

LXP-15
Multi-Effects
Processor

Owner's
Manual

lexicon

Unpacking and Inspection

After unpacking the LXP-15, save all packing materials in case you ever need to ship the unit. Thoroughly inspect the LXP-15 and packing materials for signs of damage. Report any shipment damage to the carrier at once; report equipment malfunction to your dealer.

Notice

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designated to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment OFF and ON, the user is encouraged to try to correct the interference by one or more of the following measures:

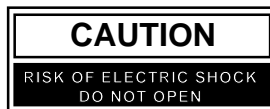
- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to identify and Resolve Radio/TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

This triangle, which appears on your component, alerts you to the presence of uninsulated, dangerous voltage inside the enclosure... voltage that may be sufficient to constitute a risk of shock.



This triangle, which appears on your component, alerts you to important operating and maintenance instructions in this accompanying literature.

WARNING:

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THE UNIT TO RAIN OR MOISTURE.

WARNING:

DO NOT DEFEAT OR REMOVE GROUND PIN ON THE POWER PLUG.

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Lexicon Part #070-07831 Rev 1

Lexicon Inc.
3 Oak Park
Bedford, MA 01730 USA
Telephone 781-280-0300
Fax 781-280-0490

Safety Suggestions

Read Instructions Read all safety and operating instructions before operating the unit.

Retain Instructions Keep the safety and operating instructions for future reference.

Heed Warnings Adhere to all warnings on the unit and in the operating instructions.

Follow Instructions Follow operating and use instructions.

Heat Keep the unit away from heat sources such as radiators, heat registers, stoves, etc., including amplifiers which produce heat.

Ventilation Make sure that the location or position of the unit does not interfere with its proper ventilation. For example, the unit should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a cabinet which impedes the flow of air through the ventilation openings.

Wall or Ceiling Mounting Do not mount the unit to a wall or ceiling except as recommended by the manufacturer.

Power Sources Connect the unit only to a power supply of the type described in the operating instructions, or as marked on the unit.

Grounding or Polarization* Take precautions not to defeat the grounding or polarization of the unit's power cord.

*Not applicable in Canada.

Power Cord Protection Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to cords at plugs, convenience receptacles, and the point at which they exit from the unit.

Nonuse Periods Unplug the power cord of the unit from the outlet when the unit is to be left unused for a long period of time.

Water and Moisture Do not use the unit near water — for example, near a sink, in a wet basement, near a swimming pool, near an open window, etc.

Object and liquid entry Do not allow objects to fall or liquids to be spilled into the enclosure through openings.

Cleaning The unit should be cleaned only as recommended

by the manufacturer.

Servicing Do not attempt any service beyond that described in the operating instructions. Refer all other service needs to qualified service personnel.

Damage requiring service The unit should be serviced by qualified service personnel when:

the power supply cord or the plug has been damaged, objects have fallen, or liquid has been spilled into the unit,

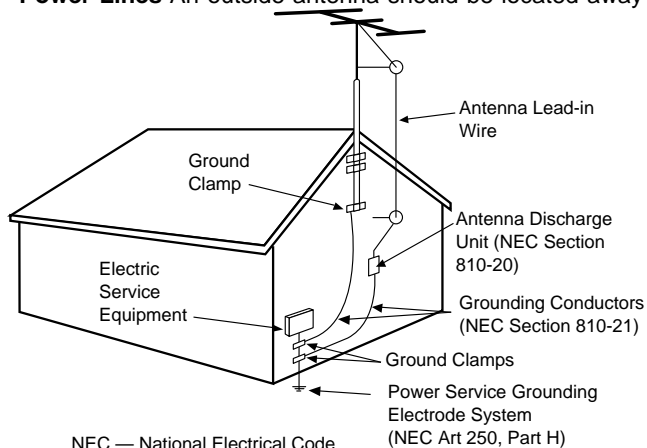
the unit has been exposed to rain,

the unit does not appear to operate normally or exhibits a marked change in performance,

the unit has been dropped, or the enclosure damaged.

Outdoor Antenna Grounding If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna-discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See figure below.

Power Lines An outside antenna should be located away



NEC — National Electrical Code

from power lines.

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Introduction Congratulations on your purchase of the LXP-15 Multi-Effects Processor! You are about to experience superb sound quality and a full range of reverb, pitch shifting, and delay effects, coupled with fast, intuitive editing of preset sounds and an industry-leading MIDI implementation.

The LXP-15 offers a rich and distinctive palette of special effects, including 128 preset effects programs to get you started. Each program has up to five display pages of variable parameters that you can adjust for subtle or dramatic changes in the program's sound, and you can store as many as 128 customized programs in user memory. All of the LXP-15 functions are accessible from the front panel, or via MIDI, providing truly world-class flexibility and control. From pitch shifting to stereo delays and flanging, the LXP-15 delivers superior performance. Whether you are a producer, engineer, or musician—whether you work on stage or in the studio—the LXP-15 will quickly become an indispensable part of your sound.

We're confident you'll find that the LXP-15's unique combination of state-of-the-art sound and extraordinary versatility is exactly what you're looking for. A Quick Reference card provides the basics of operation in a compact format to get you up and running as quickly as possible — but to make sure you don't miss out on anything, we'd like you to read this manual. It provides a thorough explanation of both front panel and MIDI operation, program descriptions, and complete MIDI Implementation data — all the information you need to access the full power of the LXP-15.

Installing the LXP-15

Unpacking

After unpacking the LXP-15, save all packing materials in case you ever need to ship the unit. Thoroughly inspect the LXP-15 and packing materials for signs of damage. Report any shipment damage to the carrier at once. The following accessories are included with the LXP-15:

1. Power Cable
2. Feet (for use if not rack-mounted)
3. Owner's Manual
4. Quick Reference Guide
5. Warranty card (USA only)

Power

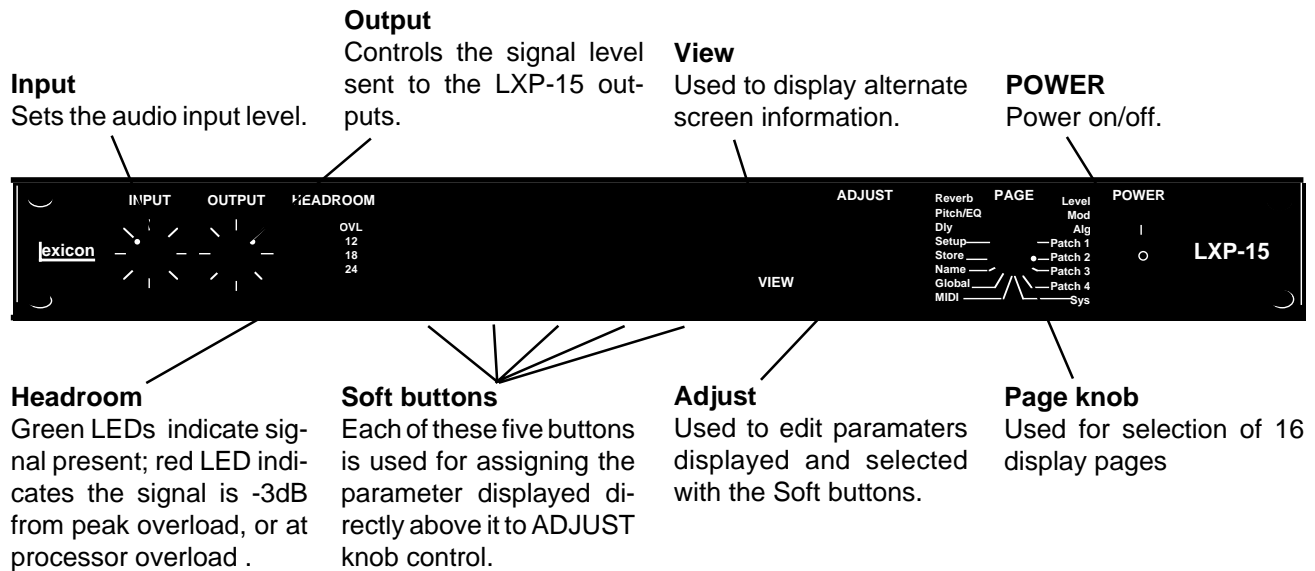
Connect the cable end of the LXP-15 line cord to the LXP-15 power connector. Then plug the line cord into an appropriate AC wall socket.

Mounting

The LXP-15 measures 19"W x 1.75"H x 13.9"D (483 x 45 x 353 mm). Make sure that the LXP-15 is securely screwed into the rack, and that support is provided for the rear of the chassis during transport to avoid possible damage from severe mechanical shock.

The maximum ambient operating temperature is 95°F (35°C). Provide adequate ventilation if the LXP-15 is mounted in a closed rack with heat-producing equipment such as synthesizer modules, effects units, or power amplifiers. Avoid mounting the LXP-15 directly above power amplifiers.

LXP-15 Front Panel Controls



LXP-15 Rear Panel Connectors

MIDI IN

Receives MIDI information from other MIDI equipment such as Host keyboard controllers, MIDI foot controllers, sequencers and synthesizers.

MIDI THRU

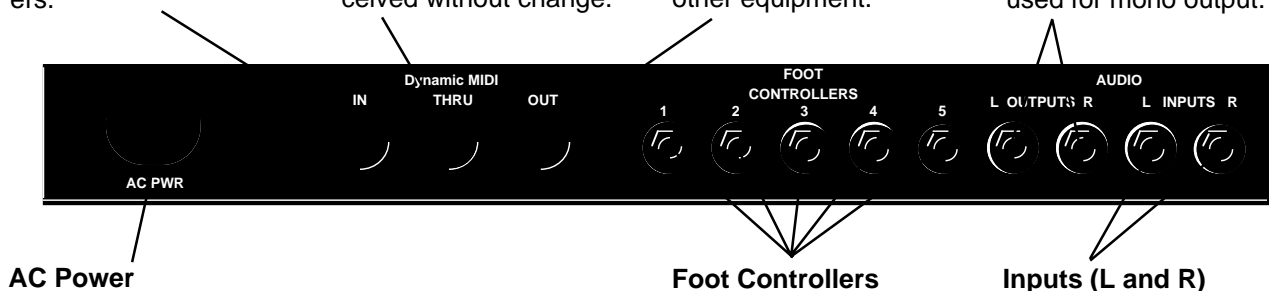
Passes any MIDI data received without change.

MIDI OUT

Transmits MIDI data to other equipment.

Outputs (L and R)

Single-ended (unbalanced) stereo outputs provide +4dBu nominal output level. Either can be used for mono output.



AC Power

Foot Controllers

Five connectors for toggle (Push on/push off) momentary contact foot switches, or continuous footpedals (50 k Ω).

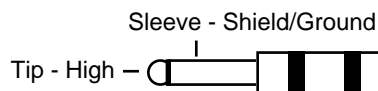
Inputs (L and R)

Single-ended (unbalanced) inputs accept levels as low as -26dBu. Input impedance is 50 k Ω in stereo, 25 k Ω in mono. Either can be used for mono input.

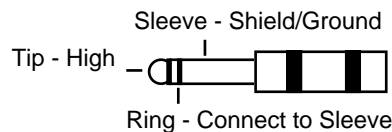
MIDI Connections MIDI connections are dependent on your applications, and on the equipment available in your system. For examples of MIDI system connections, see Chapter 6: *MIDI Operation*.

Audio Connections This section outlines several connection possibilities for the LXP-15. Because each sound system is unique, we recommend experimentation to arrive at the best configuration for your system. Always check connections for proper impedance, polarity, and levels.

Audio connections to the LXP-15 are unbalanced, and should be made with high quality shielded cables with 1/4" tip-sleeve phone jacks at the LXP-15 end. The connectors must be wired as shown below:



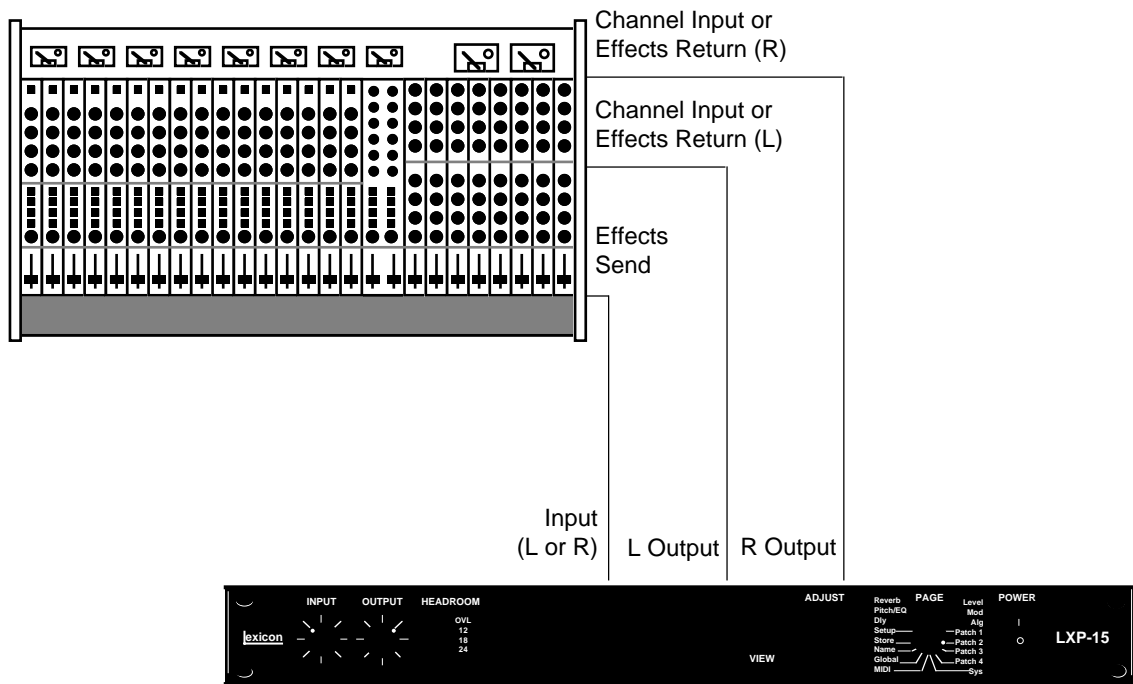
If only 1/4" tip-ring-sleeve phone jacks are available, they must be wired as shown:



Mono or stereo? The LXP-15 produces wonderful stereo effects from either mono or stereo signal sources. For mono sources, use either of the two input connectors; the dry signal appears (along with the stereo effects) in mono at both output connectors. For instruments and sources with stereo outputs, use both inputs. We recommend using both LXP-15 outputs whenever possible but, if mono output is required, you can use just one of the two output connectors. When only one output is used, the left and right signals are summed internally .

Some of the examples on the following pages use stereo instruments and amplification systems, others use mono. Feel free to adapt the examples to your specific requirements.

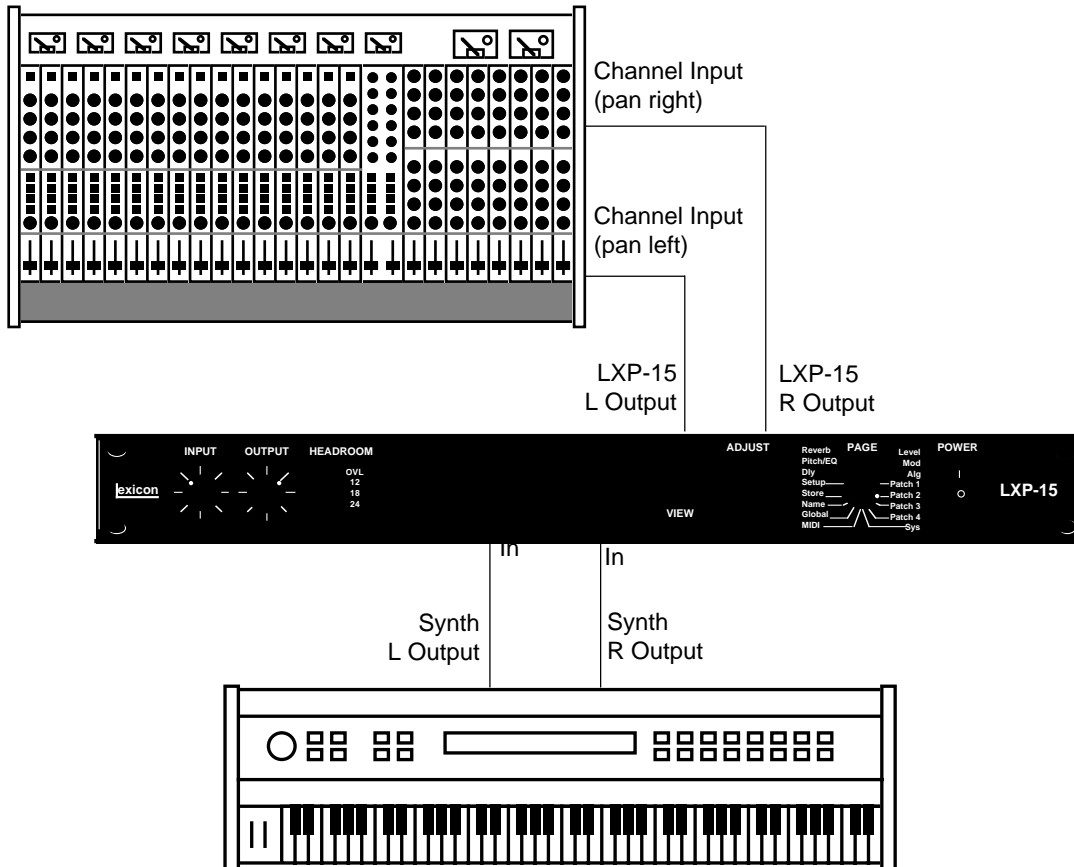
Connection to a mixing console's effects sends



If you will be using an LXP-15 as your primary effects unit, and your system includes a console with one or more auxiliary (effects) sends, connect the LXP-15 as shown above. In most applications, it is preferable to connect the LXP-15 outputs to two of the console's input channel strips, panned full left and right, rather than the effects returns. This allows the greatest flexibility in routing and equalization.

In this configuration the console controls are used to set the amount of effect heard—the LXP-15 program's MIX control should be set to 100% wet.

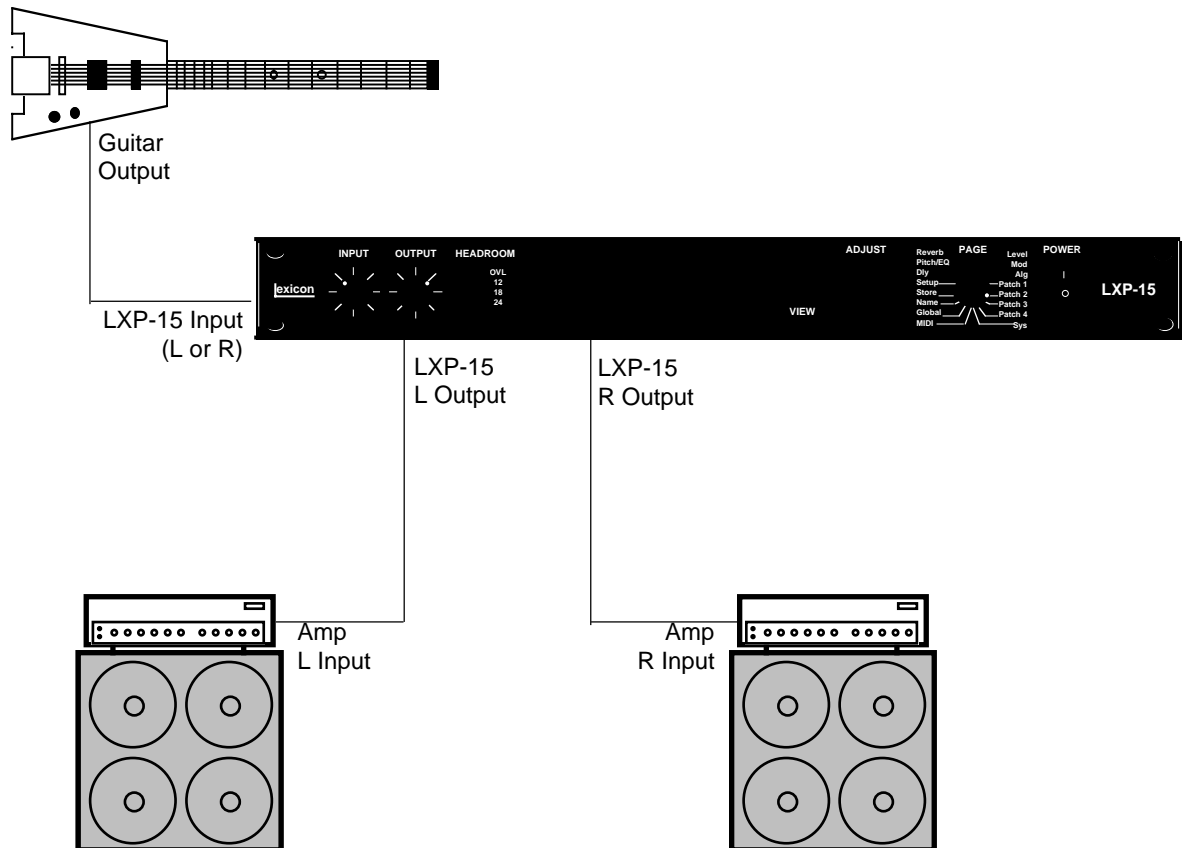
Connection between instrument and console



In some applications (such as when an LXP-15 is used for a single instrument) it may be desirable to patch the LXP-15 between the instrument and console. This makes it possible to keep the LXP-15 up on stage with other MIDI gear, rather than in the console effects rack, making MIDI control much easier.

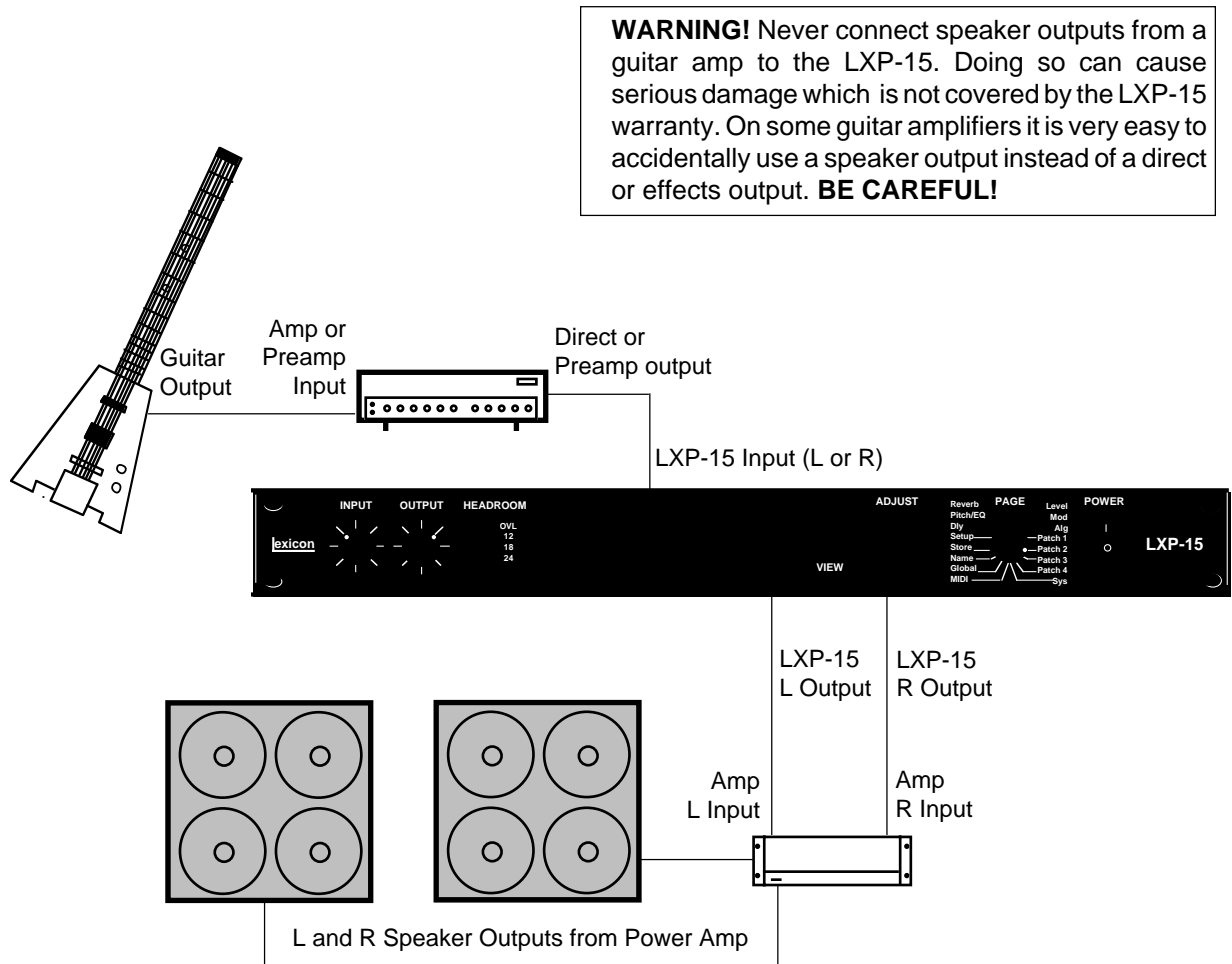
Set the LXP-15 MIX control to approximately 50%.

