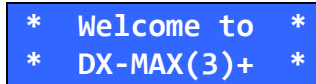


Yamaha DX7 DX-MAX(3)+ Expansion User Guide



1: Introduction

The DX7 DX-MAX(3)+ is essentially a "lite" DX7 SuperMAX+ type expansion. It provides the following new features:

MEMORY EXPANSION

- 8x memory expansion: There are now 256 patches¹ (what Yamaha calls "voices") arranged in 8 banks of 32.
- The Function Settings can be saved as a single global value or on a per-patch basis.

GLOBAL PARAMETERS

- MIDI Transmit Channel: You can set the MIDI OUT channel from 1 to 16. (MIDI IN is already settable in the Yamaha factory DX7 v1.7 firmware using button Function 8).
- MIDI Receive in OMNI mode (receives on any/all channels) or specific channel.

PATCH PARAMETERS

- Programmable Keyboard Zone: Each patch can utilize a settable active keyboard zone (low key to high key) within which the local keyboard sounds the internal FM sound engine per patch.
- Programmable Patch Volume: Each patch can utilize a volume to even out the DX7 levels when changing patches.
- Voice Stacking: You can stack and detune two or four voices of the same patch. You then have a choice of 16x1, 8x2, or 4x4 polyphony. The detuning can provide chorus effect and/or chording and/or octaves (for example).

BUG FIXES

- Includes the fixes for the DX7 Fixed Frequency table bug and also includes the faster boot.
- Hardware-selectable MIDI Velocity Offset switch fixes the stock DX7 velocity issue.

¹ In this document the term "patch" is used to denote a programmed sound. For some unknown reason back in the 80's, Yamaha called these "voices". The typical use for "voices" these days is to indicate the degree of polyphony (how many keys you can hold down at once and get sound for).

Documentation Disclaimer

The DX-MAX(3) was originally developed in the mid-80's by MAXsystems in France. The "DX-MAX(3)+" version is manufactured by Music Technologies Group with permission from the original developer, however, MTG has limited insight into (or ability to change) the underlying functionality. MTG, like you, is simply interested in getting the very most out of such a ground-breaking synthesizer by using this great mod.

This User Guide was put together from various (brief) manuals found on the 'net as well as hands-on use and collaboration with other users. There may (**will!**) be errors or omissions in the manual. *Feel free to contact MTG with contributions to make this manual better.*

Installation

You are looking at the wrong document. Please refer to the **DX-MAX(3)+ Installation Guide** available on the www.musictechnologiesgroup.com website.

Manual Conventions

Regarding the LCD, this manual shows the variable part of the LCD content using an underline. The DX7 itself is not able to underline more than one character, but this convention makes it easier to visualize the changing part of the LCD versus the fixed part.

THIS AREA IS FIXED
AND THIS: CAN CHANGE

Version Check

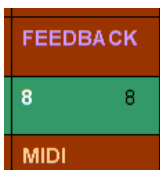
You can check the version of your DX-MAX(3)+ by pressing the brown FUNCTION key and while holding it down press and hold 16 and then 32. You should see a version message such as:

MAXsys/MTG v2.00
MIDI Out Vel=+0

Press the green INTERNAL button twice to escape.

MIDI (Function Button 8)

The following items are available on button #8 in Function mode:



MIDI Ch In = 1

Settable MIDI Receive channel, or OMNI mode

SYS INFO UNAVAIL

Enable/Disable System Exclusive

MIDI TRANSMIT ?

Visible if System Exclusive is enabled.

Read this Manual

In order to initialize the DX7 you will need to understand how some of the new settings work. Probably you should read ahead to the end of the manual then return here to complete the initialization. Things may be confusing at first, but will become clearer on the second pass.

If you haven't read the factory Yamaha DX7 user manual, well ... consider it.

Recommended Initialization

After installing the board, or any time the battery is changed, there will be some random data in the DX7 RAM. This includes the obvious scrambled patches, but it also includes the DX7 Function data and the new expansion settings.

