

MULTIVERB

Table of Contents

INTRODUCTION	1
INSTALLATION	2
CONTROLS AND OPERATION	4
DESCRIPTION OF ALGORITHMS & PARAMETERS	16
MULTIVERB PRESET LIST	27
MISCELLANEOUS	33
CIRCUIT DESCRIPTION	34
SPECIFICATIONS	36
SERVICE INFORMATION	37
WARRANTY	39
APPENDIX A - Applications	40
APPENDIX B - Examples	43
APPENDIX C - MIDI Messages	48
APPENDIX D - Preset worksheets	50
APPENDIX E - Tables and charts	52
APPENDIX F - Glossary	53
INDEX	54
USER REGISTRATION CARD	(BACK COVER)

INTRODUCTION

INTRODUCTION

Congratulations! You have just purchased what many industry professionals consider the most technically advanced signal processor ever built!

The ART MULTIVERB continues the trend of high quality cost effective professional digital signal processing. The twenty bit multiple effects processor will provide you with a virtually endless range of singular effects, plus the best of all MULTIPLE digital effects. Packed in a single high rack unit are numerous digital algorithms providing a full range of natural and simulated stereo reverberation effects. Also included are: digital delay, stereo chorusing and flanging, multitap delays and pitch transposition. The ability to combine effects together enables you to design studio effects easily, or a new generation of sound effects all your own.

The MULTIVERB may be controlled and monitored directly from the front panel allowing you to permanently rack mount your unit. Certain functions and parameters may be controlled via MIDI.

Special consideration was given to provide features that make the MULTIVERB more convenient to use in line with devices ranging from instruments to mixing consoles.

We strongly suggest that you read this manual and use it for reference while getting familiar with the MULTIVERB and its many capabilities. The initial factory presets were not only designed for instant use, but also as a starting point for your own innovative sound patterns. There is no substitute for hands on experience. Let your imagination run wild and enjoy.

ART is a strong proponent of user friendliness, this manual is written to support the concept of a user-friendly product along with a dedicated USERS manual. We feel that ease of reading along with hands on examples will help you familiarize yourself with your MULTIVERB. This will allow maximum efficient use of a sophisticated digital signal processor.

INSTALLATION

The MULTIVERB may be used in a variety of setups including: mixing consoles with effect send and return facilities, directly in line between a musical instrument and amplifier, in the effects loop of an amplifier, and in the tape loop of a home receiver. Self contained in an all steel single high 19" rack mount case, the MULTIVERB is designed for continuous professional use. For touring rack applications, care should be taken to support the units rear if the rack might be subjected to mechanical shock. NOTE: The front panel may bend if no rear support is provided. Mounting location is not critical, but for greater reliability we recommend that you not place the unit on top of power amps, tube equipment, or other sources of heat.

You will notice there is no power switch on the MULTIVERB. This is because we have found that in the majority of applications a rack of units has its power supplied via a power strip that is controlled by a main power switch. No harm will come to the MULTIVERB if it is switched on and off in this manner.

CONNECTIONS

All audio connections to the MULTIVERB are made at the rear of the unit via professional 1/4" phone jacks. The MIDI connections are accomplished via five pin "DIN" jacks on the rear panel. Fig. 1 shows the rear panel connections.

The LEFT and RIGHT inputs are single ended with an impedance of 1.0M ohm. True stereo processing is accomplished by using both inputs in a left/right application. If only one input is used, the signal is automatically routed to both channels.

The LEFT and RIGHT outputs are single ended with a source impedance of 1.0K ohms, and can provide a stereo or mono output. When a stereo signal is applied to the inputs, the resulting output is stereo. If both outputs are used with a mono input signal, a stereo image is produced. Using one output with a mono or stereo source provides a mono signal combining the processed information from both outputs.

A variety of input/output combinations may be used with the MULTIVERB. One in one out (mono, either jack may be used), one in two out (stereo image), two in one out (summed mono output), and two in two out (stereo) may be achieved. NOTE: When using the MULTIVERB in the stereo mode, only the dry signal will remain totally left and right orientated at the outputs. The processed signal will be a mix of the inputs with its own individual stereo image dictated by the algorithm used.

INSTALLATION

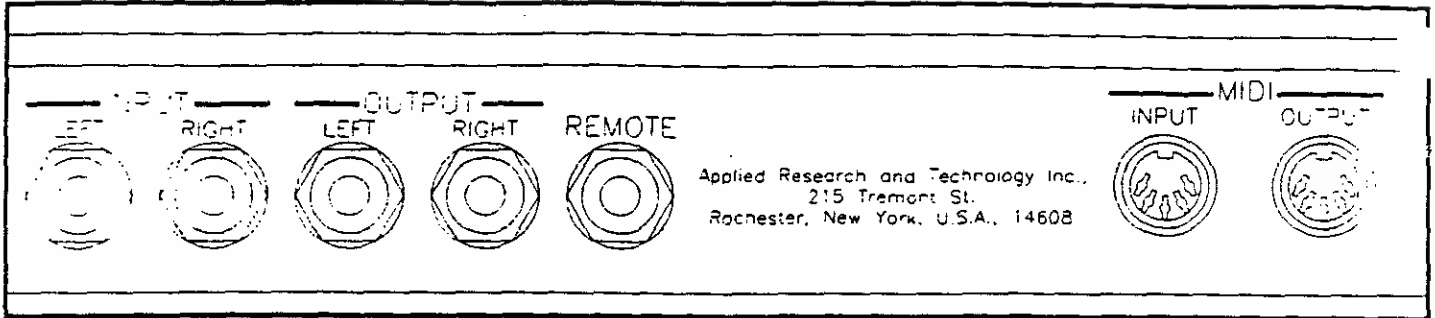


Figure 1

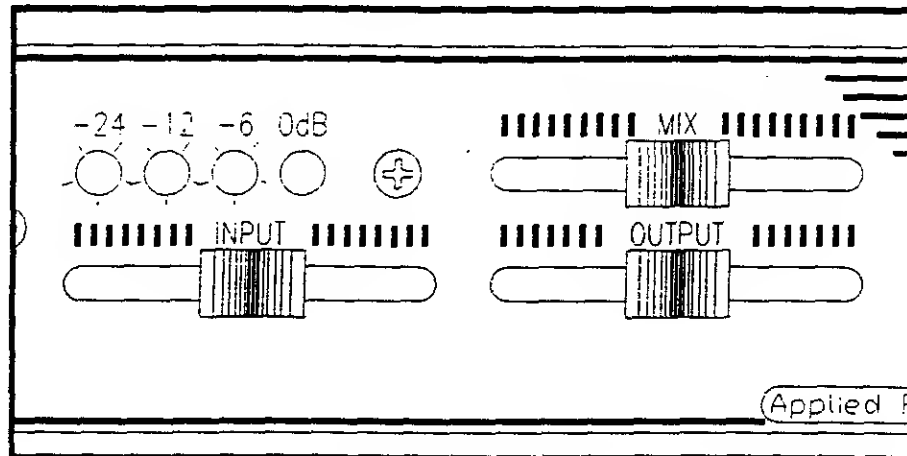


Figure 2

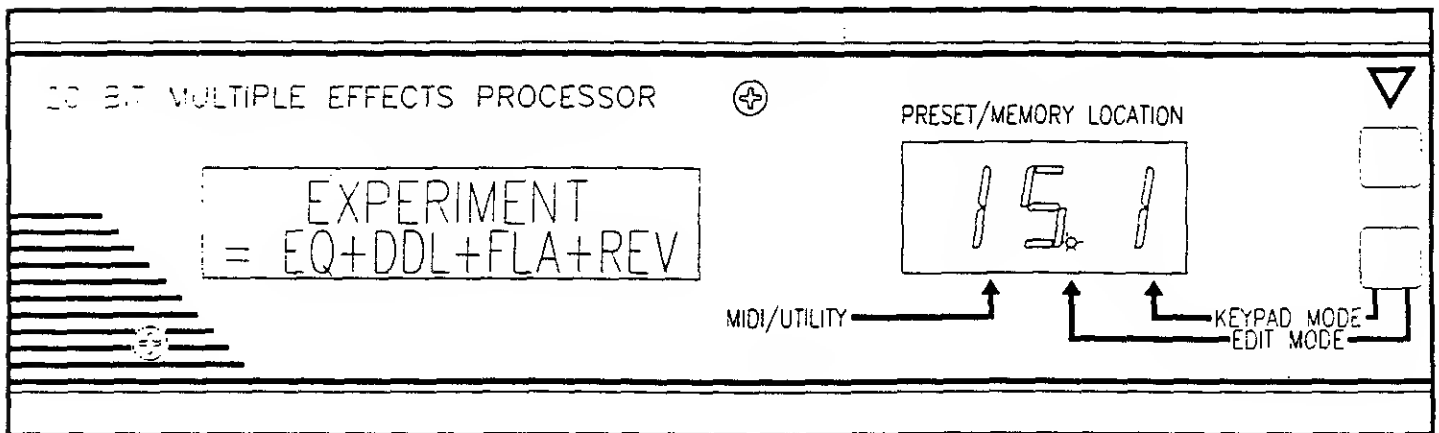


Figure 3

CONTROLS AND OPERATION

INPUT LEVEL CONTROL

The Input Level Control is located on the front panel below the Input Level Indicators (see fig. 2). This slide control adjusts the input signal to accommodate a wide range of devices. Input levels may range from approximately -20dBV to +16dBV. Source inputs may range from musical instruments such as guitars and keyboards, mixing consoles and effects loops in amplifiers. Whatever the source, adjust the Input Level Control so that the Green LED's (-24dB & -12dB) are lit constantly, the Yellow LED (-6dB) lights with soft peaks and sharp peaks lighting the Red LED (0dB). For low level output devices the slider will be positioned more to the right side. With line level devices (mixers) center the slider and control the input level from the effects send. See the Equivalent Level Table in Appendix E for slider position vs. input level. For a starting point set all the sliders to the center position and if possible adjust the output level of the device sending the signal to the MULTIVERB so that -6dB is lit on soft peaks. Use the Input Level control to compensate for minor level adjustments.

If the Input Level Control is not adjusted properly or the input source has a low output level, noise and distortion will be heard at the output of the MULTIVERB. See APPENDIX A for some level suggestions.

INPUT LEVEL INDICATORS

Front panel LED indicators (fig. 2) show the input signal level at all times. For maximum dynamic range the -24, -12 and -6dB LED should be on most of the time with the 0dB LED briefly flashing on transients only. When using a guitar or other instruments which produce sharp transients, the input level should be set so only the -24 and -12dB LEDs are lit. This is a sufficient amount of input level to operate the MULTIVERB and transients of up to 0dB will be handled without incident. If you find that you are clipping the unit simply reduce the input level to the MULTIVERB or decrease the slide control slightly.

These indicators are reference levels only. Just because the 0dB LED is lit doesn't mean that there is 0dBV present at the input. For proper adjustment of level, review the Input Level Control section.

CONTROLS AND OPERATION

MIX CONTROL

The MIX control (fig. 2) varies the amount of effect signal in the output from dry to effect only. When the knob is fully to the left, only the dry signal is apparent at the output(s). As the slider is moved towards the right, more processed signal is heard at the output(s). A fifty/fifty mix is achieved when the slider is in the center detent position. When the slider is fully towards the right, only processed signal is heard at the output.

OUTPUT LEVEL CONTROL

The Output Level Control (fig. 2) adjusts the final output level of the MULTIVERB. With the slider fully to the left, there is no output signal present at the output jacks. As you move the slider to the right the output signal level of the unit increases. Refer to the Equivalent Level Table in Appendix E for measured signal levels. From the table you will see that you may acquire gain at the output. We do not recommend that the MULTIVERB be used to make up for large losses of gain in a system. There are some circumstances where this is unavoidable. If this is the case, by all means compensate for loss.

The optimum setting is unity gain. With the Input Level Control and the Output Level Control set at center unity gain is achieved. Your output level most probably will be bumped a little up or down to compensate for small increases or decreases in the processed signal level.

