DISPLAY

CONTROL

POWER

VOICEWORKS PLUS
HARMONY | MODELING | EFFECTS

TC·HELICON
VOCAL TECHNOLOGIES

PRESET NUMBER

0.1

FACTORY | USER |

Output Clip
Input Clip

0 PPM dB
-5
-10
-20
-40

MIDI IN

PRESET NAME / MODE

Lea H/M FX OUT
-12 -12 Off -12

HARMONY / MODEL   CORRECTION   FX

LEAD LEVEL
EDIT 1

HARM / MODEL LEVEL
EDIT 2

FX LEVEL
EDIT 3

OUTPUT LEVEL
EDIT 4

VOICEWORKSPLUS
HARMONY | MODELING | EFFECTS

IMPORTANT SAFETY INSTRUCTIONS

1 Read these instructions.

2 Keep these instructions.

3 Heed all warnings.

4 Follow all instructions.

5 Do not use this apparatus near water.

6 Clean only with dry cloth.

7 Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9 Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11 Only use attachments/accessories specified by the manufacturer.

12 Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13 Unplug this apparatus during lightning storms or when unused for long periods of time.

14 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in anyway, such as cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Warning!

To reduce the risk of fire or electric shock, do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.

This apparatus must be earthed.
Use a three wire grounding type line cord like the one supplied with the product.

Be advised that different operating voltages require the use of different types of line cord and attachment plugs.
Check the voltage in your area and use the correct type. See table below:

Voltage	Line plug according to standard
110-125V	UL817 and CSA C22.2 no 42.
220-230V	CEE 7 page VII, SR section 107-2-D1/IEC 83 page C4.
240V	BS 1363 of 1984. Specification for 13A fused plugs and switched and switched socket outlets.

To completely disconnect this equipment from the AC mains, disconnect the power supply cord plug from the AC receptacle.

The mains plug of the power supply cord shall remain readily operable

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

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

This equipment should be installed near the socket outlet and disconnection of the device should be easily accessible.

Do not install in a confined space.

Do not open the unit - risk of electric shock inside.
Caution:

You are cautioned that any change or modifications not expressly approved in this manual could void your authority to operate this equipment.

Service
There are no user-serviceable parts inside.
All service must be performed by qualified personnel.

EMC / EMI.

This equipment has been tested and found to comply with the limits for a Class B Digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on. The user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

For the customers in Canada:
This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Certificate Of Conformity
TC Electronic A/S, Sindalsvej 34, 8240 Risskov, Denmark, hereby declares on its own responsibility that the following product:

VoiceWorksPlus
Harmony | Modeling | Effects Processor

- is covered by this certificate and marked with CE-label conforms with following standards:

EN 60065   Safety requirements for mains

(IEC 60065)   operated electronic and related apparatus for household and similar general use

EN 55103-1   Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1: Emission.

EN 55103-2   Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2: Immunity.

With reference to regulations in following directives:

73/23/EEC, 89/336/EEC

Issued in Risskov, 03 - 2004
Mads Peter Lübeck
Chief Executive Officer

INTRODUCTION

Thank you for purchasing VoiceWorksPlus, a vocal processing powerhouse designed to enable the singing musician to produce captivating vocals in recording and live performance. Everything from exciting harmony parts to evocative character impersonations to simply better vocal sound is possible with VoiceWorksPlus.

Features:

Generates up to 4 additional harmony "voices" with a variety of musical input methods

Exclusive TC-Helicon pitch, timing and energy humanization that effectively mimics singing groups

Vocal modeling effects such as breathiness, growl, and resonance help create alternate voice "personalities"

Vocal pitch correction block

TC Electronic Reverb, chorus, tap delay effects & more

Distortion, megaphone and telephone effects

3 band EQ, compressor and gate

Handy top level edit knobs

100 Factory / 100 User presets and MIDI control

Microphone preamp, stereo analog and digital input/output

Optional footswitch control

We update our manuals and various support materials on a regular basis. For the most up to date information we encourage you to visit our website at:

www.tc-helicon.com

We hope you *and your fans* enjoy VoiceWorksPlus,

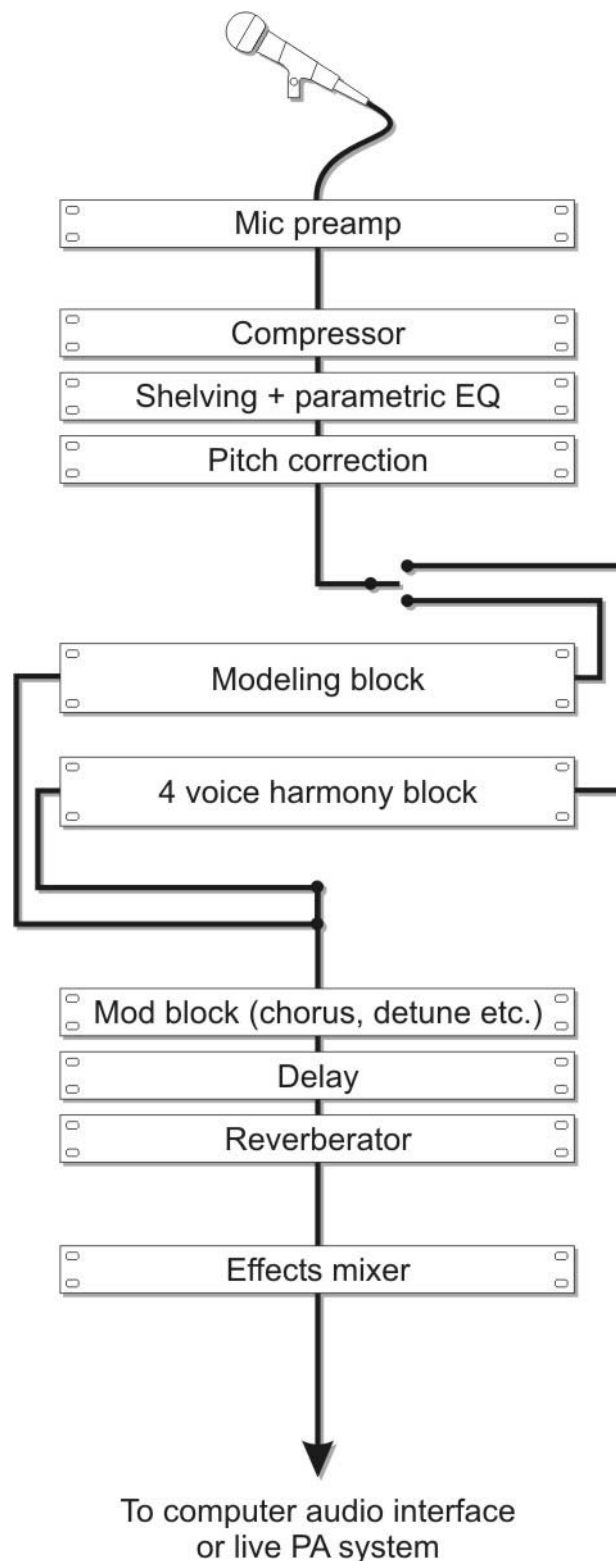The TC-Helicon Team

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PRODUCT OVERVIEW

VoiceWorksPlus can be thought of as a rack full of vocal processing in one single rackspace unit with a couple of specialty effects thrown in for good measure. The specialty effects, vocal harmony and modeling, offer you the advantages of:

- Producing rich harmony vocals and doubling from one voice during live performance

- Saving time when recording vocal harmonies

- Changing the characteristics of your singing voice with modeling to create interesting vocal hooks and effects

The remaining processing blocks, including the multieffects, dynamics and EQ add to your list of advantages allowing you to :

- Make your live performances sound more like a fully-produced CD

- Make your recordings sound more professional

- Save time preparing for mixes or performances by using factory presets and settings

See the diagram at right for a rough algorithmic path overview.

Mic preamp

Compressor

Shelving + parametric EQ

Pitch correction

Modeling block

4 voice harmony block

Mod block (chorus, detune etc.)

Delay

Reverberator

Effects mixer

To computer audio interface or live PA system

1. Power Switch

Press to turn the unit on or off. As the unit shuts down, it saves any setup data you may have changed.

2. Alphanumeric LED display

This 15 segment LED display shows the current preset number whenever the EDIT and SETUP buttons are not lit. There are dots on the bottom line indicating whether the current preset is in the Factory or User bank. The legend below the display indicates which dot represents which bank. When you press the EDIT or SETUP buttons, this display shows a letter and a number making up the address of the current edit screen.

3. Metering LED displays

There are several conditions indicated by these LEDs and they are described in the following paragraphs.

Output Clip

This LED will light showing the output of the product has clipped due to internal level overload, possibly causing audible distortion. This LED can light even though the Input Clip LED has not. This is because VoiceWorksPlus has effect blocks such as Harmony for example, that can potentially add significant level to the input signal.

Input Clip

Steady flickering of this LED with audio input shows that the level of the signal received at the input to VoiceWorksPlus is too high given the input sensitivity setting. To correct this, reduce the send level to VoiceWorksPlus from the upstream mixer or enter the Setup menu to reduce the LineSens (Line input sensitivity).

Input LED Stack

These LEDs allow you to gauge how much level to send to VoiceWorksPlus from your mixer. They use PPM (Peak Program Meter) weighting which is a way to view signal level when using digital processors. The range shows logarithmic steps down from 0 dB which is the maximum allowable level. It's important to adjust the send level from your mixer within the proper range shown by these meters. Sending too little audio signal level contributes to noise buildup and unsatisfactory performance of the voice algorithms. Too much input signal level causes distortion. If your mixer is sending its maximum level and these meters show insufficient level, or vice versa, you can adjust the Input Sensitivity setting by pressing the SETUP button and entering the Setup menu.

MIDI IN indicator LED

This will light to confirm the MIDI data is received by VoiceWorksPlus on the correct MIDI channel. To ensure that it will respond correctly to the incoming data, check to see that both your sending device and VoiceWorksPlus are set to the same MIDI channel.

4. Main LCD display

During normal operation (none of the EDIT, SETUP or STORE buttons are pressed), this display shows the name of the current preset on the top line and the main harmony or modeling parameter values on the lower line. A slight turn of any of the soft knobs will change the display to show master mix levels. While the mix levels are shown, the four soft knobs allow editing of the mix. After a few seconds the display will revert to preset name. After the EDIT, SETUP or STORE buttons have been pressed, this display shows up to four editing parameters on the top line and their associated values on the bottom. After a parameter value has been changed, an asterisk (*) will be shown to the left of the name when you return to normal operation. This is to warn that you will lose any changes should you recall another preset unless it is saved first.

FRONT PANEL DESCRIPTIONS

5. Soft knobs overview

During normal operation these controls act as a mixer, allowing you to quickly modify the global mix levels without entering an edit menu. Moving any of the knobs will momentarily switch the LCD display so that it shows the levels before reverting to the preset name and the information line. When either the EDIT, SETUP or STORE buttons have been pressed, the soft knobs control up to four editing functions from left to right in the editing menus.

Global LEAD LEVEL control

This adjusts the level of the "Lead" voice. This path is called Lead because it has no Harmony or Modeling processing applied. Note that this path may have Pitch Correction enabled if the Correction switch from the upper switch group is lit.

Global HARMONY / MODEL LEVEL control

Adjusts the overall level of any harmony voices that are turned on or the level of the modeled voice depending on which configuration is chosen in the current preset. Make sure the Harmony / Model switch above this knob is lit or this control will have no effect.

Global FX LEVEL control

Adjusts the master level of the µMod , Delay, Reverb and Transducer effects blocks for all presets. The individual effects blocks have their own level adjustment controls which may be turned down preventing you hearing them when you turn the FX Level control. Make sure the FX switch above this knob is lit or the FX Level control will have no effect.

Global OUTPUT LEVEL control

This control raises, lowers or mutes the master output of VoiceWorksPlus.

6. Block On/Off button group

These 3 buttons allow selective muting of blocks in each preset to simplify editing.

HARMONY / MODEL button

When this LED is lit, the current preset is configured to produce harmony or a modeling effect. You can press this button to disable the current effect and see what other effects are enabled in the preset.

CORRECTION button

This button allows you to quickly disable pitch correction when needed. If this button is off in a preset, turning it on will enable pitch correction with default settings which may or may not be optimum for your purpose. In this case you can edit the settings in the Edit menu at location C0.

FX button

If the FX (effects) button is lit, pressing it will mute all signal from the µMod, Delay and Reverb blocks . The Transducer effect will not be muted. If this button is not lit in a preset, pressing it will patch in a default effects setting.

