

# Using The BC3A Breath Controller with the Motif ES, and Why the PLG150VL Card Makes the Breath Control Experience That Much More Special

By

**Blake Angelos  
Product Specialist  
Product Support Group  
Yamaha Corporation of America**

One of the coolest control devices that Yamaha has ever created has got to be the breath controller. This little device allows a player to use one's breath as a control source in the same way one could use any standard continuous controller such as aftertouch, modulation wheel, a knob or slider, an FC7 foot pedal, or any other continuous input device. If you have ever been to one of my Motif ES clinics (or for that matter EX5, S80, S90, Motif...virtually any clinic where I actually play) you have seen me use a Yamaha breath Controller. One end user issue that I have been happily seeing more and more emails and phone calls lately are from end users who have seen me in a clinic, then go out and buy a BC3A breath controller and cannot get it to work properly. There are usually two primary issues that are occurring:

1. The BC3 is plugged in but doesn't work, or only works a little.
2. I feel like I need to blow too hard, or I wish the BC3 wasn't so sensitive.
3. The sound that I got in the clinic was way more impressive than the sound they are getting from the Motif ES

This document will address both issues. First I'll show you where in the Motif ES to route breath control to specific parameters and give a few specific voice examples (complete with MP3 examples since a musical application is what it's all about), then I'll show you how to use it with the awesome PLG150VL card and compare the Physical Models generated by the card to similar Motif ES voices (VL Tenor Sax with Motif ES Preset Voice Tenor Sax, for example).

Before I get into the Motif ES, let's take a look at the evolution of the Yamaha breath controller. The first version of the breath controller, the BC1, was considerably different than the current version. Released around 1985 when the DX-7 was the big new thing, the BC1 was silver and had a small control on the bottom for setting gain. The unit came complete with a small Phillips screwdriver for setting the gain control:



Yamaha BC1 (parachute pants and "How to Moonwalk" guide sold separately ;-)

When the Yamaha VL1 Virtual Acoustic Synthesizer was released at the Winter NAMM show in 1994, a new breath controller, the BC2, shipped with it. This was a marked improvement over the original BC1, with a headset style design, an improved mouthpiece and both gain and offset controls for more precise player customization:



The improved Yamaha BC2 breath controller

One thing that both the BC1 and BC2 came with was the 3.4" long mini Philips screwdriver. Although cute, it was an eminently losable piece of cute.

About 4 years ago, Yamaha released the current BC3 (also known as the BC3A) that we have today. Gone is the screwdriver—now there are small controls on the side to set gain and offset, and the mini-gooseneck stem is a nice improvement as well.



"Look: Gain and Offset Controls right on the SIDE!!"—What Yamaha Product Specialists said when first meeting the BC3A.

Mr. BC3A: Breath Controller

So there you have it: Now you know more about the evolution of Yamaha breath controllers than probably everyone you know. Now let's get into making it work in the Motif ES.

