Eventide

the next step

H3500 - dfx
Sampling Ultra-Harmonizer(R)
INSTRUCTION MANUAL

FIRST PRINTING: March 1992

EVENTIDE INC. • ONE ALSAN WAY • LITTLE FERRY, NEW JERSEY 07643 • 201-641-1200

WARNINGS

FAILURE TO HEED THESE WARNINGS could result in an electrical shock hazard.

Be certain that the **Voltage Select Switch** on the rear of the H3500 is in the correct position. The choices are 115 or 220 volts.

Always use a properly grounded, three-prong AC outlet.

Always use a 3-wire line cord like the one supplied with the H3500.

Don't expose the H3500 to rain or moisture of any kind.

Always replace the fuse with the value specified (see rear panel).

Dangerous Voltages are present inside the unit. Use extreme caution when operating the unit with its covers removed.

CAUTIONS

FAILURE TO HEED THESE CAUTIONS could result in reduced service life or damage to your equipment.

Heat is the enemy of reliability. Don't block top or bottom ventilation slots. Leave some clearance above and below the H3500 in your rack.

For **Road Use** we recommend that you don't solely rely on the front support screws when rack-mounting. Support the back of the box as well.

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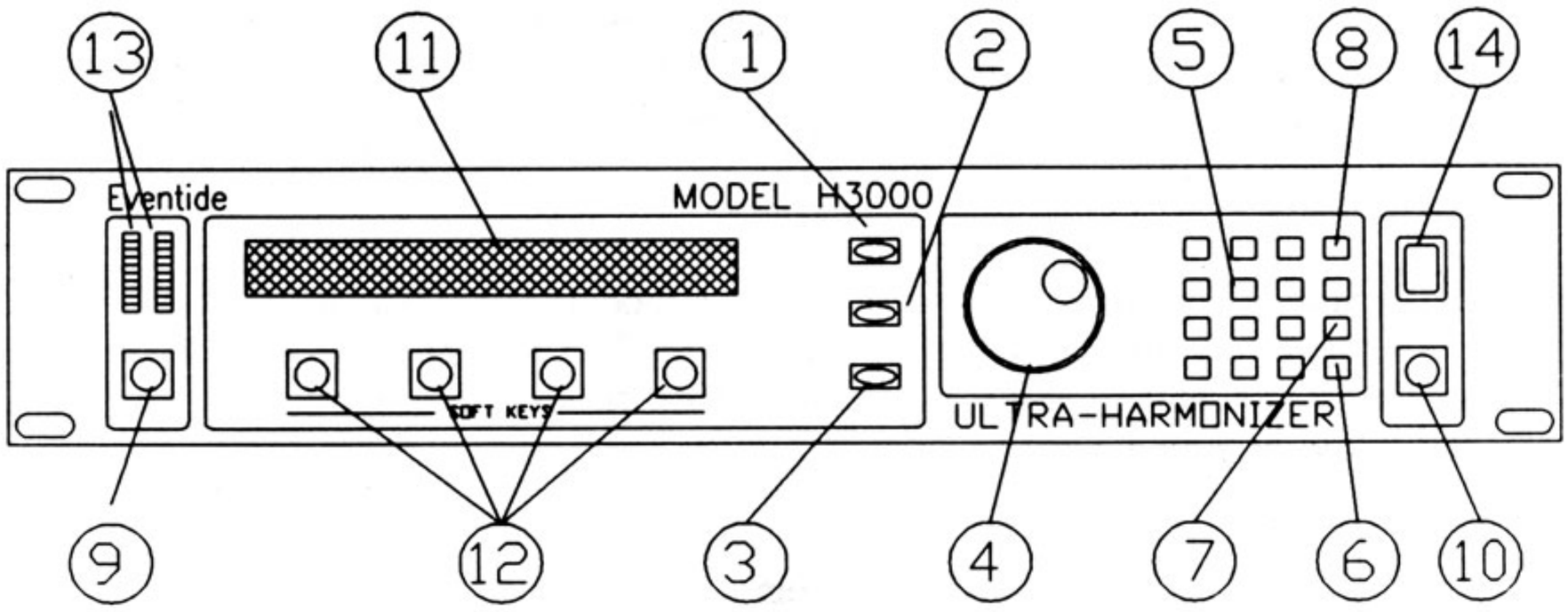
The H3000 Family of Products

The Eventide H3000 Ultra-Harmonizer is a family of products based around a multi-purpose programmable, digital audio signal processor. The products that make up the H3000 family are
The H3000-Studio (S), The H3000-Broadcast (B), The H3000-Special Edition (SE), and now the latest addition, The H3500. The H3500 incorporates the features of the H3000-SE, the new Mod Factory dynamic presets, and the HS322/395 Sampler card.

We call them Ultra because they do more than our earlier models. To begin with, they have full stereo pitch change. They also are digital reverbs. And they're a lot more. The H3500 is capable of creating effects you've never heard before. The H3500 is fully MIDI controllable, with clickless, real-time MIDI control. The H3500 has all these effects, and more, at your fingertips:

DIATONIC SHIFT	A pitch shifter that stays in key
DUAL SHIFT	Two separate pitch shifters
LAYERED SHIFT	Two pitch shifts from one input
STEREO SHIFT	Mono-compatible stereo pitch shifting (maintains stereo imaging)
REVERSE SHIFT	Backwards-talking pitch shift
SWEPT COMBS	Six sweepable delay lines, with stereo panning
SWEPT REVERB	A dense reverb with smooth sweep capability
REVERB FACTORY	A full-featured reverb with EQ and flexible gating
ULTRA-TAP	Twelve delay taps with full control over panning, level, and delay. Includes a diffusor to generate dense gated reverb effects.
DUAL DIGIPLEX	A stereo delay with smooth delay change
LONG DIGIPLEX	A 1.5 second delay with smooth delay control.
PATCH FACTORY	A "modular" effects program which lets you design your own effect. "Patch" together delay lines, filters and pitch shifting to create never-heard-before effects.
STUTTER	Get that st..st..stutter sound - effortlessly.
DENSE ROOM	Our densest reverb, with unique front/back position control.
VOCODER	This is our version of the classic vocoding effect.
MULTI-SHIFT	Two six-octave pitch shifters, two delays, panning and patchable feedback paths make this program incredibly useful.
BAND DELAY	A multi-tap delay line feeding eight resonant bandpass filters make for some sounds like you've never heard.
STRING MODELLER	This program lets the H3000 double as an extra voice in your MIDI rack.
PHASER	A wonderfully thick, smooth, phase-shifting effect that is hard to beat.
MOD FACTORY	The latest algorithms that add effects such as delay ducking, BPM delays and sweeps, compression, manual flanging, smooth autopanning, audio triggered sweeps and much more.
HS322/395 SAMPLER	Digitally records up to 11.8 seconds stereo or 23.7 seconds mono audio (47.5 seconds of stereo or 95 seconds of mono audio with the H3500 - dfx/e).

The Front Panel and Controls



1 Program Button: **Press this button to load, save, or remove programs.**

2 Function Button: **Press this button to adjust display contrast and to access user defined functions. Also found here is the internal function generator and anything relating to MIDI.**

3 Parameter Button: **Press this button to edit parameters.**

4 The Knob: **The knob is the easiest way to change a selected parameter. Just turn it.**

The Keypad:

5 Numeric Entry: **Use the numbers, decimal point, and minus sign to enter a numeric value.**

6 ENT: **Hitting the ENT button actually enters the number.**

7 CXL: **Hitting CXL cancels the last keystroke.**

8 Up/Down Buttons: **These buttons increment or decrement a parameter or numeric value.**

9 Levels Button: **Press this button to permit adjustment of input and output levels.**

10 Bypass Button: **Press this button to toggle between effect in line and total relay bypass of the Harmonizer.**

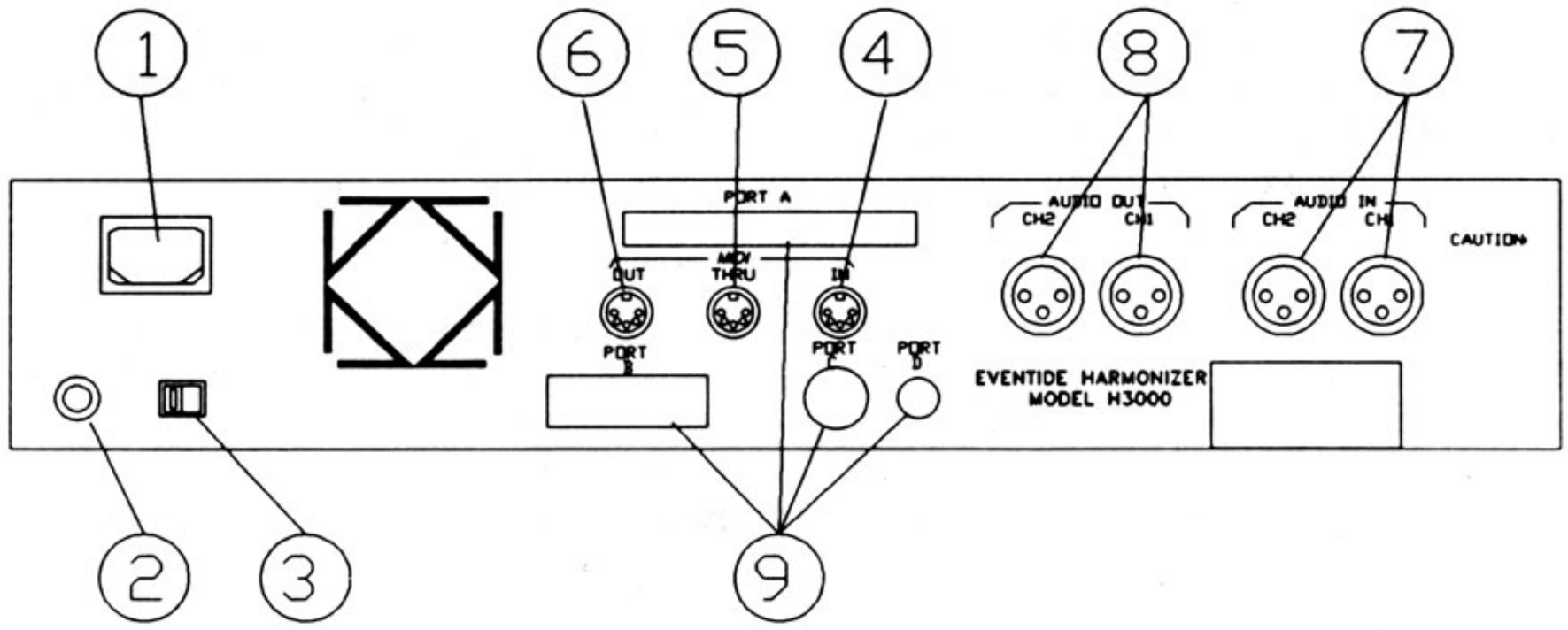
11 Display: **This tells you what's going on. The top line displays the program number, name and the parameter or function that is currently being modified. The bottom line is dedicated to the four "softkeys" that are directly below it.**

12 Softkeys: **These are explained in "Running The H3500."**

13 Input Bargraphs: **These bargraphs display the input signal levels to the H3500. Set levels as high as possible before the top "Clip" light comes on. The bargraphs are calibrated in dB.**

14 Power Switch: **This applies AC power to the unit.**

The Rear Panel and Connections



1 <u>AC Connector</u>: This is where the AC power cord is connected. It's an IEC standard 3 prong connector. The center post is chassis ground.

2 <u>Fuse Holder</u>: A 1 Amp Slo-blo fuse. Always replace it with the correct value.

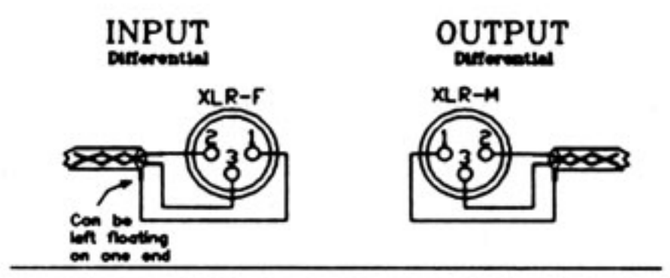
3 <u>Line Voltage Select</u>: This is the switch to set for 115v or 220v AC lines. Make sure it is correctly set for your area.

4 <u>MIDI IN</u>: This jack accepts MIDI data from a MIDI source, such as a synthesizer, sequencer or computer.

5 <u>MIDI THRU</u>: This is the MIDI THRU jack. It sends out a duplicate copy of the MIDI IN data.

6 <u>MIDI OUT</u>: This jack outputs MIDI data from the H3500.

7 <u>Audio In</u>: These are balanced audio inputs. The female XLR connectors are wired with pin #3 as +phase, pin #2 as -phase and pin #1 grounded (to the case of the external XLR connector).



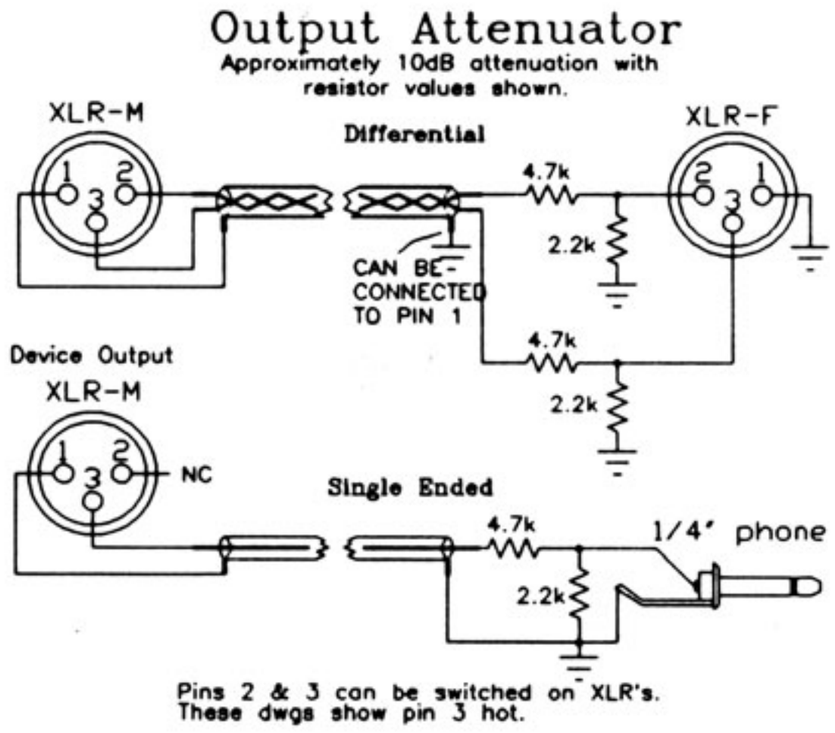
8 <u>Audio Out</u>: These are the balanced audio outputs. They're male XLR's wired like the inputs.

9 <u>Ports</u>: These are for possible future expansion.

Optimum Performance from the H3500

To obtain the best performance from your new EVENTIDE unit, certain operating principles should be applied. Use the "hottest" input levels possible without clipping. A digital gain device is used in the input section which allows front panel control of levels. This device works best when it is "turned all the way up" in other words when it attenuates least. At the factory, we chose pro levels of +4 dBm, and internal jumpers 1 through 4 should be in the "+4 position" (see diagram on next page) so that the gain control devices will hardly attenuate. If consumer -10dBm levels are used, the jumpers should be moved accordingly so that your unit can operate at its optimum, high levels.

For best signal to noise ratio, always set the input level control so that the top bar of the level indicators flashes from time to time. If this results in output levels that are too "hot", reduce the output levels, not the input! If you are using sensitive inputs (-10dB) you may want to pad the H3500 outputs so that you can operate the output level control near the top of its range and retain its full variation. Suitable attenuator pads are available from stores, or may be constructed with an XLR connector, two resistors, and an appropriate connector.



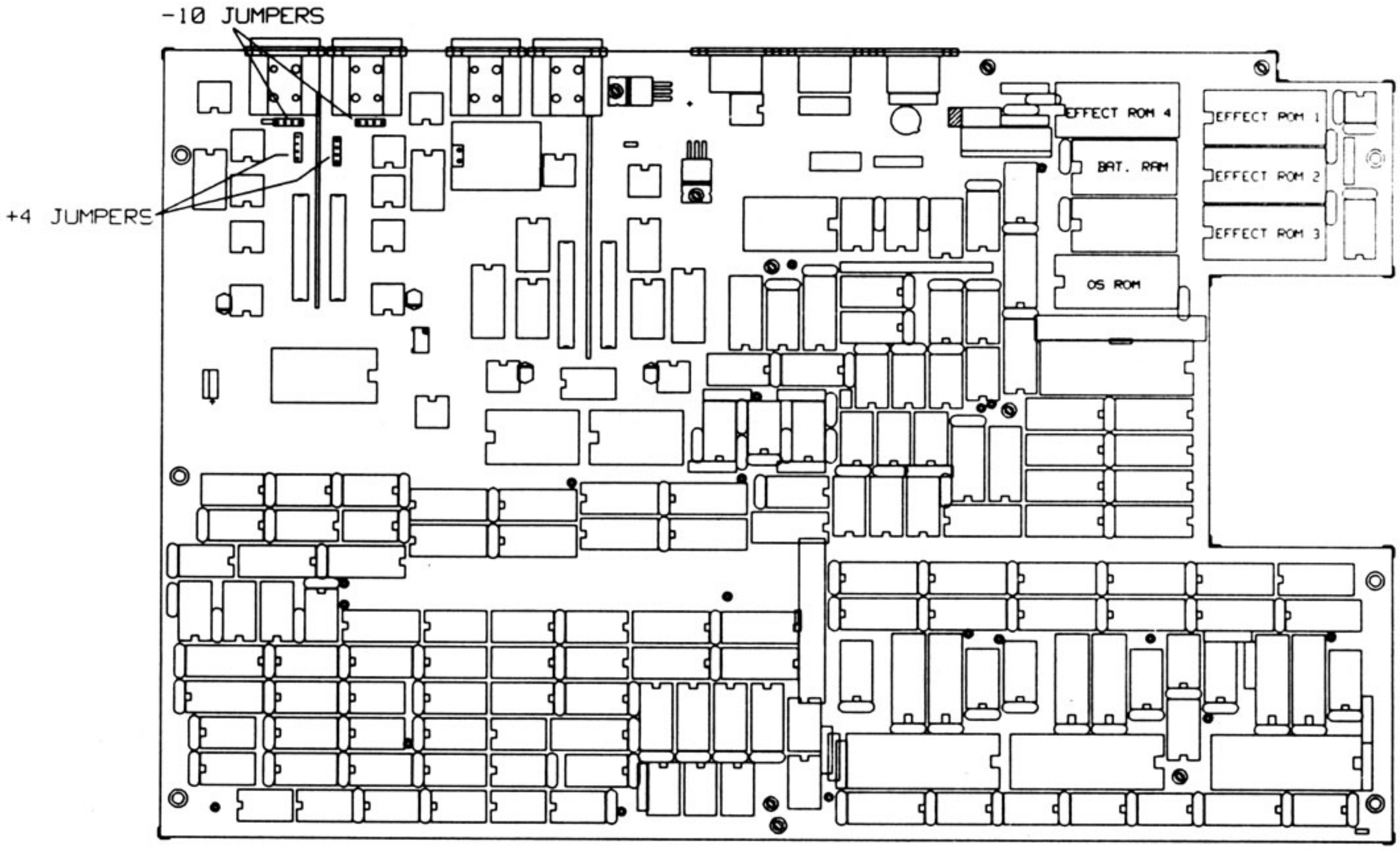
In order to reduce line noise through cable pickup, an instrumentation amp is used at the input to cancel noise. This is called a "differential input," and enables the user to mount the H3500 remotely without fear of signal degradation. If you don't use differential inputs, proper termination of the cable is desirable. For instance, if you only use pin 3 hot of the input XLR connector for signal (the standard), pin 2 should be tied to ground.

The output is differential also and "in-phase" with the input when "dry signal" is selected. If a single ended output is use, leave the unused pin unconnected. The output amp is capable of driving 600 ohm lines up to +21 dBm with negligible distortion.

Normally the H3500 will be rack mounted in a standard 19 inch rack. It is advisable to keep the rack well ventilated and in a dry environment so heat and moisture won't cause degradation of performance. Since your EVENTIDE ULTRA-HARMONIZER has almost no internal connectors, it should hold up well under "road conditions".

Changing Input Levels

The input levels of the H3500 can be changed to accept either +4dBm or -10dBm nominal operating levels. They are set to pro audio, +4dBm at the factory. To change this remove the top cover of the unit and pull the small jumper blocks from the +4 pins and put them on the -10 pins.



H3000 MAINPC

H3500 Specifications

Inputs	Stereo, true differential balanced
Outputs	Stereo, differential, transformerless
Dynamic Range	Greater than 92dB "A" weighted
Distortion	.01 % (.007 % typical) @ 1 kHz, 1 dB below clipping in "pitch change" mode, 0 shift, levels all at 0 dB
Sampling	Full 16 bit resolution at 44.1 kHz sampling rate
Frequency Response	5 Hz to 20 kHz +/-1 dB, +/-.5 dB typical
Delay	Up to 23.7 seconds or 95 seconds with H3500 - dfx/e
Pitch Variation	H3500: 3 octaves up, 3 octaves down
Power	75 watts, 110-130 volts, or 200-240 volts, AC 50/60 Hz
Size	inches: 3.5h x 19w x 13.5d centimeters: 8.9h x 48.3w x 34.3d
Weight	13 lbs. net 18 lbs. shipping weight

Running the H3500

Softkeys and Menus

The bottom line of the display contains the MENU. The menu consists of up to four SOFTKEYS. Each softkey (the text within the parentheses) describes the function of the button immediately below it. In general, the functions of the softkeys will change depending on whether programs are being loaded, effects parameters are being edited, etc. There will usually be more than one menu (set of four softkeys) available at any given time. For example, press the **"PROGRAM"** key. The display should look like this:

```
Selected Program: [101] LAYERED SHIFT
(  Load  )( Origin )
```

Press the **"PROGRAM"** key again and the display will change to this:

```
Current Edit : [101] LAYERED SHIFT
(  Info  )(  Save  )
```

The new menu has changed the function of the softkeys. While editing a program, the parameter key has a similar effect. The same also holds for the **"FUNCTION"** key.

Setting the Display Contrast

If the display is hard to read, you probably have to adjust the display contrast. Simply hit the function button and turn the knob until the display is readable.

Setting the Levels

Proper setting of input levels on a digital processor like the Ultra-Harmonizer is very important. In order to get clean distortion-free sound, the input level should be set so that the top yellow bar on each channel just flickers. The red light indicates clipping. Output levels should be adjusted so that the H3500 is putting out the hottest signal your equipment can handle without distorting.

To set the input levels, press the **"LEVELS"** key. The knob will now adjust both input levels simultaneously.

Pressing the **"LEVELS"** key a second time will allow you to adjust the output levels. The knob will adjust both outputs simultaneously.

If you wish to set the levels individually, use the four softkeys to select one of the four adjustments.

Important

If a "+" or a "-" appears after the dB indication, it means that the currently loaded program has affected that particular level setting. For more on this, be sure to read the "Levels Mode" section. That section describes in detail the level adjustment scheme of the H3500 and describes how level adjustments may be stored and recalled with different effects programs.

The Bypass Control

The bypass control allows you to completely bypass the processed audio. When the light on the bypass switch is on, you are hearing processed audio. When the light is off, the unit is bypassed. Pressing the bypass switch toggles from unbypassed to bypassed and vice versa. The unit is automatically bypassed when power is off.

Loading a Program

To load a program, press the **"PROGRAM"** button. The display should now look like this:

```
Selected program:  [100] DIATONIC SHIFT
(  Load  ) ( Origin )
```

Turn the knob or use the up/down buttons to scroll through the available programs. The PROGRAM NUMBER is displayed in brackets, and the PROGRAM NAME is shown to the right of the number. Each effects program has a unique number from 0 to 999. This includes factory programs and user programs. The program name is used to describe each effects program. There can be more than one program with the same name, so the program number is used to tell them apart.

When the display shows the program that you wish to load, press the (**Load**) softkey to "load" the new effects programs. (**Origin**) will show what algorithm that program was derived from.

At the end of the program list is **"Selected Program : Last Edit"**. Pressing (**Load**) will load the previous program that the H3500 was in as well as all of its edited parameters. Pressing the **(Origin)** softkey will display the name and number of that program.

Editing a Program

Once you've gotten through the basic operation of the H3500 and are familiar with the preset factory programs, you might want to create some of your own personalized effects. You can do this by editing parameters of an existing program.

To get into edit mode, just press the **"PARAMETER"** button. If #101 Layered Shift is loaded, the display should look something like this:

```
101 left pitch: 1200 cents, [2.000:1]
(1 coarse)(1 fine )(1 delay )(1 fdback )
```

When you're in edit mode, the top left of the display will show the current program number. The top right of the display shows the parameter you are currently adjusting. A parameter is something which will change some aspect of the sound of the currently loaded effect. If you turn the knob, use the up/down buttons, or enter a number on the keypad, you will change that parameter. To adjust a different parameter, just press its softkey. To access other menus not shown, hit the **"PARAMETER"** button. To go backwards through the menus, hit the **"CXL"** key on the keypad.

Soft Functions

Many of the factory programs in the H3500 are set up with something called "Soft Functions." The soft functions are a set of four "user-definable" parameters, intended to allow each factory or user program to have a customized interface. These soft functions will be the first menu to appear after loading a program. If there are no soft functions, the first parameter page will be shown.

Unlike parameters, the Soft Functions will not appear when paging through parameter menus with the **"PARAMETER"** button. **To access the soft functions, press the "FUNCTION" button.** Each of the values of these soft functions can be edited and saved just like parameters. However, the soft functions are not quite the same as parameters. Each soft function is actually controlling one or more **parameters** (found on the parameter pages).

To learn more about soft functions, see the section on parameter modulation.

Expert Mode

The effects programs in the H3500 are set up with a relatively small number of parameters which you can use quickly and easily to get your own personal sound. If you wish to experiment further, (especially those of you who enjoy programming certain FM synthesizers), we have given you access to a whole bunch of extra, detailed parameters. These extra parameters are accessed through the "expert" softkey found in most programs.

Press the (**expert**) softkey and you'll find a whole new set of menus and parameters. You can edit these parameters just like normal parameters. To get back to the "basic" menus, press the (**return**) softkey.

Levels Mode

In some cases it may be desirable to have different input and output levels for different effects programs. To allow this, the H3500 has a level adjustment scheme consisting of "master" levels and "offset" levels.

The master levels settings are those made after pressing the **"LEVELS"** button. These settings do not change as different effects programs are loaded. The offset levels settings are those made while editing an effects program. These settings are stored with user and factory programs and are recalled when these programs are loaded.

The actual attenuation value sent to the input and output level attenuators is the sum of the master and offset levels settings. For example, if the master input level setting is -4 dB and the offset for the current program is set to -5dB, the actual attenuation value is -9 dB.

There are a couple of things to keep in mind. The first is that if the master input or output level is set to "off", the input or output is "off" regardless of the offset setting. The other is that the sum of the master level and the offset level is limited to a value between 0 and -48 dB (-48 dB = "off"). If the master level is set to -4 dB and the offset is set to +10 dB, the actual level will be 0 dB, not +6 dB as one might expect.

(levels) key. From this menu, the four offset levels can be adjusted. The adjustment range for each of the offsets is +/- 48 dB. To return to the main parameters, press **(return).**

> *Note*
>
> *If the currently loaded program has level offsets which are not zero, the master level display (the one seen after pressing the "LEVELS" button) will indicate the offset with a "+" or a "-" ("+" for positive offset, "-" for negative offset).*

Saving an Edit

Now that you're a pro at editing programs, you'll probably want to save what you've created. If you're in edit mode, pressing the **"PROGRAM"** button twice will allow you to save your edit. The display should look like this:

```
Current Edit:      [101] Layered Shift
(  Info  )(  Save  )
```

To save the edit as a new program, press the **(Save)** softkey. The display will change to:

```
Save as: [  1] Layered Shift     Adj Num>
(New Name)(EditName)            (Save It )
```

Use the knob or keypad to select a new program number. To create the program name, press the **(New Name)** softkey or the **(EditName)** softkey. **(New Name)** will start you off with a blank slate while **(EditName)** will allow you to edit the existing name. The display will look like:

```
Save as: [  1] _                 Adj Name>
( Number )( <------ )( ------> )(Save It )
```

Use the arrow softkeys and the knob to enter a new program name. Press **(Save It)** to actually save the program. Press number to change the program number. If you change your mind about saving this edit, press the **"PROGRAM"**, **"FUNCTION"** or **"PARAMETER"** key.

If you're editing one of your own creations and want the new edit to be the final version under the same name, pressing **"PROGRAM"** twice should get a display something like this:

```
Current Edit :[  1] Special Effect
(  Info  )(  Save  )( Update )
```

Press (**Update**). The display should show:

```
Overwrite Program [  1] Special Effect
        (  Yes   )(   No   )
```

Press (**Yes**) to save your new edit. Pressing (**No**) will get you back to the "Current Edit" menu.

Removing User Programs

There may come a time when you wish to remove some of the user programs. Get into the Selected Program list/load mode. Pressing the **"PROGRAM"** button once from edit mode should do it. The display should show:

```
Selected program:  [ 94] Special Effect
(  Load  )( Origin )( Remove )
```

Press the (**Remove**) softkey. The display will change to:

```
Remove Preset [ 94] Special Effect ?
        (  Yes   )(   No   )
```

Press (**Yes**) to remove the program. Press (**No**) if you've changed your mind and still want to keep the program.

Miscellaneous

To find out which algorithm a particular preset is based upon, use the (**Origin**) softkey. Press the **"PROGRAM"** once, dial up the preset of interest, then press and hold (**Origin**).

The (**Info**) softkey will show you much memory is needed to save or update a preset and how much room is left in the memory of the H3500. Press the **"PROGRAM"** key twice, then press and hold (**Info**) to see:

```
Amount of bytes available is    7357
Save needs    26     Update needs     6
```

Parameter Modulation

Have you ever wished the H3500 had more than one knob on the front panel? Or perhaps that there was some way to automatically sweep parameters? Or perhaps even some way to control effects parameters from the mod wheel on a MIDI keyboard? If anything like this has crossed your mind, then "Parameter Modulation" is for you.

Simply put, "Parameter Modulation" allows H3500 effects parameters to be controlled in a useful variety of ways. There are three basic ways that effects parameters can be controlled (other than using the normal effect editing keys):

1) MIDI - Effects parameters can be "patched" to virtually any MIDI controller, including mod wheel, pitch bend, and note messages.

2) The Function Generator - Effects parameters can be patched to the internal function generator of the H3500. The function generator is basically an LFO (low frequency oscillator) that can produce various waveforms and triggered functions.

3) Soft Functions - Soft Functions are custom parameter controls which allow the user to control more than one effect parameter simultaneously. Once defined, these functions appear on the display and are controlled in a similar manner to the standard parameters.

Patching Parameters for Modulation

The following example uses the Layered Shift algorithm. If you plan to follow along, first load Layered Shift (program #101).

To set up a parameter modulation patch, press the "FUNCTION" key twice. The display will show this menu:

```
Modulation of Parameters
( Patch  )(SoftFunc)(FuncGen )(Control )
```

To begin patching, press (**Patch**). Initially, there will be nothing patched. The display will show:

```
1 pitch  -> Patch is disabled
[ Parmtr ]( Source )( range  )(per note)
```

Press (**Parmtr**) to select the effects parameter to be controlled. (Note: see the factory program description for a list of controllable parameters.) Turning the knob will scroll through the list of controllable parameters.

Press (**Source**) to select the controller which will be patched to the effect parameter. Turning the knob will scroll through the available controllers. This list contains all the MIDI controllers, the "Soft Functions" and the function generator. As you turn the wheel you may notice softkeys appearing and disappearing. These keys are used to adjust certain parameters of the controllers. If you've pressed any other softkeys (to adjust the controller parameters), pressing (**Source**) will get you back to selecting a controller. See Appendix A for a more complete description of the controllers and their settings.

Turn the wheel until the desired controller is shown on the display. Turn the knob to the end of the list.

The display should show:

```
l pitch  -> Function Generator
[ Source ]                    (  Done  )
```

This will patch the function generator to the l pitch parameter. Press (**done**) to make the patch. The display will show:

```
l pitch  -> Function Generator
( Parmtr )( Source )( range  )(per note)
```

The (**range**) and **(per note)** keys determine how much the controller changes the effect parameter. Press (**range**) and the display will change to:

```
l pitch  ->mod range:  1200 [   0/note ]
( Parmtr )( Source )( range  )(per note)
```

The first number (the range) shows how much the effect would change if the controller changed over its full range. In this example, if the function generator changed from zero to maximum, the pitch would increase by 1200 cents.

The second number shows how much the smallest change in the controller data would change the pitch. This is mainly used for MIDI notes. When MIDI notes are patched to a parameter, the "per note" value shows how much the parameter would change for each half-step. To adjust the range in half-step increments, press the **(per note)** key.

In some cases, instead of (**range**) and **(per note)**, the softkey (**amount**) will appear. Like range, (**amount**) will control the depth of modulation, with the exception that the value shown is the percentage of the parameter's adjustment range.

To see the effect of all this, go into the edit mode and look at the 'l pitch ' parameter. (Press the **"PARAMETER"** button and then press the **(l coarse)** softkey.) You should see the pitch value changing in the display. See the section on the function generator to change the function type or frequency.

It is important to realize that the setting of the effects parameter through the front panel works together with the controller. Setting the parameter from the panel gives a "base" setting which the controller either adds to or subtracts from.

Patching to Trigger Parameters

So far, we have tried to keep things simple by talking about modulating the "parameters". Some parameters, though, have no values. These parameters usually trigger events. An example of trigger parameters are the trigger keys in the "Stutter" algorithm.

To patch these trigger parameters to controllers, follow the procedure outlined above, with a small difference. When a trigger parameter is selected to be patched, there will not be any scaling softkeys (Range, Per note,

Amount). Also, there will be a different list of controllers to select from. See Appendix A for a complete description of the trigger controllers.

Soft Functions

As mentioned above, you can define your own soft keys. These are called "Soft Functions". To use a Soft Function, simply patch it to an effects parameter. To adjust the soft function, press the **"FUNCTION"** key once. The soft function key will appear on the menu line. It is adjustable just like a parameter.

There are four soft functions available for patching. The first page of the **"FUNCTION"** key menu is dedicated to the four soft functions. When a soft function is first patched, the menu will display the key as " Knob 1 ", " Knob 2 ", etc. These names can be edited to display anything you like.

To edit a soft function, get back to the modulation main menu by pressing **"FUNCTION."** The display should show this:

```
Modulation of Parameters
( Patch  )(SoftFunc)(FuncGen )(Control )
```

Now press **(SoftFunc)** to edit a soft function:

```
Soft 1 is " Knob 1 " Sens=  100 Pol = +
[ Select ](  Name  )( Sens   )(Polarity)
```

Press (**Select**) to select the knob you wish to edit (Knob 1 through Knob 4). Press **(Name)** to edit the name of the Soft Function. The display will look like this:

```
Soft 1 is " Soft 1 " Sens=  100 Pol = +
          (  <---  )(  --->  )(  Done  )
```

Editing the name works just like saving a preset (see "Saving an Edit"). When you are finished press (**Done**).

Press (**Sens**) to adjust the resolution of the knob. This allows you to tailor the "feel" of the knob to the parameter that you want to control. Higher settings of sensitivity allow you to adjust the parameter more finely, but require a few turns of the knob to cover the full range of adjustment. Lower settings will give you coarser control over the parameter, but will allow quick changes.

(Polarity) will select whether the softknob's range is 0 to 100 (+) or -100 to 100 (+-).

The Function Generator

You can modulate parameters automatically with the Function Generator. Once you have patched a parameter to the Function Generator, get back to the Modulation Main menu by hitting **"FUNCTION"**. The display should show:

```
Modulation of Parameters
( Patch  )(SoftFunc)(FuncGen )(Control )
```

To adjust the Function Generator, press (**FuncGen**). You will get this display:

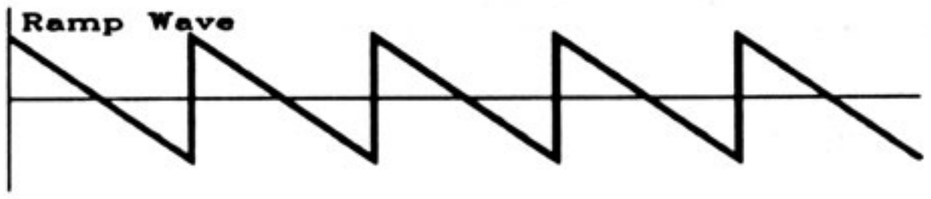
```
Function Generator Parameters
(Function)( Amount )(  Rate  )(Trigger )
```

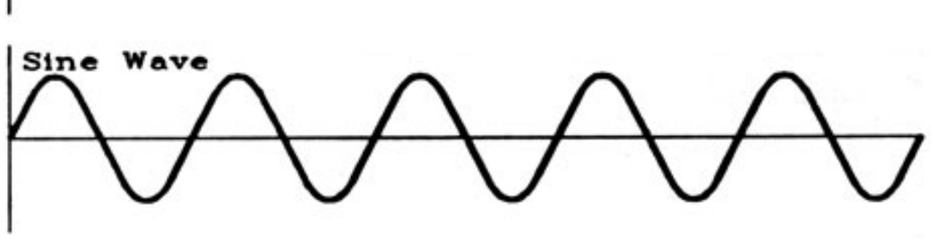
Press (**Amount**) to adjust the amplitude of the function output. It is in per cent of full scale. Keep in mind that some function types go both positive and negative. This parameter can also be modulated, usually by a soft function.

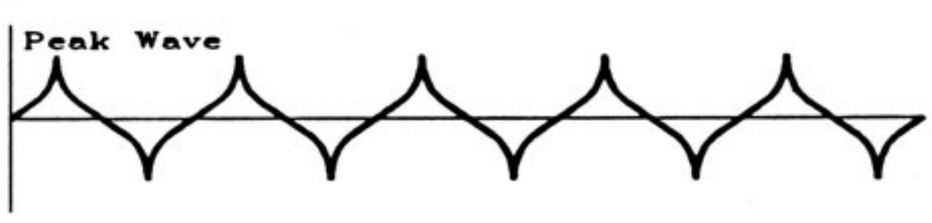
Press (**Rate**) to adjust the frequency of the function. This parameter can also be modulated, usually by a soft function. For kicks try patching this parameter to the function generator (you'll get FM type waveforms).

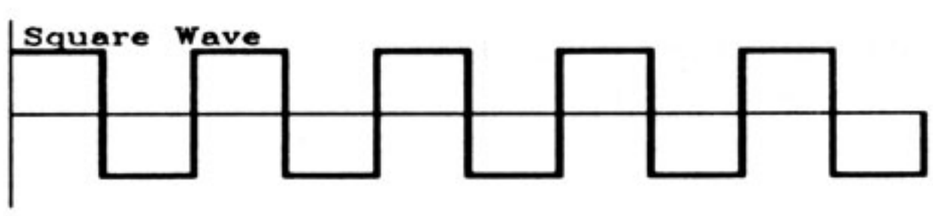
Pressing (**Trigger**) will trigger a one-shot function or restart a continuous function. To activate the trigger from a soft function or through MIDI, patch "FuncTrig" to your desired trigger.

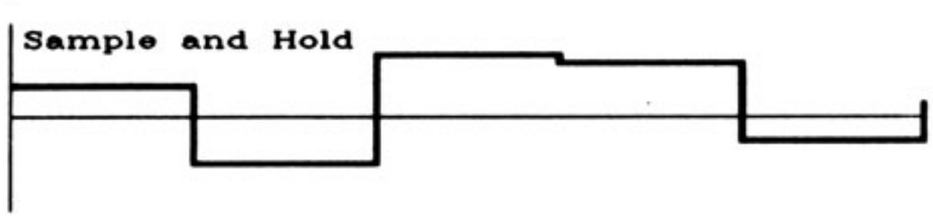
Press (Function) to select the type of function. Turn the wheel to scroll through a list of the function types. The function types include continuous functions and one-shot (triggered) functions. See the diagrams below for the function types:

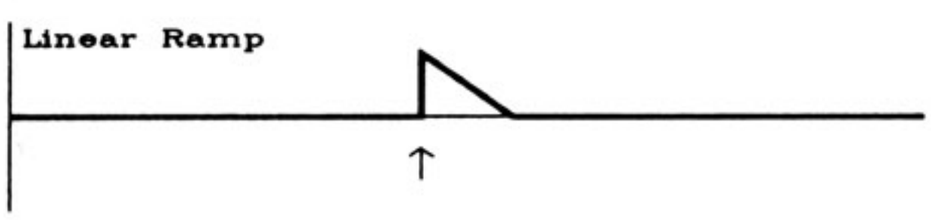


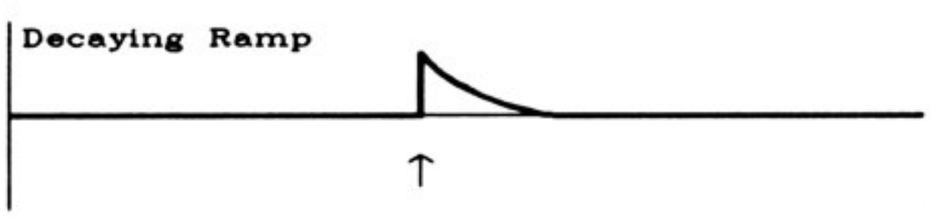


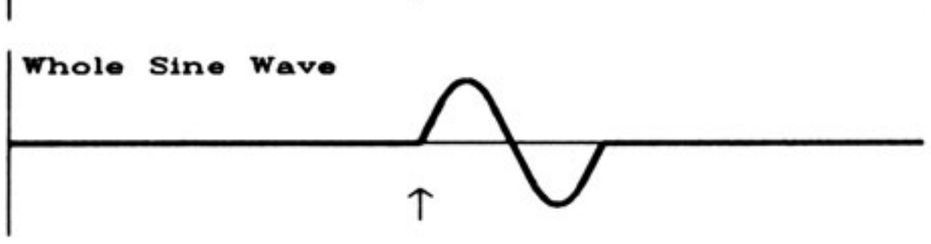


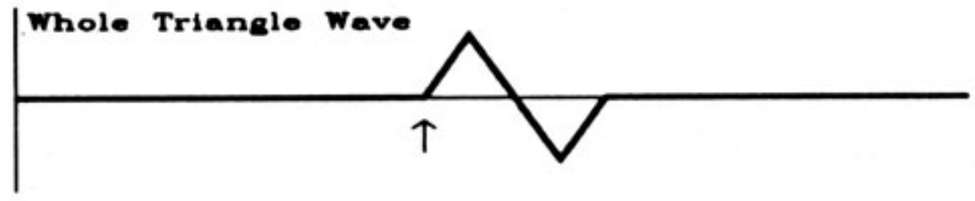


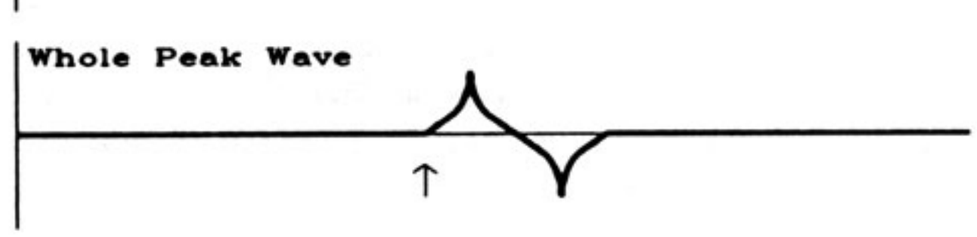


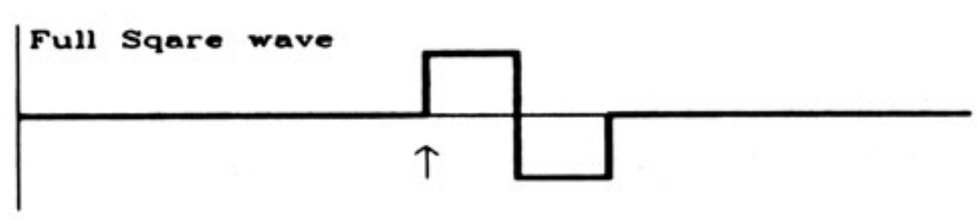


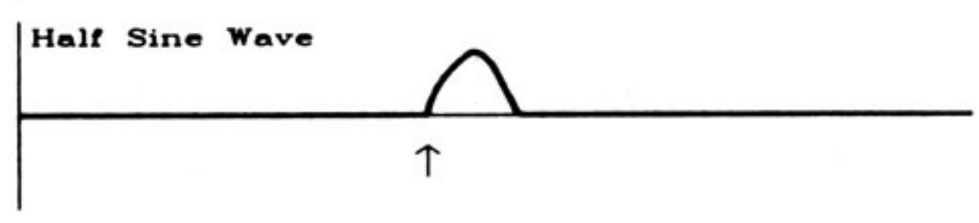


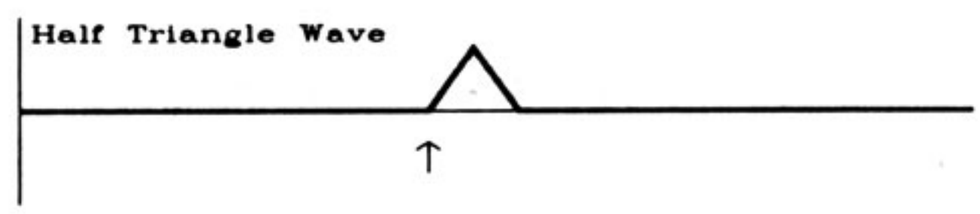


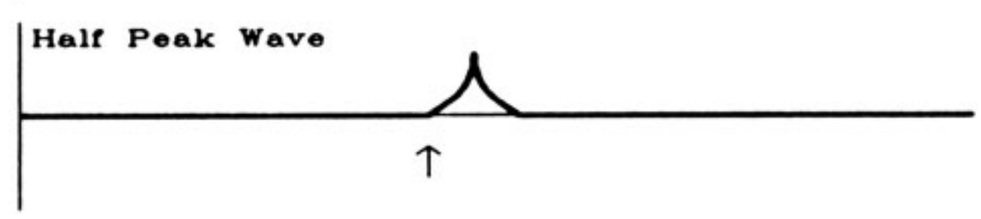


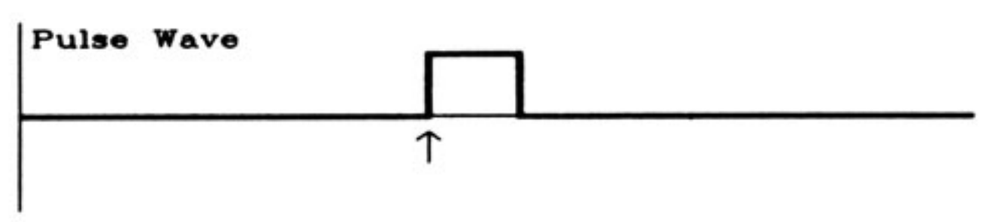


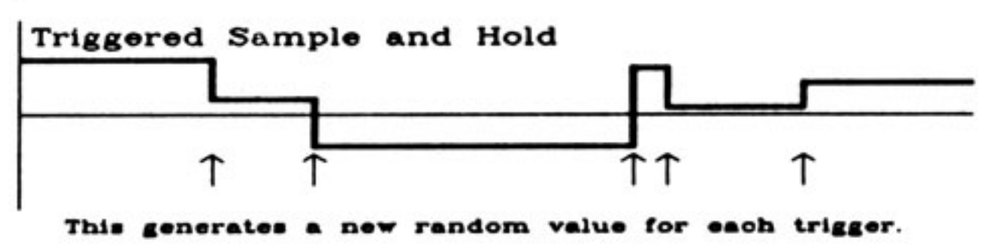




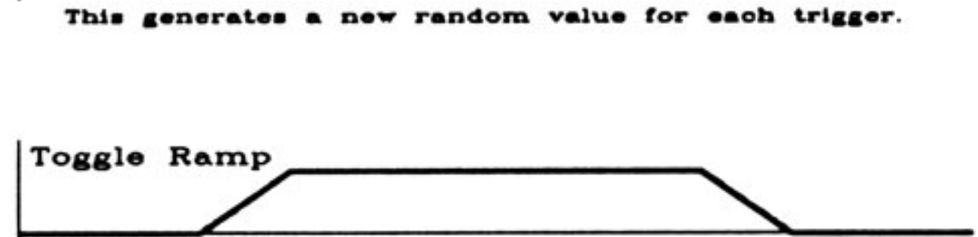








This generates a new random value for each trigger.



A trigger will cause this function to ramp from zero to positive full scale. Successive triggers will reverse the direction of the ramping.

Modulation Control

At times you may wish to disable the modulation of parameters. You can do this by hitting the (**Control**) soft key in the modulation of parameters menu. You will get:

```
Control of Parameter Modulation
(Mod= On )(ModReset)
```

Pressing (**Mod= XXX**) will toggle parameter modulation. (**Mod= On**) means modulation is enabled and (**Mod= Off**) means it is disabled. Modulation is automatically enabled when a program is loaded.

Disabling modulation does not reset parameters to their unmodulated states, it only prevents any more changes in modulation. To set all of the modulations to zero, press (**ModReset**).

Introduction to MIDI

What is MIDI?

MIDI stands for Musical Instrument Digital Interface. That's quite a mouthful. What it means is that there is now a way for musical devices to talk to each other. MIDI was originally devised by a group of synthesizer manufacturers to allow one keyboard or sequencer or computer to control any other keyboard or sequencer or computer in a standard, foolproof way. It has since become so well accepted that just about any imaginable musical (or not so musical) device now comes equipped with a MIDI interface.

