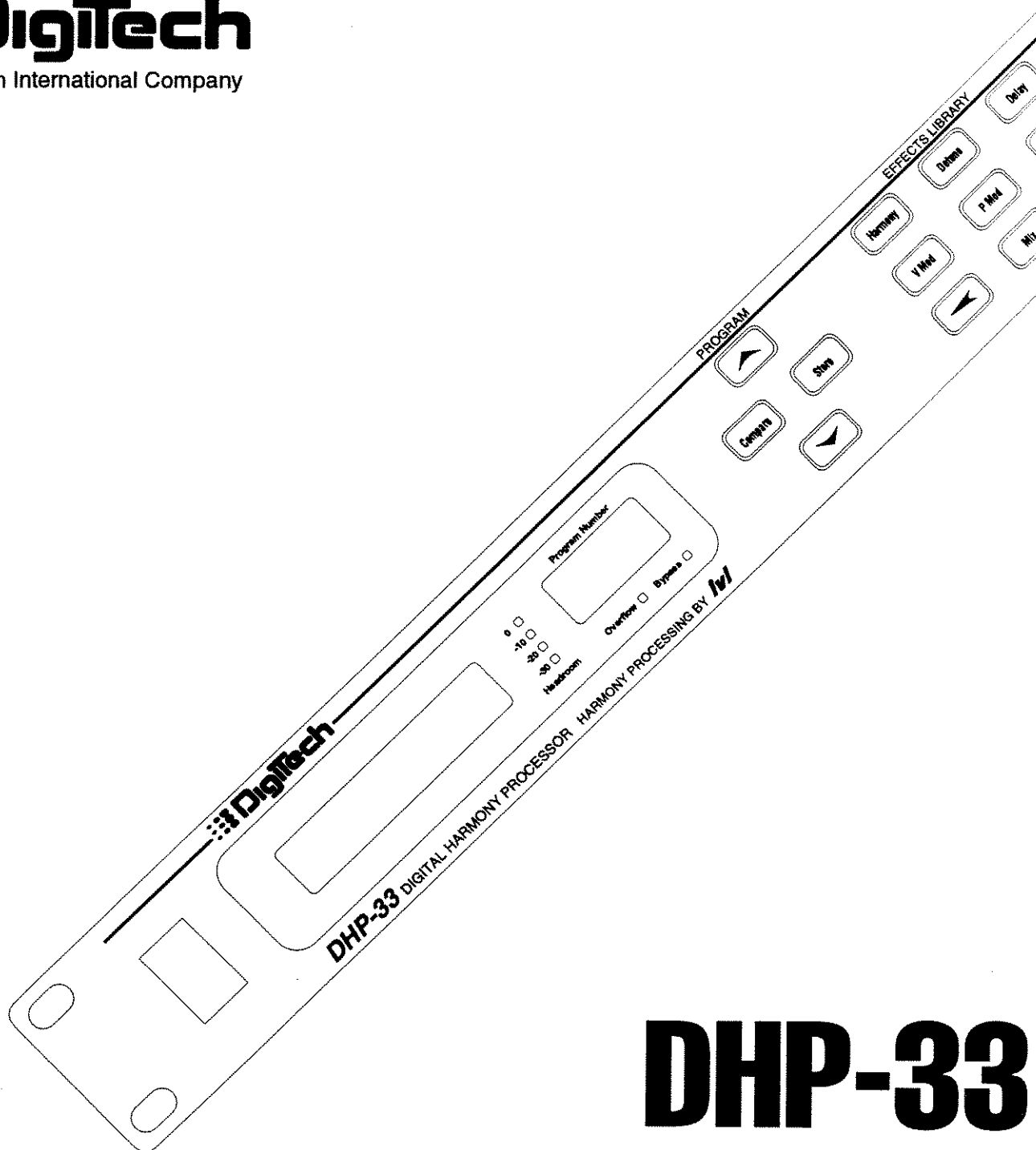




H A Harman International Company



DHP-33

Three Part Digital Harmony Processor

Owner's Manual

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Power and Grounding Information

The DHP-33 is equipped with a three-prong, grounded power cord for your protection. Do not cut off the ground prong of the plug, and do not use an adapter to plug it into a two-prong outlet unless the adapter is properly grounded.

The DHP-33, like any piece of computer hardware, is sensitive to voltage drops, spikes and surges. Interference such as lightning or power “brownouts” can erase your program memory or even permanently damage the circuitry inside the unit. Here are some steps to help protect your DHP-33 from such a fate:

- **Turn it off:** Make a habit of turning off all of your gear when it is not in use. If there is lightning or a severe windstorm, unplug all your equipment. A surge from a nearby lightning strike or downed power line can destroy equipment even if the switch is off.
- **Spike/Surge protectors:** This is an inexpensive solution to all but the severest of AC line conditions. Surge protected power strips usually cost only slightly more than unprotected strips, and higher quality, multi-stage surge suppressors are usually under \$ 50, making them a worthwhile investment for protection of all your valuable gear.
- **AC Line Conditioners:** This is the best (and most expensive) way to protect your DHP-33 from line voltage fluctuations. Line conditioners constantly monitor the incoming voltage for excessive peaks and dips and make adjustments accordingly, thereby delivering consistent power levels. For really expensive studio equipment, AC line conditioners are a required investment.

Powering On: As with any piece of electronic musical gear, a good operating practice is to turn on all of your effects and instruments first, and turn on your mixer or amplifier last. Also, make sure that your mixer and amplifier volumes are turned down until all of your gear is turned on. Following these steps will avoid sending amplified transients through your speakers or headphones.

CAUTION!

This product contains a lithium battery. There is danger of explosion if battery is incorrectly replaced. Replace only with an Eveready CR 2032 or equivalent. Make sure the battery is installed with the correct polarity. Discard used batteries according to manufacturer's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

ADVARSEL!

Lithiumbatteri - Eksplosjonsfare ved feilagtig håndtering. Utskiftning må kun ske med batteri av samme fabrikat og type. Levér det brukte batteri tilbake til leverandøren.

VAROITUS!

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

WARNING!

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.



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

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

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Welcome!

Congratulations and thank you for purchasing the DHP-33 Digital Harmony Processor. DigiTech has built a reputation for innovation in intelligent harmony processors, and the DHP-33 is at the leading edge of this technology. Prepare yourself for features and sound quality that will open up new dimensions of sound to you!

The DHP-33 is a 3-voice intelligent harmony processor designed specifically for musical instruments. New levels of performance have been achieved through the use of a new digital audio processing chip. This chip uses 24-bit processing to give crystal clear sound with a full 20 Hz to 20 kHz bandwidth and 90db signal-to-noise ratio. The DHP-33 samples at 45 kHz to provide Compact Disc sound quality.

Another innovation is the increased capability for simultaneous operation of effects. You can now combine harmony with stereo delay (up to 1.5 seconds), detune, and chorus. Since each channel (left and right) is completely independent, you can create great stereo effects where harmonies ping-pong from side to side, etc. With the arpeggiation, you have up to 64 factory preset arpeggios or 32 custom arpeggios.

One more new feature is continuous control of many parameters. Use a volume pedal, or up to seven MIDI controllers, to vary Level, Mix, Effect, Pitch Bend, and Modulation. Selecting Pitch Bend allows you to turn a volume pedal into a whammy pedal and do up to two-octave bends, down or up.

The DHP-33 works by recognizing the notes you're playing and using that knowledge to create natural sounding musical harmonies. It operates as a real time sampler that constantly samples and analyzes what you're playing. At the same time, the notes being sampled are sent back out at a different pitch. Because it recognizes the pitch of each note you play, the DHP-33 is able to automatically choose a looping point that creates a natural sounding harmony for that pitch—not a garbled one like that of unintelligent pitch shifters. Recognizing the note you're playing also means that the DHP-33 can create harmonies that stay in key with your music. Because they're smart, they make you sound great!

The DHP-33 is a powerful effects processor. With some products, you have to invest hours of your time to learn how to use this kind of power. Not so with the DHP-33. Inclusion of a 32-character LCD display means that settings are displayed in full, and step-by-step instructions are presented to make it very easy to operate. Direct access buttons give you short-cuts to the most-used functions while editing your sounds.

About the User's Manual

This manual will guide you through the operation of the DHP-33 in detail, so please read it carefully. You'll get the most value from the manual if you try the functions out on your DHP-33 as you read the manual. After your first audition of its features, spend some time experimenting to really get a grasp on some of the deeper powers of the unit; this will allow you to enhance your music in ways you haven't yet thought possible.

Section 1 - Startup:

The first section of the manual covers setting up the DHP-33 and starting to use the Factory Programs.

Section 2 - Effects Guide

The 2nd section describes all of the Parameters of the DHP-33 and how to edit them to create your own Programs.

Section 3 - Understanding Harmony

The third section goes into some detail about the musical theory behind the DHP-33's Intelligent Harmonies. While it is not essential to using the DHP-33, some understanding of harmony will enhance your ability to customize the DHP-33's settings to fit your music.

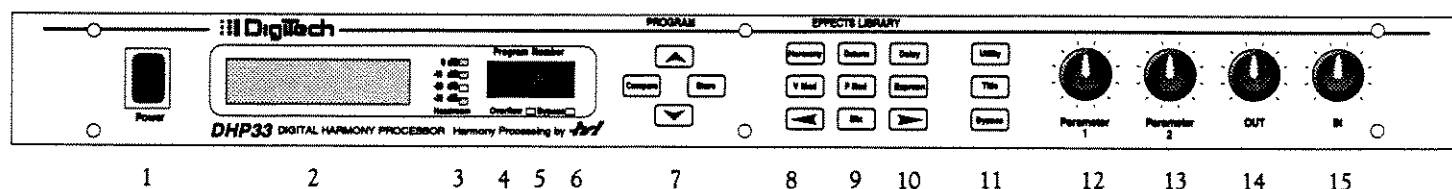
Section 4 - Application Notes and Troubleshooting

Section Four includes practical tips on using the DHP-33 in a variety of live and recording situations, and some troubleshooting steps to take if you are not getting the results you expected.

Menus:

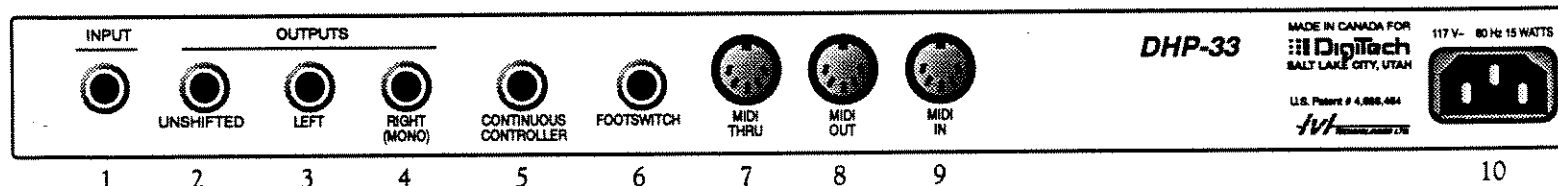
The Effects Library menus can be visualized as a long chain of LCD menu screens, arranged left to right. Pressing the MENU ► and MENU ◀ buttons allows you to move forward or back, and view each screen (each link in the chain) in turn, and the Effects Library Buttons allow you to jump to certain menu screens quickly. When you reach the end of the menus, they will "wrap around" and start again from the beginning. At certain points on the chain of menus, there are "sub-menus" under which are additional menu screens for Parameters that relate to one function. You enter and exit sub-menus by twisting a Parameter Knob counter-clockwise at the Sub-menu screen, and clockwise at the "Exit" screen. The Utility Menu is a separate chain of menus, which functions the same way.

The Front Panel



- 1) **Power** switch Turns the DHP-33 on and off.
- 2) **LCD Panel** Main display for performance, program and utility editing. 16 x 2 Character back-lit Liquid Crystal Display (LCD).
- 3) **Input level** LEDs Input level indicator: the red Light Emitting Diode (LED) illuminates when the input signal is 3dB short of clipping.
- 4) 3 digit **LED** program # display Displays currently selected program number.
- 5) **Overflow** Indicator Illuminates when the Effects are overloaded internally. Usually indicates that the regeneration in a Delay program is set too high.
- 6) **Bypass** Indicator Illuminates when the the unit is bypassed.
- 7) **Program** keypad Programs are selected, loaded, copied and saved with these buttons. Programs are selected with the **PROGRAM** ▲ and **PROGRAM** ▼ buttons. Edited programs can be compared with the original with the **COMPARE** button, and then saved with the **STORE** button.
- 8 & 10) **Menu** buttons (◀ and ▶) Parameters are selected for editing with these buttons: you move between the menu screens with the **MENU** ▶ and **MENU** ◀ buttons, while the Parameter value(s) in each screen are changed with the **PARAMETER** Knobs.
- 9) **Effects Library** Direct Access keypad 7 buttons allowing you to "jump" directly to the editing menu of the effect printed on the button. For example, when the **HARMONY** button is pressed, the current program's Harmony effect is selected, and you are "jumped" to its location in the current program (on the LCD Panel).
- 11) **System** Keypad The three buttons in this keypad are used to change the name of the current program, take the DHP-33 in and out of Bypass mode, and change the system parameters of the DHP-33: The **TITLE** button allows you to change the current name, the **BYPASS** button bypasses the unit, and the **UTILITY** button accesses the System Utilities menus (for example, the MIDI parameters).
- 12 & 13) **Parameter** knobs The **PARAMETER** Knobs are used for parameter editing: when two parameters are displayed on the LCD Panel at the same time, the left **PARAMETER** Knob (**PARAMETER 1**) changes the value of the left-hand parameter on the LCD Panel, and the right **PARAMETER** Knob (**PARAMETER 2**) edits the right parameter. If there is only one parameter on the LCD Panel, either knob will do.
The **PARAMETER** Knobs are also used to enter and exit sub-menus. When you see these symbols on the LCD, [◀] means twist either **PARAMETER** Knob counter-clockwise to enter a sub-menu, and [▶] means twist either knob clockwise to exit a sub-menu.
The **PARAMETER** Knobs respond to the speed of turning. Twisting the knob faster will take your adjustment further; slow down for more accurate selection. When the DHP-33 is first turned on, the **PARAMETER 1** Knob will choose the Program (like the Program buttons), and the **PARAMETER 2** Knob will change the Key of Scalic harmony and the Root and Chord Type of Chordal harmony programs.
- 14 & 15) **OUTPUT** & **INPUT** level knobs 2 knobs which set the input and output signal levels.

The Rear Panel



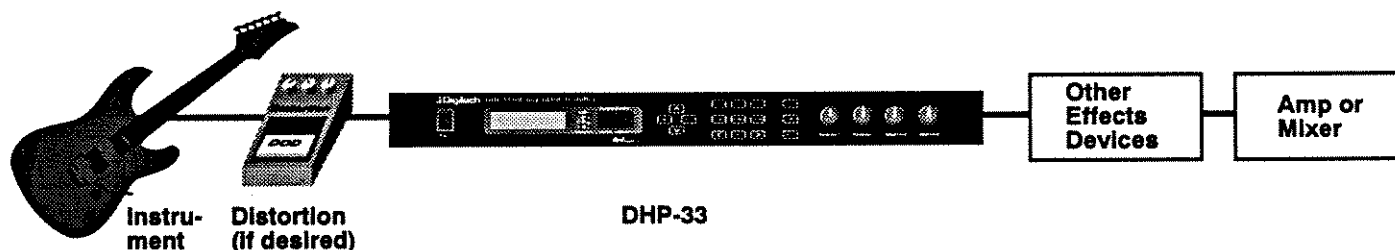
- | | |
|------------------------------------|--|
| 1) Input | The 1/4" input jack; connect your instrument to this jack. |
| 2) Unshifted Output | The 1/4" "dry" output jack, with no effects or harmonies. |
| 3) Mix Output: Left | The left stereo output with effect and dry signals mixed together according to the Mix parameter. |
| 4) Mix Output: Right/Mono | The right stereo output with effect and dry signals mixed together according to the Mix parameter; also used for mono output. |
| 5) Continuous Control Pedal | 1/4" Jack for a standard volume pedal controller |
| 6) Footswitch | 1/4" Jack for an optional Digitech FS300 3-button footswitch |
| 7) MIDI Thru | Any MIDI data received at the MIDI in port is sent directly through the unit and out of this jack: use it to "daisy-chain" the DHP-33 with other MIDI devices |
| 8) MIDI Out | All DHP-33 generated MIDI data such as program dumps and Continuous Controller (CC) messages are sent out of this jack: use it to copy User Programs to other DHP-33's and data filing devices such as computers & musical sequencers. |
| 9) MIDI In | MIDI input jack; all MIDI controlling messages from other MIDI devices for the DHP-33 enter the unit here. |
| 10) AC Line Input | The power cord receptacle. Always use a grounded (3-prong) outlet. |

Making Audio Connections

Place the DHP-33 first in the line of effects from instrument to amp, except when using distortion. If using a distortion device, place it first in the effects chain. If you plan to use a lot of distortion, the performance of the DHP-33 can be optimized by altering the tracking options for distortion guitar. See page 17, Tracking Options in the Effects Guide section.

