

Operating Manual

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# Programmable Parametric Equalizer

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MODEL 764A and 764A/SL

**PRELIMINARY**

**orban<sup>®</sup>**

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# Orban 764A and 764A/SL

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## Programmable Parametric Equalizer

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### Operating Manual

| page | contents  |
|------|---|
| 1-1  | <b>Section 1: Introduction</b><br>Orban Programmable Parametric Equalizer<br>Registration, Warranty, Feedback   |
| 2-1  | <b>Section 2: Installation</b><br>Installation of 764A<br>Installation of 764A/SL Slave Unit  |
| 3-1  | <b>Section 3: Operation</b><br>764A Controls and Displays<br>Using the 764A - General Considerations<br>Remote Control, Midi Interface<br>Specific Applications<br>Preset Log |
| 4-1  | <b>Section 4: Maintenance</b><br>Routine Maintenance<br>Getting Inside the Chassis<br>Performance Evaluation, Alignment   |
| 5-1  | <b>Section 5: Troubleshooting</b><br>Problems and Possible Causes<br>Diagnostic Procedures<br>Components: Fault Diagnosis, Replacement<br>Technical Support, Factory Service  |
| 6-1  | <b>Section 6: Technical Data</b><br>Specifications<br>Circuit Description<br>Parts List, Schematics, Assembly Drawings<br>Abbreviations                                       |

# Section 1

# Introduction

page contents

---

|     |  |
|-----|--|
| 1-3 | Orban 764A Programmable Parametric Equalizer |
| 1-2 | Fig. 1-1: Front and Rear Panels              |
| 1-5 | Applications                                 |
| 1-5 | Security                                     |
| 1-6 | Registration, Warranty, Feedback             |

764A

764A/SL

Fig. 1-1: Front and Rear Panels

## Orban 764A Programmable Parametric Equalizer

The Orban 764A Programmable Parametric Equalizer provides superior equalization in a fully-programmable package. Its flexibility and efficiency provide all the equalization you need to precisely define the sound of all audio tracks and instruments — and, when you've got the equalization you want, the Programmable Parametric Equalizer remembers the control settings so you can produce the same sound later, with the push of a button.

Optional 764A/SL Slave units provide additional programmable parametric equalization.

764A Programmable Parametric Equalizer features include:

- Four-band parametric EQ with variable frequency, bandwidth, and boost/cut for precision control.
- Continuously tunable 18dB/octave high-pass filters and 12dB/octave proprietary Automatic Sliding Besselworth™ low-pass filters that provide full flexibility while retaining maximum musicality.
- Instantaneous access to 99 user-programmed control setups.
- Input attenuator which can be used as an automated fader or mute.
- Parameters adjusted with rotary encoders for analog style operation.
- Digital display of current control settings.
- Noise and distortion specs significantly better than 16-bit digital.
- Up to 99 channels of equalization which can be controlled from one master unit.
- Memory protected by internal back-up battery.
- Security code to lock programming controls and prevent tampering.
- Optional MIDI, RS-232, or RS-422 interface.

## Specific Applications

This section provides specific instructions and suggestions for using the 764A in broadcast mic processing, multi-track recording and post-production, sound systems, and video and film post-production. We recommend that anyone involved in pro audio read all of the following.

### **Broadcast Mic Processing**

Nearly any voice can be made more appealing by the judicious use of equalization. Each voice at your station can be assigned a permanent set-up for each mic/studio combination for instant recall just before the voice airs. The Programmable Parametric Equalizer gives you an important competitive edge by enabling you to get the sound you want quickly and consistently.

It can also dramatically improve the quality of phone line feeds for talk shows and remotes by improving frequency response.

### **Multi-Track Recording, Post-Production**

The 764A can increase efficiency and result in significant savings of time in recording and production facilities. You can conveniently store the 'eq' for particular special effects or instruments in memory so that less time will be spent on tuning equalizers and more time can be devoted to getting better creative results.

The producer who moves from studio to studio knows that the final product can vary tremendously. The Programmable Parametric Equalizer eliminates some of the uncertainty and variation in getting that special EQ. The professional artist can note the settings and the particular mic used for an especially satisfying session, and then use these as a reasonable starting point for processing when working in other studios or at live venues.

The Programmable Parametric Equalizer can also be used to create a complete automation system with or without the use of a computer. With one equalizer used at the insert point of each channel of the mixing console, all EQ and level settings can be recalled at any time during mix-down. This greatly simplifies complex mixing techniques and allows for repeatable passes.

### **Installed Sound Systems and Live PA**

The 764A is a versatile sound reinforcement equalizer that can be used as a broadband equalizer and/or notch filter. It gives you the flexibility you need to deal with room resonance problems — without creating troublesome artifacts. Its constant-Q design minimizes phase shift, noise build-up, and ringing. High and low-pass filters allow shaping of the passband so that power is not wasted feeding the drivers signals they can't reproduce.

## Video and film post-production

The 764A is a versatile dialog and scoring equalizer. Its notching and bandpass filtering capabilities facilitate suppression of unwanted sounds, like air-conditioner rumble, camera whine, and other intrusions. The 764A's fine-tuning capability enables the mixer to obtain the best possible sound from difficult or poorly-recorded location recordings. Several channels of 764A equalization can be used to fatten-up or enrich dialog, music, and effects for maximum punch. Flexible high- and low-pass filters effectively remove noise outside the desired bandpass.

The programmability of the 764A allows for difficult EQ settings to be stored in memory. These settings can then be used as a starting point when a similar EQ correction or effect is required, saving a lot of time and ensuring proper results.

The 764A can also be used to equalize the motion picture monitoring environment by adjusting the B-chain in the re-recording theater to the studio's accepted acoustic response standard. The music scoring stage monitoring system can be similarly adjusted.

## Security

Access to the 764A's audio processing controls can be restricted to authorized users with a programmable security code. When the unit is locked, only those controls which recall and compare preset control settings, and unlock controls will function.

If remote control and/or the optional MIDI, RS-232 or RS-422 interfaces are installed, the 764A (and 764A/SL's) can be controlled externally even when the front-panel controls are locked.

In situations where it is desirable to limit access to *all* front-panel controls, an optional acrylic security cover can be installed. This arrangement might be appropriate, for example, when the 764A is being controlled entirely by remote control or through the optional serial interface. See page 3-19 for more information.



## Registration, Warranty, Feedback

### Registration Card

There are two good reasons for returning the Registration Card:

- 1) It enables us to inform you of new applications, performance improvements, and service aids that are developed, and
- 2) It helps us respond promptly to claims under warranty without having to request a copy of your bill of sale or other proof of purchase.

Please fill in the Registration Card and send it to us today. If it is lost (or you have purchased this unit used), please photocopy the duplicate below, fill it in, and send it to Orban at the address on the inside of the front cover.

