

ksp **8**TM

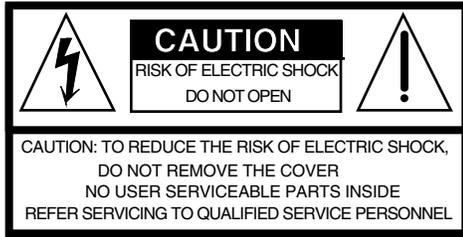
user's guide

KURZWEIL
Music Systems

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Part Number: 910358 Rev. B



The lightning flash with the arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY & INSTALLATION INSTRUCTIONS

INSTRUCTIONS PERTAINING TO THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS

WARNING - When using electric products, basic precautions should always be followed, including the following:

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with a dry cloth.
- 7) Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
- 16) **WARNING:** To reduce the risk of fire or electric shock do not expose this apparatus to rain or moisture.

SAVE THESE INSTRUCTIONS

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RADIO AND TELEVISION INTERFERENCE

Warning: Changes or modifications to this instrument not expressly approved by Young Chang could void your authority to operate the instrument.

Important: When connecting this product to accessories and/or other equipment use only high quality shielded cables.

Note: This instrument has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This instrument generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this instrument does cause harmful interference to radio or television reception, which can be determined by turning the instrument off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the instrument and the receiver.
- Connect the instrument into an outlet on a circuit other than the one to which the receiver is connected.
- If necessary consult your dealer or an experienced radio/television technician for additional suggestions.

NOTICE

This apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

AVIS

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

Manual by Rob Huffman.

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Chapter 1

Getting to Know Your KSP8

Welcome to the world of the KSP8. This manual, along with the accompanying *KSP8 Algorithm Reference Guide* (provided electronically), will tell you all you need to know about this powerful piece of gear. To get the most out of your KSP8, we recommend that you read at least the first seven chapters of this manual to understand how to route signals and create dazzling effects. Afterwards you'll want to keep this manual close at hand for reference at all times. That's why it's here.

If you simply can't wait to hear what the KSP8 can do, we've included a section called "Getting Started Really Quickly" on page 2-1.

What It Is

The KSP8 multi-bus signal processor is the right tool for today's demanding production needs. Stunning stereo reverbs, surround ambiance and unique surround effects, transparent EQs, responsive dynamic processing, new and exciting effects that transform, morph, and crunch are all provided. Flexible signal routing, configurable I/O, SmartMedia™ data storage, and superb sound quality are also part of this powerful, easy to use, and compact package. After all, pristine audio demands elegant hardware that meets and exceeds competitive specifications.

Ease of use is accomplished by an intuitive user interface. Clearly labeled front panel controls, comprehensive LED metering, and a carefully designed software interface give you a box that is as usable as it is powerful.

The KSP8 gives you amazingly powerful real-time control over hundreds of superb sounding effects. Its unique internal bus structure enables you to simultaneously create and route up to eight separate multi-effect chains in combinations of mono, stereo, and surround.

Here's a quick look at the signal path through the KSP8. For details, see Chapter 3.

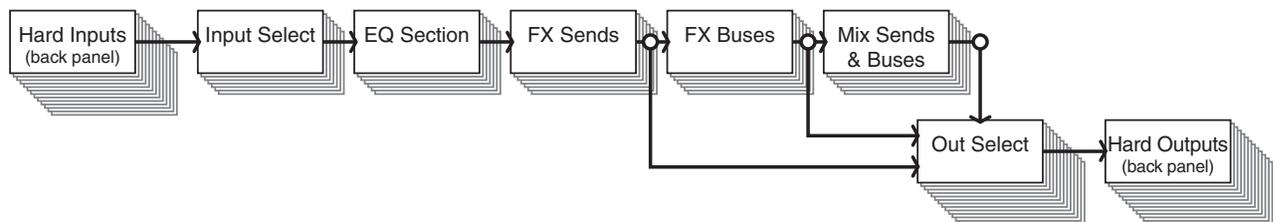


Figure 1-1. Signal path through the KSP8

Getting In and Out

Flexibility is the word when it comes to getting signals in and out of the KSP8. Four balanced/unbalanced analog audio inputs and outputs are standard, as are an AES digital input/output pair. With an I/O option card installed, the KSP8 is capable of handling up to 14 inputs and 14 outputs.

There's MIDI In, Out, and Thru, a slot for a SmartMedia card, and an optional remote control called the RSP8.

Kurzweil Digital Effects (KDFX) Algorithms

The building blocks for the KSP8's effects are the Kurzweil Digital Effects (KDFX®) algorithms that the engineers at Kurzweil Music Systems developed for the digital effects in the K2500™ and K2600™ series synthesizers. The KSP8 gives you lots more, however, since it's packed with more than twice the KDFX power of the K2600.

KDFX algorithms from the K2600 are included in the KSP8, of course, augmented by even more algorithms, including newly developed mono, stereo, and 5.1 Surround Sound algorithms. All of the KSP8's presets are based on these underlying algorithms. The KSP8's algorithms are divided into these categories:

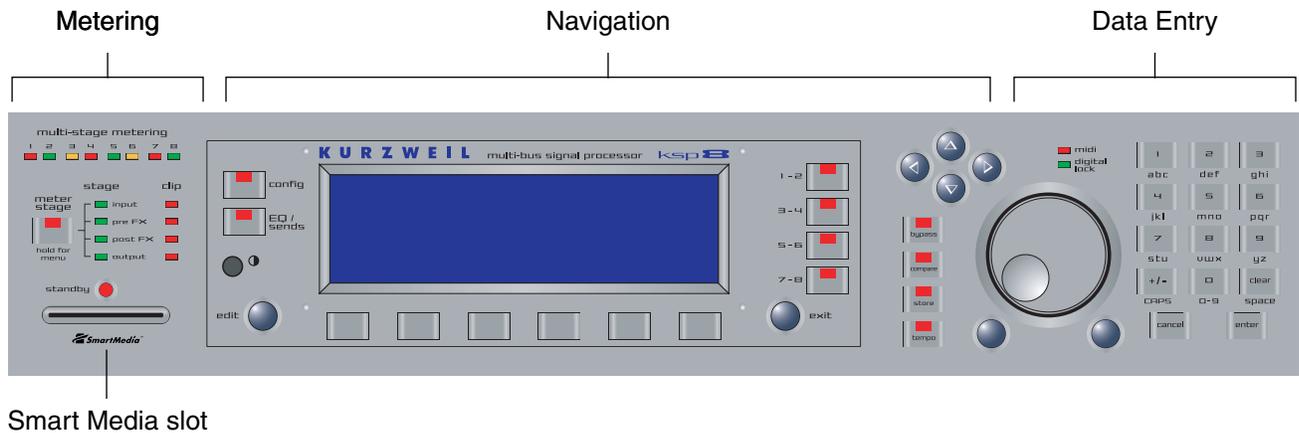
- Reverb
- Delay
- Chorus
- Flange
- Phaser
- Tremolo
- Rotary
- Spatial
- Distortion
- Dynamics
- Filters
- Oscillators
- Combinations

If you'd really like to dig in deep and edit algorithm parameters, we've provided you with extensive documentation for each algorithm in the *KSP8 Algorithm Reference Guide*, which you can download at <http://www.kurzweilmusicsystems.com/>.

KSP8 Front Panel

The KSP8 offers a familiar interface for anyone who has used Kurzweil products before. If you've used a K2000™, K2500, or K2600, you will recognize the 240 x 64 pixel display, soft buttons, edit and exit buttons, alpha wheel and other useful features. Even if you are not familiar with other Kurzweil products, however, you will have no trouble navigating the KSP8.

Take a moment now to familiarize yourself with the KSP8's front panel:



As you can see, the front panel is clearly divided into three sections: metering, navigation, and data entry. There's also a slot for Smart Media memory cards that you can use for storing or transferring your work, as well as for loading KSP8 operating system and effect object updates. You can also update the KSP8 using MIDI.

Metering

The metering section contains eight tri-color LEDs that let you view signal levels at various stages in the signal chain. These include:

- input
- pre FX
- post FX
- output

When you momentarily press the **meter stage** button in the metering section, you select the stage in the signal chain for which you wish to activate metering. The topmost eight LEDs show the levels of all eight channels at a given stage. One of the green LEDs immediately to the right of the **meter stage** button will light to indicate the current stage. There are also four clipping LEDs which turn red to indicate that clipping has occurred on at least one channel at the given stage in the signal path.

If you press and hold the **meter stage** button, the display screen shows horizontal bar-style meters for all eight channels of the currently selected stage in the signal chain. Press and hold the **meter stage** button a second time, or press **exit**, to cancel the meter display.

Standby LED

The standby LED will show you if the KSP8 is currently in standby mode. Standby mode lets you turn off the KSP8's display and audio output without turning off the unit. Choose Standby from the Master page to put your KSP8 to "sleep." Press any key on the front panel to "wake up" the KSP8. Turning the alpha wheel does not wake up the unit, however.

Navigation

The navigation section of the front panel consists of the display and the buttons surrounding it. These navigation buttons will take you to every one of the KSP8's pages and parameters.

The Display

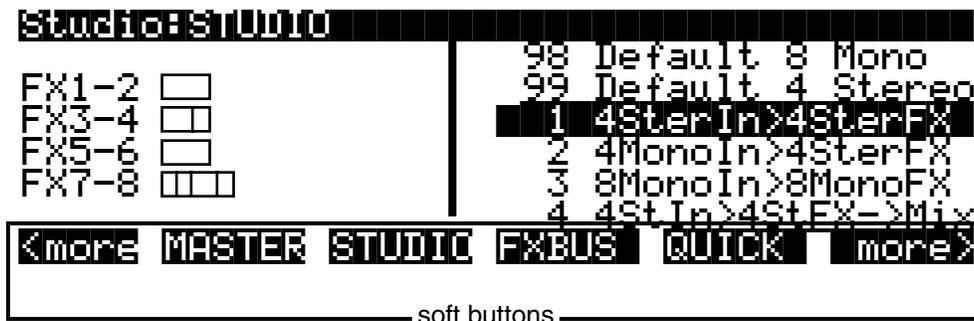
Your primary interface with the KSP8 is its backlit graphic display. As you press various buttons, this display reflects the commands you enter and the editing changes you make.

Contrast knob

You can adjust the KSP8 display for optimum viewing by turning the contrast knob (to the lower left of the KSP8 display).

Pages

The KSP8's functions and parameters are organized into smaller, related groups that appear together in the display. You move between the various pages using the navigation buttons. There are many pages, but there are a few features common to each page. The diagram below shows the Studio:STUDIO page.



The Top Line

On the top line of most pages, there's a reminder about the current page. Many pages display additional information in the top line, as well. The top line is almost always "reversed"—that is, it has a white background with blue characters.

Soft Buttons

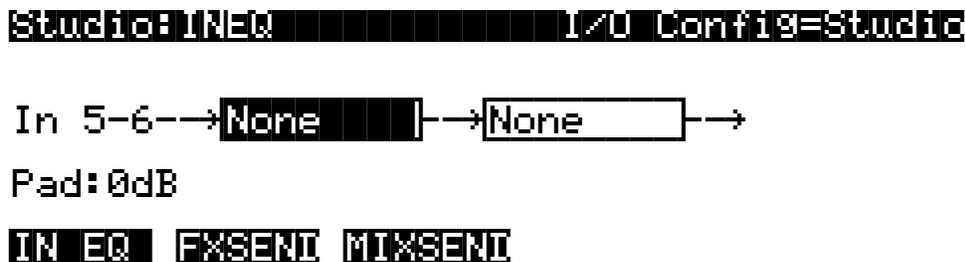
The bottom line is divided into six (sometimes fewer) sets of reversed characters that serve as labels for the six buttons directly beneath the display. These labels—and the functions of the buttons—change depending on the current page or mode. Consequently the buttons that select these functions are called "soft" buttons; their functions change depending on the currently selected page (that is, the screen currently visible on the KSP8's display). Sometimes there are more soft buttons available than can be displayed on one page. When this happens, buttons labeled "more" will display on either side of the screen; press one of these soft buttons to display additional soft buttons for the current page.

The Config Button

The **config** button, to the left of the display, gives you access to the pages where you select and set levels for your inputs and outputs. This is also where you group inputs and configure the effects buses as stereo, mono, or surround.

The EQ/Sends Button

Press the **EQ/sends** button to display the EQ and Sends pages. The display will show two channels at a time (as shown below) if you are currently in a stereo input grouping. For a grouping such as this, you would press one of the bus select buttons (to the right of the display) to change the pair of channels being displayed. If these channels were configured for mono or surround sound, this display would be a little bit different, as would the function of the bus select buttons.



Each KSP8 input group passes through two equalization (EQ) stages before being passed to the effects buses. You can choose from a range of equalization options, as well as distortion, sine and sawtooth waves, and noise generators.

The Bus Select Buttons

There are four bus select buttons to the right of the display. One or more of these will always be lit, indicating which bus(es) is currently displayed and editable. The behavior of the bus select buttons depends on configuration of the KSP8's current bus: stereo, mono, or 5.1 surround. With stereo buses, each button represents a stereo pair. If the current bus has been configured for mono effects, pressing the lighted bus select button will toggle between adjacent mono buses. When you configure the KSP8 for 5.1, the top three bus select buttons will light, telling you that buses 1–6 are configured together as the six channels required to bring you surround sound.

The complete scoop on bus select buttons is on page 3-14.

The MIDI LED

To the right of the cursor buttons is a red LED labeled MIDI. This LED will light whenever the KSP8 receives MIDI information from a MIDI device.

The Digital Lock LED

Below the MIDI LED is an LED that indicates when the KSP8 is digitally synchronized with another device. This LED will blink during loss of digital lock. The digital clock source is determined by the setting of the Clock Source parameter on the Master page. See "ClockSource" on page 10-2.

The EDIT Button

The **edit** button is one of the two blue buttons diagonally beneath the KSP8's display, and it takes you deeper into the inner workings of the device. Pressing the **edit** button tells the KSP8 that you want to change some aspect of the object marked by the cursor. For example, when a studio is selected and you press **edit**, you either gain access to the underlying parameters of the algorithm(s) with the Preset editor, or else you end up on the Chain editor page, depending on the setting of the studio's FXBUS page. You can then select parameters (navigation) and change their values (data entry). If the value of the selected parameter has its own editing page, pressing the **edit** button will generally take you to that page.

The EXIT Button

Press the **exit** button (the other blue button diagonally beneath the KSP8's display) to leave the current editor or "back out" of an operation. If you've changed the value of any parameter while in that editor, the KSP8 will ask you whether you want to save your changes before you can leave the editor. In general, the **exit** button will move you back up through the KSP8's operating system until you are at a top level (Studio) page. If you ever find yourself lost, you can usually press **exit** repeatedly until you're back on familiar ground.

The Cursor Buttons

To the right of the display are four blue buttons arranged in a diamond fashion. These are called the cursor buttons. They move the cursor around the currently selected page, in the direction indicated by their labels. The cursor is a highlighted (reversed) rectangle, or in some cases an underscore. It marks the value of the currently selected parameter.

Programming the KSP8 involves selecting various parameters and changing their values. Parameters are selected by highlighting their values with the cursor. The highlighted value can be changed with any of the data entry methods described in the data entry section below.

Data Entry

The data entry section of the front panel includes the **bypass**, **compare**, **store**, and **tempo** buttons, as well as the Alpha wheel, the Plus/Minus buttons, and the 14-button alphanumeric pad.

The Alpha Wheel

The Alpha Wheel is especially useful because it can quickly enter large or small changes in value. If you turn the Alpha Wheel one click to the right, you'll increase the value of the currently selected parameter by one increment. One click to the left decreases the value by one increment. If you turn it rapidly, you'll jump by several increments.

The Plus/Minus Buttons

These buttons are located just under the Alpha Wheel, and are sometimes referred to as the **increment/decrement buttons**. The Plus button increases the value of the currently selected parameter by one, and the Minus button decreases it by one. These buttons are most useful when you're scrolling through a short list of values, or when you want to be sure you're changing the value by one increment at a time. One press of the Plus or Minus button corresponds to one click to the right or left with the Alpha Wheel. These buttons will repeat if pressed and held.

Pressing the Plus and Minus buttons simultaneously jumps through the current list of values in large chunks instead of one by one. For example, each time you press the Plus and Minus buttons together while you're scrolling through the preset list you will fast forward to the part of the list where a new category starts. Similarly, when scrolling through the available values for a parameter, the Plus/Minus double-press will move you through the list in large, logical increments (groups of ten, for example). Don't confuse these buttons with the +/- button on the alphanumeric pad; that button is used primarily for entering negative numeric values and switching from uppercase to lowercase letters (and vice versa).

The Alphanumeric Pad

As its name implies, this set of 14 buttons lets you enter numeric values, and to enter names one character at a time. Depending on where you are, the KSP8 automatically enters letters or numerals as appropriate (you don't have to select between alphabetic or numeric entry).

When you're entering numeric values, press the corresponding numeric buttons, ignoring decimal places if any (to enter 1.16, for example, press 1, 1, 6, ENTER). The display will reflect your entries, but the value won't actually change until you press ENTER. Before pressing ENTER, you can return to the original value by pressing CANCEL. Pressing CLEAR is the same as pressing 0 without pressing ENTER.

When entering names, you'll use the left/right cursor buttons or the  soft button to move the cursor to the character you want to change. Use the labels under the alphanumeric buttons as a guide to character entry. Press the corresponding button one or more times to insert the desired character above the cursor. The **cancel** button is equivalent to the right cursor button, and **enter** is the same as OK. The **clear** button replaces the currently selected character with a space. The "+/-" button *toggles* between uppercase and lowercase letters.

The alphanumeric pad also provides a nifty search function that's described along with other useful shortcuts on page 5-3.

The Bypass Button

The **bypass** button lets you bypass the entire KSP8 from your signal chain, or individually bypass selected effects, EQs, or sends (to mute audio going to a bus). It's described on page 5-11 of this manual.

The Compare Button

Use the **compare** button to listen to the difference between the current sound of an object that you have been editing (e.g., a preset) and the sound of the previously saved version of that object (i.e., how it sounded before you started the current editing session).

The Store Button

Whenever you make changes to an object, you'll notice that the **store** button lights. If you are happy with the changes you've made to the object and you want to save it, press **store**. A dialog will display that allows you to name and store the object; other options will be available, too.

If you do not want to save the changes you've made to an object, press **exit**, then press **no**.

The Tempo Button

Press the **tempo** button to enter a page where you can tap in a tempo for use with tempo-based effects such as delays or tremolos. Press the **tap** soft button at least four times at the speed you wish to set. The KSP8 will calculate the tempo you have entered and will show the tempo in beats per minute on the display. Press the **exit** button to leave this page.

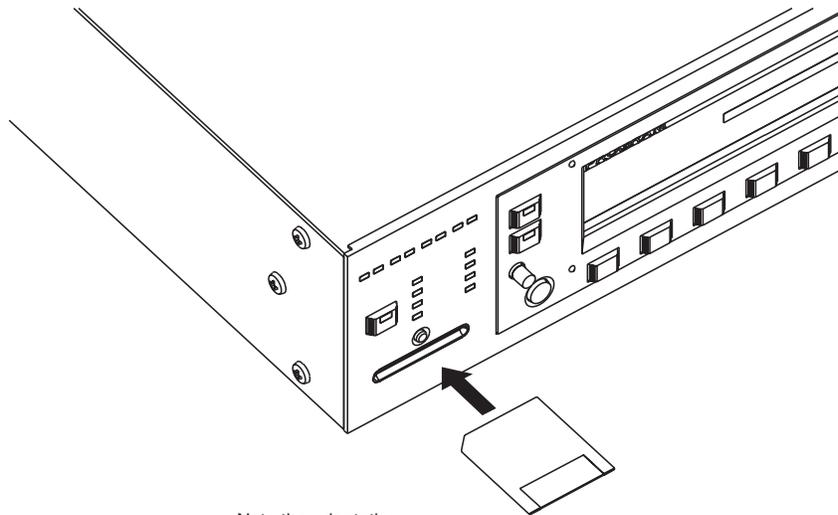
Only presets made with algorithms that have a Tempo parameter can sync to System tempo. These are often marked with the label "BPM", for "beats per minute". Presets or algorithms marked "ms", for "milliseconds" are strictly based on the specified time, and will not change with the System tempo.

Finally, the Tempo parameter of a preset must be set to System, rather than a specific tempo, for this to work. You can set this inside a preset, or set it with a Quick or MOD.

SmartMedia Card Slot

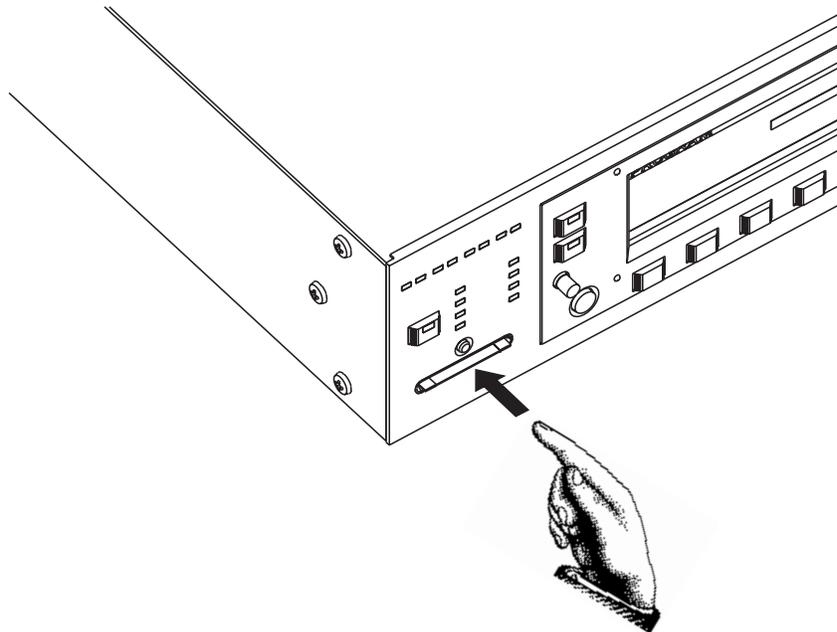
You can use 3.3v SmartMedia memory cards, in a variety of size configurations, to store and transfer data to or from your KSP8. The cards are inexpensive and are available from a variety of vendors. The SmartMedia card slot uses a built-in spring-loaded mechanism that makes it easy to insert and remove cards.

To use a card, simply insert the notched end into the KSP8's SmartMedia slot, making sure that the side of the card with the gold plating is towards the bottom, and the notch is towards the right, as shown in the picture below. The SmartMedia logo underneath the slot also has a small image of a card with the notch correctly oriented to remind you of the correct way to insert it.



Note the orientation
of the notch on the card

To eject a card, push it in slightly and it will pop out:

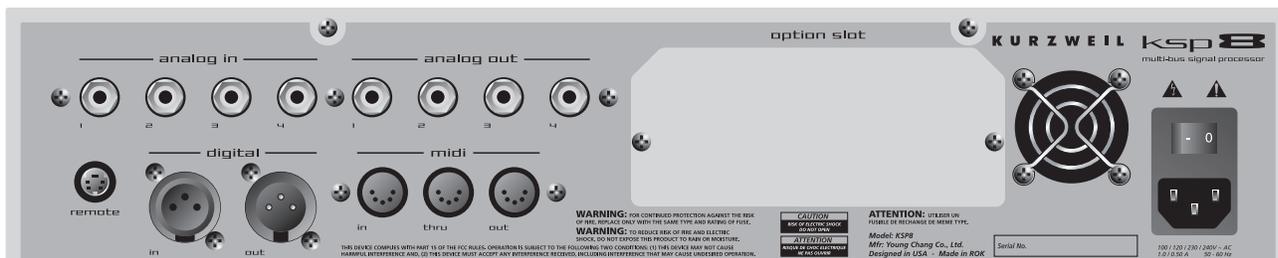


Press the **CARD** soft button on the Master page to access SmartMedia card functions. See Chapter 10 for complete information.

KSP8 Rear Panel

From both a hardware and a software point-of-view, the KSP8 is incredibly flexible. You can choose from the standard analog and digital I/O offerings or add one of the available option cards to customize the KSP8 to your liking. Throughout this manual, we'll refer to the back panel input and output jacks as "hard" inputs and outputs, to distinguish them from the "soft" inputs and outputs on the KSP8's internal buses.

Take a look at the rear panel of the KSP8 to see where the KSP8 hooks up with the other gear in your rig:



Analog I/O

These are balanced (tip-ring-sleeve) connectors. You can add more with the Analog I/O option.

Digital I/O

These are XLR connectors; they function in either pro (AES/EBU) or consumer (S/PDIF) mode.

MIDI In, Out, Thru

MIDI In lets the KSP8 receive and slave to a sequencer. MIDI In also enables real-time control of the KSP8 through devices such as MIDI slider and pedal boxes.

Use MIDI Out for SysEx dumps and for generating a MIDI master clock with the KSP8.

MIDI Thru duplicates whatever is received on the MIDI In port without altering it in any way.

Remote

This is where you connect either the RSP8 remote or the HUB7 multi-port hub. The RSP8 provides most KSP8 front panel functions, as well as a joystick and eight knobs for adjusting quick parameters on the fly. The HUB7 enables you to use a single RSP8 to control up to seven KSP8s; it also serves as a repeater, allowing you to extend the cable distance between the KSP8 and the RSP8.

Power Connection

Connect one end of the power cable provided with your KSP8 to the power connector on the back panel of the unit; connect the other end to a power source. The type of cable provided will depend on the country in which you've purchased your KSP8.

This is also the location of the on/off switch: press the "1" side of the switch to turn the KSP8 on; press the "0" side to turn the KSP8 off. For your convenience, the KSP8 also provides a "standby" mode that you can access from the MASTER page.

KSP8 Option Boards

To fully realize the KSP8's eight-channel I/O capabilities, you'll want to add one of the option boards. The KSP8 options include:

I/O Option Name	Channels Added	Comments
Analog In/Out	4 channels in / 4 channels out	Increases analog capacity to 8 I/O channels.
ADAT [®] In/Out	8 channels	Allows the connection of products using the ADAT optical standard.
AES In/Out	8 channels	Allows the connection of products using the AES/EBU digital standard.
TDIF In/Out	8 channels	Allows the connection of products using the TDIF standard.
KDS In/Out	8 channels	Kurzweil Digital Stream - allows direct connection with digitally equipped Kurzweil instruments.

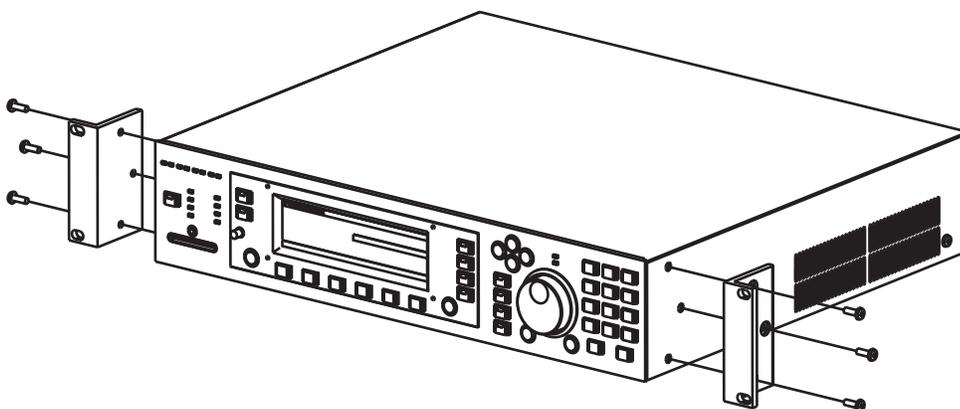
These options are user-installable, but they are NOT hot-swappable, so it is important that you turn off the KSP8 (standby mode won't be sufficient) if you are installing an option board. Carefully follow the installation instructions provided with each option before you attempt any work on your KSP8.

Basic Operations

You will undoubtedly want to spend time experimenting with your KSP8. This section gives you basic setup information. If you simply can't wait to hear what the KSP8 can do, we've also included a section called "Getting Started Really Quickly" on page 2-1.

Setting Up the KSP8

1. Remove the KSP8 from its shipping box and carefully set aside the packing materials.
2. Install the unit into two spaces of a standard 19 inch rack using the supplied hardware to attach the "rack ears," as shown below:



Or, set the KSP8 on a convenient flat work space. If you will be doing this, attach the four supplied adhesive-backed rubber feet to the bottom of the unit. Locate the rubber feet next to the four sets of small double holes on the bottom of the unit.

3. Make audio connections between the KSP8 and your other gear.
4. Make MIDI connections (if any) from the KSP8 to your other gear.
5. Use the supplied power cable to connect the power connector on the back panel of the KSP8 to an AC power supply.
6. Turn on the KSP8 by pressing the "1" side of the power switch on the back of the unit.

The KSP8 will display the Studio:STUDIO page. If necessary, you should adjust the screen contrast with the contrast knob at this time.

Studio: STUDIO Page

The first time you start up your KSP8 it displays the Studio:STUDIO page. In future sessions, your KSP8 will remember if you were last on the Studio:STUDIO, FXBus or Quick mode page, and will start up displaying the one of those pages that you were on most recently. You can always get to the Studio:STUDIO page, however, by pressing the **STUDIO** soft button, or by repeatedly pressing the **exit** button on the front panel to page back through the operating system.

```

Studio:STUDIO
-----
Studio Information Display (SID)
FX1-2  [ ]
FX3-4  [ ]
FX5-6  [ ]
FX7-8  [ ]

98 Default 8 Mono
99 Default 4 Stereo
1 4SterIn>4SterFX
2 4MonoIn>4SterFX
3 8MonoIn>8MonoFX
4 4StIn>4StFX->Mix

<more MASTER STUDIO FXBUS QUICK more>

```

The highest level object in a KSP8 is called the studio. The Studio:STUDIO Page shows all of the KSP8 studios, including the ones provided with the KSP8 and any studios you may have created. The Studio Information Display (SID) on the left side of the screen show how much of the KSP8's processing power is being used on each bus (you can read more about these on page 3-10).

Turn the alpha wheel or press a +, -, or cursor button to scroll through the studio list. Notice the soft buttons on the bottom line of the display; press the front panel button beneath one of the **more>** soft buttons to see the other soft buttons available from this page. A useful fact to bear in mind is that when a soft button label is all capital letters that means that it takes you to another page (rather than immediately performing a function).

Now look for the soft button labeled **MASTER**. (You may need to press one of the **more>** buttons a time or two to bring this button into view.) Press the **MASTER** button to display the KSP8 Master page.

Master Page

The Master page is where you set parameters that affect operation of the KSP8 at every level. These include important things such as clock source and digital word length. Soft buttons on the Master page give you access to the SmartMedia card page, Object page, and Util page. This is also where you can reset the KSP8 to return it to its default state or put the unit into standby mode.

```

MASTER Memory 487498
StudioChan1: 8 SysEx ID: 0
I/O Config : Studio
ClockSource: 48KHz Int
DigWordLen : 16 Bit
DitherType : Minimum
DigFormat : AES/EBU
<back CARD OBJECT UTIL Standby Reset>

```

When you are on the Master page, as on any page in the KSP8, you can view and change the parameters displayed. If you need to change one of the settings, use the cursor keys to highlight an item, then change its value by turning the alpha wheel or pressing the + or - button.

Signal Routing

Once you've made all the necessary back panel connections to the KSP8, press the **config** button on the front panel to access the Config pages (these are discussed in detail, starting on page 3-11).

```
Studio: INSEL I/O Config=Studio
In 1: Analog 1 In 5: AES/EBU 1L
In 2: Analog 2 In 6: AES/EBU 1R
In 3: Analog 3 In 7: None
In 4: Analog 4 In 8: None
INSEL INLVL INGRP BUSCFG OUTSEL OUTLVL
```

Use the options on the INSEL and OUTSEL page to route signals through the KSP8.

By default, the KSP8 is set up to handle pro level signals (reference level +4 dBu). Press the INLVL or OUTLVL soft buttons to change these levels.

Your options will be different depending on whether you are working with mono, stereo, or 5.1 surround signals. The pages displayed when you press the INGRP and BUSCFG soft buttons let you set up the KSP8 for one of these configurations.

Syncing your KSP8 with Other Devices

When digitally synchronizing your KSP8 with other devices, either the KSP8 or another connected device can serve as the clock master. Both 44.1 KHz and 48 KHz clock speeds are supported, whether generated internally or externally. The KSP8 can sync to an external master source via the AES/EBU input, or from a digital I/O option card. Each digital I/O option card (ADAT, TDIF, AES/EBU, KDS) also includes a BNC word clock connector.

The Digital Lock LED on the front panel will light when the KSP8 is synced with another device. The LED will blink if the lock is lost.

Processor Allocation Units (Us)

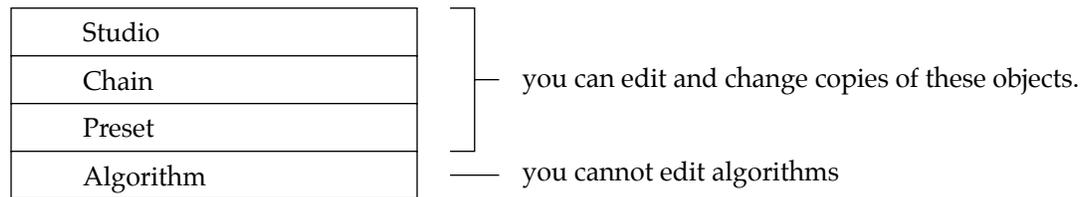
Each algorithm uses one or more Processor Allocation Units, which the KSP8 refers to simply as "U"s. In general, the more Us an algorithm uses, the more powerful and complex the algorithm. There are 16 Us available, and the KSP8 uses them in different quantities for different algorithms. Depending on how many algorithms you are chaining together on different buses, you may need to keep track of the number of Us you use. Also, it's important to realize that because of the way the KSP8 allocates U usage you may not be able to use all 16 Us at once.

The documentation for each algorithm indicates the number of Us it requires.

KSP8 Objects

As we mentioned above, the heart of the KSP8 is its collection of great sounding effects algorithms. These are pre-loaded into the KSP8's memory and are there for your use in studios, chains, and presets.

The KSP8's user interface is structured with a hierarchy of objects that (with the exception of algorithms) you can edit and arrange for your effects needs. The illustration below shows this basic hierarchy. If you'd like to check out lists of all the KSP8's objects, they're in Appendix C of this manual.



Starting at the top (since that's how you'll work with them), let's take a quick look at each type of KSP8 object:

Studio

A studio is a complete effects signal chain, from the inputs through two stages of equalization and then on to the effects buses (where you make use of presets, chains, and algorithms – objects that you'll read about below) and outputs. A number of useful studios are provided with the KSP8. You can use these as they are, edit and store them, or create your own studios from scratch.

Chain

A chain is an object that consists of a number of presets (described below), quick parameters, and MODs in a row. A chain can contain up to eight presets per effects bus. Refer to Chapter 7 for information on using chains.

Preset

Although you can't change the algorithms stored in ROM, you can change the values of an algorithm's parameters and store that as a preset. A preset, then, is an algorithm, plus the settings of the parameters associated with that algorithm. You can place a preset alone on a bus in a studio, or use a series of presets in a chain. Refer to Chapter 6 for information on using presets.

Algorithm

An algorithm is a specific type of signal processing, like a reverb, distortion, or flanger. These are stored in ROM, and you cannot change them. You can change the values of an algorithm's parameters, however, and store them in a preset. The KSP8 is loaded with a few hundred algorithms, and each one requires quite a bit of explaining – so much so, in fact, that the algorithms have their own book, the *KSP8 Algorithm Reference Guide* which you can download from the Kurzweil Music Systems web site.

Upgrading, Updating, and Maintaining your KSP8

Like most of the professional products from Kurzweil Music Systems, the KSP8 is designed so that it can be updated and upgraded in the future. These procedures are described in this section, as well as information about your KSP8's battery.

Adding Options to the KSP8

As described elsewhere, a number of option boards are available for the KSP8 to increase its number and type of inputs and outputs. Options adding other features may also be available in the future. In general, the KSP8's options are user-installable. Refer to the instructions included with each option for complete information.

Updating your KSP8's Software

From time-to-time, Kurzweil Music Systems will release updates to the KSP8's operating software and soundware objects. Using the KSP8's boot loader, you will be able to install an update in one of the following ways:

- You can update the software or soundware from a .MID file, "playing" the data file on a MIDI sequencer attached to the KSP8's MIDI In port.
- You can load the software or soundware as .KOS or .KBB, or .KSP files from a SmartMedia card.

Refer to Appendix E for complete documentation on the KSP8's Boot Loader.

Changing the Battery in your KSP8

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

Your KSP8 uses battery-backed memory to keep track of settings and programs. The battery is a 3 volt button type (CR 2032), and should last a long time – up to seven years, in fact. A message on the KSP8 display at startup will indicate a low battery. Follow the instructions below to change the KSP8 battery:

1. Back up all KSP8 data. Do this via MIDI with a SysEx dump or by saving to a SmartMedia card. See Chapter 10 for information on these backup procedures.
2. Remove power from the KSP8
3. Turn the unit over and use a Phillips screwdriver to remove the six screws from the access panel.
4. Locate the battery, and note the orientation of the + and - sides of the battery.
5. Remove the old battery.
6. Insert the new battery; do not use pliers, since this can short out the battery. Make sure that the + and - sides of the battery are oriented correctly. After installation, the + side will be visible under the clip.

KSP8 Specifications

Dimensions

Height: 3.625 inches (92 mm)

Width: 17.125 inches (435 mm)

Depth: 15.125 inches (384 mm)

Weight: 13.25 lbs. (6 Kg)

Inputs

Analog

Four analog inputs, balanced differential using 1/4" Tip-Ring-Sleeve jacks

Input impedance: 20K ohms balanced, 10K or 20K ohms unbalanced

A/D converter: 24 bit, 128x oversampling

Maximum analog input level is +22 dBu; Minimum input level for 0 dBFS: +4dBu

Analog input level control (gain) of 0 dB to 18 dB in 1.2 dB steps, software programmable on a per channel basis

Common Mode Rejection Ratio (CMRR): >60 dB @ ≤ 1 KHz, > 40 dB @ 1 KHz – 20 KHz

Frequency response: 20 Hz - 20 KHz ± 0.15 dB

Dynamic range: > 110 dB unweighted @ 1 KHz

THD+N: <0.0015% @ 1 KHz, +19 dBu

Crosstalk: < -100 dB @ 1 KHz

Digital

Stereo AES/EBU (XLR) digital input pair

Synchronizes to AES or option card input clock or generates 48 or 44.1 kHz (all selected inputs must be in sample rate sync)

Impedance: 110 ohms (AES) or 75 ohms (S/PDIF)

Formats: AES/EBU (AES3-1992) or S/PDIF (IEC 60958-3)

Input word length: up to 24 bits

Outputs

Analog

Four analog outputs, balanced differential using 1/4" Tip-Ring-Sleeve jacks (unbalanced Tip-Sleeve plugs are also supported; for best results, set software for unbalanced connectors)

D/A converter: 24 bit, 128x oversampling

Output impedance: 100 ohms balanced, 50 ohms unbalanced

Maximum analog output level is +22 dBu for full-scale digital; Minimum output level for 0 dBFS: +4 dBu

Frequency response: 20 Hz - 20 KHz \pm 0.15 dB

Dynamic range: > 110 dB unweighted @ 1 KHz

THD+N: <0.002% @ 1 KHz, +19 dBu

Crosstalk: < -100 dB @ 1 KHz

Digital

Stereo AES/EBU (XLR) digital output pair

Impedance: 110 ohms (AES) or 75 ohms (S/PDIF)

Formats: AES/EBU (AES3-1992) or S/PDIF (IEC 60958-3)

Output word length: 16, 20, or 24 bits

Engine

- 750K Bytes of fully static RAM battery backed

- 4M bytes of Flash ROM

MIDI

- One of each: In, Out, and Thru

Power Supply

- Universal switching supply for 90-250V, 50/60Hz

Stay in Touch

We'd like you to stay in touch and stay informed. Please surf on over to:

<http://www.kurzweilmusicsystems.com>

to keep up with all the latest from Kurzweil Music Systems, including late-breaking news, new operating systems, and new soundware objects as they become available.

Chapter 2 Connecting your KSP8

This chapter tells you everything you need to know about connecting your KSP8 with your other equipment, including analog and digital audio gear and MIDI devices. For those of you wishing to cut to the chase, however, the first part of this chapter, “Getting Started Really Quickly” will tell you how to play with the KSP8’s multitude of effects in a matter of minutes.

Getting Started Really Quickly

We recognize that you probably want to make neat sounds and impress your friends right away, so this section gives brief instructions to get you started now. No fancy routing will be described here, just analog stereo in to analog stereo out (or for digital stereo in to digital stereo out, see page 2-3). We also will assume that you have a pretty fair idea of how to hook up audio equipment, so let’s go!

Analog Quick Start

1. Make sure the volume on your sound system is turned all the way down.
2. Connect your input and output cables to analog inputs 1 and 2 on the back panel; connect your output cables to analog outputs 1 and 2.
3. Double check that the audio volume controls in your hookup are all the way down. Now, press the switch on the back panel of the KSP8 to turn the unit on. (We are assuming that you have taken the initiative to plug the KSP8 in already.)

The diagram below shows the Studio:STUDIO page, which will appear on the KSP8’s display when you first power up the unit. If a different screen appears, despair not; simply press the **STUDIO** soft button to bring up this screen.

```
Studio:STUDIO
FX1-2 
FX3-4 
FX5-6 
FX7-8 
98 Default 8 Mono
99 Default 4 Stereo
1 4SterIn>4SterFX
2 4MonoIn>4SterFX
3 8MonoIn>8MonoFX
4 4St.In>4St.FX->Mix
<more MASTER STUDIO FXBUS QUICK more>
```

- 4. Highlight "99 Default 4 Stereo" on the Studio:STUDIO page by using the alpha wheel or the + or - keys to scroll through the list. Press the **FXBUS** soft button to bring up the FXBUS page:

```
Studio:FXBUS
FX1-2
----->
Type:Preset : 0 None (0U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>
```

- 5. The value of the Type parameter (that is, the text to the right of the word Type) will either be Chain or Preset. If it is not set to this value already, highlight this field (by moving there with left cursor button), then use the alpha wheel or + and - keys to set the type to Preset.
- 6. Now press the right cursor key on the front panel of the KSP8 to highlight the Preset name field (the field to the right of the word Preset). You can now use the alpha wheel or + and - keys to scroll through the KSP8's different presets. Try pressing the + and - keys simultaneously to jump between groups of different types of effects within the preset list.

```
Studio:FXBUS
FX1-2
->Rvrb----->
Type:Preset : 1 Small Wood Booth (2U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>
```

- 7. Finally, send an audio signal (such as the output of a CD player) to the KSP8's input. Slowly turn up the volume on your sound system and listen to the sounds of the KSP8's different preset effects. We expect that this may keep you occupied for a while, but we do hope that you'll make time to read the rest of this manual when you're ready to become a KSP8 power user.

Digital Quick Start

1. Make sure the volume on your sound system is turned all the way down.
2. Connect your AES/EBU input to the Digital In connector on the back panel of the KSP8, and connect another cable for AES/EBU output to the Digital Out connector.
3. Double check that the audio volume controls in your hookup are all the way down. Now, press the switch on the back panel of the KSP8 to turn the unit on. (We are assuming that you have taken the initiative to plug the KSP8 in already.)

The diagram below shows the Studio:STUDIO page, which will appear on the KSP8's display when you first power up the unit. If a different screen appears, despair not; simply press the **STUDIO** soft button to bring up this screen.

```

Studio:STUDIO
FX1-2  [ ]
FX3-4  [ ]
FX5-6  [ ]
FX7-8  [ ]
98 Default 8 Mono
99 Default 4 Stereo
1 4SterIn>4SterFX
2 4MonoIn>4SterFX
3 8MonoIn>8MonoFX
4 4StIn>4StFX->Mix
<more MASTER STUDIO FXBUS QUICK more>
  
```

4. Highlight "99 Default 4 Stereo" on the Studio:STUDIO page by using the alpha wheel or the + or - keys to scroll through the list. Press the **FXBUS** soft button to bring up the FXBUS page, then press the 5-6 bus select button on the front panel of the KSP8 to display the FXBUS page for buses 5 and 6 (which are the default buses for the KSP8's base digital I/O).

```

Studio:FXBUS
FX5-6
  → -----→
Type:Preset : [None] (0U)
MIDICh:5 Lock:Off Mix Mode:Insert.
<more MASTER STUDIO FXBUS QUICK more>
  
```

5. The value of the Type parameter (that is, the text to the right of the word Type) will either be Chain or Preset. If it is not set to this value already, highlight this field (by moving there with left cursor button), then use the alpha wheel or + and - keys to set the type to Preset.
6. Now press the right cursor key on the front panel of the KSP8 to highlight the Preset name field (the field to the right of the word Preset). You can now use the alpha wheel or + and - keys to scroll through the KSP8's different presets. Try pressing the + and - keys simultaneously to jump between groups of different types of effects within the preset list.

```
Studio:FXBUS
FX5-6
  ▢Rvrb----->
Type:Preset :1 Small Wood Booth (2U)
MIDICh:5 Lock:Off Mix Mode:Insert.
<more MASTER STUDIO FXBUS QUICK more>
```

7. Finally, send an audio signal (such as the output of a CD player) to the KSP8's input. Slowly turn up the volume on your sound system and listen to the sounds of the KSP8's different preset effects. We expect that this may keep you occupied for a while, but we do hope that you'll make time to read the rest of this manual when you're ready to become a KSP8 power user.

Cable Connections

All cable connections to the KSP8 and its options are made on the back panel of the box. This chapter describes the various ways that you'll get signals and data into and out of your KSP8.

One thing to keep in mind when making your audio connections from the KSP8 is that some presets and chains generate sounds all by themselves. Check out the chain "85 Scuba love!" for a bubbly example of this.

Analog Connections

The KSP8 features balanced analog audio inputs and outputs via 1 / 4 -inch jacks. These inputs and outputs, however, can be connected to either balanced or unbalanced equipment. Although the KSP8 provides excellent unbalanced performance, you'll get best results with balanced connections if your other equipment provides balanced outputs and inputs.

Output

To connect the KSP8 outputs to balanced inputs, select balanced output mode on the KSP8's OUTLVL page (described in Chapter 3) and use balanced cables. Balanced cables should be constructed using twisted-pair cable with 1 / 4 -inch stereo (tip-ring-sleeve) plugs on the end that connects to the KSP8. The other end of each cable should have either 1 / 4 -inch stereo plugs or XLR plugs to connect to balanced inputs. To connect to unbalanced inputs, select unbalanced output mode on the KSP8's OUTLVL page and use unbalanced cables. Unbalanced cables should be constructed using coaxial cable with 1 / 4 -inch mono (tip-sleeve) plugs on both ends.

Input

To connect the KSP8 inputs to balanced outputs, use balanced cables as described above. To connect to unbalanced outputs, use unbalanced cables. No selections are required on the KSP8 to select balanced or unbalanced operation.

Setting Levels

For best performance, set the KSP8's output level (also on the OUTLVL page) to the maximum level that doesn't cause distortion in your system. If the output levels are set too low and must be increased later on by adding gain (amplification), system noise will increase.

Digital Connections

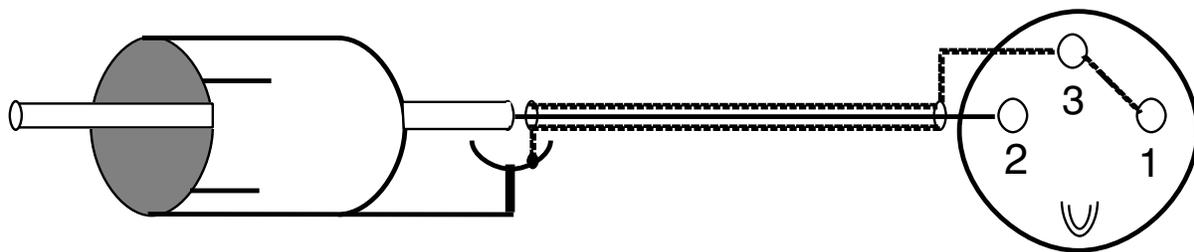
A stock KSP8 has two AES/EBU digital connectors on the back panel: a female XLR for stereo input and a male for stereo output.

Important: The digital connectors on a stock KSP8 are routed by default to buses 5 and 6.

Both Pro and Consumer formats (24 bit maximum) are supported, as described below.

The AES/EBU inputs and outputs can be used with S/PDIF digital audio signals (also known as “CP-340 Type II” and “AES Consumer” formats). S/PDIF signals use single-conductor shielded video cable, terminated in RCA (phono-type) jacks. (They can also use optical fiber cables.) There are differences between AES/EBU and S/PDIF involving signal level, line impedance, and channel status data. The circuits used at the KSP8’s digital inputs are sensitive and tolerant enough to accept either kind of signal.

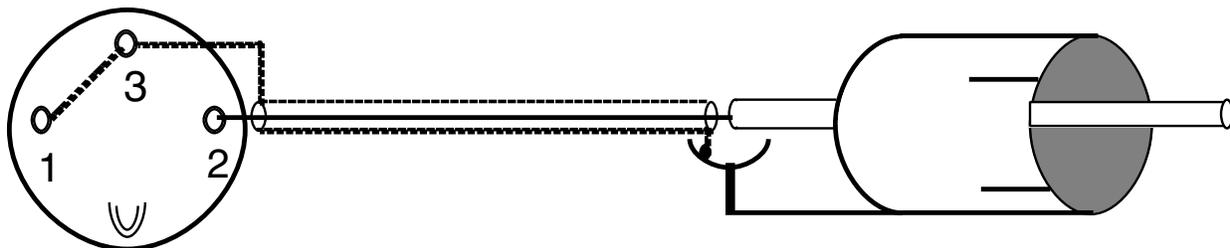
You can easily make an adaptor to bring S/PDIF signals into the KSP8’s AES/EBU inputs. The shield of the RCA connector is wired to pins 1 and 3 of the XLR connector, and the center (hot) conductor of the RCA connector is wired to pin 2 of the XLR. Below is a diagram of such an adaptor:



From S/PDIF Out

To AES In

You can use a similar adaptor to send AES/EBU signals from the KSP8 to an S/PDIF device. Since these are not balanced cables, we recommend that you keep cable lengths to a minimum.



