EV Electro-Voice®
Dx34A DIGITAL SOUND SYSTEM PROCESSOR

OWNER'S MANUAL
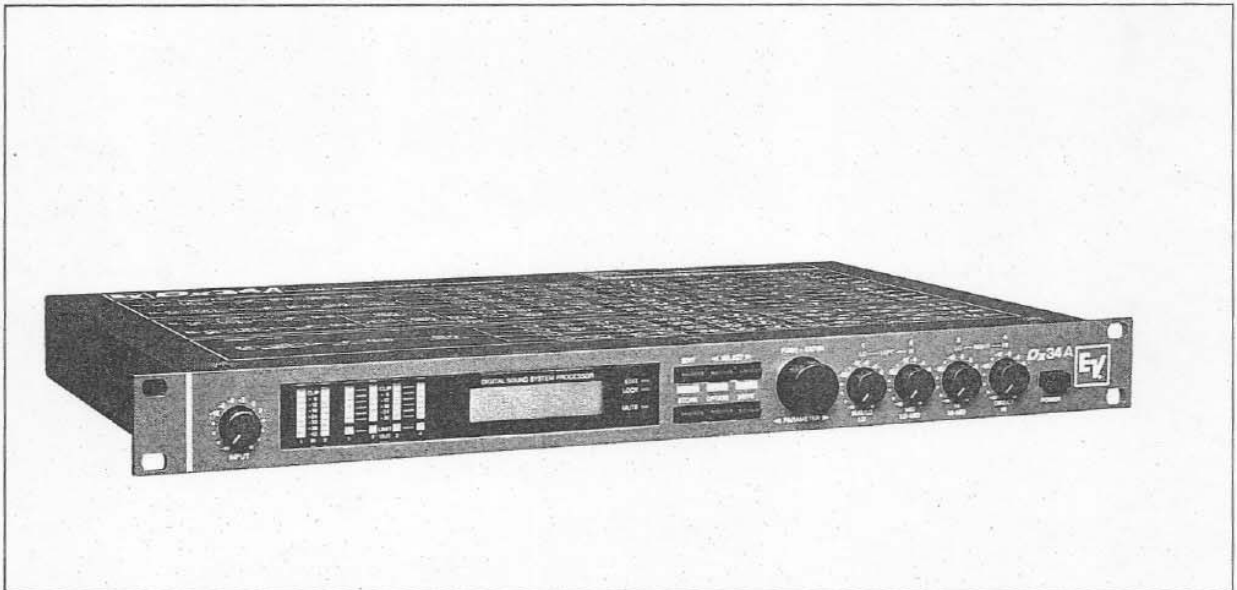
TABLE OF CONTENTS

DESCRIPTION AND FEATURES

INTRODUCTION

The Electro-Voice Dx34A is a multifunctional digital sound system processor. Its high degree of flexibility enables the set up and optimization of active multiway loudspeaker systems with variables previously unavailable in a single-rack-space device. The unit can be configured in two-way stereo, two-way dual mono, three-way mono with a separate full-range direct out, and four-way mono. In the three-way configuration, the low and direct outputs can be individually set to be a sum of two input channels, useful in some applications, e.g., mono subwoofers with stereo main speakers.

Functional blocks include:

1. High- and low-pass filters with Bessel, Butterworth and Linkwitz Riley characteristics and 6-, 12-, 18- and 24-dB-per-octave slopes.

2. Tunable low-cut filters with 6- or 12-dB-per-octave slopes and Q variable (12-dB-per-octave slopes only) from 0.5 to 2.0, to provide infrasonic speaker protection and augment or extend the low-end response of low-frequency speaker systems. Q = 2 provides a 6-dB peak boost that is appropriate for "step-down" operation of Electro-Voice TL series vented low-frequency systems.

3. Parametric equalizers with Q variable from 0.4 to 20.

4. Low- and high-shelving equalizers with 6- or 12-dB-per-octave slopes.

5. Limiters on each output, with adjustable threshold, decay rate and hold time.

6. Signal delays on the inputs (2 to 1,000 msec) and each output (0 to 10 msec).

The Dx34A block diagram is shown on page 10. The distribution of the functional blocks described above is different for each basic configuration, and is illustrated in Section 4.4.

The Dx34A addresses many different sound-system configurations and is factory programmed for a number of Electro-Voice speaker systems.

Parameter values for other EV components and systems can be downloaded off the Electro-Voice BBS at 616/695-4791 (8,N,1).

The Dx34A has two basic operating modes. The "preset mode" allows the user to select the factory speaker presets and gives the user control of only the master delay and the limiter parameters at each output. The "full-edit mode" provides access to all parameters, allowing adjustment and saving of all settings. Ten user memories in each of the three configurations (two way, three way, four way) are available for this purpose.

Input and output metering in conjunction with input level controls and an analog level control on each output help to maximize the signal to-noise ratio of the overall system.

A/D/A conversion in the Dx34A is done by linear 18-bit converters. The input A/D section is a 64-times oversampled sigma-delta converter and the output D/A is oversampled eight times. Internal resolution is 24 bits, using the Motorola DSP56004 processor. User memories are maintained in RAM backed up with a lithium battery with a life of approximately five years (the Dx34A's alphanumeric display warns of a low battery condition).

All inputs and outputs are electronically balanced with 3-pin XLR type connectors, and can be retrofitted with optional isolating transformers. Two TRB-5 input transformers and four TRB-4 output transformers are required.

ADDITIONAL FEATURES

- Delay units are selectable in distance or time.
- Polarity switch on each output channel.
- Digital gain stage with a range of -24 to +6 dB.
- "Lock out" feature to prevent unauthorized use.
- "Slow", "peak hold" and "no peak" meter display modes.
- MIDI addressable.
- MIDI dumps to save and transfer user presets.
- Mutes on each output channel.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. Harmful interference to radio communications may occur if this device is not installed and used in accordance with the instruction manual. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

"QUICK START" INSTRUCTIONS ARE ON PAGE 13.

IMPORTANT INFORMATION FOR MAXIMUM SIGNAL / LOWEST NOISE IS IN SECTION 4.2, PAGE 14.

DESCRIPTION AND FEATURES

SPECIFICATIONS

Conditions:
1.0 dBu = 0.775 volts rms.

OVERALL SPECIFICATIONS
Input/Output Configuration:
Two in/four out; stereo two way, dual mono two way, mono three way with a fourth fullrange direct out (low and direct outs may be the sum of two input channels) or mono four way

Crossovers,
> **Characteristics:**
> Butterworth, Bessel and Linkwitz-Riley
> **Slopes:**
> 6,12, 18 and 24dB per octave

Equalizers,
> **Low Shelving,**
> > **Number:**
> > Two
> > **Corner Frequenies:**
> > Variable from 20 to 500 Hz
> > **Slopes:**
> > 6 or 12dB per octave
> > **Gain:**
> > 0 to ±12dB in 1-dB steps

Parametric,
> **Number:**
> Eight
> **Center Frequencies,**
> > **Low and Low-Mid Outputs:**
> > Variable from 20 Hz to 5,000 Hz
> > **Mid Output:**
> > Variable from 30 Hz to 12,500 Hz
> > **Mid-High Output:**
> > Variable from 50 Hz to 20,000 Hz
> > **High Output:**
> > Variable from 500 Hz to 20,000 Hz
> > **Input (two-way configuration only):**
> > Variable from 20 Hz to 20,000 Hz
> **Q:**
> Variable from 0.4 to 20, resolution 0.1
> **Gain:**
> 0 to ±12dB in 1-dB steps

High Shelving,
> **Number:**
> Two
> **Corner Frequencies:**
> Variable from 500 Hz to 16,000 Hz
> **Slopes:**
> 6 or 12 dB per octave
> **Gain,**
> > 6-dB-per-octave slope:
> > 0 to ±12 dB in 1-dB steps
> > 12-dB-per-octave slope:
> > 0 to +6/-12 dB in 1-dB steps

Low Cut,
> **Number:**
> Two
> **Corner Frequencies:**
> Variable from 20 Hz to 200 Hz
> **Slopes:**
> 6 or 12 dB per octave
> **Q(12-dB-per-octave slopes only):**
> Variable in eight steps from 0.5 to 2.0 (Q = 2.0 suitable for B6 alignment of vented low-frequency systems)

Frequency Resolution of Variable Crossover and Corner Frequencies (see above),
> **20-50 Hz:**
> 1 Hz
> **50-100 Hz:**

2 Hz
> **100-200 Hz:**
> 4 Hz
> **200-500 Hz:**
> 10Hz
> **500-1,000 Hz:**
> 20 Hz
> **1,000-2,000 Hz:**
> 40 Hz
> **2,000-5,000 Hz:**
> 100 Hz
> **5,000-10,000 Hz:**
> 200 Hz

Lock-Out Provision:
Disable and enable access to internal functions of unit

Frequency Response:
20-20,000 Hz ±0.3 dB

Total Harmonic Distortion, 1,000 Hz,
> **without Transformers:**
> < 0.01%
> **with Transformers:**
> < 0.1%

Signal-to-Noise Ratio, Typical:
>102 dB

Front-Panel Controls:
Input gain control; output level controls (analog) (four); endless rotary encoder/push to-enter button; edit/two-way button; <select/ three-way button; select>/four-way button; store button; option button; mute button; power on/off switch

Front-Panel Displays:
8-segment LED input level indicators (two), including clip, with peak-hold or slow-mode ballistics; 6-segment LED output level indicators (four), including clip, with peak-hold or slow-mode ballistics; output limiter status indicators (four); 2 x 16-digit back-lit alphanumeric display; edit mode LED; lock mode LED; channel(s) muted LED

Limiters:
Four digital limiters with threshold variable over a 21-dB range and variable attack and decay times

Signal Delays,
> **Master:**
> 2 to 1,000 msec
> **Output (four):**
> 0 to 20 msec
> **Increment:**
> 21 µsec

Data Format:
18-bit linear, 24-bit internal

A/D Conversion:
18-bit linear sigma-delta, 64-times oversampling, linear phase

D/A Conversion:
18-bit linear, eight-times oversampling, linear phase

Sampling Rate:
46.875 kHz

MIDI Configuration,
> **Functions:**
> Data dump;
> Master/slave operation
> **Connectors, In and Out:**
> 5-pin DIN (180° pin pattern)

Common-Mode Rejection Ratio (CMRR), 1,000 Hz:
>70dB

Grounding:
Ground-lift switch disconnects ground from chassis to eliminate hum

Chassis Construction:
Painted steel

Colors,
> **Front Panel:**
> Gray with red accent, with white, yellow and light blue nomenclature
> **Top, Sides, Input and Bottom Panels:**
> Gray with white nomenclature

Power Requirements:
90-250 volts, 50-60 Hz ac, no changes required, 21 watts maximum

User Memory Backup Provision:
Lithium battery with five-year life (typical)

Safety Class:
VDE/IEC Class 1

Safety and Performance Approvals:
EMI/EMC approved in accordance with all applicable European regulations (EN 50082 EN 55015, EN 55022, IEC 801 and VDE 0871); fulfills safety regulations in accordance with VDE 0860

Optional Accessories:
TRB-4 output transformer kit (four required)
TRB-5 input transformer kit (two required)

Overall Dimensions,
> **Height:**
> 43.6 mm (1.75 in.)
> **Width:**
> 483 mm (19.0 in.)
> **Depth:**
> 287 mm (11.3 in.)
> **Net Weight:**
> 4.0 kg (8.8 lb)
> **Shipping Weight:**
> 5.4kg (12 lb)

INPUT SPECIFICATIONS
Number:
Two

Rated Input Voltage:
+4 dBu (1.23 V)

Maximum Input Voltage:
+21 dBu (8.7 V)

Input Impedance:
20,000 ohms

Input Configuration:
Electronically balanced (TRB-5 input transformer kit available (two required))

Insertion Loss of TRB-5 Input Transformer:
< 1.5 dB

Input Connectors:
Female 3-pin XLR type, pin 2 hot

OUTPUT SPECIFICATIONS
Number:
Four

Rated Output Voltage:
+4 dBu (1.23 V)

Maximum Output Voltage:
+21 dBu (8.7 V)

Output Impedance:
<100 ohms

Minimum Load Impedance:
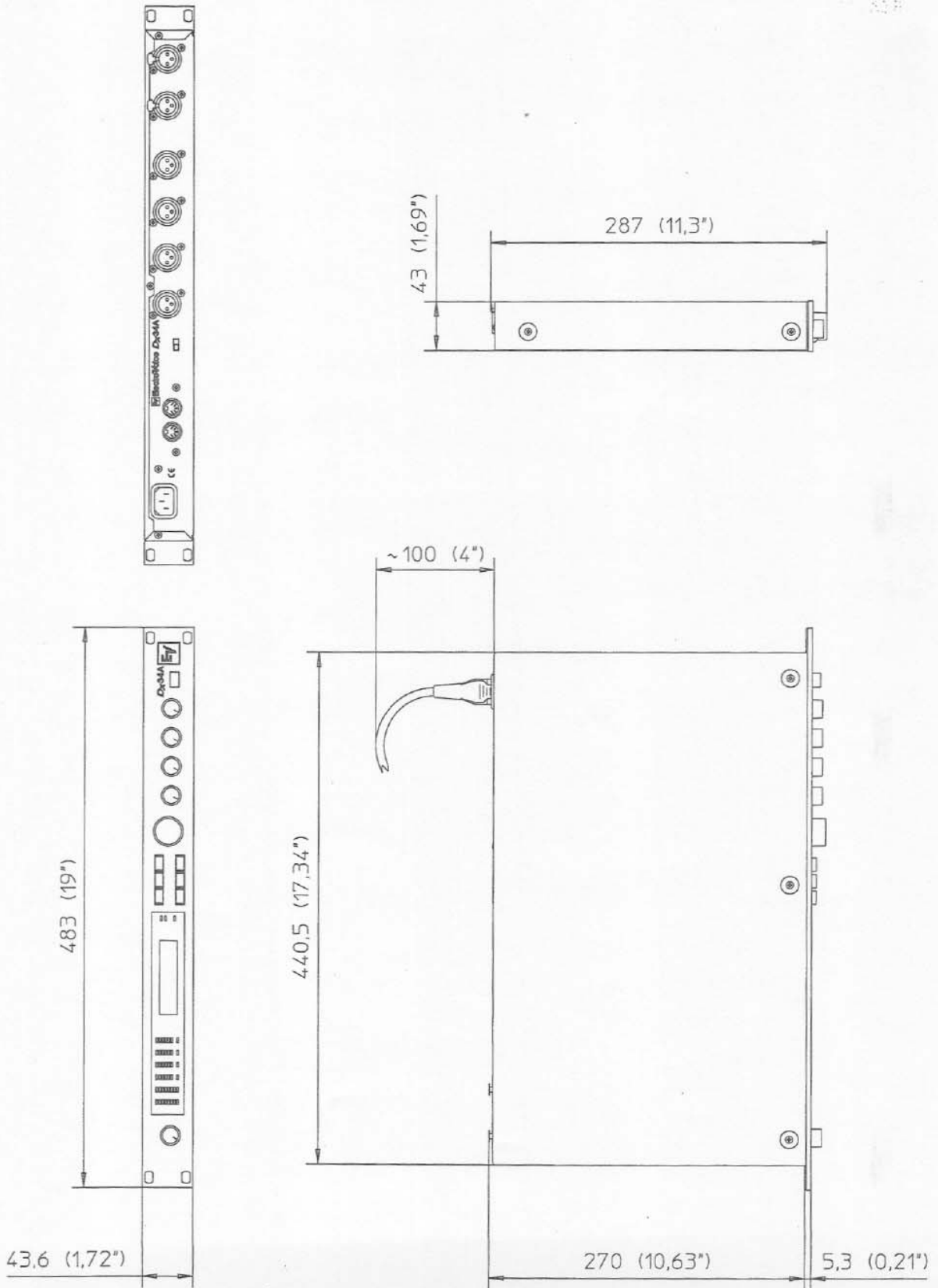600 ohms

Output Configuration:
Electronically balanced (TRB-4 output transformer kit available (four required))

Output Connectors:
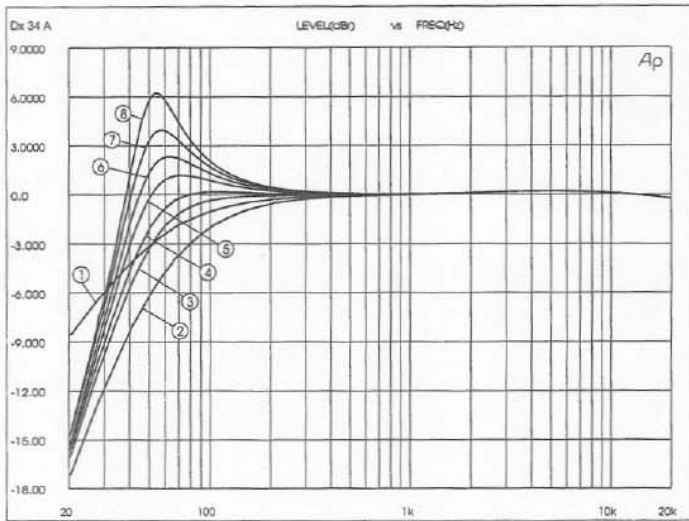Male three-pin XLR type, pin 2 hot

DESCRIPTION AND FEATURES

DIMENSIONS

43 (1,69")

287 (11,3")

~ 100 (4")

483 (19")

440.5 (17,34")

43,6 (1,72")

270 (10,63")

5,3 (0,21")

DESCRIPTION AND FEATURES

TYPICAL FILTER RESPONSE CURVES

Dx34 A Low-Cut Filters, f = 50 Hz
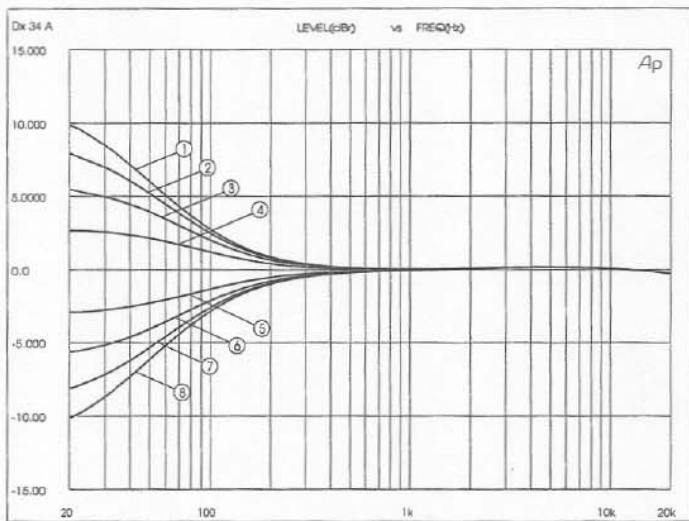
1. 6 dB
2. 12 dB Q 0.5
3. 12 dB Q 0.7
4. 12 dB Q 0.8
5. 12 dB Q 1.0
6. 12 dB Q 1.2
7. 12 dB Q 1.5
8. 12 dB Q 2.0

Dx34 A Low-Shelving EQ, 6 dB per Octave, f = 100 Hz
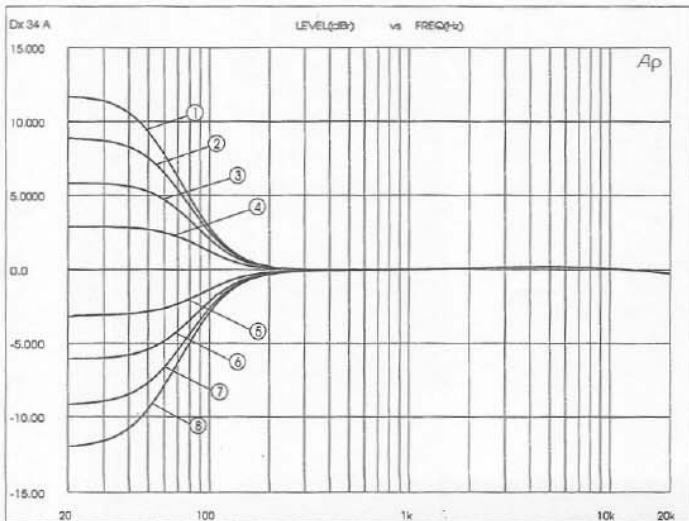
1. Gain = +12 dB
2. Gain = +9 dB
3. Gain = +6 dB
4. Gain = +3 dB
5. Gain = −3 dB
6. Gain = −6 dB
7. Gain = −9 dB
8. Gain = −12 dB

Dx34 A Low-Shelving EQ, 12dB per Octave, f = 100 Hz

1. Gain = +12 dB
2. Gain = +9 dB
3. Gain = +6 dB
4. Gain = +3 dB
5. Gain = −3 dB
6. Gain = −6 dB
7. Gain = −9 dB
8. Gain = −12 dB

DESCRIPTION AND FEATURES

TYPICAL FILTER RESPONSE CURVES

1. Gain = +12 dB
2. Gain = +9 dB
3. Gain = +6 dB
4. Gain = +3 dB
5. Gain = –3 dB
6. Gain = –6 dB
7. Gain = –9 dB
8. Gain = –12 dB

Dx34 A High-Shelving EQ, 6 dB per Octave, f = 2 kHz

1. Gain = +6 dB
2. Gain = +3 dB
3. Gain = –3 dB
4. Gain = –6 dB
5. Gain = –9 dB
6. Gain = –12 dB

Dx34 A High-Shelving EQ, 12 dB per Octave, f = 2 kHz

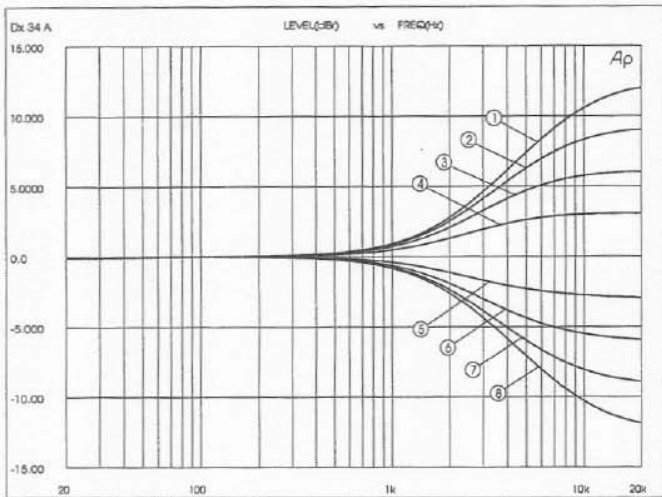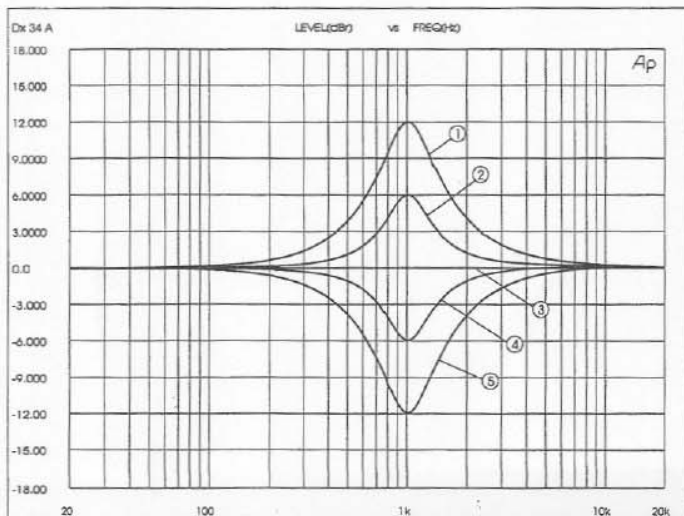

1. Gain = +12 dB
2. Gain = +6 dB
3. Gain = 0 dB
4. Gain = –6 dB
5. Gain = –12 dB

Dx34 A Parametric EQ, f = 1 kHz, Q = 2.0

DESCRIPTION AND FEATURES

TYPICAL FILTER RESPONSE CURVES
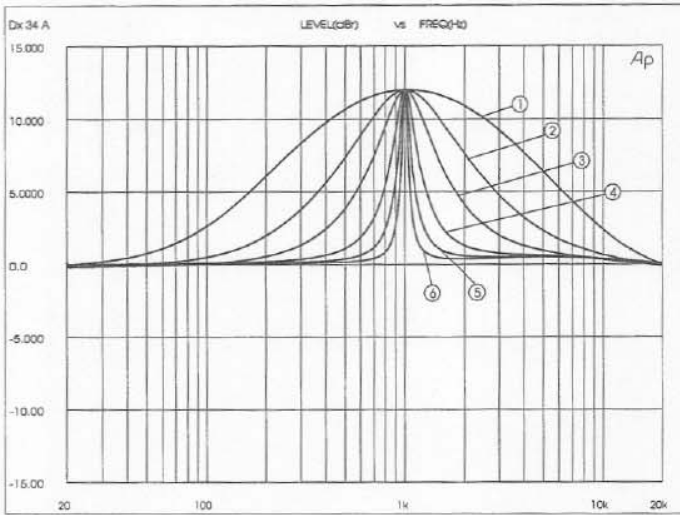
Dx34 A Parametric EQ, f = 1 kHz, Gain = +12 dB

