MIDI Vocalist

HARMONY MODE

Choral Detune Bypass MIDI
Setup CLIP
Wobbler Scalic Set key

HARMONY VOICING

BASS BELOW UNISON ABOVE

Harmony

DigiTech

Vocalist

OWNER'S MANUAL

::: DigiTech

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INTRODUCTION

Congratulations and thank you for purchasing the DigiTech MIDI Vocalist Vocal Harmony Processor. This product is designed to produce vocal harmonies that sound as natural and true to the original vocal signal as possible. Extensive research and development in the fields of pitch recognition and vocal pitch shifting have made a product of this type possible. Furthermore, you don't need any specialized knowledge of music theory to use the MIDI Vocalist. It can be as easy as playing chords on your MIDI keyboard and singing, while the MIDI Vocalist calculates the correct harmony for you.

The MIDI Vocalist's features include:

- Generates up to 5 part harmony including input vocal,

- All new simplified user interface,

- Extensive MIDI control implementation,

- Automatic and user-generated harmony modes,

- Stereo output with automatic harmony voice panning,

- Front panel XLR mic input & rear panel 1/4" line input,

- >86 dB (A weighted) signal to noise ratio,

- Easier voicing selection from front panel,

- Front panel keystrokes transmitted over MIDI.

AC Power and Grounding Information

The MIDI Vocalist is equipped with a DigiTech PS750 9 volt AC adapter. Do not use any other AC adapter with the MIDI Vocalist.

The MIDI Vocalist, like any piece of computer hardware, is sensitive to voltage drops, spikes and surges. Interference such as lightning or power "brownouts" can permanently damage the circuitry inside the unit. Here are some suggestions to help protect your MIDI Vocalist:

- Turn it off when not in use: Make a habit of turning off all of your gear when it is not in use. If there is lightning or a severe windstorm, unplug all of your equipment: A surge from a nearby lightning strike or downed power line can destroy electronic equipment even if the switch is off.

- Use Spike and Surge Protectors: This is an inexpensive solution to all but the most severe of AC line conditions. Surge protected power strips are usually only slightly more expensive than unprotected strips, and higher quality multi-stage surge suppressors are usually under $50, making them a worthwhile investment for the protection of all your valuable electronic equipment.

- Use AC Line Conditioners: This is the best and most expensive way to protect your MIDI Vocalist from line voltage fluctuations. Line conditioners constantly monitor the incoming voltage for excessive peaks and dips and make adjustments accordingly, thereby delivering consistent power levels. For very expensive equipment, AC line conditioners are an absolute requirement.

Safety Precautions

There are no user-serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty.

Do not use with any AC adapter other than the model supplied with the unit.

Do not get the MIDI Vocalist wet, and keep foreign objects out of it. If liquid is spilled on the unit, or if any metal objects enter the unit, unplug it immediately and take it to a dealer for service. Disconnect the equipment during storms to prevent damage. Keep your MIDI Vocalist away from:

- Direct sunlight
- Extreme temperature or humidity
- Excessively dusty or dirty conditions
- Excessive vibrations or shock

Clean the unit only with a clean, dry cloth. Do not use any liquids or solvents on it.

FCC Notice

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designated to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause 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 the receiving antenna
- Relocate this equipment with respect to the receiver
- Move this equipment away from the receiver
- Plug this equipment into a different outlet so that this equipment and the receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio/TV Interference Problems"

The booklet is available from the U.S. Government Printing Office, Washington, DC 20402 , Stock # 004-000-00345-4

1. The warranty registration card must be mailed within ten days after purchase date to validate this warranty.

2. DigiTech warrants this product, when used solely within the U.S., to be free from defects in materials and workmanship under normal use and service.

3. DigiTech liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, provided the product is returned to DigiTech WITH RETURN AUTHORIZATION, where all parts and labor will be covered up to a period of one year. A Return Authorization number may be obtained from DigiTech by telephone. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.

4. Proof-of-purchase is considered to be the burden of the consumer.

5. DigiTech reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same on products previously manufactured.

6. The foregoing is in lieu of all other warranties, expressed or implied, and DigiTech neither assumes nor authorizes any person to assume for it any obligation or liability in connection with the sale of this product. In no event shall DigiTech or its dealers be liable for special or consequential damages or from any delay in the performance of this warranty due to causes beyond their control.
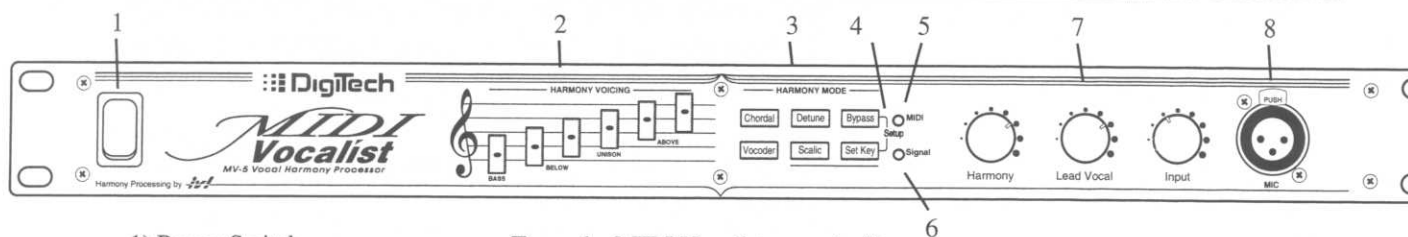
SETUP

1) Power Switch

Turns the MIDI Vocalist on and off.

2) Harmony Voicing Buttons

The six **Voicing** buttons select the arrangement of the harmonies. Up to 4 harmony voices (plus the original vocal) can be selected at one time, and each button lights up when it is turned on. If 4 buttons are selected, pressing a fifth button causes the harmony farthest away from the new selection to be replaced by the new voice.

3) Harmony Mode Buttons

There are four Harmony Modes in the MIDI Vocalist. Each Mode has its own "sound", response to your voice, and method of control (see page 8 for a description of harmony modes). The buttons light when activated.

The **Chordal** button places the MIDI Vocalist into Chordal Harmony Mode, where up to 4 harmony notes are generated in a specific Chord. The MIDI Vocalist recognizes each individual chord that you play on your keyboard or sequencer and produces musically correct harmonies for that chord (see page 9).