From AES Out
(solder side)

To S/PDIF In

MIDI Connections

Like most MIDI devices, the KSP8 is fitted with MIDI In, MIDI Out, and MIDI Thru connectors. These are located on the back panel, and are 5-pin DIN connectors that will accept standard MIDI cables.

MIDI In lets the KSP8 receive from and slave to a sequencer, and also enables real-time control of the KSP8 from devices such as MIDI pedal or slider boxes. See Chapter 9 for information on real-time control of the KSP8 through MIDI.

MIDI Out lets you send a SysEx dump or a KSP8-generated MIDI master clock. Information about SysEx is included in Appendix D of this manual. Master clock information is included in Chapter 10.

MIDI Thru duplicates whatever is received on the MIDI In port without altering it in any way.

You can see any MIDI events that the KSP8 receives by using MIDIScope, available from the Master mode UTIL page (described in Chapter 10).

SmartMedia Cards

SmartMedia memory cards are available in a variety of size configurations, allowing you to store and transfer data to or from your KSP8. The KSP8 uses 3.3v SmartMedia cards, by the way, not the 5v variety. The 3.3v SmartMedia cards are the most common type, anyway, but you'll still want to check that you get the right kind when you go shopping.

The SmartMedia card slot uses a built-in spring-loaded mechanism that makes it easy to insert and remove cards. To use a card, simply insert the notched end into the KSP8's SmartMedia slot, making sure that the side with the gold plating is facing towards the bottom. To eject a card, push it in slightly until it pops out a bit allowing you to remove it.

Press the **CARD** soft button on the Master page to access SmartMedia functions for the KSP8. These functions are described in Chapter 10 of this manual.

KSP8 Options

The following user-installable option boards are available for the KSP8:

- Analog In/Out
- ADAT In/Out
- AES In/Out
- TDIF In/Out
- KDS In/Out

Installation and usage documentation is provided with each option.

The following options are also available:

- RSP8 – remote control
- HUB7 – multi-port hub/repeater

Chapter 3 Configuring Your KSP8

Signal Routing in the KSP8

Before we look at the different ways you can configure your unit, let's take a look at the path a signal follows as it travels through the KSP8. Figure 3-1 provides an overview of the signal path through the KSP8, as well as the patch points within a KSP8 studio.

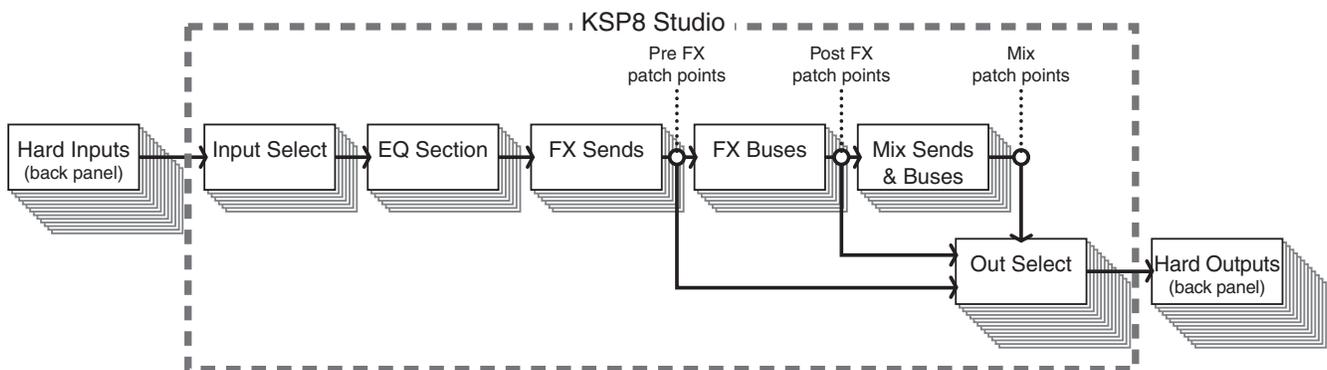


Figure 3-1. KSP8 Studio showing signal path and patch points

With the exception of the physical connections made on the back panel, all of the signal routing is defined within a studio, the KSP8's top-level object (which we'll get into in some detail in Chapter 5). Signals pass through input, EQ, effects (FX sends and buses), mix (sends and buses), and output sections, which are each discussed below.

Hard Inputs

We'll refer to anything you plug into the back panel of the KSP8 as a "hard input." For starters, there are the four analog and two digital inputs on the plain vanilla KSP8. If you have one of the KSP8 option boards (such as the digital I/O option) installed, you could have as many as fourteen hard inputs on your KSP8.

Input Select

While you can have up to fourteen hard inputs, the KSP8's eight bus architecture requires you to select eight (or fewer) inputs to process. The INSEL page (described on page 3-11) is where you'll make this choice.

EQ Section

You can configure up to two EQ functions (different types of equalization – a notch filter and a parametric equalizer – perhaps) on each EQ bus. Notice that the output of the first function is routed directly into the second function. So if you decide to configure two EQ functions the signal will be affected by the two EQ boxes in series.

FX Sends

These are FX sends to the buses, similar to what you find on a mixing board. You can read more about the FX sends on page 3-16.

FX Buses

The FX buses are where the actual effects processing occurs. Each bus can contain either a preset or a chain (which can, in turn, consist of up to eight presets), so quite a bit of processing can take place in this section. You can patch the outputs of the FX buses directly to the KSP8's outputs or send them on to the mix section.

Mix Buses

The mix section also has two sends. By default many studios are configured so that all your buses are mixed to a stereo pair. This is done merely as a convenience, however, and you can configure the mix buses any way that you wish.

Out Select

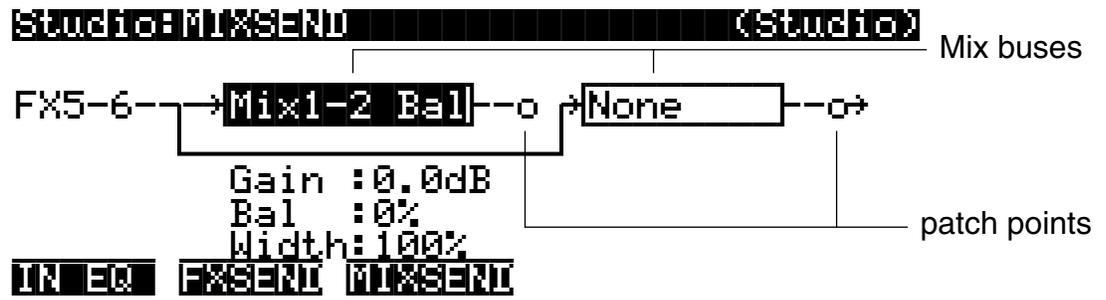
The OUTSEL page lets you select up to eight outputs. If you've got any of the KSP8 options installed, however, some of the selections on the OUTSEL page may actually be wired to more than one hard output (to a maximum total of fourteen). The chart on page 3-13 shows how this works.

Hard Outputs

Anything you plug into the back panel of the KSP8 is called a "hard output." If you have one of the KSP8 option boards installed, you may have up to fourteen hard outputs available to you.

Patch Points

The small circles in Figure 3-1 represent patch points, the places in each signal path where you can route a signal directly to the output of the KSP8. Some patch points are also shown as little circles on the KSP8's display. The display below, for example, shows the MIXSEND page.



The KSP8's architecture provides the following patch points:

- **Pre FX** – after the signal passes through the EQ section, but before any actual effects processing
- **Post FX** – after the signal passes through the EQ section and an FX bus
- **Mix** – after passing through the FX section, the signal from one or more buses can be mixed, panned, or balanced

The OUTSEL page (described on page 3-12) is the place where you “patch” a signal to the output section of the KSP8.

Configuration Basics

This section gives an overview of the three different ways you can configure the KSP8's buses:

- Stereo
- Mono
- 5.1 Surround

Combining Different Bus Configurations

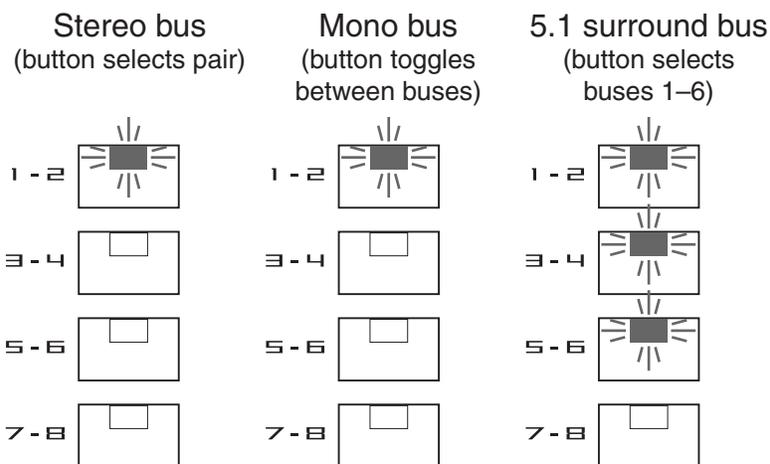
The flexible KSP8 architecture lets you combine differently configured buses, so that you can, for example, configure buses 1–6 for 5.1 surround sound and leave buses 7 and 8 configured as a stereo pair. You can also change the configuration of a bus after its signal is processed by the EQ section. This means that if you wanted to you could EQ buses 1 and 2 as separate mono buses, then process the pair as a stereo bus in the effects section.

The following pages will get you started with stereo, mono, and 5.1 bus configuration; complete reference for all of the KSP8's configuration pages is provided later in this chapter.

One more thing. The KSP8 always offers you eight internal buses for your routing pleasure. To get eight signals in or out of the KSP8, however, (through the "hard" inputs and outputs on the back panel, that is), you'll need to install one of the option boards that offers additional ins and outs. A stock KSP8 without any I/O options gives you four analog ins and outs and two for digital. Internally, though, you will always have the flexibility of eight buses at your disposal, and you can use the mix buses to digitally combine and output differently processed signals.

Bus Select Buttons

The bus select buttons are the four buttons directly to the right of the KSP8's display. As you'll see, they function slightly differently depending on whether the current bus is configured as stereo, mono, or 5.1.



Stereo Buses

We'll start with stereo bus configuration, since the KSP8's eight buses are configured by default as four adjacent stereo pairs. Stereo buses, in fact, must always be configured as adjacent pairs. So you can configure all or some of the following pairs as stereo: 1 and 2, 3 and 4, 5 and 6, 7 and 8, but not 1 and 3, 2 and 6, or any other non-adjacent permutation. (And 2 and 3, 4 and 5, and 6 and 7 won't cut it either, just in case you were wondering.)

The **config** button, located on the front panel of the KSP8 (to the left of the display), provides access to all of your configuration screens, whether for stereo, mono, or 5.1. Press this button to see a screen such as this one:

```

Studio: INLVL          I/O Config=Studio
In 1: 0.0dB
In 2: 0.0dB
In 3: 0.0dB
In 4: 0.0dB

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL

```

Notice the arrangement of the soft buttons at the bottom of the screen:

```

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL

```

The arrangement of these buttons from left to right is, as we shall see, analogous to the path of a signal through the KSP8. In conjunction with the bus select buttons (to the right of the display), you can access input functions by pressing one of the left-side soft buttons (**INSEL** and **INLVL**), perform internal bus configuration through the center soft buttons (**INGRP** and **BUSCFG**), and make your output selection and output level setting with the right-side soft buttons (**OUTSEL** and **OUTLVL**).

Pressing any one of these soft buttons will bring up the labeled page. So pressing **INLVL**, for example, brings up the screen we are currently viewing.

Press the **BUSCFG** soft button to bring up the **BUSCFG** (Bus Configuration) page:

```

Studio: BUSCFG          (Studio)
FXBus1: Stereo Left    FXBus5: Stereo Left
FXBus2= Stereo Right   FXBus6= Stereo Right
FXBus3: Stereo Left    FXBus7: Stereo Left
FXBus4= Stereo Right   FXBus8= Stereo Right

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL

```

Since the KSP8's default configuration is four stereo pairs, your **BUSCFG** screen should look like the one shown above (unless your unit's configuration has been changed already). You can see that stereo left and stereo right are always on adjacent pairs. Also notice that an equals sign is inserted in place of a colon to show a bus whose configuration is dependent on another bus. **FXBus2**, for example, can't be changed to a mono bus, since **FXBus1** is set to Stereo Left - forcing **FXBus2** the next adjacent bus to be configured as Stereo Right.

Let's stay on the **BUSCFG** page and see how you can use it to configure mono buses.

Mono Buses

Any bus can be a mono bus, although you may be constrained by the configuration of other KSP8 buses. For example, as shown in the Stereo buses example above, if you configure FXBus1 as a Stereo Left bus, the KSP8 makes darn sure that FXBus2 is a Stereo Right bus. That’s simply how the KSP8 architecture is designed to work.

Now, starting with the same BUSCFG screen used in the Stereo buses example (press Config > BUSCFG to get back there, if necessary), highlight the setting of FXBus1 then turn the alpha wheel one click to the left. The screen should look like this:

```

Studio BUSCFG (Studio)
FXBus1: Mono
FXBus2=Mono
FXBus3: Stereo Left
FXBus4= Stereo Right
FXBus5: Stereo Left
FXBus6= Stereo Right
FXBus7: Stereo Left
FXBus8= Stereo Right
INSEL INLVL INGRP BUSCFG OUTSEL OUTLVL
    
```

Notice how the KSP8 automatically changed FXBus2 to a mono bus too. The equals sign shows you that the setting of this bus remains dependent on the setting of FXBus1. Try pressing any of the four cursor keys on the front panel of the KSP8, and you’ll see that the KSP8 prevents you from even attempting to change the setting of any of the buses punctuated with equals signs.

5.1 Surround Buses

5.1 Surround (sometimes just known as “5.1”) is quickly becoming a popular audio format, especially in the realm of film. The “5” in 5.1 refers to the five channels that carry left, right, center, left rear, and right rear sound. The “.1” in 5.1 is the LFE (low frequency effects) channel that provides bass sound and rumbly stuff. Its placement in the surround spectrum is not a concern, since bass sounds are much less directional than their high frequency relations.

The five full range channels and one low frequency channel use six of your KSP8 buses, and are always configured as shown below:

KSP8 bus	5.1 Channel
1	Left
2	Right
3	Center
4	Low Frequency Effects (LFE)
5	Left Rear
6	Right Rear
7	<i>not used</i>
8	<i>not used</i>

Buses 7 and 8, as you can see from the above table, are not used as 5.1 buses. They are, then, available for your use as a stereo pair or two mono buses.

To configure your KSP8 for 5.1, start at the Bus Configuration page, just as you did for stereo and mono above. As in the previous two examples, you reach this page by pressing the **config** button on the front panel of the KSP8, then pressing the **BUSCFG** soft button.

Use the cursor keys to highlight the setting of FXBus1, then turn the alpha wheel to the right until the screen looks like the one shown below. Notice, too that the 1-2, 3-4, and 5-6 bus select buttons (to the right of the display) have now lighted. This shows that you are now active in all six buses, 1-6.

```

STUDIO BUSCFG (studio)
FXBus1=5.1 Left
FXBus2=5.1 Right
FXBus3=5.1 Center
FXBus4=5.1 LFE
FXBus5=5.1 L Rear
FXBus6=5.1 R Rear
FXBus7=Stereo Left
FXBus8=Stereo Right

INSEL INLWL INGRP BUSCFG OUTSEL OUTLWL

```

As with Stereo and Mono configurations, a colon indicates the buses whose setting you can change, while an equals sign will appear on any bus that you can not configure independently. In the case of 5.1, six buses are required; the KSP8 will always use buses 1-6 for a 5.1 configuration.

Panning and Surround Sound

Depending on the surround techniques you are using, the FXSEND page (described on page 3-16) may offer specific panning options. For example, you can specify whether or not to pan through the center channel; if this channel is reserved for dialog you may not want a signal to pan through it.

There's more information on surround panning options in the section, "Signal Control through FXSENDS and MIXSENDS" on page 3-17.

Putting It All Together

Here are two possible scenarios showing how you might use the KSP8 in your studio. The first illustration shows two stereo pairs and three mono sources being processed on three stereo and two mono effect buses with different effects. One mono source is panned to a stereo effect bus, and the others to mono effect buses; these are then submixed to a single stereo mixdown bus.

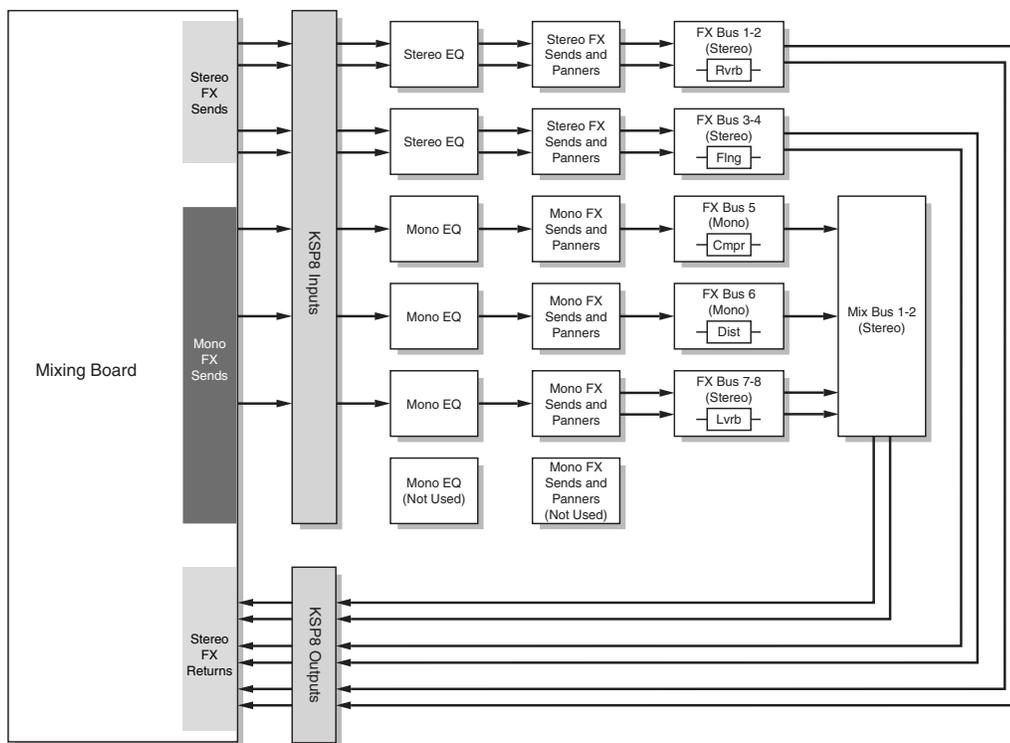


Figure 3-2. Configuration example

The next example shows a 5.1 channel stem plus two mono sources (panned independently from the 5.1 stem) being processed together in a 5.1 channel surround reverb.

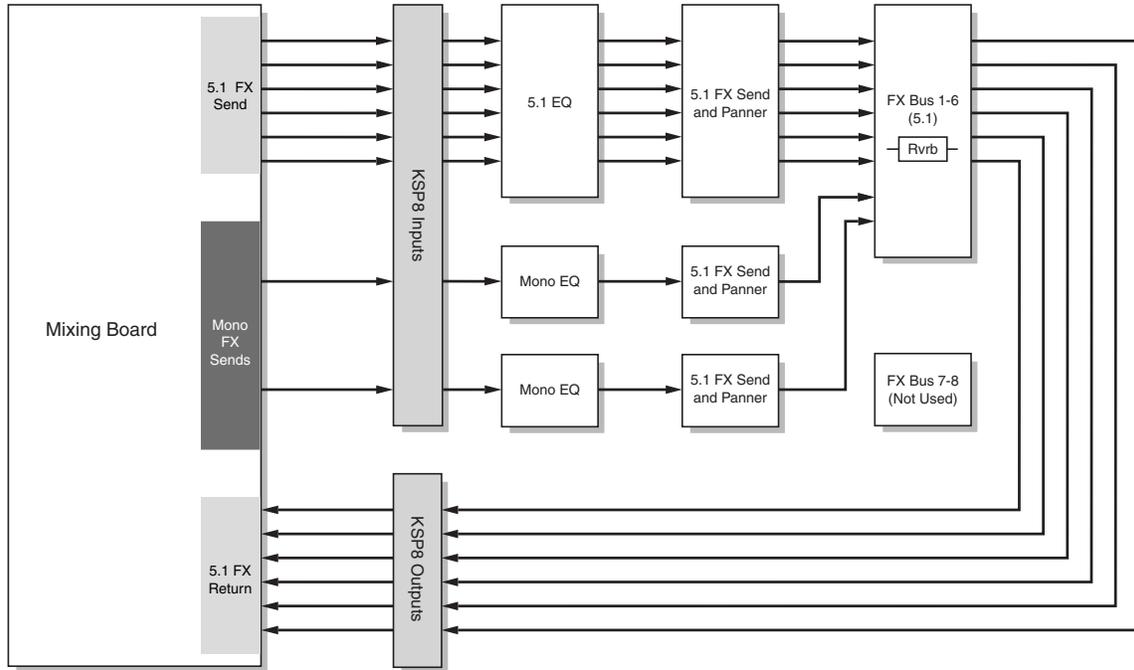


Figure 3-3. Another configuration example

Meet SID

The Studio Information Display (affectionately known in these parts as SID) occupies most of the left side of the Studio:STUDIO page. SID shows you the size and width of the effects buses in the current studio (that is, the studio currently highlighted in the studio list on the right side of the Studio:STUDIO page).

Stereo Buses

The example below shows a studio with four stereo buses (that’s the width part), and the size (in Us) of the presets on these buses. When a chain is present on an effects bus (such as buses FX3-4 and FX7-8 in the example below), multiple boxes will show you the number and size of the presets in the chain.

```

Studio:STUDIO
FX1-2 [ ] | 98 Default 8 Mono
FX3-4 [ ] | 99 Default 4 Stereo
FX5-6 [ ] | 1 4SterIn>4SterFX
FX7-8 [ ] | 2 4MonoIn>4SterFX
          | 3 8MonoIn>8MonoFX
          | 4 4StIn>4StFX->Mix
<more MASTER STUDIO FXBUS QUICK more>
    
```

Mono Buses

The example below shows eight mono buses.

```

Studio:STUDIO
FX1-2 [ ] | 1 4SterIn>4SterFX
FX3-4 [ ] | 2 4MonoIn>4SterFX
FX5-6 [ ] | 3 8MonoIn>8MonoFX
FX7-8 [ ] | 4 4StIn>4StFX->Mix
          | 5 4MnIn>4StFX->Mix
          | 6 8MnIn>8MnFX->Mix
<more MASTER STUDIO FXBUS QUICK more>
    
```

5.1 Buses

This screenshot shows six buses dedicated to 5.1 surround, as well as a stereo bus.

```

Studio:STUDIO
FX1-2 [ ] | 7 Morph This
FX3-4 [ ] | 8 AES> FX1-2 >AES
FX5-6 [ ] | 9 6 MonoIn>5.1 FX+
FX7-8 [ ] | 10 8 MonoIn>5.1 FX
          | 11 MnIn>5.1 AutoPan
          | 12 3 SterIn>5.1 FX+
<more MASTER STUDIO FXBUS QUICK more>
    
```

Config Pages

You reach the KSP8's configuration (Config) pages by pressing the **config** button on the front panel of the unit. The first time you press this button the INSEL page will display. Subsequently, the page you have viewed most recently will display when you press the **config** button.

The INSEL (Input Select) Page

```

Studio:INSEL          I/O Config=Studio
In 1: Analog 1
In 2: Analog 2
In 3: Analog 3
In 4: Analog 4
In 5: AES/EBU 1L
In 6: AES/EBU 1R
In 7: None
In 8: None

INSEL  INLVL  INGRF  BUSCFG  OUTSEL  OUTLVL

```

The INSEL page is where you specify which of your hard inputs (back panel connectors, that is) you will be processing with the KSP8. Depending on which (if any) option board you have installed, you may have up to 14 inputs from which to choose. Alas, you can't process all 14 hard inputs at once. You will have to make selections on this page to choose the eight inputs that you wish to process. You can combine analog and digital inputs in any order on this page, and you can also do funky things like assign one hard input to all eight of your input buses.

Only hard inputs that actually exist will be shown as choices for these buses. So for a stock KSP8 without any option boards installed, your choices will be Analog 1–4, AES/EBU 1L and AES/EBU 1R.

The INLVL (Input Level) Page

```

Studio:INLVL          I/O Config=Studio
In 1: 0.0dB
In 2: 0.0dB
In 3: 0.0dB
In 4: 0.0dB

INSEL  INLVL  INGRF  BUSCFG  OUTSEL  OUTLVL

```

Use the INLVL page to boost the level of any analog signal coming into the KSP8.

Your digital input levels are not affected by the settings that you make on this page.

The INGRP (Input Group) Page

```
STUDIO@INGRP          I/O Config=Studio
In 1: Stereo Left    In 5: Stereo Left
In 2= Stereo Right   In 6= Stereo Right
In 3: Stereo Left    In 7: Stereo Left
In 4= Stereo Right   In 8= Stereo Right

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL
```

The INGRP page groups buses as they enter the EQ section of the KSP8. Choose from stereo, mono, or 5.1 surround options. An equals sign indicates that a bus is linked to one of the buses listed above it. You can only change the setting for a bus that is shown with a colon.

The BUSCFG (Bus Configuration) Page

```
STUDIO@BUSCFG          (Studio)
FXBus1: Stereo Left  FXBus5: Stereo Left
FXBus2= Stereo Right FXBus6= Stereo Right
FXBus3: Stereo Left  FXBus7: Stereo Left
FXBus4= Stereo Right FXBus8= Stereo Right

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL
```

The BUSCFG page configures the buses after their signals have been processed by the EQ section, but before signals are sent to the mix or output sections. Choose from stereo, mono, or 5.1 surround options. An equals sign indicates that a bus is linked to one of the buses listed above it. You can only change the setting for a bus that is shown with a colon.

The OUTSEL (Output Select) Page

```
STUDIO@OUTSEL          I/O Config=Studio
Out1 : PostFX 1      Out5/AESL: PostFX 5
Out2 : PostFX 2      Out6/AESR: PostFX 6
Out3 : PostFX 3      Out7      : PostFX 7
Out4 : PostFX 4      Out8      : PostFX 8

INSEL  INLVL  INGRP  BUSCFG  OUTSEL  OUTLVL
```

On the OUTSEL page you can select the patch point at which the signal on each bus is sent to a hard output (back panel connector, in other words). The Post-FX signal on each bus is the default for OUTSEL, however you can choose to set an output to Pre-FX or Mix.

Out1–Out8 are basically “hard-wired,” although the signal at each out will depend on any options you have installed in the KSP8. Each Out on this page, in fact, may represent more than one hard out (physical connector on the back panel) of the KSP8. If you’ve got the analog I/O option installed for example, the signal represented by Outs 5 and 6 will be both the AES stereo pair of the stock KSP8 and analog outs 5 and 6 (from the option card). The following chart shows the outputs:

Out	Stock KSP8	Analog I/O option	ADAT option	Digital I/O option
Out1	Analog 1	Analog 1	Analog 1 & ADAT 1	Analog 1 & Digital 1
Out2	Analog 2	Analog 2	Analog 2 & ADAT 2	Analog 2 & Digital 2
Out3	Analog 3	Analog 3	Analog 3 & ADAT 3	Analog 3 & Digital 3
Out4	Analog 4	Analog 4	Analog 4 & ADAT 4	Analog 4 & Digital 4
Out5	AES/EBU 1L	AES/EBU 1L & Analog 5	AES/EBU 1L & ADAT 5	AES/EBU 1L & Digital 5
Out6	AES/EBU 1R	AES/EBU 1R & Analog 6	AES/EBU 1R & ADAT 6	AES/EBU 1R & Digital 6
Out7	<i>not available</i>	Analog 7	ADAT 7	Digital 7
Out8	<i>not available</i>	Analog 8	ADAT 8	Digital 8

Table 3-1. KSP8 Outputs

The OUTLVL (Output Level) Page

```

Studio#001LVL          I/O Config=Studio#2
Out1 :0.0dB           Out5/AESL:0.0dB
Out2 :0.0dB           Out6/AESR:0.0dB
Out3 :0.0dB           Out7      :0.0dB
Out4 :0.0dB           Out8      :0.0dB

Analog9Outputs :Unbalanced -12dB
INSEL INLVL INGRP BUSCFG OUTSEL OUTLVL

```

The OUTLVL page lets you boost or attenuate signal levels at your hard outputs. This is also the place where you can switch your analog outputs between balanced or unbalanced signals (see “Analog Connections” on page 2-5), as well as change the levels of these outputs.

EQ/Sends Pages

To display the EQ/Sends pages, press the **EQ/sends** button on the front panel of the KSP8. As with the **config** button, when you press the **EQ/sends** button the page that displays is the EQ or Send page that you have viewed most recently. As you work with your KSP8, you will discover that there are many details such as this that optimize the KSP8's user interface for quick editing.

The Bus Select Buttons

The EQ/Sends pages work in conjunction with the bus select buttons (the four buttons to the right of the display, labeled 1–2, 3–4, 5–6, and 7–8). You press one of these buttons to edit or view settings for a bus (or buses), and they also serve as visual indicators of the bus or buses currently being viewed or edited.

As shown in the chart on page 3-4, the buttons function slightly differently, depending on the type of bus:

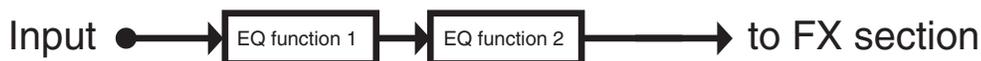
For a **stereo** bus, each button activates its labeled stereo pair. So pressing the 3–4 bus select button, for example, will make the current page relevant to the stereo pair on buses 3 and 4.

With **mono** buses, the bus select buttons toggle between the labeled buses. If buses 3 and 4 were configured for mono, then pressing the 3–4 bus select button would bring up either bus 3 or 4; pressing it again would bring up the other bus.

5.1 surround, since it requires 6 buses, will cause the top three bus select buttons (1–2, 3–4, and 5–6) to light; the three buttons work in concert, so pressing any one is the same as pressing any other. Since buses 7 and 8 can still be configured as either stereo or mono, the 7–8 bus select button will function as described in either of the above two paragraphs.

The IN EQ Page

The functions on the INEQ page allow you to change the timbre of a sound by manipulating the amplitude of specified frequency ranges. When using these functions, you usually set one or more reference points (cutoff or center frequency) that determine where the tone will be affected.



EQ Functions

Listed below are the KSP8's EQ functions. Complete information on the EQ functions, including lots of pretty pictures, is in Appendix A of this manual.

- . None
- . Lo Shelf
- . Parametric
- . Hi Shelf
- . HiPass 2P
- . HiPass 3P
- . LoPass 2P
- . LoPass 3P
- . Reson Bass
- . Wide Mid
- . Bandpass
- . Notch
- . LoShelf/HP
- . HiShelf/HP
- . Mid/HP
- . Notch/HP
- . LoShelf/LP
- . HiShelf/LP
- . Mid/LP
- . Notch/LP
- . HP 1/LP 2
- . HP 2/LP 1
- . Distulator
- . Shaper 1LP
- . Shaper 2LP
- . Sine
- . Sawtooth
- . Sine+Shape
- . Noise
- . Pinker
- . Impulse

The FXSEND Page

Press the **EQ/sends** button on the front panel, then the **FXSEND** soft button to bring up the FXSEND page. Use this page to route signals on the KSP8's buses from the output of the EQ section to the buses within the effects section of the KSP8. For stereo and mono buses, the signal can be split at this point, as shown in the following diagram:



All six buses in a 5.1 configuration must be routed to a single effect, so there will only be one FXSEND box displayed on the FXSEND page.

Options for 5.1 Surround Panning

The FXSEND page offers some special panning options for 5.1 surround:

- **Front (Frnt)** – lets you specify whether or not to pan through the center channel. In films, the center channel is often reserved for dialog, which it may not be appropriate to pan. Choose “LCR” to pan through the center channel; choose L-R to pan from left to right, leaving the center channel unchanged.
- **Angle** – relative to the front center speaker.
- **Radius (Rad)** – distance from the center of the room.

There's more information on surround panning options in the section, “Signal Control through FXSENDS and MIXSENDS” on page 3-17.

The MIXSEND Page

Press the **EQ/sends** button on the front panel, followed by the **MIXSEND** soft button to bring up the MIXSEND page. This page is where you route signals coming out of the FX section of the KSP8. You can use the mix buses to create a submix of various FX buses before outputting from the KSP8. For example, studios 4, 5, and 6 (unless you've changed them) are configured so that all FX buses are mixed down to Mix 1-2, and the Mix 1-2 signal shows up at hard outputs 1 and 2. You can see how this is done by looking at the MIXSEND pages and the OUTSEL page.

You can also send Stereo and Mono signals to two separate mix sends at this point, as shown below:



All six buses in a 5.1 configuration will be processed by a single mix send on this page.

Signal Control through FXSENDS and MIXSENDS

You can think of FXSENDS and MIXSENDS as being mixer controls. They send signals from one bus to another with a variety of level and panner controls.

You access the sends pages by pressing the **EQ/sends** button while at the studio editor level. The FXSEND page controls signal level and panning of input buses onto FX buses. The MIXSEND page controls signal level and panning of FX buses onto the output mixer buses.

Let's consider just the FXSEND page for now. What you see will depend on how your inputs are configured on the INGRP page (reached by pushing the **config** button). The available send controls are dependent on the settings in the BUSCFG page. The MIXSENDS work like the FXSENDS, except that for the MIXSENDS there are no panners to 5.1 output mixer buses.

FXSENDS are the real place to finely control levels being sent to the effects (as opposed to INLVL, which should be viewed as a coarse adjustment, used when configuring your KSP8 with the rest of your system). You will be able to access different send controls depending on whether your inputs are configured as mono, stereo or 5.1 multi-channel. You can scroll through the available send controls by moving the cursor so the send box is highlighted then turning the alpha wheel. You can access the sends for different buses by pressing the bus select buttons.

When set to "None", the sends do not pass audio to any FX bus. All other send controls will include a Gain control which sets the signal level going to the FX bus. Maximum level is 24.0 dB, and minimum is -79.0 dB – there is also an "Off" position. 0.0 dB is unity gain.

When the INGRP bus configuration is set to mono for the bus being edited, the available send controls include mono-to-mono, mono-to-stereo and mono-to-5.1 controls. The send controls for INGRP stereo configuration include stereo-to-stereo and stereo-to-5.1. The 5.1 multi-channel INGRP configuration sends a 5.1 input bus to a 5.1 FX bus. For each of the input to FX bus send configurations, there may be more than one way of controlling the signals, especially when it comes to panning. For example, the stereo-to-stereo configuration may have a balance control (left and right channels rise and fall opposite to each other) or a pan control (the phantom stereo image moves across the stereo field).

When sending to a mono or stereo FX bus, two separate mono or stereo sends are available for the input. While you can send to any two mono or stereo sends, the two sends may not have FX bus channels in common.

Send controls which send to 5.1 channel FX buses come in two variations. The "Frnt" (front) parameter lets you switch between "LCR" and "L-R". When set to "LCR", sonic images panned to the front will pan through to the front center channel. When panning an image from left to right, the image will begin in the left speaker, form a phantom image between the left and center speakers, then move into the center channel only. From there the image is a phantom between center and right before moving fully into the right speaker. When Frnt is set to "L-R" the center channel is taken out of the equation. Panning an image from left to right will produce a phantom image between left and right speakers with none of the sound coming from the center channel.

The panners produce phantom images between loudspeakers when panner positions are between channels. A phantom image is produced when adjacent loudspeakers are producing the same sonic output. The relative position of the sonic image between loudspeakers is determined by the relative signal strengths that each loudspeaker produces. When the signal strengths are equal, then the phantom image should be centered between speakers. With Gain set to 0 dB (unity gain) and any Width or Rad parameters set to 100% (defaults), the KSP8

panner implementation sets the signal level to 0 dB when an input channel is directed directly to an output channel (there is no phantom imaging). When there is a phantom image centered between two loudspeakers, the signal level to both loudspeakers is the same and both channels are reduced by 3 dB.

The panners in KSP8 are simply level controlled. Level controlled panners do not perform particularly well at producing sonic images to the sides of a 5.1 mix (between front and surround). There are more sophisticated techniques for image positioning such as head related transfer functions (HRTF) which are beyond the capabilities of the KSP8 send controls and beyond the scope of this manual.

Let's look at each send control in detail:

INGRP Send Options for Mono Configurations

FXBus1 through FXBus8

The mono-to-mono send has only a Gain control, though you can send any mono input channel to any mono FX bus channel.

FX1-2 Pan through FX7-8 Pan

The mono-to-stereo panner has a Pan control in addition to the Gain control. The pan control allows you to move the mono image from the left channel to the right channel of the stereo effects bus. The -100% setting sends the signal to the left channel only, 100% sends to the right channel only, while 0% sends to both channels equally (center).

FX1-6 X-Y

This is one of three mono-to-5.1 send controls. The LRPan control is the familiar left to right panner: -100% is left, 100% is right and 0% is center. When set to 0%, the centered image will be produced by the center channel (Frnt is "LCR") or as a phantom image between left and right channels (Frnt is "L-R"). The FSPan moves the sonic image between front speakers and the surround speakers. When FSPan is 0% the sound will come out the front speakers, and when FSPan is 100% the sound will come out the surround speakers. This panner is particularly useful for simple joystick control (from the RSP8 or other device).

FX1-6 3-Way

This mono-to-5.1 panner is similar to the FX1-6 X-Y panner. The difference is that the LRPan control affects the front channels only while there is a separate SurLR control for left-right panning of the surrounds. This combination of controls allows some interesting panner movements using a single control. For example, with LRPan set to -100% (left) and SurLR set to 100% (right), moving the FSPan from 0% (front) to 100% (surround) will cause the image to move from front left to surround right through the center of the room.

FX1-6 R-Theta

The R-Theta mono-to-5.1 panner uses distance from the center of the room (R or Rad for radius) and an Angle relative to the front center speaker to control the sonic image location. The distance from the center of the room (Rad) is expressed as a percentage of the distance from the center of the room to the ring formed by the loudspeakers. The Angle is expressed in degrees of

a circle. A circle has 360° (degrees). The center line facing forward is defined as the 0° angle. Positive angles are to the right and negative angles are to the left. The right speaker is located at 30°, the left speaker is at -30°, and the right and left surround speakers are at 110° and -110° respectively. 180° and -180° are the same angle which is directly to the rear.

INGRP Send Options for Stereo Configurations

FX1-2 Bal through FX7-8 Bal

The stereo to stereo balance control raises the gain of one input channel while lowering the other. When the Bal control is set to 100% the right input will be sent fully to the right stereo FX bus channel while the left input channel will not be heard at all. Likewise at -100% you will hear only the left input channel passed to the left FX bus channel, with the right channel silent. The stereo image width can be controlled with the Width parameter. 100% is full stereo width, so the left input is sent to the left FX bus channel while the right input is sent to the right FX bus channel. At 0% Width, the stereo width is narrowed to mono (left and right are summed), and the balance behaves like the mono-to-stereo panner. Negative Width settings swap the left and right channels.

FX1-2 Pan through FX7-8 Pan

The stereo-to-stereo panner moves the stereo input across the FX bus stereo field. The stereo image is maintained but is “tilted” to the right or left. When Pan is set to 0% there is no change to the signal, while at 100% both input signals are sent to the right channel. At 50%, what had been hard left at the input will now be in the center, and what had been in the center at the input will now be halfway between center and right. Negative values tilt the signal to the left. The stereo image width can be controlled with the Width parameter. 100% is full stereo width, so the left input is sent to the left FX bus channel while the right input is sent to the right FX bus channel. At 0% Width, the stereo width is narrowed to mono (left and right are summed), and the panner behaves like the mono-to-stereo panner. Negative Width settings swap the left and right channels.

FX1-6 R-Theta

The R-Theta stereo-to-5.1 panner uses distance from the center of the room (R or Rad for radius) and an Angle relative to the front center speaker to control the sonic image location. The distance from the center of the room (Rad) is expressed as a percentage of the distance from the center of the room to the ring formed by the loudspeakers. The Angle is expressed in degrees of a circle. A circle has 360° (degrees). The center line facing forward is defined as the 0° angle. Positive angles are to the right and negative angles are to the left. The right speaker is located at 30°, the left speaker is at -30°, and the right and left surround speakers are at 110° and -110° respectively. 180° and -180° are the same angle which is directly to the rear. The width of the stereo image is controlled with the Width parameter. The stereo width is also expressed as an angle in degrees of a circle. The width angle represents the angular distance between the left and right input channels on the 5.1 FX bus. Normal stereo has a setting of 60° (when pan Angle is 0°) while 0° collapses the stereo input to mono. Width angles greater than 90° move the image behind you. Negative width angles swap the left and right channels. To determine the angle at which the right input channel will appear in the 5.1 FX bus, divide the Width setting by 2 and add the result to the pan Angle. The angular position of the left input channel is half the Width subtracted from the pan Angle.

INGRP Send Options for 5.1 Configurations

FX1-6 Levels

This 5.1-to-5.1 send has only a Gain control. The gain controls all channels including center and the low frequency effects (LFE) channel.

FX1-6 R-Theta

The R-Theta 5.1-to-5.1 panner uses distance from the center of the room (R or Rad for radius) and an Angle relative to the front center speaker to control the sonic image location. The distance from the center of the room (Rad) is expressed as a percentage of the distance from the center of the room to the ring formed by the loudspeakers. The Angle is expressed in degrees of a circle. A circle has 360° (degrees). The center line facing forward is defined as the 0° angle. Positive angles are to the right and negative angles are to the left. The right speaker is located at 30°, the left speaker is at -30°, and the right and left surround speakers are at 110° and -110° respectively. 180° and -180° are the same angle which is directly to the rear. When pan Angle is set to 0° and Rad is 100%, all input channels pass directly to their corresponding 5.1 FX bus channels. Increasing the panning angle moves all input channels to the right relative to their former positions. The Gain controls all channels including center and the low frequency effects (LFE) channel, whether Frnt is set to "LCR" or "L-R".

Master or Studio I/O

You can lock into a particular input/output configuration so that the inputs and outputs you've set do not change every time you change studios. The I/O Config option on the Master page is the place where you set this parameter. It's described on page 10-1.

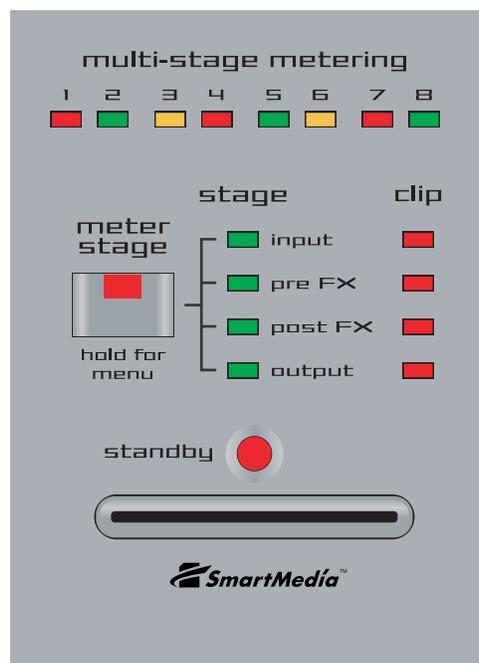
You should also keep in mind that the Master I/O Config settings are saved with your KSP8's Master Table. This means that if you save objects and want to load them with the same Master I/O Config settings at a later time, then you must also save (and subsequently reload) the Master Table.

Most of the Config and EQ/Sends pages will indicate the setting of the I/O Config option. The two exceptions are the BUSCFG and MIXSEND pages, since the information on these pages is always saved as part of a studio.

Chapter 4

Multi-stage Metering

The KSP8's metering section lets you visually check signal levels on each bus by viewing the eight LEDs labeled 1–8, in the top left corner of the unit. Additionally, four dedicated clip LEDs let you see in an instant if a signal is clipping anywhere on the KSP8's buses. Furthermore, there are graphical bar-style meters that can be shown on the display screen.



Selecting Meter Stages

You can view signal levels at these stages in the signal chain:

- **input** – shows levels for all eight input buses, just after analog level controls (INLVL page)
- **pre FX** – shows levels on FXBuses1-8, just prior to effects section (after input EQ, panning, & send levels)
- **post FX** – shows levels on FXBuses1-8, after effects processing
- **output** – shows levels for all eight soft output buses, after output level controls

The eight LEDs at the top of the metering section show signal levels on each bus at the stage you've selected. Press the **meter stage** button to select the stage in the signal chain that you want to look at. For example, if you press the **meter stage** button until the green LED labeled **post FX** lights, then each of the LEDs numbered 1 – 8 will now show the level of the signal after it passes through the FX section on each corresponding bus.

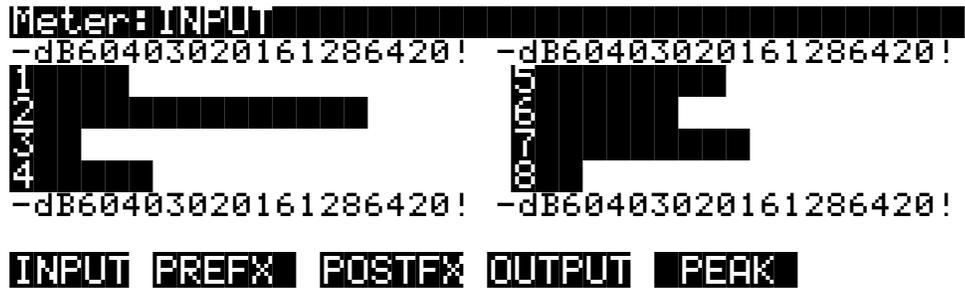
How to Read the Eight Level LEDs

A level LED is green when a signal is present, will turn amber when the signal reaches its maximum usable level, and will become red if the signal clips (i.e., reaches a level where distortion occurs). Remember that the KSP8 is a digital device, so distorting levels is unlikely to enhance your sound in a mellifluous way. (If you're looking for the "warmth" of analog distortion, however, there are some wonderful tube amp simulators in the algorithm section.)

There are four dedicated clipping LEDs to the right of the meter stage LEDs. These LEDs also turn red to indicate clipping on any channel at the indicated stage in the signal path. These LEDs are always active, however, so they will show clipping regardless of the stage being metered by the eight LEDs at the top of the metering section.

Viewing Bar-graph Meters

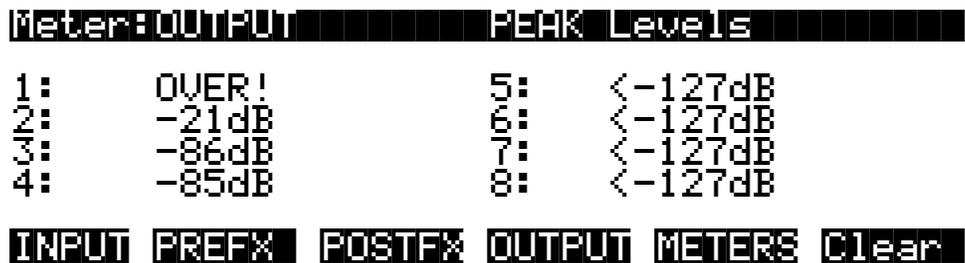
If you press and hold the **meter stage** button, the display shows horizontal bar-style meters for all eight channels of the currently selected stage in the signal chain. Press and hold the **meter stage** button a second time to cancel the meter display.



Press an **INPUT**, **PREFIX**, **POSTFX**, or **OUTPUT** soft button to select the stage to meter. Press the **PEAK** soft button to go to the Peak view (described below).

Peak or Meters View

The **Peak/Meters** soft button toggles between meter view (as shown above) and peak view, shown below. The peak levels, given in decibels (dB), show the hottest levels reached by the signals on each bus since the last time the peak values were reset. Press the **Clear** button to reset the peak levels.



Gain Staging

As stated before, you probably don't want a signal to clip at any point within the KSP8. On the other hand, you probably do want to keep your signal level as hot as possible throughout the signal path, to maintain the best possible signal-to-noise ratio. Using the metering section, you can check the signal levels at various stages, and boost or cut levels as necessary.

Keeping track of gain changes as a signal moves through the various sections of the KSP8, making sure signals are optimal (neither too soft nor too loud) is known as "gain staging."

While the KSP8 has plenty of headroom available for most processing, you may run into problems of digital overload (clipping) if extremely high filter resonances or large amounts of distortion or gain are used. Most headroom problems are best dealt with as "locally" as possible; rather than just turning down a device's output to reduce clipping, you're better off adjusting the gain at the point in the path where the level gets out of control. If the send from the input section to the effects section is too high, adjust the send, not the input level; if a particular chain or preset is clipping in the effects section, adjust the Out Gain of the preset (or the Out Gain of the last preset in the chain) with a Quick Parameter or a Mod, or even within the preset object itself. Factory presets and chains have been adjusted so that the level is roughly the same whether the effect is active or bypassed. This is a good rule to follow in your own work as well, to help avoid unpleasant surprises.

Generally, you'll want each bus's signal to be hot enough that the level LEDs shine mostly green, with some flashes of amber on transient sounds. If the LED is mostly off, with flashes of green, then your signal is probably too soft. In the case of dense or overall loud material, the LED may appear mostly amber, with flashes of green. This is OK, but remember that the more amber than green, the less headroom you will have to work with before clipping occurs. Clipping, of course, is indicated by red level LEDs and a corresponding warning from the red clip LEDs.