SEVEN SEGMENT DISPLAY (Red Numeric Display)

The Seven Segment Display shown towards the right of fig. 3 (15.1), keeps you constantly informed of your Operation Mode, Preset Number or Memory Location. The decimal points indicate whether you are in Keypad Mode, Edit Mode or MIDI/Utility mode. The actual numbers refer to Preset Number or actual Memory Location. The only time a decimal point is not blinking is when the Keypad Mode is indicated.

LIQUID CRYSTAL DISPLAY (LCD)

All information relative to a preset indicated by the Seven Segment Display (right side of fig.3) is displayed by the LCD. Backlighting of the display is provided for ease of use in low light situations. The upper sixteen characters mainly display the Preset Title (name). If no title has been assigned, the display will read "< blank title >". In some cases other information will be displayed here. The lower sixteen characters display mainly the effects stored, to be selected or to be deleted in the preset, and effect parameter information. Other information may appear here also.

The view angle may be adjusted and is covered in detail in the following section under MIDI/UTILITY function.

CONTROL BUTTONS

All of the control buttons with the exception of the PRESET SELECT UP and DOWN and the BYPASS buttons serve a dual purpose. The split functions are differentiated by color. Preset selection is depicted by the color purple. Preset control functions are labeled in grey. Two methods of Preset selection are used, scanning (up/down with rapid access) and keypad number entry. Refer to fig. 4 for reference to control buttons.

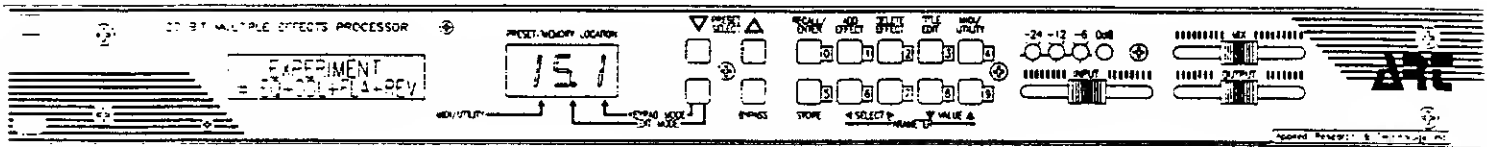


Figure 4

PRESET SELECT

The UP and DOWN buttons shown as ascending and descending triangles in purple and labeled PRESET SELECT on the front panel are used to select PRESETs. Holding either button in will step you through all 200 PRESETs when you're in Keypad Mode at a moderate rate. You can step at a much quicker rate by using the RAPID ACCESS mode. To access RAPID ACCESS mode, first press and hold the button that is in the direction that you want to go, then simultaneously press the other button. As long as both are pressed the display will increment by a value of ten rather than one at a time. When you stop at the appropriate preset you do not have to hit recall, the signal is being processed constantly.

To preview presets before actually using them, press the grey button labeled KEYPAD MODE/EDIT MODE so that the center decimal point is lit (it will flash) indicating Edit Mode. I will explain this button in detail later. Use the PRESET SELECT buttons to scan through the presets. The processed output signal is not affected. This is to say that you are not changing presets audibly as you scan through them. The reason for this is so you can be ready for the next preset change when it is supposed to happen. When you stop scanning, the preset number in the Seven Segment Display will be flashing. To recall that preset when you are ready just press the RECALL/ENTER button.

Press the KEYPAD MODE /EDIT MODE button so that the right decimal point is lit. This indicates that you are in the KEYPAD MODE. Scan through the presets, you will instantly recall the preset when you stop.

CONTROLS AND OPERATION

KEYPAD ENTRY

Make sure you are in the KEYPAD MODE. For instantaneous recall of the preset you must select the exact preset number. For example; you want preset 143, locate the buttons shown in fig. 4 labeled 0 through 9 on the front panel (the numbers are reversed image in purple), enter 1-4-3, instantly you will see the LCD read title and preset information. If you have audio hooked up you will notice that the preset has been instantly recalled. Let's try another number. Enter 34 (3-4). Oh no, what happened? What is that flashing digit and why didn't the preset change instantly? **YOU MUST ENTER A THREE DIGIT NUMBER.**

To instantly engage preset 34 you would have to enter the digits 0-3-4. Do this now and see that you get instantaneous results. Try preset 1. Did you do it right? (Enter 0-0-1) Now enter 1-5-1.

Let's discuss what happened when you entered preset 34 as 3-4. After the entry the digit flashed and then defaulted to the display of 034 and then recalled the preset. If you were to just enter one digit, the right digit would flash [] and then the display would revert to the already existing preset.

KEYPAD MODE/ EDIT MODE BUTTON

THIS BUTTON IS PROBABLY THE MOST IMPORTANT BUTTON ON THE FRONT PANEL!

If you are not in the right mode at the proper time needless aggravation will be the result. The Operation Mode is indicated by which decimal point is lit in the Seven Segment Display. Always remember to check the Mode Status Indicator to assure yourself which mode you are in.

When you are in the Keypad Mode indicated by a constantly lit decimal point to the far right of the Seven Segment Display, you are able to access all of the two hundred presets either by scanning or by keypad entry as discussed in the previous sections under Preset Select and Keypad Entry.

BYPASS

Pressing the BYPASS button kills the effects signal in the mix and is shown two ways by the LCD. When you first press the BYPASS button in either operating mode with a preset listed in the LCD, the display will first read ******BYPASS****** by with the "by" flashing for about two seconds. Then it will list the preset name along with the "by" flashing to indicate you are currently in the bypass mode.

Pressing BYPASS again returns the unit to the ACTIVE mode indicated by the display *****ACTIVE***** for about two seconds and then just displaying the preset name and effects.

Another means of bypass is attained by programming the REMOTE jack on the rear panel for the bypass function described under the MIDI/UTILITY button and referred to as EXT SW MODE.

Bypassing the unit via MIDI may be done by recalling a totally blank preset. Preset 100 is set up for MIDI BYPASS.

MIDI/UTILITY

All the MIDI and System Utility functions are accessed when this button is pushed. The left decimal point in the Seven Segment Display will flash indicating that you are in the MIDI/UTILITY Operation Mode. To access individual parameters, use the SELECT > and SELECT < BUTTONS. When you wish to change the variables use the UP and DOWN VALUE buttons. To exit the MIDI/UTILITY MODE you must press the MIDI/UTILITY button. This will exit you to either the KEYPAD or EDIT MODE, whichever mode you were in when you entered the MIDI/UTILITY MODE.

ADJUSTABLE PARAMETERS:

EXTERNAL Switch MODE: BYPASS ON/OFF or INCREMENT PROGRAMS
programs REMOTE jack for BYPASS or INCREMENT PRESET MODE

Refer to APPENDIX B for examples of programming the REMOTE jack and further documentation.

MIDI CHANNEL off-16
sets MIDI send and receive channel number

OMNI MODE on/off
sets MIDI OMNI mode on or off

MIDI PROGRAM TABLE
allows you to edit the MIDI Program Table (MPT)

Refer to APPENDIX B for examples of editing the MPT and further documentation.

MIDI MERGER ON/OFF
programs the MIDI out jack to "echo" MIDI information to the next device

When not using the merger, turn it off

LCD VIEW ANGLE
allows the viewing angle of the LCD Display to be adjusted

CONTROLS AND OPERATION

Refer to APPENDIX B for an example of setting the view angle

SOFTWARE VERSION LEVEL

displays the software revision level currently installed in the MULTIVERB

SEND PRESET

dump a single preset via MIDI, hit UP or DOWN button

SEND MPT

dump entire MPT via MIDI, hit UP or DOWN button

SEND ALL PRESETS

dump all presets via MIDI, hit UP or DOWN button

PRESET 1-100 LOCKED/UNLOCKED

allows the first 100 presets to be overwritten or protected from overwrite. Use the VALUE buttons to select LOCKED or UNLOCKED status. You may UNLOCK only one Preset at a time. When the STORE button is pressed, the LOCK becomes enabled. To unlock the presets see the MIDI/UTILITY section. At first you may not want to overwrite the factory presets, so increment up to a user preset and store the new preset. See APPENDIX B for an example of unlocking a preset.

EDIT MODE CONTROL BUTTONS

Refer to fig. 5 for Edit Mode buttons

RECALL/ENTER

The RECALL/ENTER button is used to Recall presets in the Edit Mode and to Enter or Delete effects when using the ADD or DELETE EFFECT button. To Recall a preset (the Seven Segment Display will be flashing a Preset number), select the proper Preset then press and press the RECALL/ENTER button. When prompted to Add or Delete an effect press the RECALL/ENTER button to finalize the command.

ADD EFFECT

Press the ADD EFFECT button to select which effect you want to insert into a preset. Let us first preview the effects you may add. A full description of these effects is found later in this manual. **MAKE SURE YOU ARE IN THE EDIT MODE.** Press the ADD EFFECT button once, notice that lower half of the LCD Display reads ADD:EQUALIZER?. Press the button again, ADD:FLANGER? is displayed. Continue to press the button until the display reads < no effects > . This will be twenty button pushes indicating that there are nineteen families to choose from!

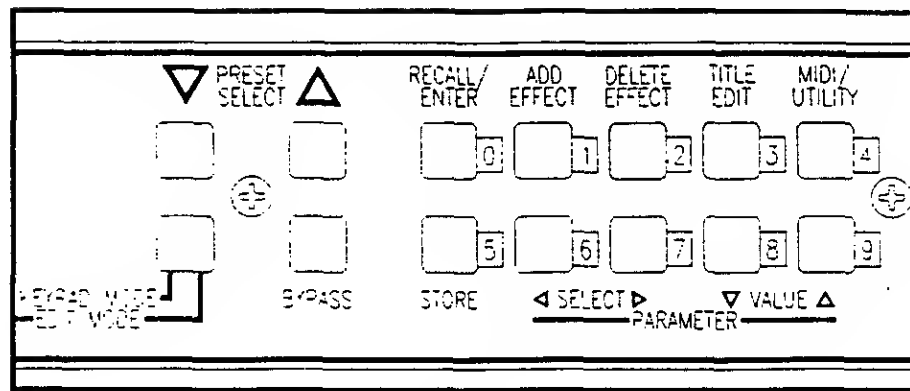


Figure 5

When you wish to add an effect to the actual preset you must press the RECALL/ENTER button to finalize the command.]

To escape from ADD EFFECT, press either the VALUE UP or DOWN button or press the KEYPAD/EDIT MODE button. This will return you to square one.

It doesn't stop there! There are many sub variables of each effect to be explored. Right now let's just worry about operation and not the effects.

To simplify matters let's step through an example depicting the selection of four effects. We will use some of the buttons not yet explained but doing it this way will make the understanding of the programming much easier. The control buttons we use now will be defined in detail later in the manual.

When you see text within the [] brackets, it is describing the text that appears in the LCD.

Enter EDIT MODE

Using the PRESET SELECT buttons, scan up to preset 151 --

Press the RECALL/ENTER button [< blank title > , < no effects >]

Press the ADD EFFECT button once, [ADD:EQUALIZER?]

Press RECALL/ENTER (you have just entered the EQ into the chain), bottom display reads [= EQ]

Press ADD EFFECT seven times, [ADD:REVERB-1?]

Press RECALL/ENTER (now the reverb algorithm is entered into the chain, display reads [= EQ + REV])

Press ADD EFFECT again, select the FLANGER, enter it into the chain. (you pressed the ADD EFFECT button once and then pressed the RECALL/ENTER button), display should read [= EQ + FLA + REV]

Press the ADD EFFECT button one more time [ADD:MONO-DDL-S?]

Enter it into the chain (press RECALL/ENTER), [= EQ + DDL + FLA + REV]

IF YOU WISH TO SAVE THIS CHAIN OF EFFECTS AS A PRESET YOU MUST PRESS STORE NOW.

