
Music Technologies Group



Yamaha DX7 SuperMAX+ User Guide

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1: Introduction

The SuperMAX+ is a very powerful option board that provides increased memory and greater control of the legendary Yamaha DX7 synthesizer.

SuperMAX Features

- Memory Expansion: Sixteen banks of 32 patches equaling 512 patches total. Two banks of "factory" patches are included.
- Voice Stacking: You can stack and detune two, three or four voices of the same patch. You then have a choice of 16x1, 8x2, 5x3 or 4x4 polyphony. The detuning can provide chorus effect and/or chording and/or octaves (for example).
- Voice Delay: Add additional notes of the same or different pitch, delayed from 10ms to 10s for each note you play.
- Arpeggiator: You can predefine 32 types of arpeggiation over part or all of the keyboard.
- Sound Creation and Morphing: New patches can be developed and existing ones can be selected live by pitch/mod wheel, velocity, random, etc.
- Temperament: You can predefine 4 different keyboard tunings.
- Programmable master volume.
- Programmable keyboard zones, MIDI zones and MIDI channel.

SuperMAX+ Features

- Addition of mounting hardware makes SuperMAX+ more stable than the original.
- Included battery holder option will save wear and tear on the DX7 main board from battery re-soldering and leakage.
- Minor bug fixes and cosmetic changes to the user interface (LCD menus).
- Supported by someone that supports the original developer, not rips him off.
- Faster boot-up. Reduced boot time by about 1.5 seconds. [v2.10+]
- Fixed a Yamaha bug in the oscillator frequency table. (*Affects stock DX7's before v1.8, original SuperMAX and unlicensed SuperMAX clones. Unknown which other expansions are affected.*) [v2.10+]
- [Rev B] Hardware-selectable MIDI Velocity Offset fixes the stock DX7 velocity issue.

Documentation Disclaimer

The SuperMAX was originally developed in the mid-80's by MAXsystems in France. The "SuperMAX+" 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 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 SuperMAX+ 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

This document is broken up into chapters based on the building blocks that SuperMAX provides such as Arpeggiator, Delay, Stacking, Temperament, etc. Also, an attempt is made to follow the panel numbering in order where possible.

Inside each chapter the panel buttons for that feature are described. In some cases there is spillover from one chapter to another due to the nature of SuperMAX.

It is recommended that you read the manual several times and then the operation and functional sections will be much clearer. This is a powerful expansion that many of us are learning about for the first time ever, nearly 30 years after it was released. Compared to other expansion options, it's really fairly easy to use (once you have a good manual for it, wink wink).

2: Starting Out

The first time you power-up the DX7 with the SuperMAX installed, and in fact any time the battery is changed, there will be a 5-second delay before the greeting message is seen. This is normal, do not panic. The greeting message should look something like this:

```
* Welcome to *  
* SuperMAX+! *
```

All 16 of the memory banks are now filled with the 2 banks of SuperMAX "factory" sounds. You can overwrite any or all of these sounds, but make sure to read the tips later in this document before you begin to do so!

Description

SuperMAX has 512 memory locations (16 banks) and you can store in each location:

- the sound patch/voice, plus
- all of the parameters of the normal DX7 functions, plus
- the new parameters of SuperMAX functions.

Ignoring the patch/voice elements for the moment, these programmable values are:

DX7 Functions:

- Mono/Poly
- Pitch Bend (Range and Step)
- Portamento (Mode, Glissando and Time)
- Modulation Wheel (Range and Assignment: Pitch, Amplitude, EG Bias)
- Foot Controller (Range and Assignment: Pitch, Amplitude, EG Bias)
- Breath Controller (Range and Assignment: Pitch, Amplitude, EG Bias)
- Aftertouch Control: (Range and Assignment: Pitch, Amplitude, EG Bias)

SuperMAX Functions:

- Master Volume
- Keyboard Zone Limit Keys (Low and High)
- MIDI Keyboard Zone Limit Keys (Low and High)
- MIDI Channel Out
- Arpeggiator Preset Number
- Delay Time, Volume, Feedback, Pitch Transpose and Hold
- Voice Stack Mode Volumes and Pitches, Coarse and Fine
- Patch Creation/Morphing (Rolling Mode, Sound Creator, Velocity Cross-switch)

Saving and Loading

You can save a complete bank of 32 sounds and functions to any RAM cartridge in 3 possible formats:

- SuperMAX Format, DX-MAX Format or standard DX7 Format. DX-MAX is another MAXsystems product that preceded the SuperMAX.

