INTELLIFEX-LTD ®

24-BIT DIGITAL SIGNAL PROCESSOR

USER'S MANUAL

ROCKTRON
GUITAR RACK TECHNOLOGY

HUSH® licensed by HUSH® SYSTEMS

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 PERSONNEL ONLY. DO NOT MAKE ANY INTERNAL AD-JUSTMENTS 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 9VAC/1.5A adaptor supplied with the unit. This 9 volt RMS AC voltage is internally processed by a voltage doubler which generates a bipolar ±15 volts 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.

Contents

1. Introduction

The Rocktron Intellifex® LTD is a 24-bit digital effects processor utilizing three individual 16-bit converters and Sigma-Delta A/D conversion, achieving a 64x oversampling rate and better than 100dB dynamic range. The Intellifex LTD is totally programmable and allows for complete MIDI control. The unit features pitch shifting, 8 voice stereo chorusing effects, digital delay effects including 2-tap, stereo and ping ponging effects, unsurpassed digital reverb quality and highly flexible configuration programming allowing for simultaneous operation of up to 5 effects plus complete mixing capabilities. The unit also offers Hush Systems' first fully digital implementation of patented HUSH® noise reduction at the unit's input, along with delay and reverb ducking capabilities.

For a thorough explanation of the Intellifex® LTD and its functions, please read this manual carefully and keep it for future reference. A better understanding of how the Intellifex® LTD operates will help make designing your own preset sounds much easier.

After removing the Intellifex® LTD from the box, save all packing materials in case it becomes necessary to ship the unit.

WHAT MAKES THE INTELLIFEX® LTD UNIQUE?

* *Super quiet operation due to use of digital HUSH® and high quality 16-bit converters.*

* *High purity sound due to the use of a 64X oversampling A/D converter, which samples the signal 64 times as often as a conventional converter, and also due to the use of a separate dual D/A converter. Most "bargain" digital effects units use a single converter multiplexed 3 ways, for decidedly higher distortion and lower dynamic range.*

* *24-Bit processing and memory circuits to maintain maximum dynamic range.*

* *Ability to store up to 8 unique MIDI controller patches with each preset.*

* *Very high quality effects algorithms.*

* *Highly stereo effects with panning available on almost all signals.*

* *8 Voice chorusing with an enormous number of parameters for the richest chorus ever.*

* *High quality 4 voice pitch shifting over 3 full octaves.*

* *2-voice pitch shifting or 4-voice chorusing offered simultaneously with Hush®, Delay and Reverb.*

* *Programming via knobs instead of push buttons.*

* *Easy to read, wide viewing angle display.*

2. Quick Setup
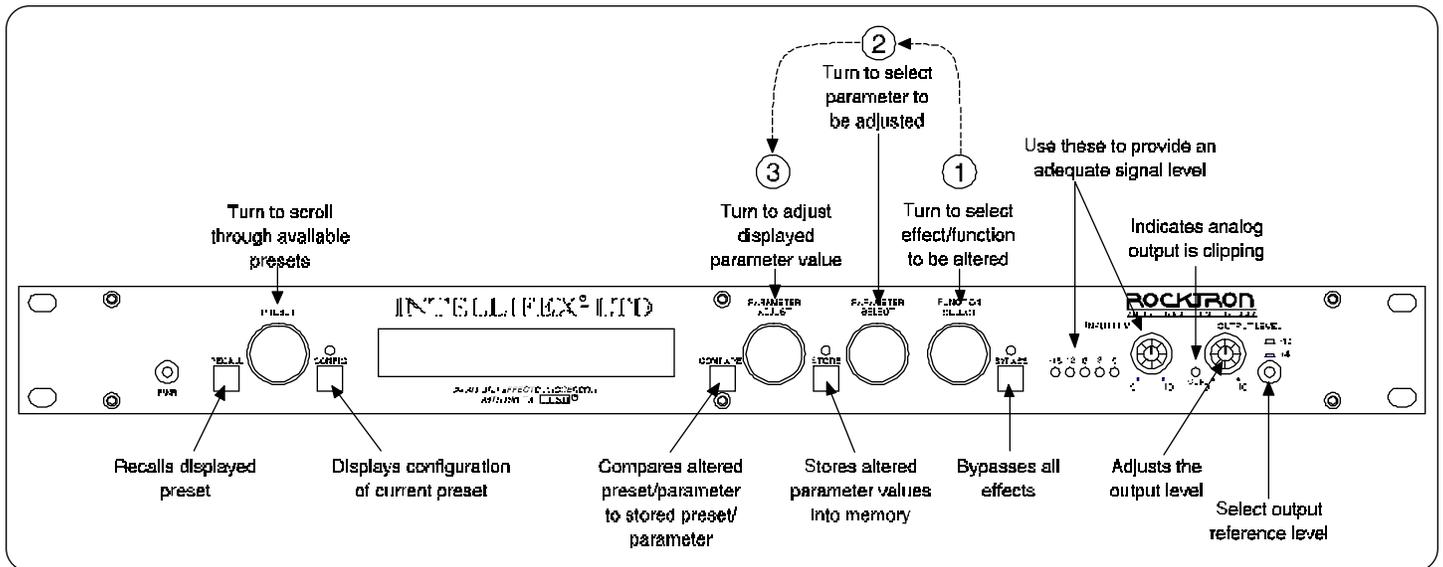
RECALLING A STORED INTELLIFEX LTD PRESET

STEP 1   To recall a stored Intellifex LTD preset, first turn the PRESET control to the desired preset number you wish to recall. The display will alternate between the preset number/title selected and:

> **PRESS RECALL FOR**

STEP2   To call up the preset you have selected, press the RECALL button. The display will now show only the new preset number/title.

> **14 PRESET TITLE**

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 effect to be changed.

> ****** REVERB ******

STEP 2   Turn the PARAMETER SELECT control to select which parameter select the parameter to be modified.

> **REV DECAY   59**

STEP 3   Use the PARAMETER ADJUST control to modify the parameter value. The LED above the STORE button lights to indicate that a parameter value has been modified from the stored preset.

> **REV DECAY   32**

STEP 4   The COMPARE button may be used to compare the stored value to the new one.

> **REV DECAY   59**

STORING MODIFIED PARAMETER VALUES

STEP 1   To store modified parameter values, press the STORE button while viewing a parameter or effect title to begin the store procedure. The Intellifex LTD will alternate displaying the current preset number/title and:

> **STORE TO PRESET**

STEP 2   Turn the PRESET control to select the desired preset number to store the new parameter values into (if the new values are to be stored into the current preset location, this step is not necessary). User presets may be stored in preset locations 1-80. Presets 81-160 are factory presets and cannot be copied over. The Intellifex LTD will now alternate displaying the new preset number/title and:

> **STORE TO PRESET**

STEP 3   Now press the STORE button a second time to store the modified values into the selected preset location. The Intellifex LTD will display "STORED" briefly before displaying the new preset number/title.

> **STORED**

STEP 4   After the modified parameters have been stored into a new preset location, the Intellifex LTD will display "COPY TITLE TOO?". This occurs only when a new preset location is selected to store the modified parameters into, and allows for the title from the original preset to be copied to the new preset location as well. To copy the title, press the STORE button a third time. The display will again flash "STORED".

NOTE 1   If it is not desired to copy the title from the original preset, turn either the PRESET or FUNCTION SELECT control to exit the store procedure.

NOTE 2   If a modified preset is edited without completing the store procedure (i.e. "STORED" displayed at least one time), all edited parameter values will be lost and the preset will revert to its original condition the next time it is recalled. When saving altered parameters, always make sure the Intellifex LTD flashes "STORED" at least once before exiting the preset to ensure that the desired modifications were stored into memory.

3. Front Panel
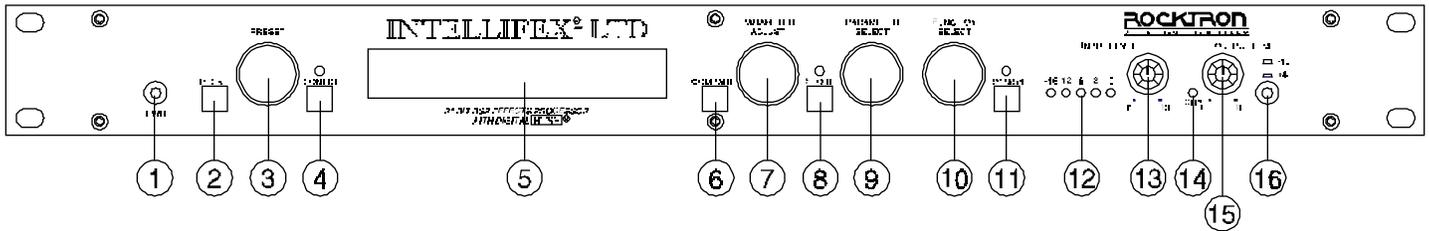
Some of the controls on the Intellifex® LTD front panel have more than one function, dependent upon what mode the unit is currently operating in. Please read this section to become better aquainted with these functions.

(1) POWER switch

(2) RECALL button:
This button is used to recall the displayed preset.

(3) PRESET control:
The function of this control is dependent 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 Intellifex LTD 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 its 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 Intellifex LTD 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 a modified 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 modified value.)

The COMPARE button may also be used to simultaneously compare multiple modified parameters under the same effect heading (i.e. Reverb, Mixer, etc.) to the stored values. To do so, turn to the effect heading where the modified parameters are located and press the COMPARE button. When the STORE LED is off, the stored parameter values are currently active. When the STORE LED is lit, the modifed values are active.

If a knob is turned or a button is pressed which changes the effect heading when the stored parameters are active (STORE LED off), any modified parameter values under that heading will be lost. This is also true if a MIDI control change is received while the stored parameters are active.

(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 (a) the new value is stored, (b) a new preset is selected or (c) the parameter is returned to its original value.

(8) STORE button:
This button is used to store values into the Intellifex LTD memory when modified. See Chapter 8, section C, "Storing Modified Parameters" for more information.

(9) PARAMETER SELECT control:
When monitoring parameter values, this control will scroll through the available parameters under the current effect heading.

In the "TITLE EDlT" 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 Intellifex LTD. Depending on which configuration the current preset is built upon, these functions may include:

Preset Select	*Reverb Parameters*
Mixer Parameters	*Title Edit*
HUSH Parameters	*MIDI Controller Mapping*
Chorus Parameters	*MIDI Program Mapping*
Pitch Shift Parameters	*MIDI Channel*
Delay Parameters	*Ducker Parameters*
Factory Restore	*MIDI Dump/Load*

(11) BYPASS button:
When pressed, the LED is lit and all effects are bypassed.

(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.

(13) INPUT LEVEL control:
This control adjusts the unit's gain to match the signal level at the input of the Intellifex LTD. The gain can be adjusted from -12dB to +12dB. Use the INPUT LEVEL meter to determine the setting of this control.

(14) 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 level, and Output Level control are set too high. If this occurs, reduce these levels until this L.E.D. does not light.

(15) OUTPUT LEVEL control:
This control is used to adjust the output level of the unit and may be adjusted from zero signal to a small amount of gain.

(16) REFERENCE LEVEL switch:
This switch determines the output range of the unit and may be set at either -10dB or +4dB. When using professional studio equipment providing a nominal input level of +4dB, it is recommended that the +4 setting on the Intellifex LTD be used for best results. If connecting the Intellifex LTD 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 Intellifex LTD. 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 Intellifex LTD. When using only one input, this jack should *not* be used.

(3) RIGHT CHANNEL OUTPUT jack:

This standard 1/4" mono jack provides an output for the right channel of the Intellifex LTD. When using the unit in a mono application, 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 Intellifex LTD. When using the unit in a mono application, either output jack may be used.

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

(7) PHANTOM POWER jack:

This jack offers the ability to power the Rocktron MIDI Mate™ Foot Controller from a seven pin MIDI cable which connects from the MIDI Mate to the MIDI IN jack on the rear panel of the Intellifex LTD, eliminating the need to find an AC outlet near where the footpedal would be placed during a performance - or the need to run an extension cord out to the MIDI Mate. Instead of inserting the adaptor into the MIDI Mate™ POWER jack, plug it into the PHANTOM POWER jack on the Intellifex LTD. This will power the MIDI Mate™ through pins 6 and 7 of the MIDI cable connecting the two units. A 7-pin MIDI cable must be used and is available through your Rocktron dealer.

(8) MIDI IN lack:

This 7-pin DIN connector receives MIDI information from the device which is transmitting the MIDI commands for the Intellifex LTD to execute.

(9) 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. 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.

(10) POWER jack:

This jack accepts power from the 9VAC/1500mA adaptor supplied with the unit. For more information on the power supply see the POWER REQUIREMENTS section on page 2.