1. Q = 0.4
2. Q = 1.0
3. Q = 2.0
4. Q = 5.0
5. Q = 10.0
6. Q = 20.0
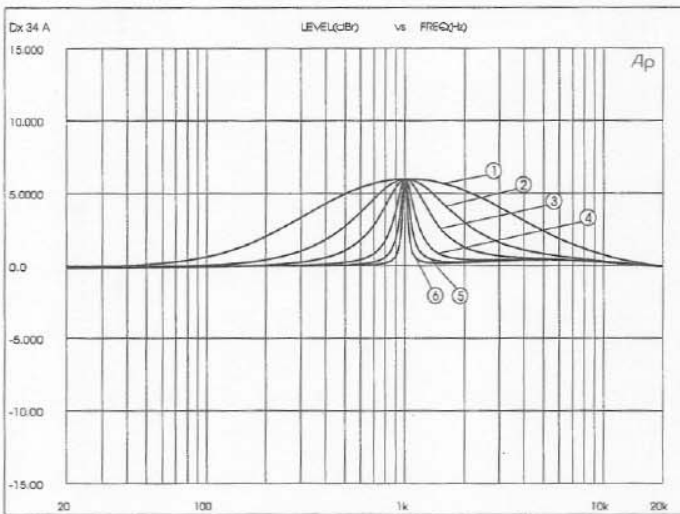
Dx34 A Parametric EQ, f = 1 kHz, Gain = +6 dB

1. Q = 0.4
2. Q = 1.0
3. Q = 2.0
4. Q = 5.0
5. Q = 10.0
6. Q = 20.0
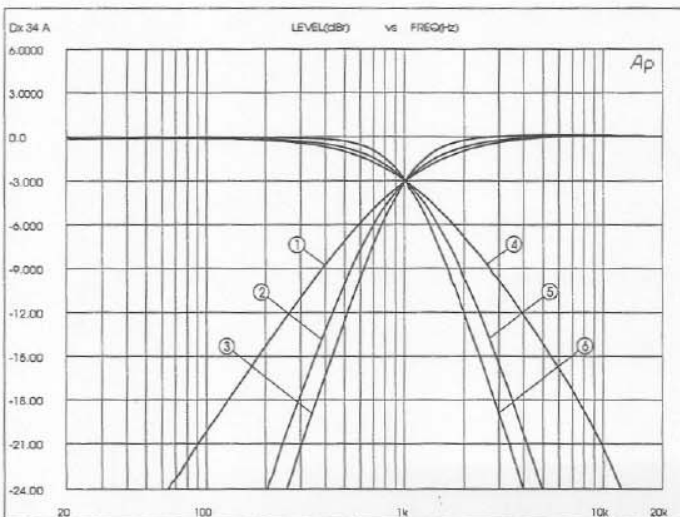
Dx34 A Crossover Filters, f = 1 kHz

1. High pass, 6 dB per octave
2. High-pass Bessel, 12 dB per octave
3. High-pass Butterworth, 12 dB per octave
4. Low pass, 6 dB per octave
5. Low-pass Bessel, 12 dB per octave
6. Low-pass Butterworth, 12 dB per octave

DESCRIPTION AND FEATURES

TYPICAL FILTER RESPONSE CURVES
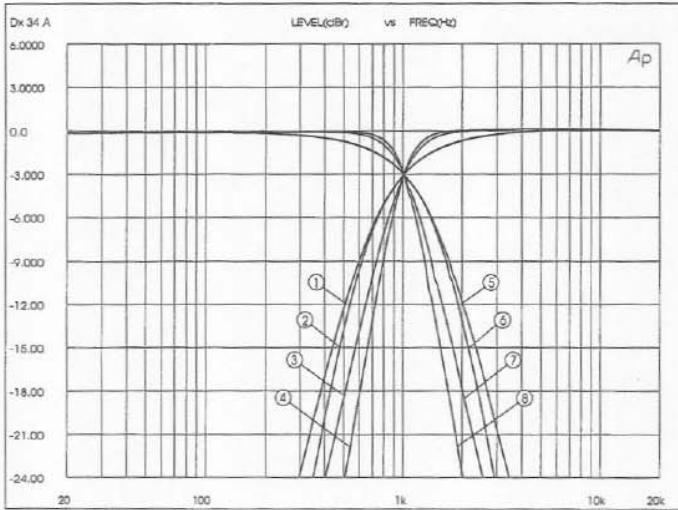
Dx34 A Crossover Filters, f = 1 kHz

1. High-pass Bessel, 18 dB per octave
2. High-pass Bessel, 24 dB per octave
3. High-pass Butterworth, 18 dB per octave
4. High-pass Butterworth, 24 dB per octave
5. Low-pass Bessel, 18 dB per octave
6. Low-pass Bessel, 24 dB per octave
7. Low-pass Butterworth, 18 dB per octave
8. Low-pass Butterworth, 24 dB per octave
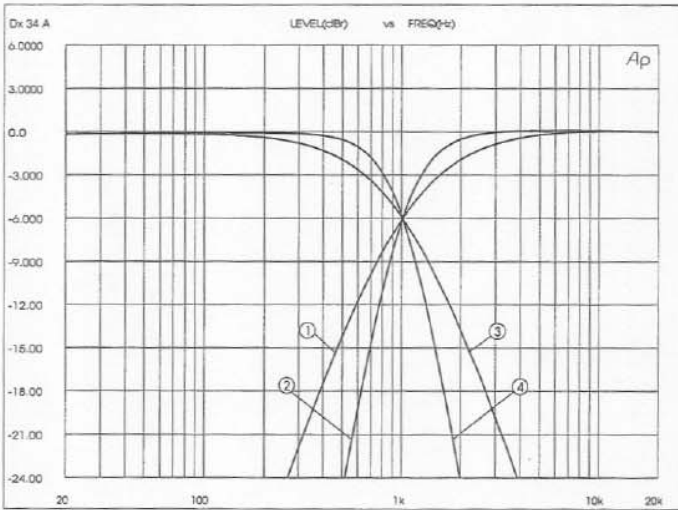
Dx34 A Crossover Filters, f = 1 kHz

1. High-pass Linkwitz-Riley, 12 dB per octave
2. High-pass Linkwitz-Riley, 24 dB per octave
3. Low-pass Linkwitz-Riley, 12 dB per octave
4. Low-pass Linkwitz-Riley, 24 dB per octave

DESCRIPTION AND FEATURES

BLOCK DIAGRAM

1 FRONT-PANEL INDICATORS AND CONTROLS

1. INPUT CONTROL

This rotary control adjusts the input level of the Dx34A. Adjust to maintain as high of a level on the input meters without clipping for best signal-to-noise ratio (S/N).

2. LEVEL INDICATORS IN 1/IN 2

These monitor the input signal, indicating the peak value of the input level in each case. Adjust the input control so that the level indicators show approximately -12 dB. If the clip LED's should light, the unit is being overdriven internally. A "peak-hold" or a "slow-mode" function can be chosen for the indicators.
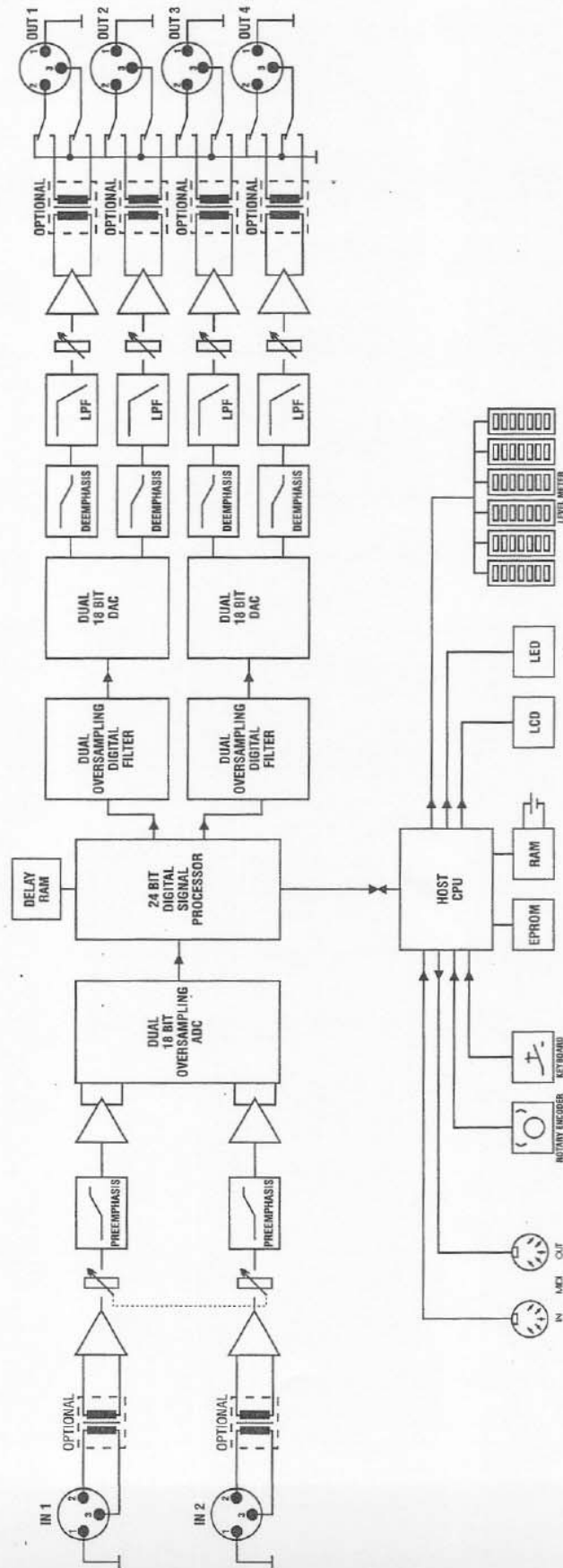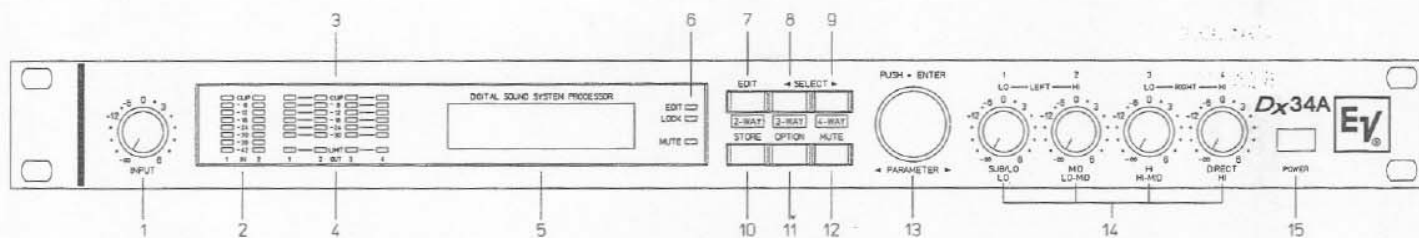
3. LEVEL INDICATORS OUT 1-4

These show the peak level of the corresponding outputs. The Dx34A should be operated in such a way that the clip LED's do not light. A "peak-hold" or a "slow-mode" function can be chosen for the indicators.

4. LIMITER INDICATORS OUT 1-4

The "limit" LED's light up when the limiter is active in the respective channel, i.e., the output level is limited when the signal level has exceeded the preselected limiter threshold for that channel.

5. MULTIFUNCTIONAL DISPLAY

This is a 2 x 16-character LCD display. In play mode, the program name or the cabinet type and configuration are displayed. In edit mode, the parameter name, a graphic and a numeric parameter value are displayed. Depending on the current status, option menus, status messages, user guide messages, etc., appear.

6. STATUS/MODE LED's

These LED's indicate the Dx34A's current status. If the edit LED lights, the edit mode has been entered. The lock LED indicates that the Dx34A is in write-protect mode and that no values can be entered. The mute LED indicates when one or more of the outputs are disabled.

7. EDIT/2-WAY KEY

This key places the unit in edit mode. After pressing this key, the first parameter of the active program is displayed. Further parameters are accessed with the select keys. The current value of the parameter can be changed with the rotary encoder. For further information please see Section 4.6.

The Dx34A is configured for two-way operation by pressing and holding this key while switching the power on.

8. < SELECT / 3-WAY KEY

In play mode, this key selects the previous program (activated by pressing "enter"). In edit mode it is used for selecting the previous parameter.

The Dx34A is configured for three-way operation by pressing and holding this key while switching the power on.

9. > SELECT/4-WAY KEY

In play mode this key selects the next program (activated by pressing "enter"). In edit mode it is used for selecting the next parameter.

The Dx34A is configured for four-way operation by pressing and holding this key while switching the power on.

10. STORE KEY

With this key, the edited programs can be saved in any memory location (number 01 - 10).

For further information please see Section 4.7.

11. OPTION KEY

This key allows access to the option menu where special settings for the unit can be made or checked.

For further information please see Section 6, Option Functions. See Section 6.2 for "lock," or edit protection.

12. MUTE KEY

This key displays the mute status of all four outputs. Each channel can be individually selected with the select keys. Mute on/off is selected by turning or pushing the parameter wheel.

13. ROTARY ENCODER WITH ENTER KEY

In play mode, turning the encoder chooses a program, pressing the encoder (enter) activates the program. In edit mode, the encoder is used to alter parameter values. Parameter values can be changed faster by turning and pressing the encoder at the same time. Generally speaking, the encoder aids speedy operation of the Dx34A with one hand.

For further information please see Section 4.

14. CONTROLS OUTPUT 1-4

These are attenuators that can be used to adjust the output levels of output channels 1 to 4.

A correct setting of these controls results in an optimal signal-to-noise-ratio. A setting of the controls into centre position (0) achieves good results in most situations. If a higher level is desired, the digital Output Gain control should be used. For less output level, the rotary controls output 1-4 should be used for level attenuation. The digital Output Gain control should never be used for higher attenuations, because this worsens the dynamic range of the D/A converter.

15. POWER SWITCH

This switches the Dx34A on and off.

2 REAR-PANEL CONNECTORS AND CONTROLS
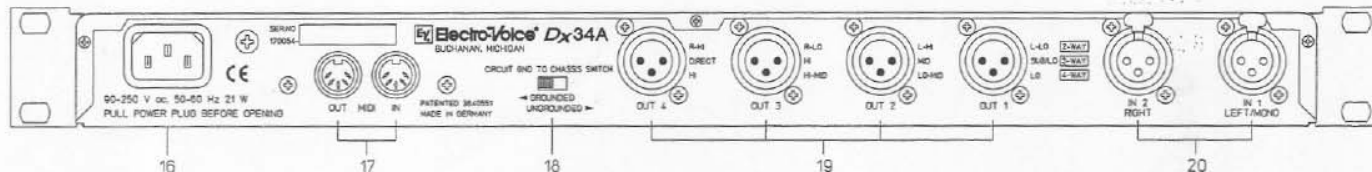
16. MAINS SOCKET

The supplied power cable plugs into this connector. The Dx34A is designed to operate with a mains voltage range of 90-250V ac. No voltage selection is required.

17. MIDI SOCKETS IN/OUT

Several Dx34A slaves can be controlled by one master unit using these sockets. Transmission of memory data (MIDI dump) in both directions is also possible.

18. GROUND LIFT SWITCH

The ground-lift switch serves to prevent hum generated by ground loops. If the housings of some units in a rack have electrical contact, all ground-lift switches should be put in the ungrounded position except for one.

19. SOCKETS OUT 1- 4

These are balanced outputs. The audio spectrum available at each output is dependent upon the selected configuration (two way, three way or four way). Connections for the different configurations must be made according to the corresponding label. The wiring for the inputs and outputs is explained in Section 4.10.

20. SOCKETS IN 1/IN 2

These are balanced inputs. In stereo mode, and in mono subwoofer operation, both sockets (IN 1 (Left/Mono) and IN 2 (Right)) must be connected. In all other modes, only IN 1 (Left/Mono) need be connected. The connections for the inputs and outputs are explained in Section 4.10. Connection examples for different configurations are explained in Section 4.4.

3 QUICK START

This section instructs you how to accomplish some of the more popular aspects of the Dx34A. More details about the functions that the Dx34A is capable of, and how to access those capabilities, will only be revealed by selectively reading the contents of the manual. This section assumes that you are already familiar with connecting audio systems and how to properly use a crossover and EQ.

PREFLIGHT CHECKLIST

Before turning the unit on you should know the answers to the following questions:

- What system configuration (two way, three way or four way) are you interfacing the Dx34A with?

- Do you want to set the unit up with a factory preset that is ready for an existing EV speaker system?

- Do you want access to all the variables that are available in the unit?

PRIMARY POWER CONNECTION

Connect the ac power cord. Theres no voltage selection switch because its a universal supply that operates from 90-250 V ac, 50/60 Hz.

SELECT CONFIGURATION

NOTE: The numbers that follow in parentheses refer to the designators in the front and rear panel views on pages 10 and 11. Also, a diagram is provided at the top of each page that illustrates the layout of the function keys.
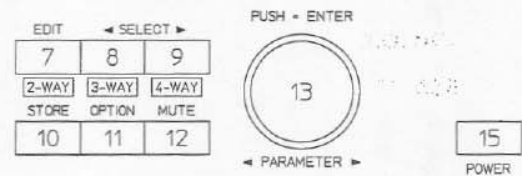
A. PRESET MODE

If you want to configure the unit for an existing EV cabinet that appears in the supported list and not modify any settings except for limiter thresholds, this is for you.

1. Press and hold in the appropriate configuration key while turning on the power. **Hold the configuration key for about three seconds.**

FOUR-WAY CONFIGURATION	THREE-WAY CONFIGURATION	TWO-WAY CONFIGURATION
MT - 4A	PI64 + PI218L	MH6040C
MT - 4/64B	PI94 + PI218L	MH9040C
MT - 4/42B	PI640C/PI6415	MH4020C
	PI660C/PI6615	DMS-1122/85
	PI940C/PI9415	DMS-1152/64
	MT-2/64	
	MT-2/94	
	DMS-1183/64	

AVALABLE PRESETS

2. Select the described system using the select (8 and 9) keys and enter (13).

3. This preset will be saved to memory and will be recalled the next time you turn the unit on.

4. Refer to the index for more information.

B. FULL-EDIT MODE

Use if you want to do a custom setting, starting from scratch.

1. Press and hold in the appropriate configuration key and the store key while turning on the power. Hold the configuration and store keys for about three seconds.

2. Press the edit key and adjust the various parameters to your heart's content. Refer to the edit instructions in the Operation and Installation section (page 19) and the Parameters section(page 26).

3. Save the preset by following the instructions in Section 4.7 (page 19).

4. If you want to modify a factory preset, read Section 4.8 (page 20).

SET INPUT LEVEL

Adjust the input level control until the input meters display a nominal-value of -6 to -12 dB with little or no clipping. This will yield the best signal-to-noise ratio.

NOTE: If the Dx34A is initially powered on with only the on/off switch, it will default to the User Stereo 2-Way Mode (see page 44 for parameter values under this condition).

EDIT PRESETS

Common things that you might want to do right away without digging through the manual are referenced in the index at the rear of this manual. Please refer to the index to find out how to quickly:

1. Adjust parametric EQ for horn equalization.

2. Set crossover frequency and order.

3. Operate mutes.

4. Adjust output levels.

5. Adjust signal delays for alignment.

6. Save a user preset (program).

7. Modify a factory preset and save it in a user preset.

8. Access the EV BBS for presets of new speaker systems.

4 OPERATION AND INSTALLATION

4.1 SWITCHING THE UNIT ON

NOTE: The numbers that follow in parentheses refer to the designators in the front and rear panel views on pages 10 and 11. Also, a diagram is provided at the top of each page that illustrates the layout of the function keys.

1. The Dx34A is switched on using the power switch (15). The unit recalls the last program that has been stored to memory before it was shut off.
2. The following appears on the display:

> ELECTRO-VOICE
> Dx34A

3. The Dx34A is now ready for operation. The following may appear on the display:

> MH4020C
> (STEREO 2-WAY)

The display indicates that the unit is in the stereo two-way configuration. The unit is set to active two-way operation for the MH4020C. This is one of the factory settings of the Dx34A. To configure other cabinets or enter another mode, please proceed to Section 4.3. *ATTENTION! If the display below appears after the unit has been switched on, contact an Electro-Voice service center to have the internal battery changed. There are no user serviceable parts inside.*

When the battery voltage has dropped below a minimum value, there is no guarantee that your program data will be maintained in memory after the unit has been disconnected from the mains supply. It is recommended that you save your user presets by doing a MIDI dump to a permanent storage medium for reloading after the new battery has been installed. See Section 6.8.

> SERVICE REQUIRED
> CHNG INT BATTERY

4.2. LEVEL SETTING FOR MAXIMUM HEADROOM AND MINIMUM NOISE

To achieve both maximum headroom and minimum noise, the Dx34A must be properly integrated into the gain structure of the total audio system. This is particularly true if high frequencies are reproduced by highly efficient compression drivers (e.g., sensitivities in excess of 110 dB 1 watt/1 meter) and system power amplifiers are of high sensitivity (driven to full output with an input of 0.775 volts (0 dBu) to 1.0 volt (0 dBV)). **Failure to use the following guidelines may result in audible noise (hiss) from system loudspeakers under no-signal conditions.** For those interested, the technical background for the guidelines is given in Section 4.2.3.

4.2.1 SETTING INPUT LEVEL CONTROL

1. The Input control (1) is used to adjust the input level of the Dx34A.
2. Operate the system with the loudest actual program material to be encountered. Advance the Input control (1) from full counterclockwise (off) while checking the maximum (peak) indication on each of the two input level meters (2). The optimum value is between -12 dB and -6 dB on program peaks. The clip LED indicates an internal overload and should light only occasionally or not at all. If maximum program peaks are below the optimum range, audible system noise with no signal present will tend to increase and the Dx34A's signal-to-noise ratio is not being fully utilized.
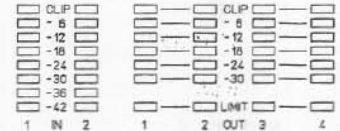
4.2.2 SETTING OUTPUT LEVELS

In general, the high or mid and high outputs of the Dx34A, when used in conjunction with fully horn-loaded loudspeakers (e.g., compression drivers), will have to be attenuated on the order of 10 dB to match the efficiency of the typical low-frequency loudspeaker system. For this purpose the Dx34A has a digital level control in each output. These level controls are used in the different presets of the Dx34A accordingly. However the digital level controls should never be used for higher attenuations, because otherwise the usable dynamic range of the D/A converter would be reduced. It is better to program the digital level controls in the LO and MID channels to level boosts, which is possible up to +6 dB. Please note that internal clipping may occur in this case. The digital level controls of the HI channels must only be set to small amounts of attenuation for level adaptation. Do not confuse the digital attenuators with the front-panel analog output attenuators (14). Their use will be addressed later in this section and is also addressed in Section 5.3, page 30.