When you load patches from a cartridge, SuperMAX is able to automatically recognize the right format:

- If the cartridge is in DX-MAX Format all functions not used by DX-MAX are set to zero (0).
- If it's in DX7 Format, the default values for the extra SuperMAX parameters are those in the EDIT BUFFER!

So, if you want to load a memory bank from a cartridge with a standard DX7 Format, then **prepare the EDIT BUFFER with the SuperMAX values you want and all the 32 memories will be initialized with these values!** You have to do the same for MIDI receive (MIDI transmit only sends the voice memories). If your loaded voices have unintended arpeggiation, voice stacking or delays, this is why. One solution is to select/edit a patch first that is "clean" of delays, stacking, etc. For your convenience, the Appendix has a patch list for the SuperMAX factory sounds.

Function Page Selection

*For reference, see the full color **Panel Layout** in the Appendix.*

BUTTON 13: Function Page Select

The new functions are accessible by pressing the Function button #13 which is the PAGE CHANGE function. You can switch alternatively from one page to the other by pressing Function button #13.

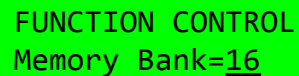
- Page 1 is the normal DX7 function list plus "Memory Bank Select" on Function button #12
- Page 2 is the "SuperMAX new functions" list

There is no unique LCD message for this operation. Each Function Page remembers your last position (your last button press on that page). This button is **active for both Page 1 and Page 2** so that you can toggle back and forth.

Memory Bank Selection

BUTTON 12: Memory Bank Select

The function assigned to previously unused button #12 (**Page 1 only!**) is now Memory Bank Select. Pressing Function, then 12 brings up this screen.



FUNCTION CONTROL
Memory Bank=16

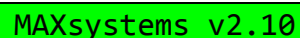
You can then select which bank is active using the Data Slider or + / - buttons. The **next** patch you select will come from the memory bank you choose. When you return to play mode (say, by pressing INT and/or a patch number), this function remains active so you can continue to change banks with minimal 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 512 voices.

CAVEAT: Keep in mind that this is the same for any function button. That means for example: if the most recently selected Function is (Page 2) SUPERMAX CONTROL KEY CONTROL (also on button #12) you could disconnect the keyboard (LOCAL OFF) without knowing the reason but on the other hand it can be very useful with other functions. For example: if the most recently selected function is TEMPERAMENT (button #14), you can change the keyboard temperament in "play" mode.

Version Check

You can check the version of your SuperMAX+ by pressing the brown FUNCTION key and while holding it down press and hold 16 and 32. You should see a version message such as:



MAXsystems v2.10

With stock Yamaha ROMs you will be prompted to enter Test Mode. Other expansions may offer part of the test mode or some other message.

[Rev B] The latest revision of the SuperMAX+ board has a physical switch on the circuit board that lets you add a velocity offset to the DX7's MIDI note data. This screen will say "Vel=+0" (normal) or "Vel=+3" (offset applied) depending on the position of said switch.

3: Arpeggiator

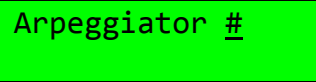
Each of your SuperMAX patches will reference one of the thirty-two arpeggiators stored in the SuperMAX memory. It's essential you leave at least one of these 32 arpeggiators "off" so that patches that don't utilize arpeggiation can reference that particular arpeggiator.

There are other buttons that associate the Arpeggiators with specific patches. That information is covered later. This section deals only with how a specific arpeggiator should operate.

Selection

When designing your arpeggiation "styles", the first thing to do is select which of the 32 arpeggiator slots you are working with.

BUTTON 1: Arpeggiator Select



Arpeggiator #

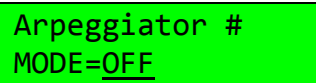
Using the Data Slider or + / - buttons, choose one of the arpeggiators 1 through 32 for editing. Once selected, the remaining buttons in this family, Button 2 through Button 10 are used to set the parameters for each arpeggiator.

If the patch you are using already has an arpeggiator assigned, it's number will automatically be copied to this screen when you press this button. This allows a moderately easy way to go from patch to patch and see which arpeggiator is selected for it.

Editing

BUTTON 2: Edit Arpeggiator Mode/Direction

Set the selected arpeggiator's direction. You can also turn off the arpeggiator here.



