

INTELLIVERB™

24 BIT VIRTUAL ROOM™ PROCESSOR

OWNER'S MANUAL

HUSH Licensed by 

May be covered by one or more of the following:
U.S. Patents #4538297, 4647876, 4696044,
4745309, 4881047, 4893099 and 5124657.
Other patents pending.
Foreign patents pending.

RSP

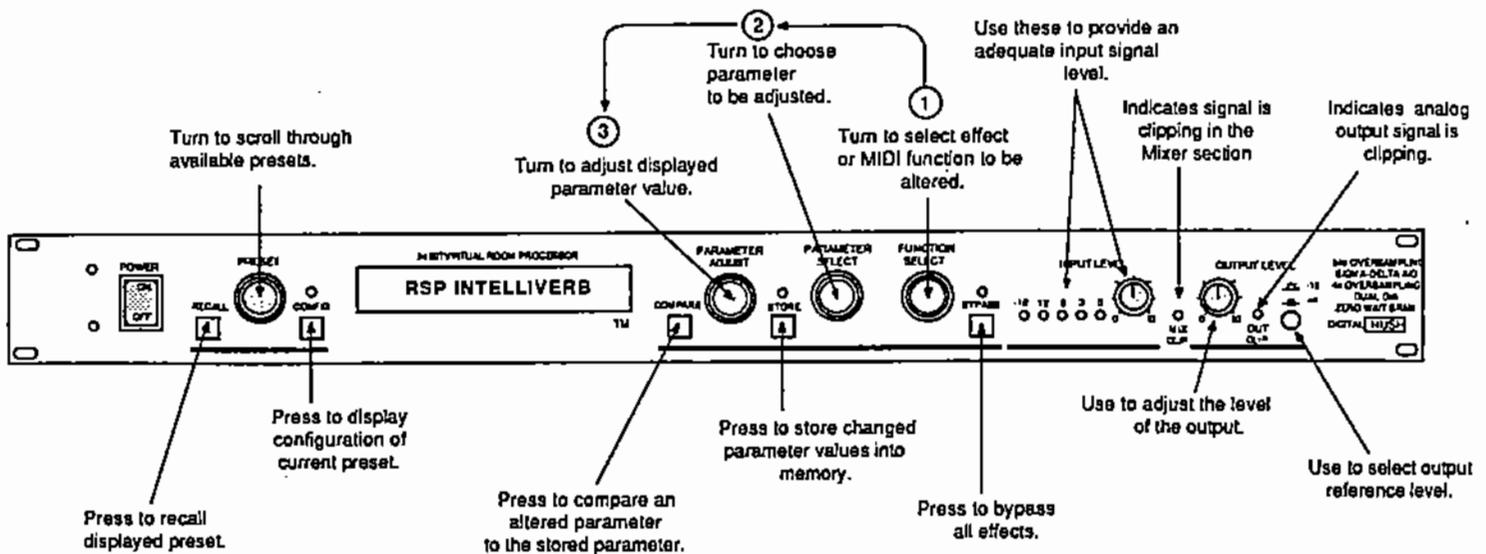
Technologies

CONTENTS

1. INTELLIVERB™ QUICK REFERENCE.....	Pg 1
2. INTRODUCTION.....	Pg 2
A. PRECAUTIONS.....	Pg 2
B. POWER REQUIREMENTS.....	Pg 3
C. OPERATING TEMPERATURE.....	Pg 3
3. FRONT PANEL OPERATION.....	Pg 4
4. REAR PANEL DESCRIPTION.....	Pg 7
5. CONNECTIONS.....	Pg 9
6. PRINCIPLE OF OPERATION.....	Pg 12
A. MIXER SECTION.....	Pg 12
B. REVERB SECTION.....	Pg 14
C. DELAY SECTION.....	Pg 22
D. DUCKER SECTION.....	Pg 24
E. PITCH CHANGE SECTION.....	Pg 25
F. HUSH™ SECTION.....	Pg 28
7. CONFIGURATIONS.....	Pg 29
A. HUSH™; VIRTUAL ROOM.....	Pg 30
B. HUSH™; CHORUS; DELAY; REVERB.....	Pg 33
C. HUSH™; DELAY; DUCKER.....	Pg 35
D. HUSH™; 8 VOICE CHORUS; DELAY.....	Pg 38
E. HUSH™; PITCH SHIFT; DELAY.....	Pg 40
F. HUSH™; PITCH SHIFT; DELAY; REVERB.....	Pg 42
8. OPERATING THE INTELLIVERB™.....	Pg 44
A. RECALLING A STORED INTELLIVERB™ PRESET.....	Pg 44
B. CHANGING PRESET PARAMETERS.....	Pg 44
C. STORING CHANGED PARAMETERS.....	Pg 45
D. EDITING A PRESET TITLE.....	Pg 46
E. SELECTING A 'POWER ON' PRESET.....	Pg 47
9. MIDI OPERATION.....	Pg 48
A. MIDI CONTROLLER ASSIGNMENTS.....	Pg 48
B. MIDI PROGRAM MAPPING.....	Pg 50
C. MIDI CHANNEL.....	Pg 52
D. MIDI DUMP/LOAD.....	Pg 53
E. FACTORY RESTORE.....	Pg 59
F. PRESET RESTORE.....	Pg 61
10. APPENDIX.....	Pg 63
A. FACTORY PRESETS.....	Pg 63
B. MIDI IMPLEMENTATION CHART.....	Pg 64
C. SPECIFICATIONS.....	Pg 65

1. QUICK REFERENCE

To change parameters



RECALLING A STORED INTELLIVERB PRESET

STEP 1: To recall a stored Intelliverb preset, first turn the PRESET control to the desired preset number you wish to recall (make sure the CONFIG LED is off). The DISPLAY panel will alternate between the preset number and title you have selected and:

DISPLAY PANEL SHOWS:

PRESS RECALL FOR



STEP 2: To call up the preset you have selected, Press the RECALL button and the DISPLAY panel will now only show the new preset number and title.

DISPLAY PANEL SHOWS:

14 PRESET TITLE



CHANGING PRESET PARAMETERS

STEP 1: The parameter menu for each function can be called up via the FUNCTION SELECT control. Turn this control to the function you wish to change.

DISPLAY PANEL SHOWS:

*** REVERB/EQ ***



STEP 2: Now turn the PARAMETER SELECT control to choose which parameter you would like to alter for that effect.

DISPLAY PANEL SHOWS:

REV DECAY 59



STEP 3: Use the PARAMETER ADJUST control to alter the parameter value. The LED above the STORE button will light, indicating that the preset has been altered from its original state.

DISPLAY PANEL SHOWS:

REV DECAY 32



STEP 4: Now you can use the COMPARE button to compare the old parameter value to the new one.

DISPLAY PANEL SHOWS:

REV DECAY 59



STORING CHANGED PARAMETER VALUES

STEP 1: To store altered parameter values, press the STORE button while viewing a parameter or effect title to start the store procedure. The DISPLAY panel will now alternate between the current preset number and title and:

DISPLAY PANEL SHOWS:

STORE TO PRESET



STEP 2: Turn the PRESET control to select the desired preset number to store the new parameter values into (if you wish to store them into the current preset number, this is not necessary).

DISPLAY PANEL SHOWS:

STORE TO PRESET



STEP 3: Now press the STORE button a second time to store the new values into the selected preset number and complete the store procedure. The DISPLAY will briefly flash "STORED" before displaying the new preset number and title.

DISPLAY PANEL SHOWS:

STORED



STEP 4: At this point the altered parameter values have been stored into the selected preset number and the DISPLAY panel will ask "COPY TITLE TOO?". This only occurs when a different destination preset is chosen, and allows you to copy the title from the altered preset into the new preset also, if desired. To copy the title, press the STORE button a third time and the display will again flash "STORED".



NOTE 1: If it is not desired to save the title of the altered preset, simply turn the PRESET control to any other preset or turn the FUNCTION SELECT control to any function to end. The altered parameters will still be stored in the new preset number.

NOTE 2: If a preset is edited without completing the store procedure, all edited parameter values will be lost and the preset will revert to its original status the next time it is recalled. When saving altered parameters, make sure the display flashes "STORED" before exiting the preset to ensure that it was indeed stored.

2. INTRODUCTION

The RSP Intelliverb™ is a 24 bit intelligent effects processor providing 6 unparalleled effect algorithms and superb sound quality not found in effect processors twice its price. Complete programmability and full MIDI implementation are coupled with a user-friendly operating scheme to ensure that designing both unique and useful preset sounds is as simple as possible.

Providing Virtual Room™ reverberation, 4 voice pitch shifting, 8 voice stereo chorus, various types of delay effects, delay ducking and HUSH Systems' fully digital implementation of HUSH™ noise reduction, the impressive sonic quality of the Intelliverb™ is, in part, due to the incorporation of three individual 16 bit converters and Sigma-Delta A/D conversion, achieving a 64x oversampling rate and a dynamic range of over 100dB.

To achieve the maximum possible performance (zero wait states) from the Digital Signal Processor (DSP) engine, the Intelliverb™ uses a large number of very fast (and expensive) Static Ram (SRAM) memory IC's. All other digital effects processors we have examined, including ones costing several times the price of the Intelliverb™ (except the Rocktron Intellifex™), use much slower and cheaper Dynamic Rams (DRAMS). This extra-powerful hardware allows the Intelliverb's Virtual Room™ algorithm to achieve unequalled levels of room simulation.

For a thorough explanation of the Intelliverb™ and its features, please read this manual carefully and keep it for future reference.

After removing the Intelliverb™ from the box, save all packing materials in case it becomes necessary to ship the unit.

PRECAUTIONS

NOTE: IT IS VERY IMPORTANT THAT YOU READ THIS SECTION TO PROVIDE YEARS OF TROUBLE FREE USE. THIS UNIT REQUIRES CAREFUL HANDLING.

All warnings on this equipment and in the operating instructions should be adhered to and all operating instructions should be followed.

Do not use this equipment near water. Care should be taken so that objects do not fall and liquids are not spilled into the unit through any openings.

The power cord should be unplugged from the outlet when left unused for a long period of time.

DO NOT ATTEMPT TO SERVICE THIS EQUIPMENT. THIS EQUIPMENT SHOULD BE SERVICED BY QUALIFIED SERVICE PERSONNEL ONLY. DO NOT MAKE ANY INTERNAL ADJUSTMENTS OR ADDITIONS TO THIS EQUIPMENT AT ANY TIME. DO NOT TAMPER WITH INTERNAL ELECTRONIC COMPONENTS AT ANY TIME. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY VOID THE WARRANTY OF THIS EQUIPMENT, AS WELL AS CAUSING SHOCK HAZARD.

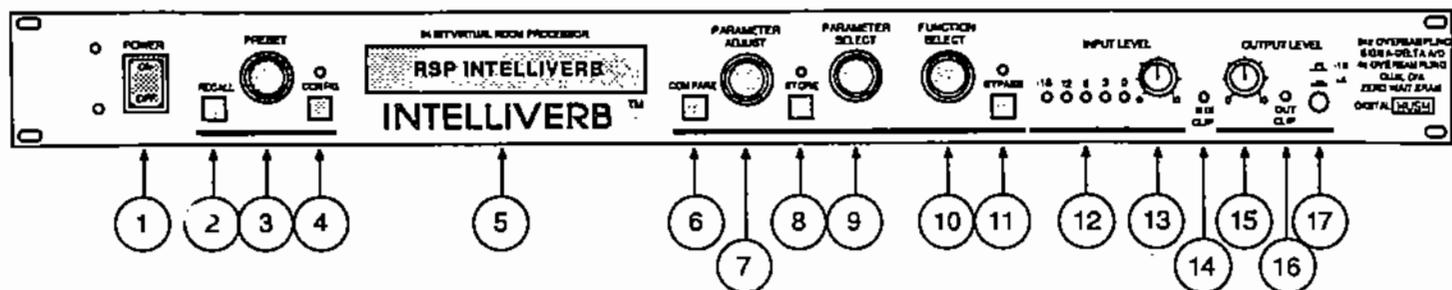
POWER REQUIREMENTS

This unit accepts power from the 9V AC/2000mA adaptor supplied with the unit. This 9V RMS AC voltage is internally processed by a voltage doubler, thus generating a bi-polar $\pm 15V$ to maintain the headroom and sound quality of professional, studio quality equipment. Using an external power source such as this minimizes excessive noise and hum problems often associated with internal transformers, providing optimal performance for the user.

OPERATING TEMPERATURE

Do not expose this unit to excessive heat. This unit is designed to operate between 32° F and 104° F (0° C and 40° C). This unit may not function properly under extreme temperatures. Under extreme temperature conditions, the Intelliverb™ may display "EXT MEMORY ERROR" when turned on. Time may be required for the unit to return to a normal operating temperature before operating properly.

3. FRONT PANEL



Many of the controls on the Intelliverb™ front panel have more than one function, dependant upon what mode the unit is currently operating in. Please read this section to become better acquainted with these functions.

(1)...POWER switch

(2)...RECALL button:

This button is used to recall the displayed preset.

(3)...PRESET control:

The function of this control is dependant on the CONFIG button (located to the right of the PRESET control).

When the CONFIG LED is "off", turning the PRESET control will cause the Intelliverb™ to exit its current function. The PRESET control may then be used to scroll through the successive factory and user presets and titles stored in it's memory.

When the CONFIG LED is "on" the PRESET control is again used to scroll through the successive presets, but instead of displaying preset titles the Intelliverb™ will display the effect configuration stored for each preset.

(4)...CONFIG button:

The CONFIG button is used to toggle between displaying either the preset title or the configuration of the currently displayed preset. The configuration display indicates both which effects the displayed preset executes and the order in which they are executed.

The LED above the CONFIG button is lit when the configuration is displayed.

(5)...DISPLAY panel:

The DISPLAY PANEL consists of 16 characters. Each character consists of 14 segments.

(6)...COMPARE button:

The compare button may be used to compare an altered parameter value to its stored value. If comparing an altered value to the stored value and the stored value is currently being viewed, turning a knob or pressing a button that changes the parameter value displayed will cancel the previous altered value.

The COMPARE button may also be used to compare multiple parameters under the same function heading (i.e. Reverb, Mixer, etc.) from their altered values to their stored values and back. Simply turn to the function heading that the parameters are under and press the COMPARE button. When the STORE LED is off, the stored parameter values are currently in effect. When the STORE LED is lit, the altered values will be in effect.

Just as in comparing individual parameters, if a knob is turned or a button is pressed which changes the effect heading when listening to the stored parameters (STORE LED off), all of the altered parameter values under that heading will be cancelled. This will also be the case if a MIDI control change is received while listening to the stored parameters.

(7)...PARAMETER ADJUST control:

This control is used to adjust the displayed parameter value. When the parameter is changed from its original value, the LED above the STORE button will light until either the new value is stored, a new preset is selected or the parameter is returned to its original value.

(8)...STORE button:

This button is used to store values into the Intelliverb™ memory when altered. See Chapter 8 section C (Storing Changed Parameters) for more information.

(9)...PARAMETER SELECT control:

When adjusting parameter values, this control will scroll through the available parameters under the current effect heading.

In the "TITLE EDIT" function, this control will scroll through the available characters in the title that may be edited.

(10)...FUNCTION SELECT control:

This control allows access to each function of the Intelliverb™. Depending on what configuration is currently recalled, these functions include:

Preset Selection	Delay Parameters	MIDI Program Mapping
Mixer Parameters	Ducker Parameters	MIDI Channel
HUSH™ Parameters	Reverb Parameters	MIDI Dump/Load
Chorus Parameters	Title Edit Function	Factory Restore
Pitch Shift Parameters	MIDI Controller Assignments	

(11)...BYPASS button:

When pressed, LED is lit and all effects are bypassed. When pressed again, returns the unit to its previous status.

(12)...INPUT LEVEL meter:

These LEDs provide visual indication of the peak level of the input signal. For the optimal signal-to-noise ratio it is best to adjust the input level so that the last LED (0dB) is rarely lit. This will guard against the possibility of overdriving the unit.

These LEDs also act as a signal level meter for the mixer section when mixer parameters are displayed on the front panel. This will help you to guard against clipping the output of the mixer at the digital-to-analog converter.

(13)...INPUT LEVEL control:

This control adjusts the units gain to match the signal level at the input of the Intelliverb. The gain can be adjusted from -11dB to +10dB. Use the INPUT LEVEL meter to determine the setting of this control.

(14)...MIX CLIP L.E.D.:

This L.E.D. indicates when the signal at the output of the mixer (before digital-to-analog conversion takes place) is clipping. Should mixer clipping occur, reducing either the mixer levels or the input level will discontinue clipping.

(15)...OUTPUT LEVEL control:

This control is used to adjust the output level of the unit and may be adjusted from no signal to a small amount of gain.

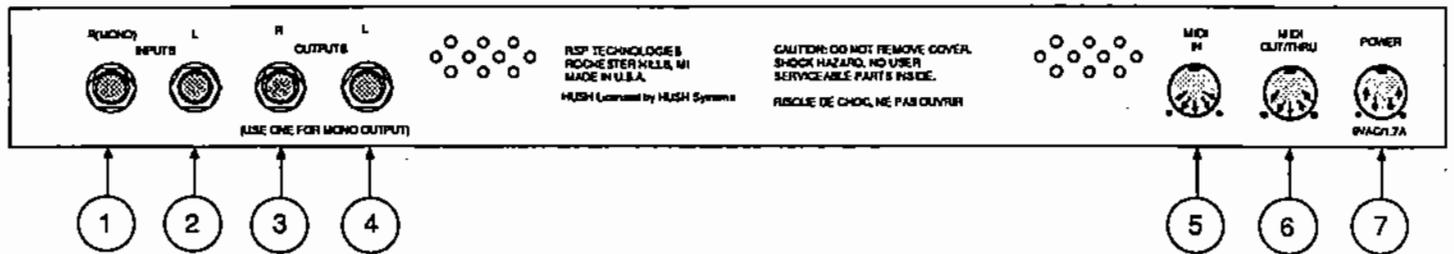
(16)...OUTPUT CLIP L.E.D.:

This L.E.D. is part of the output section and, when lit, indicates that the final analog output is being overdriven because the Effects Level, Direct signal level, and Output Level control are set too high. If this occurs, reduce these levels until this L.E.D. does not light.

(17)...REFERENCE LEVEL switch:

This switch adjusts the output range of the unit and may be set at -10dB or +4dB. When using professional studio equipment providing a nominal input level of +4dB, it is recommended that the +4 setting on the Intelliverb™ be used for best results. If connecting the Intelliverb™ to a high sensitivity input such as the input to a guitar amp, the -10 setting should be used.

4. REAR PANEL



(1)...RIGHT CHANNEL INPUT jack:

This standard 1/4" mono jack provides input to the right channel of the Intelliverb™. When using only one input (mono), this jack should be used.

(2)...LEFT CHANNEL INPUT jack:

This standard 1/4" mono jack provides input to the left channel of the Intelliverb™. When using only one input, this jack should not be used.

(3)...RIGHT CHANNEL OUTPUT jack:

This standard 1/4" mono jack provides output for the right channel of the Intelliverb™. When using the unit in a mono situation, either output jack may be used.

(4)...LEFT CHANNEL OUTPUT jack:

This standard 1/4" mono jack provides output for the left channel of the Intelliverb™. When using the unit in a mono situation, either output jack may be used.

NOTE: When using a mono input (Right Channel INPUT jack) and a mono output (either Left or Right Channel OUTPUT jacks), the left and right effected signals will be summed at the single output.

(5)...MIDI IN jack:

This 5 pin DIN connector receives MIDI information from the MIDI device which is transmitting the MIDI commands for the Intelliverb™ to execute.

(6)...MIDI OUT/THRU jack:

This standard 5 pin DIN connector passes on the MIDI information that is received at the MIDI IN jack to other MIDI-compatible devices via a MIDI cable. It also outputs MIDI data when performing a memory dump.

Note: Inherently in MIDI there is a limit to the number of devices which can be chained together (series connected). With more than three devices, a slight distortion of the MIDI signal can occur (due to signal degradation) which can cause an error in MIDI signal transmission. The Intelliverb uses a very high speed optocoupler and output driver to minimize this distortion. However, should this problem arise, a MIDI box can be used which connects directly to the MIDI device which transmits MIDI information and has multiple connectors for the multiple devices receiving MIDI. MIDI cables should not exceed 50 feet (15 meters) in length.

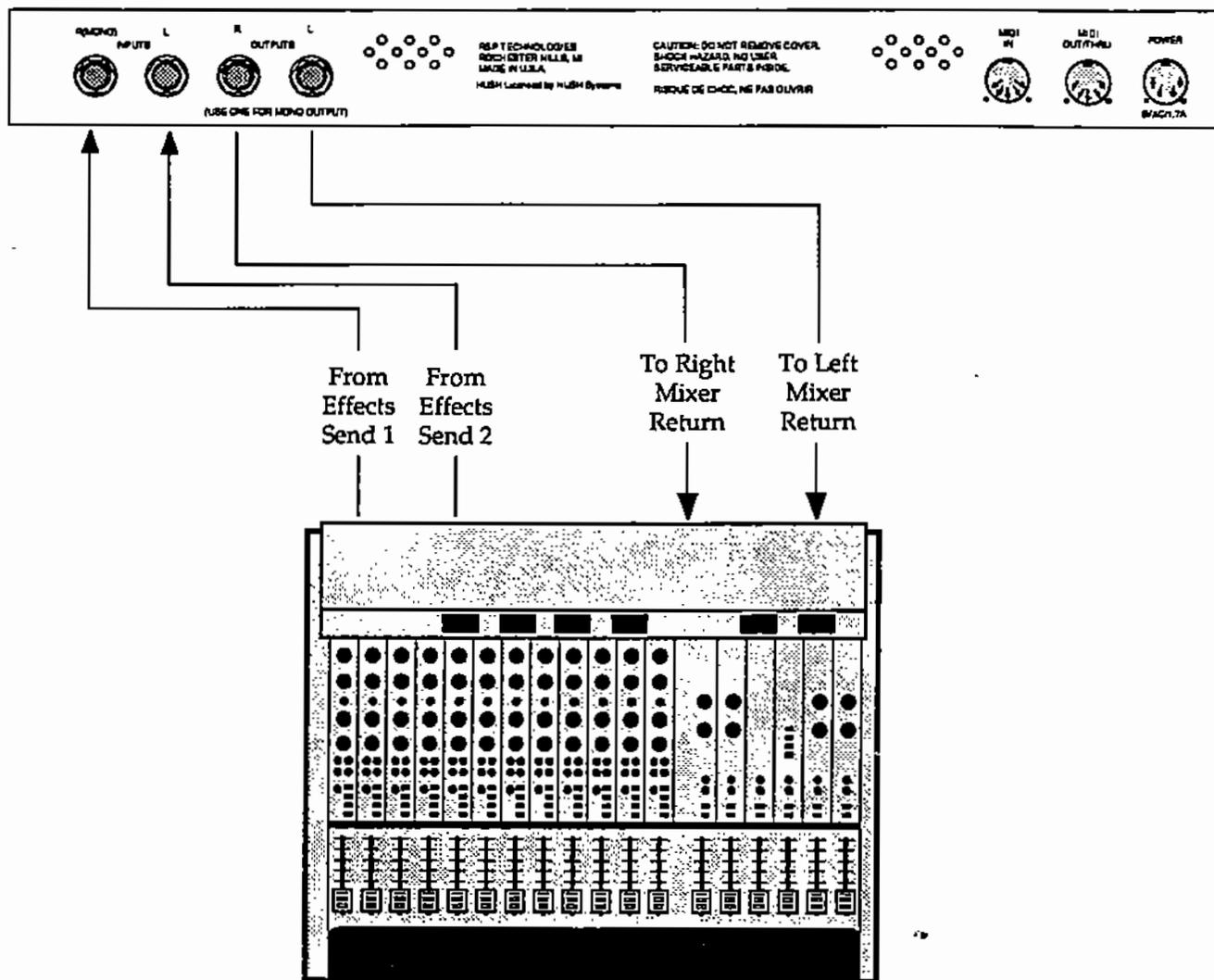
(7)...POWER jack:

This female 4 pin DIN jack accepts power from the 9VAC/2000mA adaptor supplied with the unit. For more information on the power supply see the POWER REQUIREMENTS section on page 2.