Model # \_\_\_\_\_ Purchase Date \_\_\_\_\_ Serial # \_\_\_\_\_

Your name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_ Call Letters \_\_\_\_\_

Street \_\_\_\_\_ Telephone \_\_\_\_\_

City, State, Mail Code (Zip), Country \_\_\_\_\_

Purchased from \_\_\_\_\_ City \_\_\_\_\_

Nature of your product application \_\_\_\_\_

How did you hear about this product? \_\_\_\_\_

Comments \_\_\_\_\_

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Which magazines do you find most useful in your job?

|  |   |   |                                       |
|--|---|---|---------------------------------------|
| <input type="checkbox"/> BM/E          | <input type="checkbox"/> Broadcasting           | <input type="checkbox"/> Broadcast Engineering    | <input type="checkbox"/> Millimeter   |
| <input type="checkbox"/> The Mix       | <input type="checkbox"/> Pro Sound News         | <input type="checkbox"/> Radio & Records          | <input type="checkbox"/> Radio World  |
| <input type="checkbox"/> RE/P          | <input type="checkbox"/> Sound & Communications | <input type="checkbox"/> Sound & Video Contractor | <input type="checkbox"/> TV Broadcast |
| <input type="checkbox"/> TV Technology | <input type="checkbox"/> Others: _____          |   |                                       |

95101-000-08 8/89

### Warranty

The warranty, which can be enjoyed only by the first end-user of record, is stated on the separate Warranty Certificate packed with this manual. Save it for future reference. See page 5-7 for information about factory service.

### User Feedback Form

We are very interested in your comments about this product. Your suggestions for improvements to the product or the manual will be carefully reviewed. Use the postpaid User Feedback Form in the back of this manual — or write us at the address on the inside of the front cover. Thank you.

# Section 2

# Installation

| page | contents   |
|------|--|
| 2-2  | Installation of 764A                             |
| 2-3  | Fig. 2-1: Option Jumper                          |
| 2-5  | Fig. 2-2: AC Power Cord Color Code               |
| 2-7  | Audio Connections                                |
| 2-8  | Fig. 2-3: Input Level Strapping                  |
| 2-8  | Fig. 2-4: Some Possible Connection Schemes       |
| 2-10 | Grounding  |
| 2-12 | Installation of Multiple 764A or 764A/SL Units * |

\* Not included in preliminary manual.

## CAUTION

The installation and servicing instructions in this manual are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

## Installation of 764A

Allow about 15 minutes for installation.

Installation consists of unpacking the 764A, mounting it in a rack (if desired), and connecting audio and power. In addition, input levels can be changed.

### WARNING

This equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used as directed by this manual, it may cause interference to radio communications. This equipment complies with the limits for a Class A computing device, as specified by FCC Rules, Part 15, Subpart J, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. If it does, the user will be required to eliminate the interference at the user's expense.

### 1) Unpack and inspect.

If obvious physical damage is noted, contact the carrier immediately to make a damage claim.

If you should ever have to ship the 764A (e.g., for servicing), it is best to ship it in the original packing materials since these have been carefully designed to protect the unit. Therefore, make a mental note of how the unit is packed and *save all packing materials*.

|                           |   |                      |
|---------------------------|---|----------------------|
| Packed with the 764A are: | 1 | Power cord           |
|                           | 1 | Warranty Certificate |
|                           | 1 | Registration Card    |
|                           | 1 | Operating Manual     |

The diagram, which is missing from the page, would illustrate the location and configuration of Option Jumper A on the analog circuit board of the 764A unit.

Fig. 2-1: Option Jumper

## 2) Change input levels (optional)

*[Skip this step unless you will be feeding the 764A a -10dBV signal.]*

To change input levels, you need to move option jumper A, located on the analog board inside the 764A unit. First remove the 764A's top cover, Next, remove the ten screws that hold the cover in place, then lift it off. When replacing the cover, replace all ten screws snugly (but be careful not to strip the threads by fastening the screws too tightly).

### A Change input attenuation level. (optional)

As shipped, the 764A is configured to accommodate an input signal level of +4dBu. If you are feeding the 764A a signal at -10dBV, move jumper A on the analog circuit board to the -10dBV position (see Fig. 2-1).

**3) Mount the 764A in a rack.** (optional)

The 764A requires two standard rack units (3.5 inches, 8.9 cm).

For best EMI rejection, there should be a good ground connection between the rack and the 764A chassis.

Mounting the unit directly over large heat-producing devices (such as a vacuum-tube power amplifier) may shorten component life and is not recommended. The ambient temperature should not exceed 113°F (45°C) when equipment is powered.

**4) Connect audio inputs and outputs.**

See the connection and grounding information beginning on page 2-7.

**5) Connect remote control.** (optional)

The UP/DOWN functions to recall presets can be controlled by an external remote control system through the REMOTE terminals on the rear panel. Momentarily ground the appropriate terminal to activate the function.

The 764A can also be remotely controlled through the optional MIDI (RET-054), RS-422, (RET-056) or RS-232 (RET-055) interface. See page 3-19 for more information.

**6) Connect power.**

The 764A is shipped ready for 115-volt, 50/60Hz operation — unless a label on the power cord indicates otherwise. If you change the setting of the VOLTAGE SELECTOR switch, be sure to also change the fuse.

Use a ½-amp 3AG 250V Slo-Blo fuse for 115-volt operation; use a ¼-amp 3AG 250V Slo-Blo fuse for 230-volt operation.

- Connect the 764A's power cord to an appropriate AC power source.

The power cord is terminated in a 'U-Ground' plug (USA standard). The green/yellow (or green) wire from the long prong is connected directly to the 764A chassis. If it becomes necessary to lift this ground to suppress ground loops, do so with a three-prong to two-prong adapter plug, rather than by damaging the power plug. But you should *not* defeat the ground unless absolutely necessary, because it eliminates the intrinsic safety feature of the three-wire system.

**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.



To check that all of the connections have been made correctly, press QUERY. Turn the left most rotary encoder to scroll the display through the available channels of EQ. The highest physical EQUALIZER NUMBER should be equal to the total number of EQ channels available.

**8) Complete the Registration Card and return it to Orban.**  
(please)

The Registration Card enables us to inform you of new applications, performance improvements, and service aids which may be developed, and it helps us respond promptly to claims under warranty without having to request a copy of your bill of sale or other proof of purchase. Please fill in the Registration Card and send it to us today. (If it is lost, use the duplicate on page 1-6.)

## Audio Connections

### Cable:

We recommend using **two-conductor shielded cable** (such as Belden 8451 or equivalent), because signal current flows through the two conductors only. The shield does not carry signal, is used *only* for shielding, and is ordinarily connected to ground at one end only.

Because use of single-conductor cables virtually eliminates any possibility of carefully controlling the system grounding scheme, it is **NOT RECOMMENDED!** Even so, it often does work adequately.

Sometimes, particularly if you are using the 764A with musical instruments or home-type equipment, single-conductor shielded cable may be the only practical alternative. In this case, connect the inner conductors of the shielded cables to the (+) sides of the 764A inputs and outputs. Connect the shield of the 764A *input* cable to the (-) input, and connect the shield of the 764A *output* cable to the 764A's (-) output terminal on the rear-panel barrier strip. Connect both LINE INPUT (-) and OUTPUT (-) terminals to the corresponding ( $\perp$ ) terminal.

### Connectors:

- **Input and output connectors** are XLR-type in parallel with barrier strip terminals (with #5 screws).

### Levels:

- **Nominal input level** is +4dBu. The absolute overload point is +20dBu (or +6dBu if the input level jumper has been moved).
- Some '**semi-professional**' and almost all **consumer equipment** uses a nominal operating level of -10dBV (-7.8dBu). The 764A's input can be strapped for this level. To do so, open the top cover, and move jumper A according to Fig. 2-3. If the 764A is used in a -10dBV system, it might be wise to place a 12dB-loss pad at the 764A's output to avoid overloading subsequent circuitry, since the 764A will otherwise put out peak levels as high as +21dBu.

### Input Configuration:

See Fig. 2-4 for some examples.

- The **electronically-balanced input** of each channel is compatible with most professional and semi-professional sound equipment, balanced or unbalanced, with a source impedance of 600 ohms or less. If the source impedance is greater (as in some vacuum-tube audiophile preamps), remove capacitor C2, and connect the hot side of the driving equipment's outputs to the 764A's (+) inputs.