Arpeggiator #
MODE=OFF

The choices for MODE are:

- OFF = Arpeggiator is off
- UP = Arpeggio from low to high
- DOWN = Arpeggio from high to low
- UP/DOWN = Arpeggio from low->high then from high->low
- BACKWARD ASSIGN = Arpeggio reversed from the played notes
- FORWARD ASSIGN = Arpeggio from the played notes
- RANDOM = Random arpeggio from the played notes

BUTTON 3: Edit Arpeggiator Key Latch

```
Arpeggiator #  
LATCH=OFF
```

The choices for LATCH are:

- OFF = Arpeggio stops when your hands leave the keyboard
- AUTO = Holds the arpeggio, when you play new notes the old ones stop to leave place to the new ones
- EXTEND = Like AUTO but the old notes does not stop. To reinitialize the EXTEND mode press YES/+

BUTTON 4: EDIT Arpeggiator Velocity

```
Arpeggiator #  
VELOCITY=PLAYED
```

The choices for VELOCITY are:

- PLAYED = each note will be played back with its original velocity
- FIXED = each note will be played back with a fixed velocity
- RANDOM = each note will be played back with a random velocity (randomized on the middle range)
- RANDOM+ = each note will be played back with a random velocity (randomized on the full velocity range)

BUTTON 5: EDIT Arpeggiator Extend Number/Length

```
Arpeggiator #  
NUMBER OF EXT= 0
```

The range is 0 to 7. This is the number of times that a note is repeated or an arpeggio transposed.

BUTTON 6: EDIT Arpeggiator Extend Mode

```
Arpeggiator #  
EXT MODE=REPEAT
```

The choices for EXT MODE are:

- REPEAT = Each note is repeated as many times as chosen in Func #5
- RANDOM = The number of repetitions is random (the maximum value is the one chosen in func #5)
- ROTATE = The whole arpeggio is transposed as many times as chosen in Func #5
- EVOLVE = The same as ROTATE but the notes of the arpeggio are transposed only one after the other in an evolutionary manner.

BUTTON 7: EDIT Arpeggiator Extend Interval

```
Arpeggiator #  
INTERVAL=12
```

The range is 0 to 12 in semitones. This is the interval of transposition for each extension.

BUTTON 8: EDIT Arpeggiator Low Limit Key and High Limit Key

```
Arpeggiator #  
LIMIT KEY L=C -2
```

```
Arpeggiator #  
LIMIT KEY H=G 8
```

Select the keyboard zone for the arpeggiator. Press Button 8 to set the lower key, then press Button 8 again to set the higher key. The value is chosen using the Data Slider or the + / - buttons.

BUTTON 9: EDIT Arpeggiator Gate Time

```
Arpeggiator #  
GATE TIME=1/2
```

The choices for GATE TIME are 1/2, 1/4, 1/8, 1/16. This allows the EG to transition through it's envelope.

BUTTON 10: EDIT Arpeggiator Tempo/Clock

```
Arpeggiator #  
TEMPO= 80
```

The range for the TEMPO setting is 40 through 240 BPM and additional values for MIDI Clock IN are MIDI/4, MIDI/2, MIDIx1, MIDIx2, MIDIx4.

In Use

When using the arpeggiator, the first decision you need to make is whether one arpeggiator is used for the entire DX7 or whether each patch can select it's own arpeggiator.

BUTTON 11: SuperMAX Arpeggiator Control, Global or Per-Patch

```
SupMAX Control  
ARPEGGIATOR=RAM
```

With Arpeggiator Control set to =RAM (Patch Memory), each patch has its own arpeggiator. In this case the patch establishes the arpeggiator it wants to use with patch parameter Func #21 (see below).

With Arpeggiator Control set to =1, all the patches use Arpeggiator #1. This mode enables you to listen to your various presets either without an arpeggiator, or with a common arpeggiator. You may choose to have preset 1 turned off if you do not wish to use an arpeggiator while auditioning sounds.

BUTTON 21: Patch Arpeggiator Number

```
SupMAX Function  
ARPEGGIATOR= 1
```

You can choose any of the 32 preset arpeggiators for each sound (if Func #11 = RAM). Function #21 sets the arpeggiator number for the active patch. If you don't want arpeggiation, select an arpeggiator that has it's MODE setting set to OFF.

NOTE: *The notes generated by the Arpeggiator can be sent out over MIDI. Please see Func #19 and Func #20 to enable this feature.*

4: Temperament

There are four temperaments in the SuperMAX. Whichever one you select is "live" for both use and editing.

Selection

BUTTON 14: Temperament Select

```
Temperament #  
95.00 B 5
```

Using the Data Slider or + / - buttons, choose a temperament number, 1 through 4. This chooses the temperament for playing (live) as well as editing.