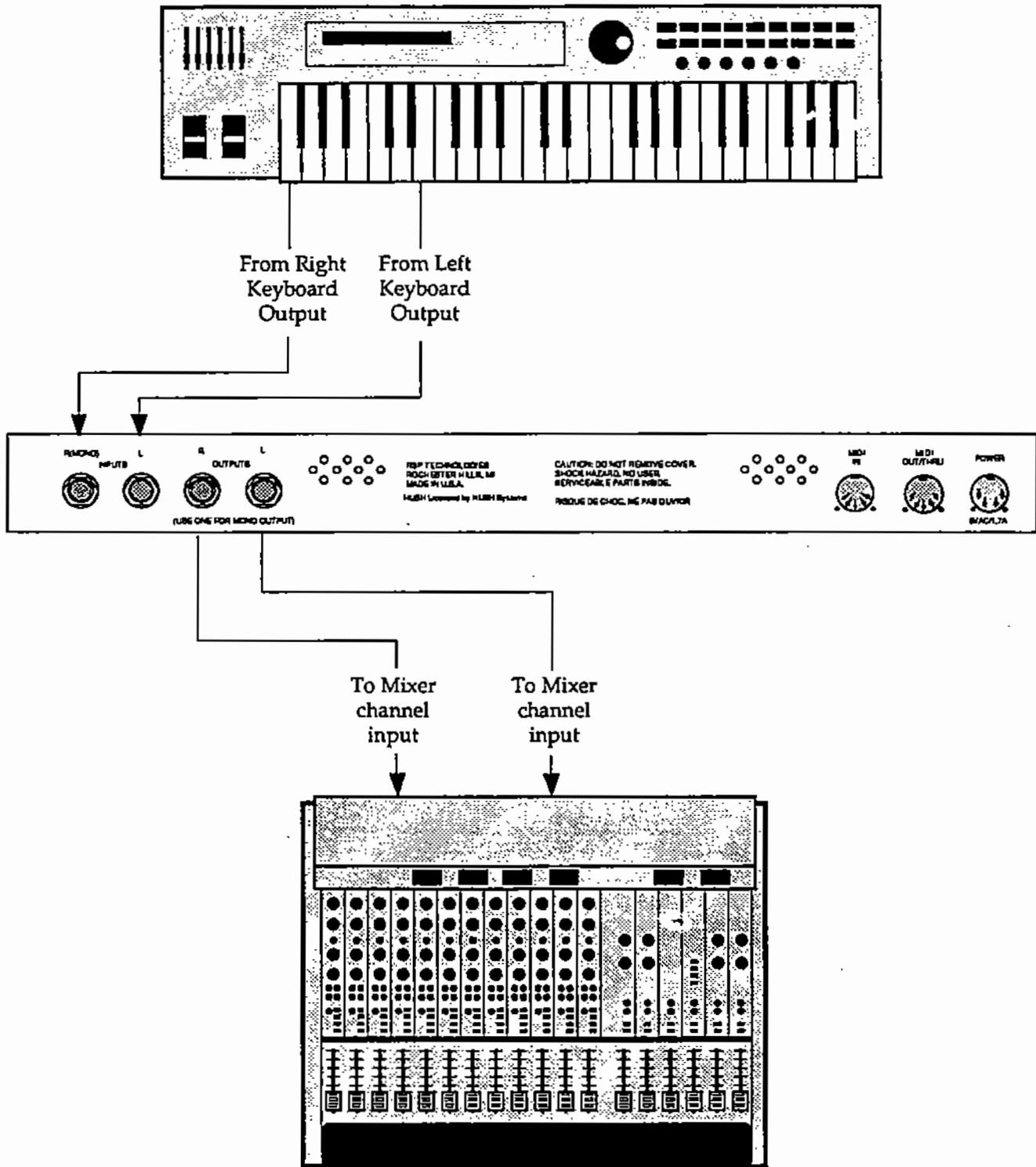
5. CONNECTIONS

There are many ways of interfacing the Intelliverb™ into a system. Here are a few examples.

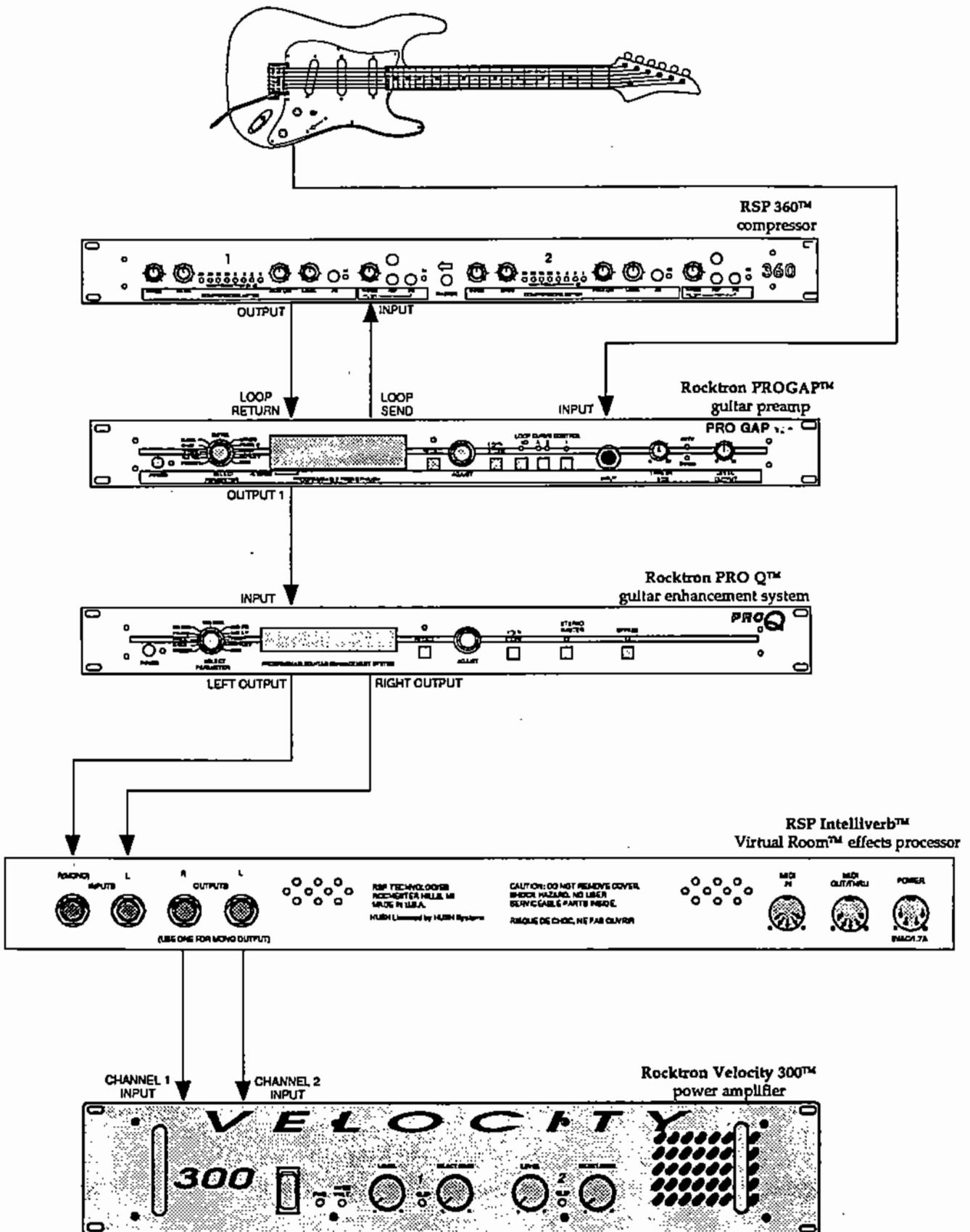
A. Using the Intelliverb™ with the auxiliary sends and returns of a mixer.



B. Using the Intelliverb™ with a keyboard and mixing console.



C. Using the Intelliverb™ with a guitar rack system.

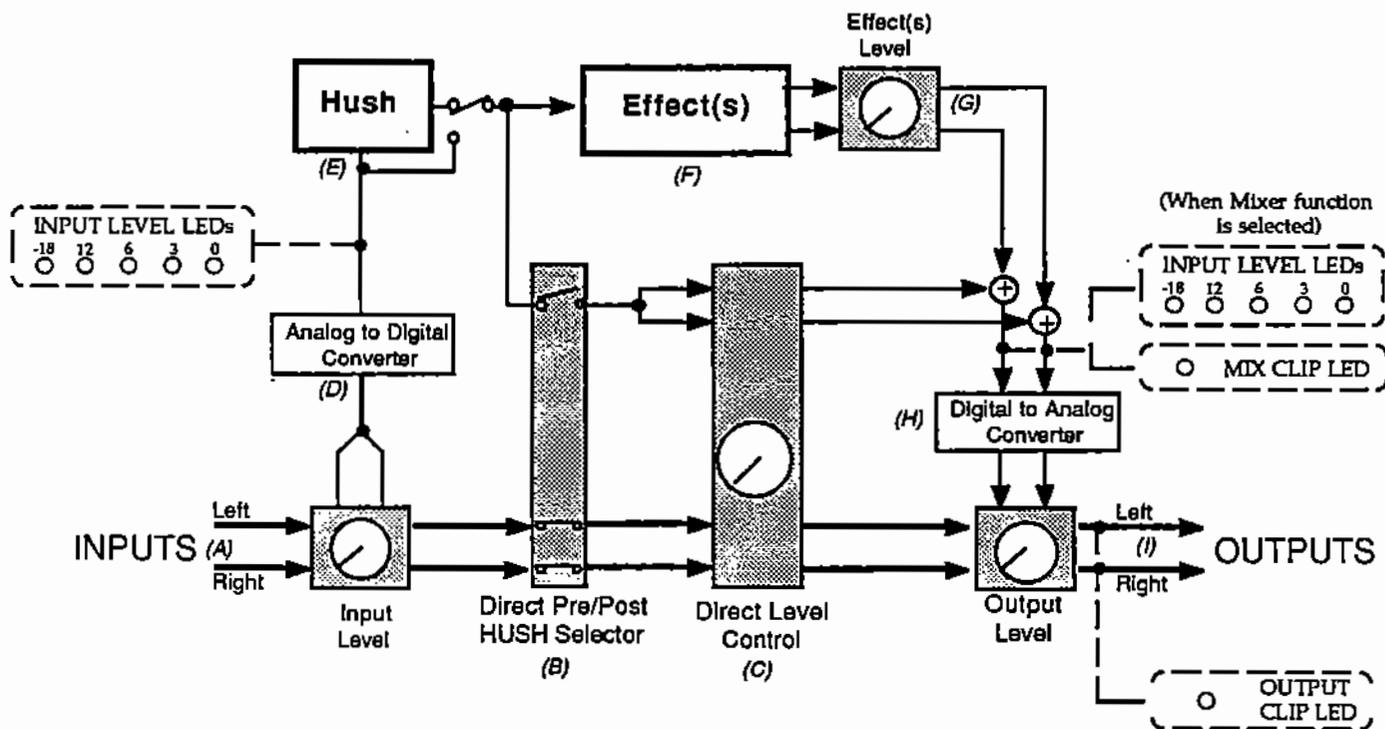


6. PRINCIPLE OF OPERATION

A. MIXER SECTION

The first function available by turning the FUNCTION SELECT control in each preset is the Mixer function. This digital mixer allows you to control most signal levels pertaining to each preset's configuration and stores these levels for each preset.

Basic Intelliverb™ Configuration



Caution: Digital Output overload

As the input signal enters at the unit's input (A), the unaltered direct signal is fed to the Direct Pre/Post Hush™ Selector (B). Here you may choose for the direct signal to remain unaltered as it entered the unit (Pre) or feed it through the digital Hush™ section (E) of the Intelliverb™ (Post). Before entering the Hush™ section, the signal must first be converted from an analog signal to digital via the converter (D). When the direct signal is fed to the Hush™ section, it will remain digital until it is summed together with the output of the Effects Level control (G). It is important to remember when using the Hush™ section with the direct signal that if the effects levels and direct signal level are set too high, it is possible to overload the Digital to Analog Converter (H). If this should occur, reduce these levels until the front panel MIX CLIP L.E.D. does not light. When the Mixer function is selected, the signal level being fed to the Digital to Analog Converter will be displayed on the Input Level LEDs.

Note that when passing the direct signal through the digital Hush™ (Post), a stereo signal will be converted to mono.

*The **PARAMETER SELECT** control will allow you to access these mixer parameters:*

*Master Effects
Level*

This controls the level of the entire effect signal. This control should be set in relation to the levels of the Left and Right Direct Signals. In configurations which do not include a Master Level, the single individual Effect Level (Chorus Level, Delay Level, etc.) is considered the Master Effect Level control.

This parameter is available in HUSH™; VIRTUAL ROOM™, HUSH™; CHORUS; DELAY; REVERB and HUSH™; PITCH SHIFT; DELAY; REVERB configurations only.

*Left and Right
Channel Direct
Signal Levels*

These controls allow for the left and right Direct signal levels to be varied individually, thereby allowing for panning of the Direct signal to the left or right output. These controls are available in all configurations.

*Direct Pre/Post
Hush™ selection*

As described on the previous page, this lets you elect for the Direct signal to pass through the digital HUSH™ section of the Intelliverb™ or to bypass it. Selecting "Post" will pass the Direct signal through the HUSH™ system while choosing "Pre" will bypass this section.

Selecting "Post" will convert a stereo direct signal to mono.

*Individual
Effect Levels*

In configurations which include a Master Effects Level control, these control the level of each individual effect (Chorus level, Reverb level, etc.). These should be set in relation to each other when defining individual levels. In configurations which do not include a Master Effects Level control, the individual effect level acts as a Master effect level.

*Left and Right
Regeneration
Levels*

Configurations which utilize Chorus or Delay effects will offer left and right regeneration level controls to determine the number of times the delayed signal will repeat. This is achieved by feeding the delayed output back into the input. Higher levels of regeneration will result in more repeats.

The Intelliverb™ software includes the added feature of Regeneration Limiting. This is done internally and avoids the possibility of overloading the processor when using high regeneration levels in configurations where a combination of multiple voices is panned to the left or right. If the regeneration level is set too high, the Intelliverb™ triggers the Regeneration Limiting and a limit (or maximum level) is set for the regeneration. This limit cannot be surpassed by increasing the Regen L or Regen R parameter values in the Mixer section.

If, for example, in the HUSH™; CHORUS; DELAY; REVERB configuration, 1 Voice is panned to the left and the Regen L parameter is set to its maximum level, panning a second Voice to the left regeneration loop will trigger the Regeneration Limiter and decrease the regeneration to a level such that runaway regeneration will not occur. The original regeneration level can be reset only by recalling the preset, or, by accessing the Regen L parameter, decreasing its value and setting it back to its original value after removing the second Voice from the regeneration loop.

This feature of the Intelliverb™ is particularly desirable in live situations where panning and regeneration levels are controlled by continuous controllers.

This parameter is found in all configurations except HUSH™; VIRTUAL ROOM™.

B. REVERB SECTION

Reverb, or reverberation, is the continuance of sound within a given room or enclosed chamber after the source of the sound has stopped producing it. More specifically, it is a multitude of echos so densely spaced that, to the human ear, seem as a single continuous sound. These echoes gradually decrease in intensity until they are ultimately absorbed by the boundaries and obstacles within the room or enclosure. As the sound waves from the signal source strike the walls or boundaries of the room, a portion of the energy is reflected away from the obstacle and another portion is absorbed into it, thereby causing both the continuance of sound and the decaying or "dying out" of the sound.

The concept behind Virtual Room™ ...

The HUSH™; VIRTUAL ROOM™ configuration is unique among most reverbs in that it provides a "room" in which the size and perceived absorption of the walls and ceiling can be modified to provide a vast array of reverb-based effects. Contained within this room is an audio source (or the signal input to the Intelliverb™) and a listen position (or the position where the sound is retrieved). The listen position can be thought of as a pair of microphones (left and right). The distance between these microphones is determined by the "SEPARATION" parameter found in the Position function. When the separation is very small, the listen position can be thought of as human ears. Both the source and listen position may be individually maneuvered anywhere within the room to achieve the desired effect. In addition, when using a small room width, the SEPARATION parameter can be set high enough to place the left and right listen position "microphones" outside of the room.

When a signal is input to the Intelliverb™, the resulting sound is perceived at the listen position four ways. The first is the direct signal, or the actual signal at the Intelliverb™ input. The level of the direct signal can be adjusted in the Mixer function parameters.

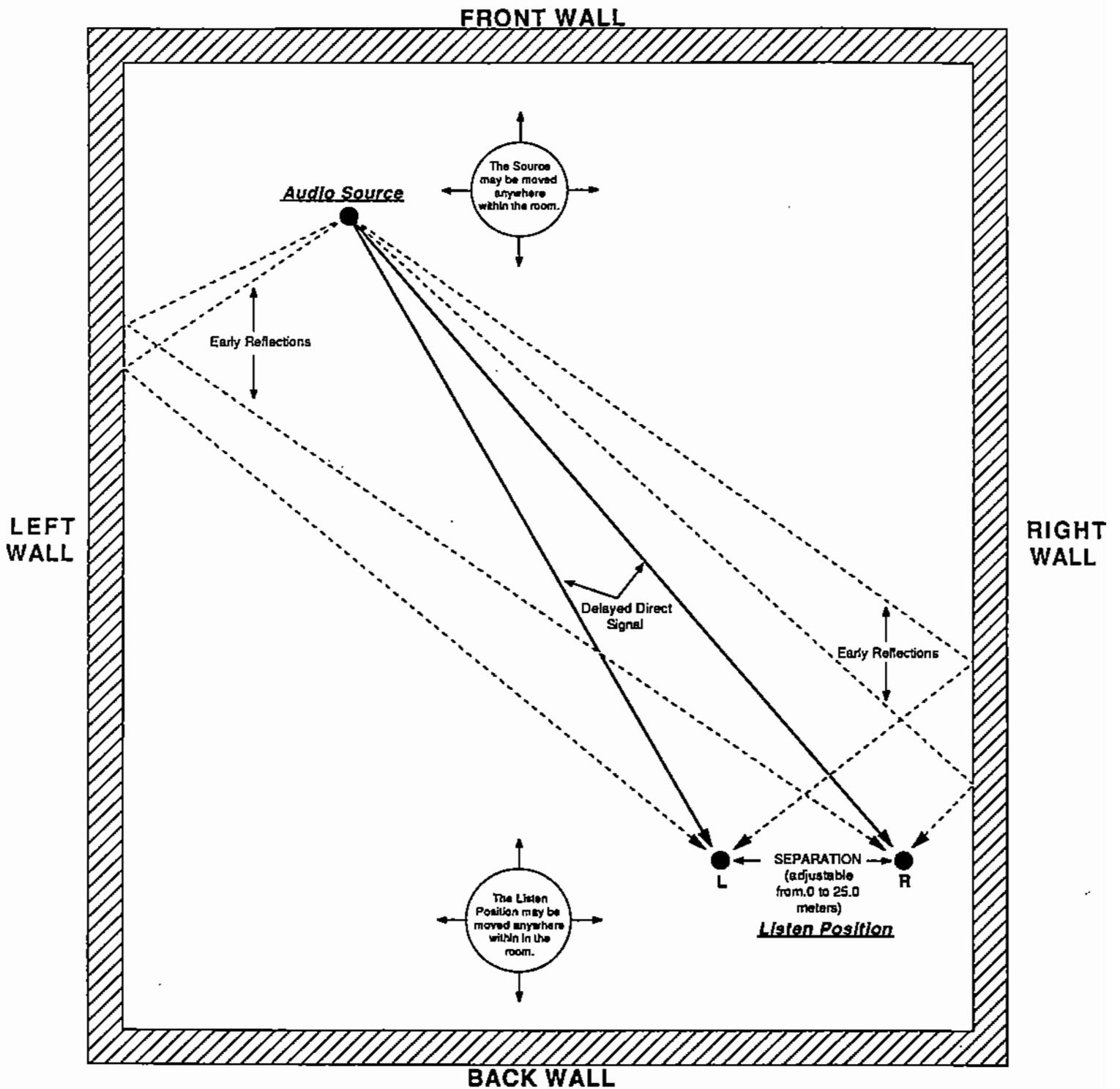
The second manner in which sound is perceived is by the delayed direct signal, or the direct signal after it has travelled the distance from the audio source to the listen position. The amount of delay is dependant on the distance between the source and listen position, and the level of the delayed direct signal can also be adjusted in the Mixer function parameters. The left and right channel delay lengths will often differ. For example, if the audio source is on the left side of the room and the listen position is on the right side of the room, it will take longer for the delayed direct signal to reach the right microphone than the left, because the right microphone is farther away (this can be seen in the diagram on the following page).

The third manner is by the early reflections (reflections which have only bounced one or two times) which come at the listen position from all directions, reflecting from the walls and ceiling. The amount of sound reflected from each wall and the ceiling is determined by the "REFLECT" parameters found in the Room function for each surface. A low setting of a "REFLECT" parameter will increase the simulated absorption of the surface and result in a "deadening" of the reflections for that surface.