Plug your instrument into the INPUT JACK on the rear of the unit directly behind the input level control. This input accepts any standard 1/4" phone plug.

The DHP-33 has left and right stereo outputs as well as an unshifted output. Be sure to use the RIGHT/MONO OUTPUT of the DHP-33 for mono applications, such as connecting to a guitar amp.



When Using a Mixer

For stereo effects, connect the LEFT OUTPUT and RIGHT OUTPUT separately to two mixer channels panned left and right, or to a stereo effects return. You may also take the dry UNSHIFTED OUTPUT to another channel and adjust the DHP-33 MIX parameter to 100%, allowing you full control over mixing the effect levels manually on your mixer; however, with the programmable MIX and L-R BALANCE levels on the DHP-33, you don't have to mix manually.

Initial Adjustments

Adjust the input level control so the green LEDs on the HEADROOM indicator are on most of the time, with only occasional peaks lighting the red (0 dB) LED.

Turn the OUTPUT level control to the right to increase the volume. Don't adjust it so high that it overloads the input of your amplifier or mixer.

Adjust Mix

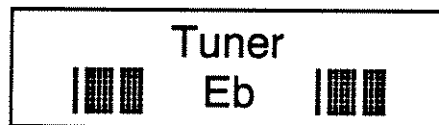
The mix between your natural sound and the harmonies is adjustable. This mix setting is stored as part of each program. If you wish to change the settings, press the MIX button, and turn the PARAMETER 2 Knob to set the level of the harmonies relative to the direct signal.

Storing Changes

To save the new setting and make it a permanent part of that program, press STORE once. Press it a second time if you wish to store the setting in the program number currently selected, or use the PROGRAM ▲ or ▼ buttons to select the program number that you want to store it to, and then press STORE.

Tuning Up To The DHP-33

The DHP-33 works best if your instrument is tuned to it. Press the UTILITY button and you will see the Tuner screen.



The DHP-33's on-board tuner is a digital version of a mechanical strobe tuner: Unlike conventional digital tuners, it uses a "strobing" display effect combined with intelligent pitch correction to make tuning an instrument fast and accurate. The digital strobe tuner display is designed to be easily read, even from across a stage or studio.

Whenever the Tuner feature is active, the DHP-33 display shows the user the most dominant fundamental pitch it "hears" to the nearest semitone; the closeness of the pitch to this semitone is reflected in the speed and direction of the moving (or strobing) blocks as they cross the display. The speed of the strobe blocks shows how close the instrument's pitch is to the actual note shown on the DHP-55's display: closer is slower, and farther is faster. The direction of the strobe blocks shows the relative sharpness or flatness of the instrument pitch: the blocks strobe right to left for flat pitches and strobe left to right for sharp ones.

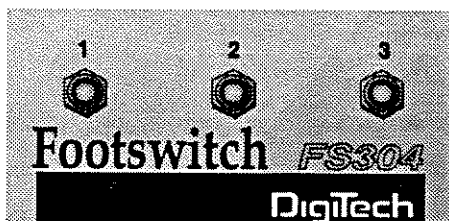
Another way to tune up to the DHP-33 is to use the Easy Tuner program, (Program # 127 and 255). This program uses the pitch correction feature to let you tune up by ear. Simply tune your instrument until you sound in tune with the tuner's output tone.

Tuning the DHP-33 to Your Instrument

If your instrument uses a reference that is different from the standard "concert pitch" tuning reference (A=440), tune the DHP-33 to your instrument for best results. Press UTILITY and use a PARAMETER Knob to raise or lower the DHP-33's tuning reference. This value may be set between 420 and 460 Hz, which is between approximately 1/4 tone flatter to 1/4 tone sharper than A=440. Press UTILITY again to exit and return to normal operation.

Choosing a Program

The DHP-33 has 256 memory locations. Program Numbers 129 through 256 contain factory programs that cannot be changed. Numbers 1 to 128 contain copies of the factory programs, but these may be changed as you wish. The simplest way to select programs is to use the PROGRAM ▲ and ▼ buttons or the PARAMETER 1 Knob. Pressing a button once will increase or decrease the program number by one. If either of these buttons is depressed for a few seconds, the numbers will start to change more rapidly.



Selecting a Program Using the Optional Footswitch

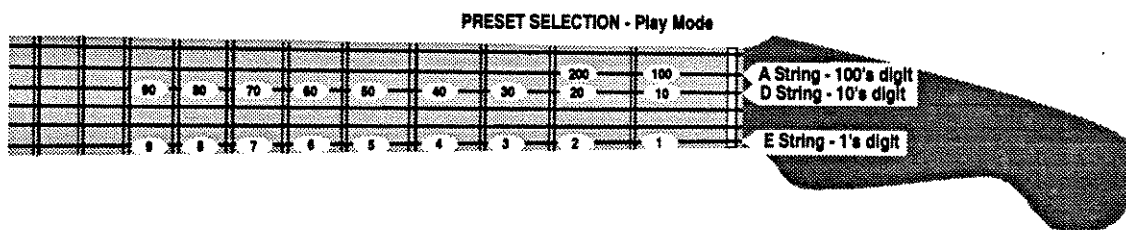
The DHP-33 comes from the factory with the footswitch settings configured in "Step" mode. In this mode, programs are changed by using the 1 and 2 switches to step up and down through program selections. A quick press on the Preset switch causes the program to increase by one. Continuing to hold the UP or DOWN switch down causes programs to step forward or backward rapidly until the switch is released. See page 23, Footswitch Settings for more information on configuring the Footswitch.

Choosing a Program From the Fretboard of a Guitar Using the Optional Footswitch

A very convenient feature of the DHP-33 is the ability to change program and key from individual notes on your guitar. To do this, you need to change from "Step" mode to "Play" mode. Press UTILITY and MENU ► to reach "Footswitch Settings" menu. Twist a PARAMETER knob counter-clockwise, and you'll see "Footswitch Type - Up Down Bypass". Twist a PARAMETER knob counter-clockwise to change to "Footswitch Type - Preset Key Bypass". Press MENU ► to reach "Preset Switch - Step Mode" and then twist a PARAMETER knob clockwise to change from "Step" to "Play". Press UTILITY to exit.



When you want to change a program, hold down the PRESET switch on the footswitch, and play one note at a time on the A, D and high E strings. The A string selects the 100's digit of the program, the D string selects the 10's digit and the high E string selects the 1's digit. For example, program 214 would be selected by playing the 2nd, 1st and 4th frets on the A, D and E strings, in that order (the notes B, D# and G#).



Program Naming

The program name may include a number such as "5-1-3." This is used on harmony programs to show you the approximate intervals in the harmony being used. The "1" will always refer to your input note and the number to the right to a harmony note above and the number to the left to a harmony note below. So "5-1-3" means your input is in the middle, the first harmony part is a fifth, in the octave below, and the second harmony part is a third up. The name also indicates whether the harmony is "open" or "closed" - for example, in the key of G Major, 1-3-5 is a closed harmony (G, B and D) and 1-5-3 is an open harmony (G, D and B in the octave above). Keep in mind that these intervals may change depending on the scale type you choose. "Complex" and "Simple" Chordal harmonies are noted by a "c" or an "s" preceding the harmony intervals (see page 28).

A ☐ symbol in lower left of the LCD indicates that the Program has a Continuous Control Pedal function active. See page 11, Expression Controllers, and page 19, Expression Effects Library Button.

Bypass

The BYPASS switch on the front panel is used to turn off operation of the DHP-33 effects. In the standard Latching Action, press once to eliminate the effect, press again to turn the effects back on (see below for a description of the Bypass Actions).

Bypass Using the Optional Footswitch

The # 3 switch (right hand switch) on the optional Footswitch can also be used in the same way.



MIDI Bypass

Selecting program # 128 (the BYPASS program) will also cause the DHP-33 to bypass the effects. This can be done from a sequencer or other MIDI controller through a MIDI Program Change message.

Bypass Actions

In addition to the step on - step off Latching Bypass Action, the BYPASS switch on the optional footswitch can be set to two different Momentary actions.

The *Momentary On Bypass Action* allows you to engage an DHP-33 effect by pressing the switch down and holding it. When you release the switch, the effect is disengaged (bypassed).

The *Momentary Off Bypass Action* does the reverse; it allows you to disengage (bypass) an effect by pressing the switch and holding it. When you release the switch, the effect is re-engaged.

To access these functions, press UTILITY and then MENU ► to reach "Footswitch Settings" menu. Twist a PARAMETER Knob counter-clockwise, then press MENU ► until you find "Bypass Action", and twist a PARAMETER Knob clockwise to choose "Latching", "Momentary Off" or Momentary On". Press UTILITY to exit.

Choosing The Key or Root

When a program is chosen which provides key-specific diatonic harmony, the DHP-33 needs to know the key you are playing in so that it can provide correct harmony. You can tell that a diatonic harmony is selected because the Key or Chord Root and Type are displayed on the LCD display immediately below the program title.

Choosing the Key from the Front Panel

The simplest way to change key is to use the PARAMETER 2 Knob. If there is a key displayed below the program name, turning the PARAMETER 2 Knob will increase or decrease the key one semitone at a time.

Selecting the Key With the Optional Footswitch

The DHP-33 comes from the factory with the footswitch settings configured in "Step" mode. Press UTILITY and MENU ► to reach "Footswitch Settings" menu. Twist a PARAMETER knob counter-clockwise, and you'll see "Footswitch Type - Up Down Bypass". Twist a



PARAMETER knob counter-clockwise to change to "Footswitch Type - Preset Key Bypass". In this mode, the #2 switch will step through the key or chord selections. A quick press on the #2 switch causes the key to increase one semitone. If you overshoot, you can step backward one semitone by pressing and holding the switch for about a second before releasing it. Continuing to hold the switch down causes the keys/chords to increase in one semitone increments until the switch is released.

Selecting the Key by Playing Notes On Your Instrument

The DHP-33 has the ability to change the key from your instrument. To do this, you change from "Step" mode to "Play" mode. Press UTILITY and MENU ► to reach "Footswitch Settings" menu. Twist a PARAMETER knob counter-clockwise to enter the sub-menu. Press MENU ► to reach "Key Switch - Step Mode" and then twist a PARAMETER knob clockwise to change from "Step" to "Play". Press UTILITY to exit.

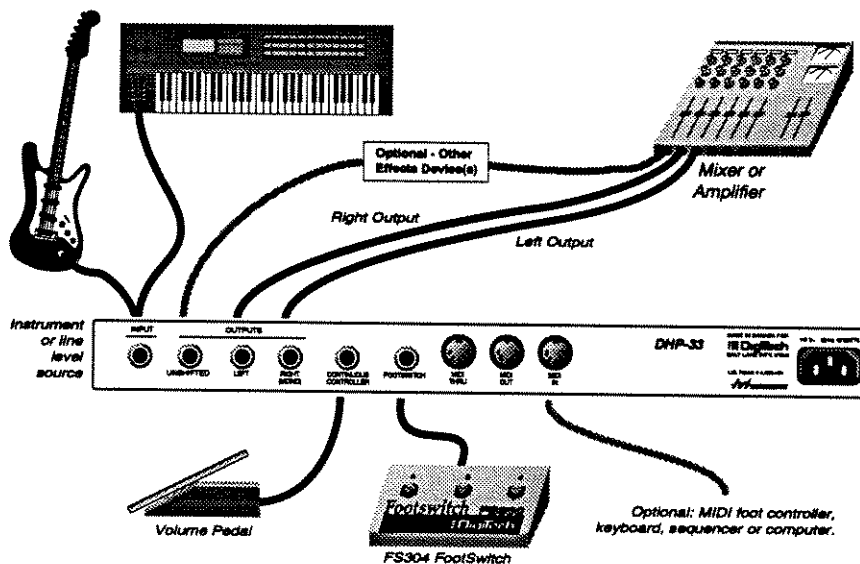
To change Key, hold down the #2 switch on the optional Footswitch, and any note you play will be the new Key or Chord root.

MIDI and Audio Routing

The following shows possible MIDI and Audio routing setups using the DHP-33:

Stage / Live setup:

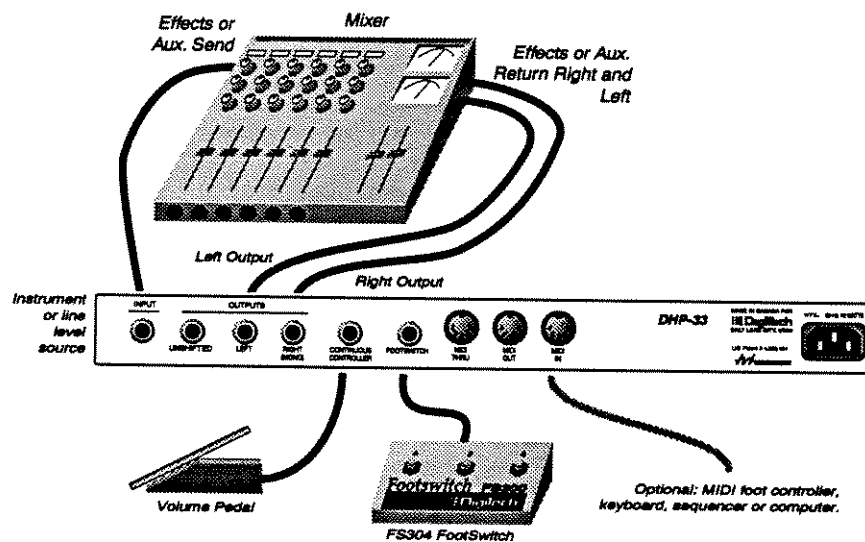
Use the Right Output for mono, or both Left and Right Outputs for stereo. You can either run the outputs to your mixer, or directly to one or two amplifiers. Your favorite effects device can be run from the DHP-33 Unshifted Output.