The information on the second line is informational only. You need to use a different button (below) to edit it. The second line shows the tuning for the last key played and the key number itself. The information is live so you can play different keys to see the tuning.

Editing

BUTTON 15: Edit Temperament Coarse Pitch

```
Temperament #  
COAR= 95.00 B 5
```

Play a key to adjust the pitch for. You will see the key number on the right hand side of the bottom line. Then use the Data Slider to set the coarse pitch (whole part) from 0 to 127.

BUTTON 16: Edit Temperament Fine Pitch

```
Temperament #  
COAR= 95.00 B 5
```

Play a key to adjust the pitch for. You will see the key number on the right hand side of the bottom line. Then use the Data Slider to set the fine pitch (cents or fractional part) from 0 to 99.

In Use

You are already using it. You can't turn this feature off, just select the temperament (1 to 4) of your choice.

5: Top-Level Control Settings

There are two settings that determine which additional parameters get saved with a patch.

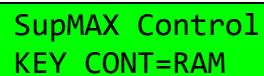
- Button 11 "SUPERMAX CONTROL ARPEGGIATOR", discussed earlier in the Arpeggiator chapter, sets whether each patch has it's own arpeggiator (setting = RAM) or if there is one global arpeggiator (setting = 1).
- Button 12 "SUPERMAX CONTROL KEY CONT", discussed here, performs a somewhat similar oversight for the keyboard zone setting discussed later in the next chapter.

BUTTON 11: SuperMAX Arpeggiator Control, Global or Per-Patch

See the "In Use" section of the Arpeggiator chapter for more information about this item.

BUTTON 12: SuperMAX Keyboard Control

This function establishes whether the keyboard is turned on or off and whether the active region is set globally or per-patch.



SupMAX Control
KEY CONT=RAM

The choices for CONT are:

- OFF = This turns the keyboard off such that it does not control the DX7 (also known as LOCAL OFF).
- RAM = Each patch has its own Keyboard ZONE (limit keys) chosen in Func #18 and its own MIDI KEY OUT mode chosen in Func #19.
- NORMAL = The Keyboard ZONE and the MIDI KEY OUT mode that you set is the same for all patches.

6: Patch Function Settings

There are several new SuperMAX parameters that can be saved with each patch. These include volume, keyboard zones, MIDI channel out and which arpeggiator the patch is assigned to use.

See the previous chapter as well because the keyboard zone and arpeggiator number can be overridden by a global value.

BUTTON 17: Set Patch Master Volume

```
SupMAX Function  
MASTER VOLUME= 7
```

The overall volume for the patch 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.

BUTTON 18: Set Patch Keyboard Zone, Limit Key Low and High

```
SupMAX Function  
LIMIT KEY L=C -2
```

```
SupMAX Function  
LIMIT KEY H=G 8
```

This function specifies the zone or region of the keyboard that will control the DX7 by setting a Low Limit Key and a High Limit Key. The next button, Func #19, then expands on how the zoning is utilized.

Press Button 18 to set the lower key, then press Button 18 again to set the higher key. The value is chosen using the Data Slider or the + / - buttons.

BUTTON 19: Set Patch MIDI Out Keyboard Region

```
SupMAX Function  
MIDI KEY OUT=ALL
```

This section determines how the zoning specified in Func #18 is used (which key data is sent out over MIDI). This allows you to use part of the keyboard for local sound generation and part of it for MIDI control of another synthesizer.

The choices for MIDI KEY OUT are:

- MID = The middle portion of the keyboard higher than LIMIT KEY L and lower than LIMIT KEY H is active.
- LEF = The keyboard zone to the left (below) LIMIT KEY L is active.
- RIG = The keyboard zone to the right (above) LIMIT KEY H is active.
- L+R = The keyboard zones below LIMIT KEY L and above LIMIT KEY H are active.
- ALL = The entire keyboard is active. The zones set by LIMIT KEY L and H are ignored.
- DEL = Only note information from the DELAY will be transmitted.
- ARP = Only note information from the ARPEGGIATOR will be sent.

BUTTON 20: Set Patch MIDI Out Channel

```
SupMAX Function  
MIDI CH OUT= 1
```

The MIDI note data transmitted (as defined in the previous sections) will be sent out on the MIDI Channel specified here. The range is 1 to 16.

BUTTON 21: Set Patch Arpeggiator Number

See the "In Use" section of the Arpeggiator chapter for more information about this item.

7: Delay

SuperMAX provides several programmable Delay parameters for a variety of digital delay effects that greatly expand the DX7's sound capabilities.