How to Find and Fix Clipping

At some point, whether caused by a very hot input signal or some process inside the KSP8, you will probably run into some unwanted digital clipping. In this case, you'll need to identify which channels are overloading, and find a good place in the signal path to reduce the gain. To identify an overloaded channel, press the **meter stage** button until the selected stage matches the stage indicated as clipping by the clip LED. If more than one clip LED is lit, select the earliest stage; sometimes an overload early in the signal path will cause clipping all the way down the line. Now look to the eight level LEDs to see which channel(s) flashes red with the clip LED.

For example, if the input clip LED is lighting, press the **meter stage** button until the green LED labeled "input" is lit, then look up to the eight level LEDs; if LEDs 1 and 2 are flashing red with the input clip LED, then you know that the clipping is occurring on input buses 1 and 2. This means that the signal routed to inputs 1 and 2 is either too loud coming from your mixer or external device, or the input level (INLVL) in the KSP8 is set too high.

The following chart will help you learn how to track down clipping:

If this clip LED lights:	Adjust the signal level here:
input	output level of device going into KSP8 or Config>INLVL (Press config button, then INLVL soft button; select the appropriate input and adjust the level)
pre FX	EQ/sends>FXSEND (Press EQ/sends button, then FXSEND soft button; adjust the Gain for the relevant send) or EQ/sends>INEQ (Press EQ/sends button, then INEQ soft button; adjust Pad setting or Gain in either processing block)
post FX	Out Gain parameter of the preset on the bus, or the Out Gain parameter of the LAST preset in a chain on the bus. You can adjust this parameter from multiple places: the Studio:QUICK page, the Chain:QUICK page, as a Chain MOD, or within a preset by pressing edit and locating the Out Gain parameter, which is usually found on the PARAM1 page of a preset.
output	Config>OUTLVL (Press config button, then OUTLVL soft button; select the appropriate output and adjust the level.) If you are using a Mixdown bus, and are getting clipping from an output set to Mix, you may need to attenuate the gain on the EQ/sends>MIXSEND page (Press EQ/sends button, then MIXSEND; adjust the Gain for any relevant sends)

Distortion Between Meter Stages

Sometimes you may encounter some distortion without seeing the clip LEDs light. This may simply mean that you are overdriving some stage, but have not reached full-scale clipping. Scan the four stages using the **meter stage** button, watching the level LEDs for predominantly amber LEDs, and you may discover the source of the distortion.

Another possibility is that you are clipping or overdriving a signal between the meter points. One place this could occur would be in the EQ section, where you can crank a signal up in the first EQ block, then turn it down in the second block, or at the send; in this case neither the input nor the pre FX clip LEDs would light because although the distortion occurs within the EQ section, the signal is attenuated down to a nominal level by the time it reaches the pre FX metering point.

Perhaps the most common case where this kind of distortion might occur is between the multiple presets of a chain. As in the EQ section, it is possible to boost a signal in a preset in one box of a chain, then cut the signal in the next box, or any later box of the chain.

There are no meter points between the individual boxes of a chain, so as long as the signal is not clipping as it passes out of the last box of the chain, the post FX clip LED will not light. In general you should try to maintain a reasonable level throughout the boxes in your chain, using the Out Gain parameter which shows up in nearly every effect algorithm in the KSP8. Of course, how you choose to construct your own chains is a matter of taste, intention, and need; if you intend to overdrive the signal at one point and cut the gain later, that's perfectly viable and perhaps even necessary for your specific application.

Multi-stage Metering

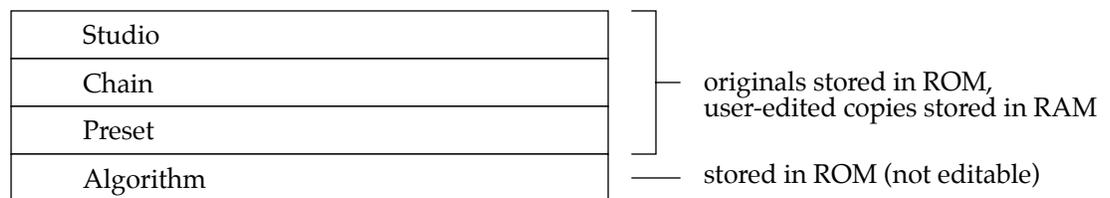
How to Find and Fix Clipping

Chapter 5

Working with KSP8 Objects

Types of Objects

The KSP8's user interface is structured with a hierarchy of objects that (with the exception of algorithms) you can edit and arrange for your effects needs. The hierarchy of KSP8 objects looks like this:



Here is a brief description of each type of KSP8 object:

Studio

A studio is a complete effects signal path, from the inputs through two stages of equalization and then on to the effects algorithms and outputs. A number of useful studios are provided with the KSP8. You can use these as they are, edit and store them, or create your own studios from scratch. Figure 3-1 on page 3-1 shows the parts of a studio.

Effects (by which we mean presets and /or chains) are placed on the buses of a studio.

If your working environment doesn't change much from session to session, you may find it convenient to use a single studio that has inputs and outputs, as well as room equalization pre-defined. In this case, you may not need to create and save studios other than the one that works for your standard configuration.

On the other hand, the studio object offers a convenient way to store all KSP8 settings from a recording or performance session for future use. The important thing to know is that the KSP8's flexibility lets you use what works best for each situation.

Chain

A chain is an object that consists of a number of presets (described below), quick parameters, and MODs in a row. A chain can contain up to eight presets per effects bus. Refer to Chapter 7 for information on using chains. Chains and presets can sit side-by-side on different buses in the same studio.

Preset

Although you can't change the algorithms stored in ROM, you can change the values of an algorithm's parameters and store that as a preset. The preset object is the most basic editable effect object in the KSP8. Each KSP8 preset is based on one algorithm (described below), and contains values for all the parameters of that algorithm. You may place a preset directly on an effects bus in a studio, or construct a chain of multiple presets. Refer to Chapter 6 for information on using presets.

Algorithm

An algorithm is a specific type of signal processing, like a reverb, distortion, or flanger. These are stored in ROM, and cannot be changed, although values of an algorithm's parameters (and there can be up to 92 of them!) can be changed and stored in a preset. Refer to the *KSP8 Algorithm Reference Guide* (provided electronically) for complete information on algorithms and their parameters.

Object Type and ID

The KSP8 stores its objects using a system of ID numbers that are generally organized into banks of 100. Each object is identified by its object type and object ID; these make it unique. An object's type is simply the kind of object it is, whether it's a studio, preset, chain, or algorithm. The object ID is a number from 1 to 999 that distinguishes each object from other objects of the same type. For example, within the 200s bank, you can have a studio, a preset, and a chain, all with ID 201; their object types distinguish them. You can't, however, have two presets with ID 201.

When you save objects that you've edited, the KSP8 will ask you to assign an ID. If the original object was a ROM object (i.e., one of the factory-supplied objects in the KSP8), the KSP8 will suggest the first available ID. If the original object was a RAM object (i.e., one that you've previously created), you'll have the option of saving to an unused ID, or replacing the original object.

Objects of different types can have the same ID, but objects of the same type must have different IDs to be kept separate. When you're saving an object that you've edited, you *can* assign the same ID to an existing object of the same type, but if you do, the new one will be written over the old one. For example, if you assign an ID of 1 to a preset you've edited, the KSP8 will ask you if you want to "replace" the ROM preset currently stored with that ID. We'll discuss this further in "Saving and Naming," later in this chapter.

The object type and ID enable you to store hundreds of objects without losing track of them, and also to load files from disk without having to replace files you've already loaded.

Shortcuts

As you work with your KSP8, you will soon see how the interface is optimized for quick editing. For example, between power cycles the KSP8 will remember whether you were on a Studio, FXBus, or Quick page. When you restart the unit, it will bring up the page you displayed most recently.

The paragraphs below describe the KSP8's other shortcuts.

Numeric Entry

Any time you are choosing from a list of options, for example, the list of EQ functions available for each box on the INEQ page, you can quickly move to a choice using numeric entry. Each available option for the highlighted box or parameter (e.g., an EQ function box on the INEQ page) has a numeric value associated with it. Simply type that number on the alphanumeric pad (e.g., 2 for Parametric EQ), then press **enter**. Of course, the cursor must be located on the correct field for this to work. In the case of an EQ function box, this means that your intended box appears in reverse video on the KSP8's display; if this is not so, then press the cursor keys until it is.

In addition to the numbers for all of the KSP8's soundware objects listed in Appendix C, there are reference charts for other numeric entry shortcuts in Appendix G of this manual.

Quick Stops

When you are scrolling through lists of objects – presets, for example – simultaneously press the plus (+) and minus (-) keys (just below the alpha wheel) to move to the next quick stop within the list. Here's an example: If you were currently scrolling through the chorus effects, then pressing plus and minus simultaneously would take you to the part of the list where the flange effects begin. This would be quicker than scrolling through the list of chori. Double-press + and - again to jump to the quick stop for the next type of effects in the list (phasers).

The KSP8 has been programmed with a number of other logical quick stops. It never hurts to try the plus and minus double press to move through lists of objects.

Double and Triple Button Presses

These are a few "hidden" multiple-button presses that can speed up your work from any point in the KSP8 editing environment. Just be sure to press the buttons at the same time.

- Press the **two left soft buttons** to enter **Standby mode**.
- Press the **middle two soft buttons** to bring up the **Utilities page**.
- Press the +/-, 0, and **clear** buttons on the alphanumeric keypad to perform a **soft reset**.
- When asked to save an object, pressing the + and - buttons together toggles between the suggested ID#, and the original ID# of the edited object. (Pressing the **up** and **down** arrows together does the same thing.)
- Pressing the **store** button twice will save the current object, either to a new location or replacing at the current location, depending on whether the edited object was a factory object (ROM) or a user object (RAM).

Search Feature

You can find any alphabetic or numeric string of characters within a currently selected list or range of values. Hold the **enter** button and press any of the numeric keys on the alphanumeric keypad. A dialog such as the following will appear:



Search string: -

Delete Insert >>End Choose OK Cancel

Type in the string of characters you want to find. For example, if you're looking at the Studio list and you want to find objects containing the word "Game," you would type g-a-m-e. This function is not case sensitive; it will find upper and lower case characters regardless of what you type.

When you've typed the string of characters you want to find, press ENTER. The KSP8 searches through the current list of values and finds all values that match the string of characters you typed.

To search for the next higher- or lower-numbered object that contains the searched-for string of characters, hold ENTER and press either the + or - button (the increment/decrement buttons beneath the alpha wheel, that is). Remember that the KSP8 has many objects to search through, so it may take a moment for it to find the next object.

The string you select will remain in memory. You can store and select a string of characters with each of the numeric buttons. Hold ENTER and press one of the numeric buttons at any time to select that string for a search. When the string appears, you can change it, or just press ENTER to find that string.

U Allocation

Each KSP8 algorithm uses one or more Processor Allocation Units, called “U”s. The more Us an algorithm uses, the more powerful and complex the algorithm. There are 16 Us available, and the KSP8 uses them in different quantities for different algorithms. Depending on how many algorithms you are chaining together on different channels, you may need to keep track of the number of Us you use. Also, it’s important to realize that because of the way the KSP8 allocates U usage there may be times when you cannot use all 16 Us at once.

The list of algorithms on page Appendix C-21 shows the number of Us required by each algorithm. Also, when you’re editing presets and chains there will be information about U usage on your KSP8’s screen.

Parentheses Around an Object Name

If an object such as a preset or chain is not available, then the object’s name will be shown in parentheses on the FXBUS page. There are two situations where this can happen: either the object selected does not fit the width of the current bus (e.g., a stereo effect on a mono bus), or the object requires more Us than are currently available.

In the case where insufficient Us are available, you can still add the object to a bus, but it will not be available for actual signal processing unless Us are freed up elsewhere in the studio. You can free up the Us you require by removing other presets from the studio, or by changing presets to similar presets that use fewer Us.

```
STUDIO:1 FXBUS
FX7-8 → [Freq] -- [Trem] -- [Filt] ----->
Type: Chain : (801) * (Synth Pulsar) (4U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>
```

Parentheses around an object name generally show that it requires more Processor Allocation Units (Us) than are currently available. To use this object in this location, you must make more Us available for the current studio. One way to do this would be to reduce the size of objects used on other buses in this studio.

Making the Most of Your Us

When allocating Us, keep in mind that the KSP8 is internally grouping them as four sets of four. If you are chaining a number of U-intensive presets, you may find that you are not able to get all sixteen Us available for your use at once. The best way to handle and anticipate this situation is to try to use Us in groups of two and four. You’ll notice that some algorithms use three Us, while some similar algorithms require only two. If you’re attempting max out your KSP8’s U usage, try using the algorithm that requires only two Us. It may have slightly less processing power than the three U algorithm, but it may free up the available processing capacity to allow you to add another algorithm to your studio if necessary.

Another thing to know is that the KSP8 gives priority to lower-number buses, so for example, bus 1-2 would win out over bus 7-8 when free Us are scarce.

Editing Objects

Working “side to side,” “up and down,” and “in and out”

You may find it useful when working with KSP8 objects to visualize a three-dimensional workspace.

- **side to side** – on any page you can choose options or bring up other pages with soft buttons, including the **more** buttons.
- **up and down** – you can move between the KSP8’s eight buses using the bus select buttons to the right of the display.
- **in and out** – you can move through the KSP8’s object hierarchy, from the top (studio) to bottom (algorithm) using the **edit** (in) and **exit** (out) buttons.

Studios

The Studio:STUDIO page shows all available studios in the KSP8, including studios you have created on your own:

```
Studio:STUDIO
FX1-2  [ ]
FX3-4  [ ]
FX5-6  [ ]
FX7-8  [ ][ ]
98 Default 8 Mono
99 Default 4 Stereo
1 4SterIn>4SterFX
2 4MonoIn>4SterFX
3 8MonoIn>8MonoFX
4 4St.In>4St.FX->Mix
<more MASTER STUDIO FXBUS QUICK more>
```

On the left side of this screen are visual indicators that show (by the height of the line or box) whether the selected studio’s buses are configured as stereo, mono, or surround. The width of these indicators shows the number and size of presets allocated on each bus

KSP8 Studios

The studio names give a clue as to what they're about. Here's some more detailed information:

- 1 **4SterIn>4SterFX** – 4 stereo pairs of inputs routed to 4 stereo FX buses, which are sent to corresponding outputs.
- 2 **4MonoIn>4SterFX** – each of the 4 analog ins are used a mono input to a stereo FX Bus, sent to corresponding outputs.
- 3 **8MonoIn>8MonoFX** – 8 mono inputs routed to 8 mono FX buses, which are sent to corresponding outputs.
- 4 **4StIn>4StFX->Mix**
- 5 **4MnIn>4StFX->Mix**
- 6 **8MnIn>8MnFX->Mix**

Studios 4, 5, and 6 are identical to Studios 1, 2, and 3, except all FX Buses are routed to Mix Bus 1-2, rather than to corresponding discrete outputs. The output of that Mix Bus goes to analog outputs 1 and 2 and the AES pair.
- 7 **Morph This** – all 8 inputs are panned through 5 FX buses via a multichannel panner controlled by an LFO.
- 8 **AES >FX1-2 >AES** – the AES input is routed to FX Bus1-2 which is sent to the AES output.
- 9 **6 MonoIn>5.1 FX+** – each of the first 6 inputs gets its own surround panner and send to the 5.1 FX Bus. The "+" denotes that a stereo pair of inputs and FX are also available.
- 10 **8 MonoIn>5.1 FX** – each of 8 inputs gets a surround panner and send to the surround FX Bus.
- 11 **MnIn>5.1 AutoPan** – input 1 is auto panned through a 5.1 channel FX Bus by means of an LFO.
- 12 **3 SterIn>5.1 FX+** – each of 3 pairs of stereo inputs gets its own surround panner and send to the 5.1 FX Bus. A stereo pair of FX are also available.
- 13 **4 SterIn>5.1 FX** – each of 4 pairs of stereo inputs gets its own surround panner and send to the 5.1 FX Bus.
- 14 **5.1 In>5.1 FX +** – a 5.1 channel signal is panned and routed to the surround FX Bus. LFE is passed on bus 4 unaffected. A stereo pair of FX are also available.

All studios described above use analog inputs 1-4 as inputs 1-4, and AES L and R as inputs 5-6, except as noted.

FXBUS Page

The FXBUS page may be the most important page in the KSP8. It is the place where you specify the types of effects you want to use, and the place where you can choose to string together different effects into chains.

The FXBUS page is also your starting point for editing presets and chains in the KSP8. You can reach the FXBUS page by either pressing the **edit** button or the **FXBUS** soft button while the studio name of the studio you want to work with is highlighted on the STUDIO page.



Most of the parameters on the FXBUS page will be the same whether the current bus is configured for a chain or a preset:

- **Type** – lets you select which type of object you wish to place on the bus, a preset or a chain.
- **Object Number** – you can select objects by either number or name.
- **Object Name** – a complete list of all objects is in Appendix C of this manual.
- **Us** – the number of processor allocation units required for this object.
- **MIDICh** – you can use a different MIDI channel for each FXBUS. By default, buses 1–8 are assigned to MIDI channels 1–8 and studio is assigned to channel 9.
- **Lock** – prevents effects on a bus from being changed or interrupted when a change is made on another bus. Effects may be briefly interrupted, however, at the moment when you change the setting of the Lock parameter; for this reason, you should not change this setting while you are doing critical audio work (such as printing a mix).

This parameter has to do with the KSP8’s processor allocation (U) usage. When you select objects for a bus, the KSP8 looks at the number of available Us and attempts to optimize their allocation so that all selected objects will function. As a result of re-linking objects to maximum the usage of the KSP8’s processing power, however, audio can be briefly interrupted (especially when changing the size of objects). When you set Lock to On, you tell the KSP8 that it is not to change the effects on the current bus, even if the organization of the Us on that bus could be optimized to make processor allocation units available for effects on other buses. The advantage to this is that you can assure that there won’t be any hiccups in the audio on the current bus caused by changes on other buses. The disadvantage is that the total number of Us available for effects on the KSP8 may be limited slightly, due to fragmentation. See the section “U allocation” on page 5-5 for complete information on how the KSP8 makes use of its 16 Us.

- **MixMode** – This parameter affects reverbs and other effects with wet/dry parameters. The setting can be Insert or Send/Return:
 - Insert uses the default wet/dry values set for this preset. The quickest way to see these settings is usually to look at the wet/dry parameter on the Quick page for the preset.
 - Send/Return sets the wet/dry value, wherever applicable, to 100% wet.

Use the bus select buttons (to the right of the KSP8's display) to move between the FXBUS pages for the different buses within a studio. The above screen, for example, shows the stereo buses 7 and 8, so bus select button 7-8 would be lit while this page is displayed. Pressing bus select buttons 1-2, 3-4, or 5-6, would display the other FXBUS pages for this studio.

Presets

To use a preset, start at the Studio page, then press the **edit** button or the **FXBUS** soft button to bring up the Studio:FXBUS page. (Alternatively, you could press the bus select button for the bus you want to use within the current studio.) Set the Type parameter to Preset, then highlight the name field to the right of the Type parameter and choose from the available presets by either scrolling through the list with the alpha wheel or increment/decrement buttons, or by typing in the ID number of a preset, then pressing the **enter** button.

See Chapter 6 for complete information on presets.

```

Studio:FXBUS
FX1-2
  →Rvrb-----→
Type:Preset :1 Nice Little Booth (1U)
MIDICH:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>

```

Chains

A chain is an object consisting of a number of presets, quick parameters, and MODs in a row; it can contain up to eight presets per effects bus.

To use a chain, start at the Studio page, then press the **edit** button or the **FXBUS** soft button to bring up the Studio:FXBUS page. Set the Type parameter to Chain, then highlight the name field to the right of the Type parameter and choose from the available chains by either scrolling through the list with the alpha wheel or increment/decrement buttons, or by typing in the ID number of a chain, then pressing the **enter** button.

You access the chain editor by pressing the **edit** button while a chain box is highlighted.

The chain editor will only allow you to insert effects that are consistent with the “width” of the current bus as specified on the BUSCFG page (for example, you can't insert 5.1 surround effects on a stereo bus).

The screen below shows a chain of three presets:

```

Studio:FXBUS
FX1-2
  →Guit--FRvb--Roto-----→
Type:Chain :800*st Chain 3 box (7U)
MIDICH:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>

```

See Chapter 7 for complete information on chains.

Algorithms

You cannot edit an algorithm directly. Instead, you make your edits at the preset level. Furthermore, you can “override” the value of any parameter using either MODs or Quick Parameters. When you override a parameter’s value, you don’t actually change the algorithm or the preset. However, the override is stored as part of a chain or studio.

There’s more information on algorithms in Chapter 8 of this manual, and complete information is provided in the *KSP8 Algorithm Reference Guide*, which you can download from the Kurzweil Music Systems web site.

Studio MODs

You can Studio Mods (S Mods) to modulate the send and EQ settings of buses, as well as the settings of the OUTLVL page. Press an **S MOD** soft button on any Studio page to bring up one of the eight Studio MOD pages for that studio. Press one of the **more** soft buttons if necessary to bring the **S MOD** soft buttons into view.

```

STUDIO8 S MOD1
Bus: Param: Adjust: Source: Depth:
In1-2 [0] [3-1000] 0.260oct MPrs+MW 0.50oc
None None Off
None None Off
None None Off
None None Off
<more> S MOD1 S MOD2 S MOD3 S MOD4 <more>

```

To use a Studio MOD, first select the bus that you wish to modulate, then choose a parameter from the available selections. The range of values for the other columns will be based on your settings in the bus and parameter columns.

- **Bus** – this column lets you select any available bus (e.g., In, Mix, or Out) to control with a Studio MOD.
- **Param** – is where you choose the specific parameter to control on the selected bus. You can choose only parameters that are actually available on that bus. For example, the parameter in the S MOD page shown above is set to width for the first EQ function (which has been set to be a BandPass filter) on stereo input bus 1-2.
- **Adjust** – sets the starting value of the selected parameter.
- **Source** – designates a MIDI controller to modulate the value of the selected parameter within the range allowed by the value of the depth setting (described below). You can choose an internal (LFO, ASR, or FUN) or external MIDI controller. There’s a complete list of these in Appendix F.
- **Depth** – is where you specify the amount of change in value that the real-time control will make to the selected parameter, using the Adjust value as a minimum or starting point. The amount of change can be positive or negative.

Intuitive Entry

There’s a shortcut for specifying a MIDI control source that we call “intuitive entry.” If you hold the **enter** button on the front panel of the KSP while a MOD page is displayed, then make any movement on an attached MIDI controller (e.g., turn the mod wheel on a synthesizer), the KSP8 will detect the movement and set that controller as the Source for the current MOD.

Also, for any parameter on a MOD or QUICK page, holding the **enter** button links the KSP8 to your MIDI controller's Data Slider(s), regardless of the setting of MIDI channels. If you're lucky enough to own a K2500 or K2600 keyboard, this includes all eight of the MIDI faders, by the way. Moving a Data Slider will run through the range of values for the currently selected parameter. This is not as precise as the Alpha Wheel, but much faster.

Studio Quicks

Another way to manipulate parameters at the studio level is with the "quick parameters" that you can access from the Studio:QUICK page. These are discussed on page 6-3.

Bypassing Effects

Press the **bypass** button (it's on the front panel of the KSP8, under the cursor keys) to turn off all effects and EQs on all buses. Press the **bypass** button a second time to re-enable everything.

Contextual Bypass

When you double-press the **bypass** button, you perform a "contextual bypass." Basically, this means that whatever is highlighted on the display when you perform the double-press will be bypassed or muted (processor allocation units, however, will not be freed up).

The LED in the **bypass** button will flash as long as a contextual bypass is in effect (and there can be more than one at any time). Also, the bypassed item will be displayed differently on the screen. In the case of an EQ, FX, or mix send, any lines that had been connected to that item on the screen will be shown bypassing – rather than connecting – the item. For a chain or preset, the appearance of the boxes on the FXBUS page will show you if an item is bypassed. During this time you can again double-press the **bypass** button to cancel the contextual bypass, or you can single-press the **bypass** button to display a screen that allows you to enable or bypass everything.

You can use contextual bypass to bypass or enable multiple objects, although it's up to you to keep track of which objects are bypassed and which aren't. If you bypass all objects (single-press the **bypass** button), then double-press on an individual object to enable it, you can "solo" that object to hear what it sounds like on its own.

Here are the different places where you can use contextual bypass:

- **Studio:FXBUS** page
 - when type is *preset*, double-click the **bypass** button to bypass the preset on that bus.
 - when type is *chain*, double-click on a box in the top half of the screen to bypass that box. Or, double-click the chain name in the bottom half of the screen to mute the entire chain.
- **Studio:INEQ** page – double-click the **bypass** button to bypass the currently selected function.
- **Studio:FXSEND** page – double-click the **bypass** button to mute the currently selected FX send box.
- **Studio:MIXSEND** page – double-click the **bypass** button to mute the currently selected mix send box.
- **Studio:QUICK** page – double-click the **bypass** button to bypass the current preset.
- **Studio:STUDIO** page – this is the same as bypassing all.
- **Chain:QUICK** page – double-click the **bypass** button to bypass the current preset.
- **Chain:BUILD** page – double-click on a box in the top half of the screen to bypass that box. Or, double-click on the chain name in the bottom half of the screen to mute the entire chain.

Bypassing boxes in a chain: a quick tutorial

The boxes in a chain will change appearance when bypassed. To see what happens, go first to the FXBUS page:

1. Press the **FXBUS** soft button from any Studio page.
2. Use one of the four cursor buttons to move the cursor on the FXBUS page to the Type parameter. Set the Type parameter to "Chain" by turning the alpha wheel or pressing the + or - (increment/decrement) buttons.
3. Move the cursor to the object name field (to the right of the Type parameter field). Press 3, 7, **enter** on the alphanumeric pad to select chain 37 "Flanging Verb". The screen below shows that nothing on this bus is being bypassed. Note the thick box around box 1 indicating that this box is the currently selected box in the chain assigned to this bus.

```

Studio:FXBUS
FX1-2 → Phsr Lurb Flng →
Type:Chain :37 Flanging Verb (4U)
MIDICh:1 Lock:Off Mix Mode:Insert.
<more MASTER STUDIO FXBUS QUICK more>

```

4. Now double-click the **bypass** button to bypass this bus (i.e., this whole chain).

As you can see below, the chain name is still selected, but the appearance of the chain boxes now shows that the current bus (i.e., the whole chain) is bypassed. The boxes around the presets on the chain are no longer displayed, with the exception of a thin box around the phaser effect, showing that this was the most recently selected box. Also, the **bypass** button on the front panel of the KSP8 will blink as long as the bus is bypassed.

```

Studio:FXBUS
FX1-2 → Phsr Lurb - Flng →
Type:Chain :37 Flanging Verb (4U)
MIDICh:1 Lock:Off Mix Mode:Insert.
<more MASTER STUDIO FXBUS QUICK more>

```

5. Double-click the **bypass** button again to re-enable the bus.

6. Press the up cursor button to move the cursor to the first box on the chain, as shown below. As before, nothing is bypassed. The only difference is that the cursor is on box 1, not the chain field, so the effect label is highlighted, making a filled-in box.

```

Studio:FXBUS 250 Slow Deep Phaser 1/4U
FX1-2 → Phsr Lvrb Flng →
Type:Chain :37 Flanging Verb (4U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>

```

7. Double-click the **bypass** button to bypass this box. The selection box will remain on box 1, as shown below, and the effect label will remain in reverse video, making a ring around the missing effect box. The display is telling you that the first box is bypassed, while the other boxes are still active.

```

Studio:FXBUS 250 Slow Deep Phaser 1/4U
FX1-2 → Phsr Lvrb Flng →
Type:Chain :37 Flanging Verb (4U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>

```

8. Press the down cursor button. The chain name is now selected, but box 1 is still bypassed, so its selection box is still shown as a thin line:

```

Studio:FXBUS
FX1-2 → Phsr Lvrb Flng →
Type:Chain :37 Flanging Verb (4U)
MIDICh:1 Lock:Off Mix Mode:Insert
<more MASTER STUDIO FXBUS QUICK more>

```

9. At this point, you can double press the **bypass** button to return to business as usual. Or, just to be sure you're back where you started, press the **bypass** button once, then press the **EnableAll** soft button.

Dependent Objects

Dependent objects are KSP8 objects that make up part of larger objects: in a studio, for example, the dependent objects are its presets and chains. When you save an object to an external device such as a SmartMedia card, you will be given the opportunity to save any dependent objects along with it. Normally you should do this.

The Compare Button

The **compare** button lets you listen to the difference between the current sound of an object that you have been editing (e.g., a preset) and the sound of the previously saved version of that object (i.e., how it sounded before you started the current editing session). Press the button once to temporarily reset the current object to the unaltered settings (i.e., before the current editing session); press the button again to return to the edited (but unsaved) settings.

Saving, Loading, Cataloging, Dumping

The Store Button

The **store** button lights whenever you make a change to a KSP8 object. If you're pleased with your edits and are ready to save the object, now's the time. Press the lighted **store** button to bring up a Save dialog such as the one shown below. The same dialog will be displayed when you press **exit** to leave a page with unsaved edits you have made.

```
editstudio:save
```

```
Save Analog/AES Mn>Mn as: ID#801
```

```
Object          Rename  Save  Cancel
```

Press the **store** button a second time or press the **Save** soft button if you want to save the current object with the name and location as displayed by the dialog. **Cancel** will exit the dialog.

Press **Object** to access these database functions:

- **Move**
- **Copy**
- **Name**
- **Delete**
- **Dump**

Object Utility functions are described on page 10-5.

Press **Rename** to edit the displayed name of the object, as described in the following section.

Naming Dialog

There's a standard procedure for saving and naming, which applies to all objects.

The best way through this process is to press the **Rename** soft button. This takes you immediately to the naming dialog, where you assign a name to the object you're saving. You haven't saved yet, but you'll be able to after you've named the object.

```
Edit:FXPreset:Rename
```

```
FXPreset Name: Right Angular
```

```
Delete Insert >>End Choose OK Cancel
```

The cursor underlines the currently selected character. Press the **>>End** soft button to move the cursor to the end of the first word ("Right" in the above example) without changing any characters. Press an alphanumeric button one or more times to enter a character above the cursor. The characters that correspond to the alphanumeric buttons are labeled under each button. If the character that appears is not the one you want, press the button again. Press the +/- button on the alphanumeric pad to switch between upper and lower case characters.

Press 0 one or more times to enter the numerals 0 through 9. Press CLEAR (on the alphanumeric pad) to erase the selected character without moving any other characters. Press the **Delete** soft button to erase the selected character. All characters to the right of the cursor will move one space left. Press the **Insert** soft button to insert a space above the cursor, moving all characters to the right of the cursor one space to the right.

The **Choose** button on the Rename page lets you pick the name of an existing object (from the displayed object list as the starting point for naming the current object. You can in fact use another object's name as the name for the current object (they'll still have different ID numbers, so they won't conflict).

Press the **Cancel** soft button if you decide not to name the object. Press **OK** when the name is set the way you want to save it.

In addition to the letters and numerals, there are three sets of punctuation characters. The easiest way to get to them is to press one of the alphanumeric buttons to select a character close to the one you want, then scroll to it with the Alpha Wheel. Here's the whole list:

```
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9
```

```
: ; < = > ? @ A through Z
```

```
[ \ ] ^ _ ` a through z. (space).
```

Pressing the Plus/Minus buttons simultaneously will select 0, A, a and (space).

If you're wondering how we came up with this sequence of characters, it's composed of ASCII characters 33 through 122.

When you press **OK**, the final Save dialog appears, where you assign an ID to the edited object. If you change your mind about the name, press the **Rename** soft button for another try.

If the object you started from was a ROM (factory preset) object, the KSP8 will automatically suggest the next available (unused) ID as the ID for the edited object. If that's the ID you want, press the **Save** soft button, and the object will be stored in RAM with that ID. Otherwise, you can select any ID from 1 to 999. This screen also gives you the opportunity to return to the naming dialog (as described above) or, by pressing the **Object** soft button, to access the Object Utilities (described in Chapter 10 of this manual).

If you select an ID that's already in use, the KSP8 will tell you that you're going to replace the ROM object that's already been assigned that ID. If you don't want to do that, you can select a different ID. Or you can press the Plus/Minus buttons simultaneously to toggle between the ID that the KSP8 suggested and the original ID. Or press the **Cancel** soft button to cancel the operation.

If you decide not to cancel or change the ID, and you press the **Replace** soft button, the KSP8 will write your newly edited object over the existing ROM object. Actually, it only appears that way, since you can't truly write to ROM. The ROM object will reappear if you delete the newly edited object.

RAM Objects

If the original object was a RAM object, the KSP8 will assume you want to replace it, and will suggest the same ID as the original object (if it has an asterisk—*—between its ID and its name, it's a RAM object). As with ROM objects, you can cancel, replace, or change the ID and save to an unused ID. If you replace a RAM object, however, it's definitely gone!

Deleting Objects

When you want to delete an object, press the **Delete** soft button on the Object Utilities page (described in Chapter 10 of this manual), and the KSP8 will ask you if you want to delete the object. Press **OK** if you want to delete it, or press **Cancel** if you don't. Although it seems that you can delete ROM objects, you can't actually do it. The KSP8 will behave as if it's deleting the ROM object, but it will still be there the next time you select it. (What actually happens is that the ROM object is copied to RAM as soon as you press **edit**, and when you "delete" the ROM object, you're actually deleting the RAM copy. The original ROM object remains in memory.)

RAM objects, on the other hand, are *gone* when you delete them! If you've "replaced" a ROM object by saving a RAM object with the same ID, the ROM object is invisible, but still there. Deleting the RAM object stored at the same ID will restore the ROM object.

You can use the Delete function to delete any RAM object from the current list of objects. After you press the **Delete** soft button, use one of the data entry methods to select any other object in the current list of objects. Then press **Delete** again.

You'll probably need to delete objects from time-to-time to clean up your machine, or to gain back some RAM space if you need it.

Chapter 6

Using and Editing Presets

A KSP8 preset consists of an effects algorithm, plus the settings of the parameters associated with that algorithm. The complete list of presets, algorithms, and other KSP8 objects is in Appendix C of this manual.

Selecting Presets

To use a preset, start at the Studio page, then press the **edit** button or the **FXBUS** soft button to bring up the Studio:FXBUS page:

```

Studio:FXBUS
FX1-2
  → -----
Type:Preset :0 None      (0U)
MIDICH:1   Lock:Off     MixMode:Insert.
<more MASTER STUDIO FXBUS QUICK more>

```

Type can be Preset (which is what we'll discuss in this chapter) or Chain. For information about chains, see Chapter 7.

Make sure Type is highlighted (use the cursor keys to move the cursor there if it isn't), then use the alpha wheel, plus, or minus buttons to select Preset. Next, press the right cursor key to highlight the Preset name ("0 None" in the above example). Now comes the fun part: turn the alpha wheel to scroll through the whole list of the KSP8's hundreds of glorious presets. Let's have a listen to the one called "40 Live Chamber." (If you knew already that this was the preset you wanted, an even faster method of selecting it would have been to highlight the preset name field, then press **4, 0, enter** on the alphanumeric pad.)

```

Studio:FXBUS
FX1-2
  → [Rvrb] -----
Type:Preset :40 Live Chamber (3U)
MIDICH:1   Lock:Off     MixMode:Insert.
<more MASTER STUDIO FXBUS QUICK more>

```

The line with the arrows, near the top of this screen, shows any effects on this bus. For a preset, this is shown as a single effects box containing the label for the underlying algorithms, in this case "Rvrb," which is short for "reverb". (A chain, by the way could include up to eight effects in series on this bus, see Chapter 7 for information on chains).

U Usage

When you select a preset, its name is displayed along with its the processor allocation unit (U) usage. As you can see, on the right side of the display, the algorithm used by this preset requires 3Us. This is an important piece of information, because (as you undoubtedly recall from Chapter 1) the KSP8 gives you up to 16 Us total for your use on its eight buses. The 3U algorithm used by this preset, then, will eat up 3/16 of your KSP8's processing power. There's nothing wrong with that, of course, you just need to be aware of these things if you're planning to make use of several algorithms simultaneously.

If perchance you select a preset that requires more Us than are currently available, the object's name will show up in parentheses on the FXBUS page. See page 5-5 for more information about what to do when this happens.

Three Ways to Use Presets

Each KSP8 preset is based on an effects algorithm and provides a way to control and/or change every parameter of the algorithm. The following sections describe the three ways of doing this:

- **QUICKs** – are the fastest way to change the values of up to eight of an algorithm's parameters.
- **C MODs** – give you real-time control over an algorithm's parameters and also let you make fixed adjustments to them. You can use the KSP8's own LFOs, ASRs, or FUNS, or you can use any MIDI control source from an external MIDI-attached controller.
- **PARAM pages** – each preset has one or more editable PARAM pages for accessing all of the algorithm parameters. When you make changes here, you must save the new values as a separate preset (or overwrite the original preset).

Overriding Parameter Values with QUICKs

Quick parameters, or “QUICKs” let you conveniently change up to eight of a preset’s parameter values without actually changing the preset. You can use the parameters provided as default “quick parameters,” or set a QUICK page to include any eight parameters of your choosing. There are two flavors of Quick parameters: Studio QUICKs and Chain QUICKs. A table on page 9-2 compares these with each other and with the two types of MODs available in the KSP8.

Press the **QUICK** soft button on the Studio:FXBUS page to display the Studio:QUICK page.

Each KSP8 algorithm has eight default quick parameters that are accessible to you from a Quick page. Shown below, for example, are the Quick Parameters for the algorithm 154 Spectral 4-Tap, as used by the preset 176 Dub Skanque Dly. To change the Wet/Dry mix in this example, you would just have to highlight that parameter’s value (as shown), then change the parameter value by turning the alpha wheel or pressing one of the increment/decrement buttons on the front panel. Or, you could enter the value you want (“50” in the example below) on the alphanumeric keypad, then press **enter**.

```

Studio:QUICK 176 Dub Skanque Dly 2/20
FX1-2
  → Dly -----→
Wet/Dry : 50%wet Tempo : 120BPM
Fdbk Level : 50% HF Damping: 5588Hz
LF Damping : 262Hz Tap2 Pt.Amt: 75%
Tap3 Pt.Amt. : 50%wet Tap4 Pt.Amt: 50%
<more MASTER STUDIO FXBUS QUICK more>

```

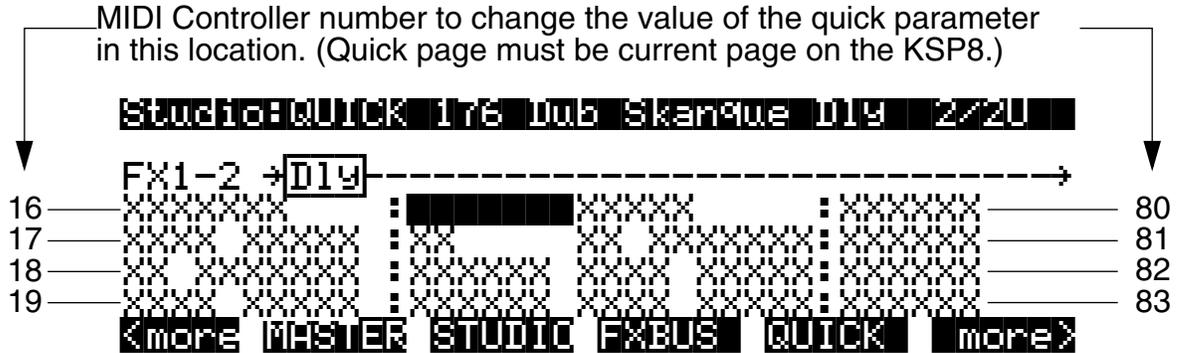
MIDI Control of Quick Parameters

You can use MIDI to control a preset’s quick parameters. First, however, you’ll have to do these two things:

- Make the Studio:QUICK page the current page on the KSP8.
- Set your MIDI controller to transmit on the same channel that is set as StudioChanl on the KSP8’s Master page. The default KSP8 Studio Channel is 9. (To check or change the Studio Channel from the QUICK page, press the **MASTER** soft button to bring up the Master page; StudioChanl is the first parameter on this page. Press the **<back** soft button to return to the QUICK page from the Master page.)

For a Chain QUICK, the MIDI controller can transmit on either the StudioChanl set on the Master page or any channel set by MIDICH on an FXBUS in the current studio.

The MIDI controller numbers for the quick parameters are 16, 17, 18, 19, 80, 81, 82, & 83, and are based on the parameter's position on the page, not the parameter itself. MIDI Ctrl 16 will adjust the top quick parameter in the first column, Ctrl 17 will adjust the second in that column, and so on from there.



Hierarchy of Quick Parameters

There are two levels of Quick Parameters, which is especially important to note when you start making changes with Quick Mode. That's because settings you change with a quick page can override the settings of a parameter on a page that's lower in the hierarchy of Studio > Chain > Preset > Algorithm.

Fortunately, the KSP8 keeps track of these things for you. For example, if you were to change the Wet/Dry level on the Quick Parameter page shown above to 51% (highlight the parameter value, then turn the alpha wheel one click to the right), this would override the default value used by the Dub Skanque Dly preset (without actually changing the preset).

You can see how the KSP8 keeps track of overrides on the preset's parameter pages. To do this, press the up cursor key to highlight the effect box (Dly), then press Edit. A screen such as the following will appear:

```

Preset: PARAM1 Stereo Size: 2U
FXAlgorithm: 154 Spectral 4-Tap

Wet/Dry : Quick Out Gain : 0.5dB
Fdbk Level : 51% Tempo : 120BPM
HF Damping : 5588Hz Diff Delay: 6.4ms
LF Damping : 262Hz Diff Amt : 100%
PARAM1 PARAM2 PARAM3
    
```

As you can see, the preset's parameter page shows that Wet/Dry has been overridden by a Quick Parameter. Were the preset in a chain, and the parameter overridden by a C MOD, the parameter's value field would say "FXMOD".

Selecting Quick Parameters

The Quick Parameters have been selected to be the most likely choices within each algorithm, but you can select any eight of an algorithm's parameters to be its Quick Parameters. To choose a new Quick Parameter, simply select a Quick Parameter that you no longer wish to use, use the arrow keys to select the name of the parameter, highlight it, then scroll through the list of the available parameters until the one that you want to use is displayed. Now the Quick Parameters you have selected will be saved with the studio. The complete list of every parameter for every algorithm is in the *KSP8 Algorithm Reference Guide*.

Overriding Parameter Values with MODs

The KSP8 gives you two kinds of MODs – modulators that you can use to change parameter values in real time. These two kinds of MODs affect different aspects of the KSP8, and are available at different places in the KSP8 editing environment.

- **Chain Mods** (C Mods) are available when you are in the chain editor, and modulate effects parameters. See page 7-3 for information on Chain MODs.
- **Studio Mods** (S Mods) affect the send and EQ settings of buses. They're described on page 5-10.

```
ChainC MOD1
Box: Param:      Adjust:  Source:  Depth:
None None              Off
<more C MOD1 C MOD2 C MOD3 C MOD4 more>
```

Editing Presets

You can edit any parameter value of the algorithm on which the current preset is based, then save your change(s) as a new preset.

First, highlight the preset name or preset box on the Studio:FXBUS page:

```

Studio:FXBUS
FX1-2
  →Rurb-----→
Type:Preset :18 SmallStudioRoom (2U)
MIDICh:1   Lock:Off   MixMode:Insert
<more MASTER STUDIO FXBUS QUICK more>
    
```

Press the **edit** button to bring up the first page of parameters for the algorithm on which the preset is based. The parameter pages show you the names and values of all the parameters for the selected algorithm. When a parameter’s value is being controlled by a Quick parameter or FXMOD (C MOD or S MOD), the parameter value field on the PARAM page will indicate this. Soft buttons at the bottom of the page will allow you to display the rest of the algorithm’s parameters.

The examples below shows the three parameter pages (PARAM1, PARAM2, and PARAM3) for the algorithm “Classic Place.” This algorithm has three pages of parameters for tweaking; other algorithms have as many as eight pages, supporting up to a maximum of 92 parameters per algorithm. (Remember that you can find the list of these parameters, as well as the parameters for the other KSP8 algorithms, in the *KSP8 Algorithm Reference Guide*.)

Press the **PARAM1** soft button to see the first set of parameters for the algorithm “Classic Place”. Note that the FXAlgorithm field at the top of this screen is the place where you can change algorithms, if you wish to.

```

Preset:PARAM1   Stereo   Size:2U
FXAlgorithm:4 Classic Place

Wet/Dry   :50%wet   Out Gain   :0.0dB
Absorption:40%    EarRef Lvl:0%
HF Dampng:14917Hz Late Lvl  :100%
L Pre Dly :3.7ms   R Pre Dly  :4.5ms
PARAM1 PARAM2 PARAM3
    
```

Press the **PARAM2** soft button to see the second set of parameters for this algorithm:

```

Preset:PARAM2   HighClassic Place
Room Type :Booth2 DiffAmtSc1:1.00x
Size Scale:1.17x DiffLenSc1:0.64x
                LFO Rate  :0.21Hz
                LFO Depth :2.2ct
TrebShlf F:7459Hz LF Split  :65Hz
TrebShlf G:-4.5dB LF Time   :0.58x
PARAM1 PARAM2 PARAM3
    
```

When you press the **PARAM3** soft button, the third set of parameters is displayed:

```

Preset: PARAM3          HIGHClassic Place
E DfDlyScf:1.00x      E X Blend :50%
E DiffAmt  :50%
E Dly L    :20.0ms    E Dly R    :20.0ms
E Dly LX   :30.0ms    E Dly RX   :30.0ms
E DfDlyL   :8.0ms     E DfDlyR   :8.0ms
E DfDlyLX :10.0ms    E DfDlyRX :10.0ms
PARAM1 PARAM2 PARAM3

```

It's important to keep in mind that when you change a parameter on one of the **PARAM** pages you will have to save the result as a new preset in order to use it again. You may find it more expedient to change individual parameter values on the Quick mode page (see page 6-3).

Your safest bet when saving a preset, especially if you've changed the underlying algorithm used by the preset, is to save it to a new location (i.e., with a new ID number). The reason for this is that there may be a chain that uses the preset you've been editing, and the chain will still look for the original unchanged preset at the indicated ID location. Since MODs are saved with the chain, but based on the algorithm in the preset, some MODs for this chain could now be set to unexpected values.

Of course if you're certain that the preset with this ID number isn't referenced elsewhere – or if you just like to live dangerously – there's no law that says you can't overwrite the preset at the current ID location. The original presets provided with the KSP8 will always be in ROM for you, but you'll have to perform a reset to get them back. We just want you to remain cognizant of the potential consequences if you choose to overwrite a preset.

Tempo-Based Effects

Some algorithms have parameters expressed in beats, along with a Tempo parameter that you can set as a fixed tempo in the preset or set to System for dynamic response to system tempo. Press the **tempo** button on the front panel of the KSP8 to bring up the Tempo page. This is where you set parameters relating to MIDI clock sync, and also the place where you can manually set a tempo for tempo-based effects.

- **Tempo** – shows the currently set tempo in beats per minute.
- **Source** – can be Internal or External, indicating the location of the master MIDI clock.
- **Sync** – can be Off or Xmit (transmit). This sets whether or not the KSP8 will transmit MIDI clock information (regardless of the source of the clock).

If tempo-based delays are not your cup of tea, look for presets and algorithms marked “ms” for milliseconds. These use units of milliseconds, and do not make use of a Tempo parameter.

Tap Tempo soft button

Some effects are based on tempo information that you provide, either by entering a beats-per-minute value or by tapping in a tempo. Tap or press on the **Tap** soft button to send tempo information, based on the average time between taps, to the KSP8’s internal clock.

It takes four taps to determine the tempo—if you tap fewer than four times, no information is sent. If you tap more than four times, the average of *all* of your taps is continuously calculated and sent to the clock. Later taps are weighted more heavily than earlier ones, so that if you change the rate at which you tap, the tempo information being sent will change accordingly, but there is a “flywheel” effect, so the clock’s tempo changes will lag somewhat behind the changes in your tapping rate.

Chapter 7 Chaining Effects

In KSP8-speak, a chain is an object consisting of a number of presets, quick parameters, and MODs in a row.

A chain can contain up to eight presets per effects bus. You may, however, create a chain with only a single preset. This enables you to control that preset with Chain MODs (see page 7-3).

Studio:FXBUS page

To work with the KSP8's chains, or to create your own, start at the Studio:FXBUS page. Press the **FXBUS** soft button from any Studio page to get there, then set the Type parameter to Chain.

The screen below shows the Studio:FXBUS displaying a chain of three presets, each represented by a box:

```
Studio:FXBUS
FX1-2
  →Guit- FRvb- Roto-----→
Type:Chain  :800*st Chain 3 box (7U)
MIDICh:1    Lock:Off  Mix Mode: Insert
<more> MASTER STUDIO FXBUS QUICK <more>
```

You can use the cursor keys or the **FXBUS** soft button to move between boxes on this page.

Studio and Chain QUICKs

Before we move into the Chain editor, this is a good time to point out that there are two kinds of QUICK parameters you can use with the KSP8: Studio QUICKs (described on page 6-3) and Chain QUICKs (page 7-3). While they are similar in how they work and what they do, the Chain QUICKs are the only ones that will be saved with a Chain object. So if you are editing a chain, and want to use QUICK parameters with it, Chain QUICKs are probably what you want them to be. The **QUICK** soft button on the Studio:FXBUS page, however, always takes you to the Studio:QUICK page. It does not bring up the Chain:QUICK page, even if the Type on the FXBUS page is Chain.

When you press the **edit** button while Chain is the Type on the Studio:FXBUS page, though, you enter the Chain editor at the Chain:QUICK page. And that's where we'll go next.

Chain Editor

To enter the Chain editor, press **edit** while on the Studio:FXBUS page and the Type is Chain.

The chain editor lets you put up to eight presets in a series, but it will only allow you to insert effects that are consistent with the “width” of the current bus as specified on the BUSCFG page (for example, you can’t insert 5.1 surround effects on a stereo bus).