5. Connections

Using the Intellifex LTD with the auxiliary sends and returns of a mixer
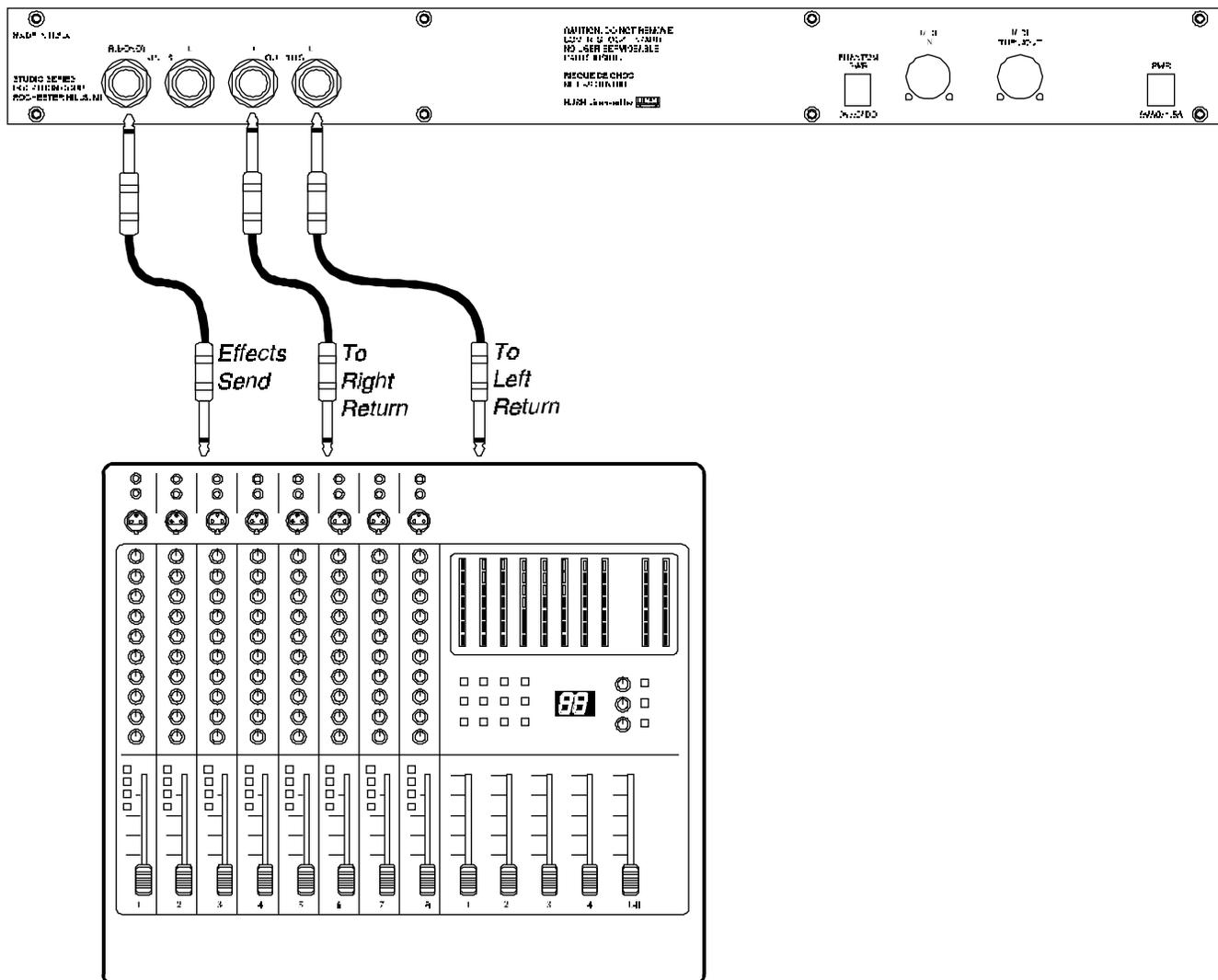
Using the Intellifex LTD with a keyboard and a mixer

From
Right
Output

From
Left
Output

To
Right
Channel
Input

To
Left
Channel
Input
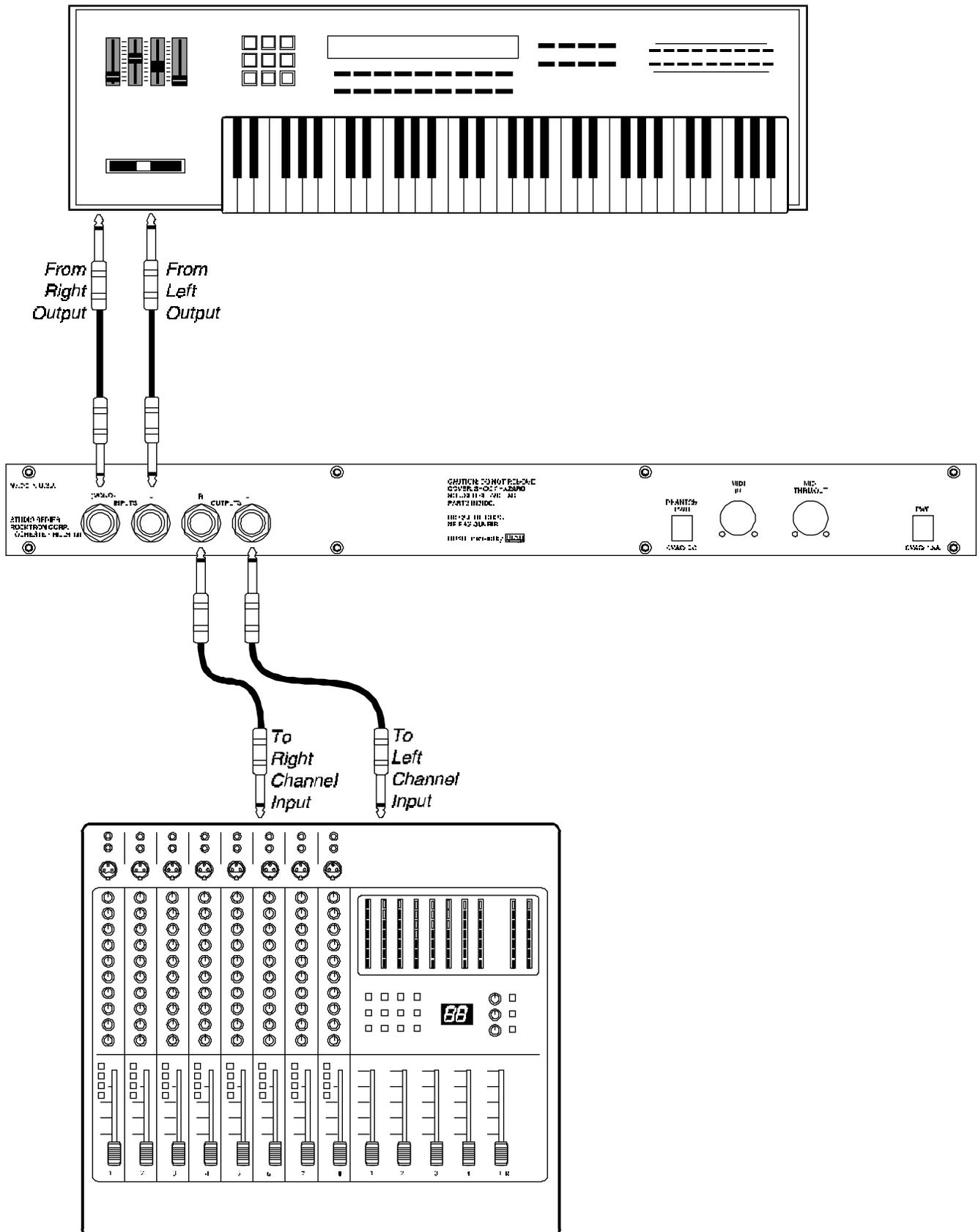
Using the Intellifex LTD with a guitar rack system

From guitar
or guitar preamp

To
Right
Return

To
Left
Return
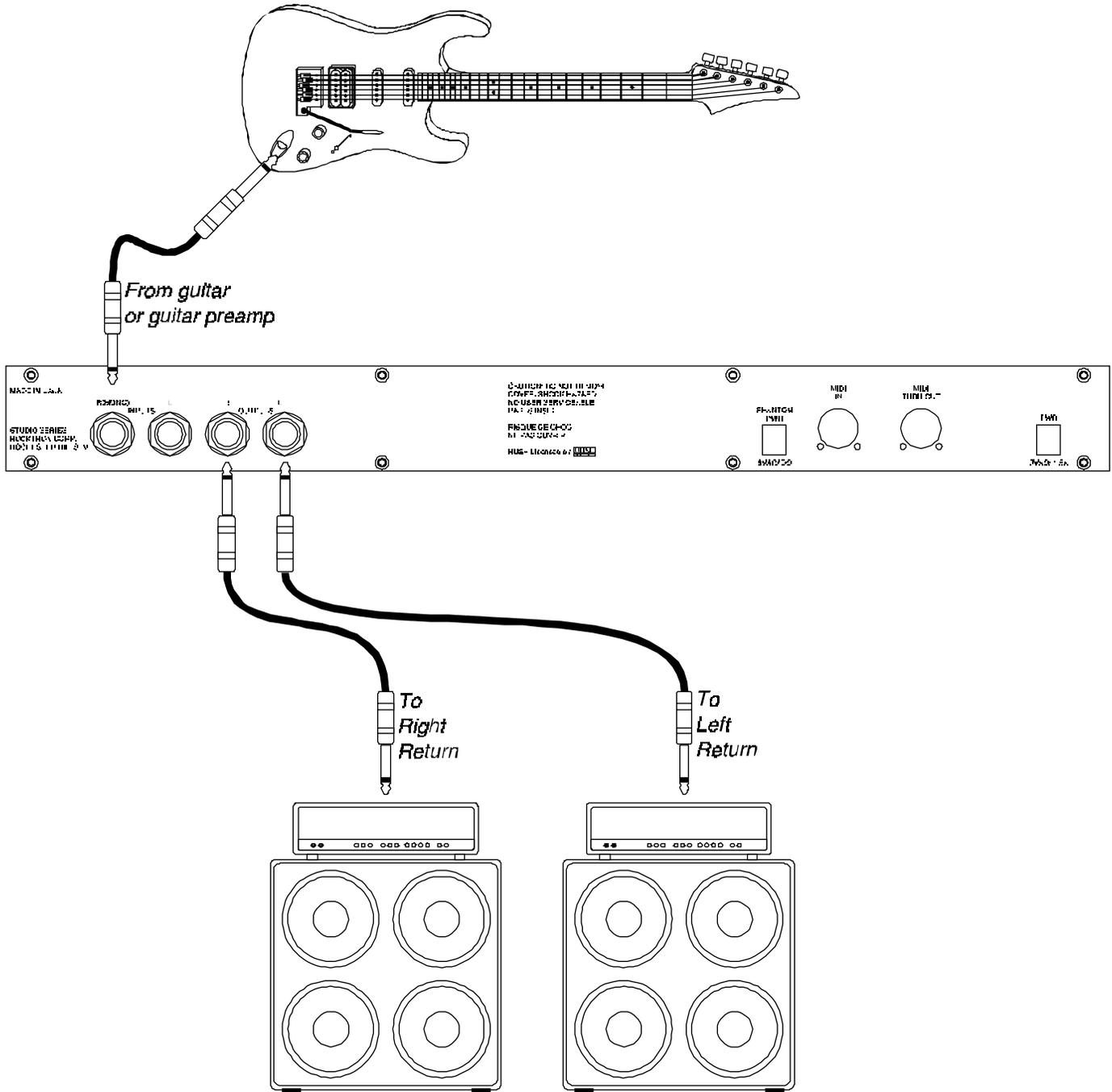
!! CAUTION !!   *Never connect the outputs of a power amplifier or guitar amplifier to the inputs of the Intellifex LTD. This could damage the Intellifex LTD.*

Note: *For best results when using the Intellifex LTD with high gain distortion, always put the Intellifex LTD* ***after*** *the distortion in the signal chain, never before it.*

6. Principle of Operation

A. MIXER SECTION

The first function accessible when turning the FUNCTION SELECT control in any preset is the Mixer function. This digital mixer allows you to control the signal levels pertaining to each preset's configuration and stores these levels for each preset.
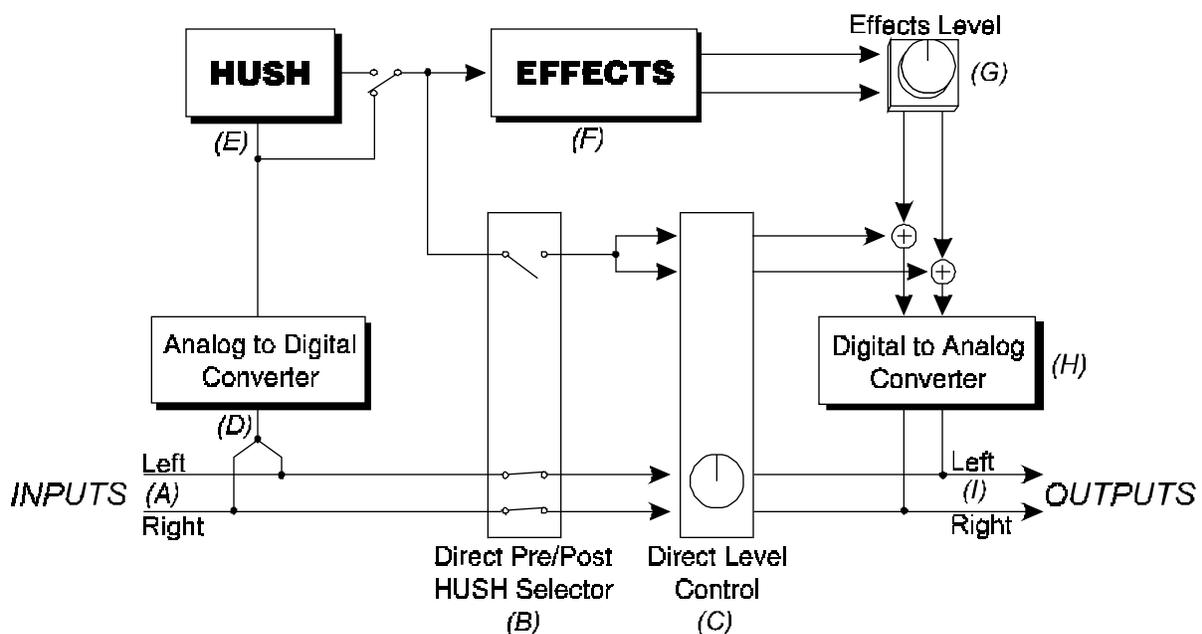
Caution: Digital Output overload

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 (Pre) or feed it through the digital Hush® section (E) of the Intellifex LTD (Post). Before being fed to 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 that it is possible to overload the Digital to Analog Converter (H) if the effects levels and direct signal level are set too high when using the Hush® section with the direct signal. If this occurs, reduce these levels until the front panel CLIP L.E.D. does not light.

Also note that when passing the direct signal through the digital HUSH® (Post), a stereo signal will be converted to mono.

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MIXER PARAMETERS

Effects Level (in *Hush; Chorus; Delay; Reverb* and *Hush; Pitch Shift; Delay; Reverb*
configurations)

    This controls the level of the entire effect signal. This control should be set relative to the levels of the Left and Right Direct signals. In configurations which do not include a master Effects Level, the single effect level parameter (Chorus Level, Delay Level, etc.) is considered the master Effect Level control.