MIDI and the Ultra-Harmonizer

So what can MIDI do for us? The simplest and most intuitive use for MIDI with the Ultra-Harmonizer is to change effects programs remotely, on the fly, or automatically in a computer-sequenced piece of music. This is accomplished by using MIDI program change. With MIDI program change, the H3500 can change its effect program every time a keyboard player changes a patch on his MIDI-equipped synth. Or, in a sequenced song, the sequencer could change the effect for different parts of the song. To find out how this works see the section on MIDI Program Change.

What else can it do? MIDI can be used to dynamically change parameters within a given program. For example, MIDI note commands could be used to set the amount of pitch shift on a pitch shift program. How about arpeggiating a live vocal performance? Or possibly using the modulation wheel on a synthesizer to control flanging rate or depth, or both at the same time? Maybe even have the decay time on a reverb change depending on what notes are being played on a keyboard? All of this and more is possible by using MIDI and the Ultra-Harmonizer. Interested? See the chapter on Parameter Modulation.

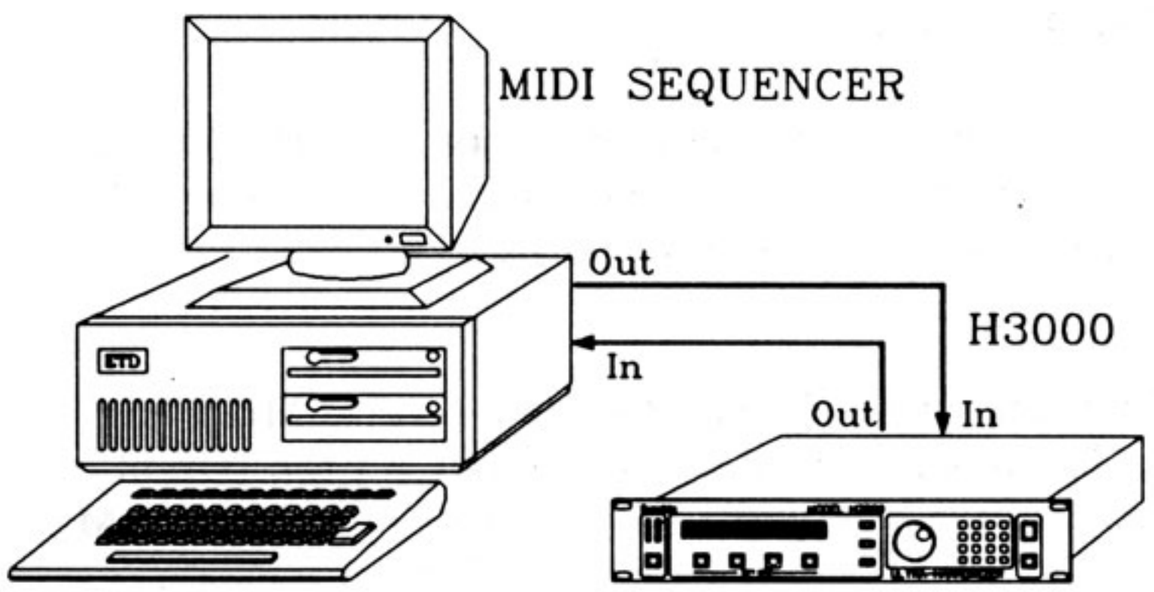
Can it do anything else? Yes. If you're a prolific effects programmer, and have come up with more effects programs than the Ultra-Harmonizer's memory can handle, MIDI can help you. Using the program dump feature and a MIDI-equipped computer you can store a virtually limitless number of effects on your computer's floppy disks (or hard disk). For more info, see the MIDI Data Dumping section.

Using a sequencer, any sequencer, (we don't know of any that won't work), you can go through a song, load programs here, change the pitch there. Play the song back using the sequencer and the H3500 will repeat what you just did. Read the section on sequencing.

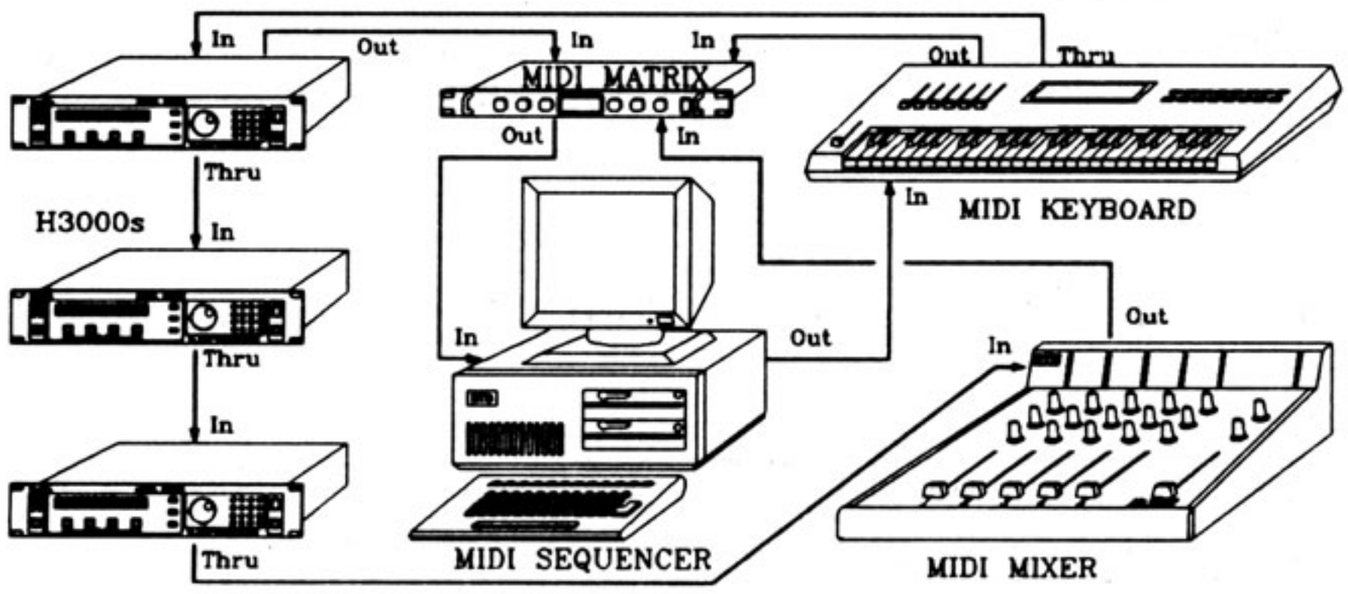
How to Hook up MIDI

The easiest way to use MIDI is with the Ultra-Harmonizer and one MIDI synthesizer. To hook it up, simply use a MIDI cable to connect the MIDI Out of the synthesizer to the MIDI In of the Ultra-Harmonizer. With this setup you can use MIDI program change and have real-time (live) control over effects parameters.

A sequenced MIDI system would use a MIDI sequencer or MIDI-equipped computer and the Ultra-Harmonizer. With this kind of setup you could do sequenced program changes, sequenced parameter changing and MIDI program storage and retrieval. Connection is simple...



The ultimate could be everything mentioned above with the addition of multiple Ultra-Harmonizers, a MIDI equipped mixer, a MIDI switcher, and anything else you might imagine. The rest is left up to you.



Using MIDI

MIDI Receive Enable

Pressing the **"FUNCTION"** key three times will bring up the MIDI Functions menu. It should look something like this:

```
MIDI Functions
(Base=  7)(Omni=Off)(Rcv=On  )( Expert )
```

(Rcv=On) is the master MIDI reception enable softkey. This lets MIDI data into the H3500. **(Rcv=On)** means yes, MIDI data will be received. **(Rcv=Off)** means no, the H3500 will not receive any MIDI data. However, the MIDI thru jack will still operate. Hitting the softkey will change "on" to "off" and back again.

MIDI Channel and Omni Mode

In order for MIDI to work at all, Omni mode must be on, or the MIDI channel number (base channel) of the sending device (synth or sequencer) must be the same as the MIDI channel of the H3500. To set the MIDI channel on the H3500 press the **(Base= ..)** softkey and turn the knob to set the channel number in the range 1 through 16.

Omni Mode is a special MIDI mode which allows a device to receive MIDI information on all 16 channels. It just ignores the channel number. To enable or disable Omni Mode hit the **(Omni=xxx)** softkey once, then again to change to on or off. When the key reads **(Omni= On)** the H3500 will ignore MIDI channel numbers. When the key reads **(Omni=Off)**, the H3500 will respond to specific channel numbers.

See Appendix B for information about the "expert" MIDI functions.

MIDI Program Change

MIDI Program Change is a number sent out over MIDI from a MIDI synthesizer or sequencer. This number is sent out whenever a patch is changed on a MIDI synth. For example, loading patch 23 on a synth should send out a program change number of 23 over MIDI. Note: On some synths, the program number sent out is actually one less than the patch number on the synth. On a DX7 for example, pressing program 23 will send out a MIDI program number of 22.

To access the MIDI program load functions, press the **"FUNCTION"** button four times. The screen should look like:

```
MIDI Program Load Functions
(  Map   )( Pgm=ID )( Pgm=On )(Bank=  0)
```

There are three ways the H3500 can deal with MIDI Program Change:

1. Do Nothing - Program Change is disabled. To disable MIDI Program Change, hit the third softkey until the text of the key reads (**Pgm=Off**). Program Change is enabled when the key reads (**Pgm=On**).

2. Load the program with the same number as the MIDI program number (a MIDI Program Change 23 from any synth would cause effect program 23 to be loaded). To have the H3500 respond in this way, hit the second softkey until the text of the key reads (**Pgm=ID**). Also, make sure Program Change is enabled; the third softkey reads (**Pgm=on**) and (**Bank = 0**).

3. Map the MIDI program number to some other H3500 effects program number. For example, a MIDI program change of 23 could load effect program 5, while MIDI program change of 24 could cause effect program 19 to be loaded. To have the H3500 respond in this way, hit the second softkey until it reads (**Pgm=Map**). Again, make sure Program Change is enabled.

Program Change Bank Select

When using the "ID" program change method, programs with numbers greater than 127 can be accessed by changing the bank number. To change the bank, press (**Bank= 0**) and turn the knob. When the bank number is set to 0, programs 0 through 99 will be loaded with program change numbers of 0 through 99. If the bank is set to 1, programs 100 through 199 will be loaded. If it is set to 2, programs 200 through 299 will be loaded, etc.

There are a couple of special cases:

For program change numbers of 100 through 127, the bank number is ignored (programs 100 to 127 will always be loaded).

To load the last edit, set the bank to 10 and send any program change number from 0 through 99.

See the section on "Sequencing" if you are interested in changing the bank number through MIDI.

Setting up the Program Change Map

If you want to use program change mapping, you'll first have to set up the map. To do that, press the (**Map**) softkey. You'll see a new display:

```
Midi Pgm # 0 Loads Nothing,  Unpatched
( Number )(  Name  )( Clear  )
```

This display shows that MIDI Program Number 0 loads nothing. To get MIDI Program 0 to load an effect, press (**Name**) and select the effect to be loaded. To set up other MIDI Program numbers, press (**Number**) and turn the knob. To clear the map, press (**Clear**).

Sequencing with MIDI

The H3500 can be hooked up to a MIDI sequencer so that front panel operations can be recorded and played back. This works with almost any sequencer. To set it up, press "FUNCTION" five times. The display should look something like this:

```
MIDI Computer and Sequencer Functions
(Seq= Off)( Enables)              ( Dumps  )
```

To set up the H3500 for sequencing, press **(Seq= Off)** to change the "Off" to an "On". Also, make sure that MIDI reception is enabled, **(Rcv=On)** on the "MIDI functions" page.

To try sequencing, connect the MIDI "out" of the H3500 to the MIDI "in" of your sequencer. Connect the MIDI "in" of the H3500 to the MIDI "out" of your sequencer. Start recording on your sequencer and then change programs, parameters, levels, etc. on the H3500. Stop recording and play the sequence back. The H3500 should repeat everything you just did.

Enables for Sequencing

When in sequence mode (**"Seq=on"**), you can customize what aspects of the machine get transmitted and received over MIDI. Normally, virtually everything done on the front panel will get transmitted and received. If you wish to change this, press **(Enables)**. The display will show:

```
Enables for transmitting MIDI Sequences
(Lvls=Off)(Pgm= Off)              (  more  )
```

Here is a description of the transmission parameters:

Lvls=On/Off: Turns on and off the transmission of front panel level changes and changes in the bypass control.

Pgm=On/Off: Turns on and off the transmission of program changes and parameter changes.

Press **(more)** to change the reception parameters. Here is a description of the reception parameters:

Lvls=On/Off: Turns on and off the reception of front panel level changes and changes in the bypass control.

Pgm=On/Off: Turns on and off the reception of program changes and parameter changes.

The Effect of Sequencing on MIDI Program Change

When sequencing is enabled, (**Seq=On**), and sequenced program reception is enabled, (**Pgm=On**), certain other parameters are automatically set to allow proper sequencing. Specifically, in the MIDI Program Change menu, the display will now show:

```
MidiProgramChange Functions <SEQUENCED>
(  Map   )( Pgm=ID )( Pgm=On )(Bank=  0)
```

The <SEQUENCED> indicates that the H3500 is in sequence mode and that certain conditions have been "forced". These conditions are:

MIDI Program Change reception is automatically enabled.

The MIDI Program Change patch map is disabled (the ID method is used).

These conditions are forced to ensure that sequencing will be done properly. Once sequencing is disabled (or sequenced program reception is disabled), these parameters will return to their previous settings.

MIDI Data Dumping

So, you've used up all the preset memory in your Ultra-Harmonizer and you don't want to throw away any of your wonderful programs. What can you do? MIDI Data Dumping on the H3500 will allow you to save your user programs on a MIDI equipped computer. You can also save your program change map with a MIDI data dump.

MIDI data dumping uses a special type of MIDI command known as System Exclusive. To take advantage of the MIDI data dump, you'll need a MIDI equipped computer and software which will recognize and save system exclusive data. Hook up the MIDI OUT from the H3500 to the MIDI IN on the computer. Connect the MIDI OUT from the computer to the MIDI IN on the H3500. To dump data from the H3500, press the **"FUNCTION"** button five times. You should see this display:

```
MIDI Computer and Sequencer Functions
(Seq= Off)( Enables)          ( Dumps  )
```

Now press (**Dumps**):

```
Dump Data Functions
(DumpEdit)(Dump Pre)(Dump Map)
```

Press (Dump Pre) to dump all of the user programs over the MIDI OUT port. Press **(DumpEdit)** to dump the current edit. Press **(Dump Map)** to dump the program change map.

When the H3500 receives a preset dump, it will replace its current set of user programs with the new programs. **Be careful!! Make sure you have saved any valuable programs before sending the H3500 a MIDI dump!** The same is true for the program change map and for the current edit data dumps.

In the MIDI Expert section of this manual (Appendix B), you will find information about how to disable the H3500 from receiving data dumps. Also, there is a description of how to have several H3500s connected to the same computer.

A Final Word...

The information above is intended to allow you to use the H3500 with MIDI and to give you a description of the modes of MIDI operation of which it is capable.

Since MIDI is a relatively new phenomenon, you may have some questions.

If you are a MIDI novice, this entire discussion may be incomprehensible.

If you are a MIDI expert, you may have questions that we never thought of, and to which we have no immediate answers.

We hope we hit the right level for the majority of people who are likely to have purchased this product. If we didn't, here's what to do:

If you are a MIDI novice, buy a book or read some of the excellent articles on the subject published by the many magazines available to amateur and professional musicians, or by the magazines catering to the recording trade, both home and professional.

If you are a MIDI expert, EXPERIMENT. You can't damage the H3500 with MIDI input data. Just be sure you've saved your valuable presets first, and re-load them when you're done.

If you're a MIDI journeyman, you can do either of the above.

And, of course, you can always contact Eventide if you have specific questions about the H3500 MIDI implementation. We realize that the manual is neither 100% complete nor as detailed as it might be for every class of user. We want you to get full use and enjoyment out of your H3500. To this end, we urge you to WRITE to us if you have any questions about MIDI operation that are not resolved by the manual. We promise a quick reply, either answering your question, or at least explaining why it can't be answered. We regret that due to the specialized nature of MIDI inquiries we cannot answer your questions on the telephone.

When writing, please be as specific as possible, and tell us exactly what information you need that isn't covered (or is confusing) in the manual. An additional advantage of writing is that we will add your name to a specific list of MIDI Mavens who will irregularly receive updates which contain some of the interesting and useful questions and answers received from people like yourselves.

Appendix A - Parameter Modulation

The following is a list of the available modulation controllers.

Scaler-type Controllers

The following are used to control value type parameters like pitch, delay, decay, etc.

Modulation Wheel
Moving the Modulation Wheel can change the effect parameter. With the Modulation Wheel moved all the way backward (position zero), the amount of pitch shift, for example, will be at the point you last set. When you move the wheel forward, and if the range is positive, the pitch will go up (until the limit). If the parameter range is negative, the pitch will go down. In the MIDI Standard, this is controller number 1. It is also what we call a large controller meaning that there are coarse and fine controllers used in order to allow precise control. Some synthesizers send only the coarse signal.

Pitch Wheel Only
Most Pitch Wheels have a center position. This is position zero where there is no effect on the parameter. Rolling the Pitch Wheel forward will increase the parameter, rolling it backward lowers the parameter. If range is negative, the reaction will be opposite. The Pitch Wheel will affect the parameter both positively and negatively.

Pitch Wheel Positive
This only affects the parameter positively (with a positive range). Move the Pitch Wheel forward and the selected parameter will go up, center it and the parameter is back again. Now move the Wheel backward and the parameter will go up again.

First Note & PW
PW represents the Pitch Wheel sensitivity. A synthesizer Pitch Wheel rolled all the way up can raise the synth's pitch an octave or some small amount (Major 2nd) depending upon the Pitch Wheel sensitivity control on the synth. The H3500 has the same control. Changing the synth's pitch one octave with its Wheel could change the H3500's pitch parameter (for example) by only a half step. The number is the maximum halftones you can shift. You have a 10 cent resolution and a two octave maximum.

For simplicity's sake, let's assume the PW=0 (no Pitch Wheel). You're at the keyboard. No keys are pressed. We'll call this reset state. You press a key. This first key changes the value of the parameter. The higher the key the more change. The amount of change is based on the lowest note that MIDI knows about. Since most keyboards cannot play this note, you will never get back to no modification by playing notes. You may want to readjust the parameter so that with this particular key you get some amount of pitch shift (using our example). The way to do that is to play the note, then turn the knob on the H3500 to the pitch shift value that you want for that note. Now, lifting up on the key (reset state) the pitch change value will not change. You now press another different note. The pitch will change again. Pressing other notes while this note is down will do nothing. The first note after reset state is the note that will affect the parameter.

Last Note & PW
We now ignore reset state. The last key that has been pressed on the keyboard is used to change the parameter. Every time you press a different key, the parameter will change.

High Note & PW

Now we don't ignore reset state again. With no notes pressed, press a key. It acts like the first note. While holding down that key, press a key lower than the first key. Nothing happens. Press a key higher than the first key, the parameter changes! Lift the last key, nothing will happen. Press a key lower than the last key, nothing will happen. The change is determined by the highest key to be pressed after reset state. (Note, this is not necessarily the highest note currently being pressed.)

Low Note & PW
This is the opposite of the above. It's the lowest key to be pressed after reset state, (no keys pressed). You can use this to control two parameters, like right and left pitch shift on one keyboard.

Note Offset & PW
From no keys down (reset state) press a key. The amount of parameter change goes to zero. Press another key. The difference between the first key and the last key is the amount of change. This can be both positive and negative.

Quantity of Notes Down
The current number of keys pressed is the amount of change of the parameter. Lifting keys will affect the parameter. This control will usually need a large range setting.

First Note Velocity
Last Note Velocity
High Note Velocity
Low Note Velocity
Instead of using the placement of the key on the keyboard, we use how hard that key is struck. Which key is looked at is determined by the mode selected.

Note xxx Velocity
xxx is a specific key that you select. How hard this particular key is struck is how much the parameter changes.

First Note Pressure
Last Note Pressure
High Note Pressure
Low Note Pressure
Like velocity, the polyphonic pressure (aftertouch) determines the parameter changes. The particular key whose pressure affects the parameter is determined by the mode.

Note xxx Pressure
You select the key (number xxx). The pressure of that key changes the parameter.

Global Pressure
DX-7's and the like have global pressure (pressure on the entire keyboard). This ties that into the parameter.

Last Note Release
How fast the last key is released determines the change in the parameter.

Note xxx Release
Again, you select the key (number xxx). How fast that key is released alters the parameter.

Velocity and Release
How fast the last strike was or the last release determines the amount the parameter changes. This could be a measure of keyboard activity.

Breath Controller
Foot Controller
Expression Controller
GP Controller #1-8
These are the various MIDI controllers to which parameters can be patched. They are all large controllers except GP Controllers 5-8.

Breath Controller	MIDI #2
Foot Controller	MIDI #4
Expression Controller	MIDI #11
GP Controller #1	MIDI #16
GP Controller #2	MIDI #17
GP Controller #3	MIDI #18
GP Controller #4	MIDI #19
GP Controller #5	MIDI #80
GP Controller #6	MIDI #81
GP Controller #7	MIDI #82
GP Controller #8	MIDI #83

Damper Pedal
Portamento Pedal
These are pedal controllers. Your synthesizer should send out 0 and max values for these, so the parameter is changed between two values (on or off).

Damper Pedal	MIDI #64
Portamento Pedal	MIDI #65

Notes Down Th(reshold)=xx
Last Note Velocity Th(reshold)=xx
Global Pressure Th(reshold)=xx
These are like the controllers before that have the same names. The difference is that **"Th=xx"** is a threshold number. They act like off/on pedals, 0 or max (depending on how range is set). The **"Th=xx"** is the threshold where this change happens. "xx" is the threshold point. For instance, in Notes Down, "xx" is how many keys have to be pressed before the parameter changes.

MIDI Clock Frequency
With sequencers and drum machines, a timing clock is sent out over MIDI. The rate of this clock will alter the parameter. A faster clock, more of a change in the parameter. Note: You cannot reset the parameter if you are using this controller because it constantly updates the parameter. There is no channel number to the MIDI clock.

MIDI Clock Period
This acts as the reciprocal of MIDI Clock Frequency, the faster the MIDI clock, the lower the change. This controller is great to tie to delays. As you speed up the song, the delays will follow in time. This mode also cannot be reset.

Undefined Small 0-121
Undefined Large 0-31
The MIDI specification contains a large number of undefined controllers. In time, they will have new definitions. Also, some manufacturers use these for their own purposes. You can use these to tie parameters to any MIDI controller, so that in the future, you can take advantage of new ones.

Small is a single message MIDI controller. Large refers to MIDI controllers use two messages.

Soft Function 1
Soft Function 2
Soft Function 3
Soft Function 4
These are not MIDI. This is where you patch your own parameters. When a parameter is patched to a Soft Function, the name in the quotes appears as a Softkey when you press the "FUNCTION" key. Hitting the soft key and turning the knob allows you to modulate the parameter that you patched. It's like putting the Modulation Wheel on the front panel of the H3500. See the section on Soft Functions for more information.

Function Generator
This will modulate the parameter automatically. It's like someone turning the modulation wheel for you. See the section on the Function Generator for more information.

Program Specific Modulators
The current program may add some controllers. Certain programs have information that could be useful for modulating parameters (Input Pitch, Amplitude, etc.) These will appear as you scroll through the list.

Trigger-Type Controllers

These are used with trigger-type parameters. They are events that will trigger something to happen in the H3500.

First Note
The first time you hit a note after no notes are down will trigger something to happen.

Last Note
Every time a note is struck on the keyboard the trigger happens.

Note xxx only
Whenever a specific note is hit (xxx) the trigger occurs.

Note xxx above
Whenever the note or a note above the specified note is hit, the trigger occurs.

Note xxx below
Similar to above, whenever the note or a note below is hit, the trigger occurs.

Soft Function 1
Soft Function 2
Soft Function 3
Soft Function 4
This is where you patch your own parameters. When a parameter is patched to a Soft Function, The name in the quotes appears as a Softkey when you press the "FUNCTION" key. Hitting the soft key causes the trigger to happen. See the section on Soft Functions for more information.

Function Gen.
This patches the trigger to the Function Generator. You can have the trigger occur when the value of the function generator rises (or falls) above (or below) a certain value. A threshold adjust picks where on the wave you want to trigger, The polarity selects if the wave should be rising (Up) or falling (Down).

Damper Pedal
Portamento Pedal
These are pedal MIDI controllers. Depressing one of these pedals will cause the trigger.

Damper Pedal	MIDI #64
Portamento Pedal	MIDI #65

Notes Down Th(reshold)=xx
Last Note Velocity Th(reshold)=xx
Global Pressure Th(reshold)=xx
These are like the controllers before that have the same names. The difference is that **"Th=xx"** is a threshold number. Whenever the threshold is crossed from below, the trigger occurs. "xx" is the threshold point. For instance, in Notes Down "xx" is how many keys have to be pressed before the parameter changes.

Undefined Small = xxx
This is for pedals or other MIDI controllers. When the value of the controller rises above half the full scale value, the trigger occurs. xxx is the controller number. The controllers are considered one byte MIDI controllers.

Program Specific Modulators
The current program may add some controllers. Certain programs recognize events that could be useful for triggering. These will appear as you scroll through the list.

Specifiers For Modulation Modes

Ch+
This is a number representing a MIDI channel offset. The number shown is added to the base channel. If the sum exceeds 16 then 16 is subtracted from the number (it wraps around). If Omni mode is ON, this has no effect as MIDI channel will be ignored.

PW=
This is the Pitch Wheel sensitivity. It is in semi-tones and it is the maximum shift the pitch wheel will give you. The number has a 10 cent resolution.

Note .....
Just the word followed by some text usually refers to a specific note. Moving the Wheel will change the text. The text is two parts, on the right is the note and its number. An x instead of a number indicates a note in the lowest octave that MIDI addresses. On the left will occasionally appear text that gives you a reference. All A notes have a frequency and "Mid" refers to Middle C.

Th=
This is a threshold. It will be a number from 0 to 127. It divides the possible values into 128 and you pick which point is the threshold. A special case is with the Function Generator. Here, the value is from -100 to 100 and is a percentage of full scale.

Up / Down
This is used with the Function Generator trigger. It specifies if the trigger occurs when the value of the Function Generator rises above the threshold (Up) or when the value falls below the threshold (Down).

"xxxxxxxx"
With Soft Functions, this is the current name of the Softkey for this Soft Function. See the section on the Soft Functions for more information including how you can change this name.

Appendix B - Expert MIDI

Like the programs, MIDI has an expert mode. Hitting the **"FUNCTION"** key three times should get the MIDI System Functions menu. Press the (**Expert**) Softkey to get this display:

```
System Exclusive Functions
(Dev =  0)(SysX=On )            (  more  )
```

These are functions that deal with MIDI System Exclusive in the H3500.

The **(Dev = 0)** softkey allows you to set a number from 0 to 99. The data dump functions of the H3500 use the MIDI System Exclusive command. This command information is similar to channel numbers. Your H3500 will respond only to System Exclusive information that was meant for EVENTIDE equipment and containing this number. This allows you to set up lots of H3500s (up to 100, to be exact) and direct messages to a specific one. Normally this is left at zero when only one H3500 is being used. Set this number uniquely for each H3500 you are using.

The **(SysX=On)** is an enable for reception of Eventide System Exclusive information. Pressing this will change the "On" to "Off", thus preventing any Eventide System Exclusive information from being accepted. This includes dumps to the H3500. Note, this will not stop Universal System Exclusive information, such as bank select.

Press (**more**) for another MIDI Expert menu:

```
Expert MIDI Functions
(MIDI-mon)(Err= Off)            (  more  )
```

These functions are for finding problems that you may have with MIDI.

Pressing **(Err= Off)** will do nothing. It will stay "Off". If the H3500 detects a lost MIDI information byte, it will read **(Err= On)**. Pressing the softkey then will change the "On" to a "Off".

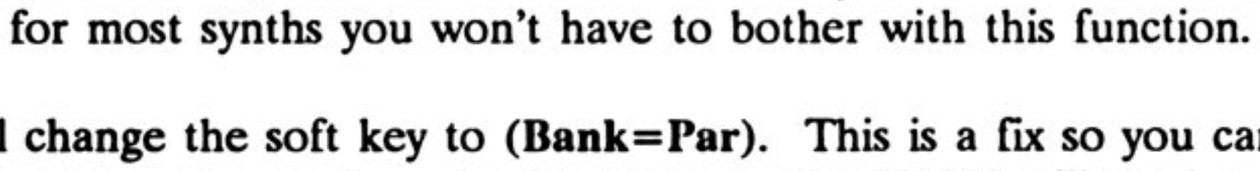
Pressing the **(MIDI-Mon)** softkey will put you into the MIDI Monitor. The display will look something like this:

```
MIDI Input in Hex, Bypass to Esc T= 470
 F0 2E 45 F1 45 3A F8 F1 37 3E F0 45 00
```

This function monitors the MIDI input data stream. The last 13 bytes are on the bottom line with the most recent data on the right. The numbers are in Hexadecimal. Hexadecimal is easy to use when looking at the bytes of MIDI. You will need a MIDI specification document in order to know what the data means. **"T=xxx"** is a monitor of the MIDI Timing Clock. The number is related to the frequency of Time Clocks (F8) that are received. The actual number is based on an internal function of the H3500. Also, if the timing clocks stop, the number will not go to zero. This function is provided in order to give you a way to see that the H3500 is receiving data and timing clocks. You can also see the nature of the data received and, if you spend some time, see what your synths are putting out. As we were designing the H3500 we occasionally found this a useful function to diagnose problems.

To leave the MIDI Monitor, press the bypass switch twice. This will take you back to the expert functions.

Press (**more**) for another MIDI Expert menu:



This menu deals with fixing some problems with MIDI.

Pressing **(Off=Both)** will allow you to select three modes; **(Off=both)**, **(Off=zero)** or **(Off=Off)**. These refer to what the H3500 recognizes as a note off command in MIDI. Some synths send a MIDI Standard Note Off command (with a release velocity). Some synths send a Note On command with an attack velocity of zero. There have been reports of naughty synths that send both. For most tone generators and synths, receiving this is not a problem. With the H3500 it may be a problem with controllers that use keys. If you are experiencing "weirdness" with some of the controllers, setting this to something other than "Both" might help. What you select is what the H3500 will recognize. Don't select Both if you know your synth sends both. **(Off=Off)** means a bona fide Note Off command. **(Off=Zero)** is a Note On with Velocity Zero. Of course **(Off=Both)** means that it will recognize either, and for most synths you won't have to bother with this function.

Pressing **(Bank=SyX)** will change the soft key to **(Bank=Par)**. This is a fix so you can use the H3500 with old sequencers. When you are sequencing and you load a program, the H3500 will send out a bank select command, and then a program load command. At the time of writing, the proposed method for doing a bank select uses MIDI Universal System Exclusive message. Most sequencers should be able to record and playback this message. However, since this is recent, some older sequencers will not since they ignore all System Exclusive messages. (There was a time when there were no Universal ID's.) To fix this problem, we have provided the ability for the H3500 to send out its bank select as a Non-Registered Parameter Change. Since this is a bunch of controller commands, just about every sequencer can record them and play them back. When the softkey is **(Bank=Par)**, the H3500 will send out the bank select as a parameter change. The H3500 will respond to either message. Note: The System Exclusive bank select will probably be MIDI Standard. This is what you should be using to keep your system "modern".

Appendix C - MIDI Sequencing Details

MIDI Parameter Numbers

The H3500 uses the MIDI parameter system to do sequencing and controlling. This system uses certain controllers to specify parameter numbers and data. Two controllers are the MSB and LSB of the data value to be written into the parameter. Another two are used to define a Registered Parameter. This is a parameter that all of MIDI-dom has decided will have this function. Another two controllers are for non-registered parameters. These are not defined as any specific function. They can change and vary with application. Further, two controllers are used to increment and decrement the data value of the parameter.

The H3500 only uses non-registered parameters and does not support the data increment and decrement functions. The actual parameter numbers vary depending on what application program is running on the H3500. Another detail is that contrary to the MIDI spec, the parameter is only changed when the LSB of the data value is received. This was necessary in order to prevent glitches in the parameter value from being heard.

When a parameter is changed, the following message is put out (one line per byte).

Controller at the base channel
Controller number 99
The MSB of the non-registered parameter number
Controller at the base channel
Controller number 98
The LSB of the non-registered parameter number
Controller at the base channel
Controller number 6
The MSB of the data value
Controller at the base channel
Controller number 38
The LSB of the data value

It should be mentioned that LSB and MSB actually refer to 7 bit bytes. The two are combined to form 14 bit numbers. The H3500 goes even further and considers the 14 bit data value to be two's complement in that if the highest bit of the MSB is high, then the number is negative.

The actual parameter numbers will vary according to the program running on the H3500. You will find this information in the section dealing with the appropriate program.

There are some parameters' numbers that will always be the same. These are for the system.

Left input attenuator is 8192 (2000H)
value is from 0 (on) to -48 (off)

Right input attenuator is 8193 (2001H)
value is from 0 (on) to -48 (off)

Left output attenuator is 8194 (2002H)
value is from 0 (on) to -48 (off)

Right output attenuator is 8195 (2003H)
value is from 0 (on) to -48 (off)

Bypass relay is 8196 (2004H)
value from 0 (bypassed) to 1 (through the H3500)

Program Bank number is 8197 (2005H)
value from 0 to 10
(0 through 9 is first digit of H3500 program number, 10 is last edit)

Soft Function 1 scaler is 8208 (2010H)
value from -5000 to 5000 (50 * displayed value)
Note: due to limitations in MIDI, this is 1/2 the resolution of which the knob is capable.

Soft Function 2 scaler is 8209 (2011H)
value from -5000 to 5000 (50 * displayed value)

Soft Function 3 scaler is 8210 (2012H)
value from -5000 to 5000 (50 * displayed value)

Soft Function 4 scaler is 8211 (2013H)
value from -5000 to 5000 (50 * displayed value)

Soft Function 1 trigger is 8212 (2014H)
any value will trigger

Soft Function 2 trigger is 8213 (2015H)
any value will trigger

Soft Function 3 trigger is 8214 (2016H)
any value will trigger

Soft Function 4 trigger is 8215 (2017H)
any value will trigger

Function Generator type is 8216 (2018H)
value 0 through 20 (type position as scanned)

Function Generator frequency is 8217 (2019H)
value 0 through 2000 (Hz * 100)

Function Generator amplitude is 8218 (201AH)
value 0 to 100 (displayed value)

Function Generator trigger is 8217 (2019H)
any value will trigger

MIDI Program Change

When you are sequencing and you load a program, the H3500 will send out first a Bank Select and then a MIDI Program Change command. Both numbers form the ID of the program that was loaded. The Bank Select number is the first digit (0 through 9) and the Program Change is the last two digits (0 through 99). When moving a change of program around with your sequencer, you must move both commands.

When you load Last Edit, a Bank Select of 10 is sent with a program change of 0. The Bank Select is sent one of two ways. The proposed MIDI Standard way is a Universal System Exclusive Real Time message. There is also a non-standard way using a parameter change command (see above). You can select which way you want in the MIDI Expert section.

The standard Bank Select message looks like this:

```
hex:  F0  7F  nn  02  01  0c  00  00  00  00  0b  00  F7
dec:  240 127 0nn 002 001 0cc 000 000 000 000 00b 000 247
```

where:

nn is the device number (see MIDI Expert section)
c is the channel number (0 through 15 for 1 through 16)
b is the bank number (0 through 10)

If a Program Change command with a number of 100 to 127 is received, then the Bank Number is ignored and program 100 through 127 is loaded.

MIDI Volume

MIDI Volume is implemented. MIDI Volume is Controller number 7. We only recognize changes with the most significant byte.

When you first turn on the unit, MIDI Volume is assumed to be full scale. It is then set to a value when a MIDI Volume message is received. The MIDI Volume will scale the Output Levels.

Appendix D - MIDI Implementation Chart

Function		Transmitted	Recognized	Remarks
Basic	Default	1-16	1-16	
Channel	Changed	1-16	1-16	
	Default	Mode 2	Mode 2 or 4	1
Mode	Messages	X	Mode 2 or 4	
	Altered		X	
Note Number	True Voice	X	0-127	
Velocity	Note ON	X	0X	
	Note Off	X	0X	
After Touch	Keys	X	0X	
	Ch's	X	0X	
Pitch Bender		X	0X	
	Mod Wheel	X	0X	2
	Damper Pedal	X	0X	
	Portamento Pedal	X	0X	
Control	Breath Controller	X	0X	
Change	Foot Controller	X	0X	
	Expression	X	0X	
	General Purpose 1-8	X	0X	
	Undefined Small 1-12	X	0X	
	Undefined Large 1-31			
Program Change	True Number	0-127	0-127	3
System Exclusive		0X	0X	
System	Song Position	X	X	
Common	Song Select	X	X	
	Tune	X	X	
System Clock		X	0X	
Real-time	Commands	X	X	
Auxiliary	Local On/Off	X	X	
Messages	All Notes Off	X	X	
	Active Sensing	X	X	
	Reset	X	X	

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

X: Yes 0: No 0X: Switchable

Notes:

1. Defaults to mode set before power off.
2. Controllers can be patched to selected effects parameters.
3. Program change numbers can be patched to any effects program.

The H3500 uses unregistered parameter change commands to transmit and receive parameter, input/output level and bypass control commands. This allows the front panel functions to be sequenced with any MIDI sequencer.

Appendix E - MIDI Dump Requests

A computer hooked up to the MIDI input port can order the H3500 to perform dumps over the MIDI output port. The computer can do this by sending messages to the H3500. These message are called System Exclusive messages. In the beginning of each message are some bytes that are called the leader:

The leader bytes are:

sysex start	manuf.ID	model code	device number route code
F0H (240)	1CH (28)	60H (96)	xx=dev. num. 0

Device number is selected from the front panel. It is used so that you can have several H3500s connected together.

The route code should always be 0.

After the leader are bytes that tell the H3500 which type of dump to perform. Immediately after the last byte is sent, the H3500 will start dumping.

DUMP EDIT

This routine dumps the program that is currently loaded.
in hex: 7CH 46H 45H 34H 36H 42H 43H
in decimal: 124 70 69 52 54 66 67

DUMPPRESETS

This routine dumps all of the user presets.
in hex: 7CH 46H 45H 34H 32H 43H 30H
in decimal: 124 70 69 52 50 67 48

DUMPPATCH

This dumps the program change patch map.
in hex: 7CH 46H 45H 34H 34H 42H 45H
in decimal: 124 70 69 52 52 66 69

An example of a complete dump request is:

(attention device 1, dump all of your presets)
Hex: F0H 1CH 60H 01H 00H 7CH 46H 45H 34H 32H 43H 30H
decimal: 240 28 96 1 0 124 70 69 52 50 67 48

Appendix F - Clearing Ram

Under certain rare conditions, the user program memory may become corrupted (from corrupted data dumps, bugs in our program, etc.) To return the H3500 to a normal operating state, you may need to clear the memory and begin with a clean slate. We have provided a way for you to do this.

Beware! This will remove all of your presets. Before doing this, make sure that clearing the memory is absolutely necessary.

Here is the procedure:

1 - Turn off the H3500.

2 - Hold down the "**FUNCTION**" key.

3 - While holding down the "**FUNCTION**" key, turn on the H3500.

You will then see this message:

```
Remove all presets ?
          (  Yes  )(   No   )
```

Now, if you really want to remove all of your presets, press (**Yes**). Otherwise press (**No**).

Next you will see this:

```
Reset the Operating System ?
          (  Yes  )(   No   )
```

This sets all of the enables, channel numbers, etc. to the way they were when you first got the unit. If you want to do this, press (**Yes**).

The memory should now be clear and the H3500 will restart itself.

Appendix G - Tips and Tricks

Loading Programs

To load a specific program, instead of using the knob or up/down keys, simply enter the program number with the keypad.

To load the program press "Load" or press the enter key on the keypad.

Adjusting Contrast

Any time you press the **"FUNCTION"** key, you will be able to adjust contrast. Nothing on the display will say so, but if the knob isn't doing anything else, it will adjust contrast.

Editing Names

When you are editing a program or soft function name, the keypad can be used to easily add a number into the name. Just press the number you want to enter and it will appear on the display. Also, a quick way to get a space is to press "9" and then press the up arrow.

Good Pitch Shifting

For the best quality pitch shifting, here are some things to consider. Single notes pitch shift best. To shift chords or program material, set the "Deglitch" settings to a low note range (something like D0 through D4). Also, narrow deglitch ranges work best. To shift a low note, lower the "high note" setting before changing the "low note" setting.

If you are using multiple effects, put the H3500 after any compression or distortion, but before any other effects.

Watch Your Ears

When adjusting feedback or reverb decay, be sure that you know what you are doing. In order to give you the widest range of effects, we allow you to adjust these parameters to values which might create a constantly increasing sound which could damage speakers, ears, etc. Usually, you would put a gate on the sound before that happens, but you should know how to do that before you start playing.

Generally, the danger occurs when you have decay with an "Infinity" sign in it, and when using feedback. Remember that, depending on the algorithm, feedbacks can add, so you might get problems even when it looks like there isn't that much feedback.

Control Several H3500s at Once

If you have several H3500s, you can hook them up so they all slave off of one master H3500. Just hook the MIDI OUT of the master to the MIDI IN of the slaves and enable sequence mode in all of the H3500s. Any program, parameter, level or bypass changes made on the master will now be made on the slaves.

Transferring Presets From One H3500 to Another H3500

By connecting the MIDI OUT of one H3500 to the MIDI IN of another, you can "Dump" a preset, or all the presets from one H3500 to another. Make sure that the "Device Number" is the same for both units and that (**SysX=On**), (see Appendix B). To send one preset to another H3500, first load that preset. Then go the dump menu and press (**DumpEdit**). The program is now the current preset in the other machine. Now on the other machine, save the preset. The preset is now in the other H3500.

A word of caution... If you press (**Dump Pre**), all of the presets from one H3500 will be sent to the other. Any presets in the receiving H3500 will be **wiped out.**

Selecting Modulation Sources

When patching modulation to parameters, instead of scrolling through the long list of modulation sources, you can use the keypad to quickly get you close to where you want to be. Pressing a number on the keypad will get you to a certain area in the list. For example, pressing 0 will get you to the beginning of the list, pressing 9 will get you to the end of the list, and pressing 5 will get you into the middle.

FM from the Function Generator?

If you look at the list of modulatable parameters in the "Patch" section, at the end of the list you will see parameters for the Function Generator. By experimenting with modulating the Function Generator with itself, you can get some interesting results. Make sure that the Function Generator's amplitude or frequency parameters never go to zero. In that case, the function generator will stop.

Warranty Information

LIMITED WARRANTY
and other legal stuff, terms and conditions

The H3500 is built to exacting quality standards, and should give years of trouble free service.

If you are experiencing problems which are not cleared up (or explained as normal) in this manual, your recourse is this warranty.

WHAT THE WARRANTY DOES AND DOES NOT COVER

The H3500 is warranted for a period of one year against defects in material and workmanship. During this period we will repair or replace (at our option) the unit.

This means that if the unit fails under normal operation, because of parts that become defective, or because of defects in construction that later become apparent, (such as bad solder joints, PC traces, etc.,) we will repair the unit at no charge for parts and labor. We also assume a limited responsibility for shipping charges, as detailed below.

The warranty DOES NOT COVER damage or defects due to accident or abuse. The H3500 is a complex piece of equipment that does not react well to being dropped, bounced, crushed, soaked or exposed to excessively high voltages. If the unit becomes defective for these similar or causes, and the unit is deemed to be economically repairable, we will repair it and charge our normal rates.
It DOES NOT COVER shipping damage, either to or from Eventide. If you receive a new unit FROM US in damaged condition, notify us and the carrier; we will arrange to file an insurance claim and either repair or exchange the unit.

If you receive a new unit FROM A DEALER in damaged condition, notify them and the carrier.

If WE received the unit FROM YOU with apparent shipping damage, we will notify you and the carrier. In this case, YOU must arrange to collect on any insurance. We will await your instructions on how to proceed with the unit, but will charge for all repairs on damaged units.

WHO IS COVERED UNDER THE WARRANTY

The warranty applies to THE ORIGINAL PURCHASER from an AUTHORIZED EVENTIDE DEALER, providing that the dealer sold a NEW unit. DEMO units are also covered under warranty under slightly different circumstances (see below), and units that are USED, or have been used as part of a rental program, are NOT COVERED under any circumstances.

It is your responsibility to prove or to be able to prove that you have purchased the unit under circumstances that effect the warranty. A copy of your purchase invoice is normally necessary and sufficient for this.

If you have any questions about who is an AUTHORIZED EVENTIDE DEALER, call us.

UNITS WITH THE SERIAL NUMBER PLATE DEFACED OR REMOVED WILL NOT BE SERVICED.

WHEN THE WARRANTY BECOMES EFFECTIVE

The one-year warranty period begins on the day the unit is purchased from an authorized dealer, or, if the unit is drop-shipped from Eventide, on the day shipped, plus a reasonable allowance for shipping delays. This applies WHETHER OR NOT YOU RETURN YOUR WARRANTY FORM.

When we receive a unit, this is how we determine whether it is under warranty:

1: **IF the unit was shipped within the past CALENDAR YEAR, we assume that it is, unless there is evidence to the contrary, such as its having been sold used, rented, etc.**

2: **IF the unit was shipped LONGER THAN A CALENDAR YEAR AGO, we assume it ISN'T UNDER WARRANTY UNLESS:**

A: There is a warranty form on file showing that it has been purchased within the past year under appropriate conditions.

B: You send a copy of your purchase invoice indicating warranty status along with the unit.

3: **If the unit was used as a DEMO, the warranty runs from the date that it was received by the dealer. The original purchaser gets the unexpired portion of that warranty.**

When you send a unit for repair, you should indicate whether or not you believe it to be under warranty. IF YOU DO NOT SAY SO, AND WE CHARGE YOU FOR THE REPAIR, we will NOT REFUND unless the charge was caused by an error on our part. If you believe the unit to be under warranty and you DO SAY SO, but WE DISAGREE, you will not incur any charges until the dispute is resolved.

Reading the above, you can see that it is to your advantage to send in the warranty form when you purchase the unit. Also, if we know who you are, we can send you updates, notifications, and advise you of new products. It will also enable you to receive pre-shipment of parts discussed below.

WHO PERFORMS WARRANTY WORK

The ONLY company authorized to perform work under this warranty is EVENTIDE, Little Ferry, NJ. While you are free to give it to anyone, (or to work on it yourself), we will not honor claims for payment for LABOR or PARTS from you or from third parties.

HOWEVER, we and our dealers do try to be helpful in various ways:

1: Our dealers will assist, usually without charge during the warranty period in:

A: Determining whether there IS a problem requiring return to the factory.

B: Alleviating "cockpit error" or interconnection problems that may be preventing the gear from operating to its full capability.

2: We are available for telephone consultation if the dealer is unable to assist.

3: If a part fails during the warranty period, and you wish to replace it yourself, we will normally ship the part immediately at no charge providing your warranty form is on file. (We reserve the right to request that the defective part be returned.)

RESPONSIBILITY FOR WARRANTY-REPAIR SHIPPING

For us to work on your unit, it must be here. Shipping suggestions are given below. This section details who pays for it all.

SHIPPING WITHIN THE 50 UNITED STATES

You are responsible for getting it to our door at no cost to us. We cannot ACCEPT COD or COLLECT SHIPMENTS.

We will return it to you PREPAID, at OUR EXPENSE, using an expeditious shipping method, normally United Parcel Service. In areas not served by UPS we will ship by US Mail.

If you are in a hurry, and want us to use a PREMIUM SHIPPING METHOD (such as air express, next day air, etc.,) be sure you tell us so, and agree to pay shipping charges COLLECT. If you specify a method that does not permit collect or COD charges, remit sufficient funds to prepay shipping.

SHIPPING OUTSIDE THE UNITED STATES

If you purchased the unit from a dealer in your country, consult with them before returning the unit.

If you wish to return it to us, please note the following:

1: The unit must be PREPAID TO OUR DOOR. This means that you are responsible for all shipping charges, INCLUDING CUSTOMS BROKERAGE. When a unit is shipped to us it must be cleared through United States Customs by an authorized broker. YOU MUST MAKE ARRANGEMENTS for this to be done. Normally your freight forwarder has a branch in the US which can handle this transaction. We CAN arrange to clear incoming shipments for you. If you want our assistance you must NOTIFY US BEFORE SHIPPING GOODS for repair, giving full details of the shipment, and including a minimum of $250.00 in US funds to cover the administrative and brokerage expenses. Any balance will be applied to the repair charges, or refunded. If a balance is due to us, we will request a further prepayment.

2: ALL SHIPMENTS WILL BE RETURNED COLLECT. If this is impossible because of shipping regulations, or money is due us, we will request prepayment from you for the appropriate amount.

3: All funds must be in $US. Payment may be effected by checks drawn on any bank in the US, or by telegraphic fund transfer to our bank. If you send US Currency, be sure that it is sent by a method you can trace such as registered mail. If you wish to pay by Letter of Credit, be sure that it affords sufficient time for work to be performed and the L/C negotiated, and that it is free from restrictive conditions and documentation requirements.

4: WE RESERVE THE RIGHT TO SUBSTITUTE FREIGHT CARRIERS. Although we will attempt to honor your request for a specific carrier, it is frequently necessary to select a substitute because of difficulties in communication or scheduling.

INDEX

The Algorithms

There are many factory programs resident in the H3500. These programs are based a smaller number of *algorithms*. An algorithm is the digital signal processing equivalent of an analog circuit, such as a compressor, an equalizer, or an analog delay.

Each of these algorithms is versatile enough to give a wide variety of sounds. Our factory programs are just a starting point for your own imagination.

