



YAMAHA

Power User

PLG150-DX TUTORIAL

PLG150-DX Advanced DX/TX Board

The **PLG150-DX** is a single part board. It has 912 preset voices and board RAM for 64 user board voices. These 64 user board voices are created and/or loaded in with the provided computer DX Easy Editor or DX Simulator software and exist in a volatile RAM bank on the board. Think of the PLG150-DX as a separate synthesizer - in this case a DX7. (In fact, Voice data can be loaded from any Yamaha 6-operator DX/TX series product. Simply make SYSEX INFO AVAILABLE in the DX product.) The DX is the same FM or Frequency Modulation synthesis found in the classic synthesizer. When you place the PLG150-DX board in the mothership you can address it via offsets from the front panel and/or in detail with the Voice Editor software. You can load in custom Voice sets, you can make variations from the preset data and with the software, you can create your own sounds from scratch. The PLG150-DX has its own 16-notes of polyphony.

Checking Installation

Check to make sure your board or boards are properly installed. Here's how:

On the host: Press [UTILITY]

Use the MENU feature (SHIFT+PAGE) or PAGE knob to navigate to the PLG Status screen

◆ PLG Status>	PLG1:PLG150-DX	Expand
Plugin	PLG2:PLG150-PF	▶----

Figure 1: Your screen may differ according to what boards you have plugged into which slots. The "Expand" parameter will be active only when you have 2 boards of the *same* type installed and polyphony expansion is possible. A second PLG150-DX will give you a maximum of 32 notes of FM polyphony in Expand 'poly' mode. Because the System is **modular**, this polyphony **does not** take away from the 64-note polyphony of the mothership host.

PLG Voices on Disk

Load the Plug-in Voices that come with the PLG150-DX. On the diskette that accompanies your board find the appropriate file:

"01PlgVc1.mid" or "01PlgVc2.mid" depending on whether your board is in slot 1 or slot 2. Playing this file to the S/CS will bulk the **Plug-In Voice** data to the 64 [PLG] locations for that board.

Play through the S/CS PLG bank (Plug-in Voices). Press [PLG1] or [PLG2] and select the first sound A01, the sound called '**DX E.Piano**'. There are 64 Plug-in Voices (A01-D16). Once loaded you can save these to an optional SmartMedia card as an ALL (or ALL_VOICE) type file.

To SAVE an ALL file to SmartMedia card

- Press [CARD] to enter the Card mode
- Use the PAGE knob to select the SAVE Card function
- If necessary set the TYPE to "all"
- Name your file (8 characters).
- Press [ENTER]; and [YES] to execute
- If you name your file in the root directory (literally): AUTOLOAD.S2A the synthesizer will automatically load this file when you switch it ON. (Obviously, there can only be one such file).

It is important to note that an "ALL" file will save the S/CS Voice and Performance Banks including:
 128 [INT] Voices + 2 [INT] Drum Voices
 128 [INT] Performances
 128 [EXT] Voices + 2 [EXT] Drum Voices
 64 [EXT] Performances
 64 [PLG1] Plug-in Voices
 64 [PLG2] Plug-in Voices

It does **not** save custom Board Voice data, however, that is a separate bulk. (See "To Save a PLUGIN file to SmartMedia Card" section.

What is a Plug-in Voice and what is a Board Voice?

The **Plug-in Voices** are found from the front panel of the host S/CS synth under the [PLG1] and [PLG2] buttons, when you have a PLG board properly installed. The host can store 64 Plug-in Voices per board (A01-D16). The PLG150-DX comes with a disk file that will load 64 Plug-In Voices to your synth. They use the mothership's (S/CS) parameters, routing and effects but call

on synth data resident on the board, called the **Board Voices**. Instead of using ROM *samples* from the host, the PLG Voices point to data that is resident on the PLG board mounted in that slot. The Voice data contained on the PLG150-DX is not based on AWM2 sampled data like the internal voices. The sounds of the DX board are generated using a synthesis method called “frequency modulation” (FM). Yamaha’s FM uses a 6-operator arrangement to create sounds. Carriers and Modulators interact to allow for rich, dynamic synthesis. For an excellent background on FM synthesis please visit the Yamaha site.