Left and **R**ight **Dir**ect **Levels**

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

Direct Hush

    This determines whether the direct signal passes through the digital HUSH® section of the Intellifex LTD or bypasses it. Selecting "Post" will pass the Direct signal through the HUSH® system while selecting "Pre" will bypass this section. (Note: Selecting "Post" converts a stereo direct signal to mono.)

Chorus Level, Delay Level, Reverb Level, etc.

    In configurations which include a Master Effects Level control, these control the level of each individual effect (Chorus, Reverb, etc.). These should be set relative 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 **R**ight **Regeneration** (in all configurations except Hush®; Reverb)

    Configurations which include chorus or delay effects provide individual left and right regeneration level controls to determine the number of times the delayed signals are repeated. Regeneration is achieved by feeding the delayed output back into the input. Higher levels of regeneration will result in more repeats.

    Intellifex LTD software version 1.01 and above includes the added feature of *Regeneration Limiting*. This feature guards against 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 Intellifex LTD triggers the Regeneration Limiting and a limit is internally set for the regeneration. This limit can not be exceeded by increasing the *Regen L* or *Regen R* parameter values in the Mixer section.

    If, for example, in the Hush; Chorus; Delay; Reverb configuration, Voice 1 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 reduce 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 Intellifex LTD is particularly desirable in live situations where panning and regeneration levels may be controlled by continuous controllers.

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 echoes 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.

REVERB TYPES

The Intellifex LTD HUSH; REVERB configuration offers 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. The Intellifex LTD offers two Plate reverb types which reflect the most common plate characteristics. This type of reverb is often used on drum and vocal tracks.

Room reverb effects simulate various rooms of different sizes and surfaces. For example, a room which is made up of primarily hardened surfaces (such as tile or hard wood) will generate reflections containing much more high frequency information than one which is made up of softer surfaces (such as thick carpeting). The Room reverb effects offered by the Intellifex LTD can generate virtually any imaginable room setting via highly efficient and adjustable reverb parameters.

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

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

Dual reverb is unique in that it allows for the left and right channels to be processed independently one another. For example, the Predelay for the left channel can be set at 100mS while the Predelay for the right channel can be set at 200mS. This results in reverb output from the left channel 100mS before reverb is output from the right channel.

REVERB PARAMETERS

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

Reverb Level
This parameter determines the level of the reverb signal at the output relative to the Direct signal and any other effect signals. It is accessible from both the Mixer function and Reverb function parameter lists.

Reverb Decay

This parameter specifies the length of time that the reverb signal will sound before it has completely faded out (or until its echoes have been ultimately absorbed by the boundaries within the given "room"). The maximum length of this decay will vary dependent upon which reverb type is active.

High Frequency Damping

High Frequency Damping is used to control the amount of high frequency information in the reverb signal.

Low Freq

This parameter determines the amount of low frequency information in the reverb signal.

Reverb Type

This parameter determines the current active reverb type (Room, Plate, etc.).

Dir In Pan

This parameter allows you to pan the direct input signal to the reverb section to the left or right - 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 greater degree than the other. This parameter is adjustable from 0 to 100 - where "0" = full left, "100" = full right and "50" = center.

Predelay L

This parameter determines the amount of time after a signal is input to the Intellifex LTD that the left channel 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.

Predelay R

This parameter determines the length of time after a signal is input to the Intellifex LTD that the right channel signal will be input to the Reverb.

Gate

Gating the reverb signal closes down the decay of the reverb very quickly after a prescribed amount of time (most commonly a very short period of time). This effect is often used on drums (particularly snare drums) to produce the effect of a much fatter percussive sound. Note that gating on the Intellifex LTD acts on the reverb decay, not on the reverb output as on many other units.

Gate Decay

The Gate Decay parameter determines how quickly the gate will close down the reverb decay after the reverb has sounded for the specified time.

Gate Threshold

The Gate Threshold determines 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. When the input signal peak rises above this threshold, the gate will open and reverb will be heard.

Hold Time

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

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 Intellifex LTD HUSH; Delay; Ducker configuration offers 3 delay types: Stereo, Ping-Pong and 2-Tap.

The **Stereo** delay type provides two separate delays. This delay type is used for applications requiring two discrete delay lines with individual 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 (provided the delay outputs are panned left and right).

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

DELAY PARAMETERS

Delay

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

Mute Type

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

Muting the input (Pre) of the Delay restricts any signal from entering 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 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 results in the delayed signal being immediately turned off when the delay is switched out. This means that delays and regeneration will not continue once 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

These are individual level controls for each of the two delays available in the Delay 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

> This allows for the panning of each delay to the left or right output, if desired. The Pan parameter is adjustable from 0 to 100 - where 0 = full left, 100 = full right and 50 = center.

Dly Time 1 and Dly Time 2

> These parameters determine the amount of time after a signal is input that the delayed signal will begin to reproduce the input signal.

Regen 1 and Regen 2

> This parameter is provided 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.

D Type

> The Delay Type parameter determines whether the Stereo, Ping-Pong or 2-Tap delay type is currently active.

Dl Hf Damp

> Delay High Frequency Damping determines the amount of high frequency content in the delayed and regenerated signals. 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, dependent upon the presence of another signal which is desired to be prominent. The Ducking feature of the Intellifex LTD works in conjunction with the Delay and Reverb sections to attenuate the delay and/or reverb level while a phrase is being played (resulting in a less cluttered, more intelligible sound), yet return each to its original level when the phrase ends - thus allowing for the full decay of the delayed and/or reverberated signal.

DUCKER PARAMETERS

Ducker

In the HUSH; Delay; Ducker configuration, this parameter determines 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 either (A) off, (B) operating on the delay, (C) operating on the reverb, or (D) operating on both the delay and reverb.

Sensitivity

This parameter determines the threshold point above which the ducker will begin attenuating the delay and/or reverb signal. Until the input signal reaches this level, the delay/reverb signal will not be affected.

Attenuation

This parameter determines how much the delayed signal is attenuated (muted). It may be set for only a slight change in signal level or it can completely attenuate the delay/reverb signal so that no delayed or reverberated signal passes while ducking is active.

Release Rate

This parameter is adjustable from .2 seconds to 9 full seconds, and determines the length of time it takes for the muted delay signal to return 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 Intellifex LTD 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 - results in a rich, spacious stereo chorused signal.

CHORUS PARAMETERS

Level (Individual Voices)
> This parameter adjusts the volume of the delayed signal relative to the other voice(s) of the effect and is included in the parameter list for each voice (or each delay signal) of both the 8-Voice and 4-Voice Chorus effects. (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 determines 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.

Rate
> The Rate parameter determines the sweep speed for the delayed signal (i.e. the speed at which the delayed signal is modulated). Here a low rate results in a slow speed and a higher rate results 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 - from to one octave above the input signal to two octaves below - 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 determines the harmony note the Intellifex LTD will produce based on the input note. An interval is the distance in semitones between the pitches of two musical tones (i.e. the distance from an A note to a C note is considered a minor third interval, this equals 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) the harmony note will be above or below the input signal.

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 the volume of each voice relative 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

This parameter allows you to pan the shifted note to the left or right channel of the Intellifex LTD. It is adjustable from 0 to 100, where 0 = full left, 100 = full right and 50 = center.

Delay

This parameter allows for the shifted signal to be delayed up to 418mS following the input signal. It is adjustable from 0 to 418mS in 2mS increments.

DETERMINING INTERVALS BY CENT VALUES

PARAMETER VALUE	CORRESPONDING INTERVAL	
+1200	One octave	
+1100	Major 7th	
+1000	minor 7th	
+900	Major 6th	
+800	minor 6th	
+700	perfect 5th	***Voices above the input signal***
+600	diminished 5th	
+500	perfect 4th	
+400	Major 3rd	
+300	minor 3rd	
+200	Major 2nd	
+100	minor 2nd	
0	Unison	———— ***Equal to the input signal***
-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	One octave	***Voices below the input signal***
-1300	One octave plus a Major 7th	
-1400	One octave plus a minor 7th	
-1500	One octave plus a Major 6th	
-1600	One octave plus a minor 6th	
-1700	One octave plus a perfect 5th	
-1800	One octave plus a diminished 5th	
-1900	One octave plus a perfect 4th	
-2000	One octave plus a Major 3rd	
-2100	One octave plus a minor 3rd	
-2200	One octave plus a Major 2nd	
-2300	One octave plus a minor 2nd	
-2400	Two 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.

F. HUSH® SECTION

HUSH® is Hush Systems' patented single-ended noise reduction system. The HUSH® system contained in the Intellifex LTD is Hush Systems' first fully digital implementation of HUSH achieved through Digital Signal Processing (DSP), and is modeled after the latest HUSH design.

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 50dB 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 preset 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 (i.e. 34dB of gain reduction). In the absence of any input signal, the expander will reduce the gain such that the noise floor becomes inaudible.

HUSH® PARAMETERS

Hush I/O

> This 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 800mS 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 active effects for a given preset and the order in which those effects are routed in the signal path. The Intellifex LTD 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 offer many simultaneous effects without degradation of the sound quality of each effect.

Selecting a Configuration

To select a specific configuration, press the CONFIG button - the CONFIG LED above the button will light and the Intellifex LTD will display the configuration for the current preset. Turning the PRESET control while in this mode will step through each preset, displaying each preset's configuration instead of its preset number and title.

The basic signal path arrangements for each of the Intellifex LTD configurations are shown in this section, as well as their respective parameter lists. These diagrams illustrate the various signal flow possibilities available via the MIX, PAN and LEVEL controls located at various points in the signal chain.

A. 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.*
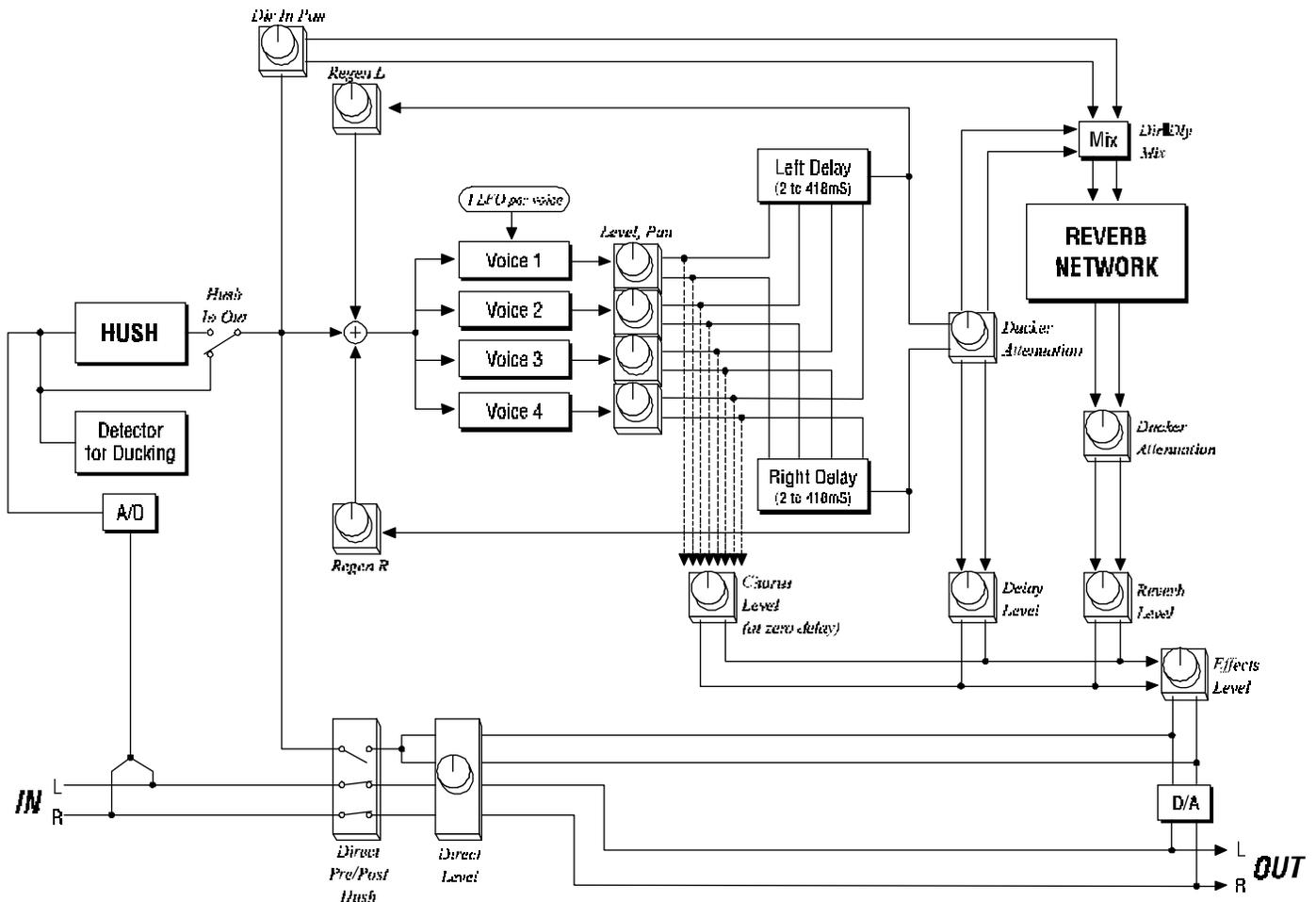
Dotted lines denote signal path
of voice(s) set to 0ms Delay Time.

