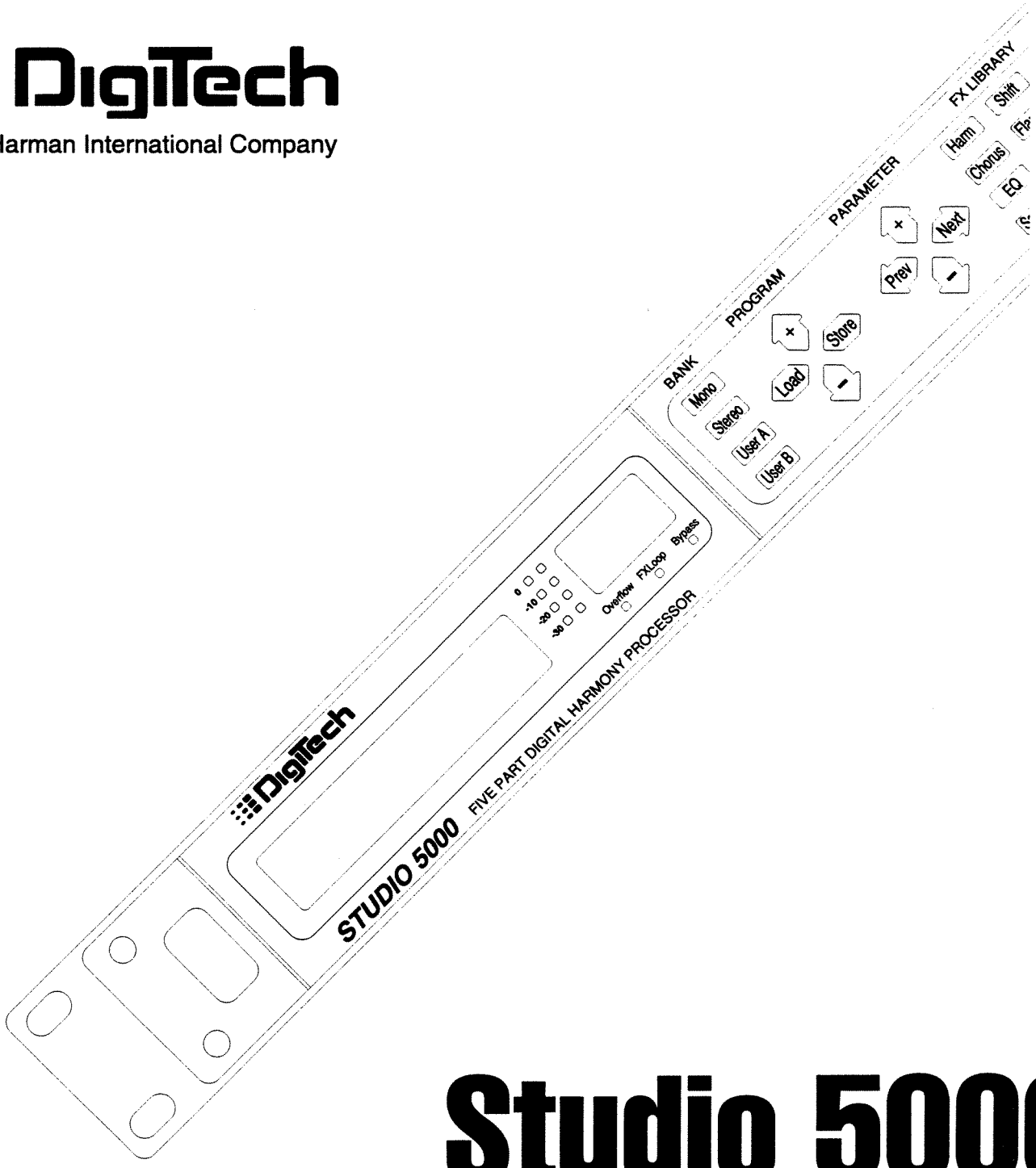
DigiTech

A Harman International Company

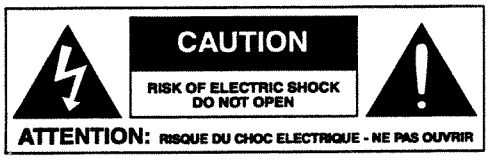


Studio 5000

Five Part Digital Harmony Processor

Owner's Manual

Safety Precautions



The symbols shown at left are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrow point in an equilateral triangle means that there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for users to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during lightning storms or wind storms to prevent damage.

Lithium Battery Warning

CAUTION!
This product contains a lithium battery. There is danger of explosion if battery is incorrectly replaced. Replace only with an Eveready CR 2032 or equivalent. Make sure the battery is installed with the correct polarity. Discard used batteries according to manufacturer's instructions.
ADVARSEL!
Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.
ADVARSEL!
Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri av samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.
VAROITUS!
Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.
VARNING!
Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

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Power and Grounding Information

The Studio 5000 is equipped with a three-prong, grounded power cord for your protection. Do not cut off the ground prong of the plug, and do not use an adapter or extension cord to plug the unit into a two prong outlet unless the adapter or extension cord is properly grounded.

The Studio 5000, like any piece of computer hardware, is sensitive to voltage drops, spikes, and surges; interference such as lightning or power "brownouts" can erase your program memory, or even permanently damage the circuitry inside the unit. Here are some suggestions to help protect your Studio 5000 from such a fate:

- Turn it off: Make a habit of turning off all of your gear when it is not in use. If there is lightning or a severe windstorm, unplug all of your equipment: A surge from a nearby lightning strike or downed power line can destroy electronic equipment even if the switch is off.
- Spike/Surge Protectors: This is an inexpensive solution to all but the severest of AC line conditions. Surge protected power strips usually only slightly more expensive than unprotected strips, and higher quality multi-stage surge suppressors usually start under $50, making them a worthy investment for protection of all your valuable electronic equipment.
- AC Line Conditioners: This is the best (but most expensive) way to protect your Studio 5000 from line voltage fluctuations. Line conditioners constantly monitor the incoming voltage for excessive peaks and dips and make adjustments accordingly, delivering consistent power levels. For expensive studio equipment, AC line conditioners are highly recommended.

Using the Front Panel

Once over the buttons, quickly. (More detail on page 16)

The [Bank] buttons select which of the four banks of Programs that you want to use.

The Program [+] and [-] buttons choose the Program that you want from that bank.

[Load] retrieves the selected Program from memory and makes it active. If you have the Autoload Presets option ON in the Utilities menu, this will happen automatically as soon as you select a Program.

[Store] saves any changes that you have made to the Program. You have the opportunity to use the Data Wheel or Program [+] or [-] buttons to change the Program number that you will save the changed Program as, then press [Store] again.

[Edit] and [Exit] will be your main way of getting in and out of Programs to modify the settings. In a nutshell, [Edit] lets you into the Program's settings menus to make changes. When an item is flashing on the top line of the LCD display, [Edit] will open a screen for changing that item. [Exit] will take you out of the editing menu and return you to the previous screen. You can go several layers deep in editing, so you may have to push [Exit] several times to return to the main Program screen.

You also use [Exit] to cancel a Store if you don't want to follow through with saving the changes.

The FX Library buttons are a way to jump straight to one of the twelve effects areas. Think of them like bookmarks; you end up in the same as if you had pressed [Edit] and [Next] until you reached that effect—the FX Library buttons just let you get there faster. Press [Edit] and you are ready to modify the effect.

The Data Wheel is a convenient way of entering changes. What it controls depends on where you are in the menus. When you turn on the Studio 5000, the Data Wheel selects Programs, like the Program [+] and [-] buttons. When you are Editing, the Data Wheel edits whichever parameter on the lower line of the LCD display is flashing, like the Parameter [+] and [-] buttons.

[Cmpare] gives you a handy way of comparing the changes you are making to a Program against the original settings of the Program.

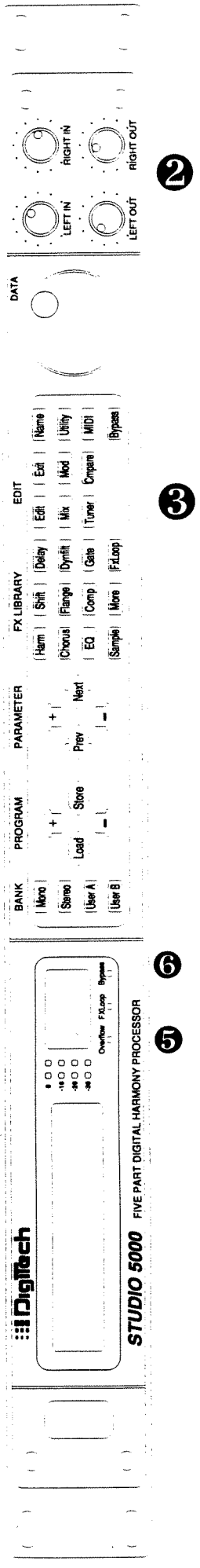
[Mix] is only active while you are editing a Program. It sets volume levels for individual effects in a Program, and allows you to balance the "wet" effect sound against the "dry" input sound.

[Tuner] turns on and off the Tuner feature,

[FXLoop] turns on and off the external Effects Loop.

[Mod] gives you access to the global Modulation source settings

[Bypass] turns the Studio 5000 effects on and off, but doesn't mute the input (dry) signal.



WELCOME:

Let's get started using the Studio 5000. We'll explore the things that we can do with it first, and save the details for the next sections of the manual. If you are a studio veteran, by all means dive right into the Applications and Programming sections, but come back and review this Exploration section when you have some time.

When we refer to "your instrument" in this manual, we mean whatever input sound source you are using. It could be an electric guitar, keyboard, a trumpet through a microphone, or the playback of tracks that you have already recorded on tape. The Studio 5000 will create Intelligent Harmonies on any single-note (monophonic) input, so stick to melody playing for these Programs. Other Studio 5000 Programs work well on chordal (polyphonic) inputs; we'll highlight these as we proceed through this manual. The Studio 5000 is tailored for use with instruments and studio applications; the Studio Vocalist unit from DigiTech is tailored for creating multi-part harmonies from the human voice.

First, read the safety information at the front of the manual. We want you to be a happy Studio 5000 user to a ripe old age... so use a properly grounded power circuit, don't open the unit up and poke around, don't replace a blown fuse with aluminum foil, and don't operate the Studio 5000 in the bathtub.

❶ TO START, HOOK UP

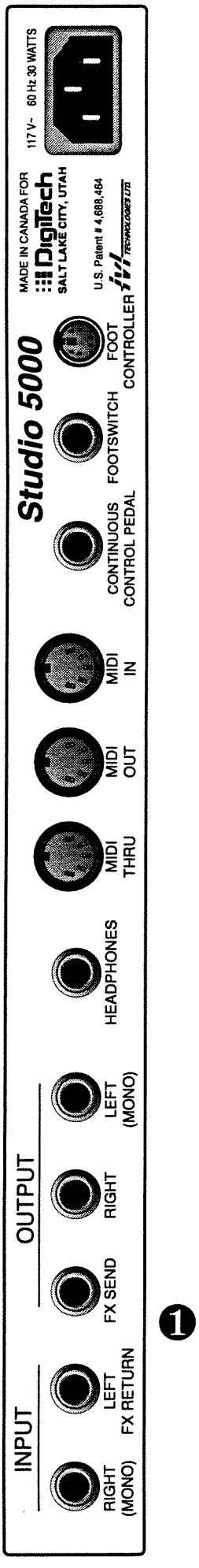
Turn your volumes down on your amp, mixer and Studio 5000, plug your instrument or mixer effects send into the Right Input (or Right and Left for stereo), and plug the Left Output into your amp, mixer channel or mixer effects return (use Right and Left Outputs for stereo). Check out Page 14 for detailed hookup options. If you are planning to use the Studio 5000's FX Loop to hook up another effects device, you will use the Right Input only, because the Left Input will be used for the FX return.

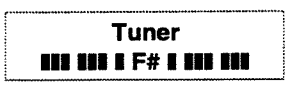
❷ NOW, TURN UP

Bring your instrument volume up to its loudest playing level, start playing, and turn up the Right In knob (and the Left, if you're in stereo) until the red Input LEDs ❹ flash occasionally. Turn up the Left and Right Out knobs and your amp or mixer level controls. If the Overload Indicator ❺ lights up, back off on your input or instrument levels. Make sure that the Bypass light ❻ is not lit—press the [Bypass] button if it is.

❸ LAST BUT NOT LEAST, TUNE UP

The Studio 5000 will produce the best quality harmonies when your instrument and the Studio 5000 agree on pitch. Press the [Tuner] button and tune your instrument to the Studio 5000 (Details on Page 22). If your instrument is not tunable, you can change the Tuning Reference of the Studio 5000 about a quarter-tone up or down from standard A=440 (Details on Page 23).





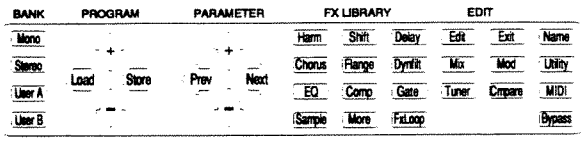
Exploration

[Data Wheel]

```
[load] program
M 1 Lush Chord Shift
```

[Load]

```
M 1 Lush Chord Shift
mono
```



Studio 5000 Front Panel Keypad

The Case of Uppercase:

Effects that are off are displayed in *lowercase* letters, and Effects that are on are displayed in *uppercase*.

What is uppercase and lowercase?

CAPITAL LETTERS are called *uppercase*, and small letters are called *lowercase*.

CHOOSE A PROGRAM:

There are two banks of factory-preset programs in the Studio 5000 a Monophonic bank (mono in, stereo out) and a Stereo bank (stereo in. stereo out). You can access these programs by pressing one of the [Mono] or [Stereo] Bank selector buttons, and then either turn the Data Wheel or press the Program [+] and Program [-] buttons to call up the Program number that you want. You won't hear the effect yet – press [Load], and the program will become active. (You can set the Studio 5000 to automatically Load the Programs as soon as you call up their numbers. See page 19).

Making your own Programs:

The User A and User B banks of Programs are where you store the customized programs that you have created. As shipped from the factory, the User A bank contains the same programs as the Mono Bank, User B has the Stereo Bank's programs. Use these as a starting point for your own experimentation (Instructions start on Page 16).

EXPLORING THE EFFECTS BY EXAMPLE:

M1 LUSH CHORD SHIFT:

```
M 1 Lush Chord Shift
mono
```

[Shift]

```
comp→GATE→CHRD→
Chord Shifter     ON
```

[Edit]

```
Chord Shifter
  algorithm: Lush
```

[Next]

```
Chord Shifter
  semitones: +12
```

Punch the [Mono] Bank Select button, dial up Program M1 with the Data Wheel and press [Load]. Play a chord on your instrument. This Program is an example of Chord Shifting, giving a layer of sound an octave up from your input, with added Chorus and Reverb. You can use this for those wide, spacious washes of keyboard or guitar chords. Try playing sustaining arpeggios or slowly strummed chords, or fading your instrument in with its volume control. The Chord Shift effect is unique to the Studio 5000.

If you want to get a little more complex, try pressing the [Shift] button, then [Edit], then [Next] until you see semitones: +12. Turn the Data Wheel counter-clockwise now and the shift interval will change by semitones. All of a sudden you're playing dense chords with just a couple of notes. Try setting it on +5 or +7 and playing some simple chords with open voicing. When you're finished experimenting, press [Exit] twice. When you move to another Program, the Studio 5000 will ask if you want to store the changes that you just made to Program M1. For now, just ignore this message and turn the Data Wheel or press Program [+] to go to the next Program.

M2 BRIGHT DETUNE:

```
M 2 Bright Detune
mono        Chromatic
```

[Edit]

```
COMP→GATE→HARM→
Compressor     ON
```

[Next] [Next] [Next]

```
→chrs→EQ 5→SDLY
Stereo Chorus  off
```

This program uses Harmony voices that are just slightly detuned from the input note, giving a rich, doubling chorus sound. The word *Chromatic* on the LCD screen shows you that the Program uses an Intelligent pitch shifter (Harmony) effect, and that the selected Scale Type is Chromatic. Normally, this would mean that the Program would be a single-note (Melody) Program, but because the Harmonies are close to the input note (set to an interval of less than 1 semitone), it works just fine for chordal playing.

In this Program, there is also Compression, a Noise Gate, 5-band EQ and a Stereo Delay processing the sound. Press [Edit], and you can experiment with turning the different effects stages on and off to see the

effect that they have on the overall sound. An effect name will be flashing on the LCD screen; use the Data Wheel or Parameter [+] and [-] to switch the effect on and off. You'll know it's off when the name appears in lowercase letters, an effect that is on is displayed in uppercase letters. The [Next] and [Prev] buttons will step you right and left through the list of effects. Press [Exit] when you're done.

M4 STRING SWELL:

M 4 String Swell
mono

[Mod] [Next]...

Modulation Sources
[Edit] Env Generator

[Edit] [Next]

Envelope Generator
trig level: -28 dB

[Edit] [Next]... [Edit] [Next]...

String Pad SWELL
type:wet+dry

[Next]...

String Pad LEFT
tone: 15

[Next]...

String Pad
splicing: C 0

You've never heard anything like this before: play a note or a chord, and it will sound like a string section fading in. Depending how you play the notes and how much high frequency content is in your input signal, you can get effects ranging from strings to church organs. The trick to playing with this Program is to play slowly, leave space between chords, and try not to make any extra noises. It takes a certain level of input signal before the String Pad effect kicks in; you should experiment with note attacks and volume. Speedy runs and hard strumming or picking won't impress this Program at all, though.

You can change this trigger level setting by pressing [Mod], then [Next] until you see *[Edit] Env Generator*. Press [Edit], then [Next] until you see *trig level: -28 db*, then use the Data Wheel to adjust the trigger level. Press [Exit] twice to exit.

You can also select whether both your input and the String Pad sound swell in, or just the String Pad. Press [Edit] and then [Next] to reach the SPAD effect in the Performance menu. Press [Edit] and [Next] until you reach the String Pad SWELL screen shown on the left, then use Parameter [+] or [-] or the Data Wheel to select *wet+dry* (input plus String Pad) or *wet only* (String Pad only). In this Edit menu, there are other parameters that you can reach with Parameter [Next] and [Prev], such as setting the Tone for the left and right channels, setting the *splicing point* to match your playing (which can improve the quality of the effect), and Detune and Vibrato settings.

M5 5TH CHORD SHIFT

This Program uses the Chord Shift effect, and is similar to M 1 Lush Chordal Shift except that the shift is set to 7 semitones, or a fifth above your input. This Program also uses the Chorus and Stereo Delay effects.

M6 OCTAVE BOX

M 6 Octave Box
mono Chromatic

[Delay]

-chrs-SDLY-REVB
Ster Delay 3s ON

[Edit] [Next]

Ster Delay 3s LEFT
delay time: 621 ms

Sounds like a bass doubling your playing (if you are playing electric bass into the Studio 5000, please check your amp levels before you blow your speakers into the next county with super-low notes). This is a Harmony Program, so play just one note at a time. There is Stereo Delay and Reverb on this Program; if you are using it to record "bass" parts, you may want to turn the delay and reverb down or off. Press Delay and then either Parameter [-] to turn off the Stereo Delay, or press Edit and use the [Next] button to look at the different delay parameters: Delay Type, Delay Time, Feedback and rolloff, for both the Left and Right channels. You can edit the flashing parameters with the Data Wheel or the Parameter [-] and [+] buttons. Notice that on the delay time parameters, the 100's digit flashes - press the [Next] button and the 10's digits flash. This allows you to make quick changes to the 100's digit without having to scroll through hundreds of numbers, and then you can zero in on the 1's digits and fine tune the value. Press [Exit] twice to get out. Same procedure if you want to edit the Reverb.

Exploration

M7 FOUR OCTAVE SPREAD

```
M 7 4-Octave Spread
mono      Chromatic
```

[Harm]

```
comp→GATE→HARM→
4 Voice Harm     ON
```

[Edit]

```
4 Voice Harm
harmony:  scalic
```

[Next] [Next]

```
4 Voice Harm C Chrom
↓↓C  ↓C  ↑C  ↑↑C
```

This is a Four-Voice, Scalic Harmony Program, which means that you will play melody lines instead of chords. It sounds a bit like a sampled "orchestra hit" on one note. As you play a melody, the Studio 5000 tracks your input notes with four harmony notes. Because the Harmony Scale Type is Chromatic, the harmonies track your input note in parallel. The Program comes from the factory with the harmonies all set to the same note as the input, but two octaves below, one octave below, one octave above and two octaves above.