The **Vocoder** button places the MIDI Vocalist into Vocoder Mode, where your voice is pitch shifted to whatever notes you hold down on your MIDI keyboard or sequencer. The MIDI Vocalist will not produce harmonies in this Mode until it receives MIDI input (see page 9).

The **Detune** button places the MIDI Vocalist into Detune Mode, which sounds like many voices are singing the same note as you. In Detune Mode, the Voicing buttons are used to select between: two slightly detuned voices, two heavily detuned voices, or a combination of both (see page 8).

The **Scalic** button places the MIDI Vocalist in Scalic Harmony Mode, where up to 4 diatonically correct harmonies are generated in a specific Key and Scale (see page 10 for description). The Key and Scale are selected by MIDI input from your keyboard or sequencer in Set Key Mode (see below).

The **Set Key** button allows you to set the current Key and Scale for Scalic Harmony Mode. Pressing the Set Key button turns on MIDI chord recognition; pressing it again turns chord recognition off. You can play a chord on your MIDI keyboard, for example Gmaj7, that will set the Key to G and the Scale Type to major. In addition to the 12 keys available, there are 9 Scale Types to choose from. (See page 10 for a cross reference of chords used to select scale types.)

Set Key also allows you to toggle between smooth (non-pitch corrected Scalic harmonies) and stepped (pitch corrected Scalic harmonies) mode using the Pitch Wheel on your MIDI keyboard (see page 10).

The **Bypass** button mutes all Harmony output, and allows your lead vocal signal to pass through with no effect.

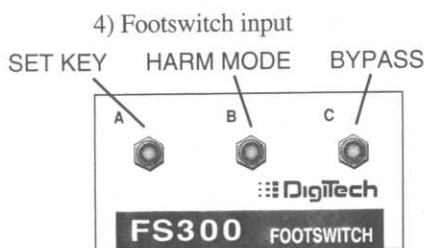| 4) Setup	The **Setup** Mode allows you to set MIDI Channel and Keyboard Zone parameters. Enter by pressing and holding both the **Bypass** and the **Set Key** buttons simultaneously. Their lights will flash. Press and hold **Bypass** and **Set Key** again to exit Setup Mode (see page 12 for Setup instructions).
5) MIDI LED	The **MIDI** LED blinks to confirm MIDI information is being received by the MIDI Vocalist. It will blink in response to MIDI activity on any channel or SysEx (except for System Realtime messages such as MIDI Clock).
6) Signal LED	The **Signal** LED monitors the incoming signal from the Mic and Line inputs. When there is a signal present, and the MIDI Vocalist has recognized the pitch, it will glow green. When the input signal is too high and near clipping, the LED turns red.
7) Level controls	The **Harmony** control varies the output level for all four harmony voices. The **Lead Vocal** control varies the output level of the original input signal. The **Input** control varies the input level for the microphone and line inputs.
8) Front panel microphone input	The balanced XLR-type **Microphone input jack** offers convenient front panel access to the mic input. Plugging a connector into the rear panel Line input overrides the front panel Mic input.

Rear Panel
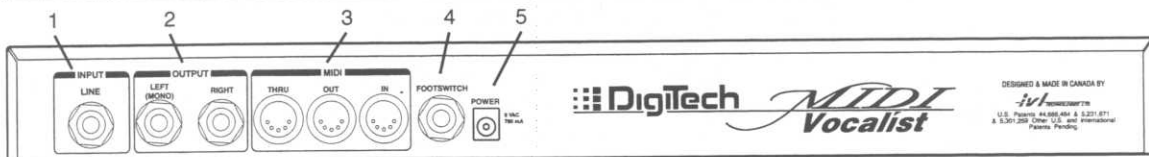
| 1) Line input	The 1/4" **Line input** jack accepts audio from external line-level sources. The MIDI Vocalist accepts audio through either the Mic or Line inputs, but plugging a connector into the rear panel Line input overrides the front panel Mic input.
2) Left and Right outputs	Both the Harmony and Lead Vocal signals appear on these 1/4" jack outputs. For monophonic signal, use the **Left** output only.
3) MIDI section	The **MIDI In** receives MIDI control information from external MIDI devices such as keyboards and sequencers. The **MIDI Out** transmits front panel control information that can be recorded and played back externally from a sequencer. The **MIDI Thru** jack transmits an exact copy of any MIDI information received at the MIDI input.
4) Footswitch input	Stereo 1/4" jack for connection to an optional **DigiTech FS-300 footswitch** to provide remote control of the Set Key, Harmony Mode and Bypass functions (using the three foot switches, from left to right). A single normally open or closed momentary switch may be used for control of Bypass only. On the FS-300 Footswitch, the Harmony Mode and Bypass footswitches are latching type, but the Set Key footswitch is a momentary action switch to allow quick Key changes in performance.
5) AC Power input	For connection to the 9 VAC **DigiTech PS750 AC Adapter** only.
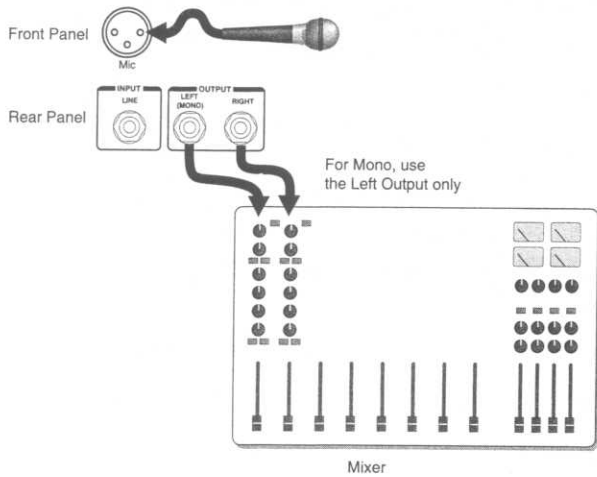
Basic Audio Setup

The drawing at left represents the simplest audio setup. You would most likely use this in live performance or if you are recording with a mixer that has a limited number of inputs.
Connect as follows:
- Connect the microphone to the MIDI Vocalist front panel Mic input.
- Connect the Left and Right audio outputs to the inputs of your mixer.

Notes: Turn your mixer or amplifier volume down before turning the MIDI Vocalist on or off.
Don't put any effects between the microphone and the MIDI Vocalist; this will adversely affect pitch recognition.
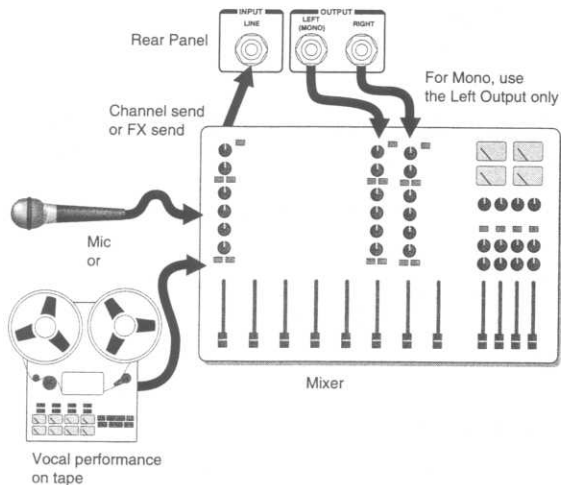
Advanced Audio Setup

This is the most likely studio arrangement. It allows you to use the microphone pre-amp in your console and provides the most flexible arrangement for pre and post effects generation. It also allows for harmony generation from lead vocal tracks that are already on tape.
Connect as follows:
- Connect the microphone to your mixing console input.
- Connect the output from your console auxiliary send to the line input on the back of the MIDI Vocalist.
- Connect the Left and Right outputs to inputs on your mixer.
- Turn off the Lead Vocal output level on the MIDI Vocalist.

For Best Results:

Sing with your mouth close to the microphone to ensure a good vocal signal. The Signal LED turns green when the MIDI Vocalist recognizes the pitch of the input signal. If this LED turns on weakly or flashes during sustained vocal notes, the input level must be increased either by singing louder or adjusting the Input Level control.

Use a unidirectional, cardoid or hyper-cardoid vocal microphone rather than an omni-directional mic. This will reduce noise or other instrument leakage into your mic.

Do not put any signal processors such as delay, chorus, reverb or distortion between the mic and the MIDI Vocalist. Microphone pre-amps or compressor/limiters are OK – any other effects will work best after the MIDI Vocalist in the audio chain, or through your mixer's Aux or Effects send.

The MIDI Vocalist is specifically engineered to analyze vocal input and create harmonies. Inputting instrument signals, or signals higher or lower in pitch than the vocal range, won't produce optimum results.

Basic MIDI Setup
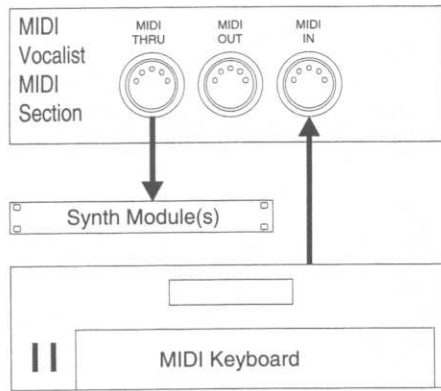
This setup could be used for a live performance or live recording situation. The MIDI Vocalist can recognize the chords you play and output the appropriate harmony, or use a Vocoder preset to play the exact harmony notes you need. These concepts are explained in greater detail later. *Connect as follows:*

- Connect the MIDI Output of your controller keyboard to the **MIDI In** of the MIDI Vocalist.
- Set the keyboard's MIDI transmit channel to 1 (the MIDI Vocalist's default channel) or change the MIDI Vocalist's MIDI receive channel to match your keyboard's (see page 12 for further Setup details).
- Connect any MIDI sound modules to the **MIDI Thru** jack.

Intermediate MIDI Setup

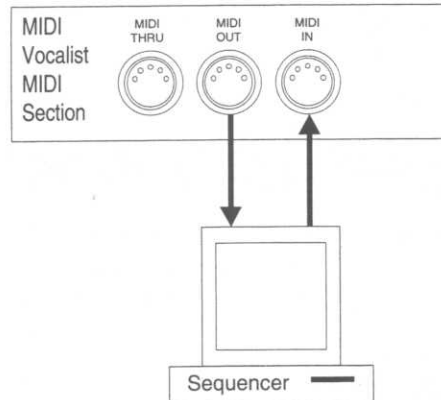This configuration allows you to record key, chord, and harmony style change keystrokes from the front panel into a sequencer for automated playback later. This could be useful for live vocal performances using sequenced backing tracks. *Connect as follows:*

- Connect the **MIDI Out** of the MIDI Vocalist to the MIDI Input of your sequencer or storage device.
- Connect the MIDI Output of the sequencer or storage device to the MIDI Vocalist's **MIDI In**.

Advanced MIDI Setup
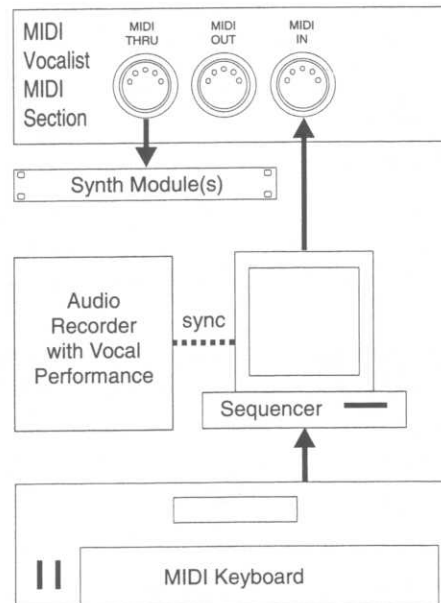
The setup at left may be found in many audio and MIDI recording studios. The sequencer allows you to record and edit a keyboard performance that controls the harmony voices. Routing the audio from the vocal performance through the MIDI Vocalist and controlling it with the sequencer in sync allows you to "craft" exactly the harmony performance you want. *Connect as follows:*

- Connect the MIDI Output of your keyboard to the MIDI Input of the sequencer.
- Connect the MIDI Output of the sequencer to the **MIDI In** of the MIDI Vocalist.
- Connect your MIDI sound module(s) to the MIDI Vocalist's **MIDI Thru** jack.

OPERATION

We assume that you have connected your MIDI Vocalist according to the diagrams on the previous pages and that you are familiar with the other devices in your system.

Input Level, Harmony and Lead Vocal Output Levels

Input Level

Sing into the microphone and turn up the Input Level control until the loudest passage you sing causes only brief peaks to register on the red LED. Too much input gain causes both the unprocessed (Lead Vocal) signal and the harmony voices to distort. Too little gain and the MIDI Vocalist will not produce harmonies at all.

Harmony and Lead Vocal Levels

After you have set the Input Level, sing into the microphone and turn the Harmony and Lead Vocal Level controls to their maximum levels before the distortion occurs in your mixing console.

QuickStart

After you have connected the MIDI keyboard and set the Input, Harmony and Lead Vocal Levels, you need to choose a harmony mode and start singing. You will need to sing in tune (A=440) so that the MIDI Vocalist can recognize the melody. Out-of-tune singing will result in the Harmonies jumping between notes.

Press the Chordal Mode button on the front panel, and press any four of the Voicing buttons (they will light to show you which are selected).

Sing into the mic and you will hear your lead vocal over a Chordal harmony on a C major chord (you can change the Key and Chord by MIDI input - see below).

Press the other Mode buttons, Detune, Scalic, Bypass and Vocoder, and sing so you can get a feel for the MIDI Vocalist's harmonies. *Note:* Harmonies in the Vocoder Mode won't sound until you play some notes on your MIDI keyboard.

Read on for more details on using each Harmony Mode. For more information on harmony, see the Basic Harmony Concepts chapter on page 14. Spend some time becoming familiar with the harmony modes and you will be able to tailor the harmony to the style of the song.

Detune Mode
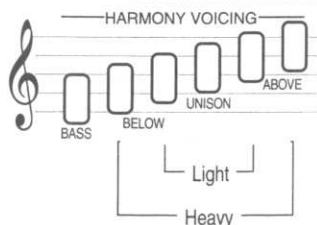
Detune fattens up your vocal input by shifting the pitch by a fraction of a note. This makes it sound as if you are a group of people all singing the same note. There are three levels of Detune, which you can select using the Voicing buttons:

Light detune, two voices at +/- 7 cents (inside pair of Voicing buttons).

Heavy detune, two voices at +/- 12 cents (outside pair of Voicing buttons).

Light and Heavy detune combined, four voices (both pairs of Voicing buttons).

Additional detune options are available through MIDI CC control (see page 19).

Vocoder Mode

You would use **Vocoder** when you want to control the actual vocal harmony notes by playing them on your MIDI keyboard or sequencer while you sing. It will take any vocal input, even speech, and turn it into melody and harmony. The main difference between Vocoder and the other modes is that you choose the vocal harmony notes yourself in real time on your MIDI keyboard or sequencer, rather than letting the MIDI Vocalist choose them.

Vocoder mode is probably the most flexible mode, allowing you to weave intricate melody lines from your MIDI instrument that can be recorded and edited in a MIDI sequencer like any other MIDI performance.

A useful application for Vocoder is to correct an out of tune vocal performance on tape by playing it back through the Vocoder mode and playing the "right" notes on a MIDI keyboard or sequencer.

The Voicing buttons have no effect in the Vocoder mode. Additional options are available through MIDI Continuous Controller commands (see page 18).

Chordal Mode

Chordal harmony creates harmonies that are fixed to a chord, creating a block harmony behind the Lead Vocal. You can sing any note or slide between notes, and the harmonies will stay on the chord you have selected. The Chordal harmonies change their chord inversion to sound correct over each chord no matter what melody you sing.

For musically correct harmonies to be generated automatically in Chordal and Scalic modes, you must provide the MIDI Vocalist with some musical information. It's like when you are playing with other musicians; they need to know the chords you're playing in order to stay in key with you.

If you are using a Chordal harmony, the MIDI Vocalist identifies each chord in your song as it occurs. The MIDI Vocalist looks at the chords that you are playing on a MIDI keyboard or sequencer, and interprets them to create chordal vocal harmony that fits what you are playing. You can also set the MIDI Vocalist so that it only recognizes chords played on the upper or lower part of your keyboard, with a split point or zone that you set. For example, you can ensure that left hand bass lines don't cause the harmonies to jump around (see Setup on page 12).

A chord has two identifiers: the chord *root* and the chord *type*. An example of this would be an A major 7th chord which has "A" as its root and "major 7th" as its type.

The MIDI Vocalist will recognize twelve chord types:

major	major 7	minor	minor 7	dominant 7	major 6
augmented 7	minor 7 flat 5	diminished	suspended	suspended 7	minor-maj7

Some of the rules used by the MIDI Vocalist to analyze MIDI keyboard input are:
> *If two MIDI chords are played at the same time, the MIDI Vocalist will combine them and make a decision based on all of the notes.*
> *If multiple notes are being held, the most recently played will assume priority.*
> *If one note is played, the chord root will change but the chord type will stay the same.*
> *Diminished 7 chords and augmented triads will always be interpreted in root position.*

A "close" harmony
Two below, one above close
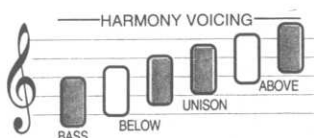
A harmony with a wider "spread"
Bass, one below close, one above far

The Voicing buttons on the front panel allow you to choose the voicing of the chord. Voicing is where the Harmonies will be placed relative to the lead vocal note. You can choose a Chordal harmony that is clustered around the lead vocal, or one which is spread out over a wider range. There are six possible positions for Harmony voicing, three Harmonies below the lead vocal note, one Unison harmony doubling the lead vocal, and two Harmonies above the lead vocal; you can choose up to four Harmonies. Additional Chordal voicing options are available through MIDI control (see page 19).

In Chordal Mode, the Unison Harmony is the same as your lead vocal, with a short delay. It will track your lead vocal notes exactly, including pitch bending. Although all of the other Harmony voices in Chordal mode are Pitch Corrected, the Unison voice is not.

Scalic Mode

Scalic Harmony creates harmonies that follow your Lead Vocal up and down a musical scale that you select. You need to select the Key and Scale, usually only once at the beginning of your song. In western popular music, the chords often revolve around a single scale such as A major where "A" is the key and "major" is the scale around which all the chords of the song are centered (i.e. the C# minor, D and E chords are all part of the A major scale).

Scalic harmonies sound correct in many songs but not all, and this is why you have a choice between it and Chordal. Scalic harmonies are more active in harmony motion where Chordal tends to be more static. Scalic harmony is more like harmonized soloing—Chordal is more like chordal backing to a solo voice.

In Scalic Mode, there are 9 Scale Types (listed below). Scalic harmonies require that you play a chord on your MIDI keyboard or sequencer at the beginning of the song or section. If the scale you have selected is correct for the song, you will not have to do anything more than toggle Bypass to introduce harmonies where you want them.

In Scalic harmonies only, you have the option of removing pitch correction from the Harmony voices. Pitch-corrected Harmony (or "stepped") is the stock setting from the factory, but this can be changed by entering Set Key mode, pushing the pitch wheel on your MIDI keyboard to the upwards pitch bend position, then releasing it. Turning Pitch Correction off can be effective in making the harmonies realistically "cling" to the pitch bends in the lead vocal. *Note:* The Octave Down (Bass Voicing button), Unison, and Octave Up (accessible through MIDI CC control) notes are never pitch corrected, even if the Pitch Correction is turned on for the harmonies.

The Key is always identified by the Root of the chord. The Scale Types and the chords that select them are:

Scale Type	Chord	Required notes in chord	Application Notes
Major	maj 7	Root, maj 3, maj 7	*General Major usage, has maj 7th tonality when singing the 5th of the scale.*
Major Raised 5th	maj	Root, maj 3, 5	*Same as Major, but removes maj 7th tonality when lead vocal centers around the 5th of the scale.*
Major Lowered 5th	dom 7	Root, maj 3, flat 7	*Same as Major, but adds a dominant 7th tonality for lead centered on the 5th of the scale.*
Major 6th	maj 6	Root, maj 3, 5, 6	*Good for close lower voicing with the lead vocal centered on the 3rd of the scale.*
Dorian	min 7	Root, min3, 5, flat 7	*Good over Blues I, IV, V changes with minor harmony over lead in tonic.*
Minor	min	Root, min 3, 5	*General Minor usage*
Harmonic Minor	min-maj 7	Root, min 3, maj 7	*Classical-sounding minor scale*
Diminished	dim 7	Root, min 3, flat 5, 6	*Specialized*
Wholetone	aug 7	Root, maj 3, flat 6	*Specialized*

As in Chordal Mode, the front panel Voicing buttons allow you to choose the spacing of your Harmony notes, up to four Harmonies at once. Additional Scalic voicing settings are available through MIDI control (see page 20).
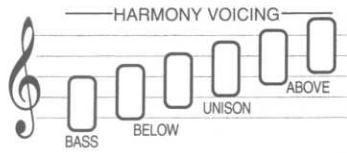
Scalic: 8ve 3rd 5/6th Unis 3rd 5/6th

The notes that make up each scale are listed below. They are shown in the key of C. The intervals will be the same when transposed to other keys. Some notes are listed as N/C—"No Change"—this means that the harmony doesn't change from the note that preceded it. For example, if your lead vocal moves from C to C# on the Major Scale Type, the 3rd harmony would stay at E. If you were descending from D to C#, the 3rd harmony on the C# would remain at F.

Major

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	E	N/C	F	G	G	A	Bb	B	N/C	C	D	D
5th	G	N/C	A	Bb	B	C	C#	D	N/C	E	F	G

Major Raised 5th

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	E	N/C	F	G	G	A	Bb	C	N/C	C	D	D
5th	G	N/C	A	C	C	C	Eb	E	N/C	E	F	G

Major Lowered 5th

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	E	N/C	F	G	G	A	N/C	Bb	N/C	C	D	D
5th	G	N/C	A	C	C	C	N/C	E	N/C	E	F	G

Major 6th

Input	C	C#	D	Eb	E	F	F#	G	G#	A	A#	B
3rd	E	N/C	F	G	G	A	A#	B	N/C	C	D	D
6th	A	N/C	B	C	C	D	D#	E	N/C	F	G	G

Dorian

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	Eb	N/C	F	G	N/C	A	N/C	Bb	C	C	D	N/C
5th	G	N/C	A	Bb	N/C	C	N/C	D	Eb	Eb	F	N/C

Minor

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	Eb	N/C	F	G	N/C	Ab	N/C	Bb	C	N/C	D	N/C
5th	G	N/C	Ab	Bb	N/C	C	N/C	D	Eb	N/C	F	N/C

Harmonic Minor

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	Eb	N/C	F	G	N/C	Ab	N/C	B	C	N/C	N/C	D
5th	G	N/C	Ab	B	N/C	C	N/C	D	Eb	N/C	N/C	F

Diminished

Input	C	C#	D	Eb	E	F	F#	G	G#	A	Bb	B
3rd	Eb	N/C	F	Gb	G	A	Bb	C	N/C	C	Db	N/C
5th	Gb	G	N/C	A	Bb	N/C	C	Db	N/C	Eb	E	N/C

Wholetone

Input	C	C#	D	Eb	E	F	F#	G	G#	A	A#	B
3rd	E	N/C	F#	N/C	G#	N/C	A#	N/C	C	N/C	D	N/C
5th	G#	N/C	A#	N/C	C	N/C	D	N/C	E	N/C	F#	N/C

Entering Setup mode

By pressing and holding the Set Key and Bypass buttons together, you can set the MIDI Vocalist's MIDI and Zone parameters. The Set Key and Bypass lights will flash while you are in Setup mode. Press and hold the Set Key and Bypass buttons together to exit Setup mode.

The MIDI Channel and Zone selected in Setup mode are saved when the MIDI Vocalist is turned off. Harmony Voicing and Scalic Bending selected from the front panel outside of Setup mode are also saved on power-off. The current Chord Root and Type, and the Key and Scale Type are not saved.

MIDI Channel

You can select the MIDI channel that the MIDI Vocalist will receive and send on in two ways:

From MIDI

While in Setup mode, play a note on any MIDI keyboard that is set to the channel that you want the MIDI Vocalist to respond to.

From Front Panel

While in Setup mode, use the front panel Voicing buttons and the Chordal and Vocoder buttons. From left to right, the first five Voicing buttons choose 1 through 5, the Vocoder button adds 5 and the Chordal adds 10. To choose MIDI channel 16, press both Chordal and Vocoder, then the highest (sixth) Voicing button.
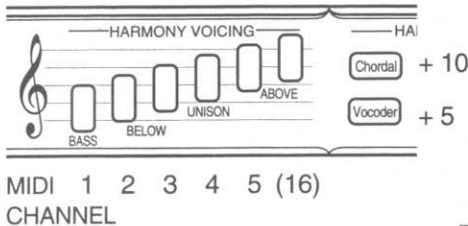
Keyboard Zone

The Keyboard Zone allows you to define a range of notes on your keyboard that will trigger harmonies (in Chordal Mode only). The MIDI Vocalist is normally set to scan the entire keyboard. To set the Keyboard Zone:

- Enter Setup Mode by pressing and holding Set Key and Bypass.

- Select the upper boundary note of the Zone by pressing the Detune key - it will flash. Then play the highest note of the Zone that you want on your MIDI keyboard. If you want to change it, play another note. The Zone setting accepts the last note that you play.

- Select the lower boundary by pressing the Scalic button and play the lowest note of your Zone.

If you just enter the upper boundary note and don't specify a lower boundary, the Zone will extend from your upper note down to the bottom of the keyboard; similarly, if you set a lower boundary and no upper, the MIDI Vocalist will respond to everything above that note.

The Keyboard Zone is saved when you turn the MIDI Vocalist off. However, the Keyboard Zone is reset again to the full keyboard whenever you enter the Setup mode. This means if you change MIDI channels, you must re-set your Keyboard Zone as well.

Button Presses

Every time you press a button on the MIDI Vocalist's front panel, the unit sends a MIDI message. This allows you to record Harmony Mode, Voicing, Key/Scale, Chord Root/Type, and Setup changes to a sequencer. Then, when you play the sequence back through MIDI, the MIDI Vocalist will receive the button press messages from the sequencer, and will respond the same way as if you had pressed the front panel buttons.

Basic Procedure

This would be roughly the same as if you were recording program changes from a synth or effects device. In the count section of your song, place your sequencer in Record and select the Harmony type and voicing that you want to use from the MIDI Vocalist front panel. If you will be using the Chordal harmony mode, you can continue recording and play chords on your keyboard where you are required to change the Chord Root and Type. Press the Set Key button whenever you need to change the Key and Scale for Scalic harmony mode. You can also press the Bypass button wherever you don't want harmonies. When you play back your song, you can sing along and hear the harmonies from the MIDI Vocalist where you recorded them.

Other MIDI Messages

The MIDI Vocalist will respond to MIDI Modulation and MIDI Volume messages, to control vibrato and overall volume (see MIDI tables, page 18 for details).

Specifications

Microphone Input	XLR Balanced > 2 KOhms
Line Input	1/4" jack, unbalanced > 10 KOhms
Full Scale Input Level (Mic)	-31 dBu to -3dBu
Line Outputs	1/4" unbalanced, 1.5 KOhm impedance
Max. Output Level	+ 14 dBu +/- 2 dB
Sampling	16-bit linear at 31.25 KHz
Frequency Response	30 Hz to 11.5 kHz +0.5/-3.0 dB through DSP 30 Hz to 20 kHz, ± 1.5 dB, analog bypass
Signal to Noise Ratio	>86 dB A-weighted, through DSP (nominal) >92 dB A-weighted, analog bypass
THD	< .03% @ 1 kHz
Size	1.75" x 19" x 6.125" (H x W x D)
Input Voltage	9 VAC @ 780 mA

BASIC HARMONY CONCEPTS

Overview

A well-crafted vocal harmony can do a great deal towards enhancing a musical selection. The contrast between a lone singing voice and a group of voices singing together makes the music that much more interesting.

Harmonies can be somewhat difficult to understand, so in this Appendix, we will try to de-mystify this process. Discussed will be the concept of "musically correct" harmonies and the difference between the two essential harmony types utilized by the MIDI Vocalist: Chordal harmony and Scalic harmony.

"Musically Correct"

This isn't a variation of "politically correct," but it still implies a certain level of responsibility. This responsibility is to produce a combination of notes that is pleasing to ears accustomed to the western twelve tone scale.

Harmonies that are "correct" are referred to as being "Diatonic" which is defined as:

➢ Any melody or group of chords that conforms to a single scale or key.

To illustrate this, see the C major scale below. Whether you studied music or not, you've no doubt heard it somewhere and could probably sing it from memory.
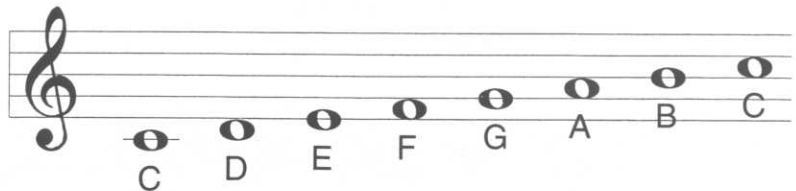
A diatonic, correct harmony could be shown by simply taking all the notes in this scale and moving them up one line on the staff. Notice in the example below of a 3rd above harmony that the harmony notes shown in grey belong to the scale.
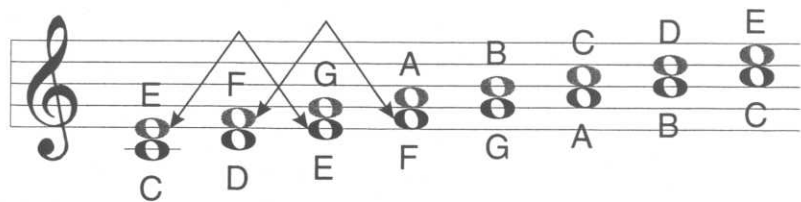

If any of the harmony notes were sharped or flatted they would fall outside this particular scale and would not be diatonic. This theory holds for all of the different types of scales such as major, minor, diminished and wholetone.

The opposite of a diatonic harmony is chromatic or parallel harmony, which, since it utilizes the chromatic scale, has harmony intervals which are all equal. A chromatic scale is defined as:

➢   A scale type that uses all 12 semitones.

Notice that the previous scale example had 8 notes. The chromatic scale uses all the sharp and flat notes in between as well. There are 12 of each of the major, minor, etc. scales; there is only one chromatic scale.

To illustrate a chromatic harmony, see the following example of a chromatic 3rd above harmony on our C major scale.
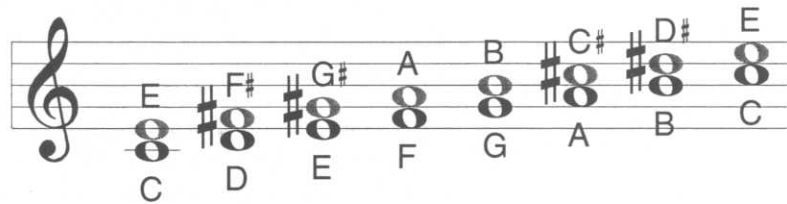
The sharps show the non-scale notes. The reason for the difference is that the chromatic harmony notes stay exactly 4 semitones (a major 3rd) above each scale note. In the diatonic example, the harmony notes varied between 3 and 4 semitones in order to stay true to the scale. The drawing below demonstrates this.
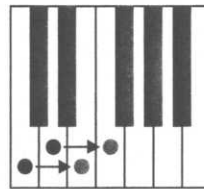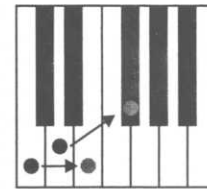
Diatonic   Chromatic

Scalic and Chordal Harmony; The Difference

Probably the toughest part of understanding harmony is pinpointing the difference between the Scalic and Chordal harmony types. There are many harmonies of each type in the MIDI Vocalist that, by trial and error, you have found useful yet not fully understood why. Let's try to clear that up.

The practical difference could be summed up in a couple of sentences:

➢   Scalic Harmony usually requires you to enter the one key that works for a whole song. Scalic harmonies will sound correct in many songs but not all and this is why you have a choice between the two. Scalic harmonies are also more active so there will be more changes as you sing different notes.

➢   Chordal harmony requires you to input a different chord change for every chord in a song. They can be applied to almost any song you can play. Since it stays anchored on the chord notes, Chordal harmony is more forgiving and allows the singer to be flexible with the pitch.

These are the practical differences between the two harmony types, we now need to explore the theoretical differences.

The word "scalic" has at its root the word "scale" and this is important. To the MIDI Vocalist, a scale is:

➤ A group of notes within one octave that falls in one of the following scale types; Major, Major Raised 5th, Major Lowered 5th, Major 6th, Dorian, Minor, Harmonic Minor, Diminished and Wholetone.

In the previous example showing the principle of diatonic harmony, we were showing a scalic harmony. That is, one whose harmony notes only fall within the notes that belong to that particular scale. For our C major scale, this means there are 7 possible harmony notes.

This is a key part of the difference between Scalic and Chordal harmonies because each note you sing in a Chordal harmony, the MIDI Vocalist will choose from only three or four possible harmony notes.

These fall within the notes of designated chords and are mostly made up of the root note, third, fifth and, optionally, the seventh of a chord. These are the choices that the MIDI Vocalist has from which to produce a Chordal harmony. The illustration below shows where the harmony notes would fall in a simple 1 voice above Scalic and Chordal harmony if you were singing up a C Major scale.
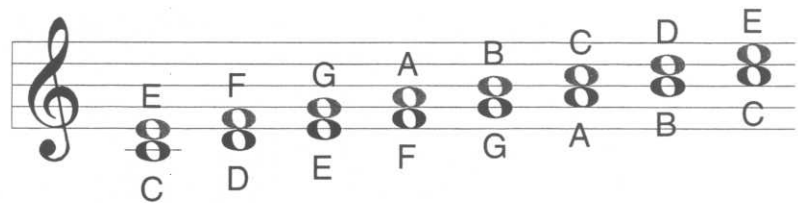
Scalic Harmony over C Major Scale
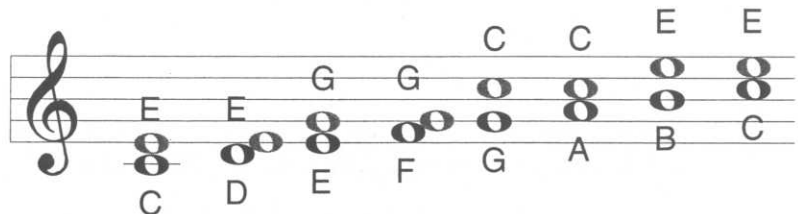
Chordal Harmony over C Major Scale

Notice that in the Chordal example, the harmony notes jump over larger distances and are made of only the root, third and fifth of the scale. Another characteristic is that some notes will generate different harmonies depending on whether you approach them from above or below.

The reason for using these different harmony types is that they create a more interesting musical experience. Most songs could benefit from either or both approaches. Depending on the chord changes in the accompaniment, the tight and always moving Scalic harmonies might be better for a catchy chorus where the more stationary and open Chordal harmonies would leave "breathing space" to highlight a lead vocal. If you have only one harmony part, Scalic is the most common choice. With multiple harmony parts, Chordal is often preferred.

It is important to assess these for yourself by experimenting with both types in all of the styles of music you are involved with. Try it out and trust your ears!

MIDI Implementation Chart

DigiTech MIDI Vocalist MV-5   Version: 1.0

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1	1	
	Changed	1-16	1 - 16	Memorized
Mode	Default	X	Mode 3	
	Messages	X	X	
	Altered	********		
Note Number		X	0-127	Chord Recognition or Vocoder Mode
	True Voice	********	24-96	Vocoder Mode
Velocity	Note On	X	O	Vocoder Mode with Velocity Sensitivity On
	Note Off	X	X	
After Touch	Polyphonic(Key's)	X	X	
	Monophonic (Channel)	X	X	
Pitch Bend		X	O	+/- 2 Semitones
Control Change	1	X	O	Vibrato Depth Mod.
	7	X	O	Volume Mod.
	16	O	O	Mute Switch
	17	O	O	Vocoder Mode Select
	18	O	O	Chordal Mode Select
	19	O	O	Detune Mode Select
	20	O	O	Scalic Mode Select
	21	O	O	Set Key Select
	64	X	O	Damper Pedal
Program Change		X	X	
	True Number	********		
System Exclusive		O	O	See details below.
System Common	Song Position	X	X	
	Song Select	X	X	
	Tune Request	X	X	
System Real Time	Clock	X	X	
	Commands	X	X	
Aux Messages	Local On/Off	X	X	
	All Notes Off	X	O	
	Active Sensing	X	X	
	System Reset	X	X	
Notes		O	O	

Mode 1: OMNI ON, POLY   Mode 2 : OMNI ON, MONO   O : YES
Mode 3: OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO   X : NO

MIDI Vocalist MV-5 Control Change Implementation Chart

Mute Switch Control:

CC#	Controller Name	Controller Value
16	Mute Switch	Standard MIDI Switch: 0-63 Mute Off 64-127 Mute On

Mutes the Harmony output.

Vocoder Mode Control:

CC#	Controller Name	Controller Value
17	Vocoder Mode	Value=Velocity Setting + Transpose Setting 0 Velocity Sensitivity On 8 Velocity Sensitivity Off Transpose Settings: 0 No Transpose 1 Auto Transpose 2 -3 Octave 3 -2 Octave 4 -1 Octave 5 +1 Octave 6 +2 Octave 7 +3 Octave Value transmitted by MV-5 = 8 Velocity Sensitivity Off (8) + No Transpose (0) = 8

Selects the Vocoder mode with a velocity setting and a transpose setting. Auto Transpose transposes the MIDI notes to the octave nearest to the sung vocal note.

Chordal Harmony Mode Control:

CC#	Controller Name	Controller Value

18	Chordal Harmony Mode	Value=Add setting values for individual voices together
		Maximum of 4 voices allowed
		Voice Settings:
		    1 Far Above On (~7th or 8th)
		    2 Mid Above On (~5th)
		    4 Close Above On (~3rd)
		    8 Unison On
		    16 Close Below On (~5th)
		    32 Mid Below On (~3rd)
		    64 Bass On
		Value Transmitted by MV-5 = current voicing
		(Far Above On is never transmitted - there is no Voicing button for it)
		Examples:
		Close Above(4) + Unison(8) + Close Below(16) = 28
		Mid Above(2) + Close Above(4) + Close Below(16) + Bass(64) = 86

Selects the Chordal Harmony mode with a voicing. The voicing sets the number of voices and position of each voice relative to the sung vocal note. If more than 4 voice settings are contained in a message, the message is ignored.

Detune Mode Control:

CC#	Controller Name	Controller Value

19	Detune Mode	Value=Number of Voices + Detune Amount
		Number of Voices Settings:
		    0 2 Voice
		    4 4 Voice
		Detune Amount Settings:
		    0 Low
		    1 Medium-Low
		    2 Medium-High
		    3 High
		Value Transmitted by MV-5 = current voicing
		Examples: 2 Voice(0) + Low(0) = 0 (Light)
		               2 Voice(0) + Med-Low(1) = 1 (Heavy)
		               4 Voice(4) + Med-Low(1) = 5 (Light + Heavy)

Selects the Detune mode with the number of voices (2 or 4) and the detune amount. Low and medium-low detune depths are useful in all musical situations. They correspond to the Light and Heavy Detune Voicings available from the front panel. Medium-high and high are more for special effects.

Scalic Mode Control:

CC#	Controller Name	Controller Value
20	Scalic Mode	Value=Add setting values for individual voices together Maximum of four voices allowed Voicing Settings: 1 Octave Above On 2 5th Above On 4 3rd Above On 8 Unison On 16 5th Below On 32 3rd Below On 64 Octave Below On Value transmitted by MV-5 = current voicing (Octave Above is never transmitted - there is no Voicing button for it) Examples: 3rd Above (4) + 5th Below (16) = 20 5th Above (2) + Octave Above (1) = 3

Explanation of the MIDI Scalic Mode Control:

Receive rules:

1. If in Scalic Mode:
   - Set Key message turns on/off Set Key feature.
   - Scalic Mode message updates only voicing.

2. If in other Modes:
   - Set Key message ignored.
   - Scalic Mode message puts the unit into Scalic mode with Set Key off.

Transmit rules:

1. If in Scalic Mode:
   - Toggling Set Key button sends Set Key message.
   - Toggling a Voicing button sends Scalic Mode message (new voicing).

2. If in other Modes:
   - Pressing Scalic button sends Scalic Mode message and Set Key message (off).
   - Pressing Set Key button sends Scalic Mode message and Set Key message (on).

Set Key Control:

CC#	Controller Name	Controller Value
21	Set Key Mode	Standard MIDI Switch: 0-63 = Set Key Off 64-127 = Set Key On

Selects the Set Key Control for Scalic harmonies. When in Set Key mode the user can input the scale type from a combination of notes in any octave. Set Key is only recognized while in Scalic Mode. Smooth or Stepped bending between notes is toggled in Set Key Mode. Pitch bend values above 8192 activate smooth bending and values below 8192 activate stepped bending. The center value 8192 is ignored. This setting will remain in effect through subsequent Set Key operations until pitch bend data is received again.

MV-5 MIDI Vocalist System Exclusive Details

Transmitted:

Universal System Exclusive Message (non real-time) - sends MIDI Vocalist identity, control channel and Chordal Mode chord scanning zone.

Hex	Description
F0	System exclusive status
00,00,10	Digitech manufacturer ID
3g	Product specific format. g is MIDI Vocalist control channel
34	MIDI Vocalist product ID
10	Chord scanning zone definition
uv	Lowest note of zone
xy	Highest note of zone
F7	End of exclusive

Note: Bytes uv and xy can have a value of 0 to 127. Example for lower scanning would be uv = 0 and xy = 64 (Split point at note number 64).

Received:

Universal System Exclusive Message (non real-time) - receives MIDI Vocalist identity, control channel and Chordal Mode chord scanning zone.

Hex	Description
F0	System exclusive status
00,00,10	Digitech manufacturer ID
3g	Product specific format. g is MIDI Vocalist control channel
34	MIDI Vocalist product ID
10	Chord scanning zone definition
uv	Lowest note of zone
xy	Highest note of zone
F7	End of exclusive

:: DigiTech

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18-2143-A