So, you should:

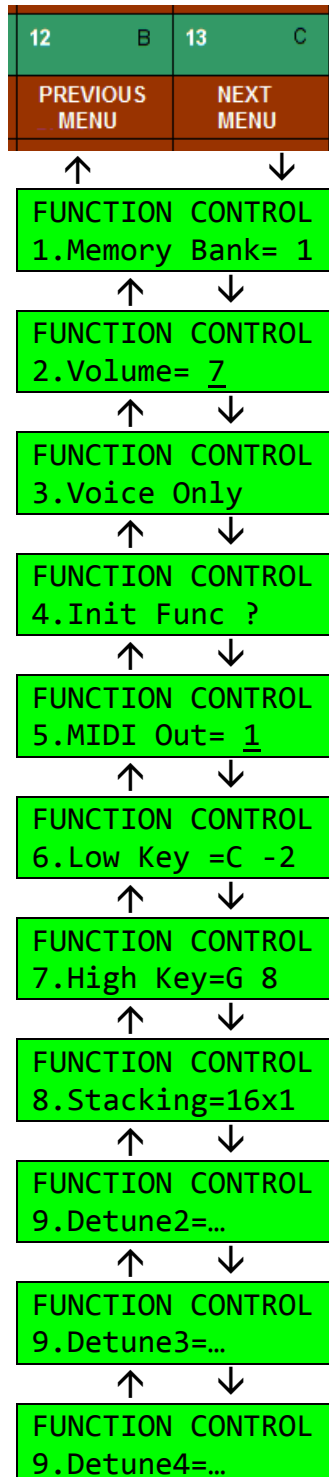
- set some basic expansion parameters (see below and next page),
- load some patch data to begin using your new DX-MAX(3)+, and
- check and set the standard Function parameters (Portamento time is a common one that gets randomized).

The following assumes you have some understanding of how to operate the DX7:

1. Turn the Internal Memory Protect OFF to enable saving settings and data.
2. Set the following basic DX-MAX expansion settings using the new menu (see instructions in the next section):
 - i. 1.Memory Bank = 1
 - ii. 2.Volume = 7
 - iii. 3.Voice or Voice+Function Data per patch = Voice Only
 - iv. *Skip over 4.Init Func ? for a moment*
 - v. 5.MIDI Out = 1 (or your preferred value)
 - vi. 6.Low Key = C-2
 - vii. 7.High Key = G8
 - viii. 8.Stacking = 16x1
 - ix. 9.Detune 2 Coarse = 0.
 - x. 9.Detune 2 Fine = .00
 - xi. 9.Detune 3 Coarse = 0.
 - xii. 9.Detune 3 Fine = .00
 - xiii. 9.Detune 4 Coarse = 0.
 - xiv. 9.Detune 4 Fine = .00
3. Now, go back and execute iv. 4.Init Func? by selecting that Function menu item and pressing YES twice.
4. Load some patches from cartridge or system exclusive into Bank 1. If Sys Ex is used, then Sys Info must be set to Available first from the stock MIDI menu.
5. Double-check each of the standard DX7 function parameters, such as Portamento Time, for validity.

2: Operation

All of the new operating parameters are accessed using button **12** and/or button **13** in Function mode. These two buttons take you up and down the list of new Function parameters and the menu wraps around if you press the same key repeatedly. The DX7 remembers the last activated Function parameter and it is “live” on the panel (data slider and Yes/No buttons) even in normal “play” mode.



2.1 Memory Bank Selection

Recall that the stock DX7 has 32 internal patches accessed by pressing the INTERNAL button and then one of the patch numbers 1 through 32.

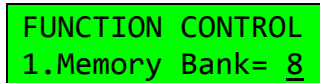
The DX-MAX(3)+ has eight banks of these to make the 256 patches.

As far as MIDI is concerned, there are only 128 basic patches selectable using the standard MIDI Patch Change command. Therefore, over MIDI, the selection stays within one half of the new overall DX7 patch memory ("Group A" or "Group B").

(Group A)	Bank 1	Patches 1 to 32	=	MIDI patch numbers 1 to 32.
	Bank 2*	Patches 1 to 32	=	MIDI patch numbers 33 to 64.
	Bank 3	Patches 1 to 32	=	MIDI patch numbers 65 to 96.
	Bank 4	Patches 1 to 32	=	MIDI patch numbers 97 to 128.
		- Or -		
(Group B)	Bank 5	Patches 1 to 32	=	MIDI patch numbers 1 to 32.
	Bank 6*	Patches 1 to 32	=	MIDI patch numbers 33 to 64.
	Bank 7	Patches 1 to 32	=	MIDI patch numbers 65 to 96.
	Bank 8	Patches 1 to 32	=	MIDI patch numbers 97 to 128.