The fourth and final manner is the actual reverb decay, or the remainder of reflections following the initial early reflections. The reverb level and decay length are controlled by parameters found in the Reverb/EQ function. The reverb can also be delayed relative to the early reflections by use of the "REVERB DELAY" parameter in the "PRE/EARLY" function.

By careful choice of the multitude of parameters, many different types of reverbs can be provided, such as plates, rooms, halls, etc.

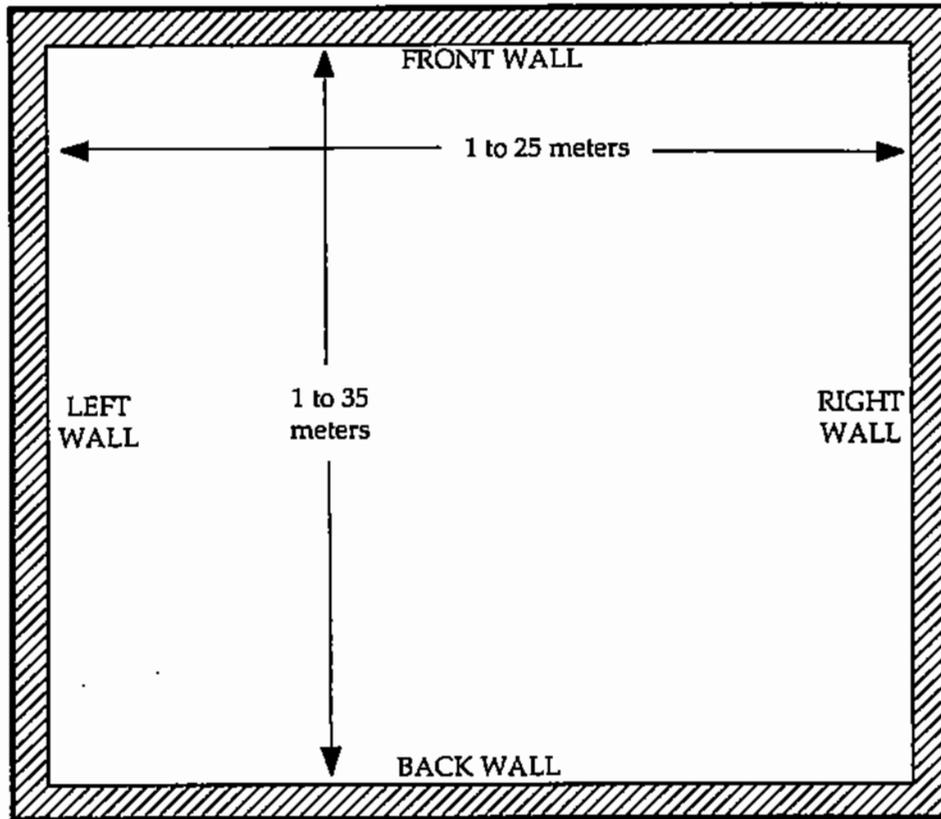
Virtual Room™ Top View



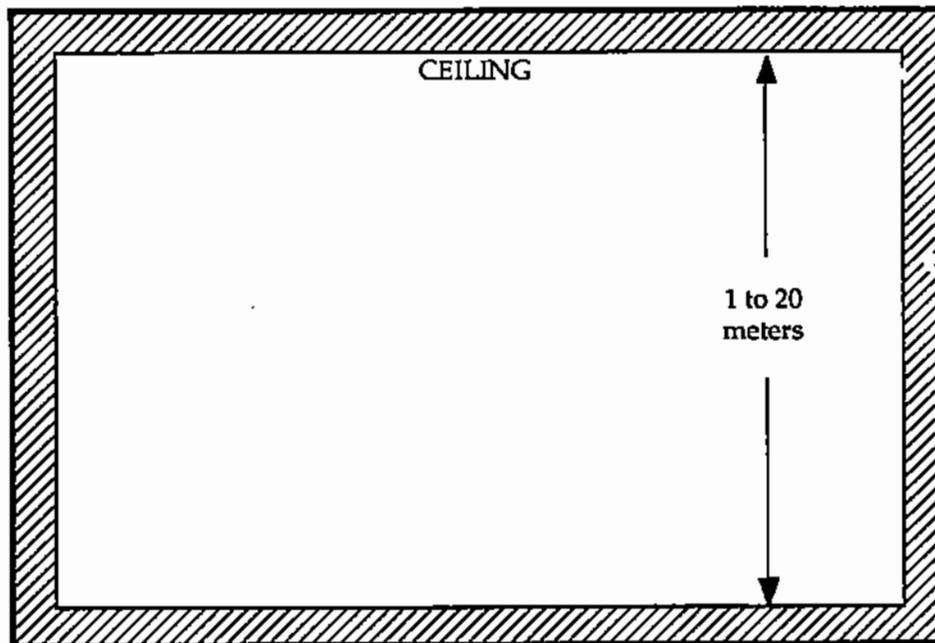
Note: Only a small number of early reflections are shown here for simplicity.

Virtual Room™ Dimensions

Top View



Side View



Virtual Room™ Parameters...

- Predelay** The **Predelay** parameter selects the amount of time after a signal is input to the Intelliverb™ that the signal will be input to the Reverb. Delaying the reverb signal provides greater separation of the input and reverb signals and helps to increase the apparent size of the Room, Hall, or Stadium.
- Mix Dir/Dly** The **Mix Dir/Dly** parameter is used to define the ratio of direct signal to predelayed signal to be input to the reverb.
- Diffusion** The **Diffusion** parameter determines the density of the initial cluster of delays. A higher diffusion setting will result in a higher density of these delays.
- ~~**Early Level**~~ The **Early Level** parameter allows the user to control the level of the initial reflections.
- Reverb Delay** The **Reverb Delay** parameter allows the user to delay the reverb following the early reflections by up to 200 milliseconds.
- Reverb Level** The **Reverb Level** parameter is part of the Reverb/EQ function and allows you to control the level of the reverb signal at the output in relation to the Direct signal and other effect signals. It is accessible from both the Mixer function and Reverb/EQ function parameter lists.
- Reverb Decay** The **Reverb Decay** parameter specifies the length of time that the reverb signal will sound before it has completely died out (or until its echoes have been ultimately absorbed by the boundaries within the given room). The Decay may be adjusted from an extremely short decay time to a very long decay time - the maximum length of which will vary dependant upon the setting of the individual REFLCT parameters and the room size used.
- HF Damp 1 Lvl** The **High Frequency Damping 1** control is set at a fixed frequency and is used to control the decay rate of high frequency information in the reverb signal. A low setting of this parameter will result in a slow decay of high frequency information, while a high setting will result in a fast decay.
- HF Damp 2 Lvl** The **High Frequency Damping 2 Level** parameter is part of a second damping control which differs from the High Frequency Damp 1 control in that it provides a shelving attenuation of the highs instead of the 6dB per octave slope provided in the High Frequency Damp 1 control. This parameter determines the amount of attenuation provided. When set at its minimum value (LP), High Frequency Damping 2 acts as a low pass filter.
- HF Damp 2 Freq** The **High Frequency Damping 2 Frequency** parameter determines the frequency at which shelving attenuation of the high frequency information will occur. Use of the Damp 2 parameter allows you to reduce the reverberation time at mid and high frequencies relative to the low frequencies.

- HF Roll Lvl** The **High Frequency Roll-off Level** parameter differs from the High Frequency Damping controls in that the signal passes through it only once. This parameter determines the amount of shelving attenuation of high frequency information. When set at its minimum value (LP), High Frequency Roll-off acts as a low pass filter.
- HF Roll Freq** The **High Frequency Roll-off Frequency** parameter determines the roll off frequency at which the highs will be attenuated.
- LF Damp Lvl** The **Low Frequency Damping Level** parameter provides a shelving-type low frequency attenuation. This parameter determines the amount of that attenuation. At its minimum setting (HP), Low Frequency Damping acts as a high pass filter.
- LF Damp Freq** The **Low Frequency Damping Frequency** parameter determines the frequency below which attenuation will occur. Use of LF Damping allows you to reduce the reverberation time at low frequencies relative to higher frequencies.
- LF Freq Roll Lvl** The **Low Frequency Roll-off Level** parameter determines the amount of attenuation of low frequency information. The Roll-off control differs from the Low Frequency Damping controls in that the input signal passes through it only once. At its minimum setting (HP), Low Frequency Damping acts as a high pass filter.
- LF Roll Freq** The **Low Frequency Roll-off Frequency** parameter determines the roll off frequency at which the lows will be attenuated.
- Length** The **Length** parameter determines the length of the Virtual Room™ and is shown in meters. Just as in real rooms, some room sizes and shapes will sound better than others.
- Width** The **Width** parameter determines the width of the Virtual Room™ and is shown in meters.
- Height** The **Height** parameter determines the height of the Virtual Room™ and is shown in meters.
- Front Offset** The **Front Offset** parameter allows the user to fine tune the delay lengths of the reverb at the wall in front of the listener in the Virtual Room™. Adjust the Offset parameters to achieve the smoothest reverb decay.
- Back Offset** The **Back Offset** parameter allows the user to fine tune the delay lengths of the reverb at the wall behind the listener in the Virtual Room™.
- Left Offset** The **Left Offset** parameter allows the user to fine tune the delay lengths of the reverb at the wall to the left of the listener in the Virtual Room™.

- Right Offset** The **Right Offset** parameter allows the user to fine tune the delay lengths of the reverb at the wall to the right of the listener in the Virtual Room™.
- Ceiling Offset** The **Ceiling Offset** parameter allows the user to fine tune the delay lengths of the reverb at the ceiling above the listener in the Virtual Room™.
- Front Reflect** The **Front Reflections** parameter will determine the amount of sound reflected from the front wall of the room. At a low setting, this parameter will deaden the sound reflected from the front wall, as if the surface of the wall were more absorbant.
- Back Reflect** The **Back Reflections** parameter will determine the amount of sound reflected from the back wall of the room. At a low setting, this parameter will deaden the sound reflected from the back wall, as if the surface of the wall were more absorbant.
- Left Reflect** The **Left Reflections** parameter will determine the amount of sound reflected from the left wall of the room. At a low setting, this parameter will deaden the sound reflected from the left wall, as if the surface of the wall were more absorbant.
- Right Reflect** The **Right Reflections** parameter will determine the amount of sound reflected from the right wall of the room. At a low setting, this parameter will deaden the sound reflected from the right wall, as if the surface of the wall were more absorbant.
- Ceiling Reflect** The **Ceiling Reflections** parameter will determine the amount of sound reflected from the ceiling of the room. At a low setting, this parameter will deaden the sound reflected from the ceiling, as if the surface of the ceiling were more absorbant.
- Source F/B** The **Source Front/Back** parameter is used to move the audio source within the Virtual Room™ from front to back in .2 meter increments. Just as in real rooms, some source and listen positions will sound better than others. The astute observer may notice that if the room dimensions are set less than their maximums, it is possible to specify source and/or listen positions which are outside of the room. While this may cause some non-reality in the simulation, the resulting sound may be perfectly satisfactory. The simulated walls of the simulated room will act as if they are solid, except the sounds coming from the source and to the listen position will pass right through.
- Source L/R** The **Source Left/Right** parameter is used to move the audio source within the Virtual Room™ from left to right in .2 meter increments.
- Listen F/B** The **Listen Front/Back** parameter is used to move the listener within the Virtual Room™ from front to back in .2 meter increments.
- Listen L/R** The **Listen Left/Right** parameter is used to move the listener within the Virtual Room™ from left to right in .2 meter increments.

Separation

The **Separation** parameter determines the distance between the left and right microphones at the listening position. A short distance will give the effect of a person at the listen position retrieving the sound with his ears. Greater distances will reflect what a pair of microphones will retrieve at the listen position.

Gate On/Off

Gating the reverb signal will abruptly close down the decay of the reverb after a prescribed amount of time (most commonly a very short period of time). This is very commonly used on drums (particularly snare drums) to produce the effect of a much fatter percussive sound. This feature can be turned on or off via this parameter. Note that gating on the Intelliverb™ acts on the Reverb Decay itself, not simply on the output of the reverb as on most other units.

Gate Decay

The **Gate Decay** parameter adjusts how quickly the gate will close down the reverb decay after the reverb has sounded for its prescribed time. It can close down extremely fast or very slowly.

Gate Threshold

The **Gate Threshold** parameter allows you to adjust the threshold point at which gating will take place. When the signal is below this threshold point for a period of time, the reverb will be gated off. When the input signal peak rises above the Threshold, the gate will open and reverb will be heard.

Hold Time

The **Hold Time** parameter determines how long the reverb signal will sound before the gate begins to close.

Reverb Type

The Intelliverb™ HUSH™; CHORUS; DELAY; REVERB and HUSH™; PITCH SHIFT; DELAY; REVERB configurations offer a simplified version of the Virtual Room™ algorithm. Many of the previous parameters are not available in these configurations. The room size is not directly adjustable, however you can select from 8 different reverb types: Plate A, Plate B, Room A, Room B, Hall A, Hall B, Stadium and Dual.

The **Plate** reverb type simulates an artificial method of producing reverberation, popular in the early years of recording, which involved using a fairly large, but very thin, metal plate suspended at its four corners by steel wires under tension. This metal plate becomes excited by a driver unit (similar to a dynamic speaker without the diaphragm) and the resulting reverberation is picked up by contact microphones. This type of reverb is often used on drum and vocal tracks.

Room reverb simulates a relatively small sized room.

Hall reverb simulates the reverberation characteristics of a very large room with a high ceiling. Being much larger than a typical room, reflections in a hall are much longer as the length of time it takes for the sound waves to travel from one surface to the next is greatly increased.

Dual reverb is unique in that it allows for the left and right channels to be processed separately from one another. For example, Voice 1 can be panned left and delayed 100ms while Voice 2 can be panned right and delayed 200ms. If the other voices are turned off, you will hear reverb from the left channel 100 ms before any reverb comes out of the right channel. Also, if the voices are all panned to one side, it is possible to get reverb from only that side.

Stadium reverb should be used with large amounts of delay and high frequency damping to simulate the characteristics of a large stadium or arena.

Reverb Input

The **Reverb Input** parameter determines whether the input to the Reverb section is active (passing a signal) or muted (not passing a signal).

Dir In Pan

The **Direct In Pan** parameter allows you to pan the direct input signal to the reverb section to the left or right, if desired, allowing for only the left or right channel to be reverberated when used with the Dual reverb type, or, for one channel to be reverberated to a higher degree than the other.

C. DELAY SECTION

Delay is simply a reproduction of the input signal, originating at a prescribed time (usually expressed in milliseconds, or ms) following the input signal.

DELAY Types...

The Intelliverb HUSH™; DELAY; DUCKER configuration offers 3 delay types: Stereo, Ping-Pong and 2 - Tap.

The **Stereo** delay type is two separate delays. Use this delay type when you desire two separate delay lines with separate regeneration loops.

The **Ping - Pong** delay type regenerates each delay's output into the opposite delay's input instead of its own. This causes the delayed signals to bounce back and forth from the left channel to the right, if the delay outputs are panned left and right.

The **2 Tap** delay type uses a single long delay line with two outputs and offers twice the delay time of the Stereo delay type.

DELAY Parameters...

Delay The **Delay** parameter determines whether the Delay section is active (passing a signal) or muted (not passing a signal).

Mute Type The **Mute Type** parameter allows for muting of the Delay section at its input (Pre), its output (Post) or both.

Muting the input (Pre) of the Delay will not allow any signal to enter the delay section until the delay is switched in. When using a moderate amount of regeneration, switching out the delay with the input muted will allow you to generate a non-delayed signal which will play over the decaying regenerated signal which continues on after the delay is switched out.

Muting the output (Post) of the delay will result in the delayed signal being immediately turned off when the delay is switched out. This means that delays and regeneration will not continue when the delay is switched out. If the output were not muted, signals input before switching the delay out would be allowed to regenerate even after switching out the delay.

It is also possible to mute both the input and output (**Both**) so that no signal enters or exits the Delay section when it is not switched in.

Level 1 and Level 2 The **Level 1** and **2** parameters are individual level controls for each of the two delays available in the Delay section. Unlike the Reverb section, these are not the same as the Delay Level parameter found in the Mixer function (which adjusts the overall level of both delay signals).

Pan 1 and Pan 2 The **Pan 1** and **2** parameters allow you to pan each delay to the left or right output, if desired. These are adjustable from 0 to 100 - where 0 = full left, 100 = full right and 50 = center.

*Delay Time 1 and
Delay Time 2*

The **Delay Time 1 and 2** parameters allow you to select the amount of time after the input signal that the delayed signal will begin to reproduce the input. It is expressed in milliseconds.

*Regen 1 and
Regen 2*

The **Regeneration 1 and 2** parameters are available for each delay and determines the number of times the delayed signal will repeat itself. This is achieved by feeding the delayed output back into the input. Higher levels of regeneration will result in more repeats.

Delay Type

The **Delay Type** parameter simply allow you to choose a Stereo, Ping-Pong or 2 - Tap delay type.

Delay Hf Damp

Delay High Frequency Damping controls the amount of high frequency content in the delayed and regenerated signal. Higher amounts of damping will result in less high frequency information in the delayed signal.

D. DUCKER SECTION

The process of ducking enables the user to suppress the level of a given signal or effect dynamically, dependant upon the presence of another signal which is desired to be prominent. The Ducking feature of the Intelliverb™ works in conjunction with the Delay and Reverb sections to allow the user to attenuate the Delay and/or Reverb level while a phrase is being played (resulting in a less cluttered, more intelligible sound), yet returns to its original level when the phrase ends - allowing for the full decay of the delayed and/or reverberated signal.

DUCKER Parameters...

Ducker In the HUSH™; VIRTUAL ROOM™ and HUSH™; DELAY; DUCKER configuration, the **Ducker** parameter selects whether the Ducker is off or on.

In the HUSH™; CHORUS; DELAY; REVERB and HUSH™; PITCH SHIFT; DELAY; REVERB configurations, this parameter determines whether the Ducker is off, operating on the Delay, Reverb or both.

Sensitivity The **Sensitivity** parameter selects the threshold point above which the ducker will begin muting the delayed signal. Until the input signal reaches this level, the delayed signal will remain unaffected.

Attenuation With the **Attenuation** parameter the user can select the degree to which the delayed signal will be attenuated (muted). It may be set for only a slight change in signal level or it can be totally attenuated so that no delayed or reverberated signal passes when ducking is taking place.

Release Rate The **Release Rate** parameter is adjustable from .2 seconds to 9 full seconds. It allows you to adjust the amount of time it takes for the muted delay signal level to rise back to its original signal level after the input signal falls below the threshold point set by the sensitivity parameter

E. PITCH CHANGE SECTION

Pitch Change effects involve splitting the input signal into at least two separate signals, then modifying the pitch of one signal and mixing it back together with the unaltered direct signal. The Inteliverb™ offers two types of pitch change effects: Chorus and Pitch Shift.

CHORUS

The Chorus effect is achieved by using one or more delayed signals, detuning these delayed signals (slightly changing their pitch) then modulating this detune effect so that the amount of pitch detune is constantly varying. Using many delayed signals at different delay lengths - as well as using different detune amounts, modulation rates and modulation depths for each delayed signal - will result in a rich, spacious stereo chorused signal.

CHORUS Parameters (for each voice)...

- Level* The Level parameter is included in the parameter list for each voice (or each delay signal) of both the 8 Voice and 4 Voice Chorus effects and adjusts how loud its delayed signal will be in relation to the other voice(s) of the effect. This level control is not the same as the Chorus Level found in the Mixer function parameter list.
- Pan* The Pan parameter allows you to pan each voice (or delay) of the chorused signal to the left or right channel. This parameter is adjustable from 0 to 100 - where 0 = full left, 100 = full right and 50 = center.
- Delay* The Delay parameter allows you to select the delay time (in milliseconds for each tap of the chorus signal. It is this delayed signal that is detuned and modulated to produce the chorus effect. Using shorter delay times for this effect produces a tighter sounding chorused signal while using longer delay times will achieve a much larger ambient effect.
- Depth* The Depth parameter adjusts the amount of modulation of each delayed signal. A lower depth setting will produce a more subtle detune effect while a higher setting of this control will cause a more drastic detuning of the delayed signal (or voice).
- Rate* The Rate parameter determines the sweep speed (or the speed at which the delayed signal is modulated). Here a low rate will result in a slow speed and a higher rate will result in a faster speed.

PITCH SHIFT

Pitch Shifting is used to change the pitch of the input signal to produce one to four harmony notes based on a single input signal. The HUSH™; PITCH SHIFT; DELAY configuration offers 4 harmony voices while the HUSH™; PITCH SHIFT; DELAY; REVERB configuration offers 2. Each harmony voice may be of any fixed interval - up to one octave up to two octaves down and is selected in 20 cent increments. Increments of one cent (1/100th of a semitone) are also available for fine adjustment via the Fine parameter.

PITCH SHIFT Parameters...

Pitch The Pitch parameter selects what harmony note the Intelliverb™ will select based on the input note. An interval is the distance between the pitches of two musical tones (i.e. from an A note to a C note is considered a minor third interval, this is 3 half-steps or 300 cents). The Pitch parameter is adjustable in 20 cent increments and any interval may be selected from one octave above to two octaves below the input signal. This parameter is adjustable from -2400 to +1200, where -2400 = 2 octaves below the input signal, 0 = unison and +1200 = one octave above the input signal. Each 100 cents (or 5 - 20 cent steps) above or below 0 represents the amount of half-steps (or semitones) above or below the input signal the harmony note will be.

Fine The Fine parameter allows for fine adjustment of pitch change in 1 cent steps (or 1/100th of a semitone) for finer adjustment of the harmony note.

Level The Level parameter determines how loud each Voice will be in relation to the other voices of the effect. This is not the same as the Pitch Shift level parameter found in the Mixer Function parameter list.

Pan The Pan parameter allows you to pan the shifted note to the left or right channel of the Intelliverb™. It is adjustable from 0 to 100, where 0 = full left, 100 = full right and 50 = center.

Delay The Delay parameter allows for the shifted signal to be delayed up to 740mS following the input signal. It is adjustable from 0 to 740mS in 5mS increments.

Determining intervals by cent value...

