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AFTERTOUCH

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From The Editor

HAPPY NEW YEAR! Before moving on to the next installment of our MIDI series in this column, I want to tell you about Yamaha's first AfterTouch Reader Survey, located on pages 17-18 of this issue. All you have to do is fill in the blanks, tear out the page, fold it up (following the instructions on page 18), and drop it in a mailbox. Just for participating, Yamaha will send you a free T-shirt, and your name will be entered in a drawing that will award a complete YCAM System to one lucky AfterTouch reader! See page 17 for more information.

And now, back to our look at basic MIDI functions:

As information travels down a MIDI cable, it may be sent to (or through) a number of instruments; but each instrument may respond to this information differently, depending on how it has been set to operate. In other words, MIDI instruments have a number of different *modes* of operation, and these modes determine how the instrument will react to MIDI information. Along with MIDI channels, the MIDI modes are the most important elements that contribute to MIDI's ability to perform musical sleight-of-hand.

Most basic MIDI information (such as a Note On or Note Off) comes complete with an informational flag that assigns it to one of the 16 MIDI channels. For instruments receiving this information, there are two possibilities–either the instrument will be assigned to recognize and respond to information on one specific MIDI channel, or it will be assigned to respond to all MIDI information, regardless of channel. This second condition is called OMNI.

When an instrument is not set up in OMNI mode, it responds only to information on the MIDI channel to which it is assigned. In addition, it may respond to this channel information in different ways, depending on whether it is set up to act like a POLYphonic instrument or a MONOphonic instrument.

All in all, there are four MIDI Modes–four different ways that an instrument may respond to incoming MIDI information. These four modes are specified by different combinations of the three MIDI mode messages outlined above: OMNI, POLY, and MONO. The combinations are pretty obvious, based on two simple conditions: An instrument can be in OMNI or not, and it may be either POLYphonic or MONOphonic. With these conditions in mind, the four MIDI modes are easy to understand. Here they are:

Mode 1: OMNI ON, POLY. An instrument in Mode 1 will respond to MIDI information sent over any of the 16 MIDI channels. This is sometimes called OMNI Mode.

Mode 2: OMNI ON, MONO. This mode assigns MIDI information sent over any of the 16 MIDI channels to one voice. When set in

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(By the way, if you received *this* issue in the mail, you are already on our permanent mailing list, so you don't need to send in another card.)

Also, don't limit yourself to just sending in your address: Let us know what you want to read, and what *you* have to offer (see page 19 for details). We look forward to your input.

To receive AFTER-TOUCH every month, absolutely free, just put your name and address on the enclosed card and mail it to us.

B3 Var2 LL. A New DX7 Voice By Lowell Levinger.

WAVE	SPEED	DELAY	PMD	AMD	SYNC	PMS
TRI	12	0	52	0	ON	0

PITCH ENVELOPE			
R1 99	R2 99	R3 99	R4 99
L1 50	L2 50	L3 50	L4 50

KEY TRANSPOSE: C3

OSC. SYNC: ON

FUNCTIONS

POLY/MONO	RANGE	STEP	MODE	GLISSANDO	TIME
POLY	2	0	OFF	OFF	0
	PITCH BEND		PORTAMENTO		

(CONTROLLER)	RANGE	PITCH	AMPLITUDE	EG BIAS
MOD WHEEL	99	OFF	OFF	ON
FOOT CONTROL	0	OFF	OFF	OFF
BREATH CONTROL	0	OFF	OFF	OFF
AFTERTOUCH	29	ON	OFF	OFF

OP 3

FREQUENCY	DETUNE	AMS
5.623Hz	0	2

ENVELOPE DATA

R1	R2	R3	R4	RS
99	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -L	C4	L 60
R -E		R 0

OP#	OUTPUT LEVEL	VELOCITY
3	64	0

OP 5

FREQUENCY	DETUNE	AMS
3.00	0	0

ENVELOPE DATA

R1	R2	R3	R4	RS
88	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -L	A3	L 84
R -E		R 69

OP#	OUTPUT LEVEL	VELOCITY
5	69	0

OP 6

FREQUENCY	DETUNE	AMS
7.413Hz	0	0

ENVELOPE DATA

R1	R2	R3	R4	RS
99	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -L	G3	L 99
R -L		R 5

OP#	OUTPUT LEVEL	VELOCITY
6	85	2

4

OP 2

FREQUENCY	DETUNE	AMS
0.50	-5	0

ENVELOPE DATA

R1	R2	R3	R4	RS
99	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -L	A-1	L 0
R -L		R 1

OP#	OUTPUT LEVEL	VELOCITY
2	82	0

OP 4

FREQUENCY	DETUNE	AMS
2.239Hz	-7	0

ENVELOPE DATA

R1	R2	R3	R4	RS
99	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -E	G3	L 99
R -E		R 0

OP#	OUTPUT LEVEL	VELOCITY
4	99	0

OP 1

FREQUENCY	DETUNE	AMS
3.311Hz	-7	0

ENVELOPE DATA

R1	R2	R3	R4	RS
99	99	99	99	0
L1	L2	L3	L4	
99	99	99	0	

KEYBOARD SCALING

CURVE	BREAKPOINT	DEPTH
L -L	C7	L 0
R -E		R 0

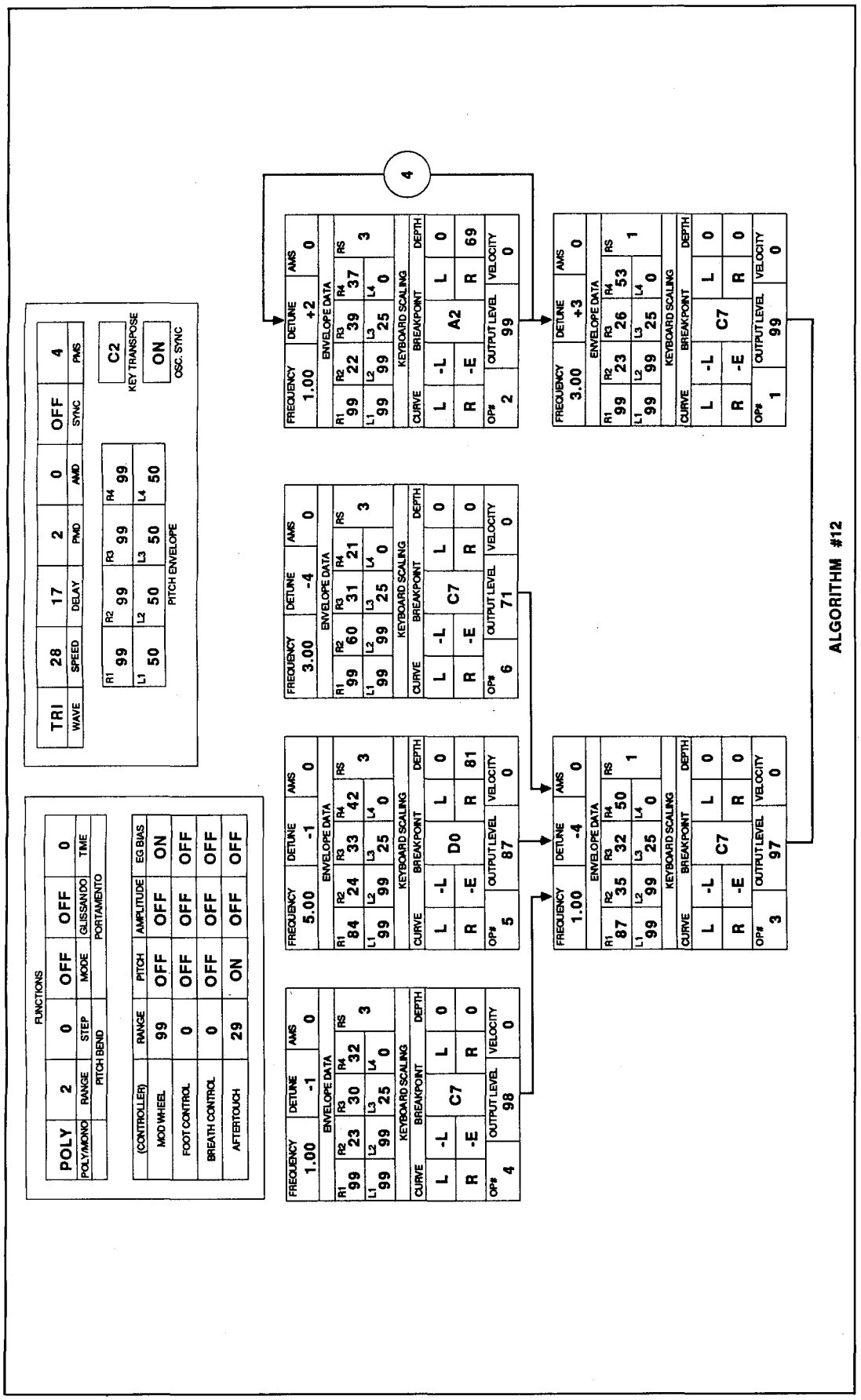
OP#	OUTPUT LEVEL	VELOCITY
1	99	0

ALGORITHM #11

Notes:

You can control the Leslie rotation effect from the Mod Wheel (by raising the AMS of Ops #3 and #6 to a value of 3).

EEYOWOO. A New DX7 Voice By Lowell Levinger.



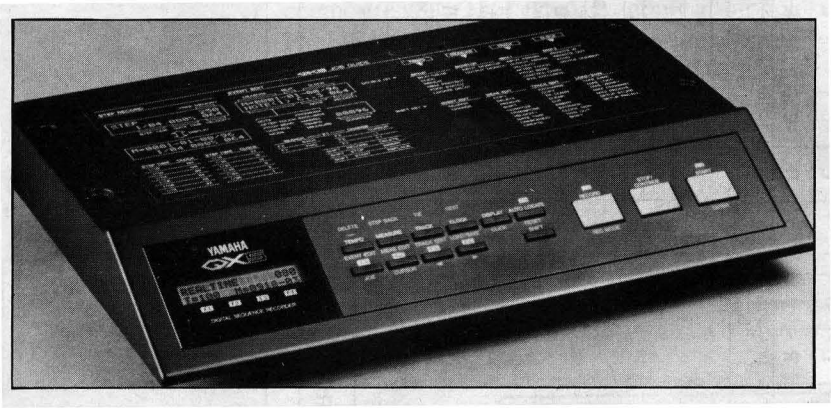
Notes:

Aftertouch pressure provides some pretty intense pitch modulation for wang bar effects.

New Products

A Quick Look At Some Of Yamaha's New Products For 1987. Compiled By Tom Darter & Sibyl Darter.

THE NEW YEAR BRINGS a number of new musical products from Yamaha. One has already been previewed in AfterTouch (in the December 1986 issue) and others are featured prominently in this issue; still others will be detailed in issues later this spring. Still, since they all appeared at the beginning of this year, we thought it would be a good idea to give our readers a short introduction to all of them in this, our first issue of the new year.



QX5 digital sequence recorder.

QX5

The QX5 is a digital MIDI sequence recorder with 8 Tracks and 32 Macros. The unit offers extensive Edit and Record mode features, with multiple MIDI channel and System Exclusive recording. Total memory capacity is 20,000 notes. (For more information on the QX5, see the cover story in the December 1986 issue of AfterTouch.) Suggested list price: $595.00.

DX7 II D

The DX7 II D is an FM digital synthesizer with two tone generator systems. The 6-operator tone generator is completely compatible with earlier Yamaha 6-operator systems. The instrument features a 61-note keyboard with Single, Dual, and Split keyboard modes. New features include Pan, Fractional Scaling, Micro Tuning, Random Pitch Sense, Assignable Controllers, and Real Time Parameter Change. The Internal Memory holds 64 Voice memories and 32 Performance memories. (For more information on the DX7 II D, see the cover story in this issue of AfterTouch.) Suggested list price: $2,195.00.

DX7 II FD

The DX7 II FD is an FM digital synthesizer with two tone generator systems. The 6-operator tone generator is completely compatible with earlier Yamaha 6-operator systems. The instrument features a 61-note keyboard with Single, Dual, and Split keyboard modes. New features include Pan, Fractional Scaling, Micro Tuning, Random Pitch Sense, Assignable Controllers, and Real Time Parameter Change. The Internal Memory holds 64 Voice memories and 32 Performance memories. The DX7 II FD also features a built-in disk drive (that uses 3.5" double-sided disks); this drive can be used to store all data related to the DX7 II, and can also be used to store data to and recall data from external MIDI products. (For more information on the DX7 II FD, see the cover story in this issue of AfterTouch.) Suggested list price: $2,495.00.

RX5

The RX5 is a digital rhythm programmer with 24 voices in Internal ROM, 12 Voices in Internal RAM, and 28 voices available from a Waveform Data Cartridge. Memory includes 100 Patterns, 20 Songs, and 3 Song Chains. In addition, each individual drum stroke can be edited for pitch, level, attack, decay, and reverse. The RX5 also features unique MIDI, Edit, and sequence capabilities. (For more information on the RX5, watch for the cover story article in the March 1987 issue of AfterTouch.) Suggested list price: $1,195.00.

RX17

The RX17 is a digital rhythm programmer with 26 drum and Latin percussion voices. Memory includes 100 Patterns and 10 Songs.

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RX5 digital rhythm programmer.

MDF1

Use Yamaha's New MIDI Data Filer To Store Your Important Musical Information. By Brad Vinikow.

MDF1 MIDI data filer.

THE YAMAHA MDF1 MIDI Data Filer is a MIDI Data Recorder capable of storing various types of MIDI information, including the following: voice data and performance data from DX-series synthesizers and TX-series tone generators; sequence data from QX-series sequencers; and pattern and song data from RX-series rhythm machines. THE MDF1 provides a cost-effective alternative to RAM cartridges; in addition, the MDF1 provides a faster and more desirable alternative to cassette data storage.

The MDF1 has four main modes of operation: FILE, SAVE, LOAD, and Utility (which is labelled JOB).

The FILE mode allows you to select a particular file from the current disk, and also displays the total number of files on a disk.

The SAVE mode allows you to store System Exclusive data to disk. This two-stage process is described in greater detail below.

The LOAD mode allows you to transmit a file from DISK via MIDI to an external device.

The Utility (JOB) mode allows you to carry out a variety of housekeeping functions. These are also described in greater detail below.

Saving To Disk

The MDF1 can store a maximum of 119.8 kilobytes of data on each 2.8" Quick Disk. Each side of the disk can contain a maximum of 59.9 kilobytes of data in as many as 19 files.

Storing data is a two-stage process. First, the data is received and placed in an input buffer. This buffer can collect up to 19 consecutive System Exclusive messages, providing the total memory requirement does not exceed 59.9K.

The next stage is to write this data to the disk. The MDF1 automatically assigns the next highest file number as it writes the data to disk.

Utility Functions

The MDF1 provides several useful Utility functions (in Job Mode) that facilitate editing data on disk. These include the following:

- displaying the available disk memory [Job 1: Free]
- setting the time (0-1.9 seconds) between multiple messages during transmission in one file [Job 2: Interval Time]
- deleting the highest numbered file [Job 3: Delete]
- copying any desired file to another disk [Job 4: Copy]
- backing up the entire contents of a disk [Job 5: Back Up]
- formatting blanks disks [Job 6: Format]

Continued on page 8

MDF1 *Continued*

The accompanying X Products Memory Table displays the memory requirements for a variety of Yamaha System Exclusive bulks, and shows how they relate to the storage capacity of the MDF1. The list is divided up into product groups. Within each product group are the available bulk format options. The Bulks-Per-Side column calculates the number of bulks available on each side of an MDF1 disk. (Remember that the MDF1 is capable of storing data on both sides of a disk.)

Changing Disks On The MDF1

As mentioned earlier, the storing process on the MDF1 is performed in 2 steps. To eliminate the chance of losing any data while changing disks with the MDF1, follow the steps below. This quick and easy process insures that your data will always be stored to disk, and also prepares the MDF1 to receive a disk:

1. Use the SAVE function to save any data in the edit buffer to disk. This process has already been described. When you are finished, the LED will alternately flash "F" and the currently selected file number.
2. Press the Disk Eject button on the MDF1 front panel.
3. Remove the disk.
4. Insert the new disk into the MDF1.
5. Press the "File" button. The LED will alternately flash "F" and the number of files on the disk.

Downloading FB-01 Voices To The MDF1

The following steps describe the process for

This chart shows the types of MIDI bulks that can be stored using the MDF1 MIDI data filer.

Product	Type of Bulk	Bytes/Bulk	Bulks/Side
DX7, TX7, TF1	1 Voice	163	approx. 370
	32 Voice	4104	14
TX7, TF1	1 Performance	102	approx. 570
	64 Performance	approx. 4K	14
DX27, 27S, 100	1 Voice	101	approx. 570
	24 Voice	approx. 4K	14
DX21	1 Voice	101	approx. 570
	32 Voice	approx. 4K	14
DX7IID/FD	64 Voice & 32 Perf.	approx. 9K	3
FB-01	1 Voice	139	425
	48 Voice	approx. 6K	7
	1 Configuration	171	approx. 350
	16 Configuration	2632	approx. 22
RX11	Pattern/Song	approx. 8K	7
RX21, 21L	Pattern/Song	approx. 4K	14
QX7, 21	Sequence	48K max.	1
QX5	Sequence	128K max.	*
KX88, 76	16 Code Memory	approx. 3K	19
MEP4	60 Program	approx. 17K	3

* The total memory available in the QX5 is 128K. Not all sequences will require the total amount of memory. If a sequence requires more than 59.9K it must be saved to several sides of an MDF1 disk. Store the sequence to several tracks in the QX5 and save them in bulks of 59.9K or less.

storing FB-01 Voice Banks or Configurations to the MDF1:

1. Connect the FB-01's MIDI OUT to the MDF1 MIDI IN.
2. Connect the MDF1's MIDI OUT to the FB-01 MIDI IN.
3. Insert an initialized disk. (NOTE: Initializing a disk already containing data files will entirely erase the data on that disk.)
4. Press the FILE button to enter the File mode.
5. Press the SAVE button to set the MDF in the standby mode.
6. Press the SYSTEM SET UP button until the display reads as follows:

   DumpV.BANK1

7. Press the −1 and +1 buttons to select the data you wish to send:

   V.BANK1 = voice bank 1 (voices 1-48)
   V.BANK2 = voice bank 2 (voices 1-48)
   CONF.ME = configuration memory (configurations 1-16)
   CONFIG = current configuration memory.

8. Press the SYSTEM SET UP button. The display will ask "sure?".
9. Press the +1 button on the FB-01 to begin sending data. The FB-01 display will show the type of data being sent.
10. The MDF1 will first display: "r" as it is receiving data. Then, the MDF1 will alternately display "S" and the number of received data messages (0-19).
11. When it is finished sending data, the FB-01 will display the following:

    dump/completed!

12. Press the SAVE button to save the input buffer data to disk. The MDF1 automatically assigns the next highest file number before writing the data to disk.

MDF1/TX816 Application

The MDF1 is capable of storing voice and function data from all eight modules in a TX816 Tone Generator Rack. The procedure outlined below will store voice and function data from modules 1-4 on Side A of the MDF1 disk, and data from modules 5-8 on Side B. Follow these steps:

1. Connect the MDF1 MIDI OUT to the TX816 common MIDI IN.
2. Connect the TX816 common MIDI OUT to the MDF1 MIDI IN.
3. Insert a formatted disk into the MDF1.
4. Press FILE.
5. Press SAVE.
6. Press SW1 on all TF1 modules until the Common LED is lit. This sets all modules to the Common mode.
7. Press and hold SW3 on all TF1 modules until the LED displays "UT." This puts all modules in the Utility mode.
8. Quickly press SW3 on TF1 module 1. The LCD will flash "dU."
9. Select OUTslot 1 by pressing the +1 button on the TX816 main panel.
10. Press the TF1 module 1 "Yes" button (SW1). The LED will display a hyphen for a few seconds, then return to the flashing "dU" display.
11. The MDF1 will display "r." Then it will flash "S" and "2." This indicates that the MDF1 buffer has received voice and function data from the TF1 module.
12. Press the SAVE button. The MDF1 will assign the next highest file number to the data it has just received.
13. Repeat steps 8 through 12 for modules 2, 3, and 4 in the TX816, substituting the correct module and OUTslot numbers (2-4) as needed.
14. Eject the disk by pressing the disk eject button on the MDF1 front panel.
15. Label the disk, flip it over, and insert it back into the MDF1.
16. Repeat steps 8 through 12 for modules 5, 6, 7, and 8 in the TX816, substituting the correct module and OUTslot numbers (5-8) as needed.

* * * *

When compared to the process of storing data on cassettes, the MDF1 offers many advantages, including a savings in time and ease in locating and manipulating data. Additionally, Quick Disks offer a much less expensive method of storing data than RAM cartridges.

Good luck in using the new Yamaha MDF1 MIDI Data Filer!

DX7 II FD/D

Introducing The New Line Of DX7 FM Digital Synthesizers. By Brad Vinikow.

SINCE ITS INTRODUCTION IN 1983, the Yamaha DX7 has become the foundation synthesizer for a whole new generation of music-making tools. But progress didn't stop at Yamaha with the original DX7, and the results of a research and development project to refine and improve the DX7 are now ready for release.

The new DX7 II D and DX7 II FD synthesizers include many features that enhance the already familiar DX sound and make these keyboards an integral component in any MIDI system.

The DX7 II D and DX7 II FD are identical in appearance, operation, and sound quality. The only difference is that the FD model comes equipped with a disk drive. In addition to increasing the DX's memory storage capacity, this disk drive (which uses 3.5" double-sided disks) can also be used to store and load data to and from other MIDI instruments.

Compatibility

One of the exciting aspects of these instruments is their compatibility with existing DX7 voices and playing techniques. Both units incorporate Yamaha's FM technology with a 6-operator, 32-algorithm, 16-note polyphonic tone generator. If you don't own a DX7, the DX7 II D and FD represent a new dimension in sonic and performance capabilities. If you already own a DX7, these new units will instantly enhance the quality of sounds and the performance abilities you've become familiar with.

These new instruments allow you to utilize your existing sound library for the DX7. It's a simple matter to load voices into the machine via cartridge or MIDI. Improved technology on the D and FD means superior sound quality for existing DX7 voices.

In addition, there are several new parameters that open a whole world of performance and sonic possibilities.

What You Asked For

Many DX7 owners requested certain features that they felt would enhance its playability and capability. Yamaha responded by including many of these requests on the DX7 II D/FD. In many ways, the DX II offers twice the capability of the original DX.

2 Tone Generators

One commonly requested feature is the ability to split the keyboard. Three Play Modes are now available: Single, Dual, and Split. The Single mode permits 16-note polyphony with one voice played across the entire 61-note keyboard. The Dual and Split modes allow you to play 2 different voices from the same keyboard, with 8-note polyphony for each voice.

Backlit LCD

The 40-character by 2-line LCD is backlit, making it easy to read (even while on stage). The larger display means that, for instance, an operator's entire envelope can be seen and edited at one time. Rate Scaling and other parameters are also much easier to program with the larger LCD.

New Voice Parameters

Both DX II models are capable of storing 64 voices in internal RAM. Voice data now includes parameters that were previously stored as Function data, plus a number of new parameters:

- Pitch EG Range
- Pitch EG Velocity
- Fractional Scaling
- Key Mode
- Unison Detune
- Pitch Bend Mode
- Portamento
- Random Pitch
- Breath Control
- Aftertouch
- Mod Wheel
- Foot Control (FC 1 and FC 2)
- MIDI Control

Performance Memory

In addition to all of the additional Voice parameters listed above, the new DX models offer a completely new kind of memory, Performance Memory, which allows you to recall Voice combinations and other performance parameters with the touch of a single button. Internal RAM has space for 32 Performance Memories, which can be called up using the 1-32 buttons in Performance Mode. The Perfor-

DX7 II FD digital FM synthesizer.

mance parameters in the D and FD are as follows:

- Voice Mode
- Total Volume
- A/B Balance
- Dual Detune
- Split Point
- Pan
- Sustain Footswitch (FS 1)
- Footswitch 2 (FS 2)
- CS 1 and CS 2
- Micro Tuning
- Note Shift
- EG Forced Damp
- Performance Name

As you can see, there are many new parameters in the Voice and Performance memories. These will be described in greater detail throughout this article.

Micro Tuning

Recently, there has been a lot of discussion about alternate tuning capabilities, often called Micro Tuning. This unique feature is available on the DX7 II D/FD synthesizers.

Basically, Micro Tuning lets you tune each key on the keyboard individually. The tuning range can be within a few cents of its original pitch or over a range of octaves. It's possible to combine two voices with slightly different tunings to produce a varying, natural detune effect across the keyboard. Or you can play Bach in the tuning of his era. It's even possible to tune the keyboard in reverse.

Both new DX models come equipped with eleven Micro Tuning Presets. (see the accompanying diagram.)

In addition, two user-definable Micro Tuning memories are available, and more User-created Micro Tunings can be stored on a properly-formatted RAM cartridge.

Pan

The new DX's 2-voice capability (in conjunction with the two audio outputs) allows for some very exciting stereo effects. The Pan feature, which controls the placement of a voice or voices in the stereo field, may be controlled by LFO, Key Velocity, Key Number, or a separate Pan Envelope Generator. Other Pan Modes allow you to control the output level of the two voices in a Performance Memory.

Controllers

In addition to the controllers current DX

Continued on page 12

1	Equal Temperament
2	Pure (Major)
3	Pure (Minor)
4	Mean tone
5	Pythagorean
6	Werckmeister
7	Kirnberger
8	Vallotti & Young
9	1/4 Shifted equal
10	1/4 Tone
11	1/8 Tone

Micro Tuning presets found in the DX7 II FD/D.

DX7 II FD/D *Continued*

owners are used to, there are several new controllers and related performance parameters available. For instance, on the far left side of the front panel are 3 sliders labelled Volume, CS 1, and CS 2. Many of you will recognize CS as a Continuous Slider (as on the KX88/76 Master Keyboard Controllers). In the Performance Edit mode, CS 1 provides A/B balance control, while CS 2 acts as the Data Entry Slider.

Before discussing the other controllers available on the D/FD, let's first define 2 different types of controllers: Fixed and Assignable. Fixed controllers are dedicated to controlling one function. Examples of Fixed controllers include:

- Volume Slider
- Pitch Wheel
- Data Entry Slider (CS 2–Edit Mode only)
- Modulation Wheel
- A/B Balance (CS 1–Performance Edit Mode only)
- Key Velocity
- Volume Foot controller
- Aftertouch
- Sustain Footswitch
- Breath Control

Assignable controllers allow you to assign the parameter they will control. Assignable controllers can be used for a number of different effects, such as the following: changing the "brightness" of a sound (by increasing the output of a modulator), changing the speed of a Leslie effect on an organ patch (by changing the LFO speed), or bringing in violins on an orchestral patch (by increasing the output of a carrier). Assignable Controllers on the new units include:

- Continuous Sliders (CS 1 and CS 2)
- Footswitch 2 (FS 2)
- Foot Controllers (FC 1 and FC 2)

More than 100 parameters can be assigned to and affected by the controllers listed above.

Understanding the controllers and the parameters they can affect is the key to performance flexibility on the DX7 II D/FD. This is where you really personalize the synthesizer for your playing style.

What You Didn't Ask For

In addition to the features most requested by current DX owners, Yamaha has included several other powerful features that take these machines one step further in terms of performance and sonic capability.

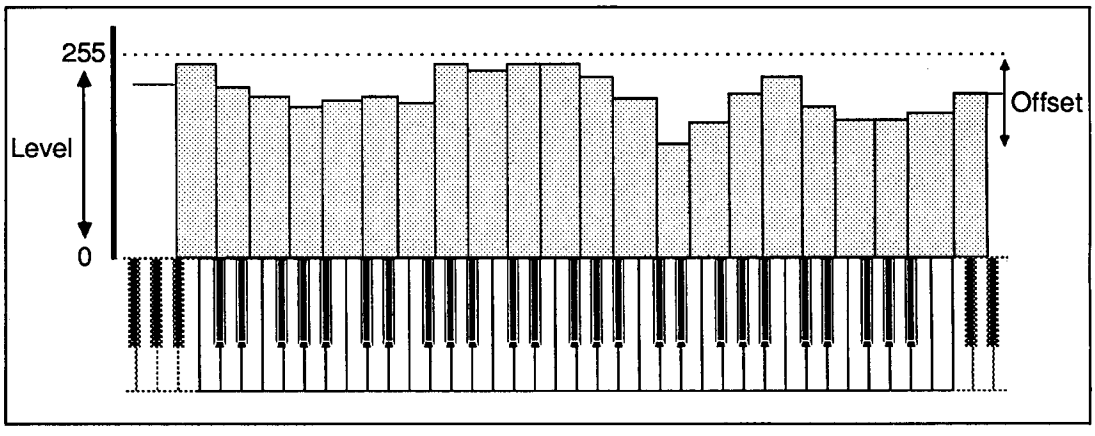
Higher Fidelity

A faster DAC (Digital-to-Analog Converter) and a more powerful CPU (Central Processing Unit) provide richer, clearer, warmer sounds. A DX7 voice that has been transferred into either the D or FD will instantly sound better!

Fractional Scaling

On the original DX7, Level Scaling allowed a change in level or timbre across the keyboard. It offered a choice of level-scaling curves and variable depth.

The DX7 II provides an enhanced version of this parameter–Fractional Scaling. Using Fractional Scaling, the output level of each individual operator can be varied in 3-key groups so



Fractional Scaling in the DX7 II FD/D allows you to adjust the output level of each operator for three-note groups.

you can create virtually any level or timbre curve. (See the accompanying diagram.)

Several examples of this powerful feature are included in the factory ROM voices. Multi Brass Ensemble (Cartridge Performance #14) and MultiPercussionSplit (Cartridge Performance #28) are two excellent examples of the capabilities of Fractional Scaling.

The Multi Brass Ensemble performance contains two different horn voices (SilvaTrmpt and SilvaBrass). Each voice has been scaled so that every other three-note group has no audible output; therefore, each voice alternates where this scaling occurs. When these two voices are played together, as you play chromatic scales on the keyboard, every three notes will alternate voices. Try playing a melody with chords behind it in close harmony groups.

The MultiPercussionSplit performance contains two identical percussion voices accessed in the Split mode. The voice uses Algorithm #5 (with three 2-operator stacks). Each stack produces a different percussion voice. Try playing rhythms in different places on the keyboard and listen to the panning and relative octave of the voices.

More Cartridge Memory

The new RAM4 cartridges hold much more data than the original RAM1 cartridges. They are also about 15% larger than the RAM1. However, the RAM1 cartridges will still work in the new cartridge port. An ADP1 adapter allows you to use RAM1 cartridges in the larger RAM4 cartridge slot.

Try it out: Take a RAM1 cartridge and plug it into an ADP1 cartridge adapter. Next, plug the ADP1 into the RAM4 cartridge port on the left side of the DX7 II D/FD front panel.

Make sure the DX is in the Single Voice mode by pressing the Single button. Also, be sure you are selecting voices from the 1-32 group by pressing the 1-32 button until the LED above it goes out. Finally, press the Poly/Mono button until the LED above it goes out. These steps assure that you are working in the proper mode to hear the sounds as they were created.

Now, press the Cartridge button on the DX panel, and use the number buttons (1-32) to select voices from the cartridge.

Notice the increased presence and richness in sound. Now, couple this with the additional performance options including Pan, Split/Dual modes, Dual mode Detune, etc. and you can really open up your sounds.

A RAM4 cartridge is able to store 64 Voices, 32 Performance Memories, 2 Micro Tunings, and 1 System Setup (which includes master tuning, cartridge bank selection, and MIDI configuration parameters). RAM4 cartridges can also be formatted and used to store Fractional Scaling or Micro Tuning data.

Multi-Mode LFO

Normally, synthesizer LFO effects such as vibrato (Pitch Modulation) or tremolo (Amplitude Modulation) are applied in perfect synchronization to all notes played. In other words, the same LFO cycle is appled to all notes played regardless of when they are struck. This would never be the case in a live ensemble, where each player starts their vibrato at a slightly different time, thus adding warmth and richness to the overall sound.

A new Multi mode for the DX7 II LFO simulates this effect by starting the LFO for each individual note as it is struck. In essence there is one LFO for each note (for a total of 16). The result is a thicker, more natural multi-instrument sound.

Pitch Bias

Pitch Bend effects on acoustic instruments are totally integrated with the process of playing a note, and are thus introduced as an integrated expressive element in the music. In synthesizers, however, the application of Pitch Bend is most often introduced through the operation of a separate Wheel controller. This not only means that the note itself must be coordinated with the effect of the controller, but also that one hand is entirely occupied with Pitch Bend rather than playing.

The DX7 II D/FD brings pitch back to the realm of touch with Aftertouch-controlled pitch. Increased pressure on a key can cause an increase or decrease in pitch over a specified range. The Pitch Bias range is +/− 4 octaves.

Pitch Bias can also be accessed via a BC 1 Breath Controller. This not only allows authentic articulation of voices (through PMD, AMD, and EG Bias) but also subtle or dramatic changes in pitch through the use of a Breath Controller. *Continued on page 14*

DX7 II FD/D *Continued*

Pitch Bend Options

The Pitch Bend Mode parameter lets you specify which notes of a chord are to be affected by the Pitch Wheel operation. The four available Mode settings are Normal, High, Low, and Key On.

Normal Mode operates just like the standard Pitch Bend on the original DX: All notes, whether played on the keyboard or held by the Sustain Footswitch, will be affected by Pitch Bend.

When High or Low is selected, only the highest note or lowest note held will be affected by Pitch Bend; this applies to notes played on the keyboard or held with the Sustain Footswitch.

In Key On Mode, only the notes played on the keyboard will be affected by Pitch Bend–notes held with the Sustain Footswitch will not be affected.

Real Time Parameter Change

The number and type of controllers available on the new DX models dramatically increase their flexibility in performance. In addition, a new capability of the FM technology itself provides unlimited freedom for expressive control.

Real Time Parameter Change is accessible from many of the controllers. There are over 100 parameters in the actual FM voice that may be changed as part of a performance. This

Internal Performance Memories of the DX7 II FD/D.

	Performance Name		Voice A		Voice B
1	Warm String Section	INT 1	Warm Stg A	INT 49	Warm Stg B
2	Mallet Brass	INT 63	XyloBrass	INT 25	MalletHorn
3	String Bass-Guitar	INT 27	StringBass	INT 57	GuitarBox
4	Dual Clavinette	INT 22	ClaviStuff	INT 48	Clavinette
5	Rich Grand Piano	INT 9	EbonyIvory		
6	Stereo EletricPiano	INT 50	KnockRoad	INT 62	HardRoads
7	Tubular Bell Wah	INT 43	BellWahh A	INT 56	BellWahh B
8	Electric Rock Organ	INT 32	Shorgan	INT 41	TapOrgan
9	Jamaica Mallet Band	INT 28	SteelCans	INT 21	EchoMallet
10	Mono Poly Synth	INT 7	FMilters	INT 35	ClariSolo
11	Dual Octave Trumpets	INT 14	Trumpet A	INT 24	Trumpet B
12	Angels	INT 10	Whisper A	INT 53	Whisper B
13	Acoustic PickGuitar	INT 3	PickGuitar	INT 40	Titeguitar
14	Multi Brass Ensemble	INT 46	SilvaTrmpt	INT 54	SilvaBrass
15	St. Elmos StringBell	INT 1	Warm Stg A	INT 20	ST.Elmo's
16	Phasar Whasars	INT 7	FMilters	INT 17	Phasers
17	Bass Piano Split	INT 39	SkweekBass	INT 62	HardRoads
18	Grand Harpsichord	INT 64	HarpsiWire	INT 52	HarpsiBox
19	Sea Songs	INT 34	ElectoComb	INT 51	LateDown
20	FM WireStrung Piano	INT 31	WireStrung	INT 5	FullTines
21	Cello Quartet	INT 44	EleCello A	INT 60	EleCello B
22	Touch Jazz Organ	INT 12	TouchOrgan		
23	DoubleHarp-SongFlute	INT 11	HarpStrum	INT 16	SongFlute
24	SynthBrass Ensemble	INT 4	Analog-X	INT 42	PitchaPad
25	Orchestral Violins	INT 61	HallOrch B	INT 58	HallOrch A
26	Stereo TinePiano	INT 5	FullTines		
27	PianoBell Ensemble	INT 19	Ensemble	INT 15	PianoBells
28	MultiPercussionSplit	INT 23	MultiPerc	INT 23	MultiPerc
29	Temple Gong - Shami	INT 38	TempleGong	INT 29	Koto
30	Dual Piano	INT 36	PianoBrite	INT 45	PianoForte
31	Stereo Vibraphone	INT 18	VibraPhone	INT 18	VibraPhone
32	Orchestral Whallop	INT 47	Wallop A	INT 55	Wallop B

means you can actually change the voice and hear the effect while you are playing in real time. Here are some examples from the factory preset Internal Performance Memories that utilize this powerful capability:

Performance #1–Warm Strings: On this patch, both CS 1 and CS 2 are set to control the Fine Frequency of Operator #2 for detuning effects. CS 1 controls Voice A, and CS 2 controls Voice B.

Performance #2–Mallet Brass: CS 1 is set to control the Coarse Frequency of Operator #1 (for Voice A), which affects the tuning of the mallet attack. CS 2 is set to control EG Rate 1 of Operator #4 (for Voice B), which changes the mallet attack speed.

Performance #17–BassPianoSplit: CS 1 is set to control the EG Level 4 of Operator #6 (for Voice A), which affects the slap on the bass; FC 1 is set for this same parameter. CS 2 is set to control the Coarse Frequency of Operator #1 (for Voice B), which can change the basic piano sound into a Rhodes-like sound. In addition, Aftertouch is set to control finger vibrato on the bass sound.

Performance #30–Dual Piano: CS 2 is set to control Dual Detune for the two voices, which changes the amount of detuning between the two piano sounds.

Performance #31–Stereo Vibes: CS 2 is set to control LFO Speed, which affects the Panning Speed for this sound.

Random Pitch

Whenever a note is played repeatedly by a violin, or when the same note is played by different groups of acoustic instruments (such as violins or trumpets), the note produced is not always at the exact same frequency–there are usually minute differences in pitch. This is one factor that adds richness and "warmth" to the sound of acoustic music.

The DX7 II recreates this effect through the Random Pitch Sense parameter. The pitch of each note is varied randomly as it is restruck, dramatically adding to the fullness and life of a voice.

To access this parameter, select a Single voice. Press the Edit button to enter the Edit Mode. Press button 24 until the display reads "Random Pitch," and move the Data Entry Slider all the way up, until the "Depth" value is 7. Now strike a note several times. Notice that each time the note sounds it has a slightly different pitch. Obviously a value of 7 is extreme in many cases; however, one interesting application of this extreme effect is described below.

More Accurate "Stuff"

Many articles written about FM programming include a discussion of the concept of "Stuff." This term refers to the noise or grit that is an essential part of a voice, such as the spit in a trumpet, the bow sound in a cello, the mallet strike in a marimba, or the thump of a hammer in a piano. These voice components are cues that let the ear know what type of an instru-

Continued on page 16

1	Warm Stg A	33	FingaPicka
2	MellowHorn	34	ElectoComb
3	PickGuitar	35	ClariSolo
4	Analog-X	36	PianoBrite
5	FullTines	37	Choir
6	SuperBass	38	TempleGong
7	FMilters	39	SkweekBass
8	Pluk	40	Titeguitar
9	EbonyIvory	41	TapOrgan
10	Whisper A	42	PitchaPad
11	HarpStrum	43	BellWahh A
12	TouchOrgan	44	EleCello A
13	Maribumba	45	PianoForte
14	Trumpet A	46	SilvaTrmpt
15	PianoBells	47	Wallop A
16	SongFlute	48	Clavinette
17	Phasers	49	Warm Stg B
18	VibraPhone	50	KnockRoad
19	Ensemble	51	LateDown
20	St.Elmo's	52	HarpsiBox
21	EchoMallet	53	Whisper B
22	ClaviStuff	54	SilvaBrass
23	MultiPerc	55	Wallop B
24	Trumpet B	56	BellWahh B
25	MalletHorn	57	GuitarBox
26	CongaDrum	58	HallOrch A
27	StringBass	59	HarmoniumA
28	SteelCans	60	EleCello B
29	Koto	61	HallOrch B
30	FM-Growth	62	HardRoads
31	WireStrung	63	Xylo-Brass
32	Shorgan	64	HarpsiWire

Internal Voice Memories of the DX7 II FD/D.

DX7 II FD/D *Continued*

ment it's listening to.

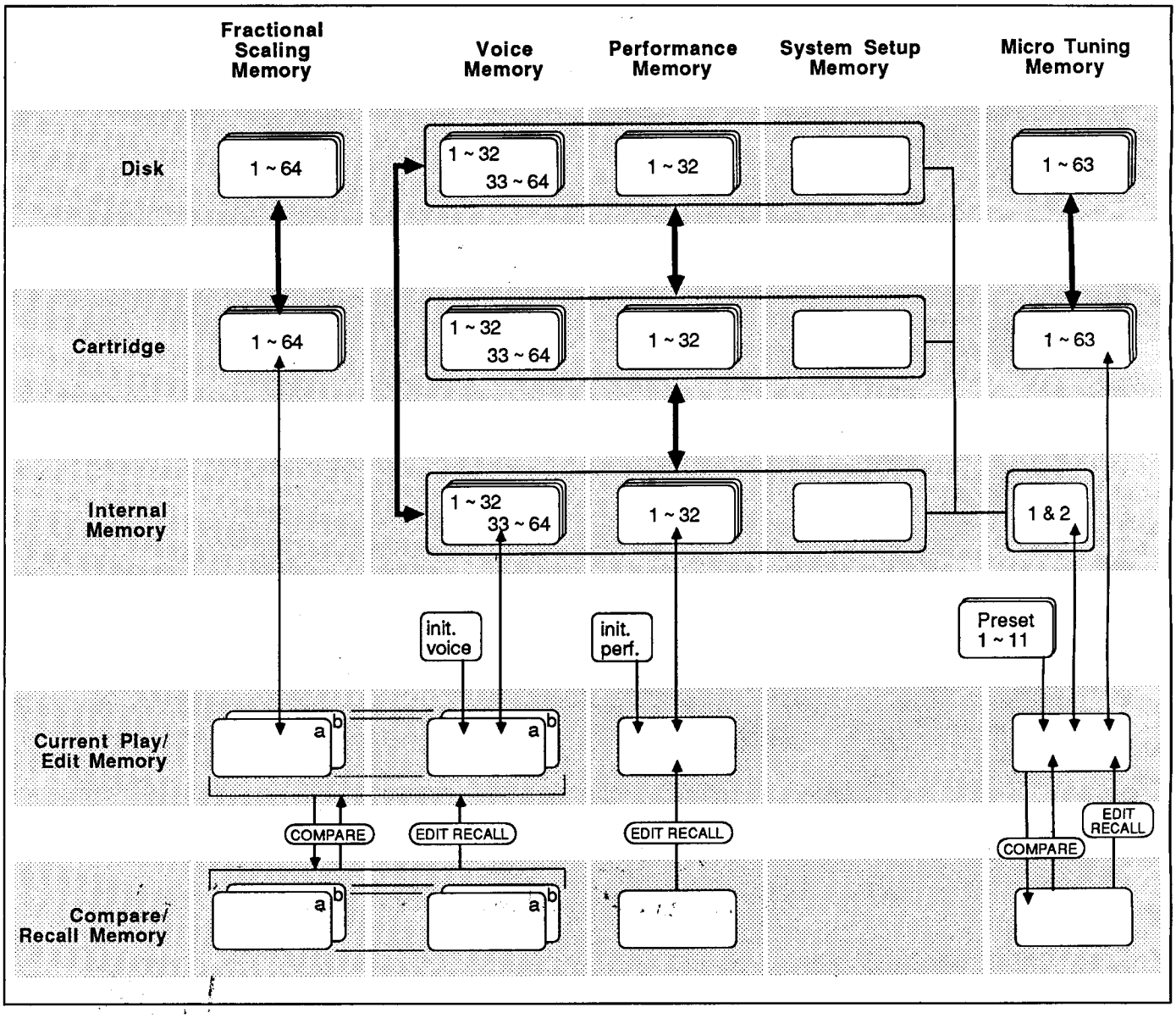
Many of the new features available on the new DX models allow you to create more accurate "stuff" in a voice. One way to apply this concept is to create a "normal" marimba voice, and then create a strictly marimba "stuff" voice. Using the Dual mode, you can play both of these sounds at once. You can further enhance the sound by applying some of the new Voice or Performance parameters to this composite voice. For example, apply a Random Pitch Sense setting of 7 to the marimba "stuff" voice—the mallet strike voice will have a randomness to its pitch that will complement and detune the "normal" voice.

This concept also applies to the Micro Tuning, Pitch Bias, Pitch EG, LFO, and other features. This flexible control over real time parameter change from the variety of controllers also opens new worlds of expression.

• • • •

The DX7 II D and FD offer many exciting new options for expressing your musical ideas in real time performance. In addition, they produce more dynamic fidelity and warmer, richer textures than the original DX7.

By utilizing the performance controllers and understanding what effect they have on a voice, you can create performances that are very authentic in reproducing acoustic sounds, and also generate an unparalleled excitement and energy in your music!



The memory layout of the DX7 II FD/D.

Yamaha Survey

AT YAMAHA, WE PUT a very high priority on customer satisfaction. We're constantly striving to do a better job of servicing your musical needs. To continue providing you with the best equipment in the industry, we need to know more about you. You can help by taking a few moments to fill out the following brief questionnaire. When you have finished filling it out, simply cut it from the magazine, fold it together, tape it closed, and drop it in the mail. Be sure our address shows on the outside.

In appreciation, when we receive your *completed* questionnaire, we will send you a free Yamaha T-shirt, so be sure to fill out the section at the end of the survey indicating your name, address, and shirt size. In addition, everyone returning a *completed* questionnaire by **March 16th** will be eligible for the Grand Prize–a complete YCAM System (including a QX1, TX816, RX5, and KX88). The winner will be determined by a drawing from all eligible entries. Please, only one questionnaire per person.

• • • •

While we invite surveys from all AfterTouch readers (all of whom will receive a free T-shirt for helping us), employees of Yamaha International Corporation and its subsidiaries are not eligible for the Grand Prize drawing.

The Grand Prize drawing is open to residents of the United States. Void where prohibited, restricted by law, license required, or subject to tax (other than tax on the prize awarded). All federal, state, and local taxes are the sole responsibility of the winner.

• • • •

1. Are you a (check one):
   - ☐ Professional musician
   - ☐ Semi-professional musician
   - ☐ Amateur musician
   - ☐ Technician/Engineer
   - ☐ Other _____ (please specify)
2. What instrument do you currently own (check all that apply)?
   - ☐ Keyboards
   - ☐ Guitars
   - ☐ Bass
   - ☐ Acoustic drums/Percussion
   - ☐ Drum machines
   - ☐ Woodwinds/Brass
   - ☐ None
3. How long have you been playing (check one)?
   - ☐ Less than 4 years
   - ☐ 4-9 years
   - ☐ 10 years or more
   - ☐ Do not play
4. What brands of instruments do you currently own (check all that apply)?
   - ☐ Korg
   - ☐ Roland
   - ☐ Casio
   - ☐ Yamaha
   - ☐ Ensoniq
   - ☐ Kawai
   - ☐ Sequential
   - ☐ Emu
   - ☐ Other _____ (please specify)
   - ☐ Other _____ (please specify)
   - ☐ Other _____ (please specify)
   - ☐ None
5. Approximately how much did you spend last year (1986) on musical instruments and equipment (check one)?
   - ☐ Less than $1000
   - ☐ $1,000-$2,499
   - ☐ $2,500-$4,999
   - ☐ $5,000-$7,499
   - ☐ $7,500-$9,999
   - ☐ $10,000-$14,999
   - ☐ $15,000-$19,999
   - ☐ $20,000 or more
6. Of the following items, how important is each to you when buying a musical instrument?

	Very Important	Somewhat Important	Not at all Important
Price/Deal offered	☐	☐	☐
Manufacturer quality	☐	☐	☐
Sound quality	☐	☐	☐
Product availability	☐	☐	☐
Manufacturer warranty	☐	☐	☐
Brand name/reputation	☐	☐	☐
Product features	☐	☐	☐
Service/Repair	☐	☐	☐
Manufacturer support	☐	☐	☐
Product versatility	☐	☐	☐
Artist endorsement/usage	☐	☐	☐
Ease of use	☐	☐	☐
Other _____ (please specify)	☐	☐	☐

7. Which music magazines do you read regularly (list all that apply)?

_____

_____

8. Please circle in question #7 the one magazine that is most important to you.
9. Of the following items, how important is each to you in music magazines?

	Very Important	Somewhat Important	Not at all Important
Ads	☐	☐	☐
Columns	☐	☐	☐
Features	☐	☐	☐
Interviews	☐	☐	☐
Reviews	☐	☐	☐
Soundsheets	☐	☐	☐
Other _____ (please specify)	☐	☐	☐

10. Which non-music magazines do you read regularly (list all that apply)?

_____

_____

11. Please circle in question #10 the *one* magazine that is most important to you.
12. Where do you get information about which models and brands of instruments to buy (check all that apply)?
    - ☐ Artist endorsement/usage
    - ☐ Dealer newsletters
    - ☐ Magazine ads
    - ☐ Magazine articles/reviews
    - ☐ Newspapers
    - ☐ Other musicians
    - ☐ Retail salespeople
    - ☐ TV/Radio
    - ☐ Music teacher
    - ☐ Other _____ (please specify)
13. Please circle in question #12 the *one* most important source of information to you.
14. What can Yamaha do to better fulfill your musical needs?

_____

_____

15. Are you: ☐ Male ☐ Female

Continued on page 18

To help Yamaha serve you better, simply fill out this short questionnaire. After you have finished, tear the page from the magazine, fold it in thirds (so that the Yamaha address on page 18 shows), tape it closed, and drop it in the mail.

Just for participating, Yamaha will send you a T-shirt. In addition, you will be entered into a drawing that will award one lucky reader with a complete YCAM System (QX1, TX816, RX5, and KX88)!

Yamaha Survey *Continued*

16. Your age:

- ☐ Under 15
- ☐ 16-20
- ☐ 21-25
- ☐ 26-30
- ☐ 31-35
- ☐ 36-40
- ☐ 41-45
- ☐ 46-50
- ☐ Over 50

17. Your occupation:

- ☐ Professional musician
- ☐ Professional/ Technical
- ☐ Manager
- ☐ Proprietor
- ☐ Office worker
- ☐ Sales worker
- ☐ Police/Postal/Fire
- ☐ Skilled trade
- ☐ Factory worker
- ☐ Farmer
- ☐ Truck driver/Equipment operator
- ☐ Military
- ☐ Student
- ☐ Housewife
- ☐ Retired
- ☐ Other _____ (please specify)

18. Your total household income in 1986:

- ☐ Under $15,000
- ☐ $15,000-$19,999
- ☐ $20,000-$24,999
- ☐ $25,000-$29,999
- ☐ $30,000-$39,999
- ☐ $40,000-$49,999
- ☐ $50,000-$59,000
- ☐ $60,000-$74,999
- ☐ $75,000 and up

19. Are you an AfterTouch subscriber? ☐ Yes ☐ No

To receive your free T-shirt and be eligible for the grand prize, please tell us:

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T-shirt* size (check one): ☐ Small ☐ Medium ☐ Large ☐ Extra-large

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New Products

Continued from page 6

Stereo outputs are included, and the unit features full MIDI implementation. (Watch for more information on the RX17 in upcoming issues of AfterTouch.) Suggested list price: to be determined.

TX81Z

The TX81Z is a 4-operator, 8-note FM tone generator that can act as eight independent instruments–it is fully multi-timbral. In addition, the four operators are not simply sine wave generators: Each operator can be set to one of eight waveforms. All voice parameters can be programmed from the instrument's front panel. Micro Tuning is available, as are a number of other new FM parameters and effects. (For more information on the TX81Z, watch for the upcoming cover story in the February 1987 issue of AfterTouch). Suggested list price: $495.00.

MDF1

The MDF1 is a MIDI Data Filer for bulk MIDI storage of many types of data, including: DX, TX, and FB voice data; RX and QX rhythm and music data; KX, MEP, and other controller data. The MDF1 uses 2.8″ Quick Disks, with storage of approximately 60K bytes per side in up to 19 files. (For more information on the MDF1, see the article in this issue of AfterTouch.) Suggested list price: $350.00.

LET US HEAR FROM YOU! We want AfterTouch to be an information network for *all* users of Yamaha professional musical products, so please join in. We're looking for many different kinds of material.

Have you created an incredible patch for the DX7, the DX100, or any of the other members of the Yamaha FM digital synthesizer family? How about a program for the CX5M music computer or a great pattern for the RX11? Send in your patches, programs, and patterns. If we use your material, we'll give you full credit plus $25.00 for each item used.

Have you discovered a trick that increases the musical flexibility of one of the Yamaha AfterTouch products? Send it in to our "FinalTouch" column. If we use your hot tip, you'll receive full credit plus a check for $25.00.

Have you developed a new approach to one of the Yamaha AfterTouch instruments, or have you discovered an important secret regarding their use? Put it on paper and send it to us. Don't worry about your writing style–just get the information down. If we decide to use your material as a full article in AfterTouch, we'll write it up, put your name on it, and send you a check for $100.00. (An AfterTouch article always covers at least one magazine page–which translates to at least four double-spaced pages of typescript.)

By the way, we cannot assume liability for the safe return of unused ideas, patches, or manuscripts. We will only be able to return unused material if you enclose a self-addressed, stamped envelope with your submission.

If you just have a question regarding the use of Yamaha professional musical products, send it along too, and we'll do our best to answer it in the pages of AfterTouch. (We regret that we won't be able to answer questions through the mail, but we will use all of your questions to guide us in our choice of future topics.)

Finally, if you just want to get something off your chest, or if you'd like to establish direct contact with other Yamaha AfterTouch product users, send in something to our letters column, "Touch Response." We'll do our best to print names, addresses, and phone numbers of all those who are interested in starting up regional users groups.

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From The Editor

Continued from page 3

this mode, an instrument will always play monophonically, no matter how much information is being sent over the various MIDI channels.

Mode 3: OMNI OFF, POLY. In this mode, an instrument will only respond to the MIDI information being sent on the channel to which it is assigned. Mode 3 is also known as POLY Mode.

Mode 4: OMNI OFF, MONO. In this mode, an instrument will only respond to MIDI information being sent on the channel to which it is assigned, and it will respond to that information monophonically. Mode 4, also known as MONO Mode, is most often used in multi-timbral instruments, where each voice can be assigned to a separate MIDI channel.

Since most synthesizers today are polyphonic, Mode 2 (OMNI ON, MONO) is the least common of the four. Mode 3 (OMNI OFF, POLY) is the most common, especially when a number of instruments are being used with a sequencer. The basic operation of the TX816 with the QX1, for example, will most often involve Mode 3.

In the early days of MIDI, many instruments were programmed so that they were in OMNI mode when turned on. This basic "default" setting is still quite common, though not as much as it was at the beginning of MIDI. The DX7, for instance, functions in POLY Mode (MODE 3), and, when turned on, is initially assigned to MIDI channel 1.

As mentioned above, Mode 4 (OMNI OFF, MONO) is usually reserved for use with multi-timbral instruments such as the FB-01. Each of the FB-01's eight voices operate like a complete monophonic synthesizer. By assigning each voice to a different MIDI channel, it is possible create multi-timbral polyphony by controlling the FB-01 with a multi-channel MIDI sequencer.

So, there is the story of the four MIDI modes. They determine how any given MIDI instrument will respond to information sent on the 16 MIDI channels. Once you understand how the channels and modes interact, you will be well on your way to understanding the basic operational system of MIDI.

–TD