HUSH; CHORUS; DELAY; REVERB Parameters

| **Function** *via FUNCTION SELECT control*	**Parameter List** *via PARAMETER SELECTcontol*	**Range** *via PARAMETER ADJUST control*
MIXER	EFFECTS LVL L DIR LVL R DIR LVL DIRECT HUSH CHORUS LVL DELAY LVL REVERB LVL REGEN L REGEN R	-∞ to +6.0dB -∞ to +6.0dB -∞ to +6.0dB PRE or POST -∞ to 0dB -∞ to 0dB -∞ to 0dB -∞ to 0dB -∞ to 0dB
HUSH	HUSH I/O EXP THRESH REL RATE	IN or OUT -92 to -20dB 25mS to 800mS
VOICE/DLY 1 *Repeated for* *Voices/Dlys 2, 3 and 4*	LEVEL 1 PAN 1 DELAY DEPTH 1 RATE 1	- ∞ to 0dB L<- 0 to 100 ->R 0 to 418mS 0 to 100 0 to 254
DUCKER	DUCKER SENSITIVITY ATTENUATION RELEASE RATE	Off, Dly, Rev or Both -92 to -20dB -∞ to 0dB .2 to 9.0 Seconds
REVERB	REV INPUT DIR IN PAN MIX DIR/DLY REVERB LVL REV DECAY RV HF DAMP	Active or Muted L<- 0 to 100 ->R DIR<- 0 to 100 ->DLY -∞ to 0dB 0 to 99 0 to 99

B . HUSH; REVERB *Configuration*

This configuration combines Hush® noise reduction with high purity Reverb sounds. Eight different Reverb types are provided, along with up to 210mS of Predelay.
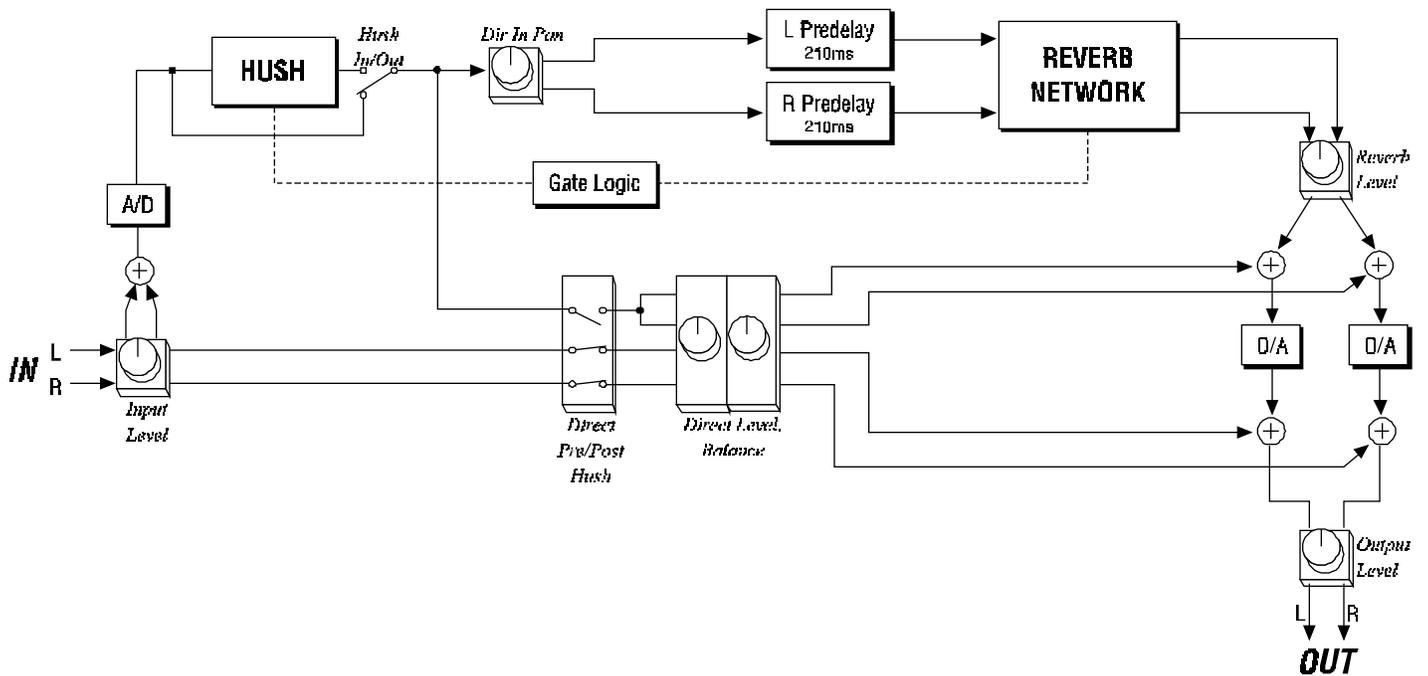
HUSH; REVERB Parameters

Function	Parameter List	Range
via FUNCTION SELECT control	*via PARAMETER SELECT control*	*via PARAMETER ADJUST control*
MIXER	REVERB LVL	-∞ to +6.0dB
	L DIR LVL	-∞ to +6.0dB
	R DIR LVL	-∞ to +6.0dB
	DIRECT HUSH	PRE or POST
HUSH	HUSH I/O	IN or OUT
	EXP THRESH	-92 to -20dB
	REL RATE	25mS to 800mS
REVERB	REVERB LVL	-∞ to 0dB
	REVERB DECAY	0 to 99
	RV HF DAMP	0 to 99
	LOW FREQ	0 to 99
	REV TYPE	Plate A, Plate B, Room A, Room B, Dual, Hall A, Hall B, Stadium
	DIR IN PAN	L<- 0 to 100 ->R
	PREDELAY L	0 to 209mS
	PREDELAY R	0 to 209mS
	GATE	On or Off
	GATE DECAY	0 to 31
	GATE THRESH	-92 to -20dB
	HOLD TIME	0 to 99

C. HUSH; DELAY; DUCKER *Configuration*

The Intellifex LTD offers three types of delay - 2-Tap, Stereo and Ping-Pong. The configurations for each are shown.

2-Tap Delay
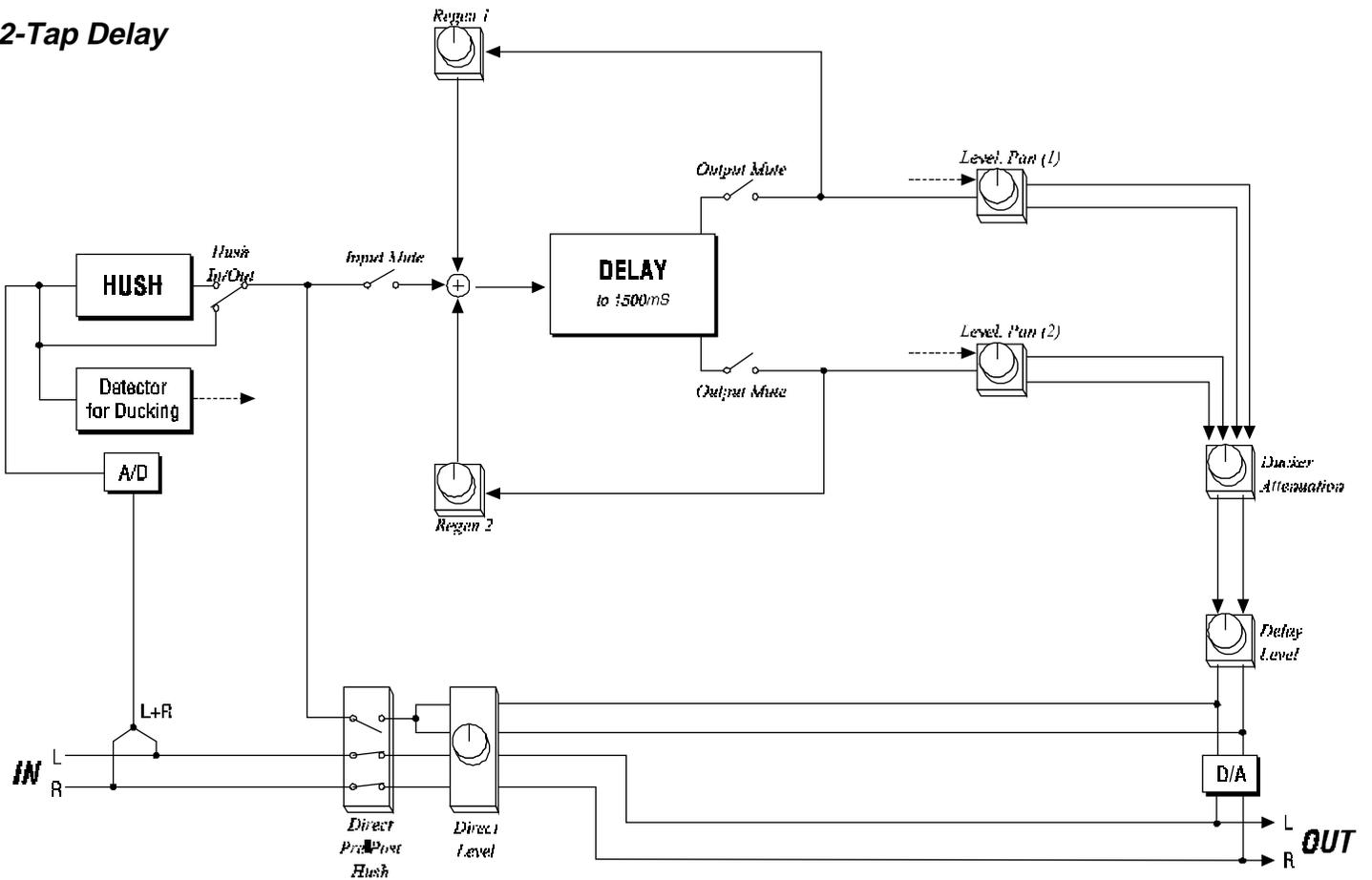
Stereo Delay
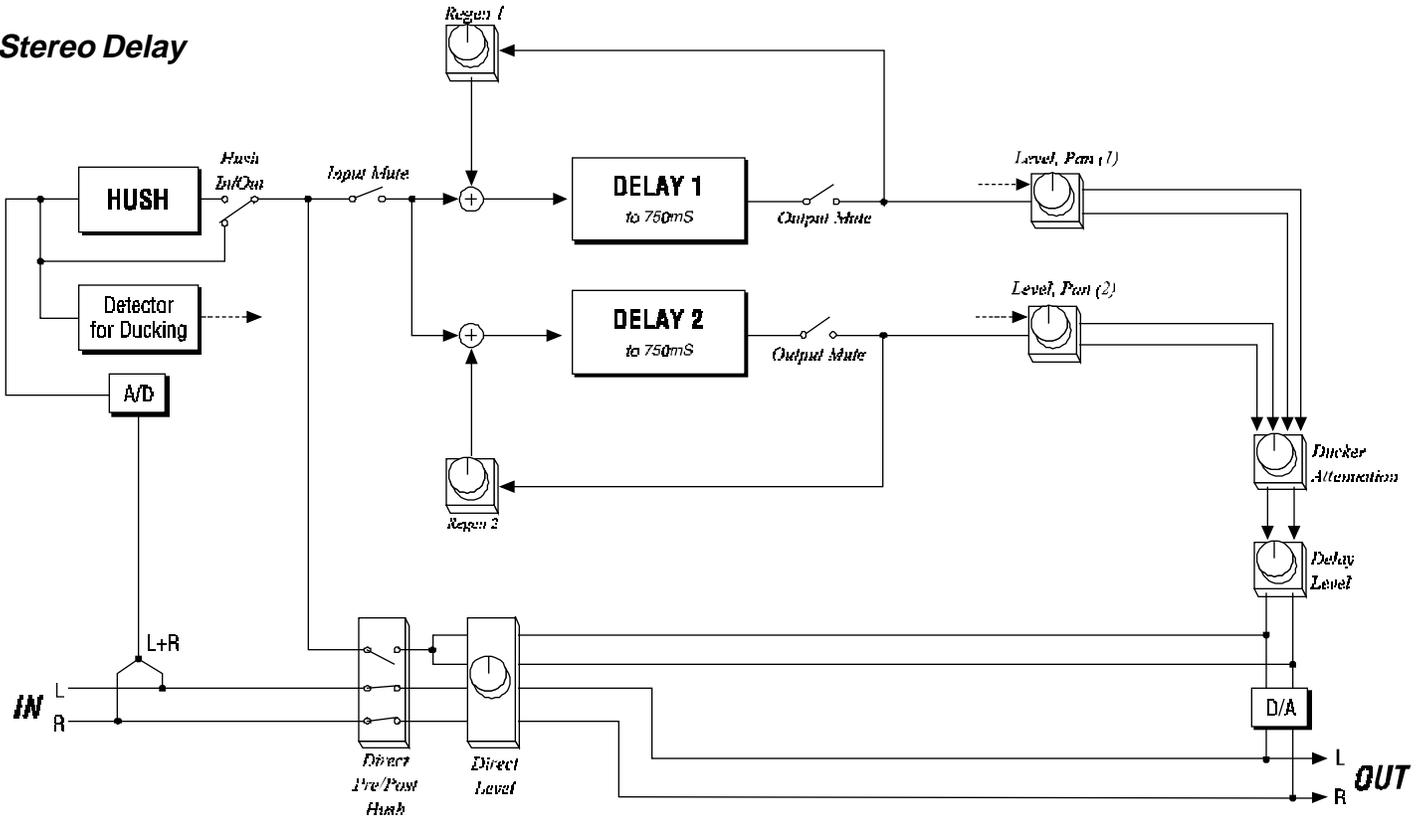
Ping-Pong Delay
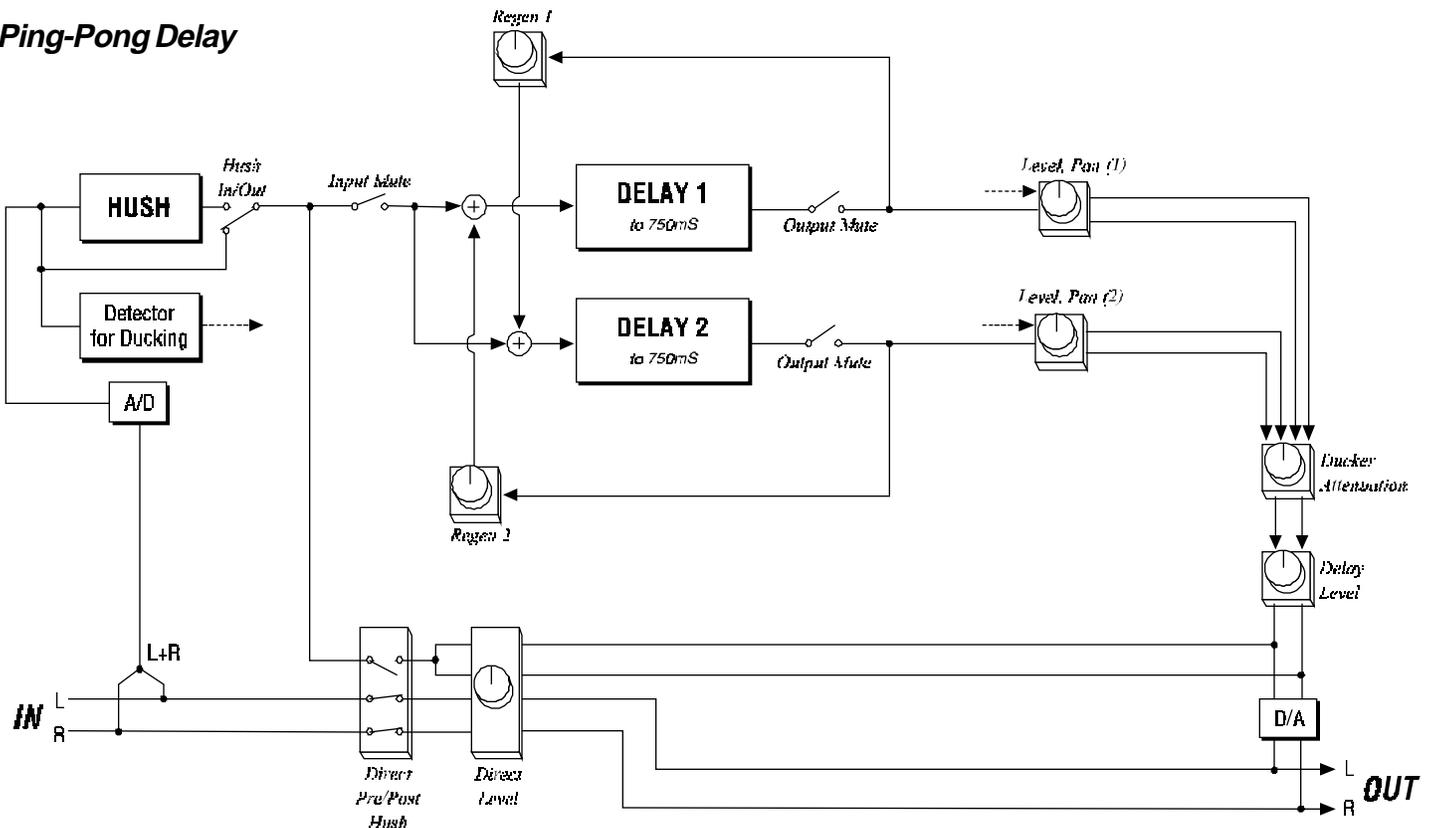
HUSH; DELAY; DUCKER Parameters