When you enter the chain editor from the Studio:FXBUS page, you are automatically brought to the Chain:QUICK page. A screen such as the following will display:

```
Chain:QUICK 6 Soundboard 3/3U
FX1-2[Guit]--FRvb--Roto----->
Wet/Dry : 50%Wet Tempo : 120BPM
Fdbk Level : 51% Late Lvl : 0%
HF Dampng : 5588Hz LF Time : 1.00x
Out Gain : 0.0dB R Pre Dly : 10.0ms
<more Add Remove BUILD QUICK more>
```

Notice that the first word on the top line of the display changes to say “Chain” when you enter the Chain editor. This is important to keep in mind, since some Studio and Chain pages can be very similar in appearance. You will not, however, be able to fully edit a chain unless you are in the chain editor.

These are the soft buttons in the Chain editor:

Add – adds additional boxes for presets to the chain. The maximum number is eight. To select the preset for a box, use the cursor keys to highlight the box, then use one of these selection methods (the preset name will be displayed on the top line, and its type will be shown in the box):

- Scroll with the alpha wheel or use the + and - buttons (double press the + and - buttons to jump to the next type of effects in the list)
- Enter the number of the desired effect on the alphanumeric keypad, then press **enter**.

A complete list of presets is in Appendix C of this manual. Remember that the chain editor only lets you add presets that will fit the current bus (so you can’t insert stereo effects on a mono bus).

Remove – removes the selected box from the chain.

Build – brings up the Chain:BUILD page, which provides a convenient way to select presets for the chain.

Quick – brings up the Chain:QUICK page, where you can add and remove boxes, as well as tweak effect parameter values and customize the QUICK parameters that are shown for that box of the chain. On the Chain:Quick page, pressing this soft button cycles through the boxes within the chain.

C MOD n – takes you to the Chain MOD pages, described below.

C LFO – Allows you to configure the four Chain LFOs. (See Chapter 9 for more information)

C ASR – Allows you to configure the four Chain ASRs. (See Chapter 9 for more information)

C FUN and C FUN2 – bring up the pages for the eight Chain FUNs. (See Chapter 9 for more information)

Chain QUICKs

As you move between boxes on the Chain:QUICK page, you'll notice that the names and values of the items on the page change with each box. These are the Chain QUICKs for each preset. Like Studio QUICKs (described on page 6-3), Chain QUICKs provide fast access to eight algorithm parameters per preset. The eight parameters shown for each box of a chain are selectable so that you can bring to the QUICK pages the parameters that you want to see for each box, depending on your intent and application. This sets you up for easier editing and tweaking later. The parameters and their settings are saved as part of a chain object.

Refer to the section on Studio QUICKs to learn how to change and control Quick parameters, but be sure to use Chain QUICKs if you want your edits to be saved as part of the chain. Also, there's a useful table on page 9-2 that compares the features of QUICKs and MODs.

Chain MODs

Chain Mods (C Mods) are available when you are in the chain editor, and modulate effects parameters for all of the boxes on chain. Although the parameters you can control are different from a Studio MOD, the method for programming the MOD is almost identical to that described on page 5-10.

To use a Chain MOD, first make sure that you're in the Chain editor, as described on page 7-2. Press one of the **C MOD** soft buttons to bring up a C MOD page. Select a Box (i.e., one of the preset effects on the chain) and the Parameter for that box that you wish to modulate (e.g., the wet/dry mix for the effect). Set Adjust and Depth values (as described for Studio MODs on page 5-10), then choose a MIDI controller for Source. The controller can be an internal (LFO, ASR, or FUN) or external MIDI controller. Check the complete list of MIDI controllers in Appendix F if you have questions about this. You can also use intuitive entry (described on page 5-10) to designate a MIDI controller.

```
Chain: C MOD1
Box: Param: Adjust: Source: Depth:
Box1 Wet/Dry 28%wet Wheel 58%wet
None None Off
None None Off
None None Off
None None Off
<more C MOD1 C MOD2 C MOD3 C MOD4 more>
```

Getting Inside a Chain

The best way to see how all the pieces of a chain work together is to get inside one, which is what we'll do here.

1. Start at the Studio:FXBUS page. Make sure you're on a stereo bus.

```

Studio:FXBUS
FX1-2 *Flng--Dly--Filt--Rvrb----->
Type:Chain  :84 Scorched Earth (9U)
MIDICh:1    Lock:Off      MixMode:Insert.
<more MASTER STUDIO FXBUS QUICK more>
    
```

2. Set the Type to Chain, choose chain "84 Scorched Earth", then press edit:

```

Chain:QUICK 234 Soft Edge Flange 2/9U
FX1-2 *Flng--Dly--Filt--Rvrb----->
Wet/Dry    :100%wet      Noise Gain:98Hz
LFO Period:8 bts       HF Damping:74%
Xcurs1 Crs:2.0ms      Dly1 Crs   :2.0ms
LFO Fdbk   :91%        Out Gain    :-6.0dB
<more ADD Remove BUILD QUICK more>
    
```

3. On the Chain:QUICK page, use the cursor keys or the QUICK soft button to highlight box 3. Notice how the quick parameters change as each box is highlighted.

```

Chain:QUICK 356 Basic Env Filter 2/9U
FX1-2 *Flng--Dly--Filt--Rvrb----->
Wet/Dry    :46%wet      Min Freq   :98Hz
Threshold  :FXMod       Freq Sweep:74%
Atk Rate   :15.0dB/s    Resonance  :15dB
Rel Rate   :7.6dB/s     FilterType:Low Pass
<more ADD Remove BUILD QUICK more>
    
```

4. Press the **more>** soft button to bring the **C MOD** soft buttons into view:

```
Chain:QUICK 234 Basic Env Filter 2/9U
FX1-2 →FIn9--Dly--Filt--Rvrb-----→
Wet/Dry :46%wet Min Freq :98Hz
Threshold :FXMod Freq Sweep:74%
Atk Rate :15.0dB/s Resonance :15dB
Rel Rate :7.6dB/s FilterType:Low Pass
<more C MOD1 C MOD2 C MOD3 C MOD4 more>
```

5. Press the **C MOD1** soft button to display the Chain:C MOD1 page:

```
Chain:C MOD1
Box: Param: Adjust: Source: Depth:
Box3 Threshold -64.0dB LFO1 3dB
Box3 Tempo 120BPM OFF 0BPM
Box3 Diff Delay 20.0ms OFF 0.0ms
Box3 Diff Amt 100% OFF 0%
Box3 Fdbk Image 61% OFF 0%
<more C MOD1 C MOD2 C MOD3 C MOD4 more>
```

6. Press **edit**. This takes you to the **PARAM1** page of the preset in the box that is highlighted on the Chain:QUICK page, regardless of what's highlighted on the C MOD page. These are the parameter pages for the "360 Env Follow Filt" algorithm, which is used by the preset "234 Basic Env Filter" in box 3 of the current chain. Notice the parameters on the **PARAM1** and **PARAM2** pages that are overridden by Quick parameters (shown in the Chain:QUICK page, above).

```
Preset:PARAM1 Stereo Size:21
FXAlgorithm:360 Env Follow Filt
Wet/Dry :Quick Out Gain :-2.0dB
FilterType:LowPass Min Freq :Quick
F 2k 4k 6k Freq Sweep:Quick
0Hz Resonance :Quick
PARAM1 PARAM2
```

Chaining Effects

Getting Inside a Chain

7. Press the **PARAM2** soft button to see the second page of parameters for this algorithm. Notice that in addition to more parameters overridden by quick parameters there is also a parameter (Threshold) that is overridden by an FXMod, in this case a Chain MOD, as shown above.

```
Preset:PARAM2 HighEnv Follow Filt
Threshold :FXMod  Atk Rate :Quick
              Rel Rate :Quick
              Smth Rate :300.0dB/
```

```
-dB 60 40 * 16 * 8 4 0
PARAM1 PARAM2
```

Press **exit** to return to the Chain:QUICK page.

Chapter 8

Using Algorithms

This Chapter describes the processing algorithms found in the KSP8: what their parameters mean, and how to use them. It is designed to be read through so that you can get a general understanding of the algorithms.

The descriptions here do not include all of the parameters associated with every algorithm, and some algorithms may not have some of the parameters described here for their category. A more complete reference, with every algorithm and the meaning and range of every parameter, arranged in the order they appear on the screen, can be found in the *KSP8 Algorithm Reference Guide*.

General Parameters

There are a number of parameters that are common to all or almost all algorithms, and we'll deal with those first.

Wet/Dry balances the levels of the processed and unprocessed signals passing through the preset. The range is 0% wet (the signal is unprocessed) through 100% wet (no dry signal is present). A setting of 50% wet means the dry and processed signals are roughly equal in level. In some algorithms, separate Wet/Dry parameters are provided for the Left and Right input channels. In some cases, this parameters can have negative values, which indicate that the Wet signal is polarity-inverted.

Out Gain sets the gain at the output of a preset.

In/Out enables or disables the effect. You can think of it as a Wet/Dry parameter with only two positions: 100% (In) and 0% (Out).

HF Damping is the cutoff (-3 dB) frequency of a 6dB/octave lowpass filter that's inserted before the processor. In the case of processors where multiple iterations of the signal are heard, such as in a delay, each iteration of the signal will pass through the filter, and will therefore be duller.

XCouple (Cross Couple). In stereo effects, this controls how much of any signal being fed back is going to the channel *opposite* to the one where it first appeared. At 100%, all feedback from signals at the left input goes to the right channel and vice versa, causing a "spreading" or in the case of delay lines, a "ping-pong" effect. At 0%, fed-back signals stay with the channel they came in on.

A->B cfg (configuration). In combination algorithms that contain two (or more) components, and whose name uses "<>", as in 719 "Reverb<>Compress", the order in which the signal passes through the two components can be changed. For example, this algorithm can be configured so the signal passes through the reverb first and then the compressor, or through the compressor first and then the reverb. The **cfg** parameter determines the configuration, and its value is context-sensitive—in this example, the choices would be "Rvb->Cmp" and "Cmp->Rvb".

A/Dry->B is also found in many combination algorithms, and controls the amount of signal that will pass dry (unprocessed) through the first component into the second component. Different combination algorithms use different variations on this parameter, depending on the context. The range is 0 to 100%.

Reverbs

Room Type changes the configuration of the algorithm to simulate a wide array of room types and sizes including booths, small rooms, chambers, halls and large spaces. Because this parameter changes the structure of the reverb algorithm, you need to be careful when assigning it a MOD—changing it in real time while signal is passing through it is likely to cause audible artifacts. Room types in different algorithms with similar names do not necessarily sound the same.

Rvrb Time is the RT_{60} —the time it takes for the reverb to decay to 60 dB below its initial level—in seconds. It is accurate assuming that several other parameters (HF Damping, Diff Scale, Size Scale, and Density) are at their nominal levels. It is adjustable up to “Inf”, which creates an infinitely-sustaining reverb.

LateRvbTim adjusts the basic decay time of the late portion of the reverb after diffusion.

L/R Pre Dly (Pre-Delay) is the time between the start of a sound and the output of the first reverb reflections from that sound. Longer pre-delays can help make larger spaces sound more realistic. Longer times can also help improve the clarity of a mix by separating the reverb signal from the dry signal, so the dry signal is not obscured.

EarRef Lvl adjusts the mix level of the early-reflection portion of algorithms which offer early reflections.

Late Lvl adjusts the mix level of the late-reverb portion of algorithms which offer early reflections.

Diff Scale scales the “diffusion” of the early reflections, that is, how spread out they are as a group over time. At very low settings, the early reflections start to sound quite discrete, and at higher settings the early reflections are seamless. It is adjustable from 0.00 to 2.00, with 1.00 being nominal for the given Room Type.

Density controls how tightly the early reflections are packed in time. Low Density settings group the early reflections close together, while higher values spread the reflections for a smoother reverb. It is adjustable from 0.00 to 4.00, with 1.00 being nominal (and usually optimal) for the given Room Type.

Expans controls the amount of late reverb energy biased toward the edges of the stereo image. A setting of 0% will bias energy towards the center. Moving away from 0% will bias energy towards the sides. Positive and negative values will have a different character.

Build adjusts the envelope of certain portions of the reverb. Positive values speed up the envelope, and negative values slow it down.

Size Scale changes the size of the current room. Altering this parameter will change the reverb time and also cause some coloration of the reverb. It is adjustable from 0.00 to 4.00, with 1.00 being nominal (and usually optimal) for the given Room Type.

InfDecay, when turned “On”, causes the reverb tail to decay indefinitely. When it’s “Off”, the decay time is determined by the “Rvrb Time” or “LateRvbTim” parameters. This is a good parameter to control with a footswitch.

Wet Bal (Wet Balance). Some reverb algorithms are actually two stereo reverbs in one, with each one receiving a different mono signal. This balances the outputs of the two reverbs—0% means they are being mixed equally.

Delays

There are two types of taps in the Multitap delays: The “Loop” tap, which has a feedback loop back to its input, and the numbered taps. The numbered taps can be single iterations or they can repeat as part of a loop, but they do not have individual feedback paths.

Fdbk (Feedback) **Level** controls the repeating function of the Loop Tap. A setting of 0% means there will only be a single delay, while a setting of 100% means the signal keeps repeating without ever stopping.

Both types of taps are individually adjustable from 0 to 2.55 seconds. The **Loop Crs** and **Tap n Crs** (n being the number of the tap) parameters set the coarse value of the loop in 20-ms increments, while the **Loop Fine** and **Tap n Fine** parameters set the fine value in 0.2-ms increments.

In Delay algorithms that use tempo to determine tap lengths, there is a **Tempo** parameter which can be set from 1 to 255 BPM or to “System”. The **Loop Length** and **Tap n Delays** are then expressed in beats relative to that overall Tempo. See Chapter 6 for more information about tempo control of KSP8 parameters.

Hold is a switch that, when turned on, “locks” any signal currently in the delay and plays it until Hold is turned off. When Hold is on, no signal can enter the delay and Feedback is set to 100%. A good parameter to control with a footswitch.

Dry Bal (Balance) is the left/right balance of the dry signal. At -100%, only the left dry signal goes to the left output, while at 100% only the right dry signal passes to the right output, and at 0%, equal amounts of the left and right dry signals pass to their respective outputs.

Tap n Level is the level of each numbered tap, from 0% to 100%, relative to the overall output of the effect.

Tap n Bal is the left/right balance of each of the numbered taps. At -100%, only the left channel of tap n goes to the left output, while at 100% only the right channel of tap n goes to the right output. At 0%, equal amounts of the left and right channels of the tap pass to their respective outputs. In some delays, pairs of taps (1 and 5, 2 and 6, etc.) are controlled together as stereo pairs.

DelayScale lets you change the lengths of all the taps together. Its range is 0 to 10x.

☛ Note that it is possible for the KSP8 to run out of delay memory with over-generous settings of DelayScale or very slow Tempos. Some Delay algorithms will simply go to a maximum value and stay there, while in some, a calculation is made that automatically cuts the delay times in half, thereby maintaining a relationship with tempo.

Complex Echo

This algorithm has two feedback taps per channel as well as three independent taps, and also a feedback diffuser for “smearing” the delays. Feedback line 1 feeds the signal back to the delay input of the same channel, while feedback line 2 feeds the signal back to the opposite channel.

FB2/FB1>FB is a balance control between feedback lines 1 and 2. 0% (minimum) turns off feedback line 2, only allowing use of feedback line 1. 50% is an even mix of both lines, and 100% (maximum) turns off line 1.

L Diff Dly and **R Diff Dly** adjusts the delay lengths of the diffusers. Range is 0 to 100 ms.

Diff Amt adjusts the diffuser intensity. Range is 0 to 100%.

C Fdbk *n* Dly adjusts the delay length of the C channel's *n*th feedback tap, fed back to the C channel's delay input. Range is 0 to 2600 ms.

Spectral Multitap Delays

These 4- and 6-tap delays have their feedback and output taps modified with shapers and filters. In the feedback path of each tap are a diffuser, hipass filter, lopass filter, and imager. Each delay tap has a shaper, comb filter, and balance and level controls.

Fdbk Image sets the amount that the stereo image is shifted each time it passes through the feedback line. Range is -100 to 100%.

Tap *n* Shapr adjusts the intensity of the shaper at each output tap. Range is 0.10 to 6.00 x.

Tap *n* Pitch adjusts the frequency of the comb filter at each output tap. Range is C-1 to C8, in semitones.

Tap *n* PtAmt adjusts the intensity of the comb filter at each output tap. Range is 0 to 100%.

Gated Ducking Delay

This runs the last thing you played through a looping delay, but only when you aren't playing. Gated Ducking Delay is great for that announcer sound, sound, sound, so popular in Monster Truck radio spots.

DegenRegen

This one's a big looping delay with lots of gain, distortion and filtering, and with a compressor to keep it all under control. Very cool.

Equalizers (EQ)

The KSP8 has both Graphic and Parametric EQ algorithms. Parametric EQ sections are also found on a number of combination algorithms.

The **Graphic** equalizer is available as stereo (linked parameters for left and right) or dual mono (independent controls for left and right). It has 10 bandpass filters per channel, each of whose gain is adjustable from -12 dB to +24 dB.

Like all graphic equalizers, the filter response is not perfectly flat when all gains are set to the same level (except at 0 dB), but rather has ripple from band to band. To minimize this ripple, it is best to center the overall settings around 0 dB.

The **Parametric** equalizer ("5-Band EQ") has two bands of shelving filters and three bands of true parametric EQ.

Treb Freq and **Bass Freq** set the center frequencies for the shelving filters. Both of these are adjustable over the full range of 16 to 25088 Hz, in increments of a semitone.

Treb Gain and **Bass Gain** control the amount of cut or boost above (Treb) or below (Bass) the center frequency. The range is -79 to +24 dB.

Mid*n* Gain sets the cut or boost for the parametric band *n*, with a range of -79 to +24 dB.

Mid*n* Freq sets the center frequency for parametric band *n*, with a range of 16 to 25088 Hz, in increments of a semitone.

Mid*n* Width set the bandwidth of the filter on band *n*, with a range of 0.01 to 5 octaves.

Enhancers

Enhancers modify the spectral content of the input signal by boosting existing spectral content, or stimulating new ones. Two- and three-band versions are provided.

Drive adjusts the input into each band. Increasing the drive will increase the effects. Range is -79.0 to 24.0 dB.

Xfer adjusts the intensity of the transfer curves. Range is -100 to 100%.

EQ Morpher

This algorithm uses two four-band bandpass filters, A and B, and moves between them, which among other things, can produce a very convincing simulation of a human vocal tract.

FreqScale offsets the filter frequencies for each set of filters. After setting the filter parameters (**Freq**, **Gain**, and **Width**), the FreqScale parameters will move each of the four filter frequencies together by the same relative pitch. Range is -8600 to 8600 cents.

Morph A>B. When set to 0% the “A” parameters are controlling the filters, and when set to 100%, the “B” parameters control the filters. Between 0 and 100%, the filters are at interpolated positions. When morphing from A to B settings, the A filter #1 will change to the B filter #1, A filter #2 moves to B filter #2, and so on. Range is 0 to 100%.

Compressors, Expanders, and Gates

A wide range of Compression and Expansion effects is available in the KSP8. The various algorithms include different combinations of:

- compressor with soft-knee characteristic—the compression action comes in gradually as the signal level approaches the threshold
- compressor with hard-knee characteristic—the compression action comes in abruptly when the signal reaches the threshold
- expander
- multiband compressor that breaks the signal up into three frequency bands and compresses them all separately
- sidechain or output EQ
- reverb and compressor in combination
- gate
- gated reverb

All of the Compression algorithms use these parameters:

FdbkComprs (Feedback Compression) selects whether to use feed-forward (set this to “Out”) or feed-back (set this to “In”) compression. The feed-forward configuration uses the input signal as a side-chain source, which is useful when the compressor has to act really quickly. The feed-back configuration uses the compressor *output* as the side-chain source, which lends itself to more subtle, but not as quick-reacting, compression.

Atk (Attack) **Time** for the compressor is adjustable from 0.0 to 228.0 ms.

Rel (Release) **Time** for the compressor is adjustable from 0 to 3000 ms.

SmoothTime smooths the output of the expander’s envelope detector by putting a lowpass filter in the control signal path. Smoothing will affect the Attack or Release times only when this parameter is longer than one of the other times. The range is 0.0 to 228.0 ms.

Signal Dly (Delay) puts a small delay in the signal relative to the sidechain processing, so that the compressor (or gate) “knows” what the input signal is going to be before it has to act on it. This means the compression can kick in before an attack transient arrives. In the `SoftKneeCompress` and `HardKneeCompress` algorithms, delay is really only useful in feed-forward configuration (`FdbkComprs` is “Out”). For other compressors, the delay can be useful in feedback configuration (`FdbkComprs` is “In”). The range is 0 to 25 ms.

Ratio is the amount of gain reduction imposed on the compressed signal, adjustable from 1.0:1 (no reduction) to 100:1, and `Inf:1`.

Threshold is the level in dBFS (decibels relative to full scale) above which the signal begins to be compressed. Adjustable from -79.0 to 0 dB.

MakeUpGain allows additional output gain to compensate for gain reduction in the compressor. It is essentially the same parameter as `Out Gain`, with which it is summed. The minimum is -79.0, and the maximum summed gain (`MakeUpGain` + `Out Gain`) is +24.0 dB.

Expansion

algorithms containing Expanders have these controls:

Atk or **Exp Atk** (Attack), how fast the expander turns off when the input signal rises above the threshold level, adjustable from 0.0 to 228.0 ms.

Rel or **Exp Rel** (Release), how fast the expander turns back on after the signal drops below the threshold level, adjustable from 0 to 3000 ms.

Ratio or **Exp Ratio**, how much the gain is reduced below the expansion threshold, adjustable from 1:1.0 (no expansion) to 1:17 (extreme downward expansion).

Threshold or **Exp Threshold**, the level below which the signal is expanded, adjustable from -79.0 to 0 dB.

In addition, the two-segment compressors with expander have separate **Ratio** and **Threshold** controls for each of the compression segments.

Multiband Compression

The Multiband Compression algorithm has **Attack**, **Release**, **Smooth**, **Signal Delay**, **Ratio**, **Threshold**, and **MakeUp Gain** parameters for each of the three bands (“Low”, “Mid”, and “High”). In addition, it has:

Crossover1 and **Crossover2**. These set the frequencies which divide the three compression frequency bands. The two parameters are interchangeable, so either may contain the higher frequency value. The range is 16 to 25088 Hz, in increments of a semitone.

Gates

SC Input lets you select which input channel(s) will control the sidechain, which is responsible for opening and closing the gate. It can be set to L, R, or the average of the two channels, $(L+R)/2$. You can use this, if you arrange the signal paths and pan controls appropriately, to gate one mono signal with a different mono signal—the venerable “Keyfex” effect.

Gate Time is the time that the gate will stay open after the sidechain signal reaches the **Threshold**. Its range is 0 to 3000ms.

Ducking reverses the action of the gate. Normally this is set to “Off”, and the gate opens when the input signal rises above the threshold. But when this is “On”, the gate *closes* when the input signal rises above the threshold.

Atk (Attack) Time is the time for the gate to ramp from closed to open (reverse if Ducking is on) after the signal rises above threshold, adjustable from 0.0 to 228.0 ms.

Rel(ease) Time is the time for the gate to ramp from open to closed (reverse if Ducking is on) after the gate timer has elapsed, adjustable from 0 to 3000 ms.

Super Gate

Super Gate is a more sophisticated gate that includes these two functions:

Env Time is the amount of time it takes for the sidechain signal envelope to drop below the threshold. If this time is too short, the gate can close and open too quickly from amplitude modulation in the sidechain signal. If it is too long, the gate may stay closed until the envelope has a chance to fall, and some signals would not get through. This parameter is only in effect when **Retrigger** is Off.

Retrigger determines whether the gate timer will reset itself each time the sidechain signal goes above the threshold. If it is “On”, the timer resets itself, and therefore the gate stays open as long as the signal is above the threshold, or keeps going above the threshold, within the interval specified by **Gate Time**. If it is “Off”, the gate closes down after **Env Time** has elapsed, regardless of the sidechain level, and the sidechain level must fall below the threshold and come back up again before the gate will open again.

Chorus

Chorus is an effect which gives the illusion of multiple voices playing in unison. The effect is achieved by detuning copies of the original signal and summing the detuned copies back with the original. Low frequency oscillators (LFOs) are used to modulate the positions of output taps from a delay line. The movement of the taps causes the pitch of the signal to shift up and down, producing the required detuning.

The choruses are available as stereo or dual mono. The stereo choruses have the parameters for the left and right channels ganged, while the dual mono choruses have separate left and right controls.

Fdbk Level is the level of the feedback signal from the LFO1 delay tap into the delay line. Negative values polarity-invert the feedback signal.

Tap Lvl sets the levels of the LFO-modulated delay taps. Negative values polarity-invert the signal. Setting any tap level to 0% turns it off.

Tap Pan sets the stereo position for a given tap’s output. The range is -100% for fully left, to 100% for fully right.

LFO Rate sets the speed of modulation of the delay lines with a range of 0.01 to 10 Hz.

LFO Dpth sets the maximum detuning depth of the LFO-modulated delay lines, with a range from 0 to 50 cents (= 1/2 semitone).

Tap Dly adds extra delay in front of the LFO modulated delay taps from 0 to 230 ms.

L/R Phase or **LFO n LRPhs** adjusts the relative phases of the LFOs for the left and right channels in the stereo Choruses.

Flanger

Flanging is the process of adding or subtracting a signal with a time-displaced replica of itself, which results in a series of notches in the frequency spectrum, generally referred to as a comb filter. In KSP8, the flanger is a multi-tap delay line, all (but one) of whose taps can have their lengths modulated up and down by a low frequency oscillator (LFO). The rate of the LFO is expressed in Tempo (see Chapter 4).

StatDlyLvl (Static Delay Level) is the level of the first, non-moving tap. Negative values invert the polarity of the tap. The range is -100 to 100%; 0% turns the tap off.

DlyCrs and **DlyFin** are the coarse and fine length controls for the Static delay (**StatDly...**) and for the minimum value of the moving delays (**Dly...**). The coarse range is 0 to 228 ms, and the fine range adjusts the coarse range in samples ($= 1/48,000 \text{ sec} = 20.8\mu\text{sec}$) from -127 to 127.

Xcurs Crs and **Xcurs Fin** determine how far the LFO-modulated delay taps can move from the center of their ranges. The total range of the LFO sweep is twice the excursion. If the excursion is set to 0, the LFO does not move and the tap behaves like a simple delay line set to the minimum delay. The coarse range is 0 to 228 ms; the range 0 to 5 ms is most effective for flanging. The fine range adjusts the coarse range in samples from -127 to 127.

Quantize + Flange

The Quantize portion of this algorithm produces digital distortion known as quantization noise, by limiting the number of bits available to the signal.

DynamRange (dynamic range) controls how many bits to remove from the signal data words. The lower the level, the greater the distortion. At 0 dB the hottest of signals will toggle between only two quantization levels, thereby producing a square wave. Every 6 dB added doubles the number of quantization levels, reducing the noise and getting closer to the original signal. If the signal has a lot of headroom (available signal level before digital clipping), then not all quantization levels will be reached. Range is 0 to 144 dB.

Headroom sets the available signal level before digital clipping. Setting this properly prevents the signal from getting ridiculously loud at low levels of DynamRange. You want to have it match the amount of level still available above the input signal: this is done by finding the DynamRange level at which the signal starts getting louder, and setting Headroom to match the DynamRange value. Range is 0 to 144 dB.

DC Offset adds a positive DC Offset to the input signal, which allows you to alter the position where digital zero is with respect to your signal. At low DynamRange settings, this can cause the output to “sputter”. Range is Off/-79.0 to 0.0 dB.

LaserVerb

LaserVerb is a new kind of reverb which produces a delayed train of closely spaced reflections, or impulses. As time passes, the spacing between the impulses gets wider, which creates a discernible buzzy pitch that gets lower as the spacing increases. The signal can be fed back into itself to extend the effect.

Dly Coarse is the overall delay length, which controls the duration or decay time. 0.5 sec is a good starting point. Range is 0 to 1.3 seconds in the 2 U version of the algorithm, and 0 to 2 seconds in the 3 U version.

Dly Fine adjusts the delay with a resolution down to 0.2 ms. Range is -20.0 to 20.0 ms.

Spacing determines the starting pitch of the descending buzz and how fast it descends, by setting the initial separation of impulses and the subsequent rate of increasing impulse separation. The spacing between impulses is given in samples ($20.8\mu\text{s}$). At low values, the buzz starts at high frequencies and drops slowly, while at high values the buzz starts at a lower pitch and drops rapidly. Range is 0.0 to 40.0 samples, with a resolution of 0.2 sample.

Contour controls the overall shape of the reverb. When set to a high value, sounds passed through the reverb start at a high level, and it slowly decays. As the control value is reduced, it takes more time for the effect to build up before decaying. At a value of around 34%, the reverb behaves like a reverse reverb, building up to a hit. When it is set to zero, the algorithm acts like a simple delay. Range is 0 to 100%.

Filters

There are four types of Resonant Filter algorithms in KSP8. All of them have these parameters in common:

Filter Type (or **FiltType**) can be Lowpass, Highpass, Bandpass, or Notch (band-cut).

Resonance is the resonance of the filter, adjustable from 0 to 50 dB.

Resonant Filter

Frequency (or **Freq**) is the fixed resonant frequency of the filter. Its range is 16 to 8372 Hz.

Envelope Filter

Envelope Filter is a resonant filter whose center frequency can be made to vary according to the level of the incoming signal.

Filter Type can be Lowpass, Highpass, Bandpass, or Notch (band-cut).

Min Freq is the minimum resonant frequency of the filter, that is, the filter frequency when the input gain is below the triggering threshold. Its range is 16 to 8372 Hz.

Sweep determines how far the resonant frequency moves when the input level increases. At positive levels it moves up in pitch, and at negative levels it moves down. The highest possible resonant frequency is 8372 Hz, the lowest is 0 Hz. This parameter's range is -100% to +100%.

Resonance is the resonance of the filter, adjustable from 0 to 50 dB.

Atk Rate adjusts the upward slew of the attack portion of the envelope detector. Range is 0 to 300.0 dB/sec.

Rel Rate adjusts the downward slew of the release portion. Range is 0 to 300.0 dB/sec.

Smooth Rate slows down the envelope follower. If it is set to a lower rate than **Atk Rate** or **Rel Rate**, it can dominate those parameters. Range is 0 to 300.0 dB/sec.

Triggered Filter

The Triggered Filter is a sweeping resonant filter that triggers when a certain input threshold is reached, and then follows its *own* envelope, consisting of an instantaneous attack and an exponential release, rather than the envelope of the input signal.

Max Freq is the resonant frequency of the filter at the peak of the internal envelope. It can be set lower than **Min Freq** (above), in which case the filter will sweep downwards, then back up. Range is 16 to 8372 Hz.

Trigger is the input-signal threshold at which the envelope detector triggers. Range is -79 to 0 dB.

Retrigger is the input-signal threshold at which the envelope detector resets, so that it can trigger again. This parameter is only useful when it is set below the value of Trigger. Range is from -79 to 0 dB.

Env Rate is the envelope detector decay rate. This can be used to prevent false triggering. When the signal envelope falls below the retrigger level, the filter can be triggered again when the signal rises above the trigger level. Since the input signal can fluctuate rapidly, it is necessary to adjust the rate at which the signal envelope can fall to the retrigger level. The range is 0 to 300.0 dB/sec.

Rel Rate is the downward slew (release) rate of the triggered envelope generator. The range is 0 to 300.0 dB/sec.

Smth Rate slows down the envelope follower. If set lower than the release rate, it will dominate it. You can also use the smoothing rate to lengthen the attack of the internal envelope. The range is 0 to 300.0 dB/sec.

LFO Filter

The LFO filter is continuously swept between two resonant frequencies over a period of time. The LFO frequency, expressed in BPM and beats, can be fixed or set to follow **System** tempo. (See Chapter 4 for information about tempo control of KSP8 parameters.)

Min Freq and **Max Freq** are the low and high limits of the resonant frequency as the filter is swept. You can set the Min Freq higher than the Max Freq, in which case the filter will sweep “upside down” relative to the controlling clock. The range for both is 16 to 8372 Hz.

LFO Shape is the waveform type for the LFO. Choices are Sine, Saw+, Saw-, Pulse, and Tri.

LFO PlsWid (Pulse Width). When the LFO Shape is set to Pulse, this sets the pulse width as a percentage of the waveform period. When the width is set to 50%, the result is a square wave. This parameter has no effect if other waveform types are chosen. Range is 0 to 100%.

LFO Smooth smooths (removes the higher harmonics from) the Saw+, Saw-, and Pulse waveforms. A Sawtooth wave becomes more like a triangle wave, and a Pulse wave becomes more like a sine wave. Range is 0 to 100%.

Distortion

Distortion algorithms on KSP8 may also include a parametric equalizer or a cabinet simulator.

Dist Drive applies a boost to the input signal to overdrive the distortion algorithm into soft clipping. This will tend to make the signal very loud, so you may have to reduce the Out Gain as this parameter is increased. Range is 0 to 96 dB.

Warmth is a lowpass filter in the distortion control path. This filter may be used to reduce some of the harshness of some distortion settings without reducing the bandwidth of the signal. Range is 16 to 25088 Hz.

Highpass allows you to reduce the bass content of the distortion content in the smaller distortion algorithms that don't have true parametric EQ. Range is 16 to 25088 Hz.

Cab Preset selects from eight cabinet simulations which have been created based on measurements of real guitar amplifier cabinets. The presets are: Basic, Lead 12, 2x12, Open 12, Open 10, 4x12, Hot 2x12, and Hot 12.

Cab Bypass switches on and off the cabinet-simulation part of the algorithm. When this is set to "In", the cabinet simulation is active; when it is "Out", there is no cabinet action.

Cabinet HP and **Cabinet LP** are highpass and lowpass filters to set the frequency response limits of the cabinets. Range of both filters is 16 to 25088 Hz.

Polydistort

This is a more complex distortion algorithm that provides two, four, or six stages of distortion.

Curve *n* controls the curvature of the individual distortion stages. 0% is no curvature (no distortion at all). At 100%, the curve bends over smoothly and becomes perfectly flat right before it goes into clipping. Maximum value is 127%.

LP *n* Freq are shelving frequencies for one-pole lowpass filters on each of the distortion stages. LP0 Freq handles the initial low pass prior to the first distortion stage. The other low pass controls follow their respective distortion stages. Range is 16 to 25088 Hz.

Rotating Speakers

An algorithm that includes Rotating Speakers breaks the signal into two frequency bands, "rotates" each band separately through a virtual speaker, and then combines the outputs with a pair of virtual "microphones" whose angle relative to the speakers is adjustable. A number of very sophisticated parameters have been included in the Rotating Speakers algorithm, to give the effect a great degree of realism. Because of the complexity of the algorithms, you might want to approach any parameters that seem a little obscure to you with caution.

Roto InOut engages or bypasses the rotary speaker effect.

There are four virtual microphones, with two each on the woofer (**LoMic A** and **LoMic B**) and on the tweeter (**HiMic A** and **HiMic B**). Each microphone has:

Pos (position), the angle of the microphone from the front of the virtual speaker, from -180 to 180 degrees;

Lvl (level) from 0 to 100%; and

Pan, the left/right panning of the microphone's output, from -100% (full left) to 100% (full right).

Other parameters:

Lo Beam W and **Hi Beam W** set the acoustic radiation patterns ("beam width") of the two drivers in the rotating speaker. If you imagine looking down on the rotating speaker, this is the angle between the -6 dB levels of the beam. The range is from 45° to 360°. At 360°, the driver is omnidirectional.

Xover (Crossover) is the frequency at which high and low frequency bands are split and sent to separate rotating drivers. The range is 16 to 25088 Hz.

Lo Gain and **Hi Gain** are the gains of the signal passing through the rotating woofer or tweeter, respectively. The range is Off/-79.0 to 24.0 dB.

Lo Size and **Hi Size** are the effective sizes (radius of rotation) of the rotating speakers in millimeters. This affects the amount of Doppler shift or vibrato of the low frequency signal. The range is 0 to 250 mm.

Lo Trem and **Hi Trem** control the depth of tremolo (amplitude modulation) of the signals. It is expressed as a percentage of full scale tremolo. The range is 0 to 100%.

LoResonate and **HiResonate** are simulations of cabinet resonant modes expressed as a percentage. For realism, you should use very low settings. The range is 0 to 100%.

Lo Res Dly and **Hi Res Dly** are the number of samples of delay in each resonator circuit in addition to the rotation excursion delay. The range is 10 to 2550 samples.

LoResXcurs and **HiResXcurs** are the number of samples of delay to sweep through the resonator at the rotation rate of each rotating speaker. The range is 0 to 510 samples.

ResH/LPhs sets the relative phases of the high and low resonators. The angle value in degrees is somewhat arbitrary and you can expect the effect of this parameter to be rather subtle. The range is 0 to 360.0 degrees.

Mic Angle is the angle of the virtual microphones in degrees from the "front" of the rotating speaker. For the left microphone the angle increases clockwise (when viewed from the top), while for the right microphone the angle increases counter-clockwise. Assigning a MOD to this parameter should be done with caution: real-time adjustments to it will result in large sample skips, which will cause clicks in the signal passing through. The range is 0 to 360.0 degrees. (In **Distort + Rotary** only.)

The following parameters relate to rotation speed:

Speed sets the rotating speakers to run at either the slow rate or the fast rate.

Brake, when set to "On", slows the rotating speakers to a halt.

Lo Mode, in the "Normal" setting, will give you full control of the low frequency speaker with the Speed parameter. The "NoAccel" setting will hold the low frequency speaker at the slow speed, and the Speed parameter will have no effect on its speed, though Brake will still work. In the "Stopped" position, the low frequency speaker will not spin at all.

Lo Slow and **Hi Slow** are the rotation rates in hertz (Hz) of the speakers when Speed is set to "Slow".

Lo Fast and **Hi Fast** are the rotation rate in hertz (Hz) of the speakers when Speed is set to "Fast".

LoSlow>Fst and **HiSlow>Fst** are the times for the speakers to accelerate from the slow speed to the fast speed.

LoFst>Slow and **HiFst>Slow** are the times for the speaker to decelerate from the fast speed to the slow speed.

LoAccelCrv and **HiAccelCrv** are the shapes of the acceleration curves for the speakers. 0% is a constant acceleration. Positive values cause the speaker to speed up slowly at first then quickly reach the fast rate. Negative values cause a quick initial speed-up then slowly settle in to the fast speed. If set to a low negative value, it will overshoot.

LoSpinDir and **HiSpinDir** are the directions of rotation of the speakers. The choice is clockwise (CW) or counter-clockwise (CCW).

Vibrato/Chorus

The Vibrato/Chorus algorithm (and also the KB3 Effects algorithm) simulates the vibrato and chorus effects on a tone wheel organ, and is used in conjunction with the Rotary Speaker. It has several unique parameters:

VibChInOut is an in/out switch for the Vibrato/Chorus effect.

Vib/Chor is the type of Vibrato/Chorus effect to be used. The choices are from three vibratos, "V1", "V2", "V3", or three choruses, "C1", "C2", "C3".

Tremolo and AutoPan

Tremolo is amplitude modulation using an LFO. AutoPan moves the signal between the left and right channels, using an LFO. They have several parameters in common and several unique ones.

LFO Rate is the rate of the LFO. The range is 0 to 10.00 Hz, or in Tremolo BPM algorithm, 0 to 12.00 x the tempo.

Rate Scale multiplies the speed of the LFO rate into the audio range. The range is 1 to 25088 x. When above 16x, the values increment in semitone steps. When the LFO Rate is set to 1.00 Hz, the value of this parameter is equal to the LFO frequency in Hertz.

LFO Shape is the waveform type for the LFO. Choices are Sine, Saw+, Saw-, Pulse, and Tri.

LFO PlsWid or **Pulse Width**. When the LFO Shape is set to Pulse, this sets the pulse width as a percentage of the waveform period. When the width is set to 50%, the result is a square wave. This parameter has no effect if other waveform types are chosen. Range is 0 to 100%.

AutoPan

Origin determines the axis for the panning motion. At 0%, the panning is centered between the speakers. Positive values shift the axis to the right, while negative values shift it to the left. At -100% or +100% (the range limits), there is no panning action.

ImageWidth is the width of the original input program material before it is auto-panned. At 0% (minimum), the input image is shrunk to a single point source, allowing maximum panning excursion. At 100% (maximum), the original width is maintained so no panning can occur.

Pan Width controls the amount of pan excursion. It is the percentage of total panning motion available after Origin and ImageWidth are set. Range is 0 to 100%.

CentrAtten (Attenuation) is the amount the signal level drops as it is panned through the center of the stereo image. For the smoothest tracking, a widely accepted subjective reference is -3dB. Values above -3dB will cause somewhat of a bump in level as an image passes through the center, while values below -3dB will cause a dip. Range is -12 to 0 dB.

Tremolo

Depth controls the amount of attenuation applied when the LFO is at its deepest excursion point. Range is 0 to 100%.

LFO Phase shifts the phase of the tremolo LFO relative to the beat reference. Range is 0.0 to 360.0 degrees.

50% Weight is the relative amount of attenuation added when the LFO is at the -6dB point. This causes the LFO shape to bow up (positive values) or down (negative values). Range is -16 to 3 dB.

L/R Phase sets the phase relationship of the channels. "In" flips the left channel's LFO out of phase, with the result that the effect turns into an auto-balancer. "Out" leaves the left LFO alone.

Pitcher

Pitcher applies a filter to the input signal which has a series of peaks in the frequency response. These peaks are normally adjusted so that their frequencies are all multiples of a specific, selectable frequency, which imposes a strong sense of pitch at the selected fundamental frequency.

Pitch. The fundamental pitch imposed upon the input, in MIDI note numbers from C-1 to G9.

Ptch Offst is an offset from the pitch frequency in semitones, from -12.0 to 12.0. It can be useful to assign pitch bend, a ribbon, or another continuous controller to this parameter through a MOD.

Odd Wts, Pair Wts, Quartr Wts, Half Wts are parameters that control the shape of the frequency response of Pitcher. An exact description of what each one does is, unfortunately, impossible, since there is a great deal of interaction between them. For more information and examples, see the *KSP8 Algorithm Reference Guide*.

Ring Modulation

Ring modulation multiplies two signals (the "carrier" and the "modulator") together to produce unusual, often non-harmonic, overtones. The Ring Modulator algorithm in the KSP8 has two modes: "L*R" in which two mono signals are modulated together; and "Osc", in which the input is stereo, and it is modulated with the sum of five waveforms that are generated from oscillators within the algorithm itself. Four of these oscillators are sine waves, while one (Oscillator 1) offers a selection of waveforms.

Wet/Dry. When the algorithm is in "L*R" mode, this controls how much of the left signal only is passed dry (the right signal isn't passed dry at all).

Mod Mode selects between the two modes.

Osc1 Lvl is the level of Oscillator 1, from 0 to 100%.

Osc1 Freq is the frequency of Oscillator 1, from 16 to 25088 Hz.

Osc1 Shape is the waveshape of Oscillator 1, selectable from Sine, Saw+, Saw-, Pulse, and Tri.

Osc1PlsWid (Pulse Width). When **Osc1 Shape** is set to Pulse, this sets the pulse width as a percentage of the waveform period. When the width is set to 50%, the result is a square wave. This parameter has no effect if other waveform types are chosen. Range is 0 to 100%.

Osc1Smooth smooths (removes the higher harmonics from) the Saw+, Saw-, and Pulse waveforms. A Sawtooth wave becomes more like a triangle wave, and a Pulse wave becomes more like a sine wave. Range is 0 to 100%.

The other four oscillators, **Sine2** through **Sine5**, each have **Lvl** and **Freq** controls.

Stereo Simulation

The Mono to Stereo algorithm converts a monaural input to simulated stereo output.

In Select selects the input signal to be “stereo-ized”. It can be Left, Right, or both: $(L+R)/2$.

CenterGain is the level of the summed left and right channels. Range is Off/ -79.0 to 24.0 dB.

Diff Gain is the level of the difference signal produced, which is the spatial component of the stereo signal. Range is Off/ -79.0 to 24.0 dB.

DiffBassG controls the gain of a bass-shelf filter on the difference signal. By boosting the low frequency components of the difference signal, you can increase the sense of acoustic envelopment. Range is -79.0 to 24.0 dB.

DiffBassF is the transition frequency for the bass-shelf frequency. Range is 16 to 25088 Hz.

The processed signal is split into three frequency bands—Lo, Mid, and High—each of which can be delayed and panned separately.

Crossover1 and **2** are the two Crossover frequencies at which the band-split filters split the signal into three bands. The two parameters are interchangeable: either may have a higher frequency than the other. Range is 16 to 25088 Hz.

Pan [High/Mid/Low] sets the pan position for each band. Range is -100% (fully left) to 100% (fully right.)

Delay [High/Mid/Low] sets the delay for each band. Range is 0 to 1000 ms.

Stereo Image

This algorithm provides enhancement for a stereo signal. It also features a stereo correlation meter. It uses some parameters from **Mono to Stereo** and some from **Stereo Analyze** (following).

Stereo Analyze

In this algorithm you can look at the two channels of a stereo signal, and also their inversions, sums, and differences. You can adjust their gains, and apply small delays to either or both channels.

L Invert and **R Invert** inverts the phase of the channels.

L Out Mode and **R Out Mode** determines which signal is going to be metered and sent to the output of each of the channels. The choices for each are: “L” (left), “R” (right), “ $(L+R)/2$ ” (normalized sum), “ $(L-R)/2$ ” (normalized difference), and polarity inverted versions of these.

L/R Delay “time balances” the two signals. At negative values, the right channel is delayed, while at positive values, the left channel is delayed. The range is -500 to 500 samples.

RMS Settle controls how fast the RMS (average-reading) meters can rise or fall with changing signal levels. Range is 0 to 300 dB/second.

FXMod Diagnostic

This algorithm allows you to view the current levels of any data sliders, MIDI controls, switches, or internally generated VAST LFOs, ASRs, FUNs, etc. which are available as modulation sources. It has no effect on any signal being routed through it.

Up to eight modulation sources may be monitored simultaneously. Meters #1 through #4 can monitor bipolar sources, meaning sources that can have both positive and negative values. The range of the bipolar meters is -1 to +1. Four monopolar meters #5 through #8 provide better resolution, but the range is limited to 0 though +1. Use the monopolar meters for sources which you do not expect to go negative.

Eight parameters are provided to connect modulation sources to the meters. The parameter values are fixed at "NoDpth" and have no function except to connect sources to meters.

To use the algorithm, save a stereo preset containing the algorithm, then a chain containing that preset. Go to one of the Chain MOD pages, and choose one of the meter parameters (Bipole N or Monopole N). You will not be able to modify the Adjust or Depth fields, but you can select any source you want. You can view the meters on PARAM page 2.

Bipole1 through **Bipole4** attach bipolar modulation sources (those that can go positive or negative) to the bipolar meters. The parameters are not adjustable.

Monopole5 through **Monopole8** attach monopolar modulation sources (can go positive only) to the monopolar meters. The parameters are not adjustable.

Mono Algorithms

Many stereo algorithms are also available in a mono configuration. Refer to the *KSP8 Algorithm Reference Guide* for complete information on Mono algorithm parameters. You can download a copy of this manual at the Kurzweil Music Systems web site (www.kurzweilmusicsystems.com).

5.1 Surround Sound Algorithms

Refer to the *KSP8 Algorithm Reference Guide* for complete information on surround algorithm parameters. You can download a copy of this manual at the Kurzweil Music Systems web site (www.kurzweilmusicsystems.com).

Chapter 9

Controlling the KSP8 in Real Time

Sending MIDI Program Change Messages to the KSP8

You can send MIDI Program Change messages to your KSP8 to select studios, chains, or presets. The KSP8 understands Kurzweil's Extended Program Change Type, with either Bank Select Controller 0 or Bank Select Controller 32. This is all pretty standard, by the way, so you may not need to make any special adjustments on your MIDI controller. What you do need to be careful about, however, are the MIDI channels on which you transmit the Program Change messages. The channel will determine the object, as well as the type of object, that you select with the Program Change message. (This is probably a good place to point out that, unless you've got a good reason, you shouldn't set two or more buses to the same MIDI channel, or to the same channel that you've set as your studio channel.)

Here's how you can select different objects with MIDI Program Change messages:

- **Studios** – Send a Program Change message on the MIDI channel set as StudioChanl on the MASTER page to activate the studio with the number of the Program Change.
- **Chains and Presets** – Send a Program Change message on the MIDI channel set as MIDICH on one of the current buses to select the object with the number of the Program Change. This will select either a chain or a preset, depending on the setting of the Type parameter on the FXBUS page. You cannot change the Type parameter via MIDI.

QUICKs and MODS for MIDI control

Quicks and MODs give you real-time MIDI control over the values of selected KSP8 parameters. The KSP8 offers two types of each: studio quicks and mods and chain quicks and mods. They are summarized in this chapter, and described in detail elsewhere in this manual.

Studio QUICKs

Studio QUICKs provide fast access to eight algorithm parameters. The parameters and their settings are saved as part of a studio object. The QUICK page must be displayed on the KSP8 for its parameters to be available.

Chain QUICKs

Chain QUICKs provide fast access to eight algorithm parameters. The parameters and their settings are saved as part of a chain object. The QUICK page must be displayed on the KSP8 for its parameters to be available.

Studio MODs

Studio mods control the gain, frequency, and level values of sends, EQs and outputs. They do not control effect parameters. The parameters and their settings are saved as part of a studio object.

Chain MODs

Chain mods provide control over the parameter values of effects in a chain. They allow the most extensive real-time control of KSP8 effects. The parameters and their settings are saved as part of a chain object.

QUICK and MOD Reference Chart

This chart illustrates the primary features of the different types of QUICKs and MODs.