Connection between instrument and amplifier



For a very spacious guitar sound, connect the LXP-15 between a guitar and two amp and speaker stacks. Set the LXP-15 MIX control to approximately 50%. The only problem with this setup is that if you use overdrive distortion created by the amplifier, changing settings on the LXP-15 also affects the quantity and quality of your distortion. If you use a separate distortion box, you can get around this problem by connecting it before the LXP-15. If you prefer amplifier-generated distortion, try the setup shown on the next page.

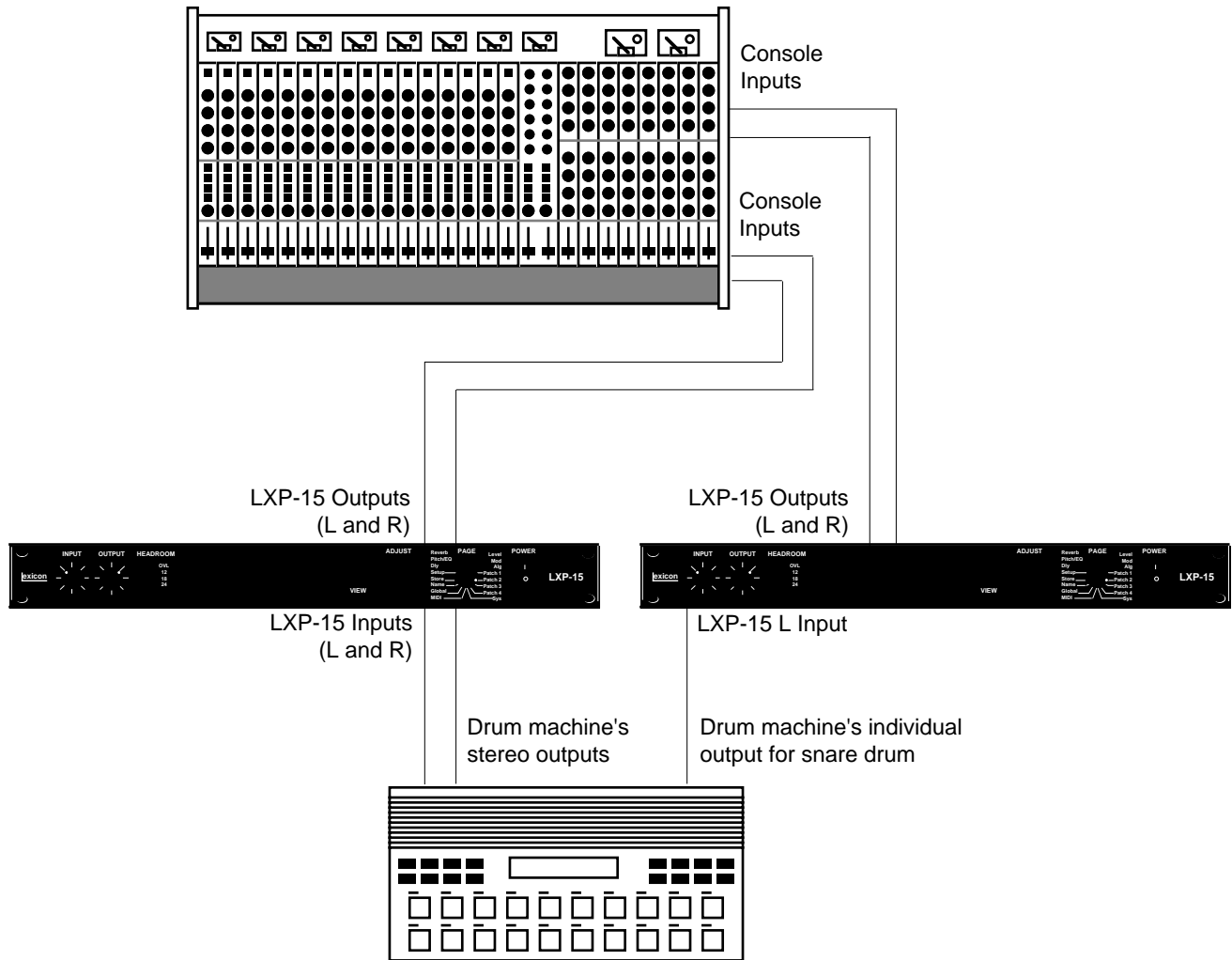
Connection between instrument preamp and power amplifier(s)



If you use overdrive distortion, it's usually better to create the overdrive *before* sending the signal to the LXP-15 to ensure that the effects don't change the quantity and quality of your distortion. In this setup, you need a guitar preamplifier or a guitar amp with a direct output. Feed this signal to either of the LXP-15 inputs, and then on to a stereo power amp or a pair of guitar amps. (A few guitar amplifiers become unhappy if they are operated without speakers connected. Consult the amp manufacturer for details.)

You can use the effects send and return connectors on a mono guitar amp to obtain similar results. Adjust the LXP-15 output level so that the amp produces the same output with the LXP-15 as it does without it.

Connection between drum machine and console



Using two LXP-15 units between your drum machine and console can make your drum machine sound much more exciting, since it allows you to process the all-important snare drum separately from the rest of the mix. Make sure you remove the snare from the drum machine's main stereo mix.

Front Panel Operation

Terms used in this manual

Algorithm The LXP-15 contains several *algorithms*. An algorithm is a set of instructions that tells the LXP-15's microprocessor how to process the input signal. One algorithm produces pitch/delay, another produces gated reverb, etc.

Parameter Each algorithm has a set of *parameters* (controls) that uniquely characterize it. The settings of the parameters can be changed to create radically different sounds from a single algorithm.

Program Parameter values are stored/recalled in setups. Some examples are: delay time, pitch shift, etc.

System Parameter values are not associated with a particular setup. System parameters are not stored in registers or presets, nor do their values change when a new setup is recalled. Examples are: display contrast and brightness, MIDI Channel number, etc.

Patch A patch is a routing assignment that allows an LXP-15 parameter to be driven by a source control such as a footpedal, or a synthesizer mod wheel.

Setup A *setup* is a collection of specific parameter values responsible for a certain sound (and as many as four general purpose patches). Each register or preset is a setup, as is the current state of the machine.

Pages *Pages* are groups of parameters (or other quantities) whose names and/or values are displayed simultaneously.

Register/Preset The LXP-15 contains 256 setups. 128 of these are *presets* which are useful setups permanently initialized at the factory; 128 are *registers* which are available for storing your own setups and effects. The factory presets cannot be overwritten, but they can be modified and stored into registers (or copied into registers, then modified). When shipped, the LXP-15 already has a duplicate of the presets loaded into its registers.

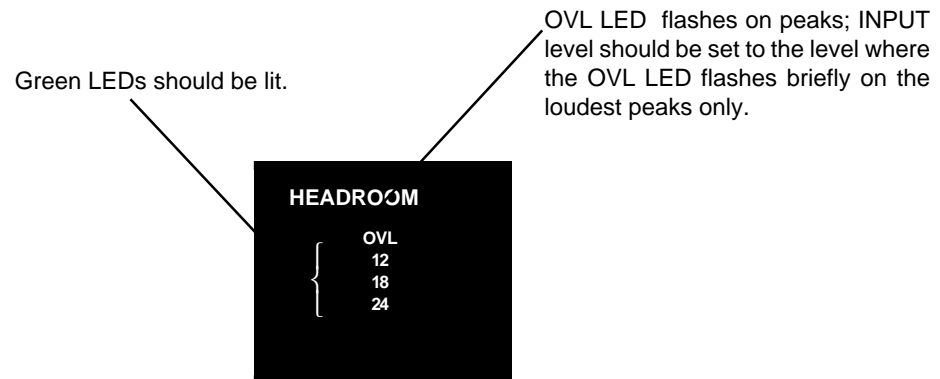
Setting Audio Levels

The wide range of adjustment available with the LXP-15 INPUT and OUTPUT controls allow it to be used with virtually any kind of equipment found in the studio or on the road.

To set audio levels:

1. Turn the LXP-15 INPUT and OUTPUT controls all the way down (fully counterclockwise).
2. Set the instrument output, preamp output, or effects send that feeds the LXP-15 input(s) to a nominal level. With an instrument, this should be your loudest normal playing level; with a preamp output or console, adjust the output(s) or effects send(s) to produce the highest level possible with the least amount of noise. If the output you are using doesn't have a level control, don't worry about it!
3. While sending audio to the LXP-15, gradually turn up the INPUT control until the red OVL LED just flashes on the loudest peaks. If it flashes continuously, turn the INPUT control down slightly. This ensures the best possible signal-to-noise ratio and dynamic range.

In general, it is best to set the gains in your system so that the nominal input to the LXP-15 is at least 12dB from the maximum converter (peak) level.



Note: If the OVL LED flashes with no input present it indicates processor overload is occurring.

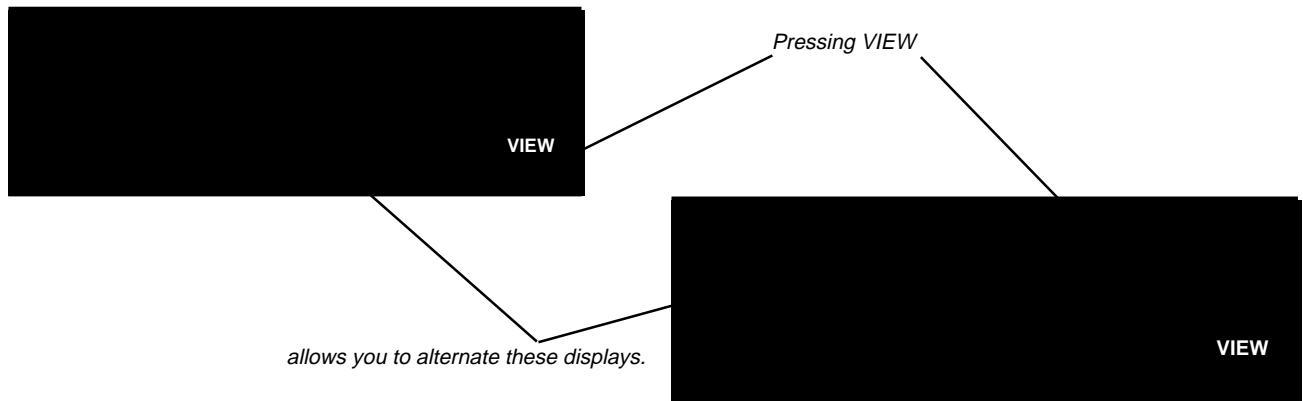
4. Turn the LXP-15 OUTPUT control up.

The LXP-15 Display

On most of the LXP-15 display pages, three lines of alphanumeric information are available:

1. System status
2. Parameter names
3. Parameter settings

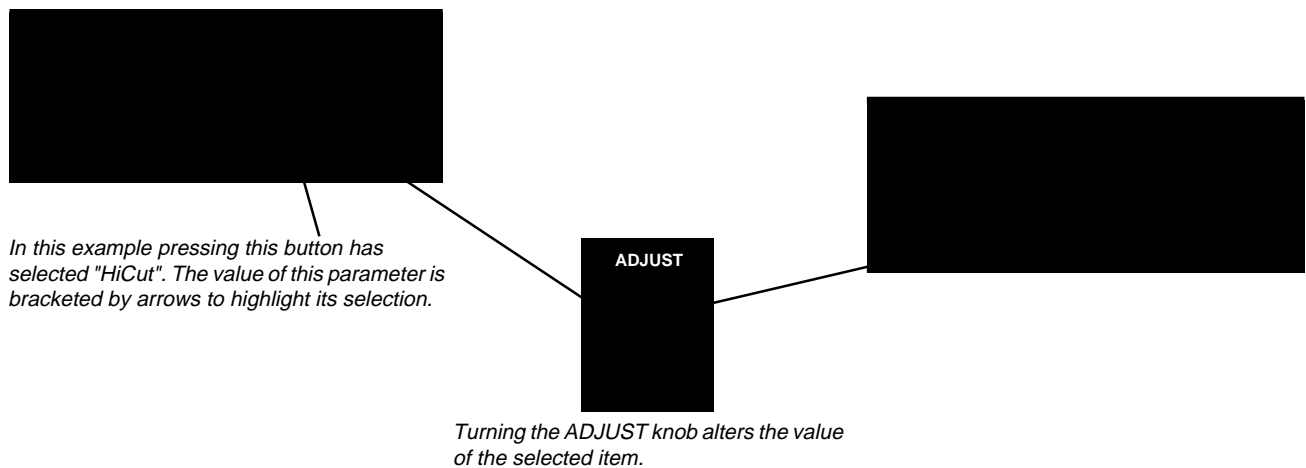
The front panel VIEW button allows you to choose between display of the first and second, or the second and third lines.



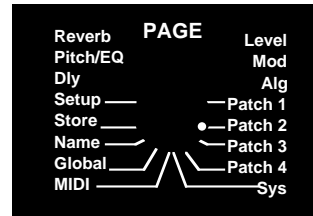
Each display line is divided into five 7-character fields. This allows as many as five items to be displayed simultaneously.



In general, pressing the button below any display field will select the item in that field for modification by the ADJUST knob.



The Page Knob The PAGE knob has 16 labeled settings. These selections are grouped into three basic functional areas. The upper section provides for selection of the available parameters which define the sound of each algorithm (Reverb, Pitch EQ, Delay, Level, Modulation, and Algorithm).



The settings grouped on the lower left allow various routine functions to be performed on setups (recalling, storing, naming, specifying MIDI Channel, etc.) These pages do not have an alternate display.

System parameters, and patch assignments are selected at the settings grouped on the lower right.

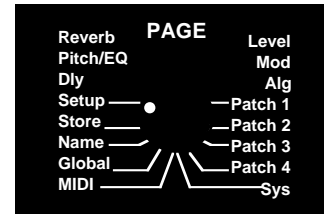
Presets and User Setups

Any one of 128 preset setups can be selected by the PAGE and ADJUST knobs on the front panel. To select a preset, first turn PAGE to SETUP.

Selecting LXP-15 presets

The following display will appear:

Preset #	Name	alg: XX		
Preset	Registr	Pre scan	Reg scan	Load



If you press the button directly below "Preset" the ADJUST knob will scroll through (and sequentially load) each one of the 128 presets. Pressing "Pre scan" allows you to use the ADJUST knob to simply scroll through the list of preset names without loading them. If you use this method, you must press the button beneath "Load" to actually select a preset. (Viewing, selecting and loading registers follow exactly the same procedure.)

Use PAGE to select "SETUP".

Press "Preset", then use ADJUST to select and load a specific preset.

or

Press "Pre scan", then use ADJUST to scan the presets. Press "Load" to select any displayed preset.

For quick reference, the names of the 128 presets are shown in the table below. The presets are generally grouped as follows: 1-78 general purpose; 79-86 guitar or bass; 87-102 guitar or keyboards; 103-117 keyboards; 118-128 special effects. For now, pick any one to try it out. (The first 50 or so should be generally useful and do not make extensive use of patched parameters).

1	Large Hall	33	Bright Gate	65	Jumpin' Beans	97	Drop Tail Env<
2	Bright Hall	34	Slap Gate	66	Thru A Ringr	98	VaryRes1Foot
3	Dark Hall	35	Short Slap	67	LFO Roll	99	Pedal1Reverb
4	Large Room	36	Tap Detune	68	Thick Chorus	100	VaryCaveFoot
5	Large Drk Room	37	Ambi Detune	69	Gtr:Eko-Room	101	PtchLoopFoot
6	Medium Room	38	Ambi Delay	70	Sizzle Verb	102	PedalWhammy1
7	Medium & Short	39	Long Delay	71	Dly Gate → Rite	103	XDly → RvrbMod
8	Medium Room 3	40	L&R Delays	72	Thick'r Gate	104	VaryCaveMod
9	Med & Bright	41	1/4 Note MAT	73	Deep End	105	ConvrtRvbMod
10	Small Room	42	1/8 → 1/16 MAT	74	Jazz Swing Dly	106	ConvrtDlyMod
11	Small Room 2	43	Space Echo	75	Glub Glub	107	8Va CloudMod
12	No Room	44	Delay Cloud	76	SoftLoopFoot	108	VaryRes2Mod
13	Small & Bright	45	Ambi Tap 5th Up	77	DlyLoopFoot	109	Mod Whammy1
14	Dark Closet	46	Roomy 4th Dwn	78	ChrsLoopFoot	110	XDelay Aft
15	Large Dly Room	47	Roomy Oct Up	79	AmbiChrEnv<	111	ConvrtRvbAft
16	Med Dly Room	48	Chorus	80	AmbiChrEnv>	112	SpacOctUpAft
17	1/4 Verb MAT	49	Chorus Too!	81	ShortAmbiDly	113	8Va CloudAft
18	Dark Dly Room	50	Chorus & Doubl	82	LongAmbiDly	114	AftFingVerb
19	Small & Delay	51	Slap & Chorus	83	EnvDetune2	115	Big Flush
20	Vocal Room	52	Chorus & Delay	84	EnvDetune3	116	DlyLoopMIDI
21	Vocal 36	53	Detune Chorus	85	RoomChrEnv	117	SpacLoopMIDI
22	Late Vocal	54	Small & Flange	86	Spacious5th^	118	XDelayEnv<
23	Vocal Plate	55	Flange Room	87	Bounce → Rvrb	119	Bounce Wave
24	Plate	56	Piano Flange	88	Rvrb → XDly	120	DlyCloudEnv>
25	Small Plate	57	Mix Jizzn'	89	XDly → Rvrb	121	RvrbWarpEnv>
26	Long Plate	58	Image Wander	90	Fade In Box	122	Gated Dive
27	Plate 15	59	Wander Fast	91	Fade In Chorus	123	MoanVerb
28	Brite Plate	60	Wander Room	92	Fade In Space	124	Oddness
29	Dark Plate	61	Wander&Small	93	Fade In Room	125	Rising Cloud
30	Small Gate	62	Small&Fast	94	Cascade8 1	126	Cascad8Env>
31	Medium Gate	63	Image Detune	95	Cascade8Env<	127	Le Room
32	Large Gate	64	Wide Image	96	Glass 3	128	Bypass

Loading a preset If you have chosen a preset with "Pre scan" selected, press the button directly below "Load" to load it. If you made your selection with "Preset" selected, you're all set, since this mode automatically loads the preset you've selected. (For footswitch control of preset changes, see Chapter 4: *Creating Sounds and Effects*)

Modifying a preset Once you've selected a preset, turn the PAGE knob to select one of the six parameter pages (Delay, Pitch/EQ, Reverb, Level, Mod or Alg). One page of parameters will appear on the display.

Preset 2		Bright Hall	alg: Dly/Rvb	
Decay	Treble	Bass Mpy	Size	Diffus

The PAGE knob will step through the other available parameter pages. You can change the value of any parameter by selecting it (push the button directly beneath it) and then turning the ADJUST knob to a new value.

When you turn the ADJUST knob, the bottom line of the display will change to show the full name of the selected parameter and the selected value. These values will change as you continue to turn ADJUST.

Preset 2		Bright Hall	alg: Dly/Rvb	
Decay Time		3.6s		

Full name of selected parameter.

Parameter value - this will change as you turn ADJUST.

The screen will return to its normal 5-parameter display if you select another parameter, or if 2 seconds pass without further parameter adjustment.

When the display returns to its normal state the setup name will be marked with an asterisk to indicate that the setup has been modified. This asterisk will remain until the setup is stored, or until another setup is loaded (clearing this setup and any changes made to it).

The setup name is now marked to show that it has been modified

Preset 2		*Bright Hall	alg: Dly/Rvb	
Decay	Treble	Bass Mpy	Size	Diffus

Remember that pressing VIEW will display the parameters along with their settings.

Decay	Treble	Bass Mpy	Size	Diffus
3.6s	8.98kHz	0.71x	64Meter	75%

If you want to keep this modified preset as a new setup, it is a good idea to assign it a new name before storing it. To change the name of a setup, turn PAGE to "Name". The following display will appear.

Naming your new setup

Preset #	Name Edit:	Bright Hall		
<Char	Char>	-	-	-

Note that the first letter of the current setup name is underlined by a cursor, indicating that it is selected. Turning the ADJUST knob allows you to replace this character with the first letter of the name you want. The ADJUST knob dials sequentially through a list of alphanumeric characters in the following order: (space), 0-9, A-Z, a-z, and an assortment of standard symbols. Pressing the buttons under "<Char" and "Char>" will step the cursor to the left and right, allowing you to choose the characters you want to change.

After creating a new sound, and assigning it a name, you may want to save it for future use in one of the LXP-15's 128 registers. — New entries will overwrite any program stored at that location, so be careful not to store into a location that contains a setup you want to save. (We have provided a chart for you to record your own program entries at the end of this manual.)

Storing a new sound

To store a setup, turn PAGE to "Store". The following display will appear.

Store into Registr XX	Briter Hall			?
Reg #	-	-	-	Store

If the register shown on the top line of the display contains a setup you want to keep, select "Reg #" and turn ADJUST to a register you don't mind overwriting. When the display shows the register you want, simply press the button beneath "Store". Successful storage is indicated by the following display:

Stored Registr XX	Briter Hall			
Reg #	-	-	-	Store

Note: The LXP-15 will not perform a store instruction if memory write-protect is enabled (see next page), or if you accidentally try to store into a Preset location.

To recall a register, simply turn PAGE to "Setup", select "Registr" and dial the ADJUST knob to the register you want. The setup is automatically recalled and ADJUST may be used to modify the sound. (For footswitch control of setup changes, see Chapter 4: *Creating Sounds and Effects*.)

Recalling a register

System Parameters To access LXP-15 System Parameters, simply turn the PAGE knob to "Sys". The following display will appear:

MIDlchn	Contrst	Bright	MemProt	Update
(1-16,OMNI)	(1-16)	(0-15)	(On/Off)	(On/Off)

Pressing the button directly beneath any of these displayed items will select that item for alteration with the ADJUST knob.

MIDlchn This control sets the MIDI channel. When selected, the ADJUST knob allows you to choose MIDI Channels 1-16 (for both transmitting and receiving MIDI data), or to choose OMNI (messages received on all channels and transmitted on Channel 1).

Contrst Adjusting the contrast of the display allows you to optimize it for different viewing angles.

Bright The LXP-15 has 15 brightness levels to allow adjustment for different lighting conditions.

Memory Write-Protect Memory Write-Protect is a feature that lets you prohibit the overwriting of the setups stored in the registers. If the write-protect function is enabled, any attempt to store to a register will cause the following display to appear:

Registr XX	Name not stored !			
Reg #	-	-	-	Store

Selecting "Mem Prot" in System Parameter mode allows you to choose ON or OFF with the ADJUST knob.