Press STORE (note the ≠ sign disappears)

What happens if we press the ADD EFFECT button one more time? Press it and look at the LCD. It will read [ADD:NO MORE FX] meaning that you cannot enter any more effects unless you delete one. If you see this display and there are only three effects entered in for processing, it only means that you are using a considerable amount of processing circuitry to achieve a suitable sound output.

REMINDER: you have not set any parameters as of yet. Don't worry we have preselected a nominal value for each of the parameters associated with an effect as a starting point. This provides a user reference to a sound instead of starting at point zero. We feel it is useful to hear a descriptive set of parameters so that you may tailor them to your own specific sound requirements. We'll look at these in just a moment as well as making a title for this preset. First, the DELETE key will be explained.

DELETE EFFECT

To delete one or more of the selected effects from your preset you will use the DELETE EFFECT button.

Recall preset 151, press the PRESET SELECT UP button once, press STORE. We have just copied preset 151 into preset 152 so as not to lose preset 151 which we will use periodically through this manual.

Press the DELETE EFFECT once. [DEL:EQUALIZER?]

Do you want to delete the equalizer? NO.

Press the button again. [DEL:MONO-DDL-S?]. Let's delete this effect. Press RECALL/ENTER [=EQ + FLA + REV] the effect has been eliminated but not permanently. You will audibly hear the sound change when the effect is deleted. Press STORE to make this change permanent. Press STORE now. With the elimination of an effect, you open up a space to insert another effect or leave things as they are. if you choose not to eliminate the effect and you wish to escape the delete mode, press either the VALUE UP or DOWN button.

If you press the DELETE EFFECT button and there are no effects in the preset, the display will read [DEL:NO FX TO DEL].

TITLE EDIT

One of the displays in the upper portion of the LCD is the title of the preset. To either edit the title or create a new one you must first enter the Title Edit Mode. Do this by pressing the TITLE EDIT button once. The display will read [Title Edit] in the upper portion and show a cursor in the lower half. There is a total of sixteen spaces with the complete ASCII character set available to use in naming presets. We will name this preset EXPERIMENT. To do this perform the following steps.

If there are characters you wish to delete in the display use the SELECT Up or SELECT Down button to move the cursor and then press the ADD or DELETE EFFECT button. If you wish to delete all sixteen characters press the DELETE EFFECT or ADD EFFECT buttons sixteen times. By doing this you will eliminate any characters and have a blank display to start with.

Recall preset 151. Press the TITLE EDIT button. Locate and hold in the VALUE UP button. You will see characters displayed in an ascending order. (to increase the speed, press the opposite button after you depress the first, this works for both ascending and descending orders) You may find that depressing the button with single pushes works better at first.

At the first cursor position, stop when "E" is displayed

Locate and press the SELECT > button once (this moves the cursor one space to the right)

Use the VALUE buttons to display "X"

Continue until you have spelled out [EXPERIMENT]

I'm sure you had to go between all four buttons to get the right display, if not, congratulations.

PRESS THE STORE BUTTON TO SAVE THIS.

Now that you have stored this title you must exit Title Edit mode. To do this press the EDIT TITLE button, notice the display. The title is in the upper half of the LCD Display and the selected effects are in the lower half. If you wish to change the title just enter the Title Edit Mode and make the appropriate changes. Don't forget to STORE the new title.

To exit or escape from the Title Edit mode press the TITLE EDIT button once.

STORE

Any time you wish to permanently save information in a preset, press the STORE button. All parameter values will be stored into the chosen preset as well as TITLE information. When you press the STORE button the LCD will display [PRESET STORED]. If the word [LOCKED/SELECT LOCATION 101-200] appears, don't panic. Presets 1 through 100 are the factory presets and though the parameters may be changed, the new values cannot be stored without first UN-LOCKING the presets (see MIDI/UTILITY section).

CONTROLS AND OPERATION

PARAMETER CONTROL BUTTONS

SELECT > and SELECT <

The selection of available variables within a given parameter is accomplished using the SELECT > and the SELECT < buttons. Treat these buttons like a cursor left and right on a computer. If the button is held in, the function will continue and cycle until it is released. We have already used these buttons to create a title, now we'll use them to view parameters and the selected variable. Once again recall preset 151. (Are you in the Edit Mode?)

Press the SELECT > once. [EQ:HF-CUT = THRU] This is the EQ variable.

Press the button again. [DDL:DELAY = 50ms] The delay variable is displayed.

The next four times you press the SELECT > button, the display will show the selected FLAger parameter variables. Scan through these using the SELECT < button to reverse direction.

Scan forward until [REV:TYPE = HALL-1] is displayed. Scanning further will display the parameter variable information. (next four presses). Press the button one more time. The preset parameters are now displayed. The buttons cycle through the ends eliminating having to back up to the starting point.

VALUE DOWN & UP

These two buttons allow you to select or set the parameter variables for each preset. Like the SELECT buttons, they act like computer cursor keys. The function will not cycle through but stop at the end extremes.

I know you're still in preset 151! Press the RECALL button. If you press either the UP or DOWN button now nothing will happen.

Press the SELECT button once [EQ:HF-CUT = THRU]. Now start pressing the VALUE DOWN button either by single pushes or just holding it down. Notice that there are a total of thirteen values just for the EQ parameter. Select different parameters and use the VALUE buttons to view the different variables. If you changed any of the variables, the sound would be affected immediately.

To save the change, merely press the STORE button. If you did not hit STORE, and used the SELECT buttons to get to the preset parameters, you will notice the LCD now has an extra character displayed on the left side. [≠ EQ + DDL + FLA + REV] This character [≠ (not equal)] indicates that the preset has different parameters than what is stored in the preset. If the character isn't there go back and change some values.

MIDI

Setting The MIDI Channel

Press the MIDI/UTILITY button.

Press the SELECT > once.

Use the VALUE UP/DOWN buttons to select the channel number.

Exit MIDI MODE (press the MIDI/UTILITY button)

Setting the OMNI Mode

Press the MIDI/UTILITY button.

Press the SELECT > button twice.

Use the VALUE UP/DOWN buttons to turn OMNI [ON or OFF]

Exit MIDI MODE (press the MIDI/UTILITY button)

MIDI Program Table

The MIDI Program Table allows the MULTIVERB to respond to a MIDI program change with any of its presets. The MPT is initialized for the first 128 presets to match the corresponding MIDI program number. (MIDI program numbers 0-127 will recall presets 1-128)

To edit the MPT:

Press the MIDI/UTILITY button.

Press the SELECT > three times.

Using the VALUE UP/DOWN buttons select the MIDI program number you wish to change the corresponding preset number for.

Press the SELECT > button again.

Now select the preset number you want recalled when that program number is accessed using the VALUE UP/DOWN buttons.

Continue editing if necessary.

Exit MIDI MODE. (press the MIDI/UTILITY button)

Note: full examples of editing the MPT may be found in Appendix B.

MIDI Merger

The MIDI Merger serves a useful function in the MULTIVERB. With this feature you are able to "echo" MIDI information to other MIDI devices in line with the MULTIVERB. This makes the MIDI OUT jack on the rear panel act the same as a MIDI THRU jack with a small delay of the MIDI information (less than 1 ms). The only difference is that if the MULTIVERB is commanded to send a message of its own, it will Merge the message with other messages that may occur without disturbing other messages.

CONTROLS AND OPERATION

Note: when you are not using the MIDI Merger turn it OFF

Press the MIDI/UTILITY button.

Press the SELECT > button five times.

Use the VALUE UP/DOWN button to either turn the Merger ON or OFF.

Exit the MIDI MODE. (press the MIDI/UTILITY button)

Sending Preset and MPT Information

Transferring a single preset, all presets or the entire MPT to another MULTIVERB or a suitable MIDI device is accomplished by selecting the SEND A PRESET, SEND ENTIRE MPT or SEND ALL PRESETS function.

Press the MIDI/UTILITY button.

Use the SELECT buttons to select the appropriate command.

Follow the directions listed by the LCD Display.

Exit the MIDI MODE. (press the MIDI/UTILITY button)

REMOTE JACK

The REMOTE jack may be programmed to be used either to bypass the MULTIVERB or access the Increment Program Mode. A footswitch is the intended device to be used with this jack. Either a momentary (normally open), or an on/off (you will have to engage the footswitch twice per event) switch may be used. It is recommended to use a momentary switch. If the jack is programmed for the Bypass feature, each time the footswitch is activated (hot connected to ground) the BYPASS function is accessed. This jack may also be programmed to allow for incrementing through a set of presets. This feature is covered later in the manual. Examples 4 and 5 show how to program the REMOTE jack.

DESCRIPTION OF ALGORITHMS & PARAMETERS

In all, there are nineteen separate categories of algorithms for you to choose from in selecting your effect or series of effects.

Each category may have from one to several characteristic algorithms to choose from in the actual sound shaping process.

There are some categories that cannot be combined together. Rather than tell you which ones cannot be combined, the MULTIVERB automatically selects (or defaults) to which algorithms may be combined and displays them in the LCD when you are "ADDing an EFFECT". The default settings for each parameter are shown in brackets []. The MULTIVERB will automatically limit the extent of the algorithms' control range.

EQUALIZER

Parameter:

EQ:HF-CUT = Selected frequency roll-offs from 665Hz to 15KHz [THRU]

There is one algorithm defining the EQ. The sound processing function of the EQ is a Low Pass Filter. This effect will always be placed at the front of the effects chain so as to tailor the frequency response of the effect and not the final product which should be further modified at the board. Thirteen possible selections of roll-off frequencies are provided.

FLANGER

Parameters:

TYPE = POST, PRE, OFF (two algorithms) [POST]

WIDTH = 0 to 100 percent in % increments [76%]

SPEED = 0 to 15 [4]

REGENeration = 0 to 100 percent in % increments [67%]

A wide range of flanging effects may be created with the MULTIVERB. The base delay for the flanger is set and the sweep WIDTH and SPEED is user controlled. REGENeration may be adjusted to vary the "strength" of the processed signal. The output level of the FLANGER algorithm is set for 100% and is not user adjustable. When the Flanger TYPE = POST the flanger is positioned last in the chain. This is to assure that maximum effect and presence is maintained in all effects combinations. Using Flanger TYPE = PRE positions the FLANGER in parallel with any Reverb or DDL effect. By positioning the Flanger like this, the processed signal is not delayed or reverberated and then flanged. Fig. 6 shows the signal path.

DESCRIPTION OF ALGORITHMS & PARAMETERS

CHORUS

Parameters:

TYPE = POST, PRE, OFF (two algorithms) [POST]

WIDTH = 0 to 100 percent in % increments [35%]

SPEED = 0 to 15 [8]

DELAY = 0 to 66ms in 1 ms increments [30]

Chorus may be used to thicken or sweeten the final processed sound. It is created by sweeping a comb filter through a base delay time and generally using between a 30 to 60 percent mix between the dry and wet signal. The base delay time plays an important role in the "depth" perception of the effect. Longer base delays are more preferable to give a deep rich sound to vocals and guitars, while shorter base delays are used for more delicate enhancement purposes. The width plays an important role in the range of perceived effect and is best used in conjunction with the speed parameter. Like the FLANGER, the effect type may either be POST or PRE located in relation to reverb or delay.

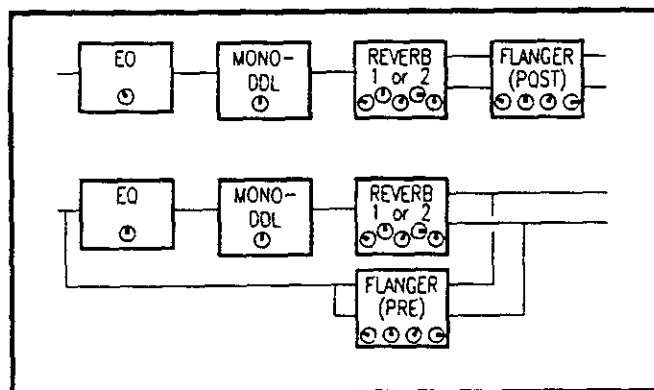


Figure 6

PITCH-TRANSpoker

Parameters:

TYPE = SMOOTH, NORMAL, QUICK, OFF (three algorithms) [SMOOTH]

PITCH = (-)12 to (+)12 half steps in 1 half step increments [0]

FINE = (-)1.00 to (+)1.00 half steps in 0.06 half step increments [0.00]

REGENeration = 0 to 100 percent in % increments [0%]

LEVEL = 0 to 100 percent level in % increments [100%]

Pitch Transposing or pitch shifting can be used to develop helpful second harmonies or other effects for vocals, instruments and even mixed material. The range of pitch change is just over two octaves. There are three "types" of pitch transposing to choose from in the MULTIVERB, Smooth, Normal and Quick.