	QUICKs		MODs	
	Studio	Chain	Studio	Chain
What they do:	Control up to eight algorithm parameters per preset.		Control the value of EQs, sends, and OUT-LVL.	Control the value of any algorithm parameter.
How to get to:	Press QUICK soft button on any Studio page.	Press edit button while on Studio:FXBUS page and type is chain, or press QUICK soft button while within Chain editor.	Press S MOD soft button while on any studio page.	Press C MOD soft button while within Chain editor.
Local control:	Select parameters and values from KSP8 front panel.		Set values from KSP8 front panel.	
Remote control:	MIDI controllers 16-19 and 80-83 only		Set Source parameter on MOD page for any MIDI controller	
MIDI channels	MIDI controller must transmit on channel set by MIDICH on any active Studio:FXBUS page, or on channel set by StudioChanl on Master page.	MIDI controller must transmit on channel set by MIDICH on any active Studio:FXBUS page, or on channel set by StudioChanl on Master page.	MIDI controller must transmit on channel set by StudioChanl on Master page.	MIDI controller must transmit on channel set by MIDICH on Studio:FXBUS page.
Special features:	Can choose values for any eight parameters.		Intuitive entry detects MIDI controller on any channel while MOD page is displayed and enter key is pressed.	
Saved with:	Studio	Chain	Studio	Chain
Usage notes:	The QUICK page must be displayed on the KSP8 for its parameters to be available. Cannot change a Chain MOD override from Studio QUICK page.	The QUICK page must be displayed on the KSP8 for its parameters to be available.		For real-time MIDI control of a single preset, create a chain with a single box containing that preset.

LFOs

The KSP8 provides you with LFOs (low frequency oscillators) to use as control sources. You program these on the LFO pages (Studio or Chain), which you can reach by pressing the **S LFO** soft button, or within a chain by pressing the **C LFO** button.

You'll use the LFO page to define the behavior of the LFOs. LFOs are periodic (repeating) control sources. The basic elements are the rate and shape, which define how frequently the LFO repeats, and the waveform of the modulation signal it generates.

With the KSP8, you can set upper and lower limits on each LFO's rate, and assign a control source to change the LFO's rate in realtime, if you wish.

Because of its periodic nature, the LFO is perfect for creating effects like vibrato (cyclic variation in pitch) and tremolo (cyclic variation in amplitude). When you're editing LFOs, or any control source, remember that it must be assigned to control some parameter before you'll hear the effects of your edits.

```

Studio's LFO
-----
MnRate: MxRate: RateCt: Shape: Phase:
LFO1:  2.00H  0.00H  OFF  Sine  0deg
LFO2:  0.00H  0.00H  OFF  Sine  0deg
LFO3:  2.00H  0.00H  OFF  Sine  0deg
LFO4:  0.00H  0.00H  OFF  Sine  0deg
<more>  S LFO  S ASR  S FUN  S FUNZ  >more>

```

There are five parameters for each of the LFOs.

PARAMETER	RANGE OF VALUES	DEFAULT
MINIMUM RATE	0 to 24 Hz	2.00 (OFF for LFO2)
MAXIMUM RATE	0 to 24 Hz	0.00
RATE CONTROL	Control Source list	OFF
LFO SHAPE	LFO Shape list (Ref. Guide)	Sine
LFO START PHASE	0, 90, 180, 270 degrees	0

Minimum Rate

This is the slowest rate at which the LFO will run. When its Rate control is set to OFF, or when the control source assigned to it is at its minimum, the LFO runs at its minimum rate.

Maximum Rate

This is the fastest possible rate for the LFO. When its Rate control is set to ON, or when the control source assigned to it is at its maximum, the LFO runs at its maximum rate.

Rate Control

Assign any control source in the list to modulate the LFO's rate between its minimum and maximum. A continuous control like the Mod Wheel is a natural choice, enabling you to get just about any rate between min and max. But you can use a switch control too, to get just the min or max with nothing in between. Assigning MPress as the rate control for an LFO vibrato gives you an easy way to increase the vibrato rate in realtime, as you can on many acoustic instruments.

LFO Shape

The shape of the LFO waveform determines the nature of its effect on the signal its modulating. There are diagrams of each LFO shape in the appendices of this manual; these will give you an idea of how each LFO shape affects the signal.

LFO Phase

Use this parameter to determine the starting point of the LFO's cycle. One complete cycle of the LFO is 360 degrees. 0 degrees phase corresponds to a control signal value of 0, becoming positive. Each 90-degree increment in the phase represents a quarter-cycle of the LFO.

When an LFO is local, the phase parameter gives you control over the starting point of the LFO for each note (for example, you could make sure every vibrato started below the pitch you played instead of at the pitch you played). The LFO's phase also affects global LFOs, although it's often indistinguishable, since global LFOs start running as soon as the program containing them is selected, even if you don't play any notes.

ASRs

An ASR is a three-section unipolar envelope—attack, sustain, and release. The KSP8's ASR can be triggered by a programmable control source, and can be delayed. ASRs are frequently used to ramp the depth of pitch or amplitude in a vibrato or tremolo, enabling delays in those effects. The ASR page consists of two rows of five parameters, one row for each of the ASRs.

```

Studio8 ASR
ASR1:  Trig:  Mode:  Delay:  Attack:  Releas:
ASR1:  ON     Hold  1.00s  1.00s  1.00s
ASR2:  ON     Rept  1.00s  1.00s  1.00s
ASR3:  ON     Rept  1.00s  1.00s  1.00s
ASR4:  ON     Rept  1.00s  1.00s  1.00s
<more  S LFO  S ASR  S FUN  S FUN2  more>
    
```

PARAMETER	RANGE OF VALUES
TRIGGER	Control Source list
MODE	Normal, Hold, Repeat
DELAY	0 to 60 seconds
ATTACK	0 to 60 seconds
RELEASE	0 to 60 seconds

Trigger

This defines the control source that starts the current layer's ASRs. The ASR starts when the trigger switches from off to on. If the Trigger parameter is set to ON, global ASRs will run as soon as the program containing it is selected. Switch controls are better suited for ASR triggers because of their binary (on/off) nature. A continuous control will trigger the ASRs when its signal value is above its midpoint.

Mode

This parameter sets the sustain section of the ASR. The ASR's mode determines what the ASR does when it finishes its attack section. If the Mode parameter is set to Normal, the ASR will run directly from its attack section to its release section (no sustain). At a setting of Repeat, the ASR will cycle through the attack and release sections, then loop forward and cycle through again until the ASR's trigger switches off. If the mode is set to Hold, the ASR maintains its position at the end of the attack section until the ASR's trigger switches off. The ASR then goes into its

release section. If the ASR's trigger switches off before the attack section is complete, the ASR goes directly to its release section.

Delay

When the ASR's trigger switches on, the ASR will start immediately if this parameter is set to zero. Non-zero values will cause a corresponding delay between the ASR trigger and the start of the ASR.

Attack

This defines how long the ASR takes to ramp up from minimum to maximum effect on whatever it's patched to.

Release

This defines how long the ASR takes to fade to minimum from its maximum. If the ASR's trigger switches off before the ASR has reached maximum, the ASR releases from that level.

FUNs

The name "FUNs," although it sounds like a pun, is simply the best abbreviation for "Function." You'll definitely have a good time with them, however, if you're looking for a variety of ways to control your sounds.

By setting up a FUN as a control source, you can mix the signals of two control sources, and perform one of 50 functions on the combined signals. The result of that function becomes the new control source value. Because the FUNs can radically change the combined input values, the FUNs can have a profound effect on your sounds.

You may find that experimenting with the various FUN equations gives you a better idea of their effects than reading the explanations. Although there's a great deal of mathematics behind the FUNs, the most important consideration is how they affect your sounds. The more you play around with them, the better you'll understand how powerful they are.

The Mechanics of Control Sources

The KSP8's control sources use their own internal signal format for interpreting control messages. Every control source sent to the KSP8 is translated to a value in the range from -1 to +1. This consistency enables the KSP8 to process control source signals very efficiently. Conversely, the KSP8's internal control source signals are translated to MIDI values before being sent to the MIDI Out port.

A control signal value of 0 represents minimum effect; it's equivalent to the control source being turned off or disconnected. A control signal value of +1 represents the maximum positive effect of a control source, while a value of -1 represents the maximum negative effect of a control source.

Unipolar and Bipolar Control Sources

There are two kinds of control source signals: unipolar and bipolar. A unipolar signal has a value between 0 and +1. A bipolar signal has a value between -1 and +1.

A switch pedal is unipolar; its control signal value will never go below 0. Since it's a switch control, it has only two possible values: 0, which corresponds to off or minimum, and +1, which corresponds to on or maximum. When you depress your MIDI controller's sustain pedal, for example, it sends a control signal value of +1 to the KSP8's sound engine.

Continuous controls can be unipolar or bipolar. Consider your MIDI controller’s Mod and Pitch Wheels as examples. Normally, the Mod Wheel affects the KSP8 as a unipolar control source; it sends a control signal value that’s interpreted as 0 when it’s fully down, and values interpreted between 0 and +1 as you push it up. When fully up, it sends a value that’s interpreted as +1. It can be used as a bipolar control source by assigning a value of Bi-Mwl to any control source parameter.

The Pitch Wheel is normally bipolar; it sends a control signal value that’s interpreted as 0 when it’s centered, values interpreted between 0 and -1 as it’s pulled downward, and values interpreted between 0 and +1 as it’s pushed upward. It can be used as a unipolar control source by assigning a value of AbsPwl to any control source parameter.

The FUNs can act as unipolar or bipolar control sources; it depends on the values of the input signals and the nature of the function you choose. Depending on the function you choose to process the input signals, the output signal value can exceed +1 or -1. Normally the signal merely pins at +1 or -1; that is, it won’t go any higher or lower. In some cases, however, the output signal value is wrapped around instead of pinning; we’ll mention these cases as we get to them. You can assume that the output signal values of the functions listed below will pin at -1 or +1, unless specified otherwise.

Programming the FUNs

Start by pressing the **S FUN** or **S FUN2** soft button (if you’re editing a studio) or the **C FUN** or **C FUN2** button (when you’re editing a chain) to select the FUN page. Setting up a FUN as a control source is a two-step process: assigning a FUN as the value for one or more control source parameters in the chain or studio editor, then programming the FUN on the FUN page, by assigning control sources to two inputs—**a** and **b**, and choosing a function (equation) that will process the combined signals from **input a** and **input b**.

```
Studio:S FUN
FUN1: OFF OFF a+b
FUN2: OFF OFF a-b
FUN3: OFF OFF (a+b)/2
FUN4: OFF OFF a/2+b
<more S LFO S ASR S FUN S FUN2 more>
```

There are a bunch of FUNs; you can combine and process two different pairs of control source signals. There are three parameters for each FUN. Inputs **a** and **b** can be any control source from the Control Source list or a provided numeric value. The control sources you want to combine are the ones you’ll assign as the values for these parameters.

The Function parameter determines what mathematical function is applied to the two inputs. When a FUN has been assigned as a control source, the KSP8 reads the values of the two control sources defined as Inputs **a** and **b**. It then processes them according to the setting for the Function parameter, and the resulting value is the FUN’s output.

Trying Them Out

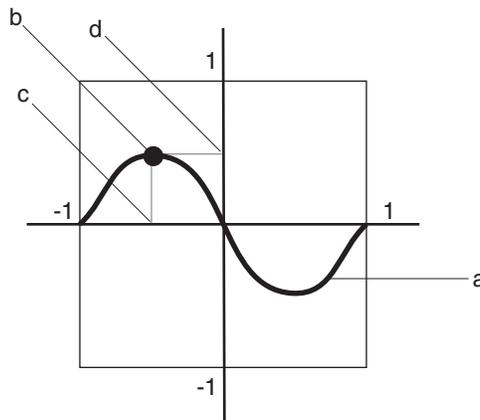
The best way to understand the use of the FUNs is to set up a simple test model, then plug in the different equations and listen to their effects.

The FUN Equations

In this section we'll describe how each of the FUN equations works. In some cases, a small graph will accompany the explanation. Here's how to interpret the graphs.

Each graph shows a curve illustrating the effect of the equations on the input signals. The horizontal axis represents the possible values of the input to the FUN (the combined control signals of **inputs a** and **b**). The vertical axis represents the possible values of the FUN's output signal. The four elements in the diagram below show you how to read these graphs:

- the curve representing the effect of the FUN's equation on every possible input value
- one point on that curve, representing a single input value and the corresponding output value generated by the FUN's equation
- the input value represented by the point
- the output value represented by the point



For any point on the equation's curve, you can determine the input value by tracing a line from the point to the horizontal axis. Similarly, you can determine the output value by tracing a line from the point to the vertical axis. For the point shown in the example above, the combined values of the control signals of **inputs a** and **b** equal about -0.5 , which translates to an output value of $+0.5$. An input value of -1 gives an output value of 0 , as do input values of 0 and $+1$. An input value of $+0.5$ gives an output value of -0.5 .

The List of Equations

The first six equations are weighted sums and differences—that is, the signal values of **inputs a** and **b** are added to or subtracted from each other, and are divided in turn by various amounts to alter their effects relative to each other. These equations give you several different types of mixers for combining the signals of the two inputs.

a + b

The values of **inputs a** and **b** are added, creating a simple mixer.

a - b

This operates similarly to the previous equation, but the value of **input b** is subtracted from the value of **input a**. This equation will reverse the normal effect of the control source assigned to **input b**. For example, if **input a** is off, and **input b** is assigned to a unipolar control source like MWheel, then the Mod Wheel will generate a control signal of -1 when fully down, and 0 when fully up.

(a + b) / 2

The values of **inputs a** and **b** are added, and the sum is divided by 2. This gives you the same kind of control as the previous two equations, but the output signal will reach +1 or -1 half as often as with the equation a + b.

a / 2 + b

The value of **input a** is divided by 2, and the result is added to the value of **input b**. **Input a** has half the effect of **input b**.

a / 4 + b / 2

The value of **input a** is divided by 4, and the value of **input b** is divided by 2. The two results are added to give the output value. **Input a** has half the effect of **input b**, and the total result has half the effect of the previous equation.

(a + 2b) / 3

The value of **input b** is multiplied by 2, and the result is added to the value of **input a**. This sum is then divided by 3. **Input a** has half the effect of **input b**, and the total result has somewhat more effect than the previous equation, but less effect than a + b.

a * b

The values of **inputs a** and **b** are multiplied.

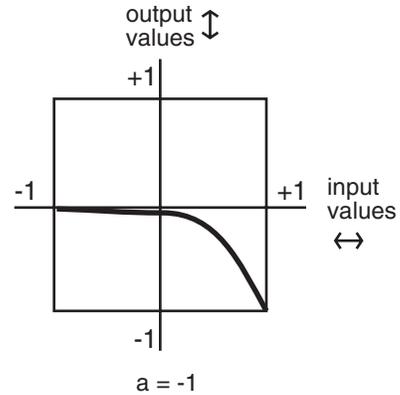
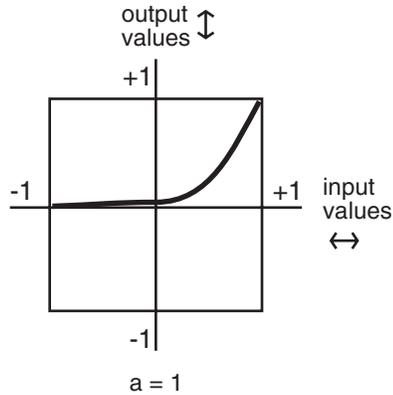
-a * b

The value of **input a** is multiplied by -1, then multiplied by the value of **input b**. This will reverse the normal effect of the control source assigned to **input a**.

a * 10^b

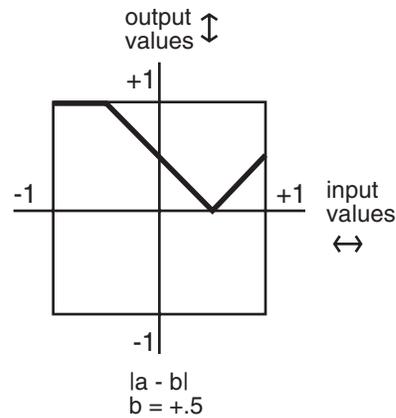
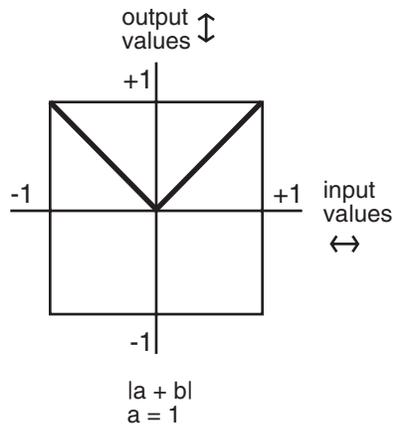
The actual equation is: $a \times (10^{(2 \times b)} \div 100)$. This is an exponential curve. 10 is raised to the (2 x b) power, then divided by 100. This result is then multiplied by a. Another way to express this is as follows: a change of 1 in the value of input b results in a hundredfold change in the output value. Here are a few possible output values:

Input values	Output values
a = +1, b = +1	+1
a = +1, b = 0	.01
a = +1, b = -1	.0001
a = 0, b = +1	0
a = 0, b = 0	0
a = 0, b = -1	0
a = -1, b = +1	-1
a = -1, b = 0	-.01
a = -1, b = -1	-.0001



| a + b |

The values of **inputs a** and **b** are added, and the absolute value of the sum is taken. If the sum is negative, it is multiplied by -1. This makes the FUN a unipolar control source. (See the illustration on the following page.)



| a - b |

The value of **input b** is subtracted from the value of **input a**, and the absolute value is taken. If the difference is negative, it is multiplied by -1. This also makes the FUN unipolar.

min (a, b)

The values of **inputs a** and **b** are compared, and the smaller value becomes the output value. This can be used to limit the value range of a control source. If, for example the value of the control source assigned to **input b** is left at +.5, then when the value of the control source assigned to **input a** is between -1 and +.5, its value will be used. As soon as its value exceeds +.5, the value of **input b** is used.

max (a, b)

This is the opposite of the previous equation. The values of **inputs a** and **b** are compared, and the larger value becomes the output value.

Quantize b to a

This turns the control source assigned to **input b** into a stepped control source. Instead of smooth transitions from minimum to maximum, it will jump from minimum to maximum in some number of equal steps. The number of steps is determined by the value of **input a**. The normal realtime application of this is to set a stationary value for input a to set the number of steps in the effect. Then use the control source assigned to **input b** as a realtime control to induce the stepped effect. Changing the value of **input a** in realtime will produce an extraneous (but possibly useful) effect.

Range of values for input a		Total number of steps as input b moves from min to max	
from	to	(when input b is bipolar)	(when input b is unipolar)
0	.0625	1 (no effect)	1
.0625	.125	2	1*
.125	.1875	3	2
.1875	.25	4	2*
.25	.3125	5	3
.3125	.375	6	3*
.375	.4375	7	4
.4375	.5	8	4*
.5	.5625	9	5
.5625	.625	10	5*
.625	.6875	11	6
.6875	.75	12	6*
.75	.8125	13	7
.8125	.875	14	7*
.875	.9375	15	8
.9375	1	16	8*

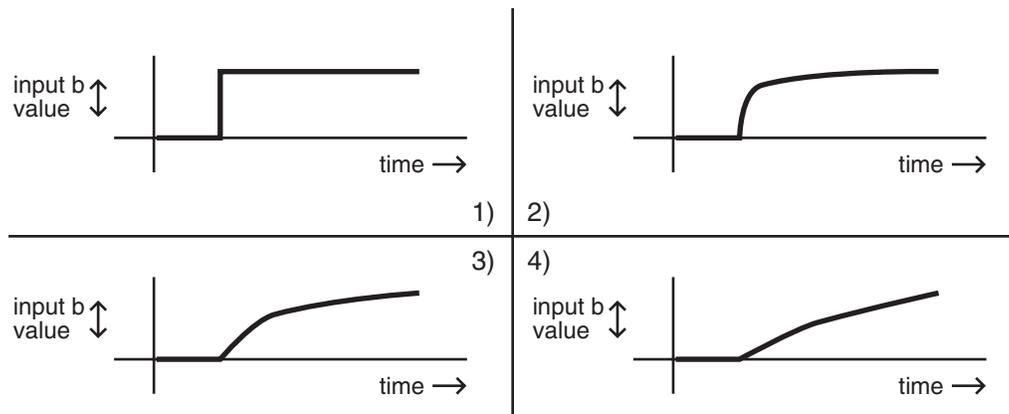
If the value of **input a** is negative, it's multiplied by -1, so its value always falls within the ranges above. When **input b** is bipolar and the resulting number of steps is an odd number, the steps are centered around a value of 0—that is, the center step is equivalent to no effect from **input b**. When the number of steps is even, a value of zero is not included in the steps. This is also true for the values marked by an asterisk when input b is unipolar.

lowpass (f = a, b)

This equation might be called a lag equation. Its effect is to introduce a delay in the KSP8's response to changes in the value of **input b**. It works by filtering (reducing) higher values of **input b**. The value of **input a** determines the degree to which the values of **input b** are filtered. Low values for **input a** will induce a long lag when the value of **input b** changes. High values will shorten the lag. When **input b** remains constant at a high level, low values of **input a** will cause the FUN to sweep up slowly from 0 to the value of **input b**. Higher values for **input a** will cause the FUN to sweep more rapidly.

The four graphs below show the effect of different values for **input a** on the change of **input b**. In each graph, the value of **input b** jumps from 0 to +1. In graph 1, the value of **input a** is +1. Each successive graph represents the same change in the value of **input b**, at successively lower values for **input a**.

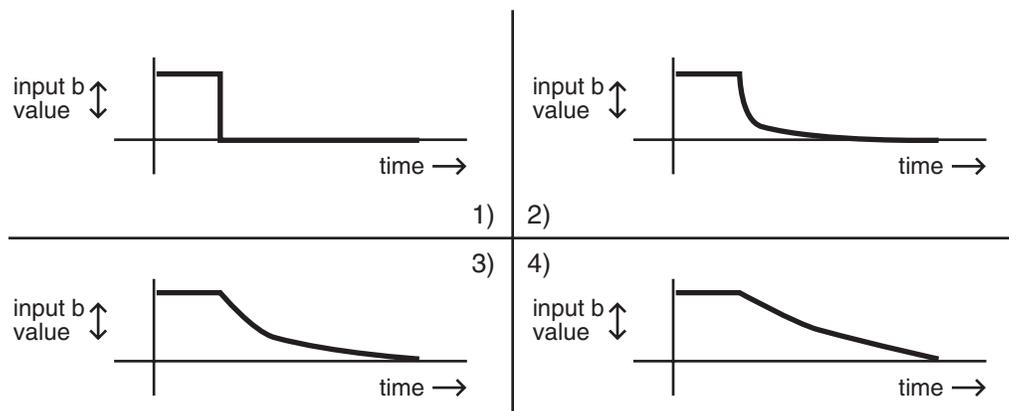
This equation works as intended only when the value of **input a** is 0 or positive. Negative values for **input a** will result in a much less predictable response than positive values. You might like the effect, but it won't be anything like what we've just described.



hipass (f = a, b)

With this equation the low values of **input b** are filtered according to the value of **input a**. This causes somewhat different results compared with the lowpass equation above. At low values for **input a**, low values for **input b** will have little effect, while high values for **input b** will cause the FUN to quickly reach full effect then slowly sweep down to its starting level. At high values for **input a**, a rapid change in the value of **input b** will have little effect. At low values for **input a**, rapid changes in the value of **input b** will cause the FUN to respond quickly to the change, then slowly fade back to minimum effect. Listening to the effects at different values for each input will give you the best understanding.

The four graphs below show the effect of different values for **input a** on the change of **input b**. In each graph, the value of **input b** drops from +1 to 0. In graph 1, the value of **input a** is +1. Each successive graph represents the same change in the value of **input b**, at successively lower values for **input a**.



$b / (1 - a)$

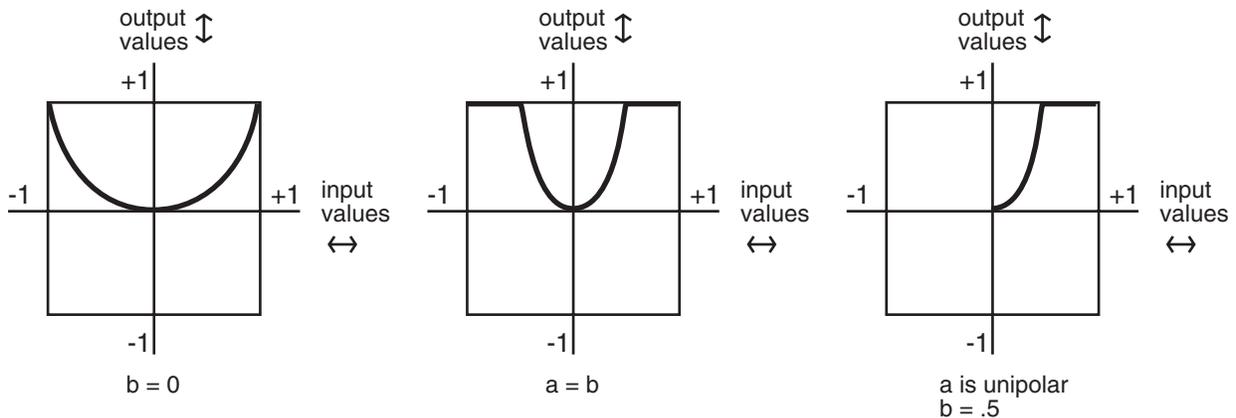
This is another weighted difference equation similar to the first six. The value of **input a** is subtracted from 1. The value of **input b** is then divided by the difference. You'll get considerably different results for different input values of **a** and **b**.

a(b-y)

Think of this equation as reading “y is replaced by the result of the function a(b-y).” The value of y indicates the value of the FUN’s output signal. Every 20 milliseconds, the KSP8 takes the current value of y, runs the equation, calculates a new value of y, and inserts the new value into the equation. Consequently the value of y will change every twenty milliseconds. Here’s an example. When you play a note, the KSP8 starts running the FUN. The first value for y is always 0. We’ll assume the value of **input a** is +.5, and the value of **input b** is +1. The first time the KSP8 evaluates the FUN, the result of the equation is $.5 \times (+1 - 0)$, or .5. So the FUN’s output value after the first evaluation is .5. This becomes the new value for y, and when the KSP8 does its next evaluation of the FUN, the equation becomes $.5 \times (+1 - .5)$, or .25. The resulting output value is .25, which becomes the new value for y. For the next evaluation, the equation is $.5 \times (+1 - .25)$, or .375.

(a + b)^2

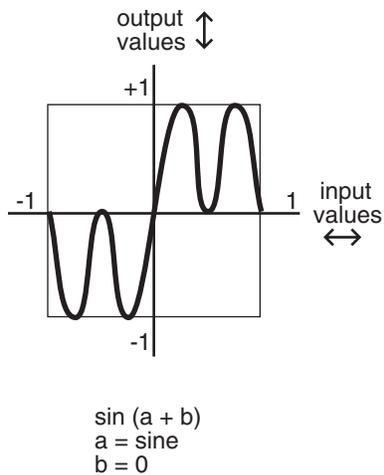
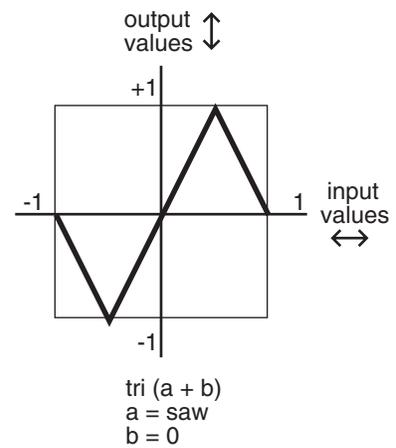
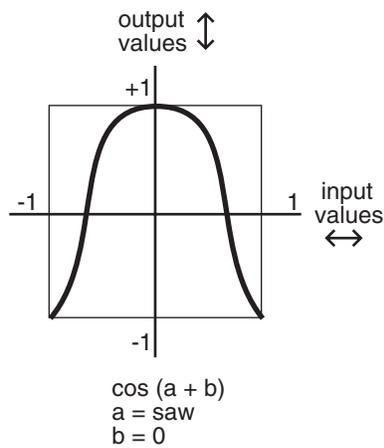
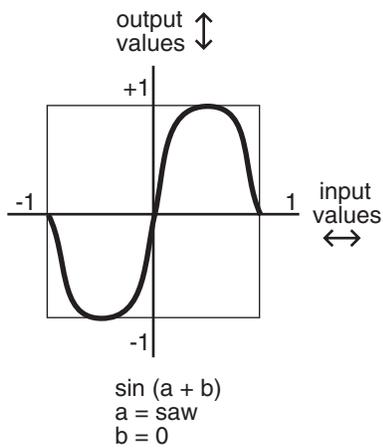
The values of **inputs a** and **b** are added, and the result is squared (multiplied by itself). This will change the linear curve of a unipolar control signal into a curve that’s lower at its midpoint (by a factor of 2). Bipolar control signals will generate curves that are high at both ends, and 0 in the middle.



sin (a + b), cos (a + b), tri (a + b)

These equations are intended to be used with inputs that are sawtooth waves—for example, **input a** might be LFO1 with its shape set as a sawtooth. Each equation will map a sawtooth-shaped input into a sine-, cosine-, or triangle-shaped output. Other input waveform shapes will result in outputs with more complex waveform shapes.

Other ways to get sawtooth shapes as inputs to these FUNs are to use other FUNs as the inputs, with their equations set as any of the ramp equations described later in this section (see the note at the end of this chapter about the evaluation order of the FUNs). You could also use LFOph1 or LFOph2 as inputs. The first three graphs below show the result of these functions when **input a** is a rising sawtooth wave, and the value of **input b** is 0. The fourth shows the result of the sin ($f=a + b$) equation when the value of **input b** is 0 and **input a** is a sine wave.

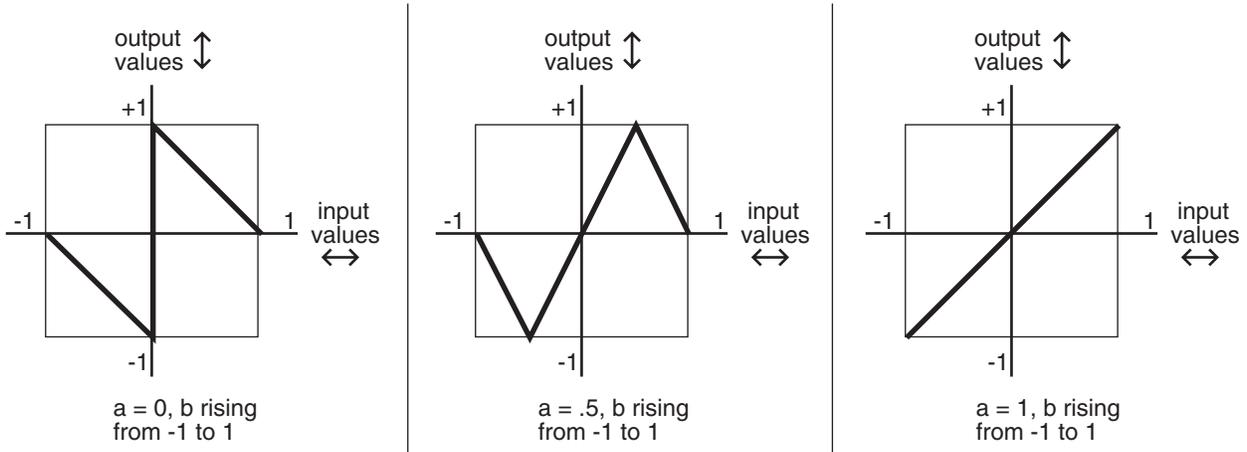


Warp Equations

The next five equations all behave similarly, and are intended to be used as follows: the value of **input a** is the controlling value, and normally remains constant, although it doesn't have to. The value of **input b** is expected to change over time; **input b** might be an LFO, for example. The value for **input a** affects how the FUN calculates its output value while the value of **input b** changes.

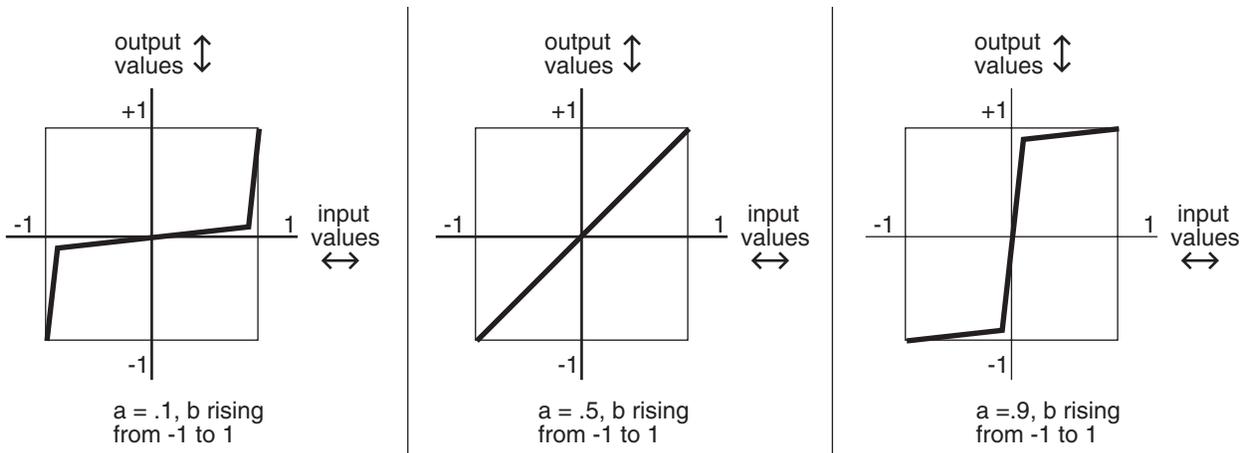
warp1(a, b)

We call this the Vari-slope™ equation. The value of input a controls the mapping of values for **input b**. If **input b** is a sawtooth wave, different values for **input a** will change it into a triangle wave. If **input b** is a more complicated waveform, the output waveform is also more complicated.



warp2(a, b)

We call this equation Slant-square.™ Again, the value of **input a** controls the mapping of values for **input b**. If **input b** is a sawtooth wave, different values for **input a** will turn it into a number of variations on square waves.

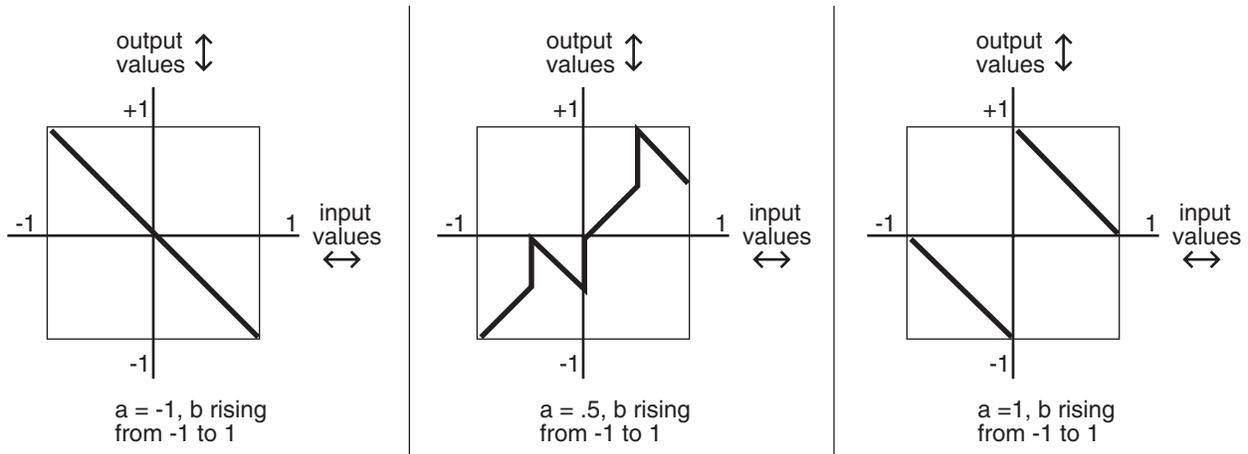


warp3(a, b)

We call this one the Variable Inverter.™ It looks at the binary numbers that represent the values of **inputs a** and **b**, compares the corresponding bits in each number, and performs an XOR operation on them (we'll explain that below). The resulting number is converted into the output value. This can produce some erratic results, but if variety is what you're after, this equation will give it to you. You'll get your best results when **input b** is an LFO with a slow rate.

The XOR operation is a subprogram that applies a truth table to each of the digits in the binary numbers that represent the values of **inputs a** and **b**. Each of these numbers is a string of 16 digits (bits); each bit is either a 0 or a 1. The subprogram looks at the first bit of each number. If they're both 0s, the resulting value is 1. If one is a 0 and the other is a 1, the result is 1. If they're

both 1s, the result is 0. This process is repeated for the remaining 15 bits of each number, and a new 16-bit number is generated. This number represents the output value of the FUN.

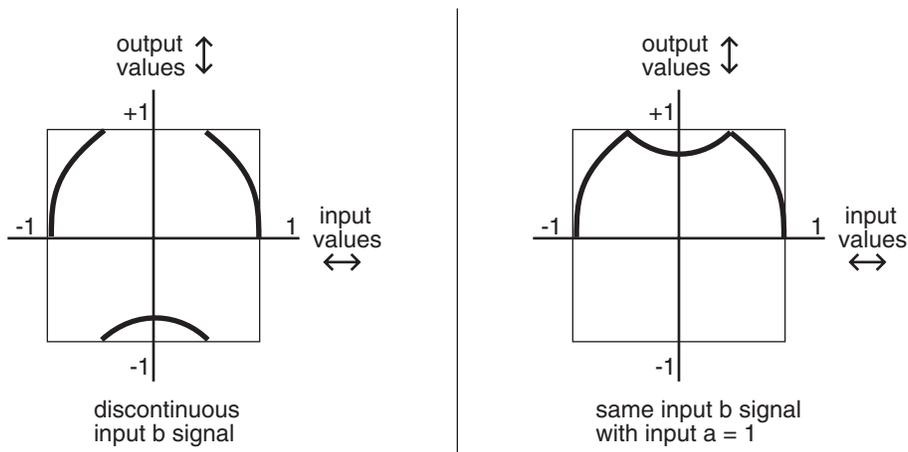


warp4(a, b)

This equation, the Period Inverter,TM is based on repeated evaluations of the value of **input b**. The KSP8 compares each new value of **input b** with the value from the previous evaluation. If the absolute value (always a positive number) of the difference between the two is greater than the value of **input a**, the current value of **input b** is multiplied by -1.

The primary feature of this equation is that it will take a discontinuous signal and make it continuous. If, for example, FUN1 uses an equation like $a(y + b)$, its output can wrap around from +1 to -1, or vice versa. You could set FUN1 as **input b** for FUN2, set **input a** of FUN2 to ON (+1), and FUN2 would remove the discontinuity from the signal. The first graph below shows a hypothetical output signal with such a discontinuity, and the second shows how FUN2 in this case would make the signal continuous without drastically changing its shape.

If, on the other hand you *want* the signal to become discontinuous, you can use the warp4(a, b) equation in a single FUN, with **input a** set to OFF (0), and the signal would be multiplied by -1 with each evaluation of **input b**.



warp8(a, b)

This relatively simple equation is $a \times b \times 8$. If the result is beyond the range of -1 to +1, it wraps around from +1 to -1 (or vice versa), until it's within the allowable range. The table below shows some examples of how this works.

$a \times b \times 8 =$	final output value
-7.4	.4
-4.2	-.2
-1.8	.8
-.6	-.6
.4	.4
1.2	-.2
2.6	.6
5.4	-.4

a AND b

The values of **inputs a** and **b** are interpreted as logical quantities—they're considered TRUE if they're greater than +.5, and FALSE otherwise. This turns the FUN into an on/off switch. This equation can be used to trigger ASRs, or as a layer enable control, or for any control source that toggles on and off. If you set one of the inputs to an LFO, the FUN would switch on and off every time the LFO's signal went above +.5 (as long as the other input was also above +.5).

a OR b

This equation is very similar to a AND b. The only difference is that the FUN will switch on when the value of either **input a** or **input b** moves above +.5.

b > a

b is greater than **a**.

Sawtooth LFOs

The next six equations case the FUN to generate a sawtooth LFO as its output signal. Each performs a different operation on the values of **inputs a** and **b**, and the resulting value is multiplied by 25. The result determines the frequency of the LFO. If the value is a positive number, the LFO has a rising sawtooth shape. If the value is negative, the LFO has a falling sawtooth shape. When the resulting values are large (above 10 or so), the output waveform is not a pure sawtooth; a bit of distortion occurs.

ramp(f=a + b)

The values of **inputs a** and **b** are added, then multiplied by 25.

ramp(f=a - b)

The value of **input b** is subtracted from the value of **input a**, and the difference is multiplied by 25.

ramp(f=(a + b) / 2)

The values of **inputs a** and **b** are added, and the sum is divided by 2. This value is multiplied by 25.

ramp(f=(a + b) / 4)

The values of **inputs a** and **b** are added, and the sum is divided by 4. This value is multiplied by 25.

ramp(f=a * b)

The values of **inputs a** and **b** are multiplied, and the result is multiplied by 25.

ramp(f=-a * b)

The value of **input a** is multiplied by -1, then multiplied by the value of **input b**. The result is multiplied by 25.

ramp(f=a * 10^b),

10 is raised to the power of **b**, then multiplied by the value of **input a**. The result is multiplied by 25.

Chaotic LFOs

The next five equations function somewhat like the equation $a(b-y)$ described earlier, in that they start with a value of 0 for y , evaluate the equation, and use the result as the new value of y for the next evaluation. Although they all can function as LFOs (they can have a repeating cycle of output values), they can become chaotic depending on the input values.

$a(y + b)$

The values of y and b are added, then multiplied by the value of a .

$ay + b$

The values of a and y are multiplied, then added to the value of b .

$(a + 1)y + b$

1 is added to the value of a . The sum is multiplied by the value of y . The result is added to the value of b .

$y + a(y + b)$

The values of y and b are added. The sum is multiplied by the value of a . The result is added to the value of y .

$a |y| + b$

The absolute value of y is taken (if it's a negative value, it's multiplied by -1). The absolute value of y is multiplied by the value of a . The result is added to the value of b .

Sample b On a

This is a sample and hold function. The values of **inputs a** and **b** are interpreted as logical quantities, as described for the equations a AND b , a OR b . When the value of **input a** changes from FALSE to TRUE (goes above +.5), the value of **input b** at that moment is sampled (recorded), and becomes the FUN's output value. This value remains constant until **input a** makes another transition from FALSE to TRUE.

Sample b On $\sim a$

This works like the previous equation, but the value of **input b** is sampled whenever the value of **input a** makes a transition from TRUE to FALSE.

Track b While a

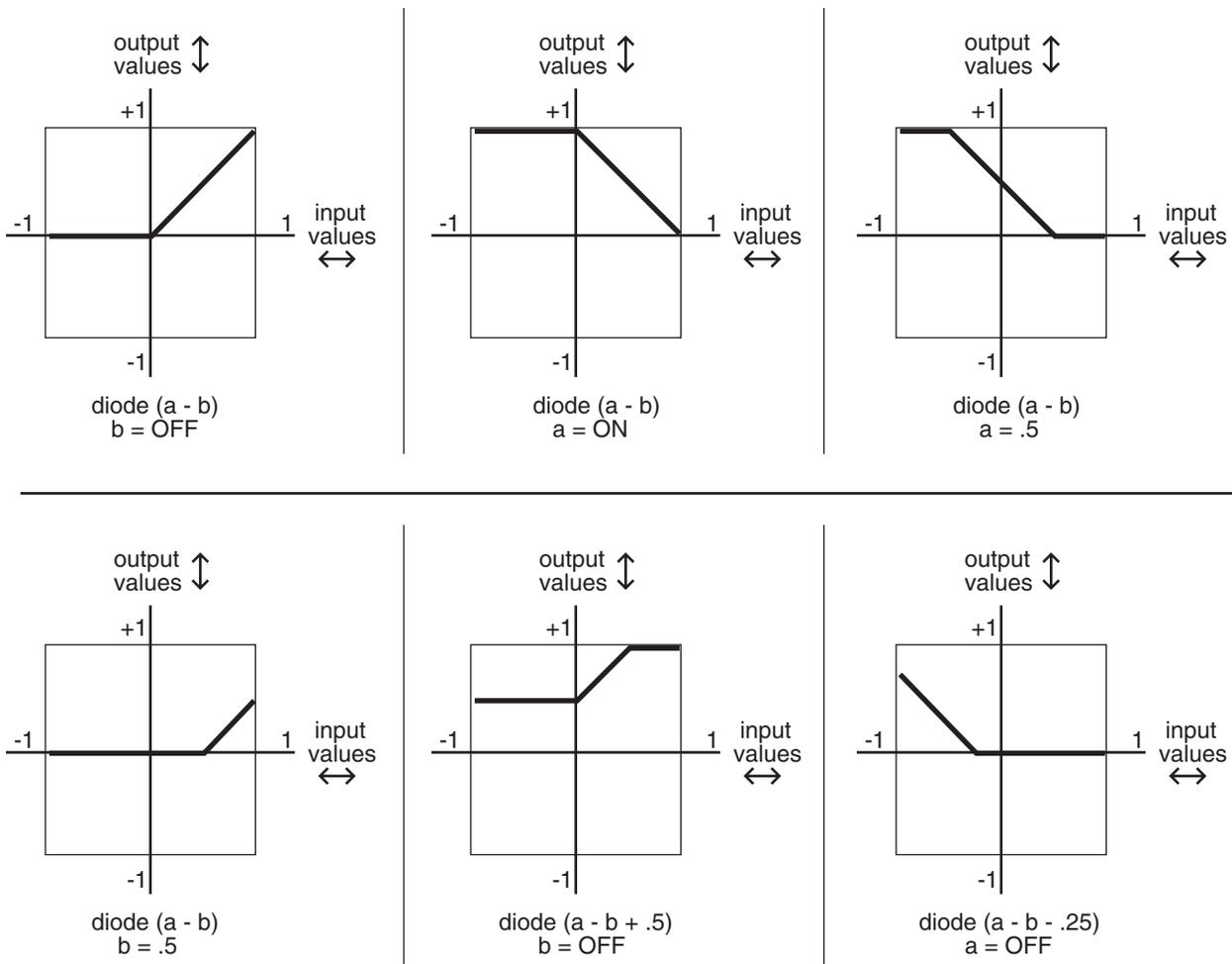
This equation also interprets the values of **inputs a** and **b** as logical quantities. While the value of **input a** is TRUE, the value of **input b** is used as the FUN's output value. The output value changes exactly as the value of **input b** changes. When the value of **input a** goes FALSE, the FUN's output value freezes and remains constant until the value of **input a** becomes TRUE again. The FUN's output value then continues to track the value of **input b** .

Track b While $\sim a$

This is the opposite of the previous equation. The FUN's output value tracks the value of **input b** as long as the value of **input a** is FALSE.

Diode Equations

The remaining equations perform a diode-like function; only positive input values are significant. If the result of the equation is negative, the FUN's output value is 0. You can use these equations to limit bipolar control signals to unipolar values. Normally you'll use these by setting input a or b to ON or OFF, and assigning some control source to the other input. These will enable you to produce a variety of output curves.



Diode (a - b) simply subtracts the value of **input b** from the value of **input a**. If the difference is less than 0, the output value is 0.

Diode (a - b + .5) adds a constant of +.5 to the difference of (a - b), then maps all negative values to 0. The curve is the same shape as Diode (a - b), but shifted upward 1/4 of the range between -1 and +1.

Diode (a - b - .5) is the same curve as diode (a - b), shifted downward 1/4 of the range.

Diode (a - b + .25) shifts the curve up 1/8 of the range, and diode (a - b - .25) shifts the curve down 1/8 of the range.

The Order of Evaluation for FUNs

The KSP8 is a computer, and processes information at very high speeds. Every 20 milliseconds it checks the condition of all active parameters, evaluates any changes, and processes the new information. This is done according to a rigid set of priorities that determines the sequence in which the parameters are evaluated.

The status of each control source is evaluated in turn, according to the sequence in which they appear in the Control Source list. In the case of the FUNs, they are evaluated in the following order: FUN1, FUN2, FUN3, FUN4 (although there are a few control sources that get evaluated between FUN2 and FUN3).

This sequence of evaluation becomes significant if you assign a FUN as the input for another FUN. You should always assign FUNs as inputs for higher-numbered FUNs. For example, you might assign FUN1 as input a for FUN2. Since the KSP8 needs to know the value of FUN1's output before it can evaluate FUN2, assigning the FUNs in this way will ensure that the KSP8 can evaluate both FUNs as quickly as possible.

If you were to assign FUN2 as an input for FUN1, then when the time came for the KSP8 to evaluate FUN1, it wouldn't know the current value for FUN2's output, so it would evaluate FUN1 according to the previous value of FUN2. There would be a delay of one evaluation cycle before a change in FUN2 would be reflected in FUN1. This might have an adverse affect on the start of notes as you play. You won't harm anything, but you might not hear what you expect to hear.

Chapter 10

Master Mode

The Master Page

You reach the Master page by pressing the **MASTER** soft button, available from any of the KSP8's top level screens. This is where you set parameters that affect operation of the KSP8 at every level, including clock source and digital word length. The soft buttons on the Master page give you access to the SmartMedia card page, Object page, and Util page, as well as allowing you to reset the KSP8 or put it into standby mode.

The top line of the Master page shows memory. As you save objects such as studios, chains and presets, the amount of memory you have available will decrease and will be reflected in this display. If you get to the point where you've run out of memory, you'll need to delete some objects (after first backing up any objects that you want to save).

```

MASTER Memory: 751K
StudioChan1: 9 SysEx ID: 0
I/O Config : Studio
ClockSource: 48KHz Int
DigWordLen : 16 Bit
DitherType : Minimum
DigFormat : AES/EBU
<back> CARD OBJECT UTIL Standby Reset

```

StudioChan1

Specify the MIDI channel to be used for MIDI control of studio mods. Studio program change and controller messages will be received on this channel. Channel 9 is the default for StudioChan1, since channels 1 – 8 are set by default to correspond to buses 1 – 8.