* If the cartridge is preset it will be selected instead of Bank 2 or Bank 6.

To select a Bank and patch from the front panel, press Function button to activate Function Control. Using button 13 (Next Menu) or button 12 (Previous Menu), locate the menu item Memory Bank:



FUNCTION CONTROL
1.Memory Bank= 8

You can then select which bank is active using the Data Slider or + / - buttons. The **next** patch you select will come from the memory bank you chose. Even when you return to play mode (say, by pressing INT and/or a patch number), this function remains active, or "live", so you can continue to change banks with minimal button pressing. Please also see the **caveat** below.

A convenient way to select banks from your now expanded memory is to leave the most recently selected MEMORY BANK button "live" in Function mode. When you return to "play" mode the data entry control remains active on the memory bank parameter thus making easy to access all 256 patches.

When you select a patch via the front panel, its patch number (1 through 128) will be transmitted on the DX7's MIDI OUT. Again, this follows the table above.

Another way to select patches is through MIDI IN. The patch numbers correspond to the patch numbers 1 to 128 in the table above. That is, on receipt of a MIDI Program Change message on the correct MIDI channel, the correct bank and patch will be activated. **Note that if you have cartridge installed it will be played in place of Bank 2 or Bank 6.**

Each bank can be saved or loaded individually using a cartridge or over MIDI.

CAVEAT: Keep in mind that this operating rule is the same for any function button. That means, for example, if the most recently selected Function is Volume, it becomes the "live" function and you could accidentally turn the sound off without knowing the reason.

2.2 Patch Volume (can be saved per-patch)

```
FUNCTION CONTROL  
2.Volume= 7
```

The overall volume can be set to a value from 0 to 7. This allows you to trim the patch volume levels for the appropriate impact when playing live or switching from patch to patch.

This data can be saved per-patch if the Function Data Per-Patch setting is turned on.

2.3 Function Data: Per-Patch or Global

This setting determines whether or not there is one global set of Function Parameters or if the Function Parameters are set on a per-patch basis.

```
FUNCTION CONTROL  
3.Voice Only
```

The traditional setting for the original DX7 is that there is one global set of Function Parameters. You can continue this tradition by setting this item to Voice Only. This means that each patch contains only voice data. If you would prefer to save Function data with each patch, then set this item to Voice + Func.

In addition to the regular DX7 function parameters

- Poly/Mono, Portamento, Aftertouch, Pitchbend, Modulation Wheel and Breath Controller

the new parameters

- Volume, Active Keyboard Zone and Voice Stacking

are saved with each patch when this is enabled. If you don't utilize Function/Patch, then the Volume setting isn't really of much use since it will be global and there is already a dedicated analog Volume slider on the DX7.

2.4 Function Data: Initialization (Ed: to be verified)

This sets the Function Data to a known good state. This should be performed after board installation and whenever dubious function data is found (such as might happen after loading from a ROM or RAM cart or Sys Ex receive or changing the battery)

```
FUNCTION CONTROL  
4.Init Func ?_
```

To initialize the Function Data, simply locate this menu item and press the +/Yes button twice.

2.5 MIDI Transmit Channel (global parameter)

All of the MIDI settings are global, in that they are NOT saved with a patch. They are saved overall for the synthesizer.

```
FUNCTION CONTROL  
5.MIDI Out=16
```

The MIDI note data, patch changes, etc. will be transmitted on the MIDI Channel specified here. Using the Data slider or the Yes/No buttons, select the MIDI OUT channel you want, the range is 1 to 16.

Note: The MIDI IN channel is established via the standard DX7 Function button 8.

2.6/2.7 Active Keyboard Zone (can be saved per-patch) (Ed: to be verified)

This function specifies the zone or region of the keyboard that will control the DX7 by setting a Keyboard Low key and a Keyboard High key. It uses two screens:

```
FUNCTION CONTROL  
6.Low Key =C -2
```

```
FUNCTION CONTROL  
7.High Key=G 8
```

The first screen sets the lowest note that will activate the internal sound. The second screen sets the highest note that will activate the internal sound. The range is from C-2 to G8.

The value is chosen using the Data Slider or the + / - buttons.