You can change these harmony notes: Press the [Harm] button and [Edit], then the [Next] button until you see the screen shown at the left. The first C should be flashing, which allows you to change its value with the Data Wheel or the Parameter [+] and [-] buttons. Change it to ↑G; this will change the first harmony's interval from your input note, so when you play a C, the harmony will sound the G above. Press the [Next] button twice, and you can change the third harmony. Try bringing it down to ↓G, which will give a harmony note "G" below your input. Then bring the fourth harmony down from ↑↑C (two octaves above the input) to ↓C (one octave below). Play some lead lines — this is the open-fifth harmony made popular by lead guitar and lead synthesizer players everywhere. A similar effect with added distortion and amplifier simulation is Program 48 *Fat Analog Solo*.

Try using other harmony intervals. You'll find that different harmony settings suggest some jazzier or more ethnic feels. Use your ears to pick the harmonies that sound best for your style. Press [Exit] twice to return to the main LCD screen.

M8 2 PART COUNTRY

```
M 8 2 Part Country
mono  C  Major
```

Parameter [+]

```
M 8 2 Part Country
mono  C#  Major
```

This is a Scalic harmony based on the C Major scale, for single-note playing. Unlike any of the Programs that we have seen so far, this uses Intelligent Harmony to generate two harmony notes that will always stay on the major scale.

The trick to these Programs is to set the Key so that the harmonies will be in the same musical key as the song you are playing. Press the Parameter [+] and [-] buttons to change the Key. These key changes are temporary and will be lost unless you Store them. The Studio 5000 can also change Key and Harmony parameters under MIDI control from a computer sequencer, a keyboard or another MIDI device (See page 21).

The two harmonies are fairly close to the input note, on a Major scale, so this Program suits many Country, European and South American harmony styles. You can edit the harmonies to be different intervals and different scale types (see example M7 above).

A word about Harmony

At first, you may notice that when you play, the harmonies sound different from each other. There are different kinds of harmony available to you in the Studio 5000:

SCALIC HARMONY is where the harmonized notes follow the input note up and down the selected scale. You choose a Key, and then choose one of either major, minor, wholetone, diminished or chromatic scales. As you play different input notes, the harmonies will automatically change their intervals to stay "true" to that scale. When you select chromatic harmony, the harmonized notes remain at fixed intervals from the input note.

CHORDAL HARMONY is where the harmonized notes are always part of specific chord. You need to choose the correct Key and Chord Type for your harmonies to sound right. As your input note moves, the harmonies will either stay on the same chord or move to the next inversion of the chord, depending on what note the input is.

SETTING THE KEY is important for these harmonies, because you and the Studio 5000 have to agree on the key that the song you are playing is in before the Studio 5000 can generate the right harmony notes.

CHORD SHIFT is a different type of harmony that works on polyphonic (multiple note) input. It doesn't need to have the Key selected, because it simply shifts all the notes up by however many semitones have been selected. (More, Page 26)

M9 HOT TUBES

```
M 9   Hot Tubes
mono
```

[Edit]

```
 comp→GATE→DIST→
Compressor   off
```

[Next] [Next] [Next]

```
→SPKR→chrs→SDLY→
Spkr Emulator   ON
```

Now we're cooking. A raunchy, distorted sound with sustain, that just might fool the listener into thinking that it's coming from a big, overdriven tube amplifier. You can play chords or lead through this one. Try it on keyboard leads as well. Play with editing the different effects to see how they alter the sound; for example turning off the Speaker Emulator will change the sound from warm "tube" distortion to high frequency transistor distortion like the Beatles' *Back in the U.S.S.R.*

Other Guitar Programs of note: A45 *Killer Queen*: for operatic harmonized guitar leads, and A49 *Octave + Filter*: for that vintage "Voice box" guitar effect (sounds like the "talking guitar" that was popularized on Peter Frampton's *Frampton Comes Alive*), and the Amplifier / Speaker Simulation group, Programs 51-60

M10 VOODOO WAH

```
A 10 Voodoo Wah
mono
```

[Dynfilt]

```
→SPKR→chrs→FLTR→
Dynamic Filter   ON
```

[Edit]

```
Dynamic Filter
  type: bandpass
```

[Next]

```
Dynamic Filter
  resonance: 7
```

[Next] [Next]

```
Dynamic Filter
  freq range: 2 oct
```

[Next]

```
Dynamic Filter SWEEP
mod by: EnvGen+
```

Are you experienced with wah-wah pedals? This Program uses Distortion and the Dynamic Filter to give a resonant Wah effect which is triggered by your input sound. You can change the frequencies of the Dynamic filter, and you can also make it respond to a controller (See Pages 22 & 41-43 for hooking up Expression Controller sources and Page 22 for MIDI CC assignments). To alter the sound of the Dynamic Filter, press the [Dynfilt] button and then [Edit]. Experiment with changing the parameters that you see, using the Data Wheel, and use [Next] to move from one parameter to another. go try it out— these changes are much easier to hear than to describe in words. The Frequency Range controls how wide a sweep the filter makes, the Resonance controls how sharp, or intense the sweep is.

Hint: If you set the Modulation Source to *none*, you will essentially have a static notch filter with adjustable resonance. This can be used to radically "color" the frequency response of an input sound. Try it for simulating wind instruments and voice, which have characteristic "formant" frequencies.

Press [Exit] twice to return to the main Program screen.

Some of the other effects that you can achieve with the Dynamic Filter are rotary speaker simulation, "underwater" sounds, "over a telephone line" effects, and sweeping resonant emphasis of the input sound. Other Dynamic Filter Programs to try are 18, 19 and 49.

STUDIO 5000 PROGRAM LIST:

The Studio 5000 programs were designed and inspired by studio professionals who worked with us in developing this product. They are designed to be immediately useful to you. We have selected groups of programs that give you:

- sound shaping for synthesizers and samplers,
- processing of instruments like horns and guitars for direct-to-board recording in the studio,
- sweetening of recorded vocal and instrumental tracks,
- harmonizing of existing instrumental tracks,
- special purpose processing of natural and Foley sounds for film and video, and
- special audio effects for audio recordings, broadcast, multimedia production and animated picture soundtracks.

The Programs are organized in groups of 5, 10 or 15 by their main effect (See next pages). At the beginning of a group, the Programs tend to be simple and subtle. As you step through the higher program numbers in that group, the Programs get progressively richer sounding. Grouping the Programs this way will save you time in finding the Program that best fits your needs, and then you can adjust its parameters as necessary.

There are two banks of factory-preset Programs, Mono and Stereo. You can view which effects are active in each program by pressing Edit. The effects that are active are the ones displayed in capital letters on the LCD Screen. Effects that are available but not active are displayed in lowercase letters.

Some Programs are meant for single-note, (also called Monophonic or melody) playing—these are listed on the next pages as Melody. The rest of the Programs can be used for chords or multiple notes at once, and are listed on the next pages as Poly (for Polyphonic).

PLAYING STYLES:
Some of the Harmony Programs (including the ones in the Intelligent Harmony group 36-50) are intended for single note playing only—these Programs are great for lead lines, but aren't meant for chords.

Chord Shift Programs will create harmonies on multiple notes.

The Programs that create harmonies will respond to the way that you play your instrument. If you generate more high frequency harmonics (by standing back from the microphone and playing louder, by turning up the tone control or filter settings, or by picking a guitar string harder or at points that create harmonics), then some of the Studio 5000 Programs can accentuate the effect and generate higher harmony effects. This is easier to hear than to describe, so choose some Programs and experiment with playing the same notes with different styles or attacks, and listen to what comes out.

Watch the Overload LED when you are playing and back off on your instrument's volume or the Left and Right Input knobs if it starts to flash; if you start overloading the Studio 5000 with too loud of an input signal, the sound quality will be affected with digital distortion, which is not nearly as good sounding as the Distortion effect built into the Studion 5000. In case of overload, you can see which sections are overloading in the [Utility] *Overflow Detected In* ... screen. Some effects like Compressor, EQ and Dynamic Filter can create substantial signal gain and may need to have their levels adjusted to avoid overload.

MONO BANK

Preset #'s	Group / Program	Melody /Polyphonic	Comments
1 - 10	***Top 10:*** *For various applications - selected to show the range of sounds the Studio 5000 has to offer.*		
1	Lush Chord Shift	Poly	Rich octave doubling of chordal input plus chorus & reverb
2	Bright Detune	Poly	2 voice detuning plus EQ & delay
3	Shimmer	Poly	2 voice detuning plus ducked delays
4	String Swell	Poly	For special chordal effects - also interesting with woodwinds
5	5th Chord Shift	Poly	Chord shifter at +7 semitones - super rich poly-harmonies
6	Octave Box	Melody	Retro octave doubling for single note lines
7	4 Octave Spread	Melody	This is the power of 4-voice intelligent shifting - fat and clean sounding
8	2 Part Country	Melody	Simple diatonic thirds in C major - great for guitars
9	Hot Tubes	Poly	Simulated amplifier distortion with speaker and cabinet emulation
10	Voodoo Wah	Poly	Simulated amp/speaker/cabinet with attack sensitive "wah"
11 - 20	***Detune Combinations:*** *For sweetening and thickening of solo instruments and recorded tracks. Detuning creates a striking doubling or chorusing effect.*		
11	2 Voice Detune	Poly	Slight pitch shifting for thickening instruments/voices
12	4 Voice Detune	Poly	Richer 4 voice version of above
13	Detune Rightly	Poly	All detuning applied to right channel only - the left is dry
14	Verb Detune	Poly	Detuning with stereo reverb
15	Slapdetune	Poly	Detuning with slap delay from multitap delay section
16	Detune DelayX2	Poly	Detuning with both stereo and multitap panning delay
17	Tap Verb Detune	Poly	Detuning with multitap delay and reverb
18	Detune Filter 1	Poly	Detuning with multitap delay and dark dynamic filter
19	Detune Filter 2	Poly	Detuning with multitap delay and bright dynamic filter
20	Kitchen Sink	Poly	Detune with very wet multitap and stereo delays - everything but the...
21 - 25	***Chorus:*** *For sweetening and thickening of solo instruments and recorded tracks, and for special effects. Classic chorus effect in various combinations.*		
21	Chorus Dry	Poly	Simple dry chorus
22	Chorus Echo	Poly	Chorus with ambient stereo delay
23	Chorus LiteShift	Poly	Chorus and delays with light chord shift octave doubling
24	Aqua Chorus	Poly	Chorus and delays with LFO-modulated dynamic filter
25	Detune Chorus	Poly	Mixed detune and chorus with delay and reverb
26 - 30	***Flange:*** *For special instrument and vocal effects. Classic flange effect in various combinations.*		
26	Dry Flange	Poly	Simple dry flange
27	Resonant Flange	Poly	Deep flange at lowest rate possible
28	Flange+delay	Poly	Simple flange with stereo delay and no ducking
29	Psyberflange	Poly	Extra-resonant flange thru use of LFO modulated dynamic filter
30	Joco Flange	Poly	Liquid, shimmering flange thru detuning and reverb
31 - 35	***Polyphonic Shifting:*** *(Chord Shifting): For keyboards, guitar and other multi-note instruments, these special pitch shifting Programs create smooth sounding shifts with a minimum of distortion.*		
31	24 String Shift	Poly	Uses 4 voice pitch shifter to create subharmonics and overtones similar to a 12-string guitar
32	HarpsiChordShift	Poly	Uses chord shifter to create harpischord-like doubling of chords
33	Crystal C. Shift	Poly	Heavy use of chord shift and chorus creates bright shimmering texture
34	Swell ChordShift	Poly	Octave chord shift swells in behind using envelope follower
35	Modulated Shift	Poly	+7 semitone chord shift modulated by LFO

Preset #'s	Group / Program	Melody /Polyphonic	Comments
36 - 50	***Intelligent Harmony:*** *For single-note instruments or tracks. These 15 Programs show a range of harmonies from simple parallel voices to four-part Jazz sax-section style harmonies, in combination with a range of effects including reverb and simulated distorting guitar amplifier.*		
36	+Fifth & Octave	Melody	Parallel fifth above
37	-Fifth & Octave	Melody	Parallel fifth below
38	Diatonic Thirds1	Melody	In-key thirds above and below input note
39	Diatonic Triads2	Melody	As above with fifth to create three-note chords in-key.
40	Chordal Open	Melody	Harmony notes always state specified chord - in this case a C triad
41	Chordal+Bass	Melody	As above but with constant bass drone
42	Play A Blues 1	Melody	Try playing blues licks in A - for theory buffs this is an A Mixolydian scale
43	Play A Blues 2	Melody	Different note arrangements of the A Blues above
44	Super Sax	Melody	Sax section styled block harmony
45	Killer Queen	Melody	Inspired by Brian May - combined harmony and amp simulation
46	Gregorian	Melody	Simple parallel harmony with panning delays
47	Suspended State	Melody	Harmony always states Csus4 with delays and reverb
48	Fat Analog Solo	Melody	Combined parallel harmony and distortion creates moog-like solo patch
49	Octaves & Filter	Melody	Touch sensitive "wah" with octave doubling
50	Octaves & Delays	Melody	Octave doubling and delays
51 - 60	***Amplifier / Speaker Emulation:*** *For processing of guitar, synthesizer and sampler-generated guitar and bass lines, as well as feeding direct to the mixing board in a recording studio.*		
51	Simuamp Clean	Poly	Simple cabinet/speaker emulation with reverb
52	Simuamp Tweed	Poly	Warm overdrive with cabinet/speaker emulation and reverb
53	Simuamp Fatbass	Poly	Amp/cabinet/speaker emulation with chorus and delay
54	Simuamp Fusion	Poly	LA-studio guitarist-inspired
55	Simuamp Edge	Poly	Brighter, buzzier overdrive simulation with reverb
56	Simuamp Solo	Poly	Singing amp simulation with ping-pong delays
57	Simuamp Tacoma	Poly	Grunge-inspired, wide sound, ping pong echo
58	Simuamp Seattle	Poly	Grunge-inspired, narrower, lots of echo
59	Piezo Warmer	Poly	Use for direct to board with piezo-electric pickups on acoustic guitars
60	Piezo Warmer2	Poly	As above
61 - 70	***Special Effects:*** *For various applications, these Programs come from studios who are using the Studio 5000 for animation and film recording.*		
61	Audio Smear	Poly	Melts input signal down in pitch. Sounds like someone strumming piano strings at random
62	Jurassic	Poly	Creature-like sounds thru bizarre shifting and delay combinations
63	Far Away	Poly	Rhythmic recirculating delays and filtering
64	Vibrato	Poly	Light regular pitch bending creates shimmery vibrato
65	Tremolo	Poly	Volume modulated pitch shifter creates classic tremolo sound
66	Auto-Wah	Poly	Dynamic filter modulated by LFO - a sampler is available in this program
67	PolyRhythm	Poly	Polyrhythm created by combined multitap and stereo delays
68	Robot Voice	Melody	Darth Vader effect thru flange and deep shifting
69	Chipmunk Voice	Melody	Chipmunk voice using up-shifting
70	Crazy Voices	Poly	Multiple voices using different pitches each delayed a different amount

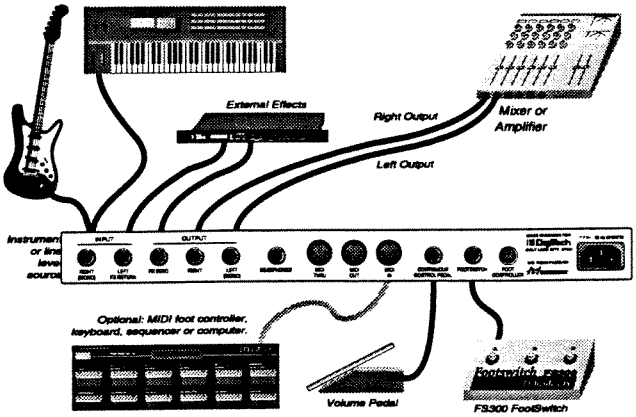
STEREO BANK

Note: The Mix on many of the Stereo Programs are set to 100% wet for studio use, this can be changed if desired (see page 25). Where the Program name starts with capital letters, this means that that Program is particularly well suited to that type of instrument: DRUM - percussion processing, MIX - sweetening of tracks on tape, SF/X - special effects processing, VOX - vocal track processing.

Preset #'s	Group / Program	Melody /Polyphonic	Comments
1 - 10	***Mix Imager Programs:*** *For thickening of stereo instruments and tracks, often used for overall sweetening in mixdown. Programs use various combinations of detuning, regenerating pitch shifts and other effects.*		
1	MIX Imager 1	Poly	Imaging through 4-voice detuning and EQ
2	MIX Imager 2	Poly	Imaging through 4-voice detuning and EQ
3	MIX Imager 3	Poly	Imaging using 4-voice regenerative pitch shifter - delays and regeneration create sense of space
4	MIX Imager 4	Poly	Slow phase shifting and shimmer through 4 voice detuning and EQ
5	MIX Imager 5	Poly	As above
6	MIX Imager 6	Poly	Imaging using 4-voice regenerative pitch shifter - delays
7	MIX Imager 7	Poly	Detuning plus reverb
8	MIX Imager 8	Poly	As above
9	MIX Imager 9	Poly	Imaging using 4-voice regenerative pitch shifter - delays
10	MIX Imager 10	Poly	Imaging using 4-voice regenerative pitch shifter - delays
11 - 15	***Stereo Keyboard Programs:*** *Various keyboard enhancement programs, for livening up the static sound of many keyboards.*		
11	Keyboard 8ve+	Poly	Stereo octave chord shift, chorus, delay and reverb
12	Flange Delay	Poly	Includes stereo 5-band EQ
13	Brite Chorus	Poly	Simple stereo chorus with EQ
14	4 Voice Detune	Poly	Pitch detuning for thickening
15	Piano Hall	Poly	Stereo chorus, EQ and reverb
16 - 20	***Drum Programs:*** *For thickening of drum samples and programs. Various combinations of pitch shifting and attack controlled pitch bending.*		
16	DRUM Snare Drop	Melody	Pitch bending triggered by envelope generator
17	DRUM Snare Rise	Melody	As above
18	DRUM Deep Snare	Melody	Intelligent shifting down a 4th - fully wet
19	DRUM Bright Kit	Poly	Stereo EQ and reverb
20	DRUM Big Toms	Melody	Like 18 but 1 octave down with reverb
21 - 25	***Stereo Vocal Programs:*** *For use with live and recorded vocals. Includes detune thickening, shifting and sampling/processing for triggered vocal fly-ins.*		
21	Voice Doubler	Poly	2 voice thickener using detune and very short delays for ambience
22	VOX 4Part Detune	Poly	4 voice thickener using detune and reverb
23	Voice Spread	Poly	Simple use of stereo delay to widen vocal image
24	Stereo Sampler	Poly	Use to fly in up to 3 seconds of stereo vocals. Plenty of effects to work with. Triggers on input when you are at the record screen.
25	VOX Deep Double	Melody	Fully wet octave down - set mix levels at board
26 - 30	***Special Effects:*** *For various applications, these Programs come from studios who are using the Studio 5000 for animation and film recording.*		
26	SF/X Thick Rhyth	Poly	Stereo chorus, delays and modulated filter
27	SF/X Way Up	Melody	Octave up with delays and reverb - fully wet
28	SF/X Way Down	Melody	4th down with flange, delays and reverb - fully wet
29	SF/X Pad Pan	Poly	Stereo detuning, panning delays and reverb
30	SF/X Funkmeister	Poly	Stereo chorus, delays and LFO-modulated dynamic filter

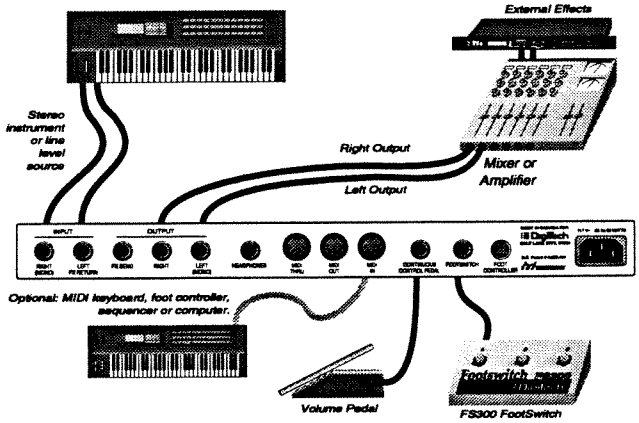
Stage / Live setup:

Use the Left output for mono, or both Left and Right outputs for stereo. You can either run the outputs to your mixer, or directly to one or two amplifiers. Your favorite effects device can be run from the Studio 5000 FX Send and FX Receive jacks.