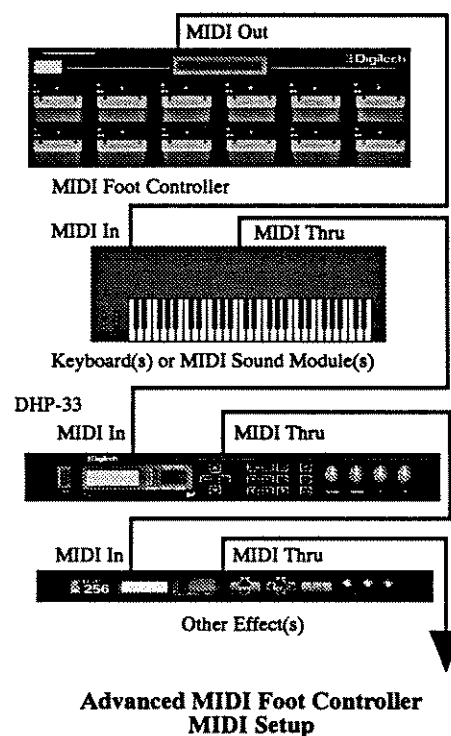
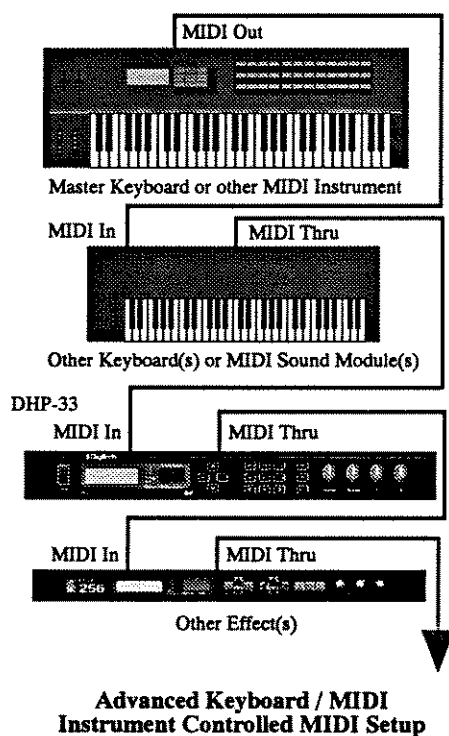
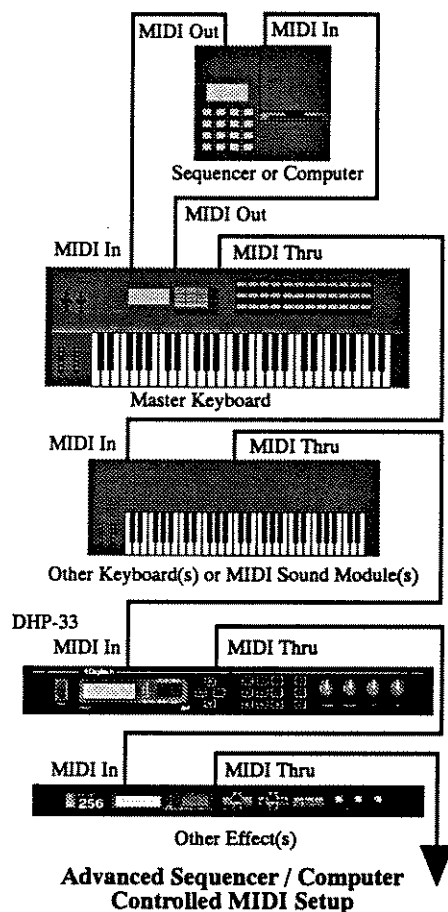
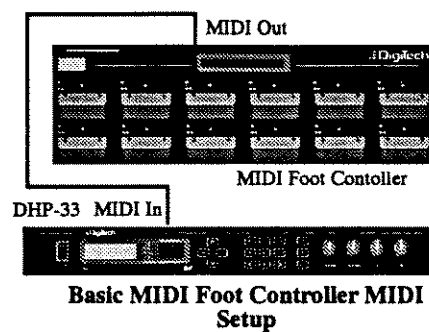
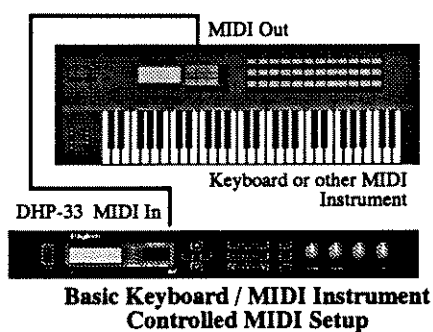
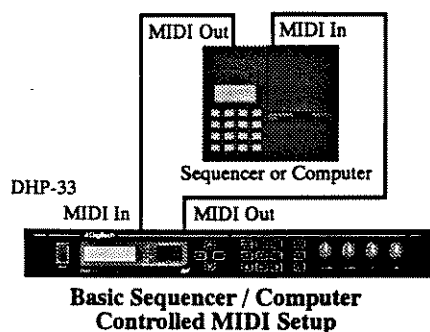
The DHP-33's Programs and Parameters can be controlled via MIDI from computers, sequencers, foot controllers and keyboards.

Recording Studio Setup:


Use the DHP-33 on the Effects or Aux. send and receive loops of your mixer. For best results, make sure that the DHP-33 is being given a dry signal.



MIDI Routings

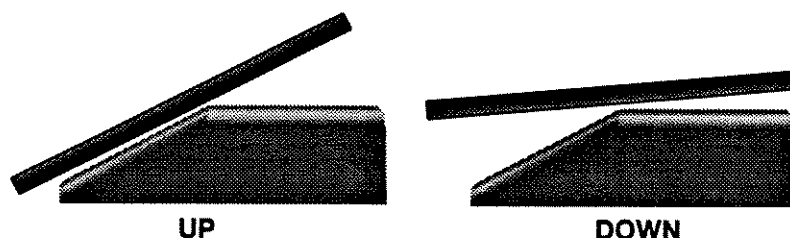


Using Expression Controllers

The DHP-33 has been designed to allow you to use volume or voltage pedals to control Level, Mix, Effect, Pitch Bend and Modulation. Try out any Program which has the  symbol on the lower left of the LCD (for example, Programs 52 - 66) to get the idea. Later, try mapping your own. A Continuous Control input is available on the back panel.


In addition to the Continuous Control input, the DHP-33 provides for continuous control via MIDI. Up to seven additional Expression Controllers may be connected through the MIDI IN jack on the rear panel. This input accepts Breath Control, Mod Wheel, Pitch Wheel, After touch and other MIDI continuous control information. See page 19, 21 and 22 in Section 2 - Effects Guide on how to use MIDI continuous controllers.

If your pedal has both input and output jacks, and is a simple volume pedal, connect only the output jack to the Continuous Controller input with a standard guitar cable (with 1/4" jacks). If your volume pedal uses batteries or plugs into the wall, it is probably an "active" pedal, and cannot be connected to the DHP-33 from the output jack, unless it has a "C.V. out" (a 0 to 5V control voltage output).



Calibrating an Expression Pedal

The DHP-33 will work with almost any volume pedal described above, but it must be calibrated each time a new pedal is used.

Press UTILITY and MENU  until you see "Calibrate Pedal."




Twist a PARAMETER Knob counter-clockwise and follow the directions displayed on the LCD display. To repeat these instructions,

- 1) Bring the foot pedal to the fully UP position, press STORE,
- 2) Bring the foot pedal to the fully DOWN position, press STORE and the DHP-33 is calibrated for your pedal.

MIDI



The DHP-33 will accept MIDI control input from any standard MIDI device, such as a keyboard, computer, sequencer or intelligent footswitch controller. This feature may be used to select programs, control harmony, vary certain parameters while performing, or change many parameters while editing Programs. The DHP-33 supports the standard MIDI In, Out, and Thru jacks on the rear panel. For MIDI control of your DHP-33, connect the MIDI output of your keyboard, computer or sequencer to the MIDI IN jack on the rear panel.

MIDI Selection of Program

The DHP-33 is programmed to allow MIDI Program Change message numbers 1-128 to select any of the DHP-33 Program numbers (1-256). If you wish to change this configuration, press the UTILITY button, use the MENU  button to step to the MIDI Parameter menu, twist a PARAMETER Knob counter-clockwise to enter the sub-menu, then MENU  to select "Receive Program Changes" and use a PARAMETER Knob to select "Yes". You may also use the MENU  to reach "MIDI Program x is y on DHP-33," and use the PARAMETER Knobs to change the way incoming MIDI Program Change numbers will select DHP-33 program numbers. The PARAMETER 1 Knob selects the MIDI Program # (x) and the PARAMETER 2 Knob selects the DHP-33 Program # (y).

MIDI Selection of Harmony

The Key of a Scalic Harmony, or both the Root and Chord Type of a Chordal Harmony can be controlled by incoming MIDI messages in two ways; Key Change by MIDI Program Change, and Key Change by MIDI Note Number.

Press UTILITY and MENU  until you see "MIDI Parameters". Twist a PARAMETER Knob counter-clockwise to enter the sub-menu, then MENU  to step to "Key Change MIDI Channel". Use the PARAMETER Knobs to match the MIDI channel to your keyboard or sequencer's MIDI channel, or "Off" if you want to disable this feature. The MIDI channel number selected should be different from the channel number used to change Programs.

Now press MENU ► until you see "Key Change from MIDI Prog Change". Turn a PARAMETER Knob to choose between "Prog" and "Notes" and finally press UTILITY to exit.

Harmony Change from MIDI Notes

In this mode of operation, the DHP-33 will listen to the lowest note you are playing on your MIDI keyboard, and up to four notes in the octave above. You may set up the DHP-33 to listen only to notes above or below a specified 'split point'. Press UTILITY and MENU ► until you see "MIDI Parameters". Twist a PARAMETER Knob counter-clockwise to enter the sub-menu, then MENU ► until you see "Keyboard Split". Use PARAMETER 1 to select "Ignore Above" or "Ignore Below", and use PARAMETER 2 to select the desired split point. Press UTILITY to exit.

Scalic Harmony: If you play one note, it will be interpreted as the root of the new key and the DHP-33 will change the key of the harmony accordingly. If you play two, three, or four notes, the key will be taken as the root of the chord being played. The DHP-33 will recognize most inversions of the chord, but the root itself must be one of the notes played. If you wish to change Scale Types (i.e. C Major to C Minor), you can do this by setting up separate Programs with the different Scale Types on adjacent Program numbers.

When playing **Chordal Harmonies**, a MIDI keyboard can select both the Root and Chord Type in much the same way as it chooses the Key. Again the lowest note, and up to four notes within an octave above, are used to determine the chord being played. The chord selected by the DHP-33 will be changed automatically to match the chord played on the keyboard. Remember that this feature will change only the key and chord—the voicing will remain the same.

Here is an example of some two-note combinations and the chords that will be chosen:

Notes	Chord
C and E together	C major
C and Eb together	C minor
C and Gb together	C minor7b5
C and Bb together	C7

Harmony Change From MIDI Program Change

When this option is selected, the DHP-33 will change Key in response to incoming MIDI Program Change messages. Keep in mind that MIDI selection of Harmony has to be separate from MIDI selection of the DHP-33's Program number. Either set the Basic MIDI channel to a different channel number from the Harmony Change MIDI Channel, or select "No" for "Receive Program Changes" in the Utility: MIDI Parameters Menu (see page 22).

In Scalic Harmonies, MIDI Program 1 changes the key to C, MIDI Program 2 to C#, and similarly up to MIDI Program 12 changes the Key to B.

In Chordal Harmonies, the Root and Chord Type can be selected: MIDI Program Change 1 to 12 selects C to B major; Program Change 13 to 24 selects C minor to B minor; 25 to 36 selects C to B dom7; and 37 to 48 selects C to B m7b5.

-- (All Harmony Programs) --		----- (Chordal Programs) -----					
MIDI Program	Key (chord)	Program	Chord	Program	Chord	Program	Chord
1	C (major)	13	C minor	25	C dom7	37	C minor7b5
2	C# (major)	14	C# minor	26	C# dom7	38	C# minor7b5
...
12	B (major)	24	B minor	36	B dom7	48	B minor7b5

Using MIDI Program Change to control other devices

The DHP-33 can be used to send out MIDI Program Change messages to control all of your MIDI system devices. This can be done by programming the DHP-33 to transmit MIDI Program Change messages when you select a new program.

To set this up, press the UTILITY button, use the MENU ► button to step to the MIDI Parameter menu, twist a PARAMETER Knob counter-clockwise to enter the sub-menu, then MENU ► to select "Transmit Program Changes", then twist a PARAMETER Knob clockwise to set it to "Yes."

Uses the same "MIDI Program x is y on DHP" settings described above, you can choose a different MIDI program numbers for each DHP-33 program number (see page 11, MIDI selection of Program).

Another powerful way to use the DHP-33 with the optional footswitch as a MIDI controller is to use the Play mode to change patches from the fretboard of your guitar. By selecting programs programmed to transmit MIDI Program Change messages using "Play" mode, your guitar becomes a convenient controller for your entire MIDI system (see page 7).

What the DHP-33 Does

The DHP-33 provides a variety of harmony types and special effects:

Harmonies

Chromatic Harmony

Each harmony part may be any interval up to two octaves up or down. These harmonies are parallel or non-intelligent. You do not have to set the DHP-33 to the key you're playing in.

Scalic Harmony

Choose any key, one of 14 different scale types (major to blues), and any interval. The DHP-33 will produce diatonically correct harmonies for each note you play.

Custom Harmonies

Create your own harmonies. Program each note to generate any two harmony notes you want. Set up your own harmonies or simply alter some of ours, and store each new harmony in memory.

Chordal Harmony

Choose a chord and one of eight different voicings, and the DHP-33 will give you perfect three-part harmony on any note you play. The chord can be made to change automatically to match the chords being played on your MIDI keyboard.

Arpeggiation

Play a note and an arpeggio is created. The arpeggio can be of varying lengths and can ascend, descend or alternate. Choose one of the factory programmed patterns or create one entirely of your own.

Other Effects

Detune

Detune produces small pitch shifts that "thicken up" your sound.

Delay

The DHP-33 offers up to 1.5 seconds of delay on either output.

Vibrato/Chorus

Quickly changing Pitch or Volume (or both) several times a second gives your sound a wide range of "color." This is called Modulation and is recognizable to players as vibrato, tremolo, chorus, and flanging.

Pitch Correction

The DHP-33 will correct the input note to the nearest semitone. This is done by shifting the input note the required number of cents to produce "harmonies" that are on the closest semitone. This can have the extraordinary effect of making an out-of-tune performer sound in tune!

Combined Effects

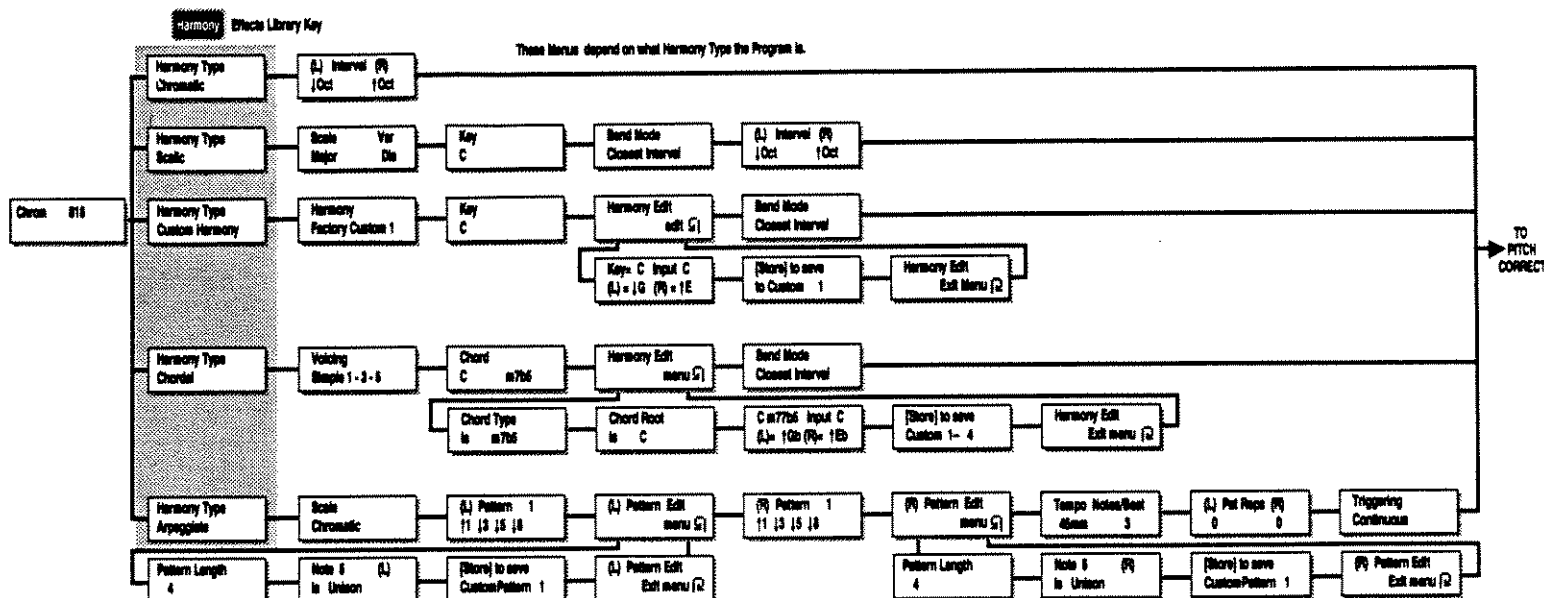
Many of the DHP-33 programs combine effects from several of the above categories. Different harmonies can be combined with varying amounts of delay, detune, modulation, pitch bend and pitch correction. In addition, each of these parameters can be continuously varied using the Expression Controllers (volume pedals).

