)  
Sets the Highpass slope of the crossover filter.

Low Fc 2 - 20Hz to 20kHz  
Selects the desired Lowpass crossover frequency.

Center Fc 2 - 20Hz to 20kHz  
Adjusts the Low Fc and High Fc together.

High Fc 2 - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Type 2 - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)

Selects the desired crossover filter type.

Low Slope 2 - 6-24dB/Octave (BW, Bessel) 12-48dB/Octave (L-R)

Sets the Lowpass slope of the crossover filter.

High Slope 2 - 6-24dB/Octave (BW, Bessel) 12-48dB/Octave (L-R)

Sets the Highpass slope of the crossover filter.

Low Fc 3 - 20Hz to 20kHz

Selects the desired Lowpass crossover frequency.

Center Fc 3 - 20Hz to 20kHz

Adjusts the Low Fc and High Fc together.

High Fc 3 - 20Hz to 20kHz

Selects the desired Highpass crossover frequency.

Type 3 - Butterworth (BW), Bessel and Linkwitz-Riley(L-R)

Selects the desired crossover filter type.

Low Slope 3 - 6-24dB/Octave (BW, Bessel) 12-48dB/Octave (L-R)

Sets the Lowpass slope of the crossover filter.

High Slope 3 - 6-24dB/Octave (BW, Bessel) 12-48dB/Octave (L-R)

Sets the Highpass slope of the crossover filter.

#### 4.6 Post-CROSSOVER PEQ (EQ)

In addition to the pre-crossover EQ options within the signal path, the 480, 481 and 482 DriveRack™ units also offer a parametric EQ after the crossover section. The parameters for the Post-crossover EQ are as follows and are user adjustable:

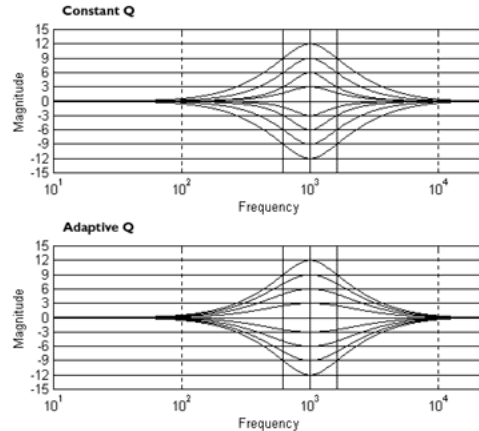
PEQ On/Off (per crossover band)

Turns the PEQ band on and off per XOVER band.

Type Const Q, Adapt Q, Const Q+Sh (with top and bottom band shelves)  
and Adapt Q+Sh (with top and bottom band shelves)

Const Q operates similar to an analog graphic EQ where the Q is constant regardless of cut or boost. Whereas, Adaptive Q, operates similar to the EQ that is found on a mixing console where the width of the band is constant regardless of the cut or boost. The DriveRack™ units also offer these Q type EQs with top and bottom band shelves.

The following figure shows the difference between constant and adaptive Q parametric filters.

**Flat Set/Undo**

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

**Band (1-4) F** frequency 20 to 20k

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

**Q (1-4)** 0.20 to 16.0

Adjusts the Q of the selected band of the parametric EQ.

**Level (1-4)** -12 to 12 dB

Sets the overall level of the selected parametric EQ frequency.

## 4.7 Compressor/Limiter (DYN)

The 480, 481 and 482 DriveRack™ units also offer compressing or limiting capabilities. Furthermore, within the configuration menu, compression or limiting can be assigned to similar bands (ie: highs with highs or lows with lows), or used in a full range capacity within the selected crossover. The parameters for the Compressor/Limiter are as follows and are user adjustable:

**Compressor On/Off**

Turns the compressor/limiter module on and off.

**Peakstop+ On/Off**

This parameter turns the peakstop limiting on and off. When peakstop+ is enabled, the ratio is automatically changed to 1:1.

**OverEasy 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 right 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 -40 to +20dBu

Threshold is the signal level at which the 480, 481 and 482 DriveRack™ units start 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 1.0 to Inf:1

Ratio is the amount the 480, 481 and 482 DriveRack™ units reduce 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 480, 481 and 482 DriveRack™ units 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 sets the compressor act as a limiter, and engages peakstop+ if turned on.

#### Gain -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 was.

### 4.8 Speaker Alignment Delay (DLY)

The 480, 481 and 482 DriveRack™ units also offer a speaker alignment delay which is ideal to use for compensating signal delay that occurs between speaker driver components such as speaker clusters or between internal speaker components such as horns, speakers and subwoofers within speaker cabinet. The Speaker alignment delay is also ideal for compensation the difference in that high and low frequencies travel. The parameters for the Speaker 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- 0-170.64ms, Feet- 0-192.32 and Meters - 0.0-58.5. Fine adjustments are made in 10ms increments.

## 4.9 Output Routing

The output section 480, 481 and 482 DriveRack™ units provide the user with the ability to control output levels of the unit and adjust phase compensation of loudspeakers within the signal path. The output level control is located in the signal path before the compressor/limiters; this means that the compressor/limiter directly affects the output level. The parameters for the Phase Compensation effect are as follows and are user adjustable. Please refer to section A.9 of the Appendix for a complete output signal routing diagram.

### Level/Shift On/Off

This parameter is used to turn the selected output level and shift parameters on or off. When level/shift is off, level is set to 0dB and phase is 0°.

### Level Inf, -9.5 to 20.0dB

This parameter is used to set the overall output level of the selected output.

### Phase Off, 0 to -360 °

This parameter sets the amount of phase within the selected output path. The phase is referenced to the upper frequency of the selected output crossover band. Pressing the PARAMETER 3 knob will invert the phase of the entire band, giving an additional 180 degrees of phase.

# STORING PROGRAM CHANGES

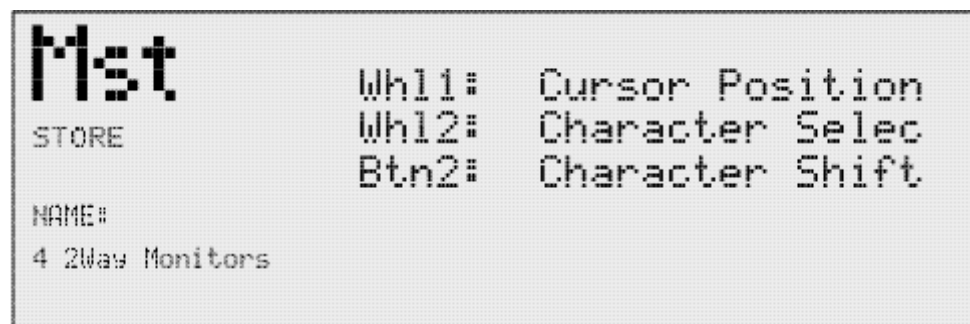


## Storing Changes

Once program editing functions have been made to programs in the 480, 481 or 482 DriveRack™ units, you will need to save any changes that have been made to the selected unit. The following section will provide you with information on making the most effective and efficient program saving and storing changes in the DriveRack™.

### 5.1 Saving Program Changes

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 to save the program as a custom USER program by simply pressing the STORE button and the display will appear something like this:

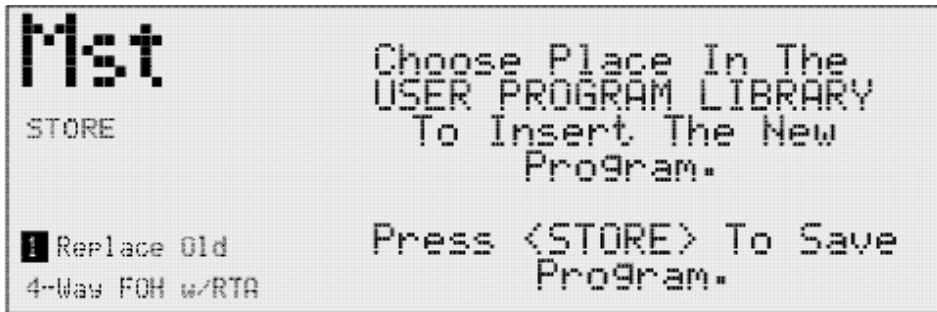


- Rotate the PARAMETER 2 knob to move the cursor position. Rotate the PARAMETER 1 knob to select the desired character. Push the PARAMETER 1 knob to toggle between upper and lower case characters.
- Once you are satisfied with the selected name, press the STORE button again and the screen will appear something like this:

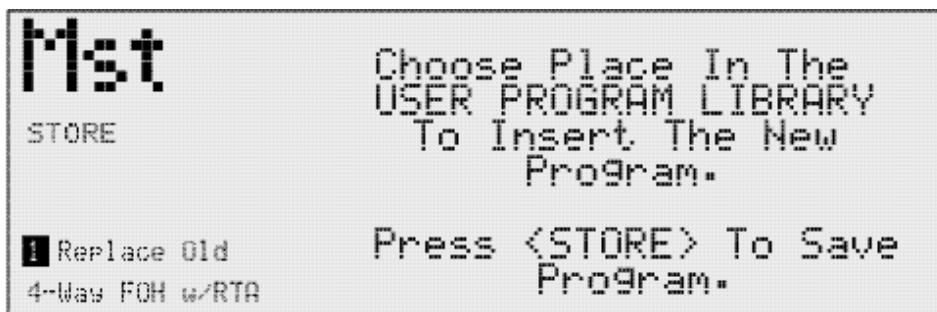


- If you wish to replace an existing User program, press the PARAMETER 1 knob and the display will appear as follows:





- Use the PARAMETER 3 knob to select the USER program to be replaced. Once the program to be replaced has been selected, press the STORE button once again and the program will then be replaced.
- To store a program as a new USER program, press the STORE button and then press the PARAMETER 2 knob to store as new and the display will appear as follows:



- At this point, use the PARAMETER 3 knob to select the position where the new USER program will be stored.

**To abort the save procedure at anytime, simply press the PROGRAM/CONFIG button.**

## 5.2 Saving Configuration Changes

Once changes have been made to the current Configuration in Configuration mode, changes can be saved by pressing the NEXT PG button and the display will appear like this:



- If you are satisfied with your Configuration changes, press the NEXT PG button. If you wish to abort, press the PREV PG button and the DriveRack™ will return to Configuration mode. Note that if you press the NEXT PG button to apply the changes, the DriveRack™ will save the changes and return to Program mode. You will still need to save the program changes before you move to the next program.

# UTILITIES SECTION



The Utility section of the 480, 481 and 482 DriveRack™ units, contain many important functions. The Utility section gives you the ability to perform several key operational functions to the DriveRack™ system including: Network Configuration, Security settings, Power-up features, MIDI programming, Mic Pre Setup and Display contrast settings. Use this section of the manual to make yourself familiar with all aspects of the Utility menu of the DriveRack™ system.

## 6.1 Network ID

All networking functions of the DriveRack™ system are accessed through page 1 of the Utility menu. The following information will lightly touch upon networking issues. For more information on the utilization of the networking capabilities, please refer to section 9.

### SETTING DEVICE IDENTIFICATION NUMBER

To set the device ID number on a 480 DriveRack™, the procedure is as follows:

1. From Program mode, press the UTILITY button once.
2. Use the PARAMETER 1 knob to set any device number from 1-99. If the 480 is going to act as the master controller unit, set the device ID to 0, and **MASTER** will appear in reverse type in the top left-hand corner of the display.

### MASTER

When the selected DriveRack™ unit is set to act as the master unit in the DriveRack™ network, control of all other units can be performed by the master unit. It is important to note that there can be only one unit designated as the master. For more information on the networking capabilities of the DriveRack™ systems, please refer to Section 9.

### SLAVE

When either the 480, 481 or 482 is set to act as a slave unit within a DriveRack™ network, the unit must have a unique ID number to be recognized within the network system. For more information on the networking capabilities of the DriveRack™ system, please refer to Section 9.

Note- ID designations cannot be changed through the network. Changes to ID numbers must be done to the selected unit from within its physical interface.

## 6.2 Security Levels

To protect all detailed parameter editing and configuration modification settings of your DriveRack™ unit, the Utility menu of the DriveRack™ systems include a complete security system set-up. This security system allows you to set security access to every module, with security levels that vary from low to high. This security system also allows you to create unique passwords which will limit/prevent any other users from access to the system. The following information is provided to help you set all security parameters.

1. Prior to setting security passwords you will access the security menu by pressing the UTILITY button and use the PREV PG and NEXT PG buttons to move to page two and three of the utility menu. Once there, the display will appear as follows:

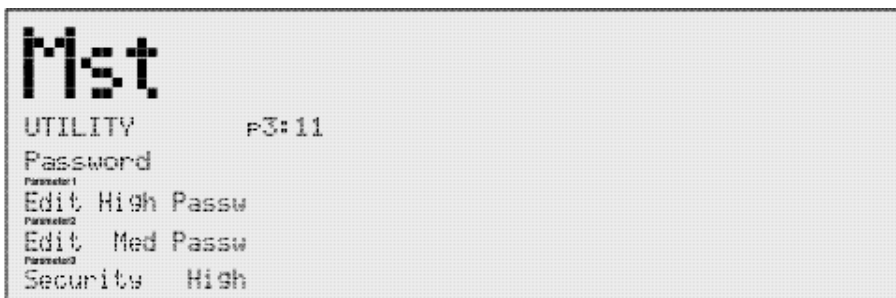


- The PARAMETER 1 knob is used to select modules and functions which are available for adding security levels. Items include: Program changes, Program list, Store, Bypass, Network, Inputs, Pre EQ, House EQ, Notch Filter, Pre Delay, Crossover, Post EQ, Dynamics, Post Delay, Outputs and RTA.
- The PARAMETER 2 knob is used select either the High, Medium or Low level of security for the currently selected module or function.

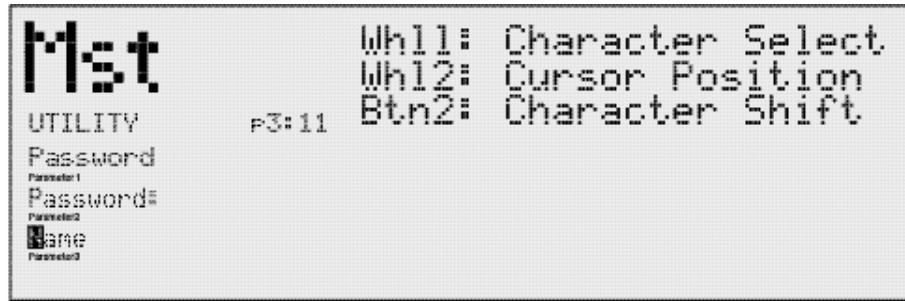
### 6.3 Security Pass words

Once security levels have been assigned to the various modules and functions, You can now proceed to set your operating security password. This Password (High or Med) will allow you to prevent any unwanted users from manipulating operating parameters and functions of modules within the DriveRack™ units.

- To set the password, move to Page 3 of the Utility menu and the display will appear something like this:



- To create a security password for either the High or Med), press or turn the PARAMETER 1 or 2 knob respectively. The PARAMETER 3 knob is used to set the security level of the unit. This means that once a security level of Medium or High has been set to the DriveRack™ unit, you will only have access to the respective level set for module on page two. The display will appear as follows:



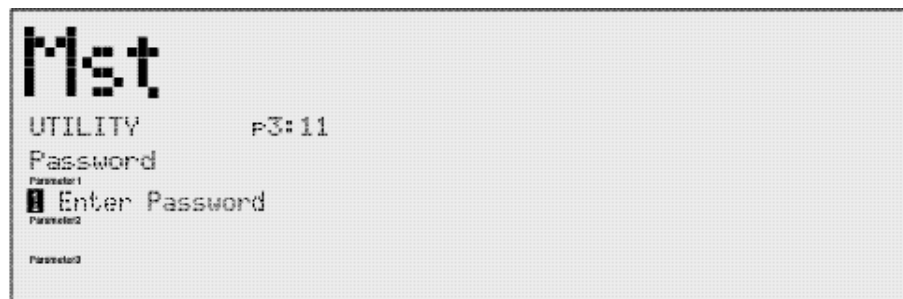
- Rotate the PARAMETER 2 knob to set the cursor position and rotate the PARAMETER 1 wheel to select characters. To shift characters, press the PARAMETER 1 knob.
- Once you are satisfied with your security password, simply press the STORE or PROGRAM button to exit or cancel the procedure.
- Note that security passwords can be changed only by the high security user.

#### 6.4 Entering Security Password

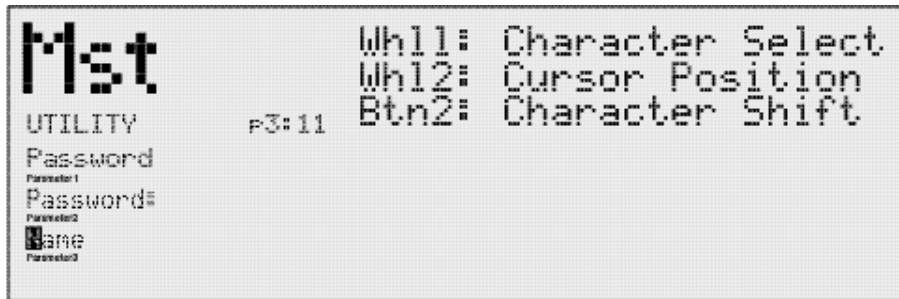
Since the security system has three levels (high,med,low), there can be three different levels of users accessing the unit. The high security password user can change/lockout all modules and users, while the medium security password user has access to limited modules and functions and the user with low access will not have access to any modules with security settings with a security clearance high or medium.



- From Program mode, press the UTILITY button and move to page 3 and the display will appear something like this:



- At this point, rotate the PARAMETER 1 knob and the screen will appear as follows:

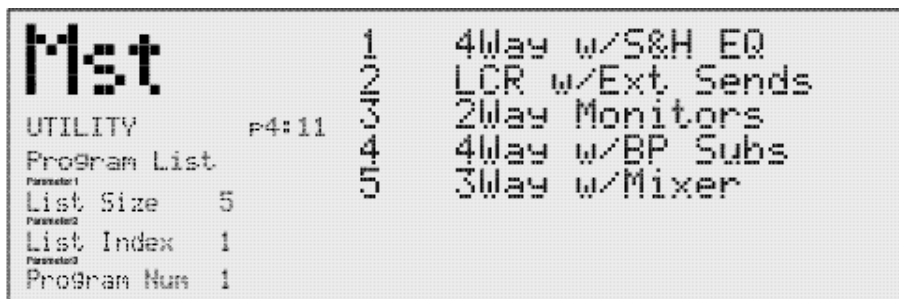


- Rotate the PARAMETER 2 knob to set the cursor position and rotate the PARAMETER 1 wheel to select characters. To shift characters, press the PARAMETER 1 knob.
- Once you entered your security password, simply press PROGRAM to exit.

## 6.5 Program List

The 480, 481 and 482 DriveRack™ units allow you to create custom program lists from within the Utility menu. This list makes it convenient for accessing and grouping selected programs. The program list cannot be changed if the security level is set to lockout access to the program list. The procedure for setting up the program list is as follows.

From Program mode, press the UTILITY button and use the PREV PG and NEXT PG buttons to move to page 4 and the display will appear something like this:



- Rotate the PARAMETER 1 knob to set the length of the Program list size. The program list size can be any number from 1-10.
- Rotate the PARAMETER 2 knob to set the index position of the selected program.

- Rotate the PARAMETER 3 knob to set the selected program in the currently selected index position.
- Once the custom Program list has been created, press the PROGRAM/CONFIG button to exit the UTILITY menu.