| <u>Function</u> *via FUNCTION SELECT control*	<u>Parameter List</u> *via PARAMETER SELECTcontrol*	<u>Range</u> *via PARAMETER ADJUST contol*
MIXER	DELAY LVL L DIR LVL R DIR LVL DIRECT HUSH	-∞ to +6.0dB -∞ to +6.0dB -∞ to +6.0dB PRE or POST
HUSH	HUSH I/O EXP THRESH REL RATE	IN or OUT -92 to -20 dB 25mS to 800mS
DELAY	DELAY MUTE TYPE LEVEL 1 PAN 1 DLY TIME 1 REGEN 1 LEVEL 2 PAN 2 DLY TIME 2 REGEN 2 D TYPE DL HF DAMP	Muted or Active PRE, POST or BOTH -∞ to 0dB L<- 0 to100 ->R 0 to 750mS (1500mS - 2 Tap) -∞ to 0dB -∞ to 0dB L<- 0 to l00 ->R 0 to 750mS (1500mS - 2 Tap) -∞ to 0dB 2-Tap, Stereo, or Ping Pong 0 to 99
DUCKER	DUCKER SENSITIVITY ATTENUATION RELEASE RATE	Off or On -92 to -20dB -∞ to 0dB .2 to 9.0 Seconds

D. HUSH; 8 VOICE CHORUS; DELAY *Configuration*

This configuration provides eight voices which may be chorused and/or delayed up to 418 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.*
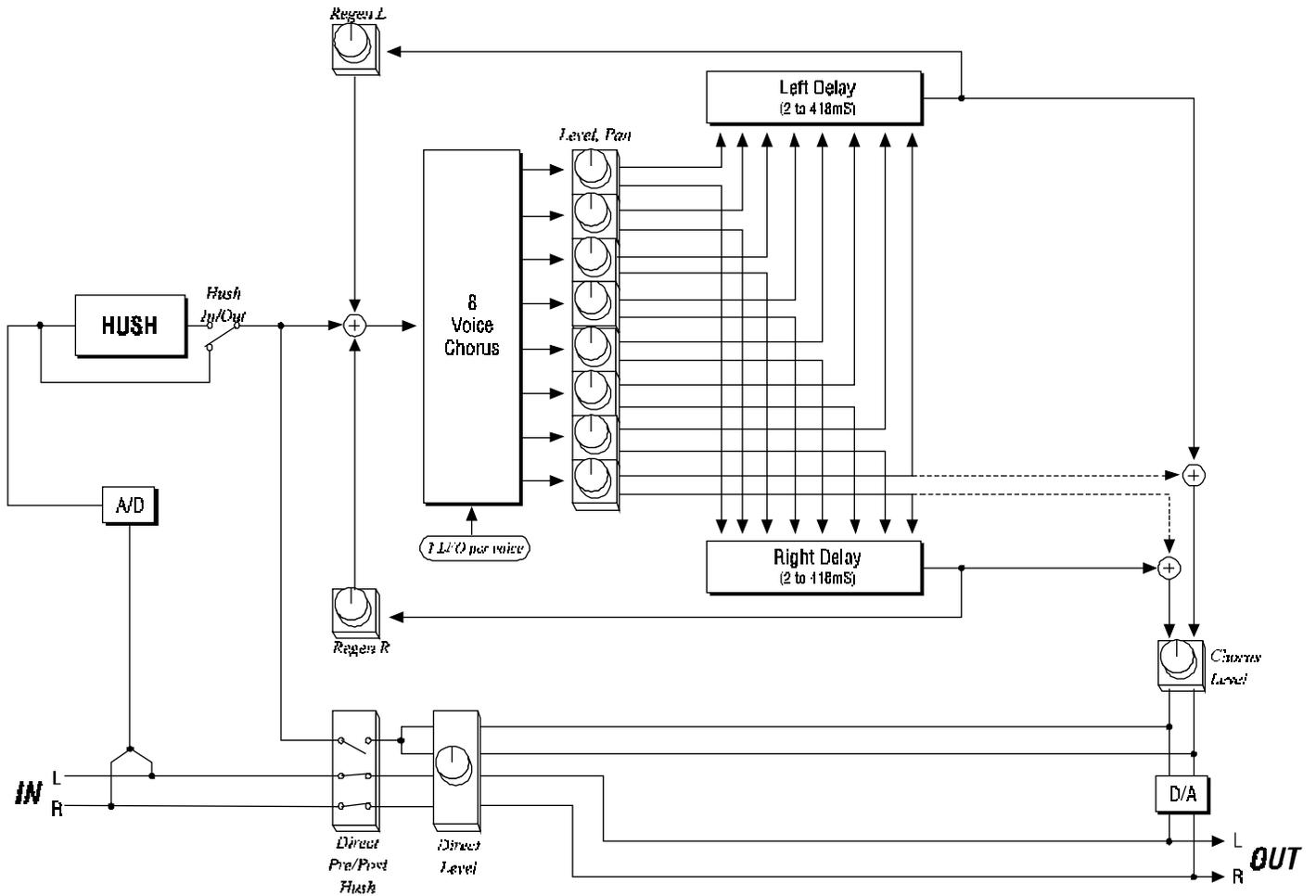
Dotted lines denote signal path
of voice(s) set to 0ms Delay Time.

HUSH; 8 VOICE CHORUS, DELAY Parameters

Function *via FUNCTION SELECT control*	**Parameter List** *via PARAMETER SELECT control*	**Range** *via PARAMETER ADJUST contol*
MIXER	CHORUS LVL L DIR LVL R DIRLVL DIRECT HUSH REGEN L REGEN R	-∞ to +6.0dB -∞ to +6.0dB -∞ to +6.0dB Pre or Post -∞ to 0.0dB -∞ to 0.0dB
HUSH	HUSH 1/0 EXP THRESH REL RATE	In or Out -92 to -20dB 25mS to 800mS
VOICE/DLY 1 *Repeated for Voices 2 - 8*	LEVEL 1 PAN 1 DELAY 1 DEPTH 1 RATE 1	-∞ to 0dB L<- 0 to 100 ->R 0 to 418mS 0 to 100 0 to 254

E. HUSH; PITCH SHIFT; DELAY *Configuration*
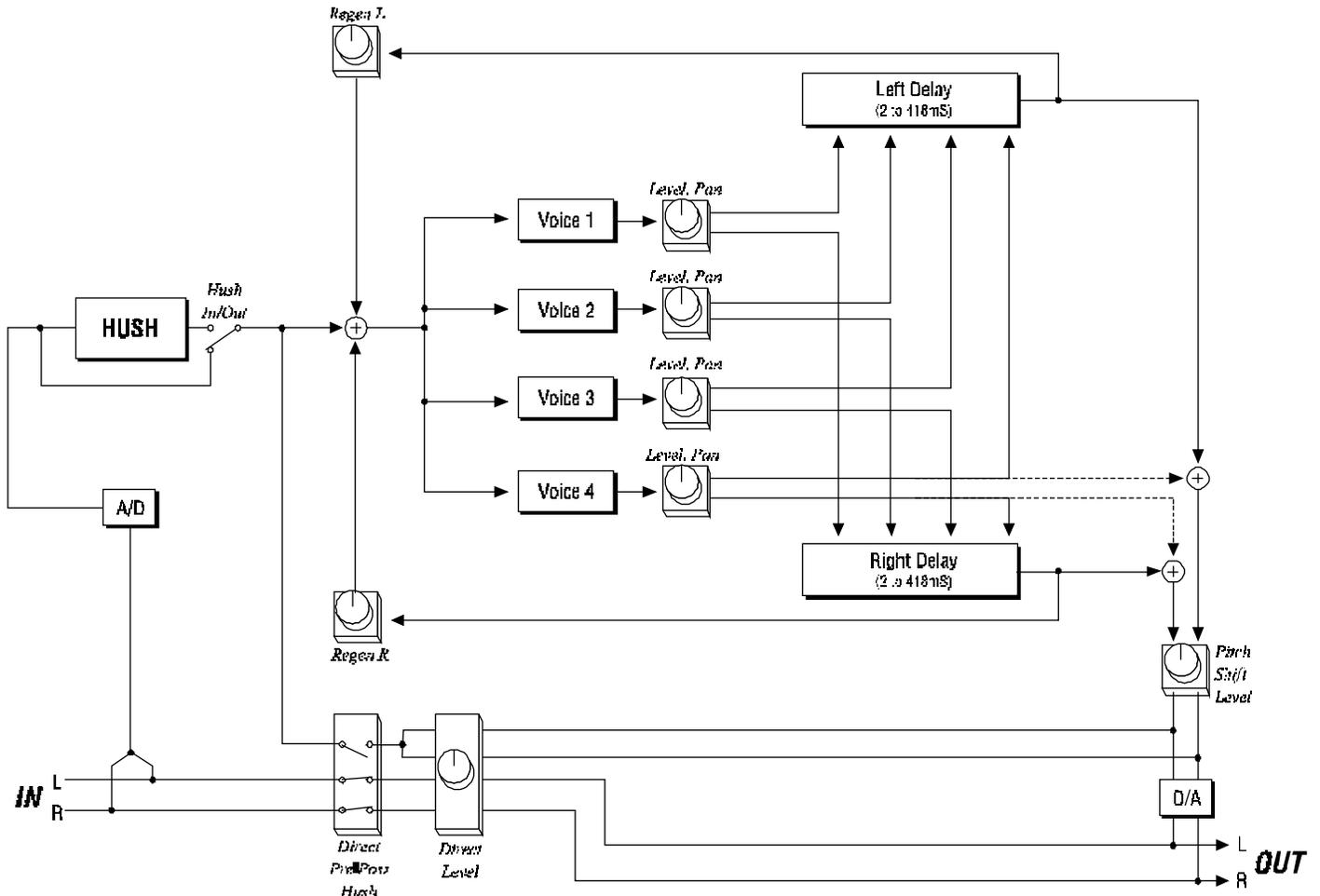
Dotted lines denote signal path
of voice(s) set to 0ms Delay Time.