	Pitch parameter value (in cents)	Interval name
<i>Pitch shift voices above the input signal...</i>	+1200	1 octave
	+1100	Major 7th
	+1000	minor 7th
	+900	Major 6th
	+800	minor 6th
	+700	perfect 5th
	+600	diminished 5th
	+500	perfect 4th
	+400	Major 3rd
	+300	minor 3rd
	+200	Major 2nd
	+100	minor 2nd
<i>Pitch shift voice equal to the input signal...</i>	0	unison
<i>Pitch shift voices below the input signal...</i>	-100	Major 7th
	-200	minor 7th
	-300	Major 6th
	-400	minor 6th
	-500	perfect 5th
	-600	diminished 5th
	-700	perfect 4th
	-800	Major 3rd
	-900	minor 3rd
	-1000	Major 2nd
	-1100	minor 2nd
	-1200	1 octave
	-1300	1 octave plus a Major 7th
	-1400	1 octave plus a minor 7th
	-1500	1 octave plus a Major 6th
	-1600	1 octave plus a minor 6th
-1700	1 octave plus a perfect 5th	
-1800	1 octave plus a diminished 5th	
-1900	1 octave plus a perfect 4th	
-2000	1 octave plus a Major 3rd	
-2100	1 octave plus a minor 3rd	
-2200	1 octave plus a Major 2nd	
-2300	1 octave plus a minor 2nd	
-2400	2 octaves	

NOTE: There are 5 steps of the PARAMETER ADJUST control between each of these intervals, as each step equals 20 cents. This allows for use of the Pitch parameter with an expression controller (such as a volume pedal used with a Rocktron MIDI Mate foot controller to change the pitch by remote means) and provides smooth pitch change when the controller is used.

E. HUSH™ SECTION

HUSH™ is Hush Systems' patented single-ended noise reduction system. The HUSH™ system contained in the Intelliverb™ is Hush Systems' first fully digital implementation of single-ended noise reduction. The following describes how the analog version of the HUSH™ design operates, as it is this version that the digital HUSH™ in the Intelliverb™ is modeled after, though the result of the entire process is achieved through Digital Signal Processing.

The low level expander of the HUSH™ system operates like an electronic volume control. The analog design utilizes a voltage-controlled amplifier (VCA) circuit which can control the gain between the input and output from unity to 30, 40 or even 50 dB of gain reduction. When the input signal is above the user preset threshold point, the VCA circuit is at unity gain. This means that the amplitude of the output signal will be equal to that of the input signal. As the input signal amplitude drops below the user pre-set threshold point, downward expansion begins. At this point the expander operates like an electronic volume control and gradually begins to decrease the output signal level relative to the input signal level. For example, if the input signal were to drop below the threshold point by 2dB, the output would drop approximately 3dB. As the input signal drops further below the threshold point, downward expansion increases. For example, if the input signal dropped 6dB below the threshold point, the output level would drop by approximately 14dB. A drop in the input level by 20dB would cause the output level to drop by approximately 54dB (this would be 34dB of gain reduction). In the absence of any input signal, the expander will reduce the gain so that the noise floor becomes inaudible.

HUSH™ Parameters...

- HUSH I/O* The HUSH I/O parameter simply determines whether the HUSH™ circuit will be in the signal path or bypassed.
- Exp Thresh* The Expander Threshold parameter determines the level at which downward expansion begins. For example, if the expander threshold was set at -20dB and the input signal dropped below -20dB, downward expansion would begin. Typically, this parameter should be set between 5 - 20dB above the quiescent noise floor of the input signal (i.e. if the noise floor was -60dB, a setting between -40 and -55dB will produce the proper expansion).
- Rel Rate* The Release Rate parameter determines the amount of time required for the downward expander to decrease the level of the output signal. This rate is adjustable from 25mS to 800 mS to accommodate a wide variety of applications. For example, when using the expander for gating applications on drums, a very quick release rate (25-200mS) should be used. When used with individual instruments such as guitar, a setting of 200mS or higher will provide adequate expansion without being as harsh as a gate. When used with sources which have long decay times (cymbals, etc.) a very slow release rate should be used.

7. CONFIGURATIONS

At the root of each preset's sound is its "configuration". The configuration includes both the effects chosen for a given preset and the manner in which they are routed in the signal path. The Intelliverb™ offers 6 highly flexible configurations capable of producing sounds which previously could only be obtained by using numerous effects devices complexly patched together. These configurations may offer many simultaneous effects without degradation of the sound quality of each effect.

Intelliverb™ configurations

- A. HUSH™; VIRTUAL ROOM™
- B. HUSH™; CHORUS; DELAY; REVERB
- C. HUSH™; DELAY; DUCKER
- D. HUSH™; 8 VOICE CHORUS; DELAY
- E. HUSH™; PITCH SHIFT; DELAY
- F. HUSH™; PITCH SHIFT; DELAY; REVERB

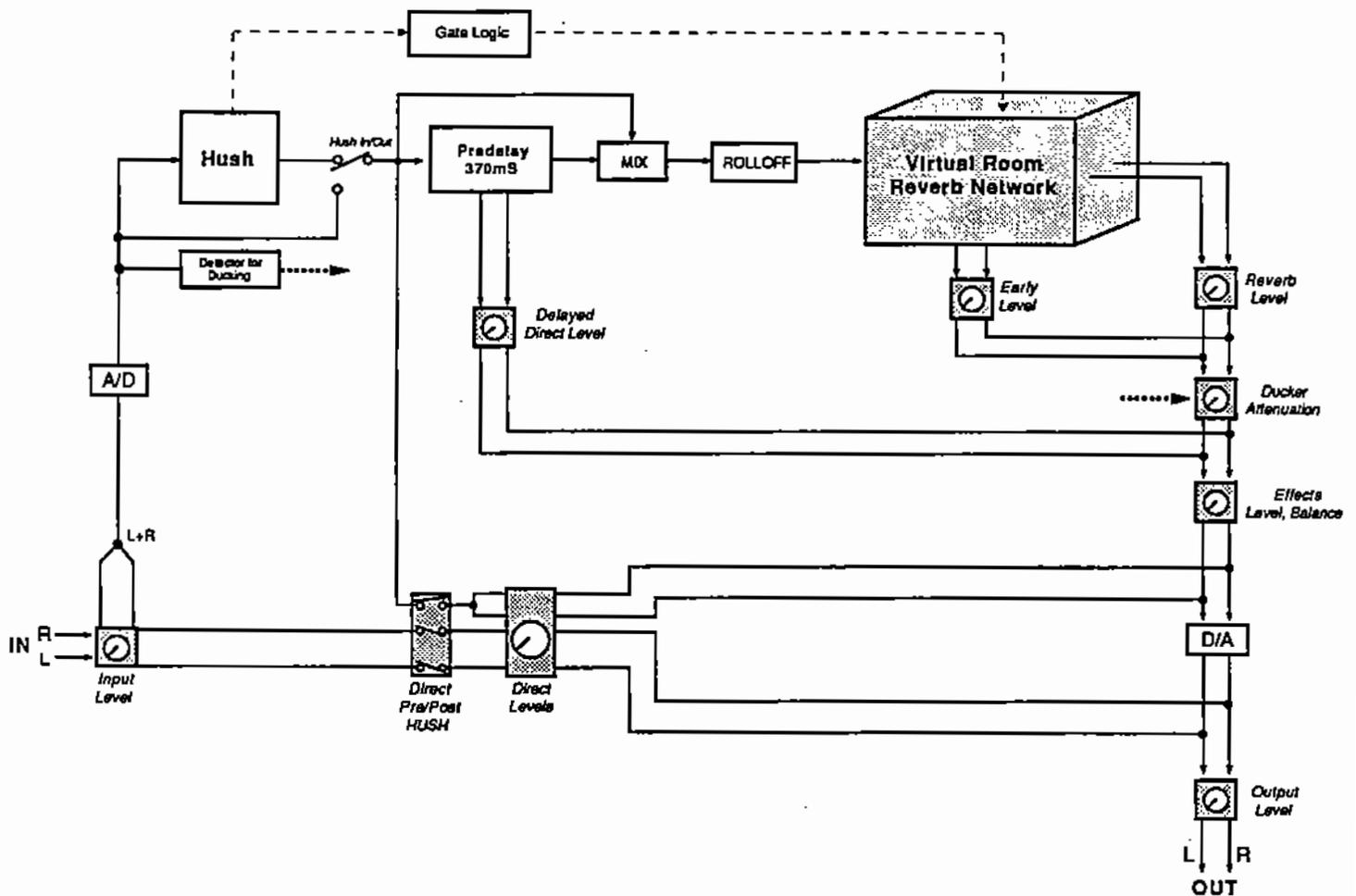
Selecting a Configuration

In selecting a configuration, press the CONFIG button - the CONFIG LED above the button will light and the DISPLAY panel will show the current configuration. Turning the PRESET control while in this mode will step through each preset, displaying its configuration instead of its preset number and title.

Shown in this section are the basic signal path arrangements for the Intelliverb™ configurations and the parameter lists for each. These illustrate the various signal flow possibilities available via the MIX, PAN and LEVEL controls located at various points in the signal chain.

A. HUSH™; VIRTUAL ROOM™ Configuration

This configuration combines Hush™ noise reduction with high purity Reverb sounds. The Virtual Room™ parameters allow the user to adjust the simulated height of the ceiling and length of the walls of the room, as well as the position of the listener within the room.



HUSH™; VIRTUAL ROOM™ Configuration

Parameter List

Step 1. Turn the FUNCTION SELECT control to access the:

FUNCTION

MIXER

1. EFFECT LVL (Effects Level)
2. L DIR LVL (Left Direct Level)
3. R DIR LVL (Right Direct Level)
4. DIRECT PRE/POST HUSH
5. DLY DIR LVL (Delay Direct Level)
6. EARLY LVL (Early Reflections Level)
7. REVERB LVL (Reverb Level)
8. EFFCT BAL (Effect Balance)

Step 3. Turn the PARAMETER ADJUST control to access the:

PARAMETER RANGE

- ∞ to +6dB
- ∞ to +6dB
- ∞ to +6dB
- PRE or POST
- ∞ to 0dB
- ∞ to 0dB
- ∞ to 0dB
- L<0 to 100>R

HUSH

1. HUSH I/O (Hush In/Out)
2. EXP THRESH (Expander Threshold)
3. REL RATE (Release Rate)

- IN or OUT
- 92 to -20dB
- 25mS to 800mS

PRE/EARLY

1. PREDELAY (Pre-delay Time)
2. MIX DIR/DLY (Direct/Delay Mix Level)
3. DIFFUSION
4. EARLY LVL (Early Reflection Level)
5. REVERB DLY (Reverb Delay)

- 0 to 370mS
- DIR<0 to 100>DLY
- 0 to 9
- ∞ to 0dB
- 0 to 200mS

REVERB/EQ

1. REVERB LVL (Reverb Level)
2. REVERB DECAY (Reverb Decay Time)
3. HF DAMP 1 (High Frequency Damping 1)
4. HF DAMP2 LVL (High Frequency Damping 2 Level)
5. HF DAMP2 FRQ (High Frequency Damping 2 Frequency)
6. HF ROLL LVL (High Frequency Roll-off Level)
7. HF ROLL FREQ (High Frequency Roll-off Frequency)
8. LF DAMP LVL (Low Frequency Damping Level)
9. LF DAMP FREQ (Low Frequency Damping Frequency)
10. LF ROLL LVL (Low Frequency Roll-off Level)
11. LF ROLL FREQ (Low Frequency Roll-off Frequency)

- ∞ to 0dB
- 0 to 99
- 0 to 99
- LP to 0dB
- 63Hz to 18.0KHz
- LP to 0dB
- 63Hz to 18.0KHz
- HP to 0dB
- 63Hz to 18.0KHz
- HP to +6dB
- 63Hz to 18.0KHz

ROOM

1. LENGTH
2. WIDTH
3. HEIGHT
4. FRONT OFFSET
5. BACK OFFSET
6. LEFT OFFSET
7. RIGHT OFFSET
8. CEILING OFFS (Ceiling Offset)
9. FRONT REFLCT (Front Reflections)
10. BACK REFLCT (Back Reflections)
11. LEFT REFLCT (Left Reflections)
12. RIGHT REFLCT (Right Reflections)
13. CEILING REFL (Ceiling Reflections)

- 1 to 35M
- 1 to 25M
- 1 to 20M
- 10 to +10
- 0 to 99

HUSH™; VIRTUAL ROOM™ Configuration

Parameter List (continued)

Step 1. Turn the FUNCTION SELECT control to access the:

FUNCTION

POSITION

GATE

DUCKER

Step 2. Turn the PARAMETER SELECT control to access the:

PARAMETER LIST

1. SOURCE F/B
2. SOURCE L/R
3. LISTEN F/B
4. LISTEN L/R
5. SEPARATION

1. GATE ON/OFF
2. GATE DECAY
3. GATE THRESH (Gate Threshold)
4. HOLD TIME

1. DUCKER ON/OFF
2. SENSITIVITY
3. ATTENUATION
4. RELEASE RATE

Step 3. Turn the PARAMETER ADJUST control to access the:

PARAMETER RANGE

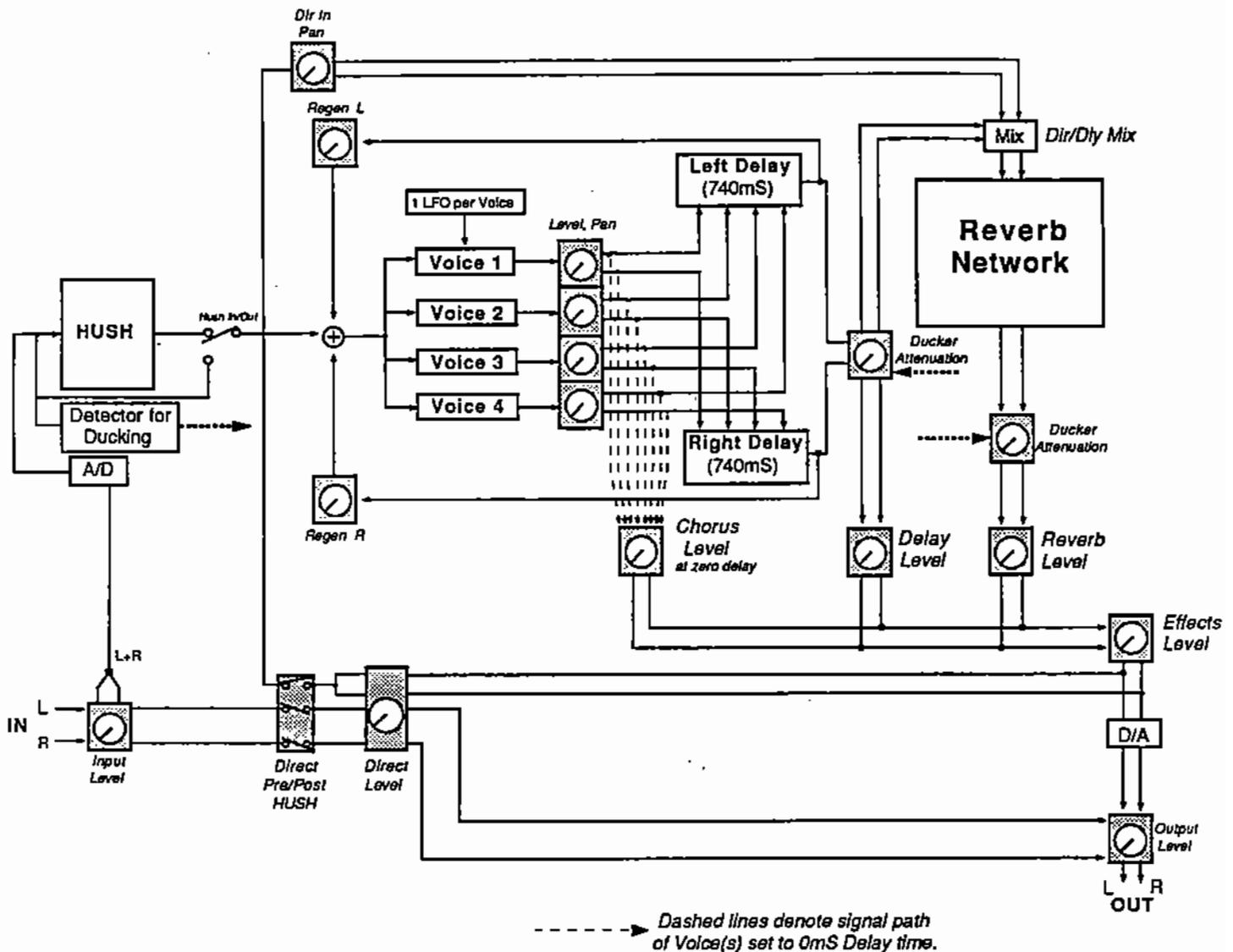
Front 17m to Back 17M
Left 12m to Right 12M
Front 17m to Back 17M
Left 12m to Right 12M
.0m to 25.0M

On or OFF
0 to 31
-92 to -20dB
0 to 99

On or Off
-92 to -20
∞ to 0dB
.2 to 9.0 seconds

B. HUSH™; CHORUS; DELAY; REVERB Configuration

This configuration offers Hush™ noise reduction at the input to quiet a noisy input signal (such as from a high-gain guitar preamp) with 4 Chorus and Delay voices and Reverb. Please note that when the Delay Time for any voice is set to zero, that voice is taken out of the regeneration loops. This will allow for higher regeneration levels (if needed). It also allows for a more pure sounding decay of the echo when used with other voices set at long delay times.



HUSH™; CHORUS; DELAY; REVERB Configuration

Parameter List

Step 1. Turn the FUNCTION SELECT control to access:

FUNCTION

Step 2. Turn the PARAMETER SELECT control to access:

PARAMETER LIST

Step 3. Turn the PARAMETER ADJUST control to access:

PARAMETER RANGE

MIXER

- | | |
|---------------------------------------|-------------|
| 1. EFFECT LVL (Master Effects Level) | -∞ to +6dB |
| 2. L DIR LVL (Left Direct Level) | -∞ to +6dB |
| 3. DIRECT PRE/POST HUSH | PRE or POST |
| 4. CHORUS LVL (Chorus Level) | -∞ to +0dB |
| 5. DELAY LVL (Delay Level) | -∞ to +0dB |
| 6. REVERB LVL (Reverb Level) | -∞ to +0dB |
| 7. REGEN L (Left Regeneration Level) | -∞ to +0dB |
| 8. REGEN R (Right Regeneration Level) | -∞ to +0dB |

HUSH

- | | |
|------------------------------------|---------------|
| 1. HUSH I/O (Hush In/Out) | IN or OUT |
| 2. EXP THRESH (Expander Threshold) | -92 to -20dB |
| 3. REL RATE (Release Rate) | 25mS to 800mS |

VOICE/DLY 1

*(repeated for
Voices/Dlys 2, 3 and 4)*

- | | |
|-----------------------------------|--------------|
| 1. LEVEL 1 (Delay 1 Level) | -∞ to 0dB |
| 2. PAN 1 (Delay 1 Pan) | L<0 to 100>R |
| 3. DELAY 1 (Delay 1 Time) | 0 to 740mS |
| 4. DEPTH 1 (Chorus Voice 1 Depth) | 0 to 100 |
| 5. RATE 1 (Chorus Voice 1 Rate) | 0 to 254 |

DUCKER

- | | |
|---------------------------------------|-----------------------|
| 1. DUCKER (Ducker Select) | Off, Dly, Rev or Both |
| 2. SENSITIVITY (Ducker Sensitivity) | -92 to -20dB |
| 3. ATTENUATION (Ducker Attenuation) | -∞ to 0dB |
| 4. RELEASE RATE (Ducker Release Rate) | .2 to 9.0 seconds |

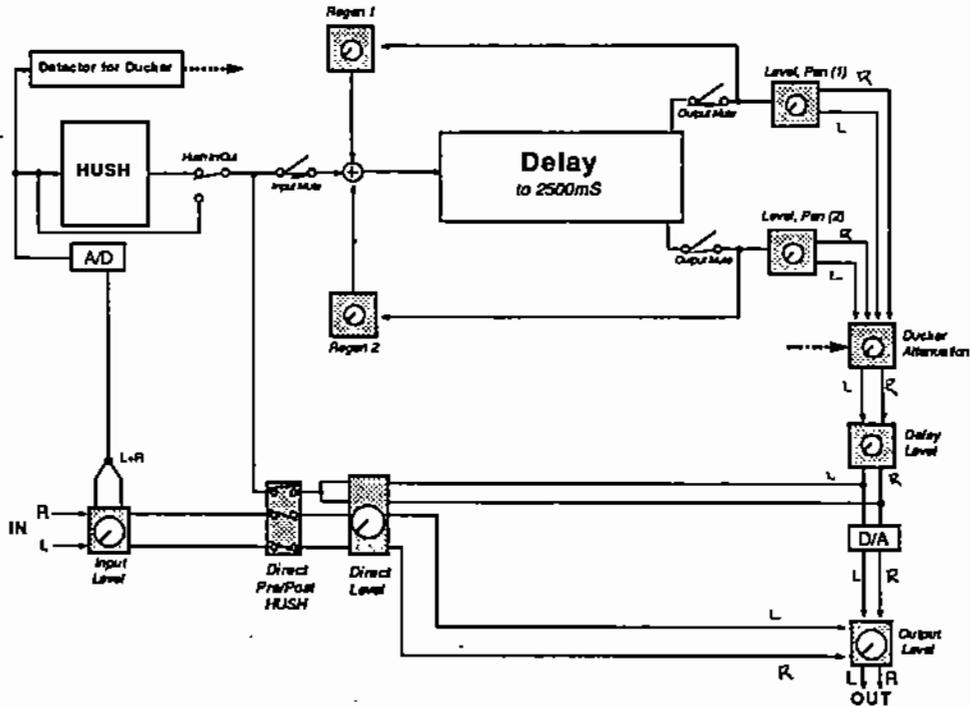
REVERB

- | | |
|--|--|
| 1. REV INPUT IN/OUT (Reverb In/Out) | Active or Muted |
| 2. DIR IN PAN (Reverb Input Pan) | L<0 to 100>R |
| 3. MIX DIR/DLY (Direct/Delay Signal Mix) | DIR<0 to 100>DLY |
| 4. REV TYPE (Reverb Type) | PlateA, PlateB, RoomA, RoomB,
HallA, HallB, Stadium, Dual |
| 5. REVERB LVL (Reverb Level) | -∞ to 0dB |
| 6. REV DECAY (Reverb Decay Time) | 0 to 99 |
| 7. HF DAMP 1 (High Frequency Damping) | 0 to 99 |

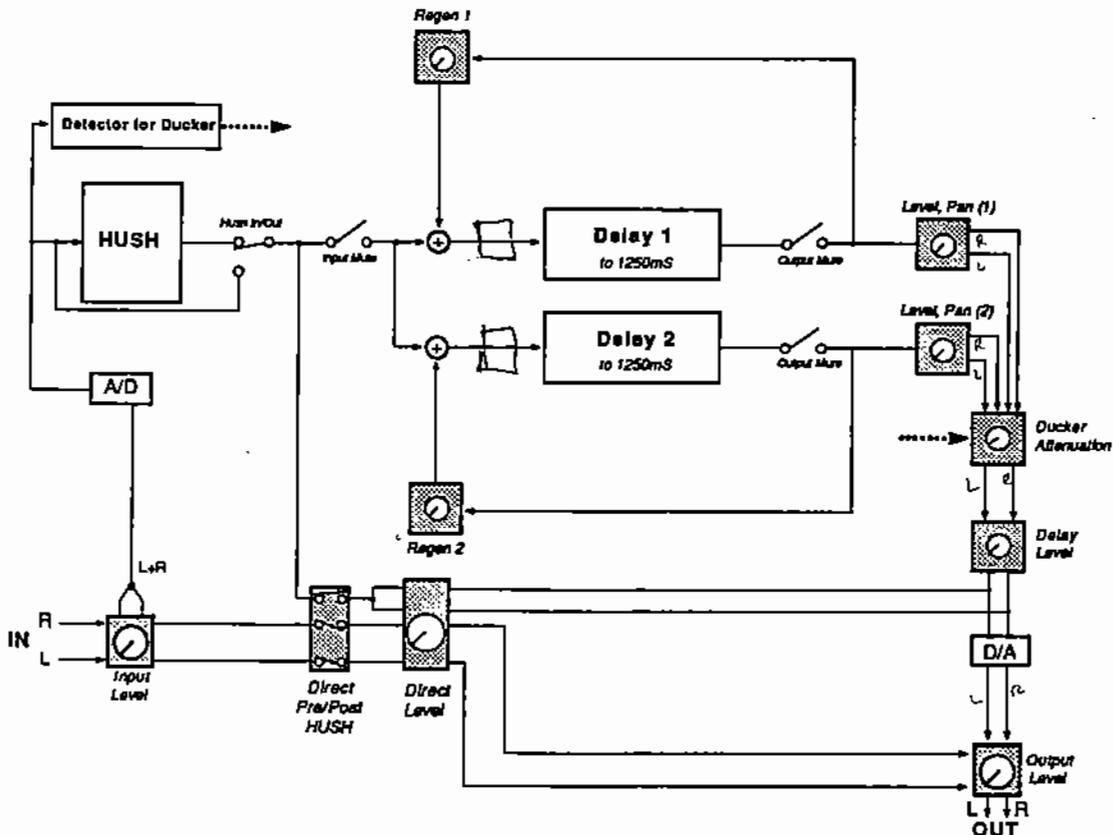
C. HUSH™; DELAY; DUCKER Configuration

The Intelliverb™ offers 3 types of delay - 2 Tap, Stereo and Ping Pong. The configurations for each are shown.