The Effects Guide:

The next section of this manual describes each of the menus and parameters of the DHP-33 in detail. It is arranged in the same order that the menu screens appear on the LCD display. Keep in mind that the DHP-33 will only display the screens that are appropriate for the current Harmony Type of the Program that you are editing. For example, since Chord Type is not a function that is used in a Chromatic Harmony, when a Program is set to Chromatic Harmony, the "Chord Type" menu screen will not appear.

The Parameters

Many of the parameters have a separate value for each of the left and right channels. These are indicated on the display as (L) and (R). Use the MENU ◀ and ▶ buttons to move forward and backward between the menu screens. Use the PARAMETER 1 and 2 Knobs to edit the left and right values.



Harmony Effects Library Button

Harmony Type

There are five Harmony Types. The harmony type will determine which parameters will follow. For a more in-depth discussion of the DHP-33 harmonies see the section, Understanding Harmony, which follows this general description of the parameters.

Chromatic Harmony

This is parallel (or non-intelligent) harmony. Setting a key is not necessary. Use this effect to create a simple doubling of the input, at a fourth, fifth, octave, etc.

Interval

↓ ↓ octave to ↑ ↑ octave. Intervals are expressed as traditional scale degrees where the lowest of the two notes (the input and harmony) is the root of a major scale. A flat (b) denoted one semitone less than the indicated interval. Arrows are used to denote which octave the interval is in relative to the input note.

If middle C is the input note:

↑ 3rd means a 3rd degree of the C scale above the input

↑ ↑ b5th means an octave above the flattened 5th of the C scale

↓ b3rd means the root of the scale in which C is the flattened third

↓ ↓ 6th means an octave below the root of the scale where C is the sixth

The resulting harmony is:

E above middle C

F* in 2nd octave above middle C

A below middle C

Eb in 2nd octave below middle C

Scale Harmony Parameters

Harmony intervals are automatically adjusted to stay within both the scale type and your chosen key to create intelligent or diatonic harmony.

Scale Type

Major to Blues, 14 different scales.

Variant

Diatonic, Parallel, Diminished, Modal, Altered. There are five variants for each scale type which define how the non-scale tones are handled (see page 27).

Key

C to B, one of 12 keys.

Interval

↓ ↓ octave to ↑ ↑ octave. Intervals for the first seven scale types (Major to Lydian) are expressed as simple degrees (steps) of the selected scale. The second 7 scale types (Lydian Aug. to Blues) use a more detailed method based on the traditional naming of intervals based on the major scale of the lowest of the two notes. Notes that are not part of the scale are handled as Non Scale Tones (N.S.T.) and assigned a harmony depending on the on the setting of the Variant parameter. Arrows are used to show which octave the harmony interval is in; ↓ is one octave down, ↓ ↓ is two octaves down, ↑ is one octave up, ↑ ↑ is two octaves down.

Interval	Major	Minor	Harmonic Minor	Melodic Minor	Dorian	Mixolydian	Lydian	Interval	Lydian Augmented
↑Oct	C	C	C	C	C	C	C	↑Oct.	C
↑7	B	Bb	B	B	Bb	Bb	B	↑7	B
↑6	A	Ab	Ab	A	A	A	A	↑6	A
↑5	G	G	G	G	G	G	G	↑#5	G#
↑4	F	F	F	F	F	F	F#	↑#4	F#
↑3	E	Eb	Eb	Eb	Eb	E	E	↑3	E
↑2	D	D	D	D	D	D	D	↑2	D
Unison	C	C	C	C	C	C	C	Unison	C
↓2	B	Bb	B	B	Bb	Bb	B	↓b2	B
↓3	A	Ab	Ab	A	A	A	A	↓b3	A
↓4	G	G	G	G	G	G	G	↓3	G#
↓5	F	F	F	F	F	F	F#	↓b5	F#
↓6	E	Eb	Eb	Eb	Eb	E	E	↓b6	E
↓7	D	D	D	D	D	D	D	↓b7	D
↓Oct	C	C	C	C	C	C	C	↓Oct.	C

Whole Tone	Half-Whole Diminished	Whole-Half Diminished	Major Pentatonic	Minor Pentatonic	Blues
↑Oct	↑Oct C	↑Oct C			↑Oct. C
↑b7	↑b7 Bb	↑b7 B			↑b7 Bb
↑6	↑6 A	↑6 A	↑Oct C	↑Oct C	↑5 G
↑#5	↑#5 G#	↑b6 G#	↑6 A	↑b7 Bb	↑b5 F#
↑#4	↑#4 F#	↑b5 F#	↑5 G	↑5 G	↑4 F
↑3	↑3 E	↑4 F	↑3 E	↑4 F	↑b3 Eb
↑2	↑#2 Eb	↑b3 Eb	↑2 D	↑b3 Eb	Unison C
Unison	↑b2 Db	↑2 D	Unison C	Unison C	Unison C
↓2	Unison C	Unison C	↓b3 A	↓2 Bb	↓2 Bb
↓3	↓2 Bb	↓b2 B	↓4 G	↓4 G	↓4 G
↓b3	↓b3 A	↓b3 A	↓b6 E	↓5 F	↓b5 F#
↓b5	↓4 G	↓3 G#	↓b7 D	↓6 Eb	↓5 F
↓b6	↓b5 F#	↓b5 F#	↓Oct C	↓Oct C	↓6 Eb
↓b7	↓b6 E	↓5 F			↓Oct. C
↓Oct	↓6 Eb	↓6 Eb			
	↓7 Db	↓b7 D			
	↓Oct C	↓Oct C			

Bend Mode

Closest interval. In this mode, if you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will abruptly change the interval when your bend reaches the half way point between the two notes.

Smooth. In this mode, if you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will gradually adjust the interval for a smooth transition.

Custom Harmony Parameters**Harmony Number**

Custom 1 to Custom 64. These are alterable custom harmonies.

FactoryCustom 1 to FactoryCustom 32. These are fixed, factory-selected custom harmonies.

Key

C to B.

Bend Mode

Closest interval. If you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will abruptly change the interval when your bend reaches the half way point between the two notes.

Smooth. In this mode, if you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will gradually adjust the interval for a smooth transition.

Harmony Edit

Create a Custom Harmony by entering the "Harmony Edit" menu. The input note will be flashing; you may select another input note with a PARAMETER Knob then press Menu ►. This screen allows you to adjust the (L) and (R) harmony notes PARAMETER 1 and PARAMETER 2. Press Menu ◀ to return to the previous screen and select another input note, or playing the desired note on your instrument, the input note setting will change to the note played. Press Menu ► and STORE to save your changes; you will not be prompted to Store your changes if you exit the Harmony Edit sub-menu. Also Store the Program that you wish to use the new Harmony with.

Chordal Harmony Parameters

Harmonies are fitted to a particular chord, rather than a key. Any note you play will have programmed harmonies that sound musically correct over the chord you choose.

Voicing

Simple 1 - 3 - 5 to Complex 3 - 1 - 5. One of eight factory programmed chordal harmony patterns.

Custom 1-4 to Custom 61-64. One of a possible 16 sets of custom harmonies that you can set up to act as chordal harmonies. If you choose "Custom 1-4," you must then use the harmony edit menu to enter a harmony for each of the four chord types, one which fits over each of major, minor, dominant 7 and half-diminished (m7b5) chords. When you save these harmonies as "Custom 1-4" you will also have access to these under the "Custom Harmony" harmony type as Custom 1, Custom 2, Custom 3 and Custom 4.

The voicing number (e.g. 3 - 1 - 5) gives an indication where the input note is relative to the two harmonies, but does not refer to exact intervals. Simple Chordal Harmonies use only chord tones. Complex Chordal Harmonies employ some 6th's and 9th's, and involve some contrapuntal movement between harmony notes.

Chord Root

C to B.

Chord Type

Maj, Min, Dom7, or m7b5.

Harmony Edit

Create a Custom Chordal Harmony by entering the "Harmony Edit" menu. The first screen will prompt you to enter one of the four Chord Types, and the second screen allows you to set the Root of the chord. On the third screen the input note will be flashing; you may select another input note with a PARAMETER Knob, then press Menu ►. This screen allows you to adjust the (L) and (R) harmony notes with PARAMETER 1 and PARAMETER 2 Knobs. Press Menu ◀ to return to the previous screen and select another input note, or playing the desired note on your instrument, the input note setting will change to the note played. When finished, press Menu ► and Store the edited harmony into one of the 16 memory locations (Custom 1-4 through 61-64). Custom Chordal Harmonies are saved in the same memory locations as Custom Harmonies, but are stored in groups of 4, so that you can use MIDI keyboard control to choose between the four chord types.

Bend Mode

Closest interval. If you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will abruptly change the interval when your bend reaches the half way point between the two notes.

Smooth. In this mode, if you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will gradually adjust the interval for a smooth transition.

Arpeggiate Parameters

In Arpeggiate programs, the DHP-33 generates a sequence of related notes for any input note.

Scale Type

Chromatic. Choose the chromatic scale type for simple parallel arpeggios.

Major to Blues. Choose one of the scales for arpeggios which stay in key with you (see page 24).

Variant

Diatonic, Parallel, Diminished, Modal, Altered. Choose the variant for the scalar harmonies to specify how you want non-scale tones handled. Does not need to be specified if the Scale Type is Chromatic (see page 27).

Key

C to B. Specifies the key for Scalar harmonies. Does not need to be specified if Scale Type is Chromatic.

Bend Mode

Closest interval. If you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will abruptly change the interval when your bend reaches the half way point between the two notes.

Smooth. If you bend from one note to another and the DHP-33 finds it has to adjust the interval to stay in key, it will gradually adjust the interval for a smooth transition.

(L) Pattern & (R) Pattern

1-3-5-8 to 5-3-1-8-3-5-10-8-5. Selects 1 of 64 factory programmed patterns.

Custom Pattern 1 to Custom Pattern 32. Selects 1 of 32 user definable patterns.

(L) Pattern Edit & (R) Pattern Edit

Create a Custom Arpeggiated Pattern by entering "Pattern Edit" menu. You choose a pattern length and then enter a transpose amount for each note in the sequence. PARAMETER 1 selects the step, PARAMETER 2 chooses the Harmony interval. Once a Pattern is edited, press Menu ► to Store the pattern. The PARAMETER Knobs allow you to select which Pattern Number to Store it to. If you exit the Pattern Edit sub-menu without Storing, you will not be prompted to Store, and the changes will be lost. Once a Pattern is Stored, you need to Store the Program as well, if you want the new pattern to be in that Program.

Tempo

45 to 300 mm (beats per minute). Specifies the tempo of the arpeggiated patterns. Adjust with PARAMETER 1.

Notes/Beat

3, 4, 5. The number of notes of the pattern played on each beat. Adjust with PARAMETER 2.

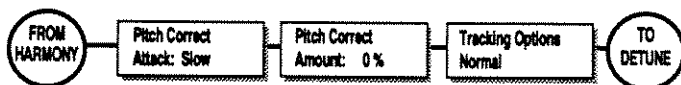
Pattern Repetitions (L) & (R)

1 to 30, continuous. Specifies how many times the pattern is to be repeated.

Triggering

Continuous. The arpeggiated is running continuously.

Trigger on note. The pattern is retriggered and starts again with each new note. It stops when you mute the note.

**Parameters Common to All Harmony Types****Pitch Correction**

This effect can be used to correct an instrumentalist's pitch, or create dynamic detune effects.

Pitch Correct Attack

Slow, Medium, Fast. This sets the response time for the effect.

Pitch Correct Amount

0% to 200%. A small amount of correction will allow some of the pitch bend to come through. 100% corrects to the nearest semitone. Values above 100% will over-correct the pitch, which will "correct" the harmony note to the "other side" of the semitone. For example, 200% overcorrection on a note that is 20 cents flat will result in a harmony that is 20 cents sharp. Set MIX to 100% when none of the out-of-tune input is to be heard.

Tracking Options

Normal. Use for tracking for lead lines, solo instrument, or other monophonic inputs.

Distortion Guitar. Use when your input signal is processed with distortion; for monophonic (lead) playing.

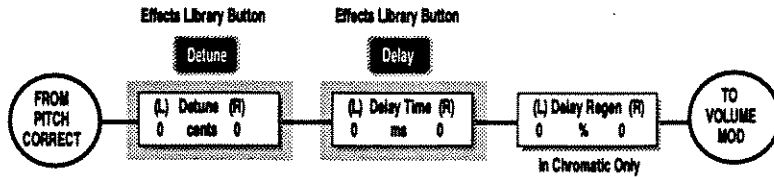
Bass Guitar. Use for bass guitar or a low-pitched instrument; for monophonic playing.

(Following for Chromatic Scale Types only)

Fuzz Guitar. Use when your input signal is heavily distorted; for monophonic (lead) playing.

Chords. Use when playing chords as opposed to monophonic (lead) lines, gives the best harmony quality.

Chords, minimum delay. Use when playing chords, gives a faster harmony response time.



Detune Effects Library Button

Detune (L) & (R)

-100 cents to 100 cents. Use Detune to thicken up the sound by slightly changing the pitch of note. The amount of detune is specified in cents, one semitone is equal to 100 cents.

Delay Effects Library Button

Delay Time (L) & (R)

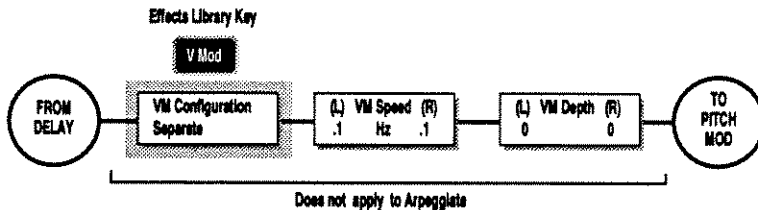
0 ms to 1500 ms (1.5 seconds). Use to create echo effects.

Delay Regeneration (Some Harmony Types only)

0% to 99%. This sets the amount of feedback on the delay line. Use to create reverb or special flanging effects.

Delay regeneration is only available when using the Chromatic harmony option. A harmony interval will be shifted by the same interval each time it is fed back into the delay line. The total amount of regeneration cannot exceed 99% between both channels, indicated by "L + R > 99" on the LCD.

Use of large values of regeneration and high signal levels may cause some overflow distortion (red overflow LED lights). If this happens, decrease the amount of regeneration or decrease the input level.



V Mod Effects Library Button

Volume Modulation (Not in Arpeggiate Harmony type)

Use to create tremolo and panning effects.

Configuration

Separate. Volume modulation speed on each output is independent.

Link pitch +. The loudest part of the volume modulation is concurrent with the sharpest pitch modulation.