Sixty-four Plug-In Voices can be made available for instant recall from the 912 preset and 64 user Board Voices provided on the PLG150-DX. **Plug-In Voices are Board Voices that have been integrated into the mothership’s setup and are stored in either banks [PLG1] or [PLG2].** The Modular Synthesis Plug-in System will let you create your own customized user controller sets to this technology. It is possible to customize the knobs, pedals, breath controller, wheels, aftertouch, etc., to help you with performing each sound.

Board Voices

Let’s look under the hood and see where these 64 sounds come from:

The PLG150-DX has several banks of sounds as follows: The numbers represent MSB/LSB for bank select – (MSB and LSB Bank Select numbers are used to facilitate remote changes from a device like a sequencer. More on that later).

Bank = 035/000 64 **user RAM Board Voices**

Bank = 035/001 128 preset1 **Board Voices**

Bank = 035/002 64 preset2 **Board Voices**

Banks = *other* banks 067/000, 083/000, 083/064~083/080, 083/096~083/109, 099/000, and 099/064~099/080;

To listen to the preset1 and preset2 board Voices provided, from Voice mode:

- Hold down the [PLG] button corresponding to the slot you have your DX board and use the PAGE knob or the [INC/YES] button to select the Board Voice bank you wish to explore: 035/001, 035/002, etc.
- Notice that banks will read P1-B and P2-B. **P1-B** for slot 1 and **P2-B** for slot 2. The ‘B’ denotes a board voice not yet integrated with the S/CS mothership parameters (effects, etc.).

VCE Play) **P1-B:032(B16)[--:SuprBas1]**
BANK= 035/001

The different banks of Board Voices are arranged by their Bank Select and Program Change numbers. If this is your first experience using MIDI MSB/LSB bank select commands it may seem a bit confusing at first but you will get used to it. The two preset banks (named 035/001 and 035/002) contain 128 and 64 Voices respectively (A01-H16) and (A01-D16). The user RAM bank (035/000) is volatile – meaning Voices created here need to be backed up before powering down. When the unit is powered down these user bank voices will disappear. When you power up this bank reverts to 64 voices from the preset 2 bank.

- (To return to the Internal **Plug-in Voices** hold [SHIFT] and use the [DEC/NO] buttons to return to BANK= INT
- There are some 912 DX Board Voices spread out among the various banks. We will now learn how to turn one of these Board Voices into an S/CS Plug-in Voice.

Step-by-Step: How to create a Plug-in Voice from a PLG150-DX Board Voice

Let’s use BRASS 1 to learn something about how the DX synth works using only on board (S/CS) parameters.

- From [VOICE] mode select the [PLG] bank that contains your PLG150-DX, [PLG1] or [PLG2]
- Press [JOB] and select the Initialize function. Initialize the current Voice position. Press [ENTER], [INC/YES] to execute.
- Press [EDIT]
- Select the OSC Assign> page – Use the menu to select ‘Elem: OSC’; To see the edit menu hold down the [SHIFT] button while turning the PAGE knob. Shortcut: touch button [9], then use the PAGE Knob, if necessary.

▼ OSC Assign	Bank	Number
Elem	▶ NORM/000	1[]

- Turn Knob C to select Bank **035/002**; Turn Knob 1 to select Program Number = **001[BRASS 1]**.
- Use the PAGE knob to explore the Element parameter pages; Shortcut: touch buttons [9], [10], [14], [15] to arrive at a single page within that area (they act like bookmarks).
- Experiment with making edits. Carrier output offsets control the volume of particular sound components, while Modulator output will effect the timbral (harmonic) quality of a sound.

- Try the S/CS parameters on the COMMON level - add effects, etc. Shortcut to COMMON parameters: touch Program button [1] General. Then use the PAGE knob to explore.
- When you [STORE] your work, it will be saved to one of the 64 PLG locations and become a proper Plug-In Voice.