Played notes outside the Active Key Zone will still be sent out on the MIDI transmit channel.

This data can be saved per-patch if the Function Data Per-Patch setting is turned on.

2.8/2.9 Voice Stack and Detune (can be saved per-patch)

The last three screens are used to set the Voice stacking mode and detuning of the extra voices.

DX-MAX(3)+ allows you to stack a DX7 patch in modes of 16x1 (standard, no stacking), 8x2 or 4x4. Each of the extra voices can have its pitch offset. Thus you can create not only chorus/flange type effects, but also octave and chording.

```
FUNCTION CONTROL  
8.Stacking=8x2
```

To utilize this feature, the first step is to select which Voice Stack mode you would like. There are up to three additional voices, or copies of the patch, available. The additional voices are called "2", "3" and "4". You access each in turn by pressing the same function button over and over again.

- If you are in mode 16x1, then only the original Voice1 is used. All Detune settings are ignored.
- If you are in 8x2 then the original Voice1 and Voice2 (Detune2 coarse and fine) are used. The detune settings for 3 and 4 are ignored.
- If you are in 4x4 then all voices detunings are used.

Stack Voice Coarse Pitch: Here you can set the coarse pitch for each of the three additional voices in semitones from -24 to +24. The modifiable coarse value is the whole number portion to the left of the decimal point

Stack Voice Fine Pitch: Here you can set the fine pitch for each of the three additional voices in cents from .00 to .99. The modifiable fine value is the fractional portion after the decimal point.

```
Voice Stack Mode
9.Detune2=-12.00
```

```
Voice Stack Mode
9.Detune2=-12.00
```

```
Voice Stack Mode
9.Detune3=- 5.00
```

```
Voice Stack Mode
9.Detune3=- 5.00
```

```
Voice Stack Mode
9.Detune4= 7.00
```

```
Voice Stack Mode
9.Detune4= 7.00
```

If you want a negative fine adjustment alone, start with -0.00 and then adjust the Fine setting.

This data can be saved per-patch if the Function Data Per-Patch setting is turned on.

MIDI Note-On Velocity Fix [v1.30+ only]

The stock DX7 keyboard has a restricted range on the maximum MIDI Note-On velocity it transmits. If you strike a key extremely hard you can get a maximum velocity out of 118 (\$76 hex). A hardware fix has been included that allows the player to obtain full MIDI Note-On velocity of 127 (\$7F hex) without fear of damaging the keyboard.

The DX-MAX(3)+ circuit board has a switch, S1, that allows you to change between default (0) and full velocity (+3) operation. This switch is not intended to be changed on-the-fly with the power on, but you can try it for an A:B comparison **if your patches are backed up**.

When the switch is to the right, the setting is +0 (stock). When the switch is to the left, the setting is +3 (enhanced). Remember, you can verify this setting by doing a Function+16+32 version check.

3.0 Expansion At-a-Glance

New Setting	Values	Description
MEMORY BANK	1 .. 8	DX-MAX gives 7 extra banks
VOLUME	1 .. 7	Master Volume
PATCH STORES VOICE OR VOICE+FUNC	Voice Only or Voice + Func	Whether the Function data is global or if each patch has its own Function data
INIT FUNCTION		
MIDI OUT	1 .. 16	MIDI channel out
LOWEST ACTIVE KEY	C-2 .. G8	Low key limit
HIGHEST ACTIVE KEY	C-2 .. G8	High key limit
VOICE STACKING	16x1, 8x2, 4x4	16 x 1 = normal polyphonic mode New Stack Modes: - 8 x 2 voices (uses Detune 2) - 4 x 4 voices (uses Detune 2, 3 and 4)
DETUNE 2 COARSE, DETUNE 2 FINE	Course.Fine	Note [1] Used in 8x2 and 4x4 only
DETUNE 3 COARSE, DETUNE 3 FINE	Course.Fine	Note [1] Used in 4x4 only
DETUNE 4 COARSE, DETUNE 4 FINE	Course.Fine	Note [1] Used in 4x4 only

Note [1]- Number before the dot: sets the coarse tuning of voice 2, 3 or 4 (-24 to +24 semitones).
- Number after the dot: sets the fine tuning of voice 2, 3 or 4 (0 to 99 cents).

Enjoy your updated DX7!
See the MTG web site for more great vintage synth and drum machine goodies.