On Drumset/Studio Percussion

READING MIDI IMPLEMENTATION CHARTS

By Norm Weinberg

WE LEARN FROM OUR MISTAKES. During its production, the Casio CZ101 was the