HUSH; PITCH SHIFT; DELAY Parameters

Function	**Parameter List**	**Range**
via FUNCTION SELECT control	*via PARAMETER SELECT control*	*via PARAMETER ADJUST control*
MIXER	P SHIFT LVL	-∞ to +6.0dB
	L DIRLVL	-∞ to +6.0dB
	R DIR LVL	-∞ to +6.0dB
	DIRECT HUSH	Pre or Post
	REGEN L	-∞ to 0.0dB
	REGEN R	-∞ to 0.0dB
HUSH	HUSH I/O	In or Out
	EXP THRESH	-92 to -20dB
	REL RATE	25mS to 800mS
VOICE 1	PITCH 1	-2400 to +1200
Repeated for	FINE 1	-20 to +20
Voices 2,3 and 4	LEVEL 1	-∞ to 0.0dB
	PAN 1	L<- 0 to 100 -> R
	DELAY1	0 to 418mS

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

This configuration combines HUSH noise reduction 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.*
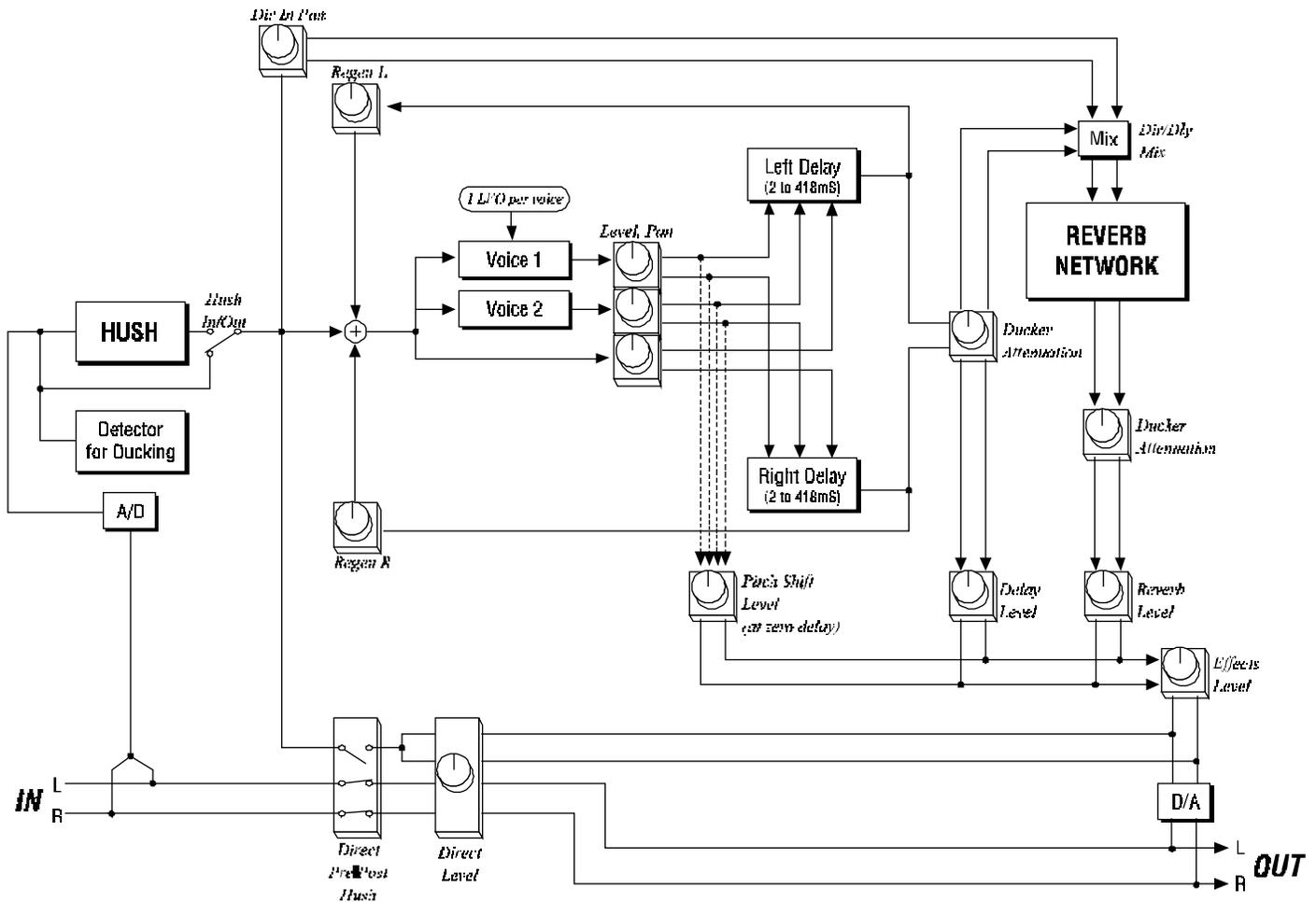
Dotted lines denote signal path
of voice(s) set to 0ms Delay Time.

HUSH; PITCH SHIFT; DELAY; REVERB Parameters

Function *via FUNCTION SELECT control*	**Parameter List** *via PARAMETER SELECT control*	**Range** *via PARAMETER ADJUST contol*
MIXER	EFFECT LVL	-∞ to +6.0dB
	L DIR LVL	-∞ to +6.0dB
	R DIR LVL	-∞ to +6.0dB
	DIRECT HUSH	Pre or Post
	PSHIFT LVL	-∞ to 0.0dB
	DELAY LVL	-∞ to 0.0dB
	REVERB LVL	-∞ to 0.0dB
	REGEN L	-∞ to 0.0dB
	REGEN R	-∞ to 0.0dB
HUSH	HUSH I/0	In or Out
	EXP THRESH	-92 to -20dB
VOICE/DLY 1	PITCH 1	-2400 to +1200
	FINE 1	-20 to +20
	LEVEL 1	-∞ to 0.0dB
	PAN 1	L<- 0 to 100 ->R
	DELAY 1	0 to 418mS
VOICE/DLY 2	PITCH 2	-2400 to +1200
	FINE 2	-20 to +20
	LEVEL 2	-∞ to 0.0dB
	PAN 2	L<- 0 to 100 ->R
	DELAY 2	0 to 418mS
DELAY 3	LEVEL 3	-∞ to 0.0dB
	PAN 3	L<- 0 to 100 ->R
	DELAY 3	0 to 418mS
DUCKER	DUCKER	Off, Dly, Rev or Both
	SENSITIVITY	-92 to -20dB
	ATTENUATION	-∞ to 0dB
	RELEASE RATE	.2 to 9.0 Seconds
REVERB	REV INPUT	Active or Muted
	DIR IN PAN	L<- 0 to 100 ->R
	MIX DIR/DLY	DIR<- 0 to 100 ->DLY
	REVERB LVL	-∞ to 0dB
	REVERB DECAY	0 to 99
	RV HF DAMP	0 to 99

8. Operating the Intellifex

A. RECALLING A STORED INTELLIFEX LTD PRESET
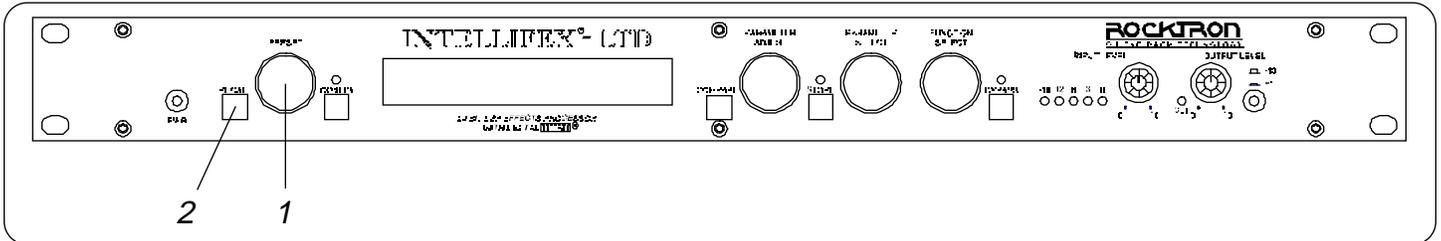
Step 1   To recall an Intellifex LTD preset, first turn the PRESET control to the preset number to be recalled. The display will alternate between the preset number/title selected and:

PRESS RECALL FOR

Step 2   To recall the selected preset, press the RECALL button and the display will now show only the new preset number and title (or configuration type - depending on the CONFIG L.E.D. status).

14 PRESET TITLE

B. CHANGING PRESET PARAMETERS
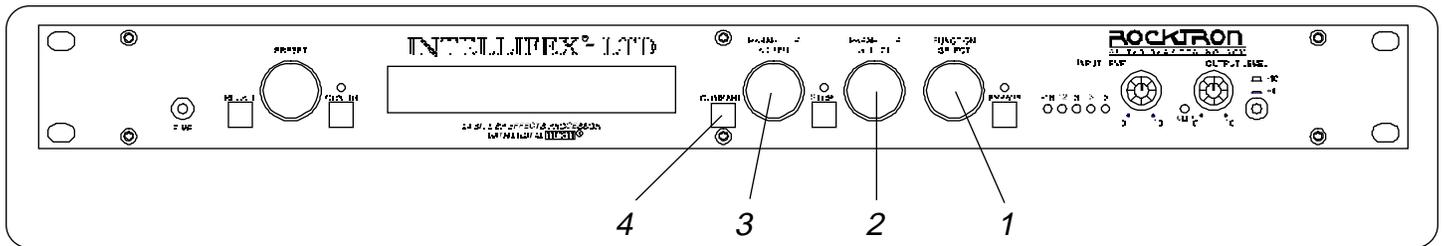
Step 1   The parameter menu for each effect can be called up via the FUNCTION SELECT control. Turn this control to the effect to be modified.

> ******* REVERB *******

Step 2   Turn the PARAMETER SELECT control to choose which parameter to be altered for that effect.

> **REV DECAY   59**

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

> **REV DECAY   32**

Step 4   The COMPARE button may be used to compare the old parameter value to the new one.

> **REV DECAY   59**

C. STORING MODIFIED PARAMETER VALUES
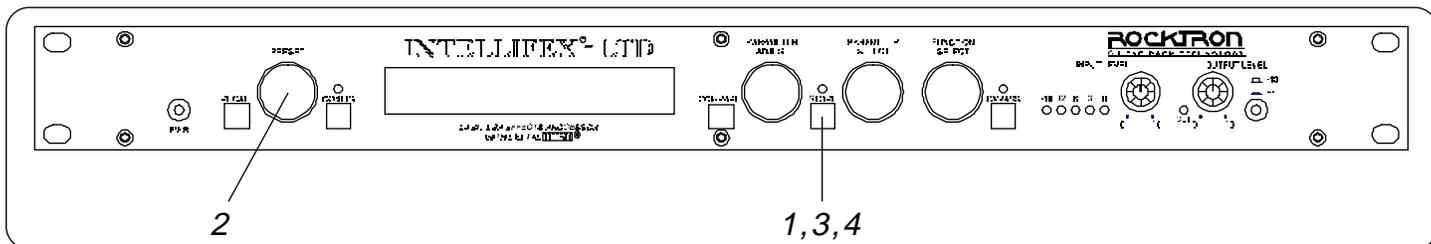
Step 1　　　To store altered parameter values, press the STORE button while the effect title or parameter is displayed to start the store procedure. The display will alternate between the preset number/title that the changes will be stored to and:

> **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 the new parameter values into the current preset number, this step is not necessary). User presets may be stored in preset numbers 1-80. Presets 81-160 are factory presets and cannot be copied over. The display will now alternate between the new preset number and:

> **STORE TO PRESET**

Step 3　　　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.

> **STORED**

NOTE　　　*Altered preset parameters can only be stored in user preset numbers 1-80. Factory presets 81-160 cannot be copied over, and therefore cannot be selected as a destination for an altered preset. If a factory preset (81-160) is altered and you wish to store it, the Intellifex LTD will **automatically default to a user preset number exactly 80 less than the factory preset number selected when the STORE button is pressed to initiate the store procedure** (i.e. if preset 81 has been altered and you attempt to store it at preset location 81, the Intellifex LTD will default and store the altered parameters to preset 1, preset 125 will default to preset 45, etc.).*

Step 4   After the altered parameter values have been stored into the selected preset number, the Intellifex LTD will display "COPY TITLE TOO?". This will only be displayed when storing into a new preset number, and allows you copy the title from the original preset into the new preset also, if desired. To copy the title from the original preset, press the STORE button a third time and the display will again flash "STORED".

$$\boxed{\textbf{STORED}}$$

NOTE 1   *If it is not desired to copy the title of the original 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 modified 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

The Title Edit function can be accessed in user presets 1-80 only. The titles of factory presets 81-160 can not be edited.
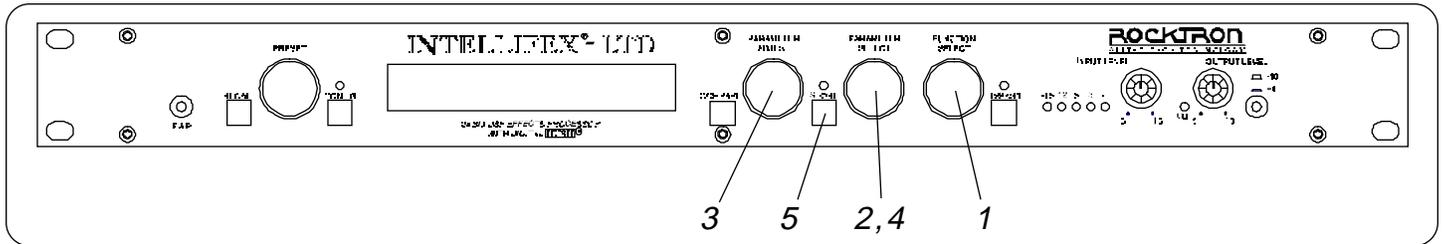
Step 1   To begin the Title Edit function, turn the FUNCTION SELECT control clockwise until the Intellifex LTD displays "TITLE EDIT".

> **TITLE EDIT**

Step 2   Turn the PARAMETER SELECT control clockwise to initiate the Title Edit mode. Turning this control will select the character location to be edited. The current character position to be edited is followed by a flashing decimal.

> **29 P.RESET TITLE**

Flashing decimal

Step 3   Use the PARAMETER ADJUST control to select the desired character for the current position to be edited.

> **29 N.RESET TITLE**

Step 4   To edit the character in the next position, turn the PARAMETER SELECT control one step clockwise - the flashing decimal will move to the next position.

> **29 NR.ESET TITLE**

Flashing decimal at next position

Step 5   After all the desired characters have been edited, press the STORE button to save the new title in Intellifex LTD memory. The Intellifex LTD will flash "STORED" briefly.

> **STORED**

**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 Intellifex will remain in Title Edit mode. You may either (a) turn the PRESET control to display and edit other preset titles, or, (b) turn the FUNCTION SELECT control to exit the Title Edit function.*

E. SELECTING A "POWER ON" PRESET

The Intellifex allows you to select the preset which that be recalled each time the unit is turned on.
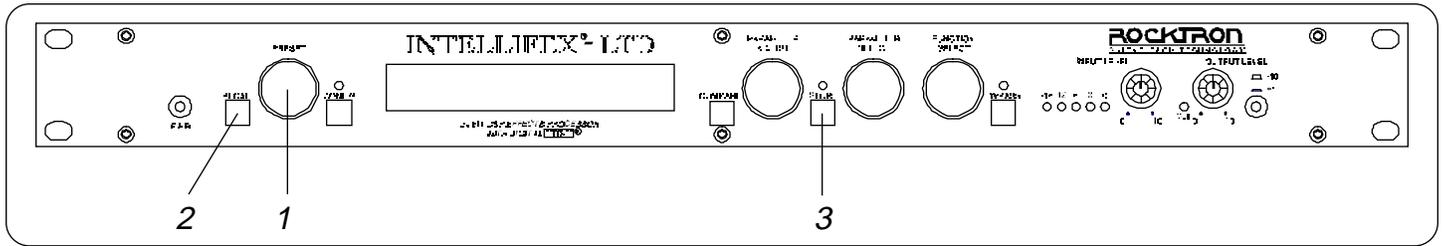
Step 1   Turn the PRESET control to the preset number that is to be recalled each time the unit is turned on.