Once the desired acoustic response of the system has been achieved as outlined above, the gain after each of the Dx34A's D/A converters must be reduced by an additional 10 dB or so in order to achieve minimum, and essentially inaudible, system noise. (The digital attenuators used to achieve flat system response decrease the signal but do not lower the noise floor.) This guideline is for most power amplifiers, which deliver full output with inputs in the range of 0.775 volts (0 dBu) to 1.0 volt (0 dBV) (input attenuators full up). The required gain reduction can be accomplished by turning down all of the Dx34A's analog output controls (14), the power amplifier input level controls or a combination of both. *In order to preserve the original frequency response, the total gain reduction on each output should be identical.*

Some power amplifiers are 7 to 9 dB less sensitive than the typical, 0.775-volt sensitivity mentioned above, taking inputs ranging from 1.7 to 2.1 volts to produce full output. Such amplifiers require little or no post-D/A gain reduction to minimize audible noise.

Here are two ways to determine the specific amount of gain reduction. In a system designed so carefully that the amplifier power ratings have been chosen to deliver the maximum sound pressure levels (SPL's) expected, the gain reduction should be such that under conditions of actual use the power amplifiers are the first devices to clip in the total signal chain, by a very slight amount (about 1 or 2 dB). This clipping test should be carried out during actual use of the sound system with maximum anticipated output from the mixing console (or other initial source). Actual program material is best, but a pink-noise source may be used, also. (With any source, take care to approach clipping slowly, in order to avoid damaging the loudspeakers with excess long-term average input.)

Many audio systems are not tailored so precisely to maximum SPL requirements. In this case, reduce the gain of the channel with the most audible no-signal noise as heard in an audience location until it is no longer audible or just barely audible. Then, reduce the gain of all other channels equally. Check the system with actual program material to see that the anticipated SPL's are delivered with nominal output (e.g., 0 dBu) from the mixing console or other initial source. If

4 OPERATION AND INSTALLATION

SPL's are inadequate, the gain reduction may be slightly reduced (in exchange for more audible noise) or the power amplifiers may be replaced with units of greater output capability. With either procedure, a dB-reading voltmeter and a sine-wave generator set to a frequency in each of the band passes are helpful in most accurately making the gain reductions equal. Alternatively, control markings can be used to approximate equal level reductions.

4.2.3 GAIN STRUCTURE TECHNICAL BACK-GROUND

Often, proper system gain structure for maximum headroom and minimum audible noise is not achieved in audio systems because most power amplifiers produce full output with relatively low input voltages of 0.775 volts (0 dBu) to 1.0 volt (0 dBV). This is about 10dB too sensitive for the typical, 0-dBu (0.775-volt) nominal output level of a mixing console and the associated, down-stream processing equipment (e.g., equalizers, active crossovers, compressor/limiters, a Dx34A, etc.).

A mixer with a 0-dBu nominal output level clips about 20 dB above this value (15.5 volts). It is properly operated when the maximum long-term average levels of actual program material are at about 0dBu on the output meters, a condition which leaves around 20 dB of headroom to cleanly reproduce the instantaneous program peaks which contribute nothing to perceived loudness but are the dynamics and "life" of music and speech.

Typically, the down-stream signal processing is designed to accommodate similar nominal and peak levels. However, most power amps deliver full power (with their input level controls fully clockwise) from a 0-dBu (0.775-volt) input. *Thus, when driven by actual program material from an properly set up mixer, the amplifier will be at the threshold of clipping with only the nominal, 0-dBu output of the mixing console, with absolutely no room for the signal peaks.*

A traditional way of dealing with this situation is to turn down the mixer output by 10 or more dB. This eliminates the peak clipping but:

1. The noise floor of all the electronics in front of the power amp is untouched, and is often audible in the high-frequency loudspeakers.

2. Mixer output meters are essentially useless since many common in-use signal levels are too low to actuate the meters.

Note that some power amplifiers require significantly higher voltages to produce full output, taking inputs in the range of 1.7 to 2.1 volts. This is 7 to 9 dB less sensitive than the typical 0.775-volt sensitivity discussed above, which in itself provides most of the approximate 10-dB gain reduction required for minimum noise.

4.3 OPERATING MODES OF THE Dx34A

The Dx34A can be operated in "factory preset mode" or "full-edit mode."

There are three configurations in each mode. These basic modes are accessed while simultaneously switching the unit on and pressing one or two function keys at the same time for approximately three seconds.
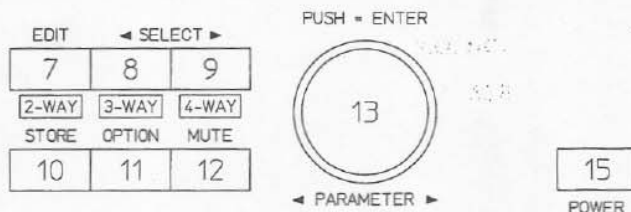
To select a different operating mode or a new configuration, the Dx34A must be switched off and switched back on again while pressing the appropriate function key(s). The procedure is described in the following paragraphs.
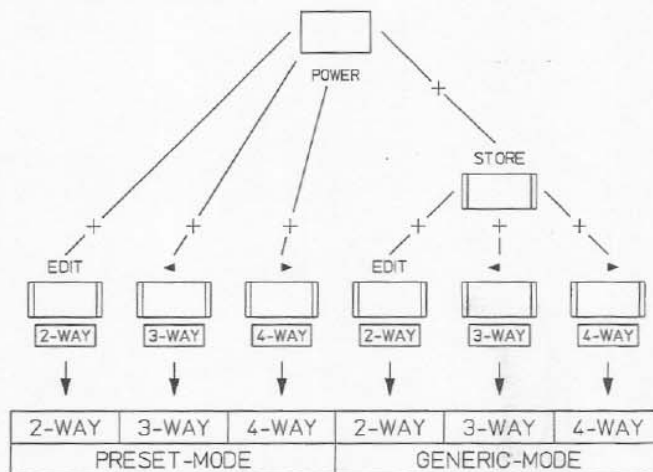
4.3.1 THE FACTORY PRESET MODE

The preset mode is the simplest way to achieve good results with the Dx34A. In preset mode, the desired loudspeaker is selected from a list. The Dx34A automatically sets the optimum parameter for the selected components. The user can then set and save the limiter threshold values in the individual channels. Please turn to Section 5.3 for a detailed description of all the parameters.

The user gains access to preset mode by pressing one of the three keys: 2-Way, 3-Way or 4-Way (depending up on the desired configuration) for approximately three seconds while switching the unit on. A brief message indicating the selected configuration appears on the display during initialization.

The unit then displays the cabinet selections that are available. For example, if the three-way configuration is selected, the following will appear on the display (software version 3.00):

SELECT APPLICAT:
PI640C/PI6415

Select the desired system by turning the rotary encoder (13). Confirm the selection by pressing the encoder knob (Enter).

Once the desired system has been selected, the Dx34A sets the appropriate parameters. The unit is then ready for operation. The display may show the following:

MT-2/64B
(3-WAY/SUB+1)

If need be, the user can edit and save the limiter parameters as described in Section 5.1.

4.3.2 FULL-EDIT MODE

In the full-edit mode, all parameters can be set. A finished program can be saved in one of the ten memory spaces for the current configuration.

For access to the full-edit mode, press and hold the Store key (10), and at the same time one of the three configuration keys: 2-Way, 3-Way or 4-Way, depending on the desired configuration, for approximately three seconds while turning on the power. The display shows a brief message while initializing.

The unit is now ready for operation and is in play mode. The display may show the following:

```
01 USER PROGRAM
(STEREO 2-WAY)
```

You now have access to all parameters and you can create and save up to ten programs for the current configuration. Please turn to Section 4.5 for details on procedures. Section 5 contains descriptions of all parameters, their setting ranges and their effects. You can download the latest Electro-Voice speaker presets off the Electro-Voice BBS at 616/695-4791 (8,N,1), and use this list of presets as a basis for your own program creations. The preset file contains all parameter settings for the loudspeakers available.

4.4 SELECT CONFIGURATION (TWO, THREE OR FOUR WAY)

The Dx34A's configurations are as follows:

1. Stereo two way (channel one and two parameters adjustable simultaneously and to the same values).

2. Two-way dual mono (channel one parameters adjustable independently from channel two parameters).

3. Mono three way with full-range direct out ("three-way/sub + 1"). (Both the low-frequency and direct out can be a mono sum of the two input channels.)

4. Mono four way.

Operating in these configurations is outlined below.

4.4.1 STEREO TWO WAY

In the stereo two-way configuration, all channels feature limiters, polarity switches, signal delay and digital gain to compensate for different loudspeaker efficiencies. Each parameter adjustment affects both channels simultaneously. Each low channel has a parametric peak-dip filter (parametric equalizer, PEQ), a tunable low-cut filter, a low-shelving EQ and crossover filter. The high channels have two parametric peak-dip filters, a high-shelving EQ and the complementary crossover filter. The master section includes a master delay to delay signals for distributed systems and a parametric peak-dip filter.

A typical stereo two-way configuration is illustrated on the right. The block diagram on page 17 shows the structure of this configuration.

Two-way dual mono is accessed in the options menu using the two-way parameter window.

4.4.2 TWO-WAY DUAL MONO

The two-way dual mono configuration allows the parameters of each channel to be adjusted independently. This configuration is accessed in the options menu using the two-way parameter window. See Section 4.3 (page 15).
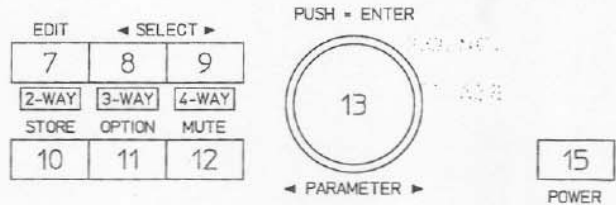

4.4.3 THREE-WAY MONO WITH FULL-RANGE DIRECT OUT ("THREE WAY/SUB + ONE")

This configuration is a three-way crossover in mono with an additional full-range direct output. Both the low-frequency and direct outputs can be the sum of two input channels (see below). Limiters, polarity switches, digital gain and delay lines are available in all channels. In the low channel, there is a parametric peak-dip filter (parametric equalizer, PEQ), a tunable low-cut filter, a low-shelve EQ and crossover filter. The mid channel is equipped with two PEQ's and two crossover filters for low and high frequencies. The high channel has two PEQ's, a high-shelving EQ and a crossover filter. The direct channel has the same filters as the low channel and could be used as a seperate, band-passed subwoofer output. The inputs feature a master delay for distributed loudspeaker systems. The low output can be switched to mono sum to accommodate stereo three-way systems (using two Dx34A's) with a mono subwoofer. This is achieved when L+R is selected in the LO & CH4 mode window. The direct output also receives a mono signal when L+R is selected in the LO & CH4 mode window or it can be switched to receive the left or right input signal.

The figure at the lower left of page 17 shows a typical mono-three-way configuration, using PI Modular Series^{TM} boxes. This also shows the use of a mono subwoofer. Both input channels of one Dx34A must be used in this case. Mono-summing occurs within the unit. The internal structure of the three-way/sub + one configuration is shown in the second block diagram on page 17.

STEREO TWO-WAY

4 OPERATION AND INSTALLATION

MODE: STEREO 2-WAY

MODE: 3-WAY/SUB + 1
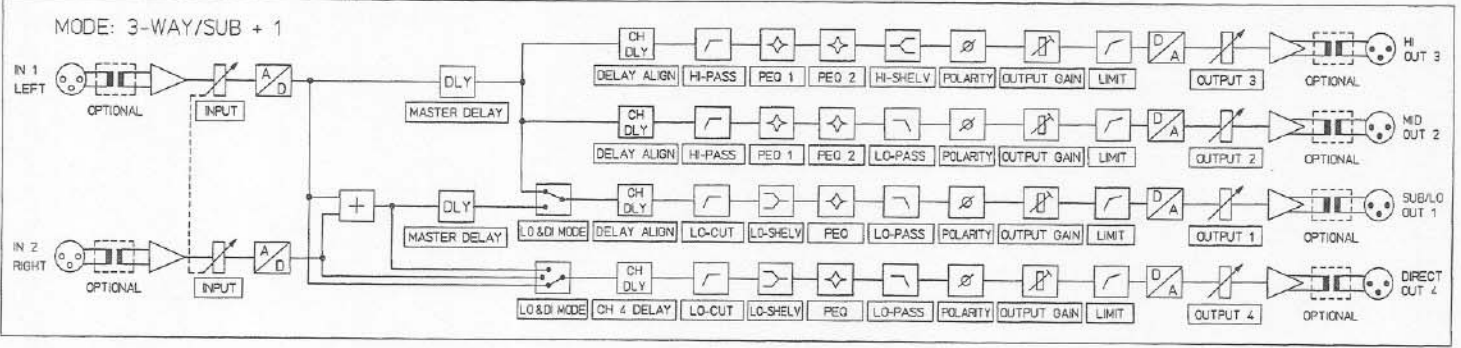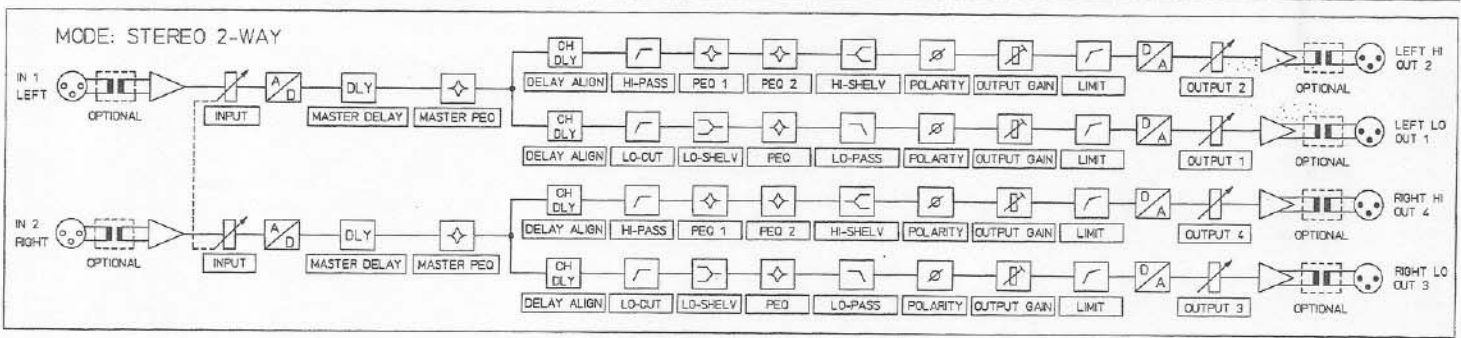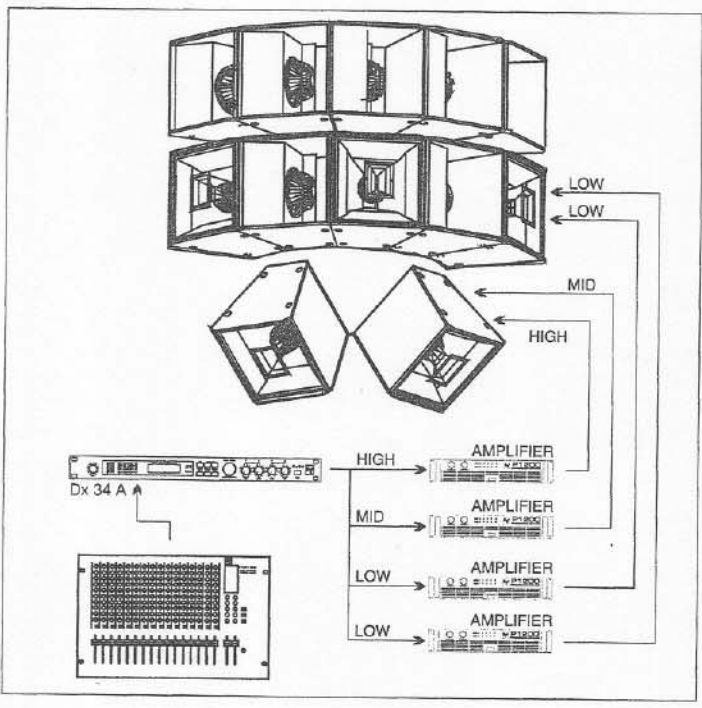
MONO THREE-WAY

STEREO THREE-WAY/SUB
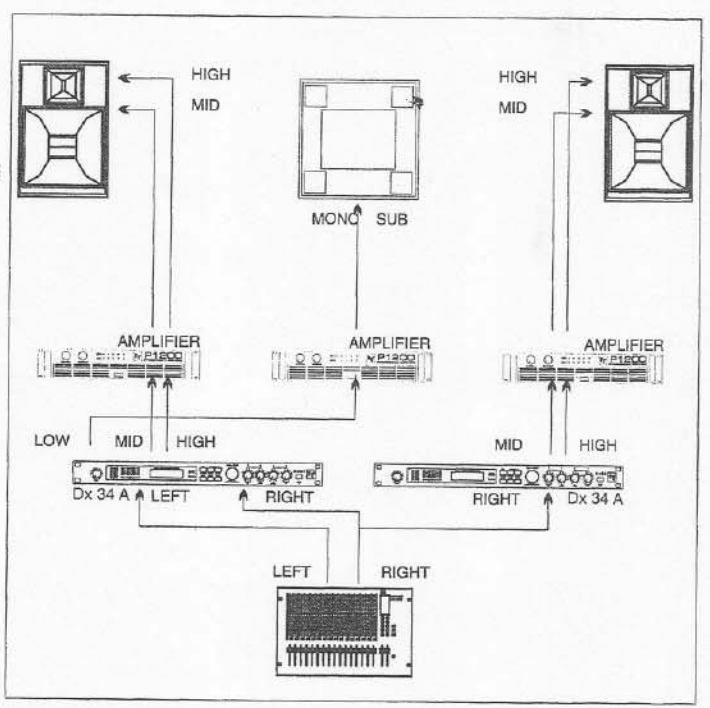
4 OPERATION AND INSTALLATION
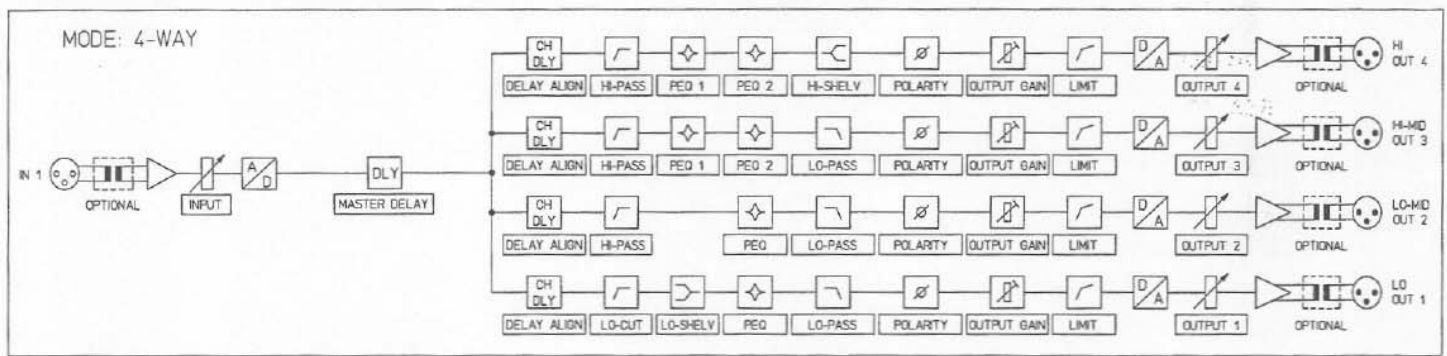
4.4.4 FOUR-WAY MONO

The four-way configuration is a four-way crossover in mono. All channels provide limiters, digital gain, polarity switches, delay lines and parametric peak-dip filters (parametric equalizers, PEQ's). In addition, there are a low-cut and low-shelving EQ in the low channel, a high-shelving EQ in the high channel and second PEQ's in the hi-mid and high channels. Each channel supports the appropriate crossover function(s). There is a master delay in the input.

The figure below shows a typical four-way configuration with two Dx34A's for stereo mode. The block diagram above shows the internal structure of the four-way configuration.

STEREO FOUR-WAY

4.5 PROGRAM SELECTION

If the Dx34A is operated in the full-edit mode, you can select up to ten different programs in each configuration (two way, three way, four way).

Programs can be accessed only when the Dx34A is in the "play" mode, which is the current operating mode after the unit is switched on. Each of the ten programs can be edited freely and can be saved in any of the ten memory locations.

1. A memory location can be reached by searching for the program you want with the rotary encoder (13) or with the two select keys (8 and 9).

2. The new program name appears on the display. The program number in the top left corner of the display flashes on and off. The unit configuration is shown in the second display line.

| 03 USER PROGRAM |
| (STEREO 2-WAY) |

3. Activate the program by pressing the rotary encoder (13)(Enter). The program number stops flashing.
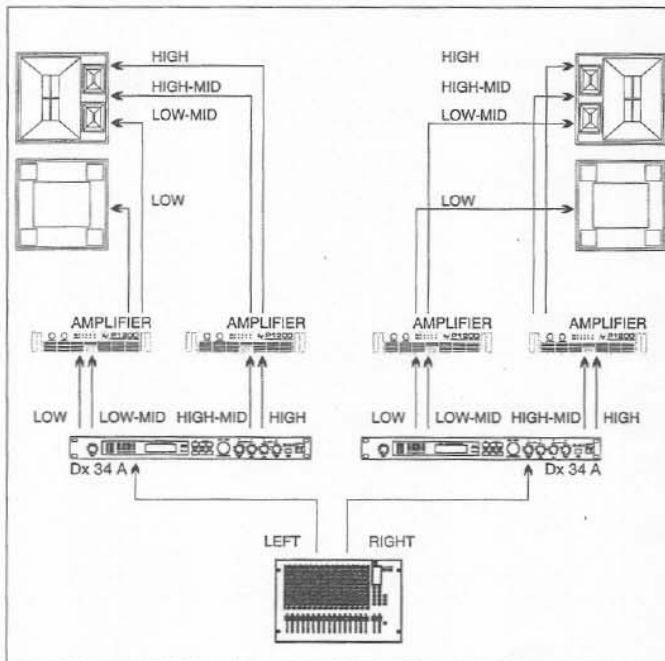
4 OPERATION AND INSTALLATION

4.6 EDITING

All parameters can be changed in the full-edit mode. For a description of the parameters please turn to Section 5.

1. Press the Edit key (7).

2. The unit is now in edit mode. The edit LED lights up and the name and the value of the first parameter in the active program appear on the display. The channel number (1, 2, 3, 4) and the channel name (LO, HI, ...) precede the parameter name. A graphic indication of the parameter value, where applicable, provides information about the current position in the parameter range.

```
1 LO >LO - CUT FREQ
        30 Hz
```

3. The rotary encoder (13) can now be used to alter the parameter value. **The rate of scrolling through the values can be increased by pushing in the parameter wheel while turning.**

4. The selected value appears on the display and the change is immediately audible. The edit LED then flashes to show that the program has been altered. If you do not want to change any other parameters, proceed directly to point seven.

```
1 LO >LO - CUT FREQ
        48 Hz
```

5. The select keys (8) and (9) access the previous or next parameter.

6. The following may appear on the display:

```
1 LO >LO - CUT RESP
     12 dB  Q 0.7
```

Points 3-6 can be repeated as often as required.

7. By pressing the edit key (7) again, you return to play mode.

CAUTION! Your program alterations have not yet been stored and will be lost at the next program change!

8. The program number, the program name and the unit configuration appear on the display. The edit LED continues to flash.

```
   03 USER PROGRAM
    (STEREO 2-WAY)
```

9. If you would like to store the edited program in a memory, proceed to Section 4.7.

10. If you would like to continue to alter parameters, go back to step one.

11. If you want to retain the original program, press the rotary encoder (13) (Enter). This deletes all alterations of the parameter values. The edit LED goes off.
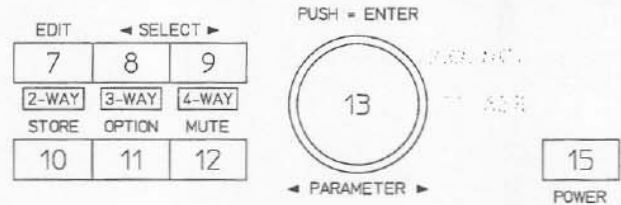
4.7 NAMING AND SAVING PROGRAMS

The procedures for saving an edited program and copying a program from one memory location to another are the same.
In preset mode, parameters are stored by pressing the store key (10) once, since no program numbers or names can be selected here. The following appears briefly on the display:

```
     PARAMETERS
     STORED...
```

The following description applies to full-edit mode:
The procedure to store a program begins and ends with the store key (10). You can exit the store mode by pressing store (10) a second time before changing the program number or name.

