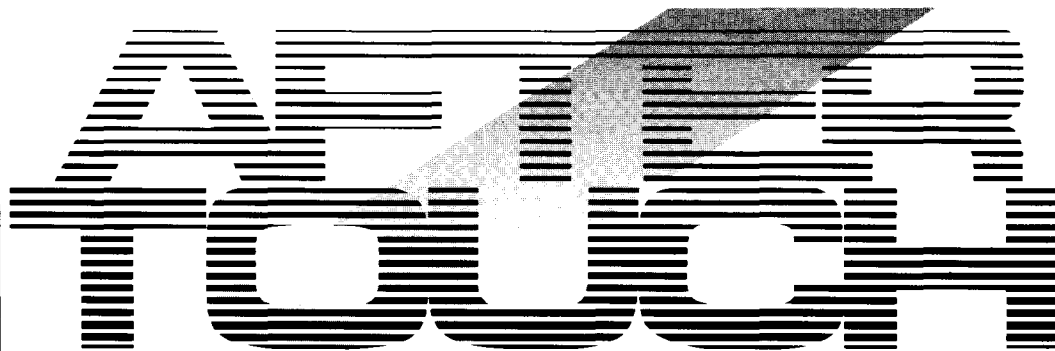


TAO

THE OFFICIAL PUBLICATION OF THE YAMAHA USERS GROUP

MIDI Accessories





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From The Editor

MIDI IS ON MY MIND as I start to write this column, for a number of reasons. The most obvious reason is our cover story, which involves three Yamaha MIDI accessories. In addition, MIDI (the Musical Instrument Digital Interface) seems to show up everywhere these days—I would venture to guess that the term has appeared in almost every article we have run in AfterTouch.

The main reason I'm thinking about MIDI, though, is that I just reread a query from this month's Questions column, in which a DX9 owner wonders if his instrument will work as part of the many MIDI systems we have featured in AfterTouch. After all, most of those systems feature the DX7, not the DX9. (For a partial answer to our reader's question, see pages 18-19.)

Obviously, there is still a lot of confusion regarding MIDI. It's everywhere these days, but still widely misunderstood. Therefore, I am going to use this column for the next few months to reiterate some basic concepts of MIDI. (Some of this material appeared—in a different form—in the first three issues of AfterTouch.) This month, let's look at MIDI ports:

All MIDI-equipped instruments have MIDI ports, those little five-pin DIN sockets that are usually found on the instrument's back panel. These sockets send and receive all MIDI messages sent from unit to unit. 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 MIDI ports.

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 instrument up.

The MIDI OUT port sends MIDI information generated by the instrument for reception at another instrument's MIDI IN port. Once again, the kinds of information transmitted via this port will be determined by the MIDI setup 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 devices. 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.

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.

The MIDI ports are the basic doors to communication between instruments. If you understand how they operate, you will have a solid basis on which to build your overall understanding of MIDI.

Next month, we'll talk about what MIDI data is and what it does. See you then.

—TD

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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.

MEP4

DRM-DOUBLE. A New MEP4 Setup By David Schoenbach.

Notes:

This setup will turn any keyboard note into a drum instrument. For example, use a sequenced bass line and double it with drums.

Turn processors on to trigger the **RX11** bass drum (processor 1), **snare** (processor 2), **hihat closed** (processor 3), and **rimshot** (processor 4); turn processors off to bypass these sounds.

PROCESSOR 1										PROCESSOR 2										PROCESSOR 3										PROCESSOR 4																									
DATA PRESETTER					CHANNEL FILTER					DATA PRESETTER					CHANNEL FILTER					DATA PRESETTER					CHANNEL FILTER					DATA PRESETTER					CHANNEL FILTER																				
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MEP4

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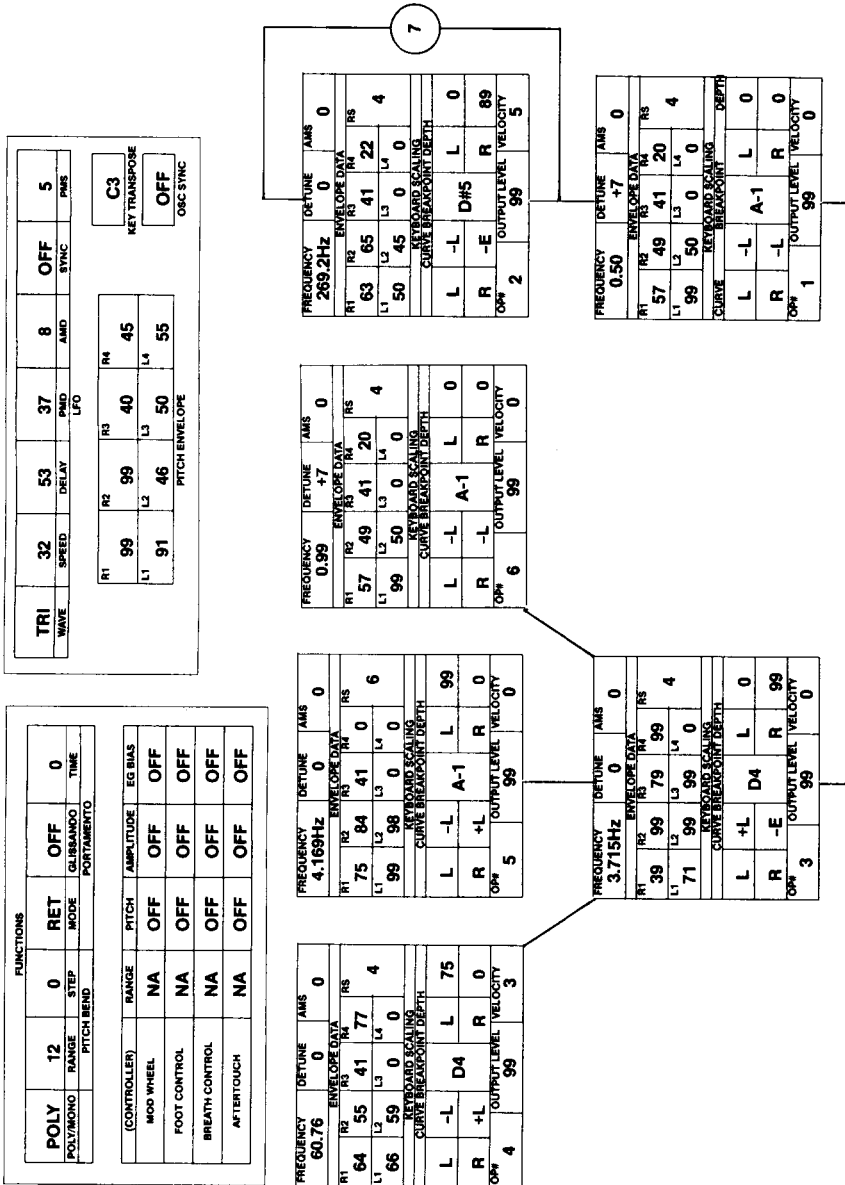
SOFTECHO.
A New MEP4
Setup By
Michael A.
Huisman.

Notes:

This setup produces two echoed notes (each at a lower velocity) from one synthesizer such as a DX7. Turn processors 1, 2, and 3 on for this effect.



NOW— YOU. A New DX7 Voice By Ken Como.



ALGORITHM #12

Notes:

If you play the key G2, you will hear "now."

If you play the key E4, you will hear "you."

Also, if you press the keys above E4 rapidly, you may hear some Gremlins laughing.



WEIRD-SCIN. A New DX7 Voice By Ken Como.

Notes:

This is a sound-effects patch based on bell tones.

When played normally, standard bell tones are produced. However, when the MOD wheel is engaged, things start to happen: At a 1/3 setting, the bells start to slide; at a full setting, the computer will start.

TRI	0	0	0	0	OFF	6
WAVE	SPEED	DELAY	PND LFO	AMD	SYNC	PMS
R1	R2	R3	R4	C3		
99	99	99	99	KEY TRANSPOSE		
L1	L2	L3	L4	ON		
50	50	50	50	OSC SYNC		

FUNCTIONS					
POLY	12	0	RET	OFF	0
POLY/MONO	RANGE	STEP	MODE	GLISSANDO	TIME
	PITCH BEND		PORTAMENTO		
(CONTROLLER)	RANGE	PITCH	AMPLITUDE	EQ BIAS	
MOD WHEEL	NA	OFF	OFF	OFF	
CONTROOCT	99	ON	OFF	ON	
BREATH CONTROL	NA	OFF	OFF	OFF	
AFTERTOUCH	NA	OFF	OFF	OFF	

FREQUENCY	2.00	DETUNE	+3	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
98	12	71	91		2
L1	L2	L3	L4		
90	0	32	0		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	0	
OP#	2	OUTPUT LEVEL	78	VELOCITY	0

FREQUENCY	2.00	DETUNE	-2	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
98	12	71	99		2
L1	L2	L3	L4		
99	61	32	0		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	0	
OP#	4	OUTPUT LEVEL	75	VELOCITY	1

FREQUENCY	37.51	DETUNE	0	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
20	12	71	99		0
L1	L2	L3	L4		
99	20	12	71		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	0	
OP#	6	OUTPUT LEVEL	98	VELOCITY	1

FREQUENCY	1.00	DETUNE	+2	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
95	33	71	99		2
L1	L2	L3	L4		
99	0	32	0		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	64	
OP#	1	OUTPUT LEVEL	90	VELOCITY	2

FREQUENCY	1.00	DETUNE	-5	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
95	33	71	30		2
L1	L2	L3	L4		
99	86	32	0		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	0	
OP#	3	OUTPUT LEVEL	96	VELOCITY	0

FREQUENCY	3.00	DETUNE	0	AMS	0
ENVELOPE DATA					
R1	R2	R3	R4	R5	
99	11	71	99		0
L1	L2	L3	L4		
99	61	32	0		
KEYBOARD SCALING					
CURVE BREAKPOINT DEPTH					
L	-L	A-1	L	0	
R	-L		R	0	
OP#	5	OUTPUT LEVEL	96	VELOCITY	0

ALGORITHM #5

3



**FLUTE
KLIK. A
New DX7
Voice By
Brian
Kapitan.**

TRI	35	15	21	2	OFF	1
WAVE	SPEED	DELAY	PMD	AMD	SYNC	PMS
LFO						
R1	R2	R3	R4			
18	60	95	60			
L1	L2	L3	L4			
50	51	50	50			
PITCH ENVELOPE						
				C3		
				KEY TRANSPOSE		
				ON		
				OSC SYNC		

FUNCTIONS					
POLY	0	0	NA	0	0
POLY/MONO	RANGE	STEP	MODE	GLISSANDO	TIME
PITCH BEND PORTAMENTO					
(CONTROLLER)	RANGE	PITCH	AMPLITUDE	EG BIAS	
MOD WHEEL	NA	OFF	OFF	OFF	
FOOT CONTROL	NA	OFF	OFF	OFF	
BREATH CONTROL	NA	OFF	OFF	OFF	
AFTERTOUCH	NA	OFF	OFF	OFF	

FREQUENCY	DETUNE	AMS				
2454Hz	+4	0				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
99	94	75	0	0		
L1	L2	L3	L4			
99	78	0	0			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-R		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
6	99	1				

FREQUENCY	DETUNE	AMS				
1.00	-5	2				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
78	26	22	45	0		
L1	L2	L3	L4			
75	61	76	51			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-R		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
2	92	1				

FREQUENCY	DETUNE	AMS				
2.00	+6	0				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
55	19	41	45	0		
L1	L2	L3	L4			
61	58	20	9			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-R		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
4	99	1				

FREQUENCY	DETUNE	AMS				
4.00	-7	0				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
99	64	67	66	0		
L1	L2	L3	L4			
85	48	0	0			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-R		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
5	69	1				

FREQUENCY	DETUNE	AMS				
1.00	+2	0				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
63	20	53	57	0		
L1	L2	L3	L4			
99	94	97	0			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-L		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
1	87	2				

FREQUENCY	DETUNE	AMS				
1.00	+3	0				
ENVELOPE DATA						
R1	R2	R3	R4	RS		
87	51	53	48	0		
L1	L2	L3	L4			
99	94	97	0			
KEYBOARD SCALING						
CURVE BREAKPOINT DEPTH						
L	-L	A-1	L	0		
R	-R		R	0		
OP#	OUTPUT LEVEL	VELOCITY				
3	99	2				

ALGORITHM #7

This DX7 voice can also be loaded into all the other Yamaha 6-operator FM digital synthesizers and tone generators, including the DX5, TX7, TX216, TX816, TF1, and DX1.

MIDI Accessories

MIDI ACCESSORY BOXES are used to make one's life with MIDI a little easier. Yamaha has three such accessory boxes: the YME8, which is used for signal routing; the YMM2, which is used to merge MIDI data; and the YMC10, which is used for interfacing and synchronizing MIDI clocks with the world of magnetic tape.

The YME8 MIDI Expander/Thru Box

A thru box facilitates set-up changes and eliminates cable re-patching by combining one or more MIDI INputs and a number of MIDI THRUputs.

The YME8 features two MIDI IN ports and eight MIDI THRU ports in a small, portable

An Introduction To The YME8 Expander, The YMM2 Merger, And The YMC10 Sync Converter. By Michael A. Huisman & Ronald Valdez.

package. The eight MIDI THRU ports are configured in two sets of four (see Figure 1). For each set of THRU ports, input is selectable from either one of the two MIDI IN ports, or both the IN ports may be turned OFF if desired.

The YME8 can be set up so that one MIDI input device is patched thru to eight instruments; or it can be set up so that MIDI messages from one of two MIDI input devices are sent to four of the instruments, while messages from the other MIDI input device are sent to the other four instruments.

How Is The YME8 Useful?

The YME8 makes it easier to trace the MIDI message signal paths, since every instrument in the system is centrally connected to the YME8. The daisy-chain MIDI setup shown in Figure 2 could easily be converted to the star network shown in Figure 3 using a YME8. Some readers have even found that using a YME8 helps to reduce the number of occurrences of the dreaded MIDI stuck-note syndrome.

The YMM2 MIDI Merge Box

Have you ever wondered why there isn't a MIDI y-cable to merge data from more than one source? Well, MIDI is transmitted in data packets. These packets are usually two or three characters (bytes) in length, although packets of many thousands of characters are possible (especially when transmitting System Exclusive voice dumps). To simply combine the transmit wires of two MIDI devices would cause the MIDI data to crash together in an uncontrollable manner, causing the integrity of the data packets mentioned before to be corrupted. This is why a MIDI y-cable is strictly forbidden in the MIDI specification. In other words, you need a special box to sort out the two data streams in order to merge them correctly.

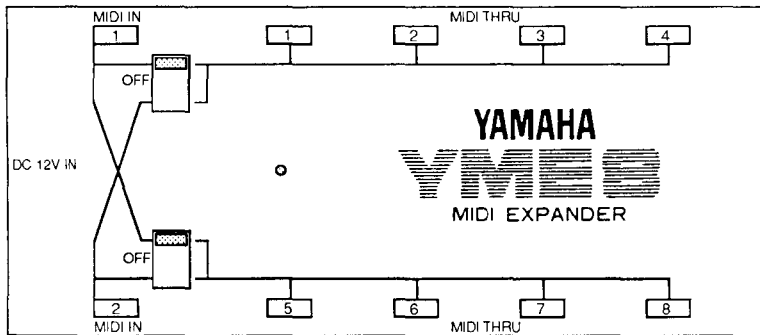
The YMM2 has 5 MIDI jacks that it uses to receive and send MIDI signals: IN1, IN2, OUT, THRU1, and THRU2. The diagram on top of the YMM2 (shown in Figure 4) shows how the jacks and the merging circuitry is connected inside the unit. The MIDI data supplied to IN1 is both re-transmitted through THRU1 and sent to one input of the merger. The MIDI data supplied to IN2 is likewise re-transmitted through THRU2 and sent to the other input of the merger. The two input signals are combined



and sent through the OUT jack.

Before merging, however, one of the input signal's MIDI clock messages is filtered out. This is necessary to prevent problems that would occur from merging MIDI signals with

Figure 1: The YME8 MIDI Expander.



conflicting clock messages. The combination Power/MIDI Clock switch determines which

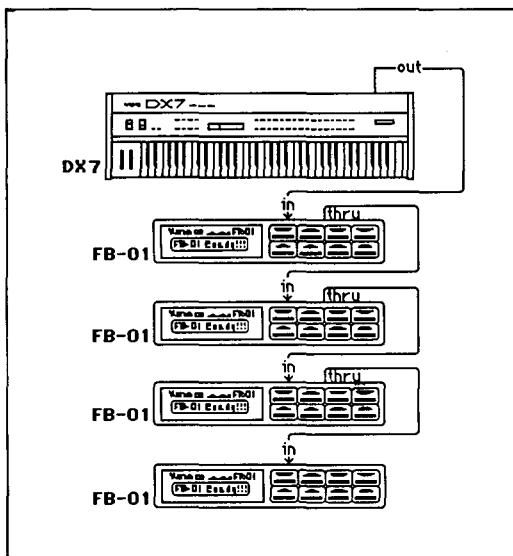


Figure 2: A standard daisy-chain MIDI system setup.

MIDI clock signal will be used and which one will be filtered.

How Is The YMM2 Useful?

The YMM2 can simplify procedures, reduce the need for re-patching, permit previously impossible hookups, and (in general) let you make the very most of your MIDI equipment. Let's look at two possible applications:

Example 1: Creating RX11 Rhythm Sequences On A QX1 Sequencer. When creating and recording rhythm sequences directly into a

QX1, it is not possible to hear previously recorded rhythm parts while recording new parts, since both the QX1 and the controlling device are playing the drum sounds of the RX11.

The YMM2 allows you to hear both previously recorded parts as well as new parts being overdubbed. This is accomplished by merging the output of the QX1 (usually from OUT port #8) with the output of the controlling device, such as a KX88 or KX76. To accomplish this with the YMM2, follow these steps:

1. Make the proper MIDI connections as shown in Figure 5.
2. Set the YMM2 to filter MIDI clock messages from IN1 by selecting IN2.
3. Now record QX1 rhythm parts as you would normally. During RECORD and PLAYback, both the data from the QX1 and data from the KX controller will be played by the RX11.

Example 2: Recording A "Digital" Jam Session. Using the YMM2, it is possible to record MIDI input from two completely independent devices. This means (for example) that two players can play simultaneously into a QX21 sequencer. For this example, we will use two players—one playing a DX7 and the other

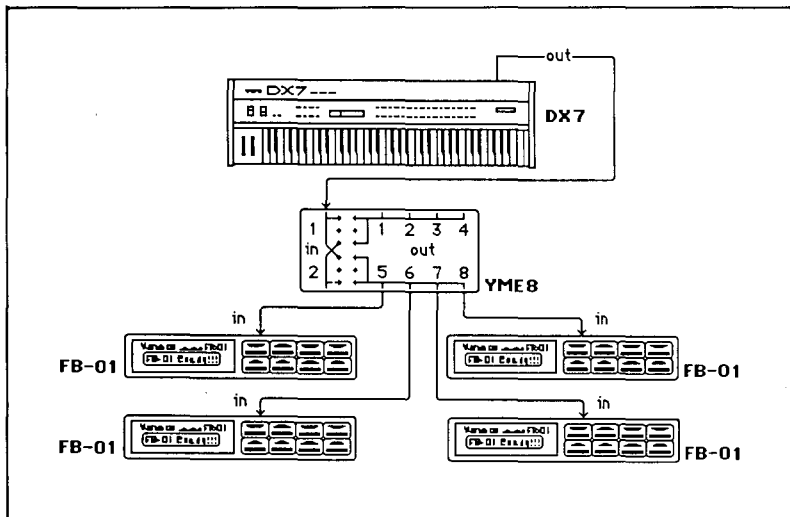


Figure 3: The system from Figure 2 converted into a star network using the YME8.

playing a PF80 (see Figure 6). Follow these steps:

1. Make the proper MIDI connections as shown in Figure 6.
2. Set the QX21 to record in OMNI mode, so

MIDI Accessories Continued

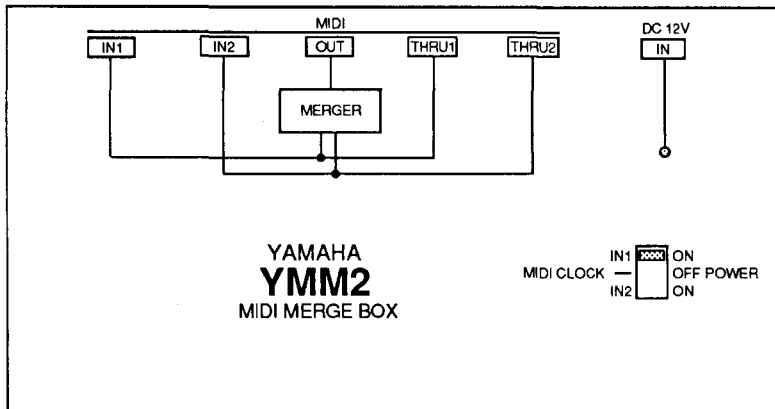


Figure 4: The YMM2 MIDI Merge Box.

that it records all MIDI channels without channelization.

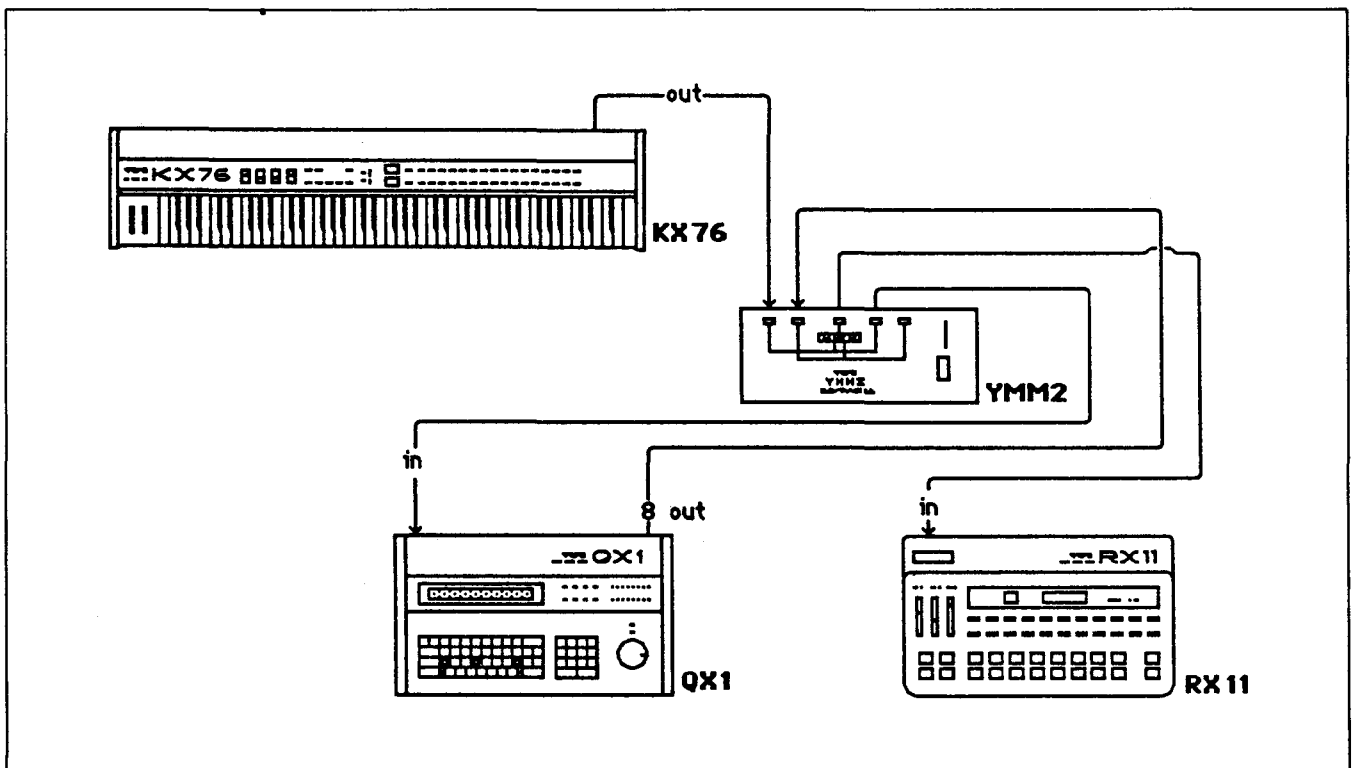
3. Set the PF80 to transmit and receive on MIDI channel 2.
4. Set the DX7 to receive on MIDI channel 1.
5. Now, press RECORD on the QX21. After the two bar countdown, both players can begin playing.

When you have finished recording, press RESET; then press PLAY to hear the parts played by both players.

The YMC10 MIDI/ Sync Converter Box

MIDI has clock messages as part of it's

Figure 5: MIDI connections for the YMM2 system used in Example 1 (see the accompanying text).



implementation, but because of the high frequency at which MIDI data is transmitted, these clock messages cannot be recorded on tape.

Most recordings of popular music involve some use of sequencers and drum machines. In order for all these devices to play at the same tempo (especially when the parts recorded can be performed at completely different times at different studios) a reference timing mechanism that is compatible with magnetic tape had to be devised. One such method is FSK (which stands for Frequency Shift Keying). Yamaha FSK involves the use of a high and a low frequency changing 24 times per quarter-note.

While most other manufacturers use FSK, they may use different frequencies or different numbers of frequency shifts per quarter-note. This means that the FSK related products from different manufacturers may not always be compatible. It is therefore a good thing that there is a MIDI specification which all manufacturers follow. Even though there are differences in FSK, all manufacturers respond to MIDI clock messages in the same way. Therefore, once synchronization is operating in the MIDI domain, compatibility is no longer a problem.

The YMC10 converts Yamaha FSK into MIDI Clock messages and vice versa (see Figure 7). First, the YMC10 is used to convert the

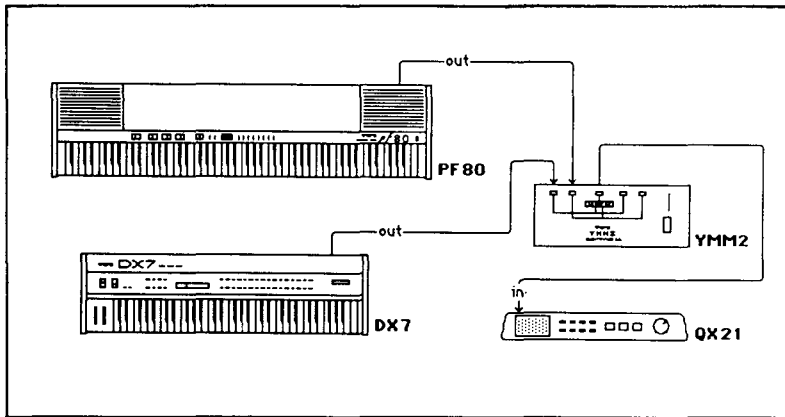


Figure 6: MIDI connection for the YMM2 system used in Example 2.

Figure 7: The YMC10 MIDI/Sync Converter.

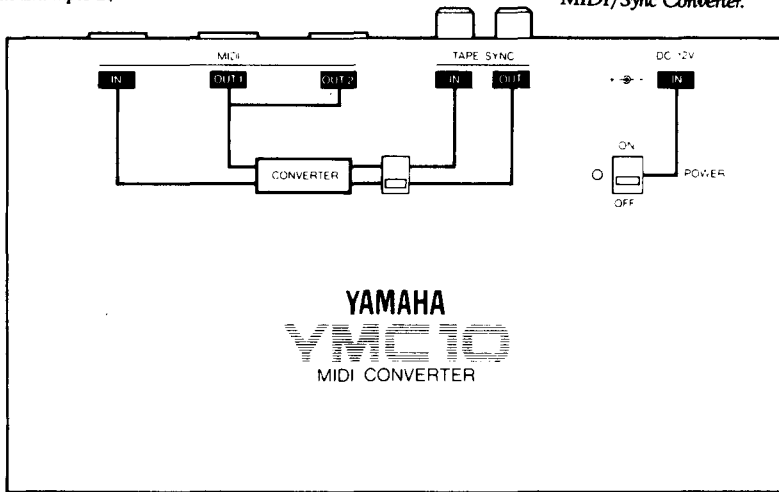


Figure 8: Connections for a basic recording system using the YMC10 (see the accompanying text).

MIDI Clock messages from a MIDI device (like an RX drum machine or a QX sequencer) into an FSK tape sync signal which can be recorded on one of the tracks of a multi-track tape. Once the FSK sync signal is on tape, it can be converted back into a MIDI sync signal by the YMC10 and used to control an RX drum machine, QX sequencer, or both.

When the tape is played, the sync track will start the MIDI instruments playing at the proper time. The sync track will also keep the MIDI instruments synchronized in time with the tape and will stop the instruments at the end of a piece.

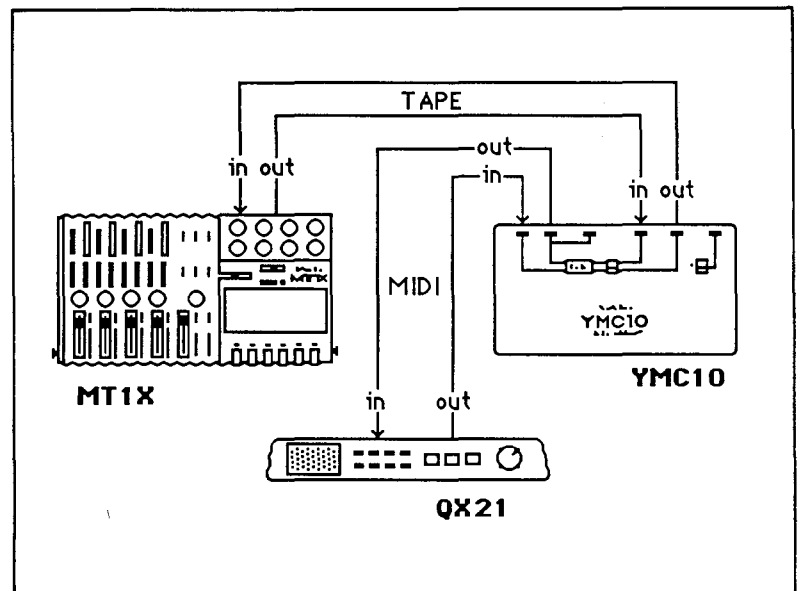
Here is a sample application of the YMC10, in which it is used to sync a QX21 sequencer to tape on an MT1X 4-track cassette recorder. Follow these steps:

1. Make the proper MIDI and sync connections, as shown in Figure 8.

2. Record tracks into the QX21.
3. When you are ready to record the QX21 tracks to tape, first set the YMC10 to convert the QX21's MIDI clocks to FSK sync. Then, start the MT1X recording the FSK sync signal sent from the YMC10 and press PLAY on the QX21.
4. Now rewind the tape, set the QX21 to external clock, press PLAY on the QX21, and set the YMC10 to convert FSK sync to MIDI clocks. You will need to connect the MIDI OUT of the YMC10 to the QX21 MIDI IN for this procedure.
5. You should now record the instruments controlled by the QX21 to an open track on the MT1X. Playback from the QX21 will occur as soon as the tape in the MT1X begins outputting FSK sync to the YMC10.

You can now record new parts into the QX21—you need to set the QX21 back to internal clock each time you record a new sequence in the QX21. Using the sync track on the MT1X, you can record those new parts to tape as if they were all played and recorded at the same time. You may continue this procedure until you run out of tracks.

One word of caution: **DO NOT ERASE THE SYNC TRACK** until you are absolutely certain that you have no further need for it. It is possible to rebuild a sync track, but it requires additional hardware and expense (not to mention headaches). Simply stated, it is better to be safe than sorry.



CX5M

YAMAHA'S YRM303 MIDI Macro & Monitor Program cartridge for the CX5M consists of two utility programs in a single package. These utility programs perform two specific functions: displaying MIDI data (the MIDI Monitor) and sending MIDI data (the MIDI Macro Generator). Each can be quite useful to the knowledgeable MIDI engineer in a typical MIDI studio.

The MIDI Monitor displays the selected MIDI data as it is received by the CX5M's MIDI IN connector. This can be very useful when trying to find problems in a complex MIDI setup. By simply connecting the monitor utility to any MIDI device, it is possible to see exactly what data is being transmitted. Then, by looking at what is being sent (and with a little knowledge about MIDI data formatting), you will be able to find any sort of difficulty you encounter with your MIDI setup.

The MIDI Macro Generator allows you to send any MIDI message out the CX5M's MIDI OUT connector. This can be useful for activating MIDI System Exclusive dumps, for testing certain MIDI devices, or for generating MIDI messages (MIDI macros) to insert into a MIDI sequence (YRM301 MIDI Recorder) or drum song (YRM302 RX Editor).

The MIDI Monitor

The MIDI Monitor Mode will show MIDI data from a MIDI device as it is received by the CX5M in real time. One very handy feature of this mode is the line feed function. This puts each MIDI message on its own line, which makes viewing MIDI data much easier. If you do not recognize the data that is displayed, you should

```

FE FE FE FE FE FE FE FE FE
FE FE FE FE
90 3C 34
90 3C 00 FE FE FE FE FE FE
90 3C 1C
FE FE FE FE FE FE FE FE
FE FE FE FE FE FE FE FE
FE FE
    
```

The New MIDI Macro & Monitor Program Cartridge. By Peter Laubach.

Figure 2: The Memory Dump Mode screen of the YRM303.

either consult the MIDI Specification 1.0 or the owners manual for the device. (Figure 1 shows the Monitor Mode screen display.)

As the data is received, it is put in the CX5M's memory for later viewing. This is very handy for going back to review large MIDI messages. To get into the Memory Dump Mode from the Monitor Mode, press the F5 function key on the CX5M. (Figure 2 shows the Memory Dump Mode screen display.)

```

0098 : FE FE FE FE FE FE FE FE 90
0090 : 31 00 00 00 00 00 00 00
0080 : 00 00 00 00 00 00 00 00
0070 : FE FE FE FE FE FE FE FE
0060 : FE FE FE FE FE FE FE FE
0050 : FE FE FE FE FE FE FE FE
0040 : FE FE FE FE FE FE FE FE
0030 : FE FE FE FE FE FE FE FE
0020 : FE FE FE FE FE FE FE FE
0010 : 3C 1C 00 00 00 00 00 00
0008 : FE FE FE FE FE FE FE FE
    
```

```

>Hard Copy: CTRL-STOP break
Hex Last Next MFOff Monit
Help Macro Filter Hcopy
    
```

To help you sort out MIDI messages, there is a MIDI filter which suppresses unwanted MIDI data. This filter is quite versatile, and very handy if you are only interested in a specific message (such as a program change). The filter is very easy to work, and can be made to pass only specific MIDI channel messages or specific System Exclusive messages. (Figure 3 shows the MIDI Filter Mode screen display.)

Figure 1: The Monitor Mode screen of the YRM303.

Figure 3: The MIDI Filter Mode screen of the YRM303.

```

MIDI FILTER
CHANNEL MESSAGE 0123456789ABCDEF
Note off      8 000000000000000000000000
Note on       2 000000000000000000000000
Key pressure  0 000000000000000000000000
Control change 0 000000000000000000000000
Program change 0 000000000000000000000000
Ch pressure   0 000000000000000000000000
Pitch bend    0 000000000000000000000000
SYSTEM MESSAGE 0123456789ABCDEF
Exclusive     0
Common       F 000000
Real time    0 000000
o <-- passing
    
```

```

>Hard Copy: CTRL-STOP break
Hex LF DFoff MFoff Dump
Help Macro Filter Hold Hcopy
    
```

```

1: H:on 2: H:off 3: H:on 4: 5: Recall
2: H:off 7: H:off 8: H:off 9: 10: H:copy
    
```

The MIDI Macro Generator

The other half of the YRM303 cartridge lets

you send out MIDI data from the CX5M to any MIDI device. This part requires a little more knowledge of MIDI and how to put together MIDI messages. In order to know what MIDI messages to send to a specific device, you will need to consult with the device's owners manual. Usually a manufacturer will put the MIDI implementation chart towards the back of the manual. After you figure out what MIDI message you want to send, you can use the MIDI Macro Generator to create the message.

The first thing you will need to do is get to the MIDI Macro Command Mode by pressing F7 on the CX5M. The command screen shows how to call each function of the Macro Generator. (Figure 4 shows the MIDI Macro Command Mode screen display.)

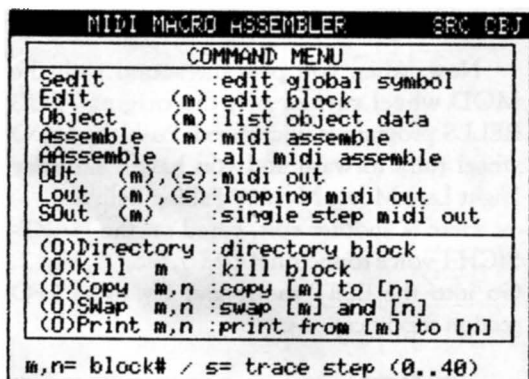


Figure 4: The MIDI Macro Command Mode screen of the YRM303.

The first command to call up is the Edit Mode. Here you will be able to type in the source that will be assembled into MIDI data which can then be transmitted. Simply type E and press the RETURN key. Figure 5 shows the MIDI Macro Edit Mode screen display.



Figure 5: The MIDI Macro Edit Mode screen of the YRM303.

From here, you will usually want to give names to the parts that will make up the messages you will be sending. For example, you might want to take this System Exclusive header:

\$F0, \$43, \$10, \$03

and give it a more understandable name such as "RXPC" (which stands for RX11 Parameter Change). To get into this mode you will need to press F3. This screen looks just like the one in Figure 5, except it says

[GLOBAL SYMBOL TABLE]

instead of

[BLOCK INFORMATION]

in the upper portion of the screen display. When you are done defining your symbols, press the ESC key to get back to the main Macro Edit Mode. Here you will be able to use your symbols and put together your MIDI messages.

Once you have your MIDI message source code typed in, you will want to assemble it and try it out. To do this, press the ESC key and you will get the "?" prompt. Press F6 and you will get the MIDI Macro Command Mode menu (as shown in Figure 4). Type an A and press the RETURN key. The program will beep a few times and come up with the message "Complete!" underneath the prompt line. The program is now ready to send out your completed message. To send the message, simply type OU and press the RETURN key.

Putting The YRM303 Program To Work

One nice feature of the YRM303 program is the ability to use the macros that you have created in a sequence or drum pattern. To do this, you will also need either the YRM301 MIDI Recorder or YRM302 RX Editor Program cartridge. To utilize these features, consult pages 49-52 in the YRM303 owners manual.

Another handy use of the YRM303 MIDI Macro & Monitor is to check MIDI studio setups. You may find that occasionally some MIDI devices may not work as desired. In order to see what is causing the difficulty, the Monitor Mode comes in very handy by showing exactly what the MIDI device is receiving. This greatly simplifies finding the problem (and the solution).

The above examples are only simple guided tours to introduce you to the MIDI Macro & Monitor program. For step-by-step examples, consult pages 47-50 in the YRM303 owners manual.

DX7 Programming

Extending The Usefulness Of Percussion Patches On The DX7. By Bart Reardon.

ANYONE WHO HAS used a DX7 probably has been impressed by its ability to produce realistic imitations of percussive sounds such as woodblocks, harpsichord, bells, and the like. On the other hand, one of the drawbacks of any quick-retrieval storage medium, such as the RAM cartridge is that sooner or later you begin to run out of storage slots and have to "weed out" some of your fun special effects and give priority to your most useful programs. The bridge between these two, seemingly unrelated facts lies in the fact that there is a lot of "hidden" storage space contained within programs that are percussive in nature.

Percussive types of sounds have envelope times that are normally too short to make much use of vibrato. Each note is usually here and gone more quickly than the length of time it takes for a musically tasteful vibrato to develop even one cycle; also most musicians usually apply vibrato a short time *after* the note has been sounded. For this reason, the LFO section of the synthesizer is often not set up to do much of anything at all on percussion programs.

So, let's forget about using the LFO as a source of vibrato for a minute and explore some of its extensive versatility, as well as finding a way to utilize some of its "hidden" storage space. Keep in mind that, even if your modification is only mildly useful, the original program is left undisturbed until the special effect is called up through the MOD wheel—you needn't use up any of your precious RAM slots for what we are about to do. So, essentially, what we have here is totally free storage space for a lot of fun and interesting special effects (or maybe just some plain ridiculous sounds, quietly waiting for the next time that your front man makes a bad joke on stage).

In order to give all DX7 users a common place to start, we are going to use some examples drawn from the standard ROM cartridge library that comes with each instrument. I realize that these modifications can't be stored on the ROM cartridges, but the idea is easily demonstrated with these sounds. Once you understand the basic idea, you can apply it to all of your percussion-type sounds.

One good place to begin looking at this concept is with the TUB BELLS program, found in the factory ROM cartridge #4, Side A, Slot 22. Go into the EDIT mode on the DX7 and try the following modifications to the LFO

section of this patch:

WAVE:	SINE
SPEED:	0
DELAY:	0
PMD:	0
AMD:	0
SYNC:	ON
PMS:	7

Now go into the FUNCTION mode and check to see that the MOD wheel is set as follows:

RANGE:	50-99
PITCH:	ON
AMPLITUDE:	OFF
EG BIAS:	OFF

Now, when you play the sound with the MOD wheel turned off, the original TUB BELLS program is unchanged. Push the MOD wheel fully forward and you have "Saturday Night Late Movie Mystery Falling Bell!"

Here is another edit, based on the HARP-SICH 1 voice found on ROM 3, Side A, Slot 2. Go into the EDIT mode and try these LFO section modifications:

WAVE:	SAW DOWN
SPEED:	16
DELAY:	0
PMD:	0
AMD:	0
SYNC:	ON
PMS:	0
AMS:	3 on Op #4, 0 on all others

This particular modification works well as an aftertouch function, so let's set the aftertouch section of FUNCTION mode as follows:

RANGE:	99
PITCH:	OFF
AMPLITUDE:	ON
EG BIAS:	OFF

Now, when you play with a normal touch, the HARPSICH 1 sound comes out unchanged. Press a little harder on the keys and you have HARPSICH 1 with a soft, slow, repeating echo.

This next experiment is *really* different. Find the BELLS program on the factory ROM car-

tridge #4, Side A, Slot 21. Go into the EDIT mode and try these modifications to the LFO section:

WAVE:	SAW UP
SPEED:	7
DELAY:	0
PMD:	0
AMD:	0
SYNC:	ON
PMS:	does not apply to this patch
AMS:	3 on Ops #1, #2, and #4 0 on Ops #3, #5, and #6

On this sound, the modulation must be engaged before the sound is played, so we have to use either the MOD wheel or the FOOT CONTROLLER. Let's use the FOOT CONTROLLER in order to leave the MOD wheel set for pitch alterations. Use these settings for the FOOT CONTROLLER in the FUNCTION mode:

RANGE:	99
PITCH:	OFF
AMPLITUDE:	ON
EG BIAS:	OFF

Now, when you play with the FOOT CONTROLLER off, the sound of the BELLS program is unchanged. Push the FOOT CONTROLLER all the way forward and you have "Backwards Bells" (with a slight bit of echo).

The list of possibilities goes on and on. These samples are meant simply to serve as illustrations of some ways to utilize unused parameters contained within certain voices, and to do that without having to store the modified voice in another RAM slot in order to preserve the original version. The same principle can be applied to an unused operator contained within a program. Find the unused operator, make it do something useful, and then call it up through an EG BIAS function.

Even if you're not thrilled with the immediate results of these samples, I think you'll agree that this idea is worth looking into, as it may apply to some of your own sounds. Here are some general guidelines as to how you might proceed:

1. Browse through your DX library and deter-

mine whether or not the sound you want to modify is already dependent upon the LFO. A quick listening test will probably determine this. A sure way to check is by removing all modulation from the sound by setting the PMD and AMD to 0 and by disengaging any FUNCTION controllers that might induce modulation. Compare these settings to the original using EDIT/COMPARE. If the edited sound doesn't suffer the loss audibly, then it's safe to proceed.

2. Set the LFO section to these values as a starting point:

WAVE:	SAW UP
SPEED:	0
DELAY:	0
PMD:	0
AMD:	0
SYNC:	ON
PMS:	7
AMS:	0 on all operators

- Now, fully engage the MOD wheel (with the MOD wheel PITCH function ON), and move the SPEED up until the duration of one cycle of the LFO matches the duration of each note, or until any desirable modification is heard.
- Perform the same experiment using AMPLITUDE modulation, either by itself or in combination with PITCH modulation. Try different combinations of Amplitude Modulation Sensitivity (AMS) to the different operators.
- Try changing the LFO WAVE and run through the procedure again. After a couple of runs through of this procedure, I'm sure you'll develop a more straightforward system that works best for you.

I hope that some of these ideas will help keep you rolling in the search for more of your own sounds. I'm sure that all of you who are doing your own programming on the DX7 are aware that FM digital synthesis is no gimmick—it is worth investing some time in. These days, the technology changes so rapidly that we are often lured into the latest synthesizer format long before we have realized or mastered the full potential of the machines sitting right in front of us.

Questions

Sometimes I have trouble reading the LCD display on my DX7 when I'm onstage. Is it possible to get a *lighted* LCD display for the DX7 (similar to those featured on some of the Yamaha rack-mount effects)?

Yes, it is possible. Lighted displays are now available for the DX7 (as a modification) through your local authorized Yamaha dealer. Contact your dealer for details.



Is there a way for the Yamaha QX1 to store the internal voices of other (non-Yamaha) products such as the Roland MKS-80 Super Jupiter using its UTILITY Job Command #21 (Bulk In)?

Yes, there is a way. Use Code 000 to specify the



format on the QX1, and initiate a voice dump from the Super Jupiter.

I recently purchased a DX100 synthesizer, and seem to be having problems getting to the saxophone program in ROM memory. No sound comes out of the instrument. What's the problem?

The voice you're referring to is probably SAX BC. The "BC" in the title stands for "breath controller," which means that the voice has been set up to operate with that controller. To

Answers To Questions From Readers.

play the voice without a breath controller, go into FUNCTION mode and set the EG BIAS for the BREATH CONTROLLER to OFF. This is true for all DX100 internal voices that have "BC" as part of their name.

I'm almost embarrassed to admit it, but I mistakenly erased all of the factory preset patterns in my RX11. Does Yamaha sell a cartridge or a tape with the patterns on it? If not, are the patterns charted so that I might step-load them back into memory?

The RX11 Pattern Book, which should have been with your unit when you bought it, contains charts of all the patterns loaded into the RX11 when it leaves the factory. If you don't have a copy of this Pattern Book, contact your local authorized Yamaha dealer.

Since most of your AfterTouch system diagrams involve a DX7 or a keyboard controller such as the KX88, I'm a little confused about the MIDI capabilities of my DX9. If we poor DX9 owners don't know what will interface with the DX9, why waste time and money experimenting with these various system possibilities?

Most of the systems shown in AfterTouch illustrate very straightforward uses of MIDI that involve no more than the most basic MIDI messages (such as Note On and Note Off). Since the DX9 is equipped with MIDI, it will operate just fine in these situations.

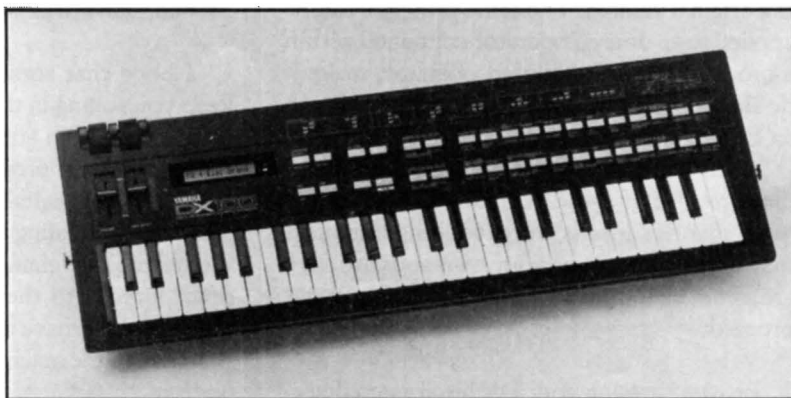
For example, you can use your DX9 to play any of the RX series of digital rhythm programmers, as outlined in the article in the September '86 issue of AfterTouch. However, since the DX9 is not velocity sensitive, you won't be able to take advantage of the fact that the RX units respond to velocity information.

Similarly, the DX9 can be used as a master

DX7 FM digital synthesizer.

QX1 digital sequence recorder.

DX100 FM digital synthesizer.



keyboard to play tone generators such as the TX816. Once again, you won't be able to access the velocity sensitivity of the voices in the TX816 from the DX9, but you *can* play the TX modules from your DX9 keyboard.

MIDI sequencers such as the QX21 will record MIDI data output from the DX9, and data from the QX21 will play the DX9 (as long as you make sure that the DX9's MIDI receive channel matches that of the sequencer's output).

In short, the DX9 is equipped with MIDI, so you can use it in all applications that involve basic MIDI data. If you have further questions about *specific* applications of *specific* instruments in combination with the DX9, send them along and we'll do our best to give you an answer.



DX9 FM digital synthesizer.

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.

AfterTouch is your publication. Let us hear from you!

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