Fig. 2-3: Input Level Strapping

Fig. 2-4: Some Possible Connection Schemes

## Audio Connections (continued)

### Audio Input:

- Input connections are the same whether the driving source is balanced or unbalanced.
- Do not connect the cable shield — it should be connected at the source end only. Connect the red (or white) wire to the appropriate (+) input terminal, and the black wire to the corresponding (-) input terminal.
- If the output of another unit is unbalanced and does not have separate ( $\perp$ ) and (-) output terminals, connect both the shield and the black wire to the common (-) or ground terminal. It is rarely necessary to balance an unbalanced output with a transformer. As long as it is feeding a balanced input, the system will work correctly.

(The only situation where the addition of an input transformer might be warranted is one in which the source equipment is powered from a separate mains transformer and power ground. Terminate the transformer's secondary with a 20K resistor.)

### Output Configuration:

See Fig. 2-4 for some examples.

- The **electronically-balanced and floating output** simulates a true transformer output. The *source* impedance is 30 ohms. There is a 1000pF capacitor between each (+) and (-) output to the chassis for RFI suppression. The output is capable of driving loads of 600 ohms or higher. Maximum output level is +20dBm into 600 ohms.
- If an **unbalanced output** is required (to drive unbalanced inputs of other equipment), it should be taken between the (+) and (-) outputs. No special precautions are required even though one side of the output is grounded. Connect the (-) output terminal to ( $\perp$ ).

### Audio Output:

- Use two-conductor shielded cable (Belden 8451, or equivalent).
- At the 764A's output (and at the output of other equipment in the system), connect the cable's shield to the ( $\perp$ ) terminal for that channel (pin 1 on XLR connectors). Connect the red (or white) wire to the channel's (+) terminal (pin 2 on XLR connectors), and the black wire to the channel's (-) terminal (pin 3 on XLR connectors).
- It may be necessary to isolate the 764A with output transformers when operating next to a transmitter, when driving more than 100 feet (30 meters) of cable, when the 764A's ground' potential differs from that of driven equipment by more than 2 volts, or in other difficult situations.

## Grounding

Very often, grounding is approached in a 'hit or miss' manner. But with care it is possible to wire an audio studio so that it is free from ground loops (which induce hum and can cause oscillation) and provides maximum protection from power faults.

In an ideal system:

- All units in the system should have *balanced inputs*. In a modern system with low output impedances and high input impedances, a balanced input will provide common-mode rejection and prevent ground loops — regardless of whether it is driven from a balanced or unbalanced source. (The 764A has balanced inputs.)
- All equipment *circuit grounds* should be connected to each other; all equipment *chassis grounds* should be connected together.
- *Cable shields* should be connected at one end only — preferably the source (output) end.

### Power Ground:

- Ground the 764A chassis through the third wire in the power cord. Proper grounding techniques *never* leave equipment chassis unconnected to power (earth) ground. *A proper power ground is essential to safe operation.* Lifting a chassis from power ground creates a potential safety hazard.

### Circuit Ground:

To maintain the same potential in all equipment, the circuit (audio) grounds should be connected together:

- *In a small system*, the connection through power ground (via the power cord's third wire) will suffice. Connect the 764A's circuit ground ( $\perp$ ) terminal to its chassis ground ( $\text{///}$ ) terminal. Also connect the circuit and chassis grounds of other equipment.
- *In larger systems*, it is common to establish an isolated circuit ground system that is insulated from the power ground except at one point (usually the studio power distribution panel). In such a system, disconnect the 764A's circuit ground ( $\perp$ ) terminal from its chassis ground ( $\text{///}$ ) terminal, then connect the 764A's circuit ground ( $\perp$ ) terminal to the isolated circuit ground system.

## Grounding (continued)

### Difficult Situations:

Because it is not always possible to determine if the equipment driving or being driven by the 764A has its circuit ground internally connected to its chassis ground (which is always connected to the ground prong of the AC power cord, if present), and because the use of the AC power ground often introduces noise or other imperfections such as RFI, hum, clicks, and buzzes, the wiring techniques in Fig. 2-4 are not universally applicable.

If you follow Fig. 2-4 and hum or noise appears, don't be afraid to experiment. If the noise sounds like a low-level crackling buzz, then probably there isn't *enough* grounding. Try connecting the (-) input of the 764A to a chassis ground terminal on the barrier strip and see if the buzz goes away. You can also try strapping or removing the strap between the the 764A chassis and circuit grounds.

A ground loop usually causes a smooth, steady hum rather than a crackly buzz. If you have a ground loop, you can often break it by *disconnecting* the jumper between circuit and chassis grounds on the 764A's rear-panel barrier strip. In either case, think carefully about what is going on, and keep in mind the general principle: one and *only one* circuit ground path should exist between each piece of equipment! (Bear in mind that the circuit grounds of the 764A and the 764A/SL slave unit are connected through the interconnect cable, and could conceivably introduce a ground loop if you do not take this connection into account in planning your wiring.)

When a single-conductor shielded cable is used for audio connections, the shield will ordinarily receive chassis ground from the external equipment which it is connecting to the output of the 764A. The chassis ground/circuit ground jumper on the rear barrier strip of the 764A should be left in whichever configuration gives minimum hum or buzz. To minimize hum or buzz, it may be necessary to jumper one or more shields to chassis ground, and/or to jumper the 764A's (-) output to chassis ground.

**Installation of Multiple 764A or 764A/SL Units**

PROCEDURE NOT AVAILABLE FOR PRELIMINARY MANUAL

# Section 3

# Operation

| page | contents  |
|------|---|
| 3-2  | 764A Controls and Displays                          |
| 3-6  | Basic Operation                                     |
| 3-6  | EQ — General Information                            |
| 3-9  | Fig. 3-1: Typical Rolloff Curves, High-pass Filters |
| 3-9  | Fig. 3-2: Typical Rolloff Curves, Low-pass Filters  |
| 3-10 | Memory — General Information                        |
| 3-10 | Using Single or Multiple 764A and 764A/SL Units     |
| 3-11 | Selecting a Channel To Control                      |
| 3-11 | Modifying Equalization                              |
| 3-12 | Memory  |
| 3-14 | Renaming Channels                                   |
| 3-15 | Grouping  |
| 3-17 | Query   |
| 3-18 | Restricting Access to Controls                      |
| 3-19 | External Control - Remote, MIDI, RS 232, RS 422     |
| 3-25 | Quick Reference Chart                               |
| 3-26 | Sample Preset Log                                   |

## 764A Controls and Displays

### General notes:

- Display messages that begin with  $\bar{E}$  are error messages — see page 5-2.
- A flashing decimal point on the far right numeric display indicates that the internal back-up battery level of the master unit is low — see page 4-2. For 764A/SL units, low battery levels are indicated when the amber ACTIVE LED labeled A flashes.

Also, each time you power on the 764A, it will check its internal battery status, and the battery status of any 764A/SL unit connected to it. If a battery is low, the display window will read  $\bar{b} \bar{b} \bar{b} \bar{b} \bar{b} \bar{b} \bar{b} \bar{b}$  followed by an EQUALIZER NUMBER representing a specific unit. When you press any switch, the display window will return to normal, unless another battery is low. When there are multiple units with a low battery, they are identified in numerical order. For example, the master unit with a low battery would always be indicated first, followed by the closest slave unit with a low battery.