Link pitch -. The loudest part of the volume modulation is concurrent with the flattest pitch modulation.

Link L to R +. Both outputs reach the loudest volume concurrently.

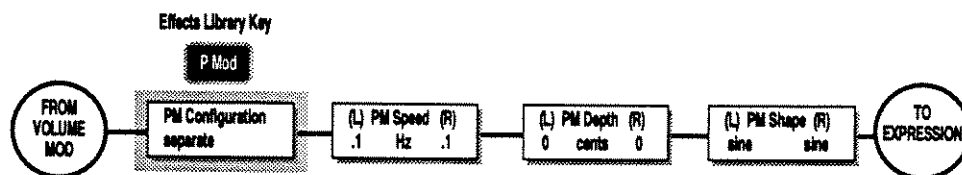
Link L to R -. One output will be at a maximum volume when the other output is at a minimum.

VM Speed (L) & (R)

0.1 Hz to 10 Hz. The repetition rate of the volume modulation (1Hz equals 1 cycle per second).

VM Depth (L) & (R)

0 to 100. This is the amount of the volume change. A depth of 100 means the volume will cycle from full on to full off, 50 means it will cycle from full on to 50% volume.



P Mod Effects Library Button

Pitch Modulation

Use to create vibrato, chorus, and trill effects by shifting the pitch of each output above and below its set pitch.

Configuration

Separate. L and R outputs run independently.

Link in phase. Links the direction of the right output modulation to that of the left output, i.e., both are sharp at the same time.

Link out of phase. Links the modulation direction of the right output so that it is opposite to that of the left output, i.e. the right output is sharp when the left output is flat.

PM (Pitch Modulation) Speed (L) & (R)

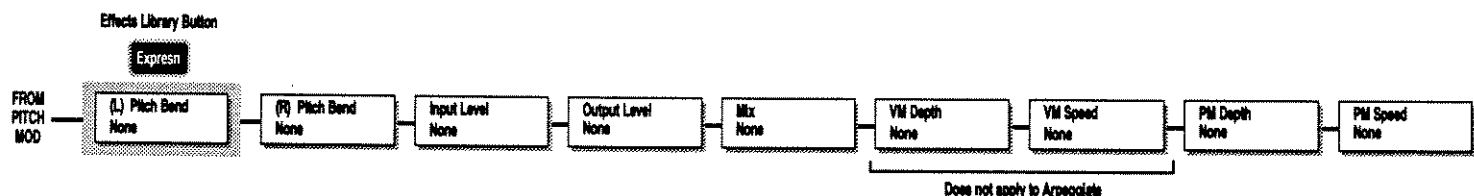
0.1 Hz to 10 Hz. The repetition rate of the pitch modulation (1 Hz equals 1 cycle per second).

PM Depth (L) & (R)

0 cents to 2400 cents (2 octaves). This is the extent that the pitch varies about the output note.

PM Shape (L) & (R)

Sine, triangular, square or random. This selects the shape of the modulating waveform.



Express Effects Library Button

Expression Control Assignments

These menus allow you to assign real time control inputs such as volume pedals, synthesizer modulation wheels, breath controllers and after touch to various effects parameters. This gives you the ability to “play” some of the DHP-33’s parameters live for more expressive musical results.

The DHP-33 has seven internal Expression Controller “channels” to route the input through to the parameters. The Expression Controller channels are named Exp1 through Exp7. The Parameters that can be controlled in real time with Expression Controllers are: Pitch Bend (L) & (R), Input Level, Output Level, Mix, Volume Mod Depth, Volume Mod Speed, Pitch Mod Depth, and Pitch Mod Speed. For each Parameter, you use a PARAMETER Knob to select the Expression Controller channel that you want it to respond to (Exp1 - Exp7), or “None” to disable control of that Parameter.

You can set each of these Expression Controller channels to respond to either the Continuous Controller pedal input on the back of the DHP-33 or any one of the 120 MIDI Continuous Controller (CC) messages. (This is done in the Utility: Expression Control Map Menu). For convenience, the most common MIDI CC messages (CC1 = Mod Wheel, CC6 = Data Entry, CC7 = MIDI Volume, Pitch Wheel [Pitch Bend], Channel Pressure [After touch]) appear on the LCD display as their names.

To select which MIDI CC number affects an Expression Controller channel, press the UTILITY button, use the MENU ► button to step to the Expression Control Map menu, twist a PARAMETER Knob counter-clockwise to enter the sub-menu. Use the MENU ► to select the Expression Controller channel, and use a PARAMETER Knob to select the CC number or “None”. To exit the menu, press MENU ► until you reach Expression Exit Menu, and twist a PARAMETER Knob clockwise (see page 23).

Pitch Bend: If one of the seven Expression Controllers is assigned to Pitch Bend (L) & (R), you will also have to specify Bend Type, Pitch Bend Range, and Bend Direction. The following three menus will not appear if Pitch Bend is not assigned one of the controllers.

Bend Type

Smooth. Gives a continuous pitch bend.

Stepped. Pitch bends in semitone steps.

Pitch Bend Range

0 cents to 2400 cents (2 octaves). Adjusts the maximum extent of the pitch bend.

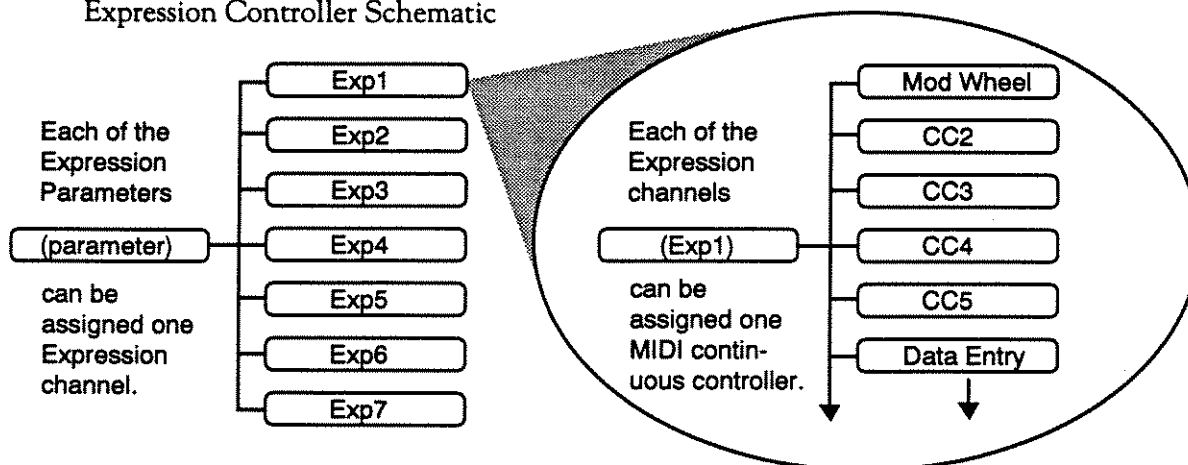
Bend Direction

Down. Starts at input pitch and bends pitch down an interval determined by Pitch Bend Range.

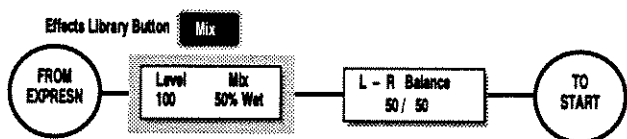
Up. Starts at input pitch and bends pitch up an interval determined by Pitch Bend Range.

Down/Up. Starts below input pitch and bends pitch above input pitch, the interval being determined by Pitch Bend Range.

Expression Controller Schematic



Up/Down. Starts above input pitch and bends pitch below input pitch.



Mix Effects Library Button

Level

0 to 100. This is used to adjust the output volume of each individual program. The OUTPUT LEVEL control on the front panel controls the absolute maximum level, this parameter sets the level relative to that point. Adjust with the PARAMETER 1 Knob. Use this Parameter to balance the relative output level of Programs, so you don't get jumps in volume level as you switch from one Program to another.

Mix

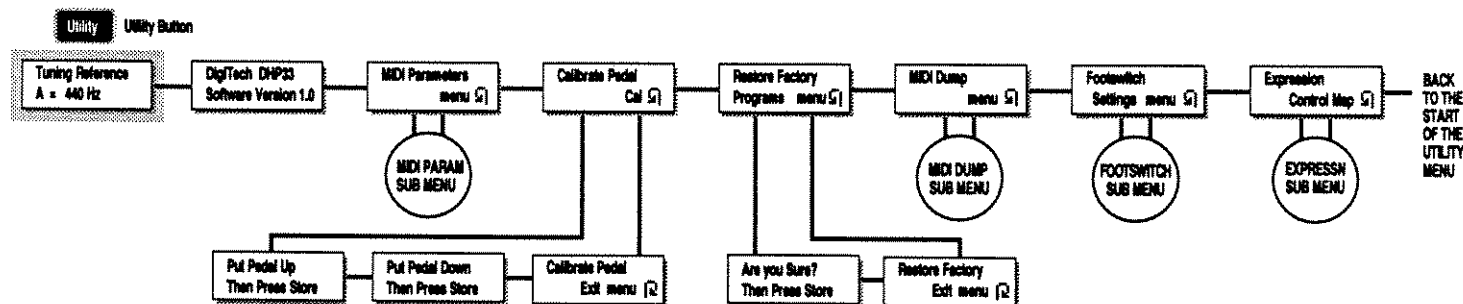
0% wet to 100% wet. Adjusts the balance between the dry (input) signal and the wet (processed) signal. Settings range from 0% wet (dry signal only), to 100% wet (no dry signal). Adjust with the PARAMETER 2 Knob.

L-R Balance

0/100 to 100/0 (percent). Adjusts the stereo balance between the left and right outputs. A setting of 0/100 indicates that there is no effects signal on the left channel, 50/50 is equally balanced between left and right, and 100/0 means that there is no effects signal on the Right channel. When using only one output (the RIGHT/MONO OUTPUT) the L-R Balance has no effect, as both the Left and Right channels are added together into a monophonic output.

Utility Menu

The UTILITY menu contains the settings that affect the basic operation of the DHP-33, and are common to all Programs. Press the UTILITY Button to enter the UTILITY Menu. You can exit from the UTILITY menu or sub-menus by pressing the UTILITY Button or the PROGRAM ▲ or ▼ Buttons (this will return you to the starting LCD display of the Program that you were in. Pressing the PROGRAM ▲ or ▼ Button while in a menu will not change the Program number).



Tuning Reference

A=420 to A=460. Used to tune the DHP-33 to your instrument if your instrument is not tuned to the standard A=440 Hz. The DHP-33's tuning reference can be tuned about 1/4 tone sharp or flat from A=440 Hz. Matching the tuning of the DHP-33 and the instrument is important for the Harmony effects to function properly.

Software Version Number

Displays the version of the DHP-33's operating system software.



MIDI Parameters Menu

Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

Basic MIDI Channel

1 through 16, Omni, Off. Chooses the MIDI channel (1 - 16) that the DHP-33 will send and receive on, Omni will accept MIDI messages on any channel, Off turns off the MIDI control features of the DHP-33.

Transmit Program Changes?

Yes, No. Selects whether the DHP-33 will transmit a MIDI Program Change message to other MIDI devices when the DHP-33 Program is changed.

Receive Program Changes?

Yes, No. Selects whether the DHP-33 will change Programs when a MIDI Program Change message is received on the Basic MIDI Channel. Does not affect receiving Program Change messages used for controlling Harmony.

Key Change From:

MIDI Prog Change or MIDI Note. Selects whether the DHP-33 will change Key in response to MIDI Program Change messages or MIDI Note messages received from other MIDI devices.

Keyboard Split: (only concerns Key Change from MIDI Notes)

Ignore above or below, C1 to C9 Selects the upper or lower limit of MIDI notes received that will be used to change the Key or Root/Chord Type.

Key Change MIDI Channel

1 through 16, Off. Sets the MIDI channel that Key Change messages will be received on, independently from the Basic MIDI Channel. Make sure that this is set to a different MIDI channel than the "Program Change from MIDI" Basic channel, if Receive Program Change is turned on.

MIDI Program x is y on DHP33

Allows you to map MIDI Program Change messages received from other MIDI devices to specific Programs on the DHP-33. The PARAMETER 1 Knob controls the x value (incoming MIDI Program number), PARAMETER 2 controls the y value (DHP-33 Program number).

This is useful in live performance; if the Program number on your keyboard for a certain song (for example, Program 67) doesn't happen to be the same Program number of the DHP-33 Program that you want to use for that song (for example, Program 34) you can set "MIDI Program 67 is 34 on DHP33" so that the correct DHP-33 Program (34) is selected each time you choose Program 67 on the keyboard.

(Scale Type) edited by (CC 1)

Global parameter (in effect for every Program) which allows editing of a wide variety of DHP-33 functions by MIDI messages. The PARAMETER 1 Knob selects the Parameter, and the PARAMETER 2 Knob selects the MIDI controller message that will control that parameter. This feature is intended for editing purposes; for performance control of DHP-33 functions, use the Expression Controller channels.

MIDI Parameters Exit Menu. Turn a PARAMETER Knob clockwise to exit the sub-menu.

Calibrate Pedal: Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

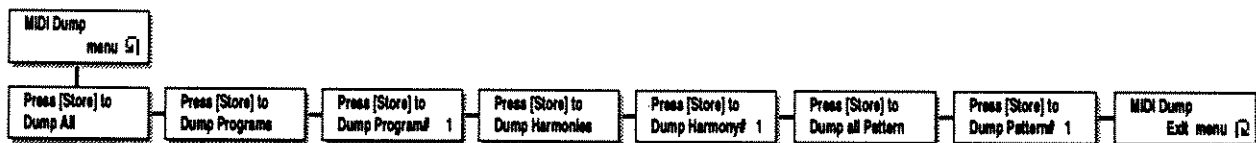
Calibrates an external passive volume pedal as a controller for the DHP-33. Follow instructions on LCD, press STORE to calibrate, Press MENU ► and twist a PARAMETER Knob clockwise to exit the sub-menu.

Restore Factory Programs: Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

Resets Programs 1 - 128 to the original factory settings, which are permanently stored in Programs 129 - 256.

NOTICE: ALL CHANGES TO PROGRAMS THAT YOU HAD PREVIOUSLY MADE TO PROGRAMS 1 - 128 WILL BE LOST WHEN YOU RESTORE FACTORY PROGRAMS. Press MENU ► and twist a PARAMETER Knob clockwise to exit the sub-menu.

To restore a single Program, select the corresponding Factory Program in # 129 - # 256, and press STORE to save it to a Program number between 1 and 128.



MIDI Dump: Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

Allows all of a portion of the Programs, Custom Harmonies and Patterns to be saved to a MIDI storage device such as a computer with a librarian program or MIDI data file. Press the MENU ► to step between these options, and press STORE to initiate the dump:

Dump All (dumps (saves) all of the settings of the DHP-33 to an outside MIDI device)

Dump Programs (dumps all 128 user programs)

Dump Program # (1-128) (dumps a single program - select the Program number with a PARAMETER Knob.)

Dump Harmonies (dumps all 64 user harmonies)

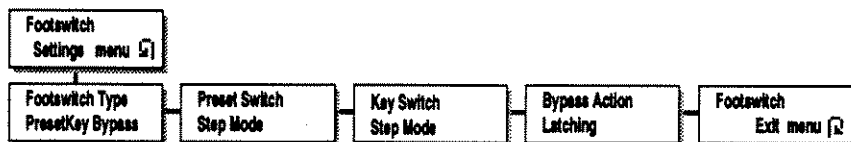
Dump Harmony # (1-64) (dumps a single Harmony - select the Harmony number with a PARAMETER Knob.)

Dump all Pattern (dumps all 64 user Patterns)

Dump Pattern # (1-32) (dumps a single Pattern - select the Pattern number with a PARAMETER Knob.)