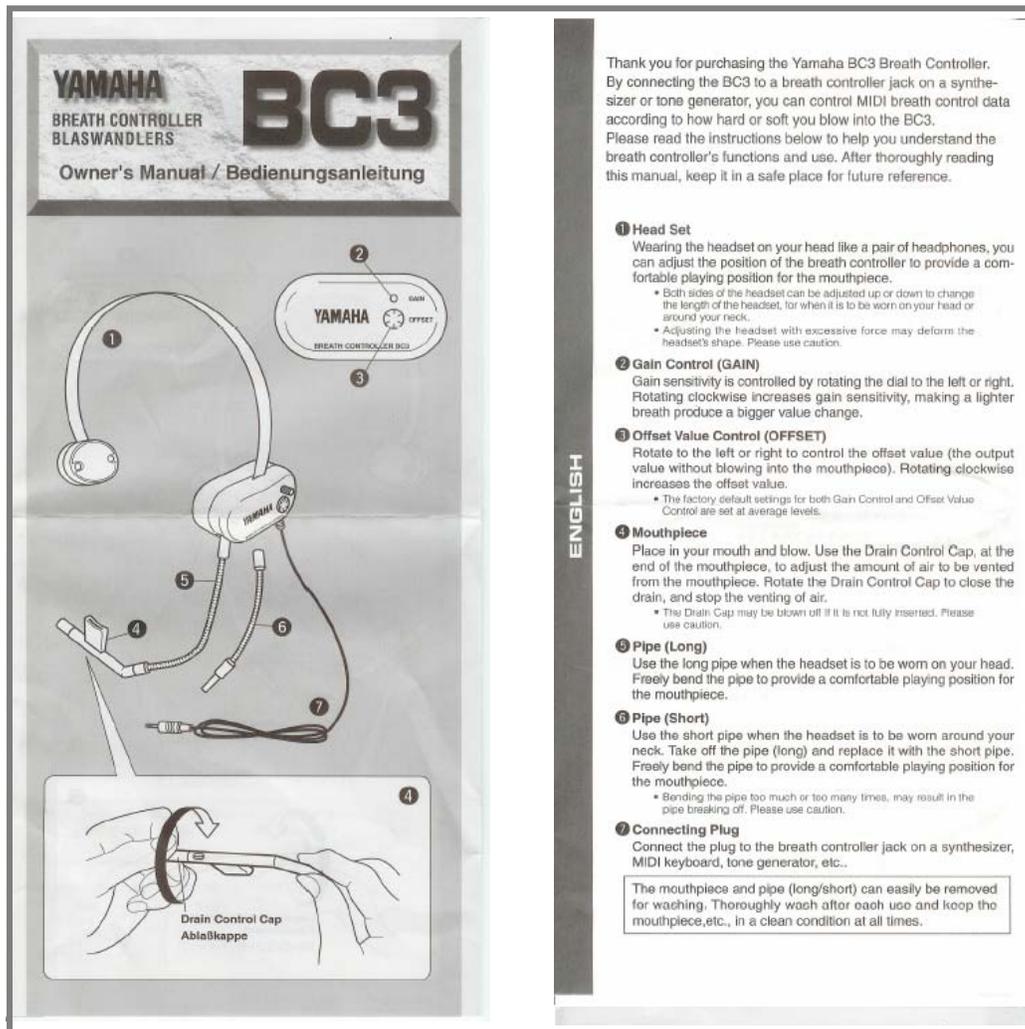
---

Whenever I do a Motif ES clinic you can safely bet that I will be using a BC3A. What people sometimes don't understand is that I am using it almost always with the PLG150VL card. This does not mean that you cannot use a breath controller with preset or internal voices and performances, and you can actually do some pretty cool things with the BC3A and a stock Motif ES. However you enter an entirely new realm of expressiveness when you add a VL card to your sonic arsenal. Before I get into that, I'll show you how to assign the BC3A to control parameters within 3 preset Motif ES voices. Breath Control is a continuous controller ("CC" for short) assigned in the standardized MIDI control set to controller 02 (CC02) in the same way as Modulation Wheel (CC01), Volume (CC07), and Expression (CC11) are (for a full list of the standardized MIDI Controller assignments as set by the MIDI Manufacturers Association (MMA), as well as some great educational resources about how MIDI works, go to <http://www.midi.org/about-midi/table3.shtml>).

Setting up the BC3A to control the volume of preset voices requires knowing something about control sets. A control set is a group of controller assignments that allow you to assign a control source, such as breath control, to a destination, such as volume. There are 6 of these source/destination sets per voice in the Motif ES. See page 155 in the ES manual for a description of control sets.

## Setting up the Breath Controller for how YOU play:

The only way to set up the BC3A is to have it working with either an internal voice in the Motif ES or with a Plug-in voice from one of the cards—PREFERABLY the PLG150VL card. The voice set up tutorials below will help you with that, but I'll describe what to do first, then you can experiment with these setting when using it to play a voice. For reference, please take a look at the BC3 owner's "manual", reprinted in its entirety below:



The two most important things to know about the BC3 are the two small controls on the side: The GAIN and OFFSET. GAIN sensitivity refers to how hard you need to blow, and as it says above, "rotating clockwise increases gain sensitivity, (and) making a lighter breath produce(s) a bigger value change". Getting this one right is important because you don't want to be blowing your brains out to get a sound or vice versa. The other control, OFFSET, is basically a threshold: if you rotate the offset clockwise, the BC3 will transmit on controller 2 just a bit; rotating a bit more and you will get more transmission. I generally set this by moving it clockwise until the sound just begins to happen, then I pull it back just a bit counterclockwise until the sound just stop. Getting the offset set correctly is really important. Bad Mister puts it this way in his VL document:

**Without blowing into the mouthpiece** (very important) hold a note down on the keyboard. Adjust the OFFSET control on the side of the BC3 up and down. Notice how the sound can be made to disappear (remember you are **not blowing**). **This is a critical setting** – you want to turn this back and forth so that you are resting at a point where the sound has **just** reached the OFF point. Stop! You should now hear absolutely no sound when you play on the keyboard. (The sound is said to be “biased” to breath control). It will now take blowing into the mouthpiece of the BC3 **and** playing a key to turn on a note.

It is important to realize that both values vary between players, and both values sometimes need to be adjusted per sound. Try to play sounds with the factory defaults (both values centered) and adjust accordingly—EXPERIMENT! The last part—the drain control cap—allows you to adjust the amount of air moving through the mouthpiece and the amount of...well, “drain control” should be self-explanatory. Think “saliva”...I like to have air moving though the cap, but you can turn it so that no air moves through. Once again, tweak these settings so the BC3 feels comfortable to you.

The final thing I have to say about playing sounds using breath control relate to a question I get at my clinics that follows along these lines: “How hard is it to play sounds with the breath controller?” or “Did it take you a while to learn to play and breath at the same time?” The answer is: For some people, especially people who also play woodwind or brass instruments, it is very natural to play sounds using the BC3. For others it takes some practice. The one thing I can say—especially with regard to using it with the PLG150VL—is that it is a very amazing and completely musical experience, and it can teach you a great deal about playing melodies, the tonguing that brass and woodwind players when articulating (“tongued” vs “legato”), and a host of other profoundly musical concepts that pianists can’t really experience. That is a heavy thing that this little piece of music technology can give you. Now, let’s set it up and get it functioning.

### **Voice Set Up #1: Assigning BC to Control the Volume of PRE 3: 113[Rp: Tenor Soft]**

1. Select Voice PRE3: 113 [Rp: Tenor Soft], the soft tenor saxophone voice. Press [EDIT] to enter Edit Mode, then press the COMMON button just in case you are not in common edit (this is the same button used for selecting FAVORITES and DRUM KITS button in Category Search mode directly to the right of the LCD display). You should see this screen

NOTE: This edit is being performed at the COMMON level (the entire voice) as opposed to the ELEMENT level or (the parts of the voice)

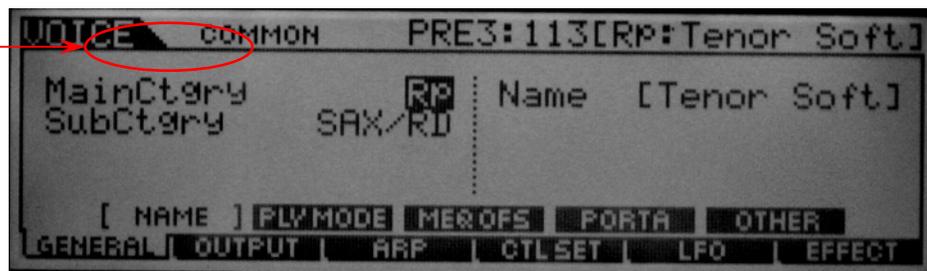


Fig. 1

2. Press [F4]: CTLSET or "Controller Set" to view the assignable controller setups as below:

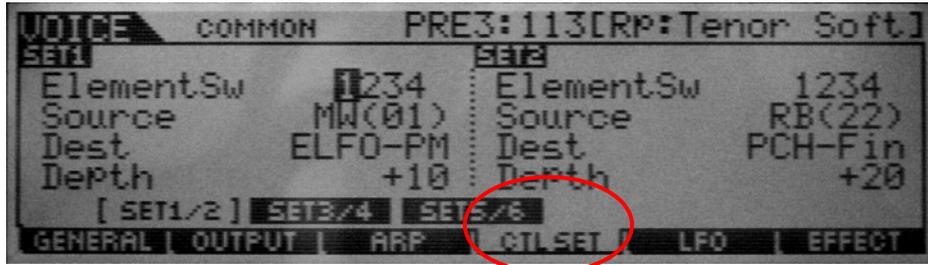


Fig. 2a

Let's take a look at this screen and define what is happening here. What you see in figure 2a above is set 1 and 2 of the controller sets for the Tenor Soft Voice. Some controller sets are assignable on a per element basis, meaning you can turn the controller on or off for each of the active elements within a voice, and some controller setting are common, meaning they are active for the entire voice. Volume is a common control setting as we will see.

Active Elements Controlled  
(All are affected)

Source Controller  
(MW=Modulation Wheel,  
CC01)

Destination (Element LFO-  
Pitch Modulation)

Depth of Control (Range: -64  
to +63 or 127 steps)



Fig. 2b

3. Let's select Control Set 5 and set that up so BC will control volume. Select set 5 by pressing [SF3]. Now, using the cursor controls and data wheel, highlight the Source setting and change it from AS2(17) or "Assignable Knob 2, sending CC17" to BC(02) or "Breath Control, sending CC2 as in Fig 3 below:

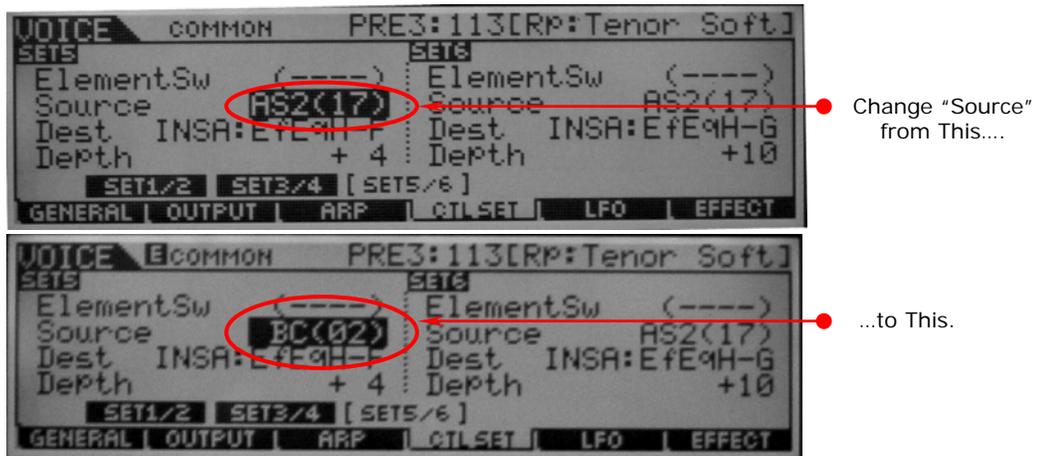


Fig. 3

- Now, change the destination from "INSA: EfEqH-F" to "Volume" and set the Depth Parameter to "+60". This will give you a big control range when you use the BC3. After you get the voice responding correctly—and after step 5 below—it is the depth parameter that you should tweak to suit your individual playing style. Outside of setting the gain and offset controls on the BC3A, the depth parameter is probably the most important one to adjust to how you play. A setting of +60 might be too much—experiment and set to where it feels most comfortable to you:

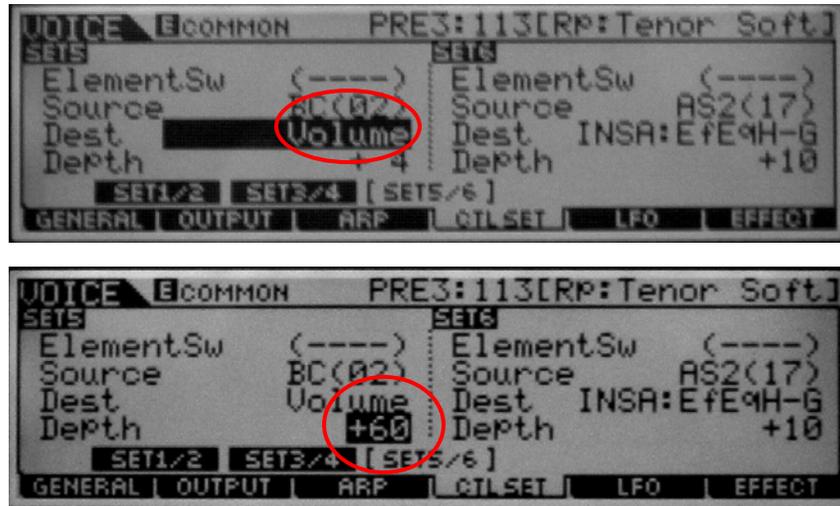


Fig. 4

- And now the one parameter that needs to be changed that many people forget to change. This one is important or you will hear the sound playing from the keyboard and won't get a very dramatic result volume when using the BC3. Press [F3]:OUTPUT to call up this screen:

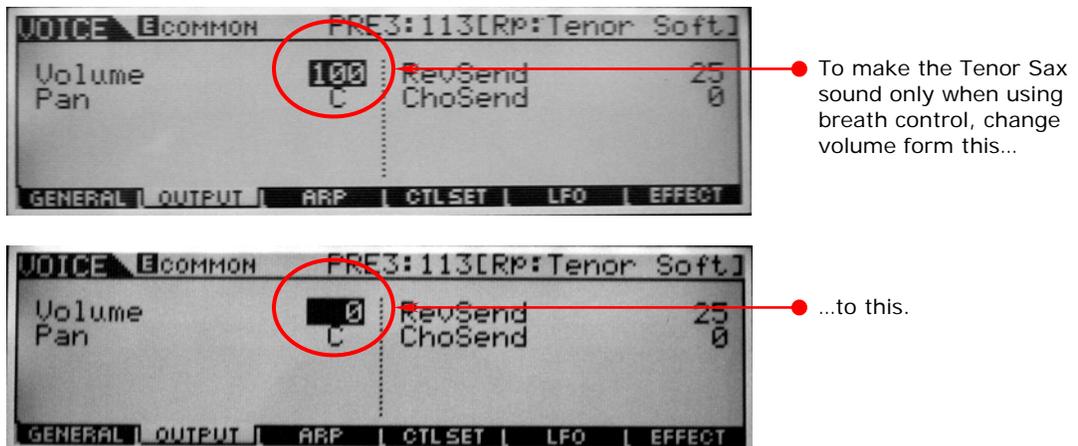


Fig. 5

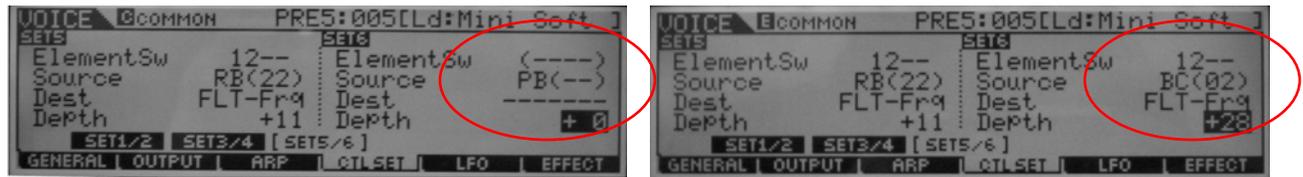
That's it for this voice. Check out the MP3 called "TenorSoft" for this tutorial to hear what this voice sounds like in context with some music. Again, experiment with the depth parameter and the gain and offset controls on the BC3A to get this voice responding the way you want it to.

## Voice Set Up #2: Motif ES Synth Lead using Breath Control

Now let's assign breath control to adjust the filter cutoff frequency of a synth lead voice, in this case PRE5:005[LD: Mini Soft]. The set up is very similarly done as in the voice set up above, except in this case I am using control set 6 and setting the destination to FLT-Frq or "Element Filter Frequency". This voice is a 2 element sawtooth wave voice, and I tweaked a few settings to get the sound I wanted. First off I quickly offset the filter settings using the control knobs so that my cutoff and resonance settings went from the values on the left to the ones on the right in figure 6 below:



This gives me not only a bit more "bite"<sup>Fig. 6</sup> when playing, but also will give the filter some room to open up when I utilize the BC3. Next I went to the controller set page and selected Set5/6 (Like before: Press [EDIT], [F4]CTLSET, [SF3]SET5/6). I then changed it from the values on the left to the ones on the right in figure 7 below:



Before Edit

Fig. 7

After Edit

Check out the MP3 called "SynthLdBC" to check out the sound in the context of a musical example. Once again, feel free to experiment with the settings I have above to get it to sound the way YOU want it to.

## Voice Set Up #3: Motif ES Piano String Layer using Breath Control

In this next voice example, I am going to set up Breath Control so it brings in a string pad behind a piano, with the string pad will only coming in when I blow through the BC3. In this case I need to make sure that BC will ONLY affect the string pad and NOT the piano sound. The voice I chose for my source was PRE1:020[Ap:Piano&Strg]. This voice is using 3 of the 4 available elements, with elements 1 and 2 being the piano sound and element 3 being the string background layer. I need to make two very important edits: One being setting the BC to only affect element 3, the other setting the level of element 3 to "0" so the BC will be the controller that moves the element level from 0 to whatever depth I adjust the control setting. In figure 8 below, you see that I have selected element 3 (by pressing the element 3 select switch (same as track 3) the selecting [F4] AMP, then [SF1] LVL/PAN (level and pad settings for element 3):

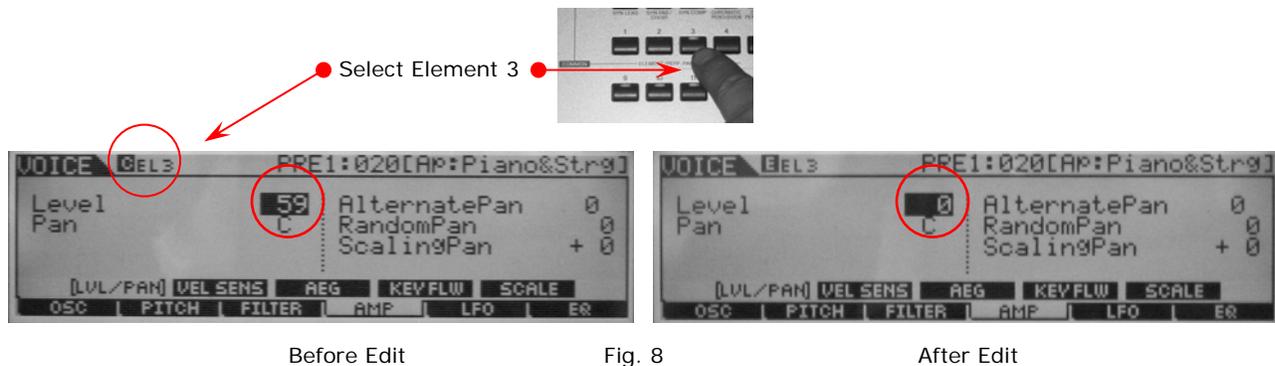


Fig. 8

In figure 9 below is the before and after settings for the control set I used (in this case, Set 5) for this voice:

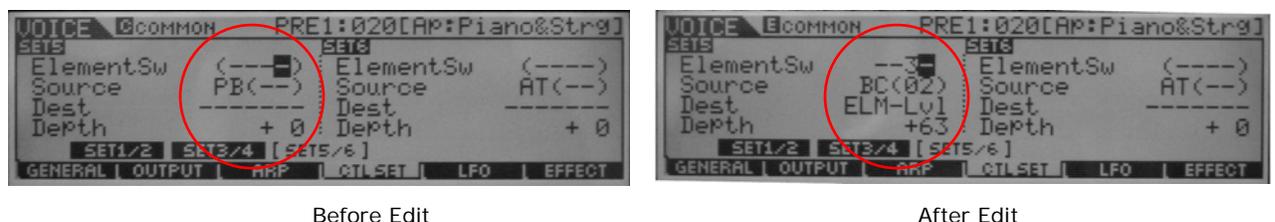


Fig. 9

I have this voice set to work well in a more rhythmic fashion, especially with the depth parameter above set at +63, and the MP3 “PnoStrgBC” is in a more Afro-Latin, rhythmic playing style (along with a PLG150PC card on percussion which sounds amazing...the card, I mean...). Pulling that parameter back to around +25 makes the string sound come in softer and would probably be better for mellower music. Once again: Feel free to edit this in any fashion for your music.

**Using the PLG150VL with the BC3:**

In my opinion, the most amazing experience you can have with the BC3 and the Motif ES is using it to control the PLG150-VL. The technology is remarkably unique, expressive and can actually change the way you experience music as a whole (and that is *not* an exaggeration). In this article I am simply going to talk about setting up the BC3 to work with the PLG150-VL and have included several MP3s comparing VL to Motif ES preset voices. For a more in depth article specific to the PLG150VL, check out Phil “Bad Mister” Clendeninn’s article “Motif ES and the PLG150-VL” in the “Behind the Manual” section of Motifator.com ([http://www.motifator.com/es/btm/btmes\\_index.php](http://www.motifator.com/es/btm/btmes_index.php)). In that article Phil really gets into the setting up the VL board in the Motif ES, the S/VA synthesis technology<sup>1</sup> behind the VL board, editing it in the Motif ES multipart editor, the various parameters that can be controlled (like “embouchure control”, “scream control”, “throat formant”, etc.) There is also another great article he wrote called “PLG150-VL Virtual Acoustic Physical Modeling Plug-in Board: A Getting Started Guide” that can be found at [http://files.keyfax.com/download/PLG150VL\\_Motif.pdf](http://files.keyfax.com/download/PLG150VL_Motif.pdf). It is HIGHLY recommended that you check these two documents out if you really want to get a

<sup>1</sup> “Self-Oscillating Virtual Acoustic” synthesis technology...great name...

good handle on VL technology. It's pretty obvious that the Product Team at Yamaha has been profoundly changed by this technology. You will be as well...

Obviously, the only way to experience this technology is to purchase the PLG150-VL board (I assume that, since you are reading this article, you already have the BC3). Install the board in one of the Motif ES three Plug-in slots. I have mine installed in slot 1, but you can have in any of the three slots.

First off, let's take a look at the voices that are available on the PLG150-VL board:

- PLGPRE1 – 64 Presets for TouchEG play mode—a specialized version of Aftertouch that varies the pressure parameter, the same parameter that, for the purposes of this document you will control with BC3
- PLGPRE2 – 64 Presets for Velocity play mode—this allows you to play the VL board from the keyboard without the BC3
- **PLGPRE3 – 64 Presets for Breath Control play mode**—These are the presets on the VL board that are set up for the BC3 and the ones that are relevant to this document!
- 033/000 – 128 Preset Board Voices
- 033/001 – 128 Preset Board Voices
- 033/002 – 6 Custom VL Editor locations
- 033/003 – 64 VL70-m compatible locations

So, in order to quickly and easily get the VL sounds on the card set up for the BC3, you must have PLGPRE3 presets set up in the Motif ES. The first voice I always start with is called "Floboe", a woodwind combination of a flute-type mouthpiece on an oboe-type resonator. This sound has the timbre characteristics of an oboe with the embouchure and "over-blowing" characteristics of a flute, and it is also one of the easier instruments to play...it really responds well. Here's how to do this:

Select voice mode and press the PLG bank button where you have installed your card and, press "D" then "1", and press button [F2] BANK and select "PLGPRE3". This will get you to the BC3-optimized voice "P3-P:049(D01) Ld:Floboe" (See Fig. 10 below):