Loading user RAM Board Voices

On your S/CS select the [PLG] button that contains your PLG150-DX board. Copy the file provided with this document: **OrigDX.DXC** to a convenient location on your computer. On your computer, open XGworks 3.0 Lite (for PC) and launch the "DX Simulator" (found under the **Plug-in** pull down). Let's send a bank of Voices from the DX Editor to the User RAM bank in the S/CS.

- When the Editor launches it will ask you for a Part No. – Part No. is 1.
- A cool replica of the DX7 will appear, click anywhere on the front panel buttons. This will open a close up of the edit buttons.
- Click on the [Function] button (tan) and then locate the LOAD function at button 16. Answer YES to the load 64 Voices and "Are you sure?" questions.
- Locate and open the file **OrigDX.DXC**– this is a cartridge file of the original DX7 Voices from ROM Cartridge 3 (circa 1983) the so called, 'USA' bank - the sounds that launched hundreds of thousands of DX7 sales.

When you click on 'OPEN' the graphic will return to the DX7 keyboard. Click again on the Edit panel to enlarge it. Now when you click on a Memory Select button 1-32 or 33-64 it will instantly send the current Voice to the Voice edit buffer. You will not see the names in the S/CS screen, yet. The first sound should be 'FLUTE'. If you are not getting communication between the software and your host check your connections in/out and check System Setup of the Editor).

- On the DX Simulator toolbar you will see an icon for 'Check Setup' – open this dialog box. You will find that you can select whether you send 1 Voice at a time to the keyboard or ALL VOICES (64). Select ALL VOICES. Close the dialog box.
- Click on the icon of a MIDI connector + arrow pointing to the right. This will **send** the data to the PLG150-DX board into bank **035/000***.

*These Voices are now in the volatile RAM of the PLG150-DX board and are what we call user Board Voices. Hold [PLG] and use the DATA knob or the [DEC/NO] button to select the 035/000 bank. Now

when you use knob 1 to select a number you will see the Voice names in bank 035/000 because the Voices are now actually in RAM.

▼ OSC Assign Elem	Bank ▶ 035/000	Number 01[FLUTE]
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Edits can be made in the software on the virtual front panel of our DX7 synthesizer. Explore the software, with its original look – a nice touch of the 80's. You can view all parameters at once by clicking on an icon in the toolbar: DX EDIT LIST VIEW. You can even insert the system exclusive data for a voice into a sequence from the toolbar: INSERT DX BULK DUMP DATA. When an edit is completed you can store it in the software (click on the disk icon) and/or transfer it to the user RAM of the PLG150-DX as outlined above). From there we can use the RAM user **Board Voices** to make S/CS **Plug-in Voices**. The difference between these *user* Board Voices and the *preset* Board Voices is that these user Board Voices must be reloaded each time you power up. Of course, this can be either from the computer editor or you can make an autoloader file that will automatically load your custom voice data on power up. This requires a SmartMedia card. You store the data as a 'plugin' type file.

To SAVE a PLUGIN file to SmartMedia card

- Press [CARD] to enter the Card mode
- Use the PAGE knob to select the SAVE Card function
- Set the TYPE to "**plugin**"
- Name your file (8 characters).
- Press [ENTER]; and [YES] to execute
- If you name your file in the root directory (literally): AUTOLD1.S2B for PLG1, or AUTOLD2.S2B for PLG2, the synthesizer will automatically load this file when you switch it ON.

Theory of Operation Summary:

You can edit the Voice in the computer software while playing it from the host edit buffer. You can then bulk over a single sound or complete set to the RAM bank of the board and then create PLG Voices directed to one of 64 locations in the host's PLG bank. **You cannot store or load data to a PLG slot that does not contain the board with the correct technology.** You will see a "TYPE MISMATCH" error screen if such an attempt is made. The PLG bank Voices can be backed up to an ALL DATA file save, if they contain only Preset Board Voices. If, however, your PLG Voices contain any user Board Voices (sounds bulked in with the editor) you will need to reload these voices to the board's user RAM in a separate operation (.s2b bulk file mentioned

above). The PLG_Native parameters that you see in the screen of the S/CS allow you to apply offsets to what has been programmed in the Editor. You can assign different parameter control to various physical controllers.