7. Mode Button Group

EDIT button

Press this button to enter and exit the preset Edit menu. All settings relating to the current preset only are accessed here. The last edit screen you accessed with the Data Wheel is remembered to reduce time required to locate specific edit menus.

SETUP button

Press this button to access all of the global audio settings, MIDI functions, the EQ and Dynamics processors and preset backup and restore. Press again to return to recalling presets.

BYPASS button

Pressing BYPASS mutes all processing blocks of VoiceWorksPlus. Any audio signal that is received at the line or mic input is passed directly to the left and right audio outputs.

STORE button

Pressing STORE initiates the storing sequence and presents the preset name and target user preset number in the main display. In Store mode, you can edit the name of the new preset by turning the EDIT 1 knob to highlight the letter positions and then using EDIT 2 to change the letter. You can press either EDIT or SETUP to cancel a Store operation or press STORE or the Data Wheel to complete.

8. The Data Wheel

The Data Wheel has two actions: you can turn it and you can press it. When the display shows a preset name, turning the Data Wheel allows you to browse through the available presets. You can then press the Data Wheel to load the preset of your choice.

If you've pressed the EDIT or SETUP buttons, this wheel cycles up and down through the menus available in these modes. Pressing it has distinct functions in some menus.

When the STORE button is lit, turning the Data Wheel allows you to choose a user bank preset number in which to store your edited preset and pressing it completes the Store operation

9. Mic Input control group

MIC GAIN knob

The MIC GAIN knob allows you to tailor VoiceWorksPlus's input gain to match your combination of microphone sensitivity and singing level.

MIC IN button

The Mic In switch controls which of VoiceWorksPlus's inputs: Mic In or Line In, will drive the unit. This switch must be lit before any adjustment of the MIC GAIN and phantom power will have any effect.

48V button

You must press and hold this button for approximately 1 second to send DC voltage to condenser microphones requiring phantom power. When using non-phantom powered mics, leaving this off is best.

-20 dB switch

This switch reduces the sensitivity of the mic input when you use mics that have a high output level. You would press this switch when you notice that even though the MIC GAIN knob is set to minimum (fully left), the Input Clip LED shows clipping during singing. In this case, press the -20 dB switch and you will have more range adjustment with the Mic Gain control.

BACK PANEL DESCRIPTIONS
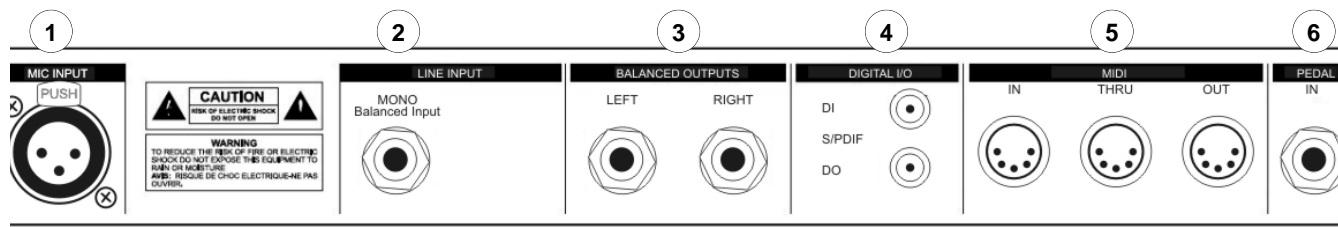
1. Mic Input

When the MIC IN switch on the front panel is lit, this becomes the main analog input. It accepts a balanced mic level XLR cable carrying a monophonic vocal source.

2. Line Input

When the MIC IN switch is not lit, this 1/4" jack becomes the main analog input. You can connect either a balanced (3 conductor TRS) or unbalanced (2 conductor TS) -equipped cable here. The input sensitivity for the line input is located in the Setup menu.

This jack can alternately be used as an auxilliary input to the μMod, Delay and Reverb effects blocks in VoiceWorksPlus. This allows VoiceWorksPlus to do double duty as both a harmony processor for your voice and also a multieffect for other instruments or vocals in your mix. To use this input, the MIC IN must be set as the main vocal input. The effects level settings are located in the Edit menu.

3. Balanced Outputs

These are the balanced analog, line level stereo output of VoiceDoubler. You can connect either a balanced (3 conductor TRS) or unbalanced (2 conductor TS) - equipped cable here. You can sum the left and right outputs to mono by changing the Output parameter in the Setup menu.

4. Digital I/O

Sends and receives digital audio. Using digital I/O instead of the analog I/O bypasses VoiceWorksPlus' converter circuitry for enhanced audio clarity when used with compatible systems. The digital output (DO) is configured to always produce the same audio as the main outputs. The Input parameter in the Setup menu must be set to Digital for the digital input (DI) to receive audio. Also, the ClockSrc must be set to Ext(ernal) for proper audio synchronization when using the digital input.

5. MIDI

This is the standard MIDI In, Out and Thru interface used to allow editing, preset selection, preset dump and restore functions.

6. Pedal

This input accepts a single function footswitch or a triple function footswitch. Any normally-open passive footswitch will work for the single function footswitch. A triple function footswitch is available from TC-Helicon called *Switch 3*. The switch type or volume pedal is detected automatically on power up. If you plug your footswitch in after power up, you may get unexpected operation.

Footswitch (Pedal) features:

> 1 button footswitch: Bypass only
>
> 3 button footswitch: individually selectable in Setup menu

Getting set up

There are several ways to connect and use VoiceWorksPlus, including using a microphone, analog line input and output or digital input and output, but in order to speed things up during this quick start, we'll assume you're using analog connections between either a mic and PA system or a computer setup with a couple of monitors.

Unpack

1. Remove the product from the packaging. Store the box and documents that came with it.

2. Place the product on a non-skid surface or in a rack. It's best to have easy access to the rear panel connectors for the first few days while you sort out which I/O scheme you prefer.

Prepare

3. Before connecting power or turning the unit on, set up your mixer or computer interface to receive audio from VoiceWorksPlus.

4. *Set your PA or monitoring levels to zero before powering up the unit!* This is just good practice when setting up new gear or even the same gear in a new situation.

Back panel connections

5. Connect the power cord to VoiceWorksPlus and plug the other end into an AC outlet. You can turn the unit on now because you've safely set your monitoring levels to off right?

6. Connect the audio cable from your source to VoiceWorksPlus. This can either be an XLR cable from your mic or the line level 1/4" connector from your computer's audio interface.

7. Connect the VoiceWorksPlus outputs to your mixer or computer inputs. Stereo is best, as this delivers the sounds as they were programmed. If you can only connect in mono, you'll have to enter the Setup menu and adjust this parameter.

8. You can optionally connect a MIDI keyboard which allows you to check out the harmony methods using MIDI input for selecting harmony intervals.

Note: When connecting the unit to a computer, you'll need to know how to route your dry vocal track to a separate, auxilliary output.
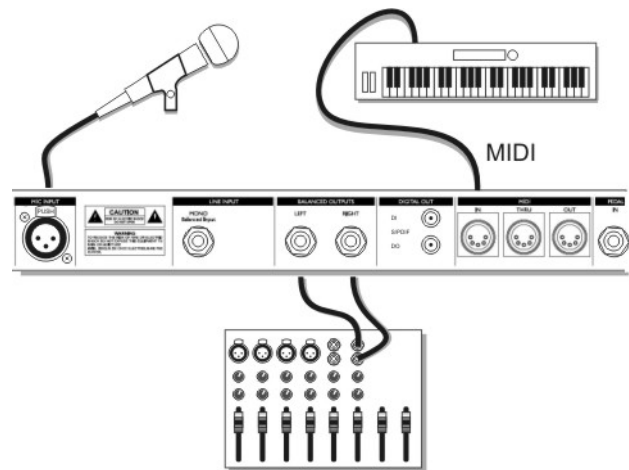
Demo setup #1: Mic input and analog mixer
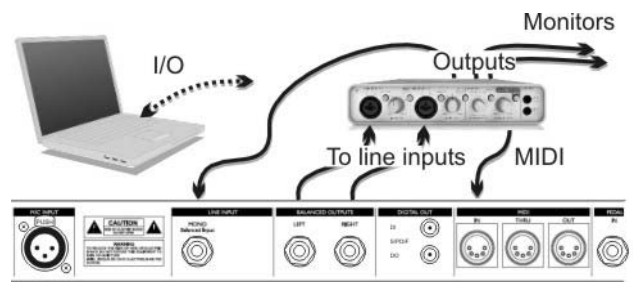
Demo setup #2: Analog to computer interface

Front panel setup

9. Press the BYPASS button so it lights. We'll check that audio is flowing properly in Bypass first and then move on to checking out the effects.

10. If you're using a mic for input, press the MIC IN button so it lights. You'll need to adjust the MIC GAIN knob so that no red shows on the LED stack when you sing. Apply 48V phantom power if needed and press the -20 dB button if the lowest setting of the MIC GAIN knob still causes peaks while you sing.

11. If you're using the Line Input, make sure the MIC IN led is not lit. Start playback on your computer. There is no front panel input level knob so adjust the send from your mixer or computer so the LED stack shows no red on peaks.

QUICK START

12. Hopefully, you've waited until now to raise your monitoring/PA levels and if you have, you should be greeted by a voice that sounds nice and dry at a reasonable level.

13. Turn off BYPASS by pressing the button so the LED is off. Turn the DATA WHEEL to preset number 1 and press the wheel to load this preset. You're now ready to explore the factory presets in VoiceWorksPlus.

Making front panel tweaks

Before you get to exploring the presets, here are some tips that will help you.

Browsing presets

When you first turn on VoiceWorksPlus, the last preset loaded will be loaded for you. Turn the Data Wheel to browse through the preset list. As you do so, the name and information fields of the next preset will be previewed in the main LCD and the effect buttons will flash indicating which effects will turn on. An "H:" on the lower line indicates a harmony preset. An "M:" indicates a modeling preset.

To load presets, push the Data Wheel.

Adjusting the mix

You can vary the global mix (all presets will be affected in the same way) by adjusting the soft knobs. As you turn one of them, the LCD display will temporarily change to show the value of all four levels before returning to the main display. Note that a value of "0" denotes full level, not Off. You can use the soft knob on the far right as a master volume instead of your mixer if that is more convenient. Any adjustment of these settings will remain through subsequent power up sessions.

Enabling and disabling the effects blocks

The three block on/off buttons above the soft knobs allow you to temporarily enable or disable:

1. the Harmony or Modeling block in the preset. (In a harmony preset this is the harmony mute button).

2. pitch correction in the preset

3. the reverb, delay or μMod effect in the preset

Reloading the preset or loading another will return the block on/off status to what was stored.

Exploring the presets

The presets are grouped by the different abilities of the product which makes it much simpler for browsing. The different harmony modes require different inputs from you and the preset groupings make it easier to compare presets of a harmony single control method with others of that same method.

Harmony presets that utilize MIDI input

Presets 1 to 10: Chord harmony mode

Presets 11 to 20: Notes harmony mode

Presets 57 to 60: Combi harmony mode

If you have connected a MIDI keyboard or the output of a MIDI sequencer track to VoiceWorksPlus, you can use these presets to produce harmony for any combination of melody and musical accompaniment. MIDI Channel channel 1 is recognized by default so set the output of your keyboard or sequencer track to send on channel 1.

The text on the lower line of the lcd display will show an H: indicating that it is a harmony preset and either "Chord", "Notes" or "Combi" which are the names of the MIDI-controlled harmony modes.

In the Chord harmony presets, the chords you play on your keyboard are interpreted by VoiceWorksPlus to produce related harmony intervals that move while you sing. Holding a chord and singing a melody or arpeggio will result in a moving harmony arrangement.

In Notes presets, you play melodies or chords that define the exact harmony intervals while you sing. Holding a chord or a note while you sing a melody or arpeggio will "freeze" the harmony arrangement on the notes held on the keyboard. VoiceWorksPlus will recognize up to 4 MIDI notes at a time although some presets may be set to mono (1 voice) or duophonic (2 voices) operation.

Combi mode presets use the same key and scale input as Scale presets do with the extended ability to temporarily insert MIDI chords from a keyboard to adjust inappropriate Scale voicings. To work best, the sung melody note should be in the chord played.

Harmony presets you set with Key and Scale

Presets 21 to 30: Scale harmony mode

These presets require that you input the key and scale of your song. No further input is generally required because the musical intelligence built into VoiceWorksPlus shifts the intervals automatically while you sing. The factory default key setting for all of these presets is A major so, if you sing a song in this key you won't have to keep changing key and scale each time you load a new preset.