- Panel display brightness can be adjusted with a BRIGHT/DIM button on the front panel. There are two levels available, bright and dim. The display will cycle through these brightness levels each time the button is pushed.

**Specific instructions on these pages:**

|              |                  |
|--------------|------------------|
| EQ           | 3-7              |
| BANDWIDTH    | 3-11             |
| CENTER FREQ  | 3-11             |
| BOOST/CUT    | 3-12             |
| CUT-OFF FREQ | 3-12             |
| INPUT GAIN   | 3-12             |
| RECALL       | 3-12             |
| STORE        | 3-12             |
| COMPARE      | 3-12             |
| CHANNEL      | 3-10, 3-14       |
| GROUP        | 3-15             |
| QUERY        | 3-17             |
| OPTIONS      | 3-18, 3-20, 3-21 |



## EQ Section

**BANDWIDTH/CENTER/ FREQUENCY/BOOST CUT** windows display the settings for one of four user-selected EQ bands (LF, LMF, HMF, HF). The rotary encoder below each window is used to change the corresponding parameter. The legend is in use when any EQ band key is pressed.

**HIGHPASS CUTOFF FREQUENCY/LOWPASS CUTOFF FREQUENCY/INPUT GAIN** windows display the cutoff frequency settings in Hz or kHz and the input gain in decibels (from 0 to -90dB). The rotary encoder below each window is used to change the corresponding parameter. An LED at the end of the the **HIGHPASS CUTOFF FREQ/LOWPASS CUTOFF FREQ/INPUT GAIN** legend indicates this legend is in use and represented in the display windows. The LED is activated when either band-pass key, or the **ATT** key, are pressed.

**EQUALIZER NUMBER/CHANNEL NUMBER/GROUP NUMBER** windows respectively display the equalizer board in use, it's user-assigned channel number, and the group status of the equalizer. The rotary encoder below each window is used to view the corresponding parameter. An LED at the end of the the **EQUALIZER NUMBER/CHANNEL NUMBER/GROUP NUMBER** legend indicates this legend is in use and represented in the display windows. The LED is activated when the **QUERY/SELECT** key is pressed.

**Rotary encoders** adjust various parameters. The legend heading and display window above each rotary encoder define the parameters which can be adjusted. Adjustments will only affect the audio when a band or filter key is active.

**EQ Band Control keys** enable or bypass the corresponding EQ circuitry and place the band parameters in the corresponding display window. Includes four keys and corresponding bands: (LF IN) LOW-BAND, (LMF IN) LOW MID-BAND, (HMF IN) HIGH MID-BAND, or (HF IN) HIGH-BAND. When a band key is pressed, the red LED inside of the key is lit to indicate which band is selected. A green LED next to each key indicates whether the EQ band is active or bypassed. Repeatedly pressing the key will toggle the band IN or OUT.

**Filter Control keys** enable or bypass filter circuitry and place the **HIGHPASS (HP IN)** or **LOWPASS (LP IN) CUTOFF FREQUENCY** settings in the corresponding display window. When a key is pressed, the **HIGHPASS CUTOFF FREQ/LOWPASS CUTOFF FREQ/INPUT GAIN** ledger is selected. A green LED next to each key indicates whether the filter is active or bypassed. Repeatedly pressing the key will toggle the band IN or OUT.

**ATT IN** key enables or bypasses **INPUT GAIN** and places the **INPUT GAIN** setting in the corresponding window. When the key is pressed, the **HIGHPASS CUTOFF FREQ/LOWPASS CUTOFF FREQ/INPUT GAIN** ledger is selected. A green LED next to the key indicates whether the gain is active or bypassed. Repeatedly pressing the key will toggle the **ATTenuator IN** or **OUT**.

**BYP** key causes internal EQ circuitry to be bypassed. Pressing the **BYP** key lights the amber LED next to the key to indicate all the unit's bands and filters are bypassed. The EQ parameters can be adjusted with the unit bypassed, but the audio will not be affected by any adjustments until the **BYP** key is pressed again and the amber light goes off. The **INPUT ATTENUATOR** remains active.

**DIM/BRIGHT button** adjusts front panel display brightness. There are two levels available, bright and dim. The display will cycle through these brightness levels each time the button is pushed.

**CLIP A and CLIP B LED lamps** light when the the output of any amplifier in the corresponding channel is within 1dB of its clipping level. To eliminate the overload, reduce the input level or turn down thew appropriate INPUT GAIN. Channel A represents equalizer board 1 and Channel B represents equalizer board 2.

## Memory Section

**Single Window (located on the right side of the front panel)** displays a PRESET NUMBER or OPTIONS DATA ENTRY corresponding to current memory messages (shown in the three display windows located on the left side of the front panel. The single window also includes a PRESET CHANGES NOT STORED lamp to indicate the latest EQ modification has not been saved. This appears as a dot preceding the current preset number.

**Three Windows (located on the left side of the front panel)** display memory messages and parameters in response to memory control keys (e.g. use the OPTIONS and SCROLL keys to show grouping or change channel control messages). For a list of memory messages (menus and submenus), see below.

**QUERY/SELECT key** places the current EQUALIZER NUMBER/CHANNEL NUMBER/GROUP NUMBER in the corresponding window.

**COMPARE key** toggles between any preset equalization curves and your newest updates, or between any other preset curves for that equalizer.

**STORE key** stores current EQ settings, PRESET NUMBERS, GROUP NUMBERS, and CHANNEL NUMBERS into memory for later retrieval. Up to 99 PRESETs can be stored.

**RECALL key** accesses a PRESET NUMBER. Each PRESET contains information for the total number of internal equalizers (1 or 2) and any slaves connected.

**SELECT CHANNEL key** designates a channel number (equalizer board) whose EQ you intend to modify.

**OPTIONS key** accesses optional menu and submenu commands (e.g.  $c \ h \ b \ c \ h \ n \ n \ n \ n$ ).

**Numeric keypad** provides access to user-selectable numeric values for response to memory control keys and messages.

**SCROLL keys** provide access to user-selectable numeric values for response to memory control keys and messages, as well as access to available menus and submenus.

**YES and NO keys** respond to memory control keys and messages. Press YES to confirm a numerical value, or a memory control command, menu, or submenu. Repeatedly pressing NO exits the current memory control command and returns the latest EQ information in all four display windows.

**Basic Operation (For Quick Use)**

**EQ — General Information**

**Control Setting Ranges**

| Control:          | Range:           |               |
|-------------------|------------------|---------------|
| INPUT GAIN        | 0 to -90dB       |               |
| BOOST/CUT         | +16 to -40dB     |               |
| CENTER FREQUENCY* | 20 to 625Hz      | low band      |
|                   | 50 to 2.5kHz     | low-mid band  |
|                   | 120 to 10.0kHz   | high-mid band |
|                   | 240 to 20.0kHz   | high band     |
| BANDWIDTH         | 0.1 to 5 octaves |               |

\* The coarse center frequency scale is logarithmic, with twelve steps per octave. The fine center frequency scale is linear, with 2.5Hz steps for the low band, 10Hz steps for the low-middle band, 40Hz steps for the high-middle band, and 80Hz steps for the high band. Note that the displayed frequency is rounded off as necessary.

**Four-Band Parametric Equalizer**

The 764A's equalization circuitry enables you to individually boost or attenuate the low, low-middle, high-middle, or high frequency components of the audio. The bandwidth (Q) and center frequency of each of these four bands is adjustable.