Update This feature allows you to choose continual display update of patched parameter values (ON), or display of only the base values of patched parameters (OFF). See Chapter 4: *Creating Sounds and Effects* for details on patched parameters.

Note: Selection of Display Update ON will slow down the operation of the LXP-15 considerably. It is primarily useful when *setting up* patches, after which it is recommended that it be turned OFF.

The Algorithms

The LXP-15 contains five effects algorithms: Delay/Reverb, Pitch/Delay, Gate, Plate, and Chorus Delay. When a preset or register is loaded, its algorithm is shown in the top line of the display. (See Chapter 5: *The Presets* for a list of the algorithms used in each preset.)

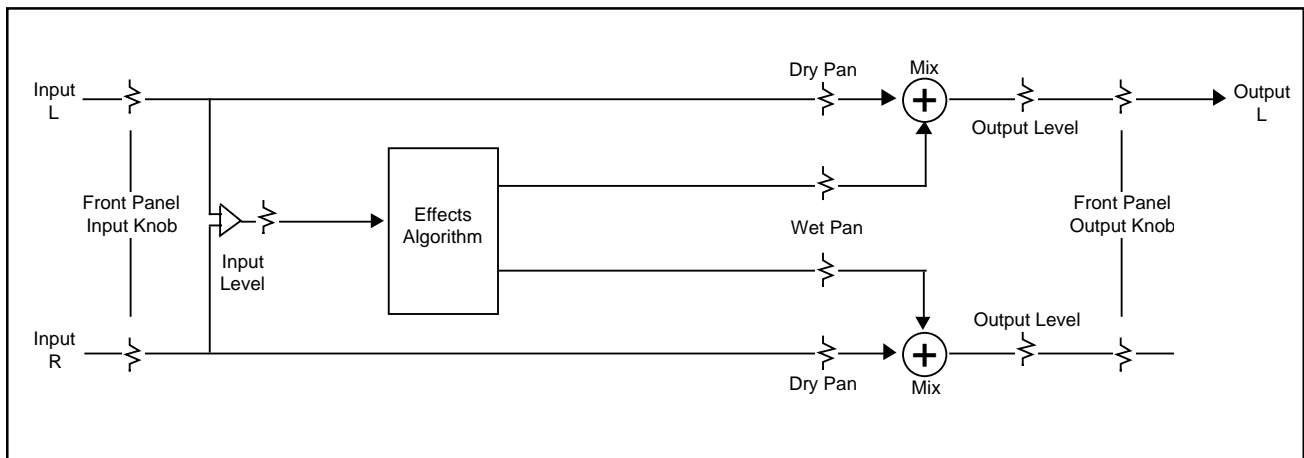
The algorithm parameters are grouped by function onto five pages: Delay, Pitch EQ, Reverb, Levels and Mod. This format allows you to find the delay parameters, for example, at the same page and display location in each algorithm. Parameters which are not available in an algorithm are assigned a blank space to maintain this format.

NOTE: You can change the current algorithm by turning the PAGE knob to "Alg" and using ADJUST to select a different algorithm. Be aware that different algorithms have different parameters. Changing algorithms with ADJUST may cause some parameters to be set to undesirable values. For this reason, when you want to work with a different algorithm, select and load a preset or register with the desired algorithm. This ensures that all parameters are set to normal values.

The general signal flow through the LXP-15, as well as the features and parameters of each of the five effects algorithms are described on the following pages.

The general signal flow through the LXP-15 is illustrated below.

Signal Flow



The routing and mixing of input and output signals for all algorithms are controlled by the five parameters found on the "Level" page. As these parameters are common to all LXP-15 algorithms, they are described first. The algorithm-specific parameters will be described with each algorithm.

LEVEL				
InLevl	Mix	Wet Pan	Dry Pan	OutLevl
0-100%	0-100%	100%L-51%L, Center, 51%R-100%R	100%R-51%R, Center, 51%R-100%R	0-100%

Input Level: Adjusts the amount of input signal sent into the effects algorithm. This signal is the sum of the left and right inputs, after the front-panel input control.

Mix: Adjusts the mixture of the dry (left and right inputs) and wet (the left and right algorithm outputs) signals sent to the left and right outputs. When set to 0%, only dry signal is present at the outputs. When set to 100%, only wet signal is present at the outputs.

Dry Pan: A pan control for the dry signal. When a mono input source is used, Dry Pan will "move" the sound between the left and right speakers. When a stereo, or two-channel input source is used, Dry Pan will make one channel louder as the other gets softer.

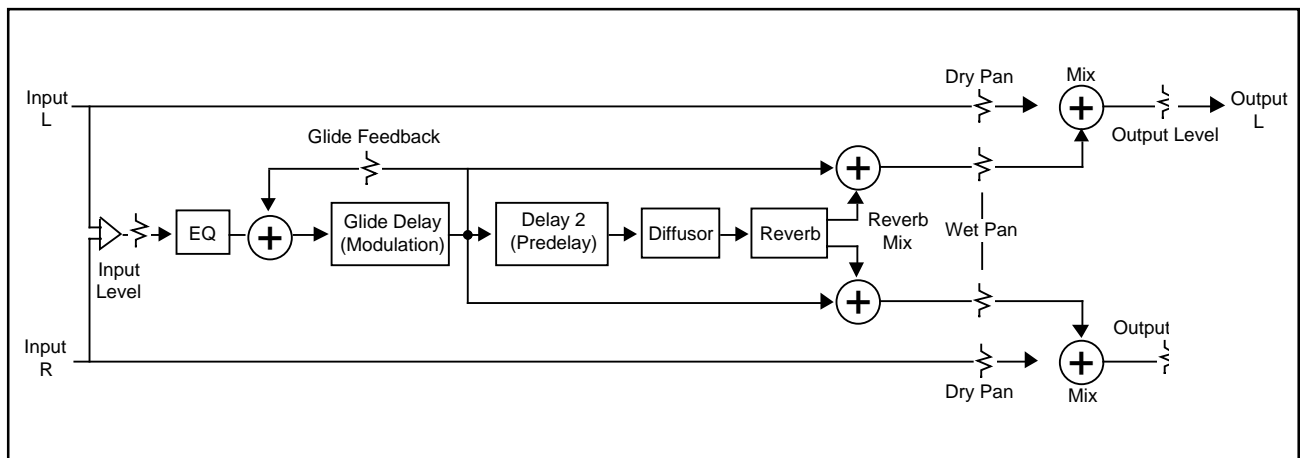
Wet Pan: A pan control for the wet signal. All effects in the LXP-15 are mono-in/stereo-out. Wet Pan will make one effects channel louder as the other gets softer.

Output Level: Adjusts the amount of dry/wet mix sent to the front panel output control.

To get some idea of the types of sounds and effects that can be created with the Delay/Reverb algorithm, be sure to listen to and experiment with presets built on this algorithm. (See Chapter 5: *The Presets*.)

Delay/Reverb

The Delay/Reverb algorithm consists of an equalizer in series with a unique glide delay line and reverb simulator. The glide delay can be smoothly modulated through its entire range with no glitches. While it is being modulated, the glide delay produces pitch shift effects. Increasing delay times will shift the pitch of signals being processed flat; decreasing delay times will shift the pitch sharp. The amount of pitch shift will decrease as the glide delay stabilizes at the new delay time. (There is no pitch shift when the delay has stabilized.) The reverberator is a full-featured room simulator with its own pre-delay. Its many parameters allow you to design almost any space you can imagine. One unique feature of this reverberator is infinite reverb: a wash of reverberated sound that sustains forever. (See *Decay*)



DELAY				
Glidely 0-638ms (64µs steps)	Gldfbk 0-100%	Delay 2 0-179ms (20µs steps)	-	-
PITCH EQ				
-	-	-	HiCut 320Hz-11.6kHz, Full	LoCut Full, 19Hz-1.35kHz
REVERB				
Decay .6-6.1s, Infinite	Treble 320Hz-11.6kHz, Full	BassMpy .35x-2.50x	Size 8M-71M	Diffus 0-100%
LEVEL				
InLevl 0-100%	Mix 0-100%	Wet Pan 100%L-51%L, Center, 51%R-100%R	Dry Pan 100%R-51%R, Center, 51%R-100%R	OutLevl 0-100%
MODULATION				
LFO Rat 03Hz-4.84Hz	Rvb Mix 0-100%	-	-	-

Parameter pages in the Delay/Reverb algorithm

Delay/Reverb parameters **Glide Delay:**The Host predelay for this algorithm, providing up to 683ms of delay. Glide Delay produces pitch shift effects while it is being modulated. Controlling Glide Delay with the LFO can produce vibrato, chorus and flanging effects.

When creating patches, Glide Delay is controlled from two patch page parameters. Gldlyhi provides coarse control over the entire delay range for the parameter (0-683ms). Gldly provides fine control over a smaller range (0-16.1ms).

Glide Feedback: A positive feedback loop around Glide Delay. When set to maximum (100%), it continues to add input signal into the feedback loop. Use feedback for repeating echo effects and to deepen chorus/flanging effects created by modulating Glide Delay.

Delay 2: Reverb predelay following the glide delay. It can provide as much as 179ms of additional delay. For setups that use a mix of both the glide delay and reverberator outputs, use Delay 2 to acoustically separate the two effects. Like Glide Delay, Delay 2 is controlled from two patch page parameters. Dly2hi provides coarse control over the entire delay range for the parameter (0-179ms). Dly2 provides fine control over a smaller range (5.04ms).

HiCut: Adjusts high frequency roll-off for the algorithm. Roll-off is adjustable in 16 steps from flat to 320Hz.

LoCut: Adjusts low frequency roll-off for the algorithm. Roll-off is adjustable in 32 steps from flat to 19Hz.

Decay: Adjusts the reverb time for mid-frequency signals. Because low frequency reverb time (Bass Multiply) is a multiplier of decay time, this parameter acts as a Host control for reverb time.

In this algorithm, Decay can be set to produce infinite reverb effects. When set to "Infnit," sounds in the reverb continue to reverberate, but do not decay. (For a truly infinite reverb effect, all of the reverb page settings must be set appropriately. See *Patching Examples* for an example of this effect.) While decay is set to "Infnit" input is locked out of the reverberator. This allows you to play over the reverb wash, and prevents cumulative overloading. Experiment with controlling Decay with MIDI Velocity or the input envelope follower for performance control of this effect.

Treble : Sets the frequency above which sounds decay at a progressively faster rate. When set relatively low, it gives a darker tone to the reverberation, simulating the effect of air absorption in a real hall. Maximum setting gives a flat response through the filter section.

Bass Multiply: Sets the reverb time for low-frequency signals, as a multiplier of the Decay parameter. For example, if Bass Multiply is set to 2X and Decay is set for 2 seconds, the low-frequency reverb time will be 4 seconds. For a natural-sounding hall ambience, values of 1.5X or less are recommended.

Size: Sets the rate of buildup of diffusion after the initial period (which is set by Diffusion). It also acts as a Host control for Decay. Because of this link, Size changes a reverb sound from very large to very small. Generally, you should set Size before adjusting anything else. The size in meters is roughly equivalent to the longest dimension of the space you are trying to create. Note that changing Size temporarily mutes the outputs.

Diffusion: Controls the degree to which initial echo density increases over time. High settings of Diffusion result in high initial buildup of echo density; low settings cause low initial buildup. Echo density is affected by Size — smaller spaces will sound denser. To enhance percussion, use high settings of Diffusion. For clearer and more natural vocals, mixes and piano music, use low or moderate Diffusion settings.

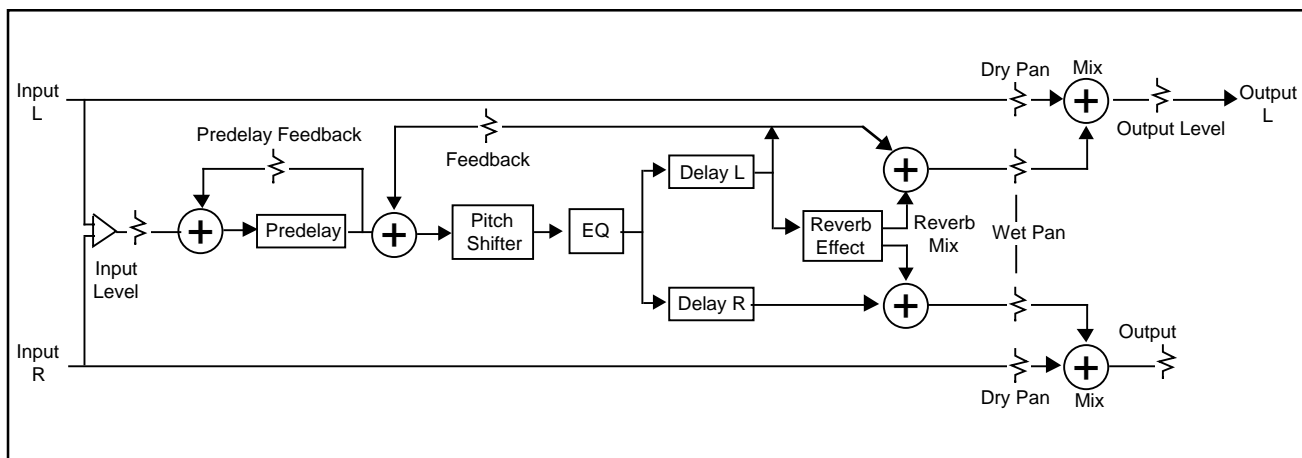
LFO Rate: Adjusts the rate of the internal LFO. Note that in order to hear the effect of changing the LFO Rate, the LFO must first be patched to control some parameter in the algorithm. (Check out presets 53-65 for LFO patches.)

Reverb Mix: Adjusts the mix of reverb with glide delay effects. You can listen to the glide delay output without any reverb effects by setting Reverb Mix to 0.

Pitch/Delay To get some idea of the types of sounds and effects that can be created with the Pitch/Delay algorithm, be sure to listen to and experiment with presets built on this algorithm. (See Chapter 5: *The Presets*.)

The Pitch/Delay algorithm allows as many as six simultaneous effects in series: long delay with infinite looping, pitch shift, EQ, stereo delay, reverb, and a panner. Delay L can be fed back through the pitch shifter for cascade effects. Pitch/Delay is very useful for creating complex layered effects for instruments and vocals. For example, you can have filtered echoes, pitch shift chorusing, enhanced stereo spread, and reverb, all at once.

A special feature of this algorithm is loop sampling. The Predelay can be used as a loop sampler controlled by Predelay Feedback. Any Pitch/Delay setup can use the loop sampling feature. (Check out presets 116 and 117.) Choose a length for Predelay, and set Predelay Feedback to 100% to start recirculation and lock out further input. To precisely cue the end of the loop, set the Mix control to 0% and listen to the input. Once the loop is captured, experiment with changing Pitch/Delay to shorten it, or Interval to change its pitch.



DELAY				
Predely 0-1.04s (64µs steps)	PdlyFbk 0-100%	Delay L 0-325ms (20µs steps)	Feedbak 0-100%	Delay R 0-325ms (20µs steps)
PITCH EQ				
Pitch On, Off	Intervl -2oct to +1oct (in semitones)	PchFine -64 to +63 (128 steps)	HiCut 320Hz-11.6kHz, Full	LoCut Full, 19Hz-1.35kHz
REVERB				
Decay .6-6.1s, Infinite	Treble 320Hz-11.6kHz, Full	BassMpy .35x-2.50x	Size 8M-33M	Diffus 0-100%
LEVEL				
InLevl 0-100%	Mix 0-100%	Wet Pan 100%L-51%L, Center, 51%R-100%R	Dry Pan 100%R-51%R, Center, 51%R-100%R	OutLevl 0-100%
MODULATION				
LFO Rat 0.03Hz-4.84Hz	Rvb Mix 0-100%	-	-	-

Parameter pages in
the Pitch/Delay algorithm

Predelay: The Host predelay for the algorithm, providing as much as 1.04 seconds of delay. It serves as the base delay for the pitch shifter and stereo delay. It can also be used to capture and loop up to 1.04 seconds of audio to create loop sampler effects.

Pitch/Delay parameters

When creating patches, Predelay is controlled from two patch page parameters. Pdlyhi provides coarse control over the entire delay range for the parameter (0-1.04s). Pdly provides fine control over a smaller range (0-16.1ms).

Predelay Feedback: A positive feedback loop around predelay. When set to maximum (100%), it locks out further input and begins an infinite loop with a length equal to the current setting of Predelay.

Delay L: Reverb predelay and source for left channel unreverberated signal and feedback. Like Predelay, Delay L is controlled from two patch page parameters. DlyLhi provides coarse control over the entire delay range for the parameter (0-325ms). DlyL provides fine control over a smaller range (0-5.04ms).

Feedback: A positive feedback loop around the pitch shifter, EQ and Delay L. When the pitch shifter is enabled, feedback will produce *cascade* effects. Short Delay L times will produce chords; long Delay L times will produce arpeggios. The higher the feedback setting, the more notes in the chord or arpeggio. If HiCut or LoCut are set to produce roll-off, feedback will increase the roll-off with each recirculation. When set to maximum (100%), feedback continues to add input signal into the feedback loop.

Delay R: Delay for right channel unreverberated signal. Like Predelay, Delay R is controlled from two patch page parameters. DlyRhi provides coarse control over the entire delay range for the parameter (0-325ms). DlyR provides fine control over a smaller range (0-5.04ms).

Pitch On/Off: Enables the pitch shifter. Selecting “Off” bypasses the pitch shifter and the small delay associated with it.

Interval: Adjusts the pitch shift in semitone increments from two octaves below to one octave above the original pitch. Control this parameter with Last Note, High Note or Low Note for MIDI harmonizer or loop sampler effects.

Pitch Fine: Provides a fine adjustment of pitch for detuning effects. The MIDI source range of 0-127 is interpreted as being centered on 64. Control this parameter with such sources as the LFO and input envelope follower to produce vibrato, doubling and detune effects.

HiCut and LoCut: Adjusts high-frequency and low-frequency roll-off. Setting both HiCut and LoCut to “Full” gives a flat response through the EQ block. The EQ block of this algorithm is within a feedback loop. When roll-off (either HiCut or LoCut) is used with feedback, the amount of roll-off will increase as the recirculation is increased. Also, if the predelay loop is used for loop sample effects, the EQ section can dynamically alter the tone of the loop.

Decay: Adjusts the reverb time for mid-frequency signals. Because low frequency reverb time (Bass Multiply) is a multiplier of decay time, this parameter acts as a Host control for reverb time.

Treble : Sets the frequency above which sounds decay at a progressively faster rate. When set relatively low, it gives a darker tone to the reverberation, simulating the effect of air absorption in a real hall. Maximum setting gives a flat response through the filter section.

Bass Multiply: Sets the reverb time for low-frequency signals, as a multiplier of the Decay parameter. For example, if Bass Multiply is set to 2X and Decay is set for 2 seconds, the low-frequency reverb time will be 4 seconds. For a natural-sounding hall ambience, values of 1.5X or less are recommended.

Size: Sets the rate of buildup of diffusion after the initial period (which is set by Diffusion). It also acts as a Host control for Decay. Because of this link, Size changes a reverb sound from very large to very small. Generally, you should set Size before adjusting anything else. The size in meters is roughly equivalent to the longest dimension of the space you are trying to create. Note that changing Size temporarily mutes the outputs.

Diffusion: Controls the degree to which initial echo density increases over time. High settings of Diffusion result in high initial buildup of echo density; low settings cause low initial buildup. Echo density is affected by Size — smaller spaces will sound denser. To enhance percussion, use high settings of Diffusion. For clearer and more natural vocals, mixes and piano music, use low or moderate Diffusion settings.

LFO Rate: Adjusts the rate of the internal LFO. Note that in order to hear the effect of changing the LFO Rate, the LFO must first be patched to control some parameter in the algorithm. (Check out presets 53-65 for LFO patches.)

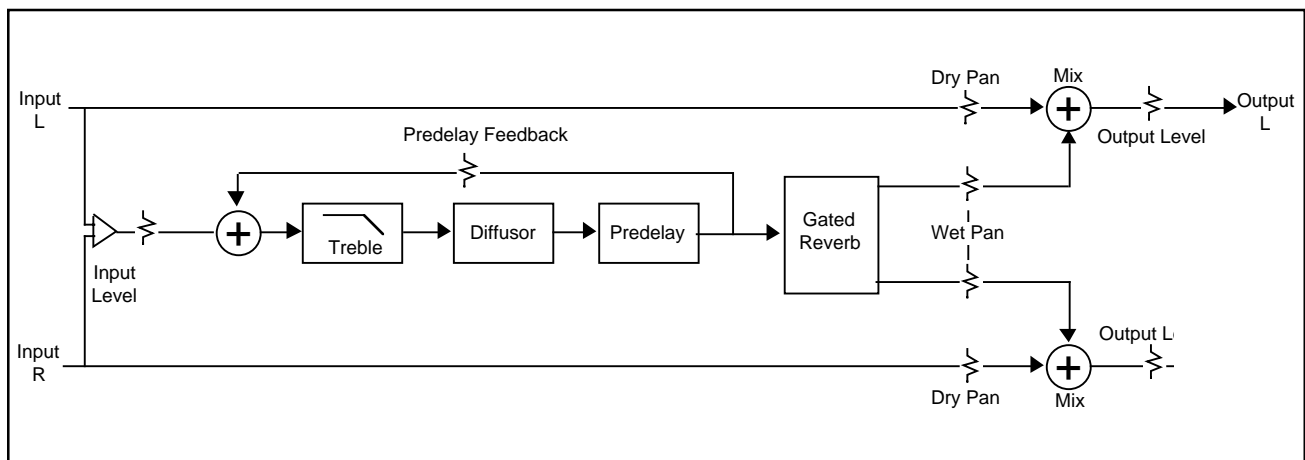
Reverb Mix: Adjusts the mix of reverb with pitch shift/EQ/stereo delay effects.

Gate

To get some idea of the types of sounds and effects that can be created with the Gate algorithm, be sure to listen to and experiment with presets built on this algorithm. (See Chapter 5: The Presets.)

The Gate algorithm is a reverb effect with a fairly constant sound and no decay until the reverb is cut off abruptly. This algorithm is a popular choice for percussion – particularly for snare and toms, but be sure to experiment with other sound sources as well.

The Mix, Predelay, and Treble parameters are very important in this algorithm, allowing you to create anything from an enhancement or subtle thickening, to a solid wall of reverb.



DELAY				
Predely 0-262ms (32µs steps)	PdlyFbk -99% to +99%	-	-	-
PITCH EQ				
-	-	-	-	-
REVERB				
Slope 0-127 (128 steps)	Treble 320Hz-11.6kHz, Full	-	Size 8M-39M	Diffus 0-100%
LEVEL				
InLevl 0-100%	Mix 0-100%	Wet Pan 100%L-51%L, Center, 51%R-100%R	Dry Pan 100%R-51%R, Center, 51%R-100%R	OutLevl 0-100%
MODULATION				
LFO Rat 0.03Hz-4.84Hz	-	-	-	-

Parameter pages in the Gate algorithm

Gate parameters **Predelay:** A predelay providing up to 262ms of delay. It is located after Treble and Diffusion and before the gated reverb. Relatively short predelay times (60ms or less) will add depth to gate effects that use a mix of wet and dry signal. Longer predelay times will produce a noticeable slap, or echo, between the wet and dry signals.

When creating patches, Predelay is controlled from two patch page parameters. Pdlyhi provides coarse control over the entire delay range for the parameter (0-262ms). Pdly provides fine control over a smaller range (3.96ms).

Predelay Feedback: A feedback loop around Treble, Diffusion, and Predelay. When set to maximum ($\pm 99\%$), it continues to add input signal to the feedback loop. Feedback can be positive or negative. Note that since Treble and Diffusion are within the feedback loop, their effects on the overall sound will be enhanced as feedback is increased.

Slope: Determines how the amplitude builds over time (Size). Low Slope settings result in a higher amplitude at the beginning of the gated reverb; high Slope settings result in a higher amplitude at the end of the gate.