To change key and scale, press EDIT and turn the Data Wheel to locate edit screen H0. Use the soft knobs to select the combination of key and scale for your song that sounds good over your chord changes. Note that VoiceWorksPlus is configured so that all presets share the key and scale settings saved with the last preset.

If you wish to change this so each preset has a different key (perhaps for different songs in live performance), the Setup menu has a parameter called Chord/Key which is set to "Global". You can set this to "Preset" if you prefer.

The Scale harmony technique works best when the accompaniment uses the simple chord changes found in pop and blues. A preset with a single 3rd harmony interval will usually produce pleasing harmony with more songs than presets that have a 5th or additional interval.

Presets that change voice character

Presets 31 to 40

These presets use modeling and the hybrid shifter to modify the timbre and pitch of your voice. In most of these presets, your dry voice is replaced with the modeled version so you can use them to mimic other singers' growl, rasp or timbre and create cartoon characters. In a few of the presets, a duet is created with the modeled voice and your dry voice hard panned left and right.

There is an "M:" on the lower line of the display indicating that the preset uses modeling. The remainder of the text on the lower line shows the amount of pitch shifting in cents (hundredths of a semitone), if any is enabled in the preset.

Load any preset from this group and talk or sing into your mic.

QUICK START

Presets that create automatic doubling

Presets 41-50

You can use these to recreate the lush thickness of voices singing in unison along with your dry voice. Some presets feature multiple harmony voices, others use the model to create a unique character to sing along with you and at least one uses the µMod effect to create the doubling illusion.

Though some presets display a key and scale, no key and scale adjustment or MIDI input is required to enjoy them.

Presets that offer Pitch Correction

Presets 51 to 56

You can explore pitch correction with this group of presets. You should be aware that, when set optimally, the effect of pitch correction is subtle compared to the other effects in VoiceWorksPlus especially when you are singing through the product (as opposed to playing back a recorded track).

To be effective, pitch correction needs key and scale to be set so that it matches your song. Like the Scale harmony presets, the default setting for these is A major. To change the key and scale of pitch correction, press the EDIT button and scroll to menu C0 with the Data Wheel.

Several presets are devoted to pairing pitch correction with the Chord, Notes and Scale harmony modes. Note that the harmony information shown on the preset main screen e.g. "H:Scale A Major2", does *not* reflect the pitch correction key and scale settings. To view the key and scale of the pitch correction in one of these presets, briefly bypass the Harmony/Model effects by pressing the Harmony/Model button. Once you've learned the correction information, you can re-activate the Harmony/Model effects.

There is one preset that uses a chromatic scale in which all notes are valid and no key or scale is required.

Presets that feature the Transducer

Presets 71 to 80

The presets in these group send your voice through the Transducer to provide interesting distortion, megaphone and telephone effects. Care must be taken when using this effect because it can cause feedback simply because of the nature of distortion which tends to raise the average level of the signal. You can take steps such as pointing your mic away from the speaker and turning down the volume until you get used to how this effect reacts with your PA setup.

Classic vocal effects

Presets 81 to 90

There is a group of presets in VoiceWorksPlus configured to produce classic effects such as reverb, delay, chorus, and flange etc. These are best auditioned in stereo although they are useful in mono as well.

...And the rest

The presets described above will give you a good overview of the capabilities of VoiceWorksPlus There are, of course more presets scattered throughout the 100 preset slots that are variations on these themes.

Editing overview

When you want to make a change to the sound you're hearing from VoiceWorksPlus, you'll need to press the EDIT button to navigate the various menus, find the setting you want to change with the Data Wheel and then press STORE to name and save the result to the User preset bank.

The first editing menus are different for Harmony and Modeling presets as you can see in the graphic at the right. Both types, however share the same editing menus from the Pitch Correction menu, C0 to the end.

There is extensive editing ability within this product and we've made every effort to balance easy customization with access to useful parameters.

Understanding the control layers concept

The following paragraphs discuss the concept of the three control "layers" that help you find the sound you need.

Presets

The factory presets have been designed to cover as many musical styles and effect combinations as possible so that you don't need to do much editing if you'd prefer not to. While at the preset level, the four soft knobs and the block on/off buttons on the front panel allow you to make changes to the effects without requiring a trip into the EDIT menu.

Styles

To make quick edits, you can press the EDIT button and navigate to the "styles" edit screens e.g. R0: Reverb Style. The styles are like presets-within-a-preset allowing you to make large changes to the reverb sound, for example, without requiring time consuming individual parameter changes. Style values can be edited and stored with a preset but the edited style cannot be used in other presets.

Parameters

Adjusting individual harmony voice levels, for example, cannot be done easily with styles, so parameters such as these are available individually. Even if you are an experienced effects programmer, it's a good idea to browse through the parameter descriptions in the following pages to familiarize yourself with the unique features available in VoiceWorksPlus.

How to find the EDIT Menu you want

Each edit screen has an alphanumeric address to make finding it easier. For example, the Delay edit screens show D0 to D4 in the LED display. The following graphic shows the addresses in the order found in the EDIT Menu:

PC

Preset configuration screen

⬇

Preset Type is set to **Harmony/Doubling**	Preset Type is set to **Lead Voice Model**
HC	*L0-L9*
Harmony control	Modeling settings
V0-V5	*S0-S2*
Harmony voicing	Shifting settings
H0-H5	*MV*
Harmony editing	Main vocal mix
DV	
Dry voice level	

⬇

C0-C2

Correction

X0-X2

FX (Effects) mixer

M0-M8

µMod settings

D0-D4

Delay settings

R0-R3

Reverb settings

T0-T4

Transducer settings

Quick editing guides

The following quick guides cover standard edits you may require.

How to store modified presets

We'll discuss this first so you can get on with modifying and saving right away.

1. Make a parameter change to a preset

2   Press the STORE button. The main LED and the STORE button's LED will flash indicating store mode.

3. Select a user location for the new preset with the Data Wheel. This only scrolls through the 100 user locations so don't worry about overwriting a factory preset.

3. Name the new preset. You can use the left two soft knobs as a cursor and letter selector respectively. Your name can have up to 15 characters.

4.   You can press STORE or the Data Wheel to commit the preset to memory. If you decide to cancel the store operation, press either the EDIT or the SETUP button.

How to change the effect (FX) settings in a preset

The following should help when you've found a harmony or modeling preset you like but, for example, the reverb effect is too long or too quiet or maybe there is a delay effect you want to use instead.

To disable effects in the preset

In the main preset operating mode where both the Edit and Setup LEDs are off, press the FX button above the soft knobs so the LED turns off. You can now store the modified preset.

To adjust effect levels and styles in a preset

Press the EDIT button and scroll the Data Wheel until you see X2 in the main LED display. This is the address for the effects mix screen. The soft knob at the far left sets the Out parameter to either Wdth (stereo width) or Lev (effect level). The remaining soft knobs allow you to individually adjust the levels of each effect processor in VoiceWorksPlus. Note that "0" means full volume, not "off".

If you turn up the level for an effect but you don't hear it, this could be because:

1. The main FX button on the front panel is off. If so, press the button to turn it on.

2. The main FX level soft knob is turned down. Exit Edit mode and turn the FX mix knob (#3) clockwise.

3. The Send to the effect is off. Re-enter Edit mode and scroll to menu X1. The leftmost soft knob selects which effect processor you want to adjust and the remaining soft knobs allow you to set the send amounts from the Lea (dry or corrected lead voice), H/M (harmony or modeling), and Aux (auxilliary input) to "0".

4. The effect you want has no Style loaded. Use the Data Wheel to scroll to screens M0, D0 and R0. These are the style selection screens for μMod (micromod), Delay and Reverb. Select any styles you prefer.

If you want to make further edits to the effects, consult the discussion of edit parameters in the following chapter.

How to add pitch correction to a preset

Pitch correction is generally added to your lead voice in a mix of harmony voices but the following is the full list of the possibilities. You can add pitch correction to:

o   your dry voice when it's mixed into a harmony, doubling or effects-only preset,

o   your modeled voice created in a modeling preset,

o   your dry voice fed through transducer presets.

1. Load a preset that meets the above criteria

2. Press EDIT and scroll to menu C0 with the Data Wheel. Enter the key and scale of your song using the soft knobs. This could be the first or last chord in your song.

3. Scroll to screen C1 and set the Wndow (Window Size), Attk (Attack Time), and Amnt (Correction Amount) settings to 100, 20 and 100 as a good starting point. If you stay on this screen while you sing, you can adjust the settings to your liking. Note that you should sing with an instrument tuned to A=440 for correction to work correctly.

4. Store the modified preset to the user bank. If you don't want to edit your preset before singing songs in different keys, you may want to store your preset in several locations with different correction settings.

How to change the levels and pan position of the harmony voices

In the case where one or more of the voices in a harmony preset stand out or are too quiet, or you would like to change pan position of each voice, you can do the following and then store your edited preset to the user bank. This procedure also allows you to add or remove harmony voices to the preset.

1. In a harmony preset, press EDIT and scroll to menu V0 with the Data Wheel. Here you'll see how many voices are enabled and their relative levels.

2. Adjust the voice levels with the soft knobs while you sing. To lower the overall harmony volume for your preset, adjust each voice by the same amount.

3. To edit pan positions, scroll to the next menu, V1, and adjust the positions with the soft knobs. If any voices are Off in the previous menu screen, adjusting their pans will have no effect.

4. If you raised the level of any voice that was set to Off, you'll need to set the new voice's interval in menu V2.

How to adjust Humanization and vibrato settings in a preset

Humanization in VoiceWorksPlus is controlled by several settings that impose time, pitch and level variances upon the harmony voices or to the modeled voice to mimic human singing. You can choose to add more of these effects or reduce them with these menus.

In a harmony or doubling preset:

1. Press the EDIT button and scroll to menu V4 to speed up (lower number) or slow down (higher number), or disable (value=0) the Portamento, or glide time between notes.

2. Scroll to menu V5 to adjust the amount of Smoothing, which, at lower numbers acts as pitch correction for the harmony voices. A value of 0% is full correction and 100% yields smooth transitions between note changes.

3. Scroll to menu H0 to choose a different Humanization style for each voice or disable it by setting the value to Off/No Style. Menu H1 allows you to adjust the amount of each Style.

4. Scroll to screens H2 and H3 to change vibrato styles and adjust the amount on each voice.

5. In menu H4 you can adjust the overall amount of detuning to all voices with a single Det (Detune) amount parameter and trim the three effects set by the current Humanization style. These include Pit (Pitch modulation, Tim (Timing variation) and Lev (Level modulation).

Note that these values are not reset when you change Humanization styles and if you reduce any value to zero and then change styles you will not get the full effect until you turn it up again.

In a modeling preset:

1. Press the EDIT button and scroll to menu L0. Here you can choose the Humanization style you prefer and adjust the amount in the same screen. These are the same styles as those available for the harmony voices.

2. In menu L1, you can adjust the individual amounts of Pitch, Time and Level randomization (Rand) set by the current Humanization style. The leftmost soft knob allows selection of the Pitch, Time or Level parameter for adjustment by the next two soft knobs.

3. Editing the amount (ScpAmt), duration (Dur) and randomization over time (Rand) of the pitch event that occurs at the start of each sung note is set in menu L2. These values are changed each time you load a new Humanization style. A ScpAmt value of 0.0st (zero semitones) disables the effect.

How to change the pitch shift in a modeling preset

Modeling presets allow chromatic or scale-based pitch shifting. If you have no dry voice mixed-in in menu DV, the modeled voice, with it's shifted pitch replaces your voice. If your dry voice is mixed in, the modeled voice can be used as a harmony or duet voice.

1. Load a modeling preset, press EDIT and scroll to menu S0.

2. With the left soft knob, select which type of shifting you prefer: Chroma (chromatic) or one of the scale shifts from Maj1 (major 1) to Cust (custom intervals).

3. You can either adjust the chromatic shift amount in cents (hundredths of a semitone) or set a new key, scale and voicing interval as you would with a Scale harmony preset only with a single modeled voice.

Chapter Overview

Presets are configured as Harmony or Modeling. The following pages detail only the editing interface for presets configured to produce harmony. The edit interface for modeling presets is discussed in the chapter entitled Lead Voice Modeling Editing.

Preset Type - menu PC

This configures the current preset's edit menus for either Harmony/Doubling processing or Lead Modeling processing.