BUTTON 22: Delay Time

```
SupMAX Function  
DELAY TIME= 80
```

The Delay Time can be set from 10 to 9930 milliseconds.

BUTTON 23: Delay Volume

```
SupMAX Function  
DELAY VOLUME= 0
```

The Delay Volume can be set from 0 to 3. **When the Delay Volume is set to zero, this feature is off.**

BUTTON 24: Delay Feedback

```
SupMAX Function  
DELAY FDBACK= 0
```

The Delay Feedback range can be set from 0 to 15. Don't forget that the DX7 is only 16-note polyphonic and that the delay uses up polyphony. However, the feedback is very effective and it's rare to need a lot of feedback

BUTTON 25: Delay Pitch Transpose

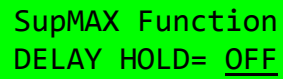
```
SupMAX Function  
DELAY P.T.= 0.08
```

```
SupMAX Function  
DELAY P.T.= 0.08
```

With each repeat the pitch increases by the value set here. There are two scales.

- Scale 1 is the fractional part .00 to .99 (cents/hundredths of a semitone).
- Scale 2 is the whole number of semitones (0 to 12).

BUTTON 26: Delay Hold



SupMAX Function
DELAY HOLD= OFF

The Delay Hold can be turned ON or OFF. You can clear the notes and start over by pressing the "Yes/+1" button.

8: Voice Stacking

SuperMAX allows you to stack a DX7 patch in modes of 16x1 (standard, no stacking), 8x2, 5x3 or 4x4. Each of the extra three voices can have it's own volume and pitch. Thus you can create not only chorus/flange type effects, but also octave and chording.

BUTTON 27: Stack Voice Volumes

There are up to three additional voices, or copies of the patch, available in this mode. How many of the three are "turned up" determines the stacking arrangement. So you don't need to concern yourself with selecting a stacking scenario, only how many volumes to set non-zero.

The three additional voices are called "2", "3" and "4". You access each in a circular fashion by pressing the same function button over and over again. In this case it is Func #27.

```
Voice Stack Mode  
VOLUME 2= 0
```

```
Voice Stack Mode  
VOLUME 3= 0
```

```
Voice Stack Mode  
VOLUME 4= 0
```

The range of volume for each voice is 0 to 3. **To completely disable this feature, set all volumes to zero.**

BUTTON 28: Stack Voice Coarse Pitch

```
Voice Stack Mode  
COARSE 2=-12.00
```

```
Voice Stack Mode  
COARSE 3=- 5.00
```

```
Voice Stack Mode  
COARSE 4= 7.00
```

Here you can set the coarse pitch for each of the three additional voices in semitones from -24 to +24.

BUTTON 29: Stack Voice Fine Pitch

```
Voice Stack Mode  
FINE 2=-12.00
```

```
Voice Stack Mode  
FINE 3=- 5.00
```

```
Voice Stack Mode  
FINE 4= 7.00
```

Here you can set the fine pitch for each of the three additional voices in cents from .00 to .99.

9: Patch Creation/Morphing

The Rolling Mode, Sound Creator and Velocity Cross-switch modes allow as many as 4 separate sounds to be assigned to a performance controller and then used in a rotational or random manner.

The Sound Creator can also be used to reveal sounds that exist between 2 user-selectable sounds. In this way, limitless new sounds can be created without extensive FM programming knowledge. The resulting sound can be saved in any of the 32 memories in each bank.

BUTTON 30: Select Patch Creation/Morphing Mode

Rolling Mode

Sound Creator

Velocity XSwitch

By using the Data Slider or +/- buttons you can select the mode you wish to employ. All three options are shown above.

BUTTON 31(a): Choose Rolling Mode Controller

Once you have selected Rolling Mode, you must then set the controller that causes the patch to switch/morph.

Rolling Mode
CONT=OFF

The choices for CONT are:

- OFF = Disabled.
- WHEEL = Use the Modulation Wheel to change from the primary sound to the others selected in Func #32 (below).
- P.BEND = The primary sound is available with the Pitch Bend Wheel in it's central position. Sound 2 when bend is up and sound 3 when bend is down.

- RANDOM = Any of the 4 sounds chosen at random.
- ROTATE = The sound changes with each key down, in the order chosen in Fun #32 (below).

BUTTON 31(b): Choose Sound Creator Controller

Once you have selected Sound Creator, you must then set the controller that causes the patch to vary.

