TC·HELICON®
VOCAL TECHNOLOGIES

VOICEWORKS
QUICKSTART GUIDE

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PART I – TOURING THE BASIC CONTROLS

Setting Up

First, connect VoiceWorks to your system by: plugging in a microphone, connecting a MIDI keyboard, providing power, connecting the audio outputs to your mixer etc.

Setting Mic Level/Phantom Power

1. Set **MIC GAIN knob** to minimum (fully counter clockwise).
2. Push **MIC IN key** so the light comes on (this enables the microphone). If you are using a condenser mic that needs phantom power, also turn on the phantom power by pressing and holding the +48V key for 2 seconds until the light comes on.
3. While singing into the mic, increase the **MIC GAIN knob** until the signal level LED ladder to the left of the display peaks at –5 dB.
4. Set your mixer levels to a comfortable volume.

Trying the Presets

Loading Presets using the UP/DOWN ARROW Keys

This gives you a chance to hear what the VoiceWorks can do.

1. Press the **RECALL Key** to make sure that it is lit.
2. Push on the **UP-ARROW key** to move to higher number presets. Push on the **DOWN-ARROW key** to move to lower number presets. Notice that when you change presets a name will be displayed for 2-3 seconds before it scrolls off the side of the display, leaving you with important information about the preset.
3. Sing into the microphone and listen to the sound of the presets.

Loading Presets using the DATA WHEEL and RECALL KEY

You can also preview a preset before you actually load it and hear it.

1. Watch the Display as you rotate the **DATA WHEEL** to advance or decrement through the presets. Preview preset information will blink to indicate that it has not been loaded.
2. Press the **RECALL key** or **ENTER key** to load the previewed preset.

Basic Editing Concepts

We have designed the factory presets in the VoiceWorks to be useful in many musical situations, but we know you will want to make your own presets that suit your taste and your needs. If you follow this tour you will quickly learn the basics of editing VoiceWorks presets.

Turning the voices and effects on and off within a preset and exploring their editable parameters

1. Go back to Preset 1. If you used the **DATA WHEEL** to get there, be sure to press the **RECALL key** to load the preset.
2. Notice that each of the eight keys is lit in the **VOICES & EFFECTS** section of the front panel. When the key is lit, the voice or effect controlled by that key is on.

3. While singing, try turning off each of the four **VOICE KEYS** in turn. Turn them back on, then press the **HARMONY key** so its light goes out. This turns all enabled harmonies off or on.
4. With harmonies off, now turn off the **THICKEN**, **EFFECTS** and **PITCH CORRECT keys**. You will now only hear your singing voice.
5. Double click on any of the **VOICES & EFFECTS keys** to see what you can control and edit. After double-clicking, use the **UP / DOWN ARROW keys** to scroll through these parameters. You will see them listed in the display. As you move through the parameter list you can change the value of a flashing parameter with the **DATA WHEEL**.
6. To save a preset at this point press the **STORE** key, edit the preset number and name that you would like this edited preset saved as and then press **STORE** again.
7. Press the **RECALL key** once to return to the top menu.
8. If you did not save the preset in step 6 above, pressing the **RECALL key** again will reload the original preset and to undo your edits.

Understanding the Harmony Information in the Preset Display

After you load a preset you will first see the preset name. After 2-3 seconds the preset name scrolls off the screen leaving you with important preset information. What does it mean?

The top line indicates the harmony mode. These are shown and defined below. The bottom line indicates the shift amounts for each of the four voices. Depending on the mode of the preset, the voicing values have different meanings. For example:

Shift Presets

Shift presets do not require MIDI input to operate. Shift presets are very useful for thickening and special effects. In Shift presets the Voicing of each harmony voice is shown in Semitones (100 cent increments). The voicing of each voice can be set to be either in unison with the input singing voice (great for thickening) or set to a fixed and unchanging distance from the input singing voice (up to +24 semitones above or -24 semitones below).

Scale Presets

The idea with Scale presets is to set the VoiceWorks once at the beginning of your song and then allow it to automatically generate musically correct diatonic harmonies as you sing. Since most popular music uses only a single scale per song, setting the Scale preset to that scale will achieve great harmonies with very little work.