<div align="center">

24 PRESET TITLE

</div>

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

<div align="center">

24 PRESET TITLE

</div>

Step 3   Press the STORE button while the preset number/title or configuration is displayed to save the current preset as the "power on" preset.

<div align="center">

PWR ON PR STORED

</div>

9. MIDI Operation

A. MIDI CONTROLLER ASSIGNMENTS

Controller mapping allows for specific Intellifex adjustable parameters to be mapped (or assigned) to a MIDI controller number for real-time control (via a pitch wheel, expression pedal, etc.) in live performance situations. Any parameter may be assigned to any controller number, from controller 0 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.

The Controller Assign function is accessible in user presets 1-80. Factory presets 81-160 do not include this function.
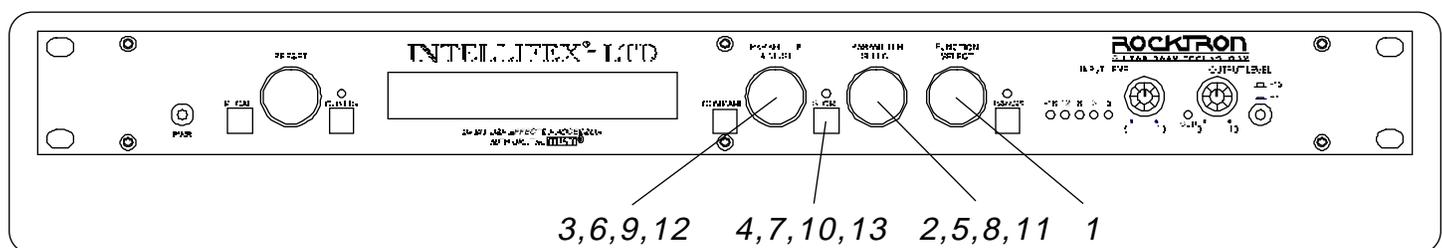
Step 1   To access the Controller Assign function, turn the FUNCTION SELECT control one step clockwise past "Title Edit".

> **CONTROLLER ASSIG**

Step 2   Turn the PARAMETER SELECT control to access the first parameter of the Controller Assign function. This parameter allows for the selection of a controller number which the first parameter (selected in Step 5) will respond to.

> **NUMB1   XXX**

Step 3   Use the PARAMETER ADJUST control to select the controller number to be assigned to the first parameter (PARA1). 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.

> **NUMB1   7**

Step 4   After selecting the desired controller number, press the STORE button to save the number. "STORED" will flash briefly on the display.

> **STORED**

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

> PARA1   XXX

Step 6   Turn the PARAMETER ADJUST control to scroll through the available parameters for the current configuration.

> PARA1   EFFECTS LVL

Step 7   After selecting the parameter to be assigned to the NUMB1 controller, press the STORE button to save it. "STORED" will flash briefly on the display.

> STORED

NOTE   *The Intellifex allows for the range of any given parameter to be limited when using a MIDI controller to determine the current parameter value. For example, if a given parameter has a range from -∞ to +6dB yet it is desirable for the full range of the controller to vary from only -10dB to +2.5dB, a lower limit of -10 and an upper limit of +2.5 may be set via the "Upper Limit" and "Lower Limit" parameters. When storing a parameter, the maximum value is stored as the upper limit and the minimum value is stored as the lower limit automatically.*

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

> ULIM C1   XXX

Step 9   Use the PARAMETER ADJUST control to select the highest parameter value that the controller is not to exceed.

> ULIM C1   +2.5

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

> STORED

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

LLIM C1   XXX

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

LLIM C1   -10.0

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

STORED

NOTES   *This entire process is repeated 7 times for a total of 8 controllers (NUMB2, NUMB3, etc.). 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 Controller Assign.*

Also, a lower limit may be selected which is greater than the upper limit. This will invert the response of the controller. For example, the toe position of an expression pedal would provide the minimum value while the heel position would provide the maximum value.

B. MIDI PROGRAM MAPPING

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

3,7   4,8   2,5,6   1
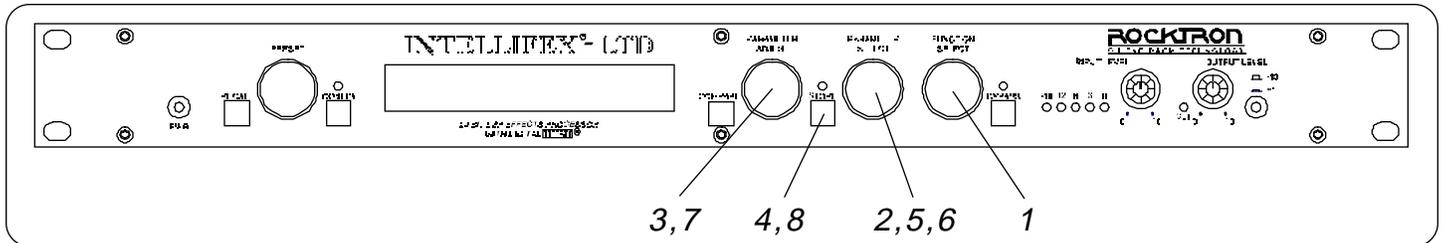
Step 1   To access the Program Mapping function, turn the FUNCTION SELECT control one step past the Controller Assign function.

> ** PROG MAPPING **

Step 2   Use the PARAMETER SELECT control to select the first parameter - *Program Mapping Status*. This parameter determines whether program mapping is on or off. When program mapping is OFF, the preset number recalled is identical to the program number sent via MIDI. When ON, the preset number recalled is the preset that the program number sent is mapped to.

> PROG MAPPING   OFF

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

> PROG MAPPING   ON

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

> STORED

Step 5   Turn the PARAMETER SELECT control one step clockwise to view the current map settings. This parameter allows you to map MIDI program numbers to specific presets.

> XXX   MAP TO   XXX

Step 6   The number on the left of the display is the MIDI program number (or the number sent via a MIDI footswitch, etc.). Use the PARAMETER SELECT control to select the number (1-128) to be mapped to a preset.

```
┌─────────────────────────────┐
│  110    MAP TO    XXX        │
└─────────────────────────────┘
```
MIDI Program Number
(1-128)
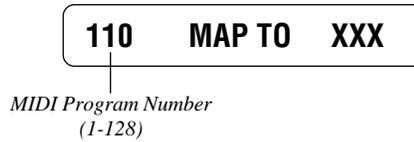
Step 7   The number on the right of the display is the preset number to map to (or the preset number that will be recalled when the MIDI program number on the left is sent). Use the PARAMETER ADJUST control to select the preset number (1-160, or OFF) to map to.

```
┌─────────────────────────────┐
│  110    MAP TO     56        │
└─────────────────────────────┘
```
Preset Number
(1-160, OFF)
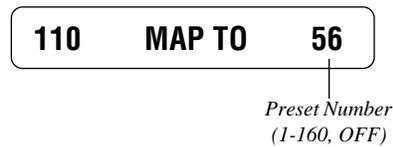
Step 8   Press the STORE button after each MIDI program number and preset number have been selected to save the change for each mapping. "STORED" will flash briefly on the display.

```
┌─────────────────────────────┐
│          STORED             │
└─────────────────────────────┘
```

The Program Mapping function may be exited by turning either the PRESET or FUNCTION SELECT control. Only the changes that have been stored will be saved after exiting the Program Mapping function.

C. MIDI CHANNEL

The MIDI Channel function determines the MIDI channel that the Intellifex LTD will receive MIDI commands on.
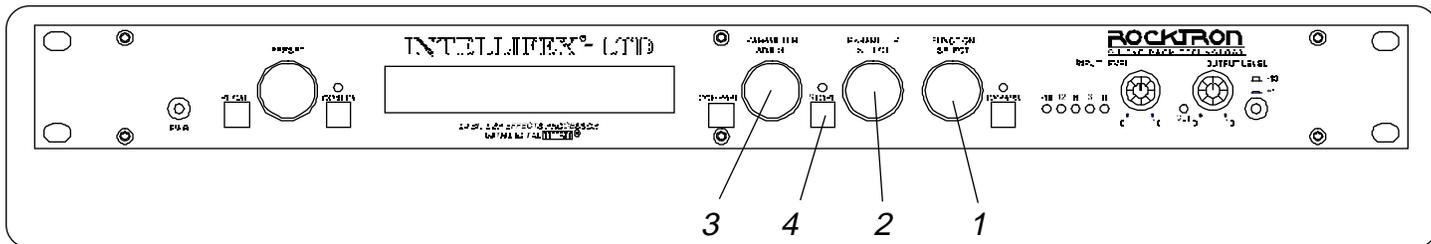
Step 1   Turn the FUNCTION SELECT control to "MIDI Channel".

> ** MIDI CHANNEL **

Step 2   Turn the PARAMETER SELECT to view the current MIDI Channel.

> MIDI CHANL   OMNI

Step 3   Use the PARAMETER ADJUST control to select the MIDI channel that the Intellifex LTD is to receive MIDI commands on. Channels 1-16, OMNI (all channels), or OFF (will not receive MIDI commands) may be selected.

> MIDI CHANL   10

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

> STORED

To exit the MIDI Channel function, turn either the PRESET or FUNCTION SELECT control. Any changes made must be stored to be saved after exiting the MIDI Channel function.

D. MIDI DUMP/LOAD

Any or all of the Intellifex LTD user presets may be dumped to a sequencer or another Intellifex LTD 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 Intellifex LTD preset into another Intellifex LTD, the preset being dumped may be loaded into any user preset location on the receiving Intellifex LTD.

Dumping a single Intellifex LTD user preset into another Intellifex LTD:

Step 1   Using a standard MIDI cable, connect the MIDI OUT of the transmitting Intellifex LTD to the MIDI IN of the receiving Intellifex LTD. Do **not** connect the other MIDI ports together.
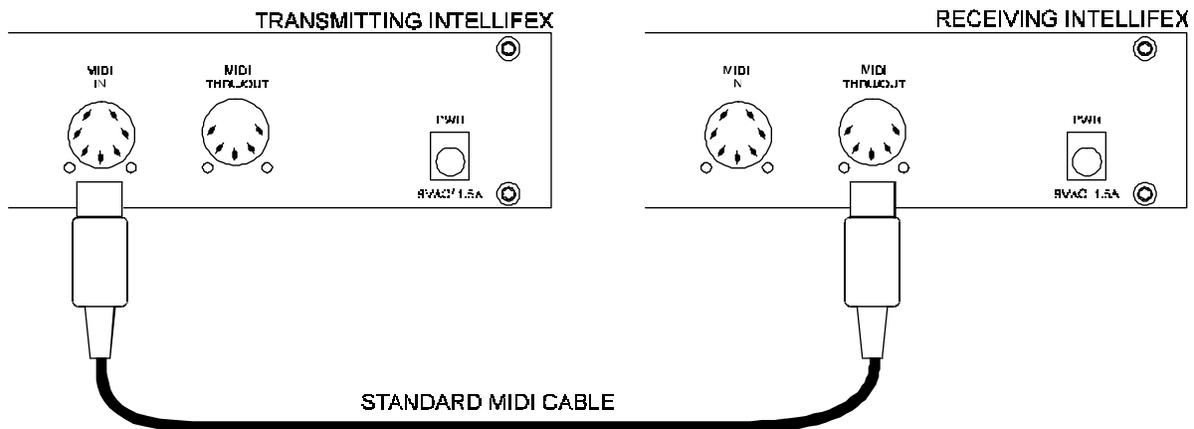
Step 2   Turn the FUNCTION SELECT knob on both units to "MIDI Dump/Load".

<div align="center">

MIDI DUMP/LOAD

</div>

Step 3   Turn the PARAMETER SELECT knob on the transmitting Intellifex LTD to "Preset Dump". (The current preset number will also be displayed.)

<div align="center">

54 PRESET DUMP

</div>

Step 4   Turn the PARAMETER SELECT control on the receiving Intellifex LTD to "Preset Load". (The current preset number will also be displayed.)

<div align="center">

78 PRESET LOAD

</div>

Step 5   Use the PRESET control on the transmitting Intellifex LTD to select the preset you wish to dump. Any of the user presets (1-80) may be dumped.

> **17 PRESET DUMP**

Step 6   Use the PRESET control on the receiving Intellifex LTD to select the preset location to store the received preset. The preset currently at this location will be overwritten, therefore use caution when selecting the preset location to dump to.

> **25 PRESET LOAD**

Step 7   Press the STORE button on the transmitting Intellifex LTD to initiate the dump. The transmitting Intellifex LTD will display the preset number of the preset dumped and "DUMPED". The receiving Intellifex LTD will display the preset location being stored to and "RECEIVING..." while it receives and stores the preset's parameters, title and controller information.

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

> **17 DUMPED**

Transmitting Intellifex

> **25 LOADED**

Receiving Intellifex

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

> F0H - Start of Exclusive byte
> 00H - Manufacturer ID byte 1
> 00H - Manufacturer ID byte 2
> 29H - Manufacturer ID byte 3
> 02H - 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.