Treble: Adjusts high-frequency roll-off. Setting Treble to "Full" gives a flat response. As noted above, Treble is within the Predelay feedback loop. If Treble is set to some value other than Full, then the roll-off slope at the selected frequency will increase with each pass through the feedback loop. For example, if Predelay and Predelay Feedback are set to produce echoes (200ms and 75%) and Treble is set to 1.92kHz, the echoes will become progressively darker.

Size: Sets the rate of buildup of diffusion after the initial period (which is set by Diffusion). It also acts as a Host control for Slope. Because of this link, Size changes a gated reverb sound from very large to very small. Generally, you should set Size before adjusting anything else. The size in meters is roughly equivalent to the longest dimension of the space you are trying to create. Note that changing Size temporarily mutes the outputs.

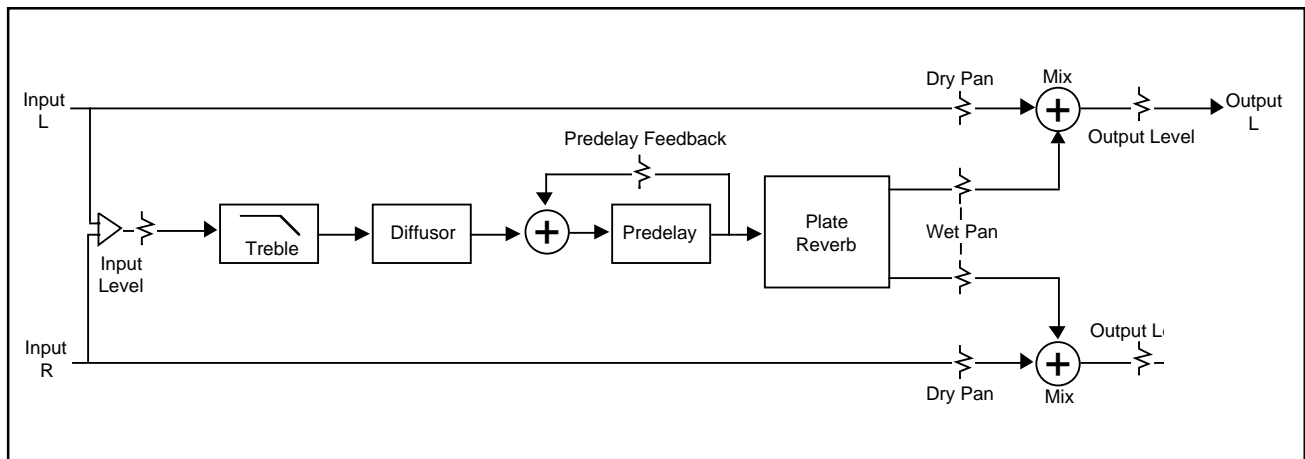
Diffusion: Controls the degree to which initial echo density increases over time. High settings of Diffusion result in high initial buildup of echo density; low settings cause low initial buildup. Echo density is affected by Size — smaller spaces will sound denser. To enhance percussion, use high settings of Diffusion. Like Treble, Diffusion is also inside the Predelay feedback loop. When feedback and diffusion are used together, the amount of diffusion will increase with each repetition of the loop.

LFO Rate: Adjusts the rate of the internal LFO. Note that in order to hear the effect of changing the LFO Rate, the LFO must first be patched to control some parameter in the algorithm. (Check out presets 53-65 for LFO patches.)

To get some idea of the types of sounds and effects that can be created with the Plate algorithm, be sure to listen to and experiment with presets built on this algorithm. (See Chapter 5: The Presets.)

Plate

The Plate algorithm is a reverb simulator that produces reverb effects with the characteristic sound of metal-plate reverberators. It has high initial diffusion and a relatively bright, colored sound. Its effect is designed to be heard as part of the music, enhancing and thickening the source material. The Plate algorithm is often the best choice for percussion, and also works well with other types of source material such as acoustic guitars and piano.



DELAY				
Predely	PdlyFbk	-	-	-
0-262ms (32μs steps)	-99% to +99%			
PITCH EQ				
-	-	-	-	-
REVERB				
Decay	Treble	BassMpy	Size	Diffus
.6-6.1s	320Hz-11.6kHz, Full	.35x-2.50x	8M-87M	0-100%
LEVEL				
InLevl	Mix	Wet Pan	Dry Pan	OutLevl
0-100%	0-100%	100%L-51%L, Center, 51%R-100%R	100%R-51%R, Center, 51%R-100%R	0-100%
MODULATION				
LFO Rat	-	-	-	-
.03Hz-4.84Hz				

Parameter pages in the Plate algorithm

Plate parameters **Predelay:** Predelay for the plate. When creating patches, Predelay is controlled from two patch page parameters. Pdlyhi provides coarse control over the entire delay range for the parameter (0-262ms). Pdly provides fine control over a smaller range (3.96ms).

Predelay Feedback: A feedback loop around the predelay. It can be set for positive or negative feedback. When set to maximum ($\pm 99\%$), input signal continues to be added to the loop.

Decay: Adjusts the reverb time for mid-frequency signals. Because low frequency reverb time (Bass Multiply) is a multiplier of decay time, this parameter acts as a Host control for reverb time.

Treble : Sets the frequency above which sounds decay at a progressively faster rate. When set relatively low, it gives a darker tone to the reverberation, simulating the effect of air absorption in a real hall. Maximum setting gives a flat response through the filter section.

Bass Multiply: Sets the reverb time for low-frequency signals, as a multiplier of the Decay parameter. For example, if Bass Multiply is set to 2X and Decay is set for 2 seconds, the low-frequency reverb time will be 4 seconds. For a natural-sounding plate reverb, 1.0X or less is recommended.

Size: Sets the rate of buildup of diffusion after the initial period (which is set by Diffusion). It also acts as a Host control for Decay. Because of this link, Size changes a reverb sound from very large to very small. Generally, you should set Size before adjusting anything else. The size in meters is roughly equivalent to the longest dimension of the space you are trying to create. Note that changing Size temporarily mutes the outputs.

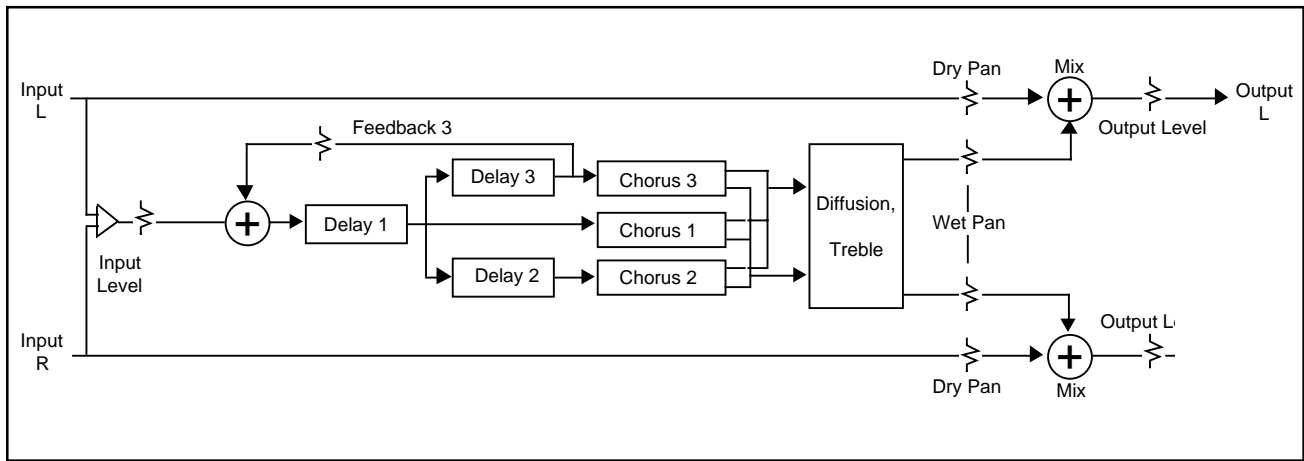
Diffusion: Controls the degree to which initial echo density increases over time. High settings of Diffusion result in high initial buildup of echo density; low settings cause low initial buildup. Echo density is affected by Size — smaller spaces will sound denser. To enhance percussion, natural vocals, mixes and piano music, use high settings of Diffusion.

LFO Rate: Adjusts the rate of the internal LFO. Note that in order to hear the effect of changing the LFO Rate, the LFO must first be patched to control some parameter in the algorithm. (Check out presets 53-65 for LFO patches.)

To get some idea of the types of sounds and effects that can be created with the Chorus Delay algorithm, be sure to listen to and experiment with presets built on this algorithm. (See Chapter 5: The Presets.)

Chorus Delay

The Chorus Delay algorithm is a six voice chorus configured as three stereo pairs. Delay 1 sets the base delay for all three pairs, Delay 2 and Delay 3 set an additional delay offset for Chorus 2 and Chorus 3. Random chorusing of $\pm 4\text{ms}$ of all three pairs is controlled by Chorus Rate. The feedback loop around Chorus 1 and Chorus 3 provides positive and negative feedback for dramatic chorus and flanging effects.



DELAY				
Delay1 0-794ms (8.19ms steps)	-	Delay2 0-1.04s (8.19ms steps)	Feedbk3 -99% to +99%	Delay3 0-1.04s (8.19ms steps)
PITCH EQ				
-	-	-	Treble 320Hz-11.6kHz, Full	-
REVERB				
-	-	-	-	Diffus 0-100%
LEVEL				
InLevl 0-100%	Mix 0-100%	Wet Pan 100%L-51%L, Center, 51%R-100%R	Dry Pan 100%R-51%R, Center, 51%R-100%R	OutLevl 0-100%
MODULATION				
LFO Rat 03Hz-4.84Hz	ChorRat 1-16 (16 steps)	-	-	-

Parameter pages in the Chorus Delay algorithm

Chorus Delay parameters

Delay 1: Delay setting for the first pair of chorus outputs providing up to 794ms of delay. Also the base delay setting for the Delay 2 and Delay 3. When creating effects with multiple delay settings, use Delay 1 to set the *shortest* delay.

Delay 2: The delay setting for the second pair of chorus outputs providing up to 1.04 seconds of additional delay. Note that the total delay setting for this pair of outputs is the value of Delay 1 added to Delay 2. (The maximum total delay is 1.798 seconds.)

Delay 3: The delay setting for the third pair of chorus outputs providing up to 1.04 seconds of additional delay. Note that the total delay setting for this pair of outputs is the value of Delay 1 added to Delay 3. (The maximum total delay is 1.798 seconds.)

Feedback 3: Feedback loop around Delay 1 and Delay 3. When set to maximum ($\pm 99\%$), it continues to add input signal to the loop. Note that feedback in this algorithm can be either positive or negative. Both produce a more pronounced chorusing effect, but each produces a different tonal quality for a given set of delay values.

Treble: Adjusts the high frequency roll-off of the summed stereo outputs of the three chorus voices.

Diffusion: Adjusts the diffusion of the summed stereo outputs of the three chorus voices. Higher diffusion settings will soften the attack of percussive sounds.

Chorus Rate: Adjusts the overall depth and rate of all three chorus voices.

LFO Rate: Adjusts the rate of the internal LFO. Note that in order to hear the effect of changing the LFO Rate, the LFO must first be patched to control some parameter in the algorithm. (Check out presets 53-65 for LFO patches)

Creating Sounds and Effects

The presets in the LXP-15 provide you with a wide range of sounds and effects which you can use right out of the box. You can create new sounds simply by calling up one of these presets and experimenting with the parameters until you get a sound that you like. Not only can you adjust parameters with the front-panel ADJUST knob, but you can change them automatically with a number of control Sources. This ability to assign a control Source to an effect parameter is called “patching.” It is one of the most powerful features of the LXP-15. Patching allows you to create sounds and effects that change dynamically in response to real-time performance.

To exploit the full potential of the LXP-15’s patching abilities, it is helpful to understand which parameters control different aspects of an effect—and what, in fact, each effect is. Following is a brief overview of some common effects. If you are already familiar with these, you may want to skip ahead to the next section where we discuss patching on the LXP-15.

Sounds have distinctive characteristics which make them recognizable to us. It is no surprise then that an analysis of the sound waves generated, for example, by a piano can be readily distinguished from those generated by a wind instrument. The art of synthesizing sounds such as these is now commonplace. The simulation of effects is more concerned with our perception of sounds and, generally, requires synthesis of the environment in which sounds occur — effects can create the impression of a piano playing in a padded cell, for example, or in a concert hall.

Sounds and Effects

All sounds are affected by their environment. From the moment a sound is generated and begins to travel (at the rate of one foot in about .9 milliseconds), it begins to change — merely passing through the air absorbs some of its energy. In the real world, sounds are distorted in a variety of ways between the time they occur and the time it takes them to reach our ears. They bounce off of near and far surfaces, each of which absorbs some of their energy and reflects them in various directions. Sounds seem to change in pitch when generated by moving objects as they approach and recede from us. Our perception of sounds changes as we approach their source, and as we hear them in different settings. Even the difference in the amount of time it takes a sound to reach our two ears contributes to the audio clues we use to identify sounds and to accurately locate their sources.

All of these characteristics can be used to simulate environments, to create the effect of sounds reaching us from a great distance, of performances in vast halls or tiny rooms. Extensive research into the acoustic properties of rooms, etc. has gone into the design of the LXP-15. The basic parameters of different environments have already been defined and are at your disposal when creating your own effects.

Reflections When a sound is reflected from walls and other surfaces, it loses some of its high frequency content. If the surface is soft, or padded, such as a curtain or rug, more high frequency content will be lost than if the surface is hard like tile or paneling. Harder surfaces give rise to more reverberation; they are more "live".

Echo True echo occurs when a sound bounces off an acoustically hard surface; its return is heard as a distinct repetition of the original sound. When synthesizing an echo, the level and the high frequency content of the delayed sound, relative to the original sound in the output mix, gives audible clues as to the hardness of the reflecting surface(s). The initial delay time determines the impression of the relative distance between the sound source, the imaginary reflecting surface, and the listening position. Long delay times provide a very distinct repetition of the source. Recirculation of the delayed sound (feedback) provides multiple repetitions, and suggests two or more reflective surfaces that are bouncing the sound back and forth.

Slap Echoes An echo of around one-tenth of a second (100 milliseconds) delay time can be heard as a distinct repetition of the original, but is so close that it is heard more as a rhythmic enhancement rather than as a separate sound. A repeat of this type is commonly called a "slap echo". Often, the delay time is carefully adjusted so that a simple relationship exists between the tempo of the music and the delay time. On drums, the slap is often positioned on the opposite side of the stereo field from the original sound. Careful use of slap echoes can increase the rhythmic density and spatial interest of a musical arrangement. The "Tempo" patch source of the LXP-15 can be used to automatically synchronize slap rhythms to a wide range of MIDI tempos.

Ambient echo Ambient echo effects simulate sound reflections from room surfaces — with random reflections, a gradual decay of overall level, and a gradual narrowing of the bandwidth. If the reflected sound continues to bounce back and forth between surfaces, it provides a long decaying "tail". To produce this effect, use 30-100ms of delay, in conjunction with feedback. Experiment with Hi and Lo cut filters to simulate different absorption characteristics of the reflecting surfaces (and of the air between them). To further enhance diffusion, try very small amounts of LFO modulation of delay time at a slow rate.

Delay settings can be varied to create larger or smaller spaces. The longer the delay times, the larger the space. Variation in the amount of feedback corresponds to the hardness of the imaginary reflecting surfaces, and use of rolloff can simulate the effects of air absorption on the high end of the sonic spectrum.

Plates Plate effects were originally generated by large, thin sheets of metal suspended upright under tension on springs. Transducers attached to the metal plate would transmit a signal which would, in turn, vibrate the plate. Because the plate provided a denser medium than air, sounds broadcast through it would seem to be occurring in a large open space. Synthesized plate effects mimic the sound of metal plates, with high initial diffusion and a relatively bright, colored sound. They are designed to be heard as part of the music, mellowing and thickening the initial sound itself. The plate sound is what most people used to associate with the term "reverb", and it is useful for all popular music, particularly percussion. The LXP-15 has a Plate algorithm dedicated to these effects.

Vibrato is the effect produced by small, regular variations in a sound's pitch; guitar vibrato, for example, is created by alternately stretching and relaxing the strings. The LXP-15 can create automatic regular vibrato for a single instrument, or mix of sounds, by means of sine wave modulation (LFO) of Glide Delay or Pitch fine. Personal control of the rate of vibrato can be created by patching an external foot pedal to the LFO.

Vibrato

Short delays (5ms) should be used with no feedback, and 100% delayed sound fed to the output. Moderate depth is more natural sounding, especially with realistic rate settings. (Both depend on the instrument and the music.)

True doubling is done by having a performer overdub a performance on a different track of a multitrack recorder. When the "takes" are synchronized, the normal variations in each performance provide enhancement — the effect is to "thicken" vocal tracks. Synthetic doubling combines the original sound with a delayed version (30ms) in order to make a single performer sound like two or more. The illusion of double tracking can be greatly improved by introducing a small amount of pitch vibrato (modulation of Glide Delay or Pitch fine), particularly if some envelope follower modulation (InLvl) is combined with sine wave modulation (LFO). This makes the pitch variations seem more random, more like what actually happens when a performer dubs in a second part.

Doubling

Chorusing is closely related to the doubling effect, but is more suggestive of a rotary speaker. The delay times used are usually somewhat shorter (20ms), the LFO modulation may be a little more exaggerated and, very often, feedback is introduced to increase the intensity of the effect. There are many possible variations of the chorusing effect; some shade into flanging, or doubling, or even echo. The LXP-15 provides a Chorus Delay algorithm which allows all of these variations.

Chorusing

Originally, flanging effects were created by simultaneously playing two identical programs on two tape recorders. By using hand pressure against the flange of the tape reels, one machine was slowed down slightly, then the other. The result was a series of changing phase cancellations and reinforcements, providing a "comb filter" and a characteristic swishing tunneling and fading sound.

Flanging

Flanging with a delay is much simpler; two tape recorders need not be kept in relative sync. In fact, no tape machine is necessary — flanging can be done as a live effect. A short delay (5-10ms), modulated by an LFO, is mixed with the original signal, causing cancellation (nulling) at a frequency whose period (the time for one cycle) corresponds to twice the delay time. Cancellation also occurs on odd harmonics of that frequency. The depth of cancellation depends on the level balance of direct and delayed sounds; maximum cancellation occurs at a 50-50 mix.

The flanging effect can be further altered by recirculating the delay with the feedback control. Larger amounts of feedback cause exaggerated "deep" flanges. Use of the envelope follower produces an interesting "talking flange"; where a sweep is produced for each attack of the input. Envelope and sine wave modulation can be mixed for a complex sweep which is really quite pleasing.

Resonant Effects Singing in the shower is one way to obtain a moderate, natural resonant effect. Startling resonances are possible with the LXP-15 by using short delay times with a lot of feedback. This causes a build-up of fundamental notes and harmonies whose period (the time for one cycle) is equal to the set delay time. These emphasized pitches are said to “resonate”. The effect can be characterized as adding a ringing, metallic quality to the sound.

The pitch and tone of the resonance is affected by delay time, phase, amount of feedback, and output mix. Care must be taken to keep feedback below the point where the unit will spontaneously oscillate (run away feedback). Use of the Hi and Lo cut filters allows greater amount of feedback to be used.

Long Delay Effects When the delay time is equal to, or greater than, the time for a single beat of the music, it becomes possible to play counterpoints and harmonies against previously-performed phrases. Careful synchronization of the performance and the delay time allows “polyphonic” sound from a single melodic line. A chart showing conversion of tempo (in beats/minute) to Delay Time (in milliseconds) is given at the end of this manual. The “Tempo” patch control source can be used to automatically synchronize rhythms to a wide range of MIDI tempos.

With no feedback, only one previous phrase will be audible; if feedback is added, each delay period will repeat more than once before it dies away. With large amounts of feedback, the performances will pile up, one phrase over another, until input to the delay line ceases. Using this overlay technique, it is possible to create compositions and rhythmic beds in real-time that can be continuously evolved by adding new notes as older ones are fading out.

Gating Gating is an effect which does not have its origins in real-world situations (except perhaps the silent slamming of a heavily insulated door shutting off all sound beyond it.) Gating allows you to cut off reverberation at any point before its natural decay time — which is in itself a dramatic effect. The LXP-15 has a Gate algorithm dedicated to these effects.

Pitch Shifting Altering the pitch of the duplicate of a sound allows a variety of effects ranging from subtle vibrato to extreme swings in pitch. Pitch shifting can be used to create chorusing, doubling effects, or musical harmonies. The LXP-15 has a Pitch/Delay algorithm dedicated to these effects. Use LFO modulation or Pitch fine for vibrato; use MIDI Note Number control of Pitch Interval for harmonizing.

Localization

A sound source can be located along two dimensions in the stereo field: lateral (left–right) and frontal (near–far). Lateral perception of a sound is affected by relative differences between left ear and right ear perception of loudness and the arrival time of sound from a single source. For lateral localization effects, you can control the left-right loudness of both the dry and wet signal with Dry Pan and Wet Pan. You can also create lateral localization effects by setting up a relative delay between the left and right signals. The sound will be perceived as coming from the undelayed side. Increasing the delay will increase the lateral shift. (Since the maximum distance between the ears and any path a sound might take to the ears is less than one foot, the maximum delay used for lateral localization is less than one millisecond.)

Frontal perception of sound is affected by such factors as relative loudness, high-frequency content and the relative mix of direct and reflected sound. As the sound source moves away, it grows softer, its high-frequency content decreases and more reflected sound is heard. If the source is moving relatively quickly, a pitch shift is heard as well. The pitch increases as the source approaches and decreases as it moves away. You can create frontal localization effects by controlling input/output levels, high-frequency roll-off, dry/wet mix, and pitch.

A useful localization effect for sound reproduction is to use delays to eliminate echoes and increase the intelligibility of sound systems.

Time delay can't eliminate reflections from walls or boundaries, but it can be used to eliminate the confusion that results when sound arrives at the listener from different loudspeakers at different times.

Ideally, the sound should arrive at the listener first from the main speakers and then about 20 milliseconds later from the auxiliary speaker (like the delay towers near the middle of the audience at a large rock concert). The LXP-15 can provide two delay paths for two zones of auxiliary speakers by using the stereo delay in the Pitch/Delay algorithm.

The correct amount of delay can be approximated by using the formula:

$$(d \times .885) + 20$$

where d = the difference in the path length to the listener from the main and the auxiliary speaker.

The result is the approximate number of milliseconds of delay required for the auxiliary speaker.

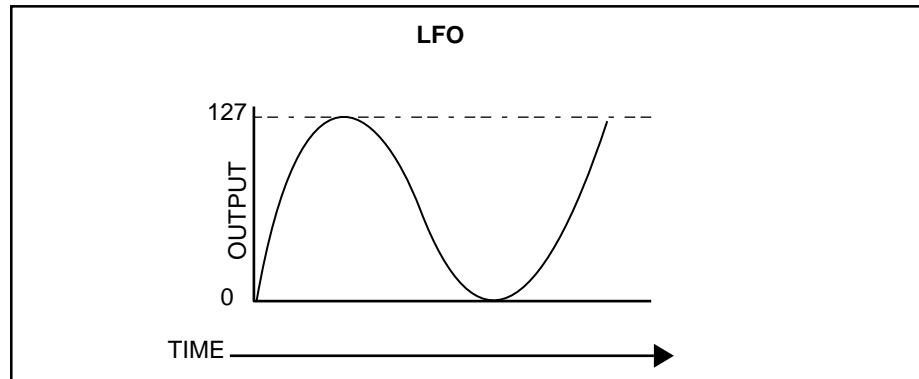
Patching Patching, as described previously, is the ability to assign a control (*Source*) to any LXP-15 parameter (*Destination*). This allows you to alter the value of the parameter by manipulating the control Source. For example, you can use a foot pedal as a Source and output level as a Destination. This patch will allow you to dynamically alter the volume of the sound with the motion of your foot. You can specify what position of the pedal corresponds to the initial setting of the parameter (pedal down, pedal up, or anywhere in between.) Furthermore you can specify how much of a change will be produced by a full sweep of the pedal, and which direction of motion (up or down) corresponds to an increase or decrease of the parameter value.