Scale mode does not require MIDI input to operate. They usually require editing of the Scale ROOT and TYPE to match the Scale of the song. Scale mode operates like Shift mode described above, except that you can choose or create the scale that your harmony notes will come from. The generated harmony for each voice differs depending on the input note that you sing. You can see the Scale Root and Type as part of the top line information. The voicing information on the second line tells you how many "scale degrees" above or below the input note the harmonies will sound.

Notes Presets

Notes presets require MIDI input to operate. The incoming MIDI Notes control the exact pitch of the enabled harmony voices. You may see that the voicings (second line of the

display) shows that each voice is 'Off'. This shows that there is no MIDI note information being received. If you play MIDI notes into the VoiceWorks, the onscreen voicings will update to show the notes you are pressing at any given time.

Chord Presets

Chord presets require MIDI input to operate automatically, but may also be controlled manually using Song Mode. With Chord presets, the VoiceWorks watches incoming MIDI notes and uses its internal chord recognition to choose harmonies that fit the recognized chord. The voicing information shown on the second line of the display when in recall mode shows the direction and position of each harmony voice in "chord tones" relative to the input singing voice. For example, if the Chord Type is C Maj and the input voice is singing a C, Dn1 would produce the first note in the chord below the input, G. Dn2 would produce the second note in the chord below the input, E. If you want the harmonies only to come on when you play the chord on the keyboard, you will need to set the HMNY LATCH parameter to Off. Most of the factory presets have this parameter set to On so that harmonies may be heard without MIDI input.

Editing Harmonies

You will need to remember two things:

1. Double clicking the HARMONY key will allow you to edit parameters that are common to all of the harmony voices (such as the harmony type, the overall Level, Smoothing etc.- see the reference manual for details)

2. Double clicking on a VOICE key will allow you to edit parameters specific to that voice only (such as LEVEL, PANNING, VOICING, etc.)

Song Mode

Song mode is basically a VoiceWorks preset sequencer where the Preset number, Harmony Root and Scale/Chord type may be changed for each sequence step. Once programmed. song steps may be stepped through using the Switch-3 footswitch. Song mode is useful for songs with key changes when using Scale presets and is also useful for creating a sequence of Chord presets with different chords that match the song. For a detailed description of Song Mode please refer to the User Manual. An example of using Song Mode can be found in the "Question and Answer" part of this manual.

PART II "HOW TO" .. QUESTION AND ANSWER SECTION

Q. How do I use the VoiceWorks to pitch correct my lead vocal?

In order to correct the pitch of a vocal, VoiceWorks needs three pieces of information. It needs to know what pitch you are singing, it needs to know what pitch you would like to be singing, and it needs to know how perfectly you would like to be singing it. The first piece of information is determined automatically by the VoiceWorks as you sing using vocally trained pitch detection algorithms. The second piece is supplied by you in the form of a set of possible target correction notes. The VoiceWorks looks at the set of supplied notes, listens to your vocal, and determines which note you are closest to at any given time. Depending on how you've configured the correction settings, the VoiceWorks will then either subtly nudge your pitch, or aggressively force it to match the target note.

The best way to supply a set of target notes is in the form of a scale that matches the musicality of your vocal. For example, you could select all of the notes of C Major to be your target notes.

Setting the target correction notes

1. Double click the PITCH CORRECTION key. The root of the scale should be flashing. Change it to "C" with the DATA WHEEL.
2. Press the DOWN ARROW key once and edit the SCALE TYPE parameter so that it shows "Maj".

Three parameters control the behavior of the VoiceWorks' pitch correction algorithms (making them more or less aggressive). A really badly out of tune vocal will require aggressive settings, but settings that are too aggressive may start to sound robotic, as only a robot could sing so perfectly in tune.