The following section describes each of the algorithms and their associated softkey-selected parameters. A list of the factory programs and their base algorithms is provided at the end of the manual.

Each parameter listed is preceded by a parameter number. These numbers are used for MIDI sequencing.

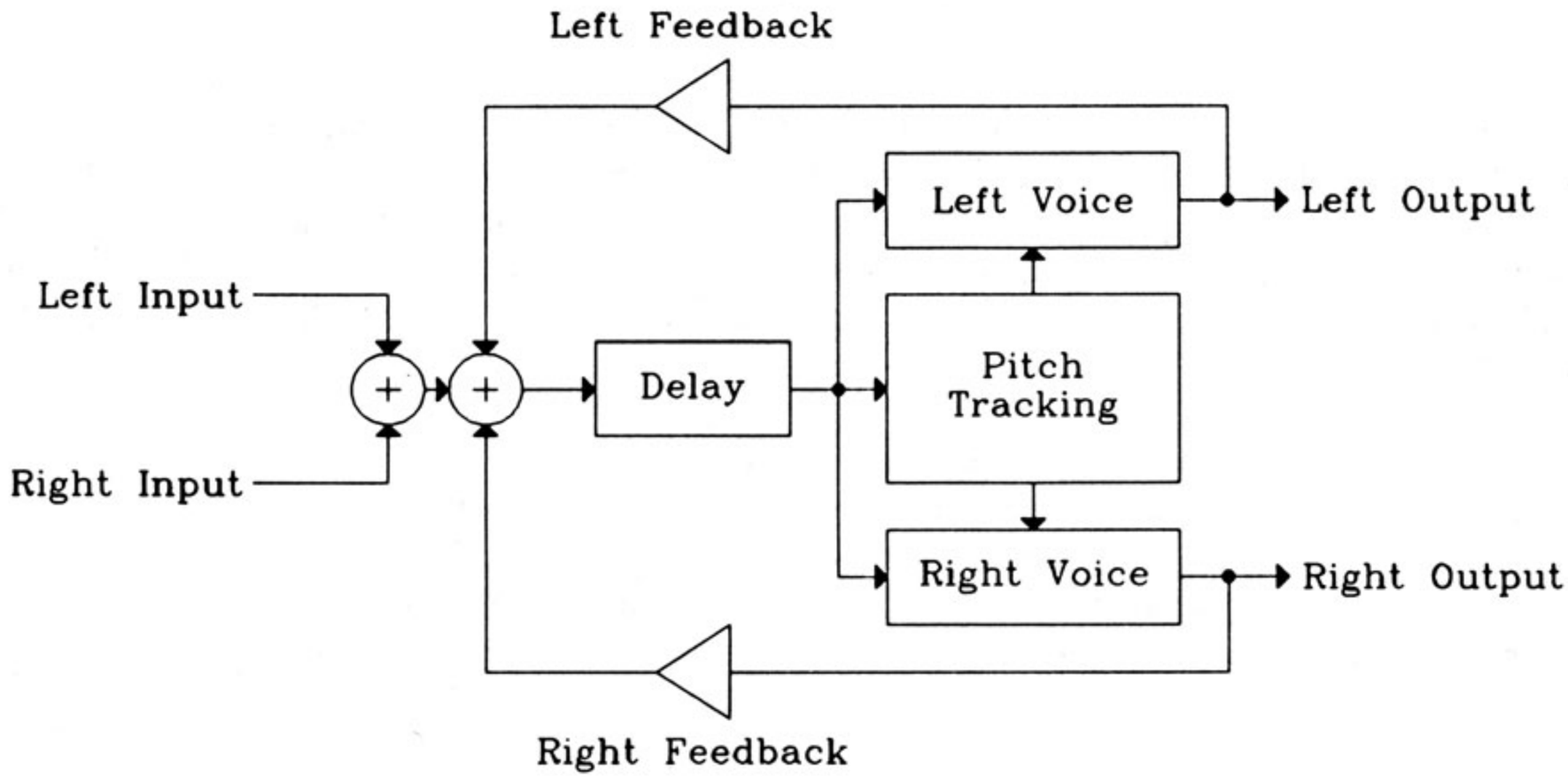
Algorithm 100 - Diatonic Shift

Description

This is the most musically useful, real-time, pitch shifter algorithm. Set the H3500 to any key signature or your own scale or harmonic pattern and play in tune in that key. Pick the right and left voice harmony intervals and now we've got harmony that stays in key. Need an example? With a conventional pitch shifter you set up a harmonic interval and are locked into that harmony with every note played. If that interval is a Major 3rd up and you're playing in the key of C it will always harmonize a Major 3rd. That works great for the notes C, F and G, but what about D, E, A and B? Wrong notes, plain and simple. Those notes require a minor 3rd harmony. Diatonic Shift gets that straight. You define the harmonies and the H3500 tracks your pitch and plays the correct notes.

This is a mono-in stereo-out program with up to one second of delay, mix and feedback on each channel. There are two user defined harmonic patterns and many pitch tracking parameters to optimize pitch shifting.

Block Diagram



Parameters

#5	**Left Voice**	**see listing below**	**Modulation**
#6	**Right Voice**	**see listing below**	**Modulation**

These are the harmonic intervals that the left and right output channel will produce. The standard intervals are all represented as + or -. + is above the input note and - is below it. Other selections are 'lo ton ped' and 'hi ton ped' which are short for low and high tonic pedal. That simply outputs the tonic note of the key either above (high) or below (low) the note played in. 'Hi dom ped' and 'lo dom ped' work the same way only the harmony note is the dominant interval (fifth) of the key. User defined scales 1 and 2 are also available but we'll describe them later. Here are all the choices:

-octave	+second	lo ton ped
-seventh	+third	lo dom ped
-sixth	+fourth	hi ton ped

-fifth	+fifth	hi dom ped
-fourth	+sixth	scale 1
-third	+seventh	scale 2
-second	+octave	
unison		

#35 Quantize **on or off**

This parameter tunes the output to the nearest even-tempered interval. **It corrects pitch.** If the H3500 is tuned to A-440 with the Right Voice set to unison an out of tune A at the input (447 for example) will produce a pitch-corrected A-440 at the right output. It corrects both channels at once. Therefore, if the Left Voice was set to +fifth the resulting fifth from the A-447 would be an in tune E-659.255. Quantizing is normally off. Pressing the softkey will change it to on. Press it again to change back to off.

#7 Delay **0 to 1000 milliseconds** **Modulation**

This adjusts the time between the input signal and the affected output signal. Both channels adjust together in 1/1000 of a second steps up to one second.

#0 Left Mix **0 to 100 per cent** **Modulation**
#1 Right Mix **0 to 100 per cent** **Modulation**

The Left Mix level is the balance between the original or dry signal and the effect or wet signal at the left output. A 50% mix will result in equal levels of dry and wet sound.

#2 L Feedback **0 to 100 per cent** **Modulation**
#3 R Feedback **0 to 100 per cent** **Modulation**

This will control the amount of feedback from the left output to the input. With unison pitch shift it works like a normal digital delay. With pitch shift, in-key arpeggios can be created. This sounds great (interesting anyway) with long delays. Both right and left channel feedback are returned to the same point. High settings of both feedback levels could cause unstable output conditions. Some people like that sort of thing and some don't.

Tune **-50 to +50 cents**

In order for the Diatonic Harmonizer to work properly the instrument or voice signal coming into it must be in tune with the H3500. Tuning can work two ways. The H3500 can be tuned in cents to the tuning of the signal coming in as long as that is within a quarter tone (50 cents) of A-440. Or you can tune to the H3500's A-440. Once you're tuned, the correct notes will be displayed in "Shownote". To tune the H3500 to your instrument, press "Tune" and then play any note on your instrument. While playing the note, press "Enter". The H3500 is now tuned.

Shownote **(not adjustable)**

This parameter only displays the pitch of the note played into the H3500. It is displayed as note name and octave where middle C is C5.

#4 Key **(see listing below)**

This parameter sets up one of the twelve standard key signatures. Remember your music theory: Those twelve keys can work as Major, relative minor or the 5 other modes (dorian, phrygian, lydian, mixolydian or locrian). Here are the available keys:

C C# D D# E F F# G G# A A# B

Expert Mode Parameters

#11-22 Scale 1 — **set using "Note" and "Interval"**
#23-34 Scale 2 — **set using "Note" and "Interval"**

Note — **see listing below**
This is where the user scales and harmonies are created. The twelve chromatic notes are listed under Note 1. Turn the knob or use the up/down buttons to get each note. This pattern will be selected under Scale 1 found in the L Voice or R Voice parameters. The notes listed are parameter numbers 11 through 22.

C Db D Eb E F Gb G Ab A Bb B

Interval — **-2400 to +1200 cents**
This key selects the harmonic interval between the note selected in Note 1 and the harmony that the H3500 will play. For example, if you set C = +300 cents and D = +500 cents when you trill between C and D the H3500 will trill between Eb and G. On any note, if no harmony is desired simply set that interval to 0 cents.

#8 Low Note — **9 Hz to C7**
This is used to optimize the pitch shifter for the best possible performance (i.e. smallest delay, smoothest pitch shift). Set this for the lowest note you reasonably expect to pitch shift. (Important: The lower this note is set to, the longer the delay of the pitch shifter.)

#9 High Note — **C4 to C8**
For the same reasons given above, set this to the highest note you reasonably expect to pitch shift.

#10 Source — **polyphonic- * -solo**
The Source parameter is another parameter that optimizes pitch shift performance. Polyphonic or solo relates to the input source. The star will move right or left when the knob is turned. Set it to solo for a monophonic input source and adjust it toward polyphonic for the best sound with polyphonic input sources.

Levels

#11 Left In — **-48 to 48 dB**
#12 Right In — **-48 to 48 dB**
#13 Left Out — **-48 to 48 dB**
#14 Right Out — **-48 to 48 dB**
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

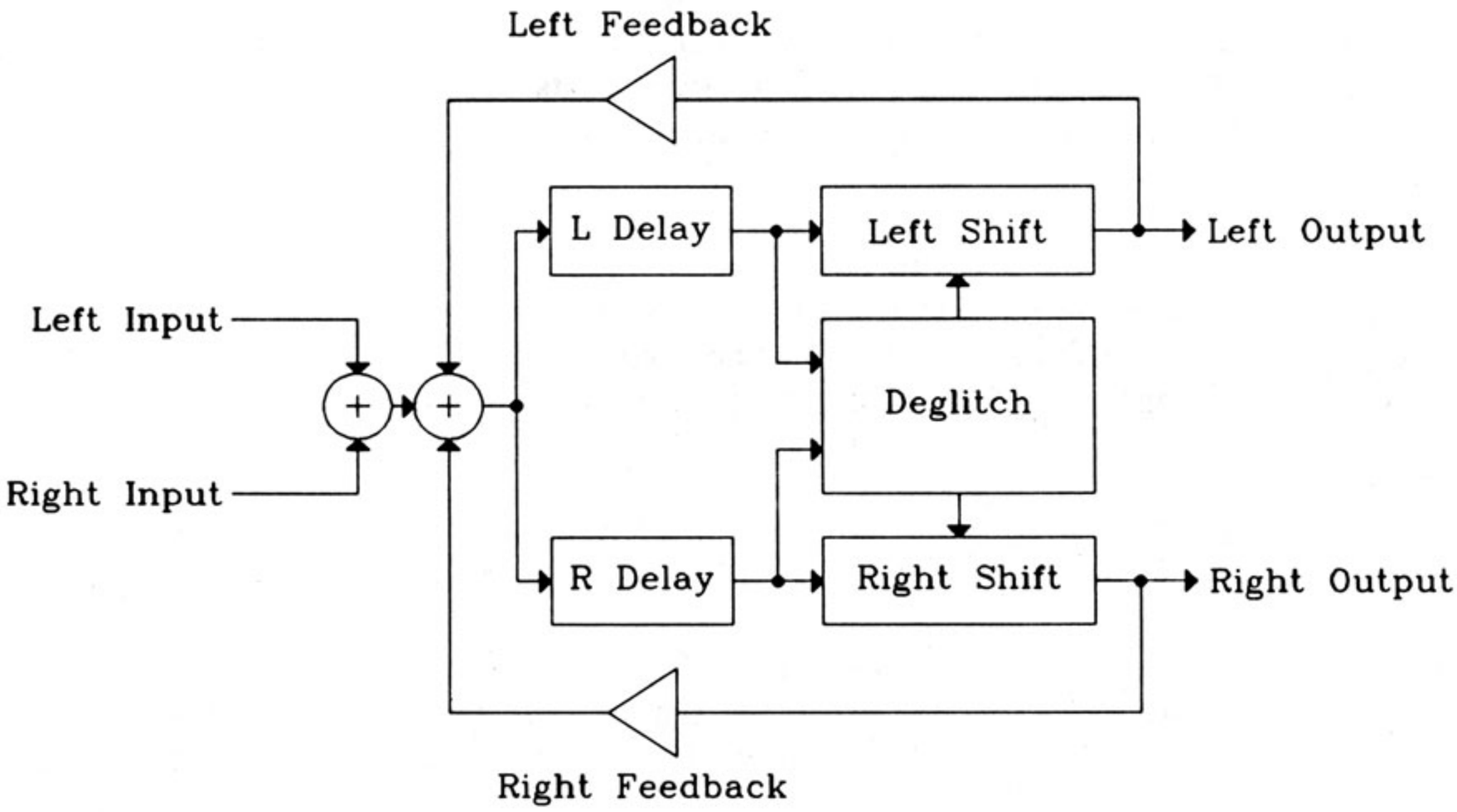
Hint: The presets using "Just" intervals refer to just intonation.

Algorithm 101 - Layered Shift

Description

This algorithm uses the left input tó create two separate pitch shifted outputs. The range of the shifters is up one octave and down two octaves (and, of course, any ratio in between). The right and left outputs are able to use any combination of these. The result... instant 3 part harmony. Parameters for each pitch shifter are independently controlled and MIDI capable.

Block Diagram



Parameters

#4	**L Coarse, Fine**	**-2400 to 1200 cents**	**Modulation**
#6	**R Coarse, Fine**	**-2400 to 1200 cents**	**Modulation**

This controls the pitch shift at the left output. The pitch shift is given in cents, where 100 cents is equal to an interval of one semitone (one half-step). Negative cents corresponds to a transposition down while positive is up. Zero cents is no pitch shift. The knob and up/down buttons will change the amount of pitch shift in 100 cent increments. Play or sing a constant pitch and turn the knob. You will hear a chromatic scale.

#5	**L Delay**	**0 to 1000 milliseconds**	**Modulation**
#7	**R Delay**	**0 to 1000 milliseconds**	**Modulation**

This sets the length of time between the input signal and the pitch shifted output for the left pitch shifter. The time is given in milliseconds (1/1000th of a second).

#2 L Feedback **0 to 100 per cent** **Modulation**
#3 R Feedback **0 to 100 per cent** **Modulation**

This controls the amount of feedback from the left output to the input. With zero pitch shift this is like a normal digital delay. Use with pitch shift and delay to get arpeggiation. Use without delay to get wild pitch smears. Use it in subtle amounts with small pitch shifts to get fat sounds. Note that both right and left channel feedback are returned to the same input point. This means that high settings on both feedback levels could cause unstable output conditions.

#0 L Mix **0 to 100 per cent** **Modulation**
#1 R Mix **0 to 100 per cent** **Modulation**

The mix levels are the balance between the original or dry signal and the effect or wet signal at the left and right outputs. A 50% mix will result in equal levels of dry and wet sound.

#11 Sustain **on or off**

The Sustain key will "loop" one pitch period of the input signal much like a sampler. Pressing the softkey will turn off the input and begin endlessly playing the loop. Pressing it again will restore normal operation. While sustaining something try changing the delay setting through its range. The result is a strange rendition of the 1.5 seconds of audio that was in the H3500's memory just before Sustain was pressed.

Expert Mode Parameters

#8 Low Note **9 Hz to C7**

This is used to optimize the pitch shifter for the best possible performance (i.e., smallest delay, smoothest pitch shift). Set this for the lowest note you reasonably expect to pitch shift. (Important: The lower this note is set, the longer the delay of the pitch shifter.)

#9 High Note **C4 to C8**

For the same reasons as given above, set this to the highest note you reasonably expect to pitch shift.

#10 Source **polyphonic- * -solo**

The Source parameter is another parameter that optimizes pitch shift performance. Polyphonic or solo relates to the input source. The star will move right or left when the knob is turned. Set it to solo for a monophonic input source and adjust it toward polyphonic for the best sound with polyphonic input sources.

Levels

#12 Left In **-48 to 48 dB**
#13 Right In **-48 to 48 dB**
#14 Left Out **-48 to 48 dB**
#15 Right Out **-48 to 48 dB**

The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

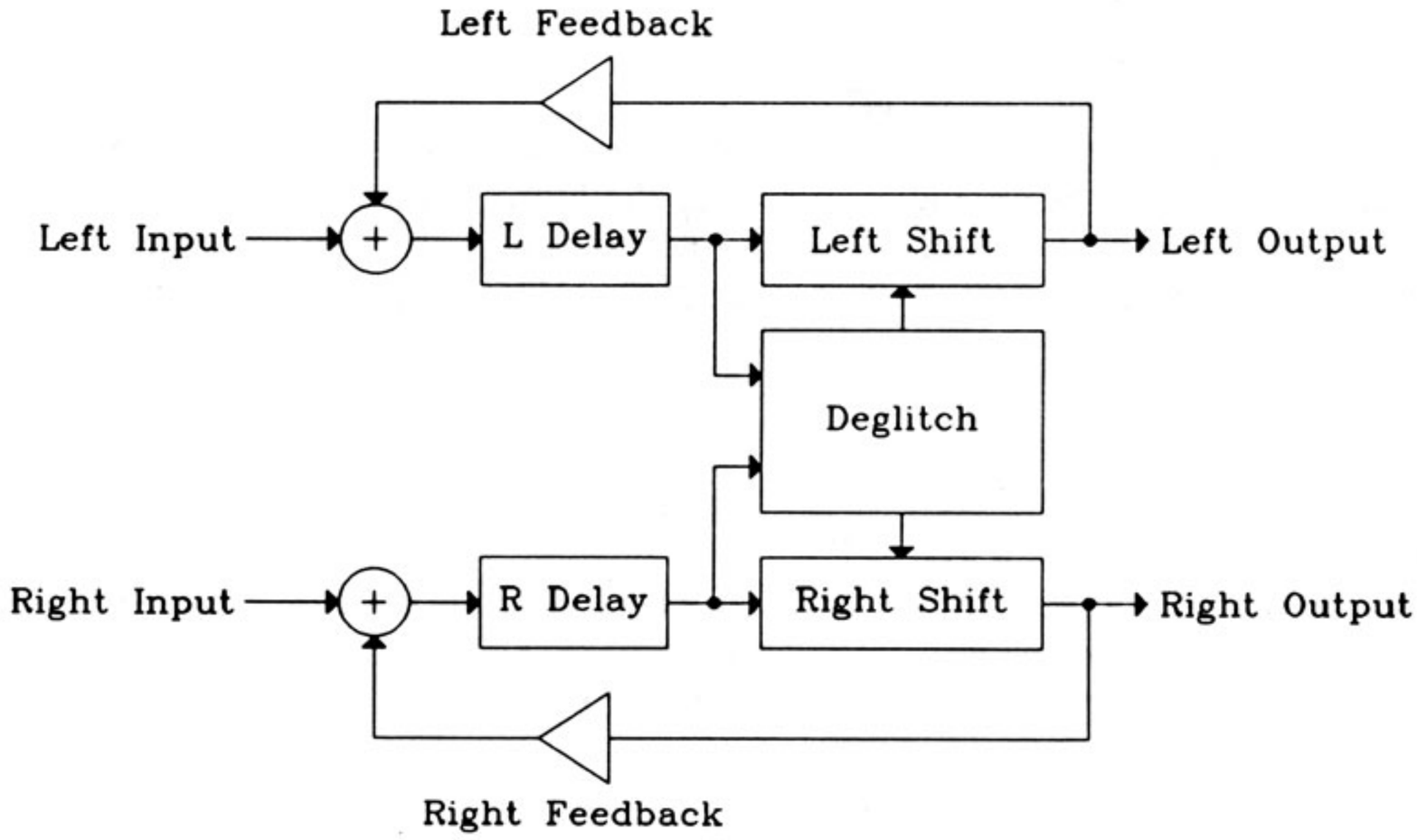
Hint: This is a real work-horse program for instrumentalists and vocalists.

Algorithm 102 - Dual Shift

Description

Algorithm 102 gives you two completely separate pitch shifters. One pitch shifter uses the left channel input and output while the other uses the right channel. Each pitch shifter has independent control over pitch, delay, feedback and mix. These parameters are also MIDI controllable.

Block Diagram



Parameters

#4	**Left Coarse, Fine**	**-2400 to 1200 cents**	**Modulation**
#6	**Right Coarse, Fine**	**-2400 to 1200 cents**	**Modulation**

This controls the amount of pitch shift applied to the left input. The pitch shift is given in cents, where +100 cents is equal to a transposition up by one semitone (one half-step). Negative cents corresponds to a transposition down. Zero cents corresponds to no pitch shift. The knob and up/down buttons will change the amount of pitch shift in 100 cent increments. Play or sing a constant pitch and turn the knob. You should hear a chromatic scale.

#5	**Left Delay**	**0 to 500 milliseconds**	**Modulation**
#7	**Right Delay**	**0 to 500 milliseconds**	**Modulation**

This sets the length of time between the input signal and the pitch shifted output for the left pitch shifter. The time is given in milliseconds (1/1000th of a second).

#2	**Left Feedback**	**0 to 100 per cent**	**Modulation**
#3	**Right Feedback**	**0 to 100 per cent**	**Modulation**

This will control the amount of feedback from the left output to the left input. With zero pitch shift this is like a normal digital delay. Use with pitch shift and delay to get arpeggiation. Use without delay to get wild pitch smears. Use it in subtle amounts with small pitch shifts to get fat sounds.

#0 **Left Mix** **0 to 100 per cent** **Modulation**
#1 **Right Mix** **0 to 100 per cent** **Modulation**

The left mix level is the balance between the original or dry signal and the effected or wet signal at the left output. A 50% mix results in equal dry and wet sound.

#11 **Sustain** **on or off**

The Sustain key will "loop" one pitch period of the input signal much like a sampler. Pressing the softkey will turn off the input and begin endlessly playing the loop. Pressing it again will restore normal operation. While sustaining something try changing the delay setting through its range. The result is a strange rendition of the 1.5 seconds of audio that was in the H3500's memory just before Sustain was pressed.

Expert Mode Parameters

#8 **Low Note** **9 Hz to C7**

This is used to optimize the pitch shifter for the best possible performance (i.e., smallest delay, smoothest pitch shift). Set this for the lowest note you reasonably expect to pitch shift. (Important: The lower this note is set to, the longer the delay of the pitch shifter.)

#9 **High Note** **C4 to C8**

For the same reasons as given above, set this to the highest note you reasonably expect to pitch shift. Here are some typical settings for various uses:

High voice	C3 to C6	Bass guitar	E1 to C4
Low voice	C2 to C5	Flute	C4 to C7
Electric guitar	E2 to C6	Trumpet	E3 to C7

#10 **Source** **polyphonic- * -solo**

The Source parameter is another parameter that optimizes pitch shift performance. Polyphonic or solo relates to the input source. The star will move right or left when the knob is turned. Set it to solo for a monophonic input source and adjust it toward polyphonic for the best sound with polyphonic input sources.

Levels

#12 **Left In** **-48 to 48 dB**
#13 **Right In** **-48 to 48 dB**
#14 **Left Out** **-48 to 48 dB**
#15 **Right Out** **-48 to 48 dB**

The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

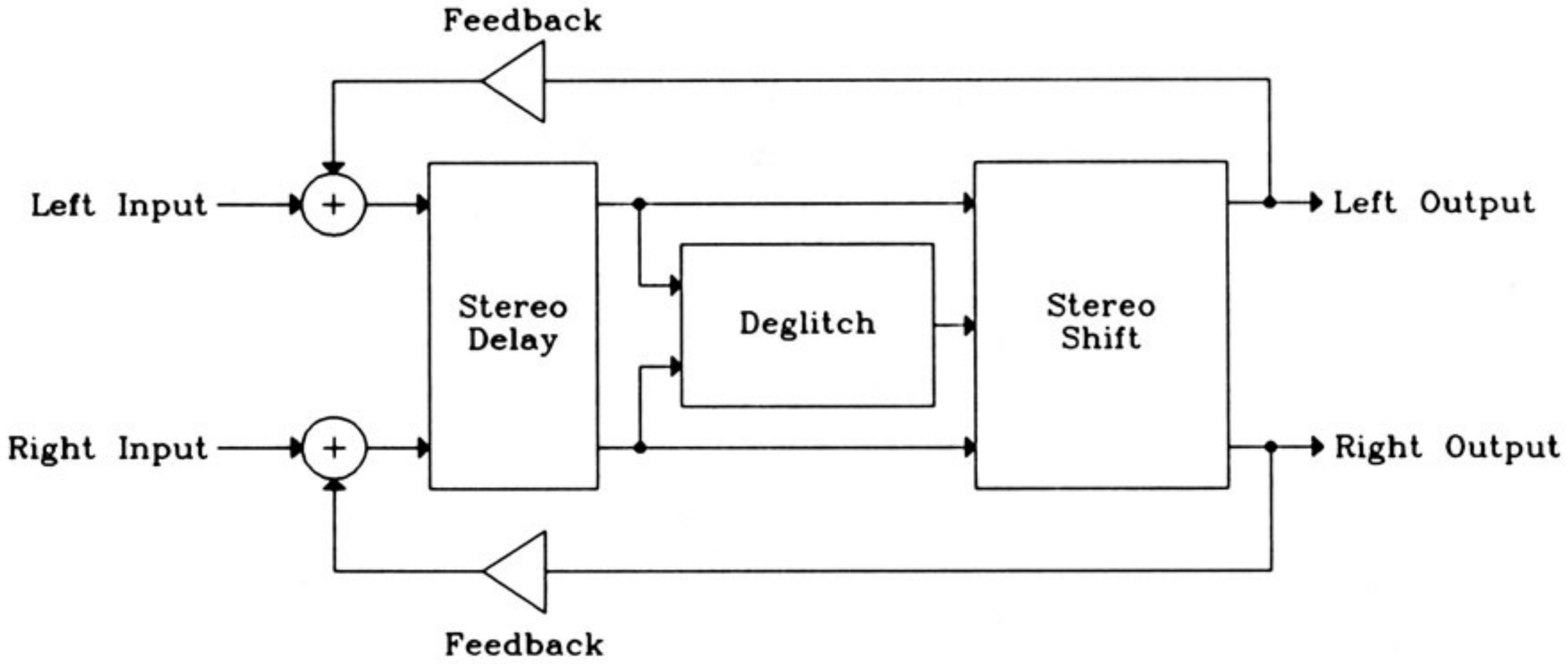
Hint: For doubling type effects use the fine pitch controls in a + or - 20 cent range.

Algorithm 103 - Stereo Shift

Description

The Stereo Pitch Shift algorithm is for operation with true stereo inputs. The unique deglitching takes both input channels into account without mixing the two audio signals. The shifter maintains stereo imaging and mono compatibility. Parameters of both channels adjust together to form a great production tool. As with all H3500 algorithms, the parameters are MIDI controllable.

Block Diagram



Parameters

#6 Coarse, Fine -2400 to 1200 cents Modulation

The pitch shift of both left and right channels track together. Like other programs the pitch shift is given in cents, where 100 cents is equal to a transposition up by one half-step. Negative cents corresponds to a transposition down. Zero cents corresponds to no pitch shift. The knob and up/down buttons will change the amount of pitch shift in 100 cent increments. Play or sing a constant pitch and turn the knob. You will hear a chromatic scale.

#7 Delay 0 to 500 milliseconds Modulation

This sets the length of time between the input signal and the output. Both channels have the same delay.

#1 Feedback 0 to 100 per cent Modulation

This will control the amount of feedback from the output to the input. With zero pitch shift this is like a normal digital delay. Use with pitch shift and delay to get arpeggiation. Use without delay to get wild pitch smears. Use it in subtle amounts with small pitch shifts to get fat sounds.

#0 Mix 0 to 100 per cent Modulation

The mix level is the balance between the original or dry signals and the effect or wet signals at the output. A 50% mix will result in equal levels of dry and wet sound.

Expert Mode Parameters

#8 Low Note **9 Hz to C7**

This is used to optimize the pitch shifter for the best possible performance (i.e., smallest delay, smoothest pitch shift). Set this for the lowest note you reasonably expect to pitch shift. (Important: The lower this note is set, the longer the delay of the pitch shifter.)

#9 High Note **C4 to C8**

For the same reasons given above, set this to the highest note you reasonably expect to pitch shift.

#10 Source **polyphonic- * -solo**

The Source parameter is another parameter that optimizes pitch shift performance. Polyphonic or solo relates to the input source. The star will move right or left when the knob is turned. Set it to solo for a monophonic input source and adjust it toward polyphonic for the best sound with polyphonic input sources.

#11 Deglitch Mode **'Lock to chan. 1' or 'chan. 1 and chan. 2**

As above, this is used to optimize pitch shift performance. With a true stereo input this should be set to 'channel 1 and channel 2'. With a mono signal going into both channels set this to 'Lock to Channel 1'.

Levels

#12 Left In **-48 to 48 dB**
#13 Right In **-48 to 48 dB**
#14 Left Out **-48 to 48 dB**
#15 Right Out **-48 to 48 dB**

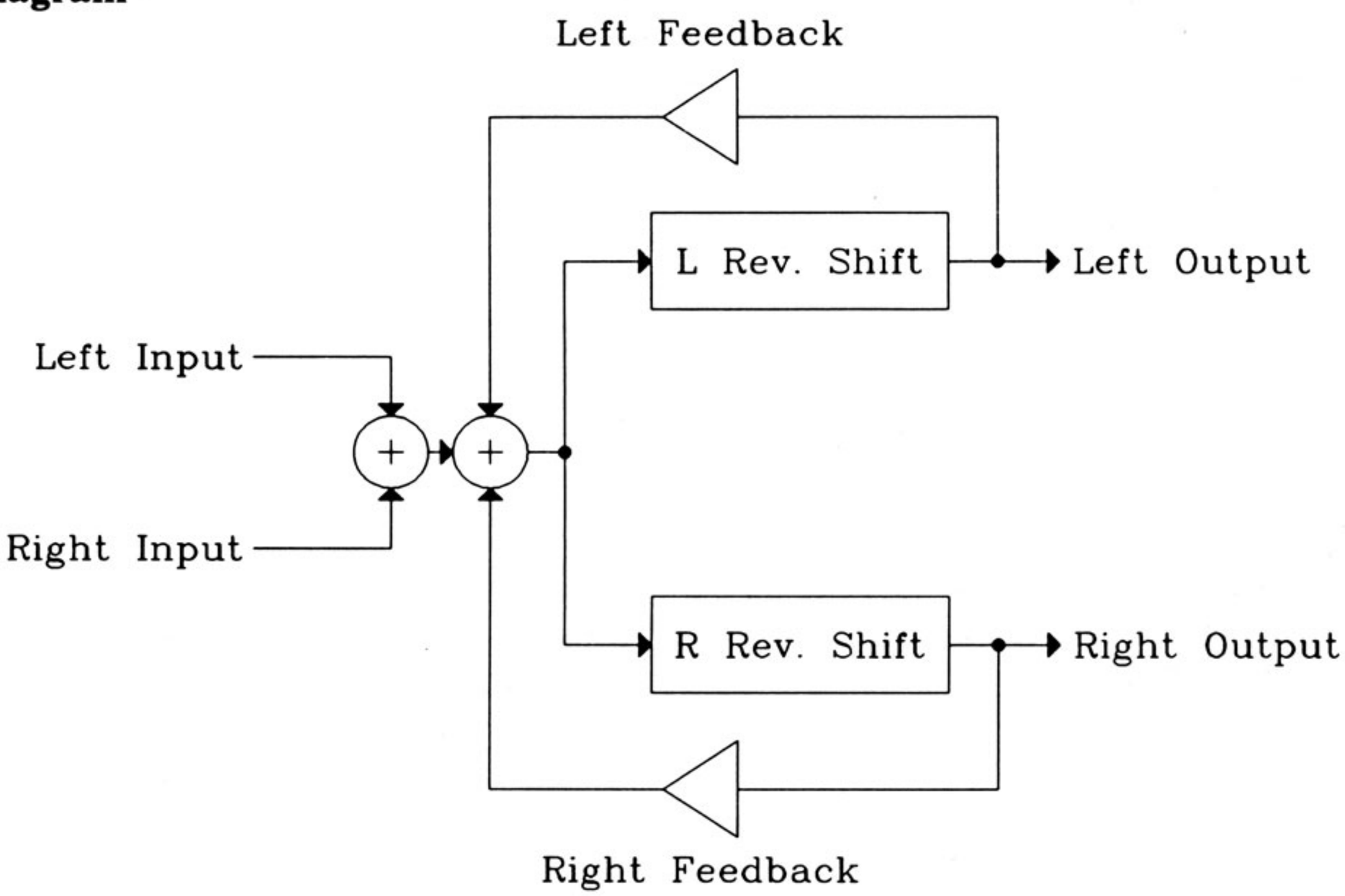
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 104 - Reverse Shift

Description

Things aren't what they seem to be. This algorithm speaks, sings or grunts back to you in reverse with pitch shift. Two pitch shifters in fact. Add variable splice lengths and feedback to this and the world of bizarre effects (in real time) takes on new proportions. And all with MIDI control. The Reverse Pitch Shift is a one-channel-in, two-channels-out algorithm.

Block Diagram



Parameters

#4 L Coarse, Fine -2400 to 1200 cents Modulation
#6 R Coarse, Fine -2400 to 1200 cents Modulation

This (like the other pitch change algorithms) controls the pitch shift at the left output. The pitch shift is given in cents, where +100 cents is equal to a transposition up by one half-step. Negative cents corresponds to a transposition down. Zero cents corresponds to no pitch shift. The knob and up/down buttons will change the amount of pitch shift in 100 cent increments.

#5	**L Length**	**0 to 1400 milliseconds**	**Modulation**
#7	**R Length**	**0 to 1400 milliseconds**	**Modulation**

Think of a tape recorder recording a small length of tape (time) which is set by this length parameter and then playing it back in reverse while it records the next. The left length is independent of the right and can be 0 to 1.4 seconds, set in one millisecond (1/1000th of a second) steps. In addition to the reversal, there is also an average delay of 1/2 the delay setting.

#2	**L Feedback**	**0 to 100 per cent**	**Modulation**
#3	**R Feedback**	**0 to 100 per cent**	**Modulation**

This will control the amount of feedback from the left or right output to the input. With zero pitch shift this is like a backward digital delay. Use with pitch shift and delay to get backward arpeggiation. Notc that both right and left channel feedback are returned to the same input point. This means that high settings on both feedback levels could cause unstable output conditions.

#0	**L Mix**	**0 to 100 per cent**	**Modulation**
#1	**R Mix**	**0 to 100 per cent**	**Modulation**

The Left Mix level is the balance between the original or dry signal and the effected or wet signal at thc left output. A 50% mix will result in equal levels of dry and wet sound.

Levels

#8	**Left In**	**-48 to 48 dB**
#9	**Right In**	**-48 to 48 dB**
#10	**Left Out**	**-48 to 48 dB**
#11	**Right Out**	**-48 to 48 dB**

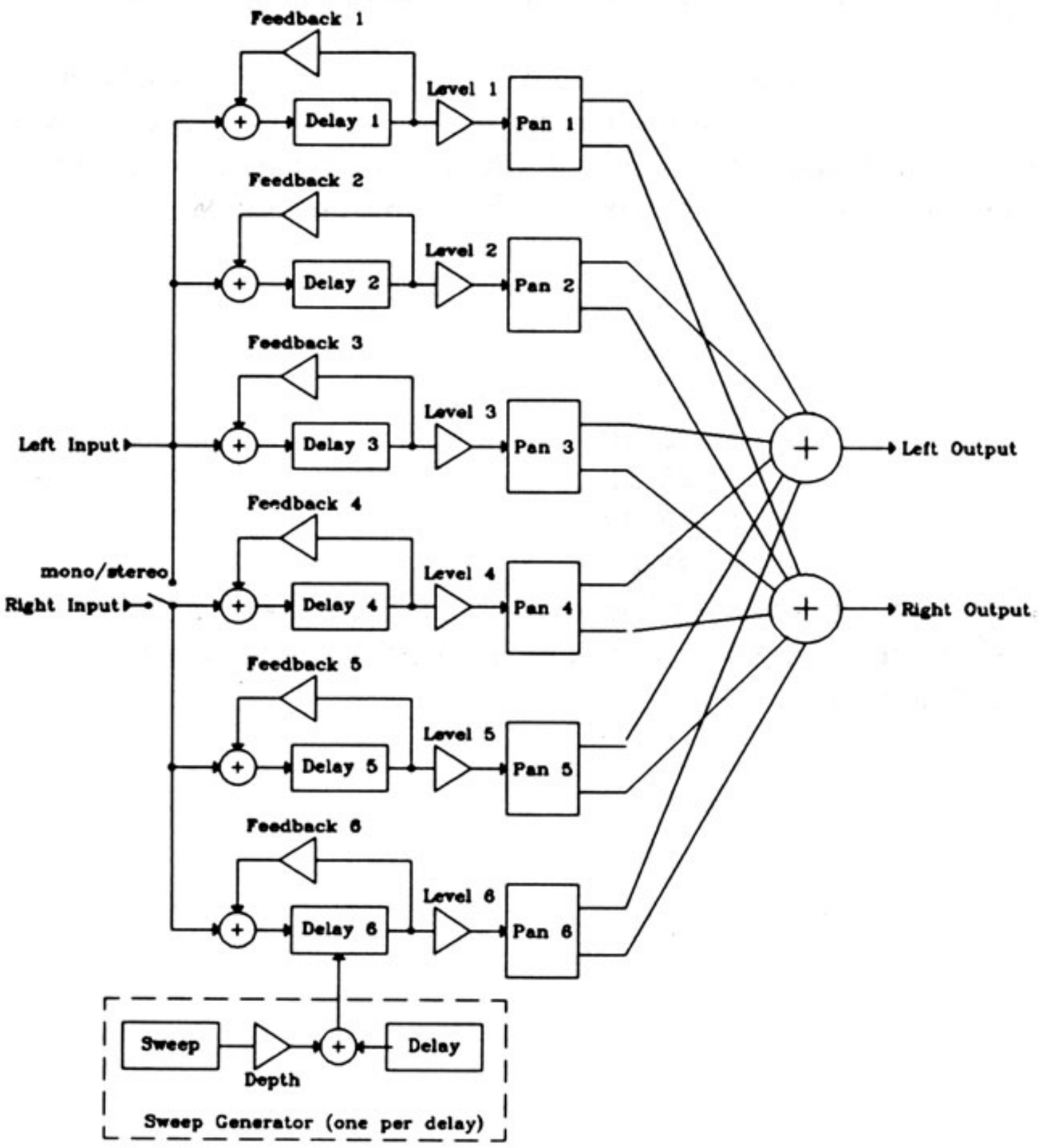
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 105 - Swept Combs

Description

Picture six high quality digital delay units racked together; each has 1/4 second delay, modulation control and feedback; all are patched to a 6 input, stereo mixer. Automation allows simultaneous control over the digital delays and mixer or separate control over each. All have extensive MIDI control. That is the power of the Swept Combs algorithm.

Block Diagram



Parameters

#2 m Delay **0 to 100 per cent** **Modulation**

This parameter is the master control for delay times of each of the 6 delay lines described earlier. Increasing this number will increase all 6 delay times while decreasing it will shorten them all. Changing this per cent will alter each delay time proportionally. As an example; if this was set to 100% and Delay 1 was at 40ms, Delay 2 at 70ms and Delay 3 at 100ms; then changing Delay from 100% to 50% would change Delay 1 to 20ms, Delay 2 to 35ms and Delay 3 to 50ms. Realize that the displays will not change but the perceived effect will. How to set individual delay times will be described later.

#3 m Rate **0 to 100 per cent** **Modulation**

Master Sweep Rate is the full name of this parameter. It's the master sweep rate generator control. Sound complex? Let's explain what the sweep generator does. Each of the 6 delays has its own sweep generator and that generator acts as a modulator (synth. fans take note) to the delay time. That means that the delay time can be lengthened and shortened constantly. Let's call that sweeping. Now the speed at which we sweep is this parameter called Sweep Rate. The H3500 uses 6 separate sweep generators and the Master Rate controls them all proportionally just as the Delay parameter described earlier controls delays proportionally.

#8 m Depth **0 to 100 per cent** **Modulation**

This master control affects the "depth" of the individual sweep generators we just described. What that really means is how far the delay changes are allowed to go. Synth. fans will ask, "Is it a sine, ramp or triangle sweep?" Actually, it's not any of those. The algorithm uses random numbers to achieve a more complex and thicker texture. This controller is again a Master Depth control and it works proportionally like the others.

#9 m Fdback **-100 to 100 per cent** **Modulation**

Feedback is also a Master control parameter. This time it's the 6 feedback levels on the 6 delay lines we're working with. In general, high feedback settings will give longer recirculation or sustain times. As usual be careful when using high levels. This Master Feedback control affects all 6 feedback levels proportionally. Changing from positive to negative feedback will reverse the phase of the feedback.

#10 Width **-100 to 100 per cent** **Modulation**

Width is short for Image Width. It is also a master controller. This parameter relates to the stereo image or panning. Each of the six delay lines is fed to a stereo mixer. Each has its own pan location within the stereo image. The Master Width control is able to change all 6 pans at once. Assuming the 6 Pans are all set at different places, setting the Master Width at 100% will allow their individual places to stay intact. Decreasing the per cent toward 0 will see them all move proportionally toward 0 or to center in the stereo image. At 0% all are at dead center. Moving the control toward -100% will result in an image reversal. Finally, when the control is at -100% all the pans will be opposite their initial location.

#7 Repeat **on or off**

The Repeat function instantly captures the audio signal in the H3500 and keeps replaying it. No new sound is allowed in. Each Delay Time setting determines the repeat length. The master controls all still function, so altering the sound while it is repeating is possible. Changing the Delay Time with no Glide will have the affect of lengthening (or shortening) the repeat time. Doing this with the Glide On (from the knob) will not only lengthen (or shorten) the sound but will also change the pitch. This can be lots of fun.

#0 Mix **0 to 100 per cent** **Modulation**

The Left Mix level is the balance between the original or dry signal and the effected or wet signal at the left output. A 50% mix will result in equal levels of dry and wet sound.

Expert Mode Parameters

#4 Glide Speed **0 to 100** **Modulation**

This is the time it takes the H3500 to respond to changes in the delay time settings. Gliding is what happens when the delay times are changed drastically. With glide on, large delay time changes will slowly and smoothly change the perceived audio delay. No noise is created in the output. 100 speed means quick changes and a speed of 0 means very slow changes.

#5 Glide Enable **delay glide on or off**

This turns the delay gliding on or off.

#6 Stereo/Mono **Stereo or Mono**

The Input Mode in this algorithm becomes very powerful. With it set to mono all 6 delay lines, feedback lines and the stereo mixer are dedicated to the left channel input signal only. Take the weakest, most dry, thin sound and process it through the H3500 and ... instant strength. Set the Input Mode to stereo and we have the possibility of two independent programs. Panning delay lines 1, 2 and 3 left and 4, 5 and 6 right plus the Width control to 100% assures total independence. Now we have two units with 3 digital delay lines, with feedback and sweeping and a 3 input 1 output mixer on each channel. That's flexibility.

#23-28 Rates 1-6 **0 to 100**

Now we've entered a new level of programming on the H3500. Pressing the Rates softkey on the front panel will give not one parameter to adjust but six. They are labeled Rate 1, Rate 2, Rate 3 etc... Pressing the particular Rate # will then allow adjustment of that specific Rate. There are six Rate #'s so the first four are displayed at once, then by pressing the Parameter Key the other two will be displayed. The rates themselves relate to the speed of the delay sweep which was described under Rates. A Rate of 100 is the fastest while 0 is the slowest.

#17-22 Depths **0 to 100 per cent**

This parameter works the same way as Rates only control is of the individual Sweep Depths. The Depths are numbered 1 through 6 with a Depth of 0 being no perceived sweeping while a Depth of 100 is the maximum.

#11-16 Delays 1-6 **0 to 200 milliseconds**

These are the six individual delay time adjustments. All are variable from 0 to .200 seconds in 1 millisecond (1/1000th of a second) steps.

#35-40 Fdbacks 1-6 **-100 to 100 per cent**

Here are the six Feedback adjustments. As with all feedback, be careful at high levels.

#41-46 Pans **-10 to 10**

These are the six individual Pan settings for each delay line. A Pan setting of -10 is hard left, 0 is center and 10 is hard right.

#29-34 Levels **0 to 100 per cent**

These six independent Level controls are the only ones in this group of parameters that are not under a master control. What these levels do is allow a balance to be achieved between all six delay line outputs. They are the fader controls on our 6 channel mixer. A setting of 0% turns the level off while 100% turns it fully on.

Hint: Don't be intimidated by the complexity of these adjustments. The program will work just fine using the basic parameters.

Levels

#47	**Left In**	**-48 to 48 dB**
#48	**Right In**	**-48 to 48 dB**
#49	**Left Out**	**-48 to 48 dB**
#50	**Right Out**	**-48 to 48 dB**

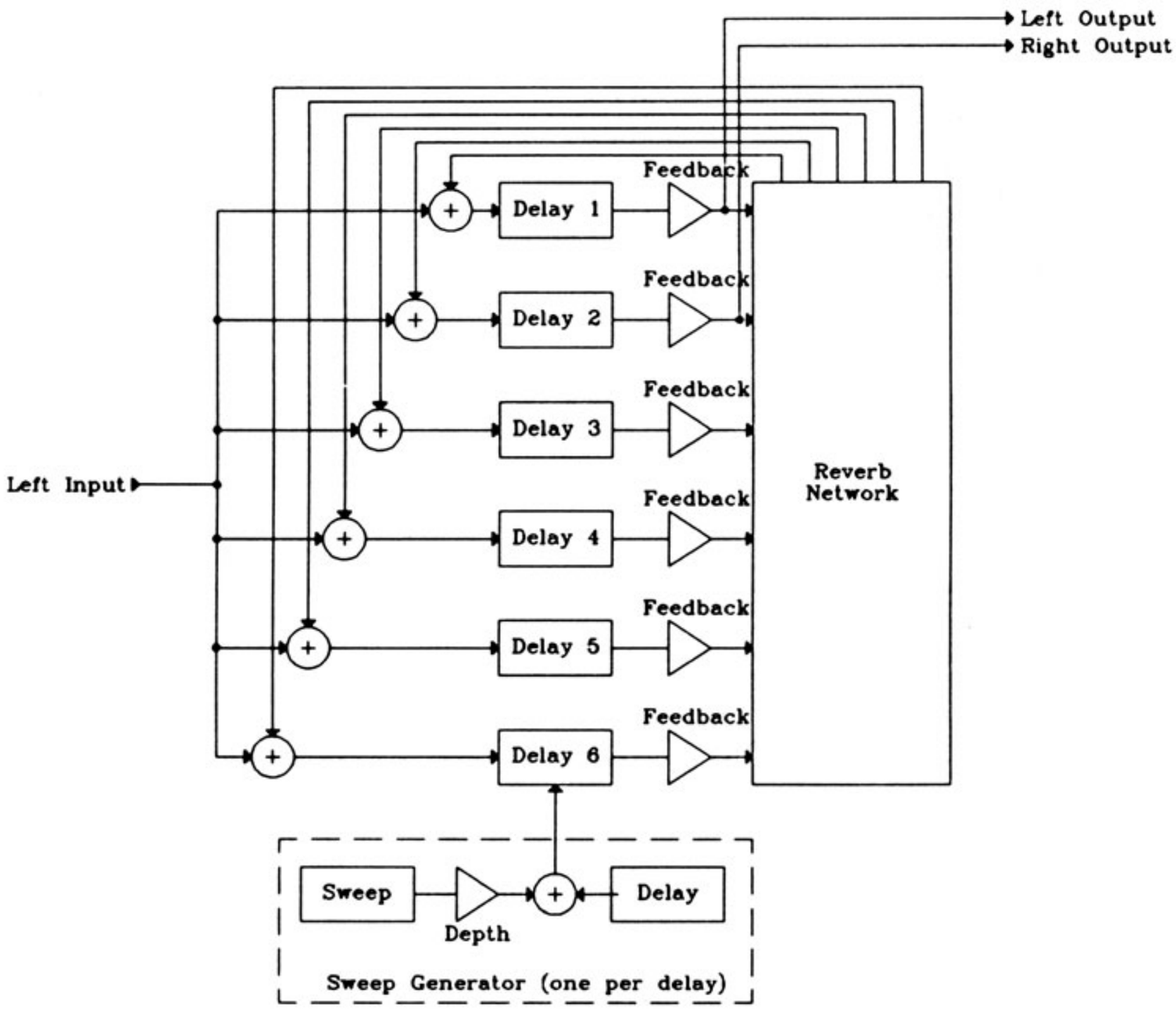
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 106 - Swept Reverb

Description

Imagine this... you're in a large room, a cathedral. There is a wonderful sound ringing through the air (that's your music), now the room starts to move while you stay still. It moves forward, side to side, up and down then around in circles and somersaults. The sound swooshes by your ears in all directions. Your music has taken on spatial characteristics you never imagined. Such is the H3500 Swept Reverb Network. It is a two input, two output modulated reverb algorithm with tight control over parameters like Feedback, Delay, Rate and Depth. It also has MIDI modulation and sequencing to add unlimited automation to all of this.