The low-pass and high-pass filters allow for reducing the frequencies at the high and low extremes of the audio spectrum to eliminate unwanted effects these frequencies can create such as damaging speaker drivers with frequency components beyond their rated frequency extremes or overloading audio equipment following the 764A.

Equalization is useful for correcting deficiencies in the source medium or in room acoustics. It can also be used to create special effects and to acoustically imitate the ambiance of a particular room or environment.

**Tunable High- and Low-pass Filters**

The 764A's tunable high- and low-pass filters are located before the corresponding channel's equalization circuitry. The low-pass filter is located after the corresponding high-pass filter.

The high-pass filters have third-order Butterworth rolloffs of 18dB/octave. The corner frequency can be adjusted throughout a range of 20-625Hz. Fig. 3-1 shows some typical rolloff curves.

The low-pass filters have second-order Automatic Sliding Besselworth™ rolloffs of 12dB/octave. The corner frequency can be adjusted throughout a range of 640Hz-20kHz. The rolloff characteristic changes smoothly from a Bessel-type rolloff to

a Butterworth-type rolloff as the corner frequency is increased (see Fig. 3-2). This approach gives a more natural sound at midrange frequencies, while allowing sharper rolloffs at high frequencies.

Fig. 3-1: Typical Rolloff Curves, High-pass Filters

Fig. 3-2: Typical Rolloff Curves, Low-pass Filters

## Memory — General Information

### Presets Defined

*[The information in this section is correct, but is being re-written to facilitate better understanding.]*

The 764A is shipped ready to support 2 channels of equalization. By adding 764A/SL Slave units, up to 99 channels of 764A equalization can be connected together to create a network of programmable equalization powerful enough to create a stand-alone automation system.

The 2 channels of EQ for each unit can be defined by sets of user-programmable EQ settings commonly called presets. There are 99 presets, represented by PRESET NUMBERS, to modify and store EQ information (See page 3-11 and 3-12). Each PRESET NUMBER actually contains information for both channels. For example, PRESET NUMBER 1 contains one EQ setting for channel 1 and another EQ setting for channel 2. The 764A (1 or 2 channels) and 764A/SL (2 channels) are shipped with their channels of equalization for each preset initially 'flat'.

Each channel of EQ is indicated by a fixed EQUALIZER NUMBER. Since each unit has two channels, or two internal equalizers, each unit usually has a fixed EQUALIZER 1 and EQUALIZER 2. However, if you use the 764A as a mono unit, it is considered one channel of EQ, called EQUALIZER 1.

Each channel of EQ is also labeled or identified by an assignable CHANNEL NUMBER. The CHANNEL NUMBER of each equalizer is initially the same as the EQUALIZER NUMBER, but can be changed to any number between 1 and 99. This enables the 764A's CHANNEL NUMBER to match the channel number of a multitrack tape recorder or mixing console. For example, if the source of the audio track driving EQUALIZER NUMBER 2 was channel 19 of the mixing console, EQUALIZER NUMBER 2 can be re-assigned to CHANNEL NUMBER 19.

## Using Single or Multiple 764A and 764A/SL Units

### Using 764A without Slave units

The initial CHANNEL NUMBER is defined by the fixed EQUALIZER NUMBERS of the single 764A unit — 1 and 2. Channel A is 1 and channel B is 2.

### Using 764A with 764A/SL Slave units

A single 764A is used as the master controller to each slave 764A/SL allowing for one central control panel. Communications between units is through MIDI or a serial bus. Each channel of equalization is automatically assigned an EQUALIZER NUMBER by the master 764A when the INITIALIZE function is executed from the SPECIAL submenu of the options menu (see page 2-5).

The initial CHANNEL NUMBER is defined by the fixed EQUALIZER NUMBERS of each 764A unit. These are numbered sequentially following the order that the

slave units are connected from the MASTER on the MIDI or serial bus. The master unit is assigned EQUALIZER NUMBERS 1 and 2, the slave connected directly to the master is EQUALIZER NUMBERS 3 and 4, etc. Channel A is odd and channel B is even.

## Selecting a Channel To Control

### To select a new CHANNEL NUMBER:

Press SELECT CHANNEL. The display will read  $\bar{E} \bar{A} \bar{L} \bar{I} \bar{Z} \bar{E} \bar{R} \bar{N} \bar{U} \bar{M} \bar{B} \bar{E} \bar{R} \bar{S}$ . The current channel will be displayed in the data display. Enter the desired CHANNEL NUMBER using the numeric keypad or SCROLL keys. Press ENTER.

If the CHANNEL NUMBER selected is not recognized, the single display will show  $\bar{E} \bar{R} \bar{R} \bar{O} \bar{R}$  when you press ENTER and hold it down. When you release the ENTER key, the three display windows will prompt you to select another CHANNEL NUMBER.

Once the new CHANNEL NUMBER has been entered, the unit will return to the equalizer programming mode.

## Modifying Equalization

**NOTE:** When the latest EQ modification has not been saved, the 'Preset Changes Not Stored' lamp lights. This appears in the upper left-hand corner of the present number window as a dot preceding the current preset number. **To save new modifications,** use the STORE function (See page 3-12).

### To turn on the equalization circuitry:

Repeatedly press the BYPASS key until the amber BYPass LED next to the key is off. This indicates the EQ and filter circuitry are in. Pressing BYPASS again will light the LED and only audio from the input attenuator will be passed to the output.

### To change the bandwidth of a band:

Select the band by pressing LF, LMF, HMF or HF. Repeatedly press the same key until the green IN light is lit; the current parameters of the selected band will then be displayed.

Turning the rotary encoder below the Bandwidth window will change the bandwidth.

### To change the center frequency of a band:

Select the band by pressing LF, LMF, HMF or HF. Repeatedly press the same key until the green IN light is lit; the current parameters of the selected band will then be displayed.



Turning the rotary encoder below the Center Frequency window will change the center frequency. There are 12 steps per octave.

The center frequency is shown in kHz if it has a decimal point, and in Hz if it does not.

If the boost/cut is set to -40dB, and bandwidth 0.1, the center frequency will change to its fine scale. This permits precise tuning for accurate notching capabilities.

### **To change the amount of boost or cut:**

Select a band by pressing LF, LMF, HMF, or HF. Repeatedly press the same key until the green IN light next to the band key is lit; the current boost (+) or cut (-) of the selected band will then be displayed, expressed in dB.

Turning the rotary encoder will vary the amount of boost/cut.

### **To change high- low-pass cutoff frequency:**

Press HP or LP. Repeatedly press the same key until the green IN light next to the band-pass key is lit; the current band-pass parameters will then be displayed.

Turning the rotary encoder below the selected band-pass window will change the band-pass cutoff frequency.

### **To change the input gain (attenuation):**

Press ATT. Repeatedly press the same key until the green IN light next to the ATT key is lit; the current input gain, as well as the current band-pass parameters, will then be displayed.

Turning the rotary encoder below the input gain window will change the input gain.

## **Memory**

Up to 99 sets of equalizer control settings, (each singularly called a PRESET), can be stored in memory for later retrieval (using the STORE and RECALL keys).

Current control settings can be quickly alternated with any preset to facilitate easy comparison using the COMPARE key.

All channels connected to the master 764A with one of the serial port options will change presets simultaneously.

### **To store the current settings:**

Press STORE; the current preset number will be displayed. If you want to store to a different preset number, enter the preset number desired to the numeric keypad or press SCROLL until the preset number you want is displayed. Press ENTER (or STORE).

Equalizer settings can be stored as presets 1 through 99.

**Be sure to write down the preset number** when you store a equalizer set-up. Include a note explaining how the preset is to be used. A sample log sheet is on page 3-26.

When you press ENTER, the control settings *previously* stored as that preset are temporarily saved in a special register numbered preset 00 (located after preset 99). This gives you one last chance to change your mind and retrieve them.

**To abort store** before finishing, press the NO key.

### **To recall a preset:**

Press RECALL; the most recently stored or recalled preset number will be displayed. If you want to recall a different preset, enter the preset number desired to the numeric keypad or press SCROLL until the number of the preset you want is displayed. Press ENTER (or RECALL).

Control settings can be recalled from presets 0 through 99. Preset 0, which can only be recalled, is an essentially 'flat' set-up of the controls.

Recalling preset 00 will retrieve the last EQ setting that was overwritten by the last STORE or RECALL function. Note that the preset number in the window will not change to 00.

**To abort recall**, press the NO key.

Presets can also be recalled by contact closure, or through the optional MIDI, RS-232, or RS-422 interfaces — see page 3-19.

**To compare a preset with the current control settings:**

Press COMPARE. Enter the preset number desired to the numeric keypad or press SCROLL until the number of the preset you want to compare with the front panel is displayed. Press ENTER (or COMPARE).

Repeatedly press COMPARE to alternate between current and preset settings. When the COMPARE key is lit, the preset settings are active; when the key light is off, the front panel settings are active.

To compare two presets, first recall one of the presets to the front panel, then select the preset you want to compare it with as above.

- **To abort compare**, press COMPARE again (or the NO key).

NOTE: When the latest preset modification has not been saved, the 'Preset Changes Not Stored' lamp lights. This appears in the upper left-hand corner of the present number window as a dot preceding the current preset number.

## Renaming Channels

**To assign a CHANNEL NUMBER to a physical equalizer:**

Press OPTIONS; Press SCROLL until the display reads `EQ 00 00`.

Press ENTER. The display will read `EQ 00 00`. Enter the desired physical EQUALIZER NUMBER using the numeric keypad or SCROLL keys. Press ENTER.

The next display will prompt you to select the CHANNEL NUMBER you wish to assign to the EQ selected and will read `EQ 00 00`. Enter the desired CHANNEL NUMBER using the numeric keypad or SCROLL keys. Press ENTER.

If a CHANNEL NUMBER selected is already in use, the display will show the physical EQUALIZER NUMBER currently using the CHANNEL NUMBER selected and will ask if the

CHANNEL NUMBER should be removed from this physical EQUALIZER NUMBER and re-assigned to the current physical EQUALIZER NUMBER. The display will alternately flash `EQ 00 00 xx`, where xx is the physical EQUALIZER NUMBER the channel selected is assigned to, and `EQ 00 00`. Pressing YES will remove the CHANNEL NUMBER from its original physical EQUALIZER NUMBER and assign it to the current physical EQUALIZER NUMBER. Pressing NO will remove the CHANNEL NUMBER from the display and will ask you to select a new CHANNEL NUMBER. A new selection for CHANNEL NUMBER can then be entered.

Once the new CHANNEL NUMBER has been entered, the next physical EQUALIZER NUMBER can be selected as above.

To exit the CHANGE CHANNEL mode, press OPTIONS. This will back down the options sub-menus. The OPTIONS key needs to be hit three more times to get back to the equalizer programming mode.

To save new modifications, use the STORE function (See page 3-12).

## Grouping

Two or more equalizer channels can be controlled simultaneously by one 764A. This is achieved with the grouping function. When two or more channels are grouped together, all of the channels in that group will assume identical EQ and filter settings. When one channel in a group is modified, all channels of that group will change settings simultaneously. This function can be used to create stereo pairs.

To create a group, a root channel must be selected. This is simply the first channel chosen. All subsequent channels added to the group will change their current settings to the settings of the root channel.

More than one group may exist at a time. An example is ten EQ channels used as five stereo pairs. This would require 5 groups.

NOTE: When the latest GROUPING modification has not been saved, the 'Preset Changes Not Stored' lamp lights. This appears in the upper left-hand corner of the present number window as a dot preceding the current preset number.

### To create a new group:

Press OPTIONS; Press SCROLL until the display reads `0 0 0 0 0 0 . 0 0`. Press ENTER. The display will read `0 0 0 0 0 0 . 0 0`. Press ENTER. The next GROUP NUMBER available will be displayed for 2 seconds.

The next display will prompt you to select the first channel in the group and will read `0 0 0 0 0 0 . 0 0`. This will be the root channel. All of the subsequent channels added to the GROUP will have the same EQ and filter parameter settings as the root channel.

The SCROLL keys or numeric keypad can be used to select the desired channel. When the channel number is found, press ENTER. If the channel selected does not exist in the system, the display will show `- -` until the ENTER key is released. This indicates that the channel entered was not accepted and a new channel must to be selected.

The display will then request the next channel to be selected. Follow the same procedure used to enter the first channel in the group.

If there are no more available channels to be grouped, the unit will exit the CREATE GROUP mode to the GROUPING sub-menu.

When all of the channels desired are grouped together, exit the CREATE GROUP function by pressing OPTIONS or NO. This will back down the options sub-menus. The OPTIONS key needs to be hit two more times to get back to the equalizer programming mode.

To save new modifications, use the STORE function (See page 3-12).

### To delete a group:

Press OPTIONS; Press SCROLL until the display reads `0 0 0 0 0 0 . 0 0`. Press ENTER. Press SCROLL until the display reads `0 0 0 0 0 0 . 0 0`. Press ENTER. The display will read `0 0 0 0 0 0 . 0 0`. The current GROUP NUMBER will be displayed in the data display. A different GROUP NUMBER can be entered with the numeric keypad or the SCROLL keys.

After the correct GROUP NUMBER to be cancelled is entered press ENTER. If the GROUP NUMBER selected is not recognized, the display will show - - until the ENTER key is released. This indicates that the group number entered was not accepted and a new one must to be selected.

A confirmation is required before cancelling the group. The display at this time will read `cancel group`. Press YES to complete the cancellation. To abort the process press NO.

The display will then request the next GROUP NUMBER to be selected. If any groups remain, follow the same procedure used to cancel the first GROUP NUMBER in the group.

When all of the GROUPs desired are cancelled, exit the CANCEL GROUP function by pressing the OPTIONS key. This will back down the options sub-menus. The OPTIONS key needs to be hit two more times to get back to the equalizer programming mode.

**To save new modifications, use the STORE function (See page 3-12).**

**To Add to a group:**

Press OPTIONS; Press SCROLL until the display reads `group`. Press ENTER. Press SCROLL until the display will reads `add`. Press ENTER.

The display will read `enter group`. The current GROUP NUMBER will be displayed in the data display. A different GROUP NUMBER can be entered with the numeric keypad or the SCROLL keys. Select the desired GROUP NUMBER and press ENTER.

The next display will prompt you to select the first channel to be added to the group and will read `select channel`. As channels are added to a GROUP the channels will take on the same EQ and filter parameter settings as the channels that already exist in that group.

After the CHANNEL NUMBER to be added is entered press ENTER. If the CHANNEL NUMBER selected is not recognized, the display will show - - until the ENTER key is released. This indicates that the channel entered was not accepted and a new channel must to be selected.

If a CHANNEL selected is already part of an existing GROUP, the display will show the group number the channel selected is assigned to and will ask if the channel should be removed from this group and added to the new group. The display will alternately flash the message `group xx`, where xx is the group number the channel selected is assigned to, and `add to group`.

Pressing YES will remove the channel from its original group and add it to the current group selected. Pressing NO will remove the channel from the display and ask for a new channel to be selected.

If there are no more available channels to be added to a group, the unit will automatically exit the CREATE GROUP mode to the GROUPING sub-menu. The OPTIONS key needs to be hit two more times to get back to the equalizer programming mode.

**To save new modifications, use the STORE function (See page 3-12).**

**To delete from a group:**

Press **OPTIONS**; Press **SCROLL** until the display reads `GROUP NO.`. Press **ENTER**. Press **SCROLL** until the display reads `DELETE FROM GROUP`. Press **ENTER**.

The display will read `ENTER GROUP NO.`. The current **GROUP NUMBER** will be displayed in the data display. A different **GROUP NUMBER** can be entered with the numeric keypad or the **SCROLL** keys. Select the desired **GROUP NUMBER** and press **ENTER**.

The next display will prompt you to select the first channel to be deleted from the group and will read `DELETE CHANNEL NO.`

After the **CHANNEL NUMBER** to be deleted is entered, press **ENTER**. If the **CHANNEL NUMBER** selected is not recognized, the display will show `--` until the **ENTER** key is released. This indicates that the channel entered was not accepted and a new channel must to be selected.

A confirmation is required before deleting the channel. The display at this time will read `DELETE CHANNEL NO.?`. Press **YES** to complete the cancellation. To abort the process press **NO**.

The display will then request the next **CHANNEL NUMBER** to be selected. Follow the same procedure used to delete the first **CHANNEL NUMBER** in the group.

When all of the **CHANNEL NUMBERS** desired are deleted, exit the **DELETE FROM GROUP** function by pressing the **OPTIONS** key. This will back down the options sub-menus. The **OPTIONS** key needs to be hit two more times to get back to the equalizer programming mode.

**To save new modifications**, use the **STORE** function (See page 3-12).

**Query**

The **QUERY** function can review the status of the 764A's current set-up at any time. The physical **EQUALIZER NUMBER**, **CHANNEL NUMBER**, **GROUP NUMBER**, and **PRESET NUMBER** can be displayed simultaneously at any time.

Each **PRESET** consists of the EQ parameters stored in memory plus the **CHANNEL NUMBER** and **GROUP NUMBER** assigned to each equalizer.

Also use the **QUERY** function and the **SCROLL** keys or keypad change presets to show the entire system configuration for any **PRESET**. The **ENTER** key must be hit if the keypad is used. Use the rotary encoders to review the **CHANNEL NUMBER** and **GROUP NUMBER** of each equalizer for a given **PRESET**.

**To review 764A set-up status information:**

Press **QUERY**. The physical **EQUALIZER NUMBER**, **CHANNEL NUMBER** and **GROUP NUMBER** for the equalizer currently selected are shown in the display windows. The associated label is beneath each window. The **PRESET NUMBER** is shown in the **PRESET NUMBER** display.

To view the status of other equalizers, turn the rotary encoder below the window of the function you wish to review. For example, if EQUALIZER NUMBER 2 is displayed and you want to see the CHANNEL NUMBER and GROUP NUMBER for EQUALIZER NUMBER 3, turn the rotary encoder below the EQUALIZER NUMBER display window clock-wise. The same can be done for CHANNEL or GROUP NUMBER.

To review the system status for different preset numbers, use the keypad and ENTER or SCROLL keys to select the desired PRESET to review.

If ENTER is hit a second time, the preset and physical EQUALIZER NUMBER selected will become active.

Exit QUERY with a 10-second time-out, or by pressing QUERY.

## Restricting Access to Controls

Access to the 764A's audio processing controls can be restricted to authorized users with a 4-digit programmable security code. When the controls are locked, only the keys which recall and compare preset settings, unlock controls, and to review the EQ settings are available. Remote control through MIDI, RS-232, or RS-422 is permitted when the unit is locked.

### To lock controls:

Press OPTIONS. Press SCROLL until `EQC .01` is displayed. Press ENTER. Press SCROLL until `Loc out` is displayed. Press ENTER. The display will read `Ent Loc 00`.

Enter from the numeric keypad the first two digits of your security code, then press ENTER to enter those digits. Enter from the numeric keypad to display the second two digits of your security code, then press ENTER to enter those digits. `Loc 00` will be displayed to indicate the controls are now locked.

You may use any four-digit number for your security code. To abort Lock-out before entering the second pair of digits, press NO or OPTIONS key.

**Be sure to record the security code in a safe place.**

- `Loc 00` is displayed when a locked key is pressed.

### To unlock controls:

Press OPTIONS. `EQC .01` will be displayed. Press ENTER. `Loc out` will be displayed. Press ENTER. The display will read `Ent Loc 00`. Enter from the numeric keypad the first two digits of your security code, then press ENTER to enter those digits. Enter from the numeric keypad to display the second two digits of your security code, then press ENTER to enter those digits. The display will read `Loc off` to indicate the controls are now unlocked.

- If the security code is lost, all is not. Remove the 764A's top cover and press LOCKOUT RESET button S1 to unlock the controls. S1 is located on the digital circuit board about 3 inches (8 cm) behind the RECALL key.
- In situations where it is desirable to restrict access to *all* front-panel controls, an optional acrylic **security cover** can be installed. This arrangement might be appropriate, for example, when the 764A is being controlled entirely by contact closure or through the optional MIDI, RS-232, OR RS-422 interface. For the 764A, order ACC-12CL for a clear transparent security cover, ACC-12BL for a blue transparent security cover, or ACC-12WH for an opaque white security cover.

## Other Special Functions

### Cross-Fade (C-fade)

The audio output is muted momentarily when front panel settings are received via MIDI, RS-232, or RS-422 interface. Cross-fading eliminates potential pops caused by large level changes when switching from one set of control settings to another. Because this cross-fading may not be wanted in some applications, it is defeatable. Press OPTIONS and then SCROLL until `5 0 0 0 0 0 0 0` is displayed. Press ENTER. Press SCROLL until `0 - 0 0 0 0 0 0 0` is seen in display. Pressing NO will shut the cross-fade function off. Pressing YES will turn cross-fade on. The display will then indicate whether cross-fading is 'c-fade on', `0 0`, or 'c-fade off', `0 0`. Press OPTIONS two times to get back to Equalizer Programming mode.

FLAT

INITIALIZE

RESET

SERIAL — BAUD RATE — MIDI, RS-232

## External Control

The 764A can be controlled through external contact closure, or through a MIDI, RS-232, or RS-422 interface. Contact closure is discussed below. See page 3-21 for MIDI interface information; see page 3-24 for RS-232 and RS-422 interface information.



## Remote Control

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The 764A can be remotely controlled through the optional MIDI, RS-232, or RS-422 interface, or through your remote control system connected to the REMOTE terminals on the 764A's rear panel.

The Preset SCROLL functions can be controlled by an external remote control system. Momentarily ground the appropriate terminal to activate a function.

The front panel lights and displays will reflect remote control activity.

When the 764A MASTER receives an SCROLL change command, all of the 764A/SL SLAVE equalizers connected through the serial port will simultaneously change preset number.

## MIDI Interface

---

Up to 99 764A channels of EQ can be linked together and controlled by one MASTER 764A or a computer. Presets can be recalled with instructions sent through the MIDI interface. Preset memory or current front panel settings can be sent to or received from another device through the MIDI interface. The MIDI channel can be assigned, and the MIDI interface can be disabled from the front panel. Real time control of EQ parameters can also be sent from or to the 764A.