Sound Creator
CONT=OFF

The choices for CONT are:

- OFF = Disabled.
- WHEEL = Start with the primary sound and move to the second sound chosen in Func #32 (below) by morphing through 126 possible sound combinations that exist between them using the Modulation Wheel.
- P.BEND = Similar to WHEEL control. Morph to the 2nd sound by moving the Pitch Bend Wheel up; to the 3rd sound when bend is down.
- RANDOM = A sample/hold chooses any of the values between two selected sounds.

BUTTON 31(c): Choose Velocity Cross-switch Control Velocity

Once you have selected Velocity Cross-switch, you must then set the controller velocity that causes the patch to vary.

Velocity XSwitch
CONT=OFF

The range of values for CONT is OFF and 1 to 7. This sets the touch sensitivity value to change from the primary sound to the other ones.

BUTTON 32(a): Choose Rolling Mode Patches

Once you have selected Rolling Mode, you must choose the patches that it utilizes. Repeated pressing on Func #32 gives you access to Patch 2, Patch 3 and Patch 4.

Rolling Mode
PATCH 2= 1

PATCH 3= 1

PATCH 4= 1

Once the patch in question is visible (2, 3 or 4) then the patch value on the right can be adjusted in the range of 1 to 32.

BUTTON 32(b): Choose Sound Creator Patches

Once you have selected Sound Creator, you must choose the patches that it utilizes. Repeated pressing on Func #32 gives you access to Patch 2, Patch 3 and Patch 4.

Sound Creator
PATCH 2= 1

PATCH 3= 1

PATCH 4= 1

Once the patch in question is visible (2, 3 or 4) then the patch value on the right can be adjusted in the range of 1 to 32. The number of patches available for setting up depends on the controller chosen in the previous step CONT=.

BUTTON 32(c): Choose Velocity Cross-switch Patches

Once you have selected Velocity Cross-switch, you must choose the other patches that it utilizes.

Velocity XSwitch
PATCH 2= 1

PATCH 3= 1

PATCH 4= 1

Adjust the patch value on the right from 1 to 32.

NOTE: Not all modes utilizes all the additional patches.

10: MIDI

MIDI Memory Bank Selection

Recall that the DX7 has 32 internal patches accessed by pressing the INTERNAL button and then one of the patch numbers 1 through 32. The later versions of the stock DX7 OS also support MIDI patch number 33 through 64 for accessing a cartridge if a cartridge is installed.

The SuperMAX extends this to 4 full banks (128 patches):

Bank 1	Patches 1 to 32	=	MIDI patch numbers 1 to 32.
Bank 2	Patches 1 to 32	=	MIDI patch numbers 33 to 64 or CART.
Bank 3	Patches 1 to 32	=	MIDI patch numbers 65 to 96.
Bank 4	Patches 1 to 32	=	MIDI patch numbers 97 to 128.

This is true for both MIDI send and receive. When you select a patch via the front panel, its patch number (1 through 128) will be transmitted on the DX7's MIDI OUT. When a MIDI patch change is received it will select the bank automatically.

CAVEAT: Things seem to be a bit less predictable when you are using the upper banks (beyond Bank 4). Try it out to make sure you know how the DX7 behaves before a live gig.

Each bank must be saved or loaded individually using a cartridge. MIDI dumps can be used if no special SuperMAX features are utilized in that bank. See also: "Saving and Loading" (page 6).

MIDI Note-On Velocity Fix

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 keybed.

The SuperMAX+ 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 toward the front of the synth (the keybed), the setting is +3. When the switch is toward the back panel, the setting is +0 (normal).

Other MIDI Additions

The following Continuous Controller and System Real-Time Messages functions were added. These have not been fully tested or characterized by the author.

CC	# 122	Local Control On/Off
CC	# 124	Omni Off
CC	# 125	Omni On
\$F8	MIDI Clock	See the “Arpeggiator Tempo/Clock” section.
\$FA	MIDI Start	See the “Arpeggiator Tempo/Clock” section.

There are probably other MIDI features yet to be discovered!