Controlling the behavior of pitch correction

Press the DOWN ARROW again to edit the WN, AT, and AM parameters. Here is what these parameters do and how you can use them:

WN: This sets the correction window in cents. When VoiceWorks tries to determine which target note you are closest to, it uses this parameter. For example, if the set of correction notes includes "C, D, E, F, G, A, B" (C-major), and you are singing a very sharp D (80 cents sharp), the window dictates whether you should be corrected to D, or not at all. If the window was set to 80 or more cents, the D# would be corrected to the D because it falls within the window. If the window was less than 80 cents, no correction would take place. Your input pitch must fall within the window around one of the supplied correction notes if it is to be corrected at all. This allows you to naturally inflect your vocals and slide between notes while cleaning up the pitches as you get fairly close to them. A setting of 100 cents or larger will

cause correction to be on continuously when using the scale C-Major, as 200 cents is the largest interval between any two notes.

AT: This sets the pitch correction attack rate. Once the target correction pitch has been identified by Voiceworks, it begins to shift the pitch of your vocal at a rate determined by this parameter. A setting of 99 gives the fastest setting which instantaneously pulls your vocal in-tune, an effect that can be useful for some types of music. Settings between 16 and 40 give the most natural results.

AM: Sets the amount of correction applied. A setting of 99 gives full correction to the target pitch. Lower settings result in less correction being applied. This parameter adds more realism since most people never sing exactly in tune. Refer to the user manual for a complete description.

Viewing the results with the Animated Correction Bar

The display line below these three parameters show the amount of pitch correction being applied. The maximum that is shown is +/-200 cents. If pitch correction is disabled, or if the notes you sing are not falling within the correction window you have set, the bar will not be displayed.

Q. How do I achieve natural sounding pitch correction?

The goal of pitch correction is to take a vocal line that has pitch problems, run it through the pitch corrector, and have it sound like it was sung without pitch problems. Combined with extremely effective pitch detection algorithms, the three parameters described above give TC-Helicon products with pitch correction the control to achieve this goal better than other products in the industry. To get optimal results with pitch correction you need to use these parameters differently for different circumstances.

Correcting Recorded Material

Using pitch correction on recorded material allows you to really "tweek" parameters to get the optimal results. The highest quality results are attained with the LEAD DELAY COMPENSATION parameter in the setup menu set to On, however you will need to re-time-align the vocal track to compensate for the delay.

Slow Ballads

1. In the Pitch Correction menu, set the appropriate ROOT and SCALE TYPE for the song you are working with.
2. Set the WN and AM parameters to maximum (200 and 99 respectively)
3. While listening to the vocal line adjust the AT parameter starting at 0 and turn it up until the vocal sounds in pitch. Remember, the lower the Attack value the more natural the sound, the higher the Attack value, the "harder" the correction applied.

Fast Songs

Natural sounding automatic pitch correction of fast songs is typically a challenge with automatic pitch correction products from other companies since they only offer controls similar to the Attack parameter in the VoiceWorks. The problem is that when correcting faster songs, the attack settings must be set quite high for correction to occur. High attack settings result in the pitch jumping directly from one note to another making the note transitions sound

unnatural. The Window parameter allows setting the VoiceWorks so that note transitions are not altered.

1. Follow the same procedure as with slow ballads. Chances are that the AT setting required to make the vocals sound in tune will also result in the vocal sounding somewhat artificial. To reduce this artificial sound, continue with the following steps.
2. Turn down the WN parameter until note transitions sound natural, but pitch errors are still being corrected. A WN value that is too low will result in some pitch errors not being corrected, too high and the note transitions sound robotic.
3. If the correction still sounds artificial, try turning down the AM parameter.

That Synthy Vocoder Sound

You know, the one the industry refers to as the "Cher effect".

1. In the Pitch Correction menu, set the appropriate ROOT and SCALE TYPE for the song you are working with.
2. Set WN, AT and AM to their maximum values. Do you believe?

Correcting Live Applications

Difficulties with most pitch correctors

The difficulty in using pitch correction for live applications is in the monitoring since the singer hears a significantly different pitch than what is sung because they can't even be sure of the note they are singing. This can result in the singer singing even more out of tune than if no pitch correction was applied. Input with extreme pitch errors like this can give an end result of a vocal line that jumps around to unwanted notes (even a bigger problem than being out of tune). To help in this situation pitch correction is sometimes only applied to the front of house and not the monitor mix. This results in a difficult to work with sound from the singer's perspective, since two different pitches are heard.