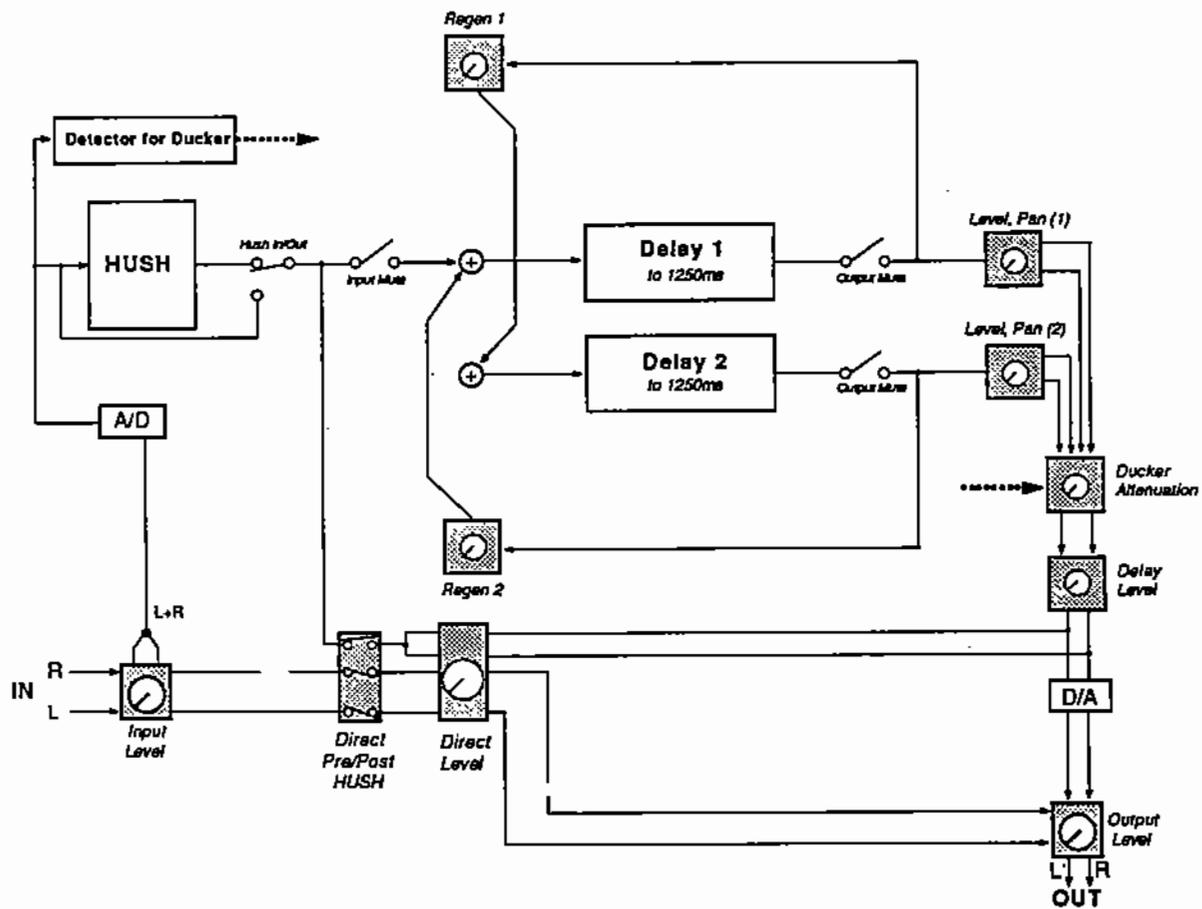
2 Tap Delay



Stereo Delay



Ping-Pong Delay



HUSH™; DELAY; DUCKER Configuration

Parameter List

Step 1. Turn the FUNCTION SELECT control to access:

Step 2. Turn the PARAMETER SELECT control to access:

Step 3. Turn the PARAMETER ADJUST control to access:

FUNCTION

PARAMETER LIST

PARAMETER RANGE

MIXER

1. DELAY LVL (Delay Level)
2. L DIR LVL (Left Direct Level)
3. R DIR LVL (Right Direct Level)
4. DIRECT PRE/POST HUSH

-∞ to +6dB
-∞ to +6dB
-∞ to +6dB
PRE or POST

HUSH

1. HUSH I/O (Hush In/Out)
2. EXP THRESH (Expander Threshold)
3. REL RATE (Release Rate)

IN or OUT
-92 to -20dB
25mS to 800mS

DELAY

1. DELAY (Delay In/Out)
2. MUTE TYPE (Delay Mute Type)
3. LEVEL 1 (Delay 1 Level)
4. PAN 1 (Delay 1 Pan)
5. DLY TIME 1 (Delay 1 Time)
6. REGEN 1 (Delay 1 Regeneration)
7. LEVEL 2 (Delay 1 Level)
8. PAN 2 (Delay 1 Pan)
9. DLY TIME 2 (Delay 1 Time)
10. REGEN 2 (Delay 1 Regeneration)
11. D TYPE (Delay Type)
12. DL HF DAMP (High Frequency Damping)

Muted or Active
Pre, Post or Both
-∞ to 0dB
L<0 to 100>R
0 to 1250mS (2500mS in 2 Tap)
-∞ to 0dB
-∞ to 0dB
L<0 to 100>R
0 to 1250mS (2500mS in 2 Tap)
-∞ to 0dB
Stereo, Ping Pong, 2 Tap
0 to 99

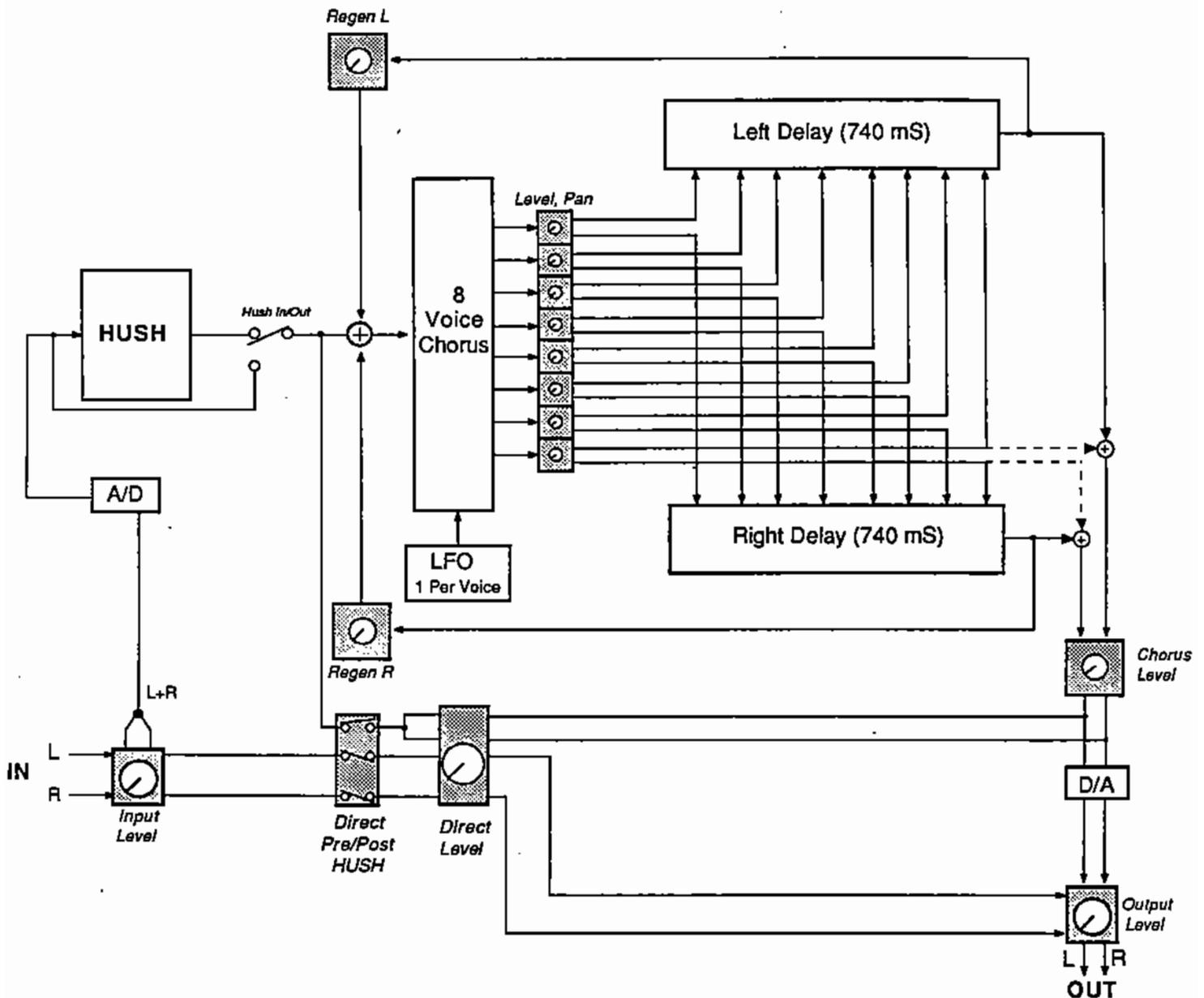
DUCKER

1. DUCKER (Ducker In/Out)
2. SENSITIVITY (Ducker Sensitivity)
3. ATTENUATION (Ducker Attenuation)
4. RELEASE RATE (Ducker Release Rate)

Off or On
-92 to -20dB
-∞ to 0dB
.2 to 9.0 seconds

D. HUSH™; 8 VOICE CHORUS; DELAY Configuration

This configuration offers 8 voices which may be chorused and/or delayed up to 740 milliseconds each. Please note that when the Delay Time for any voice is set to zero, that voice is taken out of the regeneration loops. This will allow for higher regeneration levels (if needed). It also allows for a more pure sounding decay of the echo when used with other voices set at long delay times.



-----> Dashed lines denote signal path of Voice(s) set to 0mS Delay time

HUSH™; 8 VOICE CHORUS; DELAY Configuration

Parameter List

Step 1. Turn the FUNCTION SELECT control to access:

Step 2. Turn the PARAMETER SELECT control to access:

Step 3. Turn the PARAMETER ADJUST control to access:

FUNCTION

PARAMETER LIST

PARAMETER RANGE

MIXER

1. CHORUS LVL (Chorus Level)
2. L DIR LVL (Left Direct Level)
3. R DIR LVL (Right Direct Level)
4. DIRECT PRE/POST HUSH
5. REGEN L (Left Channel Regeneration)
6. REGEN R (Right Channel Regeneration)

--∞ to +6dB
--∞ to +6dB
--∞ to +6dB
PRE or POST
--∞ to +0dB
--∞ to +0dB

HUSH

1. HUSH I/O (Hush In/Out)
2. EXP THRESH (Expander Threshold)
3. REL RATE (Release Rate)

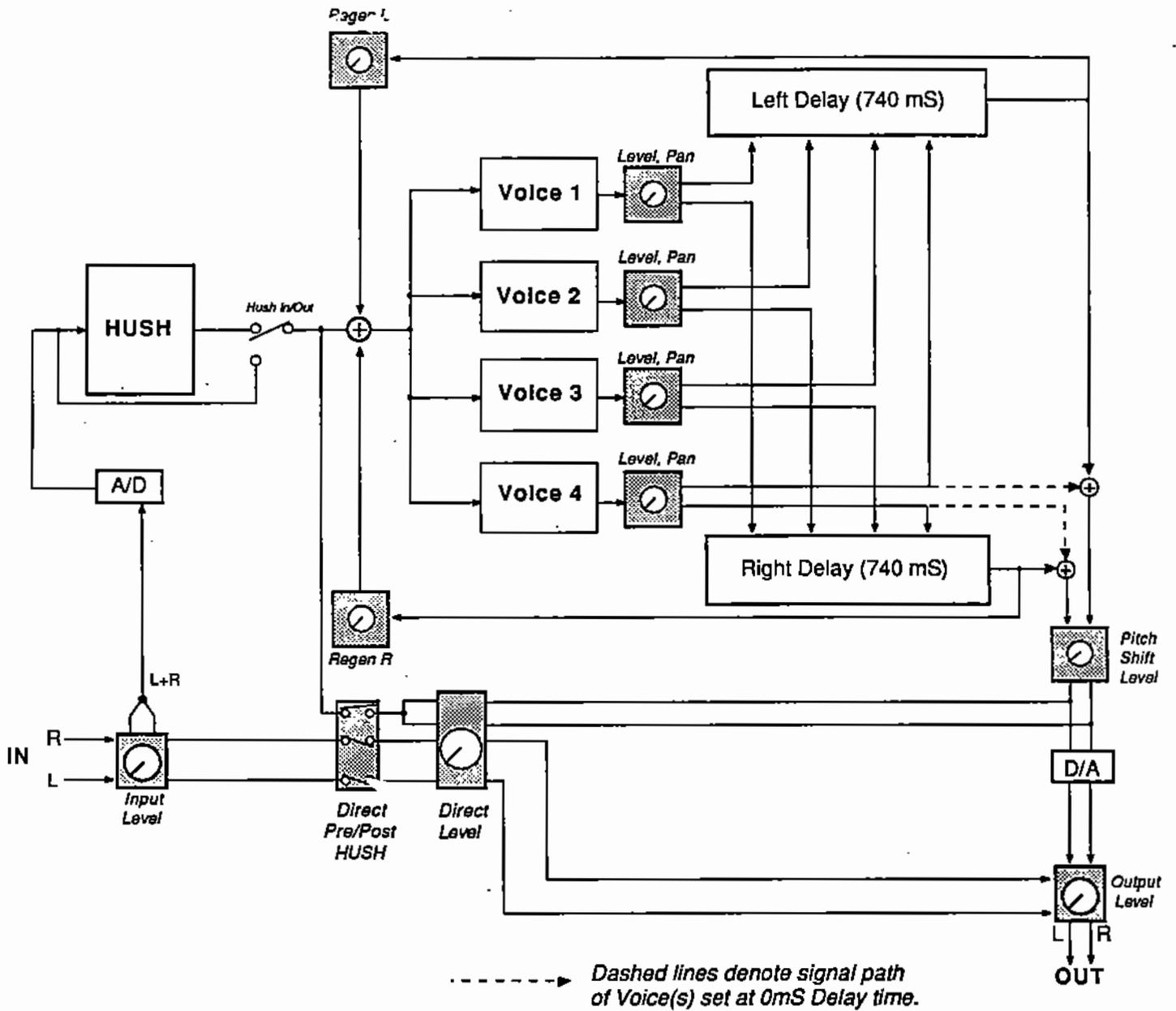
IN or OUT
-92 to -20dB
25mS to 800mS

VOICE/DLY 1 (Repeated for Voices 2 - 8)

1. LEVEL 1 (Chorus Voice 1 Level)
2. PAN 1 (Chorus Voice 1 Pan)
3. DELAY 1 (Chorus Voice 1 Delay)
4. DEPTH 1 (Chorus Voice 1 Depth)
5. RATE 1 (Chorus Voice 1 Rate)

--∞ to 0dB
L<0 to 100>R
0 to 740mS
0 to 100
0 to 254

E. HUSH™; PITCH SHIFT ; DELAY Configuration



HUSH™; PITCH SHIFT; DELAY Configuration

Parameter List

Step 1. Turn the FUNCTION SELECT control to access:

FUNCTION

MIXER

HUSH

VOICE 1
(Repeated for
Voices 2, 3 and 4)

Step 2. Turn the PARAMETER SELECT control to access:

PARAMETER LIST

1. P SHIFT LVL (Pitch Shift Level)
2. L DIR LVL (Left Direct Level)
3. R DIR LVL (Right Direct Level)
4. DIRECT PRE/POST HUSH
5. REGEN L (Left Channel Regeneration)
6. REGEN R (Right Channel Regeneration)

1. HUSH I/O (Hush In/Out)
2. EXP THRESH (Expander Threshold)
3. REL RATE (Release Rate)

1. PITCH 1 (Pitch Shift in 20 cent steps)
2. FINE 1 (Pitch Shift in 1 cent steps)
3. LEVEL 1 (Pitch Shift 1 Level)
4. PAN 1 (Pitch Shift 1 Pan)
5. DELAY 1 (Pitch Shift 1 Delay)

Step 3. Turn the PARAMETER ADJUST control to access:

PARAMETER RANGE

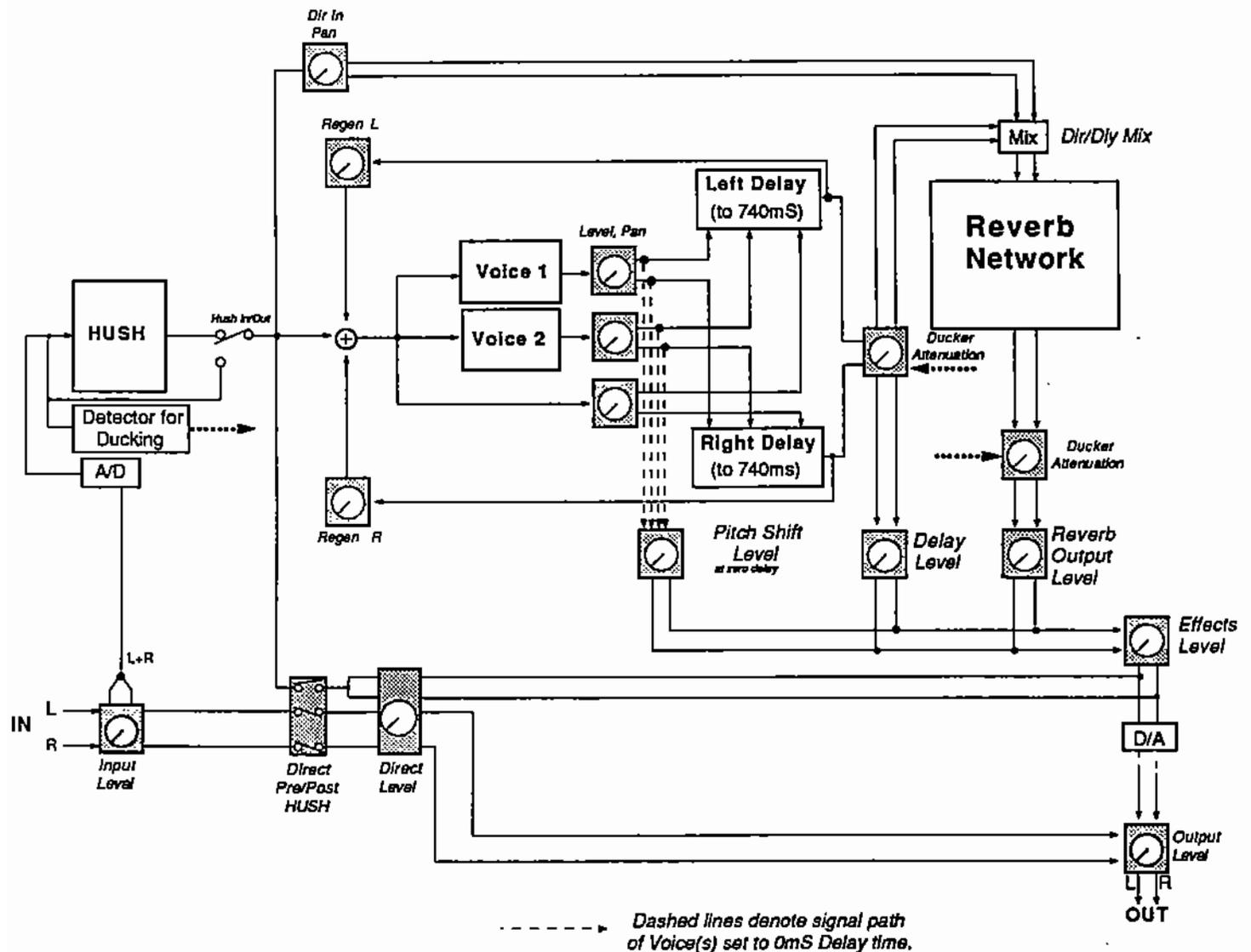
- ∞ to +6dB
-∞ to +6dB
-∞ to +6dB
PRE or POST
-∞ to +0dB
-∞ to +0dB

- IN or OUT
-92 to -20dB
25mS to 800mS

- 2400 to +1200
-20 to +20
-∞ to 0dB
L<0 to 100>R
0 to 740mS

F. HUSH™; PITCH SHIFT; DELAY; REVERB Configuration

This configuration combines HUSH™ with 2 voices of Pitch Shift and Delay along with a third delay. This is followed by a Ducking feature for the delayed signals and Reverb. Please note that when the Delay Time for any voice is set to zero, that voice is taken out of the regeneration loops. This will allow for higher regeneration levels (if needed). It also allows for a more pure sounding decay of the echo when used with other voices set at long delay times.