## 6.6 Program Change Mode

Within the UTILITY section of the 480, 481 or 482 DriveRack™ units, you have the ability to navigate (from Program mode) through the various programs by either the conventional program mode, or by using the custom program list (which was covered in section 6.5). By setting this option to Program List, you now have the convenience of using only your selected program contained in the list. The procedure for selecting either one of these modes of program navigation can be set from page 5 of the Utility menu and is as follows:

- From Program mode, press the UTILITY button and move to page 5 of the Utility menu by using the NEXT PG and PREV PG buttons. Once you have reached page 5, the display will appear as follows:



- Use the PARAMETER 1 knob to select either Program list or Normal modes of operation. Once you have made your selections, press the PROGRAM/CONFIG button to return to program mode.



## 6.7 Contrast Adjustment

### Contrast Adjustment

Since venues and applications vary, the 480 and 480R DriveRack™ units provide you with the option of changing the contrast of the large custom display. To make any adjustments to the display contrast, press the UTILITY button and use the NEXTPG or PREVPG button to move to page 4 of the utility menu. Contrast settings cannot be made to other units across the network. Settings must be changed to the selected unit through its front panel interface. The display will appear something like this:



- Use the PARAMETER 1 knob to set the desired display contrast.

## 6.8 PC COMM Mode

The DriveRack™ will allow you to select the PC communication mode of either MIDI or RS 232. Using this option gives you the ability to use either the MIDI port or the RS232 for sending and receiving information including Software downloads and System dumps. At any time, both connectors can be connected, but one or the other must be selected from the utilities menu to communicate. This can be accessed within the utility menu by using the following procedure:

- From Program mode, press the UTILITY button and use the PREV PG and NEXT PG button to move to page 6 of the Utility menu.
- Once you have reached page 6, the display will appear something like this:



- At this point, to toggle between MIDI and RS232 modes, press the PARAMETER 2 knob.

### 6.9 Power Up (Mutes On/Saved)

Within the Utility menu, you have the option of changing the set up so that when the DriveRack™ units are powered up, the output mutes will either all be on or SAVED, which defaults to the saved system setting. To change this feature, use the following procedure.

- From Program mode, press the UTILITY button and use the PREV PG and NEXT PG button to move to page 6 of the Utility menu.
- Once you have reached page 6, the display will appear something like this:



- To change the Power up set up, simply press the PARAMETER 3 button.

### 6.10 MIDI Channels

#### MIDI CH

Selects which MIDI channel the 480, 481, 482 or 480R will receive program changes on. Selections are; OFF, 1-16 or OMNI.

#### SYSEX ID

Selects the SYSEX ID for the currently selected DriveRack™ unit. Selections are Off, 1-16 or OMNI. To perform any MIDI functions, you must have PC COMM setting set MIDI. This setting must be changed back to RS 232 to perform any network functions.

### 6.11 MIDI Program Dumps

#### Program Dumps

The 480, 481 or 482 DriveRack™ units are capable of dumping program information from unit to another via the MIDI connectors. To send a MIDI program dump, use the following procedure.

- From Program mode press the UTILITY button and use the PREV PG and NEXT PG buttons to move to page 9 of the utility menu.
- Use the PARAMETER 2 knob to select the desired program to be dumped.

- Once the desired program has been selected, press the PARAMETER 3 knob to execute the program dump.

### 6.12 SYSEX Dump

The BULK DUMP option allows a complete system exclusive dump of the entire contents of the 480, 481, or 482's memory. This includes all user Programs, Setups, Utility, and MIDI configurations. To perform a system exclusive dump of the entire contents of the memory, do the following:

- Enter the "Utility" menu by pressing the UTILITY button once.
- Press the NEXT PAGE button until page 10 is reached.
- Press the PARAMETER 3 button to dump all information of the DriveRack™.

### 6.13 Setup SYSEX ID

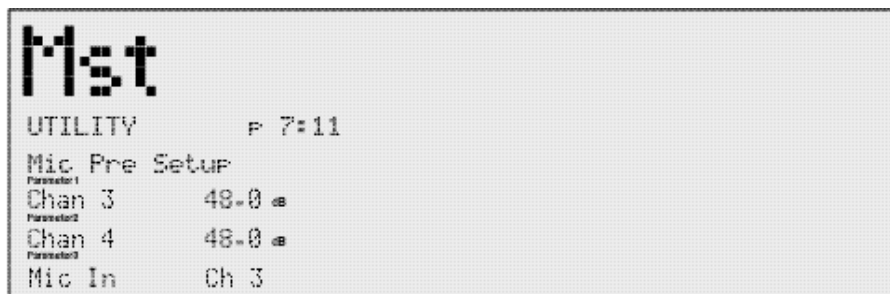
The 480, 481 or 482 DriveRack™ units allow you to assign unique SYSEX ID numbers to an individual unit. The procedure for SYSEX ID setting is as follows.

- Enter the "Utility" menu by pressing the UTILITY button once.
- Press the NEXT PG or PREV PG button until page 8 is reached.
- Use the PARAMETER 2 knob to set the SYSEX ID number for the currently selected unit.

### 6.14 Mic Pre Set up

The Utility menu of the DriveRack™ will allow you to set the gain of the RTA Mic Preamp on channels 3 and 4. The procedure is as follows:

- From Program mode, press the UTILITY button and use the PREV PG and NEXT PG button to move to page 7 of the Utility menu.
- Once you have reached page 7, the display will appear something like this:



- Use the PARAMETER 1 and 2 knobs to set the desired gain of Channel 3 and 4. Range is from 20.0 to 60.0 dB.

- Use the PARAMETER 3 knob to select the desired microphone input. Mic input options include: Ch3, Ch4 and Ch3 and 4 simultaneously. Warning - RTA will not function properly when using a microphone unless the option has been set appropriately.

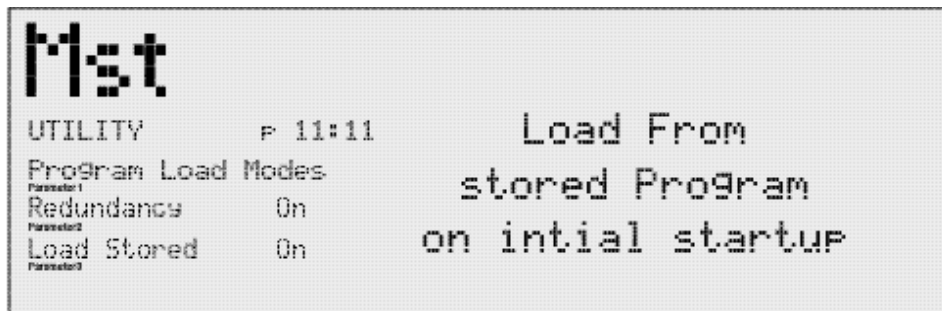
### 6.15 Redundancy Enable

The DriveRack™ units provide the user with the redundancy feature. This feature allows the selected master unit to retain all programming information of all units used in a DriveRack™ network. This simply means that in the unfortunate event that one of the units goes out of service, a replacement unit can be added into the network and the information from the previous unit will be added via the master unit. For more information about Redundancy, please refer to section 7.4. To enable this feature, use the following procedure.

- Enter the “Utility” menu by pressing the UTILITY button once.
- Press the NEXT PG or PREV PG button until page 11 is reached.
- Use the PARAMETER 1 knob to set the Redundancy feature to On. The display will appear something like this:

### 6.16 Load Stored

The DriveRack has a non-volatile memory and can return to either the last state that it was in or the last stored program. This parameter allows the user to set the non-volatile memory to either recall the last saved program, or the last state that the unit was in before the unit was shut down.



DriveRack™

Network  
Functions

NETWORK  
FUNCTIONS

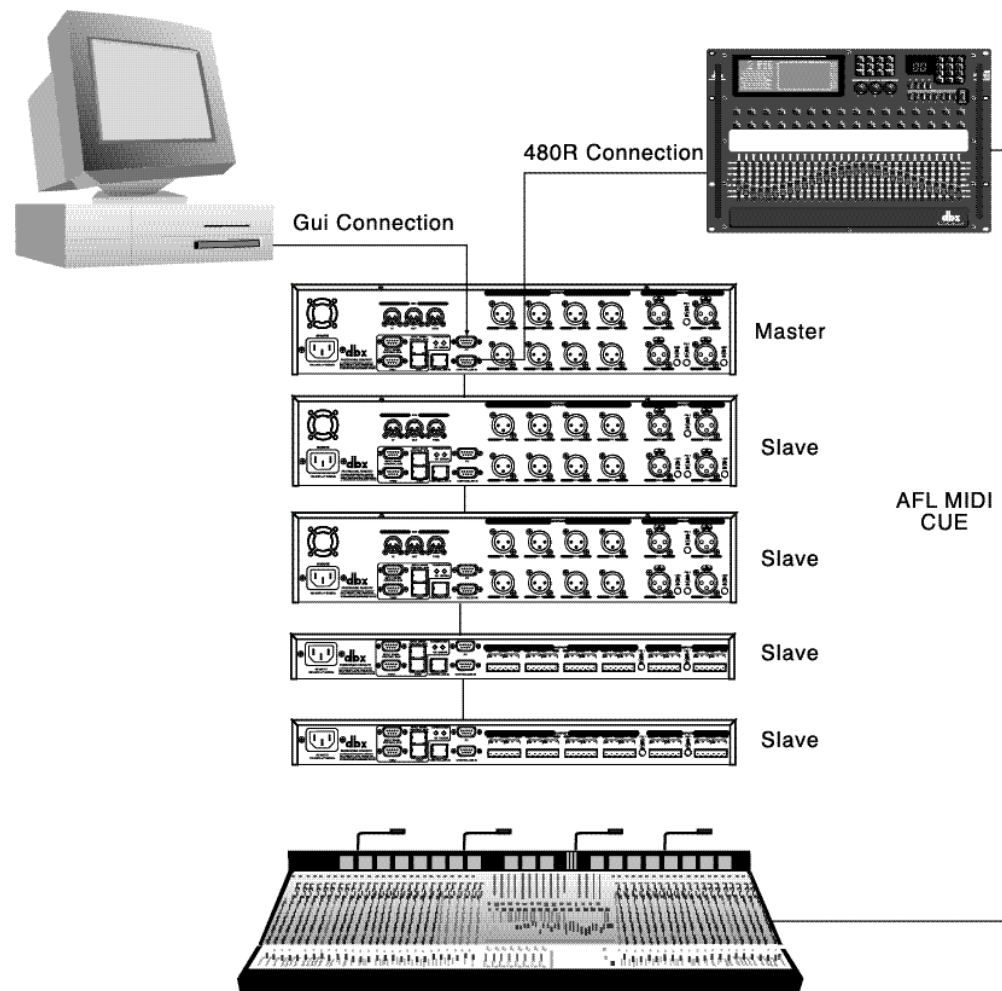


**dbx**<sup>®</sup>  
PROFESSIONAL PRODUCTS

The Network Function section of this manual will provide you with detailed information for establishing and maintaining a communication network between the 480, 481, 482 and 480R DriveRacks™, and a PC, via the GUI interface by utilizing an RS-485 network standard protocol through a back bone system. Use this section to optimize communication performance between networked DriveRacks™.

### Network Overview

The following illustration shows the versatility of a DriveRack™ network system. Notice that the DriveRack™ can be controlled by the GUI interface, 480R and the 480. This provides triple redundancy unit protection because information is continually being sent to all three controllers simultaneously. Also take note that the 480R can receive MIDI AFL cue information from selected mixing consoles.



### 7.1 Network Connections (Specs)

#### Recommended Cable Specifications:

Essentially, any product in the DriveRack™ system offers several different options of communicating in a network system. From the factory, all DriveRack™ products ship with a single 1-foot DB-9 network cable. The following applications utilize the following cable recommendations:

- PC GUI Interface - DB-9 female-to-female nul modem cable.
- 480R and 480P - DB-9 male-to-male cable. The 480P also supports RJ-45 cables.
- RS485 Network (DB-9 type) - DB-9 male-to-male cable.
- RS485 Network (RJ-45 type) - RJ-45 cable.
- Network cables are CAT-5 UTP 24 gauge.

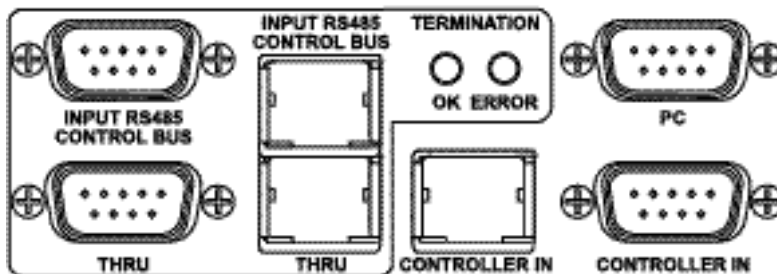
#### Cable Lengths

- 480R to 480P - 250 feet max. 500 feet with dbx proprietary cable.
- 480P to Network - Up to 4000 feet.
- RS 232 PC to any slave unit - Max. 50 feet.
- MAXIMUM BACKBONE CABLE LENGTH - 4000 feet.

Please See Section A.11 for Wire Diagram Information

#### Connectors:

Every product in the DriveRack™ line feature both DB-9 and RJ-45 type connectors for establishing a network system. Both connector types are offered for added convenience to the user. DB-9 connectors are however used exclusively for interfacing with a PC. The following illustration shows the typical network rear-panel connectors for the 480, 481 and 482 DriveRack™ units. You can utilize either connector type on a single unit. However, you cannot use both input or thru connectors simultaneously.



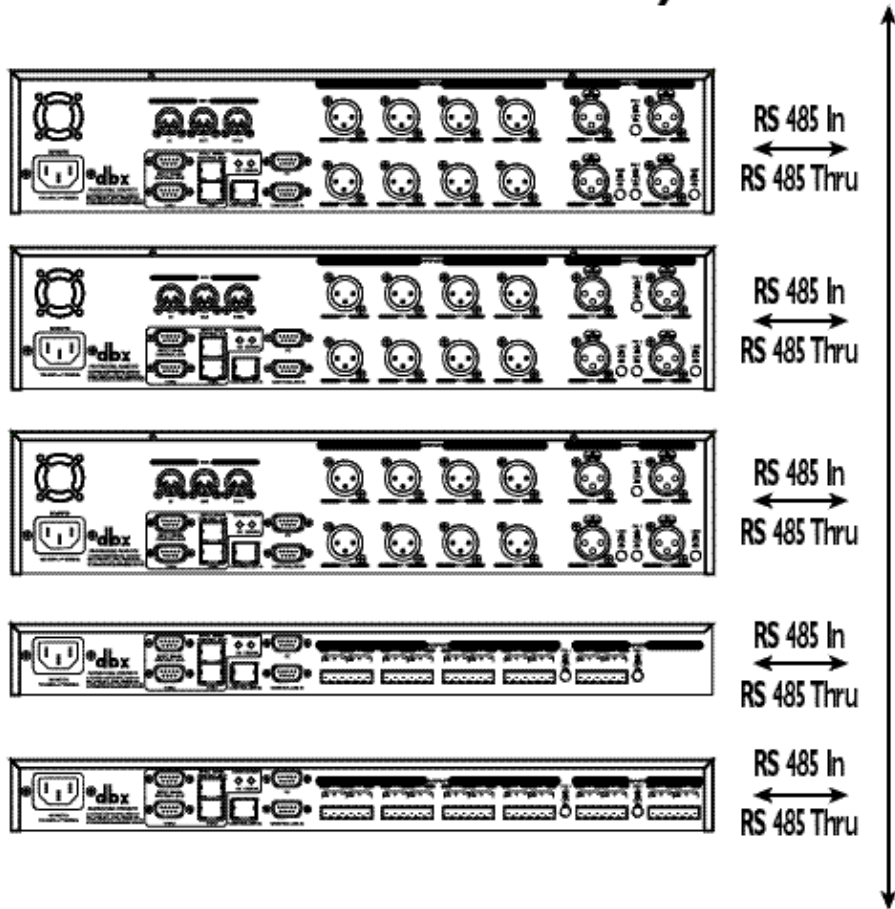
In addition to the rear panel network connectors, the 481 and 482 both offer PC GUI interface DB-9 type male connectors on the front panel.

7.2 Network Connections (Applications)

Backbone Connections

The network system of the DriveRack™ has been configured to allow the units within a multiple unit network configuration communicate through a Back bone type connection. This allows the units to transmit and receive information immediately through the line instead of the conventional daisy chain system. The illustration below shows an example of the Back Bone network system.

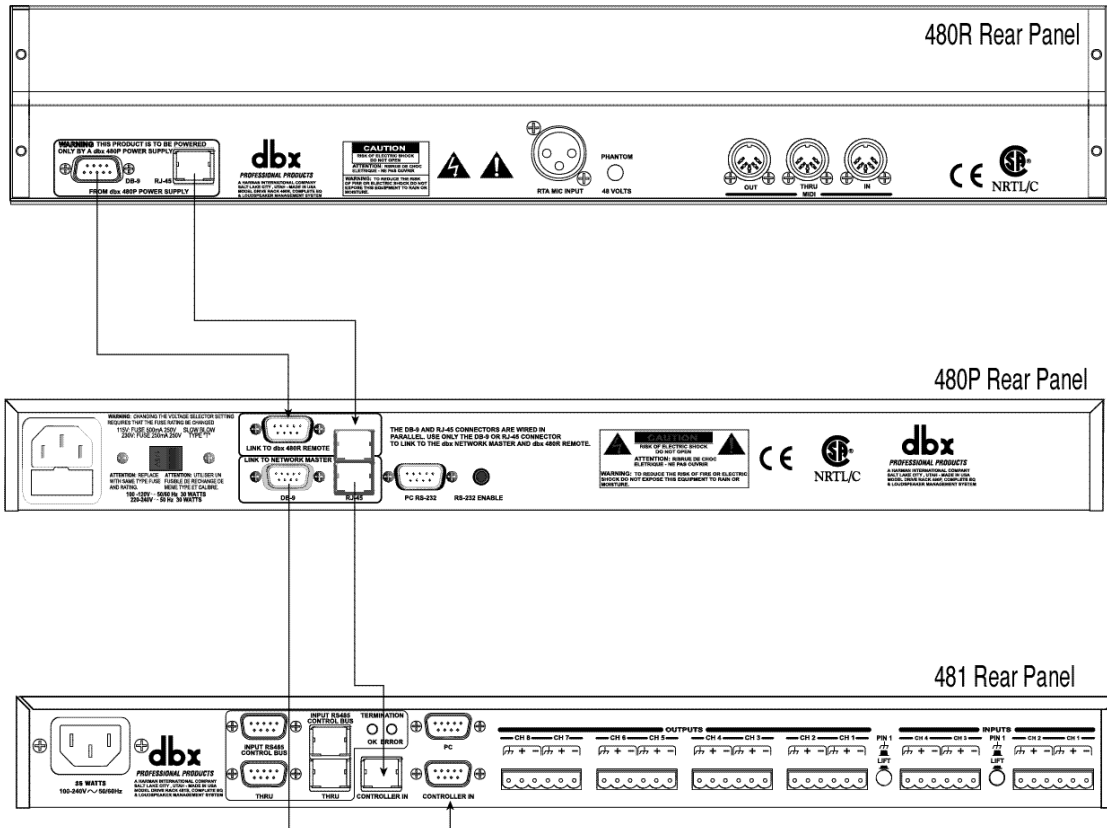
Typical DriveRack Network Back Bone System





### Connection to the 480R

When the 480R Remote Controller is used in a network system, networking connection to the 480R Remote Controller must be accessed through the 480P power supply unit which included with the 480R. The following illustration shows the proper connections for 480R utilization.