Set MIDI channels for chains and presets on the FXBUS page, as described on page 5-8.

I/O Config

I/O Config lets you lock into a particular input/output configuration so that the inputs and outputs you've selected do not change every time you change studios. This means that you can scroll through the list of studios without changing your KSP8's I/O configuration with each studio.

- **Studio** (the default setting) means that the I/O configuration will be determined by the current studio.
- **Master** tells the KSP8 to use the Master I/O configuration. After you set I/O Config to "Master," any change you make on the Config or EQ/sends pages will affect all studios.

ClockSource

This is where you set the digital clock source for the KSP8. Select an internal or external clock source at the appropriate rate:

- 44.1 KHz Internal
- 48 KHz Internal – *this is the default setting*
- AES/EBU (External)
- Option (External) – *requires I/O option board*
- Word clock (External) – *requires I/O option board*

When digitally synchronizing your KSP8 with other devices, either the KSP8 or another connected device can serve as the clock master. Both 44.1 KHz and 48 KHz clock speeds are supported, whether generated internally or externally. The KSP8 can sync to an external master clock source via the AES/EBU input, or from a digital I/O option card. Each digital I/O option card (ADAT, TDIF, AES/EBU, KDS) also includes a BNC word clock connector.

When slaving to a S/PDIF device, choose AES/EBU as your clock source.

Should you experience audible noise in a bidirectional digital configuration, you should try choosing the KSP8 at the master clock (either 44.1 KHz or 48 KHz), and set the other device to be slaved to the KSP8. Alternatively, you can use the word clock on the KSP8's Digital I/O option.

The Digital Lock LED on the front panel will light when the KSP8 is synced to another device. The LED will blink if the lock is lost. The Digital Lock LED remains off when one of the KSP8's internal clocks is the master.

DigWordLen

The KSP8 is capable of producing 16, 20, or 24-bit digital audio signals. While 16-bit digital audio provides a maximum dynamic range of about 96 dB, 20-bit digital audio adds 24 dB to the dynamic range, and 24-bit increases the fidelity even further. There are an increasing number of products on the market that can handle high resolution digital signals, including tape and hard-disk recorders, mixers, and signal processors. The KSP8 can talk to these devices with the highest degree of fidelity.

DigWordLen on the Master page determines the word length on the AES/EBU output, and also on any of the digital output options.

Note that the switch does not affect any of the KSP8's inputs, which can handle any signal up to 24-bits in length.

DitherType

Dithering is a technique in which a small bit of noise is added to a digital signal when you are shortening the digital word length, e.g., from 20 bits to 16 bits. Its effect is to remove quantization distortion that otherwise may result in strange modulation artifacts at low levels. The subjective effect, paradoxically enough, is often that the apparent noise floor of the processed signal is lowered. The Dither Type parameter on the Master page allows you to select between different digital noise floor characteristics. No setting is superior to another—each one is a tradeoff between perceived noise level and artifacts. Here is a brief explanation of each setting:

Flat—the digital noise floor is spectrally flat. This is sometimes known as “triangular” dither.

Minimum, Medium, Maximum—these utilize noise-shaping in varying degrees. The noise floor has been essentially equalized to make it softer at midrange frequencies, and louder at bass and treble frequencies. The overall power level of the noise is actually higher than at the Flat setting, but due to the ear's spectral response at low levels, the noise floor appears lower at these settings.

DigFormat

This is where you switch the levels of the KSP8's digital inputs and outputs between pro format (AES/EBU) and consumer format (S/PDIF).

SysEx ID

The SysEx ID parameter differentiates between more than one MIDI device of the same model. You won't need to change the default setting of 0 unless you have multiple KSP8s receiving SysEx messages from a single source, such as a Kurzweil RSP8 remote control. In that case, make sure each KSP8 has a different SysEx ID. Then you can direct SysEx messages to the appropriate KSP8 with the SysEx ID byte that's included with every SysEx message.

See Appendix D for more information on System Exclusive messages.

SmartMedia Card Functions

You'll want to back up your work frequently, especially if you are creating custom presets, chains, and studios that will be difficult to reproduce. SmartMedia cards are the most convenient way to backup your work, although you may also back up your work with a SysEx dump. SmartMedia cards also provide the quickest way to update the KSP8's operating system and other system software (see Appendix E).

The SmartMedia card slot uses a built-in spring-loaded mechanism that makes it easy to insert and remove cards. To use a card, simply insert the notched end into the KSP8's SmartMedia slot, making sure that the side of the card with the gold plating is towards the bottom. To eject a card, push it in slightly and it will pop out. When you go shopping for cards, keep in mind that the KSP8 supports only 3.3v SmartMedia cards.

Press the **CARD** soft button to access the following SmartMedia card functions:

- | | |
|---------------|---|
| Load | Load selected file(s) or object(s) from the SmartMedia card into KSP8 memory. |
| Save | Save banks of objects or just selected objects to the SmartMedia card. You can also save Master tables or Everything files from this page.

- Master tables consist primarily of the items on the Master page. You can load a master table into this or another KSP8 to quickly set all master items to your preferred settings.
- Everything files contain, well, everything. This includes all RAM objects and the Master table. Needless to say, these files can get quite big. |
| Delete | Delete files from the current SmartMedia card. |
| Format | Format the current SmartMedia card. |
| Rename | Change the filename of a file on a SmartMedia card. |
| Move | Change the location of a file from one directory to another (on the same card). |
| Util | Check the free space, find files, and view directory organization and sizes on the current SmartMedia card. |
| NewDir | Create a new directory on a SmartMedia card. |

SmartMedia Error Messages

There are a couple of error messages that you may see from time-to-time when you are using SmartMedia.

"Block *nn* has failed ECC. Disable ECC usage?"

- This message will appear as a result of trying to use a card that was written by a device that doesn't implement error correction codes. Choose *yes* to turn off the error correction and make the SmartMedia data accessible.

"Mark page *nn* bad?"

- This message will appear when a memory block on the SmartMedia card suffers an unrecoverable error. This is a sign that the card is wearing out, has been corrupted somehow, or is improperly inserted. The first thing you should try if you get this message is to reinsert the SmartMedia card. Marking the page bad can lead to lost data, not marking it can lead to corrupted, yet still accessible data. In most cases you should back things up and reformat the card.

Object Functions

Object Utility functions are useful for moving or copying objects into various banks, naming or renaming objects, deleting objects, and dumping objects over MIDI. To access these functions, press the **OBJECT** soft button while in Master mode. You will see the following screen:

```
Select database function:
```

```
Move Copy Name Delete Dump Done
```

Use the soft buttons to choose from these functions.

Move Move selected objects to a new bank or a specific starting ID.

Copy Copy selected objects to a new bank or a specific starting ID.

Name Name selected objects.

Delete Delete selected objects.

Dump Dump selected objects over MIDI.

Done Exit from the object utilities.

Here's an example of what the **Move** object screen looks like (with several objects selected):

```
Func: MOVE Sel: 14/211 Index: 1
Studio 800*Bla Bla Bla 2232
Studio 801*Bos>Ab9 2240
Chain 802*Big big BIG 3416
FXPreset 801*Small Wood Booth 1984
Select Next Type Multi OK Cancel
```

The name of the function is displayed on the top line:

```
Func: MOVE
```

If you press **Cancel** while in one of the object utilities, you are returned back to the Object Utilities page (the "Select database function:" screen pictured above.) Any objects that were selected when you pressed Cancel will still be selected if you subsequently enter a different object utility (by pressing a different soft button such as **Name**, for instance.) The selections are reset when you exit the Object Utilities page (by pressing the **Done** button.)

All of the features of the Save Object dialog are accessible here:

You can use the **Multiple Object Selector** (described below) to select ranges of objects according to object types, IDs, strings in the object names, or dependent relationships.

You can quickly select or deselect all objects using the Left/Right cursor and Up/Down cursor double-presses.

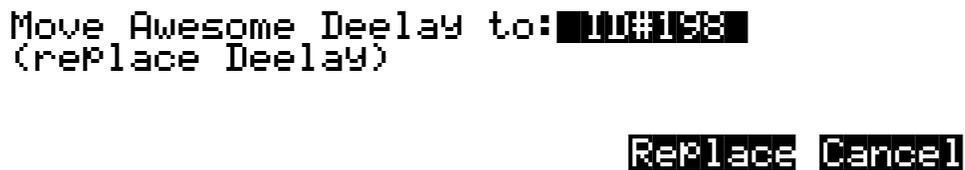
Move

Pressing **Move** from the Object Utility page takes you to the Move utility. The Move utility allows you to select any group of objects and move them to a different bank. If you select several objects of a single type, then you are allowed to set a specific starting ID for the objects, of any number (0-999). For instance, you could move a group of presets from scattered IDs to a continuous range of IDs starting from ID# 354.

If you move objects that are dependent objects of other objects (such as presets that are dependents of a particular studios,) the parent objects are automatically relinked to their dependents that have moved. What this means is that you can move any objects to any new ID numbers, without having to worry if your objects will still function correctly.

Moving a Single Object

If you select a single object to move, you will see a dialog similar to the Save/Replace dialog you see when saving any object.



Moving Multiple Objects

Select the objects that you want to move, then press **OK**. You will see the following dialog:



This is similar to the Load function, where you are asked to choose a bank and mode for loading. If you have selected more than one object, and all of the selected objects have the same type, then there will be an additional mode available, "ID":



Here is a description of the above soft buttons:

- ID** Use consecutive numbering for each object that is moved, skipping over IDs that are in use (like Fill mode), starting from the ID that you specify. You will see the following dialog when you press the **ID** soft button:
- Append** Try to use each object's ID offset within its current bank as the ID offset within the specified destination bank. If there is already an object at this offset in the new bank, increment the ID until a free ID slot is found. For example, if you were moving presets 202, 209, 217, and 230 to the 400's bank, which already has a preset at 409, the resulting IDs for the moved presets would be 402, 410, 417, and 430.
- Fill** Use consecutive numbering for each object that is moved, starting from the beginning of the specified destination bank. Any object IDs that are already being used in the specified bank will be skipped over. For instance, if you were moving Studios 300, 315, 489, and 841 to the 200's bank, which already contains Studios 200 and 203, then the moved studios' ID numbers would be 201, 202, 204, and 205.

Select starting ID: **231**

OK **Cancel**

Cancel returns you to the Move object dialog.

The objects are moved as soon as **Append** or **Fill** is pressed, or when a starting ID is selected. After the Move function completes, you will still be in the Move object dialog, and you will still be scrolled to the previously highlighted object, even if it has moved to a new ID.

Keep in mind that when you only select one object to move, you can replace another object. However, when you select multiple objects for moving you cannot overwrite any objects.

Copy

Pressing **Copy** from the Object Utility page takes you to the Copy utility. The Copy utility allows you to select any group of objects and copy them to a different bank.

The operation of the Copy utility is identical to the Move utility just described.

If the objects to be copied in a single operation include any objects grouped together with any of their dependents, the new copies of the parent objects will reference the new copies of the dependent objects. As an example, suppose you select Studio 400 and its three dependent presets: 200, 210, and 303. If you copy all of these objects at once into the 700's bank, using **Fill** mode, you will see the copies at Studio 700 and Preset 700, 701, and 702. Studio 700 will reference the copies of the presets (at 700, 701, and 702). In contrast, if you had only made a copy of Studio 400 as Studio 700, the Studio would reference the old presets (at 200, 210, and 303.)

Name

The **Name** utility allows you to rename an object without entering an editor. You can also use this utility to rename one or more objects with the same name. This is much faster than renaming each object individually. A lot of times you might want several objects to have the same name except for a unique identifier at the end of the name. Using this utility function, you could assign a common name to multiple objects at once, and then quickly name each one a little differently.

When you press **OK** after selecting objects, you will see the following screen prompting you for an object name, with a suggested default:

```
Object Name:      Z Phazer
```

```
Delete Insert >>End Choose OK Cancel
```

The default name that you are presented with is taken from the **highlighted** object in the object list, whether the highlighted object is selected or not. This makes it easy to copy the name of one object on to another. (See page 5-16 for complete information on the KSP8 naming dialog.)

The Relink-by-Name feature (described earlier) relies on there being unique names for dependent objects of the same type, so it is a good practice to make object names unique.

Delete

The Delete Objects utility is very useful for reclaiming unused object RAM in your KSP8. This can be a convenient way to delete individual or selected groups of objects. However, if you want to delete an entire bank or everything in RAM, the **Delete** soft button on the Master Mode page is quicker.

If any of the selected objects have dependents that were not selected, you will see the question:

```
Delete dependent objects?
```

```
Yes No
```

If you answer **Yes** to this question, all dependent objects of the selected objects are deleted, unless they are being used as dependents of other objects that are to remain in memory.

Answering **No** will delete only those objects that were selected.

Dump

This utility is for dumping selected objects over MIDI. If any of the selected objects have dependents that were not selected, you will be asked the question “**Dump dependent objects?**”.

Press **OK** to initiate a MIDI System Exclusive dump of the selected set of objects, one by one out the MIDI Out port of the KSP8. Dumping everything can generate massive dumps, so you should know the limits of the device you’re dumping to. You can cancel the dump at any time with the **Cancel** soft button.

Multiple Object Selector Page

The Multiple Object Selector is used for making multiple selections of objects from an object list according to combinations of selection modes such as object type, object ID, and dependencies. This page is available for use in the **Load Object** dialog, the **Save Object** dialog, and all of the object utilities that are described in the Master mode chapter (**Move**, **Copy**, **Name**, **Delete**, and **Dump Objects**.)

You enter the Multiple Object Selector page by pressing the **Multi** soft button when you’re in the dialog pages for the above functions. This page contains parameters to define a group of objects cross-referenced by object type and object ID. Objects can be grouped according to the dependencies of one or more objects, for all of the object functions *except Load Object*. (As described previously, the Load Object function can not determine exact object dependency relationships until the objects are actually being loaded into the KSP8. The other object functions operate on lists of the objects currently stored in the KSP8’s RAM, and because of this, dependent relationships are available to be used as selection criteria.)

This is what is displayed by the KSP8 when you first press the **Multi** button:

```
Multiple Object Selector
Select : TYPE/RANGE
Type   : Studio
Bank   : 200's
StartId: 200      EndId: 299

[All] [TYPE] [Toggle] [Clear] [Set] [Cancel]
```

This is the screen from which you can specify a range of object ID numbers cross-referenced with object type. If you increment the **Select** parameter to the **Dependents** setting, you will see the following additional parameter layout (not available for Load Object). This is used for selecting dependent objects of either the object currently scrolled to (from the object list that you were just viewing before pressing Multi) or dependent objects of the selected objects (indicated with an asterisk in the object list):

```
Multiple Object Selector
Select : Dependents
Of     : Current Item
Specify: All

Current = Studio 205 Sea Section

[All] [TYPE] [Toggle] [Clear] [Set] [Cancel]
```

The “**Current =**” parameter is for information only and represents the currently highlighted item in the object list that you are working with.

Two other selection modes do not have any additional parameter associated with them. These are **Everything** and **Search String**.

```
Multiple Object Selector  
Select #Everything
```

```
Multiple Object Selector  
Select #SearchStrg
```

“Select: Everything” is one way to choose all objects in the list. The **All** button performs a similar function, as described below.

“Select:SearchStrg” allows you to enter a string to be searched for in all of the object names in the list. Any objects with names containing the string can be selected. (Like “Dependents”, this mode is available for all functions except Load Object.)

Multiple Object Selector Soft Buttons

Here is a functional description of the soft buttons displayed on the Multiple Object Selector page. This is followed by an explanation of the parameter operation for all of the above object selection modes.

- All** Returns the Select parameter to **Type/Range**, if it was not already set that way. Sets the Type to **All Types** and the Bank to **All Banks**, and also the StartId to **0** and the EndId to **999**. This soft button is provided as a quick way to define the selection range as “Everything”. Once the Type and Bank parameters have been set up in this manner, it is easy to change either parameter to further define the selection range (e.g., All Types of objects in the 400's bank, or Presets in All Banks)

- Type** Returns the Select parameter to **Type/Range**, if it was not already set that way. Sets the Bank to **All Banks**, and also the StartId to **0** and the EndId to **999**. The Type parameter is set so that it **matches the type of the currently indexed object from the object list**. For instance, if you were scrolled to a Setup object when you pressed Multi, pressing the **Type** soft button would set up the Type parameter to Setup. This is usually used to quickly select or deselect all objects of a particular type by scrolling to the first object of that type, and then pressing **Multi->Type->Set** or **Multi>Type->Clear**. If you don't want to include all banks in the selection range, it is easy to adjust the Bank or ID parameters to narrow the range.

The following three soft buttons will trigger the selection and deselection of items from the current object listing, according to the function of the particular button. Only objects that are included in the specified range will be selected or deselected. When this process is completed, the display returns to the object function dialog.

Toggle For each of the objects in the specified range, “toggle” the selection status of the object. In other words, if an object is already selected, then the object will be deselected (the asterisk will go away). If an object is not already selected, it will be selected (as indicated by an asterisk in the display between the object ID and object name.)

Toggle is very useful for situations where you want to select all objects in the list except those that meet certain qualifications. For instance, in the Delete Object utility (from the Master page, press **Object->Delete**), you may want to delete all objects that are not being used by a studio that you are working on, in order to free up object RAM in the KSP8. You could do this by first selecting the studio and its dependents (with no other objects selected, highlight the studio, press **Multi**, then select “Dependents” of “Current Item” and press **Set**) and then returning to the Multiple Object Selector page, set the selection range to Everything (or press the **All** soft button), and press **Toggle**. This will return you to the object list display, with everything that is *not* in use by the studio now selected for deletion. All you would have to do then is press **OK** and confirm the delete operation.

Clear Clears the selection status of all objects within the specified range. A basic example of this would be if you wanted to save a file containing everything in RAM except Presets. You could first select all the objects with the Left/Right cursor button double-press, and then go to the Multiple Object Selector. From there you could set the selection range to be Presets in All Banks, and press Clear. The KSP8 would return to the object list display, with only the desired objects selected for saving.

Set For each of the objects in the specified range, select the object. For Example, to select all Chains and Studios in the 300's bank for saving, you would first set the selection criteria to Type/Range, set the Type to Studios, set the Bank to 300's, and press Set. Then, you would press Multi again, and just change the Type parameter to Chain, and press Set again. The desired range of objects would then be selected and ready to proceed with saving.

Cancel Exits from the Multiple Object Selector page, with no action, and returns to the object function, with the previously displayed object list.

Entering Selection Criteria in the Multiple Object Selector

This section describes the operation of the selection modes provided on the Multiple Object Selector page. These are accessed by scrolling the **Select:** parameter to different values, as pictured above.

Selection by Type/Range

This mode sets a specific range of object types cross referenced with a specific ID range.

Parameters	Possible Values	Function
Type	Table, Studio, Chain, FXPreset, FXAlg, All Types	Sets the desired object type. The value All Types will select all of the other possible types.
Bank	000's, 100's, 200's, 300's, 400's, 500's, 600's, 700's, 800's, 900's, All Banks	<p>Sets the desired bank. Changing this parameter causes the StartId and the EndId to be set to the limits of the chosen bank (e.g., setting this to 300's will set the StartId to 300 and the EndId to 399). Setting this parameter to the value All Banks will set the StartId to 0 and the EndId to 999.</p> <p>The actual range used for selections when Toggle, Set, or Clear is pressed is taken from the setting of the StartId and EndId parameters. For example, if you set the Bank to 200s and then change the StartID to 300 and the EndID to 399, the 300s bank will be selected, not the 200s.</p> <p>The Bank parameter is used as a quick way to set up the Id range for an entire bank, or all banks.</p>
StartID	0 - 999	Sets the specific starting ID of the selection range.
EndId	0 - 999	Sets the specific ending ID of the selection range.

It is possible to set the EndId before the StartId. If this is the case, no selection range will be enabled.

Selection by Dependents

This mode is used to select a group of objects that are dependents of other objects. This is not available in Load Object.

Parameters	Possible Values	Function
Of	Current Item, Selected Items	If set to Current Item , selection range is confined to those objects in the object list that are dependents of the currently indexed item (Current =), including the currently indexed item itself. If set to Selected Items , then the selection range includes any objects in the object list that are dependents of any currently selected objects. The currently indexed item that is displayed is ignored unless it is already explicitly selected (has an asterisk).
Specify	All,	This parameter is used to limit which dependent objects are included in the selection range for the appropriate objects included via the Of parameter. The normal setting is All , which means all dependents are included.
Current =	Type, ID, and name of the currently indexed object	Displays the object that will be used if Current Items is the value of the Of parameter.

Everything

“Everything” will include all objects in the list. You may prefer to use the **All** button for this purpose.

Search String

This selection mode will ask for a search string to be entered, as soon as either the **Toggle**, **Clear**, or **Set** button is pressed. The range for the selection/deselection will be any objects whose names contain the search string, ignoring upper/lower case. Search String mode is not available in Load Object.

Working with the Multiple Object Selector

The Multiple Object Selector minimizes button presses and quickly allows you to select whatever group of items you want from the KSP8's RAM. It is available in all of the related object management functions.

You may notice that the cursor positions and parameter settings are remembered whenever you exit the Multi Selector dialog, even if you exit the dialog and choose a different function. For instance, if you end up doing a lot of selecting of studios, or of dependents at various levels, the parameters will stay set up the way you left them as you move from function to function (e.g., from Copy to Delete to Save, etc.)

Utilities

You can reach the Utilities page from the Master page by pressing the **Util** soft button. There's also a shortcut, however, that lets you reach this page from any place within the KSP8's editing environment: simply double-press the middle two soft buttons and the Utilities page will display.

MIDIScope

The **MIDI** soft button launches MIDIScope™, a useful subprogram that lets you monitor the MIDI messages from the KSP8's MIDI In port. This is a good way to make sure you're receiving MIDI from MIDI masters. It's also good for making sure your controls are assigned where you want them, checking your attack velocities, etc.

Objects

The **Objects** soft button displays the entire list of objects stored in RAM. This is an easy way to check the object ID of any object you've created. You cannot manipulate objects, though, as you can with the Objects Utility (described on page 10-5).

Standby mode

Press the **Standby** soft button to turn off the KSP8's display without turning off the unit. This is a convenient way to put your KSP8 to "sleep." The standby LED lights to show you when the KSP8 is in standby mode. Press any key on the front panel to "wake up" the KSP8. Turning the alpha wheel, however, does not wake up the unit.

You can also enter Standby mode by double pressing the two left soft buttons at any time.

Reset

Press the **Reset** soft button to perform a hard or soft reset of your KSP8. You can also access the KSP8 Boot Block from this page (see Appendix E).

Loader

Press the **Loader** soft button to reach the KSP8 Boot Block. See Appendix E for complete information on the KSP8 Boot Block.

Soft Reset

A soft reset is essentially like turning your unit off then on again. The KSP8's battery-backed memory will not be erased, so any objects you've created, such as presets, chains, or studios, will still be there for you after you perform the soft reset.

Here's a shortcut: You can also perform a soft reset without going to the Master page by simultaneously press the +/-, 0, and **clear** buttons on the alphanumeric keypad.

Hard Reset

A hard reset is a much more serious matter than a soft reset, so the KSP8 will give you a couple of chances to back out of this operation if you change your mind at the last minute. This type of reset re-initializes everything inside the KSP8, including the battery-backed memory. This means that any custom objects you've created will go away. You should always back up (to SmartMedia card or via a SysEx dump) any objects you want to save before you perform a hard reset.

Generally you'll only perform a hard reset after you've upgraded certain pieces of the KSP8's system, when you're totally hosed, or if you're absolutely certain that you'd like to return the KSP8 to the state it was in before you started screwing around with stuff.

Master Mode

Reset

Appendix A

EQ Reference

EQ Types

Here's a quick summary of the primary equalization types available with the KSP8:

Lowpass filters cut the levels of all partials above the cutoff frequency without affecting the partials at or below the cutoff frequency (the low frequencies pass through). **Highpass** filters do the opposite; they cut the levels of all partials *below* the cutoff frequency without affecting the partials at or above the cutoff frequency.

Notch filters, as the name implies, cut the levels of partials in a range between high and low frequency. Consequently the "cutoff" frequency is referred to as the center frequency. With notch filters, the levels of partials at the center frequency are cut, while the levels of partials above and below the center frequency are unaffected. **Bandpass** filters are the opposite of notch filters; they leave the levels of partials at the center frequency unchanged, and cut the levels of partials above and below the center frequency.

Filter Terminology

Rolloff – Filters do not usually cut all frequencies precisely at their cutoff point. Instead, the amplitude of the frequencies above (or below, in case of a hi pass filter) the cutoff decreases by a fixed amount per octave—for example, 6 dB per octave. This curve of lessening amplitude is called a rolloff.

Poles – The number of poles in a filter affect how sharp the rolloff is. The more poles there are, the sharper the rolloff, meaning that the cutoff will have a more dramatic effect on the sound. The KSP8 has one-pole, two-pole, and three-pole filters available. A one-pole filter has a 6 dB per octave cutoff; a two-pole is 12 dB per octave; and a three-pole is 18 dB per octave.

Resonance – In a filter that has resonance, the frequencies near the cutoff are given an increase or decrease in amplitude. If you decrease these frequencies, you are essentially creating a longer rolloff. But if you increase those frequencies thereby emphasizing them, it creates a distinctive sound that you will very likely recognize. Resonance is also sometimes called Emphasis or Q on various synthesizers.

EQ Functions

The functions in the KSP8 EQ section are described on the pages that follow.

How to Read the Graphs

The graphs in this section show the rolloff curve, using several different values to illustrate how they change the shape of the curve. Amplitude is always on the vertical axis. Frequency is always on the horizontal axis.

None

No processing is performed.

Lo Shelf

This is a bass tone control, with adjustable parameters for frequency (freq) and amplitude (gain). Frequency sets the cutoff frequency. For notes above this frequency, the amplitude setting has a diminished effect. You can set the amount of cut or boost that's applied to notes below the cutoff frequency. There's a gradual increase in the bass response for each successively lower note. The location of the cutoff frequency will change somewhat as you change the amplitude settings, although the value of the frequency parameter will not reflect the change.

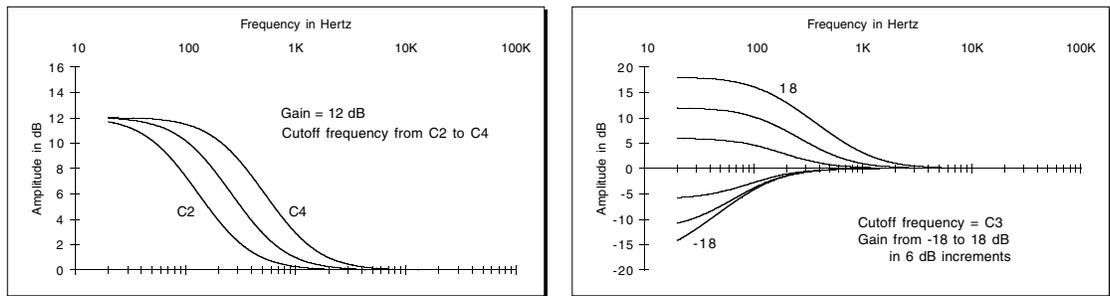


Figure A-1. Lo Shelf frequency and gain examples

Parametric

This function has three interacting parameters: center frequency (freq), width (wdth), and amplitude (gain). The center frequency is the center of the range of frequencies that will be boosted or cut by the gain setting. The width is the entire range of frequencies that will be affected by the amplitude setting. The width is defined by imagining an amplitude curve with a level (in dB) of -infinity (minus infinity) at the center frequency, then measuring the distance (in octaves) between the points on the curve where the amplitude is attenuated by 3dB.

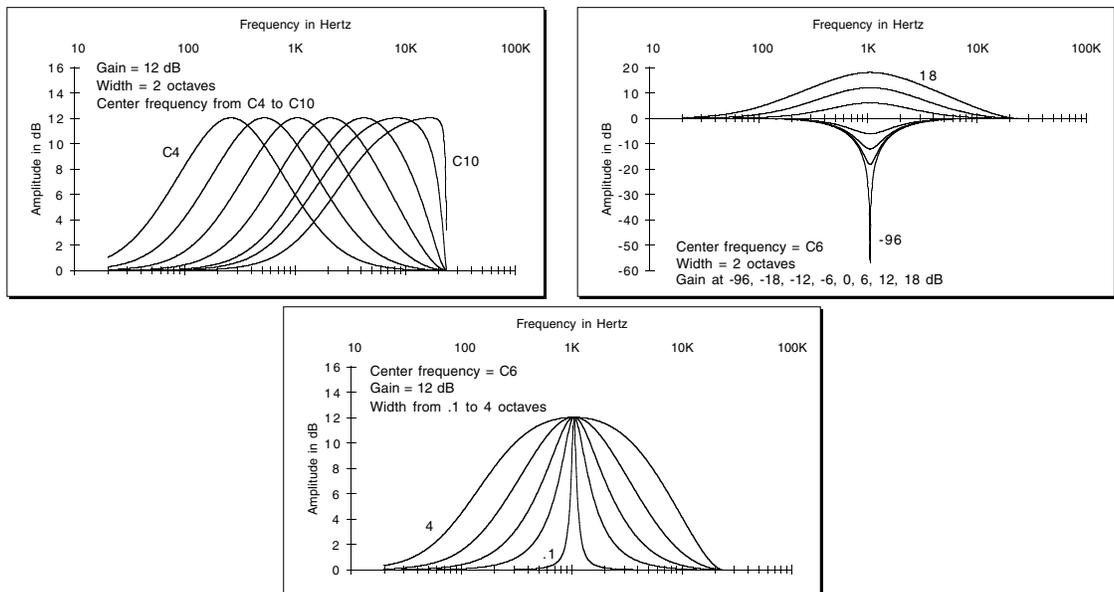


Figure A-2. Parametric frequency, gain, and width examples

Hi Shelf

This is a treble tone control, with adjustable parameters for frequency and amplitude. Frequency sets the cutoff frequency. For notes below this frequency, the amplitude setting has a diminished effect. You can set the amount of cut or boost that's applied to notes above the cutoff frequency.

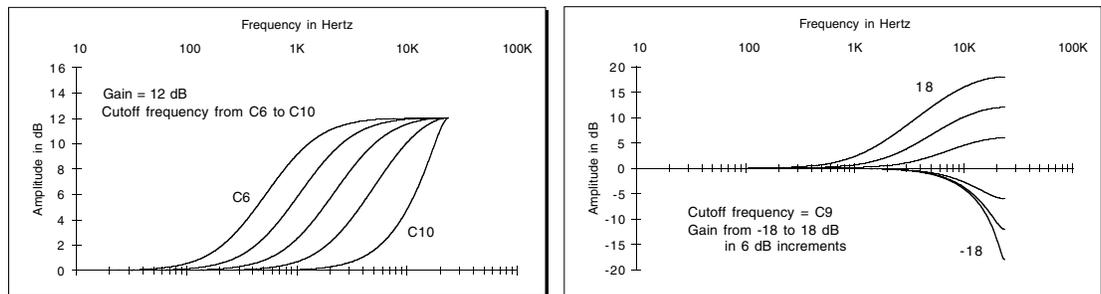


Figure A-3. Hi Shelf frequency and gain examples

HiPass 2P

A two-pole high pass Butterworth filter. A Butterworth filter is as flat as possible, before starting to roll off. It has a significantly sharper corner than do two cascaded one pole high pass filters. The filter frequency only goes up to C4. This filter is useful for removing unwanted low frequency sounds.

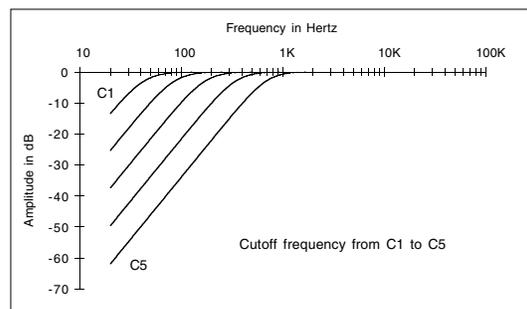


Figure A-4. Hi Pass 2P frequency example

HiPass 3P

This is three one-pole high pass filters cascaded. It has quite a long shoulder of gain slowly rising to 0 dB from the attenuation at low frequencies. It has an 18 dB/octave slope away from the shoulder area. The frequency is controllable over the entire audio range.

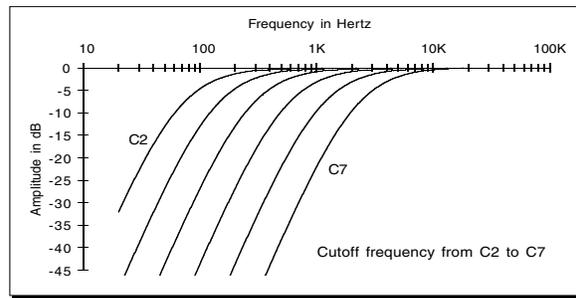


Figure A-5. HiPass 3P frequency example

LoPass 2P

This features a gain block in front of a two-pole resonant low pass filter. Gain allows you to really turn things down if too much resonance is present.

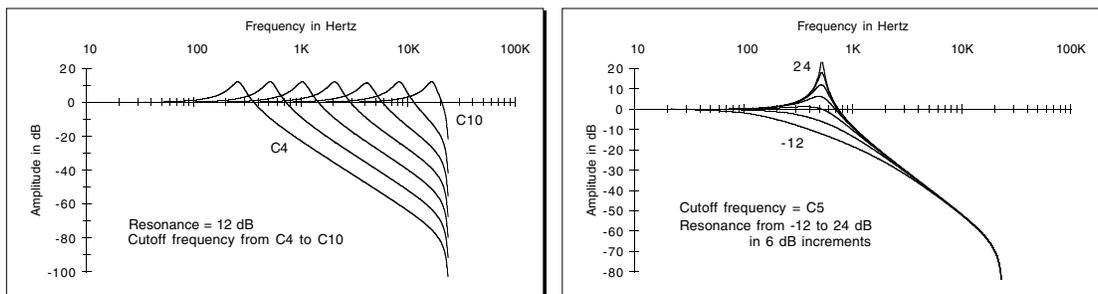


Figure A-6. LoPass 2P frequency and resonance examples

LoPass 3P

This is a one-pole low pass plus a two-pole resonant low pass filter.

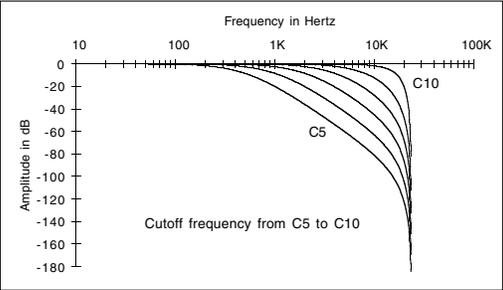


Figure A-7. LoPass 3P frequency example

Reson Bass

This is a low pass filter with a resonance control that allows you to boost or cut the amplitude of the partials near the cutoff frequency.

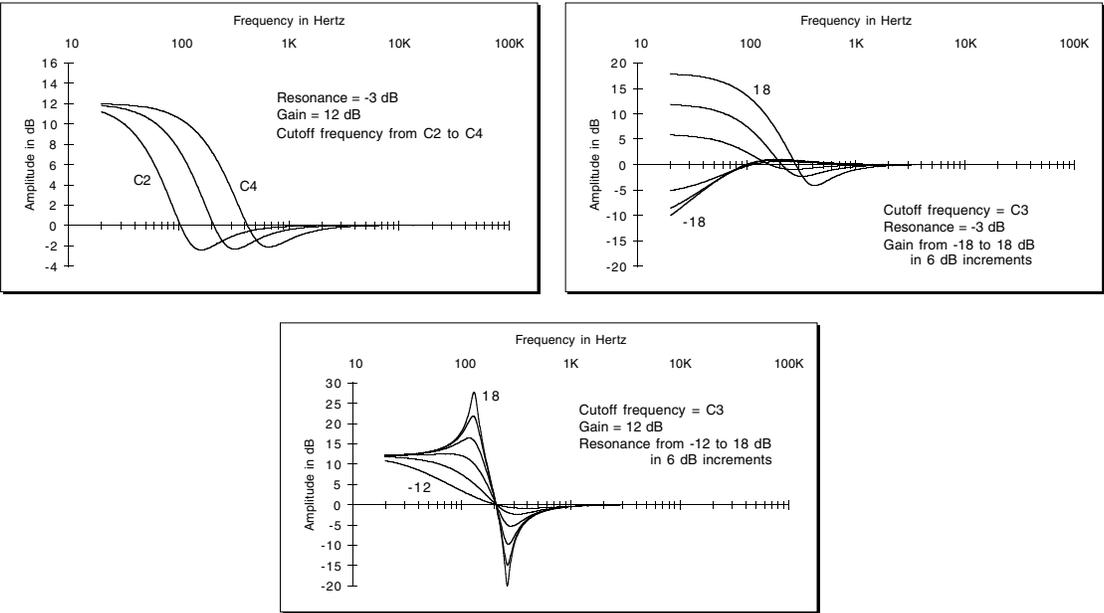


Figure A-8. Reson Bass frequency, gain, and resonance examples

Wide Mid

This is a midrange control that can be quite broad. The upper and lower frequencies are independently controllable. Don't cross the frequencies, or the filter will cease to have much effect. In fact, the two frequencies should be more than two octaves apart. The actual amount of maximum cut/boost will vary depending on the frequency spacing. It will always be somewhat less than what is displayed. The wider the spacing, the closer the actual maximum gain change will be to the specified number.

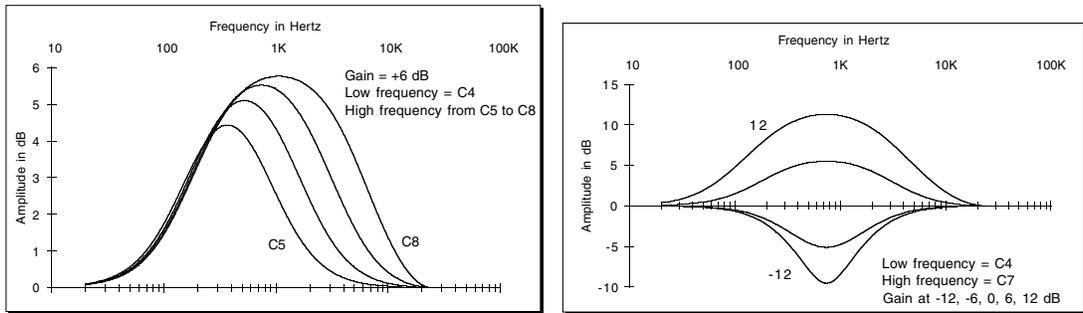


Figure A-9. Wide Mid frequency and gain examples

Bandpass

This filter passes all partials at the center frequency, and cuts the levels of partials above or below the center frequency, as specified by the width parameter.

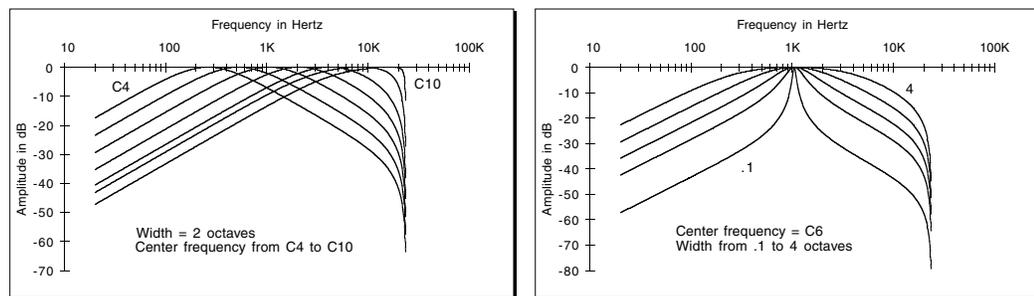


Figure A-10. Bandpass frequency and width examples

Notch

This filter lets you specify center frequency and width to be “notched.” Partial with frequencies above or below the notch will be unaffected. Within the notch, partials will be attenuated according to the width of the notch. The width is defined in terms of the number of octaves between the points on the signal’s attenuation curve where the attenuation is 3 dB. For example, if the width is set at four octaves, then the attenuation will be 3 dB at two octaves in either direction from the center frequency. There’s no attenuation of partials at more than two octaves in either direction from the center frequency.

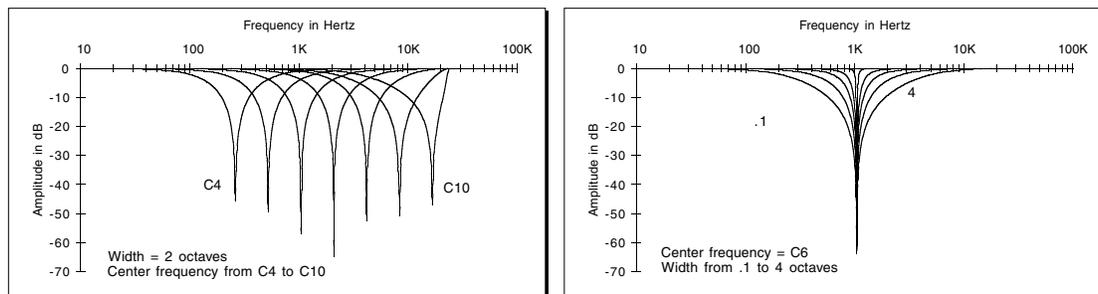


Figure A-11. Notch frequency and width examples

LoShelf/HP

This is a bass tone control, followed by a one-pole high pass filter.

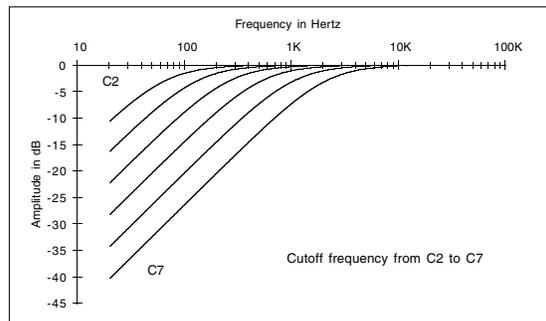


Figure A-12. One-pole high pass filter frequency example

HiShelf/HP

This is a treble tone control, followed by a one-pole high pass filter.

Mid/HP

This is mid-range parametric EQ, followed by a one-pole high pass filter.

Notch/HP

This a notch filter, followed by a one-pole high pass filter.

LoShelf/LP

This is a bass tone control, followed by a one-pole low pass filter.

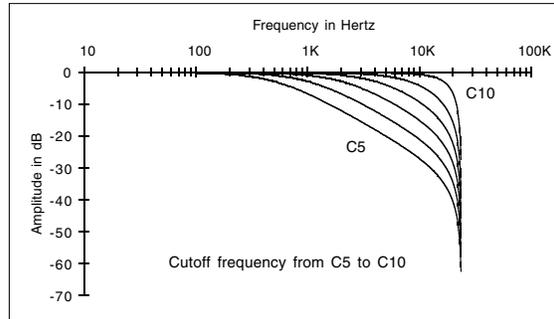


Figure A-13. One-pole low pass filter frequency example

HiShelf/LP

This is a treble tone control, followed by a one-pole low pass filter.

Mid/LP

This is mid-range parametric EQ, followed by a one-pole low pass filter.

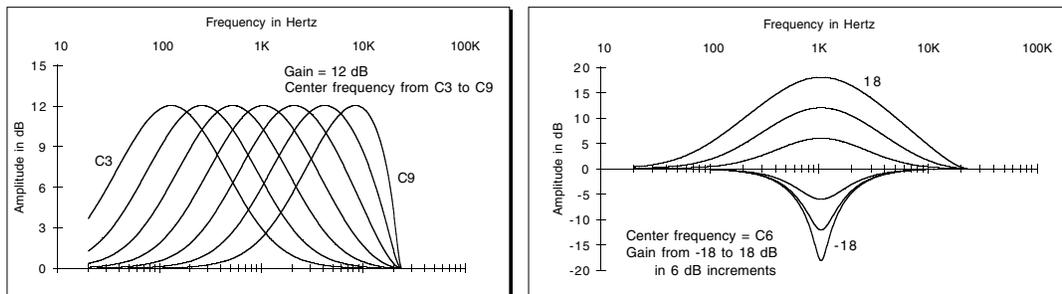


Figure A-14. Mid-range parametric EQ frequency and gain examples

Notch/LP

This is a notch filter, followed by a one-pole low pass filter

HP 1/LP 2

This is a two-pole low pass resonant filter, coupled with a one-pole high pass filter.

HP 2/LP 1

This is a two-pole high pass filter, coupled with a one-pole low pass filter.

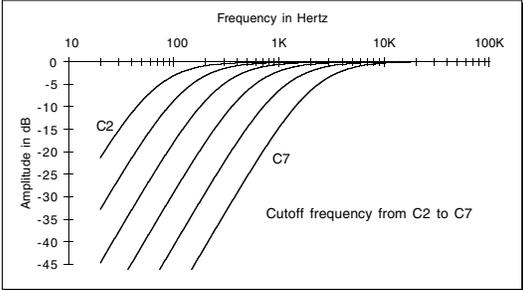


Figure A-15. Two-pole high pass filter frequency example

Distulator

This stimulator offers a one-pole low pass filter, followed by a distortion generator. The distortion function is even, so it will generate considerable amounts of second harmonic distortion from an input sine wave. The distortion has a drive control, which will control how high the order of distortion is (how many wiggles are in the distortion mapping curve.) A full scale input signal can have a drive of 0 dB to get a distortion curve that maps the input signal into four complete sine periods. A drive of -6 gives two sines; a drive of -12 dB gives one; a drive of -18 gives half a period. Anything smaller won't make any difference, except to require a higher distortion mix level. A drive greater than 0 could be needed if the input signal is small. After the distortion, a one zero LP is done. The mix function is then used to mix the distortion in with the original.

The intent is for subtle amounts of distortion. There are only two controls for this function, the drive/order control, and the mix level.

The illustrations that follow show a sinewave passed through the distulator set at various levels.

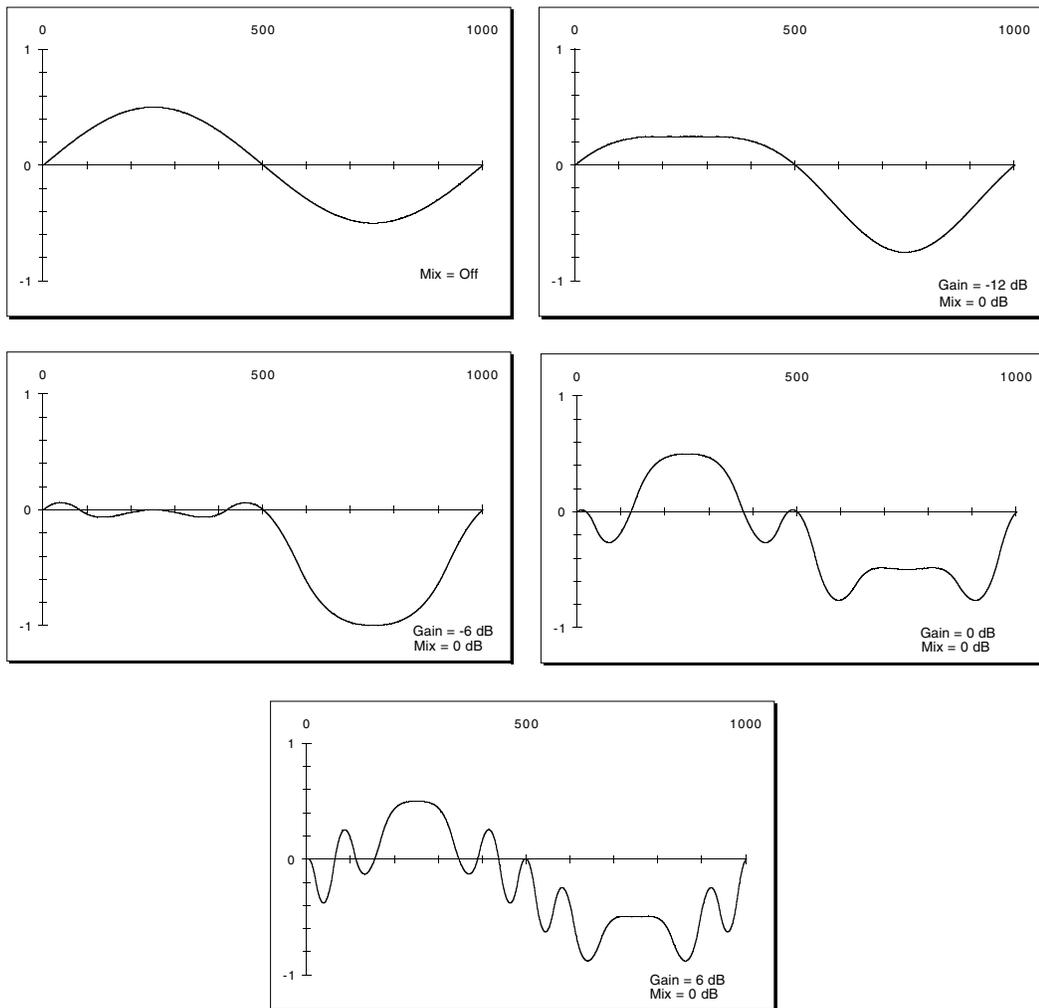


Figure A-16. Distulator gain examples

Shaper Functions

The shaper adds additional high frequency partials to a waveform in unpredictable ways, resulting in large changes in timbre. In other words, it can really mess things up.

The two series of graphs that follow show the effect of SHAPER on two typical single-cycle waveforms. The first set of six graphs just below shows the evolution of a sine wave input as the value of the Amount parameter is increased. The following set of six graphs shows the effect on a sawtooth wave when the Adjust parameter is increased. Each graph plots a 500-millisecond segment of waveforms cycling at frequencies of 2 Hz. Of course, these are just a few of the countless modulations you can apply to different waveforms at different frequencies.