11: Tips & Troubleshooting

1. Keep in mind that the DX7 has only 16 voices that are used to generate all of the instruments sounds and effects. When excessive delay is used or a combination of several effects or too many notes are played, some of the notes may not sound. For example, a 4x4 stack, a delay of 10ms and a feedback of 15 sounding together requires 64 voices within 150ms. The SuperMAX has been designed to use the DX7's voices intelligently to allow you to play as fully as possible.
2. Arpeggiator, Delay and Stack Mode are inactive in MONO MODE though Rolling Mode, Sound Creator and Velocity XSwitch can be used.
3. A convenient way to select banks from SuperMAX's expanded memory is to have the most recently selected Memory Bank (Func #12, Page 1) live in the "Function" mode. When you return to the "Play" mode the data entry controls remain live on the Memory Bank parameter making it easier to access the rest of your programs. This also holds true for any function meaning that any function can be modified in the "Play" mode.
4. You can SAVE a complete bank of 32 sounds and functions on any RAM cartridge in either DX7 format, DX-MAX format or SuperMAX format.
5. When you LOAD a cartridge SuperMAX is able to recognize the appropriate format automatically. If the cartridge is in the DX-MAX format, all of the functions that the DX-MAX ignores are set to "0". If the cartridge is in the DX7 format the default values for each sound are those in the EDIT BUFFER. Therefore, to load a bank from a DX7 formatted cartridge, prepare the EDIT BUFFER with the values you want all 32 memory locations to be initialized with. Do the same for a MIDI Receive. Note that MIDI Transmit only sends the voice information.
6. If you hear no sound from your DX7 check the following:
 - MONO MODE (Func #2, Page 1) should not be used. Choose POLY.
 - MASTER VOLUME is set to 0. Raise the value on Func #17, Page 2.
 - The Low and/or High Key Limit values are inappropriate. Modify Func #8, Page 2.
 - KEY CONT is set to Local OFF. Check Func #12, page 2.
 - The ARPEGGIATOR is set to use MIDI clock in and no such clock is present.
7. If the Arpeggiator does not work, check the following:
 - If the global Arpeggiator is enabled (Func #11, Page 2) rather than the per-patch choice, then make sure when selecting an Arpeggiator for editing that you are using Arpeggiator #1 (Func #1, Page 2).

- If the global Arpeggiator is disabled (Func #11, Page 2) then you are using a per-patch Arpeggiator. Make sure that the one chosen by your patch (Func #21, Page 2) is the same as the one you are editing (Func #1, Page 2).
- Check that the Low and/or High Arpeggiator KEY LIMIT values are appropriate (Func #8, page 2).
- If the Arpeggiator slows down it is because the processor is too busy to service all the required voices in a timely manner. See TIP #1. When the Arpeggiator is set to run off of a MIDI Clock, that clock has priority to allow the MIDI sub-system to function without synchronization problems.

Appendix A: SuperMAX Factory Sounds

First Bank		A	D	S	+
1	Caligula		Y	Y	
2	Prokofiev		Y	Y	C
3	StackSynth			Y	C
4	BrassFatty		Y	Y	C
5	Univers 0	Y	Y	Y	C
6	H. Berlioz		Y	Y	
7	Mussorgsky		Y		
8	T.Rundgren		Y		C
9	Orchid		Y	Y	
10	Beverley	Y	Y	Y	C
11	Balian	Y	Y		
12	12StrGuit.		Y	Y	
13	12 Stg Gtr		Y	Y	
14	GothicBell		Y	Y	
15	Gregorian-		Y		
16	RadioChoir		Y	Y	C
17	AfriTumbaW	Y	Y	Y	
18	Runny-Pno	Y			
19	Arpg Piano	Y	Y		
20	ErikSatie		Y	Y	
21	PianoChord			Y	
22	Chorus-Pno			Y	
23	HiStackPno			Y	
24	RuneChopNo		Y		
25	Falk			Y	
26	Peking			Y	C
27	Berlin			Y	
28	B52s Organ		Y	Y	C
29	Buxtehude			Y	
30	Necromance			Y	C
31	Tub. Space		Y	Y	C
32	Burning...		Y	Y	

Second Bank		A	D	S	+
1	Roundabout	Y	Y		R
2	BottleBell	Y	Y	Y	C
3	5th Synth.		Y	Y	C
4	JazRokArpg	Y	Y	Y	R
5	T. Riley	Y	Y	Y	C
6	P. Glass	Y	Y	Y	V
7	Murder			Y	
8	*maracas		Y		
9	JP8-PWM	Y	Y		
10	Fripp			Y	C
11	K.Crimson		Y	Y	
12	Drummy	Y	Y	Y	R
13	Debussy		Y	Y	
14	G.Mahler		Y	Y	C
15	Beethoven		Y	Y	
16	StarTrek--		Y	Y	
17	Wah-Choir		Y	Y	
18	DancinFlut	Y	Y		
19	SnareDrum			Y	
20	SpookChord		Y	Y	
21	Zol.Kodaly		Y	Y	
22	Dark Age		Y	Y	
23	Mohamed	Y			V
24	<Pluk>Echo		Y	Y	
25	PercuRotat				R
26	SpaceyEcho		Y		C
27	Bel.Bartok		Y	Y	
28	Rimsky-Kor		Y	Y	C
29	Hindemith	Y	Y	Y	
30	B. Martinu	Y	Y	Y	C
31	New York				
32	Chromosome		Y	Y	C

- A = Utilizes arpeggiator. Factory patches with no Arp are actually using Arp #1 or Arp #6. These two Arpeggiators are turned OFF by default in the Factory settings.
- D = Utilizes delay (delay volume is non-zero).
- S = Utilizes stacking (one or more stack voice volumes are non-zero).
- + = Patches feature **R**olling Mode, **S**ound **C**reator or **V**elocity **X**Switch.

Bank 2, Patch 31 "New York" is the only factory patch "free" of any additional effects.

Appendix B: Panel Layout

See the following two pages for the DX7 panel layout showing from top to bottom for each button:

- Standard DX7 EDIT/COMPARE operation in **violet on brown** .
- Standard DX7 **white on green** number/letter BUTTON.
- Standard DX7 FUNCTION in **tan on brown** .
(Plus new "Memory Bank" and new "Page Select").
- New SuperMAX FUNCTION in **black is the new orange** .
("Page Select" appears here too).

The first three items above are more-or-less standard DX7 features, the last one is for the new SuperMAX feature set.

Keep these two manual pages handy as you read through the manual or use your upgraded DX7.

EDIT/ COMPARE	OPERATOR ON-OFF / EG COPY								
	1	2	3	4	5	6	ALGORITHM	FEEDBACK	
BUTTON	1	2	3	4	5	6	7	8	
Page 1: DX7 FUNCTION	MASTER TUNE ADJ	POLY / MONO		RANGE	STEP	MODE	GLISSANDO	TIME	MIDI
		PITCH BEND							
Page 2: SuperMAX+ FUNCTION	ARP SELECT	MODE / DIRECTION	KEY LATCH	VELOCITY	ENTEND NUMBER	EXTEND MODE	INTERVAL	LIMIT KEY L/H	ARPEGGIATOR EDIT

EDIT/ COMPARE	OSCILLATOR							
	MODE / SYNC	FREQ COARSE	FREQ FINE	DETUNE	RATE	LEVEL	BREAK POINT	CURVE
BUTTON	17	18	19	20	21	22	23	24
Page 1: DX7 FUNCTION	RANGE	PITCH	AMPLITUDE	EG BIAS	RANGE	PITCH	AMPLITUDE	EG BIAS
Page 2: SuperMAX+ FUNCTION	MASTER VOLUME	KEY LIMIT L/H	MIDI KEY ZONE	MIDI CH OUT	ARP NUMBER	TIME	VOLUME	FEEDBACK

LFO				MOD SENSITIVITY				EDIT/ COMPARE
WAVE	SPEED	DELAY	PMID	AMD	SYNC	PITCH	AMPLITUDE	
9	10	11	12	13	14	15	16	BUTTON
EDIT RECALL	VOICE INIT	CART FORMAT	MEMORY BANK	FUNC PAGE SELECT	BATTERY CHECK	SAVE	LOAD	<i>Page 1: DX7 FUNCTION</i>
GATE TIME	TEMPO	ARP ASSIGN	KEY CONT ASSIGN	FUNC PAGE SELECT	TEMPERA SELECT	COARSE PITCH	FINE PITCH	<i>Page 2: Super/MAX+ FUNCTION</i>
				SUPERMAX+ CONTROL				
				CARTRIDGE				
				TEMPERAMENT EDIT				

ING		OPERATOR	PITCH EG					EDIT/ COMPARE
DEPTH	KYBD RATE SCALING	OUTPUT LEVEL	KEY VEL. SENS.	RATE	LEVEL	KEY TRANPOSE	VOICE NAME	
25	26	27	28	29	30	31	32	BUTTON
RANGE	PITCH	AMPLITUDE	BIAS	RANGE	PITCH	AMPLITUDE	EG BIAS	<i>Page 1: DX7 FUNCTION</i>
BREATH CONTROL				AFTERTOUCH				
FB PITCH TRANSP.	HOLD	VOLUMES	PITCHES COARSE	PITCHES FINE	SELECT TYPE	CONTROL	PATCHES	<i>Page 2: Super/MAX+ FUNCTION</i>
				STACK				
				PATCH CREATION / MORPHING				

NOTES: