



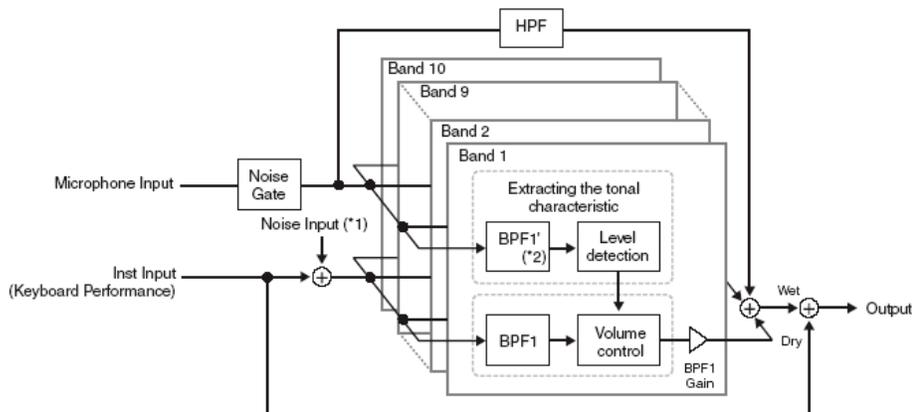
POWER USER

MOTIF XS

EFFECT PROCESSORS – VOCODER

Phil Clendeninn
Senior Product Specialist
Product Support Group
Pro Audio & Combo Division
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VOCODER: You will find four Preset Voices in the Motif XS already setup for use with the Vocoder. This article will attempt to explain a bit more about the use of this device and hopefully fill-in some of the details.
Preset 8: 125(H13), 126(H14), 127(H15) and 128(H16)



*1 The noise generated in the Vocoder unit is used.

2 The cutoff frequency of the BPF1 may not be same as the one of the BPF1. This depends on the settings of the Formant Shift and Formant Offset.

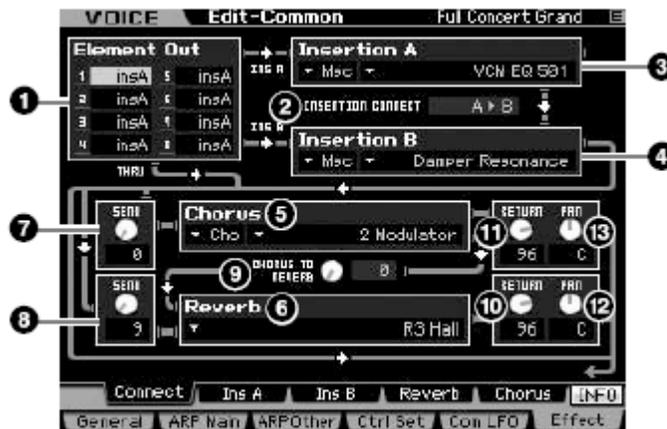
VOCODER

In the VOICE mode, the Vocoder Effect can be applied to any of the Voices. In the Mixing (SONG/PATTERN) and PERFORMANCE mode, the Vocoder Effect can be applied **only to Part 1**. The Vocoder Effect will not work even if you assign the Voice (to which the Vocoder is applied in the Voice mode) to the other Parts (Part 2 or higher). It is important to understand how a “vocoder” works to appreciate what you can do with it and what you may not be able to do with it. Originally developed to encrypt speech in the limited bandwidths of field radio, the Vocoder has historically morphed into a “cool” effect applied in some forms of music. The so-called “Robot-Voice”.

First, the Vocoder is derived from DSP (Digital Signal Processing) muscle of a pair of Insertion Effects. It is applied to a keyboard instrument sound (not the microphone). **The Vocoder is an effect applied to a synthesizer sound.** This is a key point to understand. It is not an effect added to the microphone input, rather the microphone input is fed into to the synth sound within the synth Voice’s Insertion Effect.

This difference is key to knowing what is going on and will answer many questions that may arise later. In the block diagram from the Manual shown on page 1 of this article you see the “Inst Input” (Instrument input) and you see the Microphone input. Setup for the Vocoder Effect takes place inside a Motif XS VOICE. Therefore when setting up the Vocoder you will choose a synth Voice to which you apply this Insertion Effect. The richer the synth Voice is in harmonics and noise components the more intelligible the result. Human speech is made up of tones and noise components itself. The microphone here is only applying certain of the components of your speech to the synth sound. Selecting an appropriate synth Voice is a key.

Effect Parameter Settings—[SF2] Ins L (Insertion Large)



From the above display, you can see routing parameters with a typical Motif XS Voice at the EFFECT CONNECT screen. This routing display (called up via the [EDIT] > [COMMON EDIT] > [F6] EFFECT > [SF1] CONNECT buttons) is where you can transform the **INSERTION CONNECT** parameter (#2) to “**Ins L**” (or **INSERTION LARGE**), shown here:



You can then set the parameter within the INSERTION L box: **INSERTION L = VOCODER**
 At this time [SF2] Ins L will appear and allow you access to the EDIT parameters of the Vocoder.

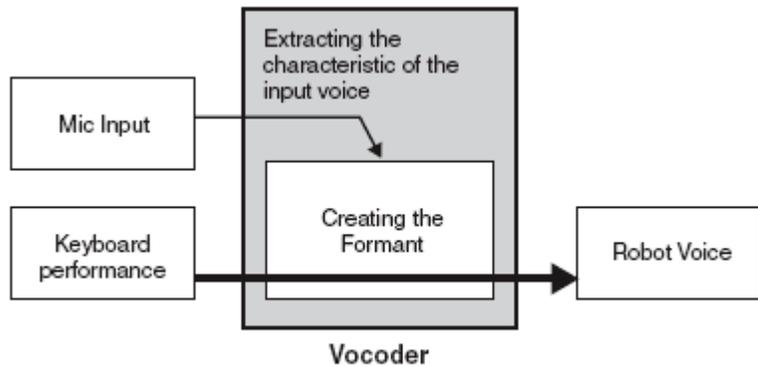


From the OWNER’S MANUAL:

Vocoder structure

The human voice consists of sounds generated from the vocal cords, and filtered by the throat, nose and mouth. These resonant sections have specific frequency characteristics and they function effectively as a filter, creating many formants (harmonic content). The Vocoder effect **extracts** the filter characteristics of the voice from the microphone input and recreates the vocal formants by the use of multiple band pass filters. The machine-like ‘robot’ voice is created by passing the pitched sounds of musical instruments (such as a synthesizer sound) through the filters.

Plain talk: Vocal formants are mainly fixed frequency components that are part of every word you say, and every note you sing. They do not really change pitch as much as the pitch of the note you sing. They remain fairly fixed no matter what you are saying or singing. It is these components that are extracted and used – while the pitch component is derived from the notes you play on the keyboard (the synthesizer input).



Using the Vocoder effect

After connecting a microphone to the A/D INPUT connector on the rear panel, follow the instructions below to use the Vocoder effect. It is highly recommended that you lower the overall Volume of your Motif XS until you have completed the routings – this is to avoid any abnormally loud output or feedback. Make sure you are positioned so that the output of the speakers will **not** be returned to the microphone (classic feedback conditions). And avoid using headphones entirely until you are sure you know what you are to expect. Ear safety should always be a priority when setting up your AD INPUT and in particularly when setting up your VOCODER for the first time.

1 Set the Vocoder related parameters for [VOICE] Mode.

In the [VOICE] Play mode

- Press [UTILITY] to enter the Utility mode
- Press [F4] VOICE AUDIO button
- Press [SF1] OUTPUT button. Output display (see below): Set the Output Select (shown below at the red arrow) from "L&R" output to "Ins L". This sends the microphone's output to the Large Insertion effect rather than to the normal Left and Right outputs.
- Set the Mono/Stereo as appropriate for your microphone connection. For example, if plugged into the left AD Input set Mono/Stereo = **L mono**
- The input to the Vocoder must always be mono.

Note: When routing in VOICE mode this setting applies for the AD INPUT for all VOICES. Set up for PERFORMANCE PART 01 and MIXING PART 01 will be on a per PERFORMANCE and per MIXING program. When using the Vocoder in the PERFORMANCE mode, set the Output Select parameter to "Ins L" in the Output display of the Performance Edit mode. When using the Vocoder in the SONG/PATTERN mode, set the Output Select parameter to "Ins L" in the Audio In display of the Mixing Edit mode.



2 Set the Input Gain of the A/D INPUT connector to microphone.

In the Utility mode:

- Press [F2] I/O to call up the Input/Output display
- Set the Mic/Line parameter to "mic."

3 In the Voice Play mode, select the desired Voice to which the Vocoder is applied.

4 Select the Vocoder as the Insertion Effect connection.

In the Voice Play mode

- Press [EDIT]
- Press [COMMON EDIT] to enter the Voice Common Edit.
- Press [SF1] to call up the Connect display
- Set the INSERTION CONNECT parameter to "Ins L"
- Set the Insertion L parameter to "Vocoder."

Note: When the INSERTION CONNECT is set to "Ins L," the audio signal will be output from this instrument in mono.

5 Set the Vocoder related parameters if necessary.

Input your voice to the microphone while pressing the note(s) to generate the machine-like Vocoder sound.

- Press [SF2] INS L to call up the Insertion L display
- Set the related parameters while listening to the Vocoder sound.

6 Press the [STORE] button to call up the Store window then store the edited Voice.

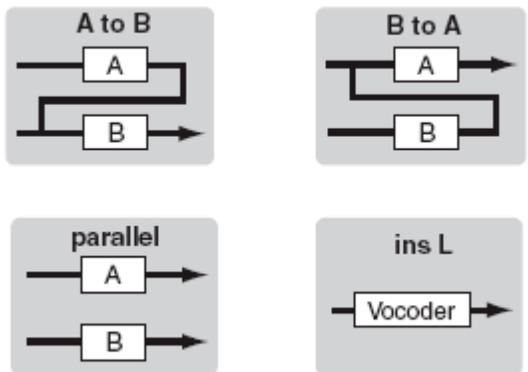
Rule: If a Voice is assigned a Vocoder effect, and that Voice is used in a Performance or in a Mixing situation, then that Voice must be set to **PART 01**. If not set to PART 01, you will not hear the Vocoder. In PERFORMANCE mode or when in MIXING mode you set the AD INPUT part as follows:

- Press [EDIT]

- Press [COMMON EDIT]
- Press [F4] AUDIO IN
- Set the MONO/STEREO parameter to match your AD INPUT
- Set the OUTPUT SELECT to "Ins L"

How the LARGE INSERTION (Ins L) is created

The Insertion Effects A and B are unified, then used as the Vocoder. Signals processed with the Vocoder block will be sent to Master Effect, Master EQ, Reverb and Chorus block. Shown here are the four different

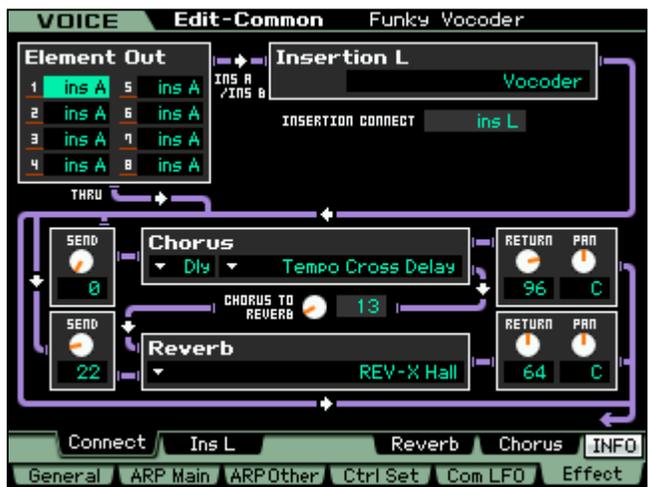


possible configurations of the Dual Insertion Effect. When combined they become one "large" processor, which is used to process and create the Vocoder.

Note: When "Ins L" is selected, "Ins L" is shown in the tab menu of the [SF2] button and the tab menu of the [SF3] button disappears. When "Ins L" is selected, the audio signal will be output from this instrument in mono.

TIPS and TRICKS:

The VOCODER can only be applied to PART 01 when you are using it in a PERFORMANCE or a MIXING setup. As mentioned at the start of the article, the Dual Insertion Effect of a synth sound is routed to the Vocoder as the carrier, the microphone is simply the modulator (or shaper) of the sound. In the Voice located in Bank: Preset 8:126(H14) **Funky Vocoder** the synth Voice is routed as follows:



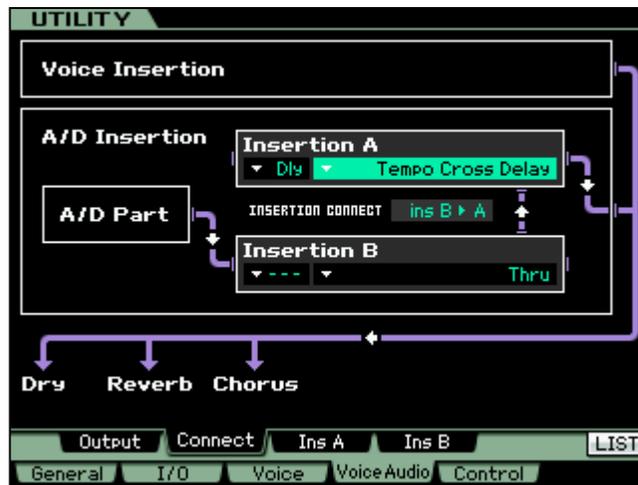
You can add the TEMPO CROSS DELAY by raising the ASSIGN 2 knob. This adds a Ping-Pong (Left/Right) delay referencing the tempo set by the XS clock. You can change the basic formants Pitch by rotating the ASSIGN 1 knob. Turning it clockwise will "chipmunk" the Voice, and counterclockwise will lower the fundamental tone. But did you know these are the Effects on the carrier synthesizer VOICE? The AD INPUT has access to its own Dual Insertion Effect... in addition to the effects seen above.

While in VOICE mode, you can apply a **separate** Dual Insertion Effect to your AD INPUT:

- Press [UTILITY]

- Press [F4] VOICE AUDIO
- Press [SF2] CONNECT

Here you will find the A/D INSERTION Effect. This applies to the AD Input globally for [VOICE] mode and will apply to the microphone input in all VOICES that you call up.



Here you can assign any two Effects for the microphone. A VCM Compressor or another Tempo Cross Delay... etc., use your imagination!

If you are in a PERFORMANCE or MIXING program, the AD INPUT can have its own Dual Insertion Effect, again, **separate** from the synthesizer Voices Insertion Effect (which is doing the Vocoder). The AD INPUT "A/D INSERTION" is found as follows (from PERFORMANCE mode or from MIXING mode):

- Press [EDIT]
- Press [COMMON EDIT]
- Press [F4] AUDIO INPUT
- Press [SF2] CONNECT
- Assign any two Insertion Effect types to the AD INPUT Part. Again, this will apply to the microphone input itself and is separate from the VOCODER effect applied to the PART 01 synth Voice.

What about recording the VOCODER to the Sequencer?

Glad you asked. This is pretty complex. Here's why. Remember we said that the Vocoder is really a synth sound shaped by the microphone (AD) input. If you set as your sampling source the AD INPUT, you will record just the signal of the microphone (quite naturally). Therefore if you set the SOURCE = AD INPUT, you will record your VOICE prior to it being processed by the Vocoder.

The only way to record a synth Voice as audio to the sampler/sequencer is to "resample". When you select SOURCE = "RESAMPLE", **all** tracks that are playing will be recorded. This is not necessarily what you want either, if you were thinking about overdubbing an isolated Vocoder vocal to a track.

You could resample the Vocoder (isolated by itself) if you record it without playing back other tracks.

So what can you do with the Vocoder and the sequencer? You have the following options:

- Set the Voice that is using the Vocoder on PART 01/track 1 and play/sing the Vocoder part "live"
- Record a MIDI track to track 1 and have the notes on that track trigger the Vocoder Voice. As you sing "live" your vocal will be forced to the pitch of the notes recorded to Track 1. This is cool as you do not have to play the melody/harmony – you simply have your pitch dictated by the track data.
- Route the output of PART 01 to an assignable output and record the Vocoder (isolated) to an external sequencer, like Cubase AI4. If later you wish to, you can export that Cubase track as a 44.1kHz 16-bit .wav file and place it back into your Motif XS as a USER VOICE, which you can trigger via the sequencer.
- Record (as a Resample) the Vocoder part separate from the music and add the tracks to it, later.