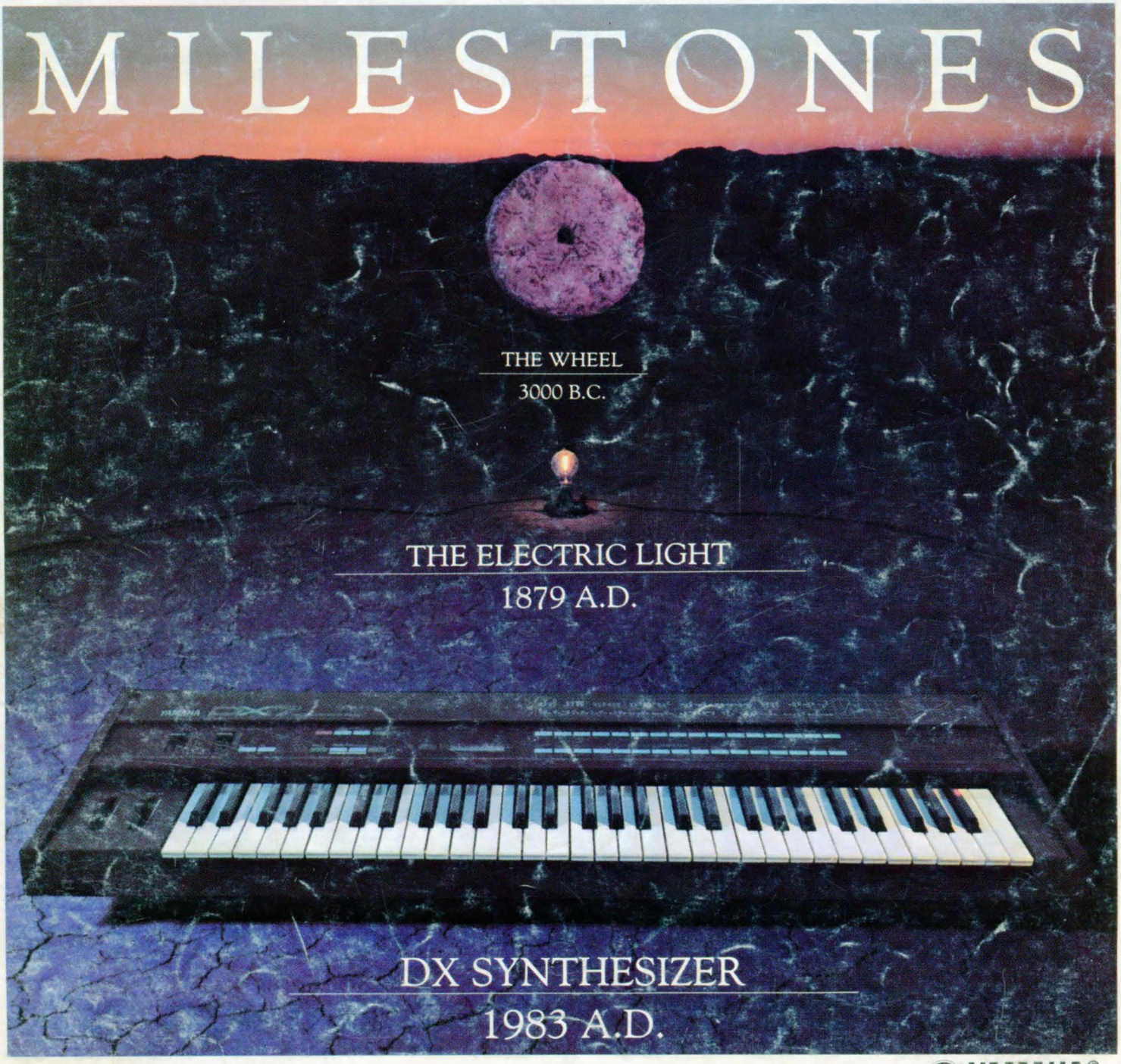
AFTER TOUCH™

THE OFFICIAL PUBLICATION OF THE YAMAHA USERS GROUP

MILESTONES



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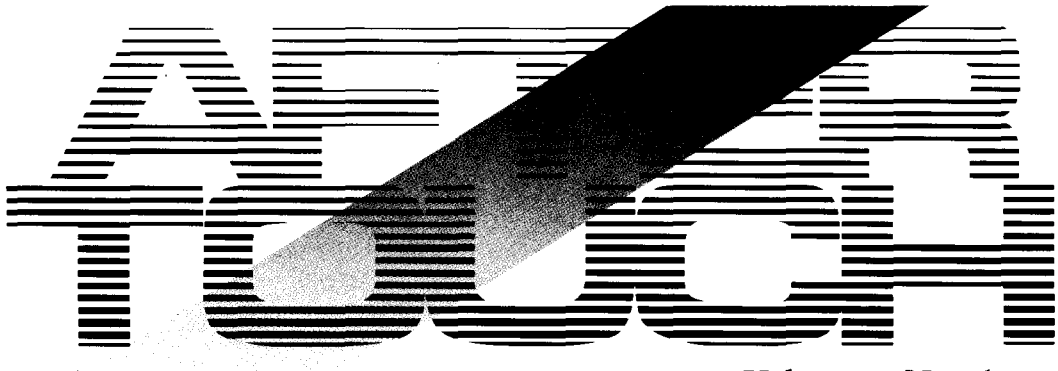

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From The Editor

WELCOME TO THE FIRST issue of AFTERTOUCH, a new monthly publication designed especially for users of the Yamaha line of FM digital synthesizers, music computers, and related MIDI products. AFTERTOUCH will appear every month, and will be available free of charge—a regular informational service from Yamaha.

Yes, it will be free, but it won't be a glossy sales brochure. The aim of AFTERTOUCH is to present information on the use of the X series line of products. As musical technology becomes more and more sophisticated, it becomes harder and harder to learn how to use new instruments to their fullest potential. Owner's manuals are written before the products get out in the hands of musicians, so they cannot be expected to present the full musical picture—it's always better to learn how to use an instrument by studying with somebody who already knows how to use it, because a user is constantly discovering new musical applications. Unfortunately, it's often hard to come by that kind of inside, hands-on information.

This information gap is precisely what AFTERTOUCH plans to combat. The material in these pages comes from people who are familiar with Yamaha musical instruments: They know how to use them, how to make them work together most effectively, and how to use them with other musical products. So, to begin with, we plan to get as much information as we can and present it to you, so that you can be more effective musicians.

But we don't plan to stop there. If you are reading this, then chances are you are a user yourself. You may have figured out a great new way to use the QX1, or you may have figured out a great new DX7 patch. We invite you to share your knowledge by sending it to AFTERTOUCH. If we use your article, hot tip, or patch, we will pay you for it, and will present it to your fellow users. They, in turn, may be able to combine your thoughts with theirs and come up with an even better idea for all of us to share.

There are of course, many other ways of increasing the flow of information, and we plan to help out with as many as we can. If you belong to or want to start a Users Group in your region, send us a letter: Include your address and (if you wish) your phone number. We'll print it, and others in your area will be able to contact you to set up meetings, information swap meets, or other gatherings.

Send us questions too. Regular customer service questions should still be sent to Yamaha, but if you have a question on how to use an X series product, send it along to us, and we'll do our best to find the answer and share it with all of our readers.

That's the bottom line. AFTERTOUCH is for its readers. We want to help you learn more about the instruments you are using to make your music. Let us know what you want to know. In the meantime, enjoy the first issue!

—TD

AFTER-TOUCH is a new monthly informational publication from Yamaha.

Receive AFTERTOUCH *Free* Every Month!

YOU HAVE RECEIVED THIS ISSUE of AFTERTOUCH because we know that you have purchased a Yamaha professional musical product, or that you frequent a store in which Yamaha products are sold. You can continue to receive AFTERTOUCH for an entire year, absolutely free, just by sending in the postcard that is bound into this issue.

If the address on the mailing label (on the back of the magazine) is correct, just peel off the label and affix it to the postcard. If it is not current, or has some error in it, put the label on the postcard and write in the necessary corrections. If the address is completely wrong, or if you picked this copy up in a music store, just write in your name and address.

After you have indicated your correct name and address, put a stamp on the postcard and mail it to us. We'll put you on our permanent mailing list, and you will receive twelve issues of AFTERTOUCH absolutely free! There is absolutely no obligation, and no other strings are attached. We just need the postcard to make sure that we have your correct address, and to make sure that you want to receive AFTERTOUCH every month.

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

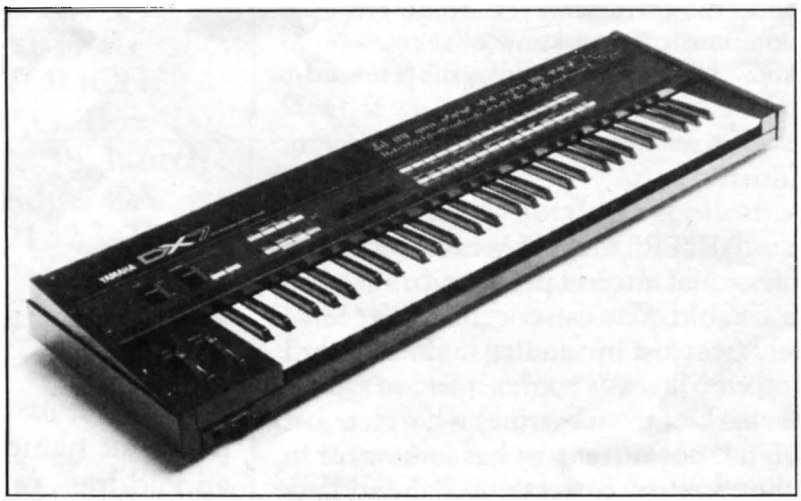
DX7

Programming The DX7 — The Anatomy Of Two New Voices. By Gary Leuenberger.

HERE WE HAVE A new publication, two new DX7 voices, and a new voice data chart. Why the new chart? Well, when you look at the standard DX7 data chart from the owner's manual (the one with all the numbers stacked in little boxes), it can be quite confusing. I think it's much easier to organize the data in a flow chart using the most important aspect of the sound, which is the algorithm.

The first two things I look for when I start to put a sound together are the operator frequencies and output levels. These two things—frequency ratios and modulation index—form the real basis of FM. In this new flow chart we can see them very clearly. All voice parameters will be found in the operator boxes. All parameters that affect the overall voice are in a separate box. The function controls (which affect the overall machine) are in another box. Using this chart, you can see the relationship of the parameters very clearly.

One thing that I really want to emphasize here, before we begin talking about any one sound in particular, is an overall concept, which we call "stuff." I know it sounds funny, but it's now an accepted term at IRCAM (the famous music research center in Paris), and it's accepted by Dr. Chowning (the "Father" of FM digital synthesis). Besides that, none of us can think of a better word. "Stuff" can be the pluck of the guitar, or the spit on a trumpet, or the slap on a conga, or the scratch on a violin—any of those little things which cue our ears into recognizing a sound.



DX7 FM digital synthesizer.

In the PICKGUITAR sound, I've done some very careful editing of my original sound (JAZZGUITAR) to get some realism and musical response. Instead of simply trying to duplicate something when I create a sound, I try rather to create a musically-responsive voice. This is a natural in FM because of the way velocity affects the modulation index to create harmonic changes; the response is similar to that of the piano or other acoustic instruments.

PICKGUITAR

Where do you start when creating a sound? First of all, it's important to develop a basic vocabulary in FM by learning how two operators work together, so you'll know what kind of frequency ratios create what kinds of textures. Then you need to work with the envelopes (starting again with just two operators), so that you have a good basic feel for how they create timbral changes.

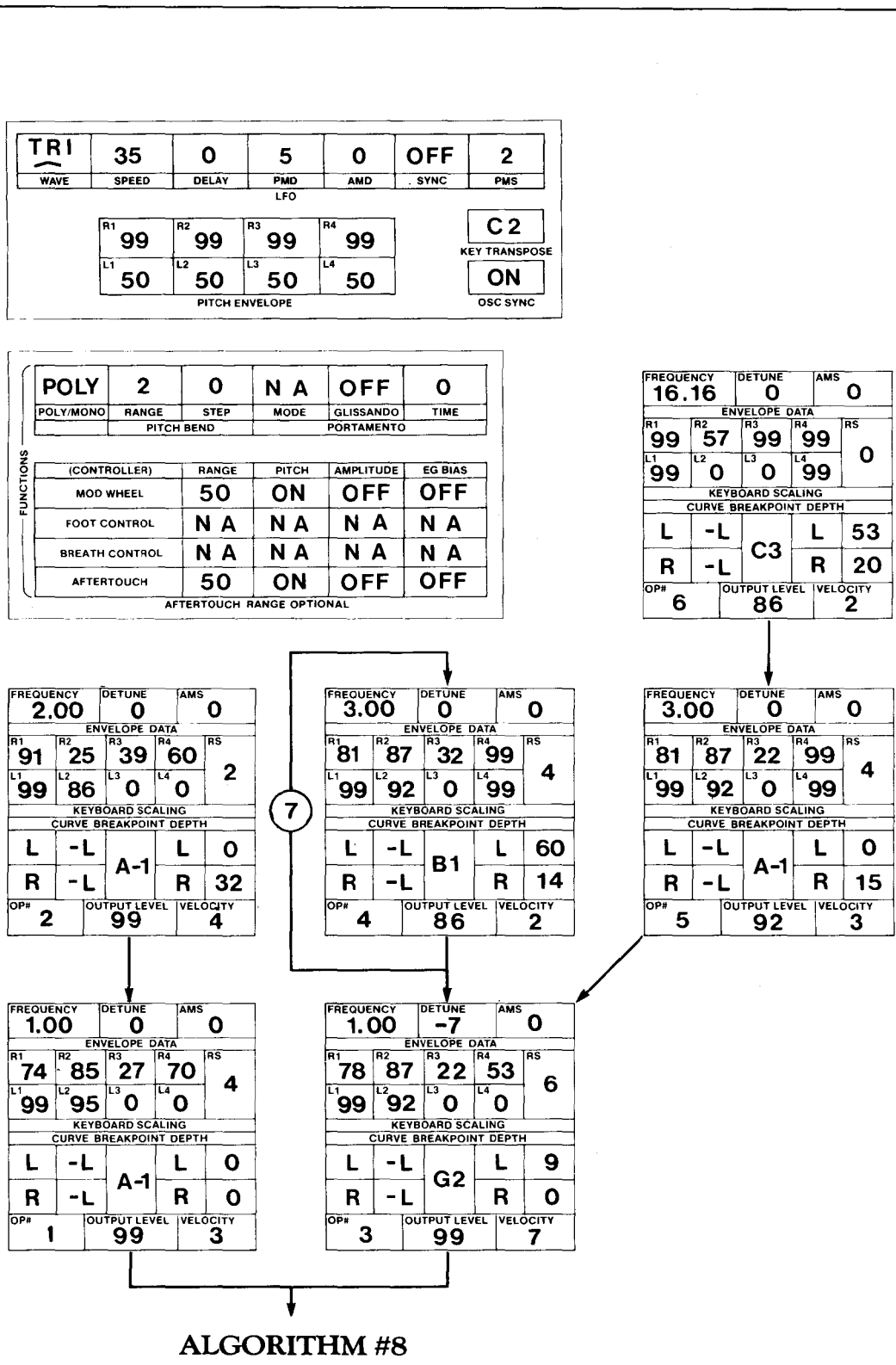
Then, when you are ready to create a particular sound, start by looking across the algorithm chart. The one I chose for PICKGUITAR was #8. First of all, there is a basic FM pair (ops #1 and #2) to create the basic, full-bodied harmonic sound of the guitar. It's a simple two-to-one ratio, which gives you the nylon string sound. The envelopes are pretty basic: A fast attack with a medium decay. I work on envelopes in a totally intuitive way: I play as a guitar player would, and adjust the envelopes until I come up with something that feels and sounds pretty good.

Once I get to that point, I add velocity, to give the sound its life. Now that I have the op #1 and #2 stack working the way I want it to, I use the next part of the algorithm to create the "stuff." On that level, if you look at the algorithm menu on the DX7, you'll find that a number of other algorithms would also work: #1, #2, #7, #9, #12, #13, #14, #15, #16, #17, and #18. I chose #8 because, I wanted to use the second FM pair (ops #3 and #4) in conjunction with the first pair, with a little detuning to fatten up the sound and add some of the higher harmonics. You will find that if you take the PICKGUITAR sound and switch through any of the above algorithms (leaving all of the parameter settings the same), you will achieve the same kind of guitar sound with different textures. In algorithm #8, I still have two more operators feeding into op #3, and I use those to create the pick sound—the "stuff."

You'll notice that I have been talking about

Continued on page 6

PICK-GUITAR. A New DX7 Voice By Gary Leuenberger.



Notes:

Ops #5 and #6 create high pick pluck.

Op #6 has "pick" frequency with "pluck" envelope.

Ops #3, #4, #5, and #6 form upper harmonics and picking sound. Level 4 at 99 on ops #4, #5, and #6 create string noise.

Ops #3 and #4 are detuned with ops #1 and #2 to fatten up the sound.

Full velocity on final output of "pick" stack (ops #3, #4, #5, and #6) for maximum expression.

Ops #1 and #2 form full-bodied sound of guitar.

These DX7 voices can also be loaded into all the other Yamaha six-operator FM digital synthesizers and tone generators, including the DX1, DX5, TX7, TX216, TX816, and TF1.

Here is a good general rule for editing voices: If you start messing with the carrier frequencies and the lower frequencies, you're going to destroy the basic overall character of the sound.

Next Month In AFTER-TOUCH: An Exclusive Interview With Dr. John Chowning, The Father Of FM Digital Synthesis!

this voice a few operators at a time. When you're voicing or studying sounds, it is very important to turn the operators on and off. As obvious as this seems to me, I find that most students or musicians I talk to just kind of dive into the voice and start moving things around. The thing to do is to look at the algorithm that was used, #8 in this case: Turn off operators 3-4-5-6, and listen to 1-2; turn off 1-2, and listen to 3-4; then add 5-6, and see what's really going on. This is the best way to study a voice, and it's also the best way to create a voice.

In this guitar sound, the critical things in the "stuff" area are as follows: We put the R4s and L4s on the modulators up to 99, which creates what might be called the "afterstuff," (a technique which was originally heard on the DX7 harpsichord voice). I find that when you play the guitar, there are all kinds of picking noises and string squeaks going on; if you play this voice properly on the DX7, those things come alive. The critical part of the voice in that sense is operator #6; it's set at a very high frequency, which gives you that plucked type of sound. There is also a lot of velocity on op #3, which allows more and more pick sound as you play harder.

Any sound on an FM system must be played in the style of the voice. So, a couple of rules about playing this voice: No sustain pedal is allowed, because guitars that I know of don't have sustain pedals. And six notes only are allowed. The way I play the patch is with the root and the 5th in the left hand (like strumming the lower strings), with a four-note voicing in the right hand. Try it—it really works! I'd also like to say that, as a former guitar player, this PICKGUITAR patch is by far my favorite sound on a DX7.

Here are a few editing tricks to try with this voice: If you take operator #2 from its frequency of 2.00 down to 0.50, you get an octave sound—the Wes Montgomery effect. You can also change operator #2 from a frequency of 2.00 up through 4.00, to change the overall lower body of the sound—kind of like changing the brand of the guitar. If you go to the output of #5, you'll find that #5 is governing the output of #6, which is the pluck; so if you increase the output of #5, you will get more of a metal sound (it's a very pleasing change). If you change also the frequency of #5 anywhere from its current frequency of 3.00 up to about 12.00, you're also going to get some pleasing metallic effects.

Here is a good general rule for editing voices: If you start messing with the carrier frequencies and the lower frequencies, you're going to destroy the basic overall character of the sound. On the other hand, if you look for the "stuff" components (which are going to be the funny-looking frequencies or higher harmonics), and just edit the output level or the frequency, you'll most likely get some very pleasing changes.

SLAPCONGAS

The basic foundation of this voice by Dr. John Chowning is once again operators #1 and #2: He has picked the basic FM pair at fairly basic frequencies to form the solid part of a conga sound. The envelopes are shaped very carefully, so that when you slap the key, you're going to get one kind of thing, whereas if you hold the key you get a different type of decay. The frequency ratios are critical in ops #1 and #2, with op #2 being lower than op #1—this is what creates the hollow, conga-like timbre.

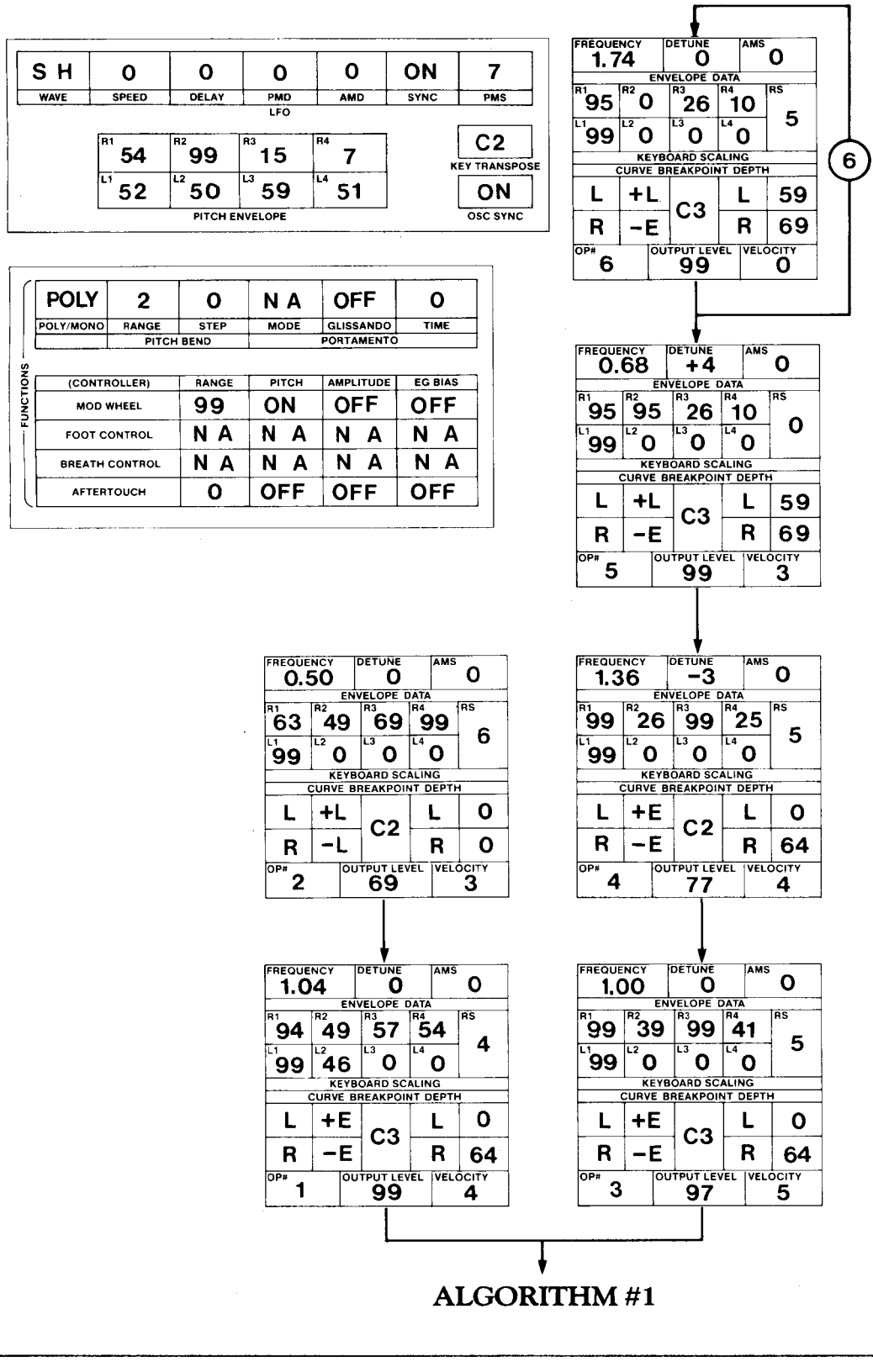
The Slap part of the sound, like the "stuff" in the guitar, is in the complex FM stack on the righthand side, ops #3, #4, #5, and #6. Dr. Chowning has voiced the velocity sensitivity very carefully, starting with op #3 set pretty high, decreasing to zero at the top of the stack. This creates an interesting effect: The slap of the conga is always there (because the velocity sensitivity of op #6 is zero), but as you start hitting the keys harder, the rest of the stack opens up and all kinds of wonderful new harmonics appear.

There are very tight envelopes going all the way up the righthand stack. By the way, if you take R2 of op #5—which is at 95 for a very tight slap—and bring it down to about 50 or below, you'll start creating the effect of a snare drum. This is because op #6 has a long envelope and a high feedback level, which creates a noise effect. You can begin to create a number of other drum sounds just by editing that one rate.

If you look across the DX7's algorithm menu, there are so many you could choose from to get the effect of a drum. As a learning exercise, try switching between algorithm #1 and these others (keeping all of the parameter values the same): #2, #5, #6, #7, #8, #9, and #29. They will give you the same overall effect, but they will be different conga sounds. Try to figure out why these algorithms work for the conga sound

Continued on page 20

SLAP-CONGAS. A New DX7 Voice By Dr. John Chowning.



Notes:

Tight EG on op #5 rate 2 creates slap; feedback on op #6 adds slap noise.

Lower rate 2 of op #5 to 50 and below for snare effect.

Nice timbral change results if frequency of op #4 is altered in the range from .60 to 2.78.

Change frequency of op #3 to "tune" conga; range from .50 to 3.00.

The basic FM pair (ops #1 and #2) create the foundation of the sound; complex FM stack (ops #3, #4, #5, and #6) create the harmonics and slap.

Ops #1 and #2 form solid conga timbre. Quick EG rate 2 at 49 eliminates pitch EG effect. Op #3 has longer decay (rate 2) so that pitch EG effect comes through. The combination of op #1 and op #3 creates a nice contrast.

Move mod wheel to max for great random drum effect.

MIDI

The Ins And Outs Of MIDI. By Tom Darter.

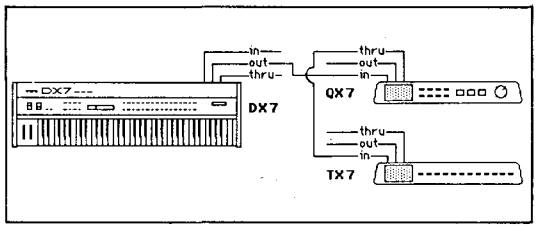
MIDI (THE MUSICAL Instrument Digital Interface) has opened up a new universe of possibilities for the electronic musician, but it has also created a whole new area of possible confusion. Anyone who has spent a few hours wrestling with a tangled mass of MIDI cables knows the frustration that can come from trying to grope your way into the marvelous new world of MIDI. As with many other things, the main weapon in the fight against confusion and frustration is knowledge.

All MIDI-equipped insruments have MIDI ports, those little five-pin DIN sockets that are usually found on the instrument's back panel. These sockets send and receive MIDI messages from unit to unit (via the tangled mass of MIDI cables mentioned above). At present, there are only three basic kinds of MIDI ports: IN, OUT, and THRU. If you want to understand how your MIDI instruments are communicating with each other, it's important to know exactly what happens at each one of these ports. Let's take a closer look.

The MIDI IN port accepts information from another MIDI device; this information controls some aspects of the device receiving the input. The exact kinds of control will be determined by the way you have set the instruments up.

The MIDI OUT port sends MIDI information generated by the instrument, for reception at another device's MIDI IN port. Once again, the kinds of information transmitted via this port will be determined by the MIDI set up you have chosen for the instrument.

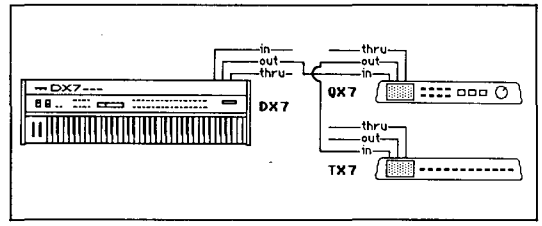
The MIDI THRU port outputs MIDI information that is being received at the instrument's MIDI IN port. This allows information being generated by one instrument to control more than one other MIDI device. For example: MIDI information from instrument 1 is received by instrument 2 (at instrument 2's MIDI IN port); this same information is present at instrument 2's MIDI THRU port, where it can be routed to instrument 3.



In this configuration using the MIDI THRU port on instrument 2 (the QX7), instrument 1 (the DX7) will control both instrument 2 and instrument 3 (the TX7); However, instrument 2 is not set up to control instrument 3, so MIDI cables have to be switched before a sequence recorded on the QX7 can be played on the TX7.

Remember, MIDI information generated by a particular instrument will appear only at its MIDI OUT port; the MIDI THRU port of a particular instrument presents only the information received at that instrument's MIDI IN port.

Obviously, the way your instruments will communicate will depend on how you connect their various MIDI ports. Let's look at the three instruments above. Instrument 1's MIDI OUT is connected to instrument 2's MIDI IN; therefore, instrument 1 will be controlling instrument 2 on some level. Now, if instrument 3 is connected to instrument 2's MIDI THRU, then it will also be controlled by the MIDI data from instrument 1. However, if instrument 3 is connected to instrument 2's MIDI OUT, it will only be controlled by MIDI information generated by instrument 2—the data coming from instrument 1 will not affect it at all.



In this configuration using the MIDI OUT port on instrument 2 (the QX7), instrument 1 (the DX7) will control instrument 2, and instrument 2 will control instrument 3 (the TX7). If MIDI echo is engaged in the QX7, then both instrument 1 and instrument 2 can control instrument 3 via MIDI.

Now, these are useful ways of operating, but there may be times that you want instrument 3 to be controlled by MIDI data coming from both instrument 1 and instrument 2. Manufacturers have considered this possibility as well, and many of them have installed a "MIDI echo" function in their instruments. When MIDI echo is engaged, information sent to an instrument's MIDI IN port will appear at that instrument's MIDI OUT port. If instrument 2 above had an echo function, then instrument 3 could receive MIDI data from both instrument 1 and instrument 2, through instrument 2's MIDI OUT (with echo engaged).

MIDI echo is, in essence, a merging of data from two separate sources. Some devices, like the KX88, offer this merge function as a permanent feature: Its MIDI OUT port merges information generated by the KX88 with information sent to the KX via its MIDI IN port.

The MIDI ports are the basic doors to communication between instruments. Try the various setups we have described, so you will really understand how MIDI works. If you do understand, you will be on the threshold of a new world of sound.

TX7

How To Use The TX7 Tone Generator As A Function Controller For The DX7.

ON ITS MOST BASIC LEVEL, the TX7 FM digital tone generator offers an inexpensive way for a MIDI-equipped musician to add FM digital sounds to his setup—the tone generating circuitry is equivalent to that found in a DX7 synthesizer. Obviously, the TX7 has no keyboard of its own, and voice patches cannot be created or edited on the TX7; however, in other areas, the TX7 offers flexibility beyond that of a DX7.

The DX7 offers a great deal of function (performance) control over its sounds, but the instrument's memory can only hold one set of function data. Programmed settings for things like pitch bend wheel range and modulation wheel depth remain the same for all voices in the DX7. If different voices require different function control settings for proper performance, these changes must be made manually.

The TX7, on the other hand, has a full 32 voice function memory, so that performance controls can be set specifically for each voice.

But that's not all. The TX7 also can hold an *additional* set of 32 function memories; used in conjunction with a DX7, a TX7 offers both another layer of sound and an added degree of control over the DX7 sounds.

To take advantage of this added flexibility, connect the DX7's MIDI OUT to the TX7's MIDI IN, and connect the DX7's MIDI IN to the TX7's MIDI OUT. Now, when you change programs on one instrument, the other instrument will also change programs. The TX7's extra function memory will combine with the DX7's voice memory for full function control per voice. This combination offers the same overall voicing and function-control capability found in the DX5.

If you want to change voices independently on the two devices, switch the TX7 from "Combined" to "Individual" mode. Now program changes are separate, but the TX7's extra function memory will still be connected to the DX7. Function memories can also be edited directly on the TX7, so you can set up your own performance controls.

D1500

The D1500 Digital Delay And MIDI.

IF YOU HAVE read sales brochures, you may know that the D1500 is a programmable, MIDI-equipped digital delay unit. If you've seen the owner's manual, you may have some understanding of what each control will do. Only one thing missing from the picture: How to make musical use of the D1500.

First of all, the D1500 has the control settings that are expected on digital delays, such as delay time, feedback, LFO control, and program mix. All of these settings can be stored in the D1500's memory—there are sixteen memory locations, each of which stores a full menu of basic settings. This means that you can create a number of specific digital delay effects and have immediate access to them.

Beyond that, the D1500 responds to MIDI program information. Each one of the 16 program locations (numbered in hexadecimal: 0-1-2-3-4-5-6-7-8-9-A-B-C-D-E-F) can be called up by a specific MIDI program number, sent to the D1500 from any source. In other words, specific sounds on a synthesizer (such as the DX7) can be processed by specific programs in the D1500. Specific voicing parameters can be connected to specific signal processing parameters, allowing sound synthesis to enter new dimensions of performance control.

The D1500 can also be programmed to accept MIDI information only on a certain MIDI channel (so that it responds to information from only one instrument), and MIDI program numbers can also be programmed to call up any one of the sixteen memory locations within the D1500 (using the MIDI Program Change function).

You can also use MIDI control, in effect, to turn the D1500 digital delay off. If one program is set up as a "blank" (no delay, no feedback), and is connected to a synthesizer sound that does not require signal processing, the D1500 will remain inactive until one of the synthesizer sounds that is connected to a specific D1500 program is called up.

Remember, MIDI can only change the D1500's programs—no more magic than that is involved. However, if you plan your synthesizer sounds and delay settings carefully, you will discover magic enough!

Yamaha Product List

A Reference Guide To All Of The Yamaha AFTER-TOUCH Products. Compiled By Sibyl Darter.

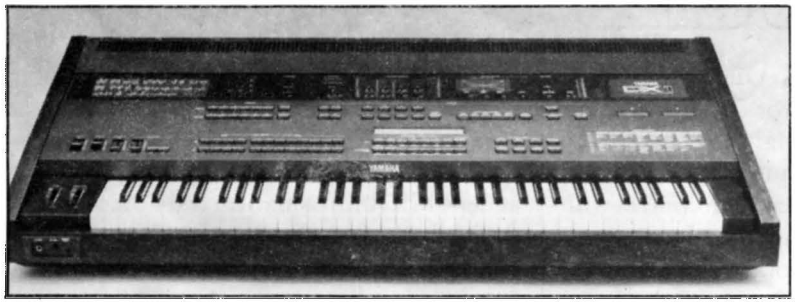
HERE IS A COMPLETE LISTING of currently-available Yamaha FM digital synthesizers, sequencers, music computer products, MIDI devices, and related accessories. The products are grouped according to type. Within each listing, you will find the product name, the current suggested retail price, and a short description. We will update this list periodically in AFTERTOUCH, so that you can stay informed on the comings and goings in the Yamaha universe of professional electronic instruments and accessories.

FM Digital Synthesizers

DX1 $10,900.00

2 FM tone generator systems with 6 operators each; 32 algorithms; 64-voice onboard RAM; two cartridge slots for voice cartridges; 73 wooden piano-type keys; 32-note polyphonic with single, dual, and split modes (16 notes each voice in dual and split modes); velocity sensitive with individual after touch; full function/performance memory per voice; dual channel operation; extensive LED display, plus illuminated LCD display.

DX1 FM digital synthesizer, with wooden, piano-type keys and polyphonic after touch.



DX5 $3,495.00

2 FM tone generator systems with 6 operators each; 32 algorithms; 64-voice onboard RAM; two cartridge slots for voice cartridges; 76 keys, plastic; 32-note polyphonic with single, dual, and split modes (16 notes each voice in dual and split modes); velocity sensitive with monophonic after touch; full function/performance memory per voice; dual channel operation.

DX7 $1,995.00

1 FM tone generator system with 6 operators; 32 algorithms; 32-voice onboard RAM; one cartridge slot for voice cartridges; 61 keys, plastic; 16-note polyphonic; velocity sensitive with monophonic after touch; one global function/performance memory.

DX9 $1,395.00

1 FM tone generator system with 4 operators; 8 algortihms; 20-voice onboard RAM; voices loaded via cassette tape; 61 keys, plastic; 16-note polyphonic; one global function/performance memory.

DX21 $795.00

2 FM tone generator systems with 4 operators each; 8 algorithms; 128 permanent onboard voices (ROM), plus 32-voice onboard RAM memory; 61 keys, plastic; 8-note polyphonic with single, dual, and split modes (notes allocated 4+4 or 7+1 in dual and split modes); one global function/performance memory.

FM Digital Tone Generators

TX816 $4,995.00

Complete rack-mount FM tone generator system, with main controlling rack and eight TF1 tone generator modules.

TX216 $2,095.00

Basic rack-mount tone generator system, with main controlling rack and two TF1 tone generator modules.

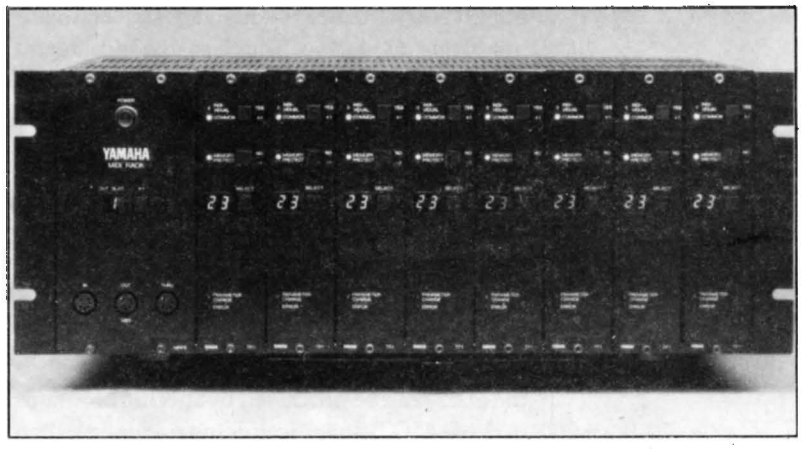
TF1 $545.00

Basic FM tone generator module for rack-mount system; 6 operators, 32 algorithms, 32-voice onboard RAM, full function/performance memory per voice; programmable via MIDI; only operates in conjunction with the rack-mount main controlling rack.

TX7 $845.00

FM tone generator module with 6 operators; 32 algorithms; 32-voice onboard RAM; full function/performance memory per voice, plus an additional 32-position function/performance memory for use in conjunction with a DX7; programmable via MIDI.

TX816 rack-mount digital FM tone generator system, with eight tone generating modules.



MIDI Keyboard Controllers

KX88 $1,695.00

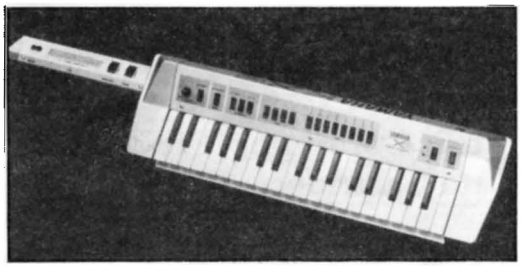
88 weighted piano-type keys; velocity sensitive with monophonic after touch; single, dual, and split modes; inputs for two FC4-type foot controllers, two FC7-type foot controllers, and one BC1 breath controller; 4 slider controls, 5 momentary switch controls, 2 toggle switch controls, 2 wheel controllers; 16-position performance memory, allowing for programmable assignment of all controllers, sliders, and switches.

KX1 $1,295.00

44 keys, plastic; velocity sensitive with monophonic after touch; designed for strap-on use.

KX5 $495.00

37 mini-keys, plastic; velocity sensitive with monophonic after touch; designed for strap-on use.



KX5 strap-on MIDI keyboard controller.

Electro/Acoustic MIDI Pianos

CP80M $5,695.00

88 keys; 7 band graphic EQ; MIDI OUT; portable.

CP70M $4,695.00

73 keys; 7 band graphic EQ; MIDI OUT; portable.

CP60M $2,695.00

76 keys; 7 band graphic EQ; MIDI OUT; foldup portable.

MIDI Sequencers

QX1 $2,795.00

8-track digital MIDI sequence recorder; full compositional edit functions; MIDI IN, MIDI THRU, eight MIDI OUT ports; use 5¼" floppy disk, 80,000+ note storage capacity; utility for storage of voice, function, and other MIDI data on disks.

For more detailed product information, write to Yamaha International Corp., P.O. Box 6600, Buena Park, CA 90622.

QX1 eight-track digital sequence recorder.

QX7 $475.00

2-track digital MIDI sequence recorder; addresses all 16 MIDI channels; storage of data via cassette.

Digital Rhythm Programmers

RX11 $895.00

29 percussive sounds; stereo and individual outputs; memory storage via cartridge or cassette; MIDI equipped; onboard memory for 100 patterns and 10 songs.

RX15 $495.00

15 percussive sounds; stereo outputs; memory storage via cassette; MIDI equipped; onboard memory for 100 patterns and 10 songs.

RX21 $275.00

9 percussive sounds; stereo outputs; memory storage via cassette; MIDI equipped; onboard memory contains 44 permanent patterns and 56 programmable patterns, plus 3 song memory.

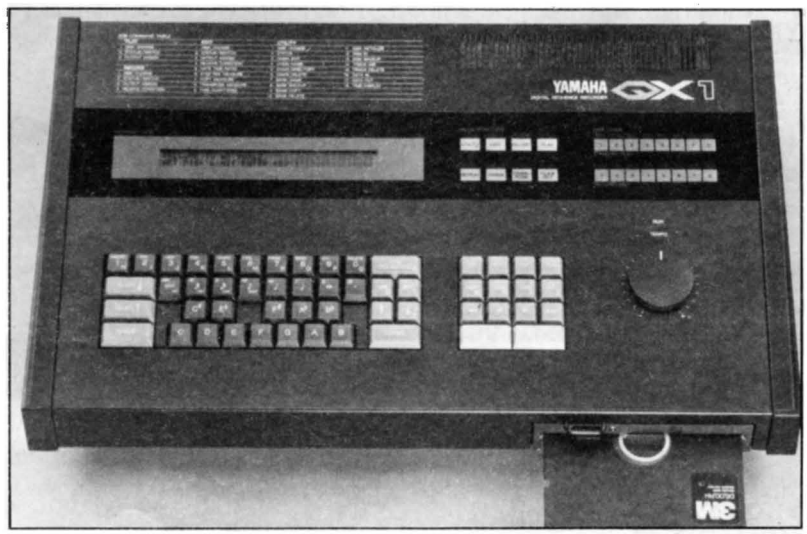
MIDI Signal Proccesors

REV7 $1,195.00

Digital reverberator and effects device; stereo outputs; MIDI equipped; 30 preset programs, plus 60 user programmable memories; remote controller included.

D1500 $895.00

Digital delay device; MIDI equipped; 16 user programmable memories.



Continued on page 12

Product List *Continued*

Voice Cartridges

VRC101 $50.00
Keyboard group; 32-voice ROM.
VRC102 $50.00
Wind instrument group; 32-voice ROM.
VRC103 $50.00
Sustain group; 32-voice ROM.
VRC104 $50.00
Percussion group; 32-voice ROM.
VRC105 $50.00
Sound effects group; 32-voice ROM.
VRC106 $50.00
Synthesizer group; 32-voice ROM.

Accessories

FC4 $25.00
Sustain/portamento footswitch controller for use with DX synthesizers and the KX88 keyboard controller.
FC5 $10.00
Sustain/portamento footswtich controller for use with DX synthesizers and the KX88 keyboard controller.
FC7 $40.00
Volume/modulation foot controller for use with DX synthesizers and the KX88 keyboard controller.
BC1 $35.00
Breath controller for use with DX synthesizers and KX keyboard controllers.
YME8 $90.00
MIDI junction box with 2 MIDI IN ports and eight THRU/OUT ports (coupled in two groups of four).
YMC10 $120.00
MIDI to tape-sync converter.
PA01 $20.00
12-volt DC adapter for use with YME8, YMC10, and other devices with DC power requirements.

Music Computer & Peripherals

CX5M $469.00
MSX based music computer; internal FM tone generating system with 4 operators, 8 algorithms, 8-note polyphonic, multi-timbral.
YK01 $100.00
44-note mini-keyboard for use with the CX5M.
YK10 $200.00
49-note standard-size keyboard for use with the CX5M.
PN101 $295.00
Dot impact printer for use with the CX5M.
CB02 $30.00
Printer cable.
PN101PF $30.00
Pin-feed adapter for the PN101.
PN101RB $10.00
Printer ribbon for the PN101.
RF02 $50.00
RF adapter for connecting the CX5M to a standard television set.
VC02 $10.00
Video cable for connecting the CX5M to a CRT monitor.
CA01 $25.00
Single cartridge adapter, to allow connection of a second cartridge via the CX5M's back port.
UDC01 $75.00
Blank data memory cartridge (4K memory).

Yamaha performance accessories will work with most of the DX and KX instruments; check your owner's manual for details.

All Yamaha computer peripherals are designed for use with the CX5M Music Computer.

Music Computers Programs & Data Cartridges

YRM101 $50.00
FM Music Composer program.
YRM102 $50.00
FM Voicing program, for use with the CX5M's internal FM tone generating system.
YRM103 $50.00
DX7 Voicing program.
YRM104 $50.00
FM Music Macro program.
YRM105 $50.00
DX9 Voicing program.
YRM301 $50.00
MIDI Recorder program.
YRM302 $50.00
RX Editor program.
CMW31 $50.00
Keyboard Chord Master program.
CMW32 $50.00
Keyboard Chord Progression program.
CMW33 $50.00
Guitar Chord Master program.
FVD01 $20.00
FM Voice data cassette #1 (96 voices).
FVD02 $20.00
FM Voice data cassette #2 (96 voices).

QX1

Your First 30 Minutes With The QX1 Digital Sequence Recorder.

By David Lourik & Tom Darter.

IF YOU'RE LIKE MOST, the first thing you'll want to do with your QX1 8-track digital sequencer (after unpacking it) is use it. That's sounds simple enough, and it is; but you are going to have to figure out how it works before you can really get going. Of course, you should read the owner's manual thoroughly, but it contains so much material that it may be difficult to assimilate at first. The instrument's basic operating principles are, however, straightforward and logical. If you can begin by keeping just a few important things in mind, your first experience with the QX1 will be a lot more rewarding.

The first step is setting the QX1 up. Take a look at the back panel. Notice that there are eight MIDI OUT ports, a single MIDI IN, and a MIDI THRU. The OUT ports are the DIN connectors labeled with numbers 1-8.

The eight MIDI OUTs are provided to eliminate potential time delays encountered when driving multiple MIDIed instruments from a single MIDI OUTput. However, the eight OUTs are for your convenience—you don't need to use all of them if you don't want to.

If you're using the QX1 with a TX816 tone generator system, you will want to connect each of the MIDI OUTs from the QX1 to one of the MIDI INs on the back of the TX816's eight individual TF1 modules. If you're using a number of different synthesizers with the QX1, the way you set up the OUTputs will depend on what you intend to do.

The QX1's MIDI OUTs are referred to as terminals. When you turn the power on, each terminal will be assigned to the QX1 track with the same number, but this configuration can be changed easily (we'll explain how in a minute). Each of the eight tracks can be assigned to any one of the 16 MIDI channels, so the QX1 can output MIDI information on a total of eight channels. A maximum of four tracks can be assigned to one output terminal.

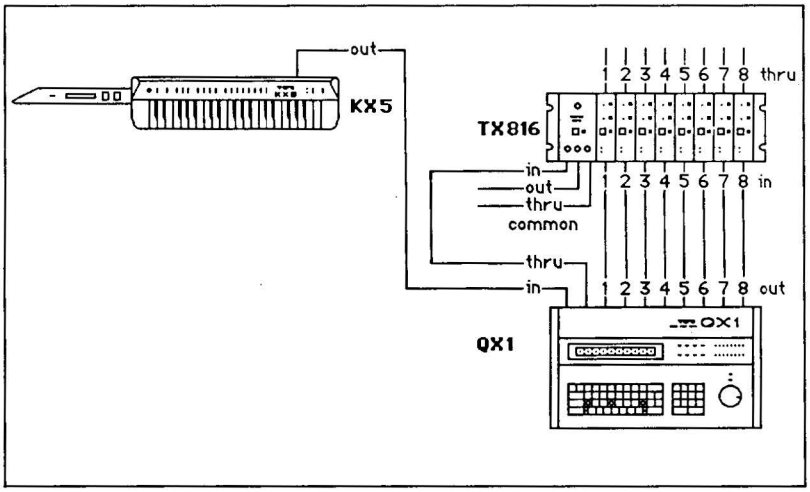
You will need to connect the QX1 to another MIDI device in order to enter data into the sequencer. If you are using a synthesizer, connect its MIDI OUT port to the QX1's MIDI IN. If you are using a MIDI keyboard controller or another sequencer, connect the device's MIDI OUT to the QX1's MIDI IN, and also connect the QX1's MIDI THRU port to the MIDI IN of the tone generator of your choice. This setup is for recording; during playback, the tone generator will need to be connected to the correct MIDI OUTput terminal on the back of the QX1.

To avoid constant shifting of MIDI cables, you may want to pick up one of the many MIDI switch boxes currently on the market.

If you are using the TX816 as your tone generator system, connect the QX1's MIDI THRU to the common MIDI IN on the main controller rack. While recording, have the TF1 modules you want to hear set to COMMON mode. In that configuration, data from the MIDI keyboard controller will drive the TX816 modules via the QX1's THRU port, and at the same time will be recorded by the QX1.

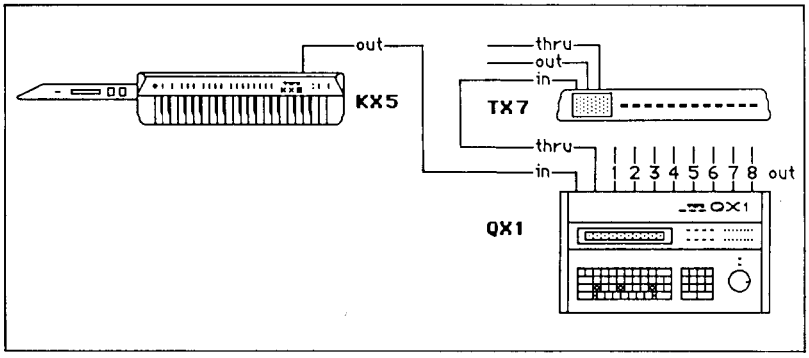
For playback using the QX1, switch the modules you want to hear to INDIVIDUAL mode. (Remember, the TF1 modules should

Continued on page 14



This is the basic setup for recording with the QX1, the TX816 tone generator system, and a keyboard controller. For playback, the tone modules used in recording have to be switched from Common to Individual mode.

already be connected to the QX1's OUTput terminals via their individual MIDI IN ports on the back of the TX816.)



This is the basic setup for recording with the QX1, a tone generating system, and a keyboard controller. For playback, the tone generator will need to be connected to correct MIDI OUTput terminal on the back of the QX1.

You'll also want to connect the jack labeled "Click" on the back panel of the QX1 to your mixing console. This output provides a metronome "click" audio output for your reference. It is engaged when the Click button on the front panel is pressed (the "Click Out" light will be lit).

Before you can do anything with your QX1, you'll have to insert a double-sided, double-density floppy diskette into its disk drive. By the way, never insert a disk into the machine before turning the power on! And don't turn the QX1 off with a disk still in its drive. Turning the QX1 off or on could send a power surge to the disk which would erase all your work!

When you turn the power on, you'll notice that the display prompts you to insert a disk and press ENTER. If you insert a brand new diskette that hasn't been formatted to operate in the QX, the machine will ask you if you want to "initialize" it, which will erase whatever is currently on the disk and prepare it to operate with the QX1. To answer "yes," press and hold the Down Shift key and press "Y" (on the TRANS key). At this point, the machine will begin the initialization process. Be warned that it takes the QX1 a couple of minutes to complete this process, so don't think there's something wrong with your sequencer.

Once the disk is initialized, you'll be ready to start working with the QX1. There are four modes of operation: PLAY, RECORD, EDIT, and UTILITY. The machine comes up in Play mode. However, in order to actually play back, record, or edit a sequence, you've got to hit the ENTER key after pressing the appropriate mode button, putting the machine into Play Ready, Edit Ready, or Record Ready mode. Keep in mind that you almost always have to press the ENTER key after inputting any data, while changing modes, and so on. There are very few exceptions to this rule. One of the most common errors new QX1 owners make is to forget to hit ENTER before moving on. Then they wonder why the last thing they did has disappeared.

This constant need to hit ENTER may seem inconvenient at first, but it is easy to get used to, and there are also some tricks you can play using the system. For example, take the Tempo control knob. Let's say you've recorded a sequence at some incredibly slow tempo in order to get it perfect, but on playback you want it speeded up. It's pretty common to find that you left the tempo knob turned fully clockwise when you went into Play Ready mode. With the Tempo knob set to this position you won't be able to get the tempo faster than the tempo you started at. However, you can get around this problem by pushing the Play button, which gets you from Play Ready to Play mode (where the Tempo knob is disabled). Once there, turn the Tempo knob all the way counterclockwise, and then push ENTER to get back into Play Ready mode. Now when you push the RUN button, you'll be able to speed up the tempo of the sequence to your heart's content (or to 280 beats-per-minute, whichever comes first).

If you desire to change the ouput configuration of the eight MIDI OUT terminals, press the Job Command button while in any of the operating modes except Utility, type "03" (for Job Command 03), and press ENTER. The display will show this:

```
TERMINAL ASSIGN   1 2 3 4 5 6 7 8
MIDI CH.          01 01 01 01 01 01 01 01
```

The eight columns correspond to the eight sequencer tracks (numbering from left to right). The top row of numbers shown actually indicates the terminal each track is assigned to. So, if the display showed this:

```
TERMINAL ASSIGN   1 1 1 1 5 6 7 8
MIDI CH.          01 01 01 01 01 01 01 01
```

it would indicate that tracks one, two, three, and four were assigned to output terminal 1, while tracks five through eight were assigned to terminals 5, 6, 7, and 8.

MIDI channels are indicated by the bottom

row of numbers. In the example above, all tracks are assigned to MIDI channel 1.

One other word of caution. Like many other MIDI sequencers, the QX1 is modeled after a multi-track tape recorder. There is one major difference, however. When you are in Record Ready mode, pressing either of the Rewind switches will erase whatever you have just recorded! Make sure to hit ENTER first, and then rewind. Otherwise, you might finish a recording and press the rewind switch thinking you're rewinding the sequence, when in fact you're erasing it! A great effect if you've got sadomasochistic tendencies, but not really recommended for anyone who's trying to get something done.

At this point, you've got the QX1 set up, and you understand some of its basic procedures and requirements. Now it's time to prepare your first track and start recording. Let's do a "Quick Record" routine, using a QX1 with a TX816 tone generator system and a standard MIDI controller keyboard.

To begin with, make sure to set the units up as indicated above. Go into Record mode and choose your track using Job Command 02. Choose the TF1 modules you want to play and hear by putting them in COMMON mode. Now hit ENTER, and you'll be in Record Ready mode. When you hit the RUN key, you will hear eight metronome clicks (2 bars of 4/4), and recording will begin.

To end recording, hit the STOP key. Then hit ENTER! Or, to hear what you've just recorded, go to Play mode first (using the PLAY button) and then hit ENTER. This will both save your recording and get you into Play Ready mode.

At this point, switch the TF1 modules you just used to INDIVIDUAL mode, and make sure that the MIDI channel of the relevant QX1 OUTput terminals matches that of the modules involved. You do this using the TX816's controls and Job Command 03 on the QX1 (as explained above).

For your next track recording, go into Record, set up the next track using Job Command 02, and hit ENTER. Then put the desired TF1 modules into COMMON mode, hit RUN, and begin again.

After recording each track, remember to switch the TF1 modules involved to INDIVIDUAL mode, and make sure the MIDI channel assignments are consistent between the QX1 terminals and the TX816.

The QX1 offers a number of sophisticated Record and Edit functions, but it's also easy to just jump right in and begin recording. Then, as you progress, you can add new functions and Job Commands to your recording routine.

By the way, some Job Commands only work in the Play, Record, or Edit modes, while others work only in the Play Ready, Record Ready, or Edit Ready "Increasable Space" modes; still others work in both versions of each basic mode. The table below will help you to find your way around the Job Commands in the various modes. After a while, these operations will become second nature.

The more you use the QX1, the more you'll discover about its logic and flexibility. Enjoy!

This Job Command List includes all of the Job Command functions on the QX1, including those that are not listed on the instrument's front panel.

QX1 Job Command Table

Play Mode

01 □ Disk Change
02 ★ Status/Switch
03 ★ Output Assign

Record Mode

01 □ Disk Change
02 ★ Status/Switch
03 ★ Output Assign
04 ★ Receive Condition

Edit Mode

01 □ Disk Change
02 □ Status/Switch
03 ★ Output Assign
04 ★ Receive Condition
05 ★ Gate Time Ration
06 ★ Step Per Measure
07 ■ Copy Measure
08 ■ Transpose Measure
09 ■ Time Quantizing
10 ■ Clock Move
11 ■ Gate Time Modify
12 ■ Velocity Modify
13 ■ Note Length Set
14 ■ Bend Delete
15 ■ Control Delete
16 ■ Edit Cancel

Utility Mode

01 ★ Disk Change
02 ★ Status
03 ★ Chain Edit
04 ★ Chain Name Change
05 ★ Chain Directory
06 ★ Chain Delete
07 ★ Bank Name Change
08 ★ Bank Backup
09 ★ Bank Copy
10 ★ Bank Delete
11 ★ Disk Initialize
12 ★ Disk ID Set
13 ★ Disk Backup
14 ★ Track Mix
15 ★ Track Delete
16 ★ Data In
17 ★ Data Out
18 ★ Time Display
19 ★ Measure Insert
20 ★ Measure Delete
21 ★ Bulk In
22 ★ Bulk Out
23 ★ Bulk Directory

★ = All modes
□ = Play mode, Record mode, Edit mode
■ = Edit "Increasable Space" mode

CX5M

Using The UDC01 Data Cartridge. By Tom Darter.

Although the UDC01's only function is to store data, the way this is accomplished varies from program to program.

THE UDC01 DATA CARTRIDGE is a quick access storage medium for use with the Yamaha CX5M music computer. Because of its limited memory size, its main function is for the storage of FM voice data. It can hold either 48 FM voices for the CX5M's internal tone generator (created using the YRM102 FM Voicing Program), or 32 DX7 voices (via the YRM103 DX7 Voicing Program). The UDC01 can also hold a program of up to 4K length written using the YRM104 FM Music Macro program.

For most uses, the UDC01 will be plugged into the back slot of the CX5M using the CA01 single cartridge adaptor. The program cartridge is plugged into the top slot, as usual. Remember: do not plug any cartridges into the CX5M while the power is on—always turn the power off before inserting or changing any program or data cartridge.

Although the UDC01's only function is to store data, the way this is accomplished varies from program to program. Here are the basic procedures involved.

With The YRM102 FM Voicing Program

The UDC01 can save up to 48 voices for use with the CX5M's internal tone generator. These voices can then be loaded into the computer for use with the YRM101 FM Music Composer or the YRM104 Music Macro. The voices can also be reloaded into the YRM102 FM Voicing Program for editing or other changes.

To save voice data from the Voicing Program into the data cartridge, use the following procedure:

1. Set the computer to the Command menu.
2. Type the command "cs *******", where "*******" can be any name.
3. The computer will respond with "Cassette?(Y/N)." You should respond by pressing the "N" key.
4. The computer will then display "Cartridge?(Y/N)." You should respond by pressing the "Y" key.
5. When the saving function is complete, the command line will clear.

To load voice data from a data cartridge into the computer when operating the Voicing Program, use the following procedure:

1. Set the computer to the Command menu.
2. Type the command "cl *******", where "*******" can be any name.
3. The computer will then respond with "Cassette?(Y/N)." You should answer by pressing the "N" key.
4. The computer will then display "Cartridge?(Y/N)." You should respond by pressing the "Y" key.
5. When the loading function is complete, the command line will clear.

With The YRM101 FM Music Composer

To increase the number of different voices (tone programs) you can access with the Music Composer, you can load a group of 48 voices from a data cartridge into the CX5M. Usually, these voices will have been created using the YRM102 FM Voicing Program. To do so, use the following routine:

1. Set the computer in Command mode.
2. Type in the command "dcload=VOICE." The word "VOICE" must be in capital letters for the routine to work properly.
3. After the voices have been loaded into the computer, you will notice that approximately 1000 steps have been used. The voices you have just loaded will be numbered from 49-96; you will also have access to the Programs original 46 preset voices. (Remember that slot 47 is saved for future computer implementation, and that slot 48 is a permanently blank voice.)

It is also possible to save music data from the FM Music Composer to the data cartridge, but this is very limited—the UDC01 can hold only about 1800 steps of music data. Also, remember that one cartridge cannot hold both voice data and music data. Each cartridge can hold only one basic unit of information at a time. To save music data, use the following routine:

1. Set the computer to Command mode.
2. Type in the command "dcsave=."
3. When saving is complete, the command will disappear from the screen. No music data will have been erased from the computer.

To load music data from a data cartridge to

the computer, do as follows:

1. Set the computer to Command mode.
2. Type in the command "dcload=."
3. When loading is completed, the music should appear on the computer screen. If the screen display nothing but random characters on the command line, the program that was saved was too large for the UDC01—the save function was unsuccessful.

If you are unsure about the size of a particular set of music data, it might be wise to save it to cassette as well as to the UDC01. Then, if you discover that the save-to-cartridge routine was unsuccessful, you will still have a copy of the original data to reload into the computer.

With The YRM103 DX7 Voicing Program

The UDC01 can save 32 DX7 voices, along with the associated function data. In order to do this, the YRM103 DX7 Voicing Program must be used. First, load the voices from the DX7 to the computer in the standard way—they will appear as voices 1-32 on the Program's 48 voice display screen. To save this voice data to the UDC01, do as follows:

1. Press the "F8" key. The prompt "Cartridge Save?" will appear in the message area.
2. Respond by pressing the "DEL" key. The confirming message "Are you sure?" will appear.
3. Press the "DEL" key once again, and the data will be saved. If you do not wish to save the data as is, pressing the "ESC" key will cancel the function and allow you to start again.

Notice that you do not need to name the voice bank, as you do when saving to cassette. This is because each cartridge will hold only one bank of voices, so the computer will automatically load the bank of whatever cartridge is inserted in its rear port.

To load voice data from a data cartridge, do as follows:

1. Press the "F8" key. The prompt "Cartridge Save?" will appear in the message area.
2. Respond by pressing the "SELECT" key, and the prompt will change to "Cartridge Load?".
3. Now press the "DEL" key, which will cause the confirming message "are you sure?" to appear.
4. Press the "DEL" once again and the data will be loaded into the CX5M, where it can then be loaded into a DX7 for immediate use, or edited further. If you do not wish to load the voice data, press the "ESC" key, which will cancel the function and allow you to start again.

With The YRM104 Music Macro

When using the Music Macro program, it is possible to load FM voices for the computer's internal tone generator from a data cartridge. Typically, these voices will have been created using the YRM102 FM Voicing Program.

To load voice data, just type in the following:

"cldv,1,1" or "call cldv,1,1"

To use this voice data, use the "selvoice" command. To save voice data, use the following:

"mcks (7,1,16)" or "call mcks (7,1,16)"

This command must be used immediately after voice data is read from cassette tape using the "cldv" command.

As mentioned earlier, it is also possible to save or load a program of up to 4K in length by using the BASIC "SAVE/LOAD" command. The device name (data cartridge) is specified by typing "DC:" using either upper or lower case letters. To save a program, type the following:

SAVE "DC:"

To load a program, type this:

LOAD "DC:"

If you want the program to be executed immediately after being loaded, type the following command:

LOAD "DC:",R

(Remember, in BASIC the quotation marks shown are part of the command. Elsewhere in this article, quotation marks have been used merely to separate the commands and prompts from the rest of the text.)

It is also possible to create files on the UDC01 (with the Music Macro program) by using the BASIC command: OPEN "DC:". This allows the use of file related commands in BASIC. For the use of these commands, refer to the MSX BASIC manual.

Two New Programs For The CX5M Music Computer.

TWO NEW MUSIC programs are now available for the CX5M music computer: the YRM301 MIDI Recorder and the YRM302 RX Editor. Each program expands the musical capabilities of the CX5M music computer, offering the user new ways to use the X series of musical products to create expressive musical statements. In future issues of AFTERTOUCH, we will discuss specific musical applications of these new programs.

The YRM301 MIDI Recorder

This new software package gives CX5M owners the capability of creating MIDI-based musical compositions using four banks of information, each of which can contain four tracks. In addition, note-by-note step recording of musical information is possible, making the MIDI Recorder an ideal medium for precise, multi-level musical creations.

The system offers a lot of flexibility: Punch-in recording can be handled either automatically or manually, and the extensive editing capabilities allow for precise modification of already-recorded tracks.

In addition, a flexible chain capability permits sequential playback of banks with tempo, transpose, track, and MIDI channel changes. The MIDI Recorder program turns the CX5M into a versatile musical tool for composing and arranging.

The YRM302 RX Editor

The RX11 is a very sophisticated rhythm programming device; it can also be difficult to program. There are many available functions, many more than can be easily displayed through the instrument's front panel.

The RX Editor program makes it possible to visualize the rhythm patterns created on the RX11 (or RX15). With the RX Editor, rhythm programming is no longer a matter of feel and nothing else. Using the CX5M music computer, it is possible to see the rhythms you are creating on the RX drum machine. Instead of groping in the dark for effective rhythm patterns, you will be able to sculpt subtle patterns from scratch, using the visual and auditory help offered by the RX Editor.

Write To: AFTER-TOUCH, P.O. Box 2338, North-ridge, CA 91323-2338.

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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 to you if you enclose a self-addressed, stamped envelope with your material.

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

AFTERTOUCH is your publication. Let us hear from you!

Questions

Why isn't there a MIDI THRU port on the KX88 keyboard controller?

The MIDI OUT port on the KX88 is more than an OUTput; it is actually a MIDI merge port. Information coming to the KX88 (via its MIDI IN) is combined with information generated by the KX88, and these two streams of data are merged and presented together at the KX88's MIDI OUT port. Since this function covers the basic THRU function as part of its operation, a THRU port is not needed. And, because the KX88 is a master controller, it is unlikely that the simple, non-merged THRU function will be needed.

Why don't the DX7 envelope generators act like other envelope generators? I spend a lot of time working on the timing of rate 1; then, when I adjust level 1 so that the envelope shape creates the timbre I want, I find that the timing of rate 1 has changed. What's going on?

Unlike standard analog ADSR envelope generators, in which a setting represents an absolute amount of time, the rates on the DX7 envelopes are *rates of speed*. Therefore, the amount of time taken up by rate 1 will depend on how far the envelope is traveling. If level 4 is set to 0 (which is typical) and level 1 is 99, there is lot more ground to cover than when level 1 is 55, so the amount of time elapsed during rate 1 will change.

This distinction is emphasized by the names—"rate one," rather than "attack time." Think of the rate settings as miles-per-hour: 10 is slow, 99 is fast. The overall time for the trip will depend on the distance covered. So, if you change level 1 after setting rate 1, you will change the timing of rate 1 (but not the speed). With practice, the interrelationships between the levels and the rates will become clear.

I've heard that you can "play" the RX Series of drum machines using a MIDI keyboard. How does this work?

Notes are designated by numbers in MIDI code. The overall note range is 128 notes (0 to 127), far larger than the range of a piano. The standard key numbers on a 5-octave synthesizer such as the DX7 are 36 to 96. Each of the RX series of rhythm programmers contains a routine whereby certain drum sounds will respond to certain MIDI key numbers. When that key is played, the corresponding drum will sound. In order to engage this function, connect the MIDI OUT from a MIDI keyboard to the MIDI IN of your RX machine. Then, prepare the rhythm machine to accept key data (this procedure will vary from instrument to instrument—consult your owner's manual). All three Yamaha drum machines have pre-assigned key numbers for the drum sounds they contain. The RX11 and RX15 contain routines that allow you to change these key assignments, while the RX21's key assignments are fixed. The chart below shows how MIDI key numbers are assigned to the drum sounds of the RX series when they leave the factory.

KX88 MIDI Ports, DX7 Envelope Generators, And How To Play The RX Rhythm Controllers With A Keyboard Via MIDI.

RX Series Key Assignments

Note	Key #	RX11	RX15	RX21
G# 1	44	BD2		
A 1	45	BD1	BD	BD
(A# 1)				
B 1	47	TOM4		
C 2	48	TOM3	TOM3	TOM3
C# 2	49	SD2		
D 2	50	TOM2	TOM2	TOM2
D# 2	51	RIMSHOT	RIMSHOT	
E 2	52	SD1	SD	SD
F 2	53	TOM1	TOM1	TOM1
F# 2	54	CLAPS	CLAPS	CLAPS
G 2	55	COWBELL	COWBELL	
G# 2	56	SHAKER	SHAKER	
A 2	57	HH CLOSED	HH CLOSED	HH CLOSED
(A# 2)				
B 2	59	HH OPEN	HH OPEN	HH OPEN
C 3	60	CRASH	CRASH	CRASH
(C# 3)				
D 3	62	RIDE	RIDE	

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Continued from page 6

while the others don't.

In playing the conga sound, you have to realize that the basic pitch is important; I have found that the fourth octave on the keyboard is the best for playing. One nice little exercise is to remove the rate scaling. Dr. Chowning has done a nice job of putting high rate scaling on the upper end of the keyboard to give it a realistic conga effect; but if you remove that the harmonics are allowed to come through and you get a woodblock—there is almost a split keyboard effect.

For fun, I've put the mod wheel pitch on 99, and put the LFO on full sensitivity with sample-and-hold. If you move the mod wheel up and touch a key, you'll get random drum effects.

Spend some time with both of these voices, and figure out how they work. There are a lot of DX7 patches out there now, but the true art of programming on the DX7 is still not very widespread. I really believe what we have to do with FM right now is concentrate on learning what areas work, so that it is possible to get inside a sound and fine tune it as much as possible. Give it a try!