HUSH™; PITCH SHIFT; DELAY; REVERB Configuration

Parameter List

1. Turn the FUNCTION SELECT control to access:

2. Turn the PARAMETER SELECT control to access:

3. Turn the PARAMETER ADJUST control to access:

FUNCTION

PARAMETER LIST

PARAMETER RANGE

**** MIXER ****

- | | |
|--|-------------|
| 1. EFFECT LVL (Master Effects Level) | -∞ to +6dB |
| 2. L DIR LVL (Left Direct Level) | -∞ to +6dB |
| 3. R DIR LVL (Right Direct Level) | -∞ to +6dB |
| 4. DIRECT PRE/POST HUSH | PRE or POST |
| 5. PITCH SHIFT LVL (Pitch Shift Level) | -∞ to +0dB |
| 6. DELAY LVL (Delay Level) | -∞ to +0dB |
| 7. REVERB LVL (Reverb Level) | -∞ to +0dB |
| 8. REGEN L (Left Regeneration Level) | -∞ to +0dB |
| 9. REGEN R (Right Regeneration Level) | -∞ to +0dB |

**** HUSH ****

- | | |
|------------------------------------|---------------|
| 1. HUSH I/O (Hush In/Out) | IN or OUT |
| 2. EXP THRESH (Expander Threshold) | -92 to -20dB |
| 3. REL RATE (Release Rate) | 25mS to 800mS |

** VOICE/DLY 1 **

- | | |
|---|----------------|
| 1. PITCH 1 (Pitch Shift in 20 cent steps) | -2400 to +1200 |
| 2. FINE 1 (Pitch Shift in 1 cent steps) | -20 to +20 |
| 3. LEVEL 1 (Pitch Shift 1 Level) | -∞ to 0dB |
| 4. PAN 1 (Pitch Shift 1 Pan) | L<0 to 100>R |
| 5. DELAY 1 (Pitch Shift 1 Delay) | 0 to 740mS |

** VOICE/DLY 2 **

- | | |
|---|----------------|
| 1. PITCH 2 (Pitch Shift in 20 cent steps) | -2400 to +1200 |
| 2. FINE 2 (Pitch Shift in 1 cent steps) | -20 to +20 |
| 3. LEVEL 2 (Pitch Shift 2 Level) | -∞ to 0dB |
| 4. PAN 2 (Pitch Shift 2 Pan) | L<0 to 100>R |
| 5. DELAY 2 (Pitch Shift 2 Delay) | 0 to 740mS |

**** DELAY 3 ****

- | | |
|----------------------------|--------------|
| 1. LEVEL 3 (Delay 3 Level) | -∞ to 0dB |
| 2. PAN 3 (Delay 3 Pan) | L<0 to 100>R |
| 3. DELAY 3 (Delay 3 Time) | 0 to 740mS |

**** DUCKER ****

- | | |
|---------------------------------------|-----------------------|
| 1. DUCKER (Ducker Select) | Off, Dly, Rev or Both |
| 2. SENSITIVITY (Ducker Sensitivity) | -92 to -20dB |
| 3. ATTENUATION (Ducker Attenuation) | -∞ to 0dB |
| 4. RELEASE RATE (Ducker Release Rate) | .2 to 9.0 seconds |

**** REVERB ****

- | | |
|--|--|
| 1. REV INPUT IN/OUT (Reverb In/Out) | Active or Muted |
| 2. DIR IN PAN (Reverb Input Pan) | L<0 to 100>R |
| 3. MIX DIR/DLY (Direct/Delay Signal Mix) | DIR<0 to 100>DLY |
| 4. REV TYPE (Reverb Type) | PlateA, PlateB, RoomA, RoomB,
HallA, HallB, Stadium, Dual |
| 5. REVERB LVL (Reverb Level) | -∞ to 0dB |
| 6. REV DECAY (Reverb Decay Time) | 0 to 99 |
| 7. HF DAMP (High Frequency Damping) | 0 to 99 |

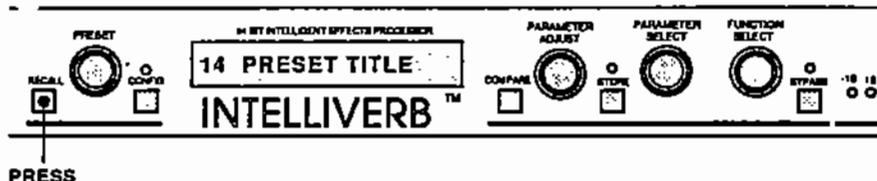
8. OPERATING THE INTELLIVERB™

A. RECALLING A STORED INTELLIVERB™ PRESET

Step 1: To recall a stored Intelliverb™ preset, first turn the PRESET control to the desired preset number you wish to recall. The DISPLAY panel will alternate between the preset number and title you have selected and:

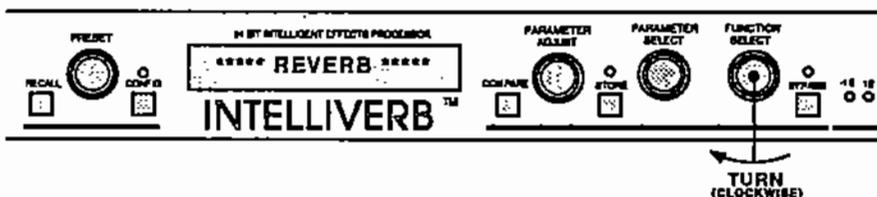


Step 2: To call up the preset you have selected, press the RECALL button and the DISPLAY panel will now show only the new preset number and title (or configuration type depending on CONFIG L.E.D.).

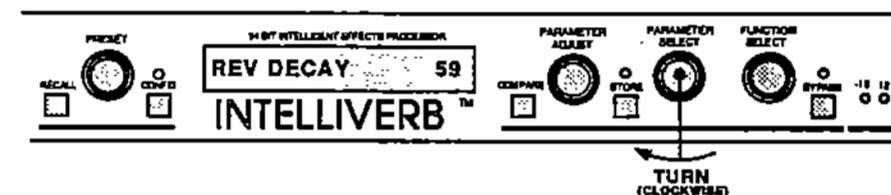


B. CHANGING PRESET PARAMETERS

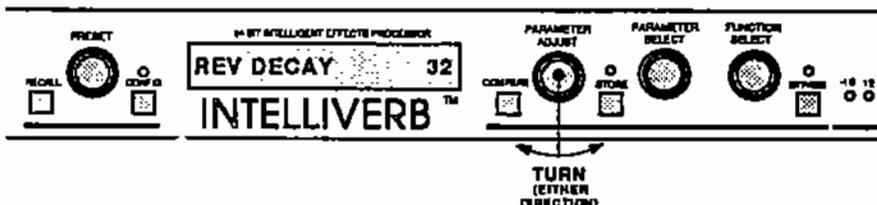
Step 1: The parameter menu for each effect can be called up via the FUNCTION SELECT control. Turn this control to the function you wish to change.



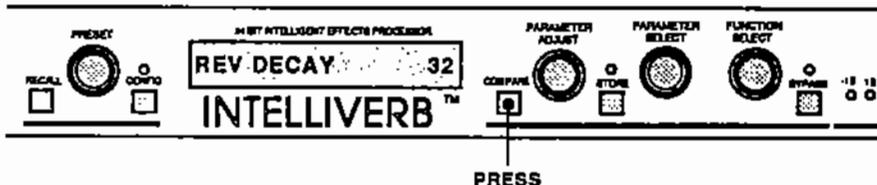
Step 2: Now turn the PARAMETER SELECT control to choose which parameter you would like to alter for that function.



Step 3: Use the PARAMETER ADJUST control to alter the parameter value. The LED above the STORE button will light, indicating that the preset has been altered from its original state.

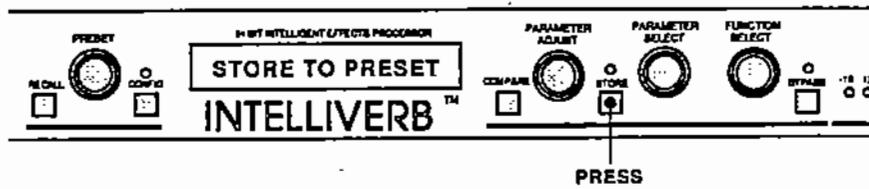


Step 4: Now you can use the COMPARE button to compare the old parameter value to the new one.

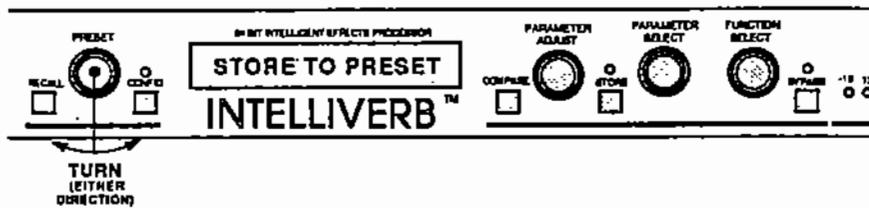


C. STORING CHANGED PARAMETER VALUES

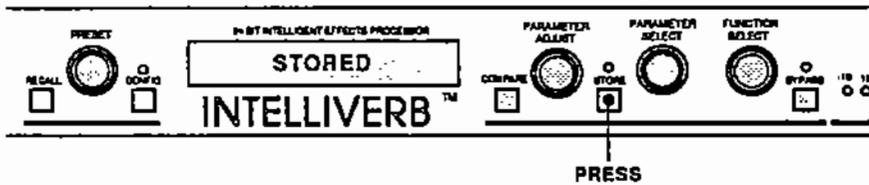
Step 1: To store altered parameter values, press the STORE button while viewing the effect title or parameter to start the store procedure. The DISPLAY panel will now alternate between the destination preset number and title and:



Step 2: Turn the PRESET control to select the desired preset number to store the new parameter values into (if you wish to store the new parameter values into the current preset number, this is not necessary). New presets may be stored into any preset number. The DISPLAY panel will now alternate between the new preset number and:



Step 3: Now press the STORE button a second time to store the new values into the selected preset number. The DISPLAY will briefly flash "STORED" before displaying the new preset number and title (turning the FUNCTION SELECT control will cancel the store procedure).



Step 4: At this point the altered parameter values have been stored into the selected preset number and the DISPLAY panel will ask "COPY TITLE TOO?". This will only be displayed when storing into a new preset number and allows you copy the title from the altered preset into the new preset also, if desired. To copy the title from the altered preset, press the STORE button a third time and the DISPLAY panel will again flash "STORED".



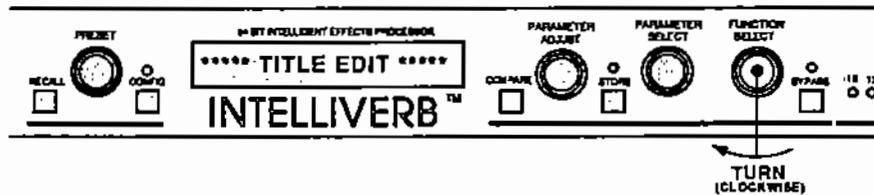
NOTE 1: If it is not desired to save the title of the altered preset, simply turn the PRESET control to any other preset or turn the FUNCTION SELECT control to any function to exit. The altered parameters will still be stored into the new preset number.

NOTE 2: If a preset with altered parameters is exited without completing the store procedure, all edited parameter values will be lost and the preset will revert back to its original status the next time it is recalled. When saving a preset's altered parameters, make sure the display flashes "STORED" before exiting the preset to ensure that it was indeed stored.

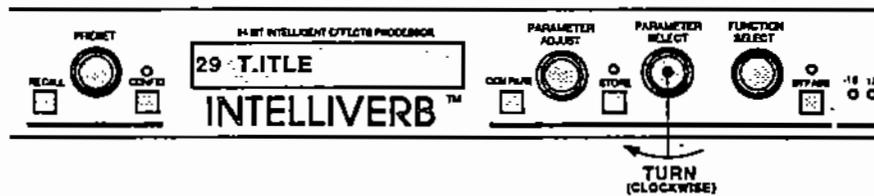
D. EDITING A PRESET TITLE

Title Edit can be found in all Intelliverb presets.

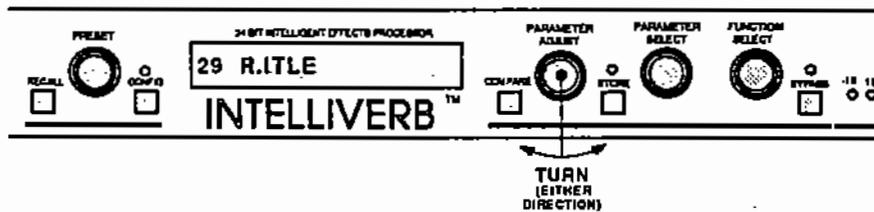
Step 1: To begin the Title Edit function, turn the FUNCTION SELECT control clockwise until the DISPLAY panel shows "TITLE EDIT".



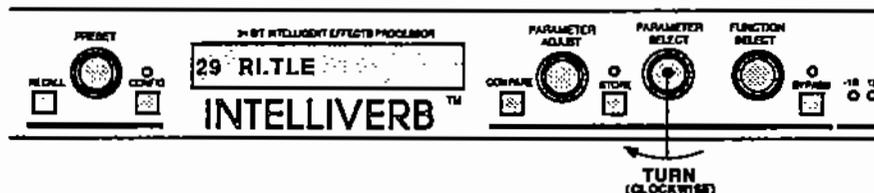
Step 2: Turn the PARAMETER SELECT control clockwise to initiate the Title Edit mode. Turning this control will also select the character location to be edited. At this point the selected character to be edited will have a flashing decimal point following it.



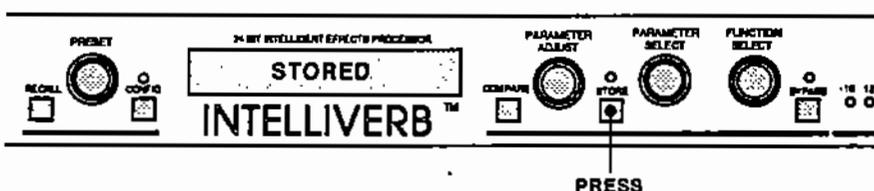
Step 3: Use the PARAMETER ADJUST control to select the desired character for the flashing decimal point position.



Step 4: To edit the character in the next position, turn the PARAMETER SELECT control one step clockwise.



Step 5: After all the characters are edited as needed, press the STORE button to save the new title in Intelliverb™ memory. The DISPLAY panel will flash "STORED" briefly.



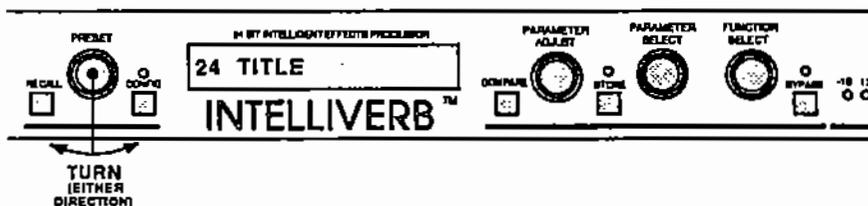
NOTE 1: The STORE button must be pressed to save the new title. Exiting the Title Edit function before pressing the STORE button will erase any editing done in the Title Edit function.

NOTE 2: After flashing "STORED" briefly, the Intelliverb™ will remain in Title Edit mode. You may now either (a) turn the PRESET control to display and edit other preset titles without having to exit and re-enter Title Edit mode, or, (b) turn the FUNCTION SELECT control to exit the Title Edit function.

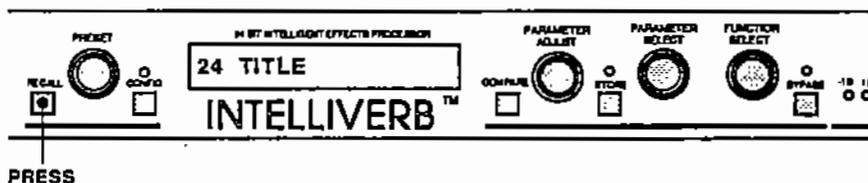
E. SELECTING A "POWER ON" PRESET

The Power On Preset function allows you to select a preset which will always be recalled when the unit is turned on.

Step 1: Turn the PRESET control to the preset number you wish to be recalled each time the unit is turned on.



Step 2: Recall the selected preset by pressing the RECALL button.



Step 3: Press the STORE button for this or any recalled preset while the preset number and title or the configuration are displayed to save it as the "power on" preset.



9. MIDI OPERATION

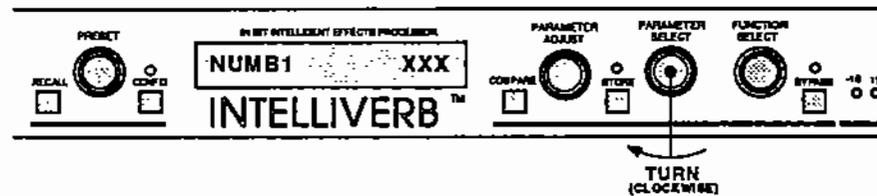
A. MIDI CONTROLLER ASSIGNMENTS

Controller mapping allows for specified Intelliverb adjustable parameters to be mapped (or assigned) to a MIDI controller number for real - time control (via pitch wheel, expression pedal, etc.) in live performance situations. The parameter may be assigned to any controller number, starting at controller zero through controller 120, or OFF. In the OFF position the assigned parameter will not respond to any MIDI control change. Each preset allows for up to 8 controllers.

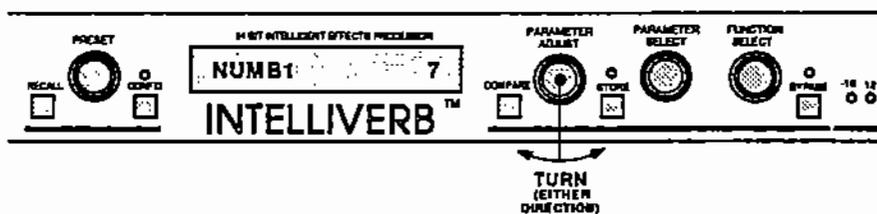
Step 1: To access the Controller Assign function, turn the FUNCTION SELECT control clockwise one step past "Title Edit".



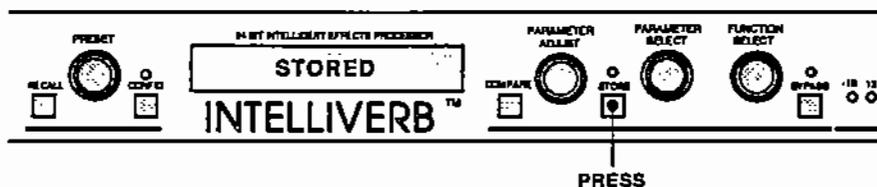
Step 2: Turn the PARAMETER SELECT control for the first parameter of the Controller Assign function. Here you may choose a number which tells the desired parameter which controller number to respond to.



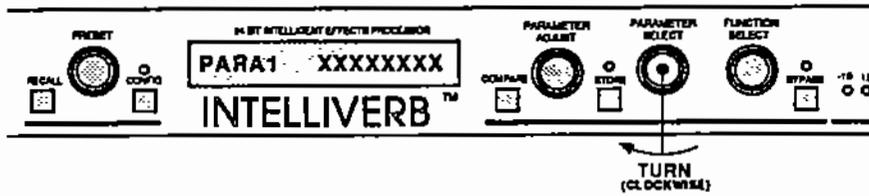
Step 3: Use the PARAMETER ADJUST control to choose the controller number you wish to assign to the selected parameter. You may choose any number from 0 to 120, or OFF so that the parameter will not respond to MIDI controller changes. Match this number with the MIDI transmitter controller number.



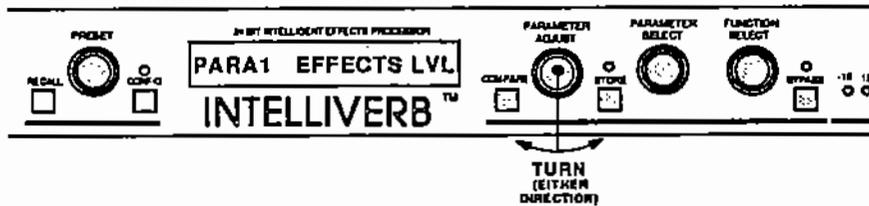
Step 4: After selecting the controller number you wish to use, press the STORE button to save the number for that parameter. "STORED" will flash briefly on the display.



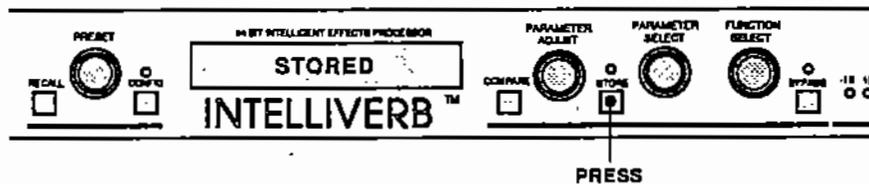
Step 5: Turning the PARAMETER SELECT control clockwise will display the effect parameter that is mapped to NUMB1 control number.



Step 6: Now turn the PARAMETER ADJUST control to scroll through the available parameters for the current configuration.

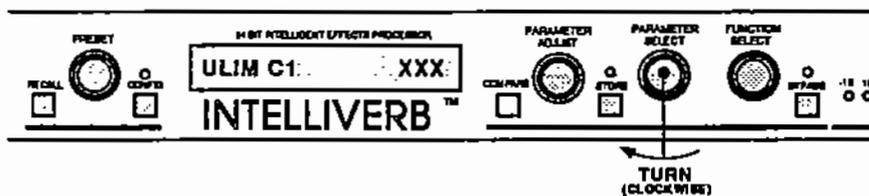


Step 7: After selecting the parameter you wish to assign to a controller, press the STORE button to save it. "STORED" will flash briefly on the display.



NOTE: The Intelliverb™ allows you to select an upper and lower value limit which the parameter cannot exceed. For example, if a parameter value has a range from $-\infty$ to +6 yet you would like the full range of the parameter to vary from only -10 to +2.5, you may set a lower limit of -10 and an upper limit of +2.5 via these "Upper" and "Lower Limit" parameters. When storing a parameter (in Step 7), the maximum value of that parameter is stored in the upper limit and the minimum value of that parameter is stored in the lower limit automatically.

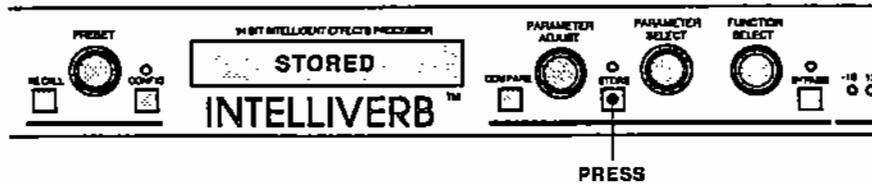
Step 8: Turn the PARAMETER SELECT control to display the next parameter - "Controller Upper Limit".



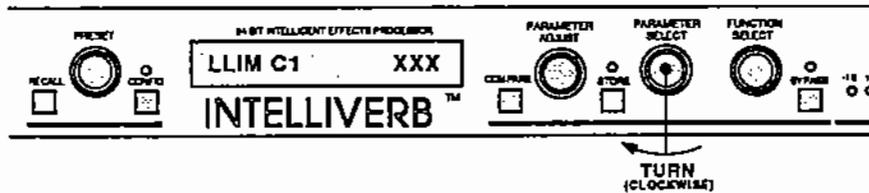
Step 9: Use the PARAMETER ADJUST control to choose the highest value that the parameter is not to exceed through MIDI control changes.



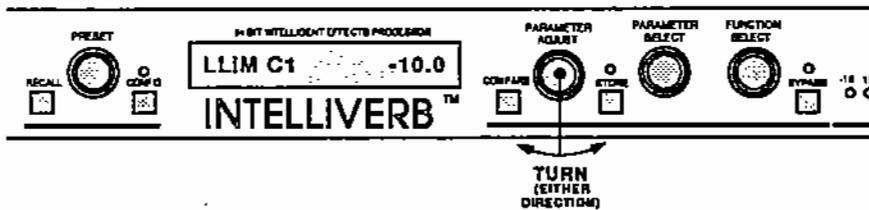
Step 10: After choosing the value for the upper limit, press the STORE button to save it. "STORED" will again flash briefly on the display.



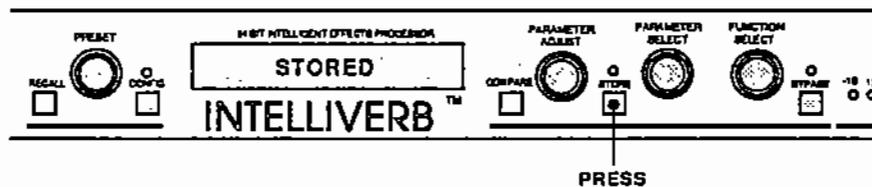
Step 11: Turn the PARAMETER SELECT control for the last parameter - Controller Lower Limit.



Step 12: Use the PARAMETER ADJUST control to select a parameter value which the controller is not to fall below.



Step 13: After choosing a lower limit parameter value, press the STORE button to save it. "STORED" will flash briefly on the display.

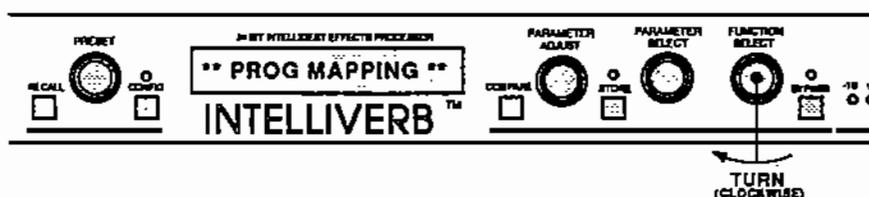


NOTE: This entire process is repeated 7 times for a total of 8 controllers. To exit Controller Assign at any time, turn the PRESET or FUNCTION SELECT controls. Only those changes that have been stored will be saved after exiting. Also, it should be noted that by choosing a lower limit greater than the upper limit, the response of the controller is inverted. For example, the toe position of the expression pedal will now give the minimum value while the heel position will now provide the maximum value.

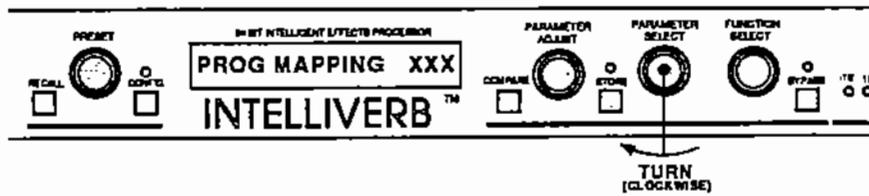
B. MIDI PROGRAM MAPPING

Program mapping allows for an Intelliverb preset number to be mapped or assigned to a different MIDI program number. The program mapping is initially programmed to allow access to the lower 128 presets (i.e. 1 to 1, 128 to 128, etc.)

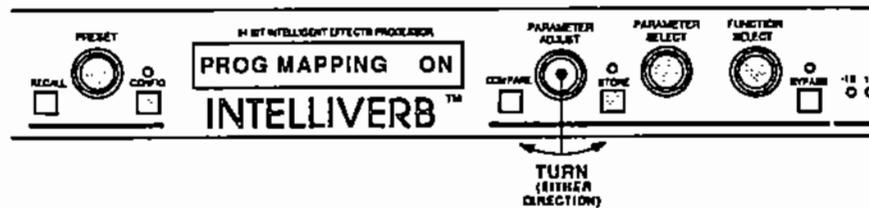
Step 1: To access the Program Mapping function, turn the FUNCTION SELECT control one step past the Controller Assign function.



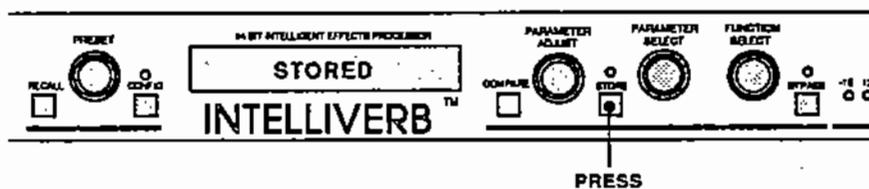
Step 2: Use the PARAMETER SELECT control to select the first parameter - Mapping Status. Mapping Status turns the program mapping ON or Off. When the program mapping is OFF, the preset number recalled is the program number sent via MIDI. When ON, the program number sent via MIDI is mapped to a preset number and that preset is recalled by the Intelliverb™.



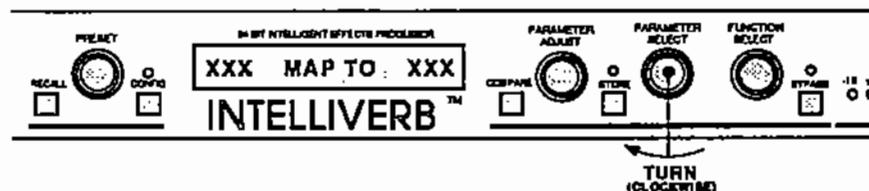
Step 3: Select whether the program mapping is to be ON or OFF via the PARAMETER ADJUST control.



Step 4: Save the chosen status of Program Mapping by pressing the STORE button. "STORED" will flash briefly on the display.



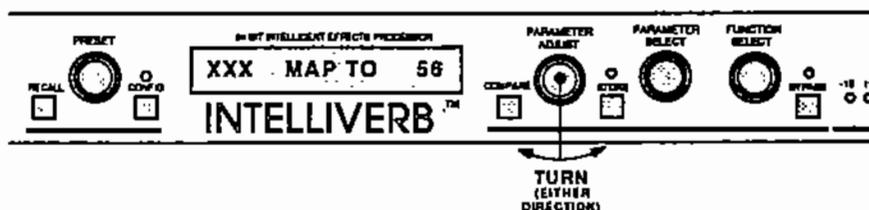
Step 5: Turn the PARAMETER SELECT control to begin viewing the map settings. This parameter allows you to select a MIDI program number and a preset number to map it to.



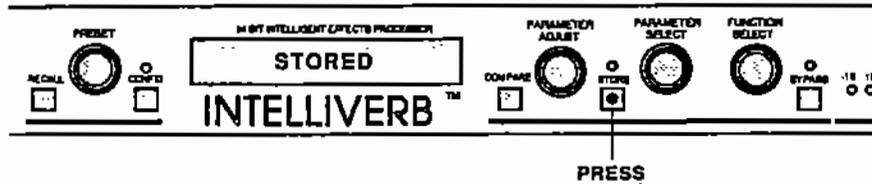
Step 6: The number on the left of the display is the MIDI program number (or the number sent via a MIDI footswitch, etc.). This number (1 to 128) can be chosen using the PARAMETER SELECT control.



Step 7: The number on the right of the display is the preset number to map to (or the preset number that will be recalled when the MIDI Program Number on the left is sent). Use the PARAMETER ADJUST control to choose the preset number (1 to 254, or OFF).



Step 8: After selecting both the MIDI Program number and Preset number, press the STORE button to save the change for each altered mapping. "STORED" will flash briefly on the display.



You may now map another program number to another preset, or exit the Program Mapping function via the PRESET or FUNCTION SELECT controls. Only the changes that have been stored will be saved after exiting.

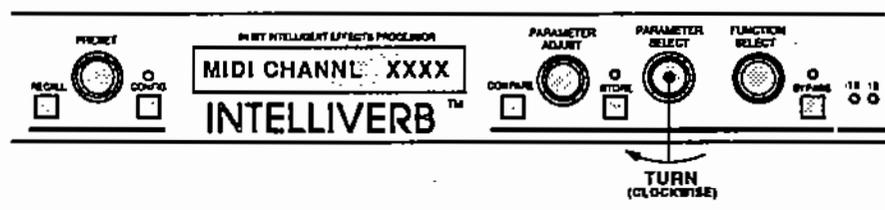
C. MIDI CHANNEL

The MIDI channel number is the channel that the Intelliverb will receive MIDI commands on.

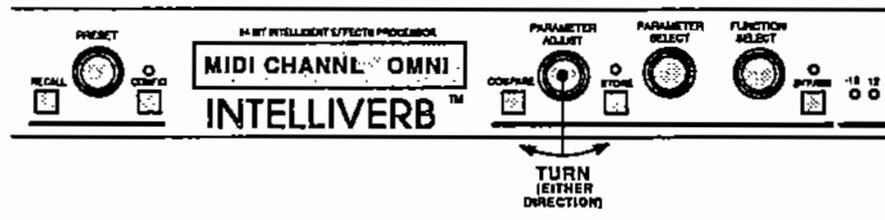
Step 1: Turn the FUNCTION SELECT control to "MIDI Channel".



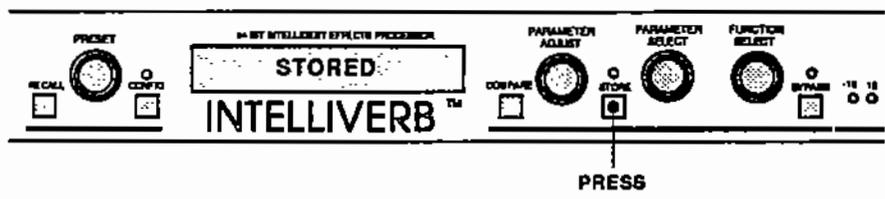
Step 2: Turn the PARAMETER SELECT to view the MIDI Channel setting.



Step 3: Use the PARAMETER ADJUST control to select the MIDI channel you wish the Intelliverb™ to receive MIDI commands on. You may select channels 1 - 16, OMNI (all channels), or OFF (will not receive MIDI commands).



Step 4: Press the STORE button to save the new MIDI channel. "STORED" will briefly flash on the display.



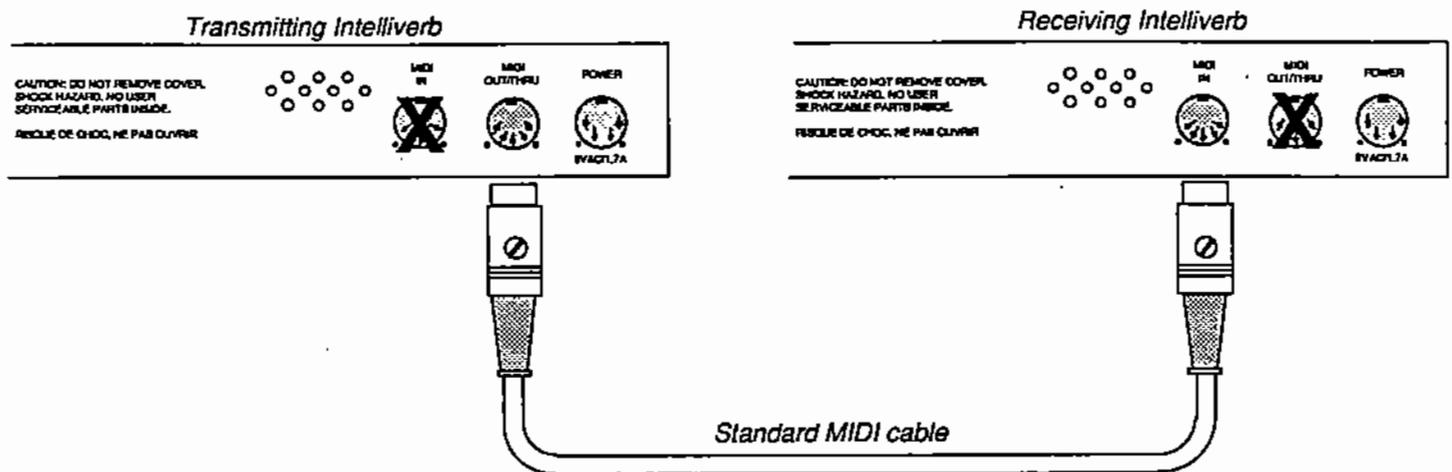
To exit the MIDI Channel function, turn the PRESET or FUNCTION SELECT controls. The altered MIDI Channel must be stored to be saved after exiting.

D. MIDI DUMP/LOAD

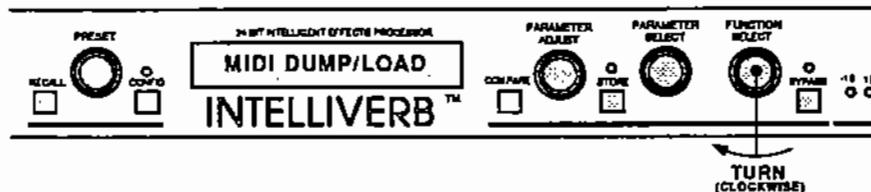
Any or all of the Intelliverb™ user presets may be dumped to a sequencer or another Intelliverb via system exclusive messages. The information exchanged when performing a MIDI Dump consists of the configuration type, parameter values, title characters and controller assignment/limit information. When dumping a single Intelliverb™ preset into another Intelliverb™, the preset being dumped may be loaded into any user preset location on the receiving Intelliverb™.

How to dump a single Intelliverb™ user preset into another Intelliverb™:

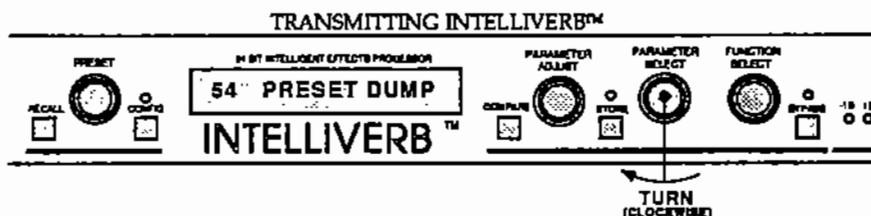
Step 1: Using a standard MIDI cable connect the MIDI OUT of the transmitting Intelliverb™ to the MIDI IN of the receiving Intelliverb™. Do not connect the other MIDI ports together.



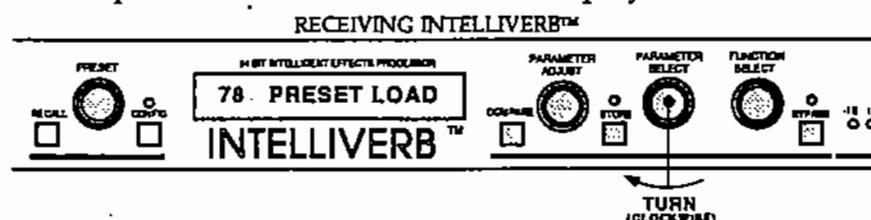
Step 2: Turn the FUNCTION SELECT knob on both units to the "MIDI Dump/Load" position.



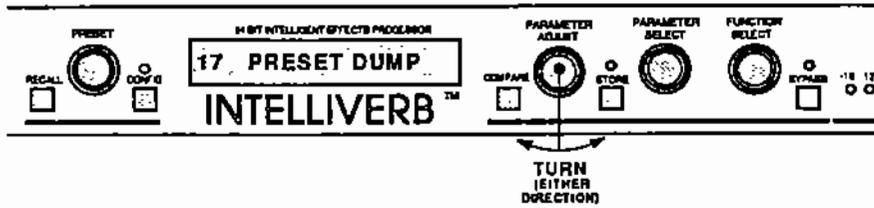
Step 3: Turn the PARAMETER SELECT knob on the transmitting Intelliverb™ to the "Preset Dump" position (the current preset number should be displayed also).



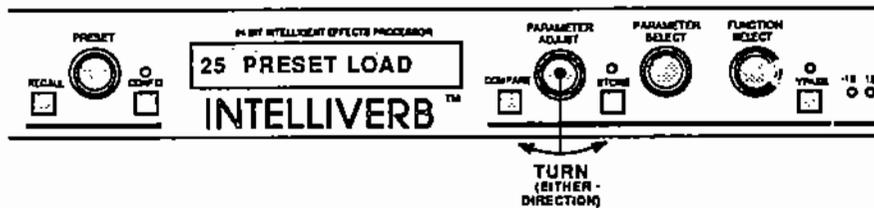
Step 4: Turn the PARAMETER SELECT control on the receiving Intelliverb™ to the "Preset Load" position. The current preset number should also be displayed.



Step 5: Use the PRESET control on the transmitting Intelliverb™ to select the preset you wish to dump. Any of the user presets (1 -254) may be dumped. As the PRESET control is turned the preset number will be displayed in the first three characters of the display.

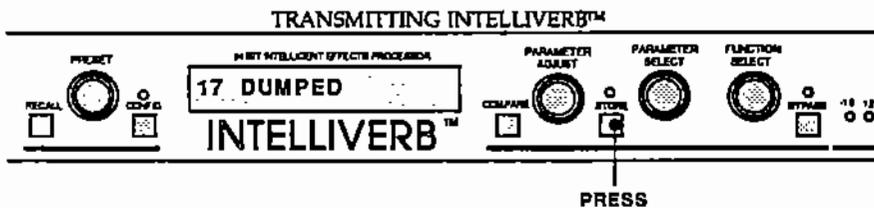


Step 6: Use the PRESET control on the receiving Intelliverb™ to select the preset location to store the received preset. The preset currently at this location will be overwritten and lost, therefore use caution when selecting this preset location.



Step 7: To initiate the dump, press the STORE button on the transmitting Intelliverb™. The transmitting Intelliverb™ will display the preset number of the preset dumped and the word "DUMPED". The receiving Intelliverb™ will display the preset location to store to and the word "RECEIVING..." while it receives and stores the preset parameters, title and controller information.

After all information for that preset is stored, the receiving Intelliverb™ will display "LOADED" and the preset number. The receiving Intelliverb™ also recalls the loaded preset at this time so that it may be verified.



The following information is transmitted when a preset dump is initiated:

F0H - Start of Exclusive byte
00H - Manufacture ID byte 1
00H - Manufacture ID byte 2
29H - Manufacture ID byte 3
03H - Product ID byte
28H - Command byte, Preset dump

XXH - 200 data bytes, (MSB=0)

YYH - Check Sum byte, ("Exclusive Or" of data bytes, MSB=0)
F7H - End of Exclusive byte

Each data byte is a 7-bit value. The first transmitted data byte consists of the lower 7-bits of the first value. The second transmitted data byte consists of the most significant bit of the first value. These two transmitted bytes are combined when received to form the first value. The next two transmitted bytes will form the next value in the same way and so on, until all 200 bytes are transmitted. The order of data byte transmission is as follows:

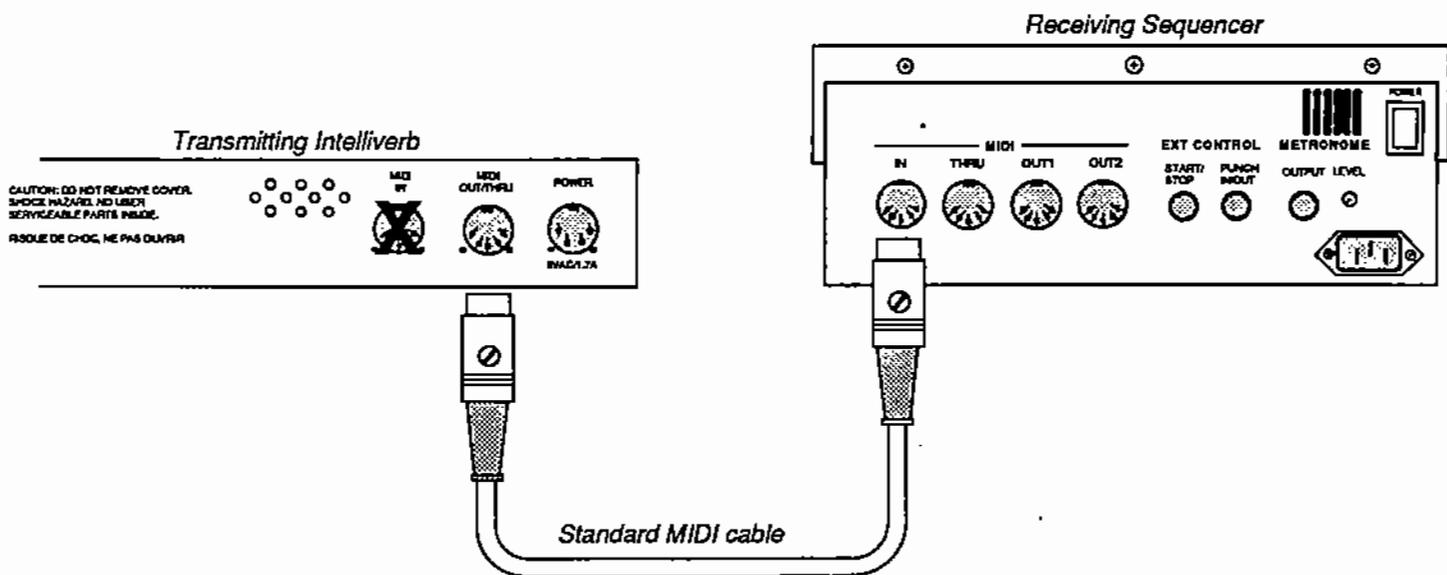
55 Parameter values X 2 = 110 transmitted bytes
13 Title characters X 2 = 26 transmitted bytes
32 Control Assignments X 2 = 64 transmitted bytes
200 total transmitted data bytes

The Check Sum byte is the "Exclusive Or" operation of all the data bytes, with the most significant bit = 0.

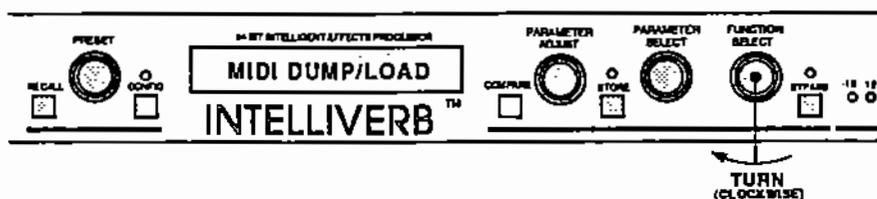
Contact RSP Technologies for a more detailed explanation of the MIDI Dump format if editing of the System Exclusive message is desired.

How to dump the Intelliverb™ user memory into a sequencer:

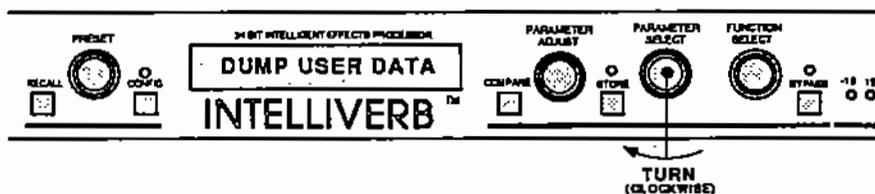
Step 1: Connect the MIDI OUT of the Intelliverb™ to the MIDI IN on the sequencer using a standard MIDI cable.



Step 2: Turn the FUNCTION SELECT control on the Intelliverb™ to the "MIDI DUMP/LOAD" function.



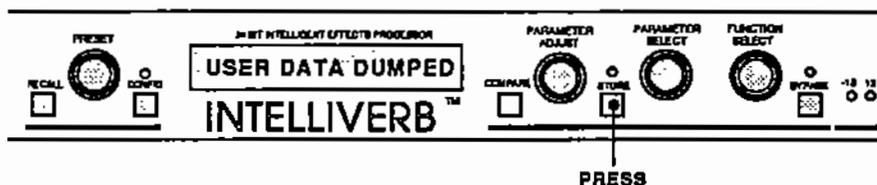
Step 3: Turn the PARAMETER SELECT control to the 'DUMP USER DATA' position.



Step 4: Start the sequencer recording.



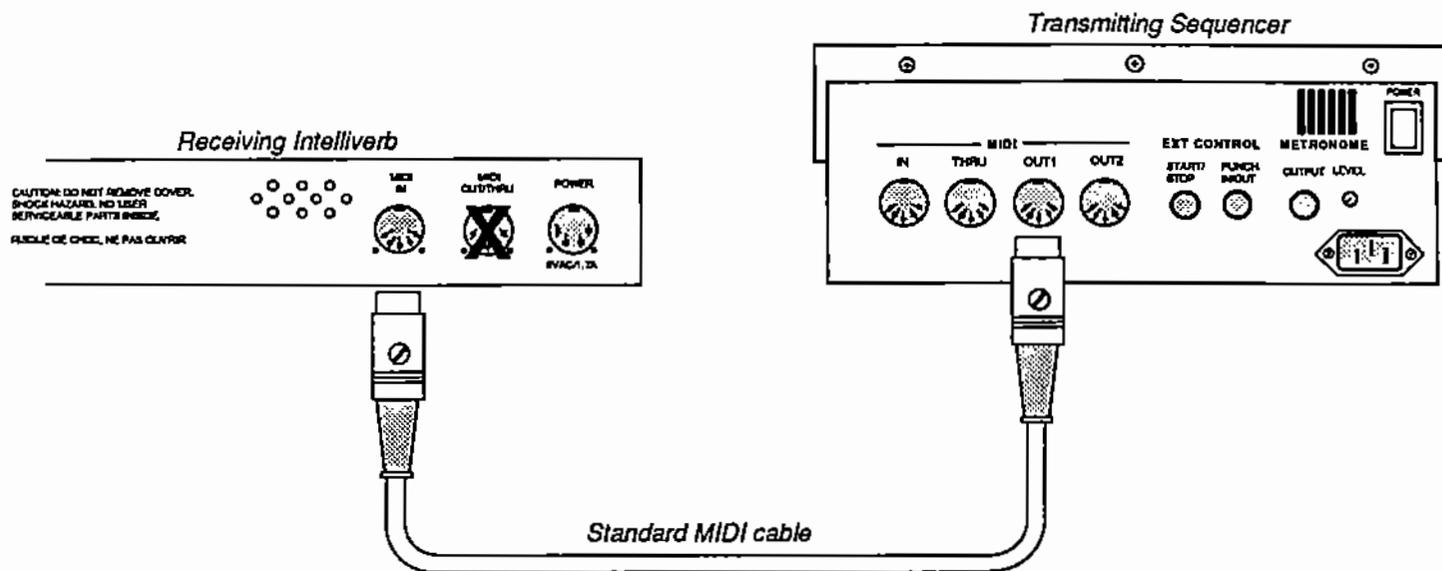
Step 5: Press the STORE button on the Intelliverb™ to initiate the user data dump. The Intelliverb™ will display the number of the data string being dumped. Data strings 1 -254 are the user presets as described by the preset dump function. Data string 255 is the program mappings. Data string 0 contains the MIDI channel, mapping status, and "power on" preset. After all the user data is transmitted, the Intelliverb™ will display "USER DATA DUMPED". It will take approximately 40 seconds for the process to complete.



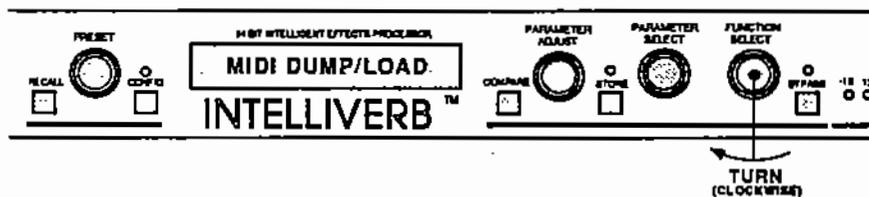
Step 6: After the Intelliverb™ displays "USER DATA DUMPED", stop the sequencer. The sequencer should have recorded all of the data. Keep the data stored on a disk and kept in a safe place.

How to reload the user memory from a sequencer:

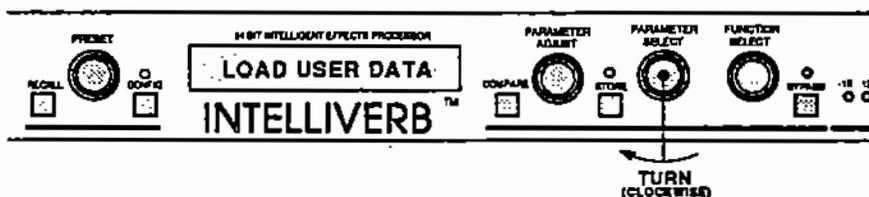
Step 1: Connect the MIDI OUT of the sequencer to the MIDI IN on the Intelliverb™ with a standard MIDI cable.



Step 2: Turn the FUNCTION SELECT control on the Intelliverb™ fully clockwise to the "MIDI DUMP/LOAD" position. This position is available in all presets.



Step 3: Turn the PARAMETER SELECT control to the "LOAD USER DATA" position. The Intelliverb™ is now ready to receive the user data from the sequencer.



Step 4: Play back the user data previously recorded on the sequencer. The Intelliverb™ will display the Data strings as it is storing them. The Data string and the word "LOADED" will appear on the display. After all the user data has been loaded the display will show "USER DATA LOADED". The entire procedure will take approximately 40 seconds to complete. Do not play back data from the sequencer faster than it was recorded, as errors may occur. Errors may also occur if any knob is turned or any button is pressed before the message "USER DATA LOADED" appears.



The following information is transmitted when a user data dump is initiated:

- F0H - Start of Exclusive byte
- 00H - Manufacture ID byte 1
- 00H - Manufacture ID byte 2
- 29H - Manufacture ID byte 3
- 03H - Product ID byte
- 2AH - Command byte, Start of User dump, 2BH continue User dump.
- XXH - 200 data bytes for 254 strings, 256 data bytes for string 255, 8 data bytes for string 256, MSB = 0
- YYH - Check Sum byte, ("Exclusive Or" of data bytes, MSB=0)
- F7H - End of Exclusive byte

The first 254 data strings are very similar to a preset dump data string except for the command byte. The first data string for a user data dump will contain the command byte 2AH. The following data strings will contain the command byte 2BH. Data string 255, which is the program mapping, will contain 256 data bytes. Data string 0 (actually 256), which is miscellaneous data, will contain 8 data bytes. A pause of 100 milliseconds is needed between data strings. Contact RSP Technologies for a more detailed explanation of the MIDI Dump format if editing of the System Exclusive message is desired.

Error Messages...

"RECEIVE ERROR" - This message will appear on a receiving Intelliverb™ if Check Sum bytes do not match, or if a status byte (MSB = 1) is received when a data byte was expected. This message also appears if a knob is turned or a button is pressed during reception. This message also appears if System Exclusive strings are sent too fast, without a long enough pause between strings.

"DUMP ERROR" - This message will appear if MIDI Data is received at the MIDI IN while dumping is in progress.

"XMEM ERROR" - This message will appear if received data cannot be verified after it is stored.

E. FACTORY RESTORE

Factory Restore allows you to restore the Intelliverb™ memory to its original condition as it was shipped from RSP Technologies.

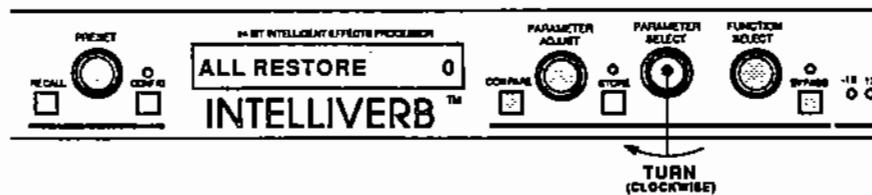
!! CAUTION !!

This procedure will permanently erase all user presets (1 - 254) and replace them with the original factory presets. If you have written and stored presets which you don't want to erase, do not perform this procedure.

Step 1: Turn the FUNCTION SELECT control clockwise to the last available function. This function is "Factory Restore".



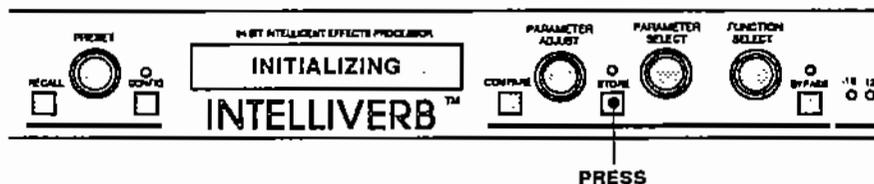
Step 2: Turn the PARAMETER SELECT control clockwise to display "ALL RESTORE 0".



Step 3: The only number which can be entered here to perform the restore function is 250. Entering any other number will immediately exit this function and return to the previously recalled preset number and title. Turn the PARAMETER ADJUST control to the number "250".



Step 4: Pressing the STORE button at this time will erase all user presets and replace them with the factory presets! Press the STORE button to initiate the Factory Restore function. The display will now show "INITIALIZING".



After the initialization process is complete, the display will read "ERRORS 0". This is the number of bytes that the Intelliverb™ found did not initialize properly. Any other message means that the Intelliverb™ may not have reinitialized properly.

The Intelliverb™ will remain in this condition until the PRESET or FUNCTION SELECT controls are turned. The currently recalled preset at this time will be #1.



F. PRESET RESTORE

Preset Restore allows for any single factory preset to be restored into any preset location.

Step 1: Turn the FUNCTION SELECT control to "Factory Restore".



Step 2: Turn the PARAMETER SELECT control clockwise to "PRESET RESTR". The factory preset number that will be written in the current location is shown to the left.

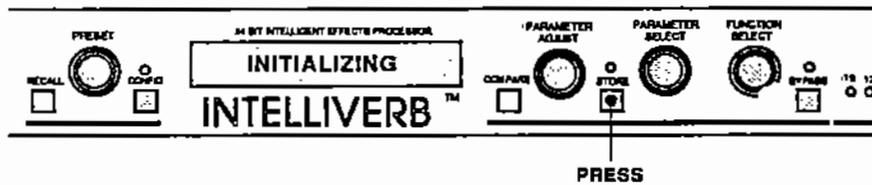


Step 3: Use the PRESET SELECT control to choose the factory preset to restore into the current location.



Warning: Pressing the STORE button will overwrite the current preset with the factory preset presently displayed!

Step 4: Press the STORE button to start "Preset Restore". The display will now show "INITIALIZING".



After the initialization process is complete, the display will read "ERRORS 0". This is the number of bytes that the Intelliverb™ found did not initialize properly. Any other message means that the Intelliverb™ may not have reinitialized properly.

The Intelliverb™ will remain in this condition until the PRESET or FUNCTION SELECT controls are turned. The currently recalled preset at this time will be the preset which was just stored into the current location.



10. APPENDIX

A. FACTORY PRESETS

#	PRESET TITLE	CONFIGURATION	#	PRESET TYPE	CONFIGURATION
1	"VIRTUAL ROOM"	HUSH;VIRTUAL ROOM	65	"ARENA A5"	HUSH;VIRTUAL ROOM
2	"DUCKED CHAMBER"	.	66	"ARENA B3"	.
3	"GATED PLATE"	.	67	"ARENA B5"	.
4	"BINAURAL HALL"	.	68	"GATED ARENA"	.
5	"REVERSE"	.	69	"DUCKED ARENA"	.
6	"CRS PAN VERB"	HUSH;CRS;DLY;REV	70	"STADIUM A0"	.
7	"SHIFT OCTAVE"	HUSH;P SHIFT;DLY;REV	71	"STADIUM A1"	.
8	"SPARE CHANGE"	HUSH;DLY;DCKR	72	"STADIUM A2"	.
9	"SWEEP CHORUS"	HUSH;8V CRS;DLY	73	"STADIUM A3"	.
10	"LIQUID SHIFT"	HUSH;P SHIFT;DLY	74	"STADIUM A4"	.
11	"HAWAIIAN CRS"	HUSH;CRS;DLY;REV	75	"STADIUM A5"	.
12	"LOW OCTAVES"	HUSH;P SHIFT;DLY;REV	76	"STADIUM B3"	.
13	"PINGPONG 750"	HUSH;DLY;DCKR	77	"STADIUM B5"	.
14	"CIRCLES"	HUSH;8V CRS;DLY	78	"GATED STADIUM"	.
15	"ESCHER"	HUSH;P SHIFT;DLY	79	"DUCKD STADIUM"	.
16	"SLOW CRS+REV"	HUSH;CRS;DLY;REV	80	"FLANGE"	HUSH;8V CRS;DLY
17	"SLAP OCTAVE"	HUSH;P SHIFT;DLY;REV	81	"DELAY FLANGE"	.
18	"PINGPONG 250"	HUSH;DLY;DCKR	82	"TAP DANCIN"	.
19	"SHIMMER CRS"	HUSH;8V CRS;DLY;DCKR	83	"CRS 2 VOICE"	.
20	"PLATE A0"	HUSH;VIRTUAL ROOM	84	"CHORUS PONG"	.
21	"PLATE A1"	.	85	"CHORUS ECHO4"	.
22	"PLATE A2"	.	86	"OCTOPUS"	.
23	"PLATE A3"	.	87	"LIQUIDCHORUS"	.
24	"PLATE A4"	.	88	"SCATTERBRAIN"	.
25	"PLATE A5"	.	89	"THICK N RICH"	.
26	"PLATE B3"	.	90	"GUITAR SOLO"	HUSH;P SHIFT;DLY;REV
27	"PLATE B4"	.	91	"OCTAVES VERB"	.
28	"GATED PLATE"	.	92	"DETUNE REVRB"	.
29	"DUCKED PLATE"	.	93	"MINOR 6"	.
30	"ROOM A0"	.	94	"MAJOR LEAGUE"	.
31	"ROOM A1"	.	95	"SPARKLE VERB"	.
32	"ROOM A2"	.	96	"1 DOWN 2 DOWN"	.
33	"ROOM A3"	.	97	"DOUBLE 4TH"	.
34	"ROOM A4"	.	98	"MAJOR W/DLY"	.
35	"ROOM A5"	.	99	"OCTAFIFTH"	.
36	"ROOM B3"	.	100	"HARPSICHORD"	HUSH;P SHIFT;DLY
37	"ROOM B5"	.	101	"MAJOR7 CHORD"	.
38	"GATED ROOM B"	.	102	"DELAYED MAJ7"	.
39	"DUCKED ROOM B"	.	103	"-MIN3 -MIN6"	.
40	"CHAMBER A0"	.	104	"18 STRING"	.
41	"CHAMBER A1"	.	105	"DETUNE"	.
42	"CHAMBER A2"	.	106	"-MIN3 +MIN6"	.
43	"CHAMBER A3"	.	107	"BASS STRING"	.
44	"CHAMBER A4"	.	108	"-MAJ 3 -5TH"	.
45	"CHAMBER A5"	.	109	"-MAJ3 +5TH"	.
46	"CHAMBER B3"	.	110	"FLANGE VERB"	HUSH;CRS;DLY;REV
47	"CHAMBER B5"	.	111	"CRS SLAPVERB"	.
48	"GATED CHAMBER"	.	112	"DELAY/REVERB"	.
49	"DUCKD CHAMBER"	.	113	"REFLECTIONS"	.
50	"HALL A0"	.	114	"GAS CAN MAN"	.
51	"HALL A1"	.	115	"DUCKED DELAY"	.
52	"HALL A2"	.	116	"CHORUS/VERB"	.
53	"HALL A3"	.	117	"AMBIENCE NOW"	.
54	"HALL A4"	.	118	"SILKEN ROOM"	.
55	"HALL A5"	.	119	"DARK SHADOW"	.
56	"HALL B3"	.	120	"DELAY 1500"	HUSH;DLY;DCKR
57	"HALL B5"	.	121	"EXIT TO LEFT"	.
58	"GATED HALL B"	.	122	"PAN DELAY"	.
59	"DUCKED HALL"	.	123	"PINGPONG1250"	.
60	"ARENA A0"	.	124	"DELAY 2500"	.
61	"ARENA A1"	.	125	"RIGHT 2 LEFT"	.
62	"ARENA A2"	.	126	"HUSH"	.
63	"ARENA A3"	.	127	"BYPASS"	.
64	"ARENA A4"	.			

****Notes****

*Preset titles grouped "Plate A0" through "Plate A5", "Room A0" through "Room A5", etc. utilize the same room size specifications for each group. "A0" begins with minimal amounts of Reverb Decay, Early Level and Reverb Level. These parameter values are gradually increased through the "A5" preset. Preset titles ending "B3", "B4" and "B5" utilize a different room size specification than is found in "A0" through "A5", but the numbers "3", "4" and "5" indicate that the Reverb Decay, Early Level and Reverb Level parameter values correspond to those of the "A3", "A4" and "A5" presets.

*Presets 1 - 127 are repeated in preset locations 128 - 254 with the Direct Level parameters "off".

B. MIDI IMPLEMENTATION CHART

RSP INTELLIVERB™

DATE: JANUARY 17, 1992

Version 1.0

	<u>FUNCTION</u>	<u>TRANSMITTED</u>	<u>RECOGNIZED</u>	<u>REMARKS</u>
BASIC CHANNEL	DEFAULT CHANGED	1-16 1-16	1-16 1-16	May be saved in non-volatile memory.
MODE	DEFAULT MESSAGES ALTERED	X X X	X X X	
NOTE NUMBER	TRUE VOICE	X	X	
VELOCITY	NOTE ON NOTE OFF	X X	X X	
AFTER TOUCH	KEY'S CHANNEL	X X	X X	
PITCH BEND		X	X	
CONTROL CHANGE**		X	O	
PROGRAM CHANGE*	TRUE NUMBER	X	O	
SYSTEM EXCLUSIVE		O	O	For User Memory Dump/Load and Preset Dump/Load
SYSTEM COMMON	SONG POSITION SONG SELECT TRUE REQUEST	X X X	X X X	
SYSTEM REAL TIME	CLOCK COMMANDS	X X	X X	
AUXILIARY MESSAGES	LOCAL ON/OFF ALL NOTES OFF ACTIVE SENSING SYSTEM RESET	X X X X	X X X X	

O = YES
X = NO

NOTES *ACTUAL MIDI PROGRAM VALUES RECEIVED ARE 0-127, CORRESPONDING TO PRESETS 1-128. OPTIONAL IMPLEMENTATION OF PROGRAM MAPPING ALSO AVAILABLE.
**EIGHT DIFFERENT PARAMETERS MAY BE CHOSEN FROM EACH USER PRESET AND ASSIGNED A CONTROL NUMBER. THE CONTROL NUMBER MAY BE FROM 0-120, OR "OFF". AN UPPER AND LOWER RANGE MAY ALSO BE SPECIFIED FOR EACH PARAMETER.

C. SPECIFICATIONS

<u>SPEC</u>	<u>MEASUREMENT</u>	<u>CONDITIONS</u>
Maximum Input:	+20dBu	Input Level pot minimum
Maximum Output:	+20dBu	Output Level pot maximum
Nominal Input Range: (16dB Headroom)	+4dBu to -16dBu	Input Level pot minimum Input Level pot maximum
Input Impedance:	100K ohms	
Output Impedance:	120 ohms	
Dynamic Range:	105dB (HUSH™ In) 94dB (HUSH™ Out)	Peak Signal/A weighted Noise Floor, Direct Level = +6dB, Direct Post HUSH™, Effects Level = -∞
THD + Noise:	.006%	1KHz, -5dB input level 22Hz to 22KHz Bandwidth Direct Post HUSH™, Direct Level = +6dB, Effects Level = -∞
Dry Frequency Response:	(10Hz to 100KHz) +0.25, -1.5dB (10Hz to 30KHz) ±0.25dB	
Wet Frequency Response:	(20Hz to 20KHz) +0.1, -0.7dB (50Hz to 19KHz) ±0.1dB	

RSP Technologies
 2870 Technology Drive
 Rochester Hills, MI
 48309