1. Press the store key (10) to initiate the saving of a program. The following may appear on the display:

```
  STORE TO PROGRAM
  03 USER PROGRAM
```

2. To store the program in the current location without changing the name, go to step six. If you only want to edit the name but not the memory location, go to step four.

3. Select the desired memory location with the rotary encoder (13). The following may appear on the display:

```
  STORE TO PROGRAM
  07 USER PROGRAM
```

Proceed to step six if you are not going to change the program name.

4. Move the cursor to the first or last character of the program name using the select keys (8) and (9). The following appears on the display:

```
     EDIT TITLE
  07 USER PROGRAM
```

5. Select the desired character by rotating the encoder (13) knob. A blank can be inserted in the active position by pushing enter. Use the select keys (8) and (9) to move the cursor back and forth, then enter each character individually, e.g., "X-Over 200 Hz." There are 13 characters available for the program name. *To continue, move the cursor back to the program number on the left-hand side of the display.*

6. Press the rotary encoder (13) (Enter) to confirm the selected program number and name.
The display then shows the following:

```
  OVERWRITE?=STORE
  07 X-OVER 200Hz
```

7. The edited program is written to memory by pressing store (10) again.

CAUTION! The previous program in this memory location will be overwritten! Therefore make certain that the chosen program number is correct. The store procedure can be cancelled by pressing any other key.

The following may appear on the display after storing:

```
07 X-OVER 200Hz
(STEREO 2-WAY)
```

The unit returns to play mode.

4.8 MODIFYING A FACTORY PRESET
A factory preset can be transferred to a user program for editing in the full-edit mode.

1. Select the appropriate two-, three-, or four-way configuration by switching the unit on while pressing the desired configuration key (7, 8 or 9). The display may show:

```
SELECT APPLICAT:
PI660C/PI6615
```

2. Select the factory preset that you would like to edit from the list and load it into memory by pressing the parameter wheel (Enter) (13).

3. Turn the unit off. The preset will remain in memory.

4. Enter full-edit mode by switching the unit on while pressing the desired configuration key (7, 8 or 9) and store key (10).

5. Select memory location 00 with the select key (8) and reload the factory preset by pressing the parameter wheel (Enter). The edit light will begin to flash at this time, prompting you to make changes by pressing edit (7) or store the program to a new location.

6. Press store (10) and select a new memory location in which to save the preset with the parameter wheel. The name can also be changed at this time. Push the parameter wheel (Enter). The display may show:

```
STORE TO PROGRAM
01 PI660C MYWAY
```

7. Pressing store once more will save the program to the selected memory location. Further modifications can be done at any time on the saved program when in full-edit mode. See Section 4.6.

4.9 INSTALLING THE OPTIONAL TRANSFORMERS

4.9.1 INSTALLING INPUT TRANSFORMERS (TRB-5)
1. Switch the unit off and pull the power plug.

2. Remove the cover (three screws on top, four on side and three on rear).

3. Cut the two wire jumpers (A) per transformer (see Figure 1).

4. Solder the resistor into PCB (see Figure 1, R 104, R 204).

5. Plug the input transformer TRB-5 into prepared socket on PCB (see Figure 1, T 101, T 201).

6. Fix the transformer with cable binder or rubber moss (see Figure 2).

7. Replace the cover.
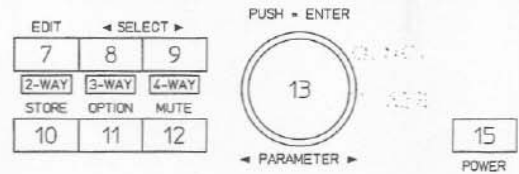
4.9.2 INSTALLING OUTPUT TRANSFORMERS (TRB-4)
1. Switch the unit off and pull power plug.

2. Remove the cover (three screws on top, four on side and three on rear).

3. Cut the two wire jumpers (A) per transformer (see Figure 1).

4. Short the two output electrolytic capacitors per transformer. Use the two provided solder areas (B) (see Figure 1, C 326, C 324, C 340, C 338, C 426, C 424, C 440, C 438).

5. Plug the input transformer TRB-4 into prepared socket on PCB (see FIG 1, T 301, T 302, T 401, T 402).

6. Fix the transformer with cable binder or rubber moss (see Figure 2).

7. Replace the cover.

4.10 CONNECTOR AND CABLE WIRING GUIDELINES
To achieve the best results with the Dx34A, the unit must be connected properly. To begin, connect the enclosed ac power cable with the Dx34A's mains socket and your outlet.
To avoid temperature related problems, the unit should have adequate ventilation and not be operated at ambient temperatures above 40°C (104°F).
Before turning on the Dx34A, all connections should be completed. Connections will vary depending upon the selected configuration.

IMPORTANT:

- Always use well-shielded audio cables.

- To avoid high-frequency losses, the source lines, especially to the inputs, should not exceed 10 m (33 ft).

- Do not position the unit directly on or under a power amplifier, TV monitor , etc., as the leakage field of the transformers in such devices could induce hum into the Dx34A.
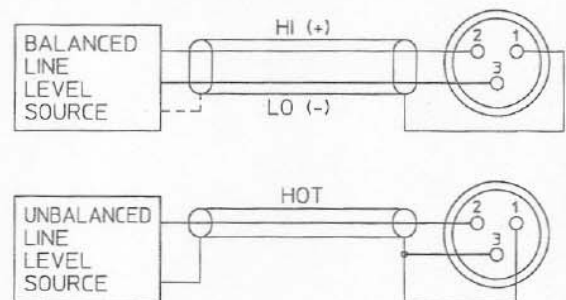
BALANCED INPUT WIRING
Connect the noninverting (+) lead of the cable to pin 2 and the inverting (-) lead to pin 3 of the XLR connector. The shield is connected to pin 1 of the XLR connector. If one or more isolation transformers are used, the shield should not be connected to the ground of the source. Any balanced cable that connects two pieces of equipment should have the shield connected at only one end.

FIGURE 1 - Position of the Components in the Dx34A

A - CUT JUMPERS
B - SHORTEN SOLDER AREAS
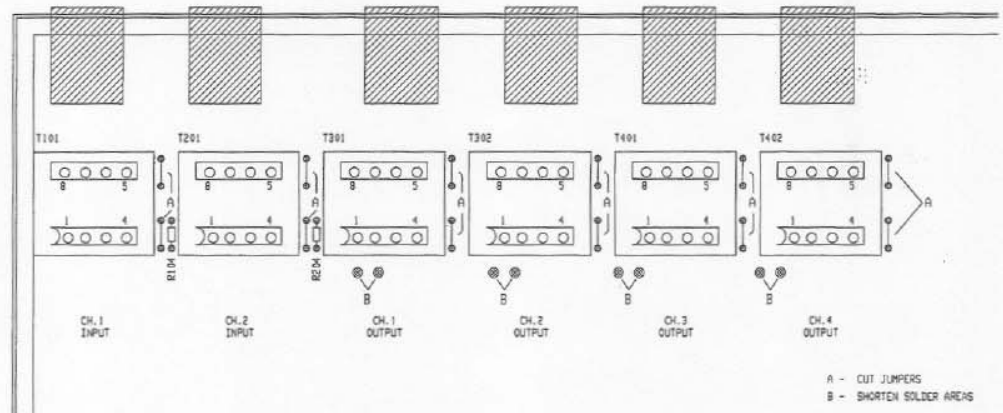
FIGURE 2 - Cover of the Dx34A

230mm (9.1in.)
188mm (7.4in.)
146mm (5.8in.)
104mm (4.1in.)
62mm (2.4in.)
20mm (0.8in.)
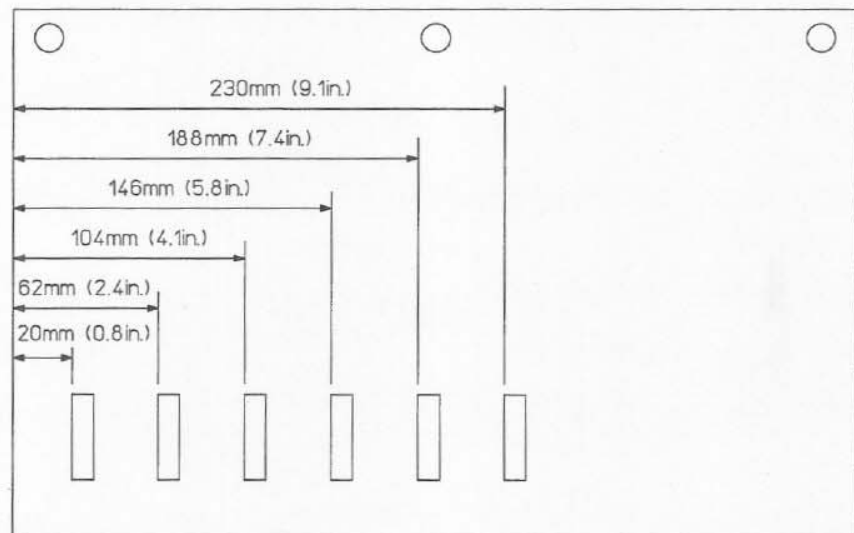
UNBALANCED INPUT WIRING

Connect the "hot" lead of the cable to pin 2 of the XLR connector and the shield to pin 1 of the XLR connector. To avoid a level loss of 6dB, short Pin 1 and 3 of the XLR connector. If noise occurs as a result of this connection, disconnect it.

BALANCED OUTPUT WIRING

Connect the noninverting (+) lead of the cable to pin 2 of the XLR connector and the inverting (-) lead to pin 3 of the XLR connector. If an isolation transformer is used, the shield should not be connected to the Dx34A ground. Tie the shield to the receiving unit.

UNBALANCED OUTPUT WIRING

Connect the "hot" lead of the cable to pin 2 of the XLR connector and the shield to pin 1 of the XLR connector. To avoid a level loss of 6dB, short Pin 1 and 3 of the XLR connector. If noise occurs as a result of this connection, disconnect it.

HI (+)
LO (-)
BALANCED LINE LEVEL

HOT
UNBALANCED LINE LEVEL
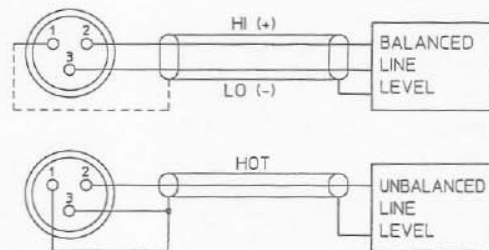
POSITION OF THE GROUNDLIFT SWITCH

The ground lift switch helps prevent ground loops. It separates the circuit ground from the housing. If more than one unit in a common case has electrical contact (e.g., installation in a rack), all ground lift switches except one should be in the "UNGROUNDED" position. This is typical, but there are exceptions. Sometimes the optimum position of the ground lift switch can only be determined by trial and error.

CIRCUIT ⊥ TO CHASSIS SWITCH

◄ GROUNDED
UNGROUNDED ►

4 OPERATION AND INSTALLATION

4.11 MIDI

This section contains information for programmers who wish to write software for the Dx34A. All the commands needed to transmit or receive data over the MIDI interface are defined.

A MIDI data transfer is only possible if a MIDI receive channel has been set (OMNI, 1 - 16). With MIDI channel off, no communication will take place (see Section 6.7).

GENERAL MIDI COMMANDS:

Program Change

MIDI-Byte	Description
0xCn (hex	n = MIDI CHANNEL 0-15
0xxx xxxx (bin)	0..10 = PROGRAM NUMBER 0..10

MIDI SYSTEM EXCLUSIVE IMPLEMENTATION:

This command sequence request the Dx34A to report its identity number.

Identity Request
(recognized)

MIDI-Byte	Description
0xF0 (hex)	SYSTEM EXCLUSIVE
0x7E	UNIVERSAL SYSTEM EXCLUSIVE NON-REAL TIME HEADER
0x0n	n = MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
0x06	GENERAL INFORMATION
0x01	IDENTITY REQUEST
0xF7	EOX

The Dx34A transmits this identy code in answer to an identy request. The following numbers are transmitted: ID-number 118, the Dx34A device ID number 34, a three-byte device code number and the revision number.

Identity Reply
(transmitted
when Identity
Request is
received)

MIDI-Byte	Description
0xF0	SYSTEM EXCLUSIVE
0x7E	UNIVERSAL SYSTEM EXCLUSIVE NONREAL TIME HEADER
0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
0x06	GENERAL INFORMATION
0x02	IDENTITY REPLY
0x00, 0x00	EXTENDED ID (TWO BYTES)
0x76	EV ID: NUMBER 118
0x22	Dx34A ID: 34
DEV_CODE	RESERVED 3 BYTE DEVICE CODE
REVISION	REVISION: 4 DIGIT ASCII CODE
0xF7	EOX

This command sequence request the Dx34A to transmit the program currently in the buffer .

Current Program
Dump Request
(recognized)

MIDI-Byte	Description
0xF0 (hex)	SYSTEM EXCLUSIVE
0x00, 0x00	EXTENDED ID (TWO BYTES)
0x76	EV ID: NUMBER 118
0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = All Channels)
0x22	Dx34A ID: 34
0x11	FUNCTION ID: CURRENT PROGRAM DUMP REQUEST
0xF7	EOX

4 OPERATION AND INSTALLATION

Here only the program currently in the buffer is transmitted or received. User programs are not altered.

	MIDI-Byte	Description
Current Program	0xF0	SYSTEM EXCLUSIVE
Dump	0x00, 0x00	EXTENDED ID (TWO BYTES)
(recognized	0x76	EV ID: NUMBER 118
+transmitted)	0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
	0x22	Dx34A ID: 34
	0x31	FUNCTION ID: CURRENT PROGRAM DUMP
	0x0c	CONFIG
	0x0m	MODE
	DATA	8/7 CODE (166 x 8/7 = 190 BYTE)
	CHECKS	CHECKSUM OF RECEIVED DATA (7 BIT, 2'S COMPL)
	0xF7	EOX

This command sequence requests the Dx34A to transmit all 30 User programs.

	MIDI-Byte	Description
All User	0xF0	SYSTEM EXCLUSIVE
Programs	0x00, 0x00	EXTENDED ID (TWO BYTES)
Dump Request	0x76	EV ID: NUMBER 118
(recognized)	0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
	0x22	Dx34A ID: 34
	0x12	FUNCTION ID: ALL PROGRAMS DUMP REQUEST
	0xF7	EOX

The Dx34A transmits or receives all 30 User programs. This procedure lasts approximately three seconds. All user programs are overwritten. The program currently in the buffer is not altered.

	MIDI-Byte	Description
All User	0xF0	SYSTEM EXCLUSIVE
Programs Dump	0x00, 0x00	EXTENDED ID (TWO BYTES)
	0x76	EV ID: NUMBER 118
(recognized	0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
+ transmitted)	0x22	Dx34A ID: 34
	0x32	FUNCTION ID: ALL PROGRAMS DUMP
	DATA	PROGRAM DATA 8/7 CODE (5700 BYTE)
	CHECKS	CHECKSUM OF RECEIVED DATA (7 BIT, 2'S COMPL)
	0xF7	EOX

This information is transmitted if a dump was received and processed.

	MIDI-Byte	Description
Dump Processed	0xF0	SYSTEM EXCLUSIVE
(transmitted)	0x00, 0x00	EXTENDED ID (TWO BYTES)
	0x76	EV ID: NUMBER 118
	0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
	0x22	Dx34A ID: 34
	0x20	FUNCTION ID: DUMP PROCESSED
	0xF7	EOX

This sequence addresses the output channel mutes of the unit.

	MIDI-Byte	Description
MIDI Mute	0xF0	SYSTEM EXCLUSIVE
(recognized)	0x00, 0x00	EXTENDED ID (TWO BYTES)
	0x76	EV ID: NUMBER 118
	0x0n	MIDI CHANNEL NUMBER: 0-15 (0x7F = ALL CHANNELS)
	0x22	Dx34A ID:34
	0x1F	FUNCTION ID: MIDI MUTE
	mBits	BIN:0000xxxx x: 1=MUTED 0=MUTE OFF (LS BIT: CHANNEL 1)
	0xF7	EOX

4 OPERATION AND INSTALLATION

In the listing below, a special parameter of the program currently in the buffer is altered.

Single Parameter adjust (recognized + transmitted)	MIDI-Byte	Description
	0xF0	SYSTEM EXCLUSIVE
	0x00, 0x00	EXTENDED ID (TWO BYTES)
	0x76	EV ID: NUMBER 118
	0x0n	MIDI CHANNEL NUMBER 0-15 (0x7F = ALL CHANNELS)
	0x22	Dx34A ID: 34
	0x30	FUNCTION ID: PARAMETER ADJUST
	NUMBER	PARAMETER NUMBER
	LSB	7 BIT DATA LSB (0-127)
	MSB1	7 BIT DATA MSB1 (NOT NECESSARY)
	MSB2	7 BIT DATA MSB2 (NOT NECESSARY
	0xF7	EOX

Parameter Numbers (decimal):

STEREO TWO-WAY

Channel 1, LO:	Channel 2, HI:	Channel 3, LO:	Channel 4, HI:	Input Channel:
4 LOCUT FREQ	20 HIPASS FREQ	41 LOCUT FREQ	57 HIPASS FREQ	LEFT:
5 LOCUT RESP	21 HIPASS RESP	42 LOCUT RESP	58 HIPASS RESP	0 MASTER DELAY
6 LOSHELV FREQ	22 PEQ1 FREQ	43 LOSHELV FREQ	59 PEQ1 FREQ	1 MASTER PEQ FREQ
7 LOSHELV SLOPE	23 PEQ1 Q	44 LOSHELV SLOPE	60 PEQ1 Q	2 MASTER PEQ Q
8 LOSHELV GAIN	24 PEQ1 GAIN	45 LOSHELV GAIN	61 PEQ1 GAIN	3 MASTER PEQ GAIN
9 PEQ FREQ	25 PEQ2 FREQ	46 PEQ FREQ	62 PEQ2 FREQ	
10 PEQ Q	26 PEQ2 Q	47 PEQ Q	63 PEQ2 Q	RIGHT:
11 PEQ GAIN	27 PEQ2 GAIN	48 PEQ GAIN	64 PEQ2 GAIN	37 MASTER DELAY
12 LOPASS FREQ	28 HISHELV FREQ	49 LOPASS FREQ	65 HISHELV FREQ	38 MASTER PEQ FREQ
13 LOPASS RESP	29 HISHELV SLOPE	50 LOPASS RESP	66 HISHELV SLOPE	39 MASTER PEQ Q
14 DELAY ALIGNM	30 HISHELV GAIN	51 DELAY ALIGNM	67 HISHELV GAIN	40 MASTER PEQ GAIN
15 POLARITY	31 DELAY ALIGNM	52 POLARITY	68 DELAY ALIGNM	
16 OUTPUT GAIN	32 POLARITY	53 OUTPUT GAIN	69 POLARITY	
17 LIMIT THRESH	33 OUTPUT GAIN	54 LIMIT THRESH	70 OUTPUT GAIN	
18 LIMIT DECAY	34 LIMIT THRESH	55 LIMIT DECAY	71 LIMIT THRESH	
19 LIMIT HOLD	35 LIMIT DECAY	56 LIMIT HOLD	72 LIMIT DECAY	
	36 LIMIT HOLD		73 LIMIT HOLD	

THREE-WAY/SUB + 1

Channel 1, LO:	Channel 2, MD:	Channel 3, HI:	Channel 4, DI:	Input Channel:
1 LOCUT FREQ	17 HIPASS FREQ	33 HIPASS FREQ	50 LOCUT FREQ	0 MASTER DELAY 1-3
2 LOCUT RESP	18 HIPASS RESP	34 HIPASS RESP	51 LOCUT RESP	
3 SHELV FREQ	19 PEQ1 FREQ	35 PEQ1 FREQ	52 LOSHELV FREQ	
4 SHELV SLOPE	20 PEQ1 Q	36 PEQ1 Q	53 LOSHELV SLOPE	
5 SHELV GAIN	21 PEQ1 GAIN	37 PEQ1 GAIN	54 LOSHELV GAIN	
6 PEQ FREQ	22 PEQ2 FREQ	38 PEQ2 FREQ	55 PEQ FREQ	
7 PEQ Q	23 PEQ2 Q	39 PEQ2 Q	56 PEQ Q	
8 PEQ GAIN	24 PEQ2 GAIN	40 PEQ2 GAIN	57 PEQ GAIN	
9 LOPASS FREQ	25 LOPASS FREQ	41 SHELV FREQ	58 LOPASS FREQ	
10 LOPASS RESP	26 LOPASS RESP	42 SHELV SLOPE	59 LOPASS RESP	
11 DELAY ALIGNM	27 DELAY ALIGNM	43 SHELV GAIN	60 DELAY	
12 POLARITY	28 POLARITY	44 DELAY ALIGNM	61 POLARITY	
13 OUTPUT GAIN	29 OUTPUT GAIN	45 POLARITY	62 OUTPUT GAIN	
14 LIMIT THRESH	30 LIMIT THRESH	46 OUTPUT GAIN	63 LIMIT THRESH	
15 LIMIT DECAY	31 LIMIT DECAY	47 LIMIT THRESH	64 LIMIT DECAY	
16 LIMIT HOLD	32 LIMIT HOLD	48 LIMIT DECAY	65 LIMIT HOLD	
		49 LIMIT HOLD	66 LO & CH4 MODE	

4 OPERATION AND INSTALLATION

FOUR-WAY

Channel 1, LO:	Channel 2, LO-MID:	Channel 3, HI-MID:	Channel 4, HI:	Input Channel:
1 LOCUT FREQ	17 HIPASS FREQ	30 HIPASS FREQ	46 HIPASS FREQ	0 MASTER DELAY
2 LOCUT RESP	18 HIPASS RESP	31 HIPASS RESP	47 HIPASS RESP	
3 SHELV FREQ	19 PEQ FREQ	32 PEQ1 FREQ	48 PEQ1 FREQ	
4 SHELV SLOPE	20 PEQ Q	33 PEQ1 Q	49 PEQ1 Q	
5 SHELV GAIN	21 PEQ GAIN	34 PEQ1 GAIN	50 PEQ1 GAIN	
6 PEQ FREQ	22 LOPASS FREQ	35 PEQ2 FREQ	51 PEQ2 FREQ	
7 PEQ Q	23 LOPASS RESP	36 PEQ2 Q	52 PEQ2 Q	
8 PEQ GAIN	24 DELAY ALIGNM	37 PEQ2 GAIN	53 PEQ2 GAIN	
9 LOPASS FREQ	25 POLARITY	38 LOPASS FREQ	54 HISHELV FREQ	
10 LOPASS RESP	26 OUTPUT GAIN	39 LOPASS RESP	55 HISHELV SLOPE	
11 DELAY ALIGNM	27 LIMIT THRESH	40 DELAY ALIGNM	56 HISHELV GAIN	
12 POLARITY	28 LIMIT DECAY	41 POLARITY	57 DELAY ALIGNM	
13 OUTPUT GAIN	29 LIMIT HOLD	42 OUTPUT GAIN	58 POLARITY	
14 LIMIT THRESH		43 LIMIT THRESH	59 OUTPUT GAIN	
15 LIMIT DECAY		44 LIMIT DECAY	60 LIMIT THRESH	
16 LIMIT HOLD		45 LIMIT HOLD	61 LIMIT DECAY	
			62 LIMIT HOLD	

MIDI Implementation Chart

| Function		Transmitted	Recognized	Remark
Basic	Default	X	1-16, -OFF-	Memorized
Channel	Changed	X	1-16, -OFF-	
	Default	X	Mode 1,3	Memorized
Mode	Messages	X	X	
	Altered			
Note		X	X	
Number	True voice			
Velocity	Note ON	X	X	
	Note OFF	X	X	
After	Key's	X	X	
Touch	Ch's	X	X	
Pitch Bend		X	X	
Control		X	X	
Change				
Prog		X	0 - 10	
Change	True		0 - 10	
System	Exclusive	O	O	
System	Song Pos	X	X	
Common	Song Sel	X	X	
	Tune	X	X	
System	Clock	X	X	
Real Time	Commands	X	X	
Aux	Local ON/OFF	X	X	
	All Notes OFF	X	X	
Messages	Active Sense	X	X	
	Reset	X	O	

Notes
Mode 1: OMNI ON, POLY   Mode 2: OMNI ON, MONO   O: Yes
Mode 3: OMNI OFF, POLY   Mode 4: OMNI OFF, MONO   X: No

5 PARAMETERS

The number of parameters that are available to the user depends upon the configuration and operating mode of the Dx34A. Adjustable parameters are available in each of the four output channels and the input channel of the two-way configuration. The channel number and name (LO, MID, HI...) appears at the top left-hand side of the display. The parameter name appears next to it. The second line contains the parameter value and the corresponding bar graph. The diagram below shows a typical example of a parameter window.

```
┌─────────────────────────────┐
│  1  LO > LO-CUT FREQ         │
│  ■■             48 Hz        │
└─────────────────────────────┘
```
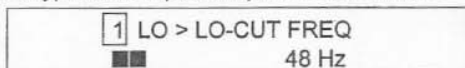
The channel name convention for each configuration appears at the right. The abbreviations used in the display are indicated in parenthesis.

STEREO TWO-WAY
AND TWO-WAY
DUAL MONO:

Channel 1 = Left Low (LO)
Channel 2 = Left High (HI)
Channel 3 = Right Low (LO)
Channel 4 = Right High (HI)

THREE-WAY/SUB + ONE:

Channel 1 = Sub/Low (LO)
Channel 2 = Mid (MD)
Channel 3 = High (HI)
Channel 4 = Direct (DI)

FOUR-WAY:

Channel 1 = Low (LO)
Channel 2 = Low-Mid (LM)
Channel 3 = High-Mid (HM)
Channel 4 = High (HI)

5.1 PARAMETERS IN PRESET MODE
The parameters for the stereo two-way configuration are as follows:

The following sections contain descriptions of all parameters, their settings and other useful information.

Channel 1, LO:	Channel 2, HI:			Input Channel:
LIMIT THRESH (parameters are valid also for channel 3)	LIMIT THRESH (parameters are valid also for channel 4)			MASTER DELAY

The parameters for the three-way/sub + one configuration are as follows:

Channel 1, LO:	Channel 2, MD:	Channel 3, HI:	Channel 4, DI:	Input Channel:
LIMIT THRESH	LIMIT THRESH	LIMIT THRESH	CH4 DELAY	MASTER DLY 1-3

The parameters for the four-way configuration are as follows:

Channel 1, LO:	Channel 2, LM:	Channel 3, HM:	Channel 4, HI:	Input Channel:
LIMIT THRESH	LIMIT THRESH	LIMIT THRESH	LIMIT THRESH	MASTER DLY

5.2 PARAMETERS IN FULL-EDIT MODE
All parameters are accessible in full-edit mode. There are slight differences in the parameters, depending upon the chosen configuration. The following tables give an overview of the parameter list.

In stereo two-way configuration, the following parameters are available.

Channel 1, LO:	Channel 2, HI:			Input Channel:
LO-CUT FREQ	HI-PASS FREQ			MASTER PEQ FREQ
LO-CUT RESP	HI-PASS RESP			MASTER PEQ Q
SHELV FREQ	PEQ1 FREQ			MASTER PEQ GAIN
SHELV SLOPE	PEQ1 Q			MASTER DELAY
SHELV GAIN	PEQ1 GAIN			
PEQ FREQ	PEQ2 FREQ			
PEQ Q	PEQ2 Q			
PEQ GAIN	PEQ2 GAIN			
LO-PASS FREQ	SHELV FREQ			
LO-PASS RESP	SHELV SLOPE			
DELAY ALIGNM	SHELV GAIN			
POLARITY	DELAY ALIGNM			
OUTPUT GAIN	POLARITY			
LIMIT THRESH	OUTPUT GAIN			
LIMIT DECAY	LIMIT THRESH			
LIMIT HOLD	LIMIT DECAY			
(Parameters are valid also for channel 3)	LIMIT HOLD (Parameters are valid also for channel 4)			

5 PARAMETERS

The parameters for the three-way/sub + one configuration are as follows:

Channel 1, LO:	Channel 2, MD:	Channel 3, HI:	Channel 4, DI:	Input Channel:
LO-CUT FREQ	HI-PASS FREQ	HI-PASS FREQ	LO-CUT FREQ	MASTER DLY 1-3
LO-CUT RESP	HI-PASS RESP	HI-PASS RESP	LO-CUT RESP	
SHELV FREQ	PEQ1 FREQ	PEQ1 FREQ	LOSHELV FREQ	
SHELV SLOPE	PEQ1Q	PEQ1 Q	LOSHELV SLOPE	
SHELV GAIN	PEQ1 GAIN	PEQ1 GAIN	LOSHELV GAIN	
PEQ FREQ	PEQ2 FREQ	PEQ2 FREQ	PEQ FREQ	
PEQ Q	PEQ2 Q	PEQ2 Q	PEQ Q	
PEQ GAIN	PEQ2 GAIN	PEQ2 GAIN	PEQ GAIN	
LO-PASS FREQ	LO-PASS FREQ	HISHELV FREQ	LO-PASS FREQ	
LO-PASS RESP	LO-PASS RESP	HISHELV SLOPE	LO-PASS RESP	
DELAY ALIGNM	DELAY ALIGNM	HISHELV GAIN	DELAY	
POLARITY	POLARITY	DELAY ALIGNM	POLARITY	
OUTPUT GAIN	OUTPUT GAIN	POLARITY	OUTPUT GAIN	
LIMIT THRESH	LIMIT THRESH	OUTPUT GAIN	LIMIT THRESH	
LIMIT DECAY	LIMIT DECAY	LIMIT THRESH	LIMIT DECAY	
LIMIT HOLD	LIMIT HOLD	LIMIT DECAY	LIMIT HOLD	
		LIMIT HOLD	LO & CH4 MODE	

In the four-way configuration, the following parameters are available.

Channel 1, LO:	Channel 2, LM:	Channel 3, HM:	Channel 4, HI:	Input Channel:
LO-CUT FREQ	HI-PASS FREQ	HI-PASS FREQ	HI-PASS FREQ	MASTER DELAY
LO-CUT RESP	HI-PASS RESP	HI-PASS RESP	HI-PASS RESP	
LOSHELV FREQ	PEQ FREQ	PEQ1 FREQ	PEQ1 FREQ	
LOSHELV SLOPE	PEQ Q	PEQ1 Q	PEQ1 Q	
LOSHELV GAIN	PEQ GAIN	PEQ1 GAIN	PEQ1 GAIN	
PEQ FREQ	LO-PASS FREQ	PEQ2 FREQ	PEQ2 FREQ	
PEQ Q	LO-PASS RESP	PEQ2 Q	PEQ2 Q	
PEQ GAIN	DELAY ALIGNM	PEQ2 GAIN	PEQ2 GAIN	
LO-PASS FREQ	POLARITY	LOPASS FREQ	HISHELV FREQ	
LO-PASS RESP	OUTPUT GAIN	LOPASS RESP	HISHELV SLOPE	
DELAY ALIGNM	LIMIT THRESH	DELAY ALIGNM	HISHELV GAIN	
POLARITY	LIMIT DECAY	POLARITY	DELAY ALIGNM	
OUTPUT GAIN	LIMIT HOLD	OUTPUT GAIN	POLARITY	
LIMIT THRESH		LIMIT THRESH	OUTPUT GAIN	
LIMIT DECAY		LIMIT DECAY	LIMIT THRESH	
LIMIT HOLD		LIMIT HOLD	LIMIT DECAY	
			LIMIT HOLD	

5 PARAMETERS

NOTE: In preset mode only the master delay and the limiter threshold of the individual channel can be set by the user.

5.3 DESCRIPTION OF PARAMETERS

This is a description of the Dx34A's parameters which may appear in any mode. Value ranges or possible settings are specified for all parameters.

In the edit mode, either the first parameter in the list of parameters will appear, or the last parameter edited will appear.

LO-CUT FREQ

This sets the cut-off frequency of the low-cut filter in the LO channel. This filter can be used to suppress infrasonic signals.

Value range: 20-200 Hz

```
1 LO > LO-CUT FREQ
■■            48 Hz
```
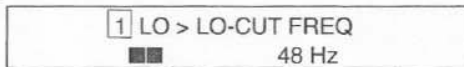
LO-CUT RESP

This parameter determines the response of the low-cut filter. Various filter slopes and Q-factors can be set in the transition range and the filter can be switched off. It is possible to set Thiele/Small B$_6$ vented-loudspeaker alignments (step-down mode) which gives a resonant boost at the filter cut-off frequency. Electro-Voice engineering data sheets specify the appropriate peak-boost (cut off) frequencies.

```
1 LO > LO-CUT RESP
      12 dB Q 0.7
```
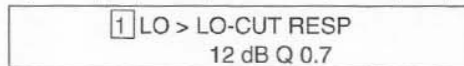
The diagram below and the Filter Response Curves section in the Description and Features section contain examples of possible settings (page 6).
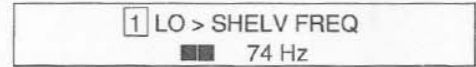
Settings: Through (flat response)
         6 dB
         12 dB Q 0.5
         12 dB Q 0.6
         12 dB Q 0.7
         12 dB Q 0.8
         12 dB Q 1.0
         12 dB Q 1.2
         12 dB Q 1.5
         12 dB Q 2.0
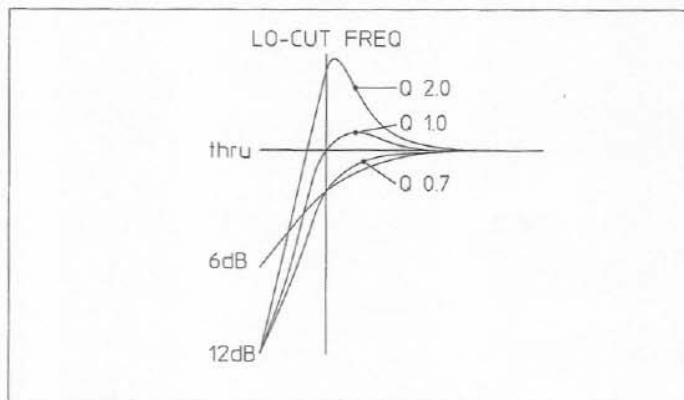
LOSHELV FREQ

The low channel features a low-shelving filter. This parameter sets the upper cut off frequency, i.e., the frequency below which the filter takes effect.

Value range: 20-500 Hz

```
1 LO > SHELV FREQ
■■           74 Hz
```

LOSHELV SLOPE

The slope of the filter can be either 6 or 12 dB per octave. The 1st-order slope (6 dB) is useful for most EQ purposes. The 2nd-order slope (12 dB) can be used in situations where it is required. Typical uses are: compensating for room acoustics, adjusting for acoustic coupling (from multiple cabinets) and setting a user preference curve.

Value range: 6 dB, 12 dB

LOSHELV GAIN

Low-shelving gain is used to set the amount of boost or cut of the low-shelving EQ. The following diagram shows various filter characteristics at different gain settings. Please turn to the Filter Response Curves section (page 6) for further examples.

Value range: ± 12 dB

```
1 LO > SHELV GAIN
■■■■         12 dB
```
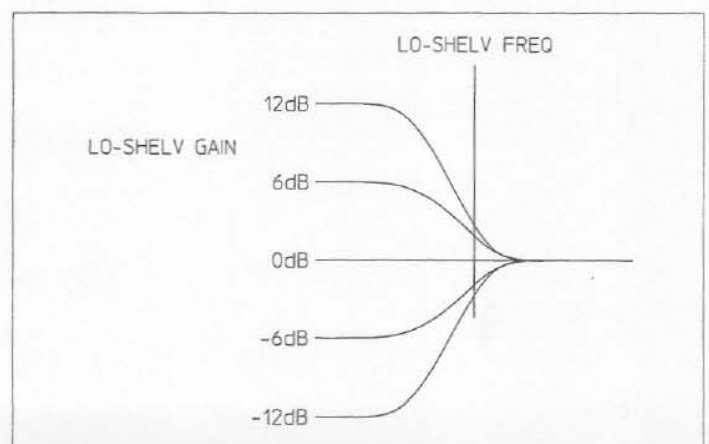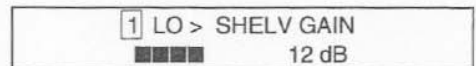
5 PARAMETERS

PEQ (1,2) FREQ, MASTER PEQ FREQ

The Dx34A has several parametric peak-dip filters (parametric equalizers, PEQ's). There are two such filters in the mid and high channels. These are designated PEQ 1 and PEQ 2. The remaining channels always have a parametric filter which is simply called PEQ. The two-way input has a parametric filter termed Master PEQ. Since this filter is in the input master, it affects the broadband frequency response. The center frequencies of the equalizer filterare set with the PEQ FREQ (PEQ 1 FREQ, PEQ 2 FREQ, MASTER PEQ FREQ) parameters.

Value ranges: 20-5,000 Hz (LO, 2-WAY)
30-20,000 Hz (HI, 2-WAY)

20-5,000 Hz (LO, 3-WAY)
30-12,500 Hz (MD, 3-WAY)
200-20,000 Hz (HI, 3-WAY)
20-20,000 Hz (DI, 3-WAY)

20-5,000 Hz (LO, 4-WAY)
20-5,000 Hz (LM, 4-WAY)
50-20,000 Hz (HM, 4-WAY)
500-20,000 Hz (HI, 4-WAY)

20-20,000 Hz (Master PEQ)

> 1 LO > PEQ FREQ
> ■■ 200 Hz

PEQ (1,2) Q, MASTER PEQ Q

The Q parameter in PEQ 1, PEQ 2 and Master PEQ set the quality-factor (bandwidth) of the parametric EQ. A high Q value produces a narrow-band filter, a low Q value produces a broadband filter. The filter response curves section shows several filter responses with the appropriate parameter settings. These examples demonstrate the effect of the Q parameter.

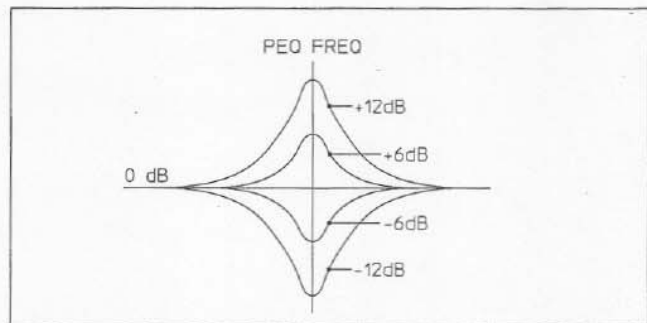Value range: 0.4-20.0

> 1 LO > PEQ Q
> ■ 5.0
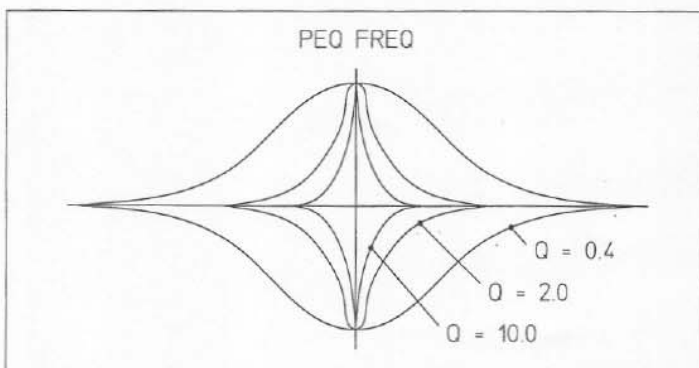
PEQ (1,2) GAIN, MASTER PEQ GAIN

The Gain parameter in PEQ 1, PEQ 2 and MASTER PEQ sets the amount of boost or cut in the parametric. The resolution is one dB.

Value range: ±12 dB

> 1 LO > PEQ GAIN
> ■ -6 dB

LO-PASS FREQ

The crossover filter consists of a low pass in one channel and a high pass in the adjacent channel. The cutoff frequency for the low pass of the crossover filter is set with this parameter. The corresponding high pass will normally be set at the same cutoff frequency.

Value ranges: 30-5,000 Hz (LO, 2-WAY)
30-5,000 Hz (LO, 3-WAY)
200-12,500 Hz (MD, 3-WAY)
30-5,000 Hz (LO, 4-WAY)
125-5,000 Hz (LM, 4-WAY)
500-20,000 Hz (HM, 4-WAY)

> 1 LO > LO-PASS FREQ
> ■■ 152 Hz
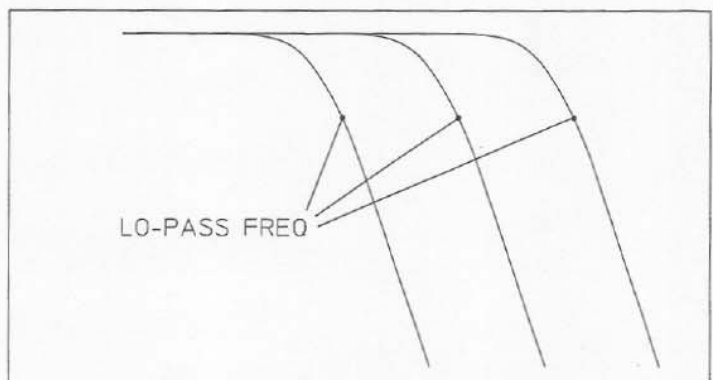
LO-PASS RESP

This determines the filter characteristics for the low pass of the crossover filter. Various filter slopes and filter responses (Bessel, Butterworth and Linkwitz-Riley) can be selected or the filter can be bypassed. The corresponding high pass will normally be set to the same filter type.

Settings: Through (flat response)
6 dB
Bessel 12 dB
Butter 12 dB
Linkwitz 12 dB
Bessel 18 dB
Butter 18 dB
Bessel 24 dB
Butter 24 dB
Linkwitz 24 dB

```
┌─────────────────────────────┐
│  1  LO > LO-PASS RESP        │
│        BUTTER  18 dB         │
└─────────────────────────────┘
```
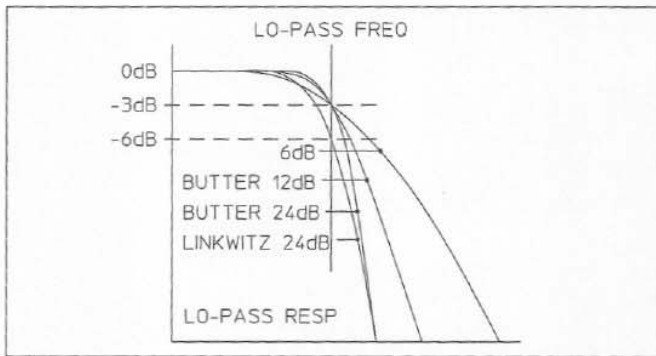

DELAY ALIGNM

This sets the time delay in channels 1-4. These delays enable the user to compensate for different propagation times that result from different radiation planes of the individual loudspeakers.

Value ranges: 0 msec to 20 msec
0 μsec to 20,011 μsec
0 ft to 23 ft
0 in. to 270 in.
0 m to 7 m
0 cm to 687 cm

```
┌─────────────────────────────┐
│  1  LO >  DELAY  ALIGNM      │
│  ██          10 ms           │
└─────────────────────────────┘
```

POLARITY

Selects the polarity of the signal in each individual output 1-4. The characteristics of the selected crossover type may make it necessary to invert the signal in one channel.

Settings: Not inverted
Inverted

```
┌─────────────────────────────┐
│  1  LO > POLARITY            │
│        NOT INVERTED          │
└─────────────────────────────┘
```


DELAY ALIGNM
= 4ms (≙ 1.37m)
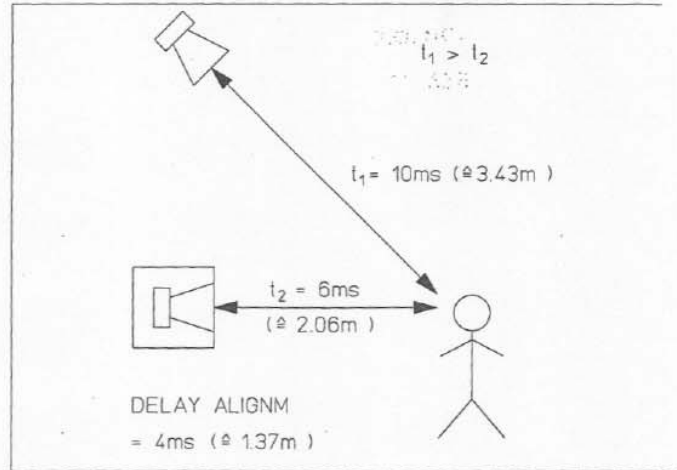
OUTPUT GAIN

This is a digital gain section to compensate for different loudspeaker efficiencies. In some situations, use of the digital attenuators may expose the digital noise floor of the Dx34A (a possibility with all digital electronics). In these cases, the highest signal-to-noise ratio will be realized by using the Dx34A's analog output attenuators (14) instead of the digital attenuators. The same effect can also be achieved by using the attenuators on electronics following the Dx34A, e.g., power amplifier input control levels.

Value range: OFF, -24 dB to +6 dB

```
┌─────────────────────────────┐
│  1  LO > OUTPUT GAIN         │
│  ███          -5 dB          │
└─────────────────────────────┘
```

LIMIT THRESH

This parameter sets the threshold of the digital limiter. If a signal peak exceeds this threshold it will be limited to the threshold value. The limiter threshold can be calibrated in dB (relative to full modulation), dBu (0 dBu = 0.775 V) or volts. The units are selected in the option menu (see Section 6.5).

Value ranges: -21 dB to 0 dB
0 dBu to 21 dBu
0.7 V to 8.7 V

```
┌─────────────────────────────┐
│  1  LO > LIMIT THRESH        │
│  ███          -5 dB          │
└─────────────────────────────┘
```
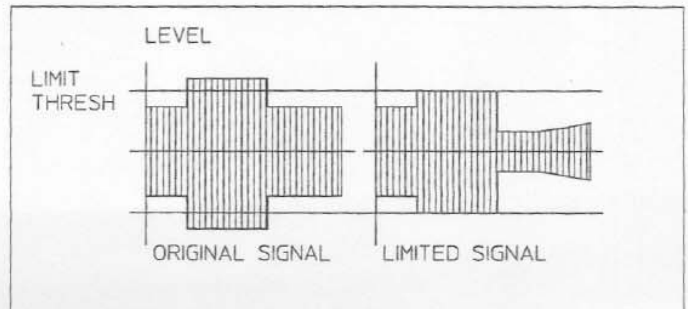
5 PARAMETERS

LIMIT DECAY

This parameter sets the decay time of the limiter. If the signal level falls below the limiter threshold, the signal returns to its original value. The decay time is expressed in dB per second.

Value range: 1 dB per second to 100 dB per second

```
┌──────────────────────────────────┐
│  1  LO > LIMIT DECAY             │
│  ■■          50 dB/s             │
└──────────────────────────────────┘
```

LIMIT HOLD

This sets the hold time of the limiter. When the signal level falls below the limiter threshold, the amount of gain reduction that occurred during the offending transient continues (is held) for this amount of time. The limiter will not begin to return to a state of non-limiting until after the hold time has expired. If signal peaks continue to exceed the limiter threshold value, the signal will be repeatedly attenuated. An audible "pumping" effect can be heard under these conditions. This pumping effect can be significantly reduced by judicious use of the hold-time parameter.

Value range: 0 msec to 100 msec

```
┌──────────────────────────────────┐
│  1  LO > LIMIT HOLD              │
│  ■            25 ms              │
└──────────────────────────────────┘
```
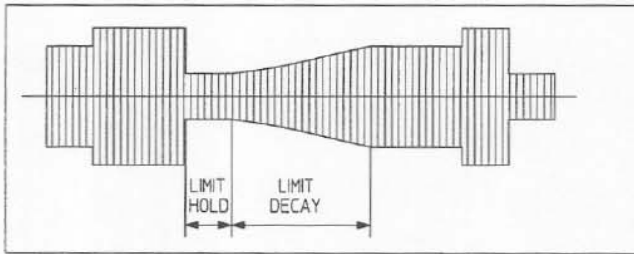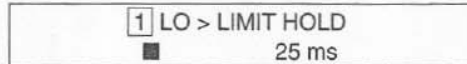

HI-PASS FREQ

The crossover filter consists of a low pass in one channel and a highpass in the adjacent channel. This parameter is used to set the cutoff frequency for the high-pass section of the crossover. The corresponding low pass will normally be set at the same cutoff frequency.

Value ranges:
- 30-5,000 Hz (HI, 2-WAY)
- 50-5,000 Hz (MD, 3-WAY)
- 200-12,500 Hz (HI, 3-WAY)
- 30-5,000 Hz (LM, 4-WAY)
- 125-5,000 Hz (HM, 4-WAY)
- 500-20,000 Hz (HI, 4-WAY)

```
┌──────────────────────────────────┐
│  2  HI > HI-PASS FREQ            │
│  ■■■          152 Hz             │
└──────────────────────────────────┘
```
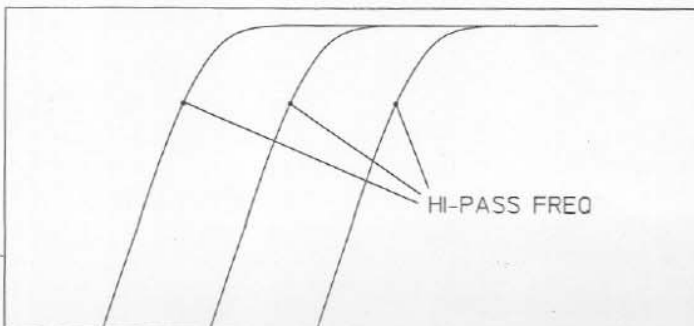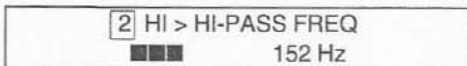

HI-PASS RESP

This parameter determines the filter characteristics for the high pass of the crossover filter. Various filter slopes and filter characteristics (Bessel, Butterworth and Linkwitz-Riley) can be selected and the filter can be bypassed. The corresponding low-pass will normally be set to the same filter type.

Settings:
Through
6 dB
Bessel 12 dB
Butter 12 dB
Linkwitz 12 dB
Bessel 18 dB
Butter 18 dB
Bessel 24 dB
Butter 24 dB
Linkwitz 24 dB

```
┌──────────────────────────────────┐
│  2  HI > HI-PASS RESP            │
│       BUTTER  18 dB              │
└──────────────────────────────────┘
```
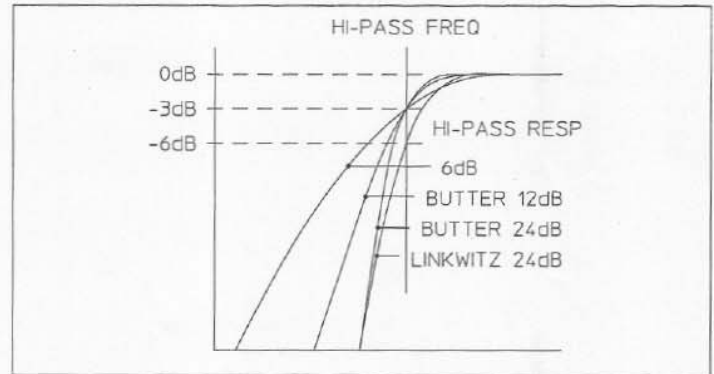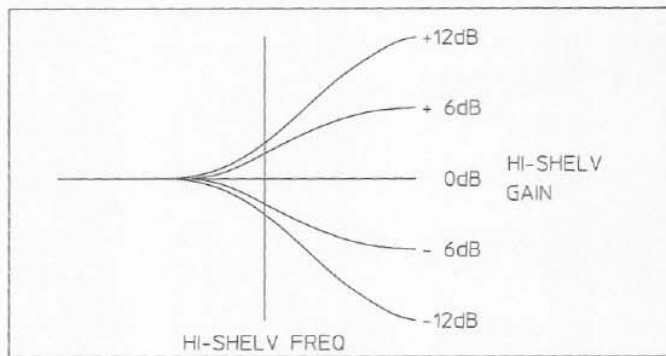

HISHELV FREQ

A high-shelving filter is included in the high channel to allow boost or cut for the high frequencies. This parameter is used to set the cutoff frequency, i.e., the frequency from which the filter begins to take effect.
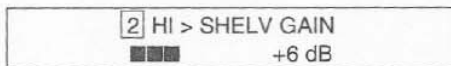
Value range: 500 - 16,000 Hz

```
┌──────────────────────────────────┐
│  2  HI > SHELV FREQ              │
│  ■■          3500 Hz             │
└──────────────────────────────────┘
```
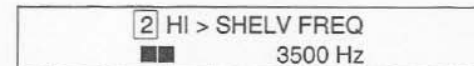
HISHELV GAIN

This parameter is used to set the boost or cut of the high-shelve filter.

Value range: 6 dB/octave slope: ±12 dB
12 dB/octave slope: -12 dB to +6 dB

```
[2] HI > SHELV GAIN
███        +6 dB
```

HISHELV SLOPE

The slope of the filter can be either 6 or 12 dB per octave. The 1st-order slope (6 dB) is useful for most EQ purposes. The 2nd-order slope (12 dB) can be used in situations where it is required. Typical uses are compensating for room acoustics, and setting a user preference curve.
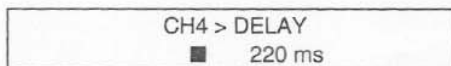
Value range: 6 dB, 12 dB

```
[2] HI > SHELV SLOPE
      6 dB
```

CH4 DELAY

This parameter appears only in the three-way/sub + one configuration. This parameter sets the delay time in channel four (DIRECT). This delay can be used to supply groups of loudspeakers with a delayed direct signal. The resolution and range differs from the delay alignment found in the other three output channels.
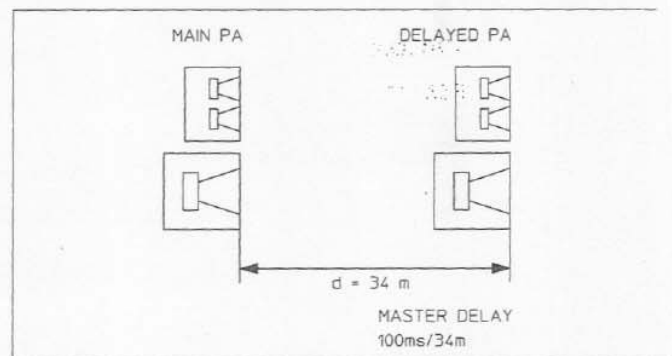
Value ranges: 2 msec to 1,000 msec
2 ft to 1,127 ft
27 in. to 13,521 in.
1 m to 343 m
70 cm to 34,345 cm

```
CH4 > DELAY
■     220 ms
```

MASTER DELAY/MASTER DLY 1-3

This delay is in the master input section before the crossover. Therefore it affects all crossover channels. In the three-way/sub +one configuration, it affects channels 1-3, in the two-way and four-way configurations, it affects all four channels.

The delay units can be specified in milliseconds, feet, inches, meters or centimeters.

Value ranges: 2 msec to 1,000 msec
2 ft to 1,127 ft
27 in. to 13,521 in.
1 m to 343 m
70 cm to 34,345 cm

```
MASTER DELAY
■■     500 ms
```
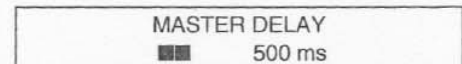
LO & CH4 MODE

This parameter appears only in the three-way/sub + one configuration. The input signal for channel one (Lo) and channel four (Direct) is assigned with this software switch. The convention used in this window is "Output: input Output: input". That is, when the second line of the display shows "LO: L   CH4: L+R," the low output is driven by the left input and CH4 is driven by the sum of the L and R inputs. There are four options in this window and they are listed below. Channels two and three continue to receive their signal from input one.

The mono-sum feature accommodates stereo three-way + sub configurations when using two Dx34A's (see the mode: three-way/sub + one block diagram in Section 4.4).

Settings: LO:L   CH4:L
LO:L+R   CH4:L+R
LO:L   CH4:L+R
LO:L   CH4:R
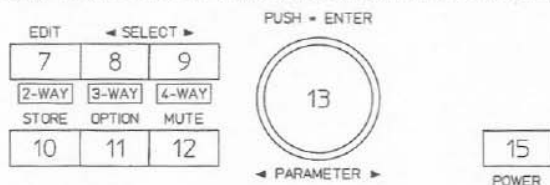
```
LO & CH4 MODE
LO:L      CH4:L+R
```
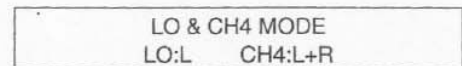
6 OPTION FUNCTIONS

The option menu contains a number of important additional functions and default settings.
The following functions are accessed with the select keys:

1. Setting of the LCD CONTRAST
2. Edit protection (LOCK)
3. Setting of the TWO-WAY PARAMETERS
4. Setting of the DELAY UNIT
5. Value of the limiter threshold (LIMIT THRESH IN)
6. Display mode of the level displays (VU DISPLAY MODE)
7. Setting of the MIDI CHANNEL
8. Transmission of MIDI data (MIDI DATA DUMP)
9. Function of MIDI OUT
10. Display of the software version number (Dx34A software)

```
EDIT      ◄ SELECT ►        PUSH ► ENTER
+-----+-----+-----+
|  7  |  8  |  9  |
+-----+-----+-----+           /‾‾‾‾‾‾\
|2-WAY|3-WAY|4-WAY|          /        \
+-----+-----+-----+         |    13    |
STORE  OPTION  MUTE          \        /
+-----+-----+-----+           _____/           +-----+
| 10  | 11  | 12  |                               | 15  |
+-----+-----+-----+        ◄ PARAMETER ►          +-----+
                                                   POWER
```

The procedure is as follows:

1. Press the Option key (11) to open the option menu.

2. The option program used last appears on the display, e.g.:

> **LCD CONTRAST**
> --- +3 ---

3. Find the desired option by using the select keys (8, 9).

4. Use the rotary encoder (13) to set the Option values.

5. The option mode can be cancelled by pressing the option key (11) again or another mode key, (e.g. switching to edit mode by pressing the edit key).

6.1 SETTING THE LCD CONTRAST

The LCD contrast or viewing angle can be adjusted between -10 (viewed from below) and +10 (viewed from above).

> **LCD CONTRAST**
> --- +7 ---
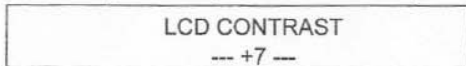
6.2 EDIT PROTECTION (LOCK)

The Dx34A has an edit protection feature which can be enabled to prevent unauthorized changes to the settings.
To activate the edit protection feature, first press the key option (11) and select the lock store window.

> **LOCK=STORE**
> CODE NR: 000
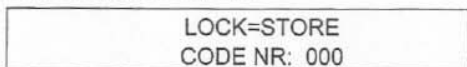
Next, enter your code number using the rotary encoder (13) and confirm by pressing store (10) and enter (13), e.g.:

> **CONFIRM=ENTER**
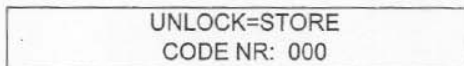> CODE NR: 008
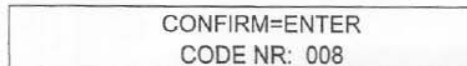
To alter any of the unit's settings, the display will show:

> **SYSTEM**
> IS LOCKED!

In this status, nothing can be entered with the keys.
To switch off edit protection, select the "lock" window again.
The display shows:

> **UNLOCK=STORE**
> CODE NR: 000

Enter your code number and press store (10). The following appears briefly on the display:

> **SYSTEM**
> IS UNLOCKED!

Lock is now disabled and parameters are accessible.

Note: If you have forgotten the code number you can switch the edit protection feature off again by pressing the keys: store (10) and mute (12) simultaneously while switching the unit on. To view the forgotten code, select the "lock" window in the option menu.

6.3 TWO-WAY PARAMETERS

The parameters for each of the two input channels may be set together for stereo operation or independently for dual-mono operation.

> **TWO-WAY PARAMETERS**
> INDEPENDENT
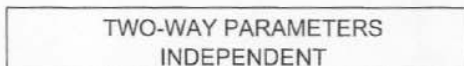
6.4 SELECTING THE DELAY UNIT

The user can choose the delay units for the delay line in the Dx34A. The display then shows:

> **DELAY UNIT**
> milli-sec

Distance settings are automatically converted into delay times.

Possible settings: millisec
                    µsec
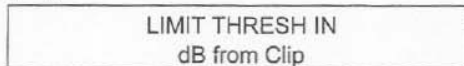   feet
                    inch
                    meter
                    centimeter

6.5 LIMITER THRESHOLD REFERENCE

The limiter threshold has three selectable references. They are:

dB FROM CLIP:
The value for the limiter threshold is in dB relative to clipping (0 dB = clipping).

> **LIMIT THRESH IN**
> dB from Clip

dBu (0.775V):
The limiter threshold is in dBu.
(0 dBu = 0.775 V).

VOLTS:
The limiter threshold is in volts.

6 OPTION FUNCTIONS

6.6 LEVEL INDICATOR RESPONSE

PEAK HOLD:

The peak-hold function is switched on. This will help the user to set the level.

```
VU DISPLAY MODE
Peak hold
```

NO PEAK:

The peak-hold function is switched off. The level display works normally with a short decay time constant of approximately 600 dB per second.

SLOW:

In this setting, the dynamics of the display is slowed by a longer decay time (approximately 60 dB per second).

6.7 MIDI CHANNEL SELECTION

The MIDI channel on which the Dx34A is to transmit and receive MIDI data is set in this option. The setting also applies to transmitting and receiving System Exclusive Data (SysEx). The following may appear on the display:

```
MIDI CHANNEL
2
```

The following settings can be made with the rotary encoder:

OFF - The Dx34A does not react to any MIDI data. No MIDI data are transmitted. SysEx is switched off.

OMNI - The Dx34A can receive MIDI data on all 16 MIDI channels. Data is transmitted on channel one.

1 - 16 - The Dx34A only transmits and receives MIDI data on the MIDI channel selected between 1 and 16. This setting is equally applicable for SysEx data.

6.8 TRANSMISSION OF MIDI DATA (MIDI DUMP)

All user programs and system data of a Dx34A can be transmitted via MIDI, provided that the MIDI out socket of the Dx34A is connected to the MIDI in socket of a unit which can recognize this data, e.g. another Dx34A, computer etc. Please ensure that the MIDI channels in both units correspond with each other.

The following may appear on the display:

```
MIDI DATA DUMP
START=ENTER
```

Pressing the rotary encoder (ENTER) activates the MIDI dump and all data is transmitted.

During transmission, the display shows the following:

```
SENDING MIDI
DATA DUMP..
```

The display then returns to its original state.

To transfer data back to the Dx34A, connect the MIDI in socket of the Dx34A with the MIDI out socket of the transmission device. The MIDI dump must then be started on the transmission device (2nd Dx34A, computer, etc.).

To control other devices from the Dx34A, first ensure that all the units have the same configuration. To do so, transfer all device data using MIDI dump from the master to the connected slaves. All devices then have identical settings and are synchronized. The master Dx34A can then transmit all operating steps to the connected slaves. The settings are immediately activated.
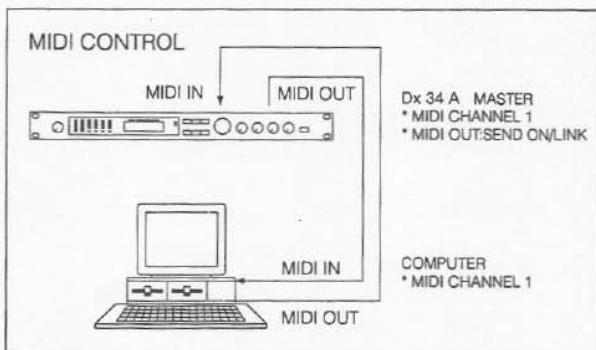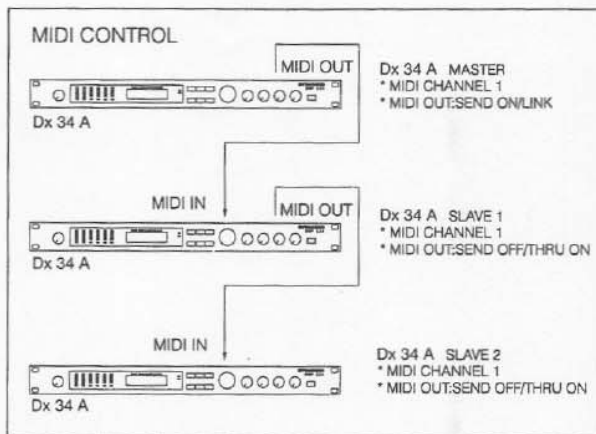
6.9 FUNCTION OF MIDI OUT

The function of the MIDI output can be selected here. The following settings can be made using the rotary encoder:

send off / - thru on The MIDI out socket is used as a MIDI through socket. All received MIDI data is retransmitted through MIDI out without being changed. If several Dx34A units are to be controlled from a single master, this setting should be used in the slave units.

```
MIDI OUT
send off/thru on
```

send on/ - link MIDI data dump, or MIDI linked control information, can be transmitted via the MIDI out socket. Select this setting to use the Dx34A as a master unit for other Dx34A units or to transfer data to other units.

The diagrams below are intended to clarify the MIDI settings described here.

MIDI CONTROL

Dx 34 A MASTER
* MIDI CHANNEL 1
* MIDI OUT:SEND ON/LINK

Dx 34 A SLAVE 1
* MIDI CHANNEL 1
* MIDI OUT:SEND OFF/THRU ON

Dx 34 A SLAVE 2
* MIDI CHANNEL 1
* MIDI OUT:SEND OFF/THRU ON

MIDI CONTROL

Dx 34 A MASTER
* MIDI CHANNEL 1
* MIDI OUT:SEND ON/LINK

COMPUTER
* MIDI CHANNEL 1

6.10 SOFTWARE VERSION NUMBER

The display shows the software version of the Dx34A's hostprocessor, e.g., version 3.00.

```
Dx34A
SOFTWARE V 3.00
```

EV

SERVICE INFORMATION

*** CAUTION ***

NO USER SERVICEABLE PARTS INSIDE. EXTREMELY HAZARDOUS VOLTAGES AND CURRENTS MAY BE ENCOUNTERED WITHIN THE CHASSIS. THE SERVICING INFORMATION CONTAINED WITHIN THIS DOCUMENT IS ONLY FOR USE BE ELECTRO-VOICE AUTHORIZED WARRANTY REPAIR STATIONS AND QUALIFIED PERSONNEL. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. OTHERWISE, REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL. SERVICE AND WARRANTY INFORMATION

SERVICE AND WARRANTY INFORMATION

ELECTRO-VOICE BBS

Electro-Voice operates a Bulletin-Board Service at 616/695-4791 (8,N,1). A current list of presets for Electro-Voice speakers can be downloaded from this service.

SHIPPING DAMAGE

Inspect the shipping carton for possible damage. If damage is found, notify the transportation company immediately. Save the carton as evidence for the carrier to inspect. If damage occurs during shipping, it is the responsibility of the consignee to file a claim with the carrier. If the carton is in good condition but the unit is damaged, call Electro-Voice at 800/234-6831.

Included in the box with the Dx34A is a power cord, warranty card and this manual.

FIELD SERVICE
CONTROLLER POWER INSPECTION

If the Dx34A power indicator does not light:

1. Check the power switch.

2. Check the power cable.

WARRANTY (Limited)