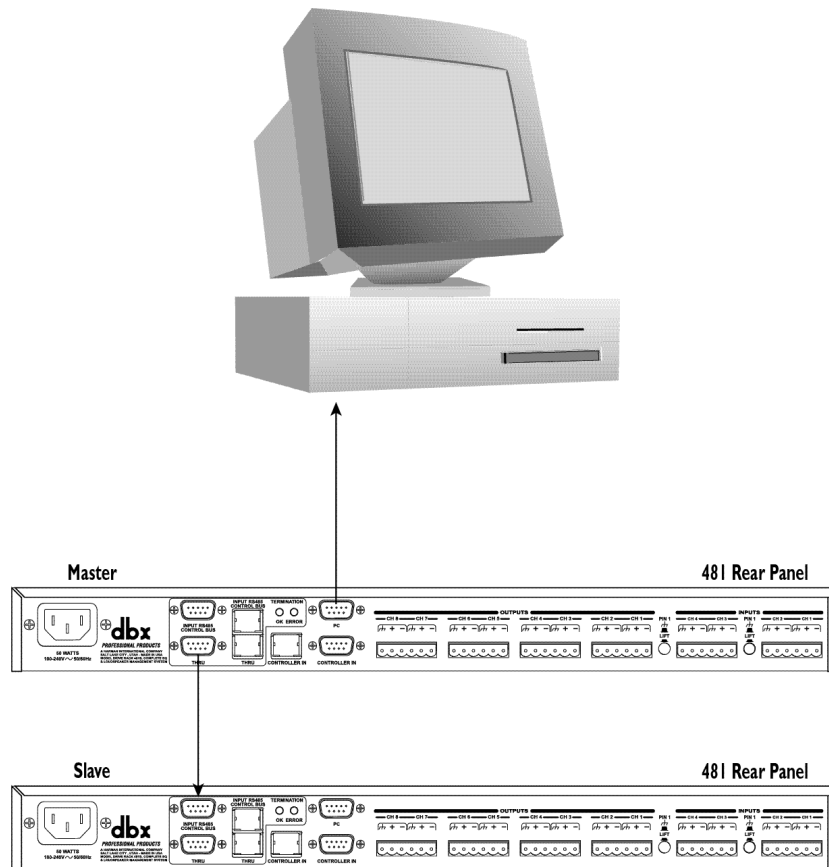
Note that when you are making network connections using the 480R, you must first connect the 480R to the included 480P. This is required, because not only does this connection establish a communication protocol, but it also provides the 480R with power from the 480P.

Also take note that the network connections between the 480R and the 480P can utilize both RJ-45 and DB-9 connection types.

### Connection to the GUI Interface:

If you elect to utilize the included GUI PC interface, either the 480, 481 or 482 can act as the master unit that interfaces with the PC. Once the master unit has been established, access to all other units within the network system can be controlled via the PC. The following illustration shows how to establish connection from the PC to the Master controller to the slaves.

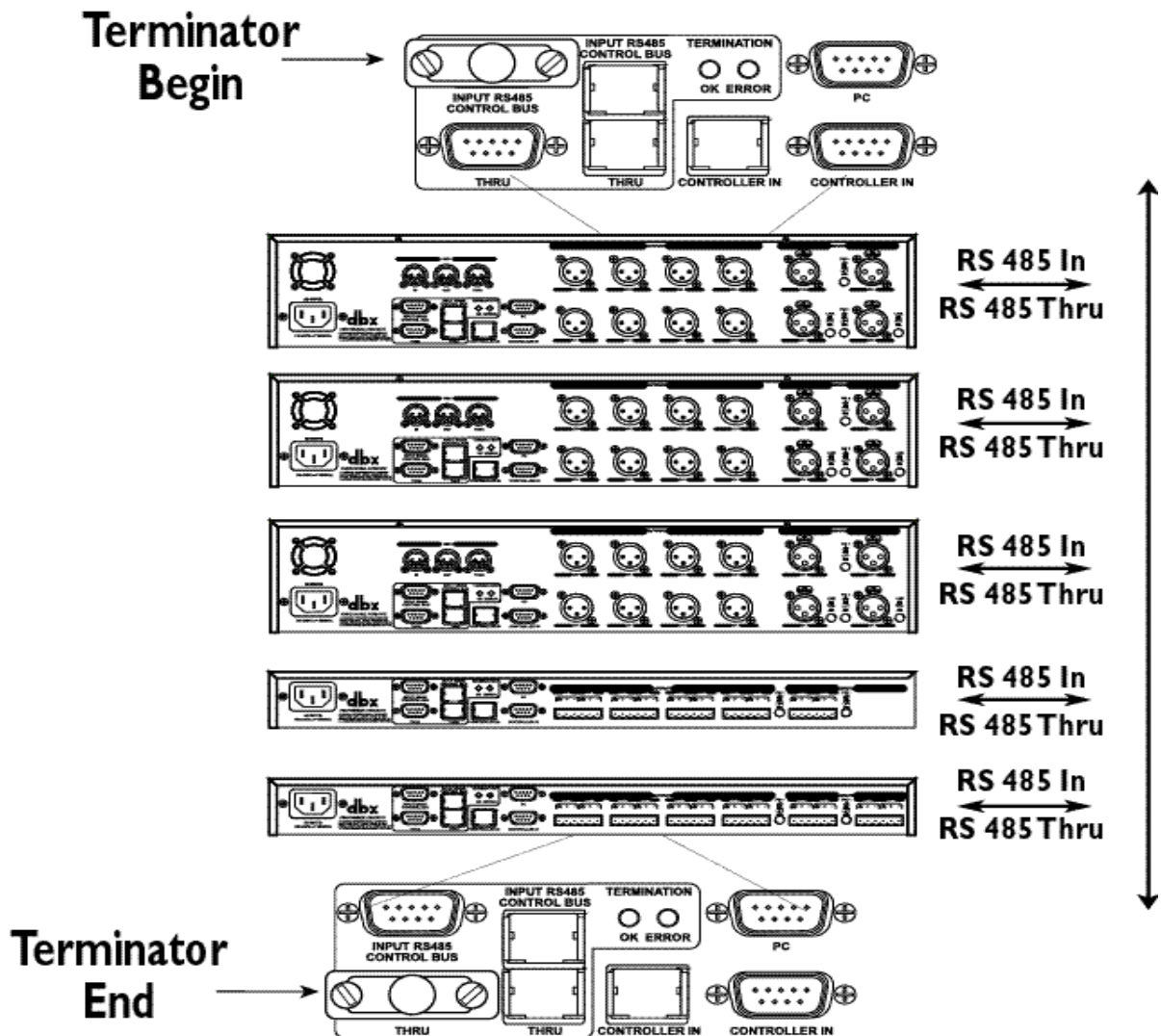
- Before the DriveRack™ unit will communicate with the PC via the GUI interface, the included GUI software must be loaded onto the selected PC.



### Termination:

In order to run your DriveRack™ system in the most effective and efficient manner, it is recommended that you utilize the included network terminator connectors. These terminator connectors essentially limit the networking information from the beginning to the ending of the Back bone network.

- The following illustration indicates that the first termination connector be placed in the DB-9 control bus input of the first unit in the Back bone network system. Use this connector regardless of whether you are using DB-9 or RJ-45 connectors.
- The ending termination connector should be connected to the THRU control bus connector of the last unit in the Back bone network.



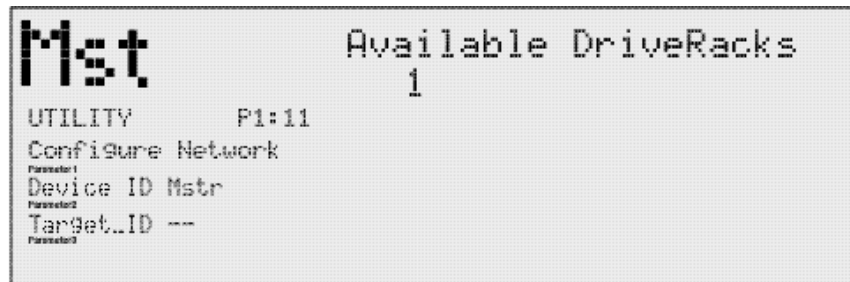
### 7.3 Master/Slave Assignments

The key element to establishing a DriveRack™ network system, is distinguishing a Master controller unit from the slaves units. Every unit in the DriveRack™ system has the ability to be assigned as a master or slave unit, but only one master must be assigned. A unit is designated as a master by setting the ID to 0 for the 481 or 482, or select Mst on a 480.

#### Setting Identification Numbers:

The following information explains the procedure for setting ID numbers on all units in the DriveRack™ network system.

480 DriveRack™ - From program mode, press the UTILITY button and use the PREV PG and NEXT PG buttons to move to page 1 of the Utility menu. The display will appear:



- At this point, use the PARAMETER 1 knob to either assign the unit as the master controller, or to give it its own unique ID number.
- Once the desired ID is selected, press the PARAMETER 3 knob to change the ID. Press the PROGRAM/CONFIG button to cancel.

481 and 482 - The procedure for setting ID numbers on both the 481 and 482 units is quite simple. From the front panel, use the ID UP and DOWN buttons to select a unique ID number for the selected unit. The following illustration shows the ID display, as well as the ID UP and DOWN buttons.



## 7.3 Master/Slave Assignments continued

## Controlling Remote Units:

In a DriveRack™ system, the entire system can be controlled by either the 480, 480R or the PC GUI interface. The following information explains how to control other units within the DriveRack™ system by a single unit.

via the

480 DriveRack™ - Follow this procedure when the 480 is set as the master. From program mode, press the UTILITY button and use the PREV PG and NEXT PG buttons to move to page one of the Utility menu. The following display will appear:



- Note that the reversed lit number or Mst in the top left-hand corner of the display indicates the unit currently being controlled.
  - Use the PARAMETER 2 knob to set the Target ID. This simply means that you are asking the 480 DriveRack™ to call up the device ID of any one of the other DriveRack™ units that are in the network system.
  - Once you have called up the desired device, press the PARAMETER 3 knob to activate the device link.
  - Once the PARAMETER 3 knob is pressed, the unit will return to program mode. Repeat this procedure anytime you wish to call up another device in the Network system.

## 7.3 Master/Slave Assignments cont' d

via the 480 R DriveRack™. The procedure for calling up and controlling slave units using the 480R Remote Controller is quite simple.

- From Program mode, use the keypad on the front panel of the 480R to enter in the unique device ID number of the unit that you wish to control, and then simply hit the ENTER button as shown in the illustration below.

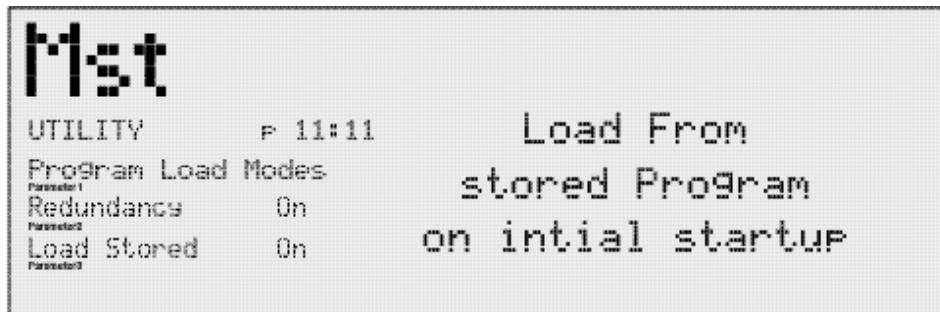


- Once the slave unit has been called up, the 480R will control all functionality of the selected slave unit until a new unit has been selected.

## 7.4 Redundancy

The Redundancy function of the 480, 481, and 482 DriveRack™ units is the very definition of the old saying that you can never be too safe. This unique function of the DriveRack™ units ensure that programming information in the 480, 481 and 482 DriveRack™ units is safe guarded in the event of any unfortunate malfunction. Simply put, this means that the program information within any 480, 481 or 482 DriveRack™ is constantly being backed up and stored not only into the memory of the selected unit, but also the master unit of the DriveRack™ network as well as the 480R (if used) and the PC GUI. Simply pull the unit out, and insert a new unit in its place. The following information will provide you with ways to optimize this priceless feature.

- To enable the Redundancy feature, enter the Utility menu by pressing the Utility button and then using the NEXTPG and PREVPG buttons to move to page 11 of the utility menu. Use the PARAMETER 1 knob to engage the Redundancy Mode. The display will now appear as follows:



- At this point, the master unit, 480R (if used) and the PC Interface (if used) is/are now recording any activity that takes place within the network of units.

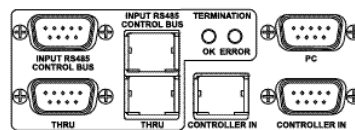
#### Replacing Units

- If a DriveRack™ unit needs to be taken out of the network backbone, the master unit automatically stores the unit's information until the unit is either returned or a replacement unit is put in its place within the network.
- Once a DriveRack™ unit is inserted, the master unit will automatically download the last information that it received from the corresponding unit, regardless of whether the editing information had been stored.
- NOTE: Anytime a unit is replaced, the same identification number **must** be assigned to the replacement unit in order for the master unit to recognize and send information.

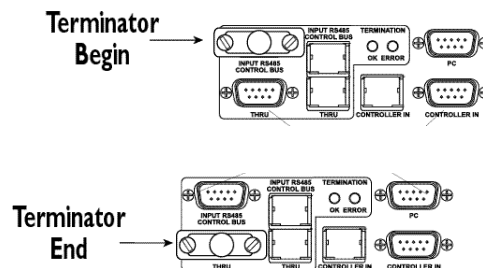
## 7.5 Network Trouble Shooting

Since a DriveRack™ network system can be so very detailed with a tremendous amount of information being transmitted across the network backbone, the following information is provided to aid you in the unfortunate event that you have network communication problems in your DriveRack™ system.

**Termination Indicators - OK or ERROR** - The best place to begin network troubleshooting, is with the Termination indicators located on the back panel of the DriveRack™ units. The Green LED indicates that network termination is working. The Red LED indicates that there is an error in the network termination. They will appear as follows:



**Terminator Connectors-** When multiple DriveRack™ units are used in a network system, make certain that the included terminator plugs are connected properly at the input bus of the master unit and the thru bus on the last unit in the network as the following illustration indicates:



**Identification numbers** - It is of paramount importance that any unit within a DriveRack™ network system have a unique ID number assigned. In addition, there can be only one master unit assigned for the network to function properly.

**Utility Configure Network Page Display** - When a DriveRack™ network is established, page one of the utility menu will show all device ID number currently in the DriveRack™ network system.

**Network Cables** - Make sure to check all cable types and connectors.

**PC Cable** - When running from the DriveRack™ to and from the PC, it is required that a null modem cable be used.

**dbx Professional Products Customer Service** - In the unfortunate event that networking problems persist, please contact us directly at: 801.568.7760 or on-line at: support@dbxpro.com.



## 7.6 PC GUI Installation and Basic Operation

To make operation of the DriveWare™ units even more convenient, dbx professional products includes the DriveRack™ PC GUI software with every unit shipped. The GUI interface will allow you to control all aspects of the DriveRack™ units. The GUI interface will also allow you to run your entire DriveRack™ network system from a PC.

The GUI interface also makes it convenient for setting up systems prior to arriving at the venue. This means that you can configure your system on the desktop of your PC or laptop at your convenience before you even arrive at the venue.

### SYSTEM REQUIREMENTS

Min. system- 166mhz PC processor - 16 bit color monitor - 32 meg RAM - Windows™ 95 OS R2 or newer - Windows™ NT 4.0 or newer - Baud rate (fixed) 38.4 kbaud

Note- COMM port setting must be consistent. This means that when the GUI is in use, any other device that uses the RS232 COMM port must be turned off.

### INSTALL

1. Install the DriveRack™ GUI interface from either the dbx Professional Products website at: [www.dbxpro.com](http://www.dbxpro.com) or from the CD ROM onto your your PC or laptop.
2. If Windows™ Explorer™ is not currently running, execute it now.
3. While using Explorer, locate the file <CDROM DRIVE> \start.html, where “**CDROM DRIVE**” is the drive letter of your CD-ROM drive. F: for example.
4. Double click on start.html. Your configured Web browser will now show the installation start screen similar to the one shown below.



5. To install DriveWare™, click on the “start here” link under “DriveWare GUI (V1.00) Install from CD”. The next page shown is the release note for DriveWare™ detailing currently unsupported features. After reading the release note, right click on the INSTALL icon and choose “SAVE TO DISK” or “SAVE LINK AS” to save the installer program to your hard disk.
6. Using Explorer, locate and run the “DriveWare Setup v.1.00” exe to install DriveWare.

7. Follow the instructions in the installer to complete installation.
8. If installing the DriveRack Updater, use the “back” button of your browser to return to the start screen shown above. Right click on the “start here” link under “DriveRack Firmware Updater V2.00 install from CD:” and choose “save to disk” or “save link as” to save the DriveRack Updater installer.
9. Using Explorer, locate and run the “DriveRack Updater v.128”.exe. to install the updater.
10. Follow the instructions in the installer to complete the installation.
11. To run DriveWare™ locate the DriveWare™ icon in the group created by the installer. To update your firmware, locate the DriveRack Updater icon in the program group created by the installer.
12. If you experience installation problems, contact Tom Cram at dbx Professional Products technical support. Ph:801-568-7530 or e-mail: tcram@dbxpro.com.

The following information offers basic operation information of the DriveRack™ GUI interface.

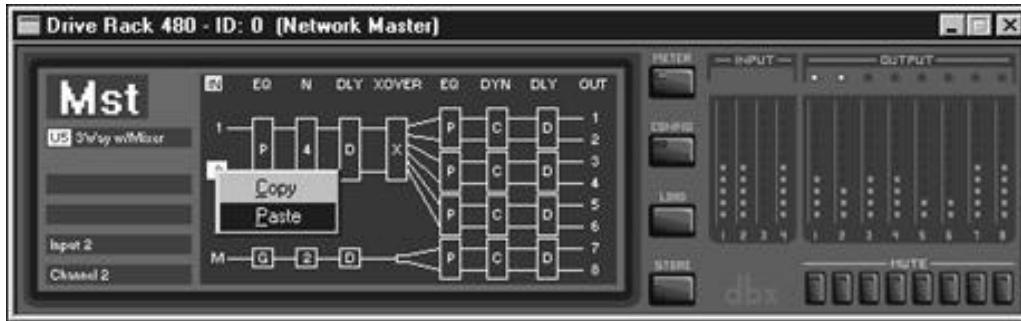
#### BASIC OPERATION

Once all units are connected, boot up the GUI Interface by double-clicking on the application icon. When the program opens, the first view you will see will either be in VENUE or DEVICE view. The VENUE view has icon representations of all units in the network system, whereas, if you are connected to a single unit (non-master), you will be brought up into DEVICE view. In VENUE view, simply double-click on the desired unit to enter DEVICE view, where you can access and edit all parameter available in the selected unit.

#### Basic VENUE View

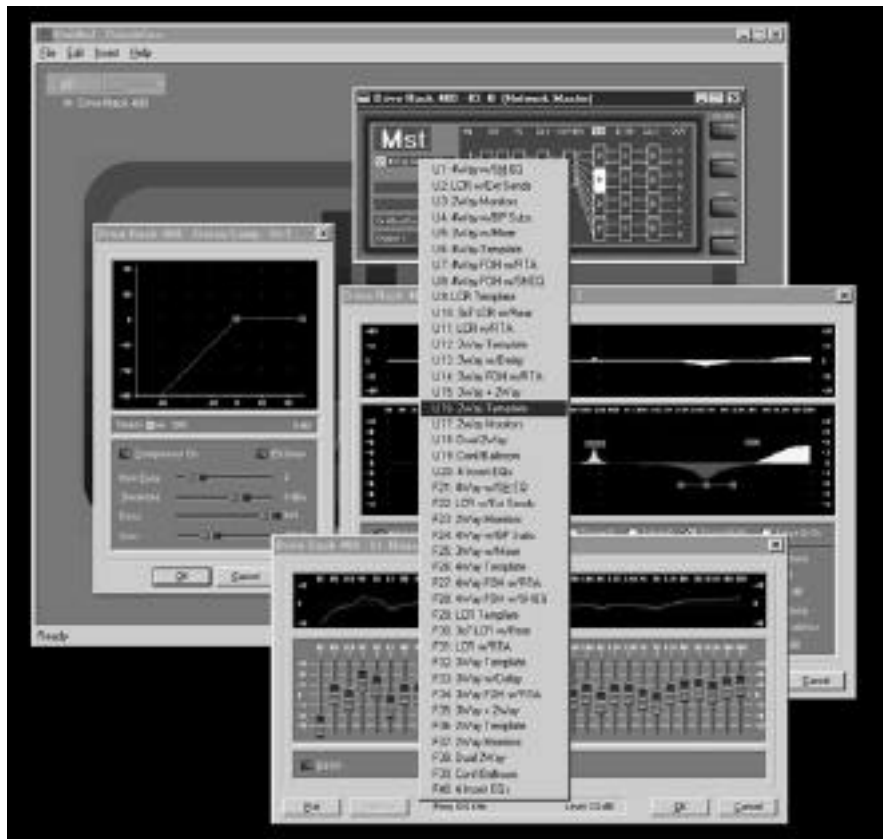


Basic DEVICE View w/Cut and Paste



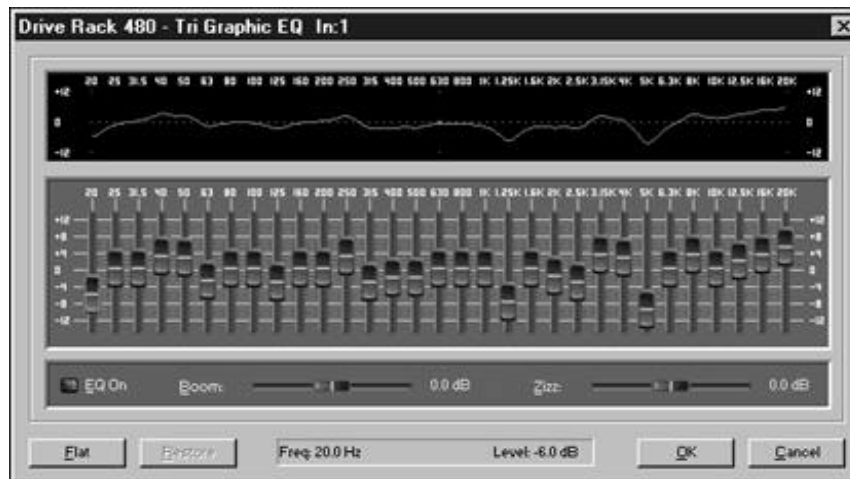
### LOADING PROGRAMS

- To **LOAD** factory/stored programs, right-click on the program line (located in the upper left corner of the DEVICE view window). At this point, a program menu is displayed. Choose the desired program by moving the mouse back and forth. If you are working in "off-line" mode (not connected to a DriveRack unit), the program will automatically load. If you are in "on-line" mode (connected to either one or multiple units), the load button must be pressed.

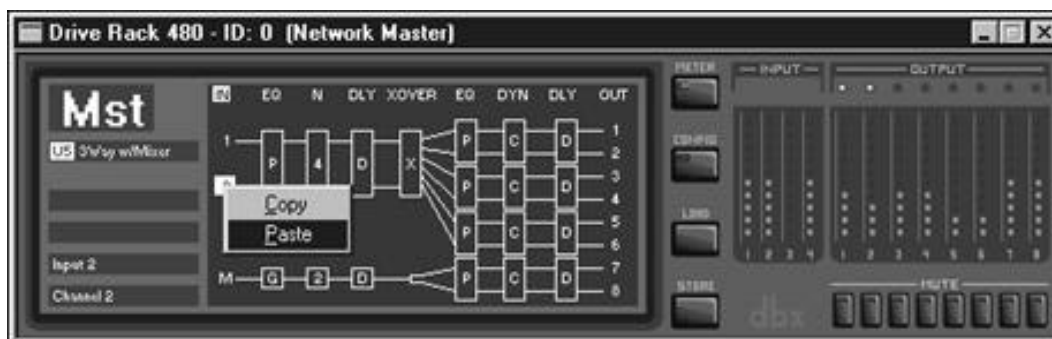


## EDITING PROGRAM PARAMETERS

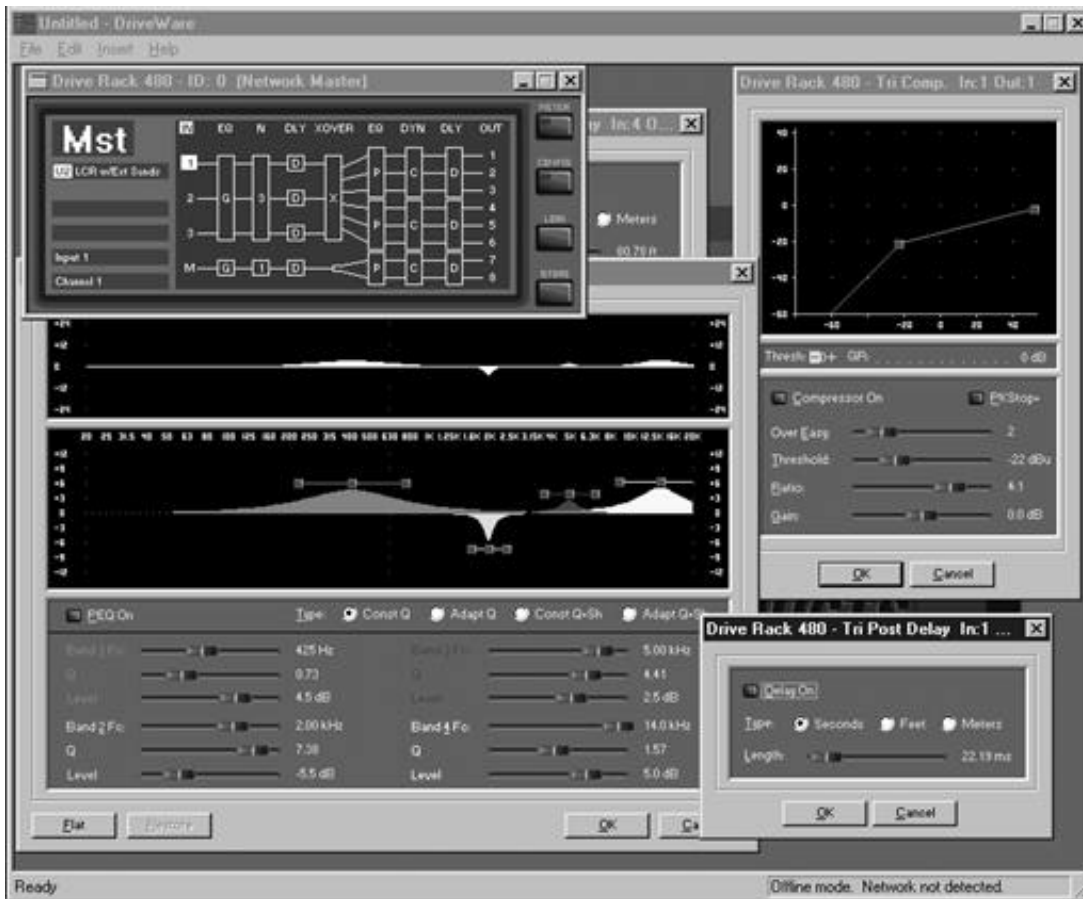
- To edit module parameters, simply double-click on the desired module. An edit window will appear (see below) where all parameters can be instantly accessed and edited.



- When editing parameters, the up and down <ARROW> keys on the keyboard can be used to fine-tune parameter values. The <Z> or <0> keys can also be used (in Graphic EQ modules) to flatten the selected frequency.
- To duplicate module parameters, a module can be copied and pasted within DEVICE view, by using the right-click button of the mouse. The module can also be selected by using a single left mouse click, and then using the <CTRL> C buttons of the keyboard to copy and <CTRL> V to paste.



Edit View (with Multiple Modules open)



- Notice that you can have as many windows open as required by your application. The intuitive interface of the DriveRack™ GUI allows you to make selections to any parameter of any unit all in real time.
- When there are many windows open for several units in the DriveRack™ network, note that each window header indicates which network unit the module is used in. This will help spare any confusion as to which unit is being edited.

## CUSTOM PROGRAM CONFIGURATION

The CONFIG mode allows the user to create any desired program setup. The following information outlines key aspects to custom program configurations.

- To **CONFIGURE** a custom program, press the CONFIG button, then right-click on the module that you wish to configure. A menu of all available options for this module will appear. For example, if the program you are working with contains a stereo 4-Way crossover and wish to change current crossover configuration, right-click on the crossover module. A list of possible crossover configurations is presented. Make your selection.



To **LINK** modules in the configuration mode, select the module by using a single left-click, then press and hold the <SHIFT> key and click on the adjacent module that you wish to link it to. Right-click the mouse, and a link icon will appear. At this point, simply click on the link icon, the link will be made.

To load the new configuration, click on the CONFIG button. You will now be prompted to either load the new configuration, or revert to the previous program.

### DRIVEWARE UTILITIES

- To adjust the utility menu features of any unit in the network and Right-Click-hold to pull down the utility menu. The utility menus will appear as follows:



- To customize the mode of operation to best suit your needs, it is recommended that you set your desired preferences in the preference folder, which can be accessed in the file menu and will appear as follows:



**Note: The Baud rate must be set to 38400.**





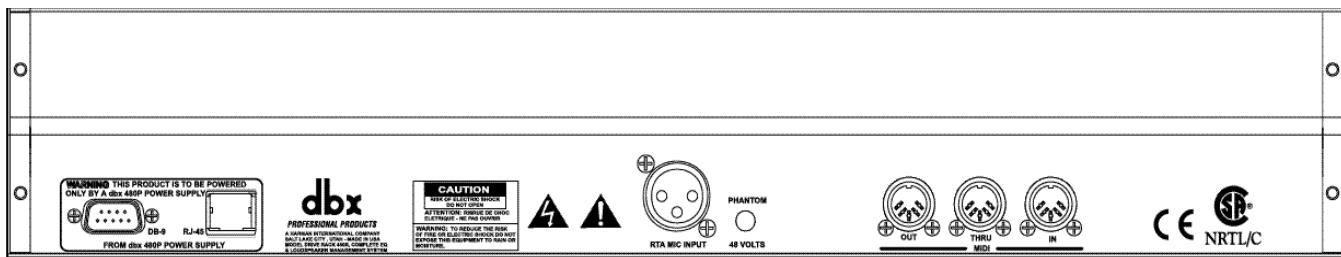
480R  
Remote  
Controller



The 480R Remote Controller is the ideal complimentary tool to the 480, 481 and 482 DriveRacks. The 480R can act as the Master unit controller in a DriveRack™ network system. The 480R's system Network Access keypad and System mute button make communication and editing of other DriveRack™ units a breeze. In addition, the 32 Hot Key instant access buttons grant the user instant access to any editing screen page of any unit in the DriveRack™ network and the ability to edit graphic equalizer settings as well.

The 480R Remote Controller ships with the included 480P power supply. The 480P is a single rack space unit that supplies the 480R with power. The 480P is also used to link the 480R with other units in a Network environment.

## 8.1 Rear Panel Connections (480R)



### DB-9 and RJ 45 Connectors

Either of these connectors can be used to send and receive information from other DriveRack™ units in the network system via the 480P. Cable lengths 480R to 480P - 300 feet max. 500 feet with dbx proprietary cable. 480P to Network - Up to 4000 feet.

### RTA Microphone Input

This input is used to insert a microphone for use with the real time audio analyzer.

### Phantom Power Switch

The Phantom power switch is used to engage or turn off the 48V phantom power.

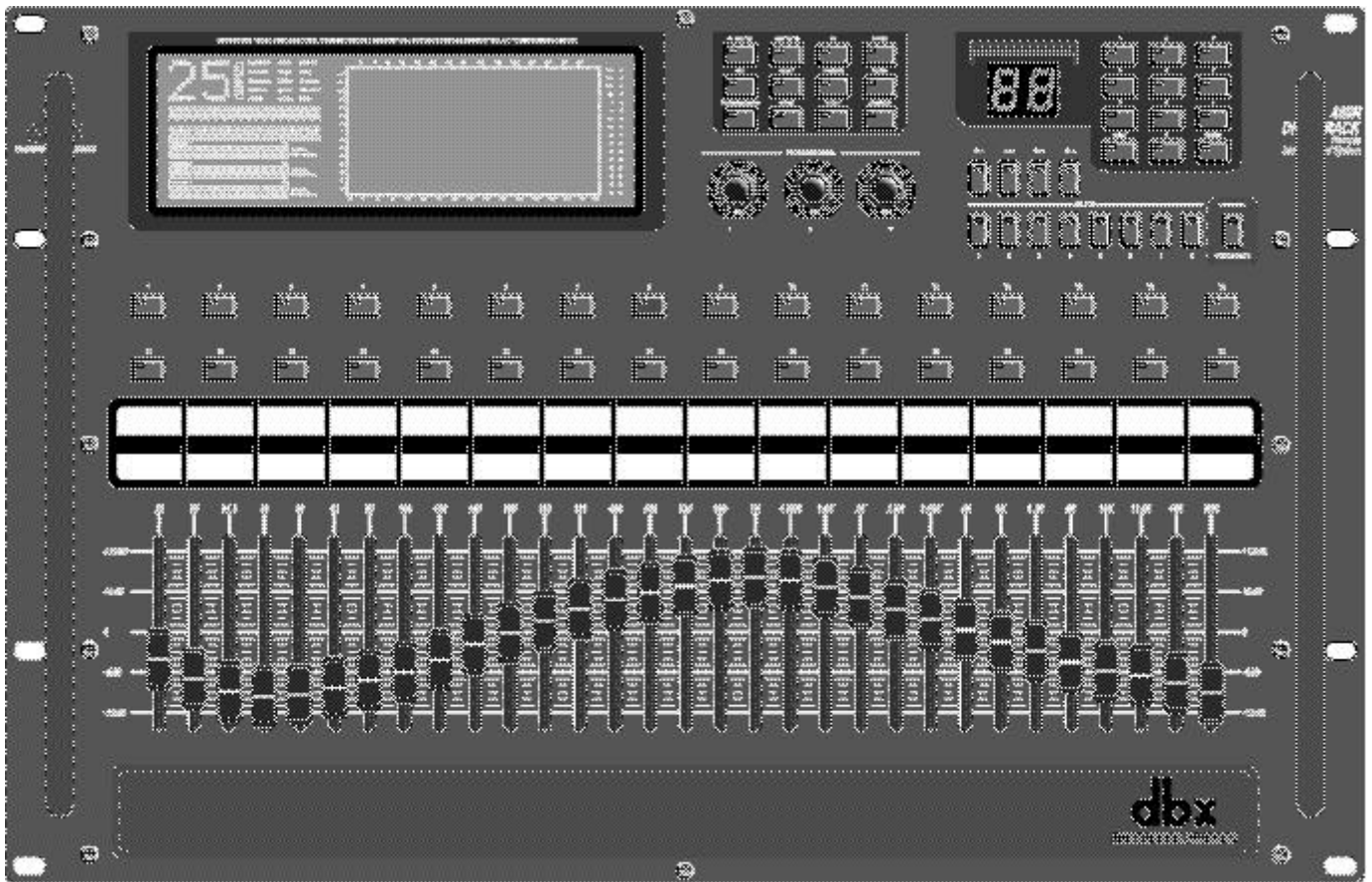
### MIDI In and Out/Thru Connectors

These connectors provide MIDI functionality to the 480 DriveRack™. The In, Out and Thru jacks allow you to use the 480R DriveRack™ at any point in the MIDI chain.

### Warning

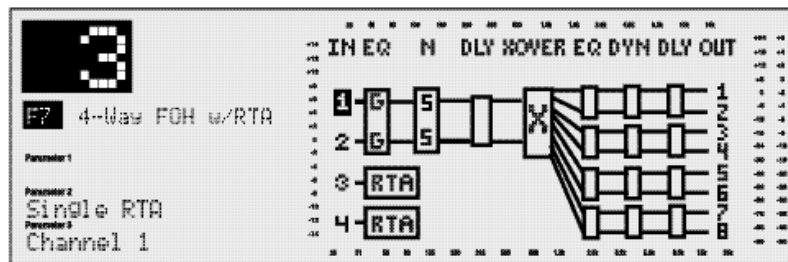
The 480R can only be powered by the included 480P power supply. **NEVER** unplug the dbx 480R remote from the dbx 480P power supply while the 480P is powered up. To properly disconnect the 480R, turn off the power on the 480P and then unplug the 480R. Failure to do so may result in damage to the 480P and/or 480R.

### 8.2 Front Panel (480R)



#### LCD Display

The large LCD display of the 480R DriveRack™ provides the user with all of the vital processing information of the DriveRack™ including: signal routing, network device ID, configuration modes, effect block editing and RTA displays.



#### Function Buttons

The function buttons of the 480R DriveRack™ allow access to all editing and navigating functions of the 480 DriveRack™.



### Voltage Selector Switch

The 480P allows you to select either 115V with 500mA 250V SLOW BLOW fuse or 230V with 250mA 250V Type “T” fuse. **WARNING:** Fuse must be changed to correspond with the desired power setting.

### RS485 Link to 480R (DB-9 connector type)

This connector is used to connect to the 480R. Cable lengths 480R to 480P - 300 feet max. 500 feet with dbx proprietary cable.

### RS485 Link to Network Master (DB-9 connector type)

This connector is used to connect the 480R to the network master. Connect to the CONTROLLER IN on the Network master. Cable lengths - 480P to Network cable length- Up to 4000 feet.

**RS485 Link to 480R (RJ-45 connector type)** This connector is used to connect to the 480R, and is wired in parallel with the DB-9 connector. Cable lengths 480R to 480P - 300 feet max. 500 feet with dbx proprietary cable.

### RS485 Link to Network Master (RJ-45 connector type)

This connector is used to connect the 480R to the network master. Connect to the CONTROLLER IN on the Network master and is wired in parallel with the DB-9 connector. 480P to Network cable length- Up to 4000 feet.

### RS232 PC Connection

This input is used to connect a PC to the 480R for 480R software updates.

### RS485/ PC Select Button

This recessed button is used to select the link to master controller connector or the RS 232 PC.

## 8.4 Front Panel (480P)



### Power Switch

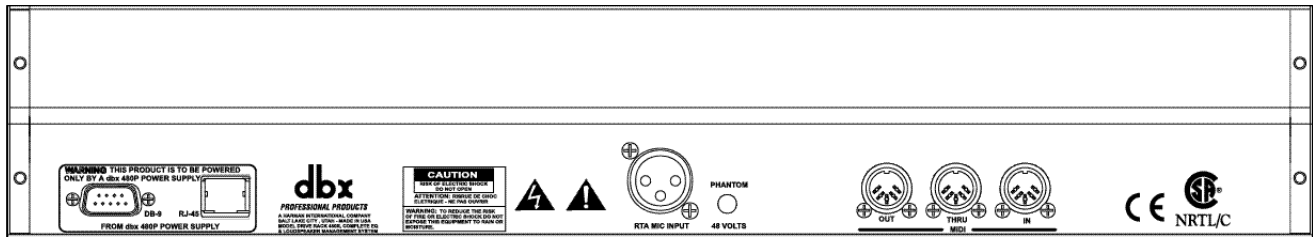
Turns the 480P and 480R on and off.

Every 480R DriveRack™ unit ships with a 480P power supply unit which supplies the 480R with power, as well acting as the communication hub between the 480R and other units in a DriveRack™ network system.

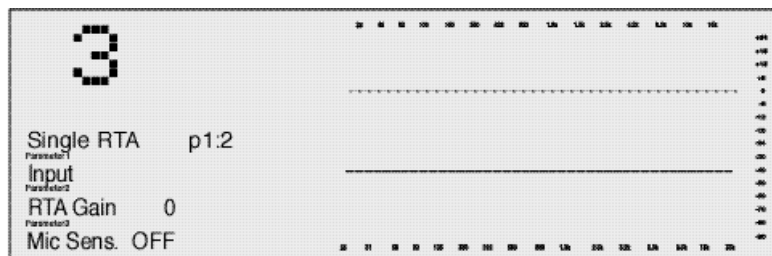
### 8.5 Using the RTA

A built-in Real Time Audio Analyzer is included as just one of the many added features of the 480R DriveRack™. The following information is provided to inform you as to how to utilize the RTA in the 480R DriveRack.

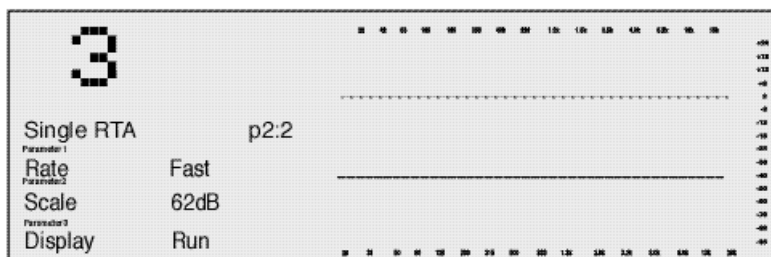
- To connect an RTA microphone to the 480R, simply make the connection to the XLR jack on the rear panel as shown below.
- Engage the phantom power switch if microphone requires 48V Phantom power.



- LOCAL/NETWORK SELECTION - Always make certain that you are working on either the Network or the 480R's RTA by selecting LOCAL(1) or NETWORK(2) when you initially enter Utility mode. Local indicates that you are working within the 480R, while Network indicates that you are through a selected unit on the network system.
- Once the connection of the microphone has been made, simply press the RTA button on the front panel of the 480R and the display will appear like this:



- Once the desired settings have been made on page 1, press the NEXT PG button to move to page 2 and the display will appear something like this:



For information about Pink Noise and “pinking” a room, please see section A.10 of the Appendix.

## 8.6 Hot Key Assignments

The 480R offers 32 “Hot Key” buttons which allow you to instantly assign any parameter display page to any one of the 32 buttons for instant access. The following information offers information for optimizing performance of this feature.

- From any Parameter display screen that you wish to assign, press and hold any one of the 32 hot keys shown below for approximately five seconds.



- The display will briefly flash and then the Hotkey assignment will be stored into the 480R's memory.
- On page 7 of the utility menu, resides the Hotkey normal/Hotkey locked option. If the parameter is set to Hotkey Locked, new Hot Keys can still be assigned, but new HotKeys cannot be assigned over previously stored Hot Keys. If the parameter is set to Hotkey normal, then previous Hotkey assignments can be overwritten.

Note- Hot key assignments cannot be made to the 480R itself.

## 8.7 Controlling Slave Devices

The 480R allows you to instantly call up other devices in the DriveRack™ network by utilizing the exclusive Network keypad located on the front panel.

- LOCAL/NETWORK SELECTION - Always make certain that you are working on the Network as opposed to the 480R (Local) by selecting LOCAL(1) or NETWORK(2) when you initially enter Utility mode. Local indicates that you are working within the 480R, while Network indicates that you are through a selected unit on the network system.
- To call up any unit in the DriveRack™ network, simply use the network key pad, as shown below to enter in the device ID number of the unit that you wish to control, and then press the ENTER button.
- At this point, you will now be controlling all parameters of the selected unit.



- Repeat the previous procedure when you wish to call up another device in the system.

## 8.8 480R Utility Menu

### 8.8.1 - Configuring RTA

LOCAL/NETWORK SELECTION - This parameter allows the user to select either a LOCAL(1) or NETWORK(2) RTA. Local indicates that you are working within the 480R, while the Network indicates that you are through a selected unit on the network system.

### 8.8.2 - MIDI Setup

The MIDI channel parameter selects which MIDI channel the 480R will communicate on. Selections are; OFF, 1-16 or OMNI.

The SyEx ID parameter selects the SYSEX ID for the currently selected DriveRack™ unit. Selections are Off, 1-127 or OMNI.

### 8.8.3 - MIDI Bulk Dumps

The 480R unit is capable of dumping MIDI information from unit to another via the MIDI connectors. To send a MIDI bulk dump, use the following procedure.

- Use the PREV PG and NEXT PG buttons to move to page 3 of the utility menu.
- Use the PARAMETER 3 knob to execute a bulk dump.

### 8.8.4 - Network Modes

The 480R provides the user with the redundancy on/off feature. This feature allows the selected master unit to retain all programming information of all units used in a DriveRack™ network. This simply means that in the unfortunate event that one of the units goes out of service, a replacement unit can be added into the network and the information from the previous unit will be added via the master unit. For more information about Redundancy, please refer to section 7.4. To enable this feature, use the following procedure.

- Use the PREV PG and NEXT PG buttons to move to page 4 of the utility menu.



- Use the PARAMETER 1 knob to set the Redundancy feature to On.

### 8.8.5 - MIDI AFL

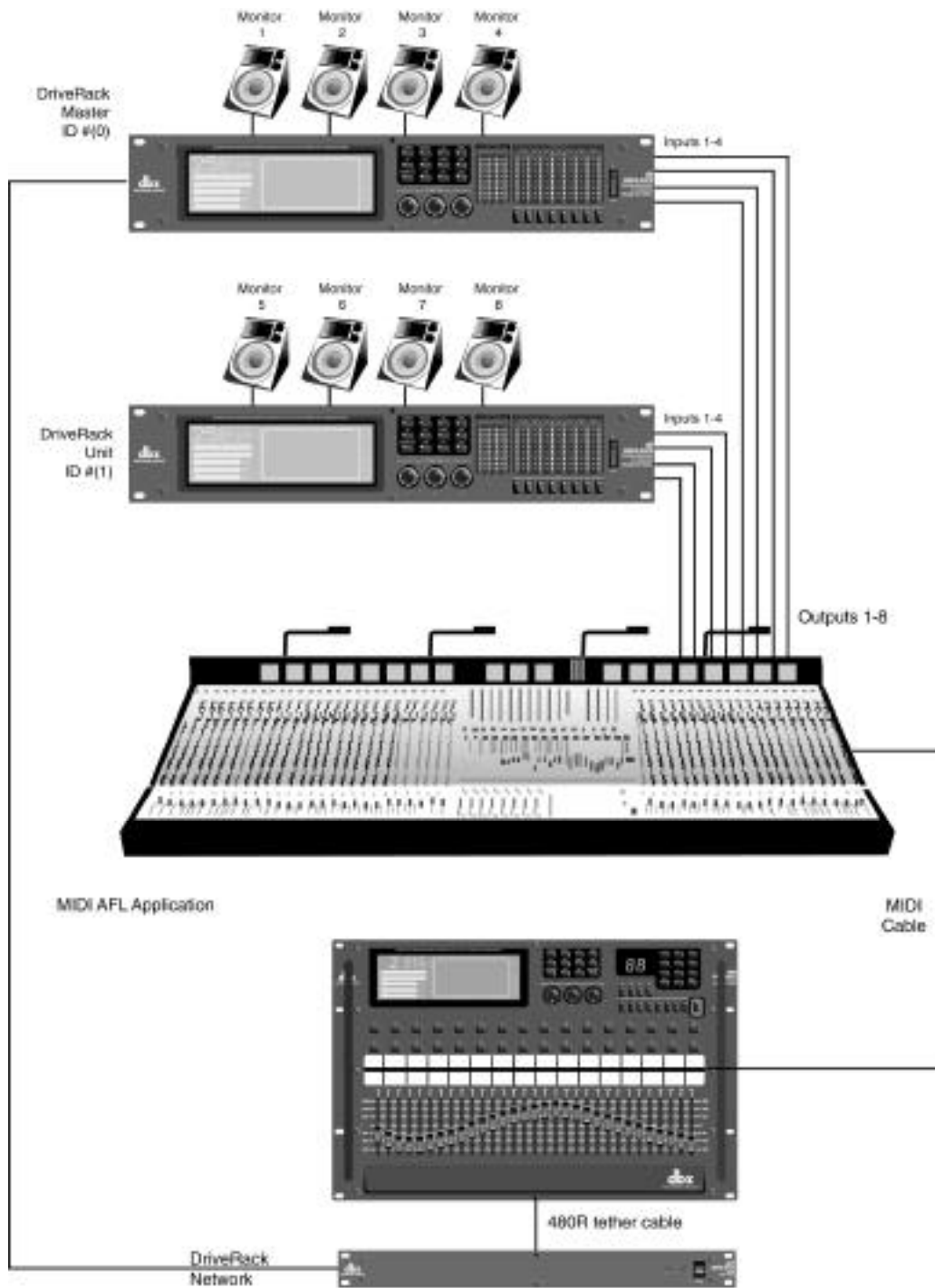
When using mixing consoles that offer MIDI capability such as the Allen&Heath ML4000 and ML5000™, the After Fader Listen (AFL) buttons can be used to recall the pre-crossover (Graphic or Parametric) EQ settings on the 480R DriveRack. When the AFL button is engaged on one of the console outputs, the console sends a MIDI message to the 480R that automatically recalls the appropriate DriveRack input channel. The console's AFL buttons then function as additional fixed hotkeys for the 480R's pre-crossover EQ. For a graphical representation of the this function, please see Figure 1.

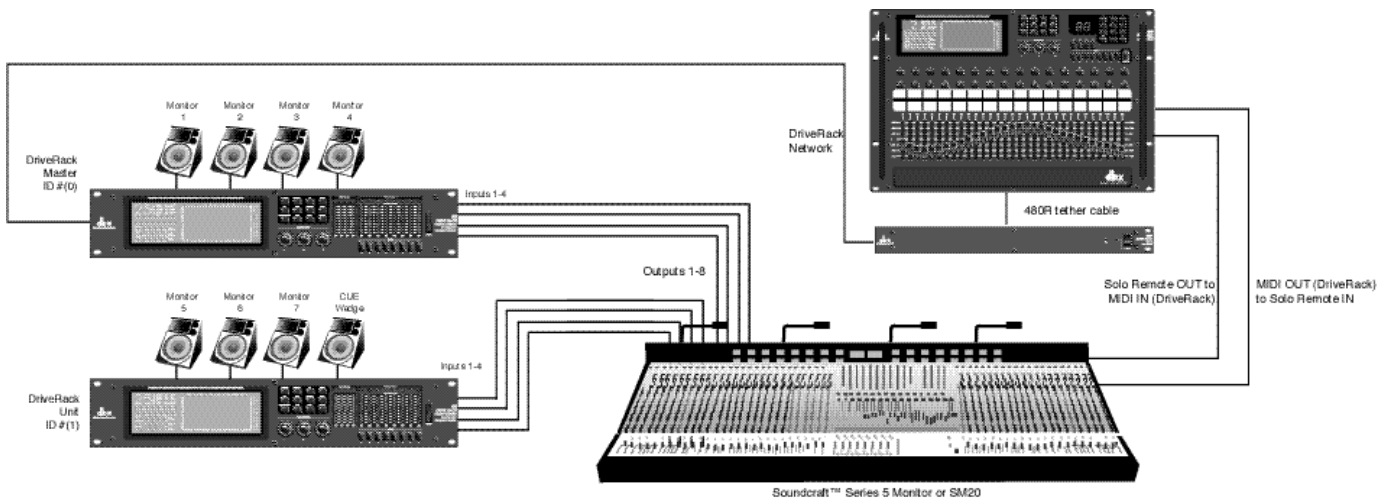
The procedure for using this function is as follows:

- To use the MIDI AFL functions of the DriveRack, use a standard 5-pin MIDI cable to connect the MIDI OUT port of the mixing console to the MIDI IN port of the 480R DriveRack. The Soundcraft consoles require a return MIDI cable from the MIDI output of the 480R.
- Enable MIDI AFL using Encoder 2 in the 480R's Utility Page 4. This parameter allows the user to select the console type being used. Options includes: Off, A&H (Allen & Heath™ ML 4000 and 5000), and SCraft (SoundCraft™ Series 5 Monitor and SM20).
- Each AFL button can be mapped to any input on a DriveRack unit. For example, console output channel 1 AFL recalls the pre-crossover EQ of the Master's (Box 0) Channel 1, console output channel 2 AFL recalls the pre-crossover EQ of the Master's Channel 2, while console output channel 5 AFL recalls the pre-crossover EQ of Box 1 Channel 1.

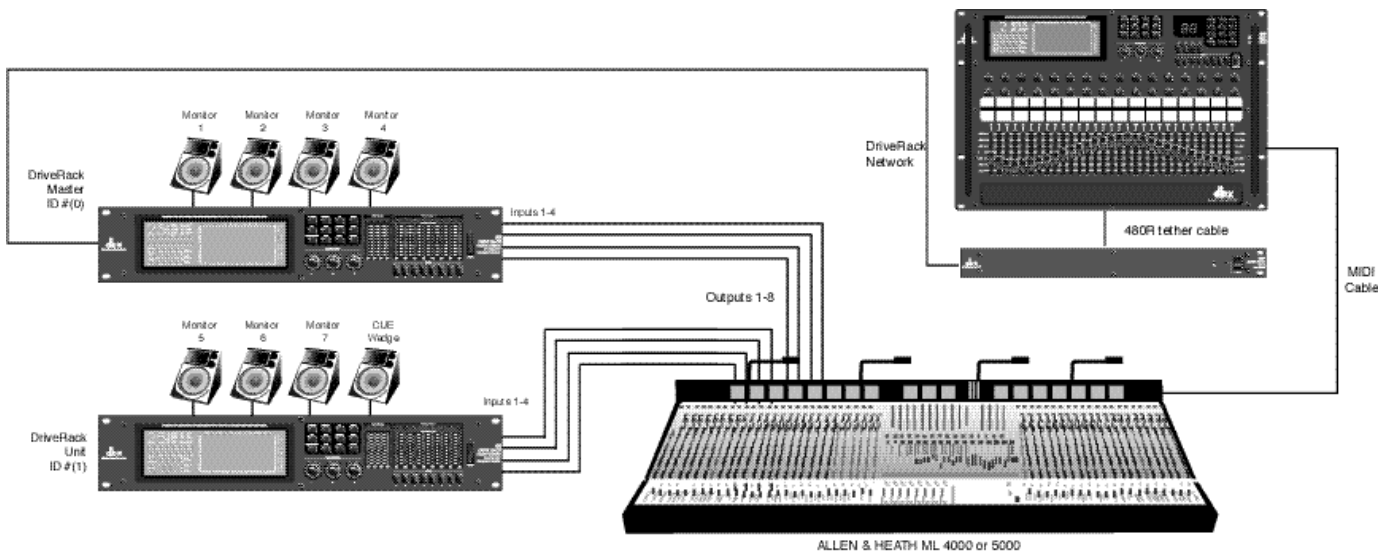
Any variation of this AFL MIDI mapping setup can be achieved on page 5 of the Utility menu. The procedure is as follows:

1. Use Parameter 1 knob to select the AFL channel.
2. Use the Parameter 2 knob select the corresponding unit ID, and the Parameter 3 knob selects the input channel of that unit.





CUE Channel Application



CUE Channel Application

### 8.8.6 - CUE Channel

With the DriveRack system's Cue Channel capability it is possible to mirror the Graphic (not Parametric) EQ settings of other DriveRack units to a channel dedicated to the monitor engineer's cue wedge. When Cue Channel is enabled, it continually echoes the 31 Graphic EQ levels of the current channel on the 480R DriveRack to the CUE channel unit and input respectively. When a channel is recalled on the 480R, the Pre-crossover Graphic EQ setting for that channel is echoed to the cue wedge, so the monitor engineer is better able to adjust the sound for the musician on stage. If Cue Channel is disabled on the 480R, the DriveRack's Graphic EQ setting will not be applied to the cue wedge.

Connect the output of the selected unit's input channel (cue channel) to the amplifier being used to power the speaker facing the monitor engineer.

Please refer to the diagram on the previous page.

- Enable Cue Channel by using the CUE Channel Setup on page 6 of the 480R utility menu. Note: The CUE channel must be used in conjunction with MIDI AFL commands.
- The Parameter 1 knob is used to turn the CUE channel option on, and select which mode CUE channel is operating in. Mode 1 activates CUE channel EQ when the CUE channel is selected. Mode 2 turns off the CUE channel's EQ when the CUE channel is selected.
- The Parameter 2 knob selects the CUE channel's unit ID. The Parameter 3 knob selects the input used for the CUE channel.

### 8.8.7 - Miscellaneous

- Page 7 of the 480R Utility menu, offers the ability to control display contrast.
- Page 7 of the utility menu also offers the Hotkey normal/Hotkey locked option. If the parameter is set to Hotkey Locked, new Hot Keys can still be assigned, but new HotKeys cannot be assigned over previously stored Hot Keys. If the parameter is set to Hotkey normal, then previous Hotkey assignments can be overwritten.

## APPLICATION GUIDE



This Application guide section is provided to offer suggested installation applications of the DriveRack™ units that will allow you to optimize peak performance of the units. Note that the six included applications represent the extensive flexibility of the DriveRack™ units. These applications can be used verbatim, or as simple reference guides for designing countless audio applications.

### 9.1 4-Way Front of House

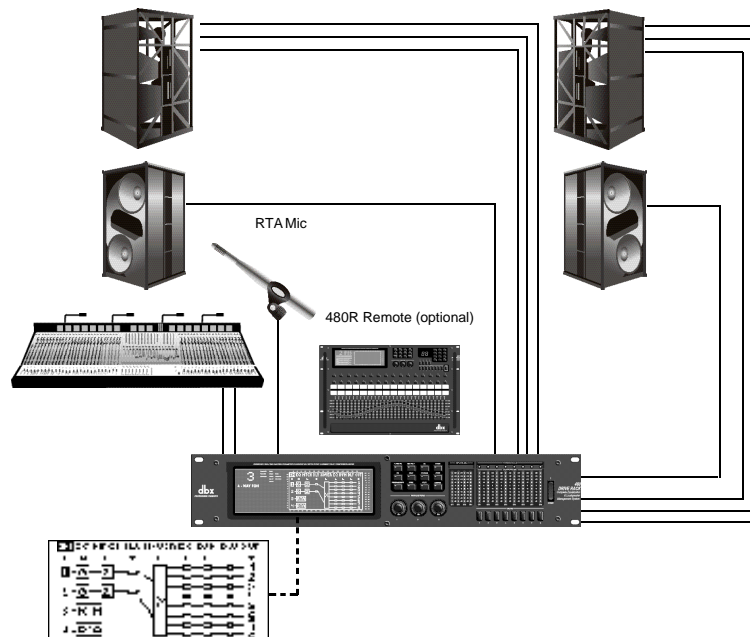
#### Hardware

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ and run to the selected speaker amplifier.
3. Connect the RTA microphone to either input 3 or 4 of the DriveRack™.
4. Connect the optional 480R to the DriveRack™ via the network connector.
5. Making sure that all outputs are muted, apply power to the mixer and amplifiers.

#### Software

1. From Program/Config mode, select the desired configuration by using the PARAMETER 1 knob to scroll through the Program/Configuration menu. For more information on configuration procedures, please see section 3.
2. From Program mode, use either the selected effect editing button or the PARAMETER 2 and 3 knobs to access and edit the desired parameter. For more information on parameters, please see section 4.
3. Press the OTHER button to access the input and output level controls of the unit. Successive presses of the OTHER button will move you through the four input and eight outputs of the unit.
4. From Program mode, press the RTA button and use the RTA to aid in optimizing the room settings. For more information on RTA and pink noise, please see section A.10 of the Appendix.



### 9.2 Front of House w/Delay 3-Way Towers

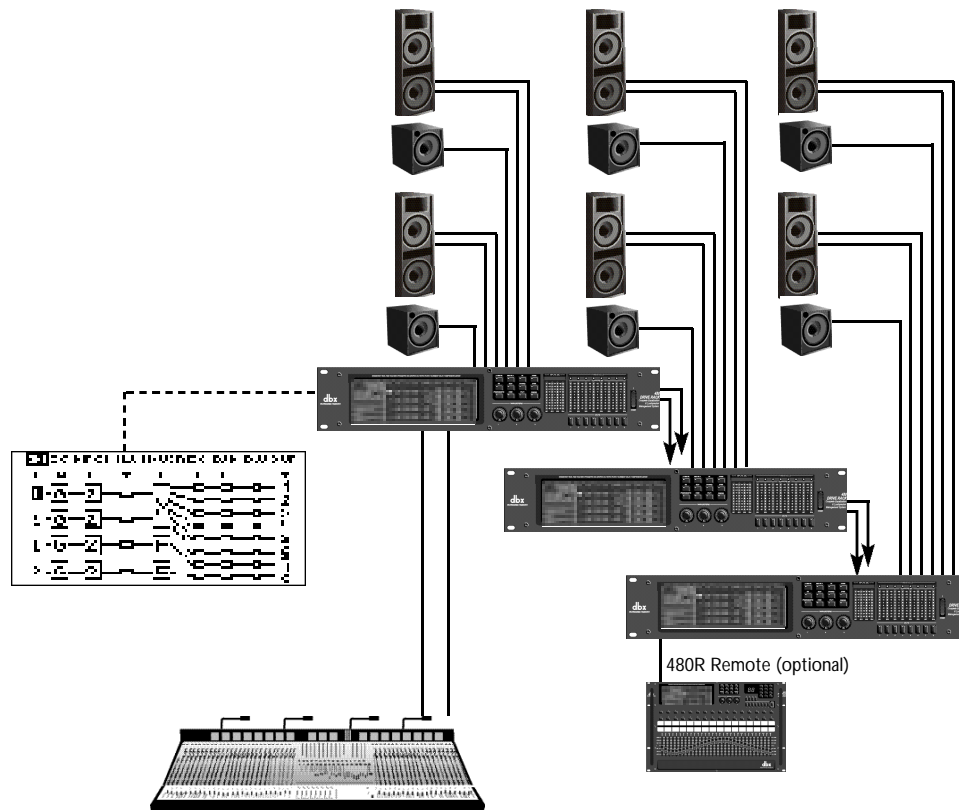
#### Hardware

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ and run to the selected speaker amplifier.
3. Connect the the output from DriveRack™ 1 to the inputs of DriveRack 2.
4. Connect the the output from DriveRack™ 2 to the inputs of DriveRack™ 3.
4. Connect the optional 480R to the DriveRack™ via the network connector.
5. Making sure that all outputs are muted, apply power to the mixer and amplifiers.

#### Software

1. From Program/Config mode, select the desired configuration by using the PARAMETER 1 knob to scroll through the Program/Configuration menu. For more information on configuration procedures, please see section 3.
2. From Program mode, use either the selected effect editing button or the PARAMETER 2 and 3 knobs to access and edit the desired parameter. For more information on parameters, please see section 4.
3. Press the OTHER button to access the input and output level controls of the unit. Successive presses of the OTHER button will move you through the four input and eight outputs of the unit.



## 9.3 L-C-R + Sub + Rear

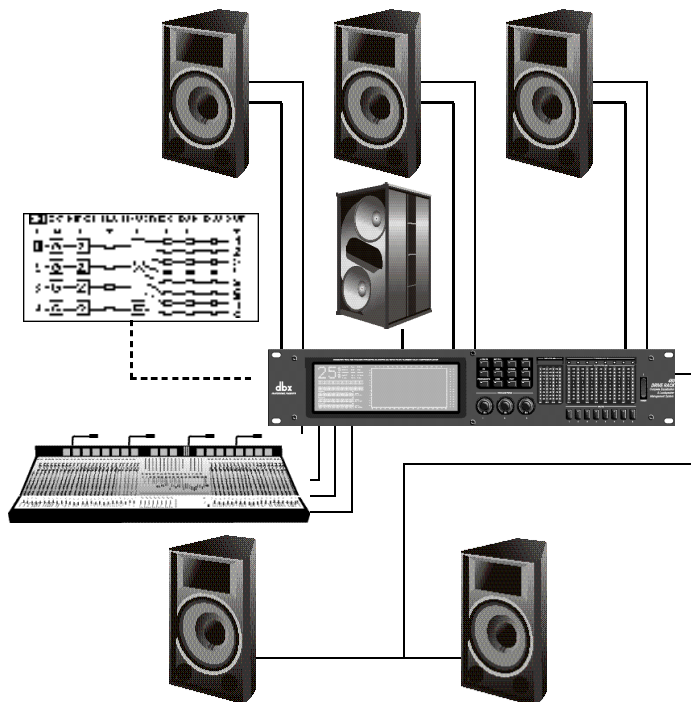
## Hardware

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ and run to the selected speaker amplifier.
3. Making sure that all outputs are muted, apply power to the mixer and amplifiers.

## Software

1. From Program/Config mode, select the desired configuration by using the PARAMETER 1 knob to scroll through the Program/Configuration menu. For more information on configuration procedures, please see section 3.
2. From Program mode, use either the selected effect editing button or the PARAMETER 2 and 3 knobs to access and edit the desired parameter. For more information on parameters, please see section 4.
3. Press the OTHER button to access the input and output level controls of the unit. Successive presses of the OTHER button will move you through the four input and eight outputs of the unit.





### 9.4 - BiAmp & In-Ear

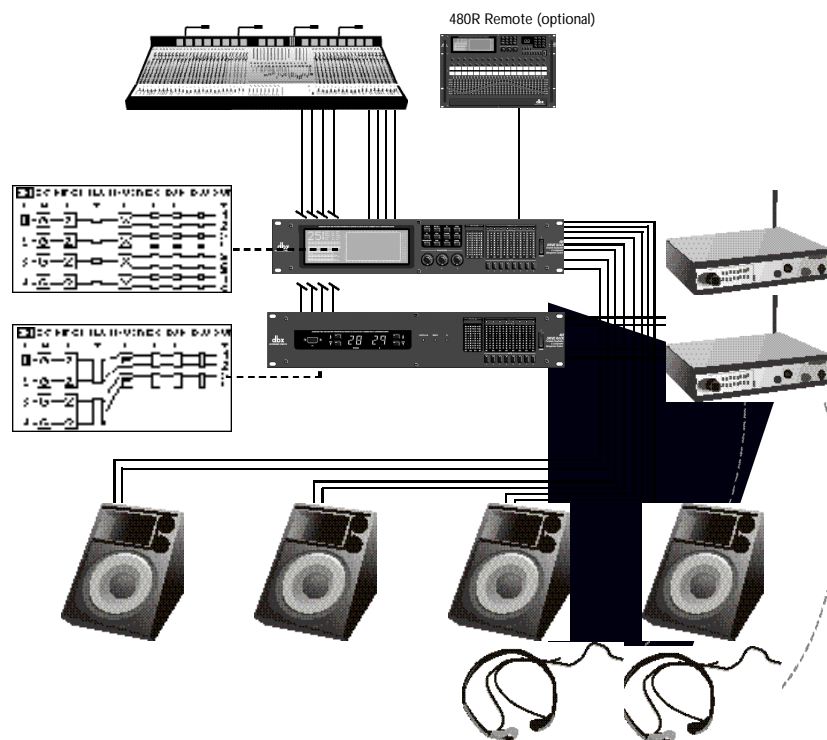
#### Hardware

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ and run to the selected speaker amplifier and in-ear monitor.
3. Connect the optional 480R to the DriveRack™ via the network connector.
4. Making sure that all outputs are muted, apply power to the mixer, amplifiers and monitors.

#### Software

1. From Program/Config mode, select the desired configuration by using the PARAMETER 1 knob to scroll through the Program/Configuration menu. For more information on configuration procedures, please see section 3.
2. From Program mode, use either the selected effect editing button or the PARAMETER 2 and 3 knobs to access and edit the desired parameter. For more information on parameters, please see section 4.
3. Press the OTHER button to access the input and output level controls of the unit. Successive presses of the OTHER button will move you through the four input and eight outputs of the unit.



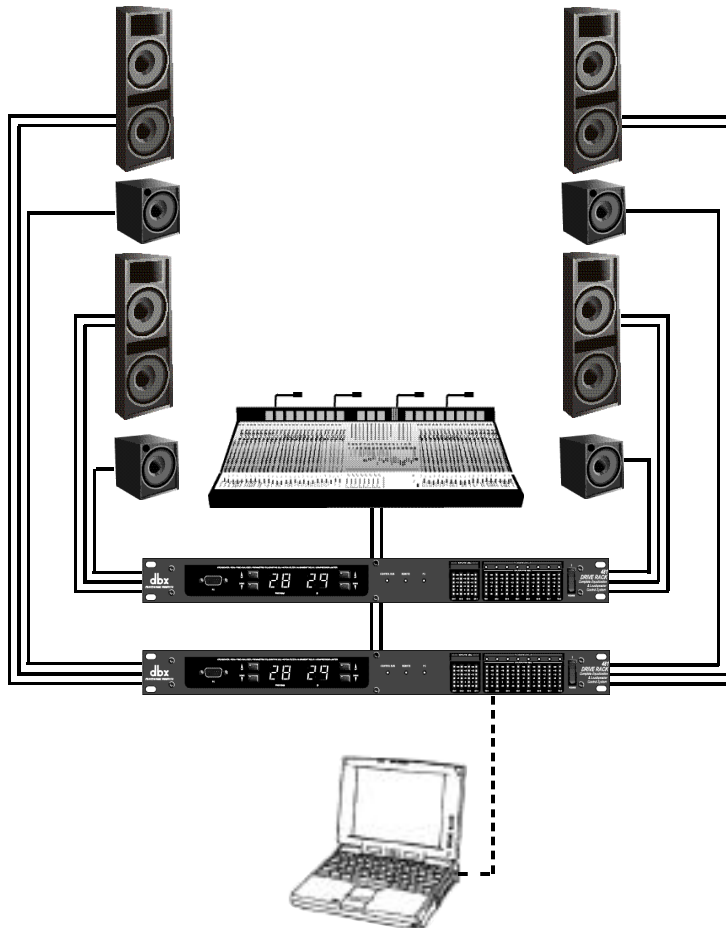
**9.5 Dedicated FOH Cross-over****Hardware**

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ units and run to the selected speaker amplifier.
3. Make network connections between the DriveRack™.
4. Connect the optional PC GUI to the DriveRack™ 1 via the front panel connector.
5. Making sure that all outputs are muted, apply power to the mixer and amplifiers.

**Software**

1. Use the GUI interface to access the input and output level controls of the unit. For information about networking and the PC interface, please see section 7.



### 9.6 - Stand Alone Monitor EQ

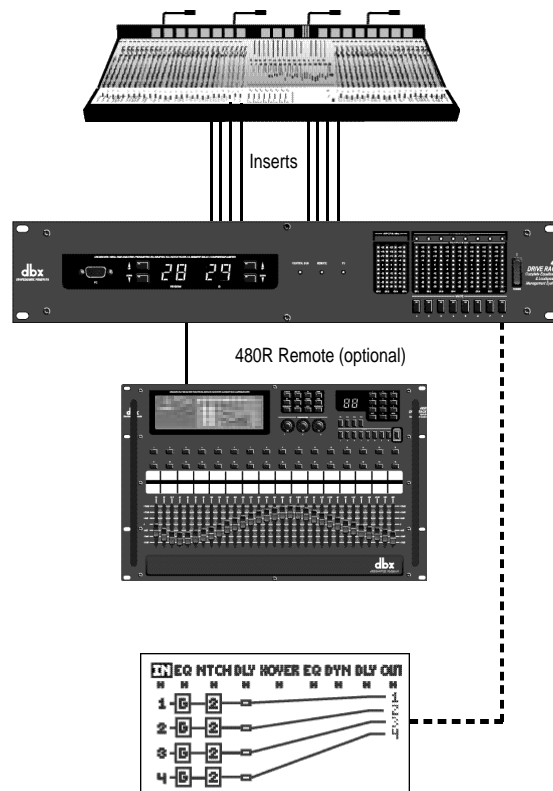
#### Hardware

**Note** Make sure that all outputs are muted on the DriveRack™ prior to adding power to any devices in the signal path (pre and post DriveRack™).

1. Connect the outputs sends from the mixer to the inputs of the DriveRack™.
2. Connect the outputs of the DriveRack™ and run to the returns of the mixer.
4. Connect the optional 480R to the DriveRack™ via the network connector.
5. Making sure that all outputs are muted, apply power to the mixer.

#### Software

1. From Program/Config mode, select the desired configuration by using the PARAMETER 1 knob to scroll through the Program/Configuration menu. For more information on configuration procedures, please see section 3.
2. From Program mode, use either the selected effect editing button or the PARAMETER 2 and 3 knobs to access and edit the desired parameter. For more information on parameters, please see section 4.
3. Press the OTHER button to access the input and output level controls of the unit. Successive presses of the OTHER button will move you through the four input and eight outputs of the unit.







## A.1 MIDI SysEx

### A.1.1 SYSEX MESSAGE FORMATS

#### SYSEX HEADER (SYS\_HEAD)

- F0(h) System Exclusive 'Begin Message' byte
- 00(h)
- 01(h) Manufacturer's ID Number (dbx)
- 1E(h)
- 00(h) - 7F(h) Device ID (7F(h) means "everyone listen")
- On(h) or 7F(h) Product ID (each product has a unique ID - DriveRack ID is 03(h))

#### SYSEX Procedure and Data

- pp
- pp = Procedure number. The different procedure's names and general formats are described in the Procedures Section.

dd(1)1, dd(1)2.....dd(n)1, dd(n)2

dd = Data as needed by procedures. Since the standard MMA MIDI Specification reserves 80(h) through FF(h) (decimal numbers 128 through 255) for specific commands, a split byte format is adopted for all data communication in this SYSEX implementation. dd(n)2 denotes the 1st through 7th bits of the nth byte and dd(n)1 denotes the 8th bit of the nth byte. Note: All data that is requested or received, is in split byte format unless noted otherwise.

#### SYSEX "Message End" byte

- F7(h) System Exclusive 'End Message' byte

### A.1.2 SYSEX Procedures

In the following section, SYS\_HEAD refers to a valid System Exclusive header. The System Exclusive header starts with the System Exclusive status byte, and includes all bytes through the dbx Product ID. F7(h) is the System Exclusive 'Message End' byte. All SYSEX numbers in the format definition of each procedure are given as hexadecimal values, along with this symbol (h) for clarification. Binary numbers are identified with this symbol (b).

## Receive One Program (42h)

SYS\_HEAD 42(h), vv(1)1, vv(1)2, vv(2)1, vv(2)2, xx1, xx2, yy1, yy2, zz(1)1, zz(1)2, zz(2)1, zz(2)2, dd(1st)1, dd(1st)2, dd(nth)1, dd(nth)2, F7(h)

vv .program dump version number

When xx = 00(h) Program Bank: 00(h) = User Program

When xx = 01(h) Program Bank: 01(h) = Factory Programs

yy The program number, 1-100 (00-63h)

zz Byte Count

dd(n) Program data

The Receive One Program procedure is used to load a Program into the 480, 482 or 480R. The number of program bytes to be received (n) is different for each program. If the 480 is sent a Receive One program procedure where the program number is not a valid RAM destination, it will be ignored.

## Receive Bulk Dump (48h)

SYS\_HEAD 48(h), dd(1st)1 dd(1st)2, ... dd(nth)1, dd(nth)2, F7(h)

dd(n) Bulk Dump Data

The Receive Bulk Dump procedure is used to load all User Programs into the 480. A software version number is imbedded in the data.

### A.1.3 SYSEX Setup Dump Sample

Following is a simple example of a SYSEX Program dump. It takes you set by step through all of the operation commands of a typical SYSEX procedure.

<<SYSEX Header>>

F0 00 01 1E 7F 03

<<Procedure>>

42

<<Program Dump Version>>

00 01 00 00

<<Program Bank and Program Number>>

00 00 00 00

<<Program Transmit Count...Lo Bytes, Hi Bytes>>

00 0A 00 06

<<15 Character Program Name...dynamic>>

00 31 00 3A 00 52 00 76 00 62 00 20 00 32 00 3A 00 47 00 74 00 52 00 76

<<Null to indicate end of Character String>>

00 00

<<Misc Setup Data...too dynamic to document>>

00 07 00 00 00 06 00 00 00 03 00 06 00 03 00 32 00 08 00 03 00 00 00 00 00 02 00 04 00 00 00 00 00 02 00 08 00  
00 00 00 01 7E 00 00 00 00 00 20 01 7F 00 00 00 00 00 20 00 00 00 00 00 00 20 00 01 00 00 00 00 00 20 00 02  
00 00 00 00 00 20 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

<<SYSEX End>>

F7



## A.2 Factory Reset

In the event that a reset is required, the DriveRack™ units offer you the option of performing a “Soft” or “Hard” reset. The Soft Reset resets everything except user programs. The Hard Reset Procedure will reset all programmable information back to the factory defaults.

### 480 and 480R Factory (“Hard”) Reset

- Press and Hold the STORE button on power-up until the following message appears:  
"! HARD RESET?"
- Pressing the PREVP AGE 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.

### 480 and 480R Factory (“Soft”) Reset

Press and Hold the OTHER button at power-up until the following message appears:  
"! SOFT RESET?"

- Pressing the PREVP AGE 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.

### 481 and 482 Factory (“Hard”) Reset

- Press and hold the ID DOWN button on power-up until the following message appears in the 7-Seg Display:  
HARD
- Pressing the PROGRAM UP 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 any other button will abort the Factory Reset sequence and the unit will reset normally.

### 481 and 482 Factory (“Soft”) Reset

- Press and Hold the ID UP button on power-up until the following message appears in the 7-Seg Display:  
SOFT
- Pressing the PROGRAM UP button will start a System Reset (All Utility settings will be defaulted.)
- Pressing any other button will abort the System Reset sequence and the unit will reset normally.

## A.3 Power Up Quick Key Options

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

### 480 and 480R Power-Up Output Mute

Press and hold any of the mute buttons at power-up. All of the outputs will be muted when the program loads.

### 480 and 480R Change Initial Program Number

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

"Use Wheel 1 to" - "Change Restart" - "Program Number"

Turning the PARAMETER 1 knob 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.

### 481 and 482 Power-Up Output Mute

Press and hold any of the mute buttons at power-up. All of the outputs will be muted when the program loads.

**Note:** 481 has no mute buttons so cannot perform this function.

### 481 and 482 Change Initial Program Number

Press and hold the PROGRAM DOWN button at power-up until the program number blinks in the display.

Use the PROGRAM UP and PROGRAM DOWN buttons to select the program you wish to load at initial reset.

Press the ID UP button when the selection is complete. Normal resetting will continue.

## 482 Toggle RS-232/MIDI

Press and hold <ID UP> and <ID DOWN> at power-up until "232" appears in the 7-Seg Display.

Watch as the fourth digit in the display toggles from "1" to "0" or from "0" to "1".

If the final result is "1" the system is set up to communicate with RS-232.

If the final result is "0" the system is set up to communicate with MIDI.

Let go of the buttons and normal resetting will continue.

## A.4 Flash Downloads

The DriveRack™ units have the ability to update their operating systems (OS) with the latest version available via the Internet. In order to perform a flash download your PC must be able to receive/transmit information through the RS 232 connector. The Flash download procedure is as follows:

1. Connect the RS 232 output from your PC to the RS 232 port of the DriveRack™.
2. Access the World Wide Web.
3. Go to [www.dbxpro.com](http://www.dbxpro.com) to access the latest OS version.
4. Download the latest OS version and all attached software.
5. Follow the detailed instructions from the website.

Start Flash Download Session (Front Panel 480 and 480R)

- Press and hold the PREV PAGE button on power-up until the following message appears:  
"WAITING FOR FLASH DOWNLOAD"

At this point, follow the flash download instructions to perform a flash download.

Start Flash Download Session (Front Panel 481 and 482)

Press and hold the PROGRAM UP and ID DOWN buttons on power-up until the following message appears  
"FLSH"

- At this point follow the flash download instructions to perform a flash download.

## A.5 Program List

U1) 4 Way w/S+H EQ	F21) 4 Way w/S+H EQ
U2) LCR w/Ext Sends	F22) LCR w/Ext Sends
U3) 2 Way Monitors	F23) 2 Way Monitors
U4) 4-Way w/BP Subs	F24) 4-Way w/BP Subs
U5) 3-Way w/Mixer	F25) 3-Way w/Mixer
U6) 4-Way Template	F26) 4-Way Template
U7) 4-Way FOH w/RTA	F27) 4-Way FOH w/RTA
U8) 4-Way w/Mono Sub	F28) 4-Way w/Mono Sub
U9) LCR Template	F29) LCR Template
U10) 3X7 LCR w/Rear	F30) 3X7 LCR w/Rear
U11) LCR w/RTA	F31) LCR w/RTA
U12) 3-Way Template	F32) 3-Way Template
U13) 3-Way w/Delay	F33) 3-Way w/Delay
U14) 3-Way FOH w/RTA	F34) 3-Way FOH w/RTA
U15) 3-Way + 2-Way	F35) 3-Way + 2-Way
U16) 2-Way Template	F36) 2-Way Template
U17) 2-Way Monitors	F37) 2-Way Monitors
U18) Dual 2-Way	F38) Dual 2-Way
U19) Conf/Ballroom	F39) Conf/Ballroom
U20) 4 Insert EQs	F40) 4 Insert EQs

## A.6 Specifications

### Specifications ( 480 DriveRack™)

<b>Inputs</b>	
Number of Inputs:	4 (Inputs 3 or 4 can be selected as an RTA mic input)
Connectors:	Female XLR
Type:	Electronically balanced/RF filtered
Impedance:	>40k
Maximum Input Level:	Hardware selectable for +30, +22, +14, dBu
Max input RTA Level:	-10 dBu
CMRR:	>40 dB typical, >55 dB at 1kHz
Input Gain Range RTA:	10 dB to 70 dB w/60 dB typical
<b>Outputs</b>	
Number of Outputs:	8
Connectors:	Male XLR
Type:	Electronically balanced, RF filtered
Impedance:	120
Output Transformers:	Optional
Max Output Level:	+25.5 dBu into 1k +22dBu into 600
<b>A/D Performance</b>	
Type:	dbx Type IV™ Conversion System
Dynamic Range line:	>112 dB unweighted, 115 dB A-weighted
Type IV™ dynamic range:	127 dB with transient material, A-weighted, 22kHz BW 125 dB with transient material, unweighted, 22kHz BW 119 dB typical with program material, A-weighted, 22kHz BW
Sample Rate:	48kHz
A/D Wordlength:	24 bits
<b>D/A Performance</b>	
Dynamic Range:	112 dB unweighted, 115 dB A-weighted
Sample Rate:	48kHz
D/A Wordlength:	24 bits
<b>System Performance</b>	
Internal Wordlength:	48 bits
THD + Noise:	0.003% typical at +4dBu, 1kHz, 0dB input gain
Frequency Response:	20Hz- 20kHz, +/-0.5dB
Interchannel Crosstalk:	<-85dB at 1kHz, 0dB input gain
<b>Pre EQ</b>	
Type:	One 31-band Graphic EQ per input channel, or 9 band Parametric EQ per input channel RTA can be substituted for EQ in channels 3 and 4
Range:	+/-12 dB range
<b>Notch Filters</b>	
Number:	1-5 per input channel not to exceed 10 for all input channels
<b>Pre Delay</b>	
Length:	680ms/channel
<b>Crossover</b>	
Type:	1x2, 1x3, 1x4, 1x5, 1x6 2x3, 2x4, 2x5, 2x6, 2x7, 2x8, 3x4, 3x5, 3x6, 3x7, 3x8, 4x6, 4x8
<b>Filter Type:</b>	
Slope:	Butterworth, Bessel, or Linkwitz-Riley 6, 12, 18 or 24 dB/octave for Butterworth or Bessel filters 12, 24, 36 or 48 dB/octave for Linkwitz-Riley filters
<b>Post EQ</b>	
Type:	Parametric
Number:	4 EQ bands per output channel

Range:	+/-15 dB range
Dynamics Type:	Compressor/Limiter with PeakStopPlus™
Attack/Release:	Program Dependent
Linking:	All 8 bands are linkable
Post Delay (Driver Alignment) Length:	170 ms per output channel
Pink Noise Generator Position:	Pink noise inserted on selected input(s)
Phase Compensation Number:	One per output channel
Amount:	0-180 degrees phase shift
Output Polarity:	Reversible
Miscellaneous Output Transformers:	Optional
Network:	Proprietary RS-485 Backbone
GUI:	RS-232 interface for computer display and configuration
RTA Microphone:	Optional
ROM Upgrade:	Flash upgradeable through RS-232
Power Requirements Watts:	100-240V - 50/60 Hz 35 Watts
Dimensions Dimensions:	Height- 3.5" X Width- 19" X Depth 12.15"
Weight:	11lbs.
Shipping Weight:	12.5lbs.

### Specifications ( 481 DriveRack™)

Inputs Inputs:	4
Connectors:	Euroblock
Type:	Electronically balanced/RF filtered
Impedance:	>40k
Max Input Level:	Hardware selectable for +30, +22, +14, dBu
CMRR:	>40 dB typical, >55 dB at 1kHz
Outputs Outputs:	8
Connectors:	Euroblock
Type:	Electronically balanced, RF filtered
Impedance:	120
Max Output Level:	+25.5 dBu into 1k +22dBu into 600
A/D Performance Type:	dbx Type IV™ Conversion System
Dynamic Range line:	>112 dB unweighted, 115 dB A-weighted
Type IV™ dynamic range:	127 dB with transient material, A-weighted, 22kHz BW 125 dB with transient material, unweighted, 22kHz BW 119 dB typical with program material, A-weighted, 22kHz BW
Sample Rate:	48kHz
A/D Wordlength:	24 bits

D/A Performance	
Dynamic Range:	112 dB unweighted, 115 dB A-weighted
Sample Rate:	48kHz
D/A Wordlength:	24 bits
System Performance	
Internal Wordlength:	48 bits
THD + Noise:	0.003% typical at +4dBu, 1kHz, 0dB input gain
Frequency Response:	20Hz- 20kHz, +/-0.5dB
Interchannel Crosstalk:	<-85dB at 1kHz, 0dB input gain
Pre EQ	
Type:	One 31-band Graphic EQ per input channel, or 9 band Parametric EQ per input channel RTA can be substituted for EQ in channels 3 and 4
Range:	+/-12 dB range
Notch Filters	
Number:	1-5 per input channel not to exceed 10 for all input channels
Pre Delay	
Length:	680ms/channel
Crossover	
Type:	1x2, 1x3, 1x4, 1x5, 1x6 2x3, 2x4, 2x5, 2x6, 2x7, 2x8, 3x4, 3x5, 3x6, 3x7, 3x8, 4x6, 4x8
Filter Type:	Butterworth, Bessel, or Linkwitz-Riley
Slope:	6, 12, 18 or 24 dB/octave for Butterworth or Bessel filters 12, 24, 36 or 48 dB/octave for Linkwitz-Riley filters
Post EQ	
Type:	Parametric
Number:	4 EQ bands per output channel
Range:	+/-15 dB range
Dynamics	
Type:	Compressor/Limiter with PeakStopPlus™
Attack/Release:	Program Dependent
Linking:	All 8 bands are linkable
Post Delay (Driver Alignment)	
Length:	170 ms per output channel
Pink Noise Generator	
Position:	Pink noise inserted on selected input(s)
Phase Compensation	
Number:	One per output channel
Amount:	0-180 degrees phase shift
Output Polarity:	Reversible
Miscellaneous	
Output Transformers:	Optional
Network:	Proprietary RS-485 Backbone
GUI:	RS-232 interface for computer display and configuration
Remote:	Optional dbx 480R
RTA Microphone:	Optional
ROM Upgrade:	Flash upgradeable through RS-232
Power Requirements	
Watts:	100-240V - 50/60 Hz 35 Watts
Dimensions	
Dimensions:	Height- 1.75" X Width- 19" X Depth 7.90"
Weight	
Shipping Weight:	8 lbs. 9.5 lbs.

## Specifications ( 482 DriveRack™)

Inputs	
Number of Inputs:	4 (Inputs 3 or 4 can be selected as an RTA mic input)
Connectors:	Female XLR
Type:	Electronically balanced/RF filtered
Impedance:	>40k
Maximum Input Level:	Hardware selectable for +30, +22, +14, dBu
Max input RTA Level:	-10 dBu
CMRR:	>40 dB typical, >55 dB at 1kHz
Input Gain Range RTA:	10 dB to 70 dB w/60 dB typical
Outputs	
Number of Outputs:	8
Connectors:	Male XLR
Type:	Electronically balanced, RF filtered
Impedance:	120
Output Transformers:	Optional
Max Output Level:	+25.5 dBu into 1k +22dBu into 600
A/D Performance	
Type:	dbx Type IV™ Conversion System
Dynamic Range line:	>112 dB unweighted, 115 dB A-weighted
Type IV™ dynamic range:	127 dB with transient material, A-weighted, 22kHz BW 125 dB with transient material, unweighted, 22kHz BW 119 dB typical with program material, A-weighted, 22kHz BW
Sample Rate:	48kHz
A/D Wordlength:	24 bits
D/A Performance	
Dynamic Range:	112 dB unweighted, 115 dB A-weighted
Sample Rate:	48kHz
D/A Wordlength:	24 bits
System Performance	
Internal Wordlength:	48 bits
THD + Noise:	0.003% typical at +4dBu, 1kHz, 9dB input gain
Frequency Response:	20Hz- 20kHz, +/-0.5dB
Interchannel Crosstalk:	<-85dB at 1kHz, 0dB input gain
Pre EQ	
Type:	One 31-band Graphic EQ per input channel, or 9 band Parametric EQ per input channel RTA can be substituted for EQ in channels 3 and 4
Range:	+/-12 dB range
Notch Filters	
Number:	1-5 per input channel not to exceed 10 for all input channels
Pre Delay	
Length:	680ms/channel
Crossover	
Type:	1x2, 1x3, 1x4, 1x5, 1x6 2x3, 2x4, 2x5, 2x6, 2x7, 2x8, 3x4, 3x5, 3x6, 3x7, 3x8, 4x6, 4x8
Filter Type:	Butterworth, Bessel, or Linkwitz-Riley
Slope:	6, 12, 18 or 24 dB/octave for Butterworth or Bessel filters 12, 24, 36 or 48 dB/octave for Linkwitz-Riley filters
Post EQ	
Type:	Parametric
Number:	4 EQ bands per output channel
Range:	+/-15 dB range

Dynamics	
Type:	Compressor/Limiter with PeakStopPlus™
Attack/Release:	Program Dependent
Linking:	All 8 bands are linkable
Post Delay (Driver Alignment)	
Length:	170 ms per output channel
Pink Noise Generator	
Position:	Pink noise inserted on selected input(s)
Phase Compensation	
Number:	One per output channel
Amount:	0-180 degrees phase shift
Output Polarity:	Reversible
Miscellaneous	
Output Transformers:	Optional
Network:	Proprietary RS-485 Backbone
GUI:	RS-232 interface for computer display and configuration
RTA Microphone:	Optional
ROM Upgrade:	Flash upgradeable through RS-232
Power Requirements	
Watts:	100-240V - 50/60 Hz 35 Watts
Dimensions	
Dimensions:	Height- 3.5" X Width- 19" X Depth 12.15"
Weight	10 lbs.
Shipping Weight:	11.5 lbs.

## Specifications ( 480R Remote Controller DriveRack™)

Inputs	
Number of Inputs:	1 Real Time Audio Analyzer with switchable 48V phantom power.
Connectors:	Female XLR
Type:	Electronically balanced/RF filtered
Impedance:	>40k
Max input RTA Level:	-10 dBu
CMRR:	>40 dB typical, >55 dB at 1kHz
Input Gain Range RTA:	10 dB to 70 dB w/60 dB typical

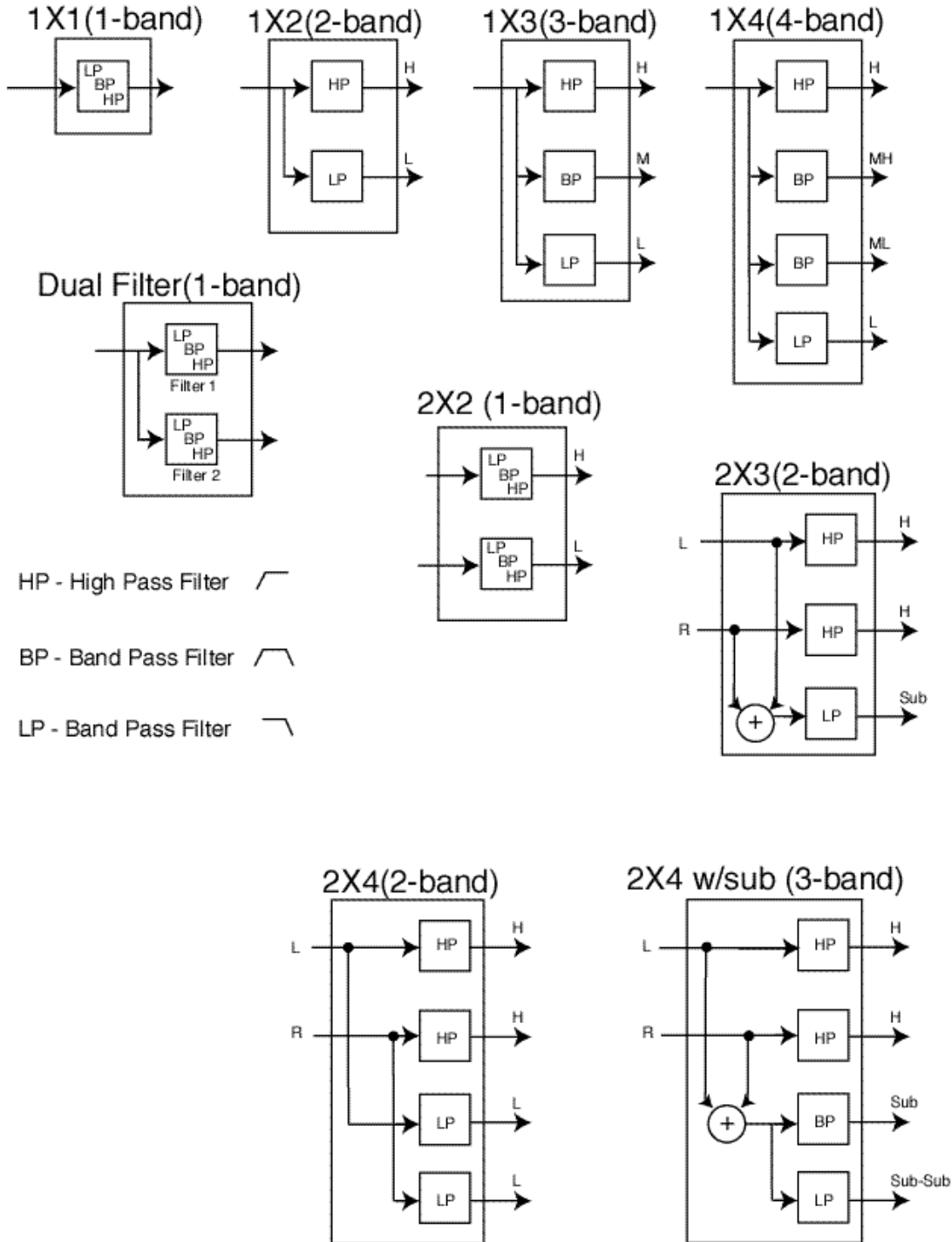
Miscellaneous	
Network:	Proprietary RS-485 link
GUI:	RS-232 interface for computer display and
RTA Microphone:	Optional
ROM Upgrade:	Flash upgradeable through RS-232

Dimensions	
Dimensions:	Height- 12.24" X Width- 19" X Depth 3.20"
Weight	12 lbs.
Shipping Weight:	13.5lbs.

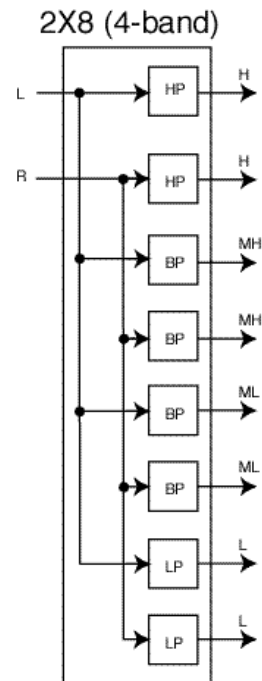
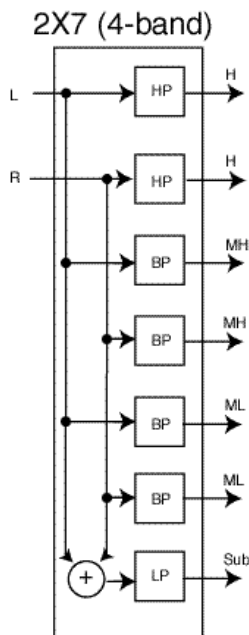
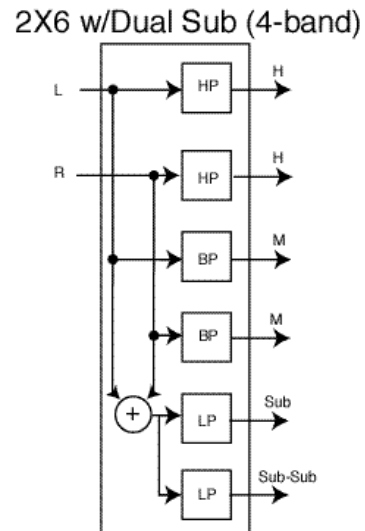
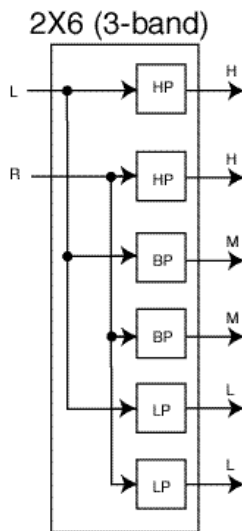
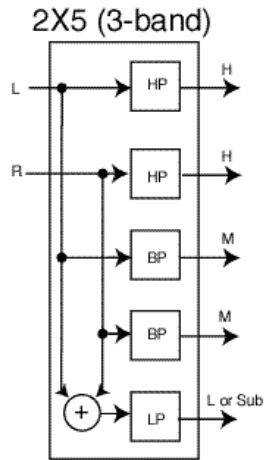
## Specifications ( 480P Power Supply)




Inputs	
Connectors:	RS 232 and RS 485 Network Communication Connectors
Power Requirements	
30 Watts	Selectable 100-120V - 50/60 Hz or 220-240V - 50/60 Hz
Dimensions	
Dimensions:	Height- 1.75" X Width- 19" X Depth 7.90"
Weight	8 lbs.
Shipping Weight:	9.5 lbs.