MIDI Dump Exit Menu Twist a PARAMETER Knob clockwise to exit the sub-menu.

Notes: Save all edits to Programs before initiating MIDI Dumps. If you are editing a Program and initiate a MIDI Dump before saving, any changes will be lost. When receiving a MIDI Program from another DHP-33 or MIDI source, the DHP-33 will immediately load that Program. Any unsaved edits to the Program that you were in will be lost.



Footswitch Settings: Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

Footswitch Type

Preset Key Bypass or Up Down Bypass. Selects the actions of switches 1 and 2 on the footswitch.

Preset Switch

Step Mode or Play Mode. Selects whether the PRESET foot switch steps through the Programs incrementally, or whether Programs are selected by playing specific notes on your instrument while depressing the PRESET foot switch.

Key Switch

Step Mode or Play Mode. Selects whether the Key switch steps through the Keys incrementally, or whether the Key is selected by playing the root note on your instrument while depressing the Key Switch.

Bypass Action

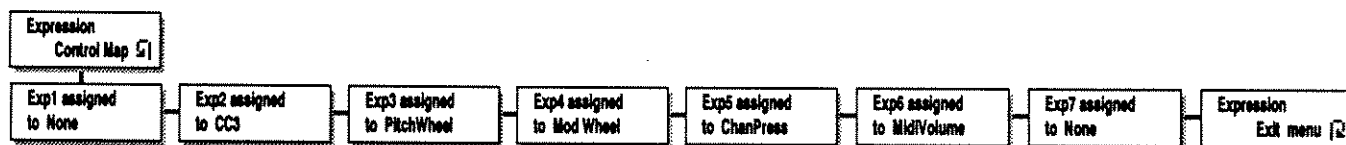
Latching, Momentary off, Momentary on. Selects the action of the BYPASS footswitch. Remember that Bypass On = Effects off (dry signal only at R & L Outputs), and that Bypass Off = Effects on (wet signal at R & L Outputs).

Latching sets Bypass on (no effects) with one press and release of the switch. It will stay Bypassed until the footswitch is depressed and released again.

Momentary off The DHP-33 will be Bypassed (dry signal only), and the effects will sound for only as long as the switch is being depressed.

Momentary on Bypasses the DHP-33 for only as long as the Bypass switch is being depressed. As soon as you release the switch, Bypass will be Off and the effects will sound again.

Footswitch Exit Menu Twist a PARAMETER Knob counter-clockwise to exit the sub-menu.



Expression Control Map Twist a PARAMETER Knob counter-clockwise to enter the sub-menu.

Sets the MIDI controller messages that will be received by the Expression Controller channels 1 through 7 (see page 19)

Exp (1 through 7) assigned to CC (None, 0 through 120, Pitch Wheel, Channel Pressure, Pedal 1)

Use the MENU ► Button to step through the 7 Expression Controller channels, use a PARAMETER Knob to select the corresponding MIDI CC number.

Expression Control Exit Menu Twist a PARAMETER Knob counter-clockwise to exit the sub-menu.

Title

The TITLE button allows you to create a name for a new Program, or change the name of an existing Program. Select the Program # that you want to edit, and press TITLE. Notice that there is an “underline” beneath the first character of the title on the LCD Display. The PARAMETER 2 Knob and the MENU ◀ and ▶ Buttons will move the “underline” right and left to select different characters of the title, and the PARAMETER 1 Knob will scroll through the alphabet for the selected character. The title can be up to 12 characters long.

A Title change is not permanent unless you STORE it. When you are finished editing the title, press a PROGRAM Button; you will see “Press [Store] to save changes” on the LCD Display. Press STORE if you wish to save your Title changes, or press PROGRAM ▲ or ▼ to abandon the changes. You can also press TITLE instead of PROGRAM when you are finished editing a Title; the DHP-33 will prompt you to [Store] the next time you press a PROGRAM Button.

Understanding Harmony

This section contains additional information about the various parameters encountered in the "Harmony Type" options. Don't be intimidated if you don't understand the theory behind this section. Try experimenting to find what sounds right. Your ears are the best judge!

Chromatic Harmony

This is parallel (or non-intelligent) harmony. Setting a key is not necessary. Use this effect to create a simple doubling of the input, at a fourth, fifth, octave, etc. The DHP-33 uses the same interval for each note you play.

Scalic Harmony

With this type of harmonization, the DHP-33 will automatically adjust any interval to stay within a specified scale system. This means that if you are performing a piece that stays within a particular key, then any note you play in the key can be perfectly harmonized. If you play a note outside the key, then the DHP-33 has five ways it can choose an alternate harmony.

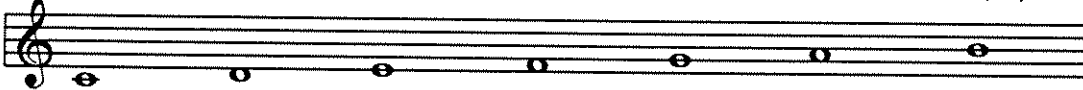
Unfortunately music does not always stay in one key or with the same scale type. To help solve this problem, the DHP-33 uses 14 different scale types and can change keys several different ways (please refer to the section on key change via the front panel, footswitch, or MIDI). Each scale/key combination may be stored as a program or you can find a scale that has all the chords required for your particular song or piece.

Scalic Harmony Charts

These examples are in the key of C, and the chords shown are the chords that would be produced for each of the input notes, if the harmony intervals were set to 3, 5 or 7 (the most common intervals in Western music). When setting up for a song, you can choose a Scale Type which has chords which correspond closest to the chords of the song.

Major and Minor scales will probably be most useful as the majority of diatonic music involves chords in these 2 groups.

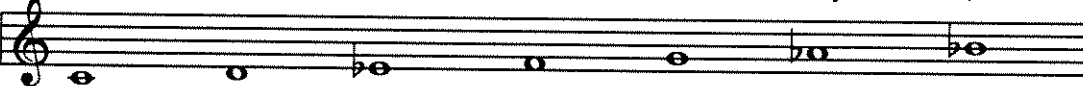
CMaj 7 Dmin 7 Emin 7 FMaj 7 G7 Amin 7 Bm 7 (b5)



Major Scale

Detailed description: A musical staff in treble clef showing the notes of the C major scale: C, D, E, F, G, A, B. Above each note is a chord: CMaj 7, Dmin 7, Emin 7, FMaj 7, G7, Amin 7, and Bm 7 (b5).

Cmin 7 Dm 7 (b5) EbMaj 7 Fmin 7 Gmin 7 AbMaj 7 Bb7




Minor Scale

Detailed description: A musical staff in treble clef showing the notes of the C minor scale: C, D, Eb, F, G, Ab, Bb. Above each note is a chord: Cmin 7, Dm 7 (b5), EbMaj 7, Fmin 7, Gmin 7, AbMaj 7, and Bb7.

Harmonic Minor differs from Minor in that the 'V' chord is dominant and, since the leading tone is present, 'VII' is diminished.


Cm (#7) Dm7 (b5) E^baug Fmin7 Gmin7 A^bMaj7 Bdim7



Harmonic Minor Scale

Melodic Minor includes two dominant chords ('IV' and 'V') and two half diminished chords ('VI' and 'VII').

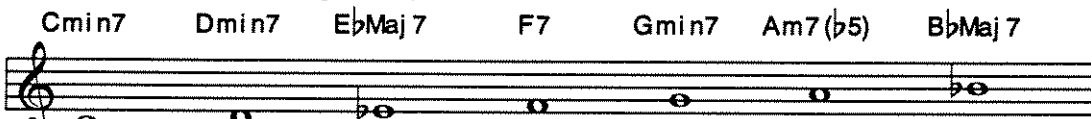
Cm (#7) Dmin7 E^baug F7 G7 A^bm7 (b5) Bm7 (b5)



Melodic Minor Scale


Dorian, Mixolydian, and Lydian involve the same chords as Major but the order is changed so the scales begin on 'II', 'V', and 'IV' respectively.

Cmin7 Dmin7 E^bMaj7 F7 Gmin7 Am7 (b5) B^bMaj7



Dorian Scale

C7 Dmin7 Em7 (b5) FMaj7 Gmin7 Amin7 B^bMaj7



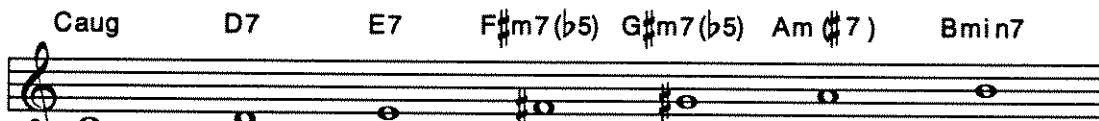
Mixolydian Scale

CMaj7 D7 Emin7 F[#]m7 (b5) GMaj7 Amin7 Bmin7



Lydian Scale

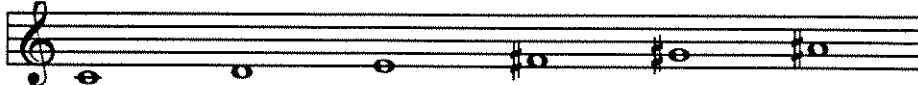
Caug D7 E7 F[#]m7 (b5) G[#]m7 (b5) Am (#7) Bmin7



Lydian Augmented Scale


The Whole Tone and both Diminished scales will give the same chord type on any scale tone.

Caug Daug Eaug F#aug G#aug A#aug



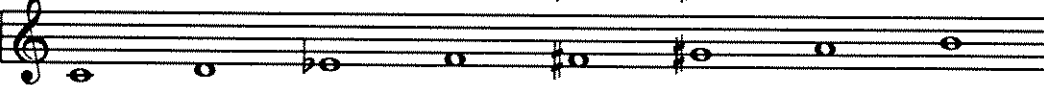
Whole Tone Scale

Cdim Dbdim Ebdim Edim F#dim Gdim Adim Bbdim



Half-Whole Diminished Scale

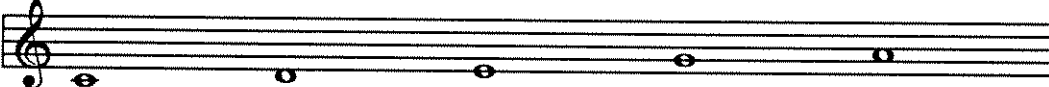
Cdim Ddim Ebdim Fdim F#dim G#dim Adim Bdim



Whole-Half Diminished Scale

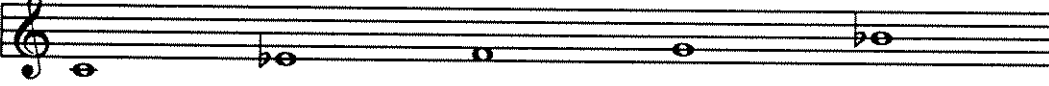
Both Pentatonic scales will give the same notes (therefore the same chord) on each scale tone.

C⁶₉ C⁶₉ C⁶₉ C⁶₉ C⁶₉



Major Pentatonic Scale


C7sus C7sus C7sus C7sus C7sus



Minor Pentatonic Scale

The Blues scale will harmonize to give two different chords ('sus' and 'min') on alternate scale tones.

Csus4 Ebmin Csus4 Ebmin Csus4 Ebmin



Blues Scale

How Non-Scale Tones Are Handled

As you can see, Scallic Harmony allows harmonization over many different chord progressions, as long as each progression can be assigned a scale and a key. If you play a note that is not in your chosen scale and key, the DHP-33 will treat it in one of 5 different ways, which you can select with the Variant Parameter (see page 14). The first two Variants are very specifically tied to the scale.

1. Diatonic -harmony notes will be identical to those of the nearest scale tone below.
2. Parallel -harmony intervals will be identical to those of the nearest scale tone below.

The others are not related to the scale at all and will result in the same chord type regardless of input note.

3. Diminished -intervals will be based on a H-W diminished scale (leading tone removed) and triadic harmony will give diminished chords.
4. Modal -intervals will be based on a lydian scale and triadic harmony will give major chords.
5. Altered -intervals will be based on an altered scale and triadic harmony will give '7(b5)' chords.

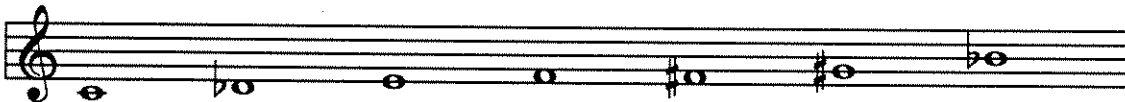
The following chart shows these scales when the non-scale tone is 'C'. Use your scalic harmony intervals on one of these scales and the resulting chord type will be identical for all your non-scale tones.



Diminished Non-Scale Tone Variant



Modal Non-Scale Tone Variant



Altered Non-Scale Tone Variant

Chordal Harmony

For this type of harmonization, the DHP-33 uses 4 sets of intervals on each note of the chromatic scale. Each set corresponds to one of the 4 chord types; Major, Minor, Dominant (7), and Half Diminished (m7b5). This allows any note to generate good sounding harmony over a specified chord.

You indicate this chord by giving the DHP-33 both the Chord Root and the Chord Type. This can be done in several ways both as predetermined in the program (page 15) or live using either MIDI keyboard input (page 18) or MIDI program change (page 14).

Since some musical situations will demand more colorful harmony than others, the factory programs include Simple Chordal harmonies, consisting mainly of chord tones, and Complex Chordal harmonies which involve voice leading and more contrary motion.

You are also able to choose voicings where both the harmony parts are above the input note (1-3-5), on either side (5-1-3 and 3-1-5), or both below (3-5-1) your input note. This gives 8 possible ways each chord can be harmonized.

The following charts use 'C' as the root, the 1-3-5 voicing, and show each of the 4 chord types in both Simple and Complex harmonies. If you wish to alter any of these intervals and create your own chordal harmony group, refer to Chordal Harmony Edit on page 15.

Three Voice Chordal; two above

Simple Chordal Harmony 1-3-5

The image displays four staves of musical notation, each representing a different chord type: C maj., C min.7, C7, and C m7b5. Each staff shows a sequence of chords across a chromatic scale, with the input note (C) as the bottom note. The notation is in treble clef and shows the progression of chords for each type, with the input note (C) as the bottom note.

Factory Simple Chordal Harmonies, Root of C, where the input note is the bottom note.

Three Voice Chordal; two above

Complex Chordal Harmony 1-3-5

The image displays four staves of musical notation, each representing a different complex chordal harmony. The staves are labeled on the left as C maj., C min.7, C7, and C m7b5. Each staff contains a sequence of chords, with the bottom note of each chord serving as the root. The chords are constructed using three voices above the root and one voice below, creating a complex harmonic texture. The notation includes various accidentals (sharps, flats, and naturals) to indicate the specific notes used in each chord.

Factory Complex Chordal Harmonies, Root of C, where the input note is the bottom note.

Using Harmony Processors

How Do Harmony Processors Work?

Intelligent harmony processors from DigiTech operate as real-time samplers that constantly analyze the sound being played into them. At the same time, the pitches being sampled are being sent out at a different pitch. Natural sound quality is maintained using intelligent real-time splicing so that one sample cleanly links to the next without gaps or misalignment.

In performance and recording applications, intelligent harmony processors allow you to:

- create the sound of more than one instrument being played in harmony, without resorting to overdubs;
- fix tracks where notes have been played or sung out of tune;
- subtly enhance the sound of single-note instruments;
- create unusual special effects.

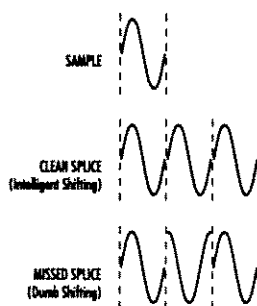
Why do Intelligent Harmony Processors Sound Better?