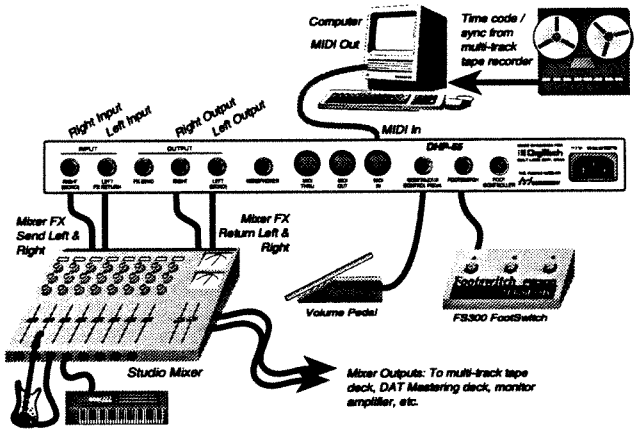
Stereo Setup:

For stereo input / output. Note that the Studio 5000's external FX Send and Receive are not connected when using stereo inputs.

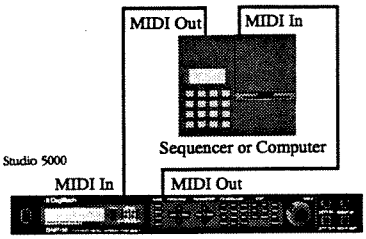


Recording Studio Setup:

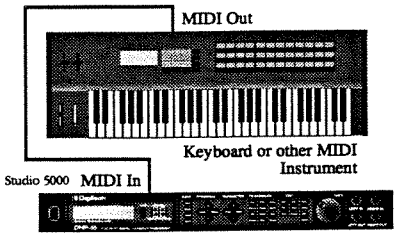
Using the Studio 5000 on the effects or auxiliary send and receive loops of your mixer. Set the Mix parameters of the effects to 100% wet, because you will be balancing the wet and dry signals with your mixer.



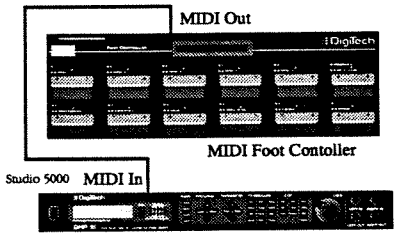
In all three examples, the Studio 5000's Programs and Parameters can be controlled via MIDI from computers, sequencers, foot controllers and keyboards.



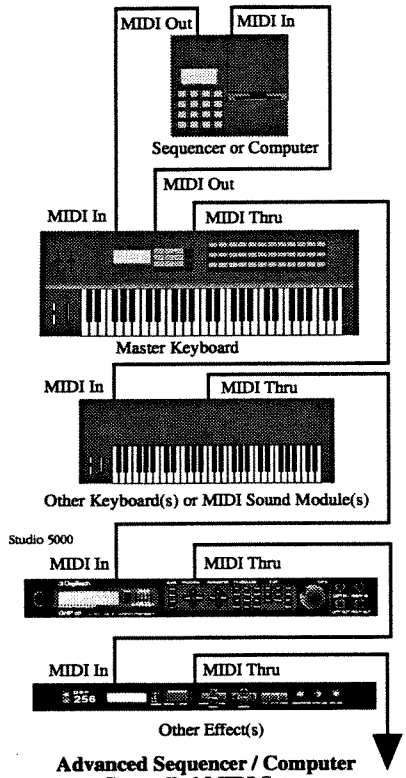
Basic Sequencer / Computer Controlled MIDI Setup



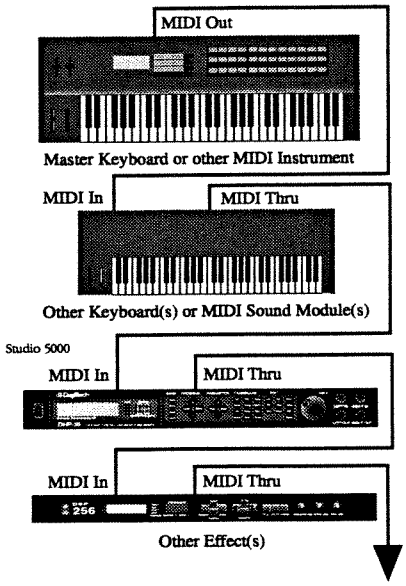
Basic Keyboard / MIDI Instrument Controlled MIDI Setup



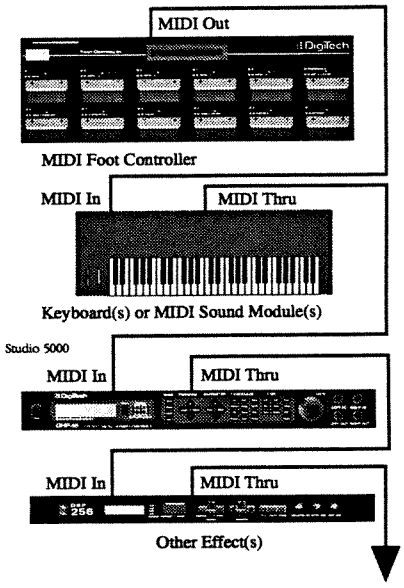
Basic MIDI Foot Controller MIDI Setup



Advanced Sequencer / Computer Controlled MIDI Setup



Advanced Keyboard / MIDI Instrument Controlled MIDI Setup



Advanced MIDI Foot Controller MIDI Setup

THE STUDIO 5000 OPERATING SYSTEM

All digital devices are computers inside: rack effects devices, synthesizers, VCRs and microwave ovens are all examples of innocent-looking devices that are actually computers. Any digital device's Operating System is a built-in collection of programs that define what it does, and how it is controlled.

Inside your Studio 5000, the operating system is stored in four socket-mounted ROM (Read Only Memory) chips: this means it can be upgraded as Studio 5000 software options are released by DigiTech.

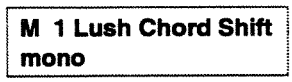
OPERATING SYSTEM STRUCTURE

Just as your town is organized into neighborhoods, which are organized into streets, which are made up of houses, the Studio 5000 operating system is organized into modes, which are organized into menus, which are made up of parameters.

Application

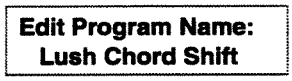
STUDIO 5000 MODES

The six modes of the Studio 5000 operating system are as follows:



- **Performance Mode** - This is the power-up mode of the Studio 5000: This is where you load and play programs. The screen shows the location and name of the Program, whether it is mono or stereo, and any Chord, Scale or Key information.

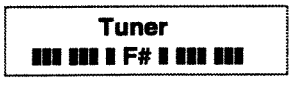
- **Edit Mode** - Enter this mode by pressing an [FX Library] button followed by the [Edit], [Mix] or [Mod] button: Use this mode to edit all main, mixer and modulation Parameters of the currently loaded program. The screen shows the arrangement and order of the Effects in the Program, and whether they are on (uppercase) or off (lowercase). Pressing the [Next] button moves to additional screens.



- **Name Mode** - Enter this mode via the [Name] button. In this mode, you can change the name of the currently loaded program. The flashing letter is the one that is currently being edited.

- **Utility Mode** - Enter this mode via the [Utility] button: Set preferences (such as Program Autoloading and whether you prefer sharps or flats) and create new programs here.

- **MIDI Mode** - This mode is where all MIDI settings for the Studio 5000 are made. MIDI channel, program change and memory dump via MIDI parameters are accessible when you are in this mode. Enter MIDI mode via the [MIDI] button.



- **Tuner Mode** - Pressing the [Tuner] button will put the Studio 5000 in tuner mode. The reference A pitch of the unit is also set here; the default is A=440 Hz, and can be changed from 420 to 460 Hz.

In Depth

What is MIDI?

MIDI stands for Musical Instrument Digital Interface, a standard which allows electronic musical instruments, computers sequencers and effects devices to pass information to each other. MIDI does not carry any audio (sound) at all, rather it carries information on which notes are being played, and what controllers are being used.

MIDI is particularly useful for commanding musical intruments by 'remote control'. In our case, this means changing Programs and Harmony parameters from a computer, sequencer, or a keyboard, in synchronization with recorded tracks on tape and/or with other MIDI controlled instruments.

STUDIO 5000 MENUS

The next level of the Studio 5000 operating system is its menus. Every Mode contains menus that allow the Studio 5000 to offer you choices (just like a restaurant menu). Once you have made your choices in a menu, you can move on to the next menu in that mode via the Parameter [Prev] and Parameter [Next] buttons, or you can leave the mode entirely at any time by pressing the mode button ([Tuner], [Name], [Utility] or [MIDI]) again, or the [Exit] button. When you reach the end of a chain of menus, your next step will return you to the first menu.

PERFORMANCE MODE

When the Studio 5000 is first turned on it is in Performance mode: The current Program Bank and Program number are displayed with the current program name on the top line of the LCD while the input mode (stereo or mono), plus any Key, Scale and Chordal information is displayed on the bottom line of the LCD.

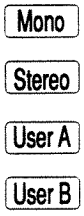
In performance mode, you can:

- Select program banks with the BANK buttons;
- Select programs with the Program [+] and Program [-] buttons;
- Change a Harmony Program's Key with the Parameter [+] and [-] buttons;
- Load and copy programs with the Program [Load] and Program [Store] buttons;
- View the configuration of the current program and edit the chain by stepping to a specific effect with the Parameter [Prev] and Parameter [Next] buttons, and turning the effect on and off with the Parameter [+] and Parameter [-] buttons or the Data Wheel;
- Call the editing mode to reprogram any of the effects in the configuration by stepping to a specific effect with the Parameter [PREV] and Parameter [Next] buttons, and then pressing the Edit button (see the next section: edit mode); and
- Step through the Harmony Key and Harmony Chord parameters in the Main Menu via the Parameter [Prev] and Parameter [Next] buttons, and change their values with the Parameter [+] and Parameter [-] buttons or the Data Wheel (harmony effect programs only).

Please note that you can also use the FX Library buttons to "jump" directly to the appropriate effect in the configuration. This is a shortcut to save you time; it's faster than stepping through the screens with the Parameter [Prev] and Parameter [Next] buttons. To return to the main Performance menu, press the [Exit] button or step back to it with the Parameter [Prev] and Parameter [Next] buttons.

The Program Bank

Studio 5000 memory is organized into 4 Program Banks. The Studio 5000's program banks are like a filing cabinet with 4 drawers: Just as you would use each drawer of a filing cabinet for storing different types of files, the Studio 5000's program banks organize the programs in the following way:



Mono Bank

M 1 Lush Chord Shift mono

The [Mono] bank is a factory preset bank, which means you cannot erase or change the programs that came in it. The programs in the mono bank are designed to be used with mono (one output only) instruments such as guitar or horns.

Stereo Bank

S 1 MIX Imager 1 stereo C Chromatic

The [Stereo] bank is also a factory preset bank, containing programs which are designed for stereo (left and right output) instruments such as keyboards and stereo recordings.

User A Bank

A 1 Lush Chord Shift mono

The [User A] bank is completely programmable, which means that you can erase and change the programs stored within it. When you purchase the Studio 5000, this bank contains copies of the programs in the [Mono] bank.

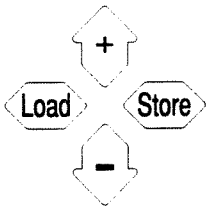
User B Bank

B 1 MIX Imager 1 stereo C Chromatic

The [User B] bank is also completely programmable. When you purchase the Studio 5000, this bank contains copies of the programs in the [Stereo] bank.

If you intend to use your Studio 5000 with both mono and stereo instruments, you may want to keep all your custom mono programs in the [User A] bank and your custom stereo programs in the [User B] bank in order to keep them separated, although nothing says you can't mix mono and stereo Programs in one bank.

REMEMBER: Factory programs are found in the [Mono] and [Stereo] banks: You cannot change them, but you can edit and save them in the [User A] and [User B] banks!



The Program Keypad

Once you have selected a Program Bank using the Bank selectors, the Studio 5000 will prompt you to select and load a Program. This is done using the Program keypad.

Selecting a Program

The Program [+] and Program [-] buttons (the up and down arrows) in the program keypad allow you to scroll through the Programs of the current bank: Program [+] takes you higher until you reach the last program, and Program [-] takes you lower until you reach the first program. The Data Wheel can be used to select programs as well; turning the Data Wheel clockwise selects higher Programs, turning counter-clockwise selects lower Programs.

Loading a Program

[load] program: M 2 Bright Detune

The Program [Load] button causes the Studio 5000 to load the selected program to temporary memory. Once the program is loaded, you can hear its effects, change its parameters and then listen to the results without changing the original version: This is because your changes are not saved into permanent memory until you Store the edited program.

Storing a Program

[Store]

```
[STORE] to copy to
A  1 Lush Chord Shift
```

[Data Wheel] or Program [+] , [-]

```
[STORE] to copy to
A14 Verb Detune
```

[Store]

```
!! STORED !!
A 14 Lush Chord Shift
```

The [Store] button saves the program to one of the permanent program positions in [User A] or [User B] banks. To store a Program:

- Press the [Store] button to access the Store menu.
- Select the destination of the new Program by choosing either [User A] or [User B] banks, then choose the Program number with the Data Wheel or the Program [+] and Program [-] buttons.

WARNING! This procedure will permanently erase the program which was previously at that selected memory location.

- Press the [Store] button again to Store the new program at the selected memory location.

EDIT MODE

To edit any effect in the current program configuration, select the desired effect from the configuration menu (it will flash when selected), and press the [Edit] button (you can also push the appropriate FX Library button to jump to the effect you need). Use the Parameter [Next] and Parameter [Prev] buttons to move to each effect parameter you wish to change, and adjust the value with the Parameter [+] and Parameter [-] buttons or the Data Wheel. To leave any Edit Mode menu, press the [Exit] button and you will be returned to the last menu you were using before calling Edit Mode. Since the configuration of every program is different, the edit menus available will depend on the Program.

Rather than show all the Edit Mode menus here, this manual includes them in the sections that explain the effects and parameters that they relate to (see Section 3: Programming, starting Page 26).

NAME MODE

```
A27 Resonant Flange
mono  Chromatic
```

[Name]

```
Edit Program Name:
_Resonant Flange
```

After editing a program to your satisfaction, you may want to give it a custom name to distinguish it from the original. To give the Program a custom name, press the [Name] button. You can then choose a name of up to 16 characters long. Step through the 16 character positions in the Name Mode menu using the Parameter [Prev] and Parameter [Next] buttons, and then scroll through the possible characters for that position using the Parameter [+] and Parameter [-] buttons or the Data Wheel.

You must Store the Program to save the name change. To leave the Name mode menu, press the [Name] button a second time or press the [Exit] button and you will be returned to the last menu you were using before you entered Name mode.

UTILITY MODE

The Studio 5000's Utility Mode allows you to change universal (or system) settings and preferences. You enter Utility Mode by pressing the [Utility] button. Once you have stepped to a desired parameter in a Utility Mode Menu, you may change its value with the Parameter [+] and Parameter [-] buttons or the Data Wheel.

Autoload Presets
[Utility] [Next]

```
UTILITIES
autoload presets: off
```

You can set the Studio 5000 to automatically load a Program as soon as you select it. Press [Utility], and then [Next] until you see the screen shown at the left. Press Parameter [+] or use the Data Wheel to change it to ON. Pressing the [Exit] button or the [Utility] button a second time returns you to Performance mode.

Building New Programs

[Utility] [Next]...

[Load] to build new program

[Load]

[Load] to Create: 1 P4+EQ7

Occasionally, you will want to create a completely new program for a sound totally unlike anything in the Studio 5000's mono and stereo banks: this is called building a new program.

The Studio 5000 offers 181 effects configurations (or effects chains) to choose from when building a new program: The starter configurations describe the effects chain they offer according to the following table:

BP2	Bass Pitch Shifter (2 Voice)	MD	Multitap Delay
C	Chorus	P2	2 voice Intelligent Pitch Shifter
CS	Chord Shifter	P4	4 voice Intelligent Pitch Shifter
D	Distortion & Speaker emulator	R	Reverb (mono)
DF	Dynamic Filter	S	Sampler
EQ5	5 band stereo Equalizer	SD	Stereo Delay
EQ7	7 band mono or stereo Equalizer	SP	String Pad
EQ15	15 band stereo Equalizer	SR	Stereo Reverb
EQ31	31 band mono Equalizer	S4R	Harmony 4 Shift with Regeneration
F	Flange		

Analog compressor and gate effects are part of all mono input configurations and are not shown when you are selecting starting configurations 1 to 94. Configurations 143–151 and 161 - 170 have digital stereo compressor and gate effects, and configurations 171–179 have a digital stereo compressor effect, which are not shown. Whenever a new configuration is loaded, all of the effects are turned off by default: This allows you to build the program effect by effect, gradually shaping the sound to your liking.

Overflow Detector

[Utility] [Prev]

Overflow Detected In none

Besides the front panel's red Overflow LED, the Studio 5000 is equipped with a "smart" Overflow detector, located in the [Utility] menus. When an overflow occurs (a hot signal overloads a Studio 5000 effect) the Overflow detector reports which effects, if any, are overflowing. This will help you determine which effects in the current program require adjustment. The most recently detected overflow condition will be displayed.

There are several possible causes of overflow:

- The output mixer stage of an effect is too high for the next effect in the configuration.
- High feedback or gain in effects such as Dynamic Filter, Flange and Delay are present.
- Some effects, such as Compressor, Distortion or EQ, have an internal gain parameter that is set too high.

Software Upgrade

If a new version of the Operating System is released, the Studio 5000 is capable of upgrading your old Programs. This is a simple procedure that means that the hard work you've spent developing your own sounds since you bought the unit won't be wasted. Once this is complete, the Programs that you have saved in the User A and User B Banks will have been upgraded to run with the new software.

[Utility] [Next] [Next] [Next]

[Load] to prepare to Upgrade Software

The automatic upgrade can be used by pressing the [Load] button in the Utility menu which prompts *[Load] to prepare to Upgrade Software*. When you do this, your unit will respond with the message *Ready for Upgrade (Power Off Now)*. If for any reason you decide at this point that you don't want to upgrade, there is absolutely no harm in turning the power back on with your old software still installed. However, to proceed with the preset upgrade, you should turn the power off, replace your old EPROM chips with the new ones, and the upgrade will take place the next time you turn the power on.

Display Flats

[Utility]

UTILITIES display Flats: off

The Studio 5000 normally displays non-natural notes as sharps, but can be set to display them as flats ($C^{\#}$ is the same as D^{b}). Press [Utility] and [Next] until you see *Utilities display Flats: off* and use Parameter [+] or the Data Wheel to turn *display Flats* to ON.

MIDI MODE

[MIDI]

MIDI basic channel: 1

The Studio 5000's MIDI mode is where all MIDI parameters are set; it is entered by pressing the [MIDI] button. Once you have stepped to a desired parameter in a MIDI Mode Menu, you may change its value with the Parameter [+] and Parameter [-] buttons or the Data wheel.

Pressing the [Exit] button or the [MIDI] button a second time returns you from MIDI mode.

MIDI Control of Key

You can use MIDI to change the key of the harmonies in three ways:

- MIDI Program Changes,
- MIDI notes, and
- Via chord analysis of MIDI notes

Changing Key Using MIDI Program Changes

[MIDI] [Next]

MIDI key change:program

[Next]

MIDI key channel: 1

Press [MIDI] and [Next] until you see the screen shown at the left. Set the MIDI Key Change to *Program*, and set the Channel parameter to the MIDI channel you will be controlling from: If this channel is the same as the basic MIDI channel, the Receive Program Change parameter should be turned off (it will take priority). Program change mapping works as follows:

Program	Variation - For Chordal Presets	Variation - For Scalic Presets	Key
1-12	Major	Major	C, C#....B
13-24	Major 7	Minor	C, C#....B
25-36	Minor	Wholetone	C, C#....B
37-48	Minor 7	Diminished	etc.
49-60	Dominant 7		
61-72	Minor7b5		
73-84	Diminished 7		
85-96	Augmented 7		
97-108	Suspended 4		
109-120	7th Suspended 4		

Changing Key Using MIDI Notes

[MIDI] [Next]...

```
MIDI
key change: notes
```

Press [MIDI] and [Next] until you see the screen shown at the left. Set the MIDI Key Change to *Notes*, and set the Key Change Channel parameter to the MIDI channel you will be controlling from: MIDI notes received will be mapped to the variations as follows:

Note	MIDI Note #	Variation - For Chordal Presets	Variation - For Scalic Presets
C-1 to B-1	0 to 11	Major	Major
C0 to B0	12 to 23	Major 7	Minor
C1 to B1	24 to 35	Minor	Wholetone
C2 to B2	36 to 47	Minor 7	Diminished
C3 to B3	48 to 59	Dominant 7	
C4 to B4	60 to 71	Minor7b5	
C5 to B5	72 to 83	Diminished 7	
C6 to B6	84 to 95	Augmented 7	
C7 to B7	96 to 107	Suspended 4	
C8 to B8	108 to 119	7th Suspended 4	

Changing Key Using MIDI Chords

```
MIDI
key change: chords
```

[Next]

```
MIDI
key channel;  1
```

The Studio 5000 can analyze incoming MIDI note data to determine what chords are being played. It will then automatically pick a harmony to fit the chord. To enable this feature, press [MIDI] and [Next] until you see the *MIDI key change* screen, then set Key Change to Chords. Press [Next] and the MIDI channel that Key change information is received on can be set seperately from the Basic MIDI channel in the *MIDI key Channel:* screen.