## A.7 Crossover Diagrams

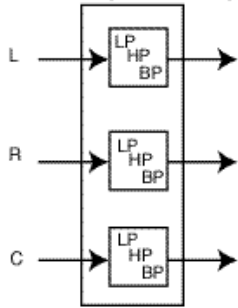




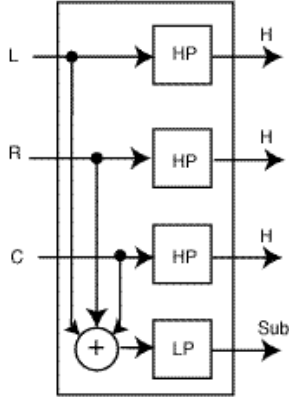


HP - High Pass Filter  BP - Band Pass Filter  LP - Band Pass Filter 

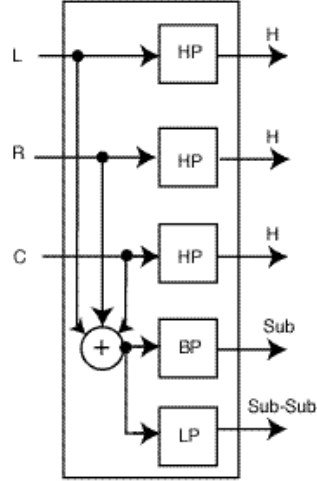
3X3 (1-band)



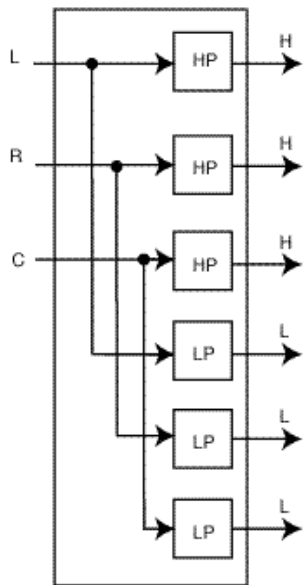
3X4 (2-band)



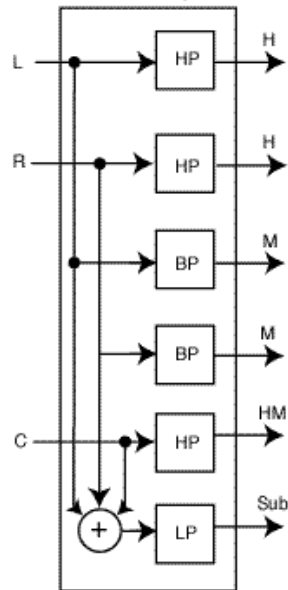
3X5 (3-band)



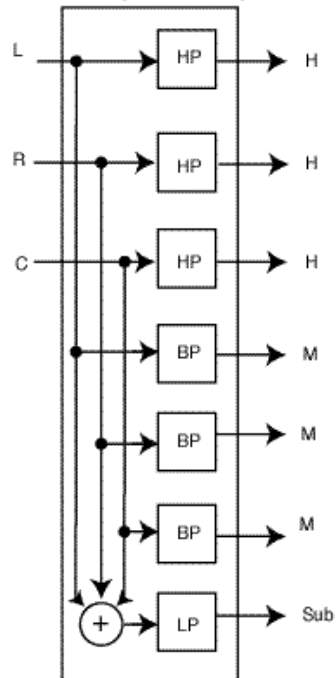
3X6 (2-band)



3X6 w/Sub (3-band)



3X7 (3-band)

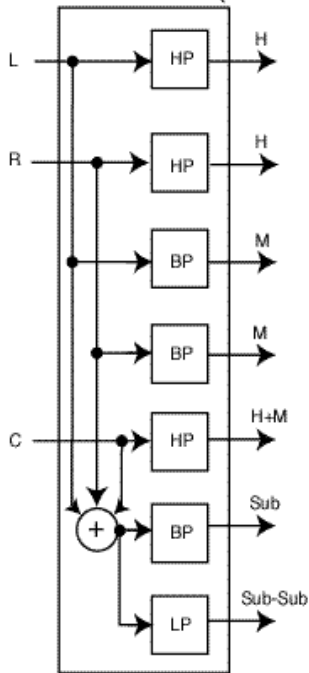


HP - High Pass Filter

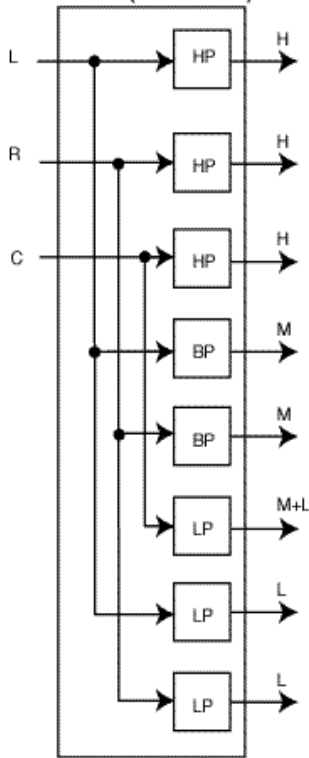
BP - Band Pass Filter

LP - Band Pass Filter

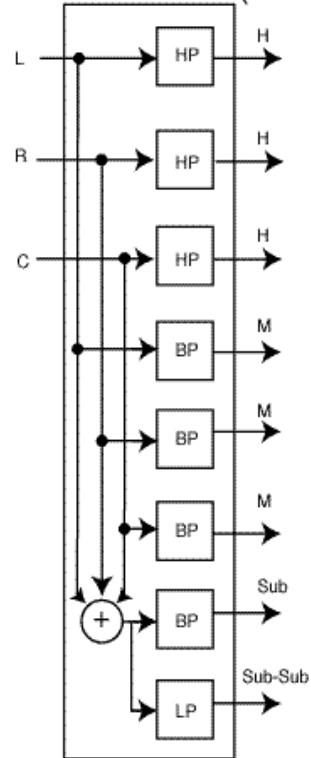
3X7 w/dual subs (4-band)



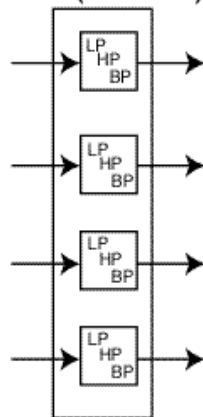
3X8 (3-band)



3X8 w/dual subs (3-band)




4X4 (1-band)





HP - High Pass Filter

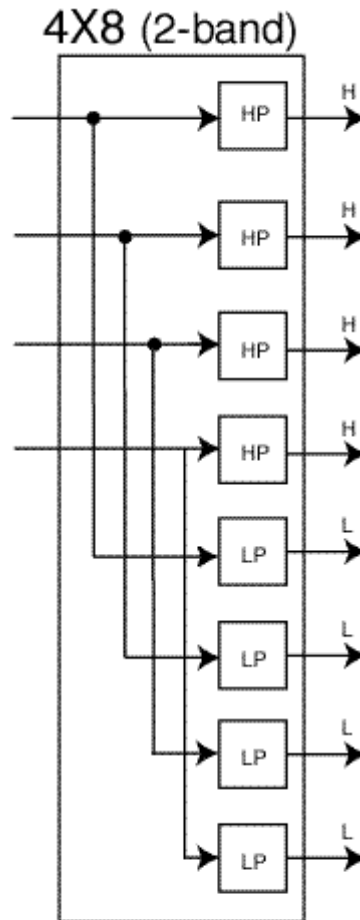
BP - Band Pass Filter

LP - Band Pass Filter

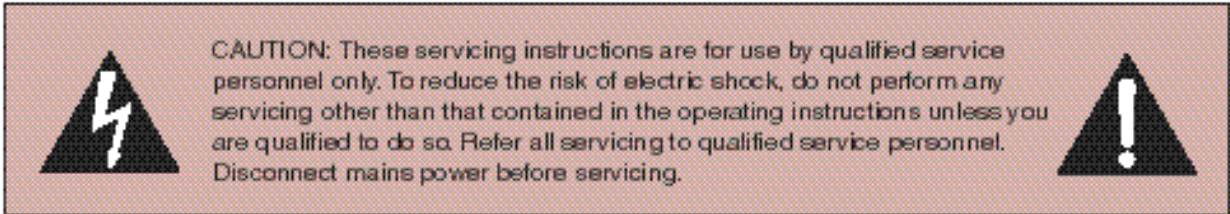
HP - High Pass Filter 

BP - Band Pass Filter 

LP - Band Pass Filter 



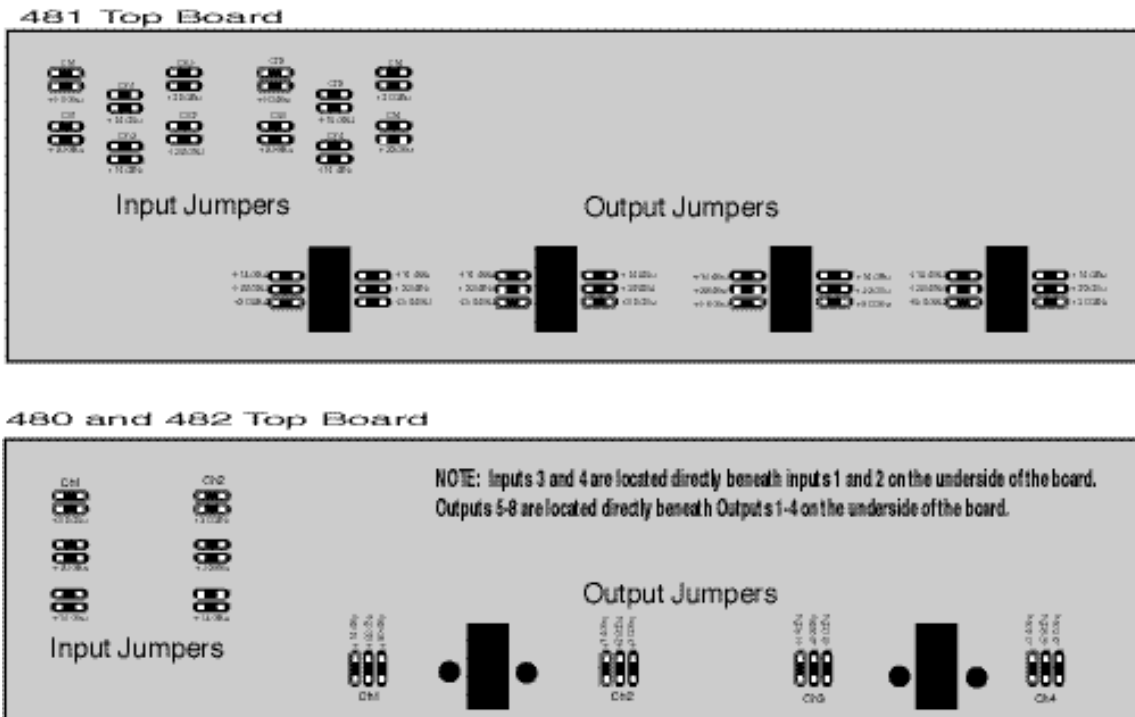
## A.8 Gain Level Jumpers



The 480, 481 and 482 DriveRack™ units offer you the option of changing the input gain level settings. There are 3 hardware configurable gain settings. They are: +14 dBu, +22 dBu and +30 dBu. For these cases, use the following procedure to change the gain level settings. Please be advised however, that once the gain level has been changed from the factory settings, the output meters will no longer be calibrated correctly.

To change the gain level, move the jumpers to the pins that are marked with the desired gain setting

- 1) First, ground yourself prior to opening the DriveRack™ chassis to prevent ESD damage.
- 2) Open the chassis by removing five screws on each side of the chassis and the top two center screws on the rear panel, as well as the top center allen screw located on the front panel
- 3) Locate the jumper block shown in the illustration below:

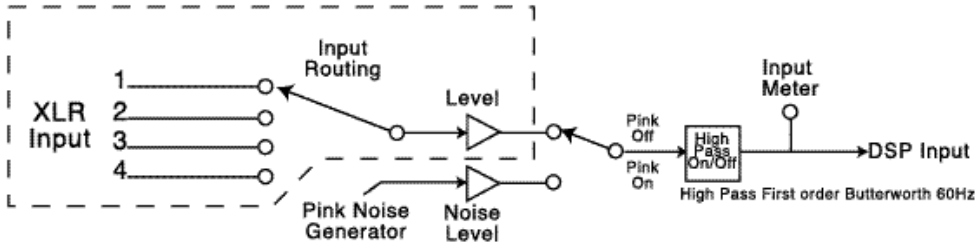


- 4) Set the jumpers to the desired input and output gain settings. Note that to change settings on inputs 3 and 4 and outputs 5-8 of the 480 and 482, the top board must be removed.
- 5) Once the desired settings have been made, replace the chassis lid.

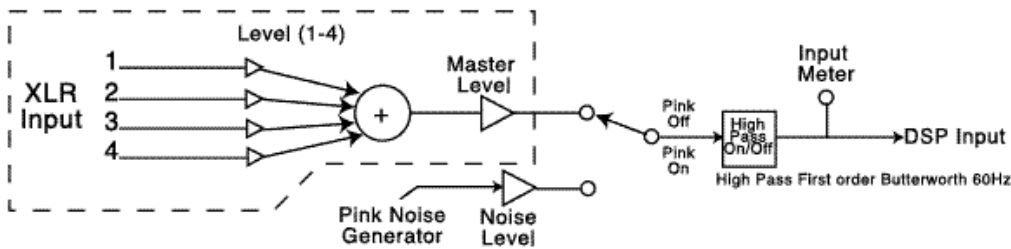
## A.9 Input and Output Diagrams

INPUT DIAGRAM (repeat for each DSP input)

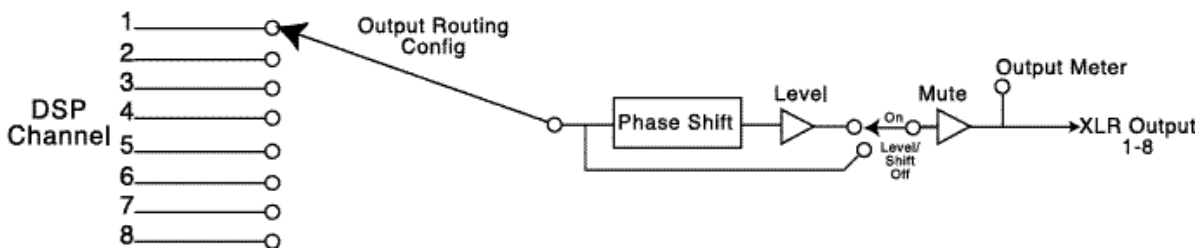
### Router Mode (1-4)



### Mixer Mode (M)



OUTPUT DIAGRAM (repeat for each XLR OUTPUT)



## A.10 "Pinking" A Room

To optimize sound performance in a live application, you may wish to "Pink" a room with the Real Time Analyzer available in the 480 and 480R DriveRack™ units. Pink Noise is defined as equal loudness at all frequencies. Pinking a room gives you a good starting point for fine-tuning the room to your desired requirements. The built-in pink noise generator (along with the built-in RTA), will help provide an accurate reading of the outputs of your speakers. Although the 481 and 482 do not have an LCD, they also include an RTA module, which can be accessed and viewed through the GUI interface. The recommended procedure for "pinking" a room using the 480 or 481 DriveRack™ is as follows.

- Connect a measurement microphone (omni-directional with flat response) to input 3 or 4 of the 480, or the RTA input of the 480R.
- Connect a measurement microphone (omni-directional with flat response) to input 3 or 4 of the 480, or the RTA input of the 480R.
- On page seven of the Utility menu, make desired adjustments to the Mic pre set-up.
- From program mode, use either the OTHER or PARAMETER 2 and 3 buttons to move to the inputs which are sending signal to your speakers.
- Once you have reached the desired inputs, use the PREV PG or NEXT PG buttons to move to page 2 of the input section.
- Use the PARAMETER 1 knob to activate the pink noise generator and use the PARAMETER 2 knob to set the desired noise level.
- Using a program that utilizes an RTA, press the RTA button and use the PARAMETER 1 knob to select the Input channel which uses the RTA mic (either 3 or 4).
- Once the input has been selected, the RTA display should be displaying an accurate reading of the pink noise being produced by the loudspeakers.
- Take notice where the frequency spectrum is either boosted or cut.
- At this point, you simply toggle between the graphic EQ and the RTA, while adjusting the graphic EQ to compensate for the boosts or cuts in the frequency spectrum.
- The RTA will display the response of the system as changes are made.
- At this point you will have completed the process of pinking the room and now you can fine-tune your system to your desired requirements.

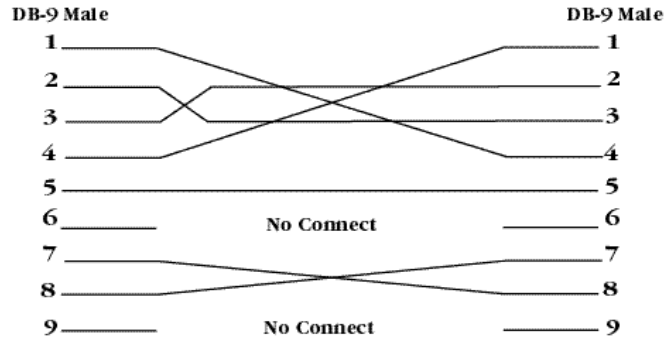
## A.11 Wire Diagrams

**Cable Specification:** Cat 5 Cable - 4-Twisted Pairs of 24 AWG wire

### Pin Configuration

DB-9 Male		DB-9 Male	RJ-45 (8-Position)		RJ-45 (8-Position)
1	White/Orange	1	1	White/Orange	1
2	Orange	2	2	Orange	2
3	White/Green	3	3	White/Green	3
4	Green	4	4	Green	4
5	White/Blue	5	5	White/Blue	5
6	Blue	6	6	Blue	6
7	White/Brown	7	7	White/Brown	7
8	Brown	8	8	Brown	8
9	No Connection	9			

### Cable to PC - Standard NUL modem Cable



**Note:** For using remote control cables longer than 250 feet, use the following wire configuration

1	20 AWG	1
2	20 AWG	2
3	24 AWG	3
4	24 AWG	4
5	24 AWG	5
6	24 AWG	6
7	20 AWG	7
8	20 AWG	8





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