Not all intelligent harmony processors are of equal audio quality, but they tend to sound better than non-intelligent harmony processors for three smart reasons:

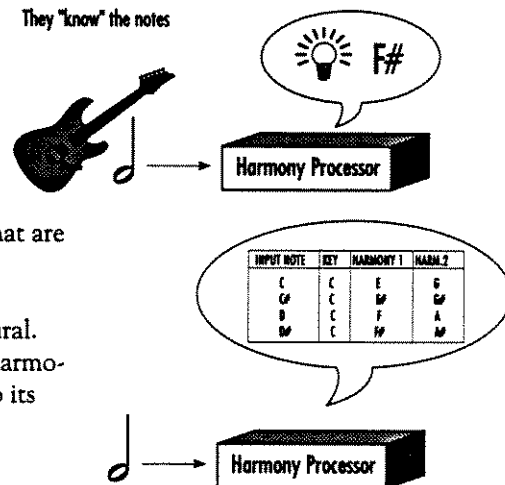
- They know what pitch is being played into them;
- They use that knowledge to shift according to rules of harmony that are preprogrammed or that you program yourself; and
- They cleanly splice the shifted voices to keep them sounding natural. Instrument harmony processors follow different rules than vocal harmony processors so that each can make the shifted pitch more true to its origin.

Note that in the missed splice there is missing information about the sound (sample), or “gaps” in the shifted waveform.

These gaps cause incomplete waveforms that are not true to the tonal characteristics of the input source, preventing dumb shifters from sounding as good as their intelligent counterparts.



They “know” the notes



Application Notes:

Studio Recording

Single note instrument tracks: doubling and harmony.

Routing single voices or instrument tracks through an intelligent harmony processor can lead to inspired productions. For example, a lead guitar solo at its peak can easily be set to break progressively into 2 and then 3 part harmony – this works particularly well for adding audio to video tracks that need extra excitement.

Single note tracks: pitch correction.

Capturing a performance onto a recording can be difficult. The take with the best “feel” can have some notes that are out of tune. In addition, some performers have inconsistent pitch control.

While “comping” a track is often the way to get around this, it may take two or more sessions to get enough takes to create a quality composite track.

To shorten the time required, an intelligent harmony processor can be used for automatic pitch correction or even manual “forcing” of notes played out of tune to focus recording time on more creative aspects.

Fully mixed tracks: sweetening

Using a harmony processor with delayed regenerative pitch shifting or multiple independent detunes can create a range of subtle shimmer and brightening to dramatic phasing and movement in the stereo image. A typical configuration is panning the mixed input to the center, with the harmony voices hard right and left. Delaying right and left voices at staggered intervals, adding up to 35% regeneration, and then shifting the channels in opposite directions by 15-20 cents each creates a striking and actively moving effect.

Electronic sounds: special effects

Special sound effects are increasingly called upon in film soundtracks. Organic sounds such as wind, water, rain, animals can be shifted, doubled at different levels, detuned, delayed, permuted and combined with other-worldly results. Harmony processors can be used for everything from increasing the sonic tension of boots walking through gravel to creating voices of animals no one has ever seen.

Performance

Guitar

Recreating harmony guitar lines from recordings in a live venue is easiest to accomplish with an intelligent instrument harmony processor. Key changes, harmony in and out and preset changes can all be pre-programmed and, depending on the functionality of the processor, be controlled directly by the guitarist's controller pedal, by MIDI sequencer, or even at the console. A general rule for guitars and keyboards is to put the harmony processor at the beginning of the signal path to give the unit a clean signal for pitch detection. If available, use inserts or effects loops on the harmony processor for high gain preamps and other devices that alter the harmonic structure of the signal.

Horns

Sectional horn lines and riffs can be programmed in the same way as guitar harmonies. Look for options in how non-scale tones are treated when creating horn harmonies. A well designed harmony processor will offer "flavors" of harmony that are both appropriate to the style of the music and easy to program.

Drums

Using the attack transient of a snare or bass drum hit to trigger a rapid pitch bend up or down is a striking and effective sound. Map the envelop generator to pitch bend and trigger it from either a mic or piezo transducer.

Continuous Controllers and MIDI control

When you are programming the DHP-33, it is useful to note the differences between performance controllers and editing controllers. The DHP-33 can accept MIDI continuous controller (CC) commands through two different routes.


Editing: In the Utility: MIDI Parameters menu, a wide variety of Parameters can be edited by a MIDI CC message. The CC assignments that you make here are global (affect all Programs). This is intended for use in editing programs, not for live performance use. Some of the parameter changes that are possible through this function are not appropriate to change during performance. Used with a MIDI remote controller, computer sequencer, computer Program editor, or the controllers on your keyboard, this function can make fine-tuning programs easier. Editing Parameters controllable are: Scale Type, Key, Bend Mode, (L) Interval, (R) Interval, (L) Detune, (R) Detune, Output Level, Mix, Left-Right Balance, (L) Delay Time, (R) Delay Time, (L) Delay Regeneration, (R) Delay Regeneration, Pitch Modulation Configuration, (L) Pitch Modulation Rate, (R) Pitch Modulation Rate, (L) Pitch Modulation Depth, (R) Pitch Modulation Depth, (L) Pitch Modulation Shape, (R) Pitch Modulation Shape, Volume Modulation Configuration, (L) Volume Modulation Rate, (R) Volume Modulation Rate, (L) Volume Modulation Depth, (L) Volume Modulation Depth, Pitch Correction Amount, Pitch Correction Speed.

Performance: The Expression Control Map allows you to set up MIDI CC control (or the back panel CC Controller foot pedal jack) as performance controllers for a more limited range of Parameters. These are intended to give you expressive control over these Parameters in real time, and are individually stored with each Program. Expression Parameters controllable are: (L) Pitch Bend, (R) Pitch Bend, Input Level, Output Level, Mix, Volume Modulation Depth, Volume Modulation Speed, Pitch Modulation Depth, Pitch Modulation Speed.

Troubleshooting

Check that each of your instruments, mixers, amplifiers and effects devices in the audio chain are powered on and set to appropriate volume levels.

No sound at all:


- 1) Check the Input and Output Level Knobs; check that the Input is set high enough that the green LEDs are on most of the time, but not so high that the red LED is on often (see page 6).
- 2) Turn down your mixer or amplifier volume, check all of your audio cables by unplugging and re-plugging them, and re-set the volume.
- 3) Check the Continuous Control pedal. Certain Programs (such as String Pad) have their Input or Output Volume or Mix controlled by the Continuous Controller pedal input, and will not make a sound unless the CC Pedal is plugged in and calibrated, and then is pushed down (see page 11). These Programs will have a  icon on the LCD.
- 4) Check other MIDI CC assignments in case you are inadvertently sending a message to the Input or Output Level from another MIDI device.

Some sound, but either the instrument sound or the effects sound is missing:

On every Program:

- 1) Check the Bypass light - is the DHP-33 bypassed?
- 2) Check MIDI CC assignments and Expression Controller settings in case you are inadvertently sending a message to Mix or L-R Balance from another MIDI device. (see pages 19 and 21)
- 3) Check the L-R Balance setting.
- 4) If you are using only one output cable, check to see that it is plugged into the Right/Mono output, not the Left Output.

On an individual program:

- 1) Check the Mix Parameter
- 2) Check the Continuous Control pedal. Certain Programs (such as String Pad) have their Input or Output Volume or Mix controlled by the Continuous Controller pedal input, and will not make a sound unless the CC Pedal is plugged in and calibrated, and then is pushed down (see page 11). Check for the  icon on the LCD.

Footswitch:

- 1) If the Bypass is coming on unexpectedly, check to see that you are not accidentally pressing two buttons at once on the Footswitch.
- 2) If the Footswitch is acting unexpectedly, check the Footswitch Settings (see page 7-8).

Persistent noise:

- 1) Low frequency hum: Check the grounding of the DHP-33 and your audio system. NEVER remove the ground-prong of the DHP-33's power cord, or plug the DHP-33 into a two-prong outlet or extension cord.
- 2) Swap the audio cables in your signal path for other cables. Defective or poorly made cables can crackle, hum, and pick up radio interference. If when you move a cable, it makes a sound through your amplifier like a microphone being handled, (microphonics) then it is a good candidate for replacement.
- 3) Check your instrument for noise. A low-level background noise from your instrument can sound quite different after being pitch shifted.
- 4) Route your audio cables away from power cables and other sources of interference (see below).
- 5) Move the DHP-33 away from sources of electronic interference, which can include synthesizers and sampler modules, fluorescent lights, electrical conduits in walls, AC adapters and power supplies. Some older synthesizer and sampler modules are insufficiently shielded, and emit a very high frequency radio frequency. This frequency cannot be heard on its own, but if it enters the DHP-33, it can create a high pitched interference frequency.
- 6) Try using a shorter cable from your instrument to the DHP-33.
- 7) You may have radio-frequency interference or transients in your AC power. Try plugging the DHP-33 into a surge suppressor that has an RFI filter.

Pitch jumping around or locking on wrong note

General:

- 1) Make sure that you are only playing one note at a time.
- 2) Check that the Input is set high enough that the green LEDs are on most of the time, but not so high that the red LED is on often (see page 6).
- 3) Tune your instrument to the DHP-33, and if necessary, adjust the Tuning Reference of the DHP-33 to your instrument if you are not tuned to A=440 (see page 6).
- 4) Check that you don't have other effects devices between your instrument and the DHP-33 (except Distortion). If you are using a distortion effect before the DHP-33, check to see that it is not also producing chorus, reverb, delay, flanging or vibrato.
- 5) Experiment with the different Tracking Options (see page 17).
- 6) If you have the DHP-33 on the effects or auxiliary send of a mixer, check to see whether mixer channels other than the one your instrument is plugged into are feeding a signal into the effects send.
- 7) If you are mic'ing an acoustic instrument, check whether other sounds are bleeding into your instrument's mic. Position the microphone and instrument for maximum isolation from other instruments and noise.

Synthesizers and samplers:

- 1) Many synthesizers and samplers have on-board effects devices. Try turning down or off any reverb, chorus or delay on the keyboard.
- 2) Some synthesizer and sampler programs have envelopes which peak more than once or swell at the end of the note - this makes it hard for the DHP-33 to distinguish between notes. Experiment with editing the envelopes for more reliable tracking.
- 3) Some synthesizer and sampler sounds incorporate a rising or falling pitch in the attack of the sound. This presents a "moving target" for pitch detection. Try editing the synthesizer program to minimize pitch variation.
- 4) Certain sounds such as bells, tuned percussion and chimes have harmonics which are louder than the fundamental, or have an inharmonic overtone series. The DHP-33 will lock onto the dominant frequency, but it may not be the fundamental.
- 5) When playing lead lines, check to see that the synthesizer or sampler is not playing more than one note at a time. With certain sounds, the "tail" of the preceding note can overlap beginning of the next note, presenting the DHP-33 with more than one pitch to lock onto. Use a monophonic setting if the synthesizer has one, or reduce the release or decay times of the program's envelope. If this is unavoidable, try a Chromatic harmony type to reduce mis-tracking, set to Utility: Tracking Option: Chords.

Appendix A - DHP-33 Program List

User Prog. #	Factory Prog. #	Program CC on Name	User Prog. #	Factory Prog. #	Program CC on Name	User Prog. #	Factory Prog. #	Program CC on Name
1	129	Simple 3rds Abv	44	172	Shimmer	87	215	Major 8-6-1
2	130	Simple 3rds Blw	45	173	Vibroluck	88	216	Major 1-3-7
3	131	Simple 6ths Abv	46	174	Vibro Tuned	89	217	Major 6-1-6
4	132	Simple 6ths Blw	47	175	Tremolo	90	218	Minor 5-1-3
5	133	Major 5-1-3	48	176	Old Tremolo	91	219	Minor 3-1-5
6	134	Major 3-1-5	49	177	Pedal Tremolo	92	220	Minor 1-3-5
7	135	Major 1-3-5	50	178	Slow Vibrato	93	221	Minor 1-5-3
8	136	Major 1-5-3	51	179	Fast Vibrato	94	222	Minor 3-5-1
9	137	Major 3-5-1	52	180	☒ Whammy Down	95	223	Minor 5-3-1
10	138	Major 5-3-1	53	181	☒ Whammy Down Echo	96	224	Minor 8-1-3
11	139	Chord s5-1-3	54	182	☒ Whammy Up	97	225	Minor 8-3-1
12	140	Chord s3-1-5	55	183	☒ Whammy Up Echo	98	226	Minor 1-3-8
13	141	Chord s1-3-5	56	184	☒ Whammy 5th	99	227	H Minor 3-1-3
14	142	Chord s3-5-1	57	185	☒ Step Whammy	100	228	H Minor 5-1-3
15	143	Chord c5-1-3	58	186	☒ Whammy UpDown	101	229	M Minor 3-3-1
16	144	Chord c3-1-5	59	187	☒ Whammy 5	102	230	M Minor 5-1-3
17	145	Chord c1-3-5	60	188	☒ Double Whammy	103	231	Dorian 1-3-5
18	146	Chord c3-5-1	61	189	☒ Whoppie 5th	104	232	Dorian 3-5-1
19	147	Chrom 8-1-8	62	190	Space Case	105	233	Dorian 1-3-7
20	148	Chrom 1-8-8	63	191	☒ Pedal Steel 1	106	234	Mixolydian 1-3-3
21	149	Chrom 8-8-1	64	192	☒ Pedal Steel 2	107	235	Mixolydian 1-3-5
22	150	Chrom 5-1-5	65	193	☒ Pedal Steel 3	108	236	Mixolydian 5-1-3
23	151	Chrom 1-5-5	66	194	☒ Pedal Steel 4	109	237	Mixolydian 3-5-1
24	152	Chrom 5-5-1	67	195	Harmonics	110	238	Mixolydian 3-1-5
25	153	Light Detune	68	196	Synth Bass	111	239	Major Pentatonic
26	154	Medium Detune	69	197	String Pad	112	240	Minor Pentatonic
27	155	Deep Detune	70	198	Ping Pong Delay	113	241	Blues 5-5-1
28	156	Detuned Chorus	71	199	Big Delay	114	242	Lydian 1-2-4
29	157	☒ Detune to Chorus	72	200	Ambience	115	243	Wholetone 4-5-1
30	158	Random Chorus	73	201	Echo Descend	116	244	Close Major
31	159	Chorus Pan	74	202	Echo Ascend	117	245	Close Minor
32	160	Deep Chorus Pan	75	203	5th Ping Pong	118	246	Blues 1-Chord
33	161	Country Chorus	76	204	Cascade 3rds	119	247	Blues 4-Chord
34	162	Light Chorus	77	205	Cascade 5ths	120	248	Blues 5-Chord
35	163	Medium Chorus	78	206	Arpeggiate 1	121	249	Country 1-Chord
36	164	Chorus Slap	79	207	Arpeggiate 2	122	250	Country 4-Chord
37	165	Slow Leslie	80	208	Arpeggiate 3	123	251	Country 5-Chord
38	166	Fast Leslie	81	209	Arpeggiate 4	124	252	Country
39	167	☒ Slow Fast Leslie	82	210	Arpeggiate 5	125	253	Custom Jazz
40	168	Flanging 5th	83	211	Arpeggiate 6	126	254	Correction
41	169	Delay Flange	84	212	Arpeggiate 7	127	255	Easy Tuner
42	170	☒ Equinox	85	213	Arpeggiate 8	128	256	Bypass
43	171	☒ The Squid	86	214	Major 3-1-3			

A ☒ symbol indicates that the Continuous Controller is to be used.