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owners manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owners manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owners manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI49107 (616/695-6831 or 800/234-6831). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitati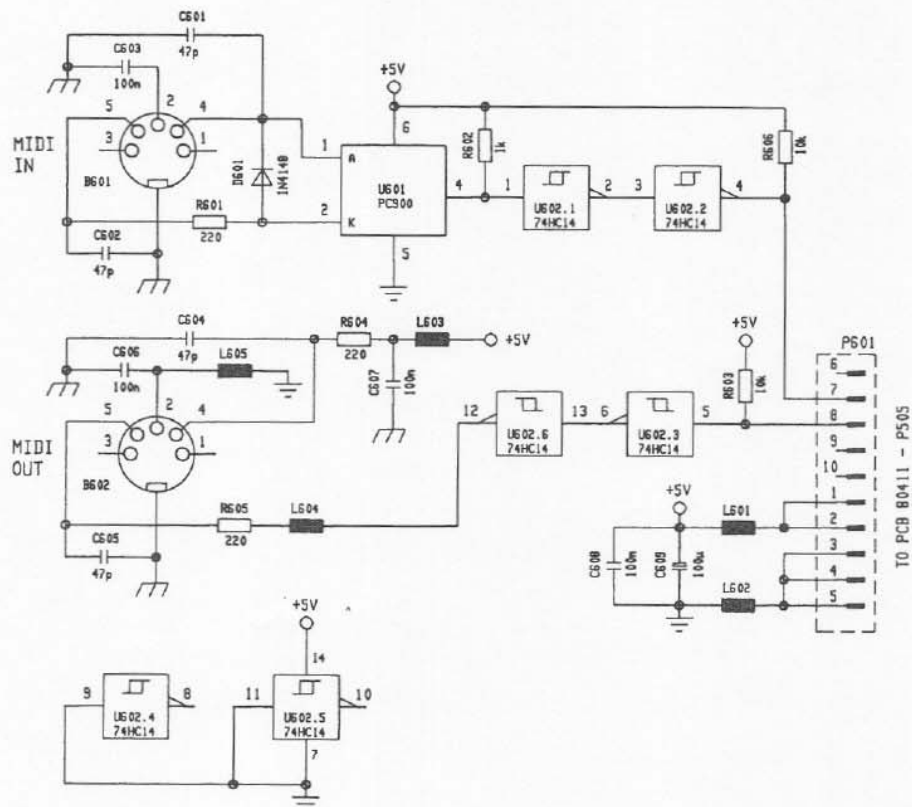on or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.
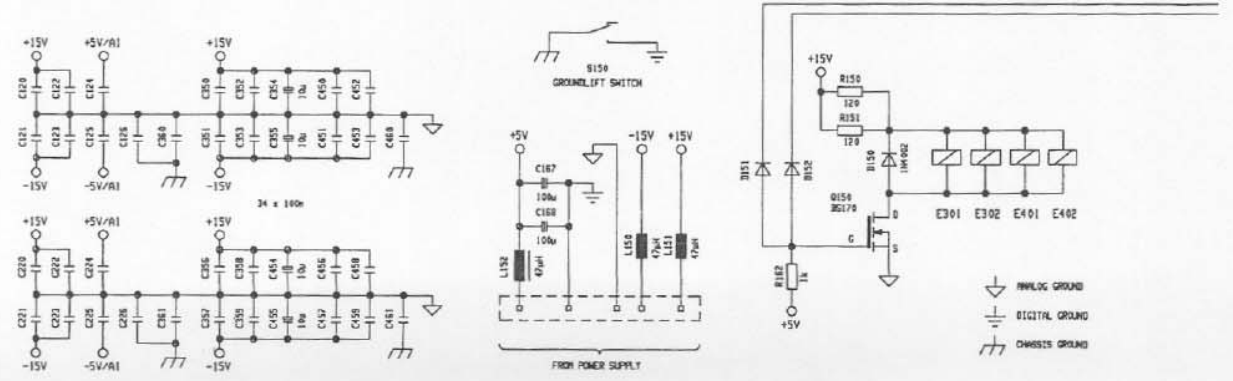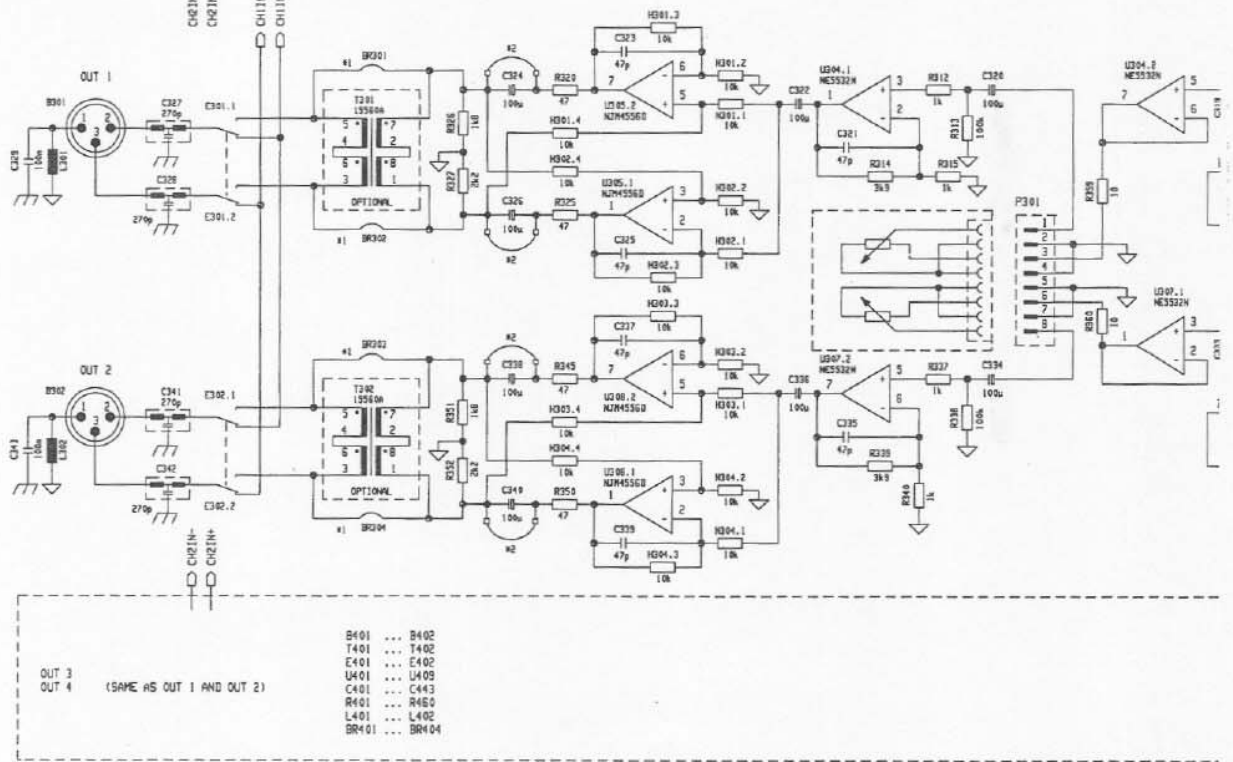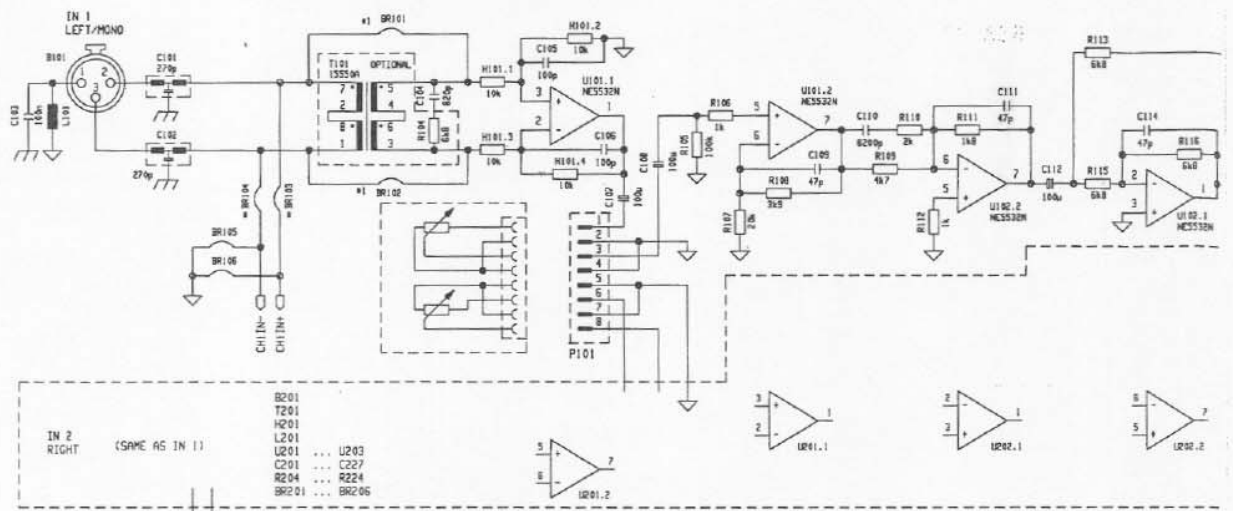
SCHEMATIC DIAGRAMS
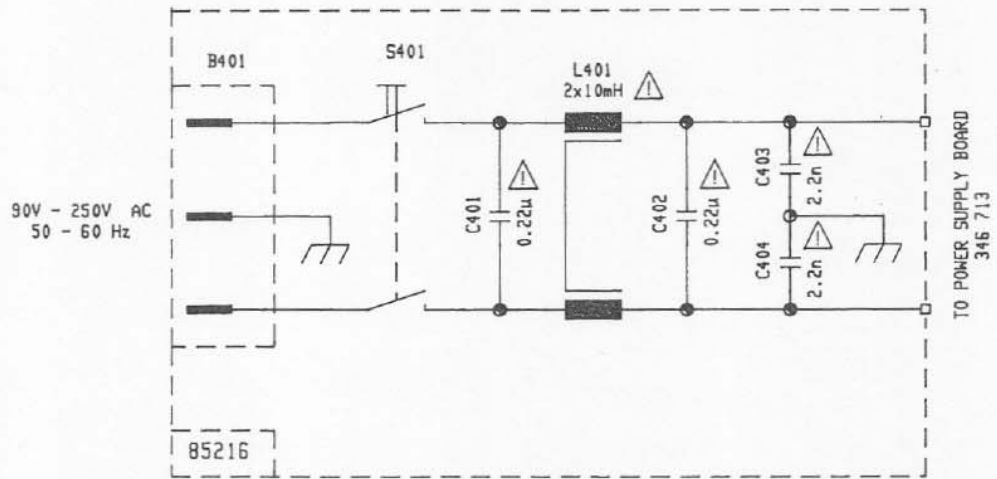
SAFETY COMPONENT
(MUST BE REPLACED BY ORIGINAL PART)

Line Filter Circuit Diagram
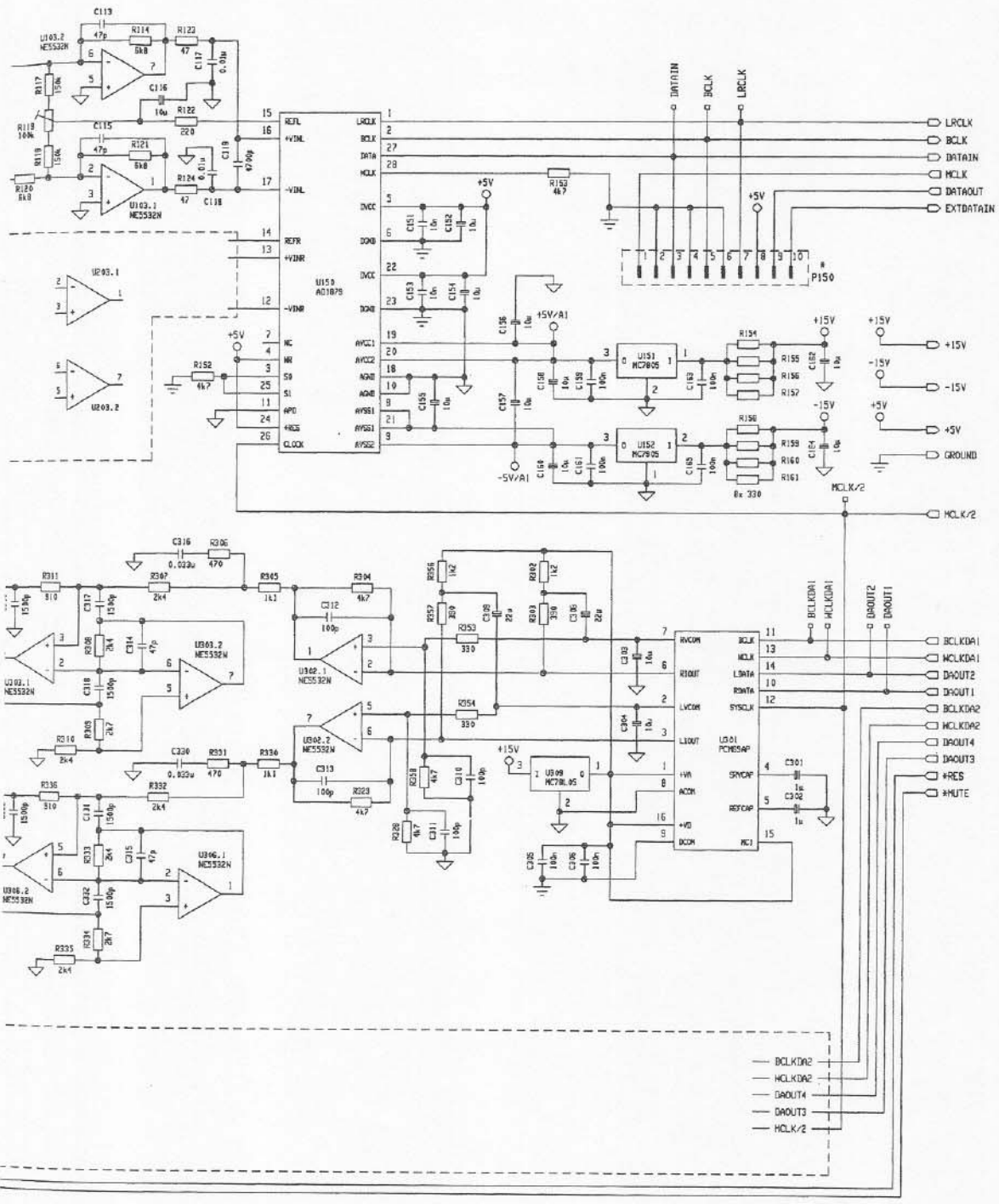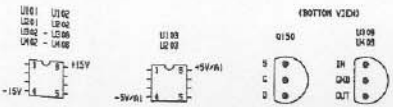

MIDI Board Circuit Diagram

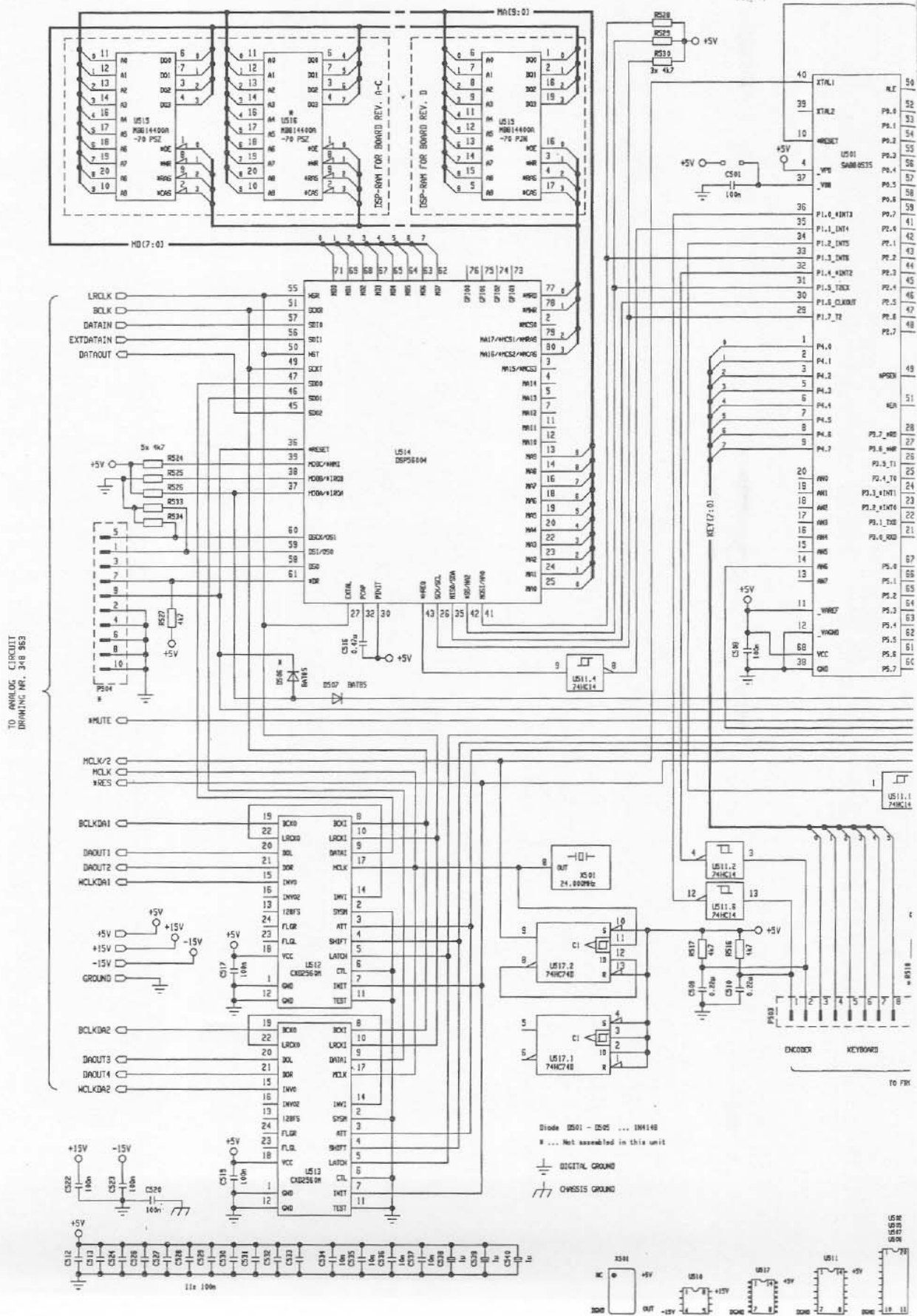# SCHEMATIC DIAGRAMS

Notes:
1. EMI filter C101,C102,C201,C202
              C327,C328,C341,C342
              C427,C428,C441,C442 ... MTB271
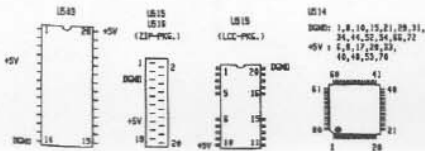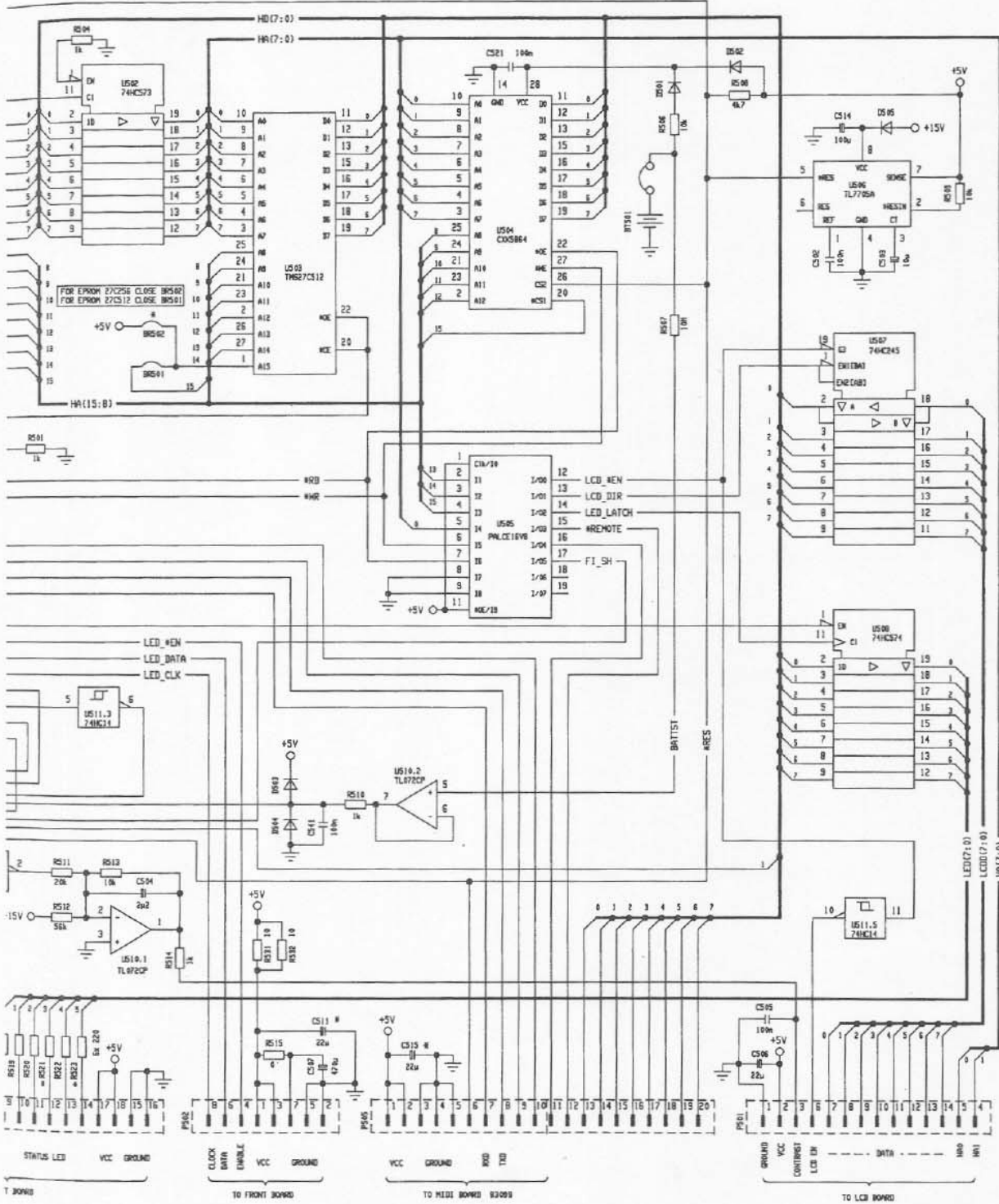2. Diode   D151,D152   ... 1N4148

* : Not assembled in this unit
*1: Remove using an optional input or output transformer
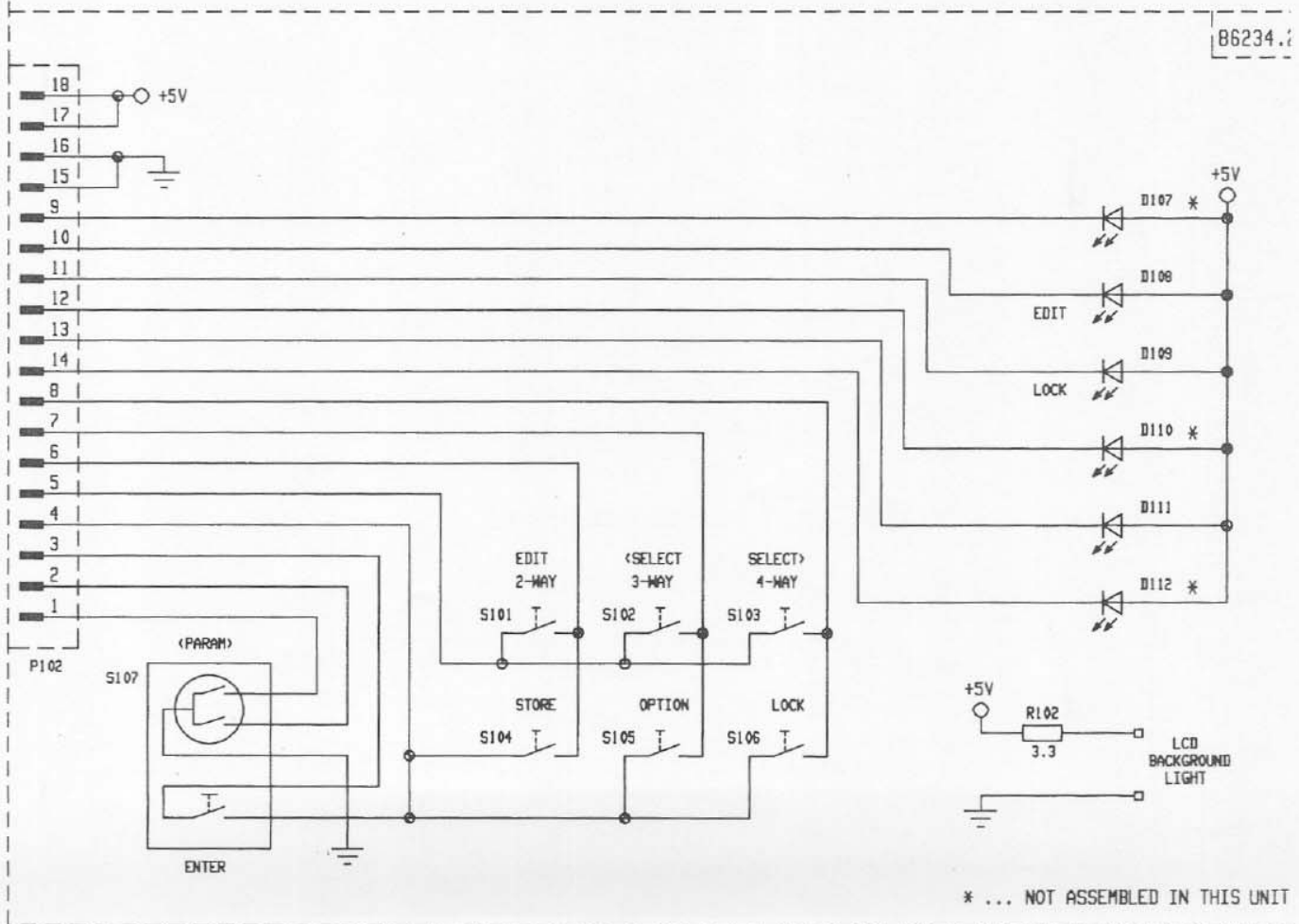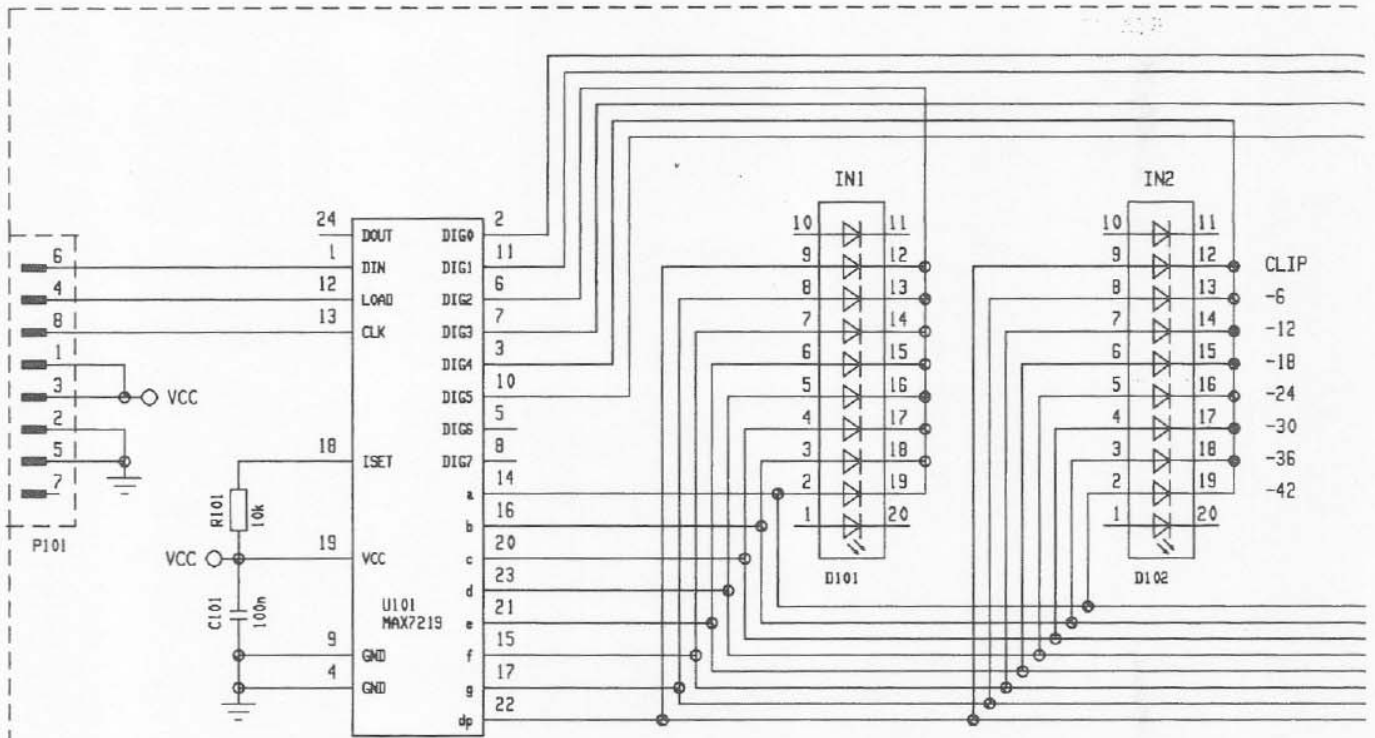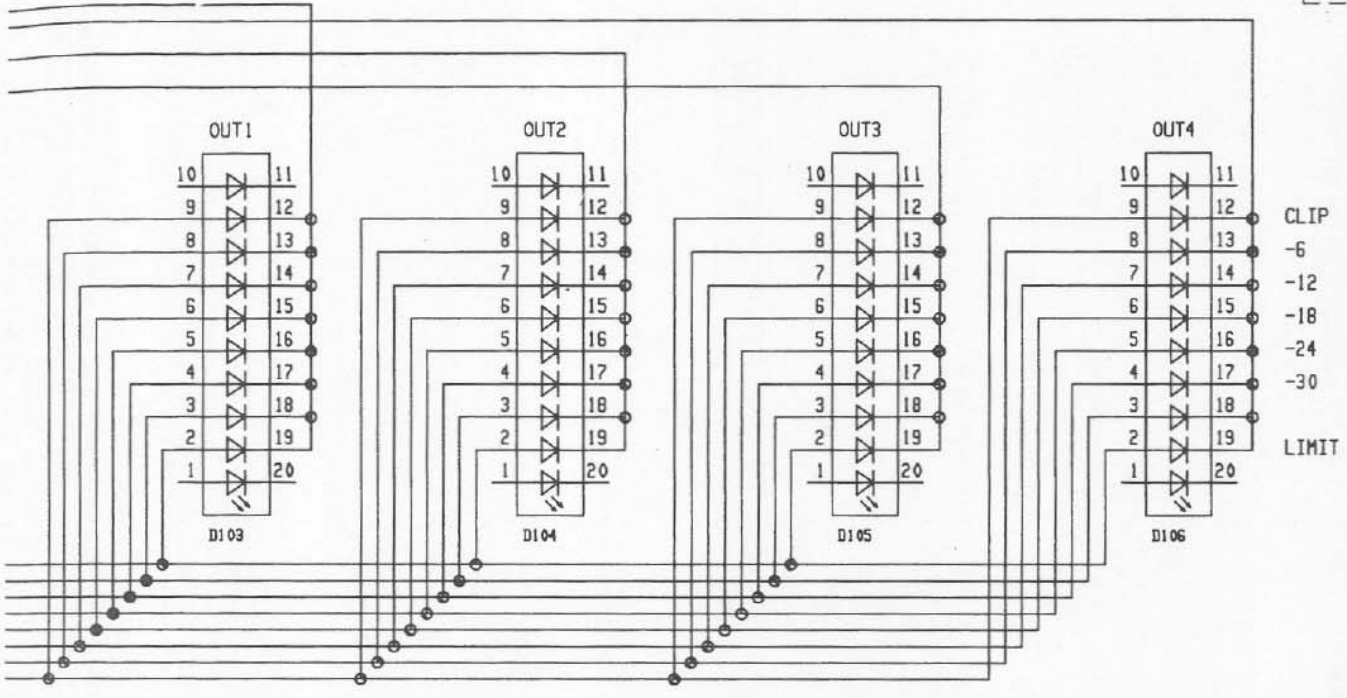*2: Only linked using an optional output transformer