Smooth relates directly to processing and splicing the signal more slowly, resulting in a cleaner more precise sound. Use the Smooth setting when you are shifting pitch more than a fifth with lower frequency inputs such as the low strings on a guitar.

Normal should be used for virtually all other applications of pitch shifting. There is a little less delay than the Smooth setting and qualitative processing is achieved.

When you select the Quick setting, a shorter delay time is used causing faster splicing. REGENeration is useful when you stack the Pitch Transposer with the MONO DDL algorithm. Each time a repeat is done it is shifted up or down by the pitch selected.

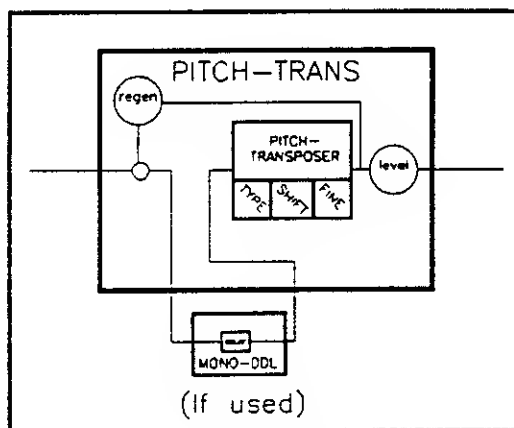


Figure 7

DESCRIPTION OF ALGORITHMS & PARAMETERS

Generally you should use the Normal Type for most applications. If you encounter problems relating to delay time, use the Quick Type and if detuning becomes a problem, use the Smooth Type. Fig. 7 shows the signal path of the Pitch Transposer.

Applications for the Pitch Transposer may be found in APPENDIX A.

PANNER

Parameters:

MOD % = 0 to 100 percent in % increments [100%]

SPEED = 0 to 15 [8]

Panning automatically pans the audio image from the left to the right in the stereo sound field. By varying the MODulation, you adjust the "depth" into the stereo field (how far left and right you go). The SPEED merely controls the rate at which you do so.

MONO-DDL-S

Mono Digital Delay - Short

Parameter:

DELAY = 0 to 100 ms in 1 ms increments [50ms]

Use this DDL effect for Short delay times such as slap-backs or with any other effect that requires only a small predelay as in reverb effects. Placement is second in the effects chain.

MONO-DDL-L

Mono Digital Delay - Long

Parameter:

DELAY = 0 to 240 ms in 5 ms increments [125ms]

When Longer delay times than the DDL-MONO-S, are required, this effect should be used. The effect will be placed second in the chain of effects.

REVERB-1

Parameters:

TYPE = HALL-1, ROOM-1, PLATE-1, VOCAL-1, OFF (four algorithms) [HALL-1]

DECAY = 0 to 25 seconds in varying increments [2.4s]

HF-DAM = 0 to 50 percent in % increments [14%]

definition: High Frequency Damping

POSITN = FRONT to REAR in % increments [83%]

definition: Position

LEVEL = 0 to 100 percent in % increments [100%]

DESCRIPTION OF ALGORITHMS & PARAMETERS

REVERB-1 algorithms are best used when you are using multiple effects. They have less density and are more suited to effects where the reverb is not the main effect but is used for presence.

REVERB-2

Parameters:

TYPE = HALL-2, ROOM-2, PLATE-2, VOCAL-2, OFF (four algorithms)
(REVERB-1 TYPES are also available) [HALL-2]

DECAY = 0 to 25 seconds in varying increments [2.4s]

HF-DAM = 0 to 50 percent in % increments [14%]
definition: High Frequency Damping

POSITN = FRONT to REAR in % increments [83%]
definition: Position

LEVEL = 0 to 100 percent in % increments [100%]

REVERB-2 algorithms use more delay and have a higher complexity than the REVERB-1 algorithms.

REVERB-3

Parameters:

TYPE = HALL-3, ROOM-3, PLATE-3, VOCAL-3, OFF
(REVERB-1 and REVERB-2 TYPES are also available) [HALL-3]

DECAY = 0 to 25 seconds in varying increments [2.4s]

HF-DAM = 0 to 50 percent in % increments [14%]
definition: High Frequency Damping

POSITN = FRONT to REAR in % increments [67%]
definition: Position

DIFFUS = 40 to 100 percent in four % increments [100%]
definition: Diffusion

LEVEL = 0 to 100 percent in % increments [100%]

REVERB-3 algorithms are the most complex and dense. Always use REVERB-3 when building "reverb only" programs.

DESCRIPTION OF ALGORITHMS & PARAMETERS

GATE-VERB-1

Gated Reverb

Parameters:

TYPE = SLOPE-1, FLAT-1, RVRS-1A, RVRS-1B, OFF (four algorithms)

[SLOPE-1]

definition: RVRS = reverse reverb

DECAY = 0.05 to 0.25 Sec. in 5 ms increments [0.25s]

DIFFUS = 60 to 100 percent in four increments of 20% [100%]

definition: Diffusion

LEVEL = 0 to 100 percent in % increments [100%]

GATE-VERB-2

Gated Reverb

Parameters:

TYPE = SLOPE-2, FLAT-2, RVRS-2A, RVRS-2B, OFF (four algorithms)

[SLOPE-2]

definition: RVRS = reverse reverb

DECAY = 0.05 to 0.40 Sec. in 5 ms increments [0.40s]

DIFFUS = 60 to 100 percent in four increments of 20% [100%]

definition: Diffusion

LEVEL = 0 to 100 percent in % increments [100%]

GATE-VERB-3

Gated Reverb

Parameters:

TYPE = SLOPE-3, FLAT-3, RVRS-3A, RVRS-3B (four algorithms)

[SLOPE-3]

definition: RVRS = reverse reverb

DECAY = 0.05 to 0.40 Sec. in 5 ms increments [0.40s]

DIFFUS = 60 to 100 percent in four increments of 20% [100%]

definition: Diffusion

LEVEL = 0 to 100 percent in % increments [100%]

DESCRIPTION OF ALGORITHMS & PARAMETERS

Both GATE-VERB-1 and GATE-VERB-2 have forward and reverse gated reverb algorithms which are not quite as dense or complex as those found in the GATE-VERB-3 algorithms. For an equal decay, GATE-VERB-1 is denser than GATE-VERB-2. The decay times found in GATE-VERB-2 are longer. When used in a four effect stack of effects these gated sounds will fill in nicely. If you choose to use these effects alone, they will be loose and moderately sparse. By varying the amount of diffusion you directly affect the tightness (or looseness) of the sound. High diffusion equates to a tighter effect.

GATE-VERB-3 algorithms are the most complex and dense. Always use GATE-VERB-3 when building "reverb only" programs.

Fig. 8 shows the difference between normal reverb decays and decays when a gated program is used. You will notice that the normal decay gradually fades into nothing while the gated decays in an abrupt manner. The most interesting gated program is the flat setting. Here there is no decay but the equivalent of a short burst of sound.

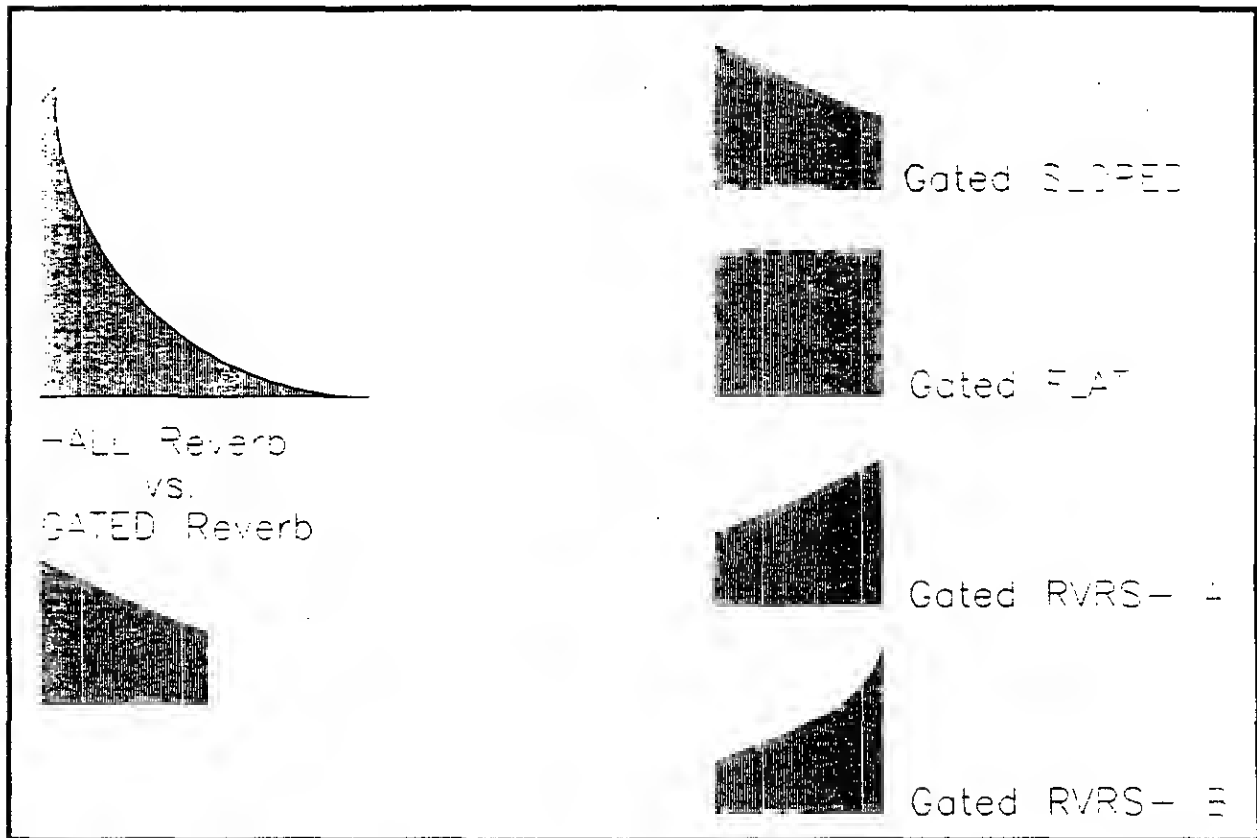


Figure 8

DESCRIPTION OF ALGORITHMS & PARAMETERS

TAP'D-DDL-S

Tapped Digital Delay - Short

Parameters:

TYPE: = FLAT-1m, FLAT-1s, RVRS-1m, RVRS-1s, SLOPE1m, SLOPE1s, (E)

FLAT-2m, FLAT-2s, RVRS-2m, RVRS-2s, SLOPE2m, SLOPE2s, (S)

FLAT-3m, FLAT-3s, RVRS-3m, RVRS-3s, SLOPE3m, SLOPE3s (L)

(eighteen algorithms) [FLAT-1m]

TAPS = 1 to 7 in one step increments [2]

DELAY = 0 to 100 ms in 5 ms increments [100ms]

LEVEL = 0 to 100 percent in % increments [100%]

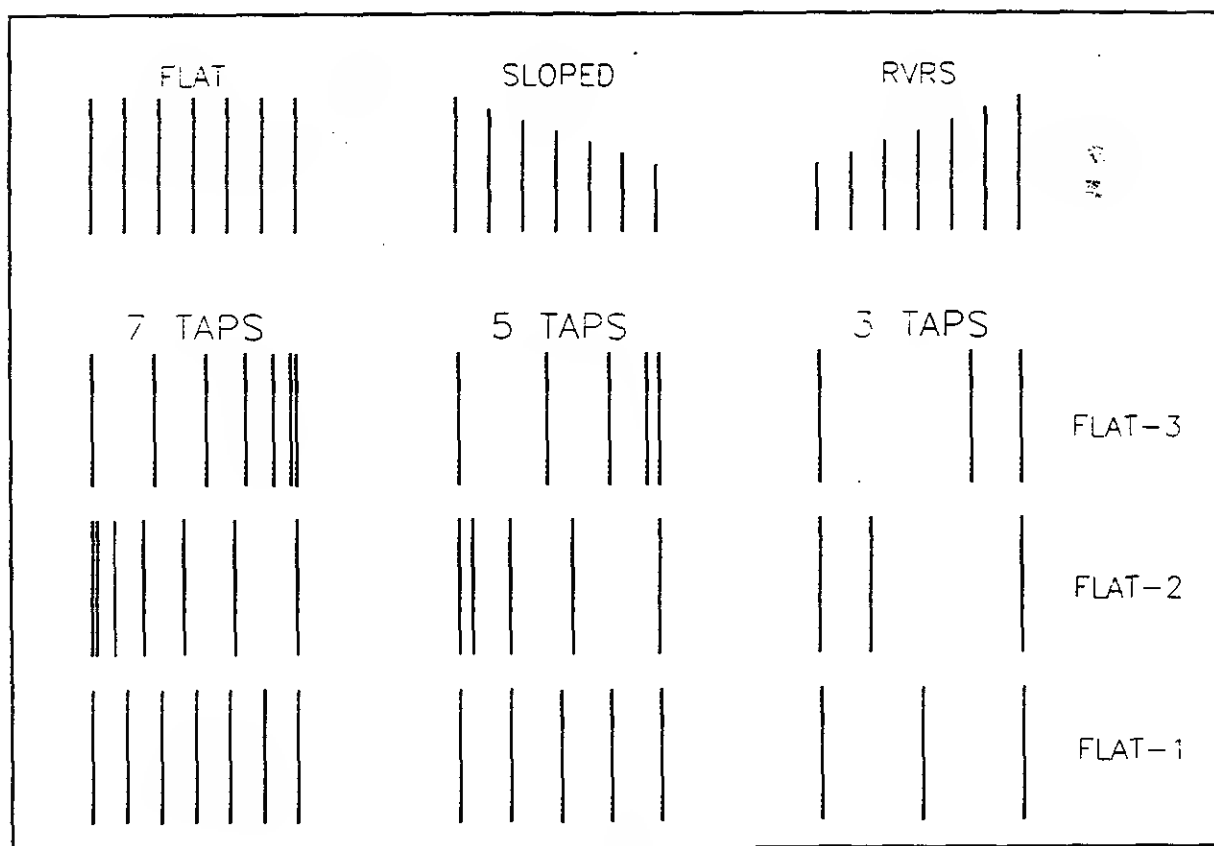


Figure 9

TAP'D-DDL-L

Tapped Digital Delay - Long

Parameters:

TYPE = FLAT-1m, FLAT-1s, RVRS-1m, RVRS-1s, SLOPE1m, SLOPE1s, (E)

FLAT-2m, FLAT-2s, RVRS-2m, RVRS-2s, SLOPE2m, SLOPE2s, (S)

FLAT-3m, FLAT-3s, RVRS-3m, RVRS-3s, SLOPE3m, SLOPE3s (L)

(eighteen algorithms) [FLAT-1m]

TAPS = 1 to 7 in one step increments [3]

DELAY = 0 to 240 ms in 5 ms increments [240ms]

LEVEL = 0 to 100 percent in % increments [100%]

There are three levels of tapped delays in the MULTIVERB. These are what we call Even (E), Shortened (S), and Lengthened (L). See fig. 9 for a graphic representation. (1's are Even, 2's are Shortened, 3's are Lengthened) Even means that the delay taps are at evenly spaced intervals. Shortened means that as the taps approach the set delay, the intervals are closer together. As the taps approach the set delay in the Lengthened mode they are farther apart. In the types you will see an [m] and an [s], the [m] means mono and the [s] signifies stereo. The mono tapped delay has its left and right taps at the same delay points where the stereo taps are staggered. When using the stereo tapped delays the first right tap is half the delay time before the first left tap. There also are three slopes used in the tapped delays, Flat, Reverse and Forward.

Flat has a flat linear response. Reverse exponentially increases in amplitude as the signal approaches the end. Forward exponentially decreases in amplitude as the signal approaches its end point. See figure 9. TYPE 3 taps are dense and full.

Use the longer tapped delay programs when you need to add some expansiveness to short reverb patches. Use the longer tapped delays especially the Sloped algorithms to create a fundamental front end reverb.

DESCRIPTION OF ALGORITHMS & PARAMETERS

REGEN-DDL-S

Regenerated Digital Delay - Short

Parameters:

DELAY = 0 to 100 ms in 5 ms increments [100ms]

REGEN = 0 to 100 percent in % increments [57%]

LEVEL = 0 to 100 percent in % increments [100%]

Since this delay algorithm has the characteristic of being in parallel with a reverb program if used with one, it can be used to add a small amount of depth, or wrap-around effect to the sound. A "hard reverb" effect may be achieved by using longer delay and a moderate amount of regeneration. Tonal sounding drones may be found using short delay and large amounts of regeneration.

REGEN-DDL-L

Regenerated Digital Delay - Long

Parameters:

DELAY = 0 to 240 ms in 5 ms increments [200ms]

REGEN = 0 to 100 percent in % increments [50%]

LEVEL = 0 to 100 percent in % increments [100%]

Use this algorithm for the same reasons and applications as the short Regen-DDL, only now the delay time is more than twice as long allowing for more effect.

STREQ-DDL-S

Stereo Digital Delay - Short

Parameters:

DLY-L = 0 to 360 ms in 5 ms increments [80ms]

definition: Delay Time Left Channel

DLY-R = 0 to 360 ms in 5 ms increments [110ms]

definition: Delay Time Right Channel

REGEN = 0 to 100 percent in % increments [57%]

HF-DAM = 0 to 100 percent in % increments [0%]

definition: High Frequency Damping

LEVEL = 0 to 100 percent in % increments [100%]

STREO-DDL-L

Stereo Digital Delay - Long

Parameters:

DLY-L = 0 to 500 ms in 5 ms increments [250ms]

definition: Delay Time Left Channel

DLY-R = 0 to 500 ms in 5 ms increments [125ms]

definition: Delay Time Right Channel

REGEN = 0 to 100 percent in % increments [50%]

HF-DAM = 0 to 100 percent in % increments [0%]

definition: High Frequency Damping

LEVEL = 0 to 100 percent in % increments [100%]

You can split image or create alternating regenerative patterns between the left and right outputs using Stereo Digital Delay. The ability to set separate delay times for each channel enables you to do this. When used in conjunction with the Flanger, Chorus or Panner, spatial effects are the result. Regeneration is derived from the left channel. Refer to Fig. 10.

When longer delay times are needed, use the STREO-DDL-L algorithm. Set both Left and Right Delay times at 500 ms for maximum delay output with no separation. You may also operate this effect in mono.

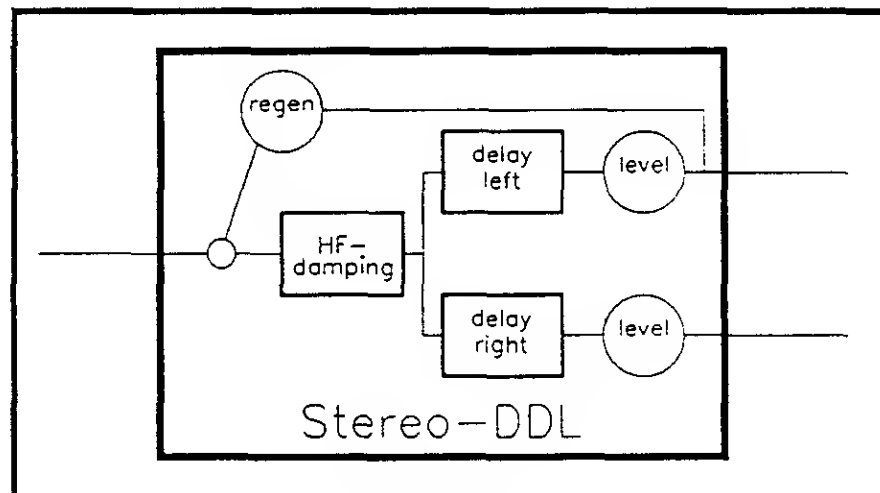


Figure 10

MULTIVERB PRESET LIST

MULTIVERB PRESET LIST

1. REVERB #1 HALL EQ + DDL + REV	dense hall
2. REVERB #2 ROOM EQ + REV	dense room
3. REVERB #3 VOCAL EQ + DDL + REV	vocal enhancement
4. REVERB #4 PLATE EQ + DDL + REV	deep and rich
5. EARLY REFLECT #1 DDL + REV	wide and distinct
6. EARLY REFLECT #2 DDL + REV	front image
7. STEREO DELAY DDL	short
8. STEREO ECHO DDL	long
9. VOCAL DOUBLER DDL + CHO	subtle doubling
10. VOCAL IMAGER EQ + DDL + REV	crisp separation
11. REV + VOC DELAY EQ + DDL + REV	deep reverb
12. REV + VOCAL ECHO DDL + REV	vocal hall
13. RVRS REV + DELAY DDL + GAT	delayed reverse
14. GATED REVERB #1 EQ + GAT	short gate
15. GATED REVERB #2 DDL + REV	dense gate
16. GATE REV + REVERB DDL + REV	reverberated gate
17. REVERSE REVERB EQ + GAT	short reverse
18. PITCH TRANSPOSER PT _r	zero shift starting point

19. PTR SHIFT 5th UP DDL + PTR	perfect fifth
20. MICRO PTR SHIFT DDL + PTR	the ultimate pitch shift chorus
21. OCTAVE SHIFT PTR	octave up
22. PITCH SHIFT DBLE DDL + PT	vocal doubler
23. STEREO CHORUS A CHO	moderate rate
24. STEREO CHORUS B CHO	fast rate
25. STEREO FLANGE A FLA	basic flanging
26. STEREO FLANGE B FLA	less regeneration
27. TAPE ECHO EQ + DDL	500ms echo
28. STEREO ECHOREC DDL	split echo
29. VIBRATO CHO	subtle vibrato
30. DELAYED VIBRATO DDL + CHO	deep vibrato
31. TREMOLO FLA	subtle tremolo
32. SYMPHONIC DDL + FLA	delayed tremolo
33. CHOIR DDL + REV	vocal reverberation
34. TWIN VOICES DDL + PTR	thick vocal doubler
35. SOFT SLAP ECHO DDL + REV	slap-back doubling
36. STEREO PHASE EQ + FLA	guitar phaser

MULTIVERB PRESET LIST

37. FLANGE & REV A DDL + FLA + REV	reverberated flange--subtle
38. FLANGE & REV B DDL + FLA + REV	reverberated flange--pronounced
39. GATED FLANGE + REV DDL + FLA + GAT	sharp cutoff flanger
40. DELAY + REVERB DDL + REV	200ms predelay then reverb
41. TAP DELAY + REV DDL + REV	tapped delay with reverb
42. CHORUS + REV A CHO + REV	subtle chorus with reverb
43. CHORUS + REV B CHO + REV	full chorus with reverb
44. CHORUS + GATE REV CHO + GAT	sharp cutoff chorus
45. STER DLY + CHOR A DDL + CHO	delayed chorus fast
46. STER DLY + CHOR B DDL + CHO	delayed chorus moderate
47. STER DLY + FLAN A DDL + FLA	delayed flange fast
48. STER DLY + FLAN B DDL + FLA	delayed flange moderate
49. CHORUS + DLY + REV EQ + DDL + CHO + REV	large room with chorus
50. FLANGE + DLY + REV EQ + DDL + FLA + REV	large room with fast flange
51. DEATH FLANGE FLA + GAT	sharp cutoff regenerated flange
52. BARBER POLE FLAN EQ + DDL + PTr	slow motion flange
53. SPACE SHIFT DDL + PTr	shimmer!
54. ARPEGGIATED FLAN DDL + FLA + REV	heavily delayed flange with reverb

55. ROTATING LESLIE EQ + FLA	leslie effect
56. CONCERT LESLIE DDL + FLA + REV	leslie effect with reverb
57. ECHOING CHORUS EQ + DDL + CHO	chorus with echo
58. VARIPITCH CHORUS EQ + DDL + PTr	regenerated pitch-shift chorus
59. CHORUS VIBRATO EQ + DDL + CHO + REV	delayed reverb with fast chorus
60. CATHEDRAL REVERB EQ + DDL + REV	large vocal reverb
61. CONCERT REVERB EQ + DDL + REV	dense room reverb
62. STUDIO PLATE REV EQ + DDL + REV	quality plate reverb
63. CHOIR LOFT REV EQ + DDL + REV	open air reverb
64. CHURCH HALL REV EQ + DDL + REV	middle position dense reverb
65. AMBIENT PERCUSS. EQ + REV	short plate reverb with HF rolloff
66. CONCERT GATE REV DDL + REV	large room gated reverb
67. STUDIO PLATE GAT GAT	short sharp gate
68. THUNDER SNARE DDL + REV	tapped delay with reverb
69. WAREHOUSE SNARE DDL + REV	seven tap delay with reverb
70. SNARE IN SHOWER EQ + REV	short rolled-off reverb
71. STRATO KILLER DDL + PTr	delayed small pitch shift
72. STER METAL GUITR DDL + CHO	stereo delayed chorus

MULTIVERB PRESET LIST

73. 12 STRING GUITAR DDL + PTr	one octave up with regeneration
74. GUITAR DREAM DDL + CHO	thick chorus with delay
75. SILKY STRAT EQ + FLA + REV	full reverb with flanging
76. THRASH FLANGE EQ + DDL + FLA + REV	flanger paralleled with delay
77. BLUES MAN GUITAR DDL + REV	long delayed reverb
78. ICE GUITAR DDL + PTr	off-pitch delay
79. 60'S ROCK EQ + DDL + REV	seven tap delay rolled off with reverb
80. ER REF + CHORUS CHO + REV	early reflections chorused
81. ER REF + FLANGE FLA + REV	early reflections flanged
82. ER REF + DELAY DDL + REV	early reflections with five tap delay
83. PREDELAYED REV DDL + REV	100ms predelay into hall reverb
84. PREDELAYED GATE DDL + GAT	100ms predelay into 400ms gate
85. ECHOVERB DDL + REV	deep echo with reverb
86. PANNING DELAY DDL + PAN	regenerated delay with fast panning
87. IMAGED CHORUS DDL + CHO	full stereo imaged chorus
88. IMAGED FLANGE DDL + FLA	full stereo imaged flanger
89. PANNING CHOIR DDL + REV + PAN	large hall with left right panning
90. DRY SWEEP SLOW PAN	side to side panning

91. DRY SWEEP FAST PAN	side to side panning
92. REV + DELAY + PAN DDL + REV + PAN	large room with fast panning
93. IMAGED REVERB A DDL + REV + PAN	room reverberation with fast panning
94. IMAGED REVERB B DDL + REV + PAN	hall reverb with fast panning
95. PING PONG DELAY DDL	fast ping pong
96. MULTI-TAP PAN DDL + PAN	delayed side to side panning
97. REV + M-TAP P-PONG DDL + REV + PAN	large room with panning
98. REVERSE REV + PAN GAT + PAN	panned reverse reverb
99. GATE REV P-PONG GAT + PAN	panned gate reverb
100. <BLANK TITLE> <NO EFFECTS>	MIDI bypass preset

MISCELLANEOUS

MISCELLANEOUS

Battery Backup

When power is terminated to the MULTIVERB, the edited MPT as well as the last preset used and the MIDI Channel will be active when the unit is next powered up. Memory retention is expected to last four years. Should you encounter memory loss, contact our service department. If you determine the battery needs to be replaced, refer to the Service Information section, Replacing the Lithium Battery.

Software Revision Level

There is a way to correctly identify the software version residing in the unit. Press the MIDI/UTILITY button, press the SELECT > button seven times. The current version as well as the date will be displayed in the LCD. The MULTIVERB's software is contained in a socketed EPROM and is field replaceable. This software controls the MULTIVERB's functions as well as its sounds.

Be sure to fill out the USER REGISTRATION CARD at the back of this manual and send it in to our Customer Service Department. Doing this will insure that you are notified of any updates or other important information regarding your MULTIVERB. Please be sure to write in your serial number.

Factory Reset

There is a Factory Reset sequence which will reinitialize the MULTIVERB to ALL of its original values. Be sure that you have either downloaded or kept a written record of the Presets you want saved since they will be eliminated. To perform a Factory Reset you must press and hold the PRESET DOWN, ADD EFFECT and MIDI/UTILITY buttons simultaneously.

CIRCUIT DESCRIPTION

Although the MULTIVERB is predominantly digital, it must interface with analog audio signals. If you look at fig. 11, you will see that the audio signal passes directly down the chain of processing stages with all of the control provided by the control processor. The Input Processing stage buffers between the audio source and the MULTIVERB's internal circuitry. This stage also has the input filtering circuitry to remove unwanted very high frequency material. The signal is then sampled at discrete instants of time and converted into a continuous stream of digital numbers by the analog to digital (A to D) converter. After this conversion the numbers are then stored in memory.

At the heart of the MULTIVERB is the high speed 20 bit digital signal processor. This processor is capable of performing virtually millions of arithmetic calculations per second. The Digital Signal Processor retrieves the encoded numbers representing the input signal from memory and processes them according to the currently selected parameters. After that is done, the information is again stored in memory.

At regular intervals the processed data is recalled from memory and converted back into an audio signal by the digital to analog (D to A) converter. Alternate samples go to each of the two output sections and produce the left and right parts of a stereo image. Finally the output sections remove unwanted high frequency noise which may have been produced during processing and then is available at the outputs.

The Control Processor, along with its operating software (in EPROM), determines the "personality" of the MULTIVERB. It monitors the front panel controls, MIDI, Remote and inputs and outputs sending information to the user via the front panel displays. Button depressions are translated into commands understood by the Digital Signal Processor. Thus the user can make quick changes to the reverberant sound using concepts such as "Hall 1" without being concerned about the details.

The Control Processor also controls the storage of front panel settings in Preset Memory and their retrieval for later use or immediate comparison. A lithium battery preserves the presets when AC power is removed.

SPECIFICATIONS

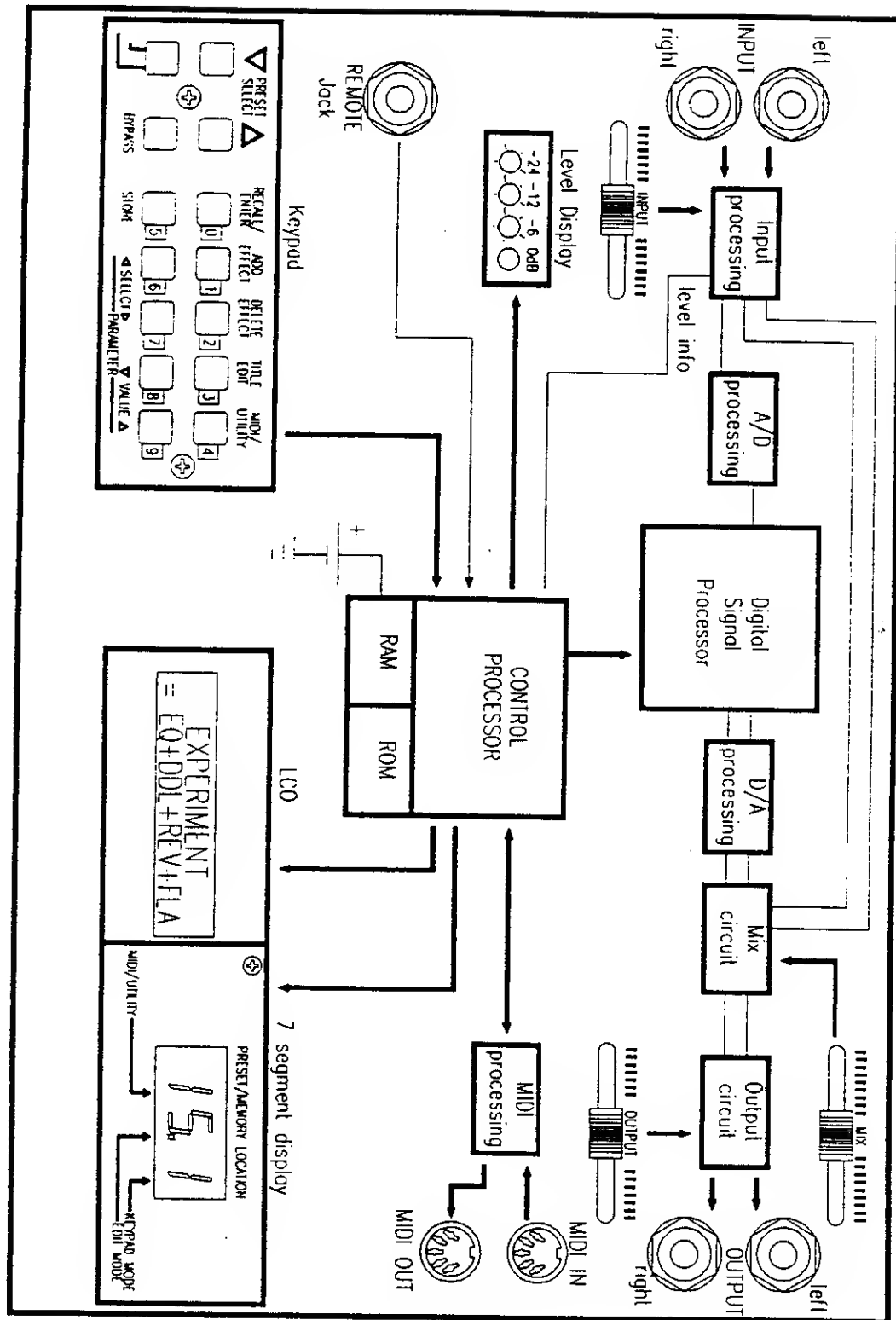


Figure 11

SPECIFICATIONS

Factory Presets:.....100

Memory Locations.....200

Bandwidth:15KHz

Dynamic Range:.....90dB Typical

Operating Level: + 16dBV max

Input Impedance:.....1M ohm

Output Impedance:1K ohm

Mechanical:1.75"H X 19"W X 10"D, all steel case

Power Requirements:117 Volts AC, 60Hz, Internal Fuse,
.....Export unit configured for destination country.

MIDI Receive Channel:1-16, OMNI (all), Off

MIDI Programs:.....May be assigned to any Preset #.

Connections:.....Stereo In/Out 1/4" phone, MIDI IN/OUT

All specifications subject to change without notice.

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Telex: 4949793 ARTROC

SERVICE INFORMATION

SERVICE INFORMATION

Returning the Unit to the Factory for Service

The following information is provided for the unlikely event your unit requires service.

1) Be sure the unit is the cause of the problem. Check to make sure the unit has power supplied, all cables are connected correctly, cables themselves are in working condition and you are in the correct operating mode for what you are doing.

2) If you find the unit to be at fault, write down a description of the problem including how and when the problem occurs. Include this information with your unit.

3) Pack the unit in it's original carton or a reasonable substitute. The packing box is not recommended for a shipping carton. If possible put the packaged unit in another box for shipping. NOTE: The front panel is subject to damage in shipping if the unit is poorly packaged.

4) Include with your unit: a return shipping address (We cannot ship to a P.O. Box), a copy of your purchase receipt, a daytime phone number in case we need to contact you and the description of the problem.

5) Ship the unit to:

APPLIED RESEARCH & TECHNOLOGY, INC.

215 TREMONT STREET

ROCHESTER, NY 14608

ATTN: REPAIR DEPARTMENT

6) If you have questions regarding repairs, or if you think your unit may (or may not) need to be repaired feel free to contact our customer service department at (716) 436-2720.

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

Replacing the Lithium Battery

CAUTION, battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Make sure power is removed from the device. Place the unit on a flat, stable surface, right side up, with the front facing you. Remove the four screws (two on each side of the case). Lift the cover up to remove. Locate the battery holder on the PC board. Lift the retaining finger and slide the battery out.

Replace the battery with Matsushita, Part No. BR2325 (or equiv.) by lifting the retaining finger and sliding the battery in place. Make sure the "+" mark on the battery is facing up. Slide the cover down on top of the unit, put the screws in about half way, slide the cover as far forward as possible and tighten the screws.

WARRANTY

WARRANTY

Warranty service for this unit will be provided by Applied Research & Technology, Inc. in accordance with the following warranty statement.

Applied Research & Technology, Inc. warrants to the original purchaser that this product and the components thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

Applied Research & Technology, Inc. (ART) will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to an authorized service center or the factory service department, accompanied by proof of purchase date in the form of a valid sales receipt.

EXCLUSIONS: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

ART shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

APPENDIX A - Applications

APPLICATIONS

LEVEL

It is not suggested to use a microphone plugged directly into the MULTI-VERB. Even though the device will function properly with some types of microphones you may encounter level mismatch or level problems. Some type of preamplifier is required since the input sensitivity of most microphones is less than -40dB.

When using guitars with high output pickups it may be necessary to set the input control farther to the left. Sharp transients from the guitar will light the -6dB LED and the unit will not clip.

Chorusing and Flanging have always been susceptible to clipping due to their own characteristics. It may be necessary to use a slightly lower input level when using these effects.

Some effects have a Level control parameter. Use this control to adjust for depth, apparent mix level, volume adjustment for each preset as well as normal output level. By adjusting level in this manner, you need not constantly adjust the Output Level Control.

PITCH TRANSPOSER

The Pitch Transposer's most obvious area of use is in producing real-time vocal and instrument harmonies. Some knowledge of music theory is necessary to use the Pitch Transposer. It is helpful to have a basic understanding of musical intervals and scales.

Each musical note has a specific physical or sound attribute called its frequency or pitch. The range of pitches used to create music is divided into intervals between pitches. The basic interval is the octave. The two pitches which span an interval of an octave have a frequency ratio of 2:1. The higher pitch is exactly twice the frequency of the lower pitch. The octave is divided into twelve intervals called half steps. One half step is the interval between adjacent frets on a guitar or between successive keys, including the black keys on a piano. Other intervals smaller than an octave may be formed by combining half steps. These intervals are listed on the following page.

APPENDIX A - Applications

Number of Half Steps / Interval

- 1 / Half Step, Semitone, Minor Second
- 2 / Whole Step, Whole Tone, Major Second
- 3 / Minor Third
- 4 / Major Third
- 5 / Perfect Fourth
- 6 / Augmented Fourth, Tritone, Diminished Fifth
- 7 / Perfect Fifth
- 8 / Augmented Fifth, Minor Sixth
- 9 / Major Sixth
- 10 / Minor Seventh, Dominant Seventh
- 11 / Major Seventh
- 12 / Octave

A musical scale is a consecutive series of notes within an octave. Each scale is comprised of a specific sequence of whole and half steps from the tonic or key note. A scale containing all twelve half steps is termed the chromatic scale. The most common scale, and the basis for other scales, is the major scale. (Do-Re-Me-etc.). The major scale adheres to the following pattern:

I ----- II ----- III ----- IV ----- V ----- VI ----- VII ----- VIII
whole whole half whole whole whole half

This scale and all others spans an octave. Other scales follow different series of whole and half steps that add up to an octave.

Unfortunately, a basic melodic harmony to the major scale is comprised of a series of notes which are an interval of a minor or major third above the original scale. The specific sequence for harmonies above a major scale is shown in the chart found in APPENDIX E. Relative minor scale sequences are shown in a separate table in the same appendix. Note that, while the interval of an octave is not normally thought of as a harmony, it is the easiest to perform, since the harmony scale is always twelve half steps above or below the major or relative minor scale (preset 21). The interval of a fifth (seven half steps, preset 19) is also quite useful, since, in general, long passages may be played without changing intervals.

To use the Pitch Transposer to play a correct harmony other than an octave to a melody line, it is necessary to set up two or more presets for different intervals and alternate between them.

APPENDIX B - Examples

EXAMPLES

CREATING A PRESET

Enter EDIT MODE

Using the PRESET SELECT buttons, scan up to preset 151

Press the RECALL/ENTER button [< blank title > , < no effects >]

Press the ADD EFFECT button once, [ADD:EQUALIZER?]

Press RECALL/ENTER (you have just entered the eq into the chain), bottom display reads [= EQ]

Press ADD EFFECT seven times, [ADD:REVERB-1?]

Press RECALL/ENTER (now the reverb algorithm is entered into the chain, display reads [= EQ + REV]

Press ADD EFFECT again, select the FLANGER, enter it into the chain. (you pressed the ADD EFFECT button once and then pressed the RECALL/ENTER button), display should read like [= EQ + FLA + REV]

Press the ADD EFFECT button one more time [ADD:MONO-DDL-S?]

Enter it into the chain (press RECALL/ENTER), [= EQ + DDL + FLA + REV]

IF YOU WISH TO SAVE THIS CHAIN OF EFFECTS AS A PRESET YOU
MUST PRESS STORE NOW.

Press STORE (note the ≠ sign disappears)

EXAMPLE 1:

Editing the MPT from the MULTIVERB front panel controls.

In this example, we will edit the MPT so that when MIDI numbers 1 and 2 are received, MULTIVERB PRESETS 60 and 151 will be recalled. It is assumed that the MULTIVERB's MPT has not been edited.

- Press the MIDI/UTILITY button.
- Press the SELECT > button three times. You will see in the LCD [MIDI PROG = 0_] at the top and [PRESET = 1] on the bottom.
- Press the SELECT > again. The [_] now is to the right of [PRESET = 1].
- Hold in the VALUE UP button until the display reads [PRESET = 60_].
- Press the SELECT < button once.
- Press the VALUE UP button once.
- Press the SELECT > once.
- Use the VALUE buttons to select preset 151 (use rapid access mode)
- Exit MIDI mode by pressing the MIDI/UTILITY button once.

You may assign any preset # to any program # including a preset to a multiple of program #'s. To test the reassigned numbers, use a MIDI device to recall the presets. Your reassigned presets should be recalled.

EXAMPLE 2:

Editing the MPT with a keyboard or external controller.

Using this method of editing, you select the desired patch on the keyboard, and then select the desired PRESET on the MULTIVERB for that sound. You can do this while you are listening to the MULTIVERB.

When used with a keyboard or other device that will send MIDI PROGRAM CHANGE messages, MPT editing may be simplified. We will edit the MPT so that when MIDI numbers 3 and 4, are received, presets 96 and 1 will be recalled. It is assumed that the MULTIVERB has not had its MPT edited.

The keyboard MIDI OUT must be connected to the MULTIVERB's MIDI IN jack. The MIDI channel on the MULTIVERB must be set to the same channel that the keyboard will be sending messages on, or the MULTIVERB's OMNI mode must be ON.

- Press the MIDI/UTILITY button.
- Press the SELECT button four times.
- Select a patch on the keyboard so that [MIDI PROG = 2] is displayed. If the MPT has never been edited, [PRESET = 3] should be in the lower half of the display.

The patch that causes [MIDI PROG = 2] to appear in the display is usually the second or third patch of the lowest numbered bank if the keyboard has banks of patches.

- Use the VALUE UP and DOWN keys to select preset 96.
- With the keyboard change the MIDI PROGram number to 4.
- Set the PRESET to = 1.

APPENDIX B - Examples

You may continue to program each of the keyboard's patches (say there are 64) in this manner assigning any preset # to the patch.

In the previous examples four of the MPT entries were edited. You may edit the entire MPT if desired. If you do not have access to a MIDI controller and you wish to change between PRESETs easily, you may want to edit the MPT for incrementing through a sequence of presets. Example three illustrates how this is done.

EXAMPLE 3

Setting up a preset sequence including a bypass preset.

If you need to change between presets quickly without scanning or MIDI, this procedure will be to your advantage. As in the other examples, editing the MPT is the key. In this example we will edit the MPT to sequence through ten presets. Ten is not the limit. You may program a sequence of 127 presets if you wish. These presets will be in the order: 60, 151, 96, 1, 151, 35, 1, 69, 100 and 61. Notice that we repeated some presets and included preset 100 which is set up from the factory as a bypass preset (no effects stored in it). Remember that you can assign any preset to a MIDI number including using a preset at multiple locations. Using an empty preset as a bypass enables you to select no effect eliminating the need to bypass the unit from the front panel and then continuing on with an effect preset next in the chain. NOTE: If your mix control is fully to the right (all wet), no signal will pass through the MULTIVERB.

- Press the MIDI/UTILITY button.
- Press the SELECT > 3 times.
- Press the VALUE UP button until top of the display reads [MIDI PROG = 4_]. The sequence must start at program location # 0. Since we have programmed 0-3 already we will start at location # 4. (If you wanted different preset #'s in the first four locations reprogramming would be required.)
- Press the SELECT > button once.
- Use the VALUE UP button to select preset 151.
- Press the SELECT < button once.
- Change the MIDI PROG # to = 5
- Press the SELECT > again.
- Change the preset # to equal 35.
- Continue this way until all the presets are entered the last being 61 at [MIDI PROG = 9].
- Press the SELECT < button once.
- Press the VALUE DOWN button nine times (each time you press the button notice the [PRESET =] is reading the preset # you have programmed in.)

INCREMENT PROGRAM

Now that we have a sequence of presets, what do we do with them? To access these presets we must program the REMOTE JACK to increment the programs. You can only increment up through the programs.

External Switch Mode [EXT SW MODE] allows you to program the REMOTE jack on the rear panel so that you may use a footswitch to increment through a desired set of presets or to operate as a normal bypass jack.

Example four describes how program the REMOTE jack to sequence through the ten presets you set up in Example three with a footswitch. Example five shows how to program the REMOTE jack for normal bypass operation.

EXAMPLE 4

Programming the REMOTE jack for Incrementing Programs

- Press the MIDI/UTILITY button. The display will read [EXT SW MODE] in the top half and [= INCR PROGS 1] in the bottom half.
- Use the VALUE UP button to change the number to 9.

You have just programmed the MULTIVERB to sequence through the ten presets set in Example 3 when using a momentary footswitch plugged into the REMOTE jack.

EXAMPLE 5

Programming the REMOTE jack for the BYPASS function.

- Press the MIDI/UTILITY button. The display will read [EXT SW MODE] in the top half and [= INCR PROGS 1] in the bottom half.
- Use the VALUE DOWN button to change the display to read [= BYPASS ON/OFF] in the lower part of the display.

Now when the footswitch is used the BYPASS function is accessed. Remember, if the MIX control is set to all wet, no signal will be present at the output(s).

APPENDIX B - Examples

EXAMPLE 6

Setting the LCD view angle.

You may change the LCD view angle for the best visibility. The angle may be adjusted to maximize legibility of the characters from top, front or under viewing angles. When viewing from the top, use a higher number. If you are viewing the display directly from the front, use the middle numbers. Viewing the LCD when the MULTIVERB is above you, adjust the view angle with the lower numbers.

- Press the MIDI/UTILITY button.
- Press the SELECT > button six times.
- Use the VALUE UP or DOWN buttons to adjust the view angle

APPENDIX C - MIDI Messages

MULTIVERB MIDI MESSAGES

The MULTIVERB responds to the following messages:

Program change:

Cxh ddh

x = channel number 0h to Fh for channels 1 to 16

dd = program number 0h to 7Fh or 0 to 127

If the channel that the MULTIVERB is set to is not off and the channel matches (either it is the same number or OMNI is ON), then the MULTIVERB will look up the preset in the MIDI Program Table (MPT) and recall the corresponding preset.

Channel Mode message for OMNI on/off

Bxh 7Ch 0h : OMNI Mode Off

Bxh 7Dh 0h : OMNI Mode On

x = channel number, 0h to Fh for channels 1 to 16

If the channel matches the Multiverb's channel number, it will set the OMNI mode accordingly. The current OMNI mode does not affect this message, the channel must match regardless of current OMNI mode.

SYSTEM EXCLUSIVE MESSAGES

message format:

general: <System Exclusive Status> <ART ID> <Channel>
<product ID> <message ID> <message...> F7h

in hex: F0h 1Ah 0xh 04h message ID message... F7h

F0h - System Exclusive status byte.

1Ah - ART manufacturer's ID number.

0xh - channel number, 0 to 0Fh.

05h - MULTIVERB product id code.

F7h - End Of eXclusive status byte.

Message ID values > = 40h are requests. A request is a message that when received by the MULTIVERB causes a message to be sent by the MULTIVERB.

0x is the channel number, 0 to 15 (00h to 0Fh). To the user, the channel number is displayed as 1 to 16.

APPENDIX C - MIDI Messages

Internally, presets are numbered 0 to 199. When a preset number is displayed, it is shown as 1 to 200. Any messages that refer to the MULTIVERB preset number refer to the internal number, 0..199. Preset numbers are referenced in message with 2 data bytes, least significant 7 bits, then most significant bit in the lsb of the next byte. Example: preset 1 on the LCD is referenced with 00h 00h, and preset 200 is referenced with 47h, 01h.

When channel number is OFF and a front panel command for a dump is processed, the MULTIVERB sends a message coded for channel 1 (the lowest channel number).

DETAILED DESCRIPTION OF MESSAGES

Set Bypass OFF F0 1A 0x 05 03 00 00 F7

Set Bypass ON F0 1A 0x 05 03 00 01 F7

This allows remotely setting the state of BYPASS in the MULTIVERB without affecting anything else in the unit.

request DUMP all presets F0 1A 0x 05 4B F7

LOAD all presets F0 1A 0x 05 0B <200 * 29 bytes> F7

Dumps all presets in preset number order. No compression of the data is done.

request MPT table F0 1A 0x 05 4C F7

set MPT table F0 1A 0x 05 0C <128 * 2 bytes> F7

For each MIDI program number there is a corresponding MULTIVERB preset number. Each entry (internally) is 0..199 and is sent as 2 bytes. First the least significant 7 bits, then the msb. This is done for each of the 128 MIDI program numbers.

If you find you require additional MIDI technical information, please contact or customer service department at (716) 436-2720.

APPENDIX D - Preset worksheets

	PARAMETER	VALUE	PARAMETER	VALUE	PARAMETER	VALUE
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
NOTES:						

APPENDIX D - Preset worksheets

	PARAMETER	VALUE	PARAMETER	VALUE	PARAMETER	VALUE
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
PRESET #						
TITLE						
EFFECTS						
NOTES:						

APPENDIX E - Tables and charts

EQUIVALENT LEVEL TABLE
(MEASUREMENTS IN dBV)

INPUT SLIDER	INPUT LEVEL (REF 0dB)	OUTPUT LEFT	OUTPUT CENTER	OUTPUT RIGHT
LEFT	(+)10	(-)7.5	(+)6	(+)10
CENTER	(+)6	(-)7.5	(+)6	(+)10
RIGHT	(-)15	(-)7.5	(+)6	(+)10

MAJOR SCALE HARMONY TABLE

	I	II	III	IV	V	VI	VII
FIRST ABOVE	+4	+3	+3	+4	+4	+3	+3
FIRST BELOW	-5	-5	-5	-5	-5	-5	-6
SECOND ABOVE	+7	+7	+7	+7	+7	+7	+6
SECOND BELOW	-8	-9	-9	-8	-8	-9	-9
OCTAVE ABOVE	+12	+12	+12	+12	+12	+12	+12
OCTAVE BELOW	-12	-12	-12	-12	-12	-12	-12

RELATIVE MINOR SCALE HARMONY TABLE

	I	II	III	IV	V	VI	VII
FIRST ABOVE	+3	+3	+4	+3	+3	+4	+4
FIRST BELOW	-8	-9	-9	-8	-8	-9	-9
SECOND ABOVE	+7	+6	+7	+7	+7	+7	+7
SECOND BELOW	-5	-6	-5	-5	-5	-5	-5
OCTAVE ABOVE	+12	+12	+12	+12	+12	+12	+12
OCTAVE BELOW	-12	-12	-12	-12	-12	-12	-12

APPENDIX F - Glossary

REVERBERATION--A complex sonic phenomenon characterized by multiple sound reflections from room surfaces, with a gradual decay in overall level and rolling off of higher frequency components.

EARLY REFLECTION--One cue comes from the time delay between the initial sound and the early well defined echoes of the first reflections off the floor, ceiling and walls. This time relates directly to the perceived size of the space.

PRE DELAY--In conventional recording practice, a delay is often used between the console and the reverb chamber. This pre delay adds an apparent depth to the reverb sound as well as separating the initial sound from the dense reverberation.

DECAY--Natural reverberation results when sound reflects off the boundaries of a confined space. The character of the reverberant sound depends on the size and shape of the space, the composition of the boundaries and the presence of objects in the space which reflect or absorb sound energy. Decay time is defined as the time required for the reverberant sound to decay to one millionth (-60 dB, RT-60) of its original energy.

H.F. Damping--As sound travels through air, or reflects off soft surfaces, the higher frequencies are absorbed quicker than the rest of the sound. This absorption of high frequency is termed damping.

POSITION--You may hear the reverberant sound from a number of different locations in a reverberant space. If you are near the front of the room, you will hear more of the initial sound. As you move towards the rear of the room you will hear more reverberant sound and less of the initial sound.

DIFFUSION--Varies the reverb sound from rough to smooth by increasing echo density and filling in the spaces between individual echoes. As diffusion is increased so is the smoothness of the sound.

INDEX

A

Algorithms p. 16 - 26
 CHORUS p. 17
 EQUALIZER p. 16
 FLANGER p. 16
 GATE-VERB-1 p. 21
 GATE-VERB-2 p. 21
 GATE-VERB-3 p. 21
 MONO-DDL-L p. 19
 MONO-DDL-S p. 19
 PANNER p. 19
 PITCH TRANSPOSER p. 18
 REGEN-DDL-L p. 25
 REGEN-DDL-S p. 25
 REVERB-1 p. 19
 REVERB-2 p. 20
 REVERB-3 p. 20
 STeREO-DDL-L p. 26
 STeREO-DDL-S p. 25
 TAP'D-DDL-L p. 24
 TAP'D-DDL-S p. 23
 Applications p. 40
 Pitch Transposer p. 40
 Setting the level p. 40

B

Battery Backup p. 33
 Bypass p. 7, 15, 46

C

Connections p. 2
 Control buttons p. 6
 ADD EFFECT button p. 9
 BYPASS button p. 7
 DELETE EFFECT button p. 11
 KEYPAD/EDIT mode button p. 7
 MIDI/UTILTIY button p. 8
 PRESET SELECT buttons p. 6
 RECALL/ENTER button p. 9
 SELECT(UP) and SELECT(down) p. 13
 STORE button p. 12
 TITLE EDIT button p. 12
 VALUE (up) and VALUE (down) buttons p. 13
 Controls
 Input level p. 4
 MIX level p. 5
 Output level p. 5

D

Decay p. 53
 Diffusion p. 53

E

Early Reflection p. 53
 Edit mode control buttons p. 9
 Examples p. 11 - 12, 15, 43
 Adjusting parameters p. 13
 Creating a preset p. 43
 Creating a title p. 12
 Deleting an effect p. 11
 Editing the MIDI Program table p. 14, 43
 Editing the MPT with MIDI instruments p. 44
 Programming the Remote jack for bypass p. 46
 Programming the Remote jack for INC PROGrams p. 46
 Selecting four effects p. 10
 Selecting parameters p. 13
 Setting the LCD View angle p. 47
 Setting the MIDI merger p. 15
 Setting up a BYPASS preset p. 45
 Setting up a sequence of presets p. 45

F

Factory presets
 1 to 18 p. 27
 19 to 36 p. 28
 37 to 54 p. 29
 55 to 72 p. 30
 73 to 90 p. 31
 91 to 100 p. 32
 Factory reset p. 33
 Five pin DIN jacks p. 2

H

H.F. Damping p. 53

I

Increment program mode p. 15, 46
 Input level p. 40
 Input level control p. 4
 Input level indicators p. 4

K

Keypad entry p. 7

L

LCD View angle p. 8, 47
 Liquid Crystal Display (LCD) p. 5
 Locking the first 100 presets p. 9

INDEX

M

- MIDI mode p. 8, 14
- MIDI channel p. 8, 14
- MIDI Merger p. 8, 14
- MIDI messages p. 48
 - BYPASS OFF message p. 49
 - BYPASS ON message p. 49
 - LOAD all presets p. 49
 - OMNI OFF message p. 48
 - OMNI ON message p. 48
 - Program change message p. 48
 - Request MPT p. 49
 - Send all presets p. 49
 - Set MPT p. 49
- SYSTEM EXCLUSIVE CODE syntax p. 48
- MIDI OMNI mode p. 8
- MIDI Program table p. 8, 14, 43 - 44, 49
- MIDI/Utility mode p. 8
 - External switch mode p. 8
 - LCD View angle p. 8
 - MIDI Channel p. 8
 - MIDI Merger p. 8
 - MPT p. 8
 - OMNI mode p. 8
 - Presets 1-100 locked/unlocked p. 9
 - Send a preset p. 9
 - Send all presets p. 9
 - Send MPT p. 9
 - Software Version level p. 9
- MIX level control p. 5

O

- OMNI mode p. 8, 14, 48
- Output level control p. 5

P

- phone jacks p. 2
- Pitch Transposer p. 40
 - Algorithm p. 18
- Position p. 53
- Predelay p. 53

R

- Remote jack p. 8, 15, 46
- Replacing the lithium battery p. 38
- Reverberation p. 53

S

- Sending a preset p. 9, 15
- Sending all presets p. 9, 15, 49
- Sending the MPT p. 9, 15, 49
- Service
 - Replacing the battery p. 38
 - Returning units for service p. 37
- Seven Segment Display (presets) p. 5
- Software Version p. Contents, 9, 33

T

- Tables
 - Equivalent level table p. 52
 - Major scale harmony table p. 52
 - Relative minor scale harmony table p. 52

____tear here____tear here____

USER REGISTRATION CARD

MODEL # _____ SERIAL # _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE (OPTIONAL) _____

DEALER _____

CITY _____ STATE _____

PURCHASE DATE _____

INTENDED USE: _____STUDIO _____HOME STUDIO _____PA

_____INSTRUMENT _____

_____COMMERCIAL/FIXED INSTALLATION _____BROADCAST

_____OTHER _____

WHAT OTHER PIECE OF AUDIO EQUIPMENT DO YOU PLAN ON
PURCHASING IN THE NEXT 12 MONTHS _____

WHAT NEW PRODUCTS WOULD YOU LIKE TO SEE FROM ART _____

COMMENTS ON THIS PURCHASE _____

WHAT MAGAZINES DO YOU SUBSCRIBE TO OR READ _____

AFFIX
PROPER
POSTAGE

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