Sources All Sources are the same in the sense that each generates an output value in the range of 0-127. The output value is used to increase or decrease the initial setting of a Destination parameter. Sources differ in the manner in which they generate an output. Some generate values continuously (they're always "on"); some generate output based on the position of a particular slider, pedal or wheel on an external MIDI instrument. Some Sources generate output based on aspects of physical performance such as how loud, how fast, or how hard you play. The LXP-15 allows you to choose from a selection of 78 different Sources for each Destination. A table of the Sources available on the LXP-15 is shown on the following page, followed by a brief description of the different types of control Sources.

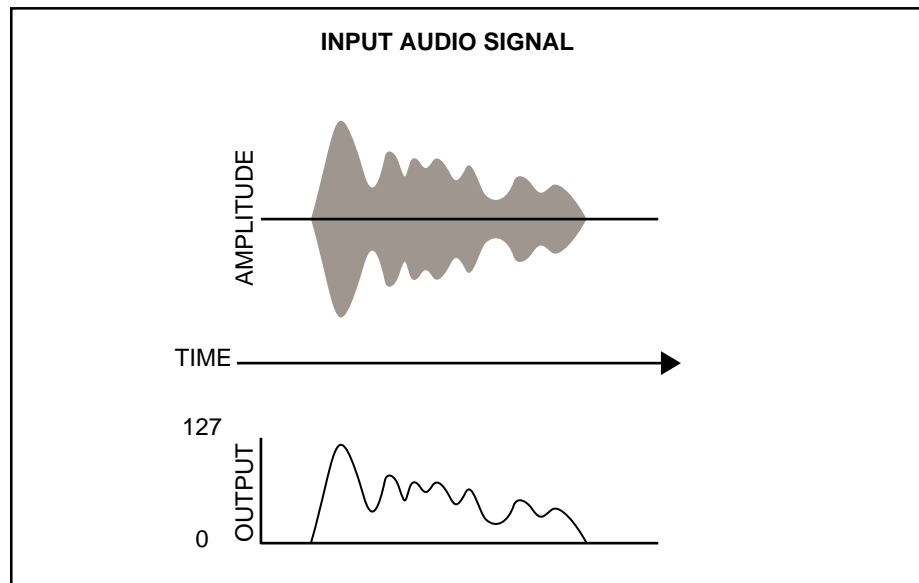
Source	Description	Type	Example presets
InLevl	internal controller	input envelope follower	82-84, 88-93, 119-126
Foot 5	rear-panel analog controller	slider or switch	
Foot 4	rear-panel analog controller	slider or switch	
Foot 3	rear-panel analog controller	slider or switch	
Foot 2	rear-panel analog controller	slider or switch	
Foot 1	rear-panel analog controller	slider or switch	77, 78, 98-102
Hi Note	highest MIDI note played	note number	
Low Note	lowest MIDI note played	note number	
LFO Out	internal controller	LFO sinewave	53-64, 66, 87,96
Tempo	MIDI clock	tempo	17, 41, 42
PchBend	MIDI pitch bender	bidirectional slider	117
Aftrtch	MIDI channel pressure	pressure	110-114
Velocity	MIDI note on velocity	velocity	
LastNot	last MIDI note played	note number	
PhasDep	MIDI phaser depth control	slider	
DetDept	MIDI detune control	slider	
ChorDep	MIDI chorus depth control	slider	
TremDep	MIDI tremolo depth control	slider	
ExtDept	MIDI ext effect depth control	slider	
70-90	MIDI controllers 70-90	slider	
Hold 2	MIDI hold2 ON/OFF	switch	
68	MIDI controller 68	slider	
Soft	MIDI soft pedal	switch	
Sosten	MIDI sostenuto	switch	
Portmnto	MIDI portamnto ON/OFF	switch	
Sustain	MIDI sustain pedal	switch	115-117
12-31	MIDI controllers 12-31	slider	
Expresn	MIDI expression controller	slider	
Pan	MIDI pan controller	bidirectional slider	
9	MIDI controller 9	slider	
Balance	MIDI balance controller	bidirectional slider	
Volume	MIDI volume controller	slider	
Data	MIDI data controller	slider	
PortTim	MIDI portamento time	slider	
Foot	MIDI foot controller	slider	
3	MIDI controller 3	slider	
Breath	MIDI breath controller	pressure	
Mod Whl	MIDI modulation wheel	slider	103-109
0	MIDI controller 0	slider	

Control Sources

LFO The LFO Source is an internally generated low-frequency sinewave. The LFO rate is variable from 0.03Hz to 4.84Hz. The LFO will produce smooth, continuous changes of a parameter value. Use it to create such effects as vibrato, chorus, and flange.

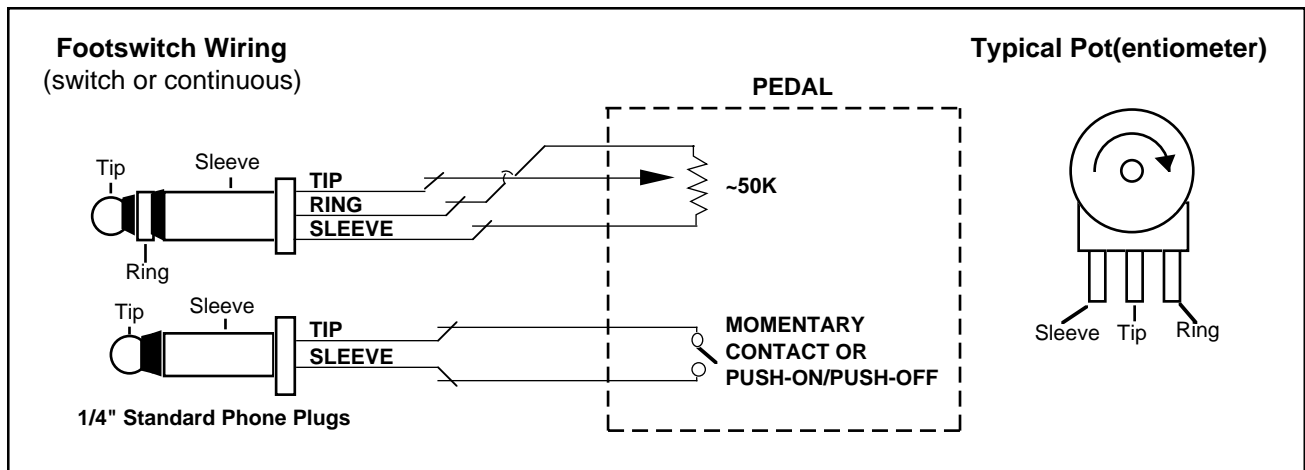


Input Envelope Follower The Input Envelope Follower (InLevel) is an internal Source that generates output based on the loudness (amplitude) of the input signal. The louder the input signal, the greater the output of the envelope follower. Use the Input Envelope Follower to create effects that change with the natural dynamics of the audio signal.



Each of the five rear-panel foot controller phone jacks can be connected to any compatible analog footswitch or pedal. These correspond to Sources Foot 1 through Foot 5. Foot pedals and switches allow you to control parameters during performance while keeping your hands free. You can also make your own analog rotary or slider controls using the following wiring diagram as a guide. Analog rotary and slider controls are good choices for controlling parameters used to fine tune the overall effect.

Analog Controllers

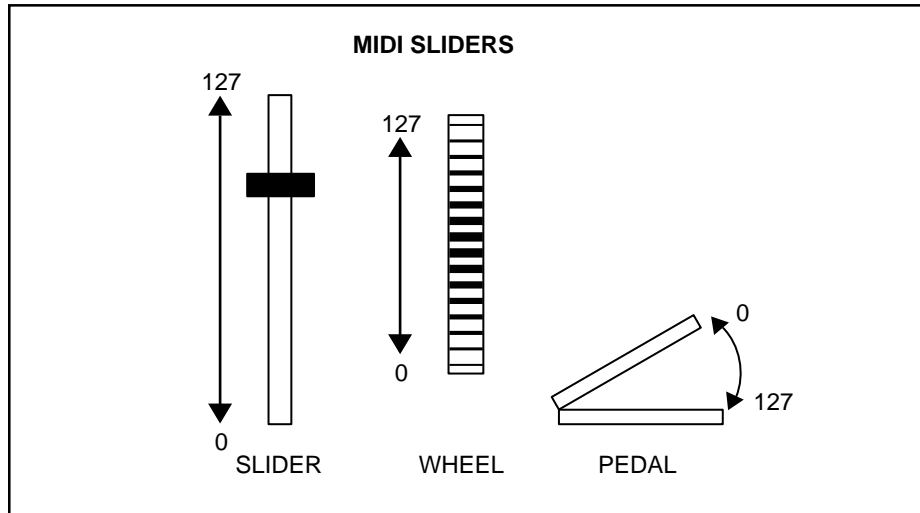


Almost all of the controllers found on a MIDI keyboard or other MIDI instrument can be used as Sources patched to control LXP-15 parameters in real-time. This feature is called Dynamic MIDI®. Most of the MIDI Sources correspond to MIDI *continuous controllers* (Mod Wheel, Volume, Sustain Pedal, etc.). The rest correspond to other specific MIDI messages (Velocity, After Touch, Note Number, Pitch Bend and MIDI Clock). Although there are more than 70 MIDI Sources recognized by the LXP-15, they can be grouped into six types of controls: sliders, switches, pressure, note number, velocity and tempo.

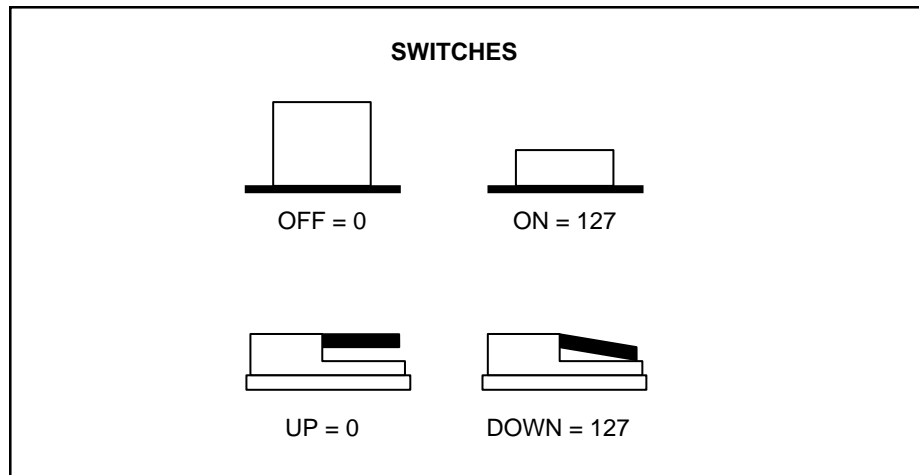
MIDI Sources

Not all messages are transmitted by every MIDI instrument. The *MIDI Implementation Chart* supplied with the MIDI instrument will detail which particular messages it can transmit.

MIDI Sliders Slider Sources correspond to some type of slider, pedal or wheel on the MIDI instrument. The output is determined by the physical position of the slider or wheel. Most sliders and wheels are implemented as unidirectional controllers. "Off" or "no change" corresponds to the minimum position. Pitch Bend, Pan and Balance are implemented as bidirectional controllers. "Off" or "no change" corresponds to the middle position of the control.

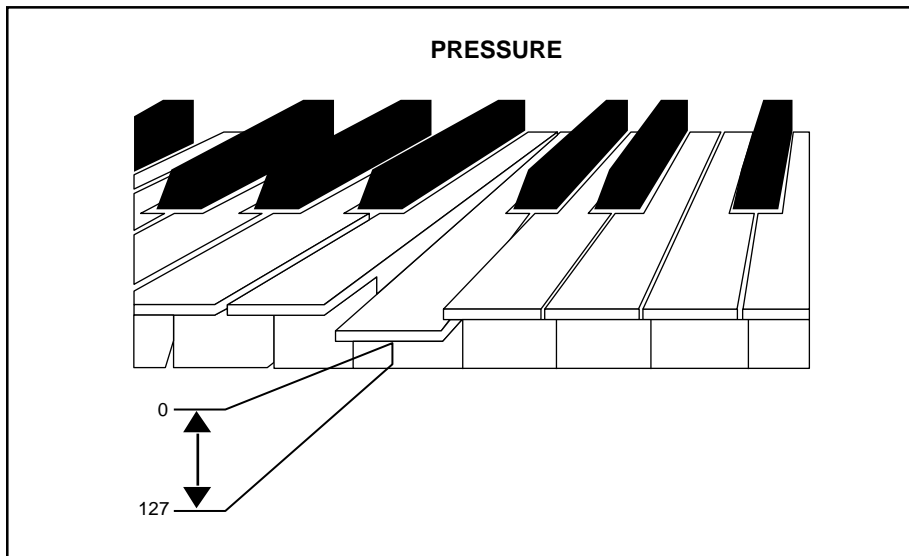


MIDI Switches The Switch Sources correspond to foot switches or front panel switches on the MIDI instrument. Switches generate 0 when the corresponding control is "off" and 127 when it is "on".



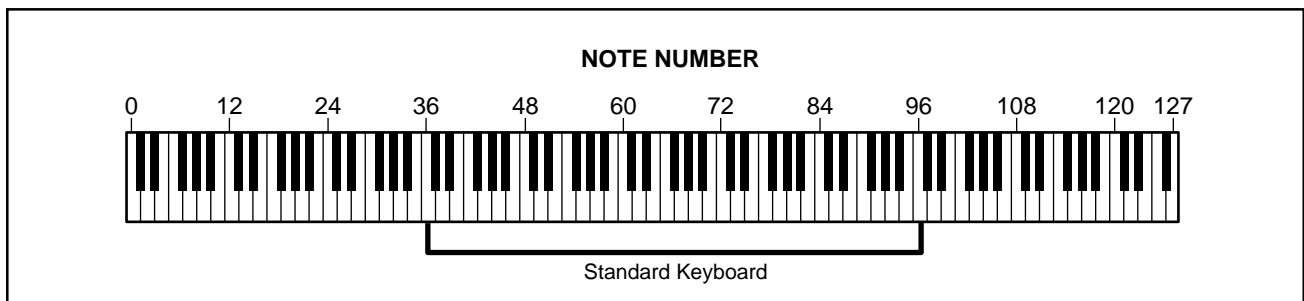
After Touch and Breath Sources correspond to pressure-type controllers on the MIDI instrument. After Touch produces output based on how hard the keys of a MIDI controller are pressed down after the initial velocity. Breath produces output based on how hard you blow into a wind controller. Minimum pressure generates 0 and maximum pressure generates 127. Note that these controllers differ from other MIDI controllers in that they are “return-to-zero” controllers. Their output will always cycle smoothly from 0 to some higher value (corresponding to the maximum amount of pressure applied to the controller) and then return to 0 again. Use After Touch and Breath to control parameters that will produce audible changes in the sound of an effect as it is processing audio.

MIDI Pressure

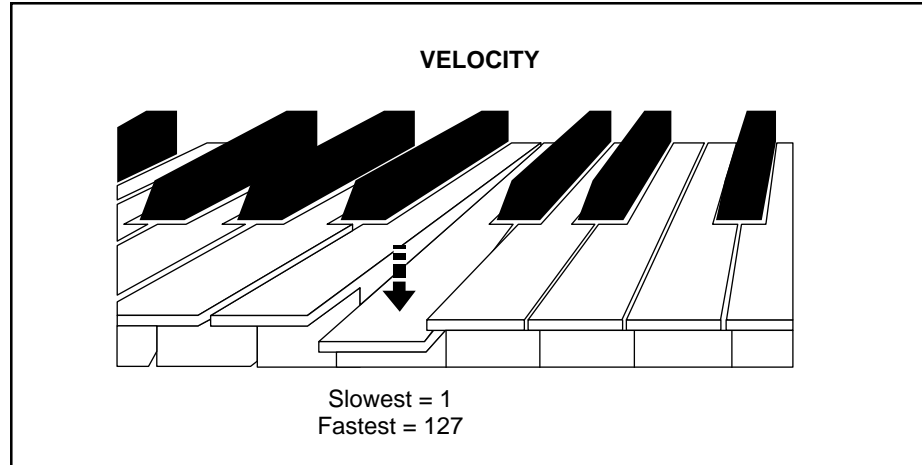


The Note Number Sources produce output based on the note played on the MIDI instrument. For reference, Note Numbers are shown here as they correspond to a MIDI keyboard, but they can also be generated from non-keyboard devices such as sequencers, guitar, wind and percussion controllers. Use Note Number controllers to control parameters that you want to vary within the pitch range of the control Source. (For example, a keyboard-controlled auto pan.) There are three different types of Note Number control Sources on the LXP-15: LastNote, LowNote, and HiNote. LastNote generates output based on the last note played. LowNote is similar to LastNote except that when more than one note is played at once, it generates output based on the lowest note played. HiNote is the same as LowNote, except it generates output based on the highest note played when more than one note is played at once.

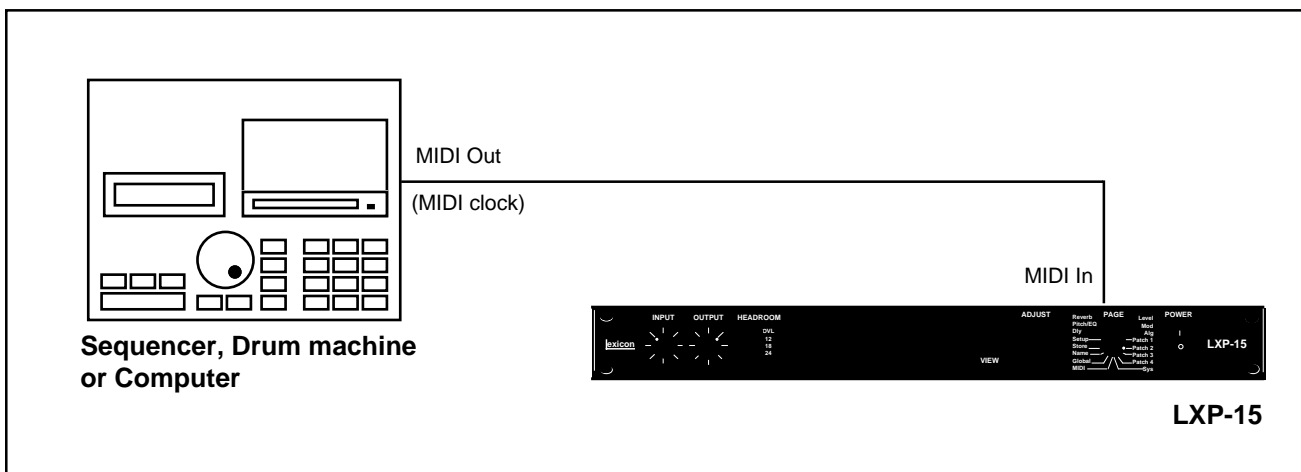
MIDI Note numbers



MIDI Velocity The Velocity Source generates output based on the Note On velocity transmitted by the MIDI instrument. Depending on the type of controller, this corresponds to how quickly a key is depressed, how hard a string is picked, how hard a percussion pad is struck, etc.



MIDI Tempo Tempo is different from other control Sources in that its value is determined by the rate of incoming MIDI Clock messages rather than by the physical position of a pedal, slider or other controller. Slower clock rates produce higher Tempo values; faster clock rates produce lower Tempo values. This allows you to create rhythmic echoes and other effects that can be synchronized to the tempo of MIDI drum machines and sequencers. In order to use Tempo patches, the MIDI Clock output of a drum machine or sequencer must be patched into the LXP-15's MIDI IN port. In *Using Scale with Tempo*, we'll describe how to use Tempo to produce specific rhythm values. (Check out presets 17, 41, and 42 for examples of patches that use Tempo as a Source.)



There are two types of patches possible on the LXP-15: Global patches and General Purpose patches. Global patches, accessed by turning PAGE to "Global," are simple Source-to-Destination links that are active for all setups. As many as 28 global patches can be active at once. General Purpose patches provide a more flexible Source-to-Destination link. General Purpose patches allow you to customize the range and sensitivity of control with threshold and scale functions. There can be as many as four General Purpose patches per setup. The four General Purpose patches for each setup are accessed by turning PAGE to "Patch 1," "Patch 2," "Patch 3," and "Patch 4."

Global and General Purpose Patches

Delay/Reverb	Pitch/Delay	Gate	Plate	Chorus Delay
Alghthm (global patches only)				
Glidely	Predely	Predely	Predely	Delay 1
Gldyhi	Pdlyhi	PredlyHi	PredlyHi	2
Gldfbk	PdlyFdbk	PdlyFbk	PdlyFbk	Feedback 3
Delay 2	Delay L	4	4	Delay 2
Delay2hi	DlyLhi	5	5	5
6	Feedbak	6	6	6
7	Delay R	7	7	Delay 3
8	DlyRhi	8	8	8
9	Pitch	9	9	9
10	Intervl	10	10	10
11	PchFine	11	11	ChorRat
Decay	Decay	Slope	Decay	12
Treble	Treble	Treble	Treble	13
BassMpy	BassMpy	14	BassMpy	14
Size	Size	Size	Size	15
Diffus	Diffus	Diffus	Diffus	Diffus
HiCut	HiCut	17	17	Treble
LoCut	LoCut	18	18	18
Rvb Mix	Rvb Mix	19	19	19
WetPan				
Dry PanMix				
OutLevel				
InLevl				
LFO Rat				
Setup + (global patches only)				
SetUp - (global patches only)				

Destination Parameters

Setting up Global Patches

NOTE: The Update function on the "Sys" page is an aid to creating patches. When Update is set to "On," the displayed Destination and Offset values will change as the Source controller is moved. This allows you to see the effect of a Source on its Destination. The Update function affects the response time of the LXP-15. Once you've got the patch set up the way you want, set Update to "Off" for the fastest response during performance.

Global patches can be enabled/disabled from the front-panel of the LXP-15. To do this, simply turn the PAGE knob to "Global." The display will show:

Dest	Source	-	-	Mode
X	X			X

Mode Pressing the button directly beneath "Mode" allows ADJUST to select: Off, Delayed or Immed.

Off disables all global patches.

When Delayed is selected and a new setup is recalled, the Destination values will remain at their initial settings until the assigned controllers are moved.

When Immed is selected and a new setup is recalled, the Destination values will immediately change to the current value of the assigned controllers.

NOTE: Set the Source for all Destinations you *don't* want to control globally to "Off." If the Destination is set to a Source not physically connected to the LXP-15, its value will jump to minimum when in the Immediate mode.

The Delayed mode is the best choice for most applications because the initial settings are retained until a control Source is moved.

Dest and Source Pressing the button immediately beneath Dest allows ADJUST to select any of the Destinations shown in the *Destination Parameters* table on the previous page. Destinations that are active in the algorithm of the current setup are displayed with a text label (Pitch, Delay L, etc.). Inactive Destinations are indicated by a number. As you scroll through the available Destinations, the Source currently assigned to each Destination will also be displayed. To change the Source assignment for any displayed Destination, press the button directly beneath "Source." ADJUST will now allow you to select any Source. Selecting "Off" as a Source disables the Source assignment (i.e. there will be no global patch assignment for the displayed Destination).

The relationship of Source position to Destination value is as follows for all Global patches: As the Source is moved from its minimum position to its maximum position, the Destination changes from its minimum value to its maximum value.