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DHP-33 MIDI IMPLEMENTATION CHART

Digitech DHP-33 Digital Harmony Processor

Date: Oct. 1993

Version: 1.0


Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1 - 16	1 - 16	Memorized
	Changed	1 - 16	1 - 16	
Mode	Default	Mode 3	Mode 3	Omni Off
	Messages Altered	x	x	
Note Number	True Voice	x	o	May be used to select Key / Chord
Velocity	Note on	x	x	
	Note off	x	x	
After Touch	Keys	x	x	
	Channels	x	o	
Pitch Bender		x	o	
Control Change		x	o	
Program Change		0 - 127	0 - 127	Internally Mappable
	True #		1 - 128	
System Exclusive		o	o	
System Common	Song Position	x	x	
	Song Select	x	x	
	Tune	x	x	
System Real-Time	Clock	x	x	
	Commands	x	x	
Auxiliary Messages	Local ON / OFF	x	x	
	All Notes OFF	x	x	
	Active Sense	x	x	
	Reset	x	x	
Mode 1: Omni On, Poly		Mode 2 Omni On, Mono	o=Yes	
Mode 3: Omni Off, Poly		Mode 4: Omni Off, Mono	x= No	

DHP-33 Specifications

Max Input:	+ 21 dBv (ref. 0.775v).
Max Output:	+ 21 dBv (ref. 0.775v).
Input Control:	±15 dB from center.
Output Control:	±15 dB from center.
Input Impedance:	220 kOhm.
Output Impedance:	1500 Ohms/750 Ohms mono.
THD:	At zero shift .03% @ 1kHz.
Resolution:	16 bit linear PCM.
SNR:	90 dB nominal.
Dry Freq. Resp.:	20 Hz to 25 kHz ± 3 dB.
Wet Freq. Resp.:	20 Hz to 20 kHz ± 3 dB.
Sampling Rate:	45 kHz.
Footswitch inputs:	1 x FS304 compatible 1/4" Jack. 1 x Continuous Controller 1/4" Jack (10 kohm-250 kohm resistive or 0V-5V control voltage).
Display:	2 line x 16 character backlit LCD, LED Headroom indicator, LED Preset indicator.
Power:	117 VAC, 60 Hz, 25 W, three prong (grounded) outlet.
Dimensions:	1.75"H x 14"W x 8.5"D.
Weight:	6.5 lbs. net.

MIDI SYSTEM EXCLUSIVE

Byte	Description	Procedure type:
1111 0000	Exclusive status	00H Request for program dump (all)
0000 0000	DOD ID byte 1=00	01H Request for program dump(one)
0000 0000	byte 2=00	02H Request for Custom Harmony Dump(all)
0001 0000	byte 3=10H	03H Request for Custom Harmony Dump(one)
0000 nnnn	Unit number; nnnn+1 equals the channel number	04H Request for Custom Arpeggiate Pattern(all)
0000 1010	Device type for the DHP-33	05H Request for Custom Arpeggiate Pattern(one)
000p pppp	Procedure type	
0xxx xxxx	Preset #, Harmony #, or Pattern #	41H Download Program dump (all)
	00 for procedure type 0,2,4,40,42,44	42H Download Program dump (one)
0ddd dddd	Data byte 1	43H Download Harmony Definition(all)
0ddd dddd	Data byte 2	44H Download Harmony Definition(one)
0ddd dddd	Data byte 3	04H Download Custom Arpeggiate Pattern(all)
.		05H Download Custom Arpeggiate Pattern(one)
.		
.		
0ddd dddd	Data byte	
1111 0111	EOX	

- Bend Mode** Determines how the DHP-33 follows the input note which is changing from one note to another.
- Bypass** This function, operated either by the BYPASS button on the DHP-33 front panel, or by the optional Footswitch, turns off all harmonies. The unprocessed instrument sound is not affected.
- Chord Root** The first or foundation note of a chord (i.e. C is the root of C maj7 which has the notes C-E-G-B). When using a Chordal program, turn the PARAMETER 2 Knob to select or change the chord root.
- Chord Type** The DHP-33 recognizes most chord types and maps them to one of these four internal chord types.
- | | | |
|-----------------------|----------------|------------|
| major | C maj | C-E-G |
| minor seven | C min7 | C-Eb-G-Bb |
| dominant seven | C dom7 (or C7) | C-E-G-Bb |
| minor seven flat five | C m7b5 | C-Eb-Gb-Bb |
- When using a Chordal program, the Parameter Knobs may be used to select the Chord Type and Root. You may also use a variety of MIDI messages to change Chord Type and Root (See Page 11).
- Chordal Harmony** This is harmony which is designed to fit over a chord. Any note may be played and appropriate harmony notes are automatically chosen to fit the chord tones. The factory programs include a system of 'no change' harmonies which gives both stability and independence to the harmony notes. 'Voicing' names describe the position and number of harmonies relative to the input note.
- Chromatic Harmony** a Scale Type which utilizes all 12 semitones. Since harmony on this scale will produce purely parallel motion, and differs dramatically in its sound from the other scale types, the DHP-33 treats Chromatic as a distinct harmony type.
- Detune** Each harmony note may be adjusted sharp or flat by a quarter tone (25 cents). This has a chorusing effect, giving a fuller and more realistic sound.
- Diatonic** Any melody or group of chords which conforms to a single scale or key (i.e. C Major) is said to be 'Diatonic'. The term 'Scalic' is also used to describe this situation but in addition, describes harmony over uncommon scales such as Diminished and Wholetone.
- Dump (Programs, Harmonies, Patterns)**
To save data to an outside storage medium: computer library software; MIDI data file, another DHP-33. The existing data in the DHP-33 is not affected by Dumping it to an outside device.
- Harmony** This refers to multiple notes sounding at the same time. In the DHP-33 we use the term to describe the DHP-33 generated (or effect) output note(s). This is not to be confused with the vocal output note which is the untouched signal from the microphone.
- Key (see Scale Key)**
- Keyboard Split** This function is used when controlling harmonies from a MIDI keyboard. It allows the keyboard to be split so only a part of its range is used to control the DHP-33.
- LCD** 'Liquid Crystal Display' is the term used to describe the DHP-33 display (light green background with black letters).
- LED** 'Light Emitting Diode' is the term used to describe the small lights used to indicate Headroom, Overflow and Bypass, and the Program Number Window (red numbers).
- Menu** This term refers to the arrangement of instructions used for changing all parameters and operations of the DHP-33. This system involves accessing the various topics (i.e. Harmony, Delay, Pitch Modulation, etc.) horizontally and using the Parameter Knobs to select values or to access other menus. Some topics have several variables and these are also arranged horizontally. These arrangements of topics within topics are referred to as sub-menus, and are accessed by twisting a Parameter Knob when prompted by the menu  symbol.
- MIDI** 'Musical Instrument Digital Interface' is the technical name for the communicating language of all modern electronic music devices (i.e. keyboard instruments, sequencers, computer programs, etc.). The DHP-33 allows these devices to act as alternate controllers and is also able to control them. The most common use will be to change DHP-33 Programs or Harmonies from a MIDI keyboard or sequencer. Changes to any aspect of the MIDI parameters are made in the Utility menu and are global to all programs.
- No Change (n/c)** When two adjacent input notes (i.e. C, C#) produce different harmony notes (i.e. C-E-G, C#-E-B), the results can be very unsteady since the voice is often 'close' but not exactly 'on' pitch. An 'n/c' in place of one of the harmonies cures this unsteadiness as it keeps the harmonies from changing pitch as the input changes.
- Octave** In the system of music which is most common in North America and Europe, 12 consecutive semitones comprise an octave (which technically is the distance in pitch from the fundamental to the first partial in a standard harmonic series). These semitones can be arranged into groups of ones, twos, and threes, which result in the common scales which are so much a part of music. The DHP-33 refers to 'middle C' as 'C5'. An octave higher is 'C6' and an octave lower is 'C4'. Notes within the octave take their number from the 'C' below, so 'F' above 'C5' is 'F5'.
- Parameter** This term refers to the various elements of the Programs and Utilities and the values which dictate these elements.
- Pitch Bend** The pitch of a note may be changed (or bent) using an external controller such as a Pitch Bend Wheel on a keyboard. When using the DHP-33, harmonies may be shifted up to an octave above or below with a Pitch Bend controller MIDI message from another MIDI device.
- Pitch Correct** The DHP-33 can alter the pitch of an input note to any pitch desired. The desired pitches may be selected by playing notes on an external MIDI keyboard or sequencer. When the keyboard note is released, the harmony returns to unison with the voice. 'Attack' describes how quickly harmony notes slide and may be assigned independently to each Program.
- Pitch Modulation (Depth, Speed & Shape)**
Pitch Modulation, commonly known as Vibrato, is technically defined as a controlled oscillation of pitch. Vibrato is part of an acoustic instrument's sound, and judicious use of

Pitch Modulation can enhance the harmony sounds of the DHP-33. The DHP-33 allows harmonies on either right or left outputs to have their own independent Pitch Modulation, or they can be linked together. The Pitch Modulation may be very wide or narrow (Depth), or it may oscillate at various tempos (Speed), and the Shape of the wave that modulates the pitch can be selected.

Preset Synonym of Program (see below)

Program This a term used to describe the 256 harmony settings stored in the DHP-33. Program and Preset are two terms that are often used interchangeably. Programs 1 through 128 are fully editable and may be stored to internal memory. Programs 129 through 256 are set at the factory, you may edit these programs, but the results must be stored to a Program number between 1 and 128. Each Program may include any one of the following 5 types of harmonization: Chromatic, Scalic, Custom, Chordal, or Arpeggiate

Progression This is a musical term used to describe a series of chords (i.e. "chord progression").

Root (see Chord Root)

Scale Key The first and fundamental note of a scale. When a melody or series of chords primarily uses the notes of a particular scale, it is said to be in that key. If notes of another scale are introduced, and you are using the DHP-33, you will need to change keys by turning the DHP-33 Parameter 2 Knob or by sending a MIDI message. 'Startup Key' is a predefined Key which is automatically selected when that Program is first selected.

Scale Tone & Non-scale Tone Scale tones are the notes of the scale (i.e. Scale tones for C Major are C, D, E, F, G, A, & B.) Non-scale tones are the notes not contained in the scale (i.e. Non-scale tones for C Major are C#, D#, F#, G#, & A#).

When constructing or simply understanding harmonies, it is important to keep in mind which input notes are scale tones and which are not. Often each will be treated differently.

Scale Type The DHP-33 enables 10 different types of scales to be used for Scalic harmonization. Each type is a combination of 12 semitones. The following is a list of the scale types with the number of semitones between each note.

Major	2, 2, 1, 2, 2, 2, 1
Minor	2, 1, 2, 2, 2, 1, 2
Harmonic Minor	2, 1, 2, 2, 1, 3, 1
Melodic Minor	2, 1, 2, 2, 1, 2, 2
Dorian	2, 1, 2, 2, 2, 1, 2
Mixolydian	2, 2, 1, 2, 2, 1, 2
Lydian	2, 2, 2, 1, 2, 2, 1
Lydian Augmented	2, 2, 2, 2, 1, 2, 1
Wholetone	2, 2, 2, 2, 2, 2
Half-Wholetone	1, 2, 1, 2, 1, 2, 1, 2

When loading a new scalic harmony, you need to choose a 'Voicing' based on the first note or root of the scale. This voicing will likely result in a particular chord, but due to the nature of these different scale types, the chord will change depending on which note generates it. For a complete discussion on using different scale types see the chapter entitled "Understanding Scalic Harmony".

Scalic (see Diatonic)

Store After editing any Parameter in a Program, you need to press the Store button if you wish to save the changes to memory. After pressing Store you may choose a new Program number. As received from the factory, DHP-33 Programs 1 to 128 are repeated in Program 129 to 256. See Restore Factory Program in Utility Menu.

Sub-menu (see Menu)

Tracking Tracking is the action of following and recognizing the pitch of the input note. The DHP-33 has three Tracking Modes for the greatest accuracy with different instruments.

Utility Pressing the Utility button gives immediate access to the global parameters which affect all Programs. Changes made in any of these menus are automatically Stored. Press Utility or Program ▲ or ▼ again to return to the original window.

Variant In Scalic Harmonies, each Scale type can have one of 5 Variations; Diatonic, Parallel, Diminished, Modal or Altered.

Volume Modulation (Depth, & Speed)

Volume Modulation is technically defined as a controlled oscillation of volume, and is also referred to as Tremolo. The DHP-33 allows harmonies on either right or left outputs to have their own independent Volume Modulation, or they can be linked together. The Volume Modulation may be very wide or narrow (Depth), or it may oscillate at various tempos (Speed).

Voicing This term is used to describe the relative position of harmony notes to the input or sung note. When loading either a new scalic or chordal harmony, the DHP-33 needs to be given a Voicing.

For Scalic harmony this involves choosing notes up to 2 octaves above or below the root of a scale. These notes will be automatically adjusted to stay within the scale but the diatonic intervals will remain consistent.

For Chordal harmony you must choose Factory Voicings of two above, one below one above, or two below. For example:

Simple 1 - 3 - 5	(two above)
Simple 5 - 1 - 3	(1 below, 1 above)
Simple 3 - 5 - 1	(two below)

With these Voicings the harmony parts will always retain their relative positions but the intervals change quite dramatically to conform to the various chords.

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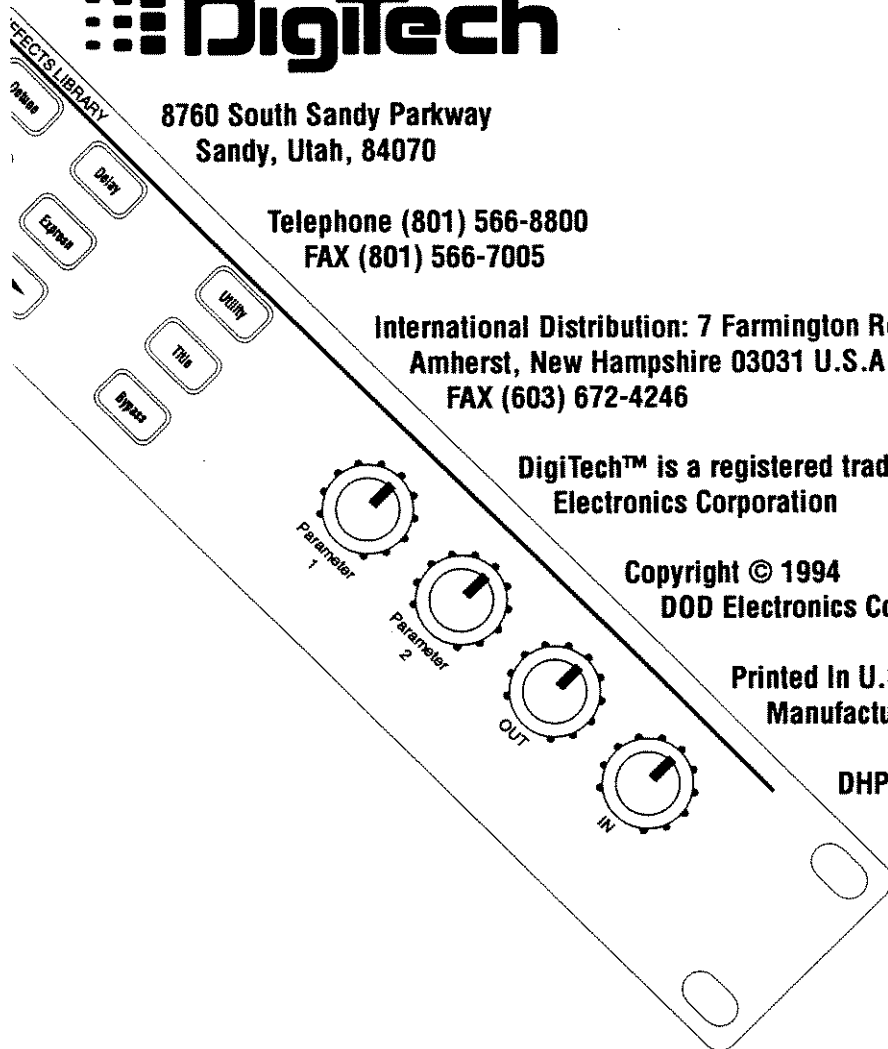
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