Dumping the Intellifex user memory into a sequencer:

Step 1   Connect the MIDI OUT of the Intellifex LTD to the MIDI IN on the sequencer using a standard MIDI cable.
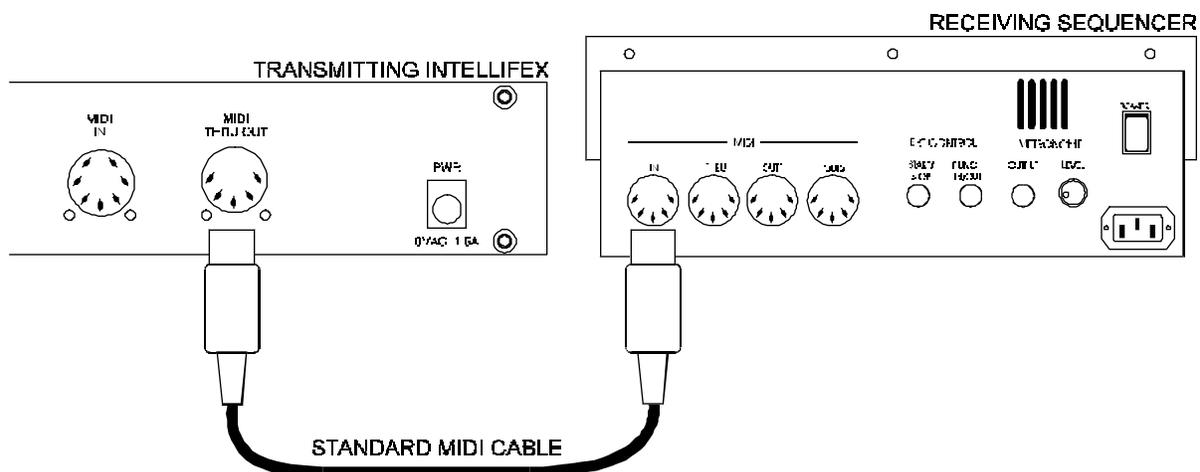
Step 2   Turn the FUNCTION SELECT control on the Intellifex LTD to the "MIDI DUMP/LOAD" function. This function is available at the most clockwise position of the FUNCTION SELECT control in all user presets.

> ### MIDI DUMP/LOAD

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

> ### DUMP USER DATA

Step 4   Start the sequencer recording.

RECORD

●
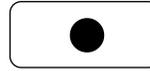
Step 5   Press the STORE button on the Intellifex LTD to initiate the user data dump. The Intellifex LTD will display the number of the data string as it is dumped. Data strings 1-80 are the user presets as described by the preset dump function, while data string 81 is the program mappings. Data string 82 contains the footswitch types, MIDI channel, mapping status, and "power on" preset. After all the user data is transmitted, the Intellifex LTD will display "USER DATA DUMPED". The process takes approximately 3 minutes to complete.

> ### USER DATA DUMPED

After the Intellifex LTD 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.

Reloading the user memory from a sequencer:

Step 1   Connect the MIDI OUT of the sequencer to the MIDI IN on the Intellifex LTD with a standard MIDI cable.
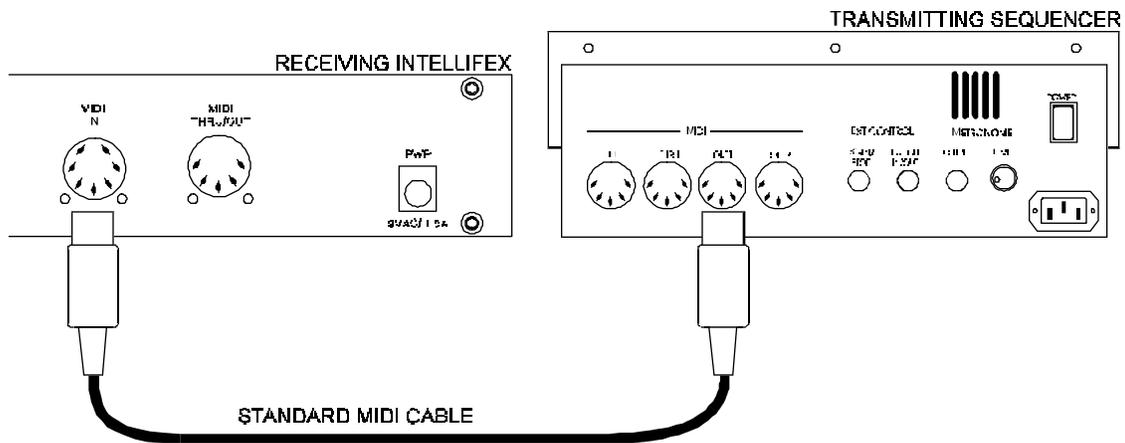
Step 2   Turn the FUNCTION SELECT control on the Intellifex LTD fully clockwise to the "MIDI DUMP/LOAD" position.

> **MIDI DUMP LOAD**

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

> **LOAD USER DATA**

Step 4   Play back the user data previously recorded on the sequencer. The Intellifex LTD will display the data strings as it is storing them. The data string and "LOADED" will appear on the display. After all the user data has been loaded the Intellifex LTD will display "USER DATA LOADED". The entire procedure will take approximately 3 minutes to complete.

> **USER DATA LOADED**

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 - Manufacturer ID byte 1
> 00H - Manufacturer ID byte 2
> 29H - Manufacturer ID byte 3
> 02H - Product ID byte
> 2AH - Command byte, Start of user dump, 2BH continue user dump.
>
> XXH - 200 data bytes for 80 stfings, 256 data bytes for string 81, 12 data bytes
>   for string 82, MSB = 0
>
> YYH - Check Sum byte, ("Exciusive Or" of data bytes, MSB=0)
> F7H - End of Exclusive byte

The first 80 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 81, which is the program mapping, will contain 256 data bytes. Data string 82, which is miscellaneous data, will contain 12 data bytes.

Error Messages

"RECEIVE ERROR" - This message will appear on a receiving Intellifex LTD 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 can not be verified after it is stored.

E. FACTORY RESTORE

This procedure allows you to restore the Intellifex LTD memory to its original condition as it was shipped from Rocktron.

```
! ! CAUTION ! !
This procedure will permanently erase all user presets (1-80) and
replace them with the factory presets found In presets 81-160. If you
have stored presets in preset locations 1-80 which you do not want to
lose, make a record of all parameter values before performing the
Factory Restore procedure.
```

Step 1   To perform the Factory Restore procedure, first recall preset #160 (preset #160 is the only preset where the Factory Restore function can be accessed).

```
160  BYPASS
```

Step 2   Turn the FUNCTION SELECT control clockwise to the last available function - "Factory Restore".

```
FACTORY RESTORE
```

Step 3   Turn the PARAMETER SELECT control clockwise to display the only parameter for this function. The Intellifex LTD will display "Enter Code   0".

```
ENTER CODE          0
```

Step 4   Turn the PARAMETER ADJUST control to select the number "249". The only number which can be entered to perform the restore function is 249. Entering any other number will immediately exit this function and return to the previously recalled preset number and title.

```
ENTER CODE        249
```

Step 5   **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 Intellifex will display "INITIALIZING".

```
INITIALIZING
```

After the initialization process is complete, the display should read "ERRORS 0". The "0" represents the number of bytes that the Intellifex LTD found did not initialize properly. Any other message indicates that the Intellifex LTD may not have reinitialized properly. The Intellifex LTD will remain in this condition until either the PRESET or FUNCTION SELECT control is turned. Preset #160 is active after completion of the Factory Restore function.

```
ERRORS              0
```

10. Appendix

A. FACTORY PRESETS

#	TITLE	CONFIGURATION	#	TITLE	CONFIGURATION
81	CRS PAN VERB	HUSH; CRS; DLY; REV	121	PINGPONG 250	HUSH; DELAY; DUCKER
82	LIQUID SHIFT	HUSH; P SHIFT	122	DELAY 1500	HUSH; DELAY; DUCKER
83	STADIUM	HUSH; REVERB	123	EXIT TO LEFT	HUSH; DELAY; DUCKER
84	SPARE CHANGE	HUSH; DELAY; DUCKER	124	PAN DELAY	HUSH; DELAY; DUCKER
85	HAWAIIN CRS	HUSH; CRS; DLY; REV	125	18 STRING	HUSH; PSHIFT; DELAY
86	SHIFT OCTAVE	HUSH; P SHIFT; DLY; REV	126	DETUNE	HUSH; PSHIFT; DELAY
87	BLUES HALL	HUSH; REVERB	127	+MIN3 +MIN6	HUSH; PSHIFT; DELAY
88	SWEEP CHORUS	HUSH; 8 V CRS; DLY	128	BASS STRINGS	HUSH; PSHIFT; DELAY
89	ESCHER	HUSH; P SHIFT; DLY	129	+MAJ3 -5TH	HUSH; PSHIFT; DELAY
90	HARPSICHORD	HUSH; P SHIFT; DLY	130	+MAJ3 +5TH	HUSH; PSHIFT; DELAY
91	SLOW CRS+REV	HUSH; CRS; DLY; REV	131	DELAYED MAJ7	HUSH; PSHIFT; DELAY
92	MAJOR7 CHORD	HUSH; P SHIFT; DLY	132	LOW MINOR 7	HUSH; PSHIFT; DELAY
93	GATED PLATE	HUSH; REVERB	133	DOUBLE MIN 6	HUSH; PSHIFT; DELAY
94	CIRCLES	HUSH; 8 V CRS; DLY	134	FATIGUE	HUSH; PSHIFT; DELAY
95	LOW OCTAVES	HUSH; P SHIFT; DLY; REV	135	CRS SLAPVERB	HUSH; CRS; DLY; REV
96	FLANGE VERB	HUSH; CRS; DLY; REV	136	DELAY/REVERB	HUSH; CRS; DLY; REV
97	FALLING DOWN	HUSH; P SHIFT; DLY;REV	137	REFLECTIONS	HUSH; CRS; DLY; REV
98	SHIMMER CRS	HUSH; 8 V CRS; DLY	138	DUCKED VERB	HUSH; CRS; DLY; REV
99	+MIN3 -MIN6	HUSH; P SHIFT; DLY	139	DUCKED DELAY	HUSH; CRS; DLY; REV
100	VOCAL PLATE	HUSH; REVERB	140	CHORUS/VERB	HUSH; CRS; DLY; REV
101	FLANGE	HUSH; 8 V CRS; DLY	141	AMBIENCE NOW	HUSH; CRS; DLY; REV
102	DELAY FLANGE	HUSH; 8 V CRS; DLY	142	SILKEN ROOM	HUSH; CRS; DLY; REV
103	TAP DANCIN	HUSH; 8 V CRS; DLY	143	DARK SHADOW	HUSH; CRS; DLY; REV
104	CRS 2 VOICE	HUSH; 8 V CRS; DLY	144	EXPANDING RM	HUSH; CRS; DLY; REV
105	CHORUS PONG	HUSH; 8 V CRS; DLY	145	MIRRORS	HUSH; CRS; DLY; REV
106	CHORUS ECHO4	HUSH; 8 V CRS; DLY	146	SLAP OCTAVE	HUSH; P SHIFT; DLY; REV
107	OCTOPUS	HUSH; 8 V CRS; DLY	147	GUITAR SOLO	HUSH; P SHIFT; DLY; REV
108	LIQUIDCHORUS	HUSH; 8 V CRS; DLY	148	OCTAVES VERB	HUSH; P SHIFT; DLY; REV
109	SCATTERBRAIN	HUSH; 8 V CRS; DLY	149	DETUNE REVRB	HUSH; P SHIFT; DLY; REV
110	COLISEUM	HUSH; REVERB	150	MINOR 6	HUSH; P SHIFT; DLY; REV
111	LARGE HALL	HUSH; REVERB	151	MAJOR LEAGUE	HUSH; P SHIFT; DLY; REV
112	SLAP PLATE	HUSH; REVERB	152	SPARKLE VERB	HUSH; P SHIFT; DLY; REV
113	DUAL REVERB	HUSH; REVERB	153	1DOWN 2DOWN	HUSH; P SHIFT; DLY; REV
114	ROOM	HUSH; REVERB	154	DOUBLE 4TH	HUSH; P SHIFT; DLY; REV
115	HALL REVERB	HUSH; REVERB	155	MAJOR W DELAY	HUSH; P SHIFT; DLY; REV
116	BRIGHT PLATE	HUSH; REVERB	156	OCTAFIFTH	HUSH; P SHIFT; DLY; REV
117	CATHEDRAL	HUSH; REVERB	157	WAY DOWN	HUSH; P SHIFT; DLY; REV
118	TINY ROOM	HUSH; REVERB	158	SOFT SHIFT	HUSH; P SHIFT; DLY; REV
119	DRIPPING WET	HUSH; REVERB	159	HUSH	HUSH; P SHIFT; DLY; REV
120	PINGPONG 750	HUSH; DELAY; DUCKER	160	BYPASS	HUSH; CRS; DLY; REV

B. MIDI IMPLEMENTATION CHART

ROCKTRON INTELLIFEX LTD

DATE: JUNE 01, 1995
MODEL: INTELLIFEX   MIDI IMPLEMENTATION CHART   VERSION: 1.0

	FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
Basic Channel	DEFAULT CHANGED	1-16 1-16	1 -16 1-16	May be saved in nonvolatile 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 TUNE REQUEST	X X X	X X X	
System Real Time	CLOCK COMMANDS	X X	X X	
Aux. 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 VALUE SENT IS 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 SPECIFIEDFOR EACH PARAMETER.

C. SPECIFICATIONS

MEASUREMENT			CONDITIONS
Maximum Input:	+20dBu		Input Level Pot minimum
Maximum Output:	+20dBu		Output Level Pot maximum
Nominal Input Range: (16dB Headroom)	+4dBu to -21dBu		Input Level Pot minimum Input Level Pot maximum
Input Impedance:	470Kohms		
Output Impedance:	120 ohms		
Dynamic Range:	104dB HUSH In, 94dB HUSH Out		Peak Signal/A weighted Noise Floor, Direct Level = +6dB, Direct Post HUSH Effects Level= - ∞
THD + N:	.009%		1KHz, -5dB input level 22Hz to 22KHz Bandwidth Direct Post HUSH, Direct Level = +6dB, Effects Level = -∞
Dry Frequency Response:	10Hz to 100KHz 10Hz to 30KHz	+.25, -1.5dB ±.25dB	
Wet Frequency Response:	10Hzto 18KHz 20Hz to 17KHz	+.5, -3dB ±.5dB	