The Global patching system is provided so you can customize the overall response of the LXP-15 to your specific needs. Here are some general things to keep in mind about Global patching:

- The Delayed mode is the best choice for most performance applications since it retains recalled settings until you move a patched control.
- The Immed mode is the best choice for editing sessions when you want to create new setups “from scratch.”
- Don’t assign Alghm or Size to performance Sources like Velocity, Note Number, etc. These two parameters temporarily mute the outputs of the LXP-15 when they are changed.
- Although you can have as many as 28 global patches active at the same time, be aware that large numbers of active patches may cause the response time of the LXP-15 to slow down. (During performance, always set the Update mode on the Sys page to “Off” for optimum response time.)
- Global patches provide control over the entire range of the assigned Destination. The minimum and maximum values of the Destination correspond to the minimum and maximum positions of the Source. If you want to tailor the response of the Destination to the Source, use a General Purpose patch instead of a Global patch.
- Several delay times can be controlled with either fine or coarse parameters. The coarse parameters: Gldyhi, Pdlyhi, DlyLhi, etc., allow you to control the entire delay range with the Source. The fine parameters: Glidely, Predely, Delay L, etc., provide very fine control over a small portion of the total range. Use the coarse parameters for dramatic changes, and the fine parameters for subtle enhancements.
- Assigning the LFO Source to multiple Destinations may cause the response time of the LXP-15 to slow down.
- Controlling the LFO Rat Destination will not produce any audible effect unless LFO Rat is first patched to control some other Destination. (See presets 53-65 for LFO patching.)

Tips for Using Global Patches

With a momentary-contact footswitch, you can specify a global patch that will allow you to step sequentially through your setups. To do this, set up a global patch (in *Delayed* mode) with "Setup +" as a destination and "Foot 1" (or whichever footswitch connector you are using) as the source. With global patches enabled, every click of the footswitch will increment the setup number, allowing you to cycle through all presets and registers. The current setup will always be the starting point of the cycle. You can also choose "Setup -" as a destination to reverse direction.

Performance Tip: Arrange your setups in the registers to match your set list. By selecting the first register at the beginning of your first set, you can simply click through all the setup changes you need.

Footswitch Control of Setup Change

Footswitch Control of Mute and Bypass

You can use a toggle footswitch (switch open = maximum value, switch closed = minimum value) or a momentary-contact switch to control either mute or bypass of LXP-15 effects.

To do either, first go to the global patch page and select the *Delayed* mode, then select "Foot 1" (or whichever footswitch connector you are using) as the source.

Selecting "InLevl" as the destination, allows you to turn off the input level with the footswitch, allowing the effect to ring on.

Selecting "OutLevl" as the destination allows you to kill the output of the LXP-15 with the footswitch.

Selecting "Mix" as the destination (with the mix control set to 100% Dry and 100% scaling), allows you to use the footswitch to bypass the effect.

Level Page Parameters

The five "Level" page parameters (InLevl, Mix, Wet Pan, Dry Pan and OutLevl) are good choices for global control. They are common to all five algorithms, and the types of changes they produce are the same for every setup. For example, you could assign them to Foot 1–5 (connected to five analog rotary controls) and have levels, mix, and panning adjustments for all setups at your disposal.

Setting up General Purpose Patches

NOTE: The Update function on the "Sys" page is an aid to creating patches. When Update is set to "On," the displayed Destination and Offset values will change as the Source controller is moved. This allows you to see the effect of a Source on its Destination. The Update function affects the response time of the LXP-15. Once you've got the patch set up the way you want, set Update to "Off" for the fastest response during performance.

Four General Purpose patches are available for each setup in the LXP-15. A controller *threshold* is used along with a *scale factor* to calculate an *offset value*. The offset value is added to (or subtracted from) the initial value of the Destination parameter. The last calculated offset is stored with the patch so that, on recall, the parameter will have this value until the controller is moved. Four General Purpose patches may be stored with any setup by using front panel controls.

General Purpose patches are created from the four "Patch" pages of the LXP-15. To create a General Purpose patch, first recall any setup and modify any parameters necessary to obtain the desired sound. Turn PAGE to any of the four "Patch" pages. Once a patch page has been selected, the patch page will be displayed.

Src 1	Thresh	Dest	Scale	Offset
X	X	X	X	X

The patch is set up as follows (Patch 1 is used in this example. The same procedure is used for the other three patch pages.):

- Press the button directly beneath “Dest 1” and use ADJUST to select the desired Destination parameter.
- Press the button directly beneath “Src 1” and use ADJUST to select the desired control Source.
- If desired, press the button directly beneath “Thresh” and use ADJUST to set the threshold value. (See *Setting Threshold Values.*)
- Press the button beneath “Scale 1” and use ADJUST to set the scale range and polarity. (See *Setting Scale Values.*)

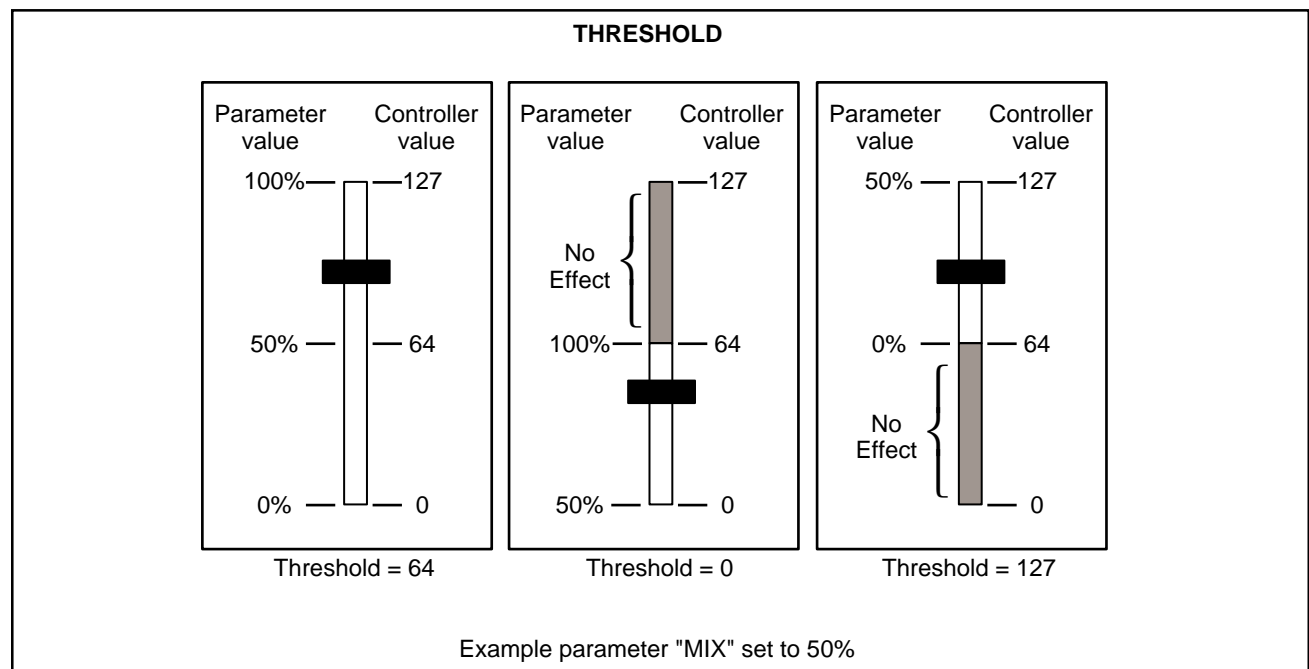
If the Update function is “On,” you will see the value of “Offset 1” change when you move the Destination controller.

After a patch is created, it can be saved in a register. Up to four General Purpose patches can be created and saved with any setup. (See page 2-7 *Storing a new sound.*)

Saving Patches

Threshold allows you to match any position of the Source controller to the initial value of the Destination parameter. Threshold values are 0-127. This corresponds to the value range of typical MIDI controllers. Setting the threshold to 0 sets the the *minumum* position of the controller to the initial value of the Destination parameter. This will allow you to *increase* (but not decrease) the parameter’s value. Setting the threshold to 127 sets the *maximum* position of the controller to the initial value of the Destination parameter. This allows you to *decrease* (but not increase) the parameter’s value. Setting the threshold to 64 sets the *middle* position of the controller to the initial parameter value. (This allows you to *both increase and decrease* the parameter’s value by equal amounts.)

Setting Threshold Values



When using any of the Note Sources (LastNote, HiNote, LoNote), the threshold value is the *Note Number* that will correspond to the initial Destination parameter value. (On a standard 5-octave MIDI keyboard, 36 corresponds to the lowest C, 60 is middle C, and 96 is the highest key.) Threshold should be set to a value within the overall Note Number range of the MIDI controller.

Tips for Setting Threshold Values

Always set the initial parameter values first, *before* assigning patches. For most applications:

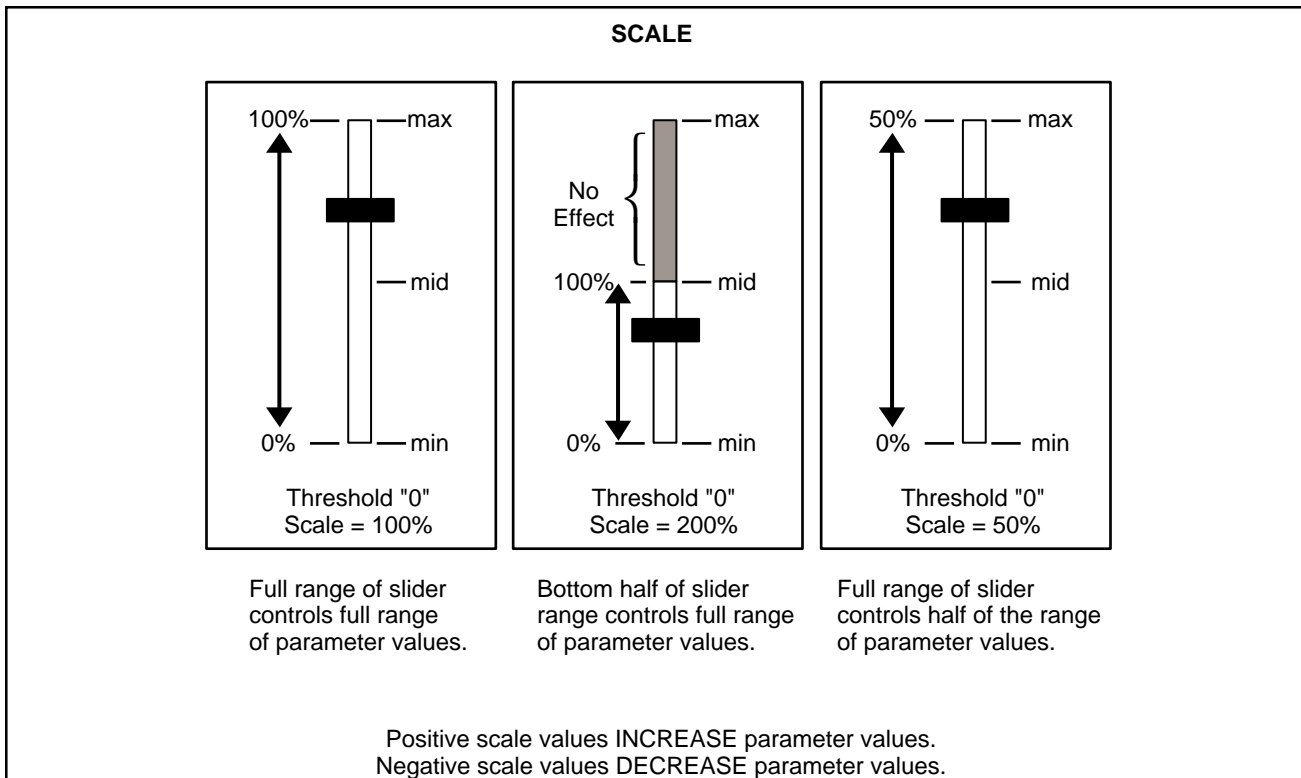
- If the initial value is set to maximum, set the threshold to 127 or the highest Note Number.
- If the initial value is set to minimum, set the threshold to 0 or the lowest Note Number.
- If the initial value is set to 50% or center, set threshold to 64 or the middle Note Number.

When using a bidirectional MIDI slider as a Source (Pitch Bend, Balance, Pan), set threshold to 64.

When After Touch or Breath are used as Sources, set threshold to 0 or 127.

Setting Scale Values

Scale values can be positive or negative. Positive values will increase the value of the Destination parameter as the Source controller is moved from minimum to maximum (from 0 to 127). Negative scale values invert this relationship — the value of the Destination parameter will *decrease* as the control is moved from minimum to maximum.



The scale value determines the effective range of the Source controller. For example, a scale value of 50% means that moving the controller through its full range of motion moves the Destination parameter through 50% of its total range. The upper and lower limits of the scale range are determined by the threshold and initial parameter values. For example, if Dry Pan is set to center and Scale is set to 100%R and the controller is moved through its full range, here's how different threshold values will affect the scale range limits:

- If threshold is set to 0, Dry Pan will vary between center and 100% right.
- If threshold is set to 127, Dry Pan will move between 100% left and center.
- If threshold is set to 64, Dry Pan will move from 100% left to 100% right.

Scale can be set to values greater than the range of the Destination parameter. (For most parameters, scale can be set to at least twice the full range.) This allows you to control the full range of a parameter with less than the full range of a controller.

One of the most useful tempo patches is to use Tempo to control any of the coarse delay parameters (PdlyHi, GlyHi, DlyLHi, etc.) to produce a delay with a specific rhythmic value. Presets 17, 40, and 41 are examples of rhythmic Tempo patches (MAT = MIDI Auto Tempo). The scale value is set to determine the specific rhythmic duration as follows:

Using Scale with Tempo

<u>Rhythm</u>	<u>Scale Value</u>
1/4	2.00s
1/8	1.00s
1/8 triplet	666ms
1/16	500ms
1/16 triplet	333ms
1/32	250ms

The length of a rhythmic duration is limited by the maximum delay time available for a given delay parameter and the tempo transmitted from the sequencer or drum machine. In order to preserve an acceptable rhythmic relationship, when the calculated delay value exceeds the maximum delay value for the parameter, it will be repeatedly cut in half until it is within the parameter range. Gldlyhi (Delay/Reverb) and Pdlyhi (Pitch/Delay) offer the widest ranges of rhythmic durations.

**Tips for Using
General Purpose Patches**

The General Purpose patching system allows you to customize the response of each LXP-15 setup to your requirements. Here are some tips and techniques for getting the most from General Purpose patches.

- Fine tune the parameters on the Delay, Pitch/EQ, Reverb, Level, and Mod pages *before* creating any General Purpose patches for the setup.
- Don't assign Size to performance Sources like velocity, note number, etc. Changing Size temporarily mutes the outputs of the LXP-15.
- During performance, always set the Update mode on the Sys page to "Off" for optimum response time.
- Assigning the LFO Source to multiple Destinations may cause the response time of the LXP-15 to slow down.
- Controlling the LFO Rat Destination will not produce any audible effect unless LFO Rat is first patched to control some other Destination. (See presets 53-65 for LFO patching.)

Be sure to check out presets 17, 41, 42, and 53-127 for examples of how to use General Purpose patches. Here are some additional patching examples to try out:

Patching Examples

- Use the Chorus Delay algorithm.
- LFO control of ChorRat controls the depth and rate of the chorus effect.
- Threshold set to 64 “centers” the control range of the LFO.
- Scaling of 75% limits change of ChorRat between 1 and 12.
- You can use Mod Wheel, Velocity, Input Level or any other controller as a Source instead of LFO. (Leave all other settings the same.)

LFO Controlled Chorus

Parameter Settings

LFO Rat	ChorRat	-	-	-
0.51Hz	7	-	-	-

Patch Settings

Src 1	Thresh1	Dest 1	Scale 1	Offset 1
LFO	64	ChorRat	75%	-

- Use with any algorithm. Dry Pan settings will pan the unchanged input signal. Wet pan setting will pan the processed output signal.
- Dry Pan “moves” a mono input signal between the left and right outputs. With stereo input signals, Dry Pan inverts the left and right signal levels.
- Threshold set to 66 “centers” panning in the middle of a standard 5-octave keyboard (F# above middle C).
- 199% scale value allows full range control of the parameter from a 61-note keyboard
- Positive (R) scaling makes panning go from left to right as notes are played from low to high. Negative (L) scaling pans from right to left when notes are played low to high.

Keyboard Cross-Pan

Parameter Settings

InLevl	Mix	Wet Pan	Dry Pan	OutLevl
100%	0%	Center	Center	100%

Patch Settings

Src 1	Thresh1	Dest 1	Scale 1	Offset 1
LastNot	66	Dry Pan	199%R	-
Src 2	Thresh2	Dest 2	Scale 2	Offset 2
LastNot	66	Wet Pan	199%L	-

- MIDI Harmonizer**
- Use the Pitch/Delay algorithm
 - The MIDI keyboard should not be the audio source. In this example it would serve as a controller only. Audio from another source (microphone, tape track, etc.). Harmony is determined by playing the MIDI keyboard.
 - Harmony is relative to middle C (note 60).
 - Mod Whl control of feedback determines the depth of cascade effects.
 - MIDI Volume pedal control of Delay L changes the cascade effect from chords to arpeggios.

Parameter Settings

Pitch On	Intervl Unison	PchFine 0	HiCut don't care	LoCut don't care
Predely 0 μ s	PdlyFdbk 0%	Delay L 0 μ s	Feedback 75%	Delay R don't care

Patch Settings

Src 1 LastNote	Thresh1 60	Dest 1 Intervl	Scale 1 1step	Offset 1 -
Src 2 Mod Whl	Thresh2 127	Dest 2 Feedbk	Scale 2 100%	Offset 2 -
Src 3 Volume	Thresh3 0	Dest 3 Dlylhi	Scale 3 325ms	Offset 3 -

NOTE: You may have to play with the Scale adjustment a bit. Start with Scale set to "0" and turn ADJUST one click at a time until the value changes to "1".

- Tempo Controlled Reverb**
- Use the Delay/Reverb algorithm.
 - Tempo control of Decay tailors decay time to tempo. The faster the tempo, the shorter the decay time. The settings here will modify decay time through a wide range of tempos (50BPM-240BPM).

Parameter Settings

Decay 6.1s	Treble 6.94kHz	BassMpy .77x	Size 64 meters	Diffus 77%
----------------------	--------------------------	------------------------	--------------------------	----------------------

Patch Settings

Src 1 Tempo	Thresh1 127	Dest 1 Decay	Scale 1 88%	Offset 1 -
-----------------------	-----------------------	------------------------	-----------------------	----------------------

- Use the Gate algorithm
- Initial setting of Predely to 0 is necessary for proper use of tempo control.
- Tempo control of Pdlyhi provides a slap/predelay rhythm that stays constant through a wide range of MIDI tempos.
- Scale value of 249ms sets the slap rhythm to 32nd-note.
- Tempo control of Slope tailors gate to tempo.

Tempo Controlled Gate

Parameter Settings

Predely	PdlyFbk	-	-	-
0	0	-	-	-
Slope	Treble	-	Size	Diffus
127	don't care	don't care	don't care	don't care

Patch Settings

Src 1	Thresh1	Dest 1	Scale 1	Offset 1
Tempo	0	Pdlyhii	249ms	-
Src 2	Thresh2	Dest 2	Scale 2	Offset 2
Tempo	127	Slope	72%	-

- Use the Delay/Reverb algorithm.
- InLevl control of Decay turns on infinite reverb. Scale sets the level of the signal that will trigger the effect. The setting here will cause relatively loud signals to trigger infinite reverb. To use the effect, play softly to load sounds into the reverb — then play loudly to layer dry sounds over the reverb wash.
- Experiment with different Sources like Velocity, Pedals or Sliders.

Infinite Reverb

Parameter Settings

InLevl	Mix	Wet Pan	Dry Pan	OutLevl
100%	50%	Center	Center	100%
Decay	Treble	BassMpy	Size	Diffus
6.1s	Full	1.00x	71 meters	50%

Patch Settings

Src 1	Thresh1	Dest 1	Scale 1	Offset 1
InLevl	0	Decay	6%	-

The Presets

About the presets

The LXP-15 is factory-loaded with 128 preset effects. These can be used as is or modified to create new sounds. (128 User registers are provided for you to store your own sounds.) The presets themselves are permanently installed in your unit; they can be modified, then stored to a User register, but they cannot be overwritten. When shipped, the LXP-15 has a duplicate set of the preset effects stored in Registers 1-128.

To make this assortment of effects more useful, we have grouped them into several categories: 1-78 general purpose; 79-86 guitar or bass; 87-102 guitar or keyboards; 103-117 keyboards; 118-128 special effects. This chapter will provide the information necessary to identify the characteristics of these groups so that you can quickly find a preset which matches your needs, or one close enough to use as a starting point for a new sound.

A simple chart of the Preset names is given in Chapter 2, and on the Quick Reference Guide. Some of the names themselves give clues as to the characteristics of the effect. In general:

- Env** means that the signal input level will alter the effect;
 - "Env<" means that a *stronger* signal will produce a deeper effect
 - "Env>" means that a *weaker* signal will produce a deeper effect
- Oct** indicates a pitch shift of one octave up.
- Cascade** indicates a patch which uses feedback through any pitch change interval other than unison
- Foot** A foot pedal is used as a controller. In the presets, a volume pedal was used which may have different resistance characteristics than yours. If this causes unpleasant effects (such as runaway feedback), you will want to modify these presets to suit your controller.
- LoopFoot** This indicates an infinite loop patch where Foot1 controls the amount of signal added to the loop, and Foot2 stops the loop. With the pedal we used, with Foot1 all the way back, no signal is added.
- Aft** indicates that Aftertouch controls the effect.
- Mod** indicates that a modulation wheel controls the effect.
- LoopMIDI** This is an infinite loop patch where a mod wheel controls the signal added, and a sustain pedal stops the loop.
- ^** indicates an upward pitch shift
- MAT** (MIDI Auto Tempo) indicates MIDI Clock is used as a control source — when no MIDI Clock is present, delays default to 0ms.

The chart on the following pages provides additional comments on each of the presets provided with your unit. The parameters of each preset, and their values, can be seen on the LXP-15 display whenever a preset is loaded.