MIDI Keyboard Split

[MIDI] [Next] ...

```
MIDI
keyboard split: C 8
```

You can set the range of MIDI notes that the Studio 5000 will respond to for changing Key. Press [MIDI] and [Next] until you reach the *MIDI keyboard split* screen. Change the note diplayed to the highest note that you want to have an effect on the Key change, and the Studio 5000 will only respond to notes below that note. (Middle C = C 4 = MIDI note # 60)

Receive Program Change

[MIDI] [Next] ...

```
MIDI
receive program: off
```

You can set the Studio 5000 to either respond to or ignore MIDI Program Change messages coming from other MIDI devices. Press [MIDI] and [Next] to reach the *MIDI receive program* screen. Turn the parameter ON or off using the Parameter [+] and [-] buttons or the Data Wheel.

MIDI CC Assignment

[MIDI] [Next]...

```
MIDI: [Edit] for
 CC Assignment
```

[Edit]

```
cc  0 Ster Delay 3s
left delay high
```

MIDI continuous controllers can be assigned to individual parameters for remote editing from other MIDI devices. This assignment takes place on a global rather than on a per-preset basis to simplify user control. Press [MIDI] then [Next] to reach the *MIDI [Edit] for CC Assignment* screen and press [Edit]. Simply select the controller number you wish to assign, then select the effect and parameter using the Parameter [Prev] and [Next] buttons and the Data Wheel or Parameter [+] and [-] buttons. Live performance use is also possible, but be careful since changing some parameters may create audible side effects when edited in real time.

MIDI Program Map

```
MIDI Pgm:  1 maps to
A 1 Lush Chord Shift
```

MIDI program change messages can be from 1 to 128. The Studio 5000 MIDI Program Map feature allows you to "map" an incoming program change to any one of its internal programs. By stepping to the MIDI Pgm number in this menu, you can change the mapping between all received MIDI Program Change (PG) commands and the Studio 5000's internal programs. Use the User A or User B] buttons along with the Data Wheel to select the Bank and Program number.

Single Program & Bank Dump

[MIDI] [Next] ...

MIDI: Store to Dump
B10 MIX Imager 10

[Next]

MIDI: Store to Dump
Bank: User B

[Next]

MIDI: Store to Dump
Prog Change Table

[Next]

MIDI: Store to Dump
CC Mapping

The Studio 5000's MIDI dump features allow you to download or "Dump" your Studio 5000 programs to another Studio 5000, Computer, Sequencer, or MIDI Data Filer device. Please note that Dumping programs does not erase them from the Studio 5000, it simply sends a copy of the information over MIDI to another device. Individual programs can be dumped with the Single Program Dump, and entire banks are dumped via the Bank Dump feature. The Program Change table and the Continuous Controller mapping table can be dumped seperately as well. This can be useful if you are transferring setup information from one Studio 5000 to another. Once a program or bank is dumped to another device, you can erase it from your Studio 5000 and use its space for other programs without having to recreate it in the future (you need only reload it from the other Studio 5000, Computer, Sequencer, or MIDI Data Filer).

TUNER MODE

When the [Tuner] button in the Edit keypad is pressed, the Studio 5000 enters Tuner mode. In Tuner mode, you can tune your instrument, the Studio 5000, and set the mode of the tuner's output. It is important that your instrument be in tune with the Studio 5000. If it isn't, harmonies generated by the Studio 5000 may sound out of tune with the original note.

The Digital Strobe Tuner

[Tuner]

Tuner
▮▮▮ ▮▮▮ ▮ F# ▮ ▮▮▮ ▮▮▮

The Studio 5000's onboard tuner is a digital version of a mechanical strobe tuner: Unlike conventional digital tuners, it uses a "strobing" display effect combined with intelligent pitch correction to make tuning an instrument fast and accurate. The digital strobe tuner display is designed to be easily read, even from across a stage or studio.

Whenever the Tuner feature is active, the Studio 5000 display shows the user the most dominant fundamental pitch it "hears" to the nearest semitone; the closeness of the pitch to this semitone is reflected in the speed and direction of the moving (or strobing) blocks as they cross the display.

The speed of the strobe blocks shows how close the instrument's pitch is to the actual note shown on the Studio 5000's display: closer is slower, and farther is faster. The direction of the strobe blocks shows the relative sharpness or flatness of the instrument pitch: the blocks strobe right to left for flat pitches and strobe left to right for sharp ones.

[Tuner] [Next]

TUNER
Reference A: 440Hz

Note: You must match the Reference A of the Studio 5000 to that of your instrument or recording in order for the Intelligent Harmony effects to be in tune. Normally, your instrument would be tuned to A=440 Hz, but if you are tuning your instrument to a different reference, or if you are using a recorded source that is not tuned to A=440 Hz, you must adjust the Studio 5000 Reference A setting. Press [Tuner] and [Next] to see the screen at left. then use Parameter [+] and [-] or the Data Wheel to adjust the tuning reference through a range of A=420 Hz to A=460 Hz. You don't need to Store this change, it will remain where you set it.

Tuning Adjustment	*Reference A*	
Half-Step (semitone) up	466 Hz	(out of adjustment range)
Quarter-Step (1/2 semitone) up	453 Hz	
None	440 Hz	
Quarter-Step (1/2 semitone) down	427 Hz	
Half-Step (semitone) down	415 Hz	(out of adjustment range)

Mute Mode

[Tuner] [Next] [Next]

TUNER
Tuner Mode: mute

When the Tuner is activated in mute mode, all output stops while you tune your instrument through the strobing display; normal output resumes when you leave the Tuner function. This mode is ideal for live performances. Press [Tuner] or [Exit] to return to Performance mode.

Easy Mode

Parameter [+]

TUNER
Tuner Mode: easy

When the Tuner is set to easy mode, the sound of your instrument is passed through the output of the Studio 5000 along with a pitch-corrected copy of itself: the resulting "beating" effect between the two output signals will indicate how accurately tuned the instrument is.

Through Mode

Parameter [+]

TUNER
Tuner Mode: through

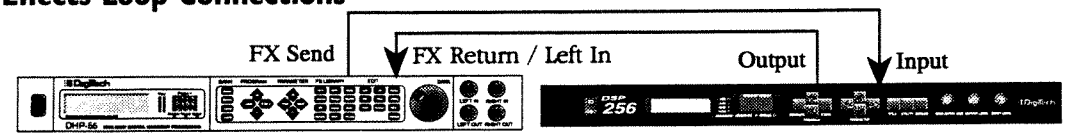
The through mode of the Tuner feature is the most like a standard electronic tuner: the sound of your instrument is passed through the output of the Studio 5000 without any effects or shifting.

The Effects Loop

An effects loop is built into the Studio 5000 to allow the use of harmonic exciters, distortion boxes, special pre-amps, or any other effects devices. When the effects loop is used, the Studio 5000 can perform intelligent pitch detection and shifting on a clean input signal and then pass the input and harmonies on to the FX Looped devices for further enhancement. Remember that the FXLoop can only be used with mono input signals and Mono Programs since the Left Input jack doubles as the FX Return jack. To use this feature, you must:

- Connect the effects unit to the FX Send & FX Return (Left Input) jacks of the Studio 5000 (see diagram).
- Activate the FX Loop by pressing the [FxLoop] button (the Fx Loop LED indicator will light).
- Adjust the amount of external effects the Studio 5000 will process with the Left Input control on the front panel (when the Fx Loop is in use, this knob acts as the FX Return level control)

Effects Loop Connections



Studio 5000 Other Effects Unit

For more detailed information on the FX Loop feature, see Page 40, Programming: FX Loop.

The Digitech FS300 is an optional footswitch controller that can be used with the Studio 5000 for hands-free control of its many features during live or studio performances. The functions of the three pedal switches on the FS300 depend on the settings of the Utility Autoload parameters, which are located in the Utility Mode menus.

When the Studio 5000's Autoload feature is disabled, the footswitch functions are as follows:

- Switch 1 increments through Programs in memory, Switch 2 decrements through Programs in memory, and Switch 3 doubles as the Load and Bypass switch.

Once you have loaded a program with the third switch, it functions as a bypass switch (it turns the Studio 5000's effected output off and on).

When the Utility Autoload parameter is enabled, the function of Switch 1 and 2 remain the same, and Switch 3 changes to function as a full-time Bypass switch.

[Utility] [Next]

UTILITIES
autoload presets:off

MIX MENUS

(example only)

2 Voice Harm HARM1
lvl: -6 dB pan:L 55%

The [Mix] button is only active when you are Editing an effect. Mix sets the relative levels and left-right panning positions of the dry (input) sound, the wet (effect) sound, and in some cases, the relative levels and pan positions of component parts of the the effect. The appearance of the Mix screens will be different for each Effect. In the example shown at the left, the component part that is being adjusted is the Harmony 1, its level is set to 6 decibels lower than full output, and the pan position is slightly to the left of center (center being 50%).

Use the [Next] and [Previous] buttons to step between the different Mix parameters, and use the Parameter [+] and [-] buttons or the Data Wheel to change the values.

Keep in mind that the Mix parameters are set for each effect, and the output of that effect affects the rest of the effects in that Program. In some cases, you may need to lower some of the effects' Mix parameters if the combination of effects' levels overloads the Studio 5000. The Mix Parameters for each effect are listed in Part 3 - Programming, starting on Page 26.

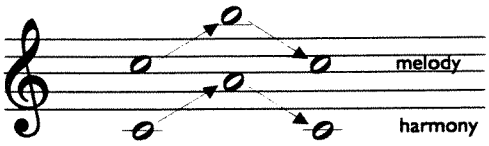
PROGRAMMING

This section provides the details on all of the parameters available for each Effect. There are also notes on programming and using the effect, and a schematic block diagram of the signal flow for most Effects. Some Effects have slightly different signal paths for their Mono and Stereo versions. We have not provided diagrams for each possible situation, but these diagrams should give you a good idea of how the Effect is put together.

HARMONY

Harmony is the sound of two or more notes playing at the same time. There are four types of harmony:

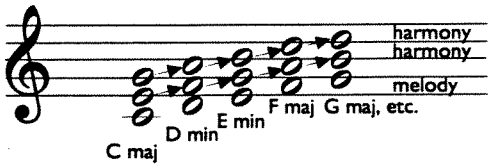
Chromatic



(exactly parallel)

Notes move in the same direction, always the same distance apart. Chromatic harmonies tend to sound monotonous after a while, and they're not always as musical.

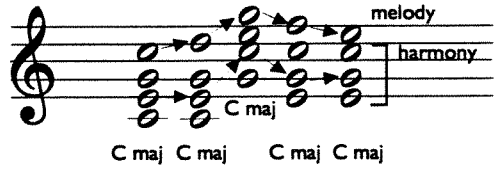
Scalic



(more musical)

The ear hears something more musical as the notes move together, but vary their distance apart from each other, to stay in the same key. Scalic harmonies are a more interesting musical sound because the varying distance between the notes adds interest, and the notes stay within a given key or scale.

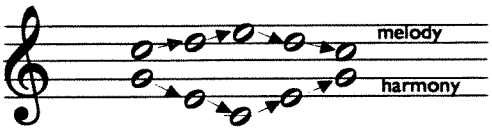
Chordal Harmony



(strong melody)

The big advantage of chordal harmony is that the ear hears the melody clearly, and is less distracted by the harmony notes. The harmony notes always form a specified chord, and they stay still while the melody moves within the chord.

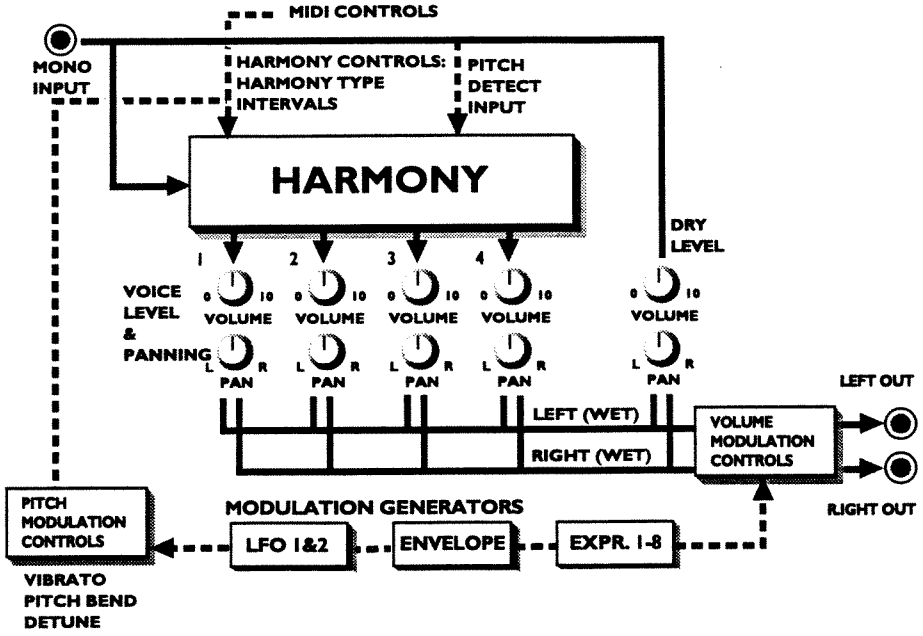
Contrary Motion



(most striking)

This is the most sophisticated and striking sound, because harmony notes move in opposite directions from the melody, creating an expanding and contracting sound texture.

4 AND 2 VOICE HARMONY



Notes on 4 Voice Harmony Effects:

The Intelligent Pitch Shifter Effect of the Studio 5000 is musically aware of most chord types and scales. There are two Types of intelligent harmonies: Chordal and Scalic. When you are programming the Intelligent Pitch Shifter, the following information is necessary:

CHORDAL: Key Root, Chord Type (major, minor, etc.) & Voicing

SCALIC: Key, Scale (major, minor, etc.), Voice Intervals and Non-scale note handling.

All Pitch Shifter Effects (accessible through the Harm key) are meant for monophonic (one-note at a time) lead playing; octaves and fifths also work with some Pitch Shifter Effects, but it is recommended that you use Chord Shifter Effects for polyphonic (chord) input signals.

- Stereo Input Intelligent Harmony effects (Found in the stereo bank) take a left and right input signal and process them separately:

2 voice harmony - Harmony 1 is processed from the Left input, while Harmony 2 is processed from the Right input

4 voice harmony - Harmonies 1 & 3 are processed from the Left input, while Harmonies 2 & 4 are processed from the Right input

- For Stereo Pitch Shifters, the Right input is the one used for all pitch recognition and analysis: send the strongest and cleanest signal to this input if there is any wide variation between your left and right channels.

- When you customize a scalic harmony, the interval, non-scale tone and pitch bend range parameters will not be available for programming. Similarly, when you customize a chordal harmony, the voicing parameter will not be available, although the bend parameter is still available.

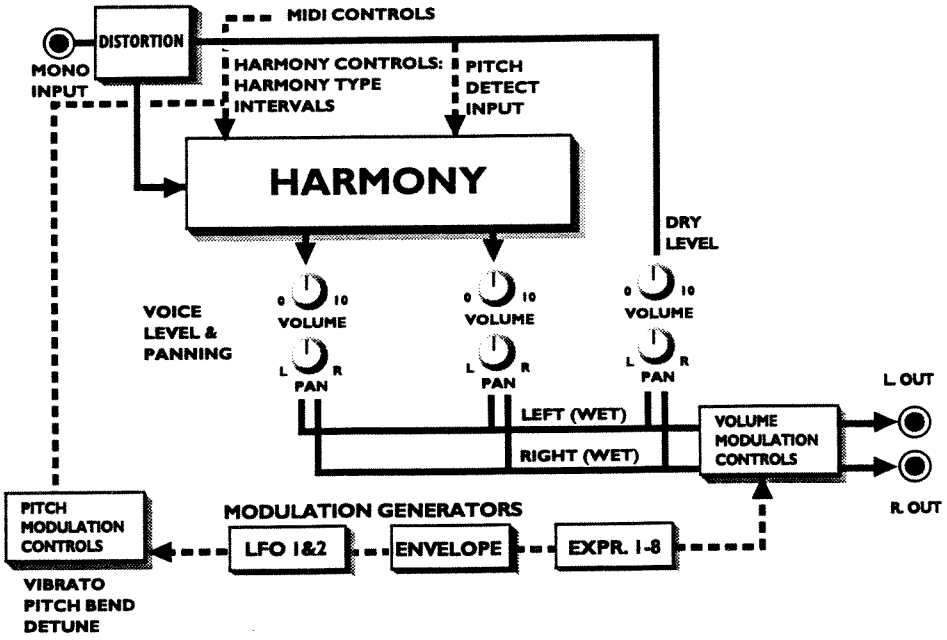
- 4-Voice Pitch Shifters can only shift voices 1 & 2 down by 2 octaves. Voices 3 & 4 are limited to 1 octave down.

- Stereo Pitch Shifters have no dry pan.

Effect Parameter	**Values**
Harmony Type	Chordal, Scalic
Key & Chord (Chordal Harmony)	key, maj, maj7, min, min7, dom7, m7b5, dim7, aug7, sus, sus7
Key & Scale (Scalic Harmony)	key, chromatic, major, minor, wholetone, diminished
Voicing (2 Voice Chordal Harmony)	2up close, 1up 1down close, 2down close, 1up 1down open, 2up open, 2down open, 1up open 1down close, 1up close 1down open
Voicing (4 Voice Chordal Harmony)	3 up 1 down close, 2 up 2 down close, 1 up 3 down close, 4 up close, 4 down close, 3 up close + bass, 2 up 1 down close + bass, 1 up 2 down close + bass, 3 down close + bass, 1 up 3 down open, 3 up 1 down open, 2 up 2 down open, 4 up open, 4 down open, fixed 3 up + bass, fixed 3 up 1 down,
Interval (Scalic Harmony)	note for each voice
Nonscale Note	Diat, Par, Dimin, Modal, Altrd, with or without pitch correction, n/c (no change), slur
Custom Harmony Reference Key	C, C#, D, D#, E, F, F#, G, G#, A, A#, B
Note Entry by:	Keypad, Notes
Custom Harmony Input=	C, C#, D, D#, E, F, F#, G, G#, A, A#, B
Custom Harmony Output Note	B↓↓ - B↑↑, Slur, n/c
VIBRATO depth	0 - 255
VIBRATO depth mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VIBRATO rate	0 - 255
VIBRATO rate mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
PBEND Pitch bend key	any key
PBEND bend (scalic)	unison, +/- 2 octaves
PBEND bend to (chordal)	maj, maj7, min, min7, dom7, m7b5, dim7, aug7, sus, sus7
PBEND mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME mod type	normal, panning
VOLUME mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME min & max	off, -40dB to 0dB
DETUNE (HARM1-4 or 1-2)	+/- 100 cents
DETUNE mod by	none, Expr 1-8, EnvGen, LFO 1-2, MIDI PB; +,-
enable	on, off

Mix Parameter	**Values**
dry level	off, -40dB to 0dB
dry pan (Not available in Stereo)	L100% - L55%, Centre, R55% - R100%
level (HARM1-4) or (1-2)	off, -40dB to 0dB
pan (HARM1-4) or (1-2)	L100% - L55%, Centre, R55% - R100%

2 VOICE HARMONY + DISTORTION



Programming

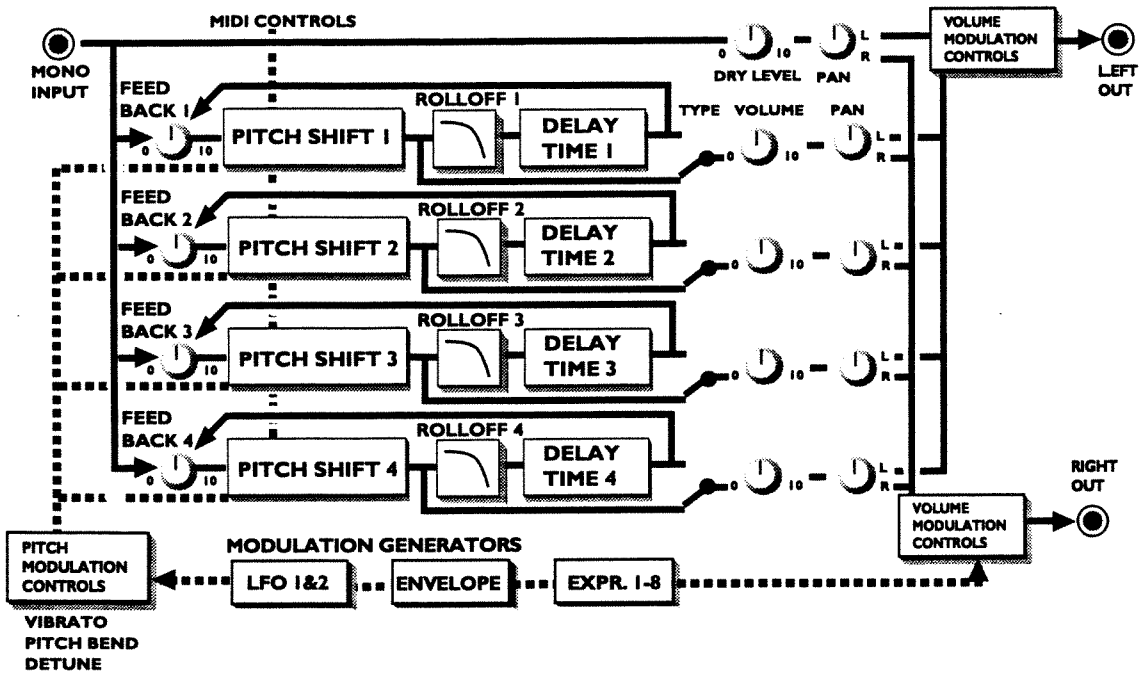
Edit Parameter	Values
Harmony Type	Chordal, Scalic
Key & Chord (Chordal Harmony)	key, maj, maj7, min, min7, dom7, m7b5, dim7, aug7, sus, sus7
Key & Scale (Scalic Harmony)	key, chromatic, major, minor, wholetone, diminished
Voicing	2up close, 1up 1down close, 2down close, 1up 1down open, 2up open,
(2 Voice Chordal Harmony)	2down open, 1up open 1down close, 1up close 1down open
Interval (Scalic Harmony)	note for each voice
Nonscale Note	Diat,Par,Dimin,Modal,Altrd,with or without pitch correction,n/c (no change),slur
Custom Harmony Reference Key	C, C#, D, D#, E, F, F#, G, G#, A, A#, B
Note Entry by:	Keypad, Notes
Custom Harmony Input=	C, C#, D, D#, E, F, F#, G, G#, A, A#, B
Custom Harmony Output Note	B - B, Slur, n/c
VIBRATO depth	0 - 255
VIBRATO depth mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VIBRATO rate	0 - 255
VIBRATO rate mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
PBEND pitch bend key	any key
PBEND bend (scalic)	unison, - 1 octave to + 2 octaves
PBEND bend to (chordal)	maj, maj7, min, min7, dom7, m7b5, dim7, aug7, sus, sus7
PBEND mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME mod type	normal, panning
VOLUME mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME min & max	0dB - -40dB, off
DETUNE (HARM1-4)	+/- 100 cents
DETUNE modulate by	none, Expr 1-8, EnvGen, LFO 1-2, MIDI PB; +,-
distortion enable	off, ON
distortion type	Smokin, Rockin, Grungy, Mellow
distortion preamp drive	0 - 42 dB
distortion power amp drive	0 - 42 dB
distortion bass contour	off, low, med, high
enable	on, off
Mix Parameter	**Values**
distortion level	off, -40db to 0db
level (DRY, HARM1-2)	off, -40db to 0db
pan (DRY, HARM1-2)	L100% - L55%, Centre, R55% - R100%

Notes on 2 Voice Harmony + Distortion Effects:

This is a combined 2 voice intelligent pitch shifter and distortion effect that is particularly useful with guitar and keyboard sounds. All Pitch Shifter Effects (accessible through the Harm key) are meant for monophonic (one-note at a time) lead playing; octaves and fifths also work with some Pitch Shifter Effects, but it is recommended that you use Chord Shifter Effects for multi-note input signals.

- When you customize a scalic harmony, the interval, non-scale tone and pitch bend range parameters will not be available for programming. Similarly, when you customize a chordal harmony, the voicing parameter will not be available, although the bend parameter is still available.
- Both voices in this effect are limited to a downward shift of one octave.

4 VOICE HARMONY WITH REGENERATION



Notes on 4 Voice Pitch Shift with Regeneration Effects:

This unique harmony effect combines digital delay with 4 voice unintelligent (or "dumb") pitch shifting to build regenerative shifting effects. Applications of this effects include Strumming effects, Autoharp simulation, Arpeggiation, Drum effects, and general audio "sweetening".

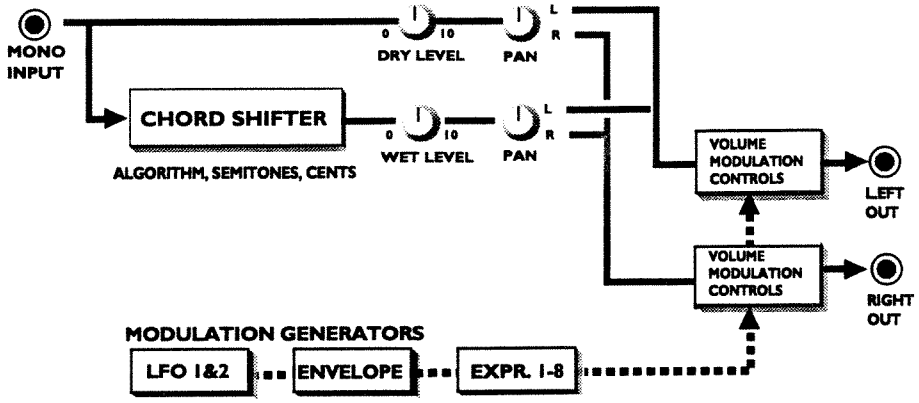
- Stereo 4 - Voice Pitch Shift with Regeneration (Found in the stereo bank) takes a left and right input signal and process them separately: Voice 1 & 3 are processed from the Left input, while Voice 2 & 4 are processed from the Right input.
- For Stereo Pitch Shifters, the Right input is the one used for all pitch recognition and analysis: send the strongest and cleanest signal to this input if there is any wide variation between your left and right channels.
- Stereo 4 - Voice Pitch Shift with Regeneration has no dry pan.

Edit Parameter	Values
Harmony Voicing	(-24 - -1,unis,1 - 24) x 4
VIBRATO depth	0 - 255
VIBRATO depth mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VIBRATO rate	0 - 255
VIBRATO rate mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
PBEND pitch bend key	any key
PBEND bend (scalic)	unison, +/- 2 octaves
PBEND mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME mod type	normal, panning
VOLUME mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME min & max	off,-40dB to 0dB
DETUNE	+/- 100 cents
DETUNE modulate by	none, Expr 1-8, EnvGen, LFO 1-2, MIDI PB; +,-
type	Pre Delay, Post Delay
splicing	C0 - C2 (MIDI Note #)
Harm 1 - 4 delay time	0 - 1500 ms.
Harm 1 - 4 feedback	0 - 99%
Harm 1 - 4 rolloff	100 Hz, 200 Hz,400 Hz,600 Hz,800 Hz,1.0 kHz,1.3 kHz,1.6 kHz,2.0 kHz,2.5 kHz, 3.2 kHz,4.0 kHz,5.0 kHz,6.3 kHz,8.0 kHz,10.0 kHz,12.5 kHz,16.0 kHz,20.0 kHz,flat
enable	on, off

Mix Parameter	Values
dry level	off,-40dB to 0dB
dry pan	L100% - L55%, Centre, R55% - R100%
level (HARM1-4)	off,-40dB to 0dB
pan (HARM1-4)	L100% - L55%, Centre, R55% - R100%

CHORD SHIFTER

Effects Block Diagrams



Pro-gramming

Edit Parameter	Values
algorithm	fast, smooth, lush, normal
semitones	0 to +12
cents	-50 to +50
VOLUME mod Type	normal, panning
VOLUME mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
VOLUME min & max	off, -40 dB to 0dB
enable	off, ON

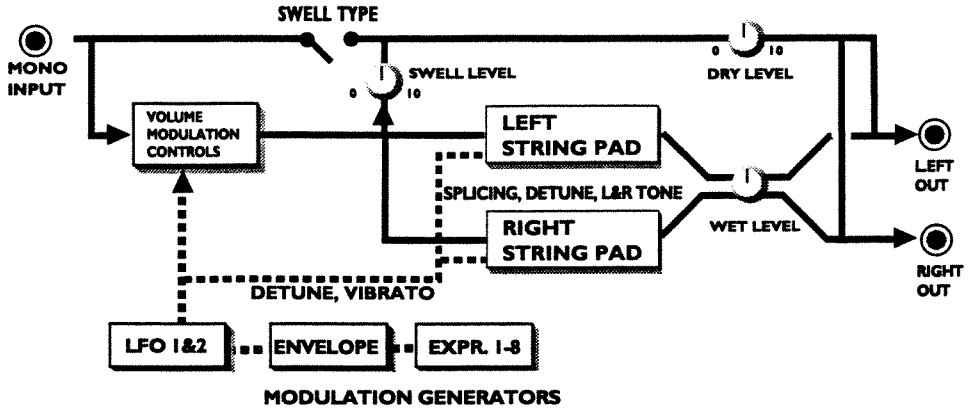
Mix Parameter	Values
Dry level	off, -40 dB to 0dB
Dry pan	L100% - L55%, Centre, R55% - R100%
Wet level	off, -40 dB to 0dB
Pan	L100% - L55%, Centre, R55% - R100%

Notes on the Chord Shifter effect

The Studio 5000 is the only signal processor that cleanly shifts multi-note, or chordal input. Chord Shifting may be used to thicken recorded sounds, keyboard or guitar signals. Depending on the settings, subtle to dramatic effects are possible. Chord Shifter Effects are designed to process polyphonic input such as guitar and keyboard chords.

The Stereo Chord Shifter has no dry pan.

STRING PAD



Notes on String Pad:

String Pad is a special effect; sounding like a new age mellotron and analog synth-strings combination, String Pad can be faded in and out of the Studio 5000's output with the expression pedal and other Expression Controllers, or swelled in and out with the Envelope Generator or LFO's. Swell type allows the choice of whether the input and the wet signal are swelled, or just the wet signal.

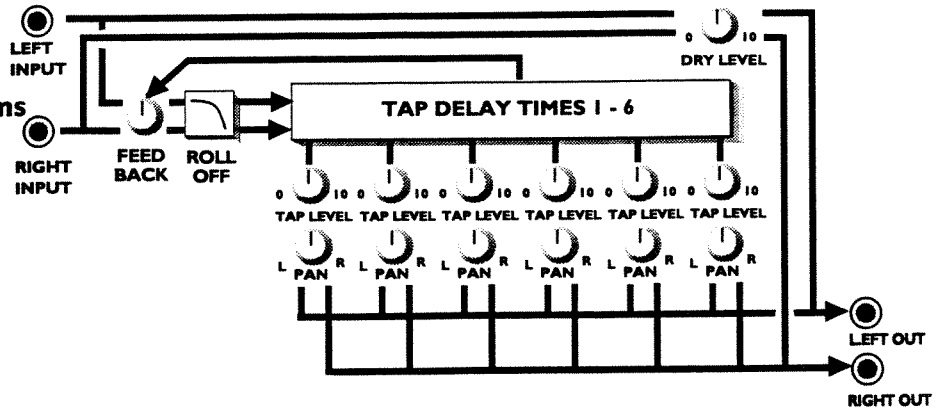
- The splicing parameter can be adjusted to improve the tonal quality of the effect, depending on the key you are playing in. For instance, choose C if you are playing in the key of C. Adjusting to lower splicing values, such as C0 rather than C1, will improve the sound when lower notes are being played.

Edit Parameter	Values
Left tone	0 - 63
Right tone	0 - 63
Left detune	-100 to +100 Cents
Right detune	-100 to +100 Cents
Detune Mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
Vibrato depth	0 - 255
Vibrato depth mod by:	none, Expr 1-8, EnvGen, LFO 1-2; +,-
Vibrato rate	0 - 255
Vibrato rate mod by:	none, Expr 1-8, EnvGen, LFO 1-2; +,-
splicing	C 0 to C 2 (MIDI note #12 - 36)
Swell Type	wet+dry, wet only
Swell Modulation	none, Expr 1-8, EnvGen, LFO 1-2; +,-
String Pad Enable	off, ON

Mix Parameter	Values
Swell, Dry, Wet level	off, -40 - 0dB

MULTITAP DELAY

Effects Block Diagrams



Edit Parameter	Values
feedback delay	000 ms to 3000 ms or 6000 ms †
feedback	0-99%
rolloff	100Hz - 20kHz, Flat
Tap 1 delay time	000ms - 3000 or 6000 ms †
Tap 2 delay time	000ms - 3000 or 6000 ms †
Tap 3 delay time	000ms - 3000 or 6000 ms †
Tap 4 delay time	000ms - 3000 or 6000 ms †
Tap 5 delay time	000ms - 3000 or 6000 ms †
Tap 6 delay time	000ms - 3000 or 6000 ms †
enable	off, ON

Mix Parameter	Values
DRY level	off, -40db to 0dB
Tap 1 lvl	off, -40db to 0dB
Tap 1 pan	L100% - R100%
Tap 2 lvl	off, -40db to 0dB
Tap 2 pan	L100% - R100%
Tap 3 lvl	off, -40db to 0dB
Tap 3 pan	L100% - R100%
Tap 4 lvl	off, -40db to 0dB
Tap 4 pan	L100% - R100%
Tap 5 lvl	off, -40db to 0dB
Tap 5 pan	L100% - R100%
Tap 6 lvl	off, -40db to 0dB
Tap 6 pan	L100% - R100%

Notes on Multitap Delay Effects:

Multi-Tap Digital Delay is a flexible delay effect with six individual output taps and a single feedback echo. Each of the output taps, as well as the feedback echo can be set to have independent delay times, levels and pan positions. Possible applications of these capabilities are

- 6 early reflections to simulate complex room ambiences
- the creation of up to 6 precisely timed echoes
- When high feedback parameter settings (ie. 99%) are programmed in any delay effects, input hum and noise can build up in the delay lines. Proper use of the Noise Gate effects (see Page 35) will help remedy the situation by eliminating this noise when you are not playing.

† Certain Multitap Delay programs are limited to 3 seconds (3000 ms.) of delay. These programs are identified by "3 s" appearing in the Configuration menus.

STEREO DELAY

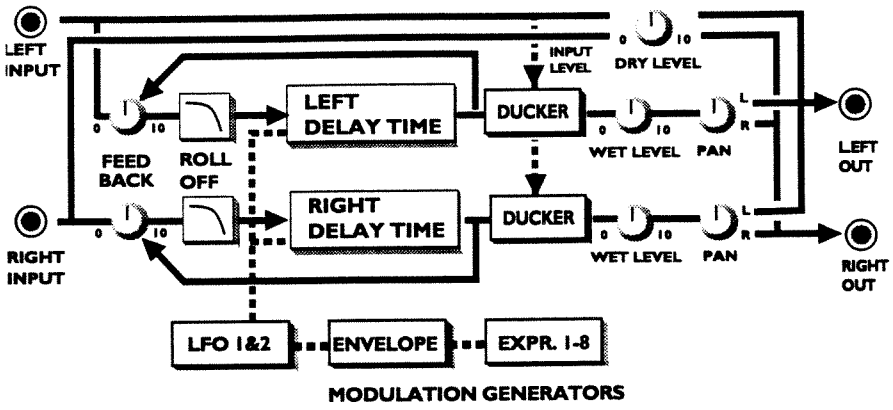
Notes on Stereo Delay Effects:

Digital Stereo Delay is an effect that creates an echo of a stereo signal, simulating the effect of a large surface reflecting back the original sound. In Normal mode, the controls of the left and right delay lines are completely independent. In Ping/Pong mode the echoed signal bounces back and forth between the left and right delay lines.

Also included in the Stereo Delay effect is a Ducker effect. One way to view the ducker is as an inverse noise gate acting on the delayed stereo signal. The ducker function monitors the input level to the Studio 5000. When the input level is below the ducker threshold, the ducker has no effect on the delay levels. When the input level is above the ducker threshold, the ducker attenuates the level of the delay outputs by the ducked level. The ducker provides a means for using dense delay patterns at the end of musical phrases without the delays cluttering up the middle of the phrase.

- When high feedback parameter settings (ie. 99%) are programmed in any delay effects, input hum and noise can build up in the delay lines. Proper use of the Noise Gate effects (see Page 35) will help remedy the situation by eliminating this noise when you are not playing.

† Certain Stereo Delay programs are limited to 1.5 seconds (1500 ms) of delay. These programs are identified by "1.5" appearing in the Configuration menus.

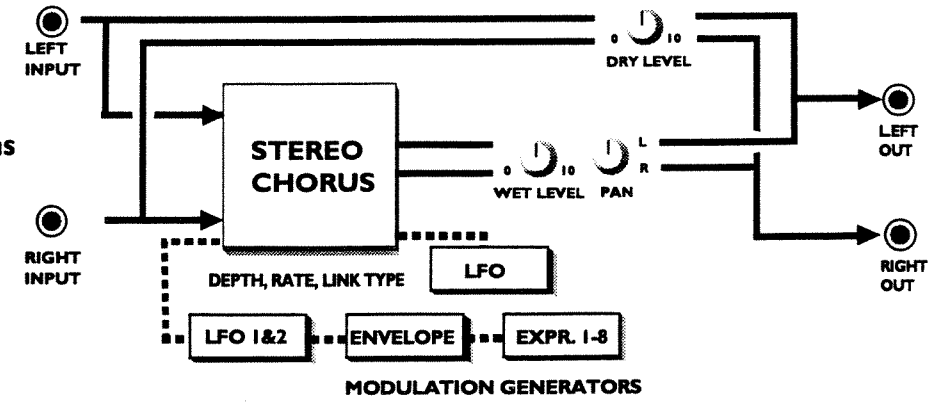


Edit Parameter	Values
type	Normal, Ping/Pong
Left delay time	0 - 1500 or 3000 milliseconds †
Left feedback	0 - 99%
Left rolloff	100Hz - 20kHz, flat
Right delay time	0 - 1500 or 3000 milliseconds †
Right feedback	0 - 99%
Right rolloff	100Hz - 20kHz, flat
DUCKER enable	off, ON
DUCKER threshold	-70dB to 0dB
DUCKER attack	1 ms - 10 sec
DUCKER release	1 ms - 10 sec
DUCKER ducked level	-70dB to 0dB
enable	off, On

Mix Parameter	Values
Dry Level	off , -40dB to 0dB
Left lvl	off , -40dB to 0dB
Left pan	L100% - R100%
Right lvl	off , -40dB to 0dB
Right pan	L100% - R100%

STEREO CHORUS

Effects Block Diagrams



Pro-gramming

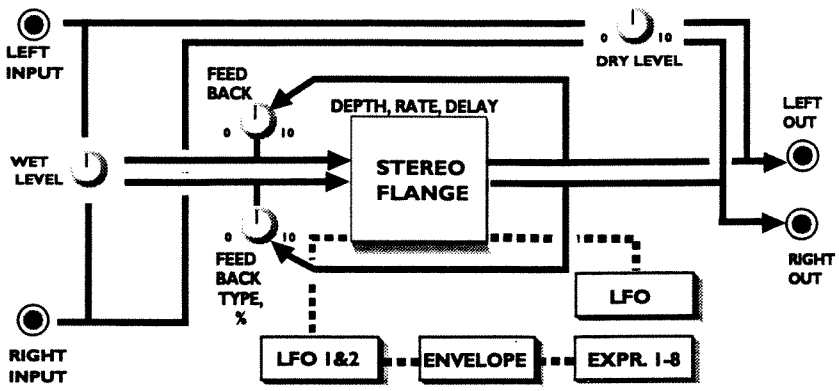
Edit Parameter	Values
rate	0-15
depth	0-15
link type	normal, reverse
DEPTH mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
enable	off, ON

Mix Parameter	Values
DRY level	off, -40dB to 0dB
WET lvl	off, -40dB to 0dB
WET pan	Narrow, Wide

Stereo Chorus

The Studio 5000's Stereo Chorus effect creates multiple, slightly delayed copies of the input signal and recombines them producing the sense of multiple input signals playing in unison: The resulting sound is wider and more pleasant than the source.

STEREO FLANGE



Stereo Flange

The Studio 5000's Digital Flange effect simulates the sound of two identical analog reel to reel tapes playing back while the flange of one of the tape reels is under pressure from the studio engineer's hand to slow it down: The resulting phasing effect between the two tapes is known as flanging. Flange is traditionally used to create "spacey" sounding vocals, guitar lines, drums and background pad drones.

Edit Parameter	Values
rate	1 - 16
depth	1 - 16
delay	1 - 16 ms
INPUT level	off, -40dB to 0dB
feedback	0 - 99 %
feedback type	pos / neg
stereo flange enable	off, ON

Mix Parameter	Values
DRY level	off, -40 - 0 dB
WET level	off, -40 - 0 dB

NOISE GATE

Edit Parameter	Values
threshold	-70dB to 0dB
attack	1ms - 100ms
release	.02 - 5.0 seconds
noise gate enable	off, ON

Notes on Noise Gate Effects:

The noise gate shuts off (or gates) the input when the input signal falls below the threshold level. This effect can be used to eliminate noise such as pick-up hum and tape hiss; additionally, the noise gate effect can be used to add emphasis to percussive playing and drum sounds.

- The Studio 5000's Noise Gate effect is an Analog effect available in mono input programs (like those found in the Mono bank). Since this analog effect can only handle a mono signal, it is not available in the stereo input programs (like those found in the Stereo bank): Instead, certain stereo input programs feature a Digital Noise Gate effect that features the same menus and parameters as its mono analog counterpart while being capable of handling stereo input signals.

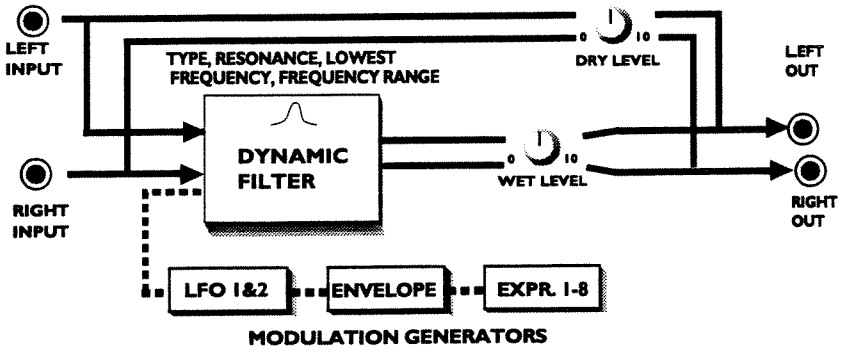
Threshold sets the threshold (signal level) below which the noise gate kicks in and attenuates the signal. The lower the threshold, the longer sustained passages will hold, but the more noise will get through during quiet passages.

Attack sets the amount of time it takes for the noise gate to stop attenuating the input signal after the input level rises above the threshold.

Release sets the amount of time it takes for the noise gate to completely attenuate the input signal when the input level falls below the threshold.

DYNAMIC FILTER

Effects Block Diagrams



Notes on Dynamic Filter Effects:

The Dynamic Digital Filter allows for a range of real-time Bandpass and Lowpass filter effects, from wah-wah to subtle timbre variations. Dynamic filter sweeping can be controlled by any of the 8 Studio 5000

expression controllers, the envelope generator or one of the 2 LFOs, providing effects such as:

* pedal wah (expression pedal controlled)

* touch wah (envelope generator controlled)

* swept wah (LFO controlled)

• The Dynamic Filter can also be used as a fixed frequency Notch Filter to create resonance: Simply set up the Dynamic Filter with no modulation source.

Edit Parameter	Values
type	bandpass, lowpass
resonance	1-7
lowest freq	250 - 1000 Hz
freq range	1/4 oct, 1/2 oct, 1 oct, 2 oct
SWEEP Mod by	none, Expr 1-8, EnvGen, LFO 1-2; +,-
enable	off, ON

Mix Parameter	Values
Dry level	off, -40dB to 0dB
Wet level	off, -40dB to 0dB

COMPRESSOR

Edit Parameter	Values
max output	-12dB to +12 dB (analog) or off, -40dB to 0dB (digital)
threshold	-60dB - 0dB
ratio	1:1 - inf:1
release	.2 sec - 5.0 sec
enable	off, ON

Notes on Compressor Effects:

Compression is an effect that reduces the source signal's dynamic range: The compressor will make loud signals softer and soft signals louder, thereby compressing the dynamic range of the instrument. The resulting sound is tighter and more uniform, allowing for longer sustaining notes and a more consistent signal level.

• The Studio 5000's Compressor effect is an Analog effect available in mono input programs (like those found in the Mono bank). Since this analog effect can only handle a mono signal, it is not available in the stereo input programs (like those found in the Stereo bank): Instead, certain stereo input programs feature a Digital Compressor effect that features the same menus and parameters as its mono analog counterpart while being capable of handling stereo input signals.

Threshold sets the minimum level that the input signal must reach before the compressor starts to work. Setting it to -60dB means the compressor operates all the time. Higher settings give more dynamic range. Ratio sets the amount of overall compression once threshold level is passed. Ratio is the ratio of output level to input level beyond the threshold. 1:1 means that the output will exactly mirror changes in the input level. At 2:1, for any increase in the input level you will get a 1/2 increase in the output level. At Inf:1 (infinite), the output level is fixed regardless of the input level.

GRAPHIC EQUALIZERS

Notes on Equalizer Effects:

• As with all Equalizer effects, it is better to cut frequencies than to boost them, since boosting of frequencies tends to introduce subtle phase shifts to the input signal, unintentionally changing your sound.

Graphic Equalizer: Stereo 5 Band

This stereo equalizer configuration consists of 5 sliders per channel, each of which controls the gain of one of these frequencies:

100 Hz, 320 Hz, 1 kHz, 3.2 kHz & 10 kHz.

Graphic Equalizer: Mono & Stereo 7 Band

This 7 band EQ effect is available as a mono or ***stereo*** configuration, consisting of 7 sliders (per channel for stereo), each of which controls the gain of one of these frequencies:

63 Hz, 160 Hz, 400 Hz, 1 kHz, 2.5 kHz, 6.3 kHz and 16 kHz.

• Mono 7 band equalizer effects do not have a "L" or "R" EQ menu: There is only one (mono) slider for each frequency.

Graphic Equalizer: Stereo 15 Band

This stereo equalizer configuration consists of 15 sliders per channel, each of which controls the gain of one of these frequencies:

25 Hz, 40 Hz, 63 Hz, 100 Hz, 160 Hz, 250 Hz, 400 Hz, 630 Hz, 1 kHz, 1.6 kHz, 2.5 kHz, 4 kHz, 6.3 kHz, 10 kHz & 16 kHz

Graphic Equalizer: Mono 31 Band

This mono equalizer configuration consists of 31 sliders, each of which controls the gain of one of these frequencies:

20 Hz, 25 Hz, 31.5 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, 2 kHz, 2.5 kHz, 3.15 kHz, 4 kHz, 5 kHz, 6.3 kHz, 8 kHz, 10 kHz, 12.5 kHz, 16 kHz & 20 kHz.

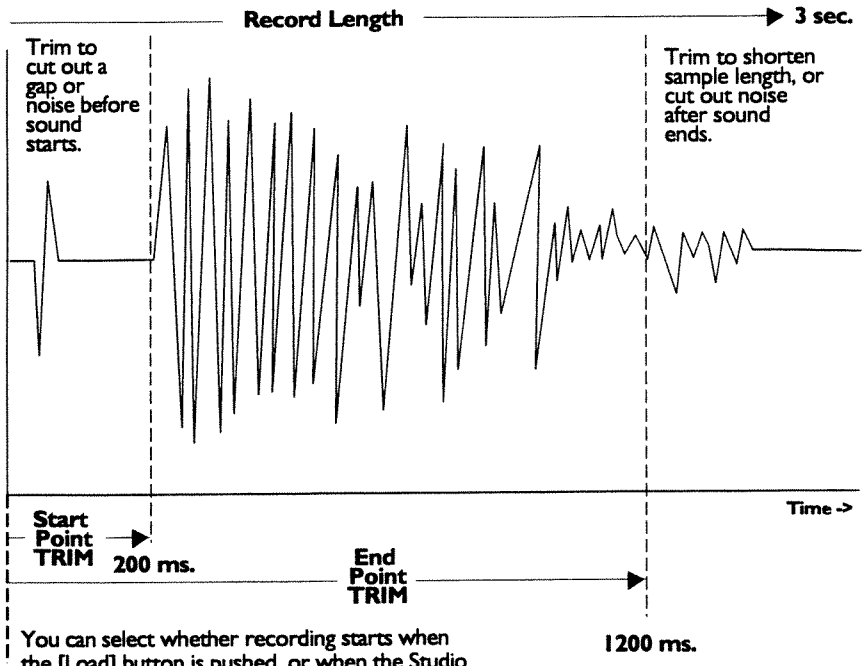
Common Parameters

Edit Parameter	Values
frequencies 100 Hz to 10 KHz (L&R)	-12 to +12 dB
enable	off, ON

Mix Parameter	Values
LEFT level	off, -40dB to 0dB
RIGHT level	off, -40dB to 0dB

DIGITAL SAMPLER

Effects Block Diagrams



You can select whether recording starts when the [Load] button is pushed, or when the Studio 5000 detects an input signal louder than the trigger level.

Edit Parameter	Values
REC length	0.1 - 6.0 sec (mono) 0.1 - 3.0 sec (stereo)
REC trigger	Load / Input level
REC trigger level	-50 to -1 dB
PLAY trigger	Load, MIDI Note, Input level
PLAY trigger note	C0 - G10, any
PLAY trigger level	-50 to -1 dB
PLAY output mode	Trig + Sample / Sample only
TRIM start point	000 ms - 6000 ms (mono) 000 ms - 3000 ms (stereo)
TRIM end point	0 ms - 6000 ms000 ms - 3000 ms (stereo)
enable	off, ON

REC trigger sets whether the load key or the input signal triggers the start of sample recording.

REC trigger level sets the level above which an audio signal triggers sample recording, in input level record trigger mode.

PLAY trigger sets which event triggers sample playback: the load key, a note received through MIDI, or an input signal.

PLAY trigger note sets which MIDI note triggers sample playback, in MIDI note play trigger mode.

PLAY Trigger Level sets the level at which the input signal triggers sample playback, in input level record trigger mode.

PLAY output mode sets whether the triggering signal is to be mixed with sample playback or not, in input level record trigger mode.

TRIM start and end points set the point in the sample to start playback from and the point that it stops.

Notes on Digital Sampler Effects:

Live performers and studio artists alike can make use of the Studio 5000's sampler feature, which allows the recording and playback of a digital recording (or sample) of up to six seconds length. Once a sound has been sampled, the user can then edit its length and trigger its playback via an input signal, MIDI note or key-press.

- Up to six seconds of mono or three seconds of stereo signal can be recorded at any one time; the user is then free to set start and end points within the sample for playback. This editing is non-destructive, which means that any sample data outside the start and end points is not erased, and can be used later.

- The Studio 5000's sampler is positioned in the effects chain right after the Compressor, Noise Gate, and external Effects Loop (see the figure below): this means that all input signals will be compressed, gated and processed by any effect in the effects loop before they are sampled by the Studio 5000. All of the internal Studio 5000 effects in the current program will be applied to the sample when it is played back so any sample can be processed in a variety of ways after it has been recorded.

- The triggering modes of the Studio 5000's Sampler are designed to make the sampling and playback process quick and easy. For sample recording, the user may initiate sampling manually or by setting the sampler to record whenever it detects an input signal above the trigger level (this is called signal level triggering). For sample playback, the Studio 5000 can be triggered manually, by signal level, or by a MIDI note event from a keyboard, sequencer or drum machine. Manual triggering on the Studio 5000 is performed with the unit's front panel Load key. Manual triggering is available in all triggering modes.

- Once recorded into memory, a sample is available for playback until the user records a new sample, changes to a new program or turns off the Studio 5000.

- When you are trimming a sample, trim the end first: Since the Studio 5000 replays the sample every time it is trimmed, this will save you a lot of replay time as you edit.

1. Set the TRIM start to a point shortly before where you'll place the TRIM end point.

2. Place the TRIM end point to its exact location.

3. Adjust the START point to where it belongs at the beginning of the sample.

STEREO REVERB

Stereo Reverb

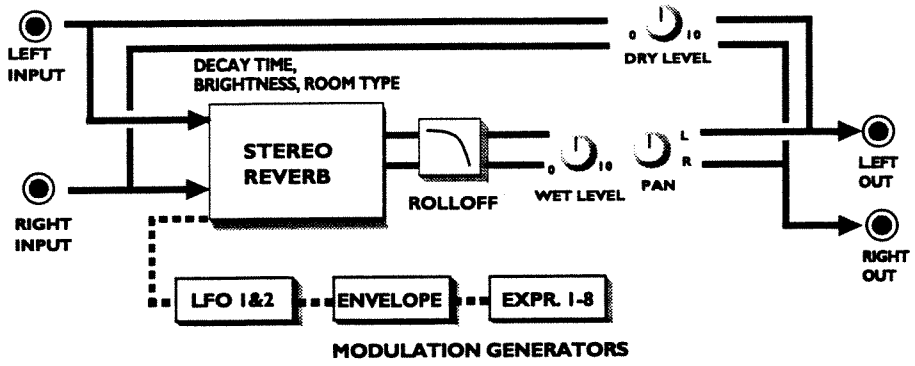
Reverb replicates the effect of playing music in a room or concert hall. When listening to music played in a room or hall, the sound heard not only comes directly from the musical source, but also comes from thousands of repeated reflections off walls, ceilings and other surfaces. This reflected sound thickens and enhances the music, providing a sense of space. In contrast, unreverberated music typically sounds flat, thin and unrealistic. The Studio 5000 reverb provides 5 room types from the subtle ambience of a small studio to an arena with as much as 50 seconds of decay time. The reverb comes in two flavours: basic reverb and full stereo reverb. The full stereo reverb provides independent reverberation images for the left and right channels.

Decay time sets the time for the reverb level to decrease by 60 dB, with each room type having a different range of times.

Brightness sets the brightness of the reverberant signal by controlling how much faster high frequencies die away than low frequencies.

HF rolloff sets the cutoff frequency of a rolloff filter applied to the overall reverberation.

Wet pan sets the separation of the independent left and right reverberant signals. (Stereo Reverb)



Edit Parameter	Values
room type	Studio, Chamber, Club, Hall, Arena
decay time	.1 - 2 sec, .5 - 3 sec, 1.0 - 4 sec, 1.6 - 6 sec, 4 - 50 sec
brightness	1 - 16
HF rolloff	600 Hz - 20 KHz, Flat
enable	off, ON

Mix Parameter	Values
dry level	off, -40dB to 0dB
wet level	off, -40dB to 0dB
wet pan	Narrow, 1, 2, 3, Wide

DISTORTION AMPLIFIER

Distortion Amplifier

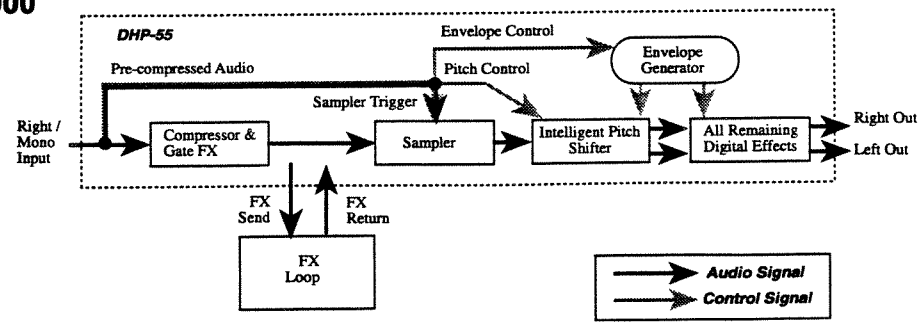
The Distortion Amplifier Effect of the Studio 5000 duplicates the sound of a distorting guitar amplifier: singing sweet to heavy metal distortion are possible. When used in conjunction with the Speaker & Cabinet Emulators (see next effect), various guitar amps from small combo amps to stacks can be simulated.

Edit Parameter	Values
type	Smokin, Rockin, Grungy, Mellow
preamp drive	0 - 42 dB
power amp drive	0 - 42 dB
bass contour	off, low, med, high
enable	off, ON

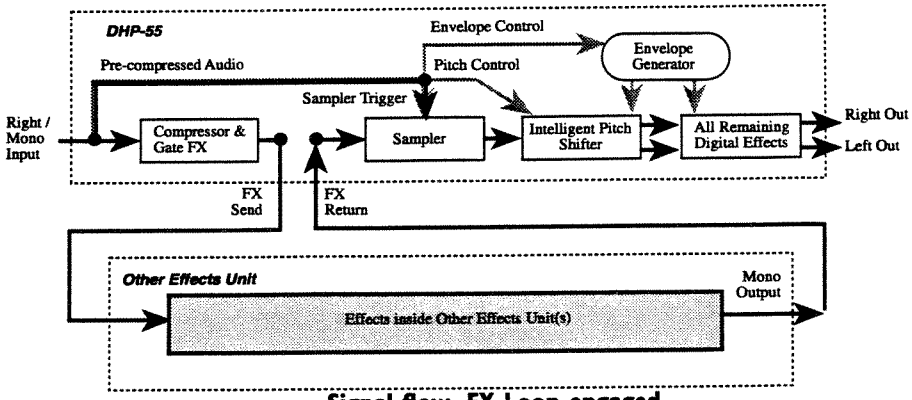
Mix Parameter	Values
output level	off, -40dB to 0 dB

FX LOOP

Effects Block Diagrams



Signal flow, FX Loop disengaged



Signal flow, FX Loop engaged

The FX Loop of the Studio 5000 lets you connect external effects devices to the unit and use them as part of your effects chain while providing the Studio 5000's pitch detection circuitry the clean signal required for harmony and shifting effects. This feature is only available when the Studio 5000 is used in mono input mode, since the FX return jack doubles as the left stereo channel input for stereo mode.

The FX loop is toggled by the [FxLoop] button: The FxLoop LED indicator on the Studio 5000 display indicates whether the FX Loop is enabled or disabled.

Notes on the FX Loop Feature:

- When setting up your unit to use another effects device through the Studio 5000's FX Loop, follow these steps:

1. connect the Studio 5000 effect send to the other effect's mono input

2. connect the Studio 5000 effect return to the other effect's mono output

3. turn down the Studio 5000's Left In (acting as the FX Return level) control to zero

4. set the output level of the other effect to your usual playing level

5. gradually turn up the Studio 5000's Left In (acting as the FX Return level) control to the desired volume

- To avoid overdriving the Studio 5000's internal effects with too much signal, toggle the FX Loop key as you perform the last step to compare the straight Studio 5000 output level with the combined FX returned signal: The two signals should be about the same volume to ensure correct operation.

- For examples of audio set-ups using the FX Loop feature of the Studio 5000, please refer to Part 1 - Audio Hookup.

Pro-gramming

SPEAKER AND CABINET EMULATOR

Notes on Speaker and Cabinet Emulator Effects:

One problem of many distortion effect devices is often their unrealistic sound when plugged directly into a P.A. or mixing console. This lack or realism is because a real guitar amplifier is more than a collection of circuitry: it is also a set of speakers mounted in a cabinet, both of which have acoustic properties of their own. Without the acoustic contributions of the speakers and cabinet, the distortion effect can be thin and unpleasant. The Studio 5000 Speaker and Cabinet Emulator effects are based around a 6 band equalizer that has been preset to emulate a speaker and cabinet configuration.

- The speaker and cabinet emulator effect is accessed via the [EQ] button in the FX Library, or the [More] button in 2 Voice Plus Distortion Programs.

Edit Parameter	Values
100Hz	-12 to +12 dB
160Hz	-12 to +12 dB
400Hz	-12 to +12 dB
1 KHz	-12 to +12 dB
2.5KHz	-12 to +12 dB
6.3KHz	-12 to +12 dB
cabinet emulator	off, ON
enable	off, ON

Mix Parameter	Values
speaker emulator Level	off, -40dB - 0 dB

MODULATION

Modulation

When you change the parameter of an effect while it is processing a signal, you are modulating the sound: The mechanism changing the parameter (your finger on the data wheel) is called the modulation source, while the parameter being changed is said to be modulated. Usually, modulation sources are not manual, but are real-time controllers of some kind (expression pedal, envelope generator, LFOs or MIDI messages) which allow you to vary parameter values while you play.

External Modulation Sources

In the Studio 5000, there are 4 basic types of real-time controller:

1. The Expression Foot-Pedal

2. MIDI Channel Pressure (Monophonic After-touch) Messages

3. MIDI Pitch Bend (PB) Messages

4. MIDI Continuous Controller (CC) 0-119 Messages

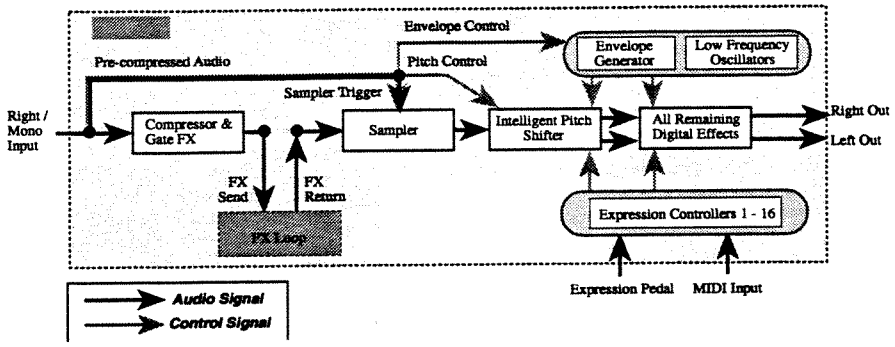
The Studio 5000 will support up to 8 external Studio 5000 Expression Controllers: Each of these controllers allow you to manipulate certain parameters of your Studio 5000 programs as you are playing your instrument. Expression assignments are made in the EXPRESSION ASSIGN sub-menus of the Modulation Menu

Calibrating the Expression Pedal

If you have chosen the Expression Pedal as one of the Studio 5000 Expression Controllers, you need to calibrate your foot pedal before it will function properly: You must select whether your pedal has a linear or logarithmic response, and then "record" the lowest and highest pedal positions in the Studio 5000's memory (this is called calibrating the pedal). The pedal response type setting and calibration routine are accessed in the EXPRESSION PEDAL sub-menu of the Modulation Menu.

Internal Modulation Sources

In addition to the 8 expression controllers available as external modulation sources, the Studio 5000 comes equipped with an Envelope Generator (EnvGen) and two Low Frequency Oscillators (LFOs) which function as built-in automatic modulation sources. These internal modulation sources are programmed via the ENVELOPE GENERATOR and LOW FREQUENCY OSCILLATOR sub-menus of the Modulation Menu.



Expression Pedal Parameter	Values
Pedal Response Type	Linear, Logarithmic

Expression Assign Parameter	Values
Expr	Expr 1 - 8
Real Time Controller	None, Expr Pedal, Chan Press, Pitch Bend MIDI Continuous Controller 0 to 119

Envelope Generator Parameter		Values
Envelope Generator Type		Triggered, Follower
Trigger Level	(Triggered EG)	-60 - 0 dB
Attack Time	(Triggered EG)	0 - 9.9 sec
Decay Time	(Triggered EG)	0 - 9.9 sec, Infinite
Release	(Triggered EG)	-80 - -30 dB
Threshold	(Follower EG)	-60 - 0 dB
Range	(Follower EG)	0 - +60 dB
Tracking	(Follower EG)	slow, med, fast

LFO Parameter	Values
LFO # 1: Rate	.1 - 5.0 Hz
LFO # 1: Type	sine, random, triangle
LFO # 2: Rate	.1 - 5.0 Hz
LFO # 2: Type	sine, random, triangle

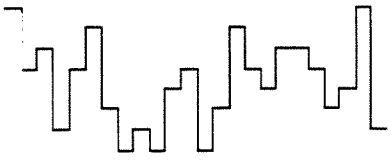
Global and Local Modulation Parameters

Global parameters, such as the Utility and MIDI parameters are called global because their settings apply to every program in the Studio 5000. Local parameters are parameters that are set for each program independently (such as Compressor and Gate parameters). In the Modulation Menus, the Expression assignments and pedal calibrations are global parameters, while the EnvGen, LFO 1 and LFO 2 are local parameters, allowing you to set them differently for each program in the Studio 5000's memory.

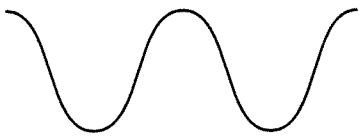
The Low Frequency Oscillators

The Studio 5000 has two internal Low Frequency Oscillators (or LFOs) which are Expression-Controllers that sweep through the same values over and over again at a programmable rate. The LFOs of the Studio 5000 can be set to produce any of these 3 waveforms:

TRIANGLE WAVE
a straight rise and decline with sharp peaks and valleys



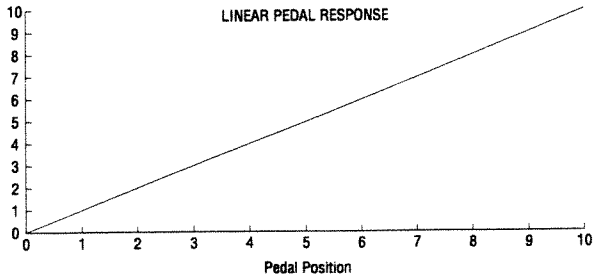
RANDOM SAMPLE HOLD
random values for all levels which never repeat

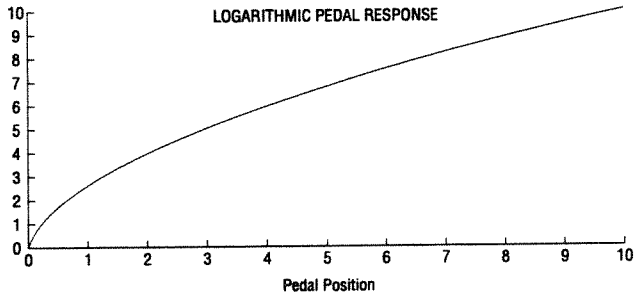


SINE WAVE
similar to a triangle, but with smoother peaks and valleys

Pro-gramming

THE EXPRESSION PEDAL



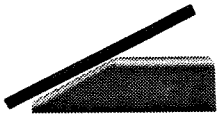


Assigning the Expression Controllers

As mentioned previously, the Studio 5000 deals with 4 basic types of real-time controllers:

1. The Expression Foot-Pedal
2. MIDI Channel Pressure (Monophonic After-touch) Messages
3. MIDI Pitch Bend (PB) Messages
4. MIDI Continuous Controller (CC) 0-119 Messages

Any of these 126 different controllers is mappable to one of the 8 Studio 5000 Expression controllers (Expr 1 to Expr 8).



The Expression Pedal

One of the more exciting features of the Studio 5000 is its ability to use an inexpensive volume pedal as a foot controller. Since there are many types of volume pedals available today, your Studio 5000 must be calibrated to properly work with your particular pedal. You can also use a standard control voltage (or CV) pedal.

Pedal Response

All volume pedals are floor mounted boxes that contain a potentiometer (or pot) which regulates the flow of signal through the pedal unit: Every position of the pedal corresponds to a position of this pot, which in turn corresponds to a particular output volume.

Ideally, you would expect the relationship between pedal position and output volume to be totally consistent: some pedal movement would give the same volume increase or decrease at the bottom of the pedal's swing as it would at the top of the pedal's swing. If your volume pedal behaves this way, its pedal response is said to be Linear.

Very few volume pedals actually have a linear response- most pedals are more sensitive to pedal movements at the bottom of their swing then they are at the top of their swing.

You will have to experiment with your volume pedal and instrument to determine the response type of your pedal: If you cannot tell by listening to the pedal's output, just assume your pedal is logarithmic. Once you have decided which pedal resonse best describes your volume pedal, set the Pedal Response type parameter on your Studio 5000 accordingly. Besides exhibiting different responses (linear or log), different volume pedals have different ranges of operation: Your Studio 5000 requires that you calibrate its sensitivity to your volume pedal by taking a "snapshot" of the pedal completely off, and then of the pedal completely on. Once these start and end points for your pedal's swing have been stored by the Studio 5000, it will be able to accurately map pedal positions to controller values based on the pedal resonse type you have set.

ENVELOPE GENERATOR

The Envelope Generators

The Studio 5000 has an internal Envelope Generator (EG), which allows you to define an "envelope" of control that you can trigger with incoming signals. The Envelope generator has two types of operation, Triggered and Follower.

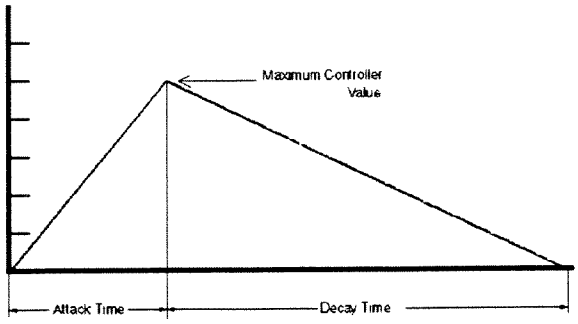
Triggered Envelope Generator

The two main parameters of the triggered envelope generator are Attack Time and Decay Time, both of which define the "envelope" to be generated. When the input signal exceeds the threshold volume, the envelope generator is triggered: The EG generates an upward sweep of controller values from zero to the maximum value over the attack time, following which the EG generates a downward sweep of controller values from the maximum value to zero over the decay time. The Studio 5000 envelope generator can also be set to have an infinite decay time: this means that the EG generates an upward sweep of controller values over the attack time, and then holds the maximum value. In both cases, the triggered EG will generate the envelope until the input signal falls below the threshold level: The EG will then sweep to zero (or release) and wait until the signal crosses the threshold level once again to re-trigger at the start of the envelope.

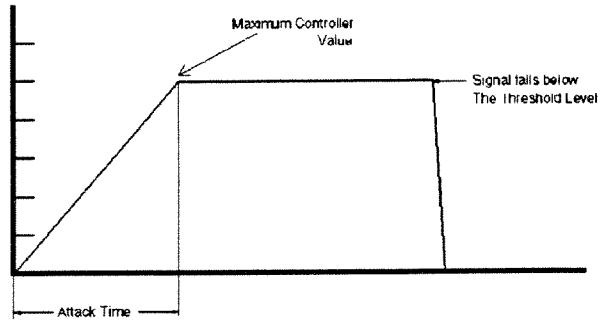
Follower Envelope Generator

When the envelope generator is in follower mode, it tracks the volume contour of your input signal (ie. low input level * low controller value, and high input level * high controller value). When the input signal level crosses the threshold level, the EG begins sending out controller values that correspond to the range of volumes set by the follower EG range parameter. Volumes outside the range cause the follower EG to send either 0 or 255 (the maximum), depending on whether they are below threshold or above the threshold + range level. The tracking parameter adjusts the speed at which the EG responds to changes in the input signal volume.

TRIGGERED ENVELOPE GENERATOR
ATTACK & DECAY TIME

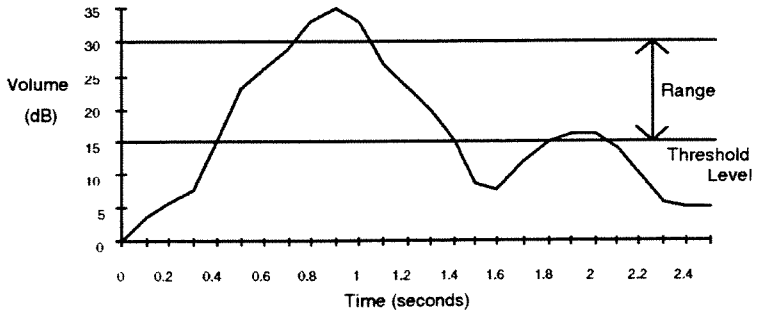


TRIGGERED ENVELOPE GENERATOR
ATTACK TIME & INFINITE DECAY

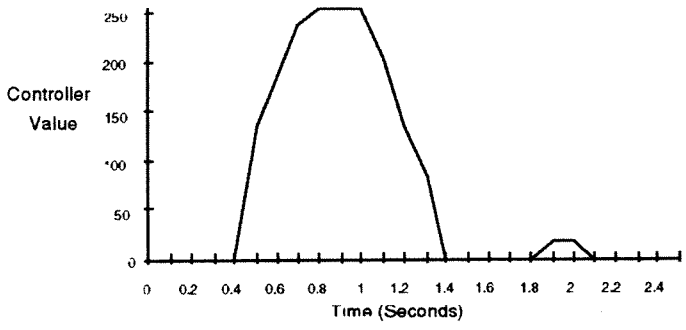


FOLLOWER ENVELOPE GENERATOR
INPUT SIGNAL AND THE RESULTING CONTROLLER OUTPUT

INPUT SIGNAL LEVELS VS. TIME



OUTPUT CONTROLLER VALUES VS. TIME



MONO BANK

1 Lush Chord Shift.....Chord Shift + Stereo Chorus + Stereo Reverb

2 Bright Detune.....Pitch Shift 2 + Stereo Chorus + 5-Band Stereo EQ + 6 sec. Stereo Delay

3 Shimmer.....Pitch Shift 2 w/ Distortion + 5-Band Stereo EQ + 6 sec. Stereo Delay

4 String Swell.....String Pad + Stereo Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

5 5th Chord Shift.....Chord Shift + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb

6 Octave Box.....Pitch Shift 2 + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb

7 4-Octave Spread.....Pitch Shift 4 + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

8 2 Part Country.....Pitch Shift 2 + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb

9 Hot Tubes.....Ultimate Distortion + Speaker Emulation + Chorus + 6 sec. Stereo Delay + Mono Reverb

10 Voodoo Wah.....Ultimate Distortion + Speaker Emulation + Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

11 2 Voice Detune.....Pitch Shift 2 + Stereo Chorus + Stereo Reverb

12 4 Voice Detune.....Pitch Shift 4 + 6 sec. Stereo Delay + Mono Reverb

13 Detune Rightly.....Pitch Shift 2 + Stereo Chorus + Stereo Reverb

14 Verb Detune.....Pitch Shift 4 + Stereo Reverb

15 Slapdetune.....Pitch Shift 4 + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter

16 Detune DelayX2.....Pitch Shift 4 + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

17 Tap Verb Detune.....Pitch Shift 2 + Stereo Chorus (Bass Effect) + 6 sec. Multitap Delay + Mono Reverb

18 Detune Filter 1.....Pitch Shift 4 + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter

19 Detune Filter 2.....Pitch Shift 4 + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

20 Kitchen Sink.....Pitch Shift 4 + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

21 Chorus Dry.....Chord Shift + Stereo Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

22 Chorus Echo.....Chord Shift + Stereo Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

23 Chorus LiteShift.....Chord Shift + Stereo Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

24 Aqua Chorus.....Pitch Shift 2 + Stereo Chorus + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter

25 Detune Chorus.....Pitch Shift 2 + Stereo Chorus (Bass Effect) + 6 sec. Stereo Delay + Mono Reverb

26 Dry Flange.....Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 1.5 sec. Stereo Delay

27 Resonant Flange.....Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

28 Flange+delay.....Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

29 Psyberflange.....Pitch Shift 2 + Stereo Flange (Bass Effect) + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

30 Joco Flange.....Pitch Shift 2 + Stereo Flange (Bass Effect) + 6 sec. Stereo Delay + Mono Reverb

31 24 String Shift.....Pitch Shift 4 with Regeneration

32 HarpsiChordShift.....Chord Shift + Stereo Chorus + Stereo Reverb

33 Crystal C. Shift.....Chord Shift + Stereo Chorus + Stereo Reverb

34 Swell ChordShift.....Chord Shift + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb

35 Modulated Shift.....Chord Shift + Stereo Chorus + Stereo Reverb

36 +Fifth & Octave.....Pitch Shift 4 + Stereo Reverb

37 -Fifth & Octave.....Pitch Shift 4 + Stereo Reverb

38 Diatonic Thirds1 ..... Pitch Shift 4 + Stereo Reverb

39 Diatonic Triads2 ..... Pitch Shift 4 + Stereo Reverb

40 Chordal Open ..... Pitch Shift 4 + Stereo Reverb

41 Chordal+Bass ..... Pitch Shift 4 + Stereo Reverb

42 Play A Blues 1 ..... Pitch Shift 2 + Stereo Chorus (Bass Effect) + 6 sec. Stereo Delay + Mono Reverb

43 Play A Blues 2 ..... Pitch Shift 2 + Stereo Chorus (Bass Effect) + 6 sec. Stereo Delay + Mono Reverb

44 Super Sax ..... Pitch Shift 4 + Stereo Reverb

45 Killer Queen ..... Pitch Shift 2 w/ Distortion + Cabinet Emulator + Mono Reverb

46 Gregorian ..... Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

47 Suspended State ..... Pitch Shift 4 + 6 sec. Stereo Delay + Mono Reverb

48 Fat Analog Solo ..... Pitch Shift 2 w/ Distortion + 5-Band Stereo EQ + 6 sec. Stereo Delay

49 Octaves & Filter ..... Pitch Shift 2 + Stereo Chorus + Dynamic Filter + Mono Reverb + 6 sec. Sampler

50 Octaves & Delays ..... Pitch Shift 2 + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb

51 Simuamp Clean ..... Ultimate Distortion + Speaker Emulation + Chorus + 6 sec. Multitap Delay + Mono Reverb

52 Simuamp Tweed ..... Ultimate Distortion + Speaker Emulation + Chorus + 6 sec. Multitap Delay + Mono Reverb

53 Simuamp Fatbass ..... Ultimate Distortion + Speaker Emulation + Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

54 Simuamp Fusion ..... Ultimate Distortion + Speaker Emulation + Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

55 Simuamp Edge ..... Ultimate Distortion + Speaker Emulation + Chorus + 6 sec. Multitap Delay + Mono Reverb

56 Simuamp Solo ..... Ultimate Distortion + Speaker Emulation + Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

57 Simuamp Tacoma ..... Ultimate Distortion + Speaker Emulation + Chorus + 6 sec. Stereo Delay + Mono Reverb

58 Simuamp Seattle ..... Ultimate Distortion + Speaker Emulation + Chorus + 7-Band Stereo EQ + 6 sec. Stereo Delay

59 Piezo Warmer ..... Ultimate Distortion + Speaker Emulation + Chorus + 7-Band EQ + Mono Reverb

60 Piezo Warmer2 ..... Ultimate Distortion + Speaker Emulation + Chorus + 7-Band EQ + Mono Reverb

61 Audio Smear ..... Pitch Shift 4 with Regeneration

62 Jurassic ..... Pitch Shift 4 with Regeneration

63 Far Away ..... Pitch Shift 2 + Stereo Chorus + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter

64 Vibrato ..... Pitch Shift 2 + Stereo Chorus + Stereo Reverb

65 Tremolo ..... Pitch Shift 2 + Stereo Chorus + Stereo Reverb

66 Auto-Wah ..... Chord Shift + Stereo Chorus + Dynamic Filter + Mono Reverb + 6 sec. Sampler

67 PolyRhythm ..... Pitch Shift 2 + Stereo Chorus + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

68 Robot Voice ..... Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

69 Chipmunk Voice ..... Pitch Shift 2 + Stereo Flange + Dynamic Filter + 3 sec. Multitap + 3 sec. Stereo Delay

70 Crazy Voices ..... Pitch Shift 4 with Regeneration

STEREO BANK

1	MIX Imager 1	Pitch Shift 4 Stereo + 7-Band Stereo EQ
2	MIX Imager 2	Pitch Shift 4 Stereo + 7-Band Stereo EQ
3	MIX Imager 3	Pitch Shift 4 with Regeneration Stereo
4	MIX Imager 4	Pitch Shift 4 Stereo + 7-Band Stereo EQ
5	MIX Imager 5	Pitch Shift 4 Stereo + 7-Band Stereo EQ
6	MIX Imager 6	Pitch Shift 4 with Regeneration Stereo
7	MIX Imager 7	Pitch Shift 2 Stereo + Stereo Chorus + Stereo Reverb
8	MIX Imager 8	Pitch Shift 2 Stereo + Stereo Chorus + Stereo Reverb
9	MIX Imager 9	Pitch Shift 4 with Regeneration Stereo
10	MIX Imager 10	Pitch Shift 4 with Regeneration Stereo
11	Keyboard 8ve+	Stereo Chord Shift + Stereo Chorus + 6 sec. Stereo Delay + Mono Reverb
12	Flange Delay	Pitch Shift 2 Stereo + Stereo Flange + 5-Band Stereo EQ + 6 sec. Stereo Delay
13	Brite Chorus	Pitch Shift 2 Stereo + Stereo Chorus + 7-Band Stereo EQ
14	4 Voice Chorus	Pitch Shift 4 with Regeneration Stereo
15	Piano Hall	Stereo Compressor + Stereo Gate + Stereo Chorus + 5-Band Stereo EQ + Stereo Reverb
16	DRUM Snare Drop	Pitch Shift 2 Stereo + Stereo Flange + Stereo Reverb
17	DRUM Snare Rise	Pitch Shift 2 Stereo + Stereo Flange + Stereo Reverb
18	DRUM Deep Snare	Pitch Shift 2 Stereo + Stereo Chorus + Dynamic Filter + Mono Reverb
19	DRUM Bright Kit	Stereo Compressor + 7-Band Stereo EQ + Stereo Reverb
20	DRUM Big Toms	Pitch Shift 2 Stereo + Stereo Chorus + Stereo Reverb
21	Voice Doubler	Pitch Shift 4 Stereo + 5-Band Stereo EQ + 6 sec. Stereo Delay
22	VOX 4Part Detune	Pitch Shift 4 Stereo + Stereo Reverb
23	Voice Spread	Pitch Shift 4 Stereo + 5-Band Stereo EQ + 6 sec. Stereo Delay
24	Stereo Sampler	Pitch Shift 2 Stereo + Stereo Chorus + 5-Band Stereo EQ + 6 Sec. Mono Sampler
25	VOX Deep Double	Pitch Shift 4 Stereo + Stereo Reverb
26	SF/X Thick Rhyth	Pitch Shift 2 Stereo + Stereo Chorus + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter
27	SF/X Way Up	Pitch Shift 2 Stereo + Stereo Flange + 6 sec. Stereo Delay + Mono Reverb
28	SF/X Way Down	Pitch Shift 2 Stereo + Stereo Flange + 6 sec. Stereo Delay + Mono Reverb
29	SF/X Pad Pan	Pitch Shift 4 Stereo + 6 sec. Stereo Delay + Mono Reverb
30	SF/X Funkmeister	Pitch Shift 2 Stereo + Stereo Chorus + 3 Sec. Multitap + 3 sec. Stereo Delay + Dynamic Filter

Configurations available for building new programs

#	Configuration
	Mono configurations
1	P4+EQ7
2	P4+EQ5+SD
3	P4+DF+MD+SD
4	P4+EQ5+S
5	P4+MD+SD+DF
6	P4+SR
7	P4+DF+R&S
8	P4+SD+R
9	P4+MD+R
10	P2+C+EQ7
11	P2+C+EQ5+SD
12	P2+C+DF+MD+SD
13	P2+C+EQ5+S
14	P2+C+MD+SD+DF
15	P2+C+SR
16	P2+C+DF+R&S
17	P2+C+SD+R
18	P2+C+MD+R
19	P2+F+EQ7
20	P2+F+EQ5+SD
21	P2+F+DF+MD+SD
22	P2+F+EQ5+S
23	P2+F+MD+SD+DF
24	P2+F+SR
25	P2+F+DF+R&S
26	P2+F+SD+R
27	P2+F+MD+R
28	P2D+EQ7
29	P2D+EQ5+SD
30	P2D+DF+MD+SD
31	P2D+EQ5&S
32	P2D+MD+SD+DF
33	P2D+EQ5+CE
34	P2D+CE+MD+SD
35	P2D+R
36	P2D+CE+R
37	SP+C+EQ7
38	SP+C+EQ5+SD
39	SP+C+DF+MD+SD
40	SP+C+EQ5+S
41	SP+C+MD+SD+DF
42	SP+C+SR
43	SP+C+DF+R&S
44	SP+C+SD+R
45	SP+C+MD+R
46	CS+C+EQ7
47	CS+C+EQ5+SD
48	CS+C+DF+MD+SD
49	CS+C+EQ5+S
50	CS+C+MD+SD+DF
51	CS+C+SR
52	CS+C+DF+R&S
53	CS+C+SD+R
54	CS+C+MD+R
55	BP2+C+EQ7
56	BP2+C+EQ5+SD
57	BP2+C+DF+MD+SD
58	BP2+C+EQ5+S
59	BP2+C+MD+SD+DF
60	BP2+C+SR
61	BP2+C+DF+R&S
62	BP2+C+SD+R
63	BP2+C+MD+R
64	BP2+F+EQ7
65	BP2+F+EQ5+SD
66	BP2+F+DF+MD+SD
67	BP2+F+EQ5+S
68	BP2+F+MD+SD+DF
69	BP2+F+SR
70	BP2+F+DF+R&S
71	BP2+F+SD+R
72	BP2+F+MD+R
73	D+C+EQ7+MD
74	D+C+EQ7+SD
75	D+C+DF+MD+SD
76	D+C+EQ7&S
77	D+C+MD+SD+DF
78	D+C+SR
79	D+C+DF+R&S
80	D+C+SD+R
81	D+C+MD+R
82	D+C+EQ7+R
83	D+F+EQ7+MD
84	D+F+EQ7+SD
85	D+F+DF+MD+SD
86	D+F+EQ7&S
87	D+F+MD+SD+DF
88	D+F+SR
89	D+F+DF+R&S
90	D+F+SD+R
91	D+F+MD+R
92	D+F+EQ7+R
93	EQ31
94	S4R
	Stereo Configurations
95	P4+EQ7
96	P4+EQ5+SD
97	P4+EQ5&S
98	P4+MD+SD+DF
99	P4+SR
100	P4+DF+R
101	P4+SD+R
102	P4+MD+R
103	P4+R&S
104	P2+C+EQ7
105	P2+C+EQ5+SD
106	P2+C+DF+MD+SD
107	P2+C+EQ5&S
108	P2+C+MD+SD+DF
109	P2+C+SR
110	P2+C+SD+R
111	P2+C+DF+R
112	P2+C+MD+R
113	P2+C+R&S
114	P2+F+EQ7
115	P2+F+EQ5+SD
116	P2+F+DF+MD+SD
117	P2+F+EQ5&S
118	P2+F+MD+SD+DF
119	P2+F+SR
120	P2+F+DF+R
121	P2+F+SD+R
122	P2+F+MD+R
123	P2+F+R&S
124	CS+C+EQ7
125	CS+C+EQ5+SD
126	CS+C+DF+MD+SD
127	CS+C+EQ5&S
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129	CS+C+SR
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149	C+EQ5+SD+R
150	C+EQ5+MD+R
151	C+EQ5+R&S
152	F+EQ7+EQ7
153	F+EQ7+EQ5+SD
154	F+EQ7+DF+MD+SD
155	F+EQ7+MD+SD+DF
156	F+EQ7+SR
157	F+EQ7+DF+R
158	F+EQ7+SD+R
159	F+EQ7+MD+R
160	F+EQ7+R&S
161	F+EQ7
162	F+EQ5+SD
163	F+DF+MD+SD
164	F+EQ5&S
165	F+MD+SD+DF
166	F+SR
167	F+DF+R
168	F+SD+R
169	F+MD+R
170	F+R&S
171	EQ7+EQ7
172	EQ7+EQ5+SD
173	EQ7+DF+MD+SD
174	EQ7+MD+SD+DF
175	EQ7+SR
176	EQ7+DF+R
177	EQ7+SD+R
178	EQ7+MD+R
179	EQ7+R&S
180	EQ15
181	S4R

Legend:

BP2 *Bass Pitch Shifter (2 Voice)*
C *Chorus*
CS *Chord Shifter*
D *Distortion & Speaker Emulator*
DF *Dynamic Filter*
EQ5 *5 Band Stereo Equalizer*
EQ7 *7 band Mono or Stereo Equalizer*
EQ15 *15 Band Stereo Equalizer*
EQ31 *31 band Mono Equalizer*
F *Flange*
MD *Multitap Delay*

P2 *2 Voice Intelligent Pitch Shifter*
P4 *4 Voice Intelligent Pitch Shifter*
R *Reverb (Mono)*
S *Sampler*
SD *Stereo Delay*
SP *String Pad*
SR *Stereo Reverb*
S4R *Harmony 4 Shift with Regeneration*

Studio 5000 MIDI Implementation Chart

Digitech Studio 5000 Five Part Digital Harmony Processor

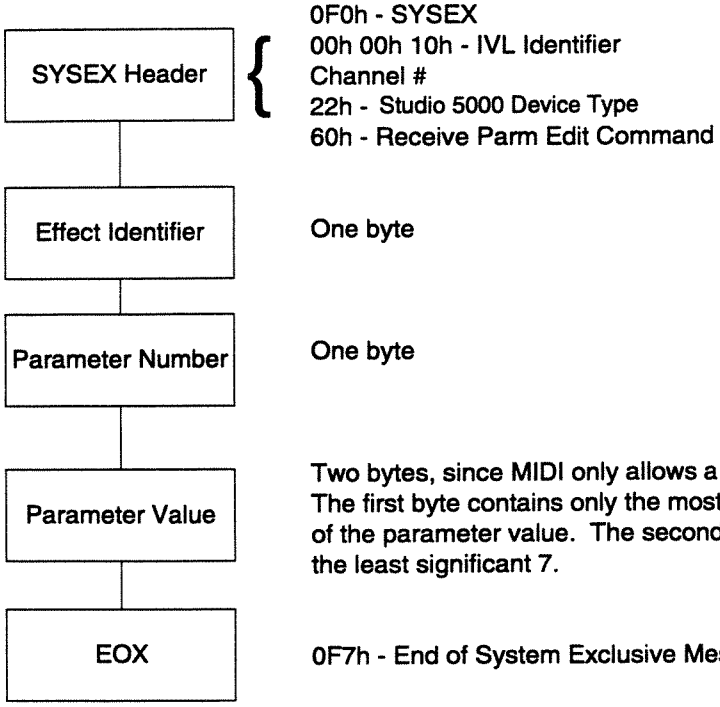
Date: Oct. 1994
Version: 1.00

MIDI Implementation Chart

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 – 16 1 – 16	1 – 16 1 – 16	Memorized
Mode	Default Messages Altered	Mode 3 x	Mode 3 x	Omni Off
Note Number	True Voice	x	o	May be used to select Key and Chord
Velocity	Note ON Note OFF	x x	x x	
After Touch	Key's Ch's	x x	x x	
Pitch Bender		x	o	
Control Change		x	o	
Prog Change	True #	x	0 – 127 1 – 128	Internally mappable
System Exclusive		o	o	
System Common	:Song Pos :Song Sel :Tune	x x x	x x x	
System Real Time	:Clock :Commands	x x	x x	
Aux Mes-sages	:Local ON/OFF :All Notes Off :Active Sense :Reset	x x x x	x x x x	
Notes				

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

O : Yes
X : No

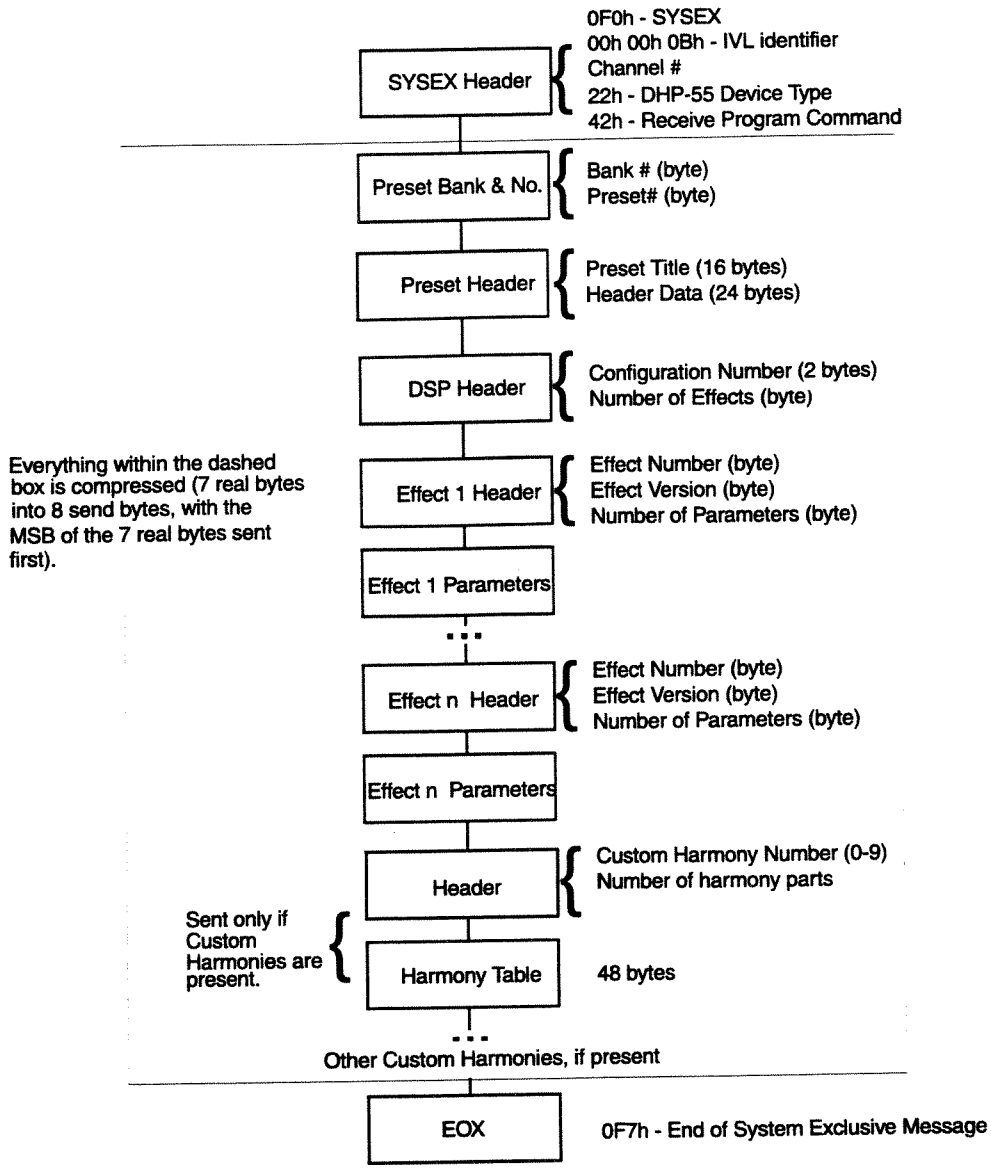


Each effect the Studio 5000 performs has a unique effect identifier. This is the same number which is dumped as the Effect number when dumping a preset over MIDI.
The list of effect ID's is:

Effect Name	*Effect ID*
compressor	*0*
stereo compressor	*1*
noise gate	*2*
stereo noise gate	*3*
stereo chorus	*4*
chorus	*5*
stereo flange	*6*
flange	*7*
stereo delay_3s	*8*
stereo delay_6s	*9*
multitap delay_3s	*10*
multitap delay_6s	*11*
pshift 4	*12*
pshift 4 stereo	*13*
pshift 4 +regen	*14*
pshift 4 + regen stereo	*15*
pshift 2	*16*
pshift 2 stereo	*17*
pshift 2 + distortion	*18*

Effect Name	*Effect ID*
string pad	*19*
chord shift	*21*
chord shift stereo	*22*
eq 5 stereo	*23*
eq 7 stereo	*24*
eq 7	*25*
eq 15	*29*
eq 31	*30*
eq 15 stereo	*31*
sampler mono_3s	*32*
sampler mono_6s	*33*
sampler stereo_3s	*34*
sampler stereo_6s	*35*
distortion	*36*
speaker emulator	*37*
dyanmic filter	*38*
cabinet emulator	*39*
stereo reverb	*40*
mono reverb	*41*

MIDI Sysex format for Program Dumps



Technical

Format for Packing of MIDI information:

Data to be sent : b1, b2, b3, b4, b5, b6, b7.

MIDI output: [0 b7.7 b6.7 b5.7 b4.7 b3.7 b2.7 b1.7],
[0 b1.0-6],
[0 b2.0-6],
[0 b3.0-6],
[0 b4.0-6],
[0 b5.0-6],
[0 b6.0-6],
[0 b7.0-6]

HARDWARE

Inputs.....Instrument /Line In: 470k Ohms impedance ; Effects Return: 10k Ohms impedance

Max Input: .....+16 dBV (0 dBV = 0.775 Vrms)

Outputs.....Left out, Right out, Effects Send, 100k Ohms impedance

Max Output: .....+16 dBV (0 dBV = 0.775 Vrms)

MIDI.....In, Out, Thru

Effects Loop.....Allows multi-device effects processing

Remote Controllers.....Expression Pedal, Optional foot controller: Digitech FS300

LCD Display.....2 row x 20 character supertwist type, backlit

A/D converters.....16 bit, 64x oversampling

D/A converters.....16 bit linear

Sample Rate.....41.667 kHz

Bandwidth.....20 Hz to 20 kHz +/- 3 dB

Dynamic Range.....92 dB A weighted, > 94 dB with Digital Gate

Distortion and Noise.....< 0.02%

DSP Integrated Circuits.....Dual 10 MIPS digital signal processors in parallel (20 MIPS total)

Programs.....140 user programmable, 110 factory preset programs, 181 raw configurations

Mix .....Fully programmable

Instrument tuner.....Digital LCD strobe tuner accurate to +/- 1 cent, selectable audio feedback: Mix, Mute & Easy

EFFECTS

Pitch Shifter .....Up to 5 parts intelligent harmony using IVL pitch recognition, Independent post harmony digital distortions, +/- 2 octave range

Chord Shifter .....Exclusive smooth polyphonic shifting algorithm, +1 octave range

Shifting Effects.....Normal, reverse, 4 voice with delay regeneration, whammy, pedal steel, detune, string pads

Digital Delay.....3 second Stereo, 6 second Multitap, Ping Pong, polyrhythm
Up to 6 second delay time

Chorus.....Normal, Reverse, Stereo

Flange .....Normal, Stereo

Distortion.....Simulated 2 stage tube amplifier distortion with a variety of tonal characteristics.

Digital Graphic Equalizer..5 band stereo, 7 band mono or stereo, 15 band stereo, 31 band mono, speaker cabinet emulation

Dynamic Filter.....Lowpass and bandpass filters: wah, frequency, sweep, resonance - controller modulated

Compression.....Digitally controlled analog compression, digital stereo compression

Noise Gate.....Analog and digital noise gate

Digital Sampling.....Audio signal level & manually triggered sampling & playback, up to 6 seconds sampling time, programmable non-destructive start and end trim points

Reverb.....Stereo programmable reverberation effect

LFOs (2).....Triangle, Random and Sine waveforms: programmable rate, available as modulation sources

Envelope Generator.....Triggered & Follower mode: programmable and available as modulation sources

DigiTech

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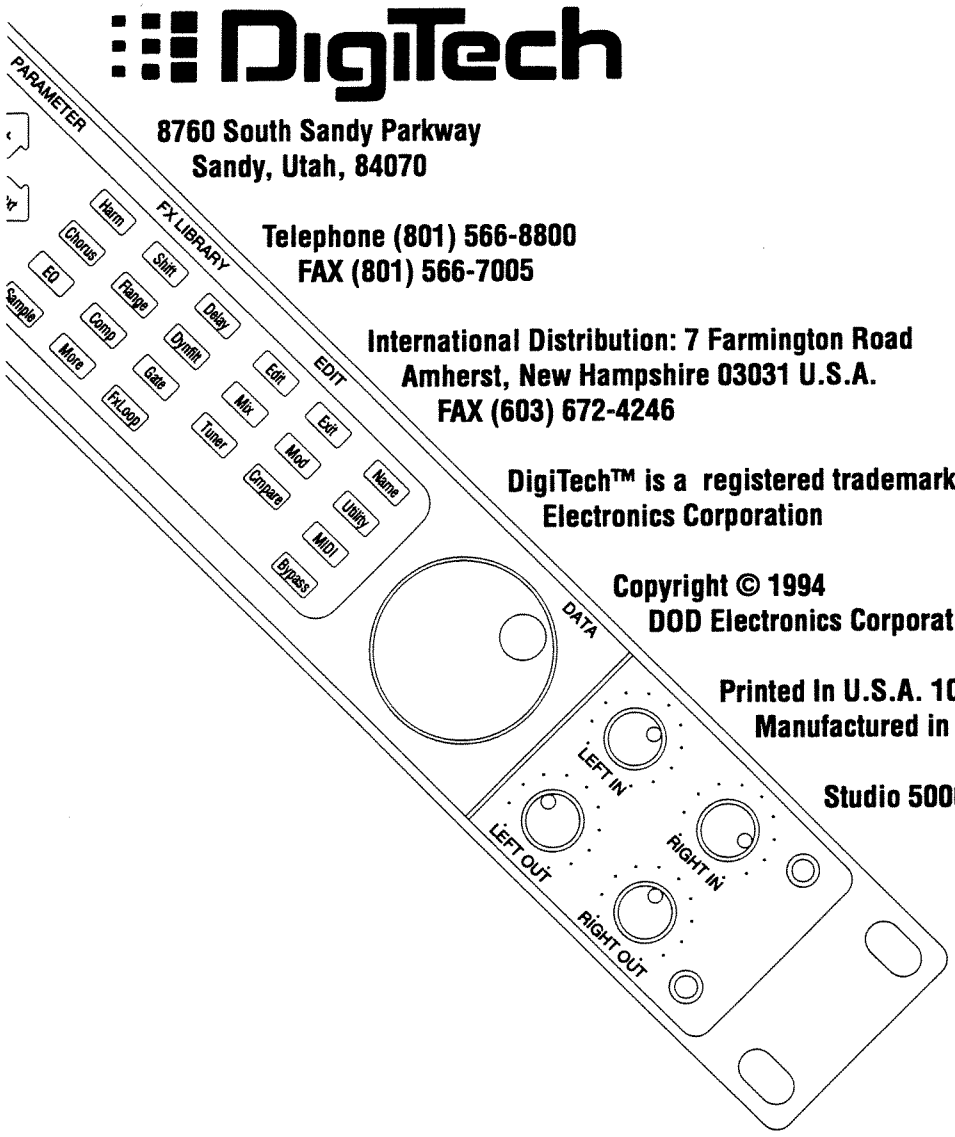

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