Harmony Control - menu HC

The parameters in this screen determine the type of harmony processing for the current preset and it's associated musical requirements.

Mode allows you to choose between the multivoice shift modes. The menu interface will change adding or removing additional parameters depending on the mode chosen.

o   Shift - no additional parameters in this screen

o   Scale - Key and Scale

o   Chord - Chord Root and Type

o   Notes - no additional parameters

o   Combi - Key and Scale

When the current value is Scale or Combi, this screen is where you set Key and Scale your song.

If the current value configures the preset for Chord mode, you can store the preset with default values for the Root and Chord Type.

Voicing Screens - menus V0 to V6

These edit screens apply to the pitch shifting aspects of your four harmony voices.

V0: Voice Level

The four EDIT knobs control the volumes of each of the voices. Note that the range of values goes from Off to +6 dB. Typically, you would avoid the 0dB to +6dB values unless only a single voice is active and you need extra level for it. The presets were created at the factory at optimum levels designed to minimize output distortion that may arise when adding the levels of the voices together at high levels.

V1: Voice Pans

Each voice may have a unique pan position. There are 100 possible steps in each of the left and right pan positions.

V2: Voicing: Harmony Intervals

Here you set the pitch shifting intervals depending on the harmony mode chosen in the Harmony Control menu. The representations of the pitch shifts also vary according the current harmony mode.

In Shift mode, you may pitch shift the voice in chromatic (fixed), one semitone intervals up to two octaves in either direction.

In Scale mode, the pitch shift follows diatonic (moving third) rules. The choices are musically useful and cover the +/- two octave range.

In Chord mode, the interval range covers the range of harmony motion defined by Chord mode.

In Notes mode voicing is determined by the notes you hold down on your MIDI keyboard and so adjustment is not applicable in this screen.

In Combi mode the intervals are the same as for Scale mode because these two modes are similar.

V3: Voicing Gender

Each voice has its own timbre adjustment in the form of Gender control. Values below 0 lend each voice a more masculine and deeper effect and values above 0 lend a more feminine or thinner effect.

V4: Portamento Times

Each voice has its own Portamento time. Portamento is a delayed response to the pitch movement of your singing voice. It is also referred to as "Glide" in synthesizers. The range of values equals approximately how long the upwards or downwards slide will take to reach each new note. Setting each voice to different values greatly assists the illusion of other singers singing with you.

V5: Smoothing Amount

Like Portamento, setting each voice with a unique value of the Smoothing parameter helps the harmonies sound more natural. At low values, Smoothing acts like pitch correction of the harmony voices according to the shifting rules applied by the current harmony mode. With the voices corrected like this, some Portamento is usually required to help soften note to note transitions. Higher values offer progressively less correction.

HARMONY EDITING

Humanization - menus H0-H7

The term "humanization" simply means the application of processes designed to increase realism. All harmony modes usually benefit from careful application of humanization styles that make each harmony voice respond slightly differently to your singing voice.

Humanization is especially useful to make Notes and Chords harmonies sound more natural. The rigid pitch definitions imposed by MIDI don't automatically lend themselves to matching the small pitch wobbles, timing inconsistencies and varying volume envelopes of a human singing group.

Humanization styles are made up of:

o   Onset pitch events - This is also known as "scooping" which adds a generated pitch trajectory for each new note that is different than the sung note.

o   Pitch modulation - a random wave generator wobbles the pitch in non-periodic ways to simulate even the finest singers' pitch variation.

o   Timing delay and modulation - Singers are unable to start notes at the same time with the exactness of a machine so this algorithm applies slight delays to the onset of notes and then adds modulated time variation to sustained portions of notes.

o   Level (volume) modulation - This effect is like a subtle tremolo with a non-periodic or semi-random waveform that simulates the way different singers change note volumes as they sing.

H0: Humanize Style

You may choose from 24 pre-programmed humanization styles that were created at the factory to speed editing. Each voice can have a unique style. The styles are loosely ordered from subtle to overt with a general style quality indicated by the name. As you change the values with the EDIT knobs, the screen briefly shows the name of the style you have selected before reverting to the menu name.

The styles were designed in groups of four so that if you apply all four numbered "Natural" styles (one for each voice) for example, each voice would respond slightly differently but still would remain within the "flavour" of the style name. Applying similarly-named humanization styles to multiple voices is not required however, allowing you can mix and match to your liking.

All humanization styles but the last four have scoop, or onset events pre-programmed into them in varying degrees. The last four, called PitTimLvl 1 through 4, have none to allow you more programming variation.

H1: Humanize Amount

You can vary the amount of humanization independently for each voice. All the styles except the last four were designed at middle values to allow you to add or remove effects as you see fit. The last four were designed at low values so you can create wild special effects as you experiment with high values.

H2: Vibrato Style

Vibrato assists in providing separation between your dry singing voice and the harmonies. Even the smallest amount of vibrato applied to your harmony voices can achieve this. There are 28 styles available in progressively more intensity as you browse down the list. Again, they are grouped in fours for when you have four voices enabled that you want vibrato on but you want them slightly out of sync to sound more natural. Of course, mixing styles is useful and recommended. Note that changed style or parameter values will be heard at the next sung note.

H3: Vibrato Amount

You can vary the amount of vibrato intensity of the current vibrato style independently for each voice. All the styles were designed at middle values to allow you to add or remove vibrato as you like.

H4: Detune, Pitch, Time and Level Trims

Detune applies a slightly different amount of pre-set and opposite pitch shift to each voice as you raise the value. At maximum, +/- 50 cents of detune is applied.

Pit (Pitch Trim), Tim (Timing Trim) and Lev (Level Trim) allow you to adjust the amounts of these components within the current humanization style. For example, if you like the sound of the Pitch and Timing variation in the style but would rather that the levels didn't fluctuate, you could lessen or remove this part of the effect. Note that a 100% value in this menu is only as much effect as what is applied in the Humanize Amount menu (H1). The Detune parameter operates on its own.

H5: Tuning and Hold Release

The Tuning parameter allows you to affect tiny pitch adjustments to your harmony intervals to achieve Equal, Just or Barbershop tuning.

Equal tuning is the compromised tuning standard that instruments such as guitar and keyboards are designed to. This tuning mode allows you to play in any key without completely retuning your instrument for every chord. This value is the default from the factory.

Just tuning is what is known as "perfect" intonation between harmony intervals. It is best to use this when performing with other instruments tuned to Equal, or standard tuning. The pitches of major and minor thirds and the fifth intervals are brought into exact mathematical symmetry which overcomes the "beating" of harmonics that occurs with Equal tuning mode.

Barbershop functions exactly like Just tuning in all harmony modes except for Chord mode. In this case, Barbershop tuning uses your singing voice as the pitch reference where Just intonation uses the root of the current chord played via MIDI.

HoldRel (Hold Release) varies the amount of time it takes for any notes held with the Hold feature to decay. This makes for a more natural release. Note that no new harmony notes will sound until the time you set with this parameter has elapsed.

H6: Notes Envelope, Attack, Decay and Release

These settings affect only Notes mode harmony. They are designed to introduce level modifications to the harmony voices' onset, duration and release for more natural effect. All values are in milliseconds.

The Attack parameter provides a gentle volume fade-in when you strike a MIDI note during a sustained sung note.

The Decay parameter adds a brief, pre-set level boost to the sustained portion of a MIDI note to separate Notes harmony from the dry voice better. Adjusting it determines the time to ramp in and out of the higher level.

The Release parameter adds a smooth fade-out if you release your MIDI note as you continue to sing.

H7: Notes Extension and Latch

The Notes Extension feature is a new feature for TC-Helicon harmony processors. It allows a harmony voice that has been triggered in Notes mode to continue sounding while the singer sings after the MIDI note has ceased. This feature makes it possible for singers to improvise by holding their sung notes longer without having to reprogram the sequencer controlling their harmony performance.

Latch works in the Notes and Chord modes only. It acts like an automatic sustain pedal. With Latch set to Off, you can sing a sustained vowel and press the notes on your MIDI keyboard on and off to bring the harmony voices in and out. With Latch set to On, removing your hands from the keyboard will cause no change to the chord or notes you played.

When turning Latch On in Notes mode, you must trigger the same number of notes for the subsequent chord as there are voices turned on in the preset. For example, if four voices are enabled in the preset (Levels are more than zero) and you play a four note chord on the keyboard while you sing, you will hear four harmony voices. If you remove your hands from the keyboard and play two different notes, the harmony will not change. Only when you hold four notes at once will the harmonies change.

Dry Voice Mix Screen - DV

You can vary the level of your singing voice in the harmony mix with the Dry Level and Pan controls. In harmony presets in VoiceWorksPlus, the "Dry" voice is your singing voice with or without pitch correction.

Chapter overview

By now you've likely browsed through the harmony presets in VoiceWorksPlus and are relatively familiar with the harmony modes and features. This chapter gives some background and tips to help you produce the best harmony performances possible using VoiceWorksPlus. Editing your settings is discussed in the following chapter.

Why are there different harmony modes?

For every note you sing, there are many notes that could qualify as good sounding harmony notes. In order to have VoiceWorksPlus "sing the right notes" you need to feed it some information and this is done through creating several harmony "modes". Each harmony mode requires different input from you and is capable of producing unique harmonies from the same vocal performance. We will use a little allegory to explain.

When you and a fellow musician get together to play and sing, typically some musical information is passed from one to the other before commencing the song. You do this in order to make sure the music sounds pleasant and not discordant. The information can be as simple as the name of a song you both know, a musical key or even pointing out the chords on your instrument. In this respect, VoiceWorksPlus is similar. You will need to share some musical information in order for it to do its job properly. The different ways in which you can communicate this information to VoiceWorksPlus are through the "harmony modes".

Like your friend in our analogy, VoiceWorksPlus has intelligence that can contribute to making good music. You can choose to use this intelligence or not depending on the chord structure of your song and the harmony lines you have in mind. You make this choice when choosing presets to produce harmony in your song.

The factory presets are organized on the basis of the five harmony modes:

- ◈ **Chords**
- ◈ **Notes**
- ◈ **Scale**
- ◈ **Shift**
- ◈ **Combi**

The "intelligent" harmony modes, **Scale** and **Chords,** calculate an input note to output note harmony "map" with the following inputs from you:

1. The note you're singing at any given moment;
2. The key and scale you've set at the beginning of your song for Scale mode;
3. or the chord root and type interpreted by VoiceWorksPlus from your incoming MIDI in Chords mode.

This map has an output note associated with every input note. This creates a harmony melody that moves with your lead melody while generally sounding harmonically correct with your accompaniment.

The non-intelligent modes, **Notes** and **Shift,** each have unique requirements so we will deal with them individually:

The **Notes** harmony mode requires a MIDI keyboard or other MIDI source to dictate to VoiceWorksPlus what harmony notes you'd like to hear during your lead melody. Once a harmony note or notes are held down on your MIDI keyboard or MIDI track, this is where they will stay regardless of your changing vocal melody.

Shift mode follows the pitch of the lead melody a fixed interval away. This is most useful for unison doubling, octaves, special effects or Gothic-sounding 5ths. As such, it's not as useful for creating what we call harmony which is usually made up of diatonic intervals or those that vary their distance away from the sung note depending on which note you are singing in a scale.

See the following page for a comparison chart of the harmony modes.

HARMONY BACKGROUND AND TIPS

A Comparison of the Harmony Modes

The following table gives an overview of the plusses and minuses of each harmony mode.

Harmony Mode	Input	Benefits	Challenges
Scale	Set Key and Scale of song	Most natural sounding with minimal input. Can be the fastest way to produce harmony.	Diatonic harmony doesn't work with all chord accompaniments. Requires that you know how to choose Key and Scale correctly
Chord	Play chords on a MIDI keyboard	Works for nearly every chord change accompaniment.	Limited harmonic movement not always most realistic sounding
Combi	Set Key and Scale then use MIDI chords where needed to correct harmony/chord change errors	Optimal blend of natural sounding Scale harmonies and Chord mode arrangement flexibility	Requires that you know how to choose Key and Scale correctly
Shift	Set shift amount with the Voicing parameter or choose Shift-based preset	Easiest to use	Fixed interval less useful for musical harmony
Notes	Perform harmony melodies on MIDI keyboard or use MIDI track playback	Complex harmonies can be created that move independently of sung voice melody.	Requires keyboard skills. Wide-panned voices may swap sides due to voice allocation.
Notes 4 Channel	Perform harmony melodies on four MIDI channels/tracks using a MIDI keyboard and/or sequencer	Any harmony melody can be created for each voice. Unique pitch bends on each channel add realism. Pan and Gender assignments locked to voice	More time required to input melodies. Sequencing knowledge required.

Which is the best harmony mode for you?

From the chart above you can see which harmony mode is likely to become your favorite. Shift is not described as it's not a true harmony mode.

"Are Chords presets the best for me?"

If you play keyboards, presets based on Chords are likely to work best for you. You just select a preset with the arrangement of intervals above or below your voice and get down to playing your instrument. All you do when you require harmony is to un-mute the harmonies with the Harmony Mute function on your footswitch and then play the chords in your song.

A new TC-Helicon feature has been added to VoiceWorksPlus that greatly improves Chord mode flexibility and it's called "Improvise" mode. This is found in the Setup menu (press the SETUP button) at menu U2 and once set, it will affect all Chord harmony presets. Improvise mode configures Chord mode presets so that only 3 note chords will trigger a chord change, instead of each note as is the case with "Classic" mode. This allows you to play your keyboard

arrangements more naturally, allowing runs, bass riffs, and chord partials while you sing and create harmony simultaneously.

"Are Scale presets the best for me?"

If you are a guitar player in a live act, Scale mode will work best because there is no requirement for ongoing musical information during the song as there is with the MIDI modes. All you do is set the Key and Scale or load a preset you've saved with the song's information before you start your song. This only takes a moment and then you can get on with playing. During the song when you need harmony, you can use the Harmony Mute button on your footswitch to turn harmonies on and off. Some songs where the combination of vocal melody and your music may produce odd harmony notes may occur, but the songs where you can create harmonies handsfree will completely impress your audience.

"Are Combi presets for me?"

For someone who uses a sequencer to help with backup music live or to at home to record their own music, Combi mode can give you the excellent combination of natural-sounding note to note

transitions that Scale mode gives you with the benefit of a MIDI chord override that solves the Scale mode dilemma. Because inputting a chord is only required during problem sections, you have to be aware of where these sections are and while you're performing, your mind is usually focussing on your performance. Also, an intricate keyboard part is usually not required so limited keyboard skills are all that's needed.

"What about Notes and Notes 4 Channel?"

These two modes, or rather the one with its sub-mode, are highly useful for home recording enthusiasts that can play a keyboard melody. Notes mode presets give you ultimate flexibility in allowing you to create harmony melodies that ascend or descend even while the pitch of your singing voice drones on a single note or goes in a completely different direction. Notes is a little unwieldy when you're simultaneously playing a live piano or organ part but it really shines when you need to create something new in your song harmonies.

Notes 4 Channel, with its ability to accept multiple pitch bend performances and the fact that the voices never swap sides when hard panned left and right make it a useful tool for recording or the creation of live backup tracks.

"How do I use Harmony Hold?"

Harmony Hold is a feature that can be triggered by the setting one of the Switch3 footswitch parameters to Hold or by sending a MIDI CC messsage. When the hold feature is triggered during a held vocal note, the vowel sound creates a sustained harmony part for as long as you hold down the pedal. At this point, you can improvise over the sustained vowel sounds.

The feature can make for very interesting live affects that seem to defy what one singer alone can produce.

HARMONY BACKGROUND AND TIPS

Scale types and voicings table

	Lead Voice	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
MAJ1	3rd Above	E	nc	F	nc	G	A	nc	B	nc	C	D	D
	5th Above	G	nc	A	nc	B	C	nc	D	nc	E	F	F
MAJ2	3rd above	E	nc	F	nc	G	A	nc	C	nc	C	D	D
	5th above	G	nc	A	nc	C	C	nc	E	nc	E	F	F
MAJ3	3rd above	E	nc	F	nc	G	A	nc	Bb	nc	C	D	D
	5th above	G	nc	A	nc	Bb	C	nc	D	nc	E	F	F
MIN1	3rd above	Eb	nc	F	G	nc	Ab	nc	Bb	C	nc	D	nc
	5th above	G	nc	Bb	Bb	nc	C	nc	D	Eb	nc	F	nc
MIN2	3rd above	Eb	nc	F	G	nc	A	nc	Bb	C	nc	D	nc
	5th above	G	nc	A	Bb	nc	C	nc	D	Eb	nc	F	nc
MIN3	3rd above	Eb	nc	F	G	nc	Ab	nc	B	C	nc	D	nc
	5th above	G	nc	A	Bb	nc	C	nc	D	Eb	nc	F	nc

The table above illustrates the how the six scale types differ. It shows the third and fifth intervals for input notes in the key of C.

The bold line of notes at the top represent the sung or input note.

The symbol "nc" means no change, in that the harmony voice will simply stay on the previous note until the lead voice changes to a non "nc" note.

The table at right shows the range of harmony voicings available in Scale mode.

Voicing intervals in Scale mode presets

+2 Octaves (+2ve)
++7
++6
++5
++4
++3
++2
+1 Octave (+1ve)
+7
+6
+5
+4
+3
+2
Unison
-2
-3
-4
-5
-6
-7
-1 Octaves (-1ve)
- -2
- -3
- -4
- -5
- -6
- -7

Chord types and voicings table

The following gives additional detail on Chords mode. It shows the range of chords recognized by Harmony4 based on a chord root of C in the left column. To the right in the table is the combination of notes that are required to be played in order for Harmony4 to recognize each chord type.

Recognized Chord Types with Root of C

Type	Required Notes				
Maj	C	E	G		
Maj6	C	E	G	A	
Maj7	C	E	G	B	
Maj7sus4	C	F	G	B	
Min	C	Eb	G		
Min6	C	Eb	G	A	
Min7	C	Eb	G	Bb	
Min7b5	C	Eb	Gb	Bb	
Dim	C	Eb	Gb		
Dim7	C	Eb	Gb	Bbb	(equiv. to A)
Dom7	C	E	G	Bb	
Dom7b5	C	E	Gb	Bb	
Aug	C	E	G#		
Aug7	C	E	G#	Bb	
Sus	C	F	G		
Sus2	C	D	G		
Sus7	C	F	G	Bb	

Voicing intervals in Chord mode presets

+2 Octaves

+1 Octave

Up 6

Up 5

Up 4

Up 3

Up 2

Up 1

Unison

Down 1

Down 2

Down 3

Down 4

Down 5

-1 Octave

-2 Octaves

Bass 2

Bass 1

Root 2

Root 1

Chapter Overview

When you load a preset that has modeling enabled you will see an M: at the lower left of the display. The "M:" indicates that the primary effect is modeling. Information beside the M: shows the method of pitch shifting and the amount.

Voice Modeling is a collection of the following algorithms that modify your voice:

o   Resonance (edited with the FreqncyStyle parameter)

o   Inflection (edited with the HumanStyle parameter)

o   Vibrato (edited with the VibratoStyle parameter)

o   Growl/Breath (edited with the GlottalStyle parameter)

Voice Modeling can be applied to your voice to achieve a diverse range of performance objectives:

o   enhance a thin-sounding vocal performance without EQ

o   produce character voices to emulate popular singers or for novelty effects

o   create duet tracks from one voice

In addition, the modeled voice can be chromatically or diatonically pitch-shifted to produce duets, doubling or modeled harmony parts.

Each Voice Modeling block can be used independently or combined with the others into a preset. The factory presets have been created containing various groups of these blocks as a starting point. Understanding what each block does will help you to use, edit, and create presets effectively.

The editing menu for each block contains a style and amount. The styles were created at a value of 50 to allow you room to increase or decrease the amount to your preference.

A note about styles in VoiceWorksPlus: "Styles" are presets-within-presets that allow you to get the sound you want faster. A large number of user and behind-the-scene parameters are required to construct a particular effect, so styles are created that combine the settings. You can edit the styles, and the changes you make will be stored with the preset.

The following pages describe the effect menus that allow editing of modeling settings. A brief discussion of each effect is followed by the location name and edit parameters.

Preset Type - menu PC

This configures the edit menus and effects blocks for either Harmony/Doubling processing using all four harmony voices or Lead Modeling processing which is a single voice processed through VoiceWorksPlus's modeling blocks.

Lead Voice Inflection (HumanStyle) - menus L0 to L2

Inflection is the automatic pitch, timing and level modification block in VoiceWorksPlus. The effects from this block can be used to:

o   create a pitch event on the beginning of sung or spoken notes to create an alternate character voice

o   introduce subtle timing and pitch modulation effects

o   allow creation of bizarre, inhuman special effects

The Humanization styles found in this menu are the same as those in harmony presets with additional controls for the "scoop" component of the effect.

L0: Humanization Style and Amount

EDIT 1 controls selection of the style and EDIT 2 varies the amount. The styles are numbered 1 through 4 to be used primarily with the four harmony voices. There are subtle differences between them that are useful for modeled voices as well.

L1: Pitch, Time and Level Randomization Amount and Rate

Rand (Randomization) allows you to chose Pitch, Time or Level randomization for further adjustment.

Amt (Amount) adjusts the modulation amount in cents (c), milliseconds (ms), or decibels (dB).

Rate allows you to adjust the modulation rate for the effect.

LEAD VOICE MODEL EDITING

L2: Scoop Amount, Duration and Randomization

ScpAmt (Scoop Amount) sets the amount of pitch swing (0 to 8 semitones) that a scoop can cover during its onset. Note that each style has a slightly different scoop trajectory curve.

Dur (Duration) sets how long it takes for that scoop to reach its target note.

Rand (Randomization) randomizes several values of the current style so that each time a new note is sung or spoken, a slightly different effect will be heard.

Vibrato (VibratoStyle) - Menus L3 to L6

Vibrato as a singing technique needs no introduction, yet its implementation in VoiceWorksPlus should be clarified. The Vibrato block can be used to create an alternate singing persona for singers. If used during recording, a unique vocal backup group can be made by the same singer overdubbing multiple tracks while singing through different styles from the Vibrato block. This is faster and more effective than the singer attempting to sing in an unnatural way for an extended period of time.

Strikingly real Voice Modeling modification is possible using the various Vibrato styles because they have been created by detailed examination of many singers' voices.

To take full advantage of a different vibrato than your own, it's best to reduce or remove the vibrato from your singing voice. Also, note that when changing Vibrato Styles, the effect won't change until a new sung note triggers the new style.

L3: Vibrato Style and Amount

VibratoStyle allows you to choose with vibrato style fo impose upon your voice. You have the same choice of vibrato styles as you have for harmony presets. They are numbered 1 to 4 to be more effective when used on four harmony voices but the subtle differences between styles that share the same first name can still be used effectively on a single voice.

Amount increases or decreases the amount of pitch variation set by the vibrato style you have chosen. "Nom" is the value at which the style was created.

L4: Vibrato Amount, Envelope and Time

VibAm (Vibrato Amount) sets the pitch swing of the current style in cents. An amount of 100c would swing a total of 100 cents although not necessarily equal amounts above and below your input pitch.

Env (Envelope) allows you to choose Atk (attack time), Sus (sustain) and Rel (release time) for adjustment by the Time parameter.

Time sets the time in milliseconds for the Attack, Sustain and Release of the vibrato effect. If the Attack is set too long you may never hear vibrato unless you sing very long notes.

L5: Frequency, Onset Delay and Randomization

VbFrq (Vibrato Frequency) controls the period, or rate of the vibrato waveforms.

OnDly (Onset Delay) determines how long a note has to hold before the vibrato enters the Attack/Sustain/Release phase. High values of OnDly may cause you to never hear the effect!

Rand (Randomization) actively varies the style settings to be slightly different with each new sung note.

L6: Tremolo and Phase

VbTrem (Vibrato Tremolo) controls the volume change in a vibrato sound. At 0dB there is no volume envelope, at 6dB, the effect is highly pronounced.

Phase allows you to determine where the peaks and values of the volume changes occur in relation to the peaks and valleys of the pitch modulation. A value of 0 aligns the two exactly. Values above and below 0 align the volume envelope peaks and valleys at different parts of the pitch envelope.

Resonance (FreqncyStyle) - menu L7

The Resonance block simulates changes in the physiology of the vocal tract. In musical applications, this can be used for example to make a singer's voice sound deeper without shifting the pitch, or to make a singer sound younger. Resonance can also disguise a singer's voice as a special effect in the breakdown or hook section of a song. Singers who sing a number of simultaneous advertising spots in a single market could use resonance to disguise their voice and avoid overexposure.

FreqncyStyle (Frequency Style) allows selection of pre-configured modeling tones for your voice. The range covers thick-sounding effects to thin.

Amt (Frequency Amount) allows you to add more or lessen the Frequency effect. The amount set when the style is loaded is what was created at the factory.

Note that further Frequency modification can be performed with the Trct (Tract) parameter in menu L9 and the Frmt (Formant) and Hybr (Hybrid) parameters in menu S1. These are explained below.

Growl/Breath (GlottalStyle) - menus L8 to L9

The Growl/Breath block can be used to create the intimate sound of a breathy singer, whispers, or an effect that evokes the gravelly voices of singers like Louis Armstrong and Bob Seger. While a preset using these effects can be imposed on a recorded voice, a the most effective technique is to sing while hearing the effect. It is possible to use either a Breath effect or Growl effect but not both at once. Breath effects are summed, or mixed with your voice whereas Growl effects are 100% wet at all times.

L8: Glottal Style and Amount

The Glottal Style allows you to choose Brth (Breath) or Grwl (Growl) styles.

Amount allows you to add more breath or growl effect to the maximum set by the style.

L9: Voice, Glottal Mix and Tract Control

The Voice and Glotl (Glottal Level) controls work for Breath styles only.

The Voice setting allows you to reduce the level of your voice if desired to make the breath effect more prominent. Note that you can remove your voice completely with this parameter allowing you to hear the Breath effect alone.

The Glotl (Glottal) setting allows you to add or remove level to of the Breath effect beyond the style value.

Trct (Tract) is a further modification of the Frequency effect. It is used to personalize the effect to the individual singer. For a given style to sound its best, a deep-voiced singer would be set to values less than 100 and a thin-voiced singer would be set above 100. Of course this can be used to attain interesting effects as well!

A value of 100 sets no Tract effect. If No Style is loaded, or the value of the current Frequency style is 0, no Tract effect is possible.

Pitch Shift - menus S0 to S3

Pitch shifting adds tremendously to character voices you can create. From instant male/female duets to deep Bass singers to soaring Sopranos, this block stimulates interest in your listening audience.

Two types of pitch shift may be applied to the modeled voice: Chromatic and Scale. You can use Chromatic shift to achieve octave transformations or any unvarying interval from your input pitch. Scale shifting allows the modeled voice to be used to sing harmony in a particular key and scale much like the Scale harmony capability of the harmony presets only with a character-rich modeled voice.

S0: Shift Type, Amount and Key*

Shift determines whether the pitch shift is chromatic (Chroma) or diatonic (Maj1-3, Min1-3, Cust).

*Key - As you change from Chroma to the scales, this additional parameter appears in the display allowing you to set the key to match your song. Key is only shown when the Shift type is non-chromatic.

Amount sets the chromatic (fixed) or diatonic (moving thirds) interval. When the Shift is set to Chroma, the Amount is in cents. 0c is no shift.

When Shift is set to the scales, this parameter works in the same way as the Voicing: Scale parameter does for a harmony preset based on Scale mode. Uni is the unison (no shift) value.

S1: Formant, Hybrid Amount

Frmnt (Formant) affects the male or female timbre of the modeled voice independent of the direction of pitch shift. This parameter sets the offset from -50, which is deeper and more male to +50 which is thinner or more feminine and at high levels, alien. At a setting of 0 there is no formant change.

LEAD VOICE MODEL EDITING

Hybr (Hybrid Amount). This works only when the pitch of the modeled voice is shifted. Typically, there are two types of pitch shift techniques:

o   Formant corrected and;

o   "Instrumental" shifting.

Applying a pitch shift using Formant correction better preserves natural humanlike sound when the pitch is shifted. Instrumental shifting does no such thing which results in the famous Chipmunk/Darth Vader effects common to special effects and old generation pitch shifting products.   The Hybrid Amount parameter allows you to define midpoints between these two techniques for finer control of timbre.

The Auto setting is full formant correction. The values from 0 (full Instrumental shifting) to 100 (closest to Auto) give you fine control.

S2: Portamento Time and Smoothing

Porta (Portamento Time) slows pitch response as you sing up and down through a melody. It is useful for making a modeled harmony voice sound more like you are singing with another person. This is because your dry melody and the harmony are slightly out of pitch synchronization at lower values and wildly out of sync at high values. The number value is roughly the time it takes to glide between two pitches.

Smooth (Smoothing). At low or zero values, Smoothing acts like a pitch corrector on the shifted voice. As you sing up and down through your melody, note-to-note transitions become stepped and the pitches are corrected even as your dry voice dips above and below pitch. With low smoothing values it's often useful to add Portamento to soften the note attacks while the Smoothing keeps them in tune.

As you progress through higher Smoothing values, generally above 60 or 70, the hard note transitions become softer.

Smoothing and Portamento apply to all shift modes including MIDI note-derived pitch shifting

S3: Unvoiced Attenuation

The UVAtn (Unvoiced Attenuation) reduces "Ess" type sounds to improve pitch shifting artifacts that occur when pitch shifting over larger intervals.

Mixing - menus MV and DV

It is possible to vary the blend between the modeled voice and your dry voice with the parameters in these two menus.

MV: Model Level

Model Level is the volume of the modeled voice. A value of 0dB is full volume.

Pan allows you to place your modeled voice where you would like in the left, right or in the middle of your stereo spectrum.

DV: Dry Voice Level

Dry Level (Dry Voice Level) controls the volume of your completely unaffected voice. In VoiceWorksPlus-modeling presets, the "Dry" voice is your singing voice with no other effects processing. You would raise the level of your dry voice to create a harmony or duet perfomance in tandem with your modeled voice.

Pan places your dry voice left or right in the stereo field.

Chapter Overview

A brief intoduction to Pitch correction is discussed in the Quick Start chapter. This Pitch Correction chapter provides more detail on usage and the editing menus for this feature.

Setting expectations

Will I sound like (insert talented singer here) by just using pitch correction? This question is best answered by saying that it can make good singing sound better.

Using pitch correction in real time (as opposed to offline studio editing) can help your pitch performance best while sounding transparent when:

o   the key and scale are set correctly

o   you are singing well

o   the parameter values are set to reasonable values

You should be aware that the pitch correction effect may be very subtle even when it's working perfectly.

Where can Correction be applied?

Pitch correction works differently in harmony presets versus modeling presets.

In harmony presets, your dry voice can have pitch correction applied which in turn feeds the corrected pitch to the harmonies. You can think of this as having a separate pitch correction device inserted between your mic and one of our harmony processors.

In modeling presets, it is only the modeled voice that can have pitch correction applied. While there is the possibility of mixing in your dry voice alongside the corrected modeling voice, your dry voice will not be corrected. This was done for pitch differentation between your modeled and dry voice paths to allow you to create interesting doubling and duet effects.

Can I add pitch correction to an existing preset?

If you like the sound of a particular harmony or modeling preset and you want to add this feature, follow the directions discussed in the Editing Overview chapter under the heading "How to add pitch correction to a preset".

Pitch Correction Menus C0 to C2

All correction parameters except the front panel Correction On/Off button are located in these three menus.

C0: Correction Key and Scale

Set the key and scale here to match your song. The scale options include:

o   Major

o   Minor-Har (harmonic minor)

o   Minor-Nat (natural minor)

o   Minor-Asc (ascending melodic minor)

o   Chro (chromatic)

o   Custom

The active scale notes of these scales is shown in menu C2 for the current key you have set. The Custom scale allows you to determine exactly which notes you want corrected.

If your song changes key or modulates you have a couple of options:

o   use the Chromatic scale

o   create two user presets with the only difference being the correction key/scale.

C1: Correction parameters

When you first turn to this menu, the upper line briefly shows the names of the three parameters before switching automatically to the correction meter. This display will revert to the parameter names anytime a value is adjusted.

The meter shows the amount of correction generated by VoiceWorksPlus. Extension to the right shows your input is flat according to the key and scale you've set and the correction algorithm is nudging you sharp to compensate. If any of the three values are 0, no meter swing or pitch correction will occur.

Wndow (Correction Window) is the setting in cents that allows you to determine how close to a valid scale note you have to be before the algorithm acts to pull you in. For example, a value of 100 cents can be read as plus or minus 50 cents or half a semitone from the scale note. The maximum value is 200 cents which, in a Major scale having no more than 100 cents on either side of any scale tone, would result in fulltime correction activity.

PITCH CORRECTION

Attk (Correction Attack Time) determines how fast the algorithm pulls you toward scale tones. A value of 0 is essentially off and a value of 100 is instant resulting in something like the infamous "Cher" effect where the pitch correction effect is stair-stepped and obvious when using non-chromatic scales. Usually, values around 20 yield acceptable results.

Amnt (Correction Amount) allows you to soften the correction effect. A value of 50% for example will only pull you halfway toward a correction scale target at the speed set by the Attk parameter.

C2: Scale display and customization screen

In this screen you can see the current scale and its active scale tones and make changes to both. The leftmost soft knob allows you to change the scale. As you change the scale you can see the active scale tones for the key you've selected in menu C0. The second soft knob acts like a cursor to select scale tones and the third changes the flashing scale note to active (shown by an "o") or disabled (shown by a "-").

Chapter Overview

This chapter discusses editing of the "classic" effects blocks that produce Reverb, µMod and Delay. Because the application of these types of effects is largely understood, we'll discuss only the editing parameters and not their usage.

The Transducer effect functions slightly differently and is discussed separately in the next chapter

The method for adjusting effects is typically thus:

o   Decide which effect you would like to hear.

o   Decide which of the input paths: Dry, Harmony/Lead Modeling or Aux input paths you would like to the effect upon.

o   Check or raise the send level for that input path.

o   Raise the level of the return from the effect you've selected. Also, make sure the FX led on the front panel is lit.

o   Go to the style selection screen for the effect you've chosen and choose a style that sounds close to what you want to hear.

o   Edit the effect style if you prefer.

Note that if Global FX is activated any editing you do will appear to be applied to the current preset but will actually be applied to the preset designated in the Global FX menu in Setup.

Effects mixing menus X0-X2

These screens allow you to adjust the send and return levels of the effects blocks. As always, 0dB means "full level".

X0: Crossover feeds to Delay and Reverb

µMod2Del: (Micromod send to Delay) This allows you to route the output of the µMod block to the input of the Delay block.

Del2Rev: (Delay send to Reverb) You can route the output of the Delay block to the Reverb block input.

X1: Sends to the effect blocks

The outputs of each of the Dry voice, Lead modeling/Harmony, and Auxilliary input paths can be routed to the effects here. This is where you can adjust the balance of reverb applied to your dry voice versus the harmony voices for example.

In order for an effect to be audible, both the send and return levels need to be set. Default send levels have been set for each expected effect configuration.

Send: Turning the soft knob associated with this parameter determines which effect you wish to adjust the sends for. As you turn the knob, the send settings for each effect are shown in the display.

Lead: This is where you can send your dry voice to the effects.

H/M: (Harmony and Lead Modeling sends) This is where you send the effects from either of the Harmony block or the Modeling block depending on the configuration of the current preset.

Aux: (Auxilliary input send) You can apply effects to any audio signal received at the Line Input when you have a mic plugged into the Mic Input.

X2: Effect returns

These parameters allow you to adjust the relative level balance and stereo width of the three effects blocks. If the send level is 0 for any of the parameters in the send screen, turning up the returns in these screens will have no effect.

Out: Turning the soft knob associated with this parameter selects the output level for each effect block or the stereo width of each effect. Note that, for some effects like mono delays, adjusting the Width will have no effect. Unless you specifically prefer mono effects, this is best left Stereo. If you are using VoiceWorksPlus with a mono sound system, you can set the global Mono/Stereo parameter to Mono in the Setup menu.

µMod, Dly(Delay), and Rev(erb): These allow you to bring the output of these effect blocks into the main mix and to balance their levels.

µMod block editing menus M0-M8

These menus allow to select styles and perform customization on this block.

µMod is short for micro-modulation ("µ" is the scientific symbol for micro). The µMod effect is capable of creating many different sounds that range from subtle but lush thickening to creatively destructive. It uses a combination of stereo pitch shifting (Detune), small amounts of stereo delay (Delay), and then a complex path of filtering, feedback, and modulation. µMod does a faithful job of emulating classic detune, chorus, flange and thickening sounds.

REVERB, μMOD AND DELAY EDITING

M0: uMod Style: (μMod style selection)

Use the soft knob assigned to this parameter to choose a μMod style you like.

M1: Detune amounts

LDetune, RDetune: (Left and right detune amounts). You can apply a small amount of pitch shift to the left or right sides independently. This setting is shown in cents and the maximum is +/- 25 cents.

M2: Modulation rate and depth

Speed: (Modulation rate). This setting sets how fast the delay time modulation occurs. In order for this to be audible, the depth amount parameter has to be non-zero.

L-Depth-R: (Left and right modulation depth) Sets the percentage of modulation of the delay time for the left and right delays.

M3: Left and right delay times

DelayL, DelayR: (Left and right delay time) Sets the left and right delay times. Up to 80 ms of stereo delay is available here to create effects from flange to slapback.

M4: Feedback amounts

FBL, FBR, (Feedback left and right) Re-introduces a portion of the audio output signal of the μMod block back to the input to create flanges, tube and chorus effects. Values above 90 can add a high amount of gain and potentially cause feedback.

XFL, XFR (Cross feedback left and right) XFL and XFR indicate cross feedback for the left and right delay lines. Cross feedback returns the delayed audio to the opposite side's delay line for ping pong type effects and more.

M5: Modulation phase and waveform

Phase (Modulation phase) This parameter defines the phase relationship between the left and right modulation LFOs (oscillators). In a flange style, setting this to 0 degrees puts all of the effect in the center while setting it to 180 degrees pulls the effect far into the stereo field.

Wave (Modulation waveform) You can choose the modulation waveform from Square, Triangle or Sine to vary the periodic nature of the modulation effect.

M6: Low band filtering

LowCutL, LowCutR (Low cut left and right) These steep highpass filters allow you to limit the amount of low frequencies sent to the μMod block to constrain the effect to a narrow bandwidth.

M7: Feedack high band filtering

HiCutL, HiCutR: (High cut for left and right) These steep lowpass filters allow you to limit the amount of low frequencies sent to the μMod block to constrain the effect to a narrow bandwidth.

M8: Phase adjustment

OutPhase Inverse: (Output phase inversion) This setting puts the output of the left and right sides out of phase, creating more 3D sound space around the effect. Note that this may potentially limit the effect's ability to collapse to mono.

Delay block editing menus D0-D4

The delay effect is a configurable echo. You can control how far apart the echoes occur (Delay Time), and whether the echoes fade out quickly, or build on themselves. In addition, there are filtering and stereo controls that allow you to create many popular delay sounds. Delays can be typically be categorized into the two listed categories below:

Short Delays:

- Initial reflections

- Slaps

Long Delays (the maximum stereo delay is 1800ms)

- Mono taps

- Stereo taps

- Syncopated taps

- Ping-pongs (delays travelling from left to right)

D0: Delay Style (Delay style selection)

Use the soft knob assigned to this parameter to choose a delay style you like.

D1: Delay time input source and time/tempo

Src: (Source from which to derive delay time) Determines which one of the three methods you want to use to set delay times. These include setting the exact delay time for the left and right delay lines manually(Time), tapping the Data wheel in time with your music to have the times calculated automatically(Tap), or the unit can be set to derive it's delay times from incoming MIDI clock signal(MIDI).

L-DelTime-R: (Left and right manual delay times) These settings are shown when the Src is set to Time. You may

set up to 1800ms (1.8 seconds) of delay for the left and right delay lines here.

Tempo: This setting is shown when Tap or MIDI is selected for the Src parameter. There is one setting for tempo in beats per minute (bpm) that is used to derive delay times for both the left and right delay lines that is then subdivided by the division set in the next screen.

L - Beat Div - R: (Left and right beat division) When the Src is set to Tap or MIDI, turning the Data wheel will reveal this screen allowing you to divide the delay tempo into even or synchopated beats.

D2: Delay feedback and cross feedback amounts

FBL, FBR: (Feedback left and right) Re-introduces a portion of the audio output signal of the Delay block back to the input to add repeats.

XFL, XFR: (Cross feedback left and right) Cross feedback returns the delayed audio to the opposite side's delay line for ping pong type effects.

D3: Low band filtering

LowCutL, LowCutR: (Low cut left and right) Removes low frequencies from the audio delays to constrain them to a specific band.

D4: High band filtering

HiCutL, HiCutR: (High cut left and right) Removes high frequencies from the audio delays to constrain them to a specific band.

Reverb block editing menus R0-R3

Reverb is the arguably the most common vocal effect . It can add a spaciousness that softens the abrupt beginnings and endings of lyric phrases. Many reverb types are meant to imitate the natural sound of spaces like churches, clubs and halls but not all. Some reverb effects are recreations of electro-mechanical effects meant to imitate real spaces like plates and springs. All reverbs are made up of early reflections (rooms), and the longer reverberant sounds (tails). Common controls are the level of the room (Room Level), and the level and decay of the tail (Tail Level, Reverb Decay). Additionally, a small delay can be added between the dry voice and the reverb signal (Predelay) that adds clarity. By far the most important control for reverb is the level. One reverb patch can have a very different result for the audience whether it is mixed subtly, or up front in the mix.

R0: Reverb Style (Reverb style selection)

Use the soft knob assigned to this parameter to choose a reverb style you like.

R1: Decay time and predelay settings

DecayTime: (Decay Time) Sets the length of the reverb tail.

PreDly: (Predelay) Introduces a short delay between the dry audio signal and the onset of reverb to simulate larger spaces and to improve the audio separation between the dry signal and the reverb effect.

R2: Reverb tail filtering

LowColor, HiColor: These are preset filters that tailor the low and high frequency response of the reverb tails.

R3: Room and tail level balance

RoomLev: (Room level) Each reverb style has a pre-configured short initial reflection sound that can be boosted or attenuated with this control.

TailLev: (Tail level) The "tail" is the long, decaying component of reverb. You can adjust the mix between the tail and the room with this control.

THE TRANSDUCER BLOCK

Chapter Overview

The edit screens and usage tips for the Transducer block are discussed in this chapter. The Transducer is a block that helps create so many of the megaphone and telephone effects in popular music, as well as replicating the vintage audio quality of older audio effects and recordings. Within the Transducer there is a configurable distortion block with internal filtering and curves, as well as a bandwidth block, which emulates the frequency response of various audio devices like phones and radios.

The Transducer is a "serial" effect which means that any signal going through it is typically meant to lose its dry component.

The FX button on the front panel will engage and disengage the Transducer effect along with the Reverb, Delay and µMod effects.

It is essential to have your input levels set correctly in order for the distortion component of the Transducer block to work. Setting the input level too low will result in less or no distortion than is intended.

Transducer editing menus T0-T4

T0: Transducer insertion point

In order to hear the effect, you must choose to apply the Transducer effect to either the dry voice path, the Harmony or Modeling path or on the master output. Applying the Transducer to the master output will effect all Harmony/Modeling processing and the Reverb, Delay and µMod effects. Any stereo signals entering the Transducer will be summed to mono.

T1: Transducer Style

Here you can choose from on of the twenty-one pre-configured styles that bring together all of the distortion and filtering effects possible with the Transducer. You can also choose No Style and edit the parameters in the following screens to your liking.

T2: PreGain PostGain

These controls apply only when a distortion type is selected in the following screen. These act similarly to a guitar distortion pedal or an amplifier with input gain and master level controls.

PreGain: Boosts or attenuates the amount of distortion for the distortion type selected in menu T3.

PostGain: When you adjust the PreGain parameter, just

like a guitar amplifier, the overall level of the effect goes up and down. Use this control to adjust the output level of the Transducer block to properly balance the current preset with the others.

T3: Distortion type and amount

Distort Type: These are pre-configured distortion styles that range from Overdrive through Saturation and Distortion and finally Fuzz. Each has a unique character. Though these styles have no direct controls like Delay or Reverb for example, you can add or reduce the distortion component (T2) and apply filtering (T4) to customize them.

Amt: Adjusts the amount of distortion for the current distortion style. This is not the same as the Pre and Post Gain controls which work on level adjustjment. The Distortion Amount control adjusts the algorithmic distortion curve that you can further trim with the Pre and Post Gain controls.

Low-BandLimit-Hi: (Low and high band filters) These are attenuation-only filters that allow you to roll off high and/or low frequencies to simulate radios, telephones and the like. When the Transducer is set with no distortion style, these can act as a filters for any of the audio paths selected in the TransducerInsert parameter.

I0 to I4 - Inputs/Output

I0: Input sensitivity

MicSens (Microphone sensitivity) This allows further adjustment of microphone input sensitivity. Normal is best for the majority of microphones. However, the Low and High settings can be useful for extra high output or extra low level microphones.

LineSens (Line input sensitivity) Sets the Line input sensitivity, or maximum input level from 0dBu to 24dBu to match with your mixer. The factory default setting of 15dBu is an average output level from most mixers. Adjust this up or down when you see the input meters consistently low or in the red.

I1: Digital input gain

Digital In Gain: Here the digital in signal can be attenuated to reduce clipping. 0dB is unity and is the ideal setting.

I2: Input source and clock settings

Input: Here you select the Analog or Digital input. Selecting Analog input will use the input selected via the front panel (Mic or Line). Digital input will use the rear S/PDIF connectors. The digital output is always available regardless of this setting.

ClockSrc: (Clock source) This sets the audio clock frequency and source. If using the analog inputs, this parameter is best set to Int(ernal) 44.1. If you are using the digital input you should set this to sync to Ext(ernal) clock. If no valid clock signal is recieved via the digital inputs, an error message will be shown.

I3: Output and bypass mode

Output: Collapses all stereo output to mono if desired.

BypMode: (Bypass mode) This sets how VoiceWorksPlus operates in Bypass. The Stage setting preserves any EQ and Dynamics settings you have set and matches the level of the Dry voice.

The Studio setting removes all effect processing including the EQ and Dynamics and outputs the lead signal at full level to the output.

I4: Input on/off controls

Dry VoiceIn: Setting this to Off removes the dry lead audio from the signal path in any presets that mix in your dry voice. This is useful when using VoiceWorksPlus on an auxilliary mixer send and want 100% wet output.

AuxIn: (Auxilliary input) Setting this to Off removes the dry Aux Input audio from the signal path. This allows VoiceWorksPlus to produce only 100% wet effects when receiving an effects send from a mixing board into the Aux Input. (Only available in analog input mode if Mic Input is selected)

Q0 to Q4 - EQ/Compressor

The EQ and compressor in VoiceWorksPlus are global meaning that all presets will be affected once either of the compressor or EQ has been activated. Be careful when adjusting these parameters because feedback is more likely.

Q0: EQ and compressor assignment

DynAssign: (Dynmics assignment) This allows you to assign dynamic processing (compressor and gate) to the lead voice, harmony/model voices, both lead and harmony/model voices or neither. Hint: assigning only to the lead voice with a medium compressor setting (threshold: -15dB, ratio:2:1) keeps the lead voice a consistent volume but keeps harmony levels following the singers level. This gives control of harmony levels with mic technique.

EQAssign: (EQ assignment) This allows assignment of the three band EQ to the lead voice, harmony/model voices, both lead and harmony/model voices or neither.

Q1: Compressor controls

The compressor in VoiceWorksPlus has automatic makeup gain to a maximum of +20dB. This means that the volume level of the signal will be increased for most volume levels of input with the compressor enabled.

Threshold: Sets threshold at which the compressor becomes active level from 0 to -60 dB. A moderate setting of -6 to -15 works well.

Ratio: Sets your compression ratio range from 1.12:1 to 64:1. This sets how much level reduction occurs once the input signal reaches the threshold you have set.

Q2: EQ settings

VoiceWorksPlus has a flexible 3 band EQ with frequency-adjustable high and low shelving bands and a fully parametric band with Q, frequency and gain controls.

LoShelf: Sets the knee frequency for the low frequency shelving boost or cut. Frequency Range: 80Hz to 16kHz

THE SETUP MENU

Cut/Boost Range: Sets how much boost or cut to apply to the low band. Range: -12dB to +12dB.

HiShelf: Sets the cutoff frequency above which the high shelf EQ may be boosted or cut. Range: 80Hz - 16kHz

Cut/Boost Range: Sets how much boost or cut to apply to the high band. Range: -12dB to +12dB.

Q3: Parametric mid controls

MidParaEQ: (Mid band parametric EQ) Sets the center Frequency in Hz. Cut/Boost Range: -12dB to +12dB.

Q: This value is equal to the center frequency of the filter divided by the difference between the upper and lower -3dB frequencies. The higher the Q value the narrower the filter. Range is .1 (shown as Wide) to 10 (shown as Thin).

Q4: LowCut and gate controls

LowCut: (Low cut) This feature reduces rumble and excess low frequency which can cause muddy sound. The "knee" is 12dB per octave. Cutoff frequency options include 60, 80 and 120Hz.

NoiseGate: Sets the threshold at which the noise gate opens to allow sound through. If this is set above the input level indicated on the led ladder, no sound will be heard.

U0 to U5 - User Settings

U0: Global settings

GlblFX: (Global effects on/off) The Global Effects parameter allows you to re-assign all presets to the effect settings in a single preset of your choice. This is to keep one effects setting across multiple presets.

Chord/Key: (Global chord and key) The Global Chord and Key setting works much like the Global Effects setting only for musical input. When you change and save a key and scale in any Scale-based preset, all presets will now be based on this setting. For Chord mode presets, the last chord received at the MIDI inputs is the first chord all Chord mode presets will produce harmony from.

U1: Dry delay and tuning reference

DryDelay: Turning this On delays the lead vocal slightly so the harmony voices will sound at the same time as your lead voice. Turning this Off results in the least amount of lead voice processing delay.

Tuning: This sets the overall tuning reference with respect to A-440.

U2: Chord mode configuration

Chord Mode: The Classic setting sets the standard Chord mode operation where any MIDI notes played will be interpreted by the chord detection algorithm. In Improvise chord mode, only 3 note chords trigger the chord detection algorithm allowing more freedom in playing keyboard parts and controlling harmony at the same time.

U3: Notes Mode configuration

Selects between 1 Channel and 4 Channel notes mode for all Notes presets in the product.

U4: Footswitch assignments

Footswitch 1-2-3: Allows custom assignment of parameters to the Switch3 three button footswitch.

   None: no assignment

   Pre- : preset down

   Pre+ : preset up

   Byp: bypass

   EffL: effect on/off latching

   EffM: effect on/off momentary

   HarL: harmony on/off latching

   HarM: harmony on/off momentary

   CorL: correction on/off latching

   CorM: correction/ff momemtary

   Hold: enables the Harmony Hold feature
      (momentary in harmony mode only)

U5: Effects priority

Lead FX Priority: When using Lead Model presets at 48 kHz sampling rates, VoiceWorksPlus does not allow uMod and Transducer to be enabled simultaneously. The parameter sets which effect gets priority upon preset or effect load.

M0 to M3 - MIDI Settings

M0: MIDI settings

MidiCh: (MIDI channel assignment) Sets the input MIDI channel for harmony and CC messages. When set the same as incoming MIDI such as that from a keyboard, the front panel MIDI led will flash. When the channels do not match the led will not respond.

Filter: Allows MIDI Program Change or System Exclusive messages to be ignored for convenience.

M1: Controller enable and disable

CC-Ctrl: (CC control) Enables or disables CC message control.

VibCtrl: (Vibrato control) Specifies how the Mod Wheel message affects vibrato. The Boost setting will add more vibrato once the part of the wheel movement reaches the corresponding amount of vibrato and then return to the original amount once the wheel resets to its rest position. The Manual setting allows the full range of control of vibrato once the wheel is moved. To restore the factory vibrato amount, recall the preset.

M2: Various

PB+-: (Pitchbend range) Sets in semitones the range that MIDI pitch bend information will alter pitch shifts in both Harmony and Modeling modes.

Trans: (Notes mode transposition) This transposes the harmony voices in Notes mode to allow it to be controlled by upper or lower sections of a MIDI keyboard if required. The value corresponds to octaves.

SyxID (MIDI System Exclusive ID number) When addressing multiple VoiceWorksPlus units on the same MIDI In/Thru chain with a Sysex editor, each one should have its own ID or they all will be edited in the same way.

M3: Keyboard zone settings

KBSplitZone: (Split zone) Sets whether MIDI notes above or below the split point are allowed for Notes mode and Chord mode presets.

Note: Sets the MIDI note above or below which the keyboard split will be active.

F0 to F1- Preset Management

F0: MIDI Dump initiation

Select which VoiceWorksPlus information you want to back-up via MIDI:

> All (User+Setup): dumps all user settings and user presets in one file
>
> User Bank: dumps only user presets
>
> Setup: dumps only setup data
>
> User 1 to 99: dumps the individual user preset selected.

Press the Data Wheel to start the dump.

F1: File functions

Function: Pushing the data wheel triggers the listed function.

> Restore Setup: reverts all setup parameters back to factory settings. This includes the front panel mix settings.
>
> Erase User Bank: erases all user presets

CAUTION - do not leave this screen set to "Erase User Bank" or you stand the chance of accidentally erasing all of your presets in a return visit to the Edit menu.

Digital Inputs and Outputs

Connectors	RCA Phono (S/PDIF)
Formats	S/PDIF (24 bit), EIAJ CP-340, IEC 958
Sample Rates	44.1 kHz, 48 kHz
Freq. Response DIO	DC to 22/23.9 kHz ± 0.01 dB @ 44.1/48 kHz

Analog Inputs

Connectors, balanced   Mic.: XLR,
Line: 1/4" phone jack
Impedance Bal./Unbal.   Mic.: 3.6/1.8 kOhm,
Line: 21/13 kOhm
Line Input Level @ 0 dBFS
+24 dBu to +0 dBu
Line Sensitivity @ 12 dB headroom
-12 dBu to +12 dBu
Mic. Input Level @ 0 dBFS Pad Off/On
-14 dBu/+6 dBu to -51 dBu/-31 dBu
Mic. Sensitivity @ 12 dB headroom Pad Off/On
-26 dBu/-6 dBu to -63 dBu/-43 dBu
Line, Mic. @ Min gain, Dynamic Range
> +92 dB, 20 Hz to 20 kHz
NF/Vi @ Max. micamp. gain, Rg = 200 Ohm
< +2 dB / -127.4 dBu
THD   < -100 dB (0,001 %) @ 1 kHz
Line Frequency Response
+0/-0.1 dB, 20 Hz to 20 kHz
Mic. Frequency Response, max gain
-1.5 dB @ 40 Hz, +0/-0.1 dB (200 Hz to 20 kHz)
Crosstalk   < -85 dB, 20 Hz to 20 kHz
A to D Conversion
24 bit, 128 x oversampling bitstream
A to D Delay   0.65/0.70 ms @ 48/44.1 kHz

Analog Outputs

D to A Conversion
24 bit, 128 x oversampling bitstream
D to A Delay   0.63/0.68 ms @ 48/44.1 kHz
Connectors, balanced   1/4" phone jack
Output Impedance   40 Ohm
Max. Output Level
Bal./Unbal.: +20 dBu/+14 dBu, R-load >= 1200 Ohm
Output Range   variable up to +20 dBu
Dynamic Range   > +104 dB, 20 Hz to 20 kHz
THD   <-98 dB (0.0013 %) @ 1 kHz
Frequency Response   20 Hz to 20 kHz, +0/-0.3 dB
Crosstalk   <-100 dB, 20 Hz to 20 kHz

EMC

Complies with IEN 55103-1 and EN 55103-2 FCC part 15, Class B, CISPR 22, Class B

Safety

Certified to   IEC 65, EN 60065, UL6500 and CSA E60065 CSA FILE #LR108093

Environment

Operating Temperature
32° F to 122° F (0° C to 50° C)
Storage Temperature
-22° F to 167° F (-30° C to 70° C)
Humidity   Max. 90 % non-condensing

Control Interface

|	
MIDI	In/Out/Thru: 5 Pin DIN
Pedal	1/4" phone jack

Supplementary

Display	2x16 backlit LCD
Dimensions	19" x 1.75" x 8.2" (483 x 44 x 195 mm)
Weight	4.1 lb. (1.85 kg)
Mains Voltage	100 to 240 VAC, 50 to 60 Hz (auto-select)
Power Consumption	<15 W
Warranty Parts and labor	1 year

Note: Due to continuous development and standardization all specifications are subject to change without notice

VoiceWorksPlus Signal Flow
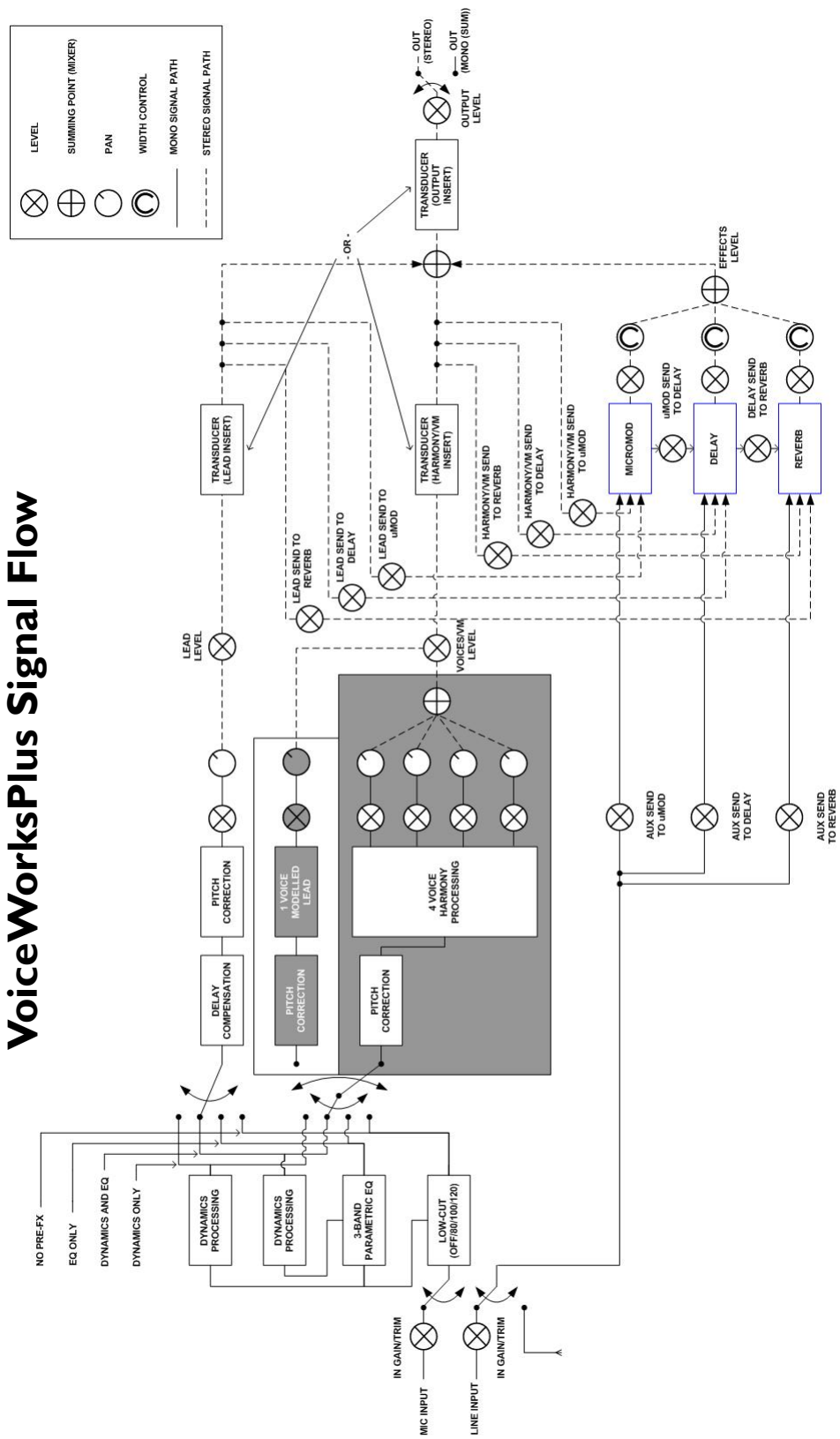
VoiceWorksPlus MIDI Implementation Details

Note: individual parameter editing is done via system exclusive using the free Vysor editor for VoiceWorksPlus.

Parameter	CC number	Range
Bypass	114	0-63 Off, 64-127 On
Harmony Mute	110	0-63 Off, 64-127 On
Block On/Off: Harmony/Model	110	0-63 Off, 64-127 On
Block On/Off: Effects	112	0-63 Off, 64-127 On
Block On/Off Correction	113	0-63 Off, 64-127 On
Harmony Hold	119	0-63 Off, 64-127 On
Sustain	64	0-63 Off, 64-127 On
Lead voice level	13	0-127
Harm/Model level	12	0-127
Effects level	91	0-127
Output level	87	0-127
Mod Wheel	1	0-127

Other MIDI messages:

Program Change: Received/Transmitted.

Pitch Bend: Received.

Note On/Off: Received.