Preset		Alg	Patch
#	Name		
1	Large Hall	Dly/Rvb	None
2	Bright Hall	Dly/Rvb	None
3	Dark Hall	Dly/Rvb	None
4	Large Room	Dly/Rvb	None
5	Large Drk Room	Dly/Rvb	None
6	Medium Room	Dly/Rvb	None
7	Medium & Short	Dly/Rvb	None
8	Medium Room 3	Dly/Rvb	None
9	Med & Bright	Dly/Rvb	None
10	Small Room	Dly/Rvb	None
11	Small Room 2	Dly/Rvb	None
12	No Room	Dly/Rvb	None
13	Small & Bright	Pch/Dly	None
14	Dark Closet	Dly/Rvb	None
15	Large Dly Room	Dly/Rvb	None
16	Med Dly Room	Dly/Rvb	None
17	1/4 Verb MAT	Pch/Dly	Tempo
18	Dark Dly Room	Pch/Dly	None
19	Small & Delay	Pch/Dly	None
20	Vocal Room	Dly/Rvb	None
21	Vocal 36	Dly/Rvb	None
22	Late Vocal	Dly/Rvb	None
23	Vocal Plate	Plate	None
24	Plate	Plate	None
25	Small Plate	Plate	None
26	Long Plate	Plate	None

Preset		Alg	Patch
#	Name		
27	Plate 15	Plate	None
28	Brite Plate	Plate	None
29	Dark Plate	Plate	None
30	Small Gate	Gate	None
31	Medium Gate	Gate	None
32	Large Gate	Gate	None
33	Bright Gate	Gate	None
34	Slap Gate	Gate	None
35	Short Slap	Gate	None
36	Tap Detune	Pch/Dly	None
37	Ambi Detune	Pch/Dly	None
38	Ambi Delay	Pch/Dly	None
39	Long Delay	Chor Dly	None
40	L&R Delays	Pch/Dly	None
41	1/4 Note MAT	Chor Dly	Tempo
42	1/8 → 1/16 MAT	Chor Dly	Tempo
43	Space Echo	Pch/Dly	None
44	Delay Cloud	Pch/Dly	None
45	Ambi Tap 5th Up	Pch/Dly	None
46	Roomy 4th Dwn	Pch/Dly	None
47	Roomy Oct Up	Pch/Dly	None
48	Chorus	Chor Dly	None
49	Chorus Too!	Chor Dly	None
50	Chorus & Doubl	Chor Dly	None
51	Slap & Chorus	Chor Dly	None
52	Chorus & Delay	Chor Dly	None

Preset		Alg	Patch	Comment
#	Name			
53	Detune Chorus	Pch/Dly	LFO	LFO patched to Delay R and Pitch Fine
54	Small & Flange	Pch/Dly	LFO	LFO patched to Pitch Fine
55	Flange Room	Dly/Rvb	LFO	LFO controls gliding delay
56	Piano Flange	Dly/Rvb	LFO	LFO controls gliding delay
57	Mix Jizzn'	Dly/Rvb	LFO	LFO controls gliding delay
58	Image Wander	Pch/Dly	LFO	LFO controls delays and Pitch Fine
59	Wander Fast	Pch/Dly	LFO	LFO controls delays
60	Wander Room	Pch/Dly	LFO	LFO controls delays
61	Wander&Small	Pch/Dly	LFO	LFO controls decay and delays
62	Small&Fast	Pch/Dly	LFO	LFO controls decay and delays
63	Image Detune	Pch/Dly	LFO	LFO controls decay, delays and pitch
64	Wide Image	Pch/Dly	LFO	LFO controls decay, delays and pitch
65	Jumpin' Beans	Chor Dly	LFO	LFO controls Delay 3
66	Thru A Ringr	Chor Dly	None	
67	LFO Roll	Chor Dly	LFO	LFO controls chorus rate
68	Thick Chorus	Chor Dly	None	
69	Gr: Eko-Room	Plate	None	
70	Sizzle Verb	Dly/Rvb	None	
71	Dly Gate → Rite	Gate	None	
72	Thick'r Gate	Gate	None	
73	Deep End	Plate	None	
74	Jazz Swing Dly	Chor Dly	None	
75	Glub Glub	Pch/Dly	None	
76	SoftLoopFoot	Pch/Dly	Foot	Input level controls pitch transposition of loop
77	DlyLoopFoot	Pch/Dly	Foot	Foot 1 controls effect, Foot2 stops loop
78	ChrsLoopFoot	Chor Dly	Foot	Foot 1 controls effect, Foot2 stops loop
79	AmbiChrEnv<	Pch/Dly	Env	Input level increases decay and feedback
80	AmbiChrEnv>	Pch/Dly	Env	Input level decreases decay and feedback
81	ShortAmbiDly	Pch/Dly	None	
82	LongAmbiDly	Pch/Dly	None	
83	EnvDetune2	Pch/Dly	Env	Input level controls Pitch Fine
84	EnvDetune3	Pch/Dly	Env	Input level controls Pitch Fine
85	RoomChrEnv	Pch/Dly	Env	Input level increases depth
86	Spacious5th^	Pch/Dly	None	5th up with feedback and delay

Preset		Alg	Patch	Comment
#	Name			
87	Bounce→ Rvrb	Pch/Dly	LFO	LFO sweeps between Xdelay and reverb
88	Rvrb→ XDly	Pch/Dly	Env	Increased input level changes reverb to Xdelay
89	XDly→ Rvrb	Pch/Dly	Env	Increased input level changes Xdelay to reverb
90	Fade In Box	Gate	Env	Input level increases depth
91	Fade In Chorus	Pch/Dly	Env	Input level increases depth
92	Fade In Space	Pch/Dly	Env	Input level increases depth
93	Fade In Room	Pch/Dly	Env	Input level increases depth
94	Cascade8 1	Pch/Dly	None	Octave up with feedback
95	Cascade8Env<	Pch/Dly	Env	Input level increases depth
96	Glass 3	Pch/Dly	LFO	LFO controls feedback
97	Drop Tail Env<	Pch/Dly	Env	Input level increases drop
98	VaryRes1Foot	Dly/Rvb	Foot	Foot1 raises resonant pitch
99	Pedal1Reverb	Dly/Rvb	None	
100	VaryCaveFoot	Pch/Dly	Foot	Foot1 increases depth and decay
101	PtchLoopFoot	Pch/Dly	Foot/Env	Inp lvl raises pitch, Foot1 controls Inp lvl and fdbk
102	PedalWhammy1	Pch/Dly	Foot	Foot1 lowers pitch
103	XDly→ RvrbMod	Pch/Dly	MIDI	Mod sweeps from delay to reverb
104	VaryCaveMod	Pch/Dly	MIDI	Mod varies depth
105	ConvrtRvbMod	Pch/Dly	MIDI	Mod increases reverb decay, predelay and mix
106	ConvrtDlyMod	Pch/Dly	MIDI	Mod increases delay time and feedback
107	8Va CloudMod	Pch/Dly	MIDI	Mod increases depth
108	VaryRes2Mod	Dly/Rvb	MIDI	Mod raises resonant pitch
109	Mod Whammy1	Pch/Dly	MIDI	Mod bends pitch down
110	XDelay Aft	Pch/Dly	MIDI	Aftertouch increases delay time
111	ConvrtRvbAft	Pch/Dly	MIDI	Aftertouch increases decay and mix
112	SpacOctUpAft	Pch/Dly	MIDI	Aftertouch increases input level
113	8Va CloudAft	Pch/Dly	MIDI	Aftertouch increases depth of effect
114	AftFingVerb	Dly/Rvb	MIDI	Aftertouch increases feedback
115	Big Flush	Dly/Rvb	MIDI	Sustain increases decay
116	DlyLoopMIDI	Pch/Dly	MIDI	Mod controls input level, sustain controls feedback
117	SpacLoopMIDI	Pch/Dly	MIDI	Mod controls inp, sust controls fbk, pch controls pch fin
118	XDelayEnv<	Pch/Dly	Env	Input level decreases delay time
119	Bounce Wave	Pch/Dly	Env	Input level changes delay time
120	DlyCloudEnv>	Pch/Dly	Env	Input level decreases effect
121	RvrbWarpEnv>	Dly/Rvb	None	
122	Gated Dive	Pch/Dly	None	
123	MoanVerb	Dly/Rvb	Env	Input level changes delay time
124	Oddness	Pch/Dly	Env	Input level changes pitch
125	Rising Cloud	Pch/Dly	None	
126	Cascad8Env>	Pch/Dly	Env	Input level decreases depth
127	Le Boom	Pch/Dly	None	Octave divider
128	Bypass			

MIDI Operation

All LXP-15 parameters, presets and registers can be accessed by MIDI. All MIDI applications require the LXP-15 to be connected with one or more MIDI devices with standard MIDI cables via the rear-panel MIDI jacks. We'll describe several typical MIDI configurations below.

Before you can use the LXP-15 with other MIDI devices, they must all be set to the same MIDI channel. To set the LXP-15 MIDI channel:

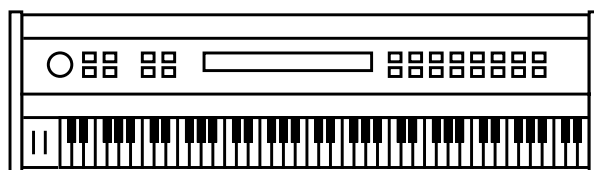
1. Set the controller you will be using (keyboard, sequencer, other LXP-15, etc.) to transmit on any MIDI channel (1-16).
2. On the LXP-15, turn PAGE to "Sys." The display will show:

MIDI chn	Contrast	Bright	Mem Prot	Update
1	8	3	Off	Off

Select "MIDI chn" by pressing the button directly beneath it. Then use ADJUST to select the same MIDI channel as your controller.

NOTE: When "MIDI chn" is set to "OMNI," the LXP-15 transmits on channel 1 and receives on channels 1-16.

Selecting a MIDI channel



Accessing Registers and Dynamic MIDI®

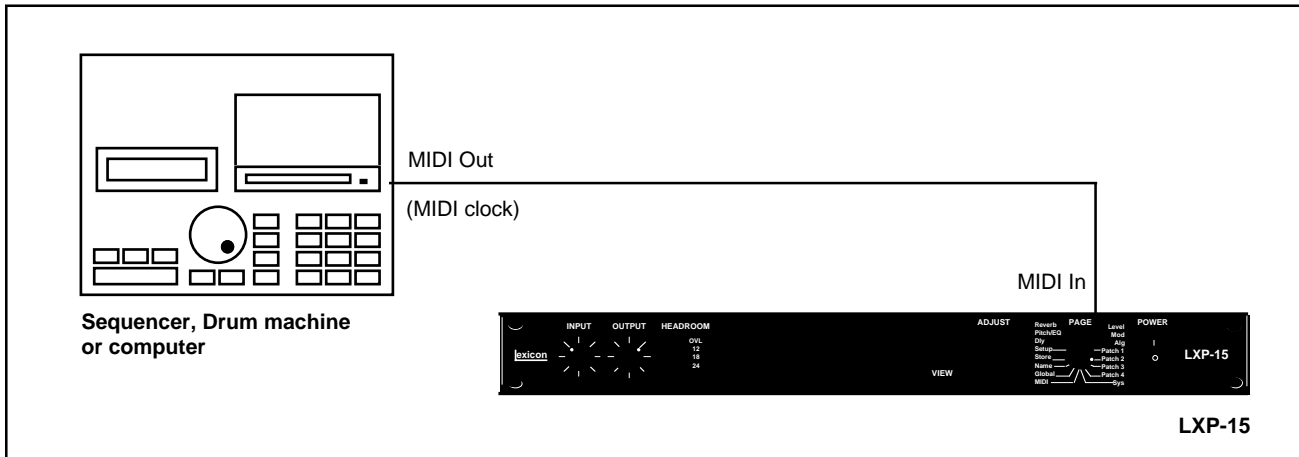


Some extremely useful effects can be created by controlling the LXP-15's variable parameters remotely in real time. Almost all of the controllers found on a MIDI keyboard or MIDI foot controller (pitch benders, mod wheels, sliders, switches, breath controllers, foot pedals and footswitches) can be used to adjust the LXP-15's parameters. We refer to this real time remote control capability as Dynamic MIDI®.

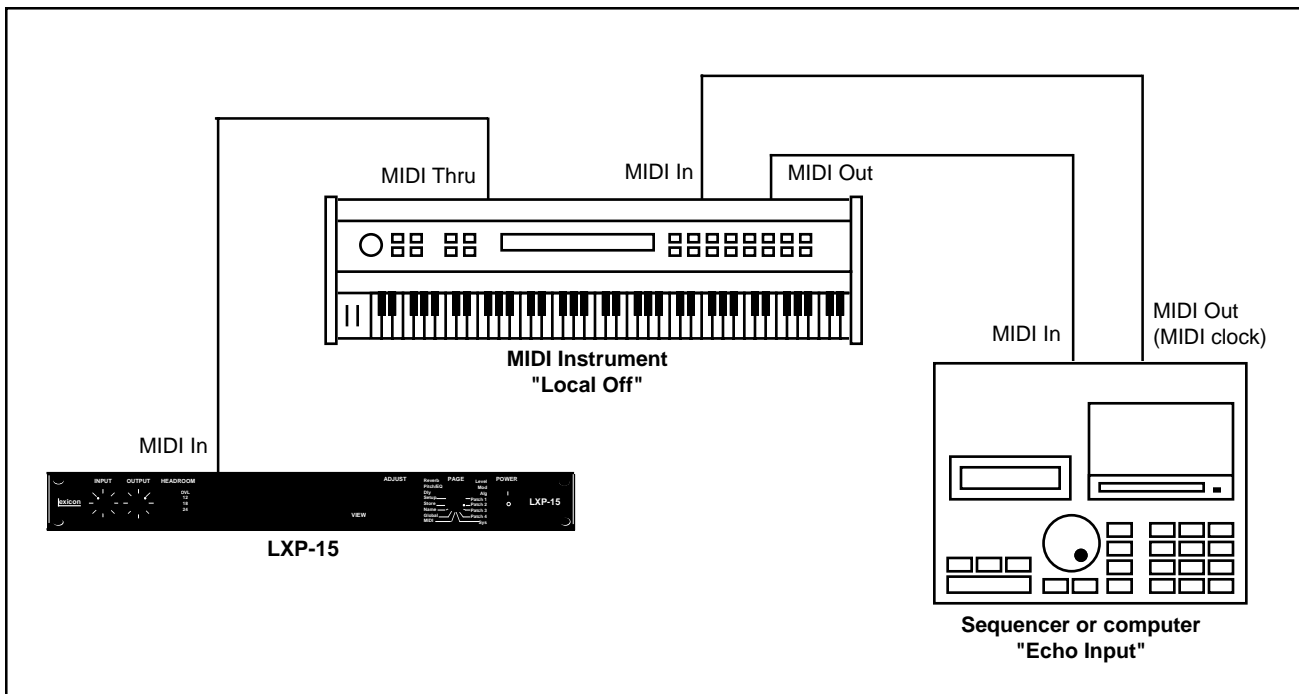
Sending a MIDI Program Change message (1-128) from the controller will load the corresponding LXP-15 register. If any MIDI sources are active as global or general purpose patches, moving the appropriate control on the controller will cause the patched destination parameter to change. (See *Patching*.) If you want to use Dynamic MIDI, but don't want the LXP-15 to load new registers when you change programs on your controller, set your controller so that it doesn't transmit Program Change messages.

Controller quirks Some synthesizers and controllers cannot send the full range of MIDI program change messages (1-128). With them, you can't access all the registers in the LXP-15. Others may appear to be able to send only 32, but actually have a bank mode that *does* let you send all 128 program change messages. Also, be aware that some MIDI devices use a program numbering system that uses 0-127 instead of 1-128. If in doubt, see the manual for your controller.

MIDI Tempo control When using Tempo as a control Source (see *Patching*), you must send MIDI Clock messages from the MIDI controller to the LXP-15 as shown below.

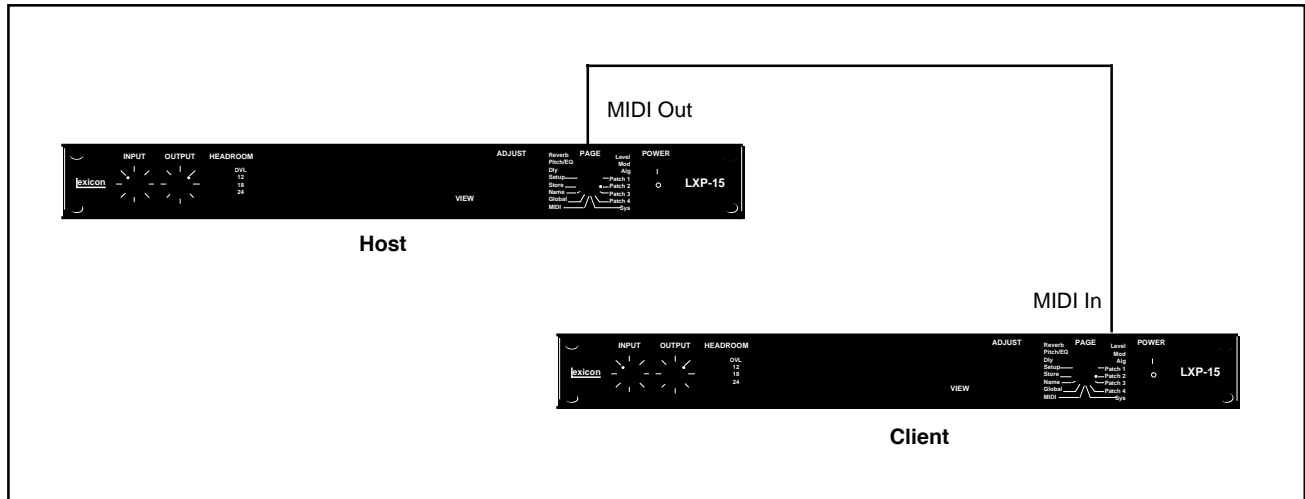


The figure below shows the MIDI connections for controlling the LXP-15 simultaneously with MIDI Clocks from a sequencer, and messages from another MIDI controller. Note that the controller is set to "local control off" and the sequencer is set to "echo input."



Two LXP-15s can be slaved together by connecting a cable from the MIDI OUT jack of the Host to the MIDI IN jack of the Client. Additional LXP-15s can be slaved to the Host by connecting a cable from the MIDI THRU port of one Client unit to the MIDI IN port of the next unit. All of the LXP-15s must be set to the same MIDI channel.

Slaving two or more LXP-15s



When connected in this way, the Client LXP-15(s) will be remotely controlled by the front panel of the Host as follows:

- In general, whenever the host ADJUST knob is used to change a parameter value, a corresponding parameter change will occur on the Client(s).
- Loading presets or registers from the setup page in either the “Preset” or “Register” modes will cause the Client(s) to load their preset or register *of the same number*. (Note: a slave’s register contents will not necessarily be the same as the master’s.)
- Loading presets or registers in either the “PreScan” or “RegScan” modes will cause the Client(s) to select the preset and register *of the same number*. The “Load” button of the Client must be pressed to actually load the preset or register.
- Changes made on the “Store” page are not transmitted to the Client(s).

Patches can also be created using LXP-15 MIDI System Exclusive data. This is perhaps the most complicated but also the most flexible way of creating patches to control the LXP-15.

Creating Patches using MIDI SysEx

Chapter 7 provides the information necessary for programming LXP-15 MIDI SysEx data.

The MIDI Page The LXP-15 allows dumping of a single parameter, the contents of a single register, or all register contents from the front panel MIDI page. To access this page, simply turn the PAGE knob to "MIDI". The display will show:

SysEx	Transmit	Parameter	Alghm	
Param	Registr	-	-	Send

Parameter dump Selecting "Param" allows the ADJUST knob to be used to scroll through the available parameters of whatever setup is currently loaded. Wherever parameters are not available in a particular algorithm, their position is indicated by a number rather than by parameter name. Selecting "Send" will cause the displayed parameter to be transmitted.

Register dump Selecting "Registr" allows the ADJUST knob to be used to scroll through the LXP-15's 128 registers. The last selection on the list is "All". Selecting "Send" will cause the contents of the displayed register (or the contents of all registers) to be transmitted.

MIDI Implementation Data

The information contained in this chapter is intended to assist experienced programmers in developing software for use with the LXP-15.

LXP-15 System Exclusive (SysEx) implementation can be divided into two basic categories: Data and Event Requests, and Data Transmit and Receive.

Data Requests prompt the LXP-15 to transmit specified data. Event Requests prompt the LXP-15 to store the data currently in the edit buffer to a specific memory location (register), or to retrieve stored data and place it in the edit buffer.

Data and Event Requests

Data Requests

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0011 nnnn(bin)	n = MIDI Channel 0-15
4	0eee eeee	e =event code: 60h = active setup data 61h = one register 62h = small param data 64h = all user data 65h = big param data
5	0ppp pppp	p = register number 0 - 127 for e = 61 = param number for e = 62, e = 65 above; else present but ignored
6	F7 (hex)	End of SysEx message

Event Requests

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0110 nnnn(bin)	n = MIDI Channel 0-15
4	0eee eeee	e = event code: 70h = store register 71h = recall register
5	0ppp pppp	p = register number 0 - 127
6	F7 (hex)	End of SysEx message

Transmit/Receive Data Data is identical in format whether transmitted as a response to a Data Request or received as a Data Dump.

When the front panel ADJUST knob is assigned to a parameter and turned, the LXP-15 will transmit a parameter change message reflecting the new position of the knob (See *Parameter Adjust* for the format.). The transmitted parameter number will reflect the specific parameter to which the knob is assigned. Recalling a program from the front panel will cause the appropriate program parameter change message to be sent. Single Program data is always stored in Register 1 when received. To specify a different register for storage, use the Event Request message.

Two LXP-15s can be slaved together by connecting a cable from the MIDI OUT jack of the *Host* to the MIDI IN jack of the *Client*. Additional LXP-15s can be slaved to the same Host by connecting a cable from the MIDI THRU port of one Client unit to the MIDI IN port of the next unit.

All LXP-15s must be set to the same MIDI Channel.

Active Setup Data

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0000 nnnn(bin)	n = MIDI Channel 0-15
4	7B (hex)	data byte count (123)
5	0vvv vvvv(bin)	7-bit data
	.	
	.	
	.	
127	0vvv vvvv	
128	0sss ssss	sumcheck of data bytes
129	F7 (hex)	End of SysEx message

Stored (Single Program) Data

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0001 nnnn(bin)	n = MIDI Channel 0-15
4	0ppp pppp	p = register number 0 - 127
5	43 (hex)	data byte count (67)
6	0vvv vvvv	7-bit data
	.	
	.	
	.	
72	0vvv vvvv	
73	0sss ssss	sumcheck of data bytes
74	F7 (hex)	End of SysEx message

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0010 nnnn(bin)	n = MIDI Channel 0-15
4	0ppp pppp	p = parameter number 0 - 127
5	0vvv vvvv	7-bit data
6	F7 (hex)	End of SysEx message

Small Parameter Adjust

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0101 nnnn(bin)	n = MIDI Channel 0-15
4	0ppp pppp	p = parameter number 0 - 127
5	0vvv vvvv	7-bit data (lsb)
6	0vvv vvvv	7-bit data (msb)
7	F7 (hex)	End of SysEx message

Big Parameter Adjust

Byte	Value	Description
0	F0 (hex)	System Exclusive
1	06	Lexicon ID
2	06	LXP-15 ID
3	0100 nnnn(bin)	n = MIDI Channel 0-15
4	43 (hi) (hex)	data byte count
5	00 (lo)	(8576 = 0x2180 = 0x4280 in 7-bit)
6	0vvv vvvv(bin)	7-bit data
.	.	.
8581	0vvv vvvv	
8582	0sss ssss	sumcheck of data bytes
8583	F7 (hex)	End of SysEx message

All User Data

Data Dump Contents

Single Program and All User Data Dump The Single Program and All User Data dump share the same format. The Single Program dump sends all of the stored parameters for the selected setup; the All User Data dump sends all 128 copies of the stored programs.

Data Byte #	Data Param #	Data Description
0-26	0-26	Microcode Parameters
27	27	General Purpose Patch 1 Source
28	28	General Purpose Patch 1 Threshold
29	29	General Purpose Patch 1 Destination
30,31	+30(31)	General Purpose Patch 1 Scale
32,33	+32(33)	General Purpose Patch 1 Offset
34-40	34-40	General Purpose Patch 2
41-47	41-47	General Purpose Patch 3
48-54	48-54	General Purpose Patch 4
55-66	55-66	Name (12 characters)

Active Setup Dump The Active Setup data dump sends all the parameters for the current setup as well as the global parameters. The format is:

Data Byte #	Data Param #	Data Description
(Program parameters)		
0-26	0-26	Microcode Parameters
27	27	General Purpose Patch 1 Source
28	28	General Purpose Patch 1 Threshold
29	29	General Purpose Patch 1 Destination
30,31	+30(31)	General Purpose Patch 1 Scale
32,33	+32(33)	General Purpose Patch 1 Offset
34-40	34-40	General Purpose Patch 2
41-47	41-47	General Purpose Patch 3
48-54	48-54	General Purpose Patch 4
55-66	55-66	Name (12 characters)
(System parameters)		
67	67	Setup Increment
68	68	Setup Decrement
69	69	Display Contrast
70	70	Display Brightness
71-74	71-74	Reserved
75	75	Register Number
76	76	Preset Number
77,78	+77(78)	Setup Number
79	79	MIDI Channel
80	80	Global Patch mode
81	81	Display Update
82	82	Memory Protect (nonzero=protected)
83-95	83-95	Reserved
96-124	96-124	Global Patch Sources

+ indicates a big parameter. There may be others in Microcode Parameters, depending on the program. The number in parentheses is the coarse portion.

Most LXP-15 parameters fit into 7 data bits to make it easier to transfer data via MIDI. We've labeled these "Small Parameters". A few parameters, notably delays, require more than this range. These "Big Parameters" are constructed of two consecutively numbered small parameters. The lower-numbered parameter can be accessed as the Fine portion of the big parameter, and always has a range of 128. The higher-numbered parameter can be used to access the Coarse portion of the big parameter. The full range of the Fine portion (128 steps) always equals one step of the Coarse portion. When reference is made to a big parameter, the number given is that of the Fine portion.

When setting or requesting a big parameter value via SysEx, the value can be sent either by a big parameter message, or by two small parameter messages.

All parameters are accessible by Parameter Change messages. There are two major parameter classifications: Program parameters and System parameters.

Generally, program parameter values will change when each new setup is loaded. Typically, this means that the values of these parameters are stored as part of a program. Similarly, when a new setup is retrieved, all of its stored program parameters are retrieved with it.

All program parameters are accessible via the front panel ADJUST knob and MIDI SysEx. A SysEx change of one of these parameters will overwrite any existing value set by a previous knob change and vice-versa (a knob change will overwrite any existing value set by a previous SysEx change).

System parameters are not associated with any particular program. These parameters are responsible for the overall operation of the LXP-15. They include MIDI Channel, Display Contrast and Brightness, Global Patch mode and sources.

Parameter Definitions

Program Parameters

System Parameters

Parameter Map

Param #	Data
(Program parameters)	
0 - 26	Microcode Parameters
27	General Purpose Patch 1 Source
28	General Purpose Patch 1 Threshold
29	General Purpose Patch 1 Destination
+30(31)	General Purpose Patch 1 Scale
+32(33)	General Purpose Patch 1 Offset
34-40	General Purpose Patch 2
41-47	General Purpose Patch 3
48-54	General Purpose Patch 4
55-66	Name (12 characters)
(System parameters)	
67	Setup Increment
68	Setup Decrement
69	Display Contrast
70	Display Brightness
71-74	Reserved
75	Register number
76	Preset number
+77(78)	Setup number
79	MIDI Channel
80	Global Patch mode
81	Display Update
82	Memory Protect (nonzero=protected)
83-95	Reserved

General Purpose Patch Parameter Map

Param #				
Patch 1	Patch 2	Patch 3	Patch 4	Data
27	34	41	48	Patch Source (0 - 127, see below)
28	35	42	49	Patch Threshold (0 - 127)
29	36	43	50	Patch Destination (microcode param # 1-22)
+30(31)	+37(38)	+44(45)	+51(52)	Patch Scale Factor (-64 to +64, 2's compl.)
+32(33)	+39(40)	+46(47)	+53(54)	Patch Offset

**MIDI Patch Sources
(General Purpose and Global)**

Control #	Function
0 - 31	Continuous controller 0 - 31
32 - 63	7-bit controllers 32-63
64	Last note played
65	Last note's velocity
66	Channel aftertouch value
67	Pitch bend value
68	MIDI tempo period
69	LFO value
70	Lowest note held
71	Highest note held
72-76	Foot controllers 1-5
77	Input signal level

Global patch parameter numbers 96-122 correspond to microcode parameter numbers 0-26. Global patch parameter numbers 123 and 124 correspond to parameter numbers 67 (Setup Increment) and 68 (Setup Decrement). If you want to globally patch Foot Controller 1 to Input level (microcode parameter number 24) you would use the global patch parameter number of 120 (96+24). Its data value would be 72, corresponding to Foot Control 1 controller number.

The MIDI patch Offset values are generated internally by the equation:

$$\text{Offset} = [\text{Source-Threshold}] \times \text{Scale factor}$$

where Source equals the value of the specified controller.

This calculated Offset value is added to the stored (base) value of the specified destination parameter. The sum of the offset and base values is the number used by the audio processor and the parameter transmit routines. The programmer should be aware that the offset values are internally updated whenever the Source controller is changed — therefore if the programmer changes the offset value externally it may be over-written shortly thereafter. The offset parameters are most useful when read to determine the MIDI patch contribution to the parameter values transmitted by the LXP-15.

Note: When the LXP-15 *receives* a parameter change, the received value is used as the new base parameter value. However, when the LXP-15 *transmits* a parameter value, this value equals the sum of the base parameter value and any applicable MIDI patch offsets.

LXP-15 Microcode Parameters

All microcode parameters in the LXP-15 have a fixed MIDI control range.

MSB always equals zero.

All microcode parameters are accessible via MIDI SysEx. These parameters can also be controlled through the front panel ADJUST knob and Dynamic MIDI®.

The following charts show parameters and their maximum values for each of the LXP-15's five algorithms.

DELAY/REVERB			
Param #	Global Patch	Parameter Name	Max. Value
1(2)	97(98)	Glide Delay (Gldlyhi)	9983
3	99	Glide Feedback	127
4(5)	100(101)	Delay 2 (Dly2hi)	8959
6	102	Unused	-
7(8)	103(104)	Unused	-
9	105	Unused	-
10	106	Unused	-
11	107	Unused	-
12	108	Decay Time	15
13	109	Treble Decay	15
14	110	Bass Multiply	31
15	111	Size	63
16	112	Diffusion	100
17	113	High Cut Filter	15
18	114	Low Cut Filter	31
19	115	Rvb Mix	127
20	116	Wet Pan	126
21	117	Dry Pan	126
22	118	Mix	127
23	119	Output Level	127
24	120	Input Level	127
25	121	LFO Rate	127

PITCH DELAY			
Param #	Global Patch	Parameter Name	Max. Value
1(2)	97(98)	Predelay (Pdlyhi)	16,383
3	99	Predelay Feedback	127
4(5)	100(101)	Delay L (DlyLhi)	16,255
6	102	Feedback	126
7(8)	103(104)	Delay R (DlyRhi)	16,255
9	105	Pitch On/Off	1,0
10	106	Pitch Interval	36
11	107	Pitch Fine	127
12	108	Decay Time	14
13	109	Treble Decay	15
14	110	Bass Multiply	31
15	111	Size	25
16	112	Diffusion	100
17	113	High Cut Filter	15
18	114	Low Cut Filter	31
19	115	Reverb Balance	127
20	116	Wet Pan	126
21	117	Dry Pan	126
22	118	Mix	127
23	119	Output Level	127
24	120	Input Level	126
25	121	LFO Rate	127

GATE			
Param #	Global Patch	Parameter Name	Max. Value
1(2)	97(98)	Predelay (Pdlyhi)	8191
3	99	Predelay Feedback	127
4	100	Unused	-
5	101	Unused	-
6	102	Unused	-
7	103	Unused	-
8	104	Unused	-
9	105	Unused	-
10	106	Unused	-
11	107	Unused	-
12	108	Slope	127
13	109	Treble Decay	15
14	110	Unused	-
15	111	Size	31
16	112	Diffusion	127
17	113	Unused	-
18	114	Unused	-
19	115	Unused	-
20	116	Wet Pan	126
21	117	Dry Pan	126
22	118	Mix	127
23	119	Output Level	127
24	120	Input Level	127
25	121	LFO Rate	127

PLATE			
Param #	Global Patch	Parameter Name	Max. Value
1(2)	97(98)	Predelay (Pdlyhi)	8191
3	99	Predelay Feedback	127
4	100	Unused	-
5	101	Unused	-
6	102	Unused	-
7	103	Unused	-
8	104	Unused	-
9	105	Unused	-
10	106	Unused	-
11	107	Unused	-
12	108	Decay Time	0 - 15
13	109	Treble Decay	0 - 15
14	110	Bass Multiply	0 - 31
15	111	Size	0 - 79
16	112	Diffusion	127
17	113	Unused	-
18	114	Unused	-
19	115	Unused	-
20	116	Wet Pan	126
21	117	Dry Pan	126
22	118	Mix	127
23	119	Output Level	127
24	120	Input Level	127
25	121	LFO Rate	127

CHORUS DELAY			
Param #	Global Patch	Parameter Name	Max. Value
1	97	Delay 1	97
2	98	Unused	-
3	99	Feedback 3	127
4	100	Delay 2	127
5	101	Unused	-
6	102	Unused	-
7	103	Delay 3	127
8	104	Unused	-
9	105	Unused	-
10	106	Unused	-
11	107	Chorus Rate	15
12	108	Unused	-
13	109	Unused	-
14	110	Unused	-
15	111	Unused	-
16	112	Diffusion	127
17	113	Treble	15
18	114	Unused	-
19	115	Unused	-
20	116	Wet Pan	126
21	117	Dry Pan	126
22	118	Mix	127
23	119	Output Level	127
24	120	Input Level	126
25	121	LFO Rate	127

- 1(2) Glide Delay (Gldlyhi)** Provides (coarse) and fine adjustment of mono delay time. This control is called **Predelay (Pdlyhi)** in the Pitch/Delay , Gate and Plate algorithms, and **Delay 1** in Chorus Delay.
- 3 Glide Feedback** Adjusts positive feedback around the mono delay. In Delay/Reverb, 100% feedback does not cut the input, but continues to add it in. There is also a slight high frequency rolloff through the gliding delay mechanism of Delay/Reverb. In Pitch/Delay (where it is called **Predelay Feedback**), 100% feedback automatically cuts the input, and can be used as a manual, or MIDI controlled, delay line sampler. In Chorus/Delay (where it is called **Feedback 3**) it recirculates the output of Delay 1 and Delay 3 before it enters the third chorusing circuit.
- 4(5) Delay 2 (Dly2hi)** Provides (coarse) and fine adjustment of two-channel delay time. In Delay/Reverb, provides a predelay adjustment for the reverb. In Pitch/Delay (where it is called **Delay L (DlyLhi)**) this control provides a reverb predelay and adjusts the left channel. In Chorus/Delay, Delay 2 adds an additional offset to the value of Delay 1 for the second pair of chorused taps.
- 6 Feedback 3** Adjusts feedback around the pitch shifter and left channel delay. This control is called **Feedback** in Pitch/Delay.
- 7(8) Delay R (DlyRhi)** Provides (coarse) and fine adjustment for right channel delay.
- 9 Pitch On/Off** Used to enable the pitch shifter. Selecting 0 (Defeat) bypasses the pitch shifter and the small delay associated with it.
- 10 Pitch Interval** Adjusts the pitch shift from two octaves down (Pitch ON=1; Pitch Interval=0) to one octave up.
- 11 Pitch Fine** Provides a fine adjustment of pitch for detuning. The MIDI value 0-127 is interpreted as being centered on 64. Adjusts **Chorus Rate** in the Chorus Delay algorithm.
- 12 Decay Time** Adjusts mid reverb time. Infinite reverb is available in Delay/Reverb algorithm only. Adjusts **Slope** in the Gate algorithm.
- 13 Treble Decay** Provides an adjustment of the low pass filter within the reverb. Maximum setting gives a flat response through the filter section.
- 14 Bass Multiply** Provides control over bass reverb time.
- 15 Size** Adjusts the room size. The range is for one side of a room; cube these values to get the approximate room volume.
- 16 Diffusion** Softens attack of percussive sounds in the reverberator.
- 17 High Cut Filter** Provides adjustment of high frequency roll-off. Maximum setting gives flat response through the filter section.
- 18 Low Cut Filter** Provides adjustment of low frequency roll-off. Minimum setting gives flat response through the filter section.
- 19 Reverb Balance** Adjusts the mix of reverb with delay effects.
- 20 Wet Pan** Provides a pan control for the wet output.

Notes on the Parameters

- 21 Dry Pan** Provides a pan control for the dry output.
- 22 MIX** Adjusts the wet/dry mix.
- 23 Output Level** Adjusts the output level of the signal processor.
- 24 Input Level** Adjusts the input level to the signal processor.
- 25 LFO Rate** Adjusts the frequency of the low frequency oscillator.

MIDI Implementation Chart

Lexicon LXP-15
Multi-Effects Processor

Version: 1.31

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Channel	1 1-16	1 1-16	Memorized
Mode	Default Messages Altered		Mode 1, 3	
Note Number	True Voice	X	0 - 127	Used as controller*
Velocity	Note ON Note OFF	X X	O X	*
After Touch	Keys Channels	X X	X O	*
Pitch Bender		X	O	7-bit resolution*
Control Change		X	0 - 95	7-bit resolution*
Program Change	True #	X	0 - 127 1 - 128	Note 1
System Exclusive		O	O	Note 2
System Common	:Song Pos :Song Sel :Tune	X X X	X X X	
System Real Time	:Clock :Commands	X X	O X	Used as controller*
Aux Messages	:Local ON/OFF :All Notes OFF :Active Sense :Reset	X X X X	X X X O	

Mode 1: OMNI ON, POLY
Mode 3: OMNI OFF, POLY

Mode 2: OMNI ON, MONO
Mode 4: OMNI OFF, MONO

O : Yes
X : No

Notes

- loads registers 1-128; presets 1-128 accessed via SysEx
 - data dumps, parameters
- * can be assigned to control any LXP-15 effect parameter

Troubleshooting

This chapter is intended primarily to help you to recognize some common error states which can be corrected from the LXP-15 front panel controls, or by simple means such as cable replacement. Any error states which are not covered here should be referred to Lexicon Customer Service.

In a low voltage, or "brown-out" condition, the LXP-15 will freeze in its current state. None of the controls will have any effect. When power returns to a normal level the unit will reset itself as though it had just been powered on. After the initial power up display message, the unit will return itself to the state it was in when the power dropped. If the unit does not reset itself, turn the power OFF, then ON to resume normal operation.

Low Voltage

Temperature extremes may cause the LXP-15 to exhibit unpredictable behavior. If the unit has been subjected to temperatures below 32°F (0°C) or above 95°F (35°C), it should be turned off and allowed to return to normal temperature before use. The unit may be damaged by exposure to temperatures below -22°F (-30°C) or above 167°F (75°C), or by exposure to humidity in excess of 95%. If a unit exposed to such conditions fails to operate after it returns to a normal operating temperature, contact Lexicon Customer Service.

Overheating

No output from the LXP-15.

Check to see if Global Patches are set to *Immediate* mode. *If you don't have a control source patched to a destination, the controller will go to its minimum value!* If you don't have anything patched to the input and output parameters, this may result in no output. When you access a preset, all of the parameter values will immediately jump to whatever value you have selected, destroying the preset's sound. See page 4-14.

Common MIDI Problems

The LXP-15 doesn't respond to MIDI.

- Check to make sure a MIDI cable is connected to MIDI OUT of the external device and to MIDI IN on the LXP-15.
- Test the MIDI cable.
- Verify that you have the LXP-15 and the external device communicating on the same MIDI Channel. See page 6-1.

A MIDI indicator in the upper lefthand corner of the display will flash to indicate the LXP-15 is receiving MIDI data on the selected channel.

The LXP-15 doesn't go to the Program Change number transmitted — it's off by 1.

Your MIDI device is transmitting Program Changes 0-127. The LXP-15 translates 0 to 1, 1 to 2, etc. Subtract 1 from the LXP-15 program number you want, and transmit that Program Change number. See page 6-2.

Restoring Factory Presets and Registers

This procedure allows you to restore the LXP-15 memory to its original condition (as shipped by Lexicon).

!CAUTION!

This procedure will erase the entire contents of the User registers and replace it with a copy of the original factory-loaded presets. If you have setups stored in the User registers that you don't want to lose, make a record of them *before* performing this procedure.

To perform this procedure, the LXP-15 must be put in Diagnostic mode. To do this:

1. Power OFF the LXP-15.
2. Power ON the LXP-15 while holding down the front panel VIEW button.

This puts the LXP-15 in Diagnostics mode. The display will show:

LXP-15 Diagnostics
Turn ADJUST to select test.

Diagnostic Tests
Do not run any test other than "Clear All RAM" unless instructed by Lexicon Customer Service
Pre burn in Test
Switch Test
Direct Audio Test
Processed Audio Test
ADC Test (factory only)
Go To System
Post Burn in Test
ADC Monitor
Bank Test
Base ROM Test
Bank A ROM Test
Bank B ROM Test
All ROM Test
Host RAM Test
Shared RAM Test
Host WCS Test
Host All RAM Test
Clear All RAM
Interrupt Test
MIDI Test
Non-Volatile Memory Test
Non-Volatile Test Init
Audio DRAM Test
Go to System (skip Diagnostics)
Client Reset
Client Communications Test
Client RAM Test
Client WCS Test
All Client Tests
Display Contrast
Display Brightness
Display Test
Repeating Test

The ADJUST knob allows you to scroll through the list of 33 diagnostic tests shown in the column at the left. About half-way through this list is a test called *Clear ALL RAM*. Turn ADJUST to select this test. **Do not run any other test unless instructed by Lexicon Customer Service.** The display will show:

Clear ALL RAM, (inits registers)
Press VIEW to start.

Press VIEW. The following display will appear:

|
Are you sure?
|

v (Press these to confirm) v

Simultaneously pressing the two buttons directly beneath the displayed arrows (the button farthest to the left and the button farthest to the right) will initiate the reinitialization procedure. While the procedure is running (approximately 5 seconds) the display will show:

Clear ALL RAM, (inits registers)
Running . . .

When the reinitialization procedure is successfully completed, the green LED at the bottom of the Headroom section on the LXP-15 front panel will flash once, and the screen should show:

Clear ALL RAM, (inits registers) Press VIEW to start.	passed
--	---------------

An error condition is signaled by the illumination of the red overload LED for approximately half a second, and the message "Failed" on the display.

Once this procedure is completed, simply power OFF the LXP-15 and power ON again to resume normal system operation.

Specifications

Audio Inputs (2)

Level: -26 dBu minimum
(0 dBu = 0.775 Vrms)

Impedance: Stereo: 50 k Ω ,
unbalanced
Mono: 25 k Ω
unbalanced

Connectors: 1/4" tip/sleeve
phone jacks (L or R may be
used for mono input)

Audio Outputs (2)

Level: +4 dBu nominal,
+8 dBu max into 600 Ω
+14 dBu max into >10k Ω

Impedance: 600 Ω unbalanced
Connectors: 1/4" tip/sleeve
phone jacks (L or R may be
used for mono output.)

Mute Protection

removes unwanted transients dur-
ing power up/down or any power
interruption

Static Protection

Frequency Response

Wet: 20 Hz to 15 kHz +1.0/-1.5 dB
Dry: 20 Hz to 20 kHz \pm 0.1 dB

Dynamic Range

85 dB typical, 20 Hz to 20 kHz band-
width

Total Harmonic Distortion and Noise

Wet: <0.03% at 1 kHz
Dry: <0.02% at 1 kHz

Encoding

16-bit linear PCM

Sampling Frequency

31.25 kHz

Memory

128 presets with 128 user registers
available

Dynamic MIDI[®]

5-pin DIN connectors provided for
MIDI IN, MIDI OUT, and MIDI THRU

Controller Inputs

Five 1/4" tip/ring/sleeve phone jack
inputs provided for connection to
any on/off toggle switch, analog
voltage controller, or 50k Ω control
pedal

Signal Level Indicators

Four signal level LED indicators,
including processed signal over-
load

Front Panel Display

Two lines of 40 alphanumeric char-
acters each, backlit liquid crystal
display

Front Panel Controls

Input Level Adjust
Output Level Adjust
Page knob: used for selecting
16 display pages
View button: used for viewing
additional display pages
Adjust knob: used for editing
parameters
Soft buttons (5): used for assigning
Adjust knob parameters
Power Switch

RFI Shielding

Complies with FCC Class A require-
ments for computer equipment

Power Requirements

100/120/220/240 VAC
50-60 Hz 20W

Dimensions

19.0"W x 1.75"H x 13.9"D
(483 x 45 x 353mm)
Conforms to 19" rack mount
standard, 1U high

Weight

12.0 lbs (5.5 kg)
Shipping Weight 14.0 lbs
(6.4 kg)

Shipping materials meet or exceed
Project 1A of the National Safe Transit
Association (NSTA) packaged-product
specifications: vibration test, drop test,
static compression test.

Environment

Operating Temperature: 32° to
95°F (0° to 35° C)
Storage Temperature: -22° to
167°F (-30° to 75°C)
Humidity: 95% maximum without
condensation

Specifications subject to change without notice.

Tempo to Delay Time Conversion

(Tempo in beats per minute; Delay values to the nearest millisecond)



Tempo	1/4	1/8	1/8T	1/16
60	1000	500	333	250
61	984	492	328	246
62	968	484	323	242
63	952	476	317	238
64	938	469	313	234
65	923	462	308	231
66	909	455	303	227
67	896	448	299	224
68	882	441	294	221
69	870	435	290	217
70	857	429	286	214
71	845	423	282	211
72	833	417	278	208
73	822	411	274	205
74	811	405	270	203
75	800	400	267	200
76	789	395	263	197
77	779	390	260	195
78	769	385	256	192
79	759	380	253	190
80	750	375	250	188
81	741	370	247	185
82	732	366	244	183
83	723	361	241	181
84	714	357	238	179
85	706	353	235	176
86	698	349	233	174
87	690	345	230	172
88	682	341	227	170
89	674	337	225	169
90	667	333	222	167
91	659	330	220	165
92	652	326	217	163
93	645	323	215	161
94	638	319	213	160
95	632	316	211	158
96	625	313	208	156
97	619	309	206	155
98	612	306	204	153
99	606	303	202	152
100	600	300	200	150
101	594	297	198	149
102	588	294	196	147
103	583	291	194	146
104	577	288	192	144
105	571	286	190	143
106	566	283	189	142
107	561	280	187	140
108	556	278	185	139
109	550	275	183	138
110	545	273	182	136
111	541	270	180	135
112	536	268	179	134
113	531	265	177	133
114	526	263	175	132
115	522	261	174	130
116	517	259	172	129
117	513	256	171	128
118	508	254	169	127
119	504	252	168	126

Tempo	1/4	1/8	1/8T	1/16
120	500	250	167	125
121	496	248	165	124
122	492	246	164	123
123	488	244	163	122
124	484	242	161	121
125	480	240	160	120
126	476	238	159	119
127	472	236	157	118
128	469	234	156	117
129	465	233	155	116
130	462	231	154	115
131	458	229	153	115
132	455	227	152	114
133	451	226	150	113
134	448	224	149	112
135	444	222	148	111
136	441	221	147	110
137	438	219	146	109
138	435	217	145	109
139	432	216	144	108
140	429	214	143	107
141	426	213	142	106
142	423	211	141	106
143	420	210	140	105
144	417	208	139	104
145	414	207	138	103
146	411	205	137	103
147	408	204	136	102
148	405	203	135	101
149	403	201	134	101
150	400	200	133	100
151	397	199	132	99
152	395	197	132	99
153	392	196	131	98
154	390	195	130	97
155	387	194	129	97
156	385	192	128	96
157	382	191	127	96
158	380	190	127	95
159	377	189	126	94
160	375	188	125	94
161	373	186	124	93
162	370	185	123	92
163	368	184	123	92
164	366	183	122	91
165	364	182	121	91
166	361	181	120	90
167	359	180	120	90
168	357	179	119	89
169	355	178	118	88
170	353	176	118	88
171	351	175	117	88
172	349	174	116	87
173	347	173	116	87
174	345	172	115	86
175	343	171	114	86
176	341	170	114	85
177	339	169	113	85
178	337	169	112	84
179	335	168	112	84

60,000 ms (1 minute) ÷ Tempo (bpm) = Delay Time in ms for quarter-note beats

1/4 = quarter-note echo

1/8 = eighth-note echo

1/8T = eighth-note triplet echo

1/16 = sixteenth-note echo

LXP-15 User Log



#	Setup Name	#	Setup Name	#	Setup Name	#	Setup Name
1		33		65		97	
2		34		66		98	
3		35		67		99	
4		36		68		100	
5		37		69		101	
6		38		70		102	
7		39		71		103	
8		40		72		104	
9		41		73		105	
10		42		74		106	
11		43		75		107	
12		44		76		108	
13		45		77		109	
14		46		78		110	
15		47		79		111	
16		48		80		112	
17		49		81		113	
18		50		82		114	
19		51		83		115	
20		52		84		116	
21		53		85		117	
22		54		86		118	
23		55		87		119	
24		56		88		120	
25		57		89		121	
26		58		90		122	
27		59		91		123	
28		60		92		124	
29		61		93		125	
30		62		94		126	
31		63		95		127	
32		64		96		128	

This page may be copied as needed for documenting the sounds stored in LXP-15 User memory.

Lexicon Inc.
3 Oak Park
Bedford, MA 01730 USA
Telephone 781-280-0200
Fax 781-280-0490

Lexicon Part #070-07831 Rev 1