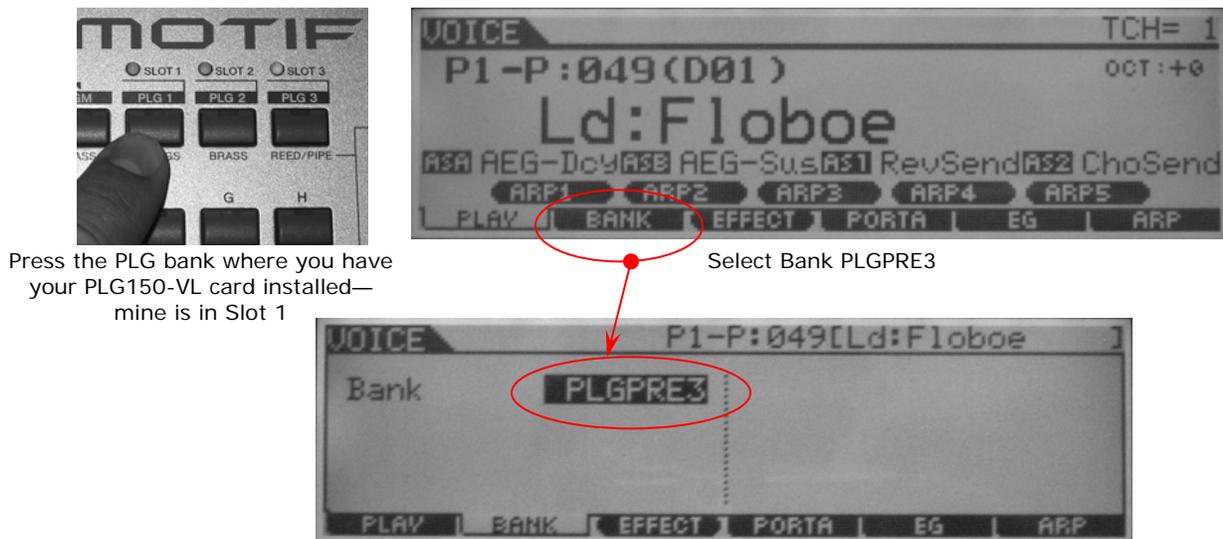


Fig. 10

Now you should have your Motif ES optimized for BC3 control of the PLG150-VL card. Now play...you may have to tweak your BC3 Offset and Gain controls to really make it respond the best for you. Things to check out on the "Floboe" voice:

1. The virtual "breath" of the sound. The air passing through the horn is being generated by the VL card. Blow very, very softly and gradually increase to hear it move from air to sound...
2. "Tongue" a note (put your tongue against the mouthpiece of the BC3, build up air and release it) and listen to how the sound responds. Then blow gradually and play a few notes, "Legato" style, and listen to how the sound responds. Clearly this is a dynamic, living sound very unlike a sample-based voice.
3. Now play a note and slowly move the pitchbend wheel. Listen to the sound "jump" the octave like a flute (from "first mode" to the upper octave "second mode"). It sounds alive...

Check out the MP3 "FLOBOE" included with this document. It is a little tune that features all of the 3 things listed above...

### **Comparing PLG150VL Sounds with Motif ES Sounds:**

I think it is really important to get understand sonically why the BC3 coupled with the PLG150-VL card is very different then using the BC3 with preset Motif ES voices. Although the ES woodwind voices are quite good, they are still sample-based and static compared to the dynamic VL based voices. During clinics I try to compare these voices so attendees can really hear and understand. This is not to say that the Motif cannot to a great job emulating wind instruments. I did a tune called "35" for the original Motif that has a tenor saxophone solo using a preset Motif sax voice that turned out great. But there is still something magical about VL technology. Check out these MP3 comparisons:

MP3 "ESTEN\_VLTEN" Motif ES Tenor Saxophone and VL Tenor Saxophone

MP3 "ESCLAR\_VLCLAR" Motif ES Clarinet and VL Clarinet

MP3 "ESTRPT\_VLTRPT" Motif ES Trumpet and VL Trumpet

MP3 "ESLD\_VLLD" Motif ES Lead Sound and VL Lead Sound

NOTE: All sequencing was done in the Motif ES, then recorded at 44.1 into Steinberg Cubase 3.01 via the mLAN16E expansion board, then imported into Steinberg WaveLab 5.0 an converted to 160 kbps MP3 format.

Thanks for checking out my article. If you have ANY questions or comments, please don't hesitate to email me at [bangelos@yamaha.com](mailto:bangelos@yamaha.com)!

Blake Angelos  
Product Specialist  
Product Support Group  
Yamaha Corporation of America