Block Diagram



Parameters

#2 m Delay **0 to 100 per cent** **Modulation**

This parameter is the master control for delay times of each of the six internal delay lines. Increasing this number will increase all six delay times while decreasing it will shorten them all. Changing this per cent will alter each delay time proportionally. A 100% change here up or down will effect a 100% change in the preset delay time of each delay line.

#3 m Rate **0 to 100 per cent** **Modulation**

This is the master sweep rate generator control (like the Swept Combs algorithm). Each of the six delay lines has its own sweep generator and that generator acts as a modulator to the delay time. That means that the delay time can be lengthened and shortened constantly (swept). The speed at which it sweeps is this parameter called "m Rate". This Master Rate Control works proportionally like others, but affects the Sweep Rates.

#8 m Depth **0 to 100 per cent** **Modulation**

This Master Depth Control affects the depth of the individual sweep generators we just described. It determines how far the delay changes are allowed to go. The algorithm uses a random number generator to provide depth. This creates a thicker texture than conventional sweep generators. This controller is again a Master Depth Controller and it works proportionally like the others.

#1 Fdback **-100 to 100 per cent** **Modulation**

The H3500's internal reverb network uses (like most digital reverbs) some type of recirculation of sound to make the reverb more or less diffuse. The Feedback parameter is what controls that in this algorithm. Note that this controls all six values which track together.

#0 Mix **0 to 100 per cent** **Modulation**

The mix level is the balance between the original or dry signal and the effect or wet signal. A 50% mix will result in equal levels of dry and wet sound.

#7 Repeat **on or off**

The Repeat function holds and keeps replaying the current audio in the H3500. No new sound is allowed in. Each Delay Time setting determines the repeat length. The master controls all still function, so altering the sound while it is repeating is possible. Changing the Delay Time with Glide off will have the affect of lengthening or shortening the repeat time. Doing this with the Glide on will not only lengthen or shorten the sound but will also change the pitch.

Expert Mode Parameters

#4 Glide Speed **0 to 100** **Modulation**

This is the time it takes the H3500 to respond to changes in the Delay time settings. Gliding occurs when the Delay time is changed drastically on the front panel. With glide on, a large Delay time change will slowly and smoothly change the perceived audio delay. No pops, crackles or even snaps in the output. 100 speed means quick changes and a speed of 0 means very slow changes.

#5 Glide En **delay glide on or off**

This turns the delay gliding on or off.

Note: The next six parameters are found by pressing the Rates softkey and then pressing the parameter key.

#23-28 Rates 1-6 **0 to 100**

These are the six Rates that control the sweep rate generator already described.

Note: The next six parameters are found by pressing the depth softkey and then pressing the parameter key.

#17-22 Depths **0 to 100 per cent**

These are the six Depths that control the sweep rate generator already described.

Note: The next six parameters are found by pressing the Delays softkey and then pressing the parameter key.

#11-16 Delays **0 to 225 milliseconds**

These are the six Delays that control the reverb network described earlier.

Hint: As with previous programs, don't be intimidated by all the variables. You need not use them to obtain useful effects.

Levels

#29	**Left In**	**-48 to 48 dB**
#30	**Right In**	**-48 to 48 dB**
#31	**Left Out**	**-48 to 48 dB**
#32	**Right Out**	**-48 to 48 dB**

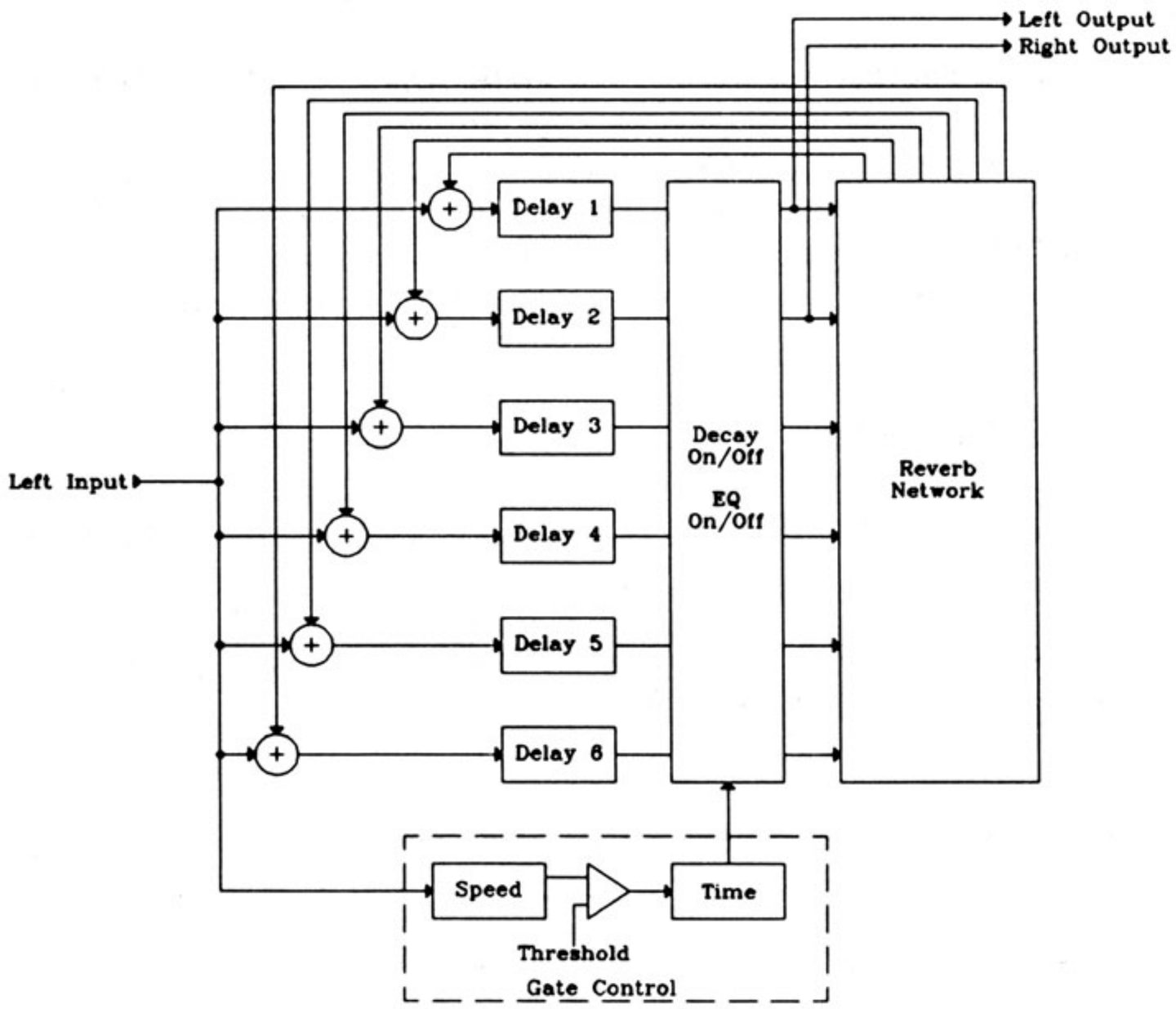
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 107 - Reverb Factory

Description

The amount of user control over critical parameters in the Reverb algorithm makes the H3500 unique. Along with the standard Predelay, Decay and Mix parameters comes a switching Gate and tight control over Delay parameters which change the characteristics of reverb itself. The built in Gate has Response Time and Threshold controls as well as separate parametric EQ on both the open and closed gate. Two decay times are also provided. Softer sounds (below the gate threshold) can have one decay time and EQ while loud sounds (above the gate threshold) can have different decay and EQ.

Block Diagram



Parameters

#1 Predelay **0 to 500 milliseconds** **Modulation**

This parameter puts up to 1/2 second of delay on the input signal before reverberation. It can be used to simulate the size of a room or the distance from the sound source to the walls, ceiling or floor. It is adjustable in one millisecond steps (1/1000 of a second) from 0 to .5 seconds.

#2 On Decay .1 to inf.+5 seconds Modulation

Reverb decay time is the length of time the sound continues after the sound source has stopped. In this parameter the Decay time for the gate on is adjusted. In other words, when a signal is loud enough to open (or trigger) the gate it will then reverberate for this set length of time. Various Decay Times are available. Some of the delay times are "infinite". This means that they don't actually decay. In fact, infinite delays with a postive number after them, will actually increase in volume. **Watch your speakers!** Using the gate can control this.

#3 Off Decay .1 to inf.+5 seconds Modulation

Off Decay is much the same as On Decay except it is the reverb time when the signal is not strong enough to trigger the gate.

#4 Gate Time 0 to 25 seconds Modulation

The Gate Time is the length of time that the gate will stay open when it has been triggered by a strong enough signal. The gate on state will then use the On Decay and EQ Open settings. The Gate Time is re-triggerable. If for example, the Gate Time was set at 20 seconds, a signal triggered it, then after only 7 seconds along came another trigger, the On Gate Time would begin again at 20 seconds.

#0 Mix 0 to 100 per cent Modulation

The mix level is the balance between the original or dry signal and the effect or wet signal. A 50% mix will result in equal levels of dry and wet sound. The effect of mixing the dry sound with the wet simulates moving further from (more wet) and closer to (more dry) the sound source.

Expert Mode, EQ Parameters

Note: These next 8 parameters are found by pressing the EQ softkey then the parameter key.

#5 On L Freq 50, 100, 200, 400 Hertz

The Low Crossover On point is the frequency, below which we can roll off the bass response. This parameter affects the Gate On state (Gate Open).

#6 On Low dB -6 to 0 dB

On Low dB is the amount of rolloff (low frequency attenuation) that will occur up to the crossover point described above. This will occur in the Gate On state. It is adjustable in one decibel steps from -6dB to 0dB.

#7 On H Freq 2, 4, 8, 12 kilohertz

This parameter also effects the Gate On state. It is the frequency above which we can rolloff the high frequencies.

#8 On HidB -6 to 0 dB

On High dB is the amount of rolloff (high frequency attenuation) that will occur above the crossover point described above. This will occur in the Gate On state. It is adjustable in one decibel steps from -6dB to 0dB.

#9 Off L Freq 50, 100, 200, 400 Hertz

Same as On L Freq, but works on the Gate Off state (signal below threshold).

#10 Off Low dB -6 to 0 dB

Same as On Low dB, but works in Gate Off state.

#11 Off H Freq **50, 100, 200, 400 Hertz**
Same as On H Freq, but works in Gate Off state.

#12 Off Hi dB **-6 to 0 dB**
Same as On HidB, but works in Gate Off state.

Gate Parameters

Note: The next three parameters are found by pressing the Gate softkey.

#13 Speed **0 to 100**
The parameter that controls how fast the gate responds to a strong enough trigger is the Speed. At slow values (near 0) it will take a longer period of the input signal being above the threshold (described below) to trigger the gate. At fast values (near 100) a quick high level signal will be able to trigger the gate.

#14 Threshold **1 to 100 per cent**
In order to trigger the gate, the input level must be higher than the threshold setting. Using a low threshold value (near 1%) means a low volume signal could trigger the gate. A high value (near 100%) would need a very strong signal to produce a trigger. Here's an example using drums as the input: Set the Threshold fairly high and the Response time fast. Now we could have light, ambient type playing all reverberated at long decay times with a darker EQ (high frequencies rolled off) because the sound stays below the threshold. A strong slam on the snare drum will open the gate and cut the decay time way down with a brighter EQ.

#15 Enable **Enabled or Disabled**
This parameter lets the gate action work (Enabled) or not work (Disabled). If the gate is Disabled the reverb uses only the Gate On EQ settings.

Delay Parameters

Note: The next six parameters are found by pressing the Delays softkey and then the parameter key.

#16-21 Delays 1-6 **0 to 5000 samples**
The six Delays are very important to the overall quality of the reverb sound itself. The parameter readout is in samples. That relates to the 44.1kHz sample rate that the H3500 uses for audio conversion to digital. This means that about 44 samples is equal to one millisecond. Changing these numbers gives you personalized, fine control over the reverb texture. Have fun.

Levels

#22 Left In **-48 to 48 dB**
#23 Right In **-48 to 48 dB**
#24 Left Out **-48 to 48 dB**
#25 Right Out **-48 to 48 dB**
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

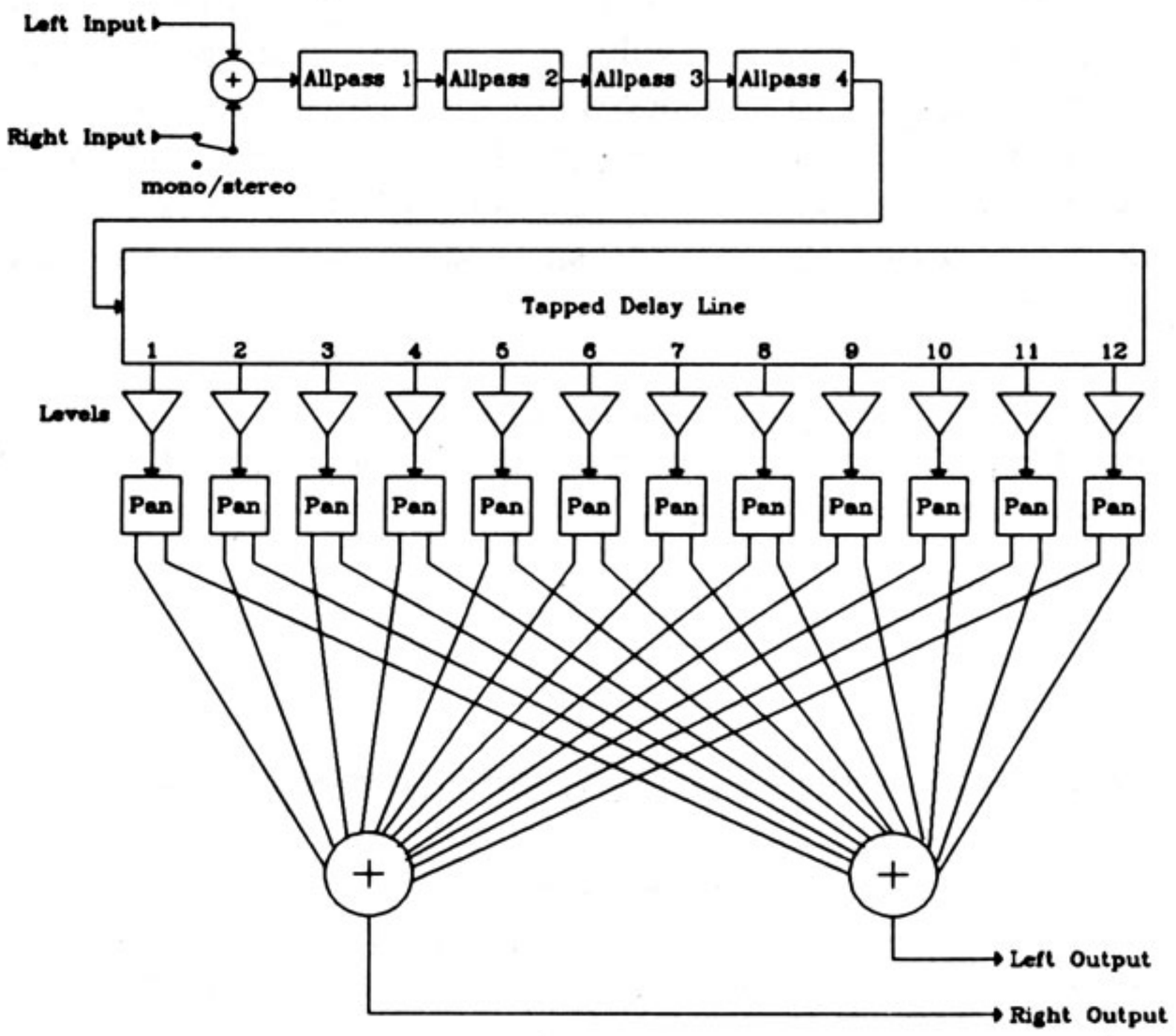
Algorithm 108 - Ultra-Tap

Description

Ultra-Tap is a multi-purpose algorithm that has two separate but connected functions. The mono-in, stereo-out program is a diffusor which generates a dense field of delays and it is a series of twelve digital delays connected to a twelve channel stereo mixer. The two functions can be used in series or one at a time. The diffusor is made of a series of four All Pass Filters which is each controlled by its own Delay parameter and by a Master Diffusion Control.

The twelve delay lines can have a 1.4 second, collective delay time yet each is independently adjustable (Tap Delay) with a Pan and Level control. Master controls include Spacing for setting the twelve delay times to various scales, Weights for the twelve levels and various Pan configurations.

Block Diagram



Parameters

#2 Length **1 to 100 per cent** **Modulation**

The Master Length parameter controls the delay time of all twelve delays proportionally. Increasing this number will increase all twelve delay times while decreasing it will shorten them all.

#3 Diffusor **0 to 100 per cent** **Modulation**

This is the Master Diffusor control for the All Pass Filters. It works proportionally like the other master controls. An All Pass Filter recirculates (feeds back) a delayed signal to its own input. However, unlike a delay line with feedback, its frequency response is flat. The delayed signal is then delayed again and fed back again. This continues until the signal decays. If a slap sound is the input with short delay times the result is a thick reverb sound with a short decay time. With the delay set long the result is many echoes that trail off slowly. Individual control over the four All Pass Delays is found in the Tedium mode described later.

#4 Width **-100 to 100 per cent** **Modulation**

Width is short for Image Width. It is also a master controller. This parameter relates to the stereo image or panning of the twelve delay lines. We describe the delay lines as being fed into a stereo mixer. Each has its own Pan location within the stereo image. The Master Width control is able to change all twelve Pans at once. Assuming that the twelve Pans are all set to different places, setting the Master Width at 100% will keep these settings intact. Decreasing toward 0% will move them all proportionally toward 0 or center in the stereo image. At 0% all are at dead center. Moving the control toward -100% will result in image reversal. In other words anything that was panned slightly right will now begin to be slightly left. Finally, when the control is at -100% all the pans will be opposite where they began.

#49 Feedback **-100 to 99 per cent** **Modulation**

This controls the level of effect signal to be added (recirculated or fed back) to the input signal. 0% feedback will give a single repeat while -100% will capture a signal infinitely. Be careful not to add too much material at high feedback levels or the output will soon turn to chaos.

#0 Left Mix **0 to 100 per cent** **Modulation**

#1 Right Mix **0 to 100 per cent** **Modulation**

The left and right mix levels are the balance between the dry signals and the wet signals. 50% mix results in equal levels of dry and wet sound at the output.

Expert Mode Parameters

#5 Stereo/Mono **Stereo or Mono** **Modulation**

Here the right input channel can be switched on or off. In stereo mode both right and left channels are added (mixed) together and sent to the delay line. In mono mode only the left channel is used.

#50 Fb Tap **tap 1 to 12**

The feedback parameter described earlier is assigned to one of the 12 delay taps with this control. Only the selected tap's output will be recirculated to the input.

Quickset Parameters

Note: The following three parameters are found by pressing the Quickset softkey. Quickset is a chosen group of three parameters which make this algorithm easy to learn and control. For the real expert, see Tedium.

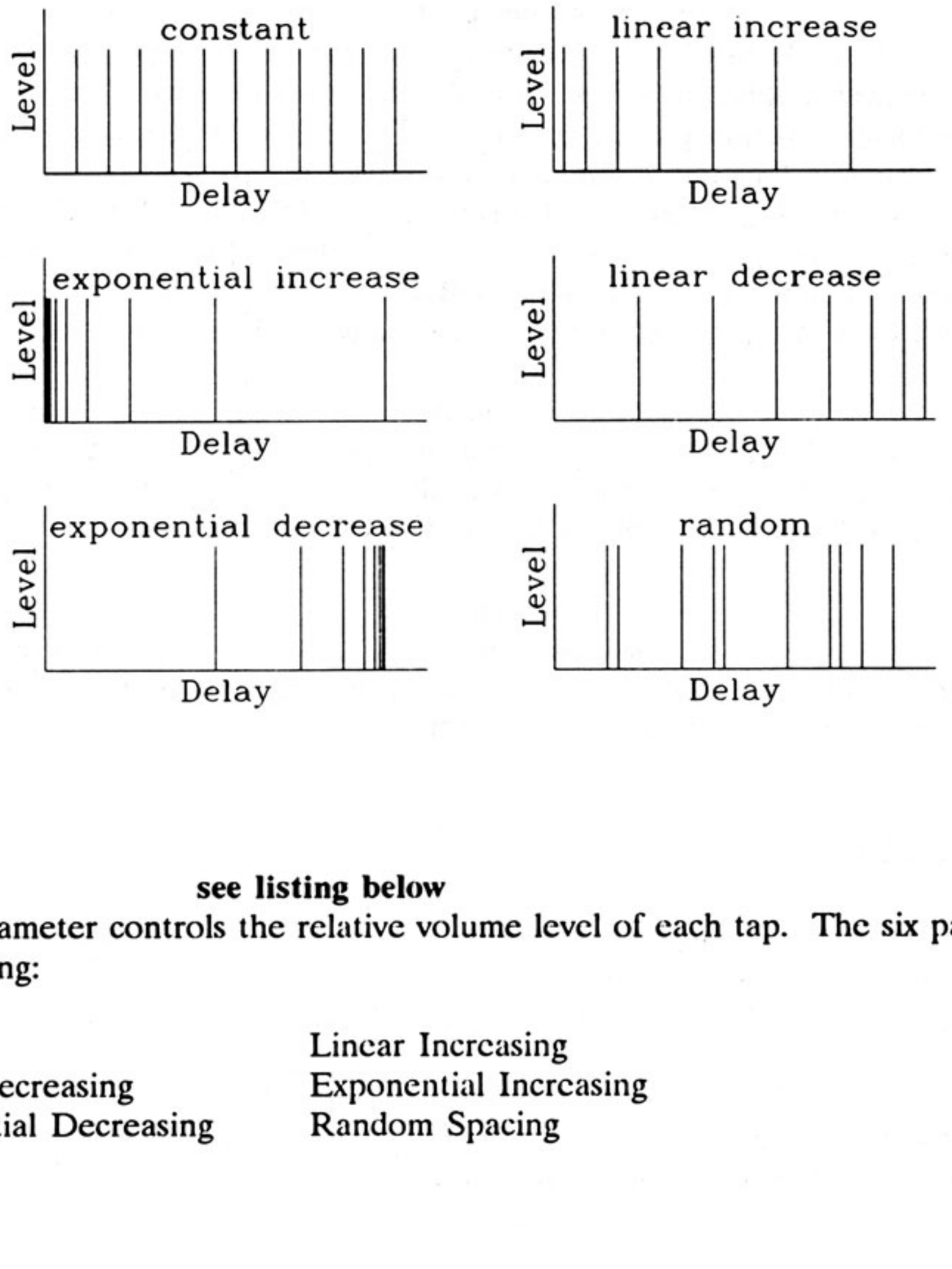
Warning: Using the Quickset parameters will change the related settings in the Tedium mode. If you have painstakingly adjusted the Tedium parameters do not change the Quickset values. These parameters are used to "preset" all of the Tedium values.

#6 Spacing **see listing below**

Spacing controls the time delay between each delay line (tap). The six parameter choices are:

Constant	Linear Increasing
Linear Decreasing	Exponential Increasing
Exponential Decreasing	Random Spacing

Here are graphic illustrations of each:

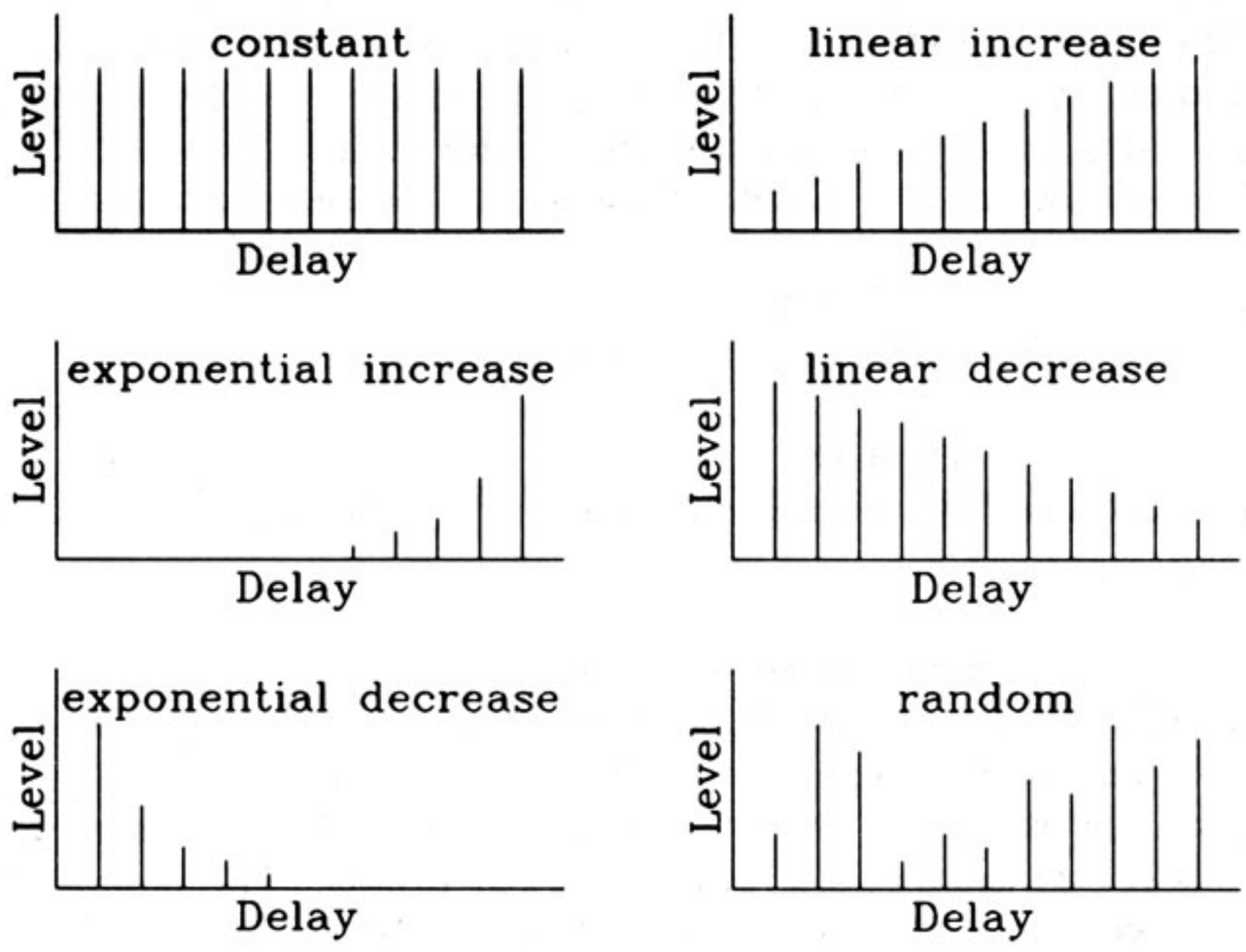


#7 Weights **see listing below**

The Weights parameter controls the relative volume level of each tap. The six parameter choices are the same as in Spacing:

Constant	Linear Increasing
Linear Decreasing	Exponential Increasing
Exponential Decreasing	Random Spacing

Here are graphic illustrations of the weight settings:



#8 Pans **see listing below**

Each of the twelve delay taps has a pan location. This parameter gives different shapes to the stereo image. Here are the nine choices:

Panned Center	Panned Left
Panned Right	Alternating Left and Right
Left to Right Sweep	Right to left Sweep
Spread from Center	Merge to Center
Random Pans	

Center, Left and Right simply put all twelve Pans to that location. Alternating Left and Right will pan the first delay tap hard left, the second hard right, the third hard left, etc. Left to Right Sweep will pan the first delay tap hard left then pan each following tap a bit closer to right until the last tap is at hard right. Right to Left Sweep does the same only reverses the direction. Spread from Center pans the first tap at center, the next a bit left of center, the next further right of center, etc., until the last tap ends at hard left. Merge to Center pans the first tap hard right, the next not so hard left and the next less hard right etc... until the last tap which ends at center. Random Pans is just that.

Tedium Parameters

Note: The following forty parameters are found by pressing the Tedium softkey, the desired softkey and then the parameter key until the desired number is found, followed by the numbered softkey. These Tedium parameters give very flexible control over each delay tap and the Diffusor. They can also make you crazy.

#9-20 Tap Delay 1-12 **0 to 1450.0 milliseconds**

These parameters control each individual delay line's delay time. Note that the values are not the time delay from input signal to output but the time between each tap. Here's an example; if all Tap Delays are set to 20ms the first tap would sound 20ms after the input signal, the second would be 20ms after that or 40ms from the input signal. The total Tap Delay cannot exceed 1450.0 milliseconds. In other words, all the Tap Delay settings added together can't be greater than 1450.0 ms. If you try to adjust them over the limit the H3500 will display the "OOPS" message and not let the value go beyond the limit.

#21-32 Tap Level 1-12 **0 to 100 per cent**

These parameters control the output level of each delay tap.

#33-44 Pan Taps **-11 to 11**

These are the pan locations of each individual delay tap. A setting of -11 is panned hard left, 0 is dead center and 11 is hard right.

#45-48 All-pass delays **0 to 800 milliseconds**

The four All Pass Delays control the All Pass Filters described earlier. These filters make up the Diffusor in this algorithm. In general, setting these numbers high (near 800ms) will give a long decay time with a discrete echo sound. Setting these numbers low (near 0ms) will give dense (diffuse) sounds. Since there are four filters a mixture of the qualities can have great results. The parameter adjusts in .1 millisecond steps (1/10,000 of a second) from 0 to 800 milliseconds. There is one limitation to the length. The total delay of all four filters and the twelve tap delays cannot exceed 1450 milliseconds and no single delay setting can exceed 800ms. The H3500 will give you an "OOPS" message if you try to go past that.

Levels

#50 Left In **-48 to 48 dB**
#51 Right In **-48 to 48 dB**
#52 Left Out **-48 to 48 dB**
#53 Right Out **-48 to 48 dB**

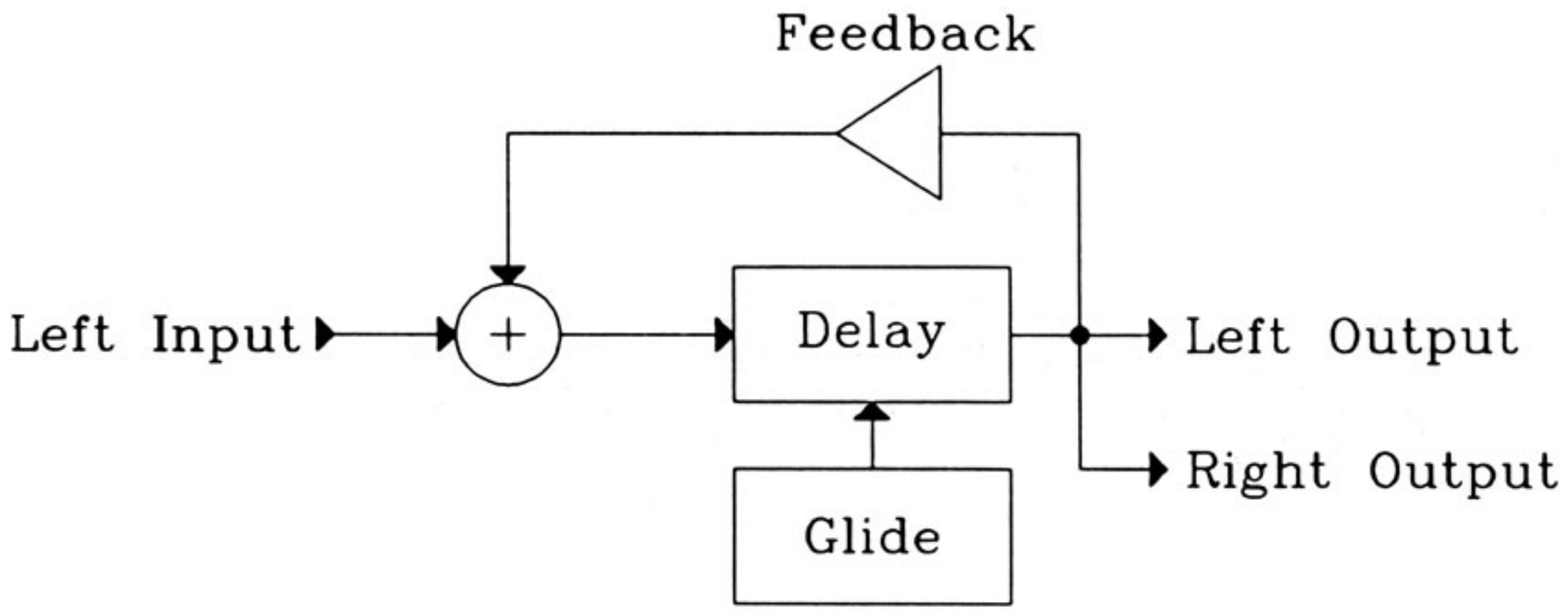
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 109 - Long Digiplex

Description

Algorithm 109 is one long delay line capable of recirculating its output back to its input. The output is sent to both right and left channels. MIDI controllable parameters include up to 1.4 seconds of delay, an adjustable feedback (recirculation) level, infinite repeat and mix level.

Block Diagram



Parameters

#1 Delay **0 to 1400 milliseconds** **Modulation**

This sets the length of time between the input signal and the delayed output signal. The delay time is adjustable in one millisecond steps (1/1000th of a second) up to 1.4 seconds.

#2 Feedback **-100 to 99 per cent** **Modulation**

This controls the level of delayed signal to be added (recirculated or fed back) to the input signal. 0% feedback will give a single repeat while -100% will capture a signal infinitely. Be careful not to add too much material at high feedback levels or the output may turn to chaos. In general -100% feedback will work better when doing tape loop type effects.

#3 Repeat **on or off**

The Repeat switch will capture up to 1.4 seconds of audio and replay it continuously. Pressing Repeat again will release the segment.

#4 Mix **0 to 100 per cent** **Modulation**

The mix level is the balance between the original or dry signal and the effected or wet signal. A 50% mix will result in equal levels of dry and wet sound.

Expert Mode Parameters

#5 Glide Speed **0 to 100** **Modulation**

This is the time it takes the H3500 to respond to changes in the delay time settings. What's gliding? Well, that's what happens when the delay time is changed drastically on the front panel. With glide on, a large delay time change will slowly and smoothly change the perceived audio delay. No pops, crackles or even snaps in the output. 100 speed means quick changes and a speed of 0 means very slow changes.

#6 Glide Enable **delay glide on or off**

This turns the delay gliding on or off. It's normally on.

Levels

#7 Left In **-48 to 48 dB**
#8 Right In **-48 to 48 dB**
#9 Left Out **-48 to 48 dB**
#10 Right Out **-48 to 48 dB**

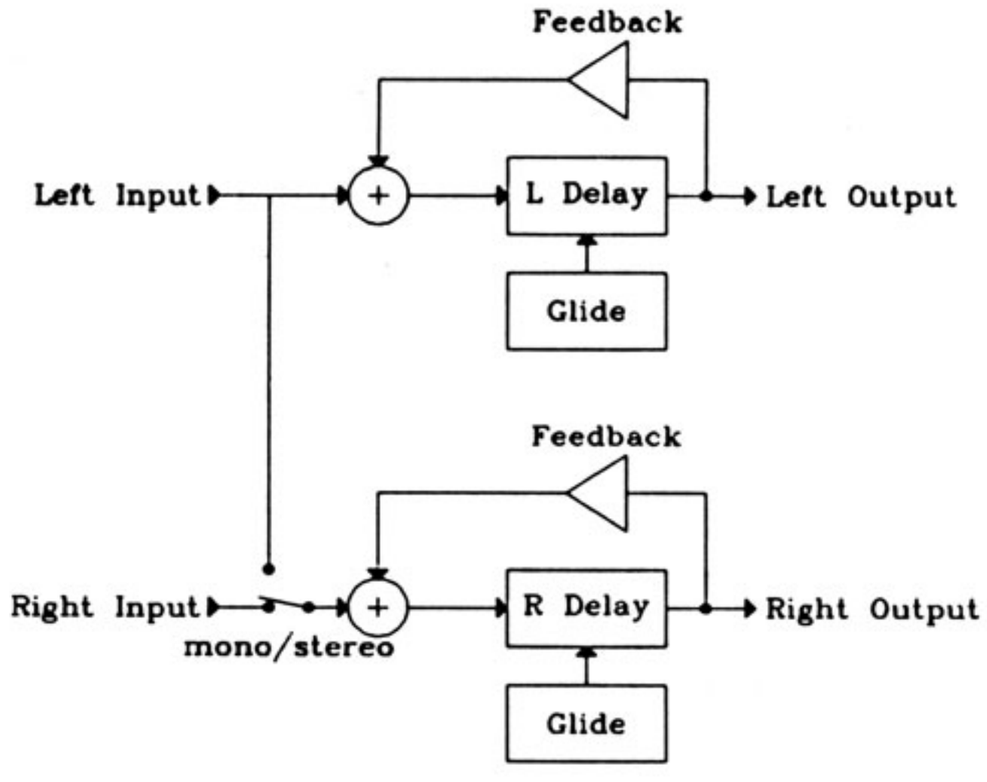
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 110 - Dual Digiplex

Description

Dual Digiplex is similar to Long Digiplex (Algorithm 109) it provides two separate delay lines each with its own controls. Delay time on each channel is up to .7 seconds.

Block Diagram



Parameters

#2 L Delay **0 to 700 milliseconds** **Modulation**
#8 R Delay **0 to 700 milliseconds** **Modulation**

This sets the length of time between the left or right input signal and the delayed output signals. Th delay time is adjustable in one millisecond steps (1/1000th of a second) from 0 up to .7 seconds.

#3 L Feedback **-100 to 99 per cent** **Modulation**
#9 R Feedback **-100 to 99 per cent** **Modulation**

This controls the amount of left or right channel delayed signal to be fed back to the left or right channel' input. 0 per cent feedback means nothing is recirculated so that only one delay is heard. -100 percen will capture the signal indefinitely. Be careful with the input levels when working with high feedbacl The output can quickly build up to clipping. In general -99 per cent feedback will work better when doin digital tape loop type effects.

#0 L Mix **0 to 100 per cent** **Modulation**
#1 R Mix **0 to 100 per cent** **Modulation**

The left and right mix levels control the balance between the dry signals and the wet signals. A 50% mi will result in equal levels of dry and wet sound at the output.

#7 Repeat **on or off**

The Repeat switch will capture up to 1.4 seconds of audio and replay it continuously. Pressing Repea again will release the segment.

Expert Mode Parameters

#4 Glide Speed **0 to 100** **Modulation**

This is the time it takes the H3500 to respond to changes in the delay time settings. Gliding occurs when the delay time is changed drastically. With glide on, a large delay time change will slowly and smoothly change the perceived audio delay. No noise is created in the output. 100 speed means quick changes and a speed of 0 means very slow changes.

#5 Glide Enable **delay glide on or off**

This turns the delay gliding on or off. It is normally on.

#6 Stereo/Mono **Stereo or Mono**

Here the right input channel can be switched on or off. If set for stereo the H3500 is two independent, 700ms digiplex units. If set to mono the signal at the left input channel can have two separate delay times, each with its own feedback and mix level.

Levels

#10 Left In **-48 to 48 dB**
#11 Right In **-48 to 48 dB**
#12 Left Out **-48 to 48 dB**
#13 Right Out **-48 to 48 dB**

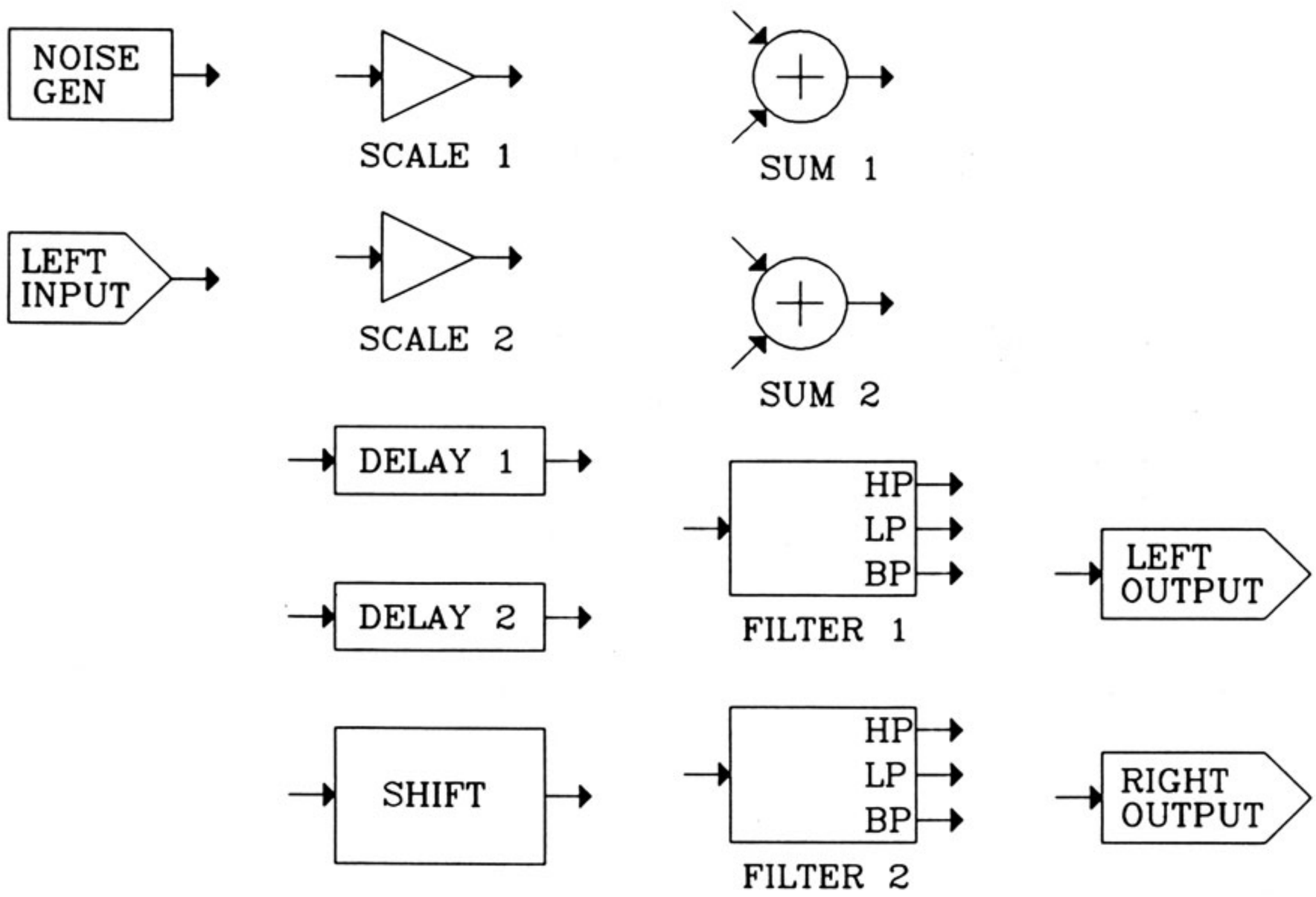
The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels. See the levels section in "Running the H3500" for further information.

Algorithm 111 - Patch Factory

Description

The Patch Factory algorithm gives the user a bit of almost everything. This algorithm contains a pitch shifter, two tuneable filters (These can be lowpass, highpass, or bandpass), two delay lines and a white noise generator. Using these basic effect elements, a flexible patching scheme and some "glue" (a pair each of summing junctions and attenuators), clever users can create sound effects limited only by their imaginations.

Block Diagram



Parameters

#0	**Cutoff 1**	**0 to 7000 Hertz**	**Modulation**
#1	**Cutoff 2**	**0 to 7000 Hertz**	**Modulation**

Cutoff 1 and 2 control the cutoff frequencies of filters 1 and 2. The adjustment is made in Hertz, and determines the point at which the filter attenuates by 3 dB (for lowpass and highpass filters). For bandpass filters, this parameter controls the center frequency (or resonant frequency) of the filter.

#2	**Q Factor 1**	**0 to 1.000**	**Modulation**
#3	**Q Factor 2**	**0 to 1.000**	**Modulation**

This parameter adjusts the shape of the frequency response of filters 1 and 2. When the Q factor is set to zero, the filter will be relatively flat up to it cutoff frequency. As the Q is increased, the filter will develop a peak at the center frequency. At a Q factor of 1, the filter will oscillate at the center frequency.

#4 **Delay 1** **0.0 to 500.0 milliseconds** **Modulation**
#5 **Delay 2** **0.0 to 500.0 milliseconds** **Modulation**

These parameters control the amount of delay for delay lines 1 and 2. The delay is adjusted in milliseconds and is adjustable to the nearest tenth of a millisecond.

#6 **Scale 1** **-100.0 to 100.0 per cent** **Modulation**
#7 **Scale 2** **-100.0 to 100.0 per cent** **Modulation**

Scale 1 and 2 control the amount of attenuation for attenuators 1 and 2. The attenuation is adjusted in per cent. An adjustment of 100 per cent corresponds to no attenuation. An adjustment of 0 per cent turns the signal off. Negative settings invert the phase of the signal.

#8 **Coarse, Fine** **-4800 to 1200 cents** **Modulation**

This controls the amount of pitch shift in the pitch shift section. The pitch shift is given in cents, where +100 cents transposes the signal up by one half-step and -100 cents transposes the signal down by one half-step. The coarse adjustment of pitch allows pitch shift control in 100 cents (or semitone) intervals.

#9 **P Delay** **0 to 500 milliseconds** **Modulation**

P Delay (Pitch shift delay) controls the amount of delay in the pitch shift section. The delay is adjusted in milliseconds. This delay can be used just like delay lines 1 and 2, with the exception that it is always connected to the pitch shifter.

Hint: If you want real-time, clickless delay control, use this delay instead of delay lines 1 and 2.

#10 **Left Mix** **0 to 100 per cent** **Modulation**
#11 **Right Mix** **0 to 100 per cent** **Modulation**

These control the dry/wet mix for the left or right output channels. A setting of 100 per cent corresponds to full wet (effect) output. Setting the mix to 0 per cent corresponds to a full dry output.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#12 **Left In** **-48 to 48 dB**
#13 **Right In** **-48 to 48 dB**
#14 **Left Out** **-48 to 48 dB**
#15 **Right Out** **-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments (The master level adjustments are those made after pressing the "levels" key beneath the bargraphs).

Expert, Deglitch Parameters

The deglitch parameters are used to optimize the pitch shift software to get the best, smoothest sound. To get to these parameters, press the "expert" key on the last parameter page, and then press the "deglitch" key.

#16 **Low Note** **9 Hz to C7**

Set this parameter for the lowest note you reasonably expect to pitch shift. Note: The lower the setting on this parameter, the longer the processing delay of the pitch shifter. In other words, don't set this parameter any lower than needed.

#17 High Note C4 to C8

Set this to the highest note you expect to pitch shift. Typically, the smaller the range between the high note and the low note, the better the pitch shifter will sound.

#18 Source polyphonic- * -solo

This is another parameter used to tune the pitch shifter performance. Move the star towards "polyphonic" for polyphonic input sources (for example, a full mix), and move it towards the "solo" for monophonic instruments (like a solo flute). The last word though, is your own ear. Adjust this and all parameters until the effect sounds the best!

Patching

This is where the fun really starts. The patching adjustments of this algorithm let you virtually design your own effect algorithms. To start patching, press the "expert" key on the last parameter page, then press the "patching" key.

Patching allows you to connect the basic effect elements (shown on the block diagram) in almost any way you wish. To make a "patch", simply find the desired patch destination in the menu.

Important Note: Before experimenting with different patches, turn your speaker or headphone level down to a **quiet** level. Changing the patching can result in bizarre and possibly **very loud** sounds.

For example, to patch something to the left output, press the "parameter" key until you see the "l output" key appear. Press the "l output" key. The display will show what "l output" or the left output is connected to. Turning the knob will change the patch. To send white noise to the left output, turn the knob until "l output:noise gen" appears on the display. If you listen to the left channel output, you will hear full amplitude white noise. (This is an example of a "very loud" sound).