To do any of this, the optional MIDI interface board must be installed. SLAVE 764A's are connected in a daisy chain through the SLAVE MIDI ports to the MASTER. All communications to a computer are done through the MASTER 764A's computer MIDI port.

To designate which 764A is to be the MASTER, follow the instructions under 'initialize'. (Refer to Section 2.)

### To assign MIDI channel:

Press OPTIONS. Press SCROLL until  $\text{5 0 0 0 0 0}$  is displayed. Press ENTER. Press SCROLL until  $\text{5 0 0 0 0 0}$  is displayed. Press ENTER. Press SCROLL (or use keypad) until the desired MIDI channel (1 through 16) is displayed, then press ENTER.

The assigned MIDI channel is used both for sending and receiving data.

Set the channel to  $\text{0 0}$  to disable the computer MIDI port.

This data can be sent to a MIDI sequencer that records MIDI SYSTEM EXCLUSIVE commands. To transfer the EQ settings back to the 764A, simply 'play' the sequence back to the 764A.

### To send preset memory or front panel settings:

First connect the sending unit to the receiving unit and set the MIDI channel the same for both the sending and receiving units.

Press OPTIONS. Press SCROLL until  $\text{5 0 0 0 0 0}$  (special) is displayed. Press ENTER. Press SCROLL until  $\text{0 0 0 0 0 0}$  (archive) is displayed. Press ENTER. Press SCROLL until the display shows  $\text{0 0 0 0 0 0}$  (preset) or  $\text{0 0 0 0 0 0}$  (current). Press ENTER to send the 99 presets or the current front panel EQ settings through the MIDI port. If any 764A/SL units are connected to the 764A, their EQ data will also be sent.

The display will show  $\text{0 0 0 0 0 0}$  (archiving) when data is being sent and  $\text{0 0 0 0 0 0}$  (archived) when the data transmission is completed.

The 764A also will send MIDI SYSTEM EXCLUSIVE data from the computer MIDI port when an EQ setting is updated from the front panel ROTARY ENCODERS and PRESET CHANGED display. This data can also be recorded to a MIDI sequencer. When the sequence is played back, the EQ settings will be updated in 'real time' as they were recorded.

The 764A may blank its display in order to avoid missing data when receiving data through its MIDI port.

## MIDI Implementation Data

Commands can be sent to the 764A through the MASTER MIDI interface to recall a preset or to send the preset memory or front panel settings to another device. Individual equalizer settings can also be updated and is transmitted from the MASTER 764A whenever a parameter is altered. The data needed to implement these commands follows.

### PROGRAM CHANGE data sent from 764A:

| Hex code: | Explanation:   |
|-----------|--|
| C n       | MIDI channel number: n = 0 through F (0 1 – 0 16)  |
| n n       | preset number: n n = 00 through 64, 7F<br>(00 = preset 0 1, 64 = preset 0 99, 7F = preset 0 0) |

### PRESET DATA sent from 764A:

| Hex code: | Explanation:                                      |
|-----------|---|
| F 0       | system exclusive command                          |
| 0 0       |   |
| 0 0       |   |
| 2 1       | Orban ID  |
| 0 n       | MIDI channel number: n = 0 through F (0 1 – 0 16) |
| 0 2       | 764A product code                                 |
| n n       | n n = reserved byte                               |
| 0 4       | function: preset memory send                      |
| n n       | destination preset number                         |
| n n       | first byte of memory data                         |
| .         |   |
| .         |   |
| .         |   |
| n n       | last byte of memory data                          |
| n n       | n n = channel number                              |
| n n       | n n = group number                                |
| n n       | n n = physical EQUALIZER NUMBER                   |
| F 7       | end of system exclusive                           |

### CURRENT SETTINGS DATA sent from 764A:

| Hex code: | Explanation:                                      |
|-----------|---|
| F 0       | system exclusive command                          |
| 0 0       |   |
| 0 0       |   |
| 2 1       | Orban ID  |
| 0 n       | MIDI channel number: n = 0 through F (0 1 – 0 16) |
| 0 2       | 764A product code                                 |
| n n       | n n = reserved byte                               |
| 2 2       | function: current settings send                   |
| n n       | first byte of memory data                         |
| .         |   |
| .         |   |
| .         |   |
| n n       | last byte of memory data                          |
| n n       | n n = channel number                              |
| n n       | n n = group number                                |
| n n       | n n = physical EQUALIZER NUMBER                   |
| F 7       | end of system exclusive                           |

PROGRAM CHANGE REQUEST sent to 764A:

| Hex code: | Explanation:   |
|-----------|--|
| C n       | MIDI channel number: n = 0 through F (01 – 016)  |
| n n       | preset number: n n = 0 through 63<br>(00 = preset 01, 63 = preset 099, 7F = preset 00) |

PRESET DATA SEND REQUEST sent to 764A:

| Hex code: | Explanation:  |
|-----------|---|
| F 0       | system exclusive command  |
| 0 0       |   |
| 0 0       |   |
| 2 1       | Orban ID  |
| 0 n       | MIDI channel number: n = 0 through F (01 – 016)   |
| 0 2       | 764A product code   |
| n n       | reserved byte   |
| 0 3       | function: request preset memory send  |
| n n       | EQUALIZER NUMBER requested  |
| n n       | PRESET NUMBER requested<br>preset number: n n = 0 through 63<br>(00 = preset 01, 63 = preset 099, 7F = preset 00) |
| F 7       | end of system exclusive   |

CURRENT SETTINGS SEND REQUEST sent to 764A:

| Hex code: | Explanation:                                    |
|-----------|---|
| F 0       | system exclusive command                        |
| 0 0       | Orban ID  |
| 0 0       |   |
| 2 1       |   |
| 0 n       | MIDI channel number: n = 0 through F (01 – 016) |
| 0 2       | 764A product code                               |
| n n       | reserved byte                                   |
| 0 1       | function: request current settings send         |
| n n       | physical EQUALIZER NUMBER requested             |
| F 7       | end of system exclusive                         |

**RS-232 and RS-422 Interface**

## Quick Reference

To modify equalization parameters:

Press **BYP** to turn equalization on or off.

Press **LF**, **LMF**, **HMF**, or **HF** to select band. Press **ATT**, **HP**, or **LP** to select filter or input attenuator

When **BANDWIDTH** is 0.1 Octaves and **BOOST/CUT** is -40dB, **CENTER FREQUENCY** fine scale is enabled.

To recall preset:

Press **RECALL**.

Press **SCROLL** or use keypad to display **PRESET NUMBER**.

Press **ENTER** or **RECALL**.

To store preset:

Press **STORE**.

Press **SCROLL** or use keypad to display **PRESET NUMBER**.

Press **ENTER** or **STORE**.

To compare preset with panel:

Press **COMPARE**.

Press **SCROLL** or use keypad to display **PRESET NUMBER**.

Press **ENTER** or **COMPARE**.

Press **NO** or **COMPARE** again to **EXIT COMPARE** mode.

To lock audio controls:

Press **OPTIONS**.

Press **SCROLL** to display **SPECIAL**.

Press **ENTER**.

Press **SCROLL** to display **LOCK OUT**.

Press **ENTER**. Enter first two digits of security code with **SCROLL** or keypad.

Press **ENTER**. Enter second two digits of security code with **SCROLL** or keypad.

Press **ENTER**.

The display will read **LOC ON**.

To unlock audio controls:

Press **OPTIONS**.

Press **ENTER**.

Press **SCROLL** or use keypad to enter first two digits security code.

Press **ENTER**.

Press **SCROLL** or use keypad to enter second two digits security code.