SCHEMATIC DIAGRAMS

B6234.2

* ... NOT ASSEMBLED IN THIS UNIT

SCHEMATIC DIAGRAMS
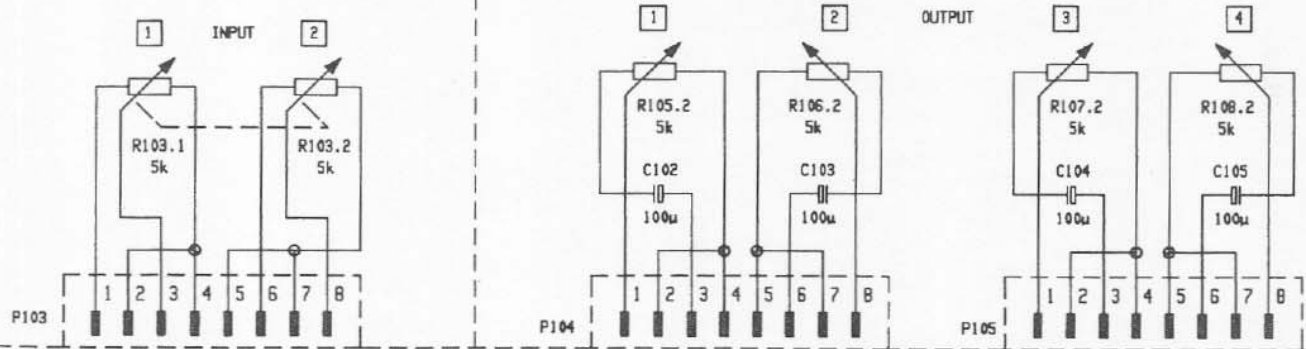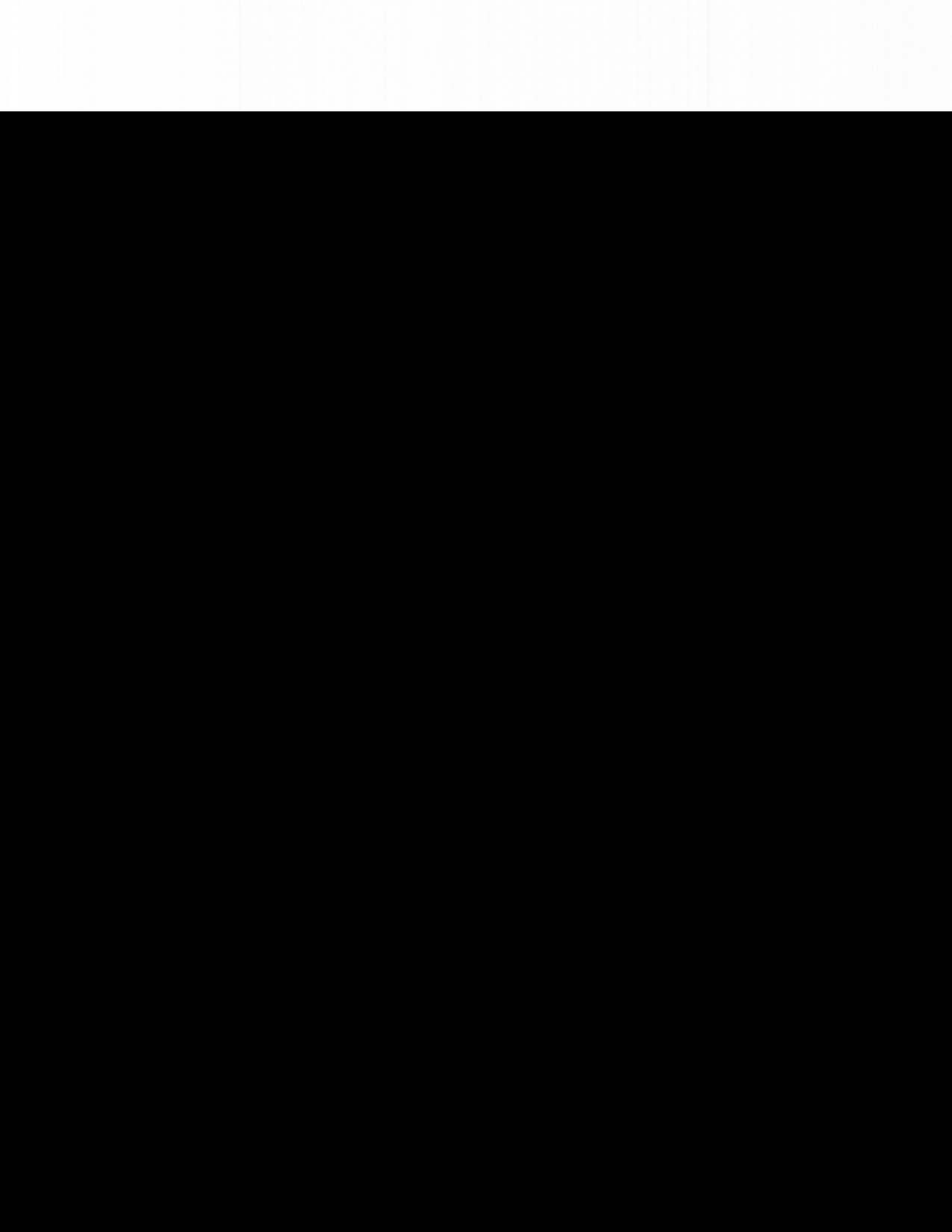
2-WAY MODE
USER PROGRAM DEFAULT VALUES

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY	2 ms				
MASTER PEQ FREQ	1000 Hz				
MASTER PEQ Q	1.0				
MASTER PEQ GAIN	0 dB				
LO-CUT FREQ		32 Hz		32 Hz	
LO-CUT RESP		12 dB 0.7 Q		12 dB 0.7 Q	
LOSHELV FREQ		100 Hz		100 Hz	
LOSHELV SLOPE		6 dB		6 dB	
LOSHELV GAIN		0 dB		0 dB	
HI-PASS FREQ			1200Hz		1200Hz
HI-PASS RESP			4th LW		4th LW
PEQ1 FREQ		80 Hz	2500 Hz	80 Hz	2500 Hz
PEQ1 Q		1.0	1.0	1.0	1.0
PEQ1 GAIN		0 dB	0 dB	0 dB	0 dB
PEQ2 FREQ			16000 Hz		16000 Hz
PEQ2 Q			1.0		1.0
PEQ2 GAIN			0 dB		0 dB
LO-PASS FREQ		1200 Hz		1200 Hz	
LO-PASS RESP		4th LW		4th LW	
HISHELV FREQ			10000 Hz		10000 Hz
HISHELV SLOPE			6 dB		6 dB
HISHELV GAIN			0 dB		0 dB
DELAY ALIGNM		0 us	0 us	0 us	0 us
POLARITY		+	+	+	+
OUTPUT GAIN		0 dB	0 dB	0 dB	0 dB
LIMIT THRESH		21 dBu	21 dBu	21 dBu	21 dBu
LIMIT DECAY		50 dB/s	50 dB/s	50 dB/s	50 dB/s
LIMIT HOLD		5 ms	5 ms	5 ms	5 ms

3-WAY MODE
USER PROGRAM DEFAULT VALUES

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY 1-3	2.0 ms				
LO-CUT FREQ		32 Hz			32 Hz
LO-CUT RESP		12 dB 0.7 Q			12 dB 0.7 Q
LOSHELV FREQ		100 Hz			100 Hz
LOSHELV SLOPE		6 dB			6 dB
LOSHELV GAIN		0 dB			0 dB
HI-PASS FREQ			160 Hz	1800 Hz	
HI-PASS RESP			4th LW	4th LW	
PEQ1 FREQ		80 Hz	180 Hz	5000 Hz	80 Hz
PEQ1 Q		1.0	1.0	1.0	1.0
PEQ1 GAIN		0 dB	0 dB	0 dB	0 dB
PEQ2 FREQ			1600 Hz	16000 Hz	
PEQ2 Q			1.0	1.0	
PEQ2 GAIN			0 dB	0 dB	
LO-PASS FREQ		160 Hz	1800 Hz		80 Hz
LO-PASS RESP		4th LW	4th LW		4th LW
HISHELV FREQ				10000 Hz	
HISHELV SLOPE				6 dB	
HISHELV GAIN				0 dB	
DELAY ALIGNM		0 us	0 us	0 us	2 ms
POLARITY		+	+	+	+
OUTPUT GAIN		0 dB	0 dB	0 dB	0 dB
LIMIT THRESH		21 dBu	21 dBu	21 dBu	21 dBu
LIMIT DECAY		50 dB/s	50 dB/s	50 dB/s	50 dB/s
LIMIT HOLD		5 ms	5 ms	5 ms	5 ms
LO & CH4 MODE					LO:L CH4:L+R

4-WAY MODE
USER PROGRAM DEFAULT VALUES

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY	2 ms				
LO-CUT FREQ		32 Hz			
LO-CUT RESP		12 dB 0.7 Q			
LOSHELV FREQ		100 Hz			
LOSHELV SLOPE		6 dB			
LOSHELV GAIN		0 dB			
HI-PASS FREQ			160 Hz	800 Hz	8000 Hz
HI-PASS RESP			4th LW	4th LW	4th LW
PEQ1 FREQ		80 Hz	180 Hz	5000 Hz	5000 Hz
PEQ1 Q		1.0	1.0	1.0	1.0
PEQ1 GAIN		0 dB	0 dB	0 dB	0 dB
PEQ2 FREQ				16000 Hz	16000Hz
PEQ2 Q				1.0	1.0
PEQ2 GAIN				0 dB	0 dB
LO-PASS FREQ		160 Hz	800 Hz	8000 Hz	
LO-PASS RESP		4th LW	4th LW	4th LW	
HISHELV FREQ					10000 Hz
HISHELV SLOPE					6 dB
HISHELV GAIN					0 dB
DELAY ALIGNM		0 us	0 us	0 us	0 us
POLARITY		+	+	+	+
OUTPUT GAIN		0 dB	0 dB	0 dB	0 dB
LIMIT THRESH		21 dBu	21 dBu	21 dBu	21 dBu
LIMIT DECAY		50 dB/s	50 dB/s	50 dB/s	50 dB/s
LIMIT HOLD		5 ms	5 ms	5 ms	5 ms

2-WAY MODE

AUTHOR: _____

TITLE: _____

SPEAKER SYSTEM NAME: _____

DATE: _____

SOFTWARE
VERSION: _____

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY	ms				
MASTER PEQ FREQ	Hz				
MASTER PEQ Q					
MASTER PEQ GAIN	dB				
LO-CUT FREQ		Hz		Hz	
LO-CUT RESP		dB Q		dB Q	
LOSHELV FREQ		Hz		Hz	
LOSHELV SLOPE		dB		dB	
LOSHELV GAIN		dB		dB	
HI-PASS FREQ			Hz		Hz
HI-PASS RESP					
PEQ1 FREQ		Hz	Hz	Hz	Hz
PEQ1 Q					
PEQ1 GAIN		dB	dB	dB	dB
PEQ2 FREQ			Hz		Hz
PEQ2 Q					
PEQ2 GAIN			dB		dB
LO-PASS FREQ		Hz		Hz	
LO-PASS RESP					
HISHELV FREQ			Hz		Hz
HISHELV SLOPE			dB		dB
HISHELV GAIN			dB		dB
DELAY ALIGNM		us	us	us	us
POLARITY					
OUTPUT GAIN		dB	dB	dB	dB
LIMIT THRESH		dBu	dBu	dBu	dBu
LIMIT DECAY		dB/s	dB/s	dB/s	dB/s
LIMIT HOLD		ms	ms	ms	ms

3-WAY MODE

AUTHOR: _____

TITLE: _____

DATE: _____

SOFTWARE
VERSION: _____

SPEAKER SYSTEM NAME: _____

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY 1-3	ms				
LO-CUT FREQ		Hz			Hz
LO-CUT RESP		dB Q			dB Q
LOSHELV FREQ		Hz			Hz
LOSHELV SLOPE		dB			dB
LOSHELV GAIN		dB			dB
HI-PASS FREQ			Hz	Hz	
HI-PASS RESP					
PEQ1 FREQ		Hz	Hz	Hz	Hz
PEQ1 Q					
PEQ1 GAIN		dB	dB	dB	dB
PEQ2 FREQ			Hz	Hz	
PEQ2 Q					
PEQ2 GAIN			dB	dB	
LO-PASS FREQ		Hz	Hz		Hz
LO-PASS RESP					
HISHELV FREQ				Hz	
HISHELV SLOPE				dB	
HISHELV GAIN				dB	
DELAY ALIGNM		us	us	us	ms
POLARITY					
OUTPUT GAIN		dB	dB	dB	dB
LIMIT THRESH		dBu	dBu	dBu	dBu
LIMIT DECAY		dB/s	dB/s	dB/s	dB/s
LIMIT HOLD		ms	ms	ms	ms
LO & CH4 MODE					

4-WAY MODE

AUTHOR: _____

TITLE: _____

SPEAKER SYSTEM NAME: _____

DATE: _____

SOFTWARE
VERSION: _____

PARAMETER		CH 1	CH 2	CH3	CH4
MASTER DELAY	ms				
LO-CUT FREQ		Hz			
LO-CUT RESP		dB Q			
LOSHELV FREQ		Hz			
LOSHELV SLOPE		dB			
LOSHELV GAIN		dB			
HI-PASS FREQ			Hz	Hz	Hz
HI-PASS RESP					
PEQ1 FREQ		Hz	Hz	Hz	Hz
PEQ1 Q					
PEQ1 GAIN		dB	dB	dB	dB
PEQ2 FREQ				Hz	Hz
PEQ2 Q					
PEQ2 GAIN				dB	dB
LO-PASS FREQ		Hz	Hz	Hz	
LO-PASS RESP					
HISHELV FREQ					Hz
HISHELV SLOPE					dB
HISHELV GAIN					dB
DELAY ALIGNM		us	us	us	us
POLARITY					
OUTPUT GAIN		dB	dB	dB	dB
LIMIT THRESH		dBu	dBu	dBu	dBu
LIMIT DECAY		dB/s	dB/s	dB/s	dB/s
LIMIT HOLD		ms	ms	ms	ms

REPAIR PARTS LIST

REF #	DESCRIPTION	PART #	REF #	DESCRIPTION	PART #
Z0080	rubber foot	345095	L 601	coil	339139
00010	plexiglass panel Dx34 A	351164	L 602	coil	339139
00040	push button black 12.5x7	337059	L 603	coil	339139
00050	push button black 6.4x3.4	342496	L 604	coil	339139
00060	rotary knob black 16	353620	L 605	coil	339139
00070	rotary knob black 24	348055	U 601	IC PC 900	333739
00080	power supply	346713	U 602	IC MC 74 HC 14	333458
00090	display	344928	00050	PCB	804118
00010	display	345483	B 101	socket XLR 3pol.	346791
00010	PCB	852168	B 201	socket XLR 3pol.	346791
B 401	connector	338835	B 301	connector XLR 3pol.	346792
C 401	safety component 0.22µF	344934	B 302	connector XLR 3pol.	346792
C 402	safety component 0.22µF	344934	B 401	connector XLR 3pol.	346792
C 403	safety component 2.2nF	334682	B 402	connector XLR 3pol.	346792
C 404	safety component 2.2nF	334682	BT501	battery	341655
L 401	coil 2x10 mH	332961	C 101	safety component	346765
S 401	mains switch	331175	C 102	safety component	346765
00020	PCB	862348	C 201	safety component	346765
D 101	led 7xgn+3xred	348813	C 202	safety component	346765
D 102	led 7xgn+3xred	348813	C 301	KO-EL 1 µF 50V	340520
D 103	led 7xgn+3xred	348813	C 302	KO-EL 1 µF 50V	340520
D 104	led 7xgn+3xred	348813	C 327	safety component	346765
D 105	led 7xgn+3xred	348813	C 328	safety component	346765
D 106	led 7xgn+3xred	348813	C 341	safety component	346765
D 108	led red 6x3.8mm	348453	C 342	safety component	346765
D 109	led red 6x3.8mm	348453	C 401	KO-EL 1 µF 50V	340520
D 111	led red 6x3.8mm	348453	C 402	KO-EL 1 µF 50V	340520
R 103	potentiometer 2x5k ohm log	352008	C 427	safety component	346765
R 105	potentiometer 2x5k ohm log	352008	C 428	safety component	346765
R 106	potentiometer 2x5k ohm log	352008	C 441	safety component	346765
R 107	potentiometer 2x5k ohm log	352008	C 442	safety component	346765
R 108	potentiometer 2x5k ohm log	352008	C 538	KO-EL 1 µF 50V	340520
S 101	switch	339674	C 539	KO-EL 1 µF 50V	340520
S102	switch	339674	C 540	KO-EL 1 µF 50V	340520
S 103	switch	339674	D 150	diode 1N 4002	304360
S 104	switch	339674	D 151	diode 1N 4148	301254
S 105	switch	339674	D 152	diode 1N 4148	301254
S 106	switch	339674	D 501	diode 1N 4148	301254
S 107	rotary encoder	346797	D 502	diode 1N 4148	301254
00040	PCB	830998	D 503	diode 1N 4148	301254
B 601	socket	303093	D 504	diode 1N 4148	301254
B 602	socket	303093	D 505	diode 1N 4148	301254
D 601	diode IN 4148	301254	D 507	diode BAT 85	301297

REPAIR PARTS LIST

REF#	DESCRIPTION	PART#
E 301	relay AZ 845	346760
E 302	relay AZ 845	346760
E 401	relay AZ 845	346760
E 402	relay AZ 845	346760
H 101	res.network rkl 8A 103J	343457
H 201	res.network rkl 8A 103J	343457
H 301	res.network rkl 8A 103J	343457
H 302	res.network rkl 8A 103J	343457
H 303	res.network rkl 8A 103J	343457
H 304	res.network rkl 8A 103J	343457
H 401	res.network rkl 8A 103J	343457
H 402	res.network rkl 8A 103J	343457
H 403	res.network rkl 8A 103J	343457
H 404	res.network rkl 8A 103J	343457
L 101	coil	339139
L 150	coil	335966
L 151	coil 47 µH	335966
L 152	coil 47 µH/5.5A	333717
L 201	coil	339139
L 301	coil	339139
L 302	coil	339139
L 401	coil	339139
L 402	coil	339139
Q 150	trans. BS 170	346764
S 150	sliding switch	338886
U 101	IC NE 5532 N	327197
U 102	IC NE 5532 N	327197
U 103	IC NE 5532 N	327197
U 150	IC AD 1879	346763
U 151	IC MC 7805 C	309719
U 152	IC MC 7905 CP	338834
U 201	IC NE 5532 N	327197

REF #	DESCRIPTION	PART #
U 202	IC NE 5532 N	327197
U 203	IC NE 5532 N	327197
U 301	IC PCM 69	346849
U 302	IC NE 5532 N	327197
U 303	IC NE 5532 N	327197
U 304	IC NE 5532 N	327197
U 305	IC NJM 4556	344864
U 306	IC NE 5532 N	327197
U 307	IC NE 5532 N	327197
U 308	IC NJM 4556 D	344864
U 309	IC MC 78 L 50 ACP	346343
U 401	IC PCM 69	346849
U 402	IC NE 5532 N	327197
U 403	IC NE 5532 N	327197
U 404	IC NE 5532 N	327197
U 405	IC NJM 4556 D	344864
U 406	IC NE 5532 N	327197
U 407	IC NE 5532 N	327197
U 408	IC NJM 4556 D	344864
U 409	IC MC 78 L 05 ACP	346343
U 501	IC SAB 80535 N	341631
U 502	IC SN 74 HC573	341636
U 504	IC HM 6264 P20	334590
U 505	IC P-IC DDL 204	346952
U 506	IC TL 7705	335857
U 507	IC SN 74 HC245 N	338389
U 508	IC SN 74 HC574 N	341637
U 510	IC TL 072 CP	331340
U 511	IC MC 74 HC 14	333458
U 515	IC MB 814400A	346762
X 501	24.0000 MHz crystal	346851

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