Patch destinations

#19	**Filt 1 In**	**Filter 1 input**	**#20**	**Filt 2 In**	**Filter 2 input**
#21	**Delay 1 In**	**Delay 1 input**	**#22**	**Delay 2 In**	**Delay 2 input**
#23	**Scale 1 In**	**Scaler 1 input**	**#24**	**Scale 2 In**	**Scaler 2 input**
#25	**Sum 1a In**	**Summing junction 1, "a" input**	**#26**	**Sum 1b In**	**Summing junction 1, "b" input**
#27	**Sum 2a In**	**Summing junction 2, "a" input**	**#28**	**Sum 2b In**	**Summing junction 2, "b" input**
#29	**Shift In**	**Pitch shifter input**	**#30**	**L Output**	**Left output**
#31	**R Output**	**Right output**			

Patch Sources

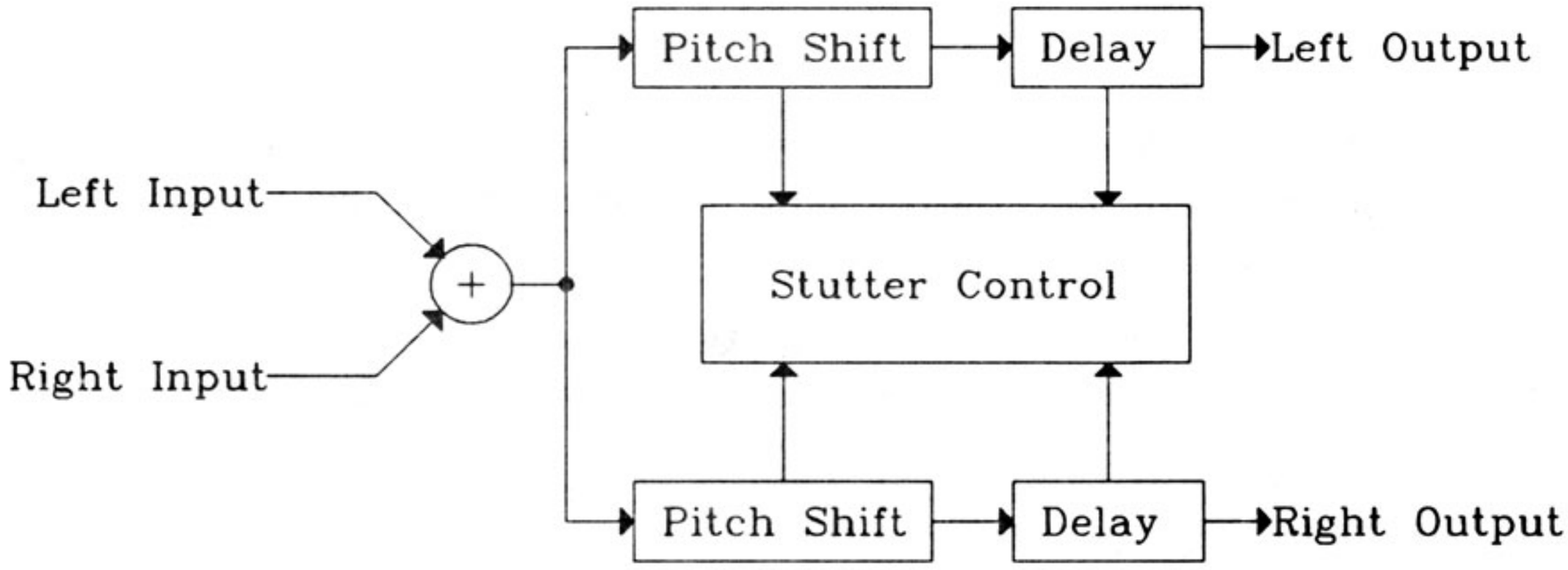
Left Input	- The left channel audio input	Sum 1	- The output of summing junction 1
Sum 2	- The output of summing junction 2	Delay 1	- The output of delay line 1
Delay 2	- The output of delay line 2	Scaler 1	- The output of scaler 1
Scaler 2	- The output of scaler 2	Lowpass 1	- Lowpass filter 1 output
Lowpass 2	- Lowpass filter 2 output	Bandpass 1	- Bandpass filter 1 output
Bandpass 2	- Bandpass filter 2 output	Highpass 1	- Highpass filter 1 output
Highpass 2	- Highpass filter 2 output	Noise Gen	- Noise generator output
Pitch Shift	- Pitch shifter output	Null Input	- Connects to nothing (no sound)

Algorithm 112 - Stutter

Description

The Stutter algorithm is used to create that popular st..st..stutter sound - in real-time, without the need for a sampler or cumbersome digital delay acrobatics.

Block Diagram



Parameters

#0 Trigger1 **no adjustment** **Modulation**
#1 Trigger2 **no adjustment** **Modulation**
#2 Trigger3 **no adjustment** **Modulation**
#3 Trigger4 **no adjustment** **Modulation**

Pressing the any of the four trigger keys will trigger an effect. The effect may consist of a stutter, a pitch sweep or a change of pitch shift. What happens depends on what is "patched" to that particular trigger key (The patching is set up in the expert parameters).

#4 Auto On/Off **On or Off**

This parameter turns on the automatic stutter sequencer. When the sequencer is on, preset triggers will be sent out at a rate determined by the "program rate" parameter.

#5 Speed **0 to 100** **Modulation**

This controls the rate at which the trigger sequencer generates triggers. At a setting of 0, the triggers will occur very infrequently. When set to 100, the triggers will occur constantly.

#6 Program **see list below**

The "program" parameter determines what type of triggers are generated by the trigger sequencer. Here is a description of each setting:

total random - generates random stutters, random pitch sweeps and random pitch shifts
random sweep - generates random pitch sweeps only
random pitch - generate random pitch shifts only
just stutter - generate random stutters only

#7 Left Mix **0 to 100 per cent** **Modulation**
#8 Right Mix **0 to 100 per cent** **Modulation**

These control the dry/wet effect mix at the left or right outputs. When set to 0 per cent, the mix is full dry. When set to 100 per cent the output is full wet effect.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#9	**Left In**	**-48 to 48 dB**
#10	**Right In**	**-48 to 48 dB**
#11	**Left Out**	**-48 to 48 dB**
#12	**Right Out**	**-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments (The master level adjustments are those made after pressing the "levels" key beneath the bargraphs.)

Expert Parameters, Trigger Menu

The trigger menu contains parameters used to set up different types of stutters and to assign stutters and pitch sweeps to the trigger keys, "trigger1" through "trigger4". To access the trigger menu, first press the "expert" key on the last page of the parameter menus. Then press the "triggers" key.

Stutter Parameters

There are two sets of stutter parameters, labelled "stutter 1" and "stutter 2". This allows the user to set up two different types of stutters and assign them to different trigger keys. For example, a single, long repeat can be assigned to trigger 1 and a short, repetitive stutter can be assigned to trigger 2.

#13	**Length 1**	**0 to 500 milliseconds**	**Modulation**
#14	**Length 2**	**0 to 500 milliseconds**	**Modulation**

The length 1 and length 2 parameters set the length of the segments to be repeated after stuttering is triggered. The "length 1" parameter will be used when "stutter 1" is patched to a trigger key. The "length2" parameter will be used when "stutter 2" is patched to a trigger key.

#15	**Count 1**	**0 to 16**	**Modulation**
#16	**Count 2**	**0 to 16**	**Modulation**

These parameters determine how many times the stutter segment is to be repeated. The "count 1" parameter will be used when "stutter 1" is patched to a trigger key. The "count 2" parameter will be used when "stutter 2" is patched to a trigger key.

Trigger Parameters

The trigger parameters are used to patch stutters and pitch sweeps to the four trigger keys "trigger1" through "trigger4". Each trigger key can trigger two things. This allows a pitch sweep and a stutter to be triggered by one key press.

To make a patch to the "trigger1" key, press "expert", "triggers", and "PARAMETER" to bring up the page with "trig 1a", "trig 1b", "trigger 1", and "return". Press the "trig 1a" key. Turn the knob to select a stutter or pitch sweep to be triggered. (See below for a list of the different triggers.) Do the same thing for the "trig 1b" parameter. Pressing the "trigger1" key will now simultaneously trigger the effects patched to "trig 1a" and "trig 1b". (We've included an extra "trigger1" key on this menu. By pressing this key you can easily audition the effect of your patching.) Follow the same procedure to set up triggers 2 through 4.

#17 Trigger 1a see trigger list
#18 Trigger 1b see trigger list
#19 Trigger 2a see trigger list
#20 Trigger 2b see trigger list
#21 Trigger 3a see trigger list
#22 Trigger 3b see trigger list
#23 Trigger 4a see trigger list
#24 Trigger 4b see trigger list

These eight parameters select the effects to be patched to trigger keys 1 through 4. Each trigger can have two effects patched to it, hence the "a" and the "b" for each parameter. See the trigger list below for the available effects.

Trigger List

no action	- This does nothing.
stut1 l	- Stutter on the left channel using stutter 1 parameters.
stut1 r	- Stutter on the right channel using stutter 1 parameters.
stut1 l&r	- Stutter on both channels using stutter 1 parameters.
stut2 l,r,l&r	- Stutter using stutter 2 parameters.
rands l,r,l&r	- Stutter using random stutter parameters.
swpu1 l,r,l&r	- Sweep up pitch using the sweep 1 parameters.
swpu2 l,r,l&r	- Sweep up pitch using the sweep 2 parameters.
swpd1 l,r,l&r	- Sweep down pitch using the sweep 1 parameters.
swpd2 l,r,l&r	- Sweep down pitch using the sweep 2 parameters.
sw lu/rd	- Sweep up the left channel while sweeping down the right channel.
sw ld/ru	- Sweep down the left channel while sweeping up the right channel.
rpit1 l,r,l&r	- Set a random pitch shift using sweep 1 parameters.
rpit2 l,r,l&r	- Set a random pitch shift using sweep 2 parameters.
zero1 l,r,l&r	- Set sweep generator 1 and the specified channel to no pitch shift.
zero2 l,r,l&r	- Set sweep generator 2 and the specified channel to no pitch shift.

Sweep Menu

The sweep menu contains parameter adjustments for the pitch shifters and pitch sweep generators. To get to these parameters, press the "expert" key on the last parameter page and then press the "sweeps" key.

#25 l coarse, fine -4800 to 1200 cents Modulation
#28 r coarse, fine -4800 to 1200 cents Modulation

These control the amount of pitch shift in the left and right channels. The pitch shift is given in cents, where +100 cents transposes the signal up by one half-step and -100 cents transposes the signal down by one half-step. The coarse adjustment of pitch allows pitch shift control in 100 cents (or semitone) intervals.

#26 l delay 0 to 500 milliseconds Modulation
#29 r delay 0 to 500 milliseconds Modulation

These control the amount of delay in the left and right channels. The delay is adjusted in milliseconds.

#27 l fdback 0 to 100 per cent
#30 r fdback 0 to 100 per cent

These control the amount of feedback in the left and right channels. When this parameter is set to 0 per cent, there is no feedback.

#31 up1 rate **0 to 100**
#35 up2 rate **0 to 100**

These control the rate of pitch sweep generators 1 and 2 for sweeping up in pitch.

#32 up1 max **0 to 100**
#36 up2 max **0 to 100**

These set the maximum pitch for sweep generators 1 and 2.

#33 dn1 rate **0 to 100**
#37 dn2 rate **0 to 100**

These control the rate of pitch sweep generators 1 and 2 for sweeping down in pitch.

#34 dn1 min **0 to 100**
#38 dn2 min **0 to 100**

These set the minimum pitch for sweep generators 1 and 2.

#39 rand1 max **-1200 to 1200 cents**
#40 rand2 max **-1200 to 1200 cents**

This sets the pitch limit for the random sweep value for sweep 1.

Deglitch Menu

The deglitch parameters are used to optimize the pitch shift software to get the best, smoothest sound. To get to these parameters, press the "expert" key on the last parameter page,and then press the "deglitch" key.

#41 Low Note **9 Hz to C7**

Set this parameter for the lowest note you reasonably expect to pitch shift. Note: The lower the setting on this parameter, the longer the processing delay of the pitch shifter. In other words, don't set this lower than needed.

#42 High Note **C4 to C8**

Set this to the highest note you expect to pitch shift. Typically, the smaller the range between the high note and the low note, the better the pitch shifter will sound.

#43 Source **polyphonic- * -solo**

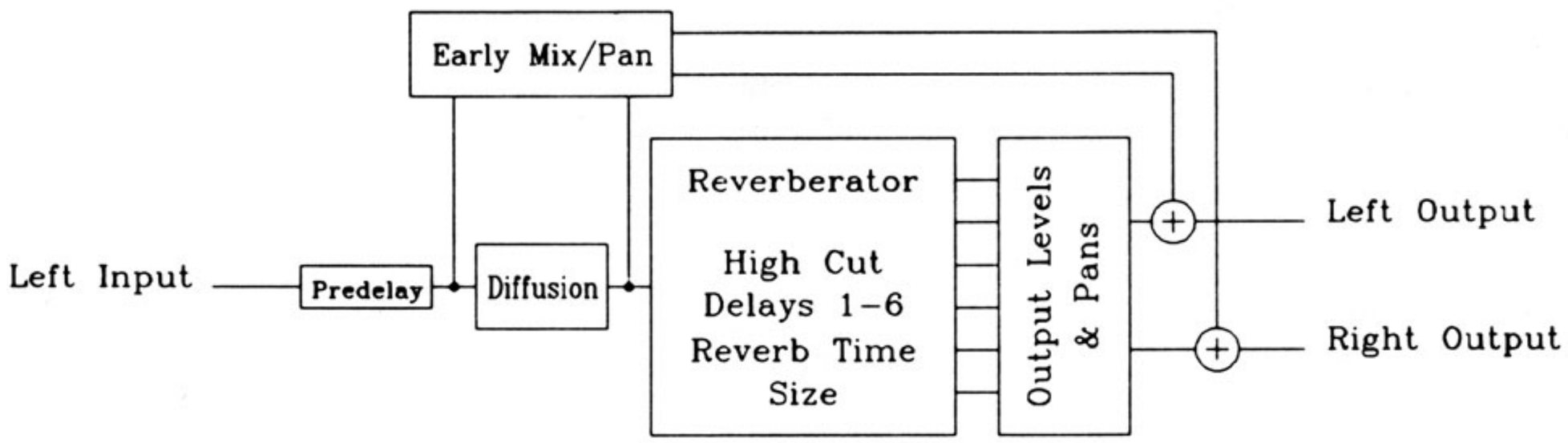
This is another parameter used to tune the pitch shifter performance. Move the star towards "polyphonic" for polyphonic input sources (for example, a full mix), and move it towards the "solo" for monophonic instruments (like a solo flute). The last word though, is your own ear. Adjust this and all parameters until the effect sounds the best!

Algorithm 114 - Dense Room

Description

This algorithm offers a much improved early response characteristic over the original "Reverb Factory" program. In addition, this algorithm has greater reverb "density" and better control over source positioning within the simulated room. The apparent source location can be easily controlled with the front/back position control and the panning control. The parametric EQ of Reverb Factory has been replaced by a simple "high-cut" control, and the noise gate has been removed to allow for the extra-dense processing.

Block Diagram



Parameters

#0 Predelay **0 to 500 milliseconds** **Modulation**

This parameter controls the amount of delay added before the reverberated sound. This can be used to increase the illusion of a large room.

#1 Rev Time **0.1 second to infinity** **Modulation**

This parameter controls the reverb time or "liveness" of the simulated room.

#2 High Cut **0 to 100 per cent** **Modulation**

The High Cut control is used to roll off the higher frequencies of the reverb to give a more natural response. Increasing this makes the room sound "warmer".

#3 Size **0 to 100 per cent** **Modulation**

Use the size control to adjust the apparent size of the room. This one control simultaneously scales all of the delay lengths in the reverb algorithm.

#4 Position **Front to Rear** **Modulation**

The position control affects the apparent location of the listener within the room. Moving the icon towards "rear" or "front" will simulate the sound of a listener seated towards the rear or front of the room.

#5 Pan **Pan Left to Pan Right** **Modulation**

Like the position control, the pan control moves the apparent location of the listener. Instead of front/rear location, this controls the left/right positioning.

#6 Early Mix **0 to 100 per cent** **Modulation**

The Early Mix parameter controls the nature of the early response of this reverb. A setting of 0 will result in a more coherent early response, especially with the position set to the front of the room. Higher settings will result in a more diffuse sound.

#7 Diffusion **0 to 100 per cent** **Modulation**

This control affects the overall diffusion within the reverb. Low settings of this parameter will result in a coarser reverb sound, while high settings will give a smoother overall reverb. The effect is most noticeable in the early response of the reverb.

#8 Mix **0 to 100 per cent** **Modulation**

This controls the overall dry/wet mix of the reverb.

Expert Parameters

#9-14 Delay 1-6 **0 to 5000 samples**

These six parameters control the delay settings of the six delay lines which are the heart of this reverb. These parameters are the key to getting different type room sounds. Because of the critical nature of these settings, the delay values are adjusted in samples, where 1 sample equals 22 microseconds.

#15-17 Allpass Delay 1-3 **0 to 5000 samples**

These three parameters control the delay values of the diffusion section of this reverb. Like the above parameters, these settings are critical in determining the actual quality of the reverb.

#18-20 Allpass Gain 1-3 **0 to 100 per cent**

The actual feedback gains of the three diffusors are controlled with these parameters. In combination with the delay settings, the gains determine the overall smoothness of the reverb sound.

#21-26 Pan 1-6 **Left to Right**

These six pan controls are used to control the panning of the six delay outputs of this reverb. These settings can have an incredible effect upon the stereo imaging of the reverb.

#27-32 Level 1-6 **-100 to 100 per cent**

The output levels of the six delay lines are controlled with these parameters. Use these settings to tailor the shape, or "envelope" of the early response.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#33 Left In **-48 to 48 dB**
#34 Right In **-48 to 48 dB**
#35 Left Out **-48 to 48 dB**
#36 Right Out **-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments. The master level adjustments are those made after pressing the "levels" key beneath the bargraphs.

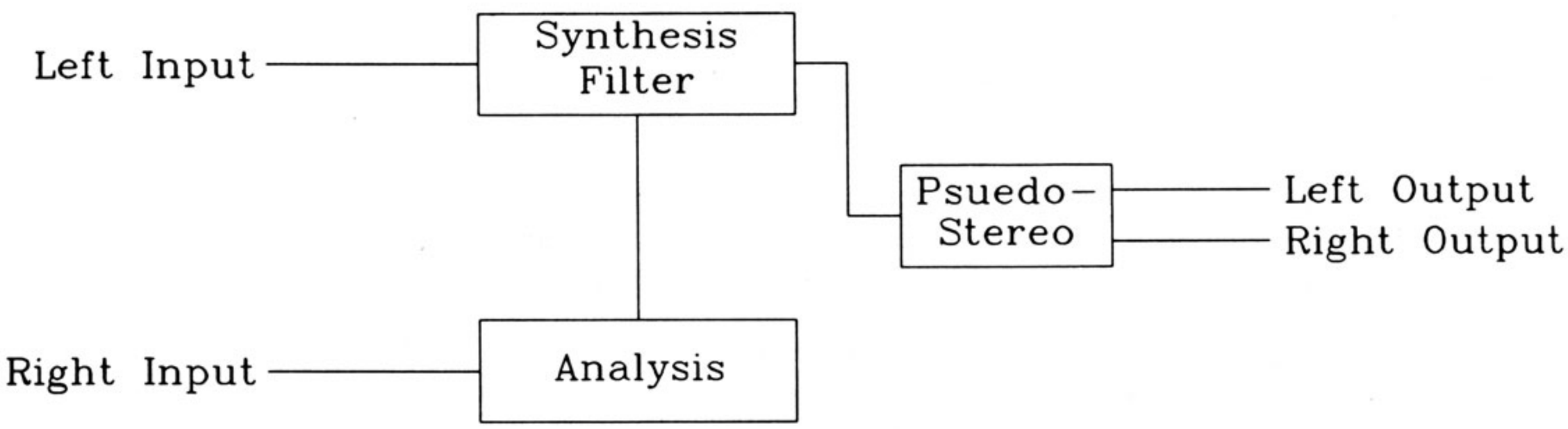
Hint: The smooth build-up of this reverb makes it perfect for simulating large halls and auditoriums.

Algorithm 115 - Vocoder

Description

This is the H3500 version of the classic "vocoder". A vocoder is used to impress the articulatory characteristics of one instrument onto the timbre and pitch of another. Usually the articulation information (the "analysis" input) comes from a spoken voice, while the timbre and pitch come from a keyboard, guitar, or any other instrument (the "synthesis" input). This is a great way to get that "talking" guitar sound. Make sure to get the channel inputs right when you're using this program. The right channel input is the analysis (voice) input, and the left input is the synthesis (instrument) input.

Block Diagram



Parameters

#0 Formant Speed **0 to 100 per cent** **Modulation**

This parameter controls the speed at which the synthesis filter tracks the spectrum of the analysis input. Low settings will result in smooth, but slow tracking. High settings will give quick response, at the expense of some smoothness.

#1 Envelope Speed **0 to 100 per cent** **Modulation**

The Envelope Speed parameter controls the speed at which the synthesis filter tracks the articulation of the analysis input. A low setting will tend to smear out the articulation while a high setting will quickly track input level changes.

#2 Formant Shift **0 to 100.0 per cent** **Modulation**

The Formant Shift parameter changes the sound of the vocoder by "modulating" the synthesis filter. The modulation is such that high values of formant shift tend to "munchkin-ize" the vocoded sound. Sweeping this parameter with the function generator will add a pleasant modulation to the vocoder.

#3 Depth **0 to 100 per cent** **Modulation**

This parameter controls the depth of the pseudo-stereo effect at the output of the vocoder. A setting of zero will result in a non-stereo output.

#4 Width **0 to 10.0 milliseconds** **Modulation**

The width parameter controls the image width of the pseudo-stereo effect.

#5 Mix **0 to 100 per cent** **Modulation**

This controls the overall wet/dry mix of the vocoder.

Expert Parameters

#6 Max Resonance **0 to 100.0 per cent** **Modulation**

The maximum resonance control determines how "ringy" the synthesis filter is allowed to get. High settings of this may result in more accurate tracking, but may result in more "blurbles" in the output.

#7 Min Error **0 to 100.0 per cent** **Modulation**

This parameter, the minimum error, determines how close the synthesis filter tracks the input spectrum. With low settings, the synthesis filter will closely track the analysis input. With high settings, the tracking is looser.

#8 Threshold **0 to 100 per cent** **Modulation**

The vocoder has a built-in noise gate which eliminates mis-tracking caused by input noise or hum. This setting determines the threshold of that noise gate.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#9 Left In **-48 to 48 dB**
#10 Right In **-48 to 48 dB**
#11 Left Out **-48 to 48 dB**
#12 Right Out **-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments. The master level adjustments are those made after pressing the "levels" key beneath the bargraphs.

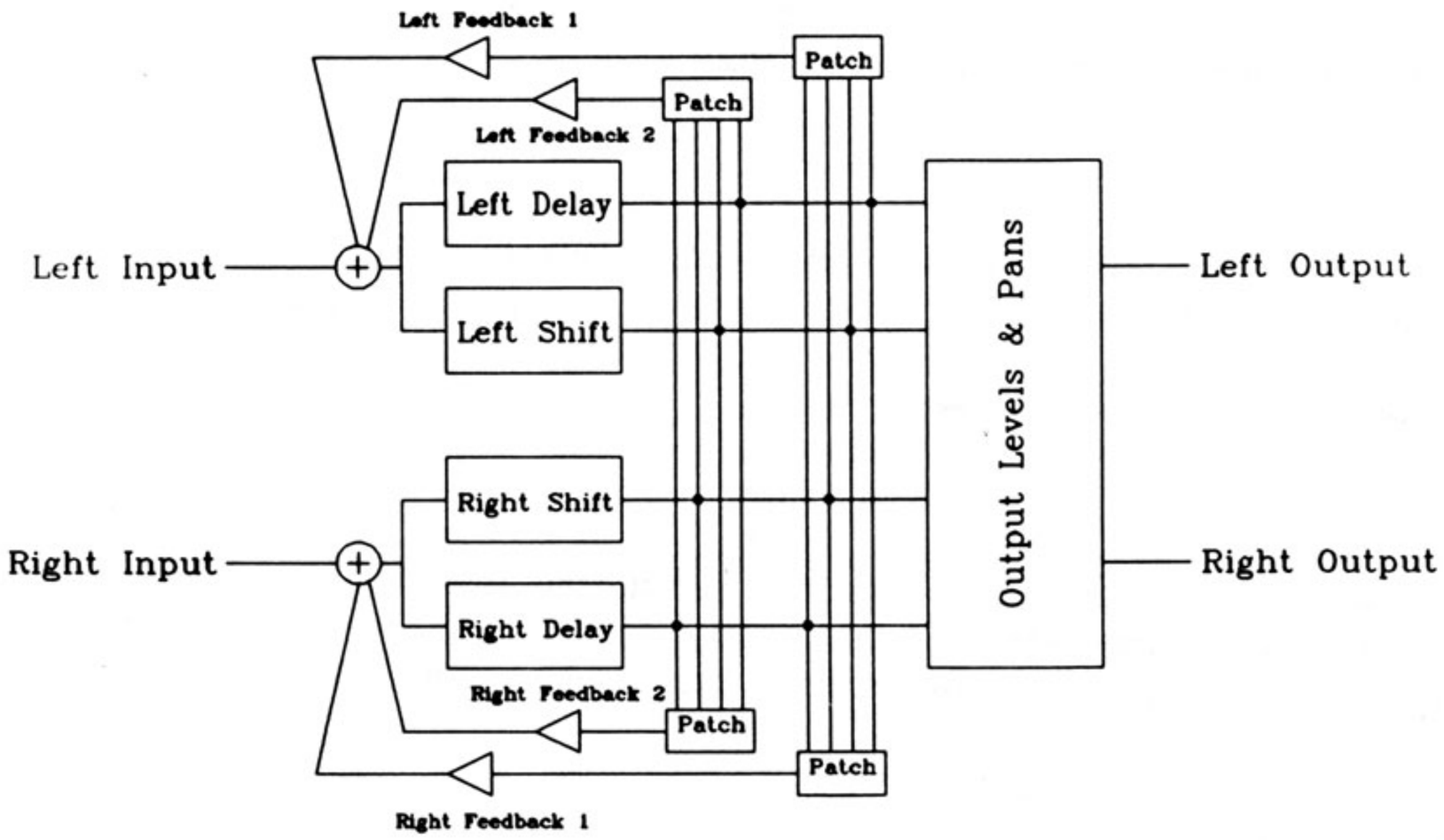
Hint: Make sure the input levels are good and hot, but **not** clipped. Extremely low input levels or clipping can give you some horrible sounds. Also, you will get the best results if the synthesis input is harmonically rich. Synthesized string ensemble type sounds are usually good to use. Distorted guitar also works very well. Using noise as an input is also interesting.

Algorithm 116 - Multi-Shift

Description

What, another pitch shift program? Well, yes, but this one's got a few neat tricks up its proverbial sleeve. Borrowing from research done with the TimeSqueeze(R) program, this program has superior pitch shift quality. The Multi-Shift algorithm has been optimized for micro-pitch shift, allowing any source material to be processed without adding artifacts. This algorithm is similar to the dual shift program, allowing discrete stereo pitch shifting. In addition to the pitch shifters, a delay tap has been added to each pitch shift channel, giving a total of four outputs. Each of the four outputs can be panned anywhere in the stereo field. The pitch shift range has been increased to plus or minus three octaves. Also, a "patchable" feedback structure has been set up, allowing each pitch shifter to use any two of the four outputs as feedback. Finally, each of the pitch shifters can be set, independently, to "reverse" pitch shift mode.

Block Diagram



Parameters

#0	**L Coarse/Fine**	**-3600 to 3600 cents**	**Modulation**
#3	**R Coarse/Fine**	**-3600 to 3600 cents**	**Modulation**

The left and right coarse/fine parameters control the amount of pitch shift in the left and right channels. Press once to adjust the value in 100 cent increments, press again to adjust in 1 cent increments.

#1	**L Pitch Delay**	**0 to 675 milliseconds**	**Modulation**
#4	**R Pitch Delay**	**0 to 700 milliseconds**	**Modulation**

These adjust the amount of delay for the left and right pitch shifters. The adjustment is in milliseconds.

#2	**L Delay**	**0 to 675 milliseconds**	**Modulation**
#5	**R Delay**	**0 to 700 milliseconds**	**Modulation**

These control the amount of delay for the left and right dry delay taps.

#6	**Mix**	**0 to 100 per cent**	**Modulation**

This controls the overall wet/dry effect mix for this effect.

#7 Feedback **0 to 10.0 milliseconds** **Modulation**

This is a "global" scaling control for the amount of feedback. This has the effect of controlling all four feedback levels at once.

#8 Image **L<->R to R<->L** **Modulation**

The "Image" control determines the width of the output stereo field. This works in conjunction with the expert "Pan" parameters.

Expert Parameters, Outputs

#9 L Pitch Level **-100 to 100 per cent**
#10 R Pitch Level **-100 to 100 per cent**
#11 L Delay Level **-100 to 100 per cent**
#12 R Delay Level **-100 to 100 per cent**

These four parameters control the output levels of the left and right pitch shifters and the left and right dry delay taps. Negative settings will invert the phase of the audio signal.

#13 L Pitch Pan **Pan Left to Pan Right**
#14 R Pitch Pan **Pan Left to Pan Right**
#15 L Delay Pan **Pan Left to Pan Right**
#16 R Delay Pan **Pan Left to Pan Right**

The four pan controls are used to set the left/right panning of the left and right pitch shifts and the left and right delays.

Patching

#17 L Feedback 1 **-100 to 100 per cent**
#18 L Feedback 2 **-100 to 100 per cent**
#21 R Feedback 1 **-100 to 100 per cent**
#22 R Feedback 2 **-100 to 100 per cent**

These control the amount of feedback for the two feedback paths of the left pitch shifter. This value is scaled by the main feedback control. (The non-expert parameter.)

#19 Left fb1= **l pitch, r pitch, l delay or r delay**
#20 Left fb2= **l pitch, r pitch, l delay or r delay**
#23 Right fb1= **l pitch, r pitch, l delay or r delay**
#24 Right fb2= **l pitch, r pitch, l delay or r delay**

This parameter selects which source is to be fed back into the first feedback point of the left pitch shifter. Pressing the softkey will scroll through the various sources. **Warning:** Be careful. Certain combinations of feedback sources can result in an unstable program. Keep the volume low while adjusting the feedback parameters.

Control

#25 L Direction **Forward or Reverse**
#29 R Direction **Forward or Reverse**

When this parameter is set to "reverse", the left pitch shifter is set to reverse pitch shift mode (exactly like program 104). The reverse shift length is set by the splice length control.

#26 L Xfade **Slow or Fast**
#30 R Xfade **Slow or Fast**

This parameter selects between two different pitch shifting modes. "Fast" is exactly like our old pitch shifters. "Slow" is intended for small pitch shift amounts, such as micro-pitch applications. This allows us to have virtually glitchless micro-pitch shifting.

#27 L Deglitch **On or Off**
#31 R Deglitch **On or Off**

This parameter controls whether "deglitching" is to be turned on or off. Normally, this should be set to "on" When set to "off", signal analysis stops, and the pitch shifter works with a fixed "splice" interval. This may be useful for some micro-pitch applications where the stereo image shift due to deglitching is annoying.

#28 L Splice **1 to 700 milliseconds**
#32 R Splice **1 to 700 milliseconds**

This control sets the **maximum** splice length. This control is equivalent to the "minimum" frequency control of the TimeSqueeze(R) program or the "low note" control of the other pitch shifters. To deglitch lower notes, set this parameter to a higher value. To shift the low E on a guitar, this should be set to 13 milliseconds. To shift the low E on a bass, this should be set to 26 milliseconds. For optimum pitch shifting, this parameter should not be set any higher than necessary. **Note:** When this parameter is set to 43 milliseconds or higher, deglitching is automatically turned off. The large splice values are intended for reverse pitch shifting or special effects.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#34 Left In **-48 to 48 dB**
#35 Right In **-48 to 48 dB**
#36 Left Out **-48 to 48 dB**
#37 Right Out **-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments. The master level adjustments are those made after pressing the "levels" key beneath the bargraphs.

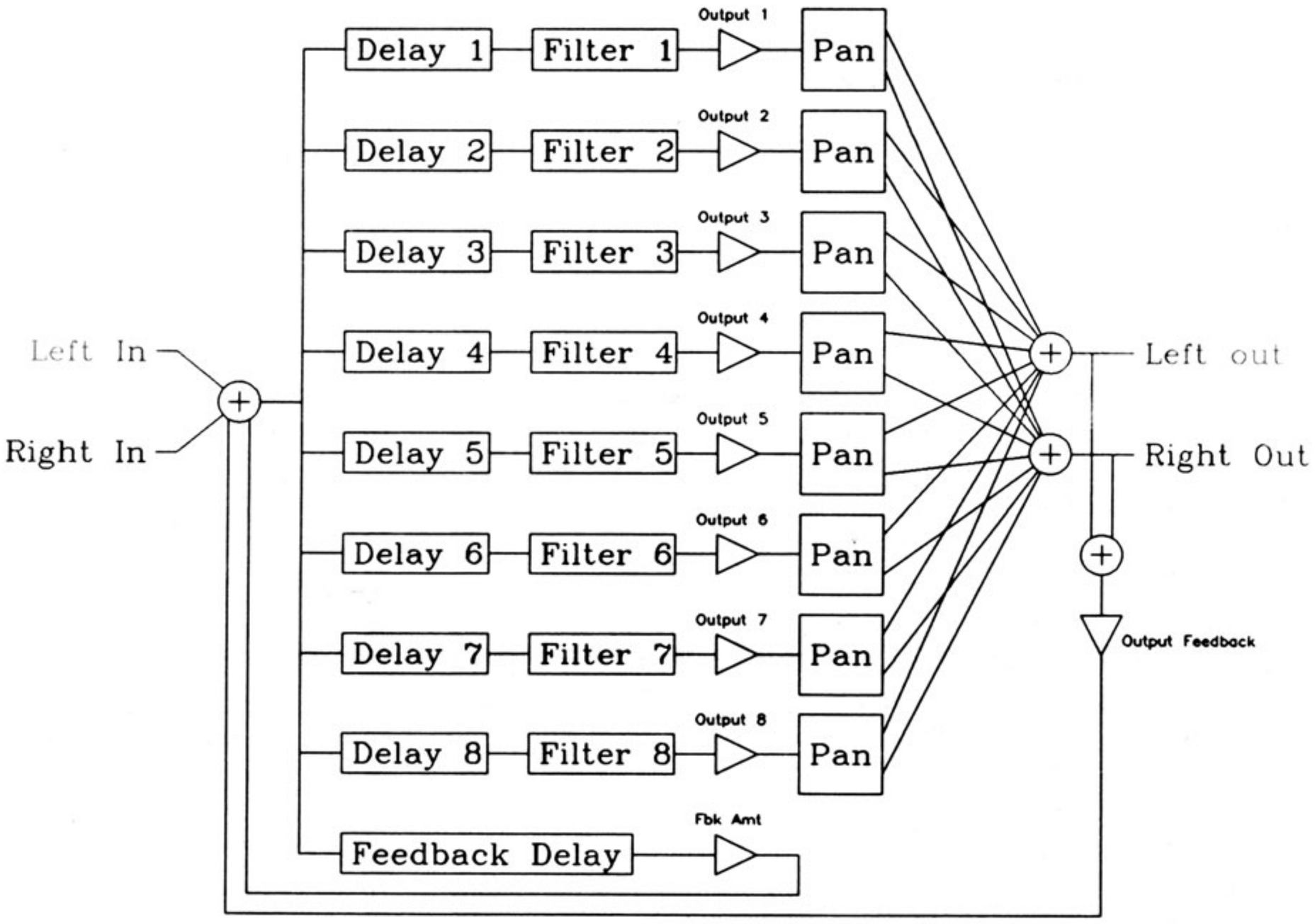
Hint: For best pitch shift quality, make sure that the pitch shifter delay is set to something more than zero. This gives our software time to properly analyze the input signal. Usually, setting the pitch delay to the same value as the splice-time gives good results.

Algorithm 117 - Band Delay

Description

This algorithm is a multi-tap delay line, with each of its eight delay outputs connected to a separate bandpass filter. The outputs of the eight bandpass filters are combined in a stereo mixer. Many unusual effects can be created by adjusting the parameters of the bands. For keyboard players, the center frequencies of the filters can be easily set to musical values by playing notes on a MIDI keyboard.

Block Diagram



Parameters

#0 Delay **0 to 100.00 per cent** **Modulation**

This is a "master" delay parameter which scales the eight individual delay values. A setting of 100 percent will yield maximum delay, while smaller values yield proportionately smaller delays. **Note:** The knob will give you a coarse adjustment. The up/down arrows will give you a fine adjustment. This is true for several of the parameters here.

#1 Frequency **-128 to 128 notes** **Modulation**

This parameter is the "master" frequency control. The frequencies of all eight bandpass filters can be controlled with this parameter. The frequency value here is added to the individual frequency setting of each filter. The frequency value is adjusted in semitones, allowing the musical pitch of the filters to be easily set.

#2 Q Factor **0 to 100.00 per cent** **Modulation**

This simultaneously scales the Q factor, or "resonance" of all of the filters. The filters are such that the higher the Q factor, the higher the gain through the filter. But since a smaller band of sound is being let through, the perceived gain is about the same. However, you should be careful when using high Q factors since they can distort the signals.

#8 Global Pan **L - R to R - L** **Modulation**

The Global Pan parameter controls the width of the stereo field.

#58 Feedback Delay **0 to 1485.0 milliseconds** **Modulation**

This parameter determines the amount of delay in the feedback loop. This, in combination with the feedback parameter, can be used to set up a digital delay repeat loop.

#59 Feedback **-100.00 to 100.00 per cent** **Modulation**

This controls the amount of feedback.

#3 Mix **0 to 100 per cent** **Modulation**

This controls the wet/dry output mix. A setting of 100 per cent corresponds to full wet effect.

Expert Parameters

#9, 15, 21, 27, 33, 39, 45, 51 **F1-8 Frequency** **0 to 12800 cents**

These eight parameters are the center frequencies for each of the filters. The values are adjusted in cents. Cents are a musical measure of frequency, where 100 cents is equal to one semitone. If you are using MIDI to set the filter frequencies, set all of these to zero.

#10, 16, 22, 27, 34, 40, 46, 52 **F1-F8 Q Factor** **0 to 999**

These parameters control the individual Q factors for the eight filters. 0 corresponds to a very gentle bandpass filter, while higher settings yield an increasingly narrow, more resonant filter. A setting of 999 will give a filter that is almost oscillating, one which will ring for a long time after any input is gone. Normally, these are all set to 999 and the global Q factor is used to adjust the value of all of the Q factors simultaneously.

#14, 20, 26, 31, 38, 44, 50, 56 **F1-F8 Note** **Cx to G9**

Like the frequency parameters above, these adjust the center frequencies of the filters. Here, the filter frequencies are shown as actual musical notes. For example, if the Note 1 is set to G#4, filter 1 will be tuned to G#4. In addition to setting these parameters from the front panel, a MIDI keyboard can be used to adjust the note values. See below for a description of the MIDI "Note Modes".

#57 Note Mode **off, routed, ordered, circular**

This parameter determines how notes played on a MIDI keyboard will set the above mentioned "Note" parameters. The modes are:

"Off" MIDI will not affect the note settings.

"Routed" This is perhaps the most intuitive mode. Each time a new note value is received (i.e., a key is pressed), the filters are tuned to the currently pressed keys. Filter 1 is tuned to the lowest note, filter 2 is tuned to the next lowest, and so on. If less than 8 keys are pressed, the notes will be repeated, until all filters are tuned. As a consequence, holding only one note down will tune all of the filters to the same note.

"Ordered" Filter 1 gets tuned to the first note that is played, filter 2 is tuned to the next note, and so on, up to filter 8. Releasing all of the keys will reset this mode, i.e., the next note received will tune filter 1.

"Circular" This is like "Ordered", with the exception that it doesn't reset to filter 1 after an "all notes off" condition. The filter tunings continue circulating from 1 through 8 as more notes are received.

#11, 17, 23, 28, 35, 41, 47, 53 F1-F8 Delay 0 to 1496.0 milliseconds

These are the individual delays for each of the eight filters. The actual delay will depend on the setting of the global delay parameter. The delay value shown assumes that global delay is set to 100 per cent.

#12, 18, 24, 29, 36, 42, 48, 54 F1-F8 Output -100 to 100 per cent

The output levels for the eight filters are set with these parameters. Generally it is a good idea to set the output levels to alternating positive and negative values in order to cancel out extremely low frequencies.

#13, 19, 25, 30, 37, 43, 49, 55 F1-F8 Pan left to right

Each of the filters can be panned anywhere in a stereo mix. These eight parameters determine where each of the filters is to be panned. To change the panning, simply use the knob to move the "*" to the desired location in the stereo field.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#4	**Left In**	**-48 to 48 dB**
#5	**Right In**	**-48 to 48 dB**
#6	**Left Out**	**-48 to 48 dB**
#7	**Right Out**	**-48 to 48 dB**

Hint: The filter frequencies are controlled by three sources, the global frequency, the individual frequencies, and the individual notes. These parameters represent musical pitch, and the final tuning of the filter is determined by adding the values together. If the filter 1 settings are:

Global Frequency: -12.00
F1 Frequency: 200 cents
F1 Note: C4

The tuning of filter 1 is:

C4 + 200 cents - 12 semitones.

Since 200 cents is equal to two semitones, the actual tuning is:

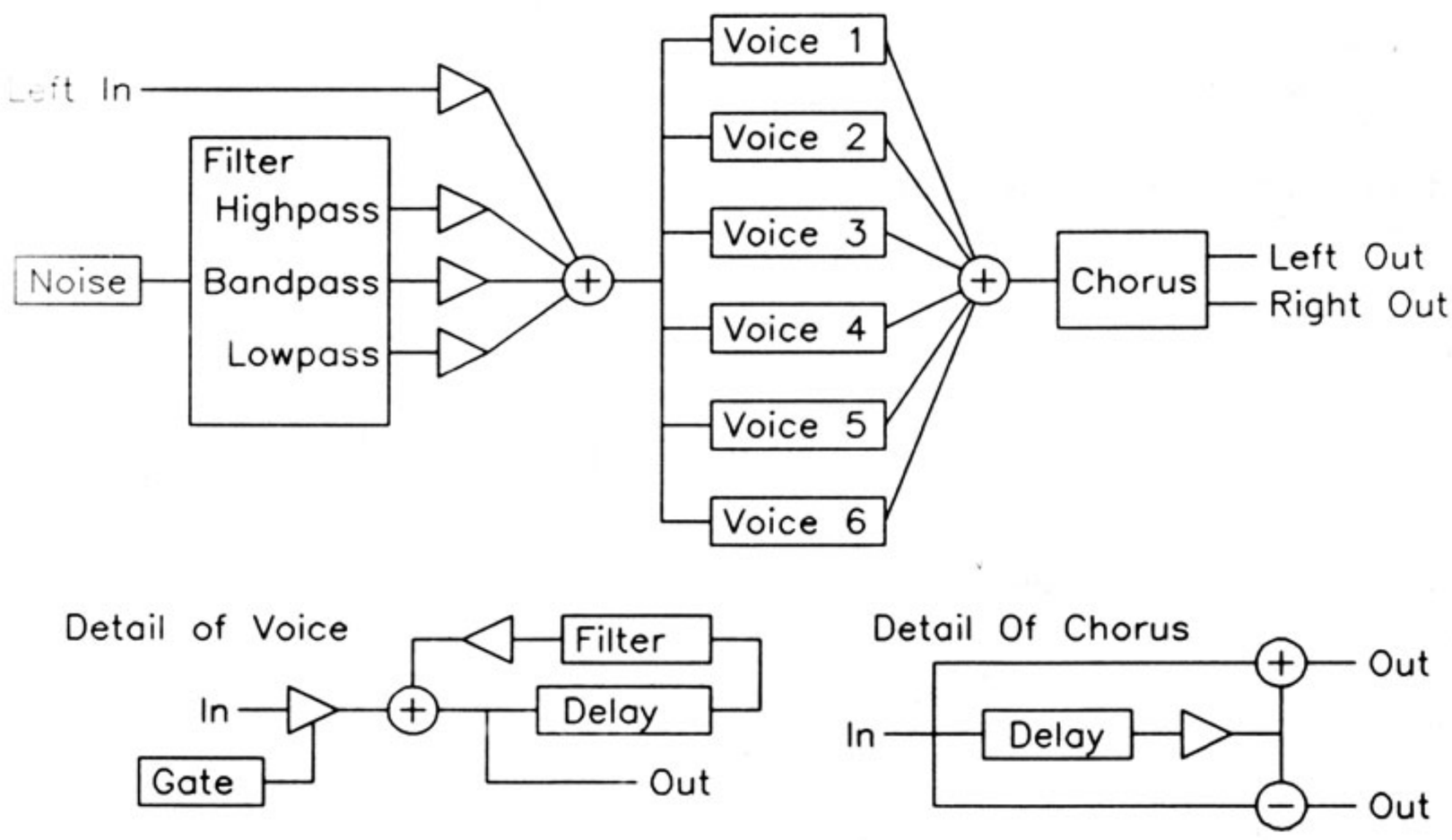
C4 - 10 semitones, or, 10 semitones below C4, or, D3

Algorithm 118 - String Modeller

Description

This algorithm is a bit of a departure from our usual. Instead of just processing audio, the String Modeller algorithm can create sounds of its own. This algorithm digitally simulates a set of six strings. When processing audio input, these strings act as passive resonators, yielding a sound similar to singing into a piano while holding down the damper pedal. To generate some amazingly realistic sounds, the "strings" can be "plucked" by playing notes on a MIDI keyboard. In this mode, the H3500 acts like an extra synthesizer module in your MIDI rack.

Block Diagram



Parameters

#0 Pitch **-100.00 to 100.00 notes** **Modulation**

This parameter controls the overall tuning of the string resonators. The tuning is displayed in semitones, and is relative to the standard tuning of A440.

#7 Offset **-100.00 to 100.00 notes** **Modulation**

This parameter is very similar to the "Pitch" parameter in that it also controls the tuning of the string resonators. However, "Offset" affects only incoming MIDI information, altering the pitch in relation to any subsequent MIDI note messages that are received.

#1 Decay **0 to 100** **Modulation**

The "Decay" parameter controls the length of the note decay after it is triggered from a MIDI keyboard. This affects the sound while a key is being held down. Larger values of this parameter result in longer note decay times.

#2 Release **0 to 100** **Modulation**

The "Release" parameter controls the length of the note decay after a key is released (a MIDI "note-off" message is received).

#3 Sustain **on or off** **Modulation**

This parameter functions very much like a sustain pedal on a synthesizer. Setting "Sustain" to "on" will sustain any notes received (limited by the available voices). When playing with a MIDI keyboard, this parameter can be patched to the sustain pedal. Patch "Sustain" to "Undefined Small #64" to get a standard MIDI Sustain Pedal.

#4 Gate **1 to 100** **Modulation**

The "Gate" parameter controls the characteristic attack sound of the plucked string. High settings of the gate parameter result in louder, buzzier string sounds. Small settings of this parameter result in soft, sharp plucking sounds.

#5 Gate Mode **Normal, Keyed or Open**

This parameter selects different triggering modes for the string resonators. Here is a description of the three available modes:

"Normal" triggers a new plucked string for each key pressed (MIDI "note-on" message received). The envelope of the sound is determined by the "decay" and "release" parameters.

"Keyed" is vaguely similar to the action of a bowed string. When a key is held down, the string resonator is constantly stimulated with filtered noise. When the key is released, the string decays according to the setting of the "release" parameter. The "decay" parameter is ignored for this mode.

"Open" will stimulate the strings constantly, regardless of whether any keys are pressed. In this mode, the keyboard will "tune" the resonators, but will not affect the dynamics of the sound. The "decay" and "release" parameters are ignored in this case, since the strings are always stimulated at full level. **Warning:** This mode can be quite loud. Turn down your levels before playing with this parameter.

#6 Hold **on or off** **Modulation**

This parameter, when set to "on", will inhibit MIDI from affecting the tuning of the string resonators. This is useful for using a MIDI keyboard to tune the strings to be used as passive resonators.

#8 Freq **0 low to 100** **Modulation**

This parameter controls the center frequency for the stimulation noise filter. This parameter will affect the resultant tone of the plucked string resonators.

#9 Qfac **0 to 100** **Modulation**

This parameter controls the resonance of the noise filter. High values will result in a very resonant filter.

#10 Bright **0 to 100** **Modulation**

This controls the tone of the decaying string. Low settings of brightness will give a warmer decay.

#11 High Amt **-100 to 100 per cent** **Modulation**
#12 Band Amt **-100 to 100 per cent** **Modulation**
#13 Low Amt **-100 to 100 per cent** **Modulation**

These parameters control the relative amount of highpass, bandpass, and lowpass noise that is used as the string stimulation. With these, and the frequency control, you can shape the tonal characteristic of the plucked string sound.

#14 In Amt **-100 to 100 per cent** **Modulation**

This parameter controls the amount of external input signal feeding the string resonators. This is usually used when the strings are acting as passive resonators. See "Tips and Tricks" to set up passive resonators.

#15 Chorus **0 to 100**

This is the amount of chorus that is mixed into the output signal.

#16 Speed **0 to 100**

This is the speed of the chorus sweep. Large values will give a faster rate, and a more intense chorus.

#17 Depth **0 to 100**

This is the range of delay that the chorus will sweep. The maximum value of 100 corresponds to a sweep range of about 300 milliseconds.

#19 Mix **0 to 100 per cent** **Modulation**

This is the wet/dry effect mix. A setting of 100 per cent will result in a full wet effect output mix.

Expert Parameters

#25 V Decay **-100 to 100**
#26 V Gate **-100 to 100**
#27 V Level **-100 to 100**
#28 V Bright **-100 to 100**

These parameters control how much the received MIDI key velocity affects the particular parameter. If you set "V Level" to a positive number, then the harder you hit, the louder the voice is. The other parameters act similarly. A negative value reverses the effect.

#20 K Decay **-100 to 100**
#21 K Gate **-100 to 100**
#22 K Level **-100 to 100**
#23 K Bright **-100 to 100**
#24 K Release **-100 to 100**

These parameters scale the keyboard to the parameters. A positive number for "K Level" causes the higher note on the keyboard to sound louder. For "Decay" and "Release" a -12 gives an even envelope across the keyboard range. A value of 12 for "K Gate" gives a natural sounding pluck across the keyboard.

#29-34 Note 1-6 **notes Cx to G9**
#35-40 Start 1-6 **0 to 127**

These parameters are included so that you can manually set the string tunings (without a MIDI keyboard). They are automatically set when you play on the MIDI keyboard. The "Note" is the note to be played. The "Start" is the value derived from the velocity and is used for velocity scaling.

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "return" will bring you back to the normal parameter pages.

#41	**Left In**	**-48 to 48 dB**
#42	**Right In**	**-48 to 48 dB**
#43	**Left Out**	**-48 to 48 dB**
#44	**Right Out**	**-48 to 48 dB**

The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments.

Interesting Ideas

Instead of using noise to stimulate the strings, use the external input. If you play your synth into the input, the strings will take on some of the character of your synth sound.

To set up this algorithm as a sympathetic resonator, set "high amt", "band amt" and "low amt" to 0. Set "in amt" to about 20 per cent and set the gate mode to "open". The strings will now resonate with the input signal. The strings can be tuned either manually (by setting the "note" parameters) or with a MIDI keyboard. If you've set up a tuning with MIDI and you desire to save it, set "hold" to "on" and save a preset. Once hold is set to "on" MIDI will no longer affect the tuning.

Things to be Aware of

When modulation is patched to some of the parameters, the parameters will be changed after the MIDI notes are received.

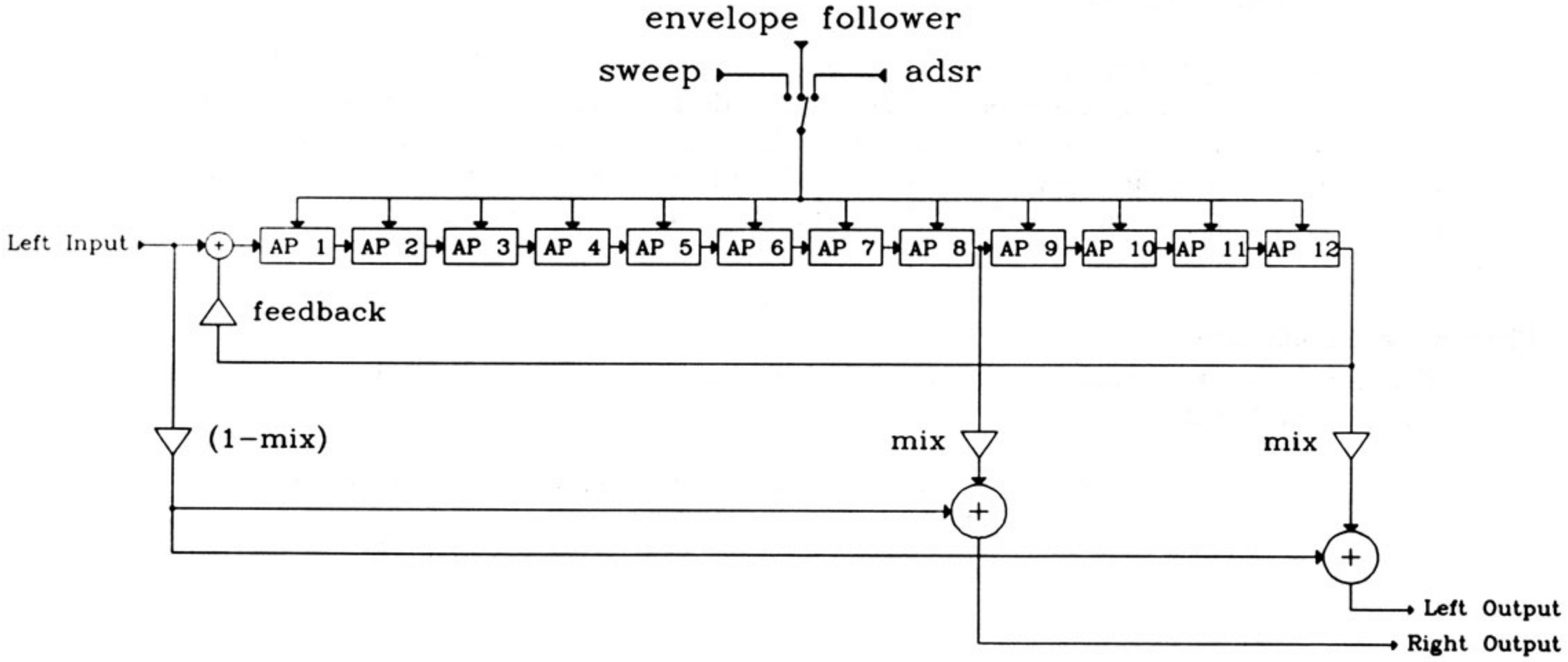
If many parameters are being modulated, the MIDI response may be a bit sluggish.

Algorithm 119 - Phaser

Description

This algorithm is a mono-in, stereo-out phase shifter, similar in theory to a guitarist's foot-pedal phaser. The dry signal is mixed with the phase-shifted signal (created by a series of all-pass filters) to produce a series of notches, whose frequencies can be swept by altering the filter characteristics. The sweep can be done by an LFO, an envelope follower, or an ADSR shape which is triggered by MIDI or by the envelope follower. The envelope or ADSR can follow either the audio signal on channel 1, or a different signal on the other channel (channel 2).

Block Diagram



Parameters

#0 Mix **0 to 100 per cent** **Modulation**

This parameter controls how much of the phase-shifted signal is present in the final mix. At 0, the output is completely dry. At 100, the output contains only the phase-shifted signal and will have the same frequency response as the dry signal if the feedback is 0. At 50, the mix is equal and has the deepest notches if the feedback is 0. For best result, do your mixing with this parameter, rather than with a console mixer.

#1 Feedback **-100 to 100 per cent** **Modulation**

This parameter controls the amount of feedback in the phase-shifted signal. With 100% feedback, no more dry signal is admitted into the phase-shifter loop, and the loop will resonate.

#2 Sweep Rate **0 to 100 per cent** **Modulation**

This controls how fast the LFO sweeps if in LFO mode. This parameter is not visible on the front panel when not in LFO mode.

#3 Envelope Decay Rate **0 to 100 per cent** **Modulation**
The envelope follower tries to track the peaks of the input signal. It has an instantaneous rise time, and this parameter is how fast it decays. This parameter appears on the main menu screen in envelope mode, and can be accessed as an expert parameter from other modes as well.

#4 ADSR Rate Scaler **0 to 100 per cent** **Modulation**
This just scales down the Attack, Decay, and Release rates of the ADSR. This does not appear on the front panel when not in ADSR mode.

#5 Sweep Mode **0 (sweep), 1 (envelope), or 2 (adsr)**
This switch is used to patch either the LFO, the envelope, or the ADSR to control the allpass filter frequencies (and therefore the notch frequencies).

#6 Sweep Bottom **0 to 100 per cent** **Modulation**
The frequency to be used at one extreme of the sweep in LFO mode, or when the envelope or ADSR are at their low points. Please note that this frequency may be set higher than the sweep top if you desire to invert the envelope or ADSR.

#7 Sweep Top **0 to 100 per cent** **Modulation**
The frequency to be used at the other extreme of the sweep in LFO mode, or when the envelope or ADSR are at their peaks. See sweep bottom.

Expert Parameters

#8 ADSR Attack Rate **0 to 100 per cent** **Modulation**
This controls the attack segment of the ADSR. This amount (multiplied by the ADSR rate scaler) is added to the ADSR level until it reaches the top, at which point it enters the decay segment. If a MIDI trigger is received in the attack phase, it will just continue to attack.

#9 ADSR Decay Rate **0 to 100 per cent** **Modulation**
This controls the decay segment of the ADSR. This amount (multiplied by the ADSR rate scaler) is subtracted from the ADSR level until it reaches the sustain level, at which point it enters the sustain phase. If a MIDI trigger is received during the decay segment, the attack segment is immediately reentered.

#10 ADSR Sustain Level **0 to 100 per cent** **Modulation**
The ADSR will stay at this level until the envelope follower goes below the release threshold, at which time it enters the release phase. If a MIDI trigger is received during the sustain portion, the attack segment is immediately reentered.

#11 ADSR Release Rate **0 to 100 per cent** **Modulation**
During the release segment of the ADSR, this amount (multiplied by the ADSR rate scaler) is subtracted from the ADSR value until it reaches 0, or until the envelope follower goes above the attack threshold, at which time it enters the attack segment once again. If a MIDI trigger is received during the release segment, the attack segment is immediately reentered.

#12 ADSR Attack Threshold **0 to 100 per cent** **Modulation**
This is the level that the envelope follower must rise above in order to begin the ADSR in its attack segment.

#13 ADSR Release Threshold **0 to 100 per cent** **Modulation**
When the envelope follower falls below this level, the ADSR may enter the release segment from the sustain segment.

#14 ADSR Trigger **Trigger only** **Modulation only**
This parameter does not appear on any menu, but can be patched to a MIDI event to trigger a new ADSR, starting from the attack segment.

#15 Envelope Channel **0 (channel 1) or 1 (channel 2)**
This switch determines whether the envelope is to follow the signal which is actually being phase-shifted (0) or the signal in the other channel (1).

#16 Envelope Decay Shape **0 (linear) or 1 (exponential)**
This switch controls whether the envelope decays in a linear fashion (0), or whether the envelope's decay slows down gradually as the level decreases (1).

Levels

To access the level adjustment parameters, press the softkey labelled "levels" on the last parameter page. Pressing "parameter" will bring you back to the normal parameter pages.

#17 Left In **-48 to 48 dB**
#18 Right In **-48 to 48 dB**
#19 Left Out **-48 to 48 dB**
#20 Right Out **-48 to 48 dB**
The level parameters allow individual level adjustments to be edited and saved with each user preset. All of the level adjustments are made in dB and are added to the master level adjustments. The master level adjustments are those made after pressing the "levels" key beneath the bargraphs.

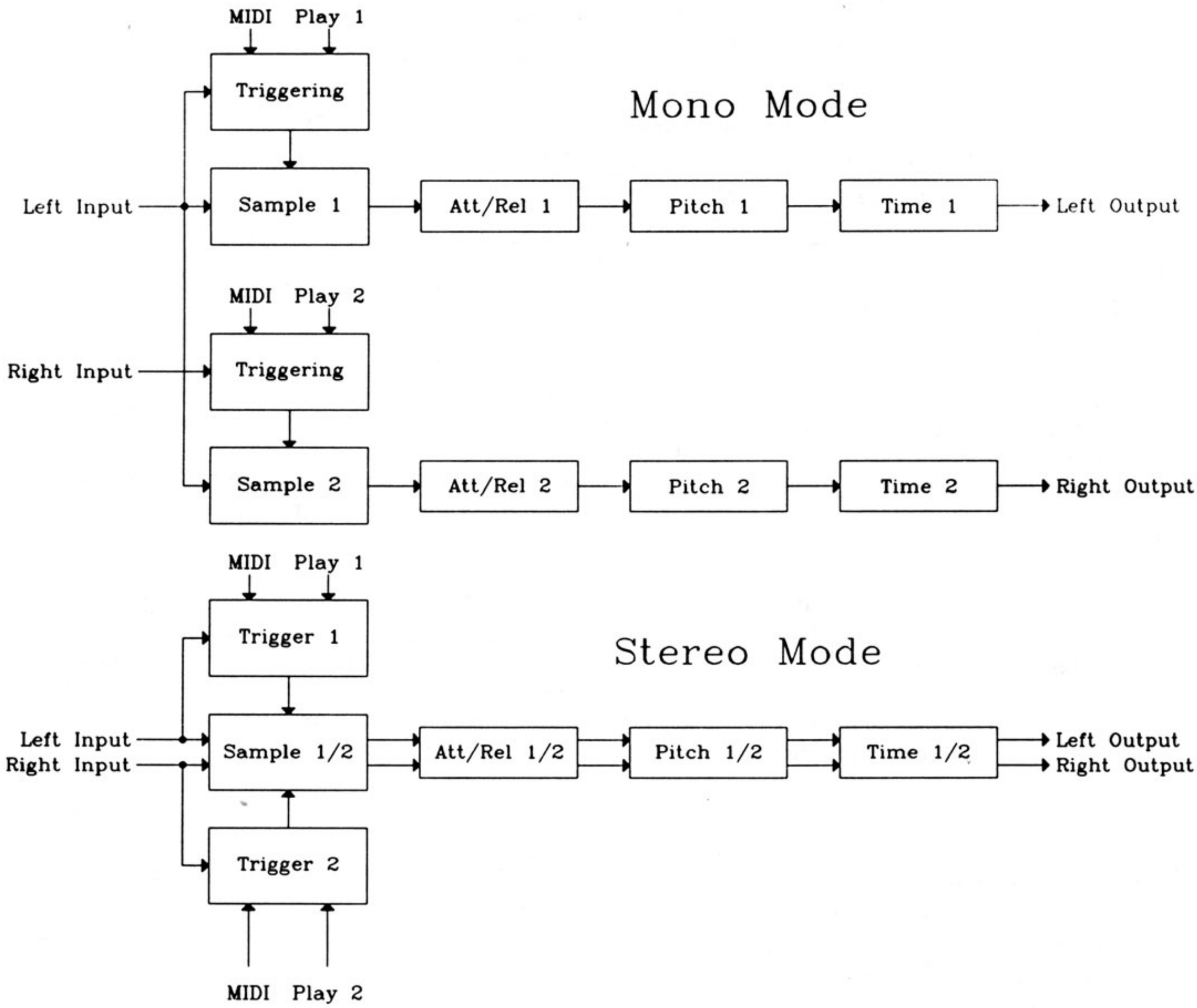
Hint: For best result, do not mix any dry analog signal with the phaser output, as this will affect the phasing. Instead, use the Mix parameter; this gives the best control over the effect. The phaser works well with guitar or other sounds rich in harmonics. Envelope or ADSR mode are subtler effects; adding more feedback can bring the effect a bit more forward. In ADSR and envelope modes, you can invert the envelope shape by switching the values for top and bottom frequencies.

Algorithm 120 - Studio Sampler

Description

This algorithm will digitally record 11.8 seconds of stereo or 23.7 seconds of mono audio (47.5/95 if you bought the H3500 - dfx/e). Two separate samples can be recorded into memory and played back using front panel buttons, audio triggering, or with a MIDI keyboard. The begin and end points of the two samples can be edited using "rock 'n' reel" style editing. Also, the pitch of the samples can be shifted over a six octave range, without altering the playback length. Conversely, the length of the sample can be altered without changing pitch. This allows independent control of the length and pitch of the recorded samples.

Block Diagram



New for Version 1.31

Stereo samples are now re-triggerable. In previous versions, audio triggering of stereo samples required that the entire sample be played out before it could be re-triggered.

Additional trigger keys have been added to allow easy auditioning of samples while adjusting the pitch, time, attack and release parameters.

Recording

After loading the Studio Sampler program, the display will show the sample memory being cleared and will then present this menu:

```
 0.000 --stopped---|| 0.000 --stopped---
(-record-)(--stop--)(-play 1-)(-play 2-)
```

To record a sample into the H3000, first press (**record**). If the program has just been loaded, the display will then show:

```
 0.000 set trigger|XXXXXtX
 (-trg en-)(-record-)
```

If a sample has been recorded into memory since loading the program, you will have the option of recording to sample 1 or sample 2. The display will show:

```
Select record destination:
(record 1)(record 2)
```

Press "Record 1" or "Record 2" to select which of the samples you wish to record to. The display will then show the "set trigger" menu.

At this point, the LCD display will show a VU meter indicating the recording level, and the H3000 will be passing its audio input to both output channels. To use the audio source to trigger the recording, use the knob to adjust the trigger threshold relative to the VU reading. The small "t" will show the location of the trigger threshold. Press "-trg en-" to enable the audio trigger for recording. To manually start the recording, press "-record-". To cancel the recording, press the parameter key. To stop recording, press "--stop--".

Once the sample is recorded, the display will return to the main menu, and will probably be flashing the message "--analyzing--". This indicates that the H3500 is analyzing the newly recorded sample for the purpose of time alteration and pitch shifting. If you wish to play back the sample without pitch shift or time scale modification, disregard the flashing message; the playback will be perfectly normal. If, however, you wish to shift the pitch or change the time of the sample, you may hear some "glitches" in the output. These will disappear once the "analyzing" message has stopped flashing.

Playback

To play a sample that was recorded into memory, press "play 1" or "play 2". The two keys will play samples 1 and 2 respectively. In mono mode, sample 1 will be played in the left output channel and sample 2 will be played in the right output channel. In stereo mode, each sample uses both output channels, and only one sample may be played at a time. Pressing the play keys repetitively will re-trigger the samples, creating a "stutter" effect.

Press "stop" to stop the playback of both of the samples.

Use pitch 1 and 2 to control the pitch of the samples.

Use time 1 and 2 to stretch or compress the samples in time.

To "loop" the samples (i.e., play them back repetitively, in an infinite loop) press and hold the appropriate play key for about 1 second. The display will show "--looping--", when the sample is in loop mode. To disengage the loop mode, press the appropriate play key; the loop will play out to the end of the sample. To stop the sample immediately, press "stop".

Editing

Press the "-edit 1-" and "-edit 2-" keys to edit the start and end points of the two samples. Then press the "start" key to edit the start point of the sample, or press the "stop" key to edit the stop point of the sample. Turning the knob will control the start and stop points, and the display will indicate the times in seconds. The audio output will mimic the effect of an analog tape recorder that is being manually shuttled back and forth to find an edit point. Think of the knob as a reel on that imaginary tape recorder. (Note: Because of the quantized nature of the front panel controls, turning the knob very slowly will not shuttle the edit point.) Press "play" to quickly preview the edit.

If the sample to be edited was "looping" when edit mode was entered, the editing function is slightly different. The audio will continue looping while the start and stop points are changed. The knob will still control the edit points. Simply adjust the start and stop points until the loop sounds right.

To play the sample backwards, set the stop time larger than the start time. Playback will always begin at the start point and end at the stop point, regardless of the settings.

Parameters

#0 Pitch 1 **-3600 to 3600 cents** **Modulation**
#1 Pitch 2 **-3600 to 3600 cents** **Modulation**
This parameter controls the playback pitch of sample 1 and 2.

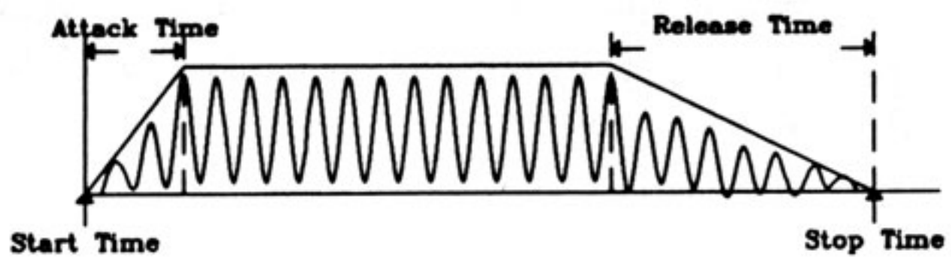
#2 Time 1 **0 to 800 per cent** **Modulation**
#3 Time 2 **0 to 800 per cent** **Modulation**
This parameter controls the playback speed of the sample, independent of pitch. A setting of 100 per cent will result in normal speed playback. Higher settings will "compress" the sample in time, resulting in higher speed playback, without altering the pitch of the sample.

#4 Attack 1 **1 to 1000 milliseconds**
#5 Attack 2 **1 to 1000 milliseconds**
Attack 1 and 2 control the length of the attack portion of the envelope of two samples.

#6 Release 1 **1 to 1000 milliseconds**

#7 Release 2 **1 to 1000 milliseconds**

Release 1 and 2 control the length of the release portion of the envelope of samples 1 and 2. The release portion begins at a point before the preset stop time such that the end of the envelope will coincide with the end of the sample. A press of the "stop" key or the reception of a note off command (when triggering with MIDI) will cause the sample to begin its release phase early.



#8 Mix **0 to 100 per cent**

The mix control allows the dry input signal to be mixed in with the output of the sampler. A setting of 0 per cent will allow only the input signal to be heard at the outputs, and a setting of 100 per cent will pass only the sampler output.

Expert Parameters

Triggers

#9 Trigger Mode **off or audio trigger**

The Trigger Mode parameter is used to enable or disable audio level triggering of the sample playback.

#10 Threshold 1

#11 Threshold 2

These two parameters determine the threshold at which an audio signal will trigger sample playback. Threshold 1 is used for the triggering of sample 1 by the left input channel and Threshold 2 is used for sample 2 with the right input channel.

MIDI

#12 MIDI Mode **off, keyboard split, or layered (mono only)**

MIDI Mode determines how MIDI note events will trigger the sample playback.

Keyboard Split mode allows the MIDI keyboard to be split into two zones, determined by the Key Split parameter. Notes played below the split point will trigger sample 1 and notes played above it will trigger sample 2. In mono mode, the playback will be polyphonic (two voice) while in stereo mode, only 1 voice may sound at a time.

Layered Mode, only offered while in mono record mode, will trigger both samples 1 and 2 from a single MIDI note event. This is useful to create thick layered sounds. It can also be used to fatten monophonic sounds by setting the edit points of sample 1 and 2 to the same values. By subtly altering the pitches and playback times of sample 1 and 2, a very convincing double track effect may be obtained.

#13 Base Note **C-1 to C8**
#14 Base Note 1 **C-1 to C8**
#15 Base Note 2 **C-1 to C8**

The Base Note determines which MIDI note will give a non-pitch-shifted playback. Playing above the base note will shift the pitch upward; playing below will lower the pitch. The Base Note parameter is used with the "layered" MIDI mode and Base Note 1 and 2 are used for the "Key Split" MIDI mode.

#16 Split Point **C-1 to C8**

The split point parameter is used only in conjunction with the "Keyboard Split" MIDI mode. Notes played below the split point will trigger sample 1; those played above will trigger sample 2.

#17 Drum Trigger **off or on**

The drum trigger enable is used in conjunction with MIDI trigger of the samples. When drum triggering is on, a single note-on message will play the entire sample; the note off will be ignored. For normal, keyboard-type playback, this parameter should be set to "off".

Sampler Control

#18 Shift Mode **constant length, generic sampler**

In constant length mode, splicing is used to shift the pitch of the sample without changing the playback length. In generic sample mode, the sample is simply played back faster or slower to alter the pitch.

#19 Record Mode **monophonic, stereophonic**

The Record Mode setting determines whether the H3500 records in stereo or mono. The record mode should only be changed before recording a new sample. More specifically, a sample recorded in mono cannot be changed into a stereo sample by changing this parameter. Also, when the record mode is set to stereo, the available recording time will be halved and only one sample may be played back at a time.

To help you save time when you wish to record a stereo sample, we have provided algorithm 121. The default of this algorithm is set to stereo, thus saving you the tedium of changing the default of the mono/stereo option parameter when you wish to record a stereo sample. Therefore, when you wish to record a mono sample, we suggest you use algorithm 120. When you wish to record a stereo sample, use 121.

Using mod factory™

mod factory for the Eventide H3500 is a collection of two new algorithms and one hundred preset effects patches that add a new angle to the already impressive effects repertoire of H3500. With this software, effects such as delay ducking, BPM delays and sweeps, compression, manual flanging, smooth autopanning, audio triggered sweeps and much, much more are now possible.

The two algorithms of the mod factory software are designed with the era of analog synthesis in mind. Each algorithm gives the user access to a dozen or so basic digital signal processing "modules". Using software "patch cords", the user can connect the modules to create literally thousands of unique signal processing algorithms. To learn more about creating your own effects patches, look at the patching section in the algorithm descriptions.

If the idea of creating your own effects algorithms makes you weak in the knees, don't worry. We've included a very comprehensive and useful collection of effects patches that should keep you very happy. Dial up program numbers 800 and up on your H3500 to see for yourself.

Basics

The mod factory algorithms and presets essentially work like any other H3500 effects program, with some minor differences. The two new algorithms, mod factory|one, and mod factory|two can be found at program numbers 122 and 123. The library of presets that we've created is located at program number 800 and beyond.

In order to make the presets easy to use, we've made extensive use of "soft knobs", found when you first press the "function" key. In addition, the mod factory algorithms have a tricky feature that might make your life a bit easier; when a mod factory preset is saved, the current page of parameters is remembered so that it will show up the next time the preset is loaded. This allows you quick access to your favorite page of parameters.

There is one thing to watch out for. Because of the modular, patchable nature of the mod factory algorithms, some of the parameters may have no audible effect on a particular patch. This would occur if, for example, the delay blocks were not "patched" into the signal chain. You could still change the "delay" parameters, but because the audio was not going through the delay module, you would not hear any effect on the sound.

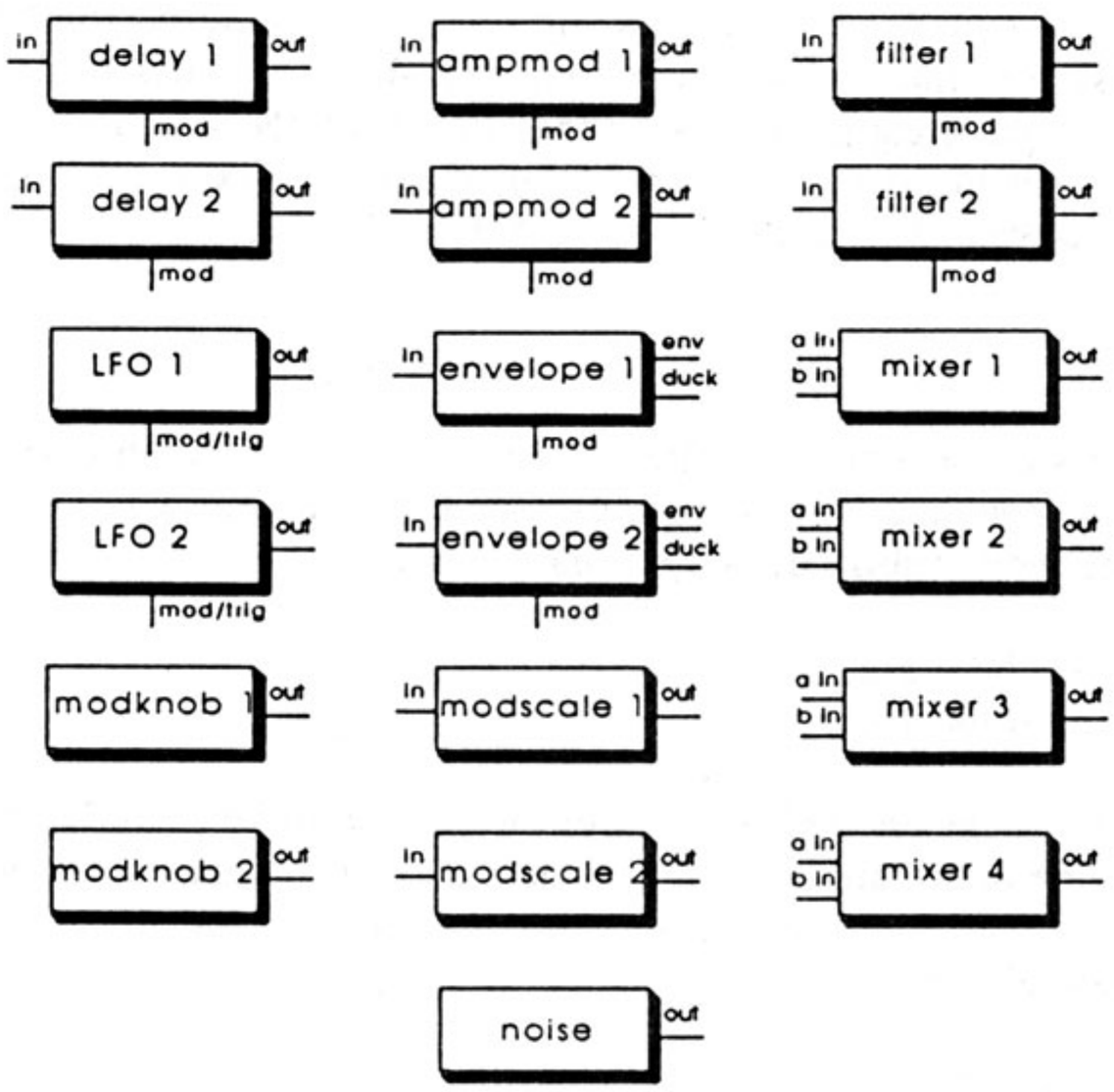
Our final word of advice is to feel free to experiment. Play with things, let your imagination run wild. Use your ears as your guide to what works and what doesn't. Don't be afraid to try unusual patches; you just might create that next hot sound. Good luck and enjoy!

Algorithm 122 - mod factory|one

Description

This is a "modular" effects processing algorithm. Software "patch cords" can be used to connect the processing modules shown below in any desired configuration. The main building blocks are a pair of sweepable delays, a pair of state-variable filters, two low-frequency oscillators, two envelope detectors, and two amplitude modulators.

Block Diagram



Mod Knobs, Mix and BPM Control

The Modulation Knobs are specially designed controls that convert the digital, quantized nature of parameter entry on the H3500, to a smoother, analog-style control. This is very useful for creating effects such as manual flanging and filter sweeps. Mod Knobs 1 and 2 produce signals that can be patched to the modulation inputs of the any of other module. To create a manual flanger, the output of Knob 1 would be patched to the modulation input of delay 1. By mixing the delayed and undelayed signals a very simple flanger has been created. To modulate the delay, simply press "knob 1" and turn the knob on the H3500.

#30	**Knob 1**	**0 to 100.0 per cent**	**Modulation**
#31	**Knob 2**	**0 to 100.0 per cent**	**Modulation**

These parameters control the value of the modulation output of Mod Knobs 1 and 2. A value of zero will produce a zero output, and a value of 100 will produce a maximum modulation output.

#32 Mix 0 to 100 per cent Modulation

This controls the wet/dry mix of the H3500. A setting of 100 per cent will give only the effected signal at the outputs.

#33 BPM 30 to 200 beats/min Modulation

The BPM control works in conjunction with the BPM controls of delay 1 and 2 and lfo 1 and 2. Essentially, this paramcter determines the time value of a beat (quarter note). If the BPM value is set to 60, one quarter note will equal one second. This feature is extremely useful when delays must be in time to a particular tempo.
In addition to using the knob or keypad to enter the desired tempo, the beats per minute may by set by "tapping" the BPM key. To "tap in" the tempo, rhythmically press the BPM key 4 times. The time between taps will be taken as the new tempo.

Also, a MIDI controller may be used to "tap" in the tempo. By default, the MIDI Damper Pedal is patched to the BPM tap control. To set the tempo, simply tap the damper pedal three times. To use a different MIDI controller, go to the MIDI patching menu, under the "FUNCTION" key on the front panel. If you have difficulty making this feature work, check to see that the MIDI out of your controller is connected to the MIDI in of the H3500 and that the two devices are using the same MIDI channel.

Filters

The filter modules of this algorithm allow flexible control over the timbre within an effects patch. Modulation inputs on the filter allow dynamic control of the filter cutoff frequency. This can be used to created dramatic envelope filter effects or more subtle dynamic tonal shaping.

#34 Cutoff 0 to 7000 Hz
#35 Cutoff 0 to 7000 Hz

The cutoff controls the frequency at which the filter effects the audio path. For a low-pass filter, frequencies above the cutoff frequency will be attenuated. For a high-pass filter, frequencies below the cutoff will be attenuated. For a bandpass filter, frequencies above and below the cutoff will be reduced. In the case of a bandpass filter, the cutoff frequency is commonly known as the "center" frequency.

#36 Q Factor 1 1 to 1000
#37 Q Factor 2 1 to 1000

The Q factor controls the amount of resonance of a particular filter. A Q setting of 1 will give a smooth, natural response, while a setting of 1000 will give a highly resonant, oscillatory sound. Higher Q settings also increase the gain of the filter, increasing the likelihood of clipping. Also, at very high Q settings, lowpass and highpass filters will begin to sound like bandpass filters because of the high resonance.

#38 Type 1 lowpass, bandpass, or highpass
#39 Type 2 lowpass, bandpass, or highpass

Use this to set the type of filter desired. A lowpass filter will reduce high frequencies, producing a warmer sound. A highpass filter setting can be used to remove bass frequencies or to produce a thinner sound. Use a bandpass filter to pass a selected portion of the frequency range or to produce resonant peaks.

#40 Mod Amount 1 0 to 7000 Hz
#41 Mod Amount 2 0 to 7000 Hz

These parameters determine how the modulation input of the filters will affect the cutoff frequency. If set to 1000 Hz, a maximal change on the modulation input will produce a 1000 Hertz change in the cutoff frequency of the filter.

Delays

The two delay modules in this algorithm have a variable amount of delay, depending on the hardware configuration of the H3500. With a standard H3500, each delay line has up to 700 milliseconds of delay. With an Eventide HS322 board, the maximum delay is 11000 milliseconds (11 seconds) per delay module. When an Eventide HS395 board is installed, up to 32000 milliseconds (32 seconds) of delay is available per module.

Each delay module has a modulation input which allow smooth modulation of the delay, allowing for effects such as manual flanging and dynamic or triggered delay sweeps.

#42 Delay 1 0 to 700, 11000, or 32000 msec
#43 Delay 2 0 to 700, 11000, or 32000 msec

Use this to control the amount of delay in the delay modules. This parameter works in conjunction with the Delay BPM setting to determine the final delay. When strict beat per minute control of delays is desired, this should be set to zero.

#44 Delay 1 BPM 0/24 to 96/24 beats
#45 Delay 2 BPM 0/24 to 96/24 beats

The Delay BPM control determines how the master BPM tempo control affects the delay. When this is set to zero, the tempo setting has no effect on the delay time. To get a BPM setting of delay, set the normal delay parameter to zero, and set this to the number of beats the delay should correspond to. The settings are in 1/24 subdivisions of a quarter note. To get a quarter note delay, the delay BPM should be set to 24/24. To get an eighth note delay, set this parameter to 12/24. A setting of 8/24 will give quarter note triplets.

#46 Delay 1 Feedback -100 to 100 per cent
#47 Delay 2 Feedback -100 to 100 per cent

This controls how much of the delay's output is fed back to its input. Settings other than zero will result in recirculating, repeating delays.

#48 Loop 1 off or on Modulation
#49 Loop 2 off or on Modulation

To "loop" the delays, i.e., to make them repeat indefinitely, set this parameter to "on". When set to "on" all input to the delay lines will be blocked, repeating the most recent audio, but preventing any further input.

#50 Delay 1 Mod -500.0 to 500.0 milliseconds
#51 Delay 2 Mod -500.0 to 500.0 milliseconds

The Delay Mod controls determine how much the modulation input affects the final delay. For flanging effects, this should usually be set to several milliseconds. For chorusing, set this to about 10 or 20 milliseconds. Negative settings will sweep the delay in the opposite direction. This is useful if sweeping the two delays with the same signal, allowing for a richer sound.

Low Frequency Oscillators

The low frequency oscillators are the modules to use when creating sweep and triggered sweep effects. These oscillators work in a different way than the H3500 Function Generator, allowing much smoother modulation of delays, filters and gain. The waveshape of the LFO can be selected from a variety of continuous or audio-triggered waveforms. In addition, the LFOs have frequency modulation inputs that open up new dynamic sweeping effects.

#52	**LFO 1 Frequency**	**0.00 to 300.0 Hertz**	**Modulation**
#53	**LFO 2 Frequency**	**0.00 to 300.0 Hertz**	**Modulation**

These parameters control the frequency of LFO 1 and 2. This works in conjunction with the LFO Beat per Minute control. When tempo tracking of the LFOs is desired, set this parameter to zero.

#54	**LFO 1 BPM**	**0/24 to 96/24 beats**
#55	**LFO 2 BPM**	**0/24 to 96/24 beats**

Similar to the Delay BPM control, this parameter allows the master BPM tempo to control the frequency of the LFOs. With this, effects such as in-tempo autopanning can be obtained.

#56	**LFO 1 Waveform**	**sine, square, sawtooth, triangle, exponential sawtooth, exponential triangle, triggered sine, triggered saw, triggered triangle, triggered exponential saw, triggered exponential triangle, toggle linear, toggle exponential**
#57	**LFO 2 Waveform**	**same as above**

The LFO Waveform parameter determines the shape of the output of the LFOs. The first 8 waveforms in the list are continuous; that is, they always do what they do. The next 5 waveforms are audio-triggered. When the level of whatever is patched to the input of the oscillator goes above the threshold, the oscillator sweeps through one cycle. The last 2 waveforms, the toggle waves are also audio-triggered. They will alternately sweep up and down with every other audio trigger. This is useful for such things as autopanning, where alternate hits of a drum would cause the input to pan from left to right, then right to left.

#58	**LFO 1 Threshold**	**0 to -40 dB**
#59	**LFO 2 Threshold**	**0 to -40 dB**

The LFO threshold controls the level at which the oscillators are triggered. This parameter only has effect when the oscillator is set to an audio-trigger waveform.

#60	**LFO 1 Mod**	**0 to 300.0 Hertz**
#61	**LFO 2 Mod**	**0 to 300.0 Hertz**

For continuous LFO waveforms, the oscillator input will modulate the frequency of the LFO. This parameter controls how much the frequency will change for a full level input to the LFO.

Envelope Detectors

The two envelope detectors are used to modulate various parameters based on the envelope of the signal. The envelope of a signal is simply its level at any given instant, so, the envelope detectors allow us to build effects that vary with the signal level. The input to the envelope detectors can be patched anywhere, allowing this dynamic modulation to be based on the signal level of any point in our effects patch.

The envelope detectors each have two outputs, the envelope output and the ducker output. The envelope output is what you would expect, a signal that varies in proportion to the input of the envelope detector. The ducker output is a signal that is useful in building effects that reduce their level in the presence of another signal; i.e. they duck out of the way. allowing you to hear the other signal. So, the ducker output is normally at a high level. When the input to the envelope detector exceeds a threshold, the output gets progressively smaller.

#62 Env 1 Attack 0.0 to 1000.0 milliseconds
#63 Env 2 Attack 0.0 to 1000.0 milliseconds

The Attack Time controls how fast the envelope and ducker outputs respond to increases in signal level.

#64 Env 1 Decay 0.0 to 1000.0 milliseconds
#65 Env 2 Decay 0.0 to 1000.0 milliseconds

The Decay Time controls how fast the envelope and ducker outputs respond to decreases in signal level. Often it is desirable to have a fast attack time and a slow decay time (Especially in something like a compressor).

#66 Threshold 1 0 to -40 dB
#67 Threshold 2 0 to -40 dB

The Threshold determines the level at which the ducker begins reducing its level. This is very similar to the threshold control on a compressor.

#68 Ratio 1 1.0:1 to 100.0:1
#69 Ratio 2 1.0:1 to 100.0:1

The Ratio parameter controls how much the output of the ducker will decrease in relation to the input signal level. If the ducker output is patched to the modulation input of one of the AmpMod modules, this parameter will function similar to the ratio control on a compressor.

Amplitude Modulator Parameters

The amplitude modulator modules allow the gain of a signal to be smoothly varied. These modules are the basis for autopanning, compression, ducking, and many other dynamic effects.

#70 AM 1 Amount -200 to 200 per cent
#71 AM 2 Amount -200 to 200 per cent

The Amp Mod Amount determines how much the modulation input effects the gain of the audio signal. A setting of 100 per cent will give no attenuation for a maximum modulation input and full attenuation for a zero modulation input. When the amount is set to 200 per cent, a maximum modulation input will add 6 dB of gain to the signal.

#72 AM 1 Offset -200 to 200 per cent
#73 AM 2 Offset -200 to 200 per cent

The Amp Mod Offset controls how much gain or attenuation the signal will have when the modulation input is zero.

Mixer Parameters

The four simple two-input mixers are essential in building useful patches. They are used for controlling level, mixing, building feedback loops and much more.

A mixer is used to combine two signals with control over the amount and phase of each signal. A mixer can be used to simply control the level of a signal by patching the B input of a mixer to zero.

#74	**Mix 1 A Amount**	**-100 to 100 per cent**	**Modulation**
#75	**Mix 1 B Amount**	**-100 to 100 per cent**	**Modulation**
#76	**Mix 2 A Amount**	**-100 to 100 per cent**	**Modulation**
#77	**Mix 2 B Amount**	**-100 to 100 per cent**	**Modulation**
#78	**Mix 3 A Amount**	**-100 to 100 per cent**	**Modulation**
#79	**Mix 3 B Amount**	**-100 to 100 per cent**	**Modulation**
#80	**Mix 4 A Amount**	**-100 to 100 per cent**	**Modulation**
#81	**Mix 4 B Amount**	**-100 to 100 per cent**	**Modulation**

Each of the mixers has two inputs, an "A" input and a "B" input. This is like a mixing console that only has two channels, channel A and B. The mix amount control is like the fader for that particular input. A setting of 0% means the fader is fully off. A setting of 100% means the fader is fully on. A setting of 50% will cut that channel's level by one-half.

To invert the phase on a mixer input, use negative settings instead of positive settings. A setting of -100% will give a full "on" signal that has its phase inverted. A setting of -50% will cut the signal by half and also invert the phase.

Modulation Scalers

The modulation scalers are useful in controlling the gain of a particular modulation signal. They are particularly useful in allowing MIDI or the softknobs to control a particular parameter. To do this, patch fullscale into one of the control scalers. Then, to modulate delay, patch the output of the control scaler into the delay mod input. Then, patch MIDI or a SoftKnob to control the scaler. Using this method, most parameters can be MIDI controlled.

#82	**Mod Scale 1**	**-100 to 100.0 per cent**	**Modulation**
#83	**Mod Scale 2**	**-100 to 100.0 per cent**	**Modulation**

The Mod Scale Amount determines the amount of attenuation given to the input modulation signal. A setting of 100 per cent gives no attenuation and a setting of zero turns off the input. Negative settings reverse the polarity of the input signal.

Level Parameters

The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels.

#84	**Left In**	**-48 to 48 dB**
#85	**Right In**	**-48 to 48 dB**
#86	**Left Out**	**-48 to 48 dB**
#87	**Right Out**	**-48 to 48 dB**

Patching Parameters

#88 Prg Load Speed slow or fast

The program load speed control is definitely considered an expert parameter. This parameter affects the speed at which presets are loaded. When set to slow, the loading speed will be noticeably slower than when the load speed is set to fast. The drawback to the fast load mode is that the contents of delay lines and other internal registers are not "cleared" before the new patch begins working. This means that if loading a patch with long delay times and/or lots of feedback, the patch may load with clicks or noise in the output audio.

Here's the basic rule of thumb. If you aren't sure about what to do, set this parameter to slow. If you think you know what you're doing and have a patch that has a very small amount of delay and little feedback, try setting this parameter to fast. If you find that the patch loads in a noisy manner, set the mode back to slow.

How to Patch

To create an effects "patch" press **(patch)**. The display will look like:

```
122 mod factory|one          dly 1 in<mixer 1
( input  ) (output ) (prg load) ( return )
```

This display shows that mixer 1 is patched to dly 1 in. The input is always shown on the left and the output on the right, in the form input<output. Here, dly 1 in is the input, and mixer 1 is the output. To select an input to patch, press **(input)**. The knob will scroll through a list of all available inputs. To re-patch a particular input, scroll the input list until the signal is shown in the display. Then, press **(output)**. The knob will now scroll through the outputs that may be patched to the currently selected input. As you turn the knob, you will instantly hear the effect of the signal being repatched.

An important note of warning! Please, keep your monitor volume low when creating new patches. It is fairly easy to create feedback loops capable of producing ear and speaker damaging signals. Be careful out there.

One thing to make note of when creating a patch is the difference between audio inputs and modulation inputs. Generally, the modulation inputs are used to change some parameter of the effect, such as a filter frequency or delay time. In most cases, patching a slowly changing signal, such as an LFO to a modulation input will result in the most aurally satisfying result. It is possible and might sometimes be tempting to patch an audio signal directly into a modulation input. The main problem with this is that modulation signals are processed at a slower sample rate than audio signals. Because of this, patching an audio signal into a modulation input may result in audible aliasing. (Aliasing is a non-harmonic modulation distortion that results when a digital signal is sampled too slowly.) To minimize the potential for aliasing, it is suggested that an audio signal be passed through a lowpass filter before patching into a modulation input.

The inputs and outputs are shown below:

Inputs

#0	**left out**	**The left output of the H3500.**
#1	**right out**	**The right output of the H3500.**
#2	**mix1a in**	**The "A" input of mixer 1.**
#3	**mix1b in**	**The "B" input of mixer 1.**
#4	**mix2a in**	**The "A" input of mixer 2.**
#5	**mix2b in**	**The "B" input of mixer 2.**

#6	**mix3a in**	**The "A" input of mixer 3.**
#7	**mix3b in**	**The "B" input of mixer 3.**
#8	**mix4a in**	**The "A" input of mixer 4.**
#9	**mix4b in**	**The "B" input of mixer 4.**
#10	**am1 in**	**Amplitude modulator 1 audio input.**
#11	**am1 mod**	**Amplitude modulator 1 modulation input.**
#12	**am2 in**	**Amplitude modulator 2 audio input.**
#13	**am2 mod**	**Amplitude modulator 2 modulation input.**
#14	**dly 1 in**	**Delay 1 audio input.**
#15	**dly1 mod**	**Delay 1 modulation input.**
#16	**dly 2 in**	**Delay 2 audio input.**
#17	**dly 2 mod**	**Delay 2 modulation input.**
#18	**filt1 in**	**Filter 1 audio input.**
#19	**filt1 mod**	**Filter 1 modulation input.**
#20	**filt2 in**	**Filter 2 audio input.**
#21	**filt2 mod**	**Filter 2 modulation input.**
#22	**env1 in**	**Envelope follower 1 input.**
#23	**env2 in**	**Envelope follower 2 input.**
#24	**lfo1 in**	**Low frequency oscillator 1 modulation/trigger input.**
#25	**lfo2 in**	**Low frequency oscillator 2 modulation/trigger input.**
#26	**mdscl1 in**	**Modulation scaler 1 input.**
#27	**mdscl2 in**	**Modulation scaler 2 input.**

Outputs

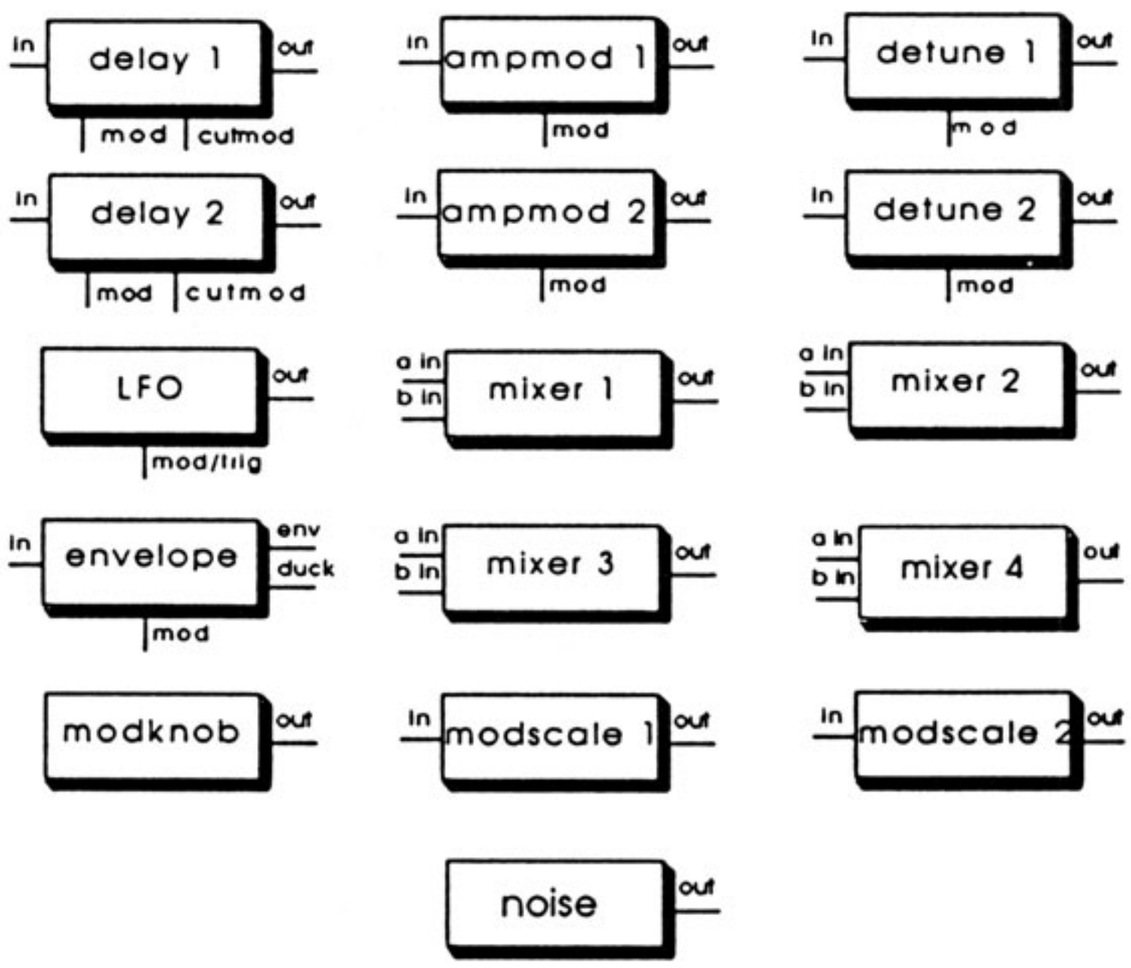
#0	**zero**	**A zero, or "off" signal.**
#1	**left input**	**The left audio input of the H3500.**
#2	**right input**	**The right audio input of the H3500.**
#2	**mixer 1**	**Audio output of mixer 1.**
#3	**mixer 2**	**Audio output of mixer 2.**
#4	**mixer 3**	**Audio output of mixer 3.**
#5	**mixer 4**	**Audio output of mixer 4.**
#6	**amp mod 1**	**Amplitude modulator 1 output.**
#7	**amp mod 2**	**Amplitude modulator 2 output.**
#8	**delay 1**	**Delay line 1 audio output.**
#9	**delay 2**	**Delay line 2 audio output.**
#10	**filter 1**	**Filter 1 audio output.**
#11	**filter 2**	**Filter 2 audio output.**
#12	**ducker 1**	**Ducker 1 modulation output.**
#13	**ducker 2**	**Ducker 2 modulation output.**
#14	**envelope 1**	**Envelope 1 modulation output.**
#15	**envelope 2**	**Envelope 2 modulation output.**
#16	**lfo 1**	**Low frequency oscillator 1 modulation output.**
#17	**lfo 2**	**Low frequency oscillator 2 modulation output.**
#18	**knob 1**	**Mod knob 1 modulation output.**
#19	**knob 2**	**Mod knob 2 modulation output.**
#20	**noise gen.**	**Noise generator output.**
#21	**fullscale**	**Fullscale, a maximum positive signal.**
#22	**-fullscale**	**Minus fullscale, a maximum negative signal.**
#23	**modscale 1**	**Modulation scaler 1 modulation output.**
#24	**modscale 2**	**Modulation scaler 2 modulation output.**

Algorithm 123 - mod factory|two

Description

This algorithm is a cousin to algorithm #122, mod factory|one. This too, is a "modular" effects processing algorithm. Software "patch cords" can be used to connect the processing modules shown below in any desired configuration. The main building blocks are a pair of sweepable, filtered delays, a pair of detuning pitch shifters, one low-frequency oscillator, one envelope detector, and two amplitude modulators.

Block Diagram



Mod Knob, Mix and BPM Control

The Modulation Knob is a specially designed control that converts the digital, quantized nature of parameter entry on the H3500, to a smoother, analog-style control. This is very useful for creating effects such as manual flanging and filter sweeps. The Mod Knob produces a signal that can be patched to the modulation inputs of the any of other module. To create a manual flanger, the output of ModKnob would be patched to the modulation input of delay 1. By mixing the delayed and undelayed signals a very simple flanger has been created. To modulate the delay, simply press "mod knob" and turn the knob on the H3500.

#30 Mod Knob 0 to 100.0 per cent Modulation

These parameters control the value of the modulation output of Mod Knobs 1 and 2. A value of zero will produce a zero output, and a value of 100 will produce a maximum modulation output.

#31 Mix 0 to 100 per cent Modulation

This controls the wet/dry mix of the H3500. A setting of 100 per cent will give only the effected signal at the outputs.

#32 BPM 30 to 200 beats/min Modulation

The BPM control works in conjunction with the BPM controls of delay 1 and 2 , the LFO, and the two detuners. Essentially, this parameter determines the time value of a beat (quarter note). If the BPM is set to 60, one quarter note will equal one second. This feature is extremely useful when delays must be in time to a particular tempo.

In addition to using the knob or keypad to enter the desired tempo, the beats per minute may by set by "tapping" the BPM key. To "tap in" the tempo, rhythmically press the BPM key 4 times. The time between taps will be taken as the new tempo.

Also, a MIDI controller may be used to "tap" in the tempo. By default, the MIDI Damper Pedal is patched to the BPM tap control. To set the tempo, simply tap the damper pedal three times. To use a different MIDI controller, go to the MIDI patching menu, under the "FUNCTION" key on the front panel. If you have difficulty making this feature work, check to see that the MIDI out of your controller is connected to the MIDI in of the H3500 and that the two devices are using the same MIDI channel.

Detuners

This algorithm contains two detuning modules. The most common use of these modules is to slightly shift the pitch on the left and right channels to create a very rich chorus effect. Modulation inputs on the detuners allow dynamic control of the amount of detuning. This can be used to created more realistic chorus effects, dynamic vibrato or wild modulations.

Note: The detune modules used in this algorithm have been optimized for small amounts of pitch shifting. While they are capable of shifting the pitch over a two-octave range (using the mod inputs), the result will not necessarily be very nice.

#33 Detune 1 -100 to 100 cents
#34 Detune 2 -100 to 100 cents

This parameter controls the amount of detuning. For a moderate chorus effect the left and right channels are usually shifted plus and minus ten cents.

#35 Delay 1 0 to 90 or 700 milliseconds
#36 Delay 2 0 to 90 or 700 milliseconds

This parameter controls the amount of delay through the detune modules. This parameter works in conjunction with the BPM setting to determine the final delay. When strict beat per minute control of delays is desired, this should be set to zero.

#37 BPM 1 0/24 to 96/24 beats
#38 BPM 2 0/24 to 96/24 beats

The BPM control determines how the master BPM tempo control affects the delay of the detuners. When this is set to zero, the tempo setting has no effect on the delay time. To get a BPM setting of delay, set the normal delay parameter to zero, and set this to the number of beats the delay should correspond to. The settings are in 1/24 subdivisions of a quarter note. To get a quarter note delay, the delay BPM should be set to 24/24. To get an eighth note delay, set this parameter to 12/24. A setting of 8/24 will give quarter note triplets.

#39 Mod Amount 1 -1200 to 1200 cents
#40 Mod Amount 2 -1200 to 1200 cents

These parameters determine how the modulation input of the detuners affects the amount of pitch shift. If set to 10 cents, a maximal change on the modulation input will produce a 10 cent change in the amount of detuning.

#41 Fadelength 1 1 to 1000 milliseconds
#42 Fadelength 2 1 to 1000 milliseconds

The fadelength parameter controls the nature of the crossfade that occurs when audio segments are spliced together in the detuner. Large settings of this parameter will generally give the most pleasing results, with the least audible glitching. Small settings will tend to produce sharper, more noticeable glitching in the output, but will reduce the flanging effect produced by long crossfades.

#43 Splice Length 1 1 to 700 milliseconds
#44 Splice Length 2 1 to 700 milliseconds

The splice length parameter determines the length of the audio segments that the detuner splices together. (A detailed explanation of pitch shifting is beyond the scope of this manual.) Longer settings of this parameter will result in less glitches in the detuned audio, but will result in longer and less predictable delays. Smaller settings of this parameter will result in a tighter, more predictable delay, but will cause more audible glitching and modulation in the output audio.

Filtered Delays

The filtered delay modules work just like those in mod factory|one with the added feature of adjustable high frequency rolloffs for each of the delays. This allows for warm, natural sounding delays.

The two modules each have a variable amount of delay, depending on the hardware configuration of the H3500. With a standard H3500, each delay line has up to 650 milliseconds of delay. With an Eventide HS322 board, the maximum delay is 11000 milliseconds (11 seconds) per delay module. When an Eventide HS395 board is installed, up to 32000 milliseconds (32 seconds) of delay is available per module.

Each delay module has a modulation input which allow smooth modulation of the delay, allowing for effects such as manual flanging and dynamic or triggered delay sweeps.

There is also a high-cut modulation input for each of the delay modules. These allow dynamic variation of the amount of high frequency rolloff.

#47 Delay 1 0 to 650, 11000, or 32000 milliseconds
#48 Delay 2 0 to 650, 11000, or 32000 milliseconds

Use this to control the amount of delay in the delay modules. This parameter works in conjunction with the Delay BPM setting to determine the final delay. When strict beat per minute control of delays is desired, this should be set to zero.

#49 Delay 1 BPM 0/24 to 96/24 beats
#50 Delay 2 BPM 0/24 to 96/24 beats

The Delay BPM control determines how the master BPM tempo control affects the delay. When this is set to zero, the tempo setting has no effect on the delay time. To control the delay in beats-per-minute, set the normal delay parameter to zero, and set the Delay BPM to the number of beats of delay desired. The settings are in 1/24 subdivisions of a quarter note. To get a quarter note delay, the delay BPM should be set to 24/24. To get an eighth note delay, set this parameter to 12/24. A setting of 8/24 will give quarter note triplets.

#51 Delay 1 Fdback -100 to 100 per cent
#52 Delay 2 Fdback -100 to 100 per cent

This controls how much of the delays output is fed back to its input. Settings other than zero will result in recirculating, repeating delays.

#53 Highcut 1 0 to 20000 Hz
#54 Highcut 2 0 to 20000 Hz

The highcut parameters control the amount of high frequency rolloff applied to the delay outputs. The setting is in Hertz, and represents the frequency at which the audio is attenuated by 3 dB. A setting of 20000 will give a full bandwidth signal, with no attenuation of high frequencies. Lower settings will take the edge off of the delay, giving a much warmer, analog-style sound.

#55 Loop 1 off or on Modulation
#56 Loop 2 off or on Modulation

To "loop" the delays, i.e., to make them repeat indefinitely, set this parameter to "on". When set to "on" all input to the delay lines will be blocked, repeating the most recent audio, but preventing any further input.

#57 Delay 1 Mod -500.0 to 500.0 milliseconds
#58 Delay 2 Mod -500.0 to 500.0 milliseconds

The Delay Mod controls determine how much the modulation input affects the final delay. For flanging effects, this should usually be set to several milliseconds. For chorusing, set this to about 10 or 20 milliseconds. Negative settings will sweep the delay in the opposite direction. This is useful if sweeping the two delays with the same signal, allowing for a richer sound.

#59 Cut Mod 1 0 to 20000 Hz
#60 Cut Mod 2 0 to 20000 Hz

This parameter controls how much the modulation affects the amount of high cut. This is useful for dynamic control of the timbre of the delay lines.

Low Frequency Oscillator

The low frequency oscillator is the module to use when creating sweep and triggered sweep effects. The oscillator works in a different way than the H3500 Function Generator, allowing much smoother modulation of delays, filters and gain. The waveshape of the LFO can be selected from a variety of continuous or audio-triggered waveforms. In addition, the LFO has a frequency modulation input that opens up new dynamic sweeping effects.

#61 LFO Frequency 0.00 to 300.0 Hertz Modulation

This parameter controls the frequency of the LFO. This works in conjunction with the LFO Beat per Minute control. When tempo tracking of the LFO is desired, set this parameter to zero.

#62 LFO BPM 0/24 to 96/24 beats

Similar to the Delay BPM control, this parameter allows the master BPM tempo to control the frequency of the LFO. With this, effects such as in-tempo autopanning can be obtained.

#63 LFO Waveform **sine, square, sawtooth, triangle, exponential sawtooth, exponential triangle, triggered sine, triggered saw, triggered triangle, triggered exponential saw, triggered exponential triangle, toggle linear, toggle exponential**

The LFO Waveform parameter determines the shape of the output of the LFO. The first 8 waveforms in the list are continuous, that is, they always do what they do. The next 5 waveforms are audio-triggered. When the level of whatever is patched to the input of the oscillator goes above the threshold, the oscillator sweeps through one cycle. The last 2 waveforms, the toggle waves are also audio-triggered. They will alternately sweep up and down with every other audio trigger. This is useful for such things as autopanning, where alternate hits of a drum would cause the input to pan from left to right, then right to left.

#64 LFO Threshold **0 to -40 dB**

The LFO threshold controls the level at which the oscillator is triggered. This parameter only has effect when the oscillator is set to an audio-trigger waveform.

#65 LFO Mod **0 to 300.0 Hertz**

For continuous LFO waveforms, the oscillator input will modulate the frequency of the LFO. This parameter controls how much the frequency will change for a full level input to the LFO.

Envelope Detector

The envelope detector is used to modulate various parameters based on the envelope of the signal. The envelope of a signal is simply its level at any given instant; hence, the envelope detector allows us to build effects that vary with the signal level. The input to the envelope detector can be patched anywhere, allowing this dynamic modulation to be based on the signal level of any point in our effects patch.

The envelope detector has two outputs, the envelope output and the ducker output. The envelope output is what you would expect, a signal that varies in proportion to the input of the envelope detector. The ducker output is a signal that is useful in building effects that reduce their level in the presence of another signal; i.e., they duck out of the way, allowing you to hear the other signal. Hence, the ducker output is normally at a high level. When the input to the envelope detector exceeds a threshold, the output gets progressively smaller.

#66 Env Attack Time **0.0 to 1000.0 milliseconds**

The Attack Time controls how fast the envelope and ducker outputs respond to increases in signal level.

#67 Env Decay Time **0.0 to 1000.0 milliseconds**

The Decay Time controls how fast the envelope and ducker outputs respond to decreases in signal level. Often it is desirable to have a fast attack time and a slow decay time, (especially in something like a compressor).

#68 Threshold **0 to -40 dB**

The Threshold determines the level at which the ducker begins reducing its level. This is very similar to the threshold control on a compressor.

#69 Ratio **1.0:1 to 100.0:1**

The Ratio parameter controls how much the output of the ducker will decrease in relation to the input signal level. If the ducker output is patched to the modulation input of one of the AmpMod modules, this parameter will function similar to the ratio control on a compressor.

Amplitude Modulator Parameters

The amplitude modulator modules allow the gain of a signal to be smoothly varied. These modules are the basis for autopanning, compression, ducking, and many other dynamic effects.

#70 AM 1 Amount -200 to 200 per cent
#71 AM 2 Amount -200 to 200 per cent

The Amp Mod Amount determines how much the modulation input effects the gain of the audio signal. A setting of 100 per cent will give no attenuation for a maximum modulation input and full attenuation for a zero modulation input. When the amount is set to 200 per cent, a maximum modulation input will add 6 dB of gain to the signal.

#72 AM 1 Offset -200 to 200 per cent
#73 AM 2 Offset -200 to 200 per cent

The Amp Mod Offset controls how much gain or attenuation the signal will have when modulation input is zero.

Mixer Parameters

The four simple two-input mixers are essential in building useful patches. They are used for controlling level, mixing, building feedback loops and much more.

A mixer is used to combine two signals with control over the amount and phase of each signal. A mixer can be used to simply control the level of a signal by patching the B input of a mixer to zero.

#74 Mix 1 A Amount -100 to 100 per cent Modulation
#75 Mix 1 B Amount -100 to 100 per cent Modulation
#76 Mix 2 A Amount -100 to 100 per cent Modulation
#77 Mix 2 B Amount -100 to 100 per cent Modulation
#78 Mix 3 A Amount -100 to 100 per cent Modulation
#79 Mix 3 B Amount -100 to 100 per cent Modulation
#80 Mix 4 A Amount -100 to 100 per cent Modulation
#81 Mix 4 B Amount -100 to 100 per cent Modulation

Each of the mixers has two inputs; an "A" input and a "B" input. This is like a mixing console that only has two channels, channel A and B. The mix amount control is like the fader for that particular input. A setting of 0% means the fader is fully off. A setting of 100% means the fader is fully on. A setting of 50% will cut that channel's level by one-half.

To invert the phase on a mixer input, use negative settings instead of positive settings. A setting of -100% will give a full "on" signal that has its phase inverted. A setting of -50% will cut the signal by half and also invert the phase.

Modulation Scalers

The modulation scalers are useful in controlling the gain of a particular modulation signal. They are particularly useful in allowing MIDI or the softknobs to control a particular parameter. To do this, patch fullscale into one of the control scalers. To modulate delay, patch the output of the control scaler into the delay mod input, then patch MIDI or a SoftKnob to control the scaler.

Using this method, most parameters can be MIDI controlled.

#82 Mod Scale 1 -100 to 100.0 per centModulation
#83 Mod Scale 2 -100 to 100.0 per centModulation

The Mod Scale Amount determines the amount of attenuation given to the input modulation signal. A setting of 100 per cent give no attenuation and a setting of zero turns off the input. Negative settings reverse the polarity of the input signal.

Level Parameters

The level parameters allow individual presets to alter the input and output levels of the H3500. The levels set here are added to or subtracted from the "master" levels.

#84 Left In -48 to 48 dB
#85 Right In -48 to 48 dB
#86 Left Out -48 to 48 dB
#87 Right Out -48 to 48 dB

Patching Parameters

#88 Prg Load Speed slow or fast

The program load speed control is definitely considered an expert parameter. This parameter affects the speed at which presets are loaded. When set to slow, the loading speed will be noticeably slower than when the load speed is set to fast. The drawback to the fast load mode is that the contents of delay lines and other internal registers are not "cleared" before the new patch begins working. This means that if loading a patch with long delay times and/or lots of feedback, the patch may load with clicks or noise in the output audio.

Here's the basic rule of thumb. If you aren't sure about what to do, set this parameter to slow. If you think you know what you're doing and have a patch that has a very small amount of delay and little feedback, try setting this parameter to fast. If you find that the patch loads in a noisy manner, set the mode back to slow.

How to Patch

To create an effects "patch" press (**patch**). The display will look like:

```
123 mod factory|two          dly 1 in<mixer 1
( input  ) (output ) (prg load) ( return )
```

This display shows that mixer 1 is patched to dly 1 in. The input is always shown on the left and the output on the right, in the form input<output. Here, dly 1 in is the input, and mixer 1 is the output. To select an input to patch, press (**input**). The knob will scroll through a list of all available inputs. To re-patch a particular input, scroll the input list until the signal is shown in the display. Then, press (**output**). The knob will now scroll through the outputs that may be patched to the currently selected input. As you turn the knob, you will instantly hear the effect of the signal being repatched.

An important note of warning! Please, keep your monitor volume low when creating new patches. It is fairly easy to create feedback loops capable of producing ear and speaker damaging signals. Be careful out there.

One thing to make note of when creating a patch is the difference between audio inputs and modulation inputs. Generally, the modulation inputs are used to change some parameter of the effect, such as a filter frequency or delay time. In most cases, patching a slowly changing signal, such as an LFO to a modulation input will result in the most aurally satisfying result. It is possible and might sometimes be tempting to patch an audio signal directly into a modulation input. The main problem with this is that modulation signals are processed at a slower sample rate than audio signals. Because of this, patching an audio signal into a modulation input may result in audible aliasing. (Aliasing is a non-harmonic modulation distortion that results when a digital signal is sampled too slowly.) To minimize the potential for aliasing, it is suggested that an audio signal be passed through a lowpass filter before patching into a modulation input.

The inputs and outputs are shown below:

Inputs

#0	**left out**	**The left output of the H3500.**
#1	**right out**	**The right output of the H3500.**
#2	**mix1a in**	**The "A" input of mixer 1.**
#3	**mix1b in**	**The "B" input of mixer 1.**
#4	**mix2a in**	**The "A" input of mixer 2.**
#5	**mix2b in**	**The "B" input of mixer 2.**
#6	**mix3a in**	**The "A" input of mixer 3.**
#7	**mix3b in**	**The "B" input of mixer 3.**
#8	**mix4a in**	**The "A" input of mixer 4.**
#9	**mix4b in**	**The "B" input of mixer 4.**
#10	**am1 in**	**Amplitude modulator 1 audio input.**
#11	**am1 mod**	**Amplitude modulator 1 modulation input.**
#12	**am2 in**	**Amplitude modulator 2 audio input.**
#13	**am2 mod**	**Amplitude modulator 2 modulation input.**
#14	**dly 1 in**	**Delay 1 audio input.**
#15	**dly1 mod**	**Delay 1 modulation input.**
#16	**dly1 ctmd**	**Delay 1 highcut modulation input.**
#17	**dly 2 in**	**Delay 2 audio input.**
#18	**dly2 mod**	**Delay 2 modulation input.**
#19	**dly2ctmd**	**Delay 2 highcut modulation input.**
#20	**dtune1in**	**Detuner 1 audio input.**
#21	**dtun1mod**	**Detuner 1 modulation input.**
#22	**dtune2in**	**Detuner 2 audio input.**
#23	**dtun2mod**	**Detuner 2 modulation input.**
#24	**env in**	**Envelope follower input.**
#25	**lfo in**	**Low frequency oscillator modulation/trigger input.**
#26	**mdscl1 in**	**Modulation scaler 1 input.**
#27	**mdscl2 in**	**Modulation scaler 2 input.**

Outputs:

#0	**zero**	**A zero, or "off" signal.**
#1	**left input**	**The left audio input of the H3500.**
#2	**right input**	**The right audio input of the H3500.**
#3	**mixer 1**	**Audio output of mixer 1.**
#4	**mixer 2**	**Audio output of mixer 2.**
#5	**mixer 3**	**Audio output of mixer 3.**
#6	**mixer 4**	**Audio output of mixer 4.**

#7	**amp mod 1**	**Amplitude modulator 1 output.**
#8	**amp mod 2**	**Amplitude modulator 2 output.**
#9	**delay 1**	**Delay line 1 audio output.**
#10	**delay 2**	**Delay line 2 audio output.**
#11	**detune 1**	**Detuner 1 audio output.**
#12	**detune 2**	**Detuner 2 audio output.**
#13	**ducker**	**Ducker modulation output.**
#14	**envelope**	**Envelope modulation output.**
#15	**lfo**	**Low frequency oscillator modulation output.**
#16	**mod knob**	**Mod knob modulation output.**
#17	**noise gen.**	**Noise generator output.**
#18	**fullscale**	**Fullscale, a maximum positive signal.**
#19	**-fullscale**	**Minus fullscale, a maximum negative signal.**
#20	**modscale 1**	**Modulation scaler 1 modulation output.**
#21	**modscale 2**	**Modulation scaler 2 modulation output**

User Program Worksheets

This section contains worksheets for programming the H3500 algorithms. These are included to make it easier for you to create and document your own custom sound effects. We recommend that you use these to keep a permanent record of your valuable presets. The faithful use of these sheets will insure that your creative inspirations will never be lost and will provide a way of recreating your sounds in the case of any bizarre mishaps with your H3500.

We encourage you to make photocopies of the worksheets in the following pages.

#100 Diatonic Shift - Programming Sheet

Program Name_____

Parameters	Value	Mod Source	Mod Range
Left Mix	%		%
Right Mix	%		%
Left Feedback	%		%
Right Feedback	%		%
Delay	mS		mS
Left Voice			
Right Voice			
Quantize	On / Off		
Key			

Expert Params	Value
Low Note	
High Note	
Source	

User Scales	C	C #	D	Eb	E	F	F#	G	Ab	A	Bb	B
Scale 1												
Scale 2												

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#101 Layered Shift - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Left Pitch	c		c
Left Delay	mS		mS
Left Feedback	%		%
Left Mix	%		%
Right Pitch	c		c
Right Delay	mS		mS
Right Feedback	%		%
Right Mix	%		%

Expert Params	Value
Low Note	
High Note	
Source	

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#102 Dual Shift - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Left Pitch	c		c
Left Delay	mS		mS
Left Feedback	%		%
Left Mix	%		%
Right Pitch	c		c
Right Delay	mS		mS
Right Feedback	%		%
Right Mix	%		%

Expert Params	Value
Low Note	
High Note	
Source	

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#103 Stereo Shift - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Pitch	c		c
Delay	mS		mS
Feedback	%		%
Mix	%		%

Expert Params	Value
Low Note	
High Note	
Source	
Deglitch Mode	

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#104 Reverse Shift - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Left Pitch	c		c
Left Length	mS		mS
Left Feedback	%		%
Left Mix	%		%
Right Pitch	c		c
Right Length	mS		mS
Right Feedback	%		%
Right Mix	%		%

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#105 Swept Combs - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Master Delay	c		c
Master Rate	mS		mS
Master Depth	%		%
Master Feedback	%		%
Image Width	c		c
Mix	mS		mS

Expert Params	Value	Mod Source	Mod Range
Glide Speed			
Glide Enable	On / Off		
Input Mode	Stereo/Mono		

Tap Settings	1	2	3	4	5	6
Rates (%)						
Depths (mS)						
Delays (mS)						
Feedbacks (%)						
Pans (L<->R)						
Levels (%)						

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		

#106 Swept Reverb - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Master Delay	c		c
Master Rate	mS		mS
Master Depth	%		%
Master Feedback	%		%
Mix	mS		mS

Expert Params	Value	Mod Source	Mod Range
Glide Speed			
Glide Enable	On / Off		

Tap Settings	1	2	3	4	5	6
Rates (%)						
Depths (mS)						
Delays (mS)						

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#107 Reverb Factory - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Predelay	c		c
On Decay Time	mS		mS
Off Decay Time	mS		mS
Gate Time	mS		mS
Mix	%		%

Equalization	Low Xover	Low Atten	Hi Xover	Hi Atten
Gate On Eq	Hz	dB	kHz	dB
Gate Off Eq	Hz	dB	kHz	dB

Delays	1	2	3	4	5	6
Delay(sample)						

Gate Parameters	Value
Gate Speed	%
Gate Threshold	%
Gate Enable	On / Off

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#108 Ultra-Tap - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Length	%		%
Diffusor	%		%
Image Width			
Feedback	%		%
Left Mix	%		%
Right Mix	%		%

Expert Params	Value
Feedback Tap	
Input Mode	Stereo/Mono

Tap Settings (Quick)	Envelope Shape
Delays	
Weights	
Pans	

Tap Settings (Tedium)	1 / 7	2 / 8	3 / 9	4 / 10	5 / 11	6 / 12
Delays (mS)						
Weights (%)						
Pans (L<-->R)						

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#109 Long Digiplex - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Delay	mS		mS
Feedback	%		%
Mix	%		%

Expert Params	Value	Mod Source	Mod Range
Glide Speed			
Glide Enable	On / Off		

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#110 Dual Digiplex - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Left Delay	mS		mS
Left Feedback	%		%
Left Mix	%		%
Right Delay	mS		mS
Right Feedback	%		%
Right Mix	%		%

Expert Params	Value	Mod Source	Mod Range
Glide Speed			
Glide Enable	On / Off		

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#111 Patch Factory - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Cutoff Freq. 1	Hz		Hz
Cutoff Freq. 2	Hz		Hz
Q Factor 1			
Q Factor 2			
Delay 1	mS		mS
Delay 2	mS		mS
Scale 1	%		%
Scale 2	%		%
Pitch Shift	c		c
Pitch Delay	mS		mS
Left Mix	%		%
Right Mix	%		%

Expert Params	Value
Low Note	
High Note	
Source	

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

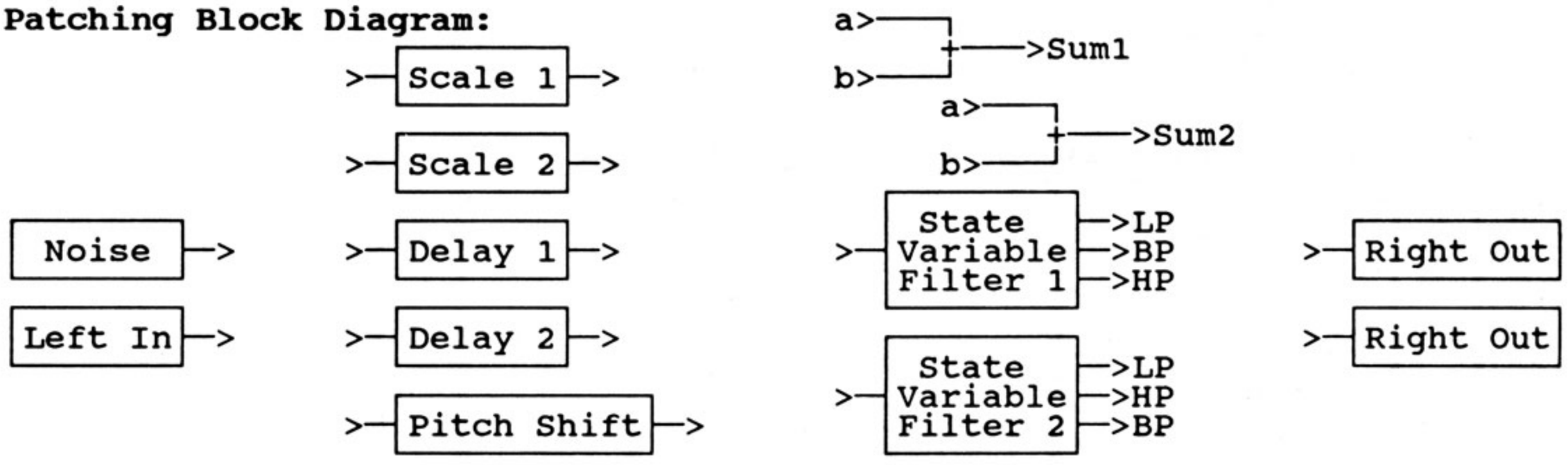
Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#111 Patch Factory - Programming Sheet (continued)

Program Name _____

PATCHING		OUTPUTS															
		LEFT INPUT	SUM 1	SUM 2	DELAY 1	DELAY 2	SCALER 1	SCALER 2	LOWPASS 1	LOWPASS 2	BANDPASS 1	BANDPASS 2	HIGHPASS 1	HIGHPASS 2	NOISE GEN	PITCH SHIFT	NULL INPUT
INPUTS	Filter 1																
	Filter 2																
	Delay 1																
	Delay 2																
	Scale 1																
	Scale 2																
	Sum 1a																
	Sum 1b																
	Sum 2a																
	Sum 2b																
	Shifter																
	L Output																
	R Output																

Patching Block Diagram:



#112 Stutter - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Program Speed			
Left Mix	%		%
Right Mix	%		%
Program			
Auto (Program)	On / Off		

Trigger Settings	Value	Mod Source	Mod Range
Length 1	mS		mS
Length 2	mS		mS
Count 1			
Count 2			

Sweep Settings	Value	Mod Source	Mod Range
Left Shift	c		c
Right Shift	c		c
Left Delay	mS		mS
Right Delay	mS		mS
Left Feedback	mS		mS
Right Feedback	mS		mS

Sweep Gen	Up Rate	Up Max	Down Rate	Down Max	Rand Max
Sweep 1		c		c	
Sweep 2		c		c	

Trigger Patches	"A" Patch	"B" Patch
Trigger 1		
Trigger 2		
Trigger 3		
Trigger 4		

#112 Stutter - Programming Sheet (Continued)

Program Name _____

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#114 Dense Room - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Predelay	c		c
Rev Time	S		S
High cut	%		%
Size	%		%
Position	R.....F		
Pan	L....C....R		
Early Mix	%		%
Diffusion	%		%
Mix	%		%

Delays	1	2	3	4	5	6
Delay(sample)						
Pan						
Level						

All Passes	1	2	3
Delay(sample)			
Gain			

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#115 Vocoder - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Formant Speed	%		%
Envelope Speed	%		%
Formant Shift	%		%
Depth	%		%
Width	mS		mS
Mix	%		%

Expert Parameters;

Parameters	Value	Mod Source	Mod Range
Max Resonance	%		%
Min Error	%		%
Threshold	%		%

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#116 Multi-Shift - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Left Pitch	c		c
L Pitch Delay	mS		mS
Left Delay	mS		mS
Right Pitch	c		c
R Pitch Delay	mS		mS
Right Delay	mS		mS
Mix	%		%
Feedback	%		%
Image			

Expert Parameters;

Parameters	Left	Right
Pitch Level		
Pitch Pan		
Delay Level		
Delay Pan		
Feedback 1 Level		
Feedback 1 Patch		
Feedback 2 Level		
Feedback 2 Patch		
Direction		
X fade		
Deglitch		
Splice	mS	mS

#116 Multi-Shift - Programming Sheet (continued)

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#117 Band Delay - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Delay			
Frequency			
Q Factor			
Global Pan			
Feedback Delay			
Feedback Amount			
Output Feedback			
Mix			

Parameters	F1	F2	F3	F4	F5	F6	F7	F8
Frequency								
Q Factor								
Note								
Delay								
Output								
Pan								
Note Mode								

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#118 String Simulator - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Pitch			
I Pitch			
Decay			
Release			
Sustain			
Gate			
Hold			
Frequency			
Q factor			
Bright			
High Amount			
Band Amount			
Low Amount			
In Amount			
Mix			
Gate Mode			
Chorus Amount			
Chorus Speed			
Chorus Depth			

#118 String Simulator - Programming Sheet (continued)

Velocity Scalers

Parameters	Value
V Decay	
V Gate	
V Level	
V Bright	

Keyboard Scalers

Parameters	Value
K Decay	
K Gate	
K Level	
K Bright	
K Release	

Initial states

Parameters	1	2	3	4	5	6
Note						
Start (Velocity)						

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#119 Phaser - Programming Sheet

Program Name _____

Parameters	Value	Mod Source	Mod Range
Mix	%		%
Feedback	%		%
Sweep Rate	%		%
Envelope Rate	%		%
ADSR Rate	%		%
Mode			
Bottom Freq	%		%
Top Freq	%		%

Expert Params	Value	Mod Source	Mod Range
Attack Rate	%		%
Decay Rate	%		%
Sustain Level	%		%
Release Rate	%		%
Attack Thresh	%		%
Release Thresh	%		%
Envelope Type			
Env Channel			

Function Gen	Value	Mod Source	Mod Amount
Amplitude	%		%
Frequency	Hz		%
Function Type			

User Knobs	Name	Value
Knob 1		
Knob 2		
Knob 3		
Knob 4		

Levels	Offset
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#122 mod factory one - Programming Sheet

Program Name_____

Main Page Parameter	Value	Mod Source	Mod Range
Mod Knob 1			
Mod Knob 2			
Mix	%		
BPM	beats/min		

Filter Parameters	Value
Cutoff 1	Hertz
Q Factor 1	
Mod Amount 1	Hertz
Type 1	lp/bp/hp
Cutoff 2	Hertz
Q Factor 2	
Mod Amount 2	Hertz
Type 2	lp/bp/hp

Delay Parameters	Value	Mod Source	Mod Range
Delay 1	ms		
Delay 1 BPM	/24		
Delay 1 Feedback	%		
Delay 1 Mod Amt	ms		
Delay 1 Loop	on/off		
Delay 2	ms		
Delay 2 BPM	/24		
Delay 2 Feedback	%		
Delay 2 Mod Amt	ms		
Delay 2 Loop	on/off		

#122 mod factory one - Programming Sheet (continued)

LFO Parameters	Value	Mod Source	Mod Range
LFO 1 Frequency	Hertz		
LFO 1 BPM	/24		
LFO 1 Mod Amt	Hertz		
LFO 1 Wave			
Threshold 1	dB		
LFO 2 Frequency	Hertz		
LFO 2 BPM	/24		
LFO 2 Mod Amt	Hertz		
LFO 2 Wave			
Threshold 2	dB		

Envelope Follower Param	Value
Env 1 Attack Time	ms
Env 1 Decay Time	ms
Threshold 1	dB
Ratio 1	
Env 2 Attack Time	ms
Env 2 Decay Time	ms
Threshold 2	dB
Ratio 2	

Mixers	Value	Mod Source	Mod Range
Mix 1A	%		
Mix 1B	%		
Mix 2A	%		
Mix 2B	%		
Mix 3A	%		
Mix 3B	%		
Mix 4A	%		
Mix 4B	%		

#122 mod factory one - Programming Sheet (continued)

Mod Scalers	Value	Mod Source	Mod Range
Mod Scale 1	%		
Mod Scale 2	%		

Amplitude Modulators	Value
Amp Mod 1 Amt	%
Amp Mod 1 Offset	%
Amp Mod 2 Amt	%
Amp Mod 2 Offset	%

Levels	Value
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

#123 mod factory two - Programming Sheet

Program Name_____

Main Page Parameters	Value	Mod Source	Mod Range
Mod Knob			
Mix	%		
BPM	beats/min		

Detune Parameters	Value
Detune 1	cents
Delay 1	ms
BPM 1	/24
Detune 1 Mod Amt	cents
Crossfade Length 1	ms
Splice Length 1	ms
Detune 2	cents
Delay 2	ms
BPM	/24
Detune 2 Mod Amt	cents
Crossfade Length 2	ms
Splice Length 2	ms

#123 mod factory two - Programming Sheet (continued)

Delay Parameters	Value	Mod Source	Mod Range
Delay 1	ms		
Delay 1 BPM	/24		
Delay 1 Feedback	%		
Delay 1 High Cut	Hertz		
Delay 1 Mod Amt	ms		
Delay 1 Cut Mod	Hertz		
Delay 1 Loop	off/on		
Delay 2	ms		
Delay 2 BPM	/24		
Delay 2 Feedback	%		
Delay 2 High Cut	Hertz		
Delay 2 Mod Amt	ms		
Delay 2 Cut Mod	Hertz		
Delay 2 Loop	off/on		

LFO Parameters	Value	Mod Source	Mod Range
LFO Frequency	Hertz		
LFO BPM	/24		
LFO Mod Amt	Hertz		
LFO Wave			
Threshold	dB		

Envelope Follower Param	Value	Mod Source	Mod Range
Envelope Attack	ms		
Envelope Decay	ms		
Threshold	dB		
Ratio			

#123 mod factory two - Programming Sheet (continued)

Mixers	Value	Mod Source	Mod Range
Mix 1A	%		
Mix 1B	%		
Mix 2A	%		
Mix 2B	%		
Mix 3A	%		
Mix 3B	%		
Mix 4A	%		
Mix 4B	%		

Mod Scalers	Value	Mod Source	Mod Range
Mod Scale 1	%		
Mod Scale 2	%		

Amplitude Modulators	Value
Amp Mod 1 Amt	%
Amp Mod 1 Offset	%
Amp Mod 2 Amt	%
Amp Mod 2 Offset	%

Levels	Value
Left In	dB
Right In	dB
Left Out	dB
Right Out	dB

Quick Reference: H3500

These next few pages contain a "quick reference" guide to the H3500 factory presets. These presets are found in program numbers 425 through 899. Each program is listed along with its program number and a brief description of its use.

We have divided the 404 factory presets into several smaller groups. Here is the scheme:

100 - 123	Basic Effects Algorithms	These are the basic "algorithms", the building blocks upon which the rest of the factory programs are based. Note: Algorithm 113, Timesqueeze(R), is not included in the H3500.
425 - 493	Percussion & Other Presets	Written specifically for drums, guitar, and bass. Also includes interesting distortion effects.
500 - 534	Chorus/Flange/Thickeners	This group of effects contains choruses, flanges, micro-pitch shifts and other very useful "thickening" types of effects.
535 - 554	Delay Effects	Echoes, recirculating delay lines, multi-tap delays, and other delay-based effects are in this group.
555 - 574	Small/Ambient Reverbs	This group of reverbs contains the smaller rooms and ambient spaces.
575 - 589	Large Reverbs	Large halls and other immense spaces are found here.
590 - 604	Alternative Reverbs	This groups contains reverb-like effects, including gated and reverse reverbs.
605 - 629	Pitch Shift Effects	The more extreme pitch shift effects are found here. This includes the "Diatonic" pitch shifters.
630 - 674	Unique/Filter Effects	Many dramatic filtering effects are found here, in addition to other indescribable things.
675 - 689	Tone Generators	This group of effects generates sounds. Look here for a tuning tone, or for MIDI triggered synthesizers.
690 - 699	MIDI Controlled Effects	In this group, the programs are specifically designed to be used with MIDI.
750 - 786	Custom Presets	Special presets for recording, post production and music written by our friends in the industry.
800 - 899	Mod Factory	These presets provide delay ducking, BPM delays and sweeps, compression, manual flanging and more.

Percussion and Other New Presets

#	Program Name	Description
425	2 MULTI EFFECTs	Multi-Shift: Two independent shifters with panning, semi-equivalent to two H949's.
426	AMBIENT SLAP	Ultra Tap: Quick slap with an element of reverb.
427	BALLAD SNARE	Dense Room: A good verb for slow tunes. Has a long predelay.
428	BOOGALOO	Patch Factory: A jungle sounding patch, try on toms.
429	CASTANET PSYCHO	Band Delay: Rhythmic, resonant delays.
430	CLACK	Patch Factory: Adds a clacky noise.
431	CRACK O'SNARE	Patch Factory: One of several presets good for snare processing.
432	DARK CELLAR	Reverb Factory: Good for growing mushrooms.
433	DAVE'S PLATE	Swept Reverb: Plate type reverb with a little chorusing.
434	DITH VERB	Reverb Factory: Unusual warm and thick verb.
435	DRUM WHEEZE	Patch Factory: Funny wheeze for something a little different.
436	DRUNKIT	Swept Reverb: Too much tequila the night before.
437	DUAL FLAT FIXER	Multishift: Correct the "out of tuneness" of two vocalists at the same time. The knob will control Ch 1's pitch, and a pitch bend wheel will control Ch 2's. A sequencer will store your pitch changes if you record them to it.
438	DUAL TOM SHIFT	Dual Shift: Stereo In, Adds Stereo, high harmonics to toms.
439	DUCK VERB	Reverb Factory: This reverb will "duck" slightly while a signal is present.
440	EMPTY WATER TANKS	Reverb Factory: Sounds like the inside of one of those water towers.
441	FALLING FLANGE	Patch Factory: Use "P DELAY" to change repeat interval.
442	FAT FLAM	Layered Shift: Tight delays to widen drum strokes.
443	FINEYOUNG SNARE	Patch Factory: Pretty poppy processing.
444	FIXT PITCH TOMS	Diatonic Shift: Interesting tom thickener.
445	FUNKshunTAPS	Ultratap - A discrete, reverb-like set of delays sweeping right to left.
446	GATED KIK	Reverb Factory: This is a gated bass drum reverb.
447	GATED SNARE	Reverb Factory: Guess what this is.
448	GRIF RANDOM	Dual Shift: Another thickener reminiscent of H949 random function.
449	H949 REV 3	Patch Factory: Basic configuration and sound of H949.
450	HAT ROOM	Swept Reverb: Check your hat in here.
451	HI HAT BREATH	Swept Reverb: Makes hat a little more ambient.
452	HI HAT DELAY	Patch Factory: EQ'd delays for hat.

#	Program Name	Description
453	ITCHY COO TOM	Swept Reverb: Try it on toms. By the way, do you remember the song?
454	JOE'S GATE	Reverb Factory: A nice gated reverb.
455	JUNGLE 7	Band Delay: Adds jungle rhythms in 7/8.
456	KERR VERB	Reverb Factory: Medium dark gated verb.
457	KIT FLANGER	Swept Reverb: Neato overall kit flanger.
458	LEXY ROOM	Reverb Factory: Bright sounding room with white tail.
459	LITE ROOM	Reverb Factory: Sounds great, Less filling.
460	LONG ROOM	Dense Room: Long Verb.
461	LO PROCESSOR	Swept Reverb: Adds low percussive ambience to anything.
462	MIDI GATE VERB	Reverb Factory: Use keyboard controller to change parameters. Sustain pedal is tied to gate and Mod Wheel is tied to decay.
463	MIDI SWEPT VERB	Swept Reverb: Size is tied to pitch wheel and the sweep is tied to modulation wheel.
464	OCTAVE DOWNERS	Diatonic Shift: Both left and right channels take the drums down an octave.
465	ONE AND AH 16TH	Ultra-tap: Gives you great 16th note subdivisions ("one and ah" as Lawrence Welk used to say).
466	ONE CAR GARAGE	Reverb Factory: Small tight reverb, like a, um, one car garage.
467	ONE EE AND AH	Ultra-Tap: One-ee-and-ah 16th note subdivisions.
468	ONE EE AH 16THS	Ultra-Tap: One Ee Ah (sixteenths).
469	PERC WAH WAH	Patch Factory: And now, Wah Wah for drums!
470	PHONERING DELAY	Ultra-tap: Delays timed to sound like an old, phone ring effect.
471	ROOM 90x40x15	Ultra-tap: simulates discrete style reverb of small room with mentioned dimensions.
472	ROCK ROOM	Dense Reverb: Power verb.
473	SEXTUPLETS A	Ultra-tap: Variation of above.
474	SEXTUPLETS	Ultra-tap: This is, well, sextuplet delays.
475	SEWER VERB	Patch Factory: Foul liquid sounding reverb.
476	SHORT ROOM	Reverb Factory: A small reverb (4 car garage?).
477	SIMMONIZE	Patch Factory: See above.
478	SMALL TILED ROOM	Reverb Factory: The sound of Ivana's bathroom.
479	SON OF BIGSNARE	Dense Room: Remember Big Snare (#576)?
480	STEREO TOM DELAY	Multishift: Delays that will follow the panning of the inputs.
481	SWEEP 8	Band Delay: Pitched & timed delays.

#	Program Name	Description
482	THICK RICK	Swept Reverb: Thickening, sweeping ambience.
483	TILED HAT ROOM	Reverb Factory: This is a very large bathroom.
484	TImBrAl bRooM	Patch Factory: Wah-wahing ambience.
485	TIMID VERB	Swept Reverb: Subtle reverb/flanger.
486	TINY WAREHOUSE	Dense Room: This is the reverb of a small Hoboken, N.J. sock outlet factory.
487	TOMBALLS	Reverb Factory: Good on toms.
488	TOM SWEEP	Band Delay: Pitched delays for toms.
489	TRASHY DRUMS	Swept Reverb: Want a really gritty drum sound? Load this one.
490	TWINKIE SHIFT	Multi-Shift: Adds adorable higher octaves.
491	TWO WARM DELAYS	Patch Factory: These are so useful to add ambience without "swishing" around.
492	WARP 2	Swept Reverb: Kind of a sea sick preset. Warps pitch of input.
493	WORD UP	Layered Shift: Noise effect for snare or percussion.

Thickening Effects

#	Program Name	Description
500	ADSR FILTER	When the sound into the H3500 goes over a threshold, a sweeping, "wah"-like, filter effect is triggered. Phaser. Mono in, stereo out.
501	ADSR PHASER	Like above, the input audio level will trigger a sweeping phaser effect. Phaser. Mono in, stereo out.
502	ANALOG THICK	A warm chorused echo sound. Two adjustable lowpass filters provide the warmness. Patch Factory. Mono in, stereo out.
503	BASS CHORUS	Specifically tailored for bass, this is a simple micro-pitched chorus. Multi-shift. Stereo in, stereo out.
504	BUENOS NOTCHES	Pleasant, sweeping notches will result when this effect is mixed with the dry audio. Phaser. Mono in, stereo out.
505	DEATH FLANGE	A deep, intense flange that's great for thickening up a synthesized bass line. Swept Reverb. Mono in, stereo out.
506	DIGDLY & MICRO	Dual digital delays with micro-shift on the outputs. A nice sounding setup useful for thickening up a synthesized bass line. Multi-Shift. Stereo in, stereo out.
507	DGDLY+WAH+MICRO	This is an unusual combination of a digital delay, a cycling "wah wah" filter, and a micro pitch shift. Patch Factory. Mono in, stereo out.
508	DUAL H910 MICRO	This program is designed to function like two Eventide H910 Harmonizers(R). The glitching you hear is intentional. This is a true dual program, where both left and right channels are processed separately. Multi-Shift. Stereo in, stereo out.
509	ENVELOPE FILTER	This program consists of a resonant filter that sweeps as the input level changes. Try experimenting with the envelope rate parameter. Phaser. Mono in, Stereo out.
510	ENVELOPE PHASER	Here, a phaser sweep follows the input signal level. Phaser. Mono in, stereo out.
511	FLANGE & REVERB	This is a reverb with a subtle flanging effect. Swept Combs. Stereo in, stereo out.
512	FLANGER	This is a basic stereo flanger. For the best effect, mix the H3500 output with the dry signal. Swept Combs. Mono in, stereo out.
513	INSTANT PHASER(R)	A straight forward sweeping phaser, in memory of our famous product. Phaser. Mono in, stereo out.
514	JUST STEREO	A very subtle micro-pitch shift. Just enough to add a presence to an otherwise flat mono sound.
515	MAGIC AIR	This has two upward microshifts and two delays in a tight ambient formation. Use to liven and slightly raise flat vocals or to generally thicken sources. Multi-Shift. Stereo in, stereo out.

#	Program Name	Description
516	MANY REFLECTIONS	Numbers of micro pitched echoes slowly decaying upwards. Good chorused echo effect. Multi-Shift. Stereo in, Stereo out. (loop)
517	MICRO + DRYSLAP	A general-purpose thickener with some delay with feedback. Multi-Shift. Stereo in, stereo out.
518	MICRO + REVERB	Includes a microshift and a quasi-reverb set of delays with feedback. Multi-Shift. Stereo in, stereo out.
519	MICROPITCHSHIFT	This is the perfect effect to fatten up or widen a sound without adding any color. Layered Shift. Stereo in, stereo out.
520	MICRO-REVERB	Similar to above but much less discrete, with tighter delays. Multi-Shift. Stereo in, stereo out.
521	MICROPITCH-SLAP	The left channel is micro-shifted and the right is a slap delay with micro-shift. Great for guitar. Layered Shift. Stereo in, stereo out.
522	MULTI-DLYEFFECT	All kinds of subtle things going on here. Delays, echoes, flanging, chorusing. Swept Combs. Mono in, stereo out.
523	MULTI-FLANGE	With six delays being swept at once, this program creates a very thick flange sound. Swept Combs. Mono in, stereo out.
524	QUADRUPLER	Provides a dense, panned stereo field with two sweeping shifters and two delays. Denser than Voice Doubler (572) but similar in effect. Multi-Shift. Stereo in, stereo out.
525	RANDOM FLANGE	Another doubling effect with random, moving micro-pitch-shifts. Multi-Shift. Stereo in, stereo out.
526	RESONANT SWEEP	A medium-speed, resonant phaser. Phaser. Mono in, stereo out.
527	RICH CHORUS	This program uses six delay lines to create a useful chorus effect. Try increasing "m delay" to get a subtler but more realistic effect. Swept Combs. Mono in, stereo out.
528	REAL CHORUS	A convincing doubling effect. Pretty smooth. Multi-Shift. Stereo in, stereo out.
529	SPACE FLANGE	This program is a cross between a digital delay, a reverb and a flanger. Swept Reverb. Mono in, stereo out.
530	TREMOLO DELAY	A long delay whose pitch warbles, creating a thick atmospheric effect. Use on guitar sound effects. Multi-Shift. Stereo in, stereo out.
531	TWO THICKENERS	Two independent effects, each made up of a delay with pitch shift, and a discrete delay. Multi-Shift. Stereo in, stereo out.
532	ULTRA-THICK	General thickener with a nice stereo image. Multi-Shift. Stereo in, stereo out.

#	Program Name	Description
533	VOICE DOUBLER	Sweeps two pitch shifters in opposite directions giving a convincing doubling effect. Layered Shift. Mono in, stereo out.
534	WATERY FLANGE	Just as the name suggests. Swept Combs. Mono in, stereo out.

Delay Effects

#	Program Name	Description
535	ANALOG DELAYS	Warm echoes provided by lowpass filters. Patch Factory. Mono in, stereo out.
536	BUILD-A-SHIMMER	Eerie echoes that fade in and fade out. Ultra-tap. Stereo in, stereo out.
537	CIRCLES	A stereo delay effect that seems to circle around your head. The effect is most noticeable on short sounds, like hand claps. Ultra-Tap. Stereo in, stereo out.
538	DIGITAL DELAY	A basic digital delay line, with feedback control. Long Digiplex. Mono in, stereo out.
539	DUAL DELAYS	Two simple delays. One left, one right. Dual Digiplex, Stereo in, stereo out.
540	ECHOPLEXINGPONG	An echo that bounces from one side to another Dual Digiplex, Stereo in, stereo out.
541	ECHO RAMP	A manually triggerable program with a delay that sweeps down and up when the trigger key is pressed. Long Digiplex. Mono in, stereo out.
542	FAT SLAP	A slap delay with an ambient sound. Ultra-Tap. Stereo in, stereo out.
543	5TH AVE ECHO	Delays and diffusion are selected to sound a lot like those on a big city street. Ultra-Tap. Mono in, stereo out.
544	LONG DELAY	Simple long delay. Long Digiplex. Mono in, stereo out.
545	MULTI-TAP	If you own an Eventide SP2016, you'll be familiar with this sound. This preset emulates the SP2016 Multi-Tap program, with a slightly shorter overall delay. Ultra-Tap. Mono in, stereo out.
546	PING PONG BALL	Another echo that bounces side to side. But, the echo shortens with time. Ultra-Tap. Stereo in, stereo out.
547	SETTLEDOWN ECHO	Echoes that go from bright to warm. Band Delay. Mono in, stereo out.
548	SOFT SHORT ECHO	A very smooth, diffuse echo. Dense Room. Mono in, stereo out.
549	SPACE ECHO	Simulates a very popular tape delay from the 70's. Even adds tone controls, and tape warble for that thick analog sound. We thought about adding tape hiss but... Patch Factory. Mono in, stereo out.
550	SUBTLE SWEEP	Two, subtle sweeping delays. This is ideal for turning mono sources into stereo. Pan original source to one side, and its sweeping delay to the other. Use on two sources. Very unobtrusive. Dual Shift. Stereo in, stereo out.

#	Program Name	Description
551	SWEEP RIGHT	Exponential increasing delays that are panned from left to right. Ultra-Tap. Mono in, stereo out.
552	THICK LOOP	A repeating delay that fades into a reverb sound. Swept Reverb. Mono in, stereo out.
553	THREE ON TWO	The delays in this program are set such that the familiar 3 against 2 rhythm is produced. (feedback) controls the amount of feedback. (mix) wet/dry effect mix. Dual digiplex. Stereo in, stereo out.
554	WIDENING TAPS	The echoes get longer as time goes on, spreading from the center to the sides of the stereo field. Ultra tap. Stereo in, stereo out.

Small Rooms

#	Program Name	Description
555	AMBIENCE	Use this to add ambience without muddying the mix. Ultra-Tap. Stereo in, stereo out.
556	AMBIENT BOOTH	A short but natural reverberation. Dense Room. Mono in, stereo out.
557	BATHROOM	Lots of highs left in by those ceramic tiles. Reverb Factory. Mono in, stereo out.
558	CHORUS ROOM	Short reverb with chorus. Nice for instruments but perhaps not with drums. Swept Reverb. Mono in, stereo out.
559	CRASS ROOM	A harsh hollow reverb reminiscent of those good old school days. Dense Room. Mono in, stereo out.
560	DE-BURR	Takes the edge off of sharp attacks. Ultra-tap. Mono in, stereo out.
561	DREW'S CHAMBER	Medium short natural reverb. Dense Room. Mono in, stereo out.
562	DRUM AMBIENCE	A soft ambience that just barely livens up otherwise dry sounds. Dense Room. Mono in, stereo out.
563	EMPTY CLOSET	This reverb is very short. You almost can't detect it. Use it for situations where you really don't want to hear a reverb Swept Reverb. Mono in, stereo out.
564	EMPTY ROOM	Medium reverb with slight chorus. Sounds nice on regular instruments. Swept Reverb. Mono in, stereo out.
565	MEDIUM SPACE	Another Medium reverb with slight chorus. This has a somewhat more natural sound and the chorus is very slight. Swept Reverb. Mono in, stereo out.
566	NEW HOUSE	Use this to get that metallic sound of an empty, reflective room. Swept Combs. Stereo in, stereo out.
567	PRCSVHORN PLATE	A plate reverb that enhances natural or synthesized horn sounds. Dense Room. Mono in, stereo out.
568	REAL ROOM	Short reverb with a natural airiness. Swept Reverb. Mono in, stereo out.
569	SMALL ROOM	A small room reverb. Reverb Factory. Mono in, stereo out.
570	SML:STEREOSPACE	Very short ambience with a slight chorus added in order to give it a big full sound for its short duration. Swept Reverb. Mono in, stereo out.
571	SMALLVOCAL ROOM	Medium length reverb tailored for vocals. Dense Room. Mono in, stereo out.
572	TIGHT ROOM	A short, bright reverb. Dense Room. Mono in, stereo out.

Large Rooms

#	Program Name	Description
573	TIGHT & BRIGHT	Like above but longer and brighter. Dense Room. Mono in, stereo out.
574	VOCAL BOOTH	Short natural reverb with a slight delay. Dense Room. Mono in, stereo out.
575	ALIVE CHAMBER	Large chorus reverb. A real full sound. Swept reverb. Mono in, stereo out.
576	BIG SNARE	This is a sizzling reverb, somewhat gated with lots of punch for drums. Reverb Factory. Mono in, stereo out.
577	BIG SWEEP	To really hear the sweep, turn up the master feedback, make some noise and then change the master delay. Swept Reverb. Mono in, stereo out.
578	BOB'S ROOM	A warm long reverb, useful on lots of sources. Dense Room. Mono in, stereo out.
579	BREATHING CANYON	A very long reverb. Very roomy. Swept Reverb. Mono in, stereo out.
580	BRIGHT ROOM	A short, bright reverb. Reverb Factory. Mono in, stereo out.
581	CANYON	Our biggest reverb sound, like an echoing canyon. Reverb Factory. Mono in, stereo out.
582	CONCERT HALL	A big hall with a lot of predelay. Dense Room. Mono in, stereo out.
583	DARK ROOM	Yes, another dark reverb. Sounds like the inside of a big petroleum tank. Dense Room. Mono in, stereo out.
584	DISCRETE-VERB	A sparse reverb effect. Swept Combs. Stereo in, stereo out.
585	NORTHWEST HALL	Very similar to Concert Hall except that the reverb is somewhat more discrete. Dense Room. Mono in, stereo out.
586	RICH PLATE	A slight sweep in this reverb gives it a rich sound and a smooth tail. Swept Reverb. Mono in, stereo out.
587	SLAPVERB	A short delay and then a bright long reverb. Dense Room. Mono in, stereo out.
588	SMOOTH PLATE	Airy and smooth. Dense Room. Mono in, stereo out.
589	WARM HALL	Our basic reverb sound. Reverb Factory. Mono in, stereo out.

Alternative Reverbs

#	Program Name	Description
590	BACKWARD REVERB	A quasi-reverb made up of little backward bits of the input. One of a kind. Multi-Shift. Stereo in, stereo out.
591	ECHO-VERB	A discrete, echo-like reverb. Dense Room. Mono in, stereo out.
592	EXPLODING 'VERB	This sounds like a reverb, until the input level goes above the gate threshold. Once triggered, the reverb sound grows explosively. Reverb Factory. Mono in, stereo out.
593	GATED REVERB	That very familiar drum effect. To change the length of the "gate" sound, set the gate length parameter. Reverb Factory. Mono in, stereo out.
594	GATED ROOM	A warm sounding gated room best used on one source such as snare drum or toms. Reverb Factory. Mono in, stereo out.
595	GATE ROOM	Like above but with a more natural decay. Reverb Factory. Mono in, stereo out.
596	HUMP-VERB	A very unique reverb with a sound not unlike the name. Ultra-Tap. Stereo in, stereo out.
597	METALVERB	A metallic set of closely packed delays approaching reverb density. Ultra-Tap. Mono in, stereo out.
598	RANDOM GATE	A "gated reverb" sound created with the Ultra-Tap program. Great for drums. Ultra-Tap. Stereo in, stereo out.
599	RESONANT WORLD	This is one is different. A long lasting "reverb" with bizarre resonances and echoes. String Modeler. Mono in, stereo out.
600	REVERSE GATE	Another standard drum reverb. Ultra-Tap. Stereo in, stereo out.
601	REVERB RAMP	A triggerable, sweeping reverb. It sweeps up the first time it is triggered, and toggles from then on. Swept Reverb. Mono in, stereo out.
602	SHIMMERISH	A recirculating delay effect that fades into a smooth reverb. Swept Reverb. Mono in, stereo out.
603	TONAL ROOM	With pitched inputs, this reverb will actually generate many other tones. On drums, this is one of the biggest sounds you can get. Swept Reverb. Mono in, stereo out.
604	UP/DOWN REVERB	User selectable, rising or falling reverb-like effect. Multi-Shift. Stereo in, stereo out.

Pitch Shift Effects

#	Program Name	Description
605	A MINOR CHORDS	Play or sing a solo line in A minor. The H3500 will generate two perfect "in-key" harmonies. Diatonic Shift. Stereo in, stereo out.
606	ARPEGGIOS	Adds a fifth and an octave rhythmically, along with a short delay. Multi-Shift. Stereo in, stereo out.
607	BASS SHIFT	A doubling effect intended for bass guitar. One channel is shifted up an octave. The other is slightly detuned. Layered Shift. Stereo in, stereo out.
608	DEEPEN	Adds lower octave harmonics with a pitch shifter sweep. Patch Factory. Mono in, stereo out.
609	DIATONIC DANCE	You play a note and after half a second, you get a harmony. Use only one note at a time and in an effect loop. Diatonic Shift. Mono in, stereo out.
610	DUAL SHIFT EASY	An easy to use program featuring two pitch shifters with function knobs set up, with pitch calibrated in semitones (1/2 steps). Dual Shift. Stereo in, stereo out.
611	GLITCH SHIFT	A "cheap" pitch shifter. If glitches are what you want, here they are. Dual Shift. Stereo in, stereo out.
612	GREGORIAN SHIFT	This program filters and pitch shifts input voices to produce a chorus of droning monks. Patch Factory. Mono in, stereo out.
613	H949	This gives you what the H949 gave you. One output is a straight delay while other is pitch shifted. Both outputs are fed back to the input. Layered Shift. Stereo in, stereo out.
614	HAMMER-ON 3RD	You, too, can play like the flashiest guitarist, without the years of hard work and shredded fingers. Will take one note and arpeggiate it to sound like a familiar two-handed guitar technique. Dual Digiplex. Stereo in, stereo out.
615	HAMMER-ON 5TH	Similar to above but different intervals. Dual Digiplex. Stereo in, stereo out.
616	HARMO-CHORUS	A pitch shifter and chorus combined. Multi-Shift. Stereo in, stereo out.
617	IN SIX	6/8 time is implied in this preset which adds a fourth down, a minor 3rd up, and a minor 6th up. Multi-Shift. Stereo in, stereo out.
618	JUST 3RD & 5TH	A "diatonic" pitch shifter that will generate just-intoned 3rds and 5ths above the input. Make sure to set the key properly. Diatonic Shift. Stereo in, stereo out.
619	JUST 4TH & 6TH	This generates just-intoned 4ths and 6ths above the input. Diatonic Shift. Stereo in, stereo out.
620	MUSIC SHIFT	This stereo pitch shift program is optimized for shifting input program material. Stereo Shift. Stereo in, stereo out.

#	Program Name	Description
621	OCTAVE ECHOES	Complex delays which are fed back and combined with a radically down shifted signal. Multi-Shift. Stereo in, stereo out.
622	PITCHED ECHO	Shows off one aspect of the Multi-Shift algorithm's feedback setup. Long echoes come back shifted but the shorter delays don't. Multi-Shift. Stereo in, stereo out.
623	PITCH QUANTIZE	This program quantizes the input to the nearest chromatic interval. Diatonic Shift. Stereo in, stereo out.
624	SUSPENSE STAIRS	Echoes are shifted to create suspenseful harmonies. Multi-Shift. Stereo in, Stereo out.
625	THIRD & FIFTH	Generates an "in-key" 3rd and 5th above the input. Diatonic Shift. Stereo in, stereo out.
626	THIRD & OCTAVE	This generates a diatonic 3rd above and an octave below the input. Diatonic Shift. Stereo in, stereo out.
627	TWELVE STRING	Provides an octave down and a micro-pitch-shift, simulating a twelve string guitar. Multi-Shift. Stereo in, stereo out.
628	VIBRATO	Instant vibrato at the press of a button. Multi-Shift. Stereo in, Stereo out.
629	VOICE SHIFT	This stereo shift program is optimized for pitch shifting program material whose main content is spoken voice. Stereo Shift, Stereo in, stereo out.

Unique Effects

#	Program Name	Description
630	ALIENS	Transforms voice into a rough, alien-like sound. Reverse Shift. Stereo in, stereo out.
631	ANTI-AMBIENCE	This is a reverb-like sound created from Reverse Shift. Sounds great on guitar. Reverse Shift. Stereo in, stereo out.
632	AUTOPANNER	Produces automatic stereo (left<->right) panning. (delay) controls delay of panned signal. (feedback) increase for repeated panning echoes. (pan rate) sets speed of panning. Swept Combs. Stereo in, Stereo out.
633	AVANTE-GARDE	A Reverse Shift effect that generates descending chromatic lines. Reverse Shift. Stereo in, stereo out.
634	BACKWARDS	Turns the input around in one second chunks. (length) controls length of reversed segments. (feedback) feeds back reversed output. (pitch) sets pitch of reversed signal. (mix) wet/dry effect mix. Reverse Shift. Stereo in, stereo out.
635	BAND PAN	Rhythmically, panned and delayed, with its own band pass filter Band Delay. Mono in, stereo out.
636	BAND SLAP	A stereo slap effect using two bands that are fed back. One band is tuned higher. Band Delay. Mono in, stereo out.
637	BANDSWEEPRANDOM	A random pitched set of bands that are delayed and pass from left to right in the stereo field. Band Delay. Mono in, stereo out.
638	BAND SWEEP	Upward sweeping bands passing from left to right. Band Delay. Mono in, stereo out.
639	BIZARREMONIZER	Generates a bizarre, upward sweeping pitch shift. Layered Shift. Stereo in, stereo out.
640	CANNONS	A unique sweeping sound that's great on drums. Try playing a tom solo through this. Reverse Shift. Stereo in, stereo out.
641	CRITICAL BAND	A close approximation to Fletcher/Munson bandpass curves. Use to brighten signals, or key compressors and gates to frequencies to which our ears are most sensitive. Patch Factory. Mono in, stereo out.
642	CRYSTAL ECHOES	Words fail. A stairway of echoes reaching for heaven. Multi-Shift. Stereo in, Stereo out.
643	DRUM PROCESSOR	This very different effect tends to make things that aren't drums sound like drums. Try adjusting the first four parameters for a variety of effects. Swept Reverb. Mono in, stereo out.
644	FILTER PAN	A filter sweep effect that seems to pan as it sweeps. Patch Factory. Mono in, stereo out.

#	Program Name	Description
645	FUTURE SHIFT	A shimmering orchestral effect. Try on swelling monophonic synths or single line voices. Multi-Shift. Stereo in, stereo out.
646	LIQUID REVERB	A reverb-like program with band delays whose filters sweep downward with increasing delay length. Band Delay. Mono in, stereo out.
647	LOWPASS FILTERS	Two lowpass filters connected in series process the audio. Use cutoff 1 and 2 to control the rolloff frequencies. Use Q factor 1 and 2 to control the resonance of the filters. Patch Factory. Mono in, stereo out.
648	MAJOR WIND HARP	The first in a series of resonant reverb-like programs. This program acts like sympathetically resonating strings tuned to a major scale. String Modeler. Mono in, stereo out.
649	MODULATORS	Remember that ring modulated astronaut sound? Here it is, constructed from a pitch shifter that reverses little segments of the input. Multi-Shift. Stereo in, stereo out.
650	MODULATOR-VERB	Similar to above with more reverb like decay. Multi-Shift. Stereo in, stereo out.
651	OCTAVE FILTERS	Gurgling, upward sweeping filter bands. Band Delay. Mono in, stereo out.
652	PSYCHO-PANNER	This program swirls the input in pitch, pan and delay. Wild! (range) controls the range of delay and pitch sweep (feedback) lower this to reduce the decay time (pan rate) controls the panning and sweep speed (mix) wet/dry effect mix. Swept Combs. Stereo in, stereo out.
653	RESONANT MAJ7	Sets up sympathetic resonances that form a Major seventh chord. String Modeler. Mono in, stereo out.
654	RESONANT PENT	Same as above, except resonances form pentatonic scale. String Modeler. Mono in, stereo out.
655	REVERSERB	A reverb-like effect made up of little backward bits of the input signal. Try shortening the "size" parameter to smooth it out a little. Multi-Shift. Mono in, stereo out.
656	RUNTHRUMYMIND	An echo that bounces and changes timbre back and forth. Band Delay. Mono in, stereo out.
657	SCARY MOVIE	This program uses reverse shift to create an evil sounding voice. Use with guitar to create that tape splice, psychedelic sound. Reverse Shift. Stereo in, stereo out.
658	S/H PAN-A-DELAY	Very similar to RunThruMyMind but with different timbres. Band Delay. Mono in, stereo out.
659	SLAP+WAH+MICRO	A slap delay, a sweeping wah-wah, and a microshift all from one program. Patch Factory. Mono in stereo out.
660	SPACE CRICKETS	Circulating, up sweeping band delays. Band Delay. Mono in, stereo out.

#	Program Name	Description
661	STUTTER	Use this for that popular stutter sound. (--stut--) will trigger the stutter. (speed) controls the speed of the stutter. (count) controls how many stutters occur. (pitch) controls the pitch of the voice. Stutter. Mono in, stereo out.
662	STUTTER RANDOM	This program generates various random stutters. (--stut--) triggers a random stutter. (---up---) triggers a stutter with pitch sweep up. (--down--) triggers a stutter with pitch sweep down. (-updown-) stutter and sweep up left, down right. Stutter. Mono in, stereo out.
663	SWEEP DOWN	Rhythmically panned and delayed, with its own band pass filter. Band Delay. Mono in, stereo out.
664	SWEEP & REVERB	Sounds reverb-like until manually triggered, which causes a radical, mystical, up and down sweep. String Modeler. Mono in, stereo out.
665	SWEEP UP/DOWN	Band delays on left sweep up, band delays on right sweep down. Band Delay. Mono in, stereo out.
666	SWEEP UP LINEAR	Rising band delays sweeping from right to left. Band Delay. Mono in, stereo out.
667	SWEEP UP	Similar to above only bands are tuned one octave apart. Band Delay. Mono in, stereo out.
668	TALKING GUITAR	Vocoder tailored for the guitar. Vocoder. Two inputs. stereo out.
669	TRIGGERED SCALE	Another sympathetic resonator program, except this one has a twist. Press the "trigger" key to get a unique, harp-like strumming sound. String Modeler. Mono in, stereo out.
670	TUBE CLONE	This is strictly meant for guitars. Play, with distortion, directly through the H3500 and this program will add a nice crunchy EQ. Band Delay. Mono in, stereo out.
671	TWO-BAND FILTER	Two general purpose bandpass filters with tunable center frequency and filter Q. Patch Factory. Mono in, stereo out.
672	WAH WAH + MICRO	Combines a sweeping filter (wah-wah) with a micro-shift. Patch Factory. Mono in, stereo out.
673	WAH WAH	A basic, cyclical wah-wah sound using filters and a function generator. Patch Factory. Mono in, stereo out.
674	WAH-VERB	This sounds like a reverb with a wah-wah. Band Delay. Mono in, stereo out.

Tone Generators

#	Program Name	Description
675	A 440	Need a reference tuning tone? Here it is. You can mix in the sound you are tuning or fine adjust the pitch for slightly different tunings. Patch Factory. Stereo.
676	GUITAR-ESQUE	Connect MIDI up and you have a mellow guitar sound. The input signal will also affect the sound out. String Modeler. Mono in, stereo out.
677	HVYMETAL CELLO	The string is briefly bowed and left to ring. The harder you hit the key, the longer the bowing. Feeding input sound will affect the timbre of the note. String Modeler. Mono in, stereo out.
678	KEYBOARD	An adjustable keyboard sound where you can tailor the sound to your tastes. Also, try your pitch wheel and hit the same note a number of times. String Modeler. Stereo out.
679	KOTO	By itself, a very delicate sound. Feed in some input, and the sound takes on all kinds of characters. String Modeler. Mono in, stereo out.
680	LS BACH HARPSCD	Bright and crisp harpsichord. String Modeler. Stereo out.
681	LS BOWED STRING	An Airy resonant noise. String Modeler. Stereo out.
682	LS CLAVICHORD	This is a more classical clavichord sound than we're used to. Use pressure to bend the notes. String Modeler. Stereo out.
683	LS FAR STRINGS	Your not so standard string section. String Modeler. Stereo out.
684	LS HARP RESONS	A hollow harp sound. String Modeler. Stereo out.
685	LS HARPSICHORD	Like the Bach but fuller. String Modeler. Stereo out.
686	LS HIT STRING	Crisp and full struck strings. String Modeler. Stereo out.
687	LS NOSTALGIA	This has that honky-tonk sound. String Modeler. Stereo out.
688	LS PSEUDO PIANO	An almost piano. String Modeler. Stereo out.
689	LS ZITHER	Plucked strings that are full and chorused. Hitting harder will change the timbre. String Modeler. Stereo out.

MIDI Controlled Effects

#	Program Name	Description
690	ALICE-VERB	This is a reverb. With each note you hit, you could have a different decay time. Also, the harder you hit, the less bright the reverb. Dense Room. Mono in, stereo out.
691	DUAL GLIDEDELAY	The delay lines are controlled by MIDI. The note you play changes the delay. (higher is longer) How hard you hit changes how fast the delay changes. Pressing on the keys turns up the feedback. Dual Digiplex. Stereo in, stereo out.
692	FILTER SWEEPS	A recirculating sweep up is swept by the function generator. (delay) is the delay between bands (fb delay) is the recycle delay. (feedback) is how fast the recycle decays. (rate) is the rate the function generators sweeps. The note you hit adjusts the q factor of the filters. Band Delay. Mono in. Stereo out.
693	GLIDE DELAY	This is a mono version of Dual Glide Delay. Long Digiplex. Mono in. Mono out.
694	MIDI 3 ON 2	This preset will sync up its delay times to a MIDI drum machine or sequencer. The delays are in the familiar 3 on 2 pattern. Dual Digiplex. Stereo in, stereo out.
695	MIDI PEDALSWEEP	The MIDI foot pedal controller will manually sweep the delays in this program to generate a flange-like sound. The Modulation Wheel controls modulation of the delays. Swept Reverb. Mono in, stereo out.
696	MIDIPLEX	Connect a MIDI drum machine or sequencer to this program and the delay will automatically be in time. Long Digiplex. Mono in, stereo out.
697	MIDI BANDSWEEP	This program does process audio, but generate an interesting sweep when a MIDI note message is received. Band Delay. MIDI in, mono in, stereo out.
698	MODWHEEL REVERB	When connected to a MIDI keyboard, the Mod Wheel controls the decay time and the Pitch Wheel controls the delay (room size). Use this to easily generate dramatic reverb sweeps. Swept Reverb. Mono in, stereo out.
699	ROCK 'N' ROLL	This one's a bit different. Capture an audio loop by pressing the "sustain" parameter. Play a note on a MIDI keyboard to hear the loop. Moving the Mod Wheel will alter the loop points (a bit like rocking tape reels). Playing different notes will change the pitch of the loop. Layered Shift. Stereo in, stereo out.

Custom Presets

#	Program Name	Description
750	ADR TAPE HISS	Patch Factory: Provides hiss to use for matching edits between analog and digital sources.
751	BOING HIT	Patch Factory: Sounds like a boing hit.
752	CIRCLES	Ultra-tap: Delays that sound like they sweep in circles.
753	DAY IN THE LIFE	Swept Reverb: Long nightmarish reverb.
754	DRAGWAY AD	Patch Factory: One stop preset for those annoying ads.
755	FADE TO DREAM	Layered Shift: Gives illusion of drifting off into dream.
756	GIL'S ROOM	Reverb Factory: Smooth roomy reverb.
757	GREGORIAN CHANT	Patch Factory: Adds fifths to input ala Gregorian Monks.
758	HOUSE VERB	Swept Combs: Sounds like the echo in a new house without furniture.
759	JET FLY BY	Patch Factory: Convincing stereo jet plane.
760	LASER HIT	Patch Factory: Captain, I can't make the shields last much longer!
761	MASSIVE STRING TAP	Ultra-Tap: delays set mondo-wide and big for strings.
762	MEGAPHONE	Patch Factory: "Come out with your hands up".
763	MOVING VOCAL SPREAD	Multi-Shift: Left output moves up 9 cents, right moves down 9 cents with sine wave modulation.
764	PLUCK HIT	Patch Factory: Hi tech plucking sound.
765	PULSING ROOM	Dense room: Long warm verb, mon.
766	RANDOM SHIFT	Layered Shift: Random shifting thickener.
767	REVERSE DOGS	Reverse Shift: Low Octaves howling backwards.
768	RIPPED WOOFER	Patch Factory: Damn! Should have kicked in the subsonic woofer for that jet sample!
769	SHIMMERISH	Swept Reverb: Ethereal sounding verb-like effect.
770	STEREO COPTER	Patch Factory: Stereo sounding helicopter.
771	ST PETERS CATHEDRAL	Reverb Factory: BEEEG Reverb, senor!
772	TELEPHONE	Patch Factory: One stop telephone voice sound.
773	THUNDER BOLT	Patch Factory: Sounds like
774	TV/RADIO/JUKE	Patch Factory: Sounds like box in the next room.

#	Program Name	Description
775	VOICE DISGUISER	Swept Combs: Useful for covering identity of interviewee's voice for controversial/confidential radio or television appearances.
776	WALAWALA	Dual Shift: Conversation simulator.
777	WARPED LP	Stereo Shift: Guess what this sounds like.
778	WINDSTORM	Patch Factory: Bundle up before you load this preset.
779	DIRECT BOX	Patch Factory: Very clean direct box. See manual for changing gain. Avoids Analog to digital converters unless "effect" is turned up. At unity gain, S/N is well over 100dB on channel 1.
780	MEAN OCTAVES	Patch Factory: Distortion with Octave Pitch Shift
781	PIGNOSY	Patch Factory: A popular little guy.
782	R&B PLUCK	Patch Factory: Has that clean sound with flange and delay.
783	SCREAMER DELAY	Patch Factory: Gritty distortion with delay.
784	SCREAMER uPITCH	Patch Factory: Gritty distortion with added delay and Harmonizer!
785	SILVERTONE II	Patch Factory: That old beginner's sound.
786	ULTRALUX	Patch Factory: Bright rhythm sound.

Mod Factory Presets

#	Program Name	Description
800	ALLPASS DETUNE	Uses two detuners in series to give a unique reverb-like chorus. (feedback) controls the amount of regeneration in the two delay loops. (detune) controls the amount of pitch shifting.
801	ANTI-DUCK FDBACK	Dual delays that feedback only while audio is present. (fdback 1) controls the amount of regeneration for the left delay. (fdback 2) controls the amount of regeneration for the right delay.
802	AWESOME FLANGE	Two flangers in series gives some super notches with pitch detuning on the output. (rate) Flange rate in Hertz. (depth) Flange depth controls the width of the delay sweep. (feedback) Amount of regeneration around the two flangers. (detune) Detune amount in cents.
803	AWESOME KNOB	The awesome flanger with manual control. (the knob) Use this to manually sweep the flanger. (depth) Flange depth controls the width of the delay sweep. (feedback) Amount of regeneration around the two flangers. (detune) Detune amount in cents.
804	BAND COMPRESS	A fixed 2:1 dual-band compressor. Use env1 attack and env1 decay to control the attack and release times of low band. Use env2 controls for the high band. cutoff 1 controls the crossover frequency.
805	BAND FLIP	This patch splits the input signal into two bands, a high band and a low band. The output continuously crossfades between these two bands. (swp rate) Controls the rate at which the filters are modulated. (tune) Sets the crossover frequency for the bandsplit effect.
806	BANDSPLIT DELAY	Splits input signal into two bands and passes each band through a separate delay line. The low band goes to the left output channel and the high band to the right. (delay 1) The amount of delay in the low band. (fdback 1) The amount of delay regeneration in the low band. (delay 2) The amount of delay for the high band. (fdback 2) The amount of delay regeneration in the high band.
807	BOING	A strange triggered pitch mutilation.
808	BPM PANNER	An autopanner with the pan rate controlled by the BPM setting.
809	BPM TRIPS & QTR	Beat-per-minute triplets on one side, quarter note on the other. (fdback 1) Feedback for the triplet delay (pan 1) Pan position for the triplets. Left =-100, right = +100. (fdback 2) Feedback for the quarter-note delay (pan 2) Pan position for the quarter notes.
810	BPM TRIP PAN	Beat-per-minute triplets feeding an autopanner.
811	BPM X-FED DUCK	Two ducked delays adjusted in beats-per-minute. The output of delay 1 feeds back into the input of delay 2 and vice-verse. (feedback) Feedback for both delays.

#	Program Name	Description
812	CHORUS/DUCK TRM	Detune chorus to the left and right and a ducked, tremolo delay in the center (chrs lvl) Chorus level in percent. (trem lvl) Tremolo level in percent. (tremrate) Tremolo rate in Hz.
813	CHORUS/DUCK DLY	A detuned chorus and ducked delays. (detune) Detune amount in cents. (high cut) High frequency cut for delay outputs. Maximum cut = 100. (mod rate) Delay modulation rate in Hertz.
814	CHORUS/PAN DLY	Pitch detuning on the left and right with a dry autopanned repeating delay. (chrs lvl) Level of the chorus output in percent. (delaylvl) Level of the panning delay in percent (pan rate) Pan rate in Hertz
815	CHORUS ROOM	A reverb-like chorus. (decay) Decay amount in percent. (detune) Detune amount in cents. (delaymod) Modulation amount in milliseconds. (mod rate) Modulation rate in Hertz.
816	COMPRESS 2:1	A fixed 2:1 compressor. Use env1 parameters to control the compressor.
817	DETUNED SPACE	Detuners arranged to give a small room sound. (feedback) Amount of delay regeneration in percent. (detune) Amount of detuning in cents.
818	DETUNE DARKLY	Detuning with control over high-frequency rolloff. (detune) Amount of detuning in cents. (high cut) Amount of high frequency rolloff in percent.
819	DUAL LONG DELAY	Two independent delay loops. Use delay controls to change delay and feedback. (mod amt1) Delay 1 modulation amount in milliseconds. (modfreq1) Delay 1 modulation frequency in Hertz. (mod amt2) Delay 2 modulation amount. (modfreq2) Delay 2 modulation frequency.
820	DUAL DUCK DELAY	Two independent delay loops with gain ducking. Use delay controls to change delay and feedback. Use envelope controls to adjust gain ducking. (mod amt1) Delay 1 modulation amount in milliseconds. (modfreq1) Delay 1 modulation frequency in Hertz. (mod amt2) Delay 2 modulation amount. (modfreq2) Delay 2 modulation frequency.
821	DUAL PANNERS	Two independent autopanners. (panrate1) Rate of left panner in Hertz. (panrate2) Rate of right panner in Hertz.
822	DUAL TREMOLO	Two tremolos, with delays (freq 1) Left tremolo rate in Hertz. (depth 1) Left tremolo depth in percentage. (freq 2) Right tremolo rate. (depth 2) Right tremolo depth.
823	DUCKED 'VERB	A chorused reverb-like effect that ducks with the input. (feedback) Decay time of the reverb in percent. (moddepth) Amount of delay modulation in tenths of milliseconds. (modrate) Delay modulation rate in Hertz.

#	Program Name	Description
824	DYNAMIC FEEDBACK	Dual delay loops with lowpass filters in the feedback loop. The filter frequencies are modulated by the input envelope to give a downward sweep to the feedback. (fdback 1) Feedback amount for left delay. (fdback 2) Feedback amount for right delay.
825	DYNAMIC FLANGE	The input level controls the amount of feedback in this two-voice flanger. Higher inputs levels give a more resonant flange. (max fb) The maximum amount of feedback in percent. (moddepth) Delay sweep amount in percent. (modfreq1) Delay 1 sweep rate in Hertz. (modfreq2) Delay 2 sweep rate.
826	DYNAMIC TREMOLO	Tremolo, with the rate controlled by the input level. The output is detuned to give a stereo chorus effect. (rate) Tremolo rate in Hertz. (env mod) Controls how much the input level affects the tremolo rate. The adjustment is in Hertz. Positive settings increase rate with increasing input level, negative settings decrease rate with level. (detune) Amount of output detuning in cents.
827	ENVELOPE DETUNE	A stereo detuner with dynamic control of the detune amount. Greater input levels increase or decrease the amount detuning. (detune) Amount of detuning, in cents, before addition of envelope detune. (det mod) How much input envelope affects amount of detuning, in cents. Positive numbers result in more detuning with higher input levels; negative numbers give less detuning. (feedback) Amount of feedback in detuners. Higher settings will give more intense chorus.
828	ENVELOPE FILTER	That classic funky sound. This uses both filter 1 and 2. Use env1 attack and env1 decay times to control the envelope response. (in level) Adjusts input level to filters. Set this so that filters do not clip.
829	ENVELOPE FLANGE	A two-voice flanger with the envelope sweeping the delay. (fdback 1) Amount of feedback on the left delay. (depth 1) Amount of modulation on the left delay in milliseconds. (fdback 2) Amount of feedback on the right delay. (depth 2) Amount of modulation on the right delay.
830	ENV FILTER/SLAP	Envelope filter into a slap delay. (drct lvl) Level of non-delayed filter in percent. (slap lvl) Level of slap in percent. (feedback) Feedback of slap delay. (chorus) Amount of delay chorus in percent.
831	ENV FILTER/VERB	Envelope filter into a cheap reverb. (feedback) Feedback amount in percent. (chorus) Chorus amount in percent. (modrate1) Modulation rate of delay 1 in Hertz. (modrate2) Modulation rate of delay 2.
832	ENVELOPE PAN	Pan position varies with input signal level. Higher levels are panned left and lower levels are panned right. Use env 1 controls to set attack and decay times.
833	ETHEREAL	A very watery, haunting reverb. (decay) Sets decay time of reverb in percent. (detune) Detune amount in cents. (delaymod) Delay modulation in milliseconds. (mod rate) Modulation rate in Hertz.

#	Program Name	Description
834	ETHEREAL LOGIC	The ethereal reverb modulated with a square wave. (decay) Decay time of reverb in percent. (detune) Detune amount in cents. (env mod) Effect of input envelope on modulation frequency in Hertz. (mod rate) Mod rate in Hertz.
835	ETHERPAN	The ethereal reverb followed by an autopanner. (decay) Decay time of reverb in percent. (detune) Detune amount in cents. (env mod) Controls how much input level affects pan rate. (pan rate) Pan rate in Hertz.
836	ETHERTREM	The ethereal reverb feeding a tremolo. (decay) Decay time of reverb in percent. (detune) Detune amount in cents. (env mod) Controls how much input level affects mod rate. (mod rate) Mod rate in Hertz.
837	EXPONENTIAL	Four chorused delay taps with exponential spacing. Use BPM to set the amount of delay. (feedback) Amount of feedback in percent. (detune) Detune amount in cents. (delaymod) Delay modulation amount in milliseconds. (mod rate) Delay mod rate in Hertz.
838	FILTER SWEEP	A funky triggered filter sweep. The input signal triggers the sweep. To set the trigger level, adjust lfo1 threshold. (swp rate) Filter sweep rate in Hertz. (swp dpth) Amount of filter sweep. (mod rate) Frequency of modulation on sweep signal in Hertz. (mod dpth) Depth of modulation on sweep signal. Setting this to zero will make the sweep sound smooth.
839	FLANGE PAN	Dual autopanners with delay modulation. (panrate1) Left channel pan rate in Hertz. (panrate2) Right channel pan rate.
840	FLUTTER	A more intense dynamic tremolo. (rate) Tremolo rate. (env mod) Controls how much input level affects tremolo rate. (detune) Output detune amount in cents.
841	FUNKY SQUARES	A pair of highly resonant, square-wave modulated filters. (depth 1) Filter 1 modulation amount. (depth 2) Filter 2 modulation amount. (envmod 1) Controls how much input level affects modulation frequency for filter 1. (envmod 2) Controls how much input level affects modulation frequency for filter 2.
842	FUZZ/CHORUS	A fuzz box feeding a detuned chorus. The detune is right and left, with dry distortion in the center. (gain) Gain control for distortion. (chrs lvl) Level control for stereo chorus output. (dist lvl) Level control for dry fuzz output. (detune) Chorus detune amount in cents.
843	FUZZ/CLEAN CHRS	Fuzz in the center with a clean pitch detune left and right. (gain) Gain control for distortion. (chrs lvl) Level control for clean chorus output. (dist lvl) Level control for fuzz output.

#	Program Name	Description
844	FUZZ/EQ/COMP	A 2:1 compressor precedes the distortion. Also has two bands of eq and independent left/right channel delays. Adjust filter 1 and 2 to control eq. (gain) Gain control for distortion. (eq1boost) Amount of boost for eq1. 100 = 12 dB of boost. (eq2boost) Amount of boost for eq2.
845	FUZZ/EQ/ROTARY	Fuzz into a rotating speaker simulation. (gain) Gain control for distortion. (eq1boost) Amount of boost for eq1. (eq2boost) Amount of boost for eq2. (modrate) Frequency control for rotating speaker.
846	FUZZ/EQ/TREMOLO	Fuzz into a tremolo. (gain) Gain control for distortion. (eq1boost) Amount of boost for eq1. (eq2boost) Amount of boost for eq2. (tremrate) Tremolo rate in Hertz.
847	FUZZ-HEAD	Super high-gain fuzz with resonant overtones. (gain) Gain control for the distortion.
848	GATED GHOST	The ethereal reverb followed by a noise gate. Use the envelope follower parameters to adjust the gate. (decay) Decay control for the reverb. (detune) Detune amount in milliseconds. (delaymod) Delay modulation amount. (mod rate) Delay mod rate, in Hertz.
849	GATED MULTITAP	A chorused multitap delay followed by a noise gate. (density) Delay tap density. (detune) Detune amount in cents. (delaymod) Delay modulation amount. (mod freq) Delay modulation frequency in Hertz.
850	HAAS PANNER	An autopanner that varies the delay to the left and right channels to enhance the realism of the panning effect. (pan rate) Pan rate in Hertz.
851	HAAS PAN/MANUAL	A manual panner that varies the delay to the left and right channels to enhance the realism of the panning effect. (the knob) Use this to control the pan position. A setting of zero is pan left. A setting of 100 is pan right.
852	HI->EFX LO->NOEFX	A frequency-dependant gate that lets the high notes into a chorus delay effect. Use cutoff1 and cutoff2 to adjust the crossover point.
853	HIGH->LFT LOW->RT	A frequency dependant gate that steers the high notes to the left channel and the low notes to the right channel. Use cutoff1 and cutoff2 to adjust the crossover point.
854	KNOB ZIPPERS	Use the knob to control delay time, giving a zipper effect. (mod amt1) Controls how much the knob affects delay 1. With a setting of 100, the knob will modulate the delay by 500 milliseconds. (mod amt2) The modulation amount for delay 2. (feedback) The amount of feedback for the two delays. (the knob) Use this to modulate the delays.
855	MANUAL FLANGE	Use the knob to flange. This is a subtle version; try rich flange/man or awesome knob for more intense flanging. (the knob) Use this to control the flange. (depth) The flange depth, in tenths of milliseconds. (feedback) Amount of feedback in percent.

#	Program Name	Description
856	MIDI EFX RACK	This is set up to use with a MIDI controller like the MIDI Mitigator. Each parameter of this patch is assigned to a different MIDI controller. This patch gives you a pair of ducked, BPM delays in parallel with a pitch detuning chorus. Detune AmtGP Cont #1(MIDI control #16) Controls the amount of detuning. Detune LvlGP Cont#2(MIDI control #17) Adjusts the level of the detune outputs. DlyModAmtGP Cont #3(MIDI control #18) Adjusts the Modulation Amount for the two delays. DlyModRateGP Cont #4(MIDI Control #19) Adjusts the modulation rate for the two delays. Duck AmtGP Cont #5(MIDI Control #80) Sets the amount of gain ducking. High CutGP Cont #6(MIDI Control #81) Controls the amount of high cut. FeedbackGP Cont #7(MIDI Control #82) Controls the amount of delay regeneration. Delay LevelGP Cont #8(MIDI Control #83) Controls the level of the delay outputs. BPMTap with MIDI Damper Pedal.
857	MULTITAP CHORUS	A very rich chorused multitap delay. (density) Density of delay taps. (detune) Detune amount in cents. (delaymod) Delay modulation amount. (mod freq) Delay modulation frequency.
858	OVERDUB LOOP	A long loop with delay modulation that overdubs without overload. Use delay 1 to control the length of the loop. (loop fb) Feedback amount when no input signal is present. When new input is present, the feedback is ducked, erasing the old signal to make room for the new one. (delaymod) The amount of delay modulation in milliseconds. (mod freq) Delay modulation frequency in Hertz.
859	OVERDUB/DETUNE	An overdubbing loop like above, except with detuning on the left and right outputs. The dry loop output is panned center. Also, this patch has BPM control over the loop length. (loop fb) Feedback amount when no signal is present. (chrs lvl) Level control for the detune outputs. Negative settings invert the phase of the output signal. (cntr lvl) Level control for the dry loop output. (detune) Detune amount in cents.
860	OVERDUB/TREMOLO	An overdubbing loop with chorus and tremolo. BPM controls the loop length. The chorus is panned left and right. The tremolo is panned center. (loop fbk) Feedback amount when no signal is present. (chrs lvl) Level control for detuned chorus output. (cntr lvl) Level control for the center tremolo output. (am depth) Depth of the tremolo effect.
861	OVERDUB DUAL	Dual overdubbing delay loops with knob modulation of the delay times. (loop1 fb) Feedback amount for loop 1. (knobmod1) Use this to modulate the delay of loop 1. (loop2 fb) Feedback amount for loop 2. (knobmod2) Use this to modulate the delay of loop 2.
862	PANNING BANDS	Dual autopanners fed by fixed bandpass filters. Use filter 1 and 2 parameters to adjust the characteristics of the bands. (rate 1) Left channel pan rate. (rate 2) Right channel pan rate.
863	PANNING DELAYS	Dual delays, each with its own autopanner. (panrate1) Left channel pan rate. (panrate2) Right channel pan rate.

#	Program Name	Description
864	PANNING DETUNE	An autopanner with the left and right channels detuned. (detune) Detune amount in cents. (pan rate) Pan rate in Hertz.
865	PAN INTO DELAYS	An autopanner that feeds a cross-fed pair of delays. (pan rate) Pan rate in Hertz. (feedback) Delay feedback amount. (cross fb) Amount of delay output that is fed-back from one delay to the other.
866	PANNER	Autopan using a frequency modulated oscillator. (pan rate) Pan rate in Hertz. (fm amt) Amount of frequency modulation on the pan rate. (fm freq) Frequency modulation rate.
867	PAN SQUARELY	Autopan with a square-wave oscillator. (pan rate) Pan rate in Hertz. (fm amt) Amount of frequency modulation on the rate. (fm freq) Frequency modulation rate.
868	PING-PONG	A ping-pong delay with controllable high cut. (feedback) Amount of delay feedback in percent. (detune) Detune amount in cents. (high cut) High cut amount. Higher settings give maximum cut.
869	PING-PONG DUCK	Like above, with ducking on the delays. Use envelope controls to adjust ducking parameters. (feedback) Delay feedback amount in percent. (detune) Detune amount in cents. (high cut) High cut amount.
870	QUIVERING ECHO	A uniquely modulated delay. Use BPM to adjust delays and modulation.
871	RICH FLANGE	A flanger built with two delays and cross-coupled feedback. (depth) Flange depth. (rate) Flange rate in Hertz. (feedback) Feedback in percent. Higher settings will give a more resonant flange.
872	RICH FLANGE/MAN	The same flanger as above, but this one has manual control. (the knob) Use this to sweep the flanger. (feedback) Feedback in percent. Higher settings will give a more resonant flange.
873	RICH RHYTHM	A very diffuse, chorused pair of repeating delays. Use BPM to set the tempo. (detune) Detune amount in cents. (diffuse) Low settings make delays sound more discrete.
874	SINE FLANGE	A very smooth flange that uses a sine wave to sweep the delays. (rate) Sweep rate in Hertz. (depth) Controls how much the delay is swept. (feedback) Feedback level in percent. Higher settings give more resonant, canny flange.
875	SLAP CENTER	Detuned chorus on left and right with a dry slap in the middle. (chrs lvl) Level control for chorus in percent. (delaylvl) Level control for dry slap.
876	SLIDE INTO TUNE	The input envelope bends the pitch upward. Use envelope controls to vary the dynamics of the pitch bend. (detune) Maximum detune amount in cents.
877	SPEAKER SPINNER	A rotating speaker simulation. Even takes time to come up to speed. (speed) Speaker rotation speed.

#	Program Name	Description
878	SQUARE CHORUS	Pitch detuning modulated by a square wave. (mod amt) Amount of pitch modulation in cents. (mod rate) Pitch modulation rate in Hertz.
879	STEREO DETUNE	Splits stereo signal into L+R and L-R. In addition to controlling the balance of L+R and L-R, L+R can be detuned. (l+r lvl) Level control for the L+R signal, the mono, or in-phase part of a stereo mix. (l-r lvl) Level control for the L-R signal, the stereo, or out-of-phase part of a stereo mix. (detune) Controls the amount of pitch detuning to be used on the L+R signal.
880	STEREO ENHANCE	This patch plays around with the L-R component of a stereo mix. Delay and EQ of the L-R signal are controllable with softknobs. (delay) Delay, in tenths of milliseconds, added to the L-R signal. (boost fr) Center frequency around which the L-R signal is boosted, The adjustment is in tens of Hertz. (delay lv) Amount of delayed L-R to be added into the output. (boostamt) Amount of boost to apply to the L-R signal. A setting of 100 will boost the selected frequency by about 6 dB.
881	STEREO WIDEN	Adds delay to L+R to give wider center image. (l+r lvl) Level control for the L+R component. Increasing this makes a mix more monophonic. (l-r lvl) Level control for the L-R component. Increasing this brings out the stereophonic components of a mix. (cnt wdth) Center width control. Spreads out L+R signal with delay to make the center image wider.
882	STRANGE LOOP	Output switches between two different delay loops, giving an interesting rhythmic effect.
883	SWELL	A gain swell triggered by the audio input. Use thresh1 to adjust the trigger threshold. (rate) Swell rate in Hertz.
884	SWELL REVERB	The ethereal reverb modulated by a triggered amplitude swell. (decay) Decay time of the reverb in percent. (detune) Detune amount in cents. (delaymod) Delay modulation amount in milliseconds. (mod rate) Swell rate.
885	SWELL TAPS	A multitap delay gated with a triggered lfo. Use lfo thresh to adjust trigger threshold. (density) Lower settings make for lesser taps. (detune) Detune amount in cents. (delaymod) Delay mod amount in milliseconds. (mod freq) Swell and delay mod rate in Hertz.
886	THROATY	An envelope flanger based on the awesome flanger. (depth) Amount of delay sweep. (feedback) Feedback amount in percent. (detune) Detune amount in cents.
887	TREMOLO	A stereo tremolo with independent left/right delay control. Use *delay 1* and *delay 2* parameters to set delays. (freq) Tremolo rate in Hertz. (depth) Tremolo depth in percent.

#	Program Name	Description
888	TRIGGERED AIR	A rich, chorused reverb whose output is gated by a triggered lfo. The left input triggers the swell. Use thresh1 to set the trigger threshold. (decay) Decay length control. (detune) Detune amount in cents. (delaymod) Delay mod amount in milliseconds. (mod rate) Mod rate in Hertz.
889	TRIGGERED FLANGE	Audio input triggers flange sweep. *Thresh1* adjusts the trigger threshold. (depth) Flange depth. (rate) Flange rate in Hertz. (feedback) Feedback level control. Higher settings give more resonant flange.
890	TRIGGERED PAN	Audio input alternately triggers a pan to the left, then to the right. *Thresh1* controls the trigger threshold. (pan rate) Pan rate in Hertz.
891	TRIG PAN R->L->R	Audio trigger pans right to left to right. *Thresh1* controls the trigger threshold. (pan rate) Pan rate in Hertz.
892	TRUE FLANGE	Thru-zero flanging. This uses two delays to get flanging that actually passes through zero delay. (feedback) Feedback level in percent. Higher settings give more resonant flange. (depth) Flange delay sweep depth. (rate) Sweep rate in Hertz.
893	UNDULATOR	Tremolo on top of a multitap delay. (density) Higher settings give more delay taps. (detune) Detune amount in cents. (delaymod) Delay modulation amount in milliseconds. (mod freq) Modulation rate in Hertz.
894	VIBRATO	Vibrato with controllable delay. (rate) Vibrato rate in Hertz. This will affect the amount of perceived pitch modulation, so depth may have to be adjusted after adjusting this. (depth) Controls amount of pitch variation. (delay) Amount of delay, in milliseconds.
895	WHAAAT-A-PANNER	Two bands that pan and change cutoff frequency. (rate 1) Sweep rate for filter/panner 1. (rate 2) Sweep rate for filter/panner 2.
896	WHOOPIE	Very strange envelope modulated noises. (fdback 1) Amount of feedback for delay 1. (modamt 1) Amount of modulation for delay 1. (fdback 2) Amount of feedback for delay 2. (modamt 2)Amount of modulation for delay 2.
897	WIDE TREMOLO	Tremolo with different delay on left and right gives a nice stereo effect. (rate) Tremolo rate in Hertz. (width) Left to right channel delay in milliseconds.
898	WILTING PHRASE	After a phrase is played, the pitch drops. (wilt) Amount of pitch shifting applied at end of phrase. (feedback) Feedback level in percent.
899	X-COUPLED DUCKS	Two ducked delays with cross-coupled feedback. (feedback) Delay feedback level in percent. (moddepth) Delay modulation depth in tenths of milliseconds. (modfreq1) Modulation rate in Hertz for delay 1. (modfreq2) Modulation rate for delay 2.