Note: It should be mentioned here that the host keyboard/module (S/CS) gives you options when it comes to how you are going to use the Plug-in sounds. For example, when you are performing live you will most likely want to have your favorite sounds stored as completed Plug-in Voices (complete with effects and controller routings). You can have instant access to 64 completely programmed Voices based on the data of the PLG150-DX. You may also find it convenient to set up a basic PLG Voice as a template with your favorite controller and effect settings. From there it is a simple matter to use to swap a Board Voice element on the OSC Assign Element page – it will inherit the basic settings from the template. In this manner you can have access all 912 sounds without having to individually program effects and controllers for each one.

PLG Plug-in and Board Voices can also be used in complex split and layer arrangements via Performance and Master Keyboard mode. Performances can house single sounds or are complex combinations – even combining multiple technologies. You have 128 Internal Performance and an additional 64 External on an optional SmartMedia card. (See below).

PLG150-DX sounds in Performance Layer

Until now we have mainly been discussing the creation of PLG **Voices** in the host product. You can also use the sounds on a Plug-in Board directly in a Performance. Remember that Performance mode does double duty in the S/CS product: it is used for multi-timbral setups for use with sequencers (Performance Multis) and it is used for multi-voice layered sounds for real time play. This is what we call Performance Layers.

In order to use a PLG sound in a Performance Layer you simply activate the LAYER SWITCH = ON for PartP1 or PartP2, depending on the slot of the PLG150-DX board. The PLG Part works just like any other PART of the Performance. Any 4 Parts can have their LAYER SWITCH set to ON in a Performance. Each Plug-in slot PLG1 and PLG2 can contribute one sound at a time as PartP1 and PartP2, respectively.

◆LYR Mode)	Mode	Arp	Layer	RcvCh
PartP1	poly	off	▶on	16

Fig: The Rcv Ch = 16 setting, in this case, is **ignored**. The PartP1 is going to receive on the LAYER CHANNEL of the Performance, which is set in COMMON.

GEN MIDI	Arp Out	ArpCh	LayerCh
Common	off	1	1

Fig: The LAYER CHANNEL setting is the channel on which the 4 Layer Parts are communicated with.

When the Layer Switch is ON for a Part, the Receive channel setting is ignored. The 4 Layer Parts will receive on the channel set by the LAYER CHANNEL parameter in each Performance. Each PLG150 Series board will be able to access a special reserved Insertion effect processor – this processor lets one of the PLG slots recall its Insertion Effect from Voice mode. In the Performance EDIT - Common parameters you will find the **EFF Part Common** screen. Here you can assign the effect processor reserved for the PLG. Assign either PartP1 or PartP2 to the INS EFF. Some of the PLG series boards will have their own effect processors (on the board) which will be active in addition to this Insert effect.

◆EFF Part)	----InsEF----
Common	Part07 ▶PartP1

In a Performance Layer you can combine sounds from the host (AWM2) INT/EXT banks with a sound from a Plug-in board from the PLG banks, or you can use any of the board Voices directly from the PLG150-DX MSB/LSB banks – there are over 900 sounds in there. FM works so well when layered with the AWM2 sounds.

Each Performance has its own memory for controller setups and effect routing. You have the option of storing a Master Keyboard setup with each Performance to create even more unique situations. Master Keyboard settings can help you setup splits, layers and zones for both internal and external gear. Each zone can be active both internally and externally or in any combination.

Please visit the Yamaha website at www.yamahasyth.com and www.xgfactory.com for more information on the FM synthesis, MSPS, and PLG-series boards.

Also visit the **FM Tone Generator Seminar** at: www.yamaha-xg.com/english/xg/fm/index.html
This is a great resource for additional background on Frequency Modulation (FM) synthesis.

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