The VoiceWorks Solution

The Window parameter (WN) in the VoiceWorks allows you to set the pitch correction to only correct when you are close to the note. Putting this corrected audio through both the mains and monitors results in the singer being able to effectively hear the notes they are actually singing as well as gives them valuable feedback as to what in tune pitches sound like – this often helps the singer to better learn what accurate pitch sounds like and often over time, improves their performance without pitch correction.

1. In the Pitch Correction menu, set the appropriate ROOT and SCALE TYPE for the song you are working with. It is also sometimes effective to set the SCALE TYPE to chromatic (Chro) and use this scale for all songs performed.
2. Set WN to 30-40 cents. By keeping this at a lower setting the singers brain doesn't get mixed up as to what note he/she is singing.
3. Set AT to 30 and AM to 78. Not setting these parameters too high helps in the singer getting good feedback as to what they are actually singing as well as correcting the pitch of the vocal, making it sound substantially better.

Q. Sometimes the vocal I am trying to correct jumps to unwanted notes. I have the proper pitch correction Root and Scale already selected. Is there anything else that I can do?

Yes.
Situation A.
If the note that it's jumping to is a note that is never meant to be sung in the song, you can remove it from the pitch correction scale.
The Pitch Correction Map is edited by pressing the DOWN ARROW past the "WN, AT, AM" parameters. You can directly edit the set of correction notes from this screen by using the arrow keys to select a note and the DATA WHEEL to turn them on or off (notes that are active show "o", notes that are inactive show "x"). Since the pitch would have to be substantially out to require this, make sure the WN is set high enough to "catch" the note.

Situation B.
If the notes that are being jumped to are meant to be sung in other parts of the song, you'll have to use this process.

With MIDI send Custom Scale CC messages to the VoiceWorks dynamically throughout the song.

1. Start with the base Pitch Correction Scale for the song.
2. Mark in your sequence where the pitch errors are occurring. In Cakewalk, this may be done by pressing F11 in the track view screen every time a pitch error occurs.
3. Figure out the note that you do not want to be heard at those locations.
4. Go to the Pitch Correction Map and position the Cursor on the first note that you do not want to be heard (it should be an "o")
5. Set your sequencer up to record the MIDI out of the VoiceWorks on a fresh MIDI track and start it recording.
6. Turn the VoiceWorks DATA WHEEL one click counter clockwise, setting the o to an x and then back again setting the x to an o.
7. Stop your sequencer from recording.
8. This will have recorded a pair of CC messages that define the Custom Correction Scale with the unwanted note removed, and then a pair of CC messages defining the Correction scale with the note back in.
9. Position the first CC message pair in time just before the corresponding pitch problem occurs, and the second pair just after the problem.
10. Repeat steps 4 to 9 for every pitch problem marked in the sequence.

The custom correction scale can also be edited via MIDI using the correction scale CCs (see the manual for details). This however requires binary/decimal calculations.

Q. How do I quickly dial in 2, 3 and 4 part harmonies to match my song without a MIDI keyboard?

Without MIDI input the fastest way to make the harmonies work for you is to follow the simple steps below.

1. Make sure the VoiceWorks is in Recall mode by pressing the RECALL Key.

2. Select a Scale preset, number 1, 2 or 11-30 using the DATA WHEEL and press ENTER. For your first time try using Preset number 21.
3. Double click the HARMONY key to set the ROOT and SCALE TYPE of the song. For example if the song is in D major, set the ROOT to D and the SCALE TYPE to Maj1.
4. Try singing the song into the VoiceWorks while playing a guitar or some other instrument to ensure that you are singing in the key that you've programmed the VoiceWorks.
5. If the harmonies do not seem quite right, and the song is in a major key, try changing the SCALE TYPE to Maj2 or Maj3. If the song is in a Minor key try Min1, Min2 or Min3.
6. Store the preset by pressing the STORE key twice.
7. Press the RECALL key.
8. The second line of the display shows the voicings of the preset. Negative numbers indicate harmony voices below, positive numbers indicate voices above and U indicate voices in unison. Many presets have more than one voice set to the same value. This results in doubling of that harmony voice. The 4 voice keys show which of these voices are enabled. Pressing these Voice keys will turn on and off the individual harmony voices. Using these keys lets you set the harmonies to be 2, 3, 4 or 5 part.
9. Once you have the preset the way you want it press the STORE key twice to save the preset.

Q. The song I'm working with sounds great with my programmed Scale Preset, but only needs harmonies on the chorus and changes key near the end of the song. Can I program the VoiceWorks to handle this?

Yes. Using the Switch-3 footswitch and VoiceWorks' special mode of operation called SONG MODE you are easily able to handle a song of this type.

Switch-3 Footswitch

The Switch-3 footswitch is highly recommended when using the VoiceWorks. It allows you to enable/disable harmonies, change presets, activate **Harmony Hold**, step through SONG MODE sequences and more! Please refer to the user manual for a complete description of the Switch-3 capabilities.

Back to the above question, say the song you are working with starts in C major, but changes to D major near the end and the preset you've programmed to work with this song is "21 Scale C Maj2". Here's how to handle this with the VoiceWorks.

Setting up for operation with the Switch-3 Footswitch

1. Power up the VoiceWorks with the Switch-3 plugged in. This is necessary to ensure that the VoiceWorks properly recognizes the footswitch.
2. Press the Setup key a few times until the MIDIDUMP parameter is shown. (Pressing the setup key multiple times advances to various groupings of parameters. Once you become familiar with the VoiceWorks this will increase your speed of editing).

3. Press the UP ARROW key once to get to the FOOTSWITCH 1-2-3 page.
4. Using the DATA WHEEL and the ARROW keys, change the parameters to show: SS+ (Song Step Increment), SS- (Song Step Decrement) and HarL (Harmony Enable).

Programming Song Mode

5. Press RECALL twice to ensure that the current preset is not edited and then press the SONG MODE key.
6. Using the DATA WHEEL, select an empty song (SNG# parameter).
7. Go to the <STEP INS> parameter and change to <NAMESONG> and press ENTER.
8. Using the ARROW KEYS and the DATA WHEEL name the song. When you have finished, press ENTER and then with the DATA WHEEL change <NameSong> to <Step Ins>.
9. Move the cursor to P--, and then turn the DATA WHEEL until the preset to be used for the song is selected. If the preset is Scale Preset Number 21, the parameter would show P21s.
10. Go to the <Step Ins> parameter and press ENTER. This will insert another Song step with the same settings.
11. The second line of the Display should read "S2 P21s C Maj2". Move the cursor to the C and change to a D using the DATA WHEEL.

Using Song Mode

12. Press the 2nd button on the Switch-3 footswitch to set the VoiceWorks back to the first Step.
13. Press the 3rd Switch-3 button to mute the harmonies.
14. Start the song. When needed, press the 3rd Switch-3 button to unmute and mute the harmonies.
15. When the song changes key to D major, press the 1st Switch-3 button to advance to the second song step. Pressing the 2nd button on the Switch-3 will go back to the previous step.

* Note: Remember to power off the VoiceWorks using the front panel power button. Using this button to power down is like performing a global store operation for all setup, current preset and current song parameters prior to turning the device off and ensures that you do not lose settings when powering down.

Q. How can I control the VoiceWorks using a MIDI keyboard?

There are two ways to control harmonies using MIDI allowing easy harmonization of both simple and complex melodies. Before following the steps below make sure that the MIDI out of your keyboard is connected to the MIDI in of the VoiceWorks and that the MIDI channel being output by the keyboard matches the MIDI channel set in the VoiceWorks under the setup menu.

Chord Presets

The VoiceWorks watches incoming MIDI and analyzes it to determine what chords are being played, then creates harmonies using only notes from the chords it recognizes. The user can decide the position of each the harmony voices being created - above or below the singer.

1. Press the RECALL key to ensure that you are in preset recall mode.

2. Turn the Data Wheel to Preset number 31 and press RECALL or ENTER to load the preset.
3. Sing into the VoiceWorks (via a microphone of course) while playing chords on the keyboard. Notice how the harmonies produce the chord you are playing while relatively following the pitch of your voice.
4. Preset 31 has all voices set to be above the input voice. Press the up arrow key to try out the other Chord Presets. Preset numbers 31 to 50 are chord presets.
5. To make the harmonies only sound while notes are being played on the keyboard, double click the HARMONY key to enter the harmony edit menu and change the LATCH Parameter from On to Off.

Notes Presets

The VoiceWorks' harmony voices are controlled directly by incoming MIDI notes - what you play is what you get. Like any synthesizer does, VoiceWorks will assign available harmony voices to MIDI notes as they come in, up to the number of voices you have enabled.

Q. How do I set up a delay on my preset, and use tap tempo or MIDI-CLOCK to alter its timing?

Setting up delay on a blank preset

1. Recall preset 100 (a blank preset). Turn the effects section on with a single click to the EFFECTS key to make it lit.
2. For the sake of demonstration, make sure that the HARMONY, THICKEN and PITCH CORRECTION keys are not lit.
3. Double click the EFFECTS key to edit the effects section. Use the ARROW keys and the DATA WHEEL to edit parameters.
4. Set the FX LEVEL to 0db.
5. Set REV/DLY to 0/100, meaning the effects will consist entirely of delay with no reverb.
6. Ignore LE-REV SND (lead-reverb send), HA-REV SND (harmony-reverb send), and AU-REV SND (auxiliary-reverb send) parameters, as we are only worried about delay here.
7. Set both the LE-DLY SND (lead-delay send) and HA-DLY SND (harmony-delay send) parameters to 0dB. Ignore the AU-DLY SND (auxiliary-delay send) parameter unless you are purposely sending audio through the aux input of the VoiceWorks.
8. Ignore DLY2REVSND, REVERBTYPE, DECAY, PREDELAY, and the L and H parameters. (A quick way to do this is to double click again on the **effects key** which will advance you directly to the delay parameters section.
9. Choose PingPong1 for DELAY TYPE, and set the Dly (delay time) parameter to 1000. Move to the very next parameter and if it doesn't already say Manual, turn the DATA WHEEL to the right until it does. Set FB (feedback) to 50%, and D (damping) to Flat.
10. Speak boldly into your mic: "This is fun". You will hear an echo of your statement every second alternating from left to right in the stereo field.

Using Tap Tempo

Starting from where we left off…

11. To enable tap-tempo, move the cursor so that Manual is blinking, and change it to Tap, then move the cursor one spot to the right and edit the multiplying factor to read 1:1. This settings means that you will get one repetition for each beat of the rhythm you tap into the VoiceWorks.
12. Notice that the Effects light is blinking once per second (since you initially set the delay time to be 1000ms). You are allowed to tap in a new rhythm as long as the cursor is editing one of the three delay parameters: Delay Time, Delay Source, Source Multiplier. On the screen these parameters look like "Dly:1000 TAP 1:1".
13. Start tapping on the EFFECTS key and the light should start to blink to match the rhythm you tap. If you were not editing one of the three parameters mentioned above, you'll notice that the cursor will have either advanced to the FX LEVEL REVERB TYPE, or DELAY TYPE parameters. Simply move to one of the three parameters mentioned above and try again.
14. While speaking into your mic, try changing the multiplier value. If you set it to "1:2", you will hear two delay repetitions for every beat of the rhythm you tapped in. Choosing "2:3" will give you a triplet feel.
15. You can always tweak the delay value directly by moving to the delay parameter and adjusting it with the DATA WHEEL.

Using a MIDI-Clock derived Delay Tempo

If you have a device capable of sending standard MIDI clock messages (for example sequencers or drum machines), set the delay source parameter to MCLK. The VoiceWorks will listen for incoming clock messages and will adjust the delay times accordingly. The source multiplier parameter will also work, allowing you to set up a various triplet delay feels, or basic on-the-beat delay feels.