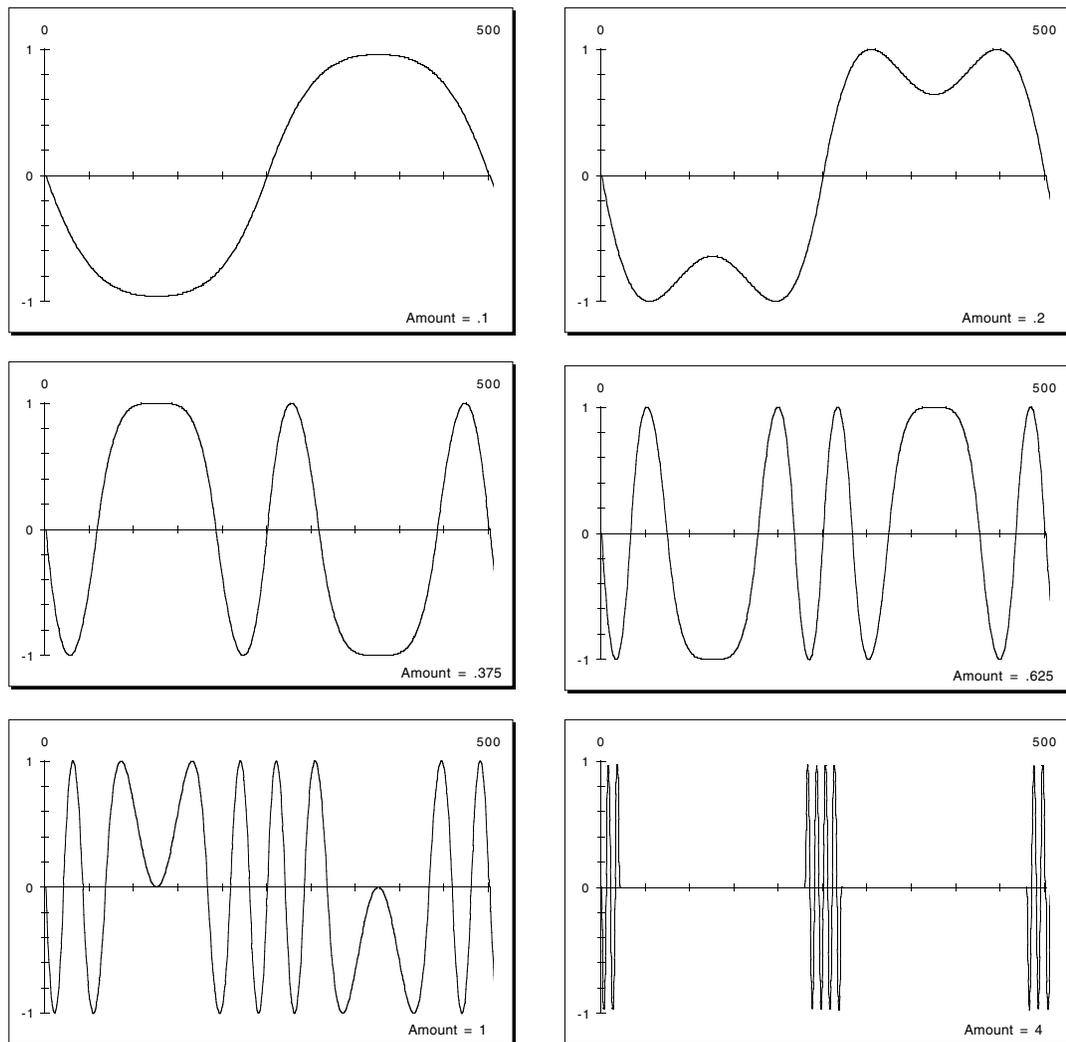


Figure A-17. Shaper amount examples

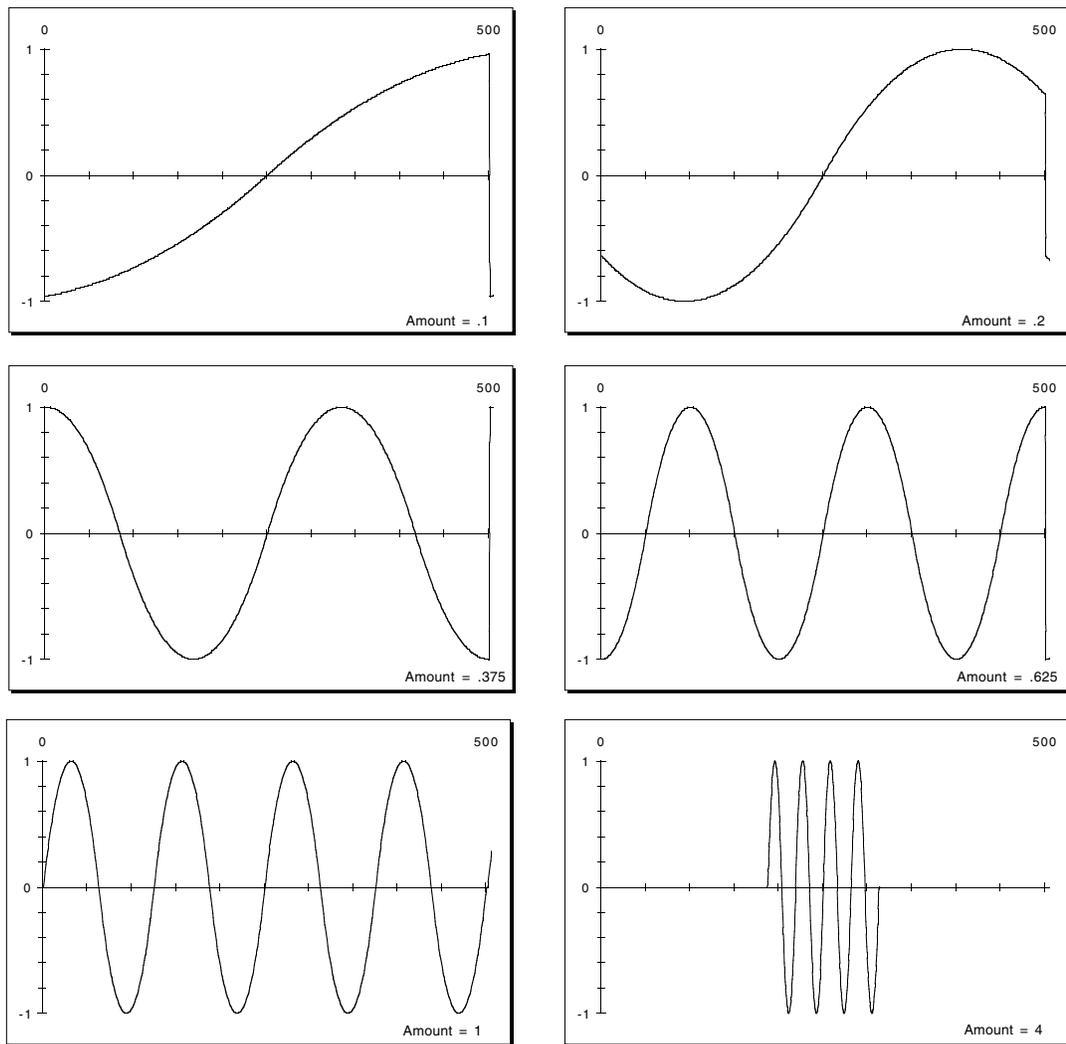


Figure A-18. Shaper adjust examples

Shaper 1LP

The Shaper 1LP EQ function features the shaper followed by a one-pole low pass filter, and finally faded with the original input.

Shaper 2LP

This function provides the shaper sandwiched between a pair of one-pole low pass filters.

Sine

This is a sine wave, for calibration and test purposes, followed by gain.

Sawtooth

A sawtooth wave, followed by gain.

Sine+Shape

A sine wave followed by the shaper function.

Noise

A white noise generator. There is a gain control, so that you won't be surprised by sudden full scale noise when scrolling to this function.

Pinker

A filter with a 3 dB/octave slope, falling towards the high frequencies, over the entire audio band. There are no controls. The main purpose is to follow the white noise generator, to produce pink noise. This can also make an interesting "warming" filter.

Impulse

A periodic click generator. You can set the rate (Tpmo) in beats per minute (BPM). Impulse can be useful for evaluating reverbs. If the click seems too bright, adjust the low pass filter parameter or follow it with a filter in the second EQ slot.

Appendix B

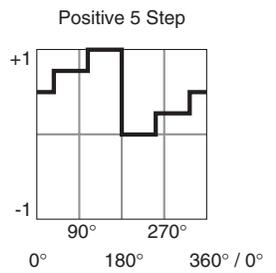
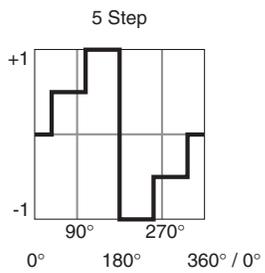
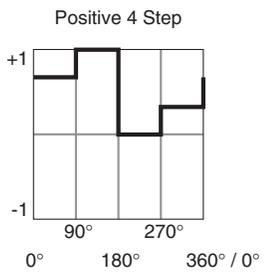
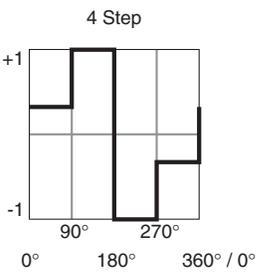
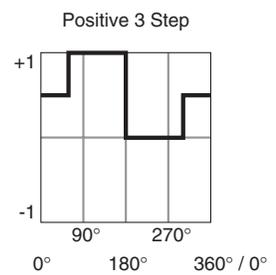
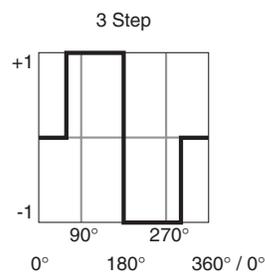
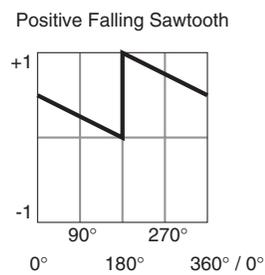
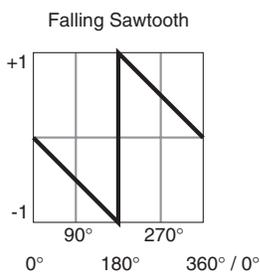
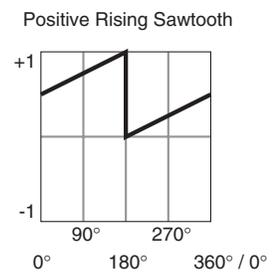
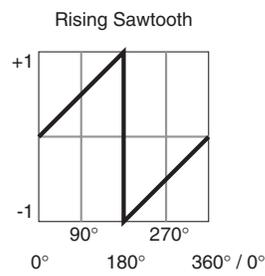
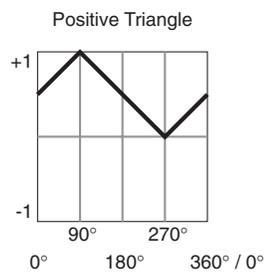
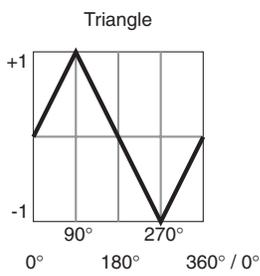
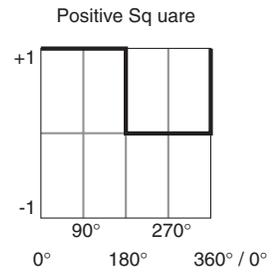
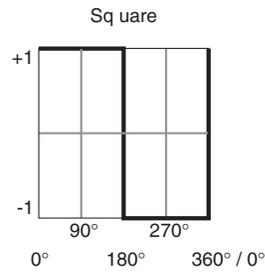
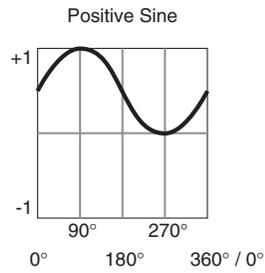
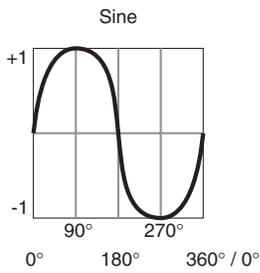
LFO Reference

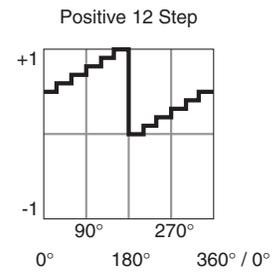
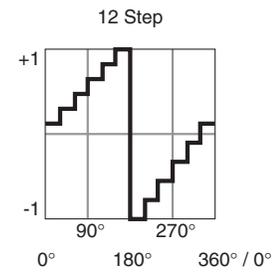
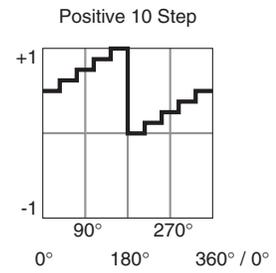
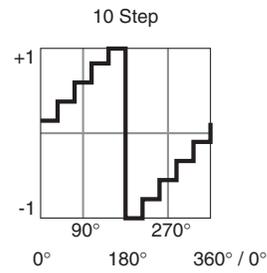
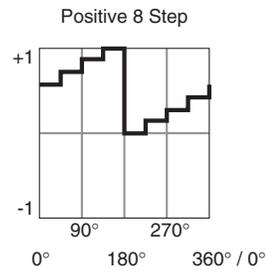
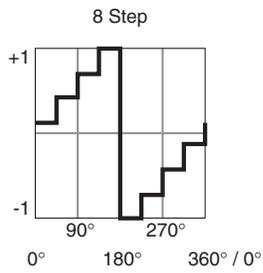
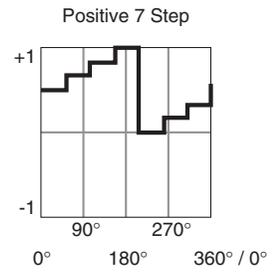
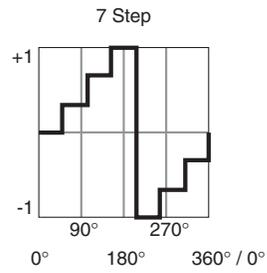
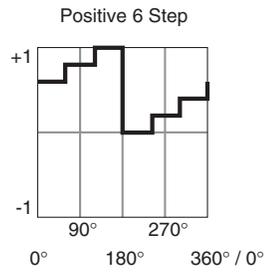
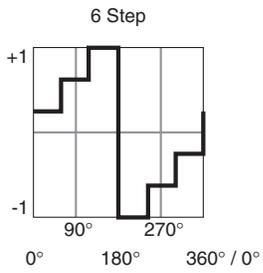
LFO Shapes

LFO Shape	Displayed:
Sine	Sine
Positive Sine	+Sine
Square	Square
Positive Square	+Squar
Triangle	Triang
Positive Triangle	+Trian
Rising Sawtooth	Rise S
Positive Rising Sawtooth	+Rise
Falling Sawtooth	Fall S
Positive Falling Sawtooth	+Fall
3 Step	3 Step
Positive 3 Step	+3 Ste
4 Step	4 Step
Positive 4 step	+4 Ste
5 Step	5 Step
Positive 5 Step	+5 Ste
6 Step	6 Step
Positive 6 Step	+6 Ste
7 Step	7 Step
Positive 7 Step	+7 Ste
8 Step	8 Step
Positive 8 Step	+8 Ste
10 Step	10 Ste
Positive 10 Step	+10 St
12 Step	12 Ste
Positive 12 Step	+12 St

LFO Reference

LFO Shapes





Appendix C

Object Reference

Studios

For more information on these studios, see page 5-7.

Number	Name
1	4SterIn>4SterFX
2	4MonoIn>4SterFX
3	8MonoIn>8MonoFX
4	4StIn>4StFX->Mix
5	4MnIn>4StFX->Mix
6	8MnIn>8MnFX->Mix
7	Morph This
8	AES> FX1-2 >AES
9	6 MonoIn>5.1 FX+
10	8 MonoIn>5.1 FX
11	MnIn>5.1 AutoPan
12	3 SterIn>5.1 FX+
13	4 SterIn>5.1 FX
14	5.1 In>5.1 FX +
97	Default 5.1+Ster
98	Default 8 Mono
99	Default 4 Stereo

Presets

Type	Number	Name	Algorithm	Size
STEREO REVERB PRESETS				
Booth/Ambience	1	Small Wood Booth	alg 4	2U
	2	Natural Room	alg 5	2U
	3	PrettySmallPlace	alg 4	2U
	4	NiceLittleBooth	alg 1	1U
	5	Sun Room	alg 5	2U
	6	Soundboard	alg 7	3U
	7	Add More Air	alg 10	3U
	8	Standard Booth	alg 8	3U
	9	A Distance Away	alg 6	3U
	10	Live Place	alg 8	3U
	11	Viewing Booth	alg 1	1U
	12	Small Closet	alg 10	3U
	13	Add Ambience	alg 1	1U
	14	With A Mic	alg 4	2U
Room	15	BrightSmallRoom	alg 1	1U
	16	Bassy Room	alg 1	1U
	17	Percussive Room	alg 1	1U
	18	SmallStudioRoom	alg 4	2U
	19	ClassRoom	alg 5	2U
	20	Utility Room	alg 5	2U
	21	Thick Room	alg 5	2U
	22	The Real Room	alg 5	2U
	23	Small Drum Room	alg 1	1U
	24	Real Big Room	alg 5	2U
	25	The Comfy Club	alg 9	3U
	26	Spitty Drum Room	alg 7	3U
	27	Stall One	alg 7	3U
	28	Green Room	alg 7	3U
	29	Tabla Room	alg 12	3U
	30	Large Room	alg 7	3U
	31	Platey Room	alg 14	3U
	32	Bathroom	alg 5	2U
	33	Drum Room	alg 12	3U
	34	Small Dark Room	alg 12	3U
	35	Real Room	alg 5	2U
	36	Brt Empty Room	alg 7	3U

Type	Number	Name	Algorithm	Size
	37	Med Large Room	alg 12	3U
	38	Bigger Perc Room	alg 7	3U
	39	Sizzly Drum Room	alg 5	2U
Chamber	40	Live Chamber	alg 11	3U
	41	Brass Chamber	alg 1	1U
	42	Sax Chamber	alg 1	1U
	43	Plebe Chamber	alg 1	1U
	44	JudgeJudyChamber	alg 7	3U
	45	Bloom Chamber	alg 7	3U
	46	ClassicalChamber	alg 7	3U
	47	In The Studio	alg 4	2U
	48	My Garage	alg 4	2U
	49	Cool Dark Place	alg 11	3U
Hall	50	Small Hall	alg 5	2U
	51	Medium Hall	alg 1	1U
	52	Real Niceverb	alg 5	2U
	53	Opera House	alg 5	2U
	54	Mosque Room	alg 7	3U
	55	Grandiose Hall	alg 1	1U
	56	Elegant Hall	alg 1	1U
	57	Bright Hall	alg 1	1U
	58	Ballroom	alg 1	1U
	59	Spacious Hall	alg 5	2U
	60	Classic Chapel	alg 5	2U
	61	Semisweet Hall	alg 5	2U
	62	Pipes Hall	alg 404	2U
	63	Reflective Hall	alg 5	2U
	64	Smooth Hall	alg 5	2U
	65	Empty Stage	alg 7	3U
	66	Pad Space	alg 11	3U
	67	Bob'sDiffuseHall	alg 9	3U
	68	Abbey Piano Hall	alg 7	3U
	69	Short Hall	alg 13	3U
	70	The Long Haul	alg 7	3U
	71	Predelay Hall	alg 9	3U
	72	Sweeter Hall	alg 7	3U
	73	The Piano Hall	alg 7	3U
	74	Bloom Hall	alg 9	3U
	75	Recital Hall	alg 12	3U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	76	Generic Hall	alg 12	3U
	77	Burst Space	alg 9	3U
	78	Real Dense Hall	alg 7	3U
	79	Concert Hall	alg 9	3U
	80	Standing Ovation	alg 11	3U
	81	Flinty Hall	alg 7	3U
	82	HighSchool Gym	alg 7	3U
	83	My Dreamy 481!!	alg 9	3U
	84	Deep Hall	alg 9	3U
	85	Sweet Hall	alg 5	2U
	86	Soundbrd/ rvb	alg 11	3U
	87	Long & Narrow	alg 7	3U
	88	Long PreDly Hall	alg 11	3U
	89	School Stairwell	alg 4	2U
Plate	90	Real Plate	alg 14	3U
	91	Bright Plate	alg 14	3U
	92	Medm Warm Plate	alg 7	3U
	93	Bloom Plate	alg 9	3U
	94	Clean Plate	alg 9	3U
	95	Plate Mail	alg 11	3U
	96	RealSmoothPlate	alg 9	3U
	97	Classic Plate	alg 5	2U
	98	Weighty Platey	alg 5	2U
	99	Huge Tight Plate	alg 9	3U
XL	100	Immense Mosque	alg 7	3U
	101	Dreamverb	alg 10	3U
	102	Splendid Palace	alg 5	2U
	103	Big Gym	alg 11	3U
	104	Huge Batcave	alg 12	3U
Reverse	105	Reverse Reverb 1	alg 15	3U
	106	Reverse Reverb 2	alg 15	3U
	107	Reverse Reverb 3	alg 15	3U
Gated	108	Gated Reverb	alg 3	2U
	109	Gate Plate	alg 3	2U
w/Comprs	110	Vocal Room	alg 53	4U
	111	Vocal Stage	alg 53	4U
	112	Reverb>Compress	alg 51	3U
	113	Reverb>Compress2	alg 51	3U
	114	Drum Comprs>Rvb	alg 51	3U

Type	Number	Name	Algorithm	Size
	115	Rvrb Compression	alg 50	2U
	116	Snappy Drum Room	alg 50	2U
	117	Roomitizer	alg 50	2U
	118	Live To Tape	alg 50	2U
	119	L:SmlRm R:Hall	alg 2	2U
Unusual	120	Non-Linear 1	alg 10	3U
	121	Non-Linear 2	alg 15	3U
	122	Non-Linear 3	alg 6	3U
	123	Exponent Booth	alg 10	3U
	124	Drum Latch 1	alg 10	3U
	125	Drum Latch 2	alg 10	3U
	126	Diffuse Gate	alg 9	3U
	127	Acid Trip Room	alg 10	3U
	128	Ringy Drum Plate	alg 104	3U
	129	Oil Tank	alg 104	3U
	130	Wobbly Plate	alg 104	3U
	131	Pitcher Hall	alg 383	2U
	132	DistantTVRoom	alg 383	2U
	133	Drum Neurezonate	alg 102	1U
	134	Growler	alg 104	3U
Laserverb	135	LaserVerb	alg 100	3U
	136	Laserwaves	alg 100	3U
	137	Cheap LaserVerb	alg 101	2U
	138	Gated LaserVerb	alg 104	3U
	139	Rvrs LaserVerb	alg 103	4U
	140	LazerfazerEchoes	alg 102	1U
	141	Simple LaserVerb	alg 102	1U
	142	Crystallizer	alg 100	3U
	143	Spry Young Boy	alg 101	2U
Rvb w/Dly	144	Gunshot Verb	alg 105	2U
	145	Slapverb	alg 11	3U
	146	Far Bloom	alg 9	3U
	147	Room + Delay	alg 105	2U
	148	New Hall w/Delay	alg 403	2U
	149	Delay Big Hall	alg 403	2U
STEREO DELAY PRESETS				
	150	Basic Delay 1/8	alg 150	1U
	151	Basic Dly 250ms	alg 190	1U
	152	Simple Slap 60ms	alg 190	1U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	153	TightSlapbk 30ms	alg 190	1U
	154	MedSlapback 76ms	alg 190	1U
	155	LongishSlap 95ms	alg 151	1U
	156	Wide Slapbk 76ms	alg 191	1U
	157	TiteSlapAmb 50ms	alg 191	1U
	158	33ms Ambience	alg 191	1U
	159	17ms Ambience	alg 191	1U
	160	Stereo Delay ms	alg 151	1U
	161	StereoFlamDelay	alg 191	1U
	162	Cheap Tape Echo	alg 154	2U
	163	Better Tape Echo	alg 171	4U
	164	Stereo Tape Slap	alg 171	4U
	165	Dub Delay ms	alg 190	1U
	166	4-Tap Delay BPM	alg 150	1U
	167	4-Tap Dly Pan ms	alg 151	1U
	168	SemiCircle 4-Tap	alg 151	1U
	169	8-Tap Delay BPM	alg 152	2U
	170	Multitaps ms	alg 156	1U
	171	Diffuse Slaps	alg 156	1U
	172	OffbeatFlamDelay	alg 150	1U
	173	Sloppy Echoes	alg 156	1U
	174	Pad Psychosis	alg 191	1U
	175	500ms BehindSrce	alg 156	1U
	176	Dub Skanque Dly	alg 154	2U
	177	Electronica Slap	alg 156	1U
	178	Spectral 4-Tap	alg 154	2U
	179	Astral Taps	alg 154	2U
	180	SpectraShapeTaps	alg 155	3U
	181	Fanfare In Gmaj	alg 155	3U
	182	Ecko Plecks BPM	alg 170	4U
	183	Ecko Plecks ms	alg 171	4U
	184	Degenerator	alg 170	4U
	185	Nanobot Feedback	alg 170	4U
	186	Takes a while...	alg 170	4U
	187	Wait for UFO	alg 170	4U
	188	News Update	alg 172	2U
	189	Timbre Taps	alg 105	2U
	190	LaserDelay->Rvb	alg 105	2U

Type	Number	Name	Algorithm	Size
	191	Furbelows	alg 9	3U
	192	Festoons	alg 9	3U
	193	Ducked Delay	alg 174	2U
	194	Drum+Bass Zapper	alg 174	2U
	195	3BandDly Drums=!	alg 173	2U
	196	Warped Echoes	alg 191	1U
	197	Ween-vox	alg 190	1U
	198	L:Flange R:Delay	alg 191	1U
	199	2Dlys 1Chr 1FIng	alg 192	2U
STEREO CHORUS PRESETS				
	200	Basic Chorus	alg 202	1U
	201	Smooth Chorus	alg 202	1U
	202	Chorusier	alg 202	1U
	203	Ordinary Chorus	alg 202	1U
	204	SlowSpinChorus	alg 202	1U
	205	Chorus Morris	alg 202	1U
	206	Everyday Chorus	alg 202	1U
	207	Thick Chorus	alg 203	2U
	208	Soft Chorus	alg 203	2U
	209	Rock Chorus	alg 203	2U
	210	Sm Stereo Chorus	alg 200	1U
	211	Lg Stereo Chorus	alg 201	2U
	212	Full Chorus	alg 402	2U
	213	Dense Gtr Chorus	alg 201	2U
	214	Standrd Gtr Chor	alg 406	1U
	215	Bass Chorus	alg 202	1U
	216	Stereo Chorus	alg 203	2U
	217	Chorus Fastback	alg 400	1U
	218	Wide Chorus	alg 203	2U
	219	Nickel Chorus	alg 387	3U
	220	Rich Noodle	alg 190	1U
	221	PinchChorusDelay	alg 406	1U
	222	StChorus+Delay	alg 406	1U
	223	StChor+3vs2Delay	alg 406	1U
	224	CDR for Lead Gtr	alg 403	2U
STEREO FLANGE PRESETS				
	225	Big Slow Flange	alg 225	1U
	226	Squeeze Flange	alg 225	1U
	227	Sweet Flange	alg 225	1U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	228	Throaty Flange	alg 225	1U
	229	PseudoAnaGtrFlnG	alg 225	1U
	230	Flanger Double	alg 225	1U
	231	Wetlip Flange	alg 225	1U
	232	Simply Flange	alg 226	2U
	233	Analog Flanger	alg 226	2U
	234	Soft Edge Flange	alg 226	2U
	235	Ned Flangers	alg 225	1U
	236	Wispy Flange	alg 225	1U
	237	Crystal Flange	alg 456	1U
	238	NarrowResFlange	alg 452	2U
	239	TightSlapFlange	alg 450	1U
	240	Flanged Taps	alg 455	2U
	241	StFlange+Delay	alg 456	1U
	242	StFlnG+3vs2Delay	alg 456	1U
	243	Singing Flanger	alg 456	1U
	244	DampedEchoFlange	alg 456	1U
	245	Stereo Flanger	alg 226	2U
	246	Gulp Flange	alg 225	1U
	247	Splat Flange	alg 225	1U
	248	Spread Flange	alg 225	1U
	249	CacophonousFlnG	alg 225	1U
STEREO PHASER PRESETS				
	250	Slow Deep Phaser	alg 251	1U
	251	Circles	alg 250	1U
	252	Saucepan Phaser	alg 253	1U
	253	ThunderPhaser	alg 254	1U
	254	Fast Phaser	alg 251	1U
	255	Vibrato Phaser	alg 254	1U
	256	Fast&Slow Phaser	alg 250	1U
	257	Wawawawawawawa	alg 253	1U
	258	Slow Swish Phase	alg 253	1U
	259	Slippery Slope	alg 385	2U
	260	Static Phaser 1	alg 255	1U
	261	Static Phaser 2	alg 255	1U
	262	Static Phaser 3	alg 255	1U
	263	Static Phaser 4	alg 255	1U
	264	Static Phaser 5	alg 257	4U
	265	Slow Riser	alg 258	4U

Type	Number	Name	Algorithm	Size
	266	BarberPole Notch	alg 258	4U
	267	BarberPole Peak	alg 258	4U
	268	All The Way Down	alg 258	4U
	269	Westward Waves	alg 385	2U
STEREO TREM / PANNER / SPATIAL PRESETS				
	270	Tremolo BPM	alg 270	1U
	271	Fast Tremolo BPM	alg 270	1U
	272	Tremolo in Hz	alg 271	1U
	273	FastPulseTremolo	alg 270	1U
	274	Simple Panner	alg 275	1U
	275	Dual Panner	alg 276	2U
	276	Widespread	alg 280	1U
	277	Widener Mn->St	alg 281	1U
	278	Dynam Stereoizer	alg 282	2U
STEREO ROTARY PRESETS				
	280	CleanRotors fast	alg 290	2U
	281	CleanRotors slow	alg 290	2U
	282	CleanRotors f C1	alg 290	2U
	283	CleanRotors f V1	alg 290	2U
	284	CleanRotors f Hi	alg 290	2U
	285	CleanRotors s Hi	alg 290	2U
	286	SlightDstRotor f	alg 291	2U
	287	SlightDstRotor s	alg 291	2U
	288	DirtyRotors fast	alg 292	2U
	289	DirtyRotors slow	alg 292	2U
	290	MoreDistRotor f	alg 293	2U
	291	MoreDistRotor s	alg 293	2U
	292	HeavyDistRotor f	alg 294	2U
	293	HeavyDistRotor s	alg 294	2U
	294	Res Rotor1 fast	alg 295	1U
	295	Res Rotor1 slow	alg 295	1U
	296	FullRotors4 fast	alg 296	4U
	297	FullRotors4 slow	alg 296	4U
	298	MegaVCRotors8 f	alg 298	8U
	299	MegaVCRotors8 s	alg 298	8U
STEREO DISTORTION PRESETS				
	300	Classic Gtr Dist	alg 310	3U
	301	Crunch Guitar	alg 310	3U
	302	SaturatedGtrDist	alg 310	3U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	303	Mean 70'sFunkGtr	alg 310	3U
	304	Blown Speaker	alg 390	2U
	305	Synth Distortion	alg 303	2U
	306	Superphasulate	alg 170	4U
	307	Dist Cab EPiano	alg 301	2U
	308	Distortion+EQ	alg 302	2U
	309	Burnt Transistor	alg 304	3U
	310	SubtleDistortion	alg 300	1U
	311	A little dirty	alg 305	1U
	312	Slight Overload	alg 305	1U
	313	ODriveGtrLd DICh	alg 317	3U
	314	Krazy Gtr Comper	alg 317	3U
	315	MildGtrOD+Dly+Fl	alg 320	3U
	316	LeadGtr Dly Flng	alg 318	3U
	317	Drum Shaper	alg 306	1U
	318	SubtleDrumShape	alg 307	2U
	319	SuperShaper	alg 306	1U
	320	3 Band Shaper	alg 307	2U
	321	New3BandShaper	alg 307	2U
	322	Shaper->Flange	alg 321	2U
	323	Shaper->Reverb	alg 322	2U
	324	Quantizer	alg 309	1U
	325	Quantize+Flange	alg 309	1U
	326	Quantize+Alias1	alg 308	1U
	327	Quantize+Alias2	alg 308	1U
	328	Drum Mortar	alg 308	1U
	329	Aliaser	alg 308	1U
STEREO DYNAMICS PRESETS				
	330	HKCompressor 3:1	alg 330	1U
	331	HKCompressor 5:1	alg 330	1U
	332	SK FB Compr 6:1	alg 331	1U
	333	SKCompressor 9:1	alg 331	1U
	334	SKCompressr 12:1	alg 331	1U
	335	Opto-compress	alg 333	2U
	336	Compress w/SC EQ	alg 332	2U
	337	Compress/Expand	alg 341	2U
	338	Compr/Expnd +EQ	alg 342	3U
	339	Expander	alg 340	1U
	340	Simple Gate	alg 343	1U

Type	Number	Name	Algorithm	Size
	341	Gate w/ SC EQ	alg 344	2U
	342	3Band Compressor	alg 336	4U
	343	3Band Compress2	alg 336	4U
	344	Mid Compressor	alg 335	3U
	345	OddHarmSuppress	alg 374	2U
	346	60Hz Buzz Kill	alg 374	2U
	347	Dual SK Compress	alg 347	2U
	348	Dual ComprS SCEQ	alg 348	3U
	349	Dual 3BandComprS	alg 349	8U
STEREO EQ / FILTERS PRESETS				
	350	AM Radio	alg 350	1U
	351	U-Shaped EQ	alg 350	1U
	352	5 Band EQ Flat	alg 351	3U
	353	Graphic EQ Flat	alg 352	3U
	354	Dual Graphic EQ	alg 353	3U
	355	Dual 5 Band EQ	alg 354	3U
	356	Basic Env Filter	alg 360	2U
	357	Phunk Env Filter	alg 360	2U
	358	Synth Env Filter	alg 360	2U
	359	Bass Env Filter	alg 360	2U
	360	EPno Env Filter	alg 360	2U
	361	Trig Env Filter	alg 361	2U
	362	LFO Sweep Filter	alg 362	2U
	363	DoubleRiseFilter	alg 362	2U
	364	Circle Bandsweep	alg 362	2U
	365	TripFilter	alg 362	2U
	366	Resonant Filter	alg 363	1U
	367	Dual Res Filter	alg 364	1U
	368	2 Band Enhancer	alg 370	1U
	369	3 Band Enhancer	alg 371	2U
	370	Extreem Enhancer	alg 371	2U
	371	HF Stimulator	alg 372	1U
	372	Ring Modulator	alg 380	1U
	373	PitcherA	alg 381	1U
	374	PitcherB	alg 381	1U
	375	PolyPtVoxChanger	alg 382	2U
	376	HollowPolyPitchr	alg 382	2U
	377	Pitcher+Chorus	alg 411	2U
	378	Pitcher+Flange	alg 461	2U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	379	Pitcher+Chor+Dly	alg 409	2U
	380	Pitcher+Flng+Dly	alg 459	2U
	381	Ring Linger	alg 390	2U
	382	Waterford	alg 103	4U
	383	Hip Hop Aura	alg 256	3U
	384	Woodenize	alg 256	3U
	385	Marimbafication	alg 256	3U
	386	Frequency Offset	alg 385	2U
	387	Drum Loosener	alg 385	2U
	388	Drum Tightener	alg 385	2U
	389	Vox Honker	alg 386	2U
	390	EQ Morpher ah-oo	alg 365	4U
	391	EQ Morpher ee-aa	alg 365	4U
	392	EQ Morpher aw-er	alg 365	4U
	393	Sawtooth Synth	alg 391	4U
	394	DeepSquare Synth	alg 391	4U
	395	Contact	alg 387	3U
	396	Drum Frightener	alg 387	3U
	397	Mad Hatter	alg 387	3U
	398	Fallout	alg 387	3U
	399	Ascension	alg 387	3U
STEREO CHORUS COMBI PRESETS				
	400	BasicChorusDelay	alg 400	1U
	401	Chorus PanDelay	alg 400	1U
	402	Chorus & Echo	alg 400	1U
	403	CDR Lead	alg 403	2U
	404	CDR Lead 2	alg 403	2U
	405	Chorus Delay 2	alg 400	1U
	406	Doubler & Echo	alg 400	1U
	407	Chorus Booth	alg 403	2U
	408	ChorusSmallRoom	alg 403	2U
	409	ChorusMedChamber	alg 404	2U
	410	Chorus MiniHall	alg 404	2U
	411	Chorus HiCeiling	alg 404	2U
	412	ChorBigBrnPlate	alg 404	2U
	413	CathedralChorus	alg 404	2U
	414	Flam Dly Bckgrnd	alg 403	2U
	415	CDHall Halo	alg 403	2U
	416	CrackedPorcelain	alg 401	1U

Type	Number	Name	Algorithm	Size
	417	Rich Delay	alg 403	2U
	418	FastChorusDouble	alg 400	1U
	419	MultiTap Chorus	alg 401	1U
	420	Chorused Taps	alg 402	2U
	421	MultiEchoChorus	alg 405	2U
	422	DeepChorDlyHall	alg 403	2U
	423	ClassicEP ChorRm	alg 403	2U
	424	Chorus Slow Hall	alg 404	2U
	425	SoftChorus Hall	alg 404	2U
	426	Chorus Air	alg 404	2U
	427	PsiloChorusHall	alg 404	2U
	428	SpeeChorusDeep	alg 400	1U
	429	Chorus Room	alg 404	2U
	430	Chorus Smallhall	alg 404	2U
	431	Chorus Med Hall	alg 404	2U
	432	Chorus Big Hall	alg 404	2U
	433	Chorus Echoverb	alg 402	2U
	434	Chorus Bass Room	alg 404	2U
	435	New Chorus Hall	alg 404	2U
	436	Floyd Hall	alg 404	2U
	437	Into The Abyss	alg 403	2U
	438	BroadRevSlapback	alg 403	2U
	439	Carlsbad Cavern	alg 403	2U
	440	Chr->GtrDst->Chr	alg 317	3U
	441	That's No Moon!!	alg 403	2U
	442	Laser Amalgam	alg 405	2U
	443	Cut it out!! CDR	alg 403	2U
	444	Chor-Delay Booth	alg 403	2U
	445	Chor Tin Room	alg 403	2U
	446	Boiler Plate	alg 403	2U
	447	O.T.T.Pad	alg 403	2U
	448	TheChorusCloset	alg 403	2U
	449	C-D	alg 402	2U
STEREO FLANGE COMBI PRESETS				
	450	Flange + Delay	alg 450	1U
	451	ThroatyFlangeDly	alg 450	1U
	452	Slapback Flange	alg 450	1U
	453	Flange Booth	alg 454	2U
	454	FlangeVerb Clav	alg 454	2U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	455	Flange Amb Smack	alg 454	2U
	456	Flange Dly 3-D	alg 453	2U
	457	Fl Dly Large Hall	alg 453	2U
	458	Flanged Edge	alg 321	2U
	459	Flange + 4Tap	alg 451	1U
	460	FlangeDelayHall	alg 453	2U
	461	SloFlangeDlyRoom	alg 453	2U
	462	Flange Hall	alg 454	2U
	463	FlangeDlyBigHall	alg 453	2U
	464	Flange Theatre	alg 454	2U
	465	FlangeTap Synth	alg 452	2U
	466	Flange Room	alg 453	2U
	467	Flange Echo	alg 452	2U
	468	Flange 4 Tap	alg 452	2U
	469	Flange Hall 2	alg 454	2U
	470	Flange-Dly Hall	alg 453	2U
	471	Flange Delay	alg 450	1U
	472	Mecha-Godzilla	alg 451	1U
	473	Industro-Flange	alg 453	2U
	474	Panning FDRoom	alg 453	2U
	475	Drum&Bass FlgDly	alg 451	1U
	476	Laserflange	alg 455	2U
	477	Pewter FlangeVrb	alg 454	2U
	478	WeirdFlangePlate	alg 454	2U
	479	F-D Hall	alg 453	2U
	480	SyntheticRmFlg	alg 453	2U
	481	Space Flanger	alg 452	2U
	482	Lazertag Flange	alg 455	2U
	483	Flange->Pitcher	alg 384	2U
	484	Flange->Shaper	alg 321	2U
	485	Pitch Spinner	alg 384	2U
	486	FD Lead Madness	alg 450	1U
	487	Brite Rippleverb	alg 453	2U
	488	Rotary Club	alg 453	2U
	489	Flangey Hall	alg 453	2U
	490	Flg->GtrDst->Chr	alg 319	3U
	491	MyGtrAteYo'Momma	alg 318	3U
	492	Glacial Canyon	alg 456	1U

Type	Number	Name	Algorithm	Size
	493	Spring Thing	alg 456	1U
	494	Ultima Thule Pad	alg 403	2U
	495	Dr. Who	alg 225	1U
	498	FX Mod Diag	alg 498	1U
	499	Stereo Analyze	alg 499	1U
MONO PRESETS				
Reverb	600	NiceLittleBooth	alg 600	1U
	601	Viewing Booth	alg 600	1U
	602	Add Ambience	alg 600	1U
	603	BrightSmallRoom	alg 600	1U
	604	Bassy Room	alg 600	1U
	605	Percussive Room	alg 600	1U
	606	Smooth Room	alg 600	1U
	607	Sm Drum Chamber	alg 600	1U
	608	Emperors Chamber	alg 600	1U
	609	Brass Chamber	alg 600	1U
	610	Sax Chamber	alg 600	1U
	611	Plebe Chamber	alg 600	1U
	612	Plate/Room	alg 600	1U
	613	Full Plate	alg 600	1U
	614	Small Auditorium	alg 600	1U
	615	Medium Hall	alg 600	1U
	616	Fast Decay Hall	alg 600	1U
	617	Dense Hall	alg 600	1U
	618	Courtyard	alg 600	1U
	619	Thunder Dome	alg 600	1U
Delay	620	Basic Dly 1/8	alg 610	1U
	621	4-Tap Delay	alg 610	1U
	622	2 Head Echo	alg 615	4U
	623	Spectral 4-Tap	alg 612	1U
	624	Astral Taps	alg 612	1U
	625	Multitaps ms	alg 613	1U
	626	DynGate Delay	alg 617	2U
	627	3 Band Delay	alg 616	1U
	628	Ecko Plecks	alg 614	4U
	629	Degenerator	alg 614	4U
Chorus	630	Basic Chorus	alg 620	1U
	631	Everyday Chorus	alg 620	1U
	632	Chorus Comeback	alg 620	1U

Object Reference

Presets

Type	Number	Name	Algorithm	Size
	633	Soft Chorus	alg 620	1U
	634	Ordinary Chorus	alg 620	1U
	635	Chorusier	alg 620	1U
	636	Thick Chorus	alg 620	1U
	637	Small Chorus	alg 620	1U
	638	Dense Gtr Chorus	alg 620	1U
	639	Boris Chorus	alg 620	1U
Flange	640	Big Slow Flange	alg 625	1U
	641	Classic Flange	alg 625	1U
	642	Wetlip Flange	alg 625	1U
	643	Throaty Flange	alg 625	1U
	644	Squeeze Flange	alg 625	1U
	645	Simply Flange	alg 625	1U
	646	Soft Edge Flange	alg 625	1U
	647	Ned Flangers	alg 625	1U
	648	Wispy Flange	alg 625	1U
	649	NarrowResFlange	alg 625	1U
Phaser	650	Sweeping Phaser	alg 630	1U
	651	Slow Deep Phaser	alg 631	1U
	652	Vibrato Phaser	alg 633	1U
	653	Saucepan Phaser	alg 632	1U
	654	Phase Tremor	alg 630	1U
	655	BarberPole Phasr	alg 637	2U
	656	Oceans of White	alg 632	1U
	657	Notch Your Daddy	alg 630	1U
	658	Manual Phaser	alg 634	1U
	659	Static Phaser	alg 634	1U
Tremolo	660	Fast Tremolo	alg 641	1U
	661	Tremolo Pulse	alg 641	1U
	662	Tempo Tremoloso	alg 640	1U
Rotary	663	CleanRotors slow	alg 646	2U
	664	Full Rotors fast	alg 646	2U
Distortion	665	Rock Lead 1	alg 656	3U
	666	Rock Lead 2	alg 656	3U
	667	Classic Dist	alg 656	3U
	668	ClassicOverdrive	alg 656	3U
	669	Meaty Overdrive	alg 656	3U
	670	Just Distortion	alg 650	1U
	671	Superphasulate	alg 614	4U

Type	Number	Name	Algorithm	Size
	672	Torn	alg 651	2U
	673	3 Band Shaper	alg 654	1U
	674	Quantizer	alg 655	1U
Dynamics	675	HKCompressor 3:1	alg 660	1U
	676	SK FB Compr 6:1	alg 661	1U
	677	SKCompressr 12:1	alg 661	1U
	678	Compress/Expand	alg 664	2U
	679	3Band Compressor	alg 665	3U
	680	HiBand Compressr	alg 665	3U
	681	Hard Limiter	alg 660	1U
	682	Drum Chop + EQ	alg 609	3U
	683	Drum Gate	alg 663	1U
Filter	684	Graphic U EQ	alg 670	2U
	685	6 Band EQ	alg 671	2U
	686	Slow Smooth Trg	alg 676	2U
	687	Synth Env Filter	alg 675	2U
	688	Phunk Env Filter	alg 675	2U
	689	Freak Slurper	alg 677	1U
	690	Resonant Filter	alg 678	1U
	691	3Band HiEnhancer	alg 672	1U
	692	HF Trimulator	alg 673	1U
	693	Ring Modulation	alg 680	1U
	694	Pitcher	alg 681	1U
	695	Woodenize	alg 636	2U
	696	Shimmer Warp	alg 682	2U
	697	Synth Trigger	alg 691	4U
	698	Laser Trickle	alg 605	2U
	699	Gain & Meter	alg 699	1U
5.1 SURROUND PRESETS				
Booth/ Ambience	700	Padded Booth	alg 700	12U
	701	Wood Booth	alg 703	12U
	702	Bright Back	alg 700	12U
	703	Thick Booth	alg 700	12U
	704	Add More Water	alg 700	12U
	705	Open Booth	alg 702	12U
Room	715	Tiny Room	alg 703	12U
	716	Spaced Room	alg 703	12U
	717	More Room	alg 703	12U
	718	Medium Room	alg 703	12U

Object ReferencePresets

Type	Number	Name	Algorithm	Size
	719	Brighter Room	alg 703	12U
	720	Metric Room	alg 703	12U
	721	Lively Room	alg 703	12U
	722	Brilliant Room	alg 703	12U
Chamber	730	Wide Loft	alg 703	12U
	731	Tonal Chamber	alg 701	12U
	732	Bare Studio	alg 701	12U
	733	Outdoor Market	alg 704	16U
	734	Damp Chamber	alg 703	12U
	735	Back Wall	alg 703	12U
	736	Mellow Space	alg 703	12U
	737	Smooth Chamber	alg 703	12U
Hall	750	Opaque Hall	alg 703	12U
	751	Less Hall	alg 703	12U
	752	Transient Hall	alg 703	12U
	753	Grand Hall	alg 703	12U
	754	Empty Hall	alg 703	12U
	755	Pacific Hall	alg 701	12U
	756	Orchestral Hall	alg 703	12U
	757	Big Clean Hall	alg 701	12U
	770	Astral Plate	alg 701	12U
	771	Big Shiny Plate	alg 701	12U
	772	Antique Plate	alg 701	12U
	777	Gothic	alg 701	12U
	778	Ominous	alg 701	12U
	779	Cavern	alg 703	12U
	790	Compress 5.1	alg 720	8U
	797	With Echo	alg 703	12U
	798	Relay Delay	alg 703	12U
	799	No Effect	alg 0	0U

Chains

Number	Name	Number	Name	Number	Name
STEREO CHAINS					
1	Phaser Cubed	33	Multiphaser	63	Squishy Delay
2	Synth Pulsar	34	Super Moving Phz	64	Ultra Big Place
3	Fat Boy Stutter	35	Phasy Compressxn	65	Band Compres Rvb
4	SpaciousGtrChor	36	Chorus All Ovus	66	Dirty Compressxn
5	Out of the Room	37	Flanging Verb	67	Pad Enhancer
6	Super Soloizer	38	Angry Rotors	68	Wide Slow Pan
7	Drum Megashaper	39	Distorted Truth	69	Before the Crash
8	Reverb Morpher	40	Superdistflange	70	Alien Buddies
9	Echo World	41	Quantum Phaser	71	Rising Resonance
10	Ode to Specktor	42	Compressed Rvb	72	Notch Your Step
11	Shine On vocal	43	Compressor Rvb	73	Voice Modulation
12	R+B Female Vox	44	Early & Late Rvb	74	Distort-in-a-box
13	Crystal Mic Vox	45	Coming of Dawn	75	Low Talker
14	Backing Voxzer	46	ResoDelay Plate	76	Mastering 1
15	RoomyPhasey EPno	47	Infinita' Phaser	77	Mastering 2
16	Dirty Organ Room	48	Trippy Taps	78	Sum & Diff Proc1
17	70's PianoChorus	49	RingMod Sequence	79	Sum & Diff Proc2
18	Bluegrass Squash	50	Wild Pitch	80	Sawbass Synth
19	Guitar Fazer	51	Freak Modulation	81	Drum Synth MIDI
20	Crushed Gtr Chor	52	Frequency Shock	82	Chaos Theory
21	Loveless GtrDist	53	No Nonsense Dist	83	Wasteland
22	Lead Yowler	54	Ultraphasulate	84	Scorched Earth
23	Banshee Wail	55	Dbl Comprsd Rvb	85	Scuba love!
24	FrumpyBass Comp	56	Enhanced Phase		
25	Roomy Bass Chor	57	Phased Chorus		
26	Scrooge McFunk	58	Chorus Attack		
27	Drum Treat	59	Superflange		
28	Drum'n Gate	60	Flanged Slapback	99	Default Chain St
29	Pump'n Drumz	61	Mayan Calling		
30	Drum Terror	62	Sweeping Verb		
31	Serious Drum efx				
32	SmooVDrumLpSynth				

Object Reference

Chains

Number	Name	Number	Name	Number	Name
MONO CHAINS					
600	Chorus Flange	617	LeadGtr Cln/Dist	634	PhaseeDistortion
601	MultiPhaser	618	Screaminautowah!	635	Quantifier
602	Subway Delay	619	Rezzo Drum Loop	636	LaserVerb 747
603	Guitar Rage	620	BasicChorusDelay	637	ReflectiveChorus
604	Bootsy's Muetron	621	Swizzle Stim CDR	638	Roosevelt
605	3BandComp+Reverb	622	Icarus' Phaser	639	Magical Relish
606	Super Phaser	623	Phase Dist Delay	640	CPR Delay
607	Eurhythmia	624	Quantiphase	641	Alias+Phase+Fun
608	Gated Reverb	625	DoubleDDistort	642	FDR Overdrive
609	Synth Pulsar II	626	Grits n' Gravy	643	BitingDistortion
610	Old LP ElecPiano	627	Sweeping Verb	644	Rvrb+Graphic EQ
611	Rotorrizer	628	Chorus Comp Lasr	645	Gate & Compress
612	Overdrv Vox Slap	629	Stuttering Delay	646	Pitcher MIDIkeys
613	Backing Vocal	630	Spin Drops	647	DrumPitcher MIDI
614	Roomy Bass Chor	631	Chorus... Delay	648	EZTchnoPlayAlong
615	Bass Head Compr	632	Psychedelic Guit	649	Saw Synth MIDI
616	Sly Bass	633	Barberpole Roto	98	Default Chain Mn

Number	Name
5.1 SURROUND CHAIN	
97	Default Chain Sr

Algorithms

Number	Name	Size	Number	Name	Size
STEREO ALGORITHMS					
1	MiniVerb	1U	320	PolyAmp<>MD>Flan	3U
2	Dual MiniVerb	2U	321	Flange<>Shaper	2U
3	Gated MiniVerb	2U	322	Shaper<>Reverb	2U
4	Classic Place	2U	330	HardKneeCompress	1U
5	Classic Verb	2U	331	SoftKneeCompress	1U
6	TQ Place	3U	332	Compress w/SC EQ	2U
7	TQ Verb	3U	333	Opto Compress	2U
8	Diffuse Place	3U	334	Opto ComprS SCEQ	3U
9	Diffuse Verb	3U	335	Band Compress	3U
10	OmniPlace	3U	336	3 Band Compress	4U
11	OmniVerb	3U	340	Expander	1U
12	Panaural Room	3U	341	Compress/Expand	2U
13	Stereo Hall	3U	342	Comp/Exp + EQ	3U
14	Grand Plate	3U	343	Gate	1U
15	Finite Verb	3U	344	Gate w/SC EQ	2U
50	Reverb+Compress	2U	347	Dual SKCompress	2U
51	Reverb<>Compress	3U	348	Dual ComprS SCEQ	3U
52	ClascVrb<>ComprS	3U	349	Dual 3 Band Comp	8U
53	Gate+Cmp[EQ]+Rvb	4U	350	3 Band EQ	1U
54	Gate+Cmp<>EQ+Rvb	4U	351	5 Band EQ	3U
100	LaserVerb	3U	352	Graphic EQ	3U
101	LaserVerb Lite	2U	353	Dual Graphic EQ	3U
102	Mono LaserVerb	1U	354	Dual 5 Band EQ	3U
103	Revrse LaserVerb	4U	360	Env Follow Filt	2U
104	Gated LaserVerb	3U	361	TrigEnvelopeFilt	2U
105	LasrDly<>Reverb	2U	362	LFO Sweep Filter	2U
106	LasrDly<>Rvrb ms	2U	363	Resonant Filter	1U
150	4-Tap Delay BPM	1U	364	Dual Res Filter	1U
151	4-Tap Delay	1U	365	EQ Morpher	4U
152	8-Tap Delay BPM	2U	366	Mono EQ Morpher	2U
153	8-Tap Delay	2U	370	2 Band Enhancer	1U
154	Spectral 4-Tap	2U	371	3 Band Enhancer	2U
155	Spectral 6-Tap	3U	372	HF Stimulate 1	1U
156	Complex Echo	1U	373	HF Stimulate 3	3U
170	Degen Regen BPM	4U	374	HarmonicSuppress	2U
171	Degen Regen	4U	375	Tone Suppressor	2U
172	Switch Loops	2U	380	Ring Modulator	1U
173	3 Band Delay	2U	381	Pitcher	1U
174	Gated Delay	2U	382	Poly Pitcher	2U
190	Moving Delay	1U	383	Pitcher+Miniverb	2U

Object Reference

Algorithms

Number	Name	Size	Number	Name	Size
191	Dual MovDelay	1U	384	Flange<>Pitcher	2U
192	Dual MvDly+MvDly	2U	385	Frequency Offset	2U
200	Chorus 1	1U	386	MutualFreqOffset	2U
201	Chorus 2	2U	387	WackedPitchLFO	3U
202	Dual Chorus 1	1U	390	Chaos!	2U
203	Dual Chorus 2	2U	391	ADSR Synth	4U
225	Flanger 1	1U	392	Env Synth	3U
226	Flanger 2	2U	400	Chorus+Delay	1U
250	LFO Phaser	1U	401	Chorus+4Tap	1U
251	LFO Phaser Twin	1U	402	Chorus<>4Tap	2U
253	SingleLFO Phaser	1U	403	Chor+Dly+Reverb	2U
254	VibratoPhaser	1U	404	Chorus<>Reverb	2U
255	Manual Phaser	1U	405	Chorus<>LasrDly	2U
256	Allpass Phaser 3	3U	406	St Chorus+Delay	1U
257	Allpass Phaser 4	4U	407	St Chorus+4Tap	1U
258	Barberpole Comb	4U	408	St Chor+Dly+Rvrb	2U
270	Tremolo BPM	1U	409	Pitcher+Chor+Dly	2U
271	Tremolo	1U	410	Pitch+StChor+Dly	2U
275	AutoPanner	1U	411	MonoPitcher+Chor	2U
276	Dual AutoPanner	2U	412	MonoPitch+StChor	2U
280	Stereo Image	1U	420	Chorus+Delay ms	1U
281	Mono -> Stereo	1U	421	Chorus+4Tap ms	1U
282	DynamicStereoize	2U	422	Chorus<>4Tap ms	2U
284	Cabinet	3U	423	Chor+Dly+Rvrb ms	2U
290	VibChor+Rotor 2	2U	425	Chor<>LasrDly ms	2U
291	Distort + Rotary	2U	426	St Chor+Delay ms	1U
292	VC+Dist+HiLoRotr	2U	427	St Chor+4Tap ms	1U
293	VC+Dist+1Rotor 2	2U	428	StCh+Dly+Rvrb ms	2U
294	VC+Dist+HiLoRot2	2U	429	Ptch+Chor+Dly ms	2U
295	Rotor 1	1U	430	Ptch+StCh+Dly ms	2U
296	VC+Dist+Rotor 4	4U	450	Flange+Delay	1U
297	VC+Tube+Rotor 4	4U	451	Flange+4Tap	1U
298	Big KB3 Effect	8U	452	Flange<>4Tap	2U
300	Mono Distortion	1U	453	Flan+Dly+Reverb	2U
301	MonoDistort+Cab	2U	454	Flange<>Reverb	2U
302	MonoDistort + EQ	2U	455	Flange<>LasrDly	2U
303	PolyDistort + EQ	2U	456	St Flange+Delay	1U
304	StereoDistort+EQ	3U	457	St Flange+4Tap	1U
305	Subtle Distort	1U	458	St Flan+Dly+Rvrb	2U
306	Super Shaper	1U	459	Pitcher+Flan+Dly	2U
307	3 Band Shaper	2U	460	Pitch+StFlan+Dly	2U
308	Quantize+Alias	1U	461	MonoPitcher+Flan	2U

Number	Name	Size	Number	Name	Size
309	Quantize+Flange	1U	470	Flange+Delay ms	1U
310	Gate+TubeAmp	3U	471	Flange+4Tap ms	1U
311	Gate+Tube+Reverb	4U	472	Flange<>4Tap ms	2U
312	Gt+Tube<>MD+Chor	4U	473	Flan+Dly+Rvrb ms	2U
313	Gt+Tube<>MD+Flan	4U	475	Flan<>LasrDly ms	2U
314	Gt+Tube<>2MD	4U	476	St Flan+Delay ms	1U
315	Gt+Cmp+Dst+EQ+Ch	4U	477	St Flan+4Tap ms	1U
316	Gt+Cmp+Dst+EQ+Fl	4U	478	StFl+Dly+Rvrb ms	2U
317	TubeAmp<>MD>Chor	3U	479	Ptch+Flan+Dly ms	2U
318	TubeAmp<>MD>Flan	3U	480	Ptch+StFl+Dly ms	2U
319	PolyAmp<>MD>Chor	3U	498	FXMod Diagnostic	1U
			499	Stereo Analyze	1U

Number	Name	Size	Number	Name	Size
MONO ALGORITHMS					
600	Mn MiniVerb	1U	651	Mn Distort+Cab	2U
605	Mn LaserVerb	2U	652	Mn Distort + EQ	2U
608	MnGt+Cmp[EQ]+Rvb	3U	653	Mn Super Shaper	1U
609	MnGt+Cmp<>EQ+Rvb	3U	654	Mn 3 Band Shaper	1U
610	Mn 6-TapDelayBPM	1U	655	MnQuantize+Alias	1U
611	Mn 6-Tap Delay	1U	656	Mn Gate+TubeAmp	3U
612	Mn Spectral 4Tap	1U	660	Mn HK Compress	1U
613	Mn Complex Echo	1U	661	Mn SK Compress	1U
614	Mn DegenRegenBPM	4U	662	Mn Expander	1U
615	Mn Degen Regen	4U	663	Mn Gate	1U
616	Mn 3 Band Delay	1U	664	Mn Compr/Expand	2U
617	Mn Gated Delay	2U	665	Mn 3 Band Compr	3U
620	Mn Chorus 1	1U	670	Mn Graphic EQ	2U
625	Mn Flanger 1	1U	671	Mn 6 Band EQ	2U
630	Mn LFO Phaser	1U	672	Mn 3BandEnhancer	1U
631	Mn LFOPhaserTwin	1U	673	Mn HF Stimulate1	1U
632	Mn SingleLFOPhsr	1U	674	Mn HF Stimulate2	2U
633	Mn VibratoPhaser	1U	675	Mn Env Filter	2U
634	Mn Manual Phaser	1U	676	Mn Trig Env Filt	2U
635	Mn AP Phaser 3	2U	677	Mn LFOSweepFilt	1U
636	Mn AP Phaser 4	2U	678	Mn Res Filter	1U
637	Mn Barberpole	2U	679	Mn EQ Morpher	2U
640	Mn Tremolo BPM	1U	680	Mn Ring Modulate	1U
641	Mn Tremolo	1U	681	Mn Pitcher	1U
645	Mn Cabinet	2U	682	Mn Freq Offset	2U
646	Mn VC+Dist+Rotor	2U	690	Mn Chaos!	2U
650	Mn Distortion	1U	691	Mn ADSR Synth	4U

Object Reference

Algorithms

Number	Name	Size	Number	Name	Size
			692	Mn Env Synth	3U
			699	Mn Analyze	1U

Number	Name	Size
5.1 SURROUND ALGORITHMS		
700	OmniPlace 5.1	12U
701	OmniVerb 5.1	12U
702	TQ Place 5.1	12U
703	TQ Verb 5.1	12U
704	Surround	16U
720	Compress 5.1	8U

Appendix D

KSP8 SysEx

The MIDI System Exclusive capabilities of the KSP8 allow you to manipulate objects in the KSP8's memory from a computer system, another KSP8, or a MIDI data recorder. The following is a reference to the SysEx protocol used by the KSP8. This information can be used to build a simple object librarian software program. A word of advice—before you begin experimenting with SysEx, make sure you have saved anything of value in RAM to disk.

Common Format

In the following discussion, the fields of the KSP8 System Exclusive Protocol messages are notated as `field(length)`, where `field` is the name of the particular information field in the message, and `(length)` is either 1, 2, 3, or `n`, representing the number of sequential MIDI bytes that make up the field. A length of `n` means that the field is of a variable length that is determined by its contents or subfields.

All KSP8 SysEx messages have the common format:

```
sox(1) kid(1) dev-id(1) pid(1) msg-type(1) message(n) eox(1)
```

`sox` is always `F0h`, and represents start of System Exclusive.

`kid` must be `07h`, and is the Kurzweil Manufacturer ID.

`dev-id` is Device ID. The KSP8 will recognize a SysEx message if `dev-id` is the same as the SysEx ID parameter from the MIDI-mode RECEIVE page. If the KSP8's SysEx ID parameter is set to `127`, it will recognize SysEx messages no matter what the value of `dev-id` is.

`pid` is the Product Identifier, and must be `32h` (50 decimal), indicating the SysEx message is for the KSP8.

`msg-type` is the identifier of one of the KSP8 SysEx messages defined below, and `message` is the variable-length message contents.

`eox` is always `F7h`, for end of System Exclusive.

Data Formats

KSP8 SysEx messages are subdivided into fields that contain data in different formats. The various fields are shown in the Messages section below. Within a message, any fields for values that can be bigger than 7 bits are broken into 7 bit chunks. Thus two MIDI bytes gives 14 bits, three bytes gives 21 bits. The significant bits are right justified in the field. All bytes in a field must be present no matter what the value is. For example, an object type of 132 would be split into two MIDI bytes in a `type` field as 01 04:

```
decimal:                132
binary:                10000100
binary encoding for type(2) field: 0000001 0000100
decimal encoding for type(2) field: 1 4
```

Object name fields are sent as a string of ASCII values in a `name` field, with one MIDI byte of zero as a string terminator. For example, the name **Glass Kazoo** would be sent as follows:

```

          G   l   a   s   s   _   K   a   z   o   o   <null>
hex encoding  47   6C   61   73   73   20   4B   61   7A   6F   6F   00
for name field:
```

Data sizes and offsets are sent in the `size` and `offs` fields. These values refer to quantities of 8-bit bytes in the KSP8's memory, which is packed in the `data` field.

Binary data in the `data` field are sent in one of two formats, according to the value of the `form` field. If the `form` field equals zero, the data are transmitted as 4 bits or one "nibble" in every MIDI byte. If the `form` field equals one, then the data are sent as a compressed bit-stream, with 7 bits per MIDI byte. The bit-stream format is more efficient for data transmission, while the nibble format is easier to read (and write software for).

For example, to send the following four KSP8 data bytes,

```
hex:          4F                D8                01                29
decimal:      79                216             1                 41
binary:      01001111         11011000        00000001         00101001
```

eight MIDI bytes are sent in "nibble" format:

```
hex          04          0F          0D          08          00          01          02          09
decimal      4           15          13          8           0           1           2           9
binary      0000100    0001111    0001101    0001000    0000000    0000001    0000010    0001001
```

five MIDI bytes are sent in bit-stream format:

```
hex:          27                76                0                 12                48
decimal:      39                118               0                 18                72
binary:      0100111         1110110         0000000         0010010         1001000
```

The bit-stream format can be thought of as taking the binary bits of the KSP8 data and, starting from the left, slicing off groups of 7 bits. Note that the trailing bits are set to zero.

After the **data** field, there is another field, **xsum**. This is a checksum field that is calculated as the least significant 7-bits of the sum of all of the MIDI bytes that make up the **data** field.

Messages

This section defines the KSP8 System Exclusive message formats. Each message has a message type, which goes in the **msg-type** field, followed by the field definitions of the message.

DUMP = 00h **type(2) idno(2) offs(3) size(3) form(1)**

Requests the KSP8 to send a data dump of an object or portion thereof. **type** and **idno** identify the object. **offs** is the offset from the beginning of the object's data; **size** describes how many bytes should be dumped starting from the offset. **form** indicates how the binary data are to be transmitted (0=nibblized, 1=bit stream). The response is a **LOAD** message:

LOAD = 01h **type(2) idno(2) offs(3) size(3) form(1) data(n) xsum(1)**

This writes data into the specified object, which must exist. Both load and dump operate on the object data only. The response to a load message will be the following:

DACK = 02h **type(2) idno(2) offs(3) size(3)**

Load accepted, or

DNAK = 03h **type(2) idno(2) offs(3) size(3) code(1)**

Load not accepted. The **code** field indicates the cause of the failure, as follows:

Code	Meaning
1	Object is currently being edited
2	Incorrect checksum
3	ID out of range (invalid)
4	Object not found (no object with that ID exists)
5	RAM is full

To request information about an object, use:

DIR = 04h **type(2) idno(2)**

The **type** and **idno** identify the object. The response is an **INFO** message:

INFO = 05h **type(2) idno(2) size(3) ramf(1) name(n)**

This is the response to **DIR**, **NEW**, or **DEL**. If object is not found, **size** will be zero and **name** will be null. **ramf** is 1 if the object is in RAM.

NEW = 06h **type(2) idno(2) size(3) mode(1) name(n)**

Creates a new object and responds with an INFO message of the created object. The object's data will not be initialized to any default values. If `idno` is zero, the first available object ID number will be assigned. If `mode` is 0, the request will fail if the object exists. If `mode` is 1, and the object exists in ROM, a RAM copy will be made. If `mode` is 1, and the object exists in RAM, no action is taken.

DEL = 07h **type(2) idno(2)**

Deletes an existing object and responds with an INFO message for the deleted object. If there is only a RAM copy of the object, the response will indicate that the object doesn't exist anymore. However, if the deletion of a RAM object uncovers a ROM object, the INFO response will refer to the ROM object. A ROM object cannot be deleted.

CHANGE = 08h **type(2) idno(2) newid(2) name(n)**

Changes the name and/or ID number of an existing object. If `newid` is zero or `newid` equals `idno`, the ID number is not changed. If `newid` is a legal object id number for the object's type, then the existing object will be relocated in the database at the new ID number. This will cause the deletion of any object which was previously assigned to the `newid`. If the `name` field is null, the name will not change. Otherwise, the name is changed to the (null-terminated) string in the name field.

WRITE = 09h **type(2) idno(2) size(3) mode(1) name(n) form(1) data(n) xsum(1)**

Writes an entire object's data directly into the database. It functions like the message sequence DEL followed by NEW followed by a LOAD of one complete object data structure. It first deletes any object already existing at the same type/ID. If no RAM object currently exists there, a new one will be allocated and the data will be written into it. The object name will be set if the `name` string is non-null. The response to this message will either be a DACK or a DNAK, as with the load message. The `offs` field of the response will be zero. The KSP8 will send a WRITE message whenever an object is dumped from the front-panel (using a **Dump** soft button), or in response to a READ message.

The `mode` field is used to determine how the `idno` field is interpreted.

If `mode` = 0, the `idno` specifies the absolute ID number to write to, which must exist (must be valid). If `idno` equals zero, write to the first available ID number.

If `mode` = 1, the object is written at the first available ID number after what is specified by `idno`.

It doesn't matter if `idno` is a legal ID number. Remember that for certain object types, the 100s through 900s banks allow fewer than 100 objects to be stored (for example, the 100s bank will store Quick-Access banks at IDs 100–119 only). In this mode, if `idno` were 313, the object would be written to ID 400 if available.

READ = 0Ah **type(2) idno(2) form(1)**

Requests the KSP8 to send a WRITE message for the given object. No response will be sent if the object does not exist.

READBANK = 0Bh **type(2) bank(1) form(1) ramonly(1)**

Requests the KSP8 to send a WRITE message for multiple objects within one or all banks.

`type` and `bank` specify the group of objects to be returned in WRITE messages. The `type` field specifies a single object type, unless it is zero, in which case objects of all user types will be

returned (see object type table below). The **bank** field specifies a single bank, 0–9, unless it is set to 127, in which case objects from all banks will be returned.

form requests the format of the binary data in the WRITE messages. If **ramonly** is one, only objects in RAM will be returned. If **ramonly** is zero, both RAM and ROM objects are returned.

The responses, a stream of complete WRITE messages, will come out in order of object type, while objects of a given type are in order by ID number, from lowest to highest. If no objects are found that match the specifications, no WRITE messages will be returned. After the last WRITE message, an ENDOFBANK message (defined below) is sent to indicate the completion of the bank dump.

The KSP8 will insert a small delay (50ms) between WRITE messages that it issues in response to a READBANK message.

A bank dump can be sent in its entirety to another KSP8, which will add all of the objects contained in the dump to its own object database. Important: If the KSP8 receives a large bank dump for a bank or banks that already contain objects, errors may result unless the sender waits for the DACK message before sending the next object's WRITE message. One way to avoid transmission errors such as this is to make sure that the bank being dumped is clear in the KSP8 before sending the dump, so that the KSP8 will not miss parts of the dump while its CPU is busy deleting already existing objects. This can be done using the DELBANK message (defined below). If the destination bank in the KSP8 is clear, it is not necessary to wait for the DACK before sending. Even if the sender chooses not to wait for the DACK before sending the next message, it may be necessary to preserve the 50ms delay between the WRITE messages.

Due to the large amount of incoming data during a bank dump containing many objects, the receiving KSP8 may have a more sluggish response to front-panel use and keyboard playing during the data transfer. This is normal behavior and the machine will become fully responsive as soon as the dump is finished.

DIRBANK = 0Ch type(2) bank(1) ramonly(1)

This is similar to the READBANK message. The DIRBANK message requests an INFO message (containing object size, name, and memory information) be returned for each object meeting the specifications in the **type** and **bank** fields. Following the last INFO response will be an ENDOFBANK message.

ENDOFBANK = 0Dh type(2) bank(1)

This message is returned after the last WRITE or INFO response to a READBANK or DIRBANK message. If no objects matched the specifications in one of these messages, ENDOFBANK will be the only response.

DELBANK = 0Eh type(2) bank(1)

This message will cause banks of objects (of one or all types) to be deleted from RAM. The **type** and **bank** specifications are the same as for the READBANK message. The deletion will take place with no confirmation. Specifically, the sender of this message could just as easily delete every RAM object from the KSP8 (for example, **type** = 0 and **bank** = 127) as it could delete all studios from bank 7 (for example, **type** = 113, **bank** = 7.)

MOVEBANK = 0Fh type(2) bank(1) newbank(1)

This message is used to move entire banks of RAM objects from one bank to another. A specific object type may be selected with the **type** field. Otherwise, if the **type** field is unspecified (0), all object types in the bank will be moved. The **bank** and **newbank** fields must be between 0 and 9. The acknowledgement is an ENDOFBANK message, with the **bank** field equal to the new bank

number. If the operation can't be completed because of a bad type or bank number, the ENDOFBANK message will specify the old bank number.

PANEL = 14h buttons(3n)

Sends a sequence of front-panel button presses that are interpreted by the KSP8 as if the buttons were pressed at its front panel. The button codes are listed in tables beginning on page B-7. Each button press is 3 bytes in the message. For a single press, the third byte can be zero. The PANEL message can include as many 3-byte segments as necessary.

Byte 1	Button event type:
08h	Button up
09h	Button down
0Ah	Button repeat
0Dh	Alpha Wheel
Byte 2	Button number (see table). Byte 3 is ignored when button events are received.
Byte 3	Repeat count (number of clicks) for Alpha Wheel; the count is the delta (difference) from 64—that is, the value of the byte minus 64 equals the number of clicks. A Byte 3 value of 46h (70 dec) equates to 6 clicks to the right. A Byte 3 value of 3Ah (58 dec) equates to six clicks to the left. For example, the equivalent of 6 clicks to the right would be the following message: (header) 14h 0Dh 40h 46 (eox). Byte 2 is ignored when an alpha wheel event is received.

For efficiency, multiple button presses should be handled by sending multiple Button down bytes followed by a single Button up byte (for incrementing with the **Plus** button, for instance).

Object Types

These are the object types and the values that represent them in type fields:

Type	ID (decimal)	ID (hex)
Algorithm	143	8Fh
Preset	141	8Dh
Studio	145	91h
Chain	146	92h

Master Parameters

The Master parameters can be accessed as type 100 (00h 64h), ID number 16. Master parameters cannot be accessed with any of the Bank messages.

Button Press Equivalence Tables

Alphanumeric pad			Soft-Buttons A-F		
Button	Code (dec)	Code (hex)	Button	Code (dec)	Code(hex)
Zero	49	\$31	A (leftmost)	10	\$0A
One	24	\$18	B	11	\$0B
Two	25	\$19	C	16	\$10
Three	26	\$1A	D	17	\$11
Four	31	\$20	E	18	\$12
Five	33	\$21	F (rightmost)	19	\$13
Six	34	\$22	AB	13	\$0D
Seven	40	\$28	CD (2 center)	20	\$14
Eight	41	\$29	EF	21	\$15
Nine	42	\$2A	YES	18	\$12
+/-	48	\$30	NO	19	\$13
Cancel	43	\$2B			
Clear	50	\$32			
Enter	51	\$33			

Edit / Exit

Button	Code (dec)	Code(hex)
Edit	27	\$1B
Exit	35	\$23
Soft Reset	54	\$36

Navigation			Buttons		
Button	Code (dec)	Code (hex)	Button	Code (dec)	Code(hex)
Plus (+)	8	\$08	Config	56	\$38
Minus (-)	9	\$09	EQ/Sends	57	\$39
Plus & Minus	12	\$0C	Meter	58	\$3A
Cursor Left	2	\$02	FX Bus 1-2	64	\$40
Cursor Right	3	\$05	FX Bus 3-4	65	\$41
Cursor Left/ Right	5	\$05	FX Bus 5-6	66	\$42
Cursor Up	0	\$00	FX Bus 7-8	67	\$43
Cursor Down	1	\$01	Bypass	72	\$48
Cursor Up/ Down	4	\$04	Compare	73	\$49
			Store	74	\$4A
			Tempo	75	\$4B

Screen Display Commands

These commands allow you to read the screen display, both text and graphics layers.

ALLTEXT = 15h

...requests all text in the KSP8's display.

PARAMVALUE = 16h

...requests the current parameter value.

PARAMNAME = 17h

...requests the current parameter name.

GETGRAPHICS = 18h

...requests the current graphics layer.

SCREENREPLY = 19h

This is the reply to ALLTEXT, PARAMVAL, PARAMNAME, GETGRAPHICS, or SCREENREPLY.

The reply to ALLTEXT will be 320 bytes of ASCII text (the display has 8 rows of 40 characters each). If you receive less than that, then the screen was in the middle of redrawing and you should request the display again.

The reply to PARAMVALUE will be a variable length ASCII text string. Some values (like keymaps, programs, samples, etc.) include their ID number in the text string (for example, **983 OB Wave 1**). Some messages are also padded with extra spaces.

The reply to PARAMNAME will be a variable length ASCII text string. In cases where there is no parameter name, there will just be the single 00 null terminator.

The reply to GETGRAPHICS will be 2560 bytes of information. The 6 least significant bits of each byte indicate whether a pixel is on or off. If pixels are on over characters, the text becomes inverted. Characters on the KSP8 display are a monospaced font with a height of 8 pixels and a width of 6 pixels.

Appendix E

Boot Block

The Boot Block is KSP8 system code containing specialized tools that let you:

- view the version numbers of your KSP8 objects
- update the KSP8's operating system, Boot Block, and/or objects
- run diagnostic tests
- reset the KSP8

There are two ways to enter the Boot Block, described in the following sections.

Entering the Boot Block at Startup

1. If the KSP8 is turned on, you must turn it off first.
2. Press the back panel power switch to start the KSP8.
3. The KSP8 will display a "Please wait..." message for approximately 2 seconds. Press and release the exit key (front panel of the KSP8) while the "Please wait..." message is displayed. The Boot Block Main Menu will appear, and the boot block tests the KSP8's files to make sure they are valid.

```
Boot Block Main
KSP8 Boot Block v1.00      Valid
KSP8 OS v1.00             Valid
KSP8 Objects v1.00       Valid
```

```
Install Run Reset DIAGS
```

Entering the Boot Block from the Master Page

1. While displaying one of the KSP8's studio-level pages, press the **MASTER** soft button.
2. Press the **Reset** soft button on the Master page.
3. Press the **Loader** soft button. The Boot Block Main Menu will appear

Boot Block Main Menu

The Main Menu looks and functions similarly to other KSP8 menus. Press one of these soft buttons to access a function:

- **Install** – lets you update the KSP8's operating system, boot block, and/or objects from either MIDI or a SmartMedia card.
- **Run** – starts the KSP8 in its regular operating mode.
- **Reset** – performs a hard reset.
- **DIAGS** – runs diagnostic tests for troubleshooting issues with the KSP8.

Updating KSP8 Software

From time-to-time, Kurzweil Music Systems will release updates to the KSP8's operating system, boot block, and/or objects. Generally, these will be posted at our web site:

<http://www.kurzweilmusicsystems.com/>

Use the Boot Loader, as described in this section, to install any software update. Updates can include:

- KSP8 Operating System
- KSP8 Objects (algorithms, presets, chains, and studios)
- KSP8 Boot Block

File types

There are four different types of files, each distinguished by a unique three-character extension, that you may encounter when loading software into the KSP8:

- **.KOS** – KSP8 operating system and object files (load via SmartMedia)
- **.KSP** – KSP8 object files (load via SmartMedia)
- **.KBB** – KSP8 boot block files (load via SmartMedia)
- **.MID** – MIDI files (can incorporate any of the above types of data; load via MIDI)

Loading via SmartMedia

If you're in a hurry, it's much faster to load from a SmartMedia card than it is to load from MIDI. Of course you'll need a way to copy files (e.g., updates that you've downloaded from the Kurzweil web site) to a SmartMedia card first. Fortunately, SmartMedia drives are readily and inexpensively available from a variety of sources.

Always check for special instructions that may be included with a software update, since some updates may require a hard reset or other action.

To load objects via SmartMedia:

1. Press the **Install** soft button on the Boot Block Main Menu.
2. Press the **Card** soft button. The KSP8 will list all the files in the top level directory on the SmartMedia card. You can use the alpha wheel, or the up, down, increment (+), or decrement (-) keys to navigate to the file(s) you want to load.
3. Use the Root, Parent, and Open soft buttons to move between directories:
 - **Root** takes you to the top level directory on the card.
 - **Parent** moves you up one directory level.
 - **Open** opens the currently selected directory.

4. Highlight a filename, then press the **Select** button. Press **Select** a second time to deselect an item.

You can select multiple .KOS and/or .KSP files from the selection list. The status line at the top of the screen will show the current directory, how many files are in this directory, and how many files you have currently selected. An index counter shows you where in the list the cursor is currently located.

You can also double press the left and right cursor keys to select all the files in the current directory, with one exception. The exception is KBB files; if there is a single KBB file in the current directory, then it will be highlighted along with all the other files when you perform the double press. If there are several KBB files in the current directory, however, then the select-all double press will not select any of the KBB files.

5. Press the **OK** soft button when you're ready to load the selected file(s). The boot block will first test each segment of an OS or Object file before loading. If any problem is detected it will report that segment as CORRUPT!

When the load is complete, press the **Done** soft button, then press the **Run** soft button to start the KSP8 in its regular operating mode.

Note: When you install a KBB file (boot block) the unit automatically restarts, running the new boot block.

Loading via MIDI

To load updates to the KSP8 through its MIDI In port, you must have MIDI Out from a sequencer attached to the MIDI In port of the KSP8.

Always check for special instructions that may be included with a software update, since some updates may require a hard reset or other action.

1. Press the **Install** soft button on the Boot Block Main Menu.
2. Press the **MIDI** soft button.

The KSP8 will display "Waiting for MIDI." You can now play the MIDI file update(s) on the attached sequencer and into the MIDI In port of the KSP8. The percentage of load for each segment will display during the upgrade process.

When the load is complete, press the **Done** soft button, then press the **Run** soft button to start the KSP8 in its regular operating mode.

Note: When you update a boot block via MIDI, the unit automatically restarts, running the new boot block.

Running Diagnostic Tests

The **DIAGS** soft button from the Boot Block Main Menu provides a list of available diagnostic tests. Since these tests are intended for service personnel, they are not described in this manual.

Resetting the KSP8

Press the **Reset** soft button to perform a hard reset. This will restart your KSP8, reset everything, and empty the unit's memory of any objects (presets, chains, and studios) you may have created. Therefore, you want to be absolutely sure that you want to perform a hard reset before you confirm this operation.

This option is the same as the Hard Reset option available from the Master page. There is also a less severe "soft" reset available on the Master page.

Appendix F

MIDI Control Sources

Control sources are assigned as values for control source parameters, like Source on the S MOD and C MOD pages, ASR Trig, and LFO Rate Control. Assigning a control source to one of these parameters is like connecting control source outputs to various inputs on early modular synthesizers. You can think of each control source parameter as the input to a synthesizer module, and the values for those parameters as the outputs of modules generating control signals.

For the control sources to have an effect, two things have to happen. First, the control source must be assigned as the value for (patched to) a control source parameter like ASR Trig. In other words, for a control source parameter to have an effect, it must be programmed to respond to a particular control message. Second, the control source must generate a signal. The level of the control source's signal determines how much effect it has on the control source parameter to which it's assigned.

Hardware Control Sources

In terms of generating signals, there are two types of control sources. The first, which might be called hardware control sources, require some physical movement to transmit them. The control source called MWheel (MIDI 01) is probably the most prominent example of this type of control source. When you move your MIDI controller's Mod Wheel, it sends a Modulation message (MIDI 01), unless you've programmed it to send something else. If you set a MIDI controller to send a MIDI 01 (Mod Wheel) message to the KSP8, it responds by sending a control signal to whatever control source is assigned as the value for the MWhl parameter.

Software Control Sources

The other type of control source is independent of the movement of physical controls. These control sources generate their control signals internally, and might be called software control sources. They either run automatically (like A Clock and RandV1), or they're programmed to generate their signals according to parameters of their own (as with the LFOs and FUNs). The software control sources must have some nonzero value set for one or more of their parameters before they'll generate control signals.

Trying Out the Control Sources

Here is a quick way to configure your KSP8 to hear the effect of the control sources:

1. Set up your KSP8 so that it has a MIDI controller (a Kurzweil K2600, for example) connected to its MIDI In port, and audio from the KSP8 going to some sort of sound system.
2. Turn down the volume of the sound system.
3. Make sure that your MIDI controller is transmitting on the MIDI channel defined as “studio-chan1” on the KSP8’s Master page. By default, this is channel 9.
4. Select Studio 3 on the KSP8 Studio:STUDIO page.
5. Press the **EQ/sends** button. Make sure you are working on the In1 bus.
6. Press the **INEQ** soft button, then set the first EQ box to “Sawtooth”.
7. Turn up the volume on your sound system and you will hear a sawtooth wave.
8. Press **exit**, then press the **S MOD1** soft button to go to the first Studio MOD page. (Press one of the **more** soft buttons if you don’t immediately see the **S MOD** soft buttons.)
9. Set the parameters on the first line of the S MOD1 page as shown here:
 - Bus: In1
 - Param: EQ1SawFreq
 - Depth: 1200ct
10. Set the parameters on the second line of the S MOD1 page like this:
 - Bus: In1
 - Param: EQ1SawGain

You can now highlight the Adjust parameter for EQ1SawGain on the second line of the S MOD1 page and use your KSP8’s alpha wheel as a volume control.

11. Set the Source parameter on the first line of the S MOD1 page (EQ1SawFreq) to the name of a control source (e.g., Mod wheel (MWheel)) that you would like to try on your MIDI controller. You can now change the pitch of the sawtooth wave by modulating the control source you have selected.

Your Studio MOD page will now look something like this.

```

STUDIO3 S MOD1
Bus:   Param:   Adjust:  Source:  Depth:
In1    EQ1SawFreq 262Hz   MWheel   1200ct
In1    EQ1SawGain -40.0dB Off      0dB
None   None
None   None
None   None
<more S MOD1 S MOD2 S MOD3 S MOD4 more>

```

By changing the value of the Source parameter you can now try all of your other MIDI control sources.

Control Source Lists

There's one long list of control sources stored in the KSP8's memory, although not all control sources are available for all control source parameters. With time you'll become familiar with the types of control sources available for various control source parameters.

The available list of control sources varies depending on the type of control source parameter you're programming. There are three basic types: MIDI control sources, global control sources, and FUNs.

When you're setting the control assignment parameters in the Setup Editor, you'll see only the portion of the Control Source list that has values appropriate to MIDI controller messages. Consequently we refer to this subset of the Main Control Source list as the MIDI Control Source list.

You'll see variations on the Main Control Source list as you program the other control source parameters. We'll explain these variations, but it's not important that you memorize each variation. The lists differ to prevent you from assigning a control source where it would be ineffective. All you have to do is to scroll through the list of control sources available for any given control source parameter, and choose from the available values.

If you're programming one of the FUNs, you'll see the Main Control Source list, which includes almost every control source from the MIDI Control Source list. The list for the FUNs also includes a set of constant values that set an unvarying control signal level for one or both of the FUN's inputs.

Descriptions of Control Sources

This section is organized into two sets of descriptions: the MIDI Control Source list, and the rest of the control sources. The numeral preceding the name of each control source can be entered on the alphanumeric pad to select the control source directly (press **Enter** after typing the numeral).

MIDI Control Source List

With a few exceptions, the MIDI control sources correspond to the standard MIDI controller numbers used by every MIDI device.

- 0** **OFF**
This value eliminates the effect of any control source parameter to which it's assigned.
- MPrs+MW**
Mono pressure plus Mod Wheel (*no numeric entry number*)
- Brth+Ft**
Breath (MIDI03) plus Foot (MIDI04) (*no numeric entry number*)
- SftPd+MW**
Soft pedal plus Mod Wheel (*no numeric entry number*)

MIDI Control Sources

MIDI Control Source List

1 **MIDI 01 (MWheel)**

2 **MIDI 02 (Breath)**

3 **MIDI 03**

4 **MIDI 04 (Foot)**

5 **MIDI 05 (PortTim)**

6 **MIDI 06 (Data)**

7 **MIDI 07 (Volume)**

8 **MIDI 08 (Balance)**

9 **MIDI 09**

10 **MIDI 10 (Pan)**

11 **MIDI 11 (Express)**

12—15 **MIDI 12—15**

16—19 **MIDI 16—19 (Ctl A—D)**

These MIDI controllers are used for MIDI control of the four quick parameters in the left-hand column of the QUICK page. See page 6-3 for an illustration.

20—31 **MIDI 20—31**

64 **MIDI 64 (Sustain)**

65 **MIDI 65 (PortSw)**

66 **MIDI 66 (SostPD)**

67 **MIDI 67 (SoftPd)**

68 **MIDI 68 (LegatoSW)**

69 **MIDI 69 (FrezPd)**

70—79 **MIDI 70—79**

80—83 **MIDI 80—83 (Ctl E—H)**

These MIDI controllers are used for MIDI control of the four quick parameters in the right-hand column of the QUICK page. See page 6-3 for an illustration.

84—90 **MIDI 84—90**

91 **MIDI 91 (FXDep)**

92—95 **MIDI 92—95**

KSP8 Specific Control Source List

This list contains all but the last three control sources in the MIDI Control Source list. It also contains the following control sources. All are local unless specified as global.

- 32 Channel State (Chan St)**
Chan St refers to whether any notes are currently active on a given MIDI channel. Chan St switches on whenever a note is started, and switches off when a Note Off has been received for each current note on that channel, even if notes are sustained.
- 33 Mono Pressure (MPress)**
Many of the KSP8's factory programs are assigned to modify parameters such as pitch, filter cutoff frequency, and depth control when MPress messages are received. The mono pressure (Press) control assignment parameters in MIDI and Setup modes are set by default to transmit MPress messages when mono pressure messages are received from a controller.
- 34 Bipolar Mono Pressure (BMPress)**
This control source generates a control signal of -1 when the value of the control to which it's assigned is at its minimum, and +1 when the control is at its maximum.
- 35 Pitch Wheel Message (PWheel)**
The KSP8 is hard-wired to respond to this message. Any parameter with PWheel assigned as its value will be affected when your MIDI controller's Pitch Wheel is moved.
- 36 Bipolar Mod Wheel (Bi-Mwl)**
This control source will always respond to MIDI controller 01 (MWheel). Control source parameters set to this value will generate control signals of -1 when the MIDI Controller 01 message value is 0, and will generate a control signal of +1 when the MIDI Controller 01 message is at 127, scaling all values in between.
- 37 Absolute Value of Pitch Wheel (AbsPwl)**
This control source always responds to movement of your MIDI controller's Pitch Wheel, but makes the Pitch Wheel unipolar. Whereas pulling the Pitch Wheel fully down usually generates a control signal value of -1, this control source generates a value of +1 when the Pitch Wheel is pulled fully down.
- 43 Volume Control (VoiCtl)**
This control source will always respond to MIDI Controller 07 messages. Assign this value to a parameter when you want MIDI volume messages to affect the parameter.
- 44 Balance Control (BalCtl)**
This control source will always respond to MIDI Controller 08 messages. Assign this value to a parameter when you want MIDI balance messages to affect the parameter.
- 45 Pan Control (PanCtl)**
This control source always responds to MIDI Controller 10 messages. Assign this value to a parameter when you want MIDI pan messages to affect the parameter.

MIDI Control Sources

KSP8 Specific Control Source List

- 47, 48** **A Clk4, ~A Clk4**
49, 50 **B Clk4, ~B Clk4**
51, 52 **A Clk2, ~A Clk2**
53, 54 **B Clk2, ~B Clk2**

These control sources function like sources 56 – 59, except that the sources appended with “2” trigger twice per clock beat, and those appended with “4” trigger four times per clock beat.

- 55** **Tempo**

- 56** **A Clock**

This is a unipolar square wave that responds to MIDI clock messages. It switches to +1 and back to 0 with every clock beat. This control source looks first for externally received MIDI clock messages, and if none is received, it responds to the KSP8’s internal clock, which is always running. The internal clock speed is set with the Tempo parameter in Song mode.

- 57** **Negative A Clock (~A Clock)**

This is the opposite of A clock, that is, it switches from 0 to +1 with every clock beat (the square wave is 180 degrees out of phase with that of A Clock).

- 58** **B Clock**

This is similar to A Clock, but it’s bipolar—it switches from +1 to -1 with every clock beat.

- 59** **Negative B Clock (~B Clock)**

The opposite of B Clock, this bipolar control source switches from -1 to +1 with every clock beat (the square wave is 180 degrees out of phase with that of B Clock).

- 60, 61** **Phase 1 and 2**

These bipolar global control sources are both rising sawtooth waves that rise from -1 to +1 with each MIDI clock beat. Like A Clock and B clock, they look for an external clock signal, and if none is received, they respond to the KSP8’s internal clock.

- 62, 63** **Random Variant 1 and 2 (Rand1, Rand2)**

These are also bipolar and global, and generate random control signal values between -1 and +1 when assigned to a control source parameter. There is a subtle difference in the randomness of the signals they generate, therefore choosing between them is a matter of preference.

- 96–99** **ASR1, ASR2, ASR3, ASR4**

These are programmable envelopes with three segments, Attack, Sustain, and Release. Their control source signals are unipolar.

- 100, 102,**
104, 106 **LFO1, LFO2, LFO3, LFO4**

The LFOs can be unipolar or bipolar depending on the value set for the shape parameter.

101, 103, 105, 107 LFO1 Phase (LFO1ph), LFO2 Phase (LFO2ph), LFO3 Phase (LFO3ph), LFO4 Phase (LFO4ph)

This bipolar control source generates its signal based on the cycle of the associated LFO. For example, when the phase of LFO1 is 0 degrees, the signal value of LFO1ph is 0. When the phase of LFO1 is 90 degrees, the signal value of LFO1ph is 1. When the phase of LFO1 is 180 degrees, the signal value of LFO1ph is 0. When the phase of LFO1 is 270 degrees, the signal value of LFO1ph is -1.

108 – 115 FUN1 – FUN8

These generate their control source signals by combining the control signal values of two programmable inputs, and performing a mathematical function on the result. Their control signals can be unipolar or bipolar, depending on the control sources assigned as their inputs.

127 ON

This generates a constant control signal value of +1.

128, 132, 133, 134 HiKey**131 LowKey**

These control sources track the highest key currently held and the lowest key currently held respectively.

129 KeyNum

Uses the key number (global) to modify whatever it is patched into. Higher notes will have a very different effect than will lower notes. You can use this source to control any KSP8 parameters, or to scale amplitude or pitch.

130 AttVel

This is updated every time you strike another key (kind of a multi-trigger function).

In addition to enabling (triggering) layers from any controller (works like an on/off switch), you can set the assigned controller's threshold (value, or range of values from 0-127), thus defining the controller's active range where it will enable the layer.

Constant Control Sources

The remaining control sources are constants, which appear only when you're assigning control sources as inputs for the FUNs. Assigning one of these values fixes the input's control signal value at a steady level.

Assigned Value	Corresponding Constant	Assigned Value	Corresponding Constant
133	-0.99	201	0.09
134	-0.98	202	0.10
135	-0.97	203	0.12
136-140	-0.96 to -0.92	204	0.14
141	-0.91	205	0.16
142	-0.90	206-210	0.18 to 0.26
143-145	-0.88 to -0.84	211-215	0.28 to 0.36
146-150	-0.82 to -0.74	216-220	0.38 to 0.46
151-155	-0.72 to -0.64	221-225	0.48 to 0.56
156-160	-0.62 to -0.54	226-230	0.58 to 0.66
161-165	-0.52 to -0.44	231-235	0.68 to 0.76
166-170	-0.42 to -0.34	236-240	0.78 to 0.86
171-175	-0.32 to -0.24	241	0.88
176-180	-0.22 to -0.14	242	0.90
181	-0.12	243	0.91
182	-0.10	244	0.92
183	-0.09	245	0.93
184	-0.08	246-250	0.94 to 0.98
185	-0.07	251	0.99
186-190	-0.06 to -0.02	256	OFF
191	-0.01		
192	0.00		
193	0.01		
194	0.02		
195	0.03		
196-200	0.04 to 0.08		

Note: There are no control sources that correspond to numeric entries 252—254.

Appendix G

Numeric Entry Shortcuts

This appendix details some of the numeric values (in addition to the KSP8 object numbers provided in Appendix C) used throughout the KSP8. You can enter the number for an item or object, then press the **enter** button as a quick way to select a parameter value.

LFO Shapes

Keypad	Shape	Keypad	Shape
0	NONE	42	4 Step
1	Sine	43	+4 Ste
2	+Sine	44	5 Step
3	Square	45	+5 Ste
4	+Squar	46	6 Step
5	Triang	47	+6 Ste
6	+Trian	48	7 Step
7	Rise S	49	+7 Ste
8	+Rise	50	8 Step
9	Fall S	51	+8 Ste
10	+Fall	54	10 Step
40	3 Step	55	+10 Ste
41	+3 Ste	58	12 Step
		59	+12 Ste

FUN Functions

Keypad	Function	Keypad	Function
0	NONE	38	Warp4(a,b)
1	a+b	39	Warp8(a,b)
2	a-b	41	a AND b
3	$(a+b)/2$	42	a OR b
4	$a/2+b$	43	$b > a$
5	$a/4+b/2$	47	ramp(f=a+b)
6	$(a+2b)/3$	48	ramp(f=a-b)
9	a*b	49	ramp(f=(a+b)/2)
10	-a*b	50	ramp(f=a*b)
13	$a*10^b$	51	ramp(f=-a*b)
16	:a+b:	52	ramp(f=a*10^b)
17	:a-b:	53	ramp(f=(a+b)/4)
18	min(a,b)	54	a(y=b)
19	max(a,b)	55	ay+b
20	Quantize b to a	56	$(a+1)y+b$
22	lopass(f=a,b)	57	$y+a(y+b)$
23	hipass(f=a,b)	58	a:y:+b
25	$b/(1-a)$	61	Sample b ON a
27	$a(b-y)$	62	Sample b ON ~a
29	$(a+b)^2$	63	Track b While a
31	sin(a+b)	64	diode(a-b)
32	cos(a+b)	65	diode(a-b+.5)
33	tri(a+b)	66	diode(a-b-.5)
35	Warp1(a,b)	67	diode(a-b+.25)
36	Warp2(a,b)	68	diode(a-b-.25)
37	Warp3(a,b)	69	Track b While ~a

EQs

Keypad	EQ	Keypad	EQ
0	NONE	16	LoShelf/LP
1	Lo Shelf	17	HiShelf/LP
2	Parametric	18	Mid/LP
3	Hi Shelf	19	Notch/LP
4	Hi Pass 2P	20	HP 1/LP 2
5	Hi Pass 3P	21	HP 2/ LP 1
6	Lo Pass 2P	22	Distulator
7	Lo Pass 3P	23	Shaper/LP
8	Reson Bass	24	Shaper2LP
9	Wide Mid	25	Sine
10	BandPass	26	SawTooth
11	Notch	27	Sine+Shaper
12	LoShelf/HP	28	Noise
13	HiShelf/HP	29	Pinker
14	Mid/HP	30	Impulse
15	Notch/HP		

Appendix H

MIDI Implementation Chart

Model: KSP8

**Manufacturer:
Young Chang**

**Date: 9/12/01
Version 1.0**

Effects Processor

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	X	1(-16)	
	Changed	X	1 - 16	
Mode	Default	X	X	
	Messages			
	Altered			
Note Number			0 - 127	
	True Voice	X	0 - 127	
Velocity	Note ON	X	O	
	Note OFF	X	O	
After Touch	Keys	X	X	
	Channels	X	O	
Pitch Bend		X	O	
Control Change		X	0 - 95	
Program Change			O	
	True #	X	0 - 127	
System Exclusive		O	O	
System Common	Song Pos.	X	X	
	Song Sel.	X	X	
	Tune	X	X	
System Real Time	Clock	O	O	
	Messages	X	X	
Aux Messages	Local Control	X	X	
	All Notes Off	X	X	
	Active Sense	X	X	
	Reset	X	O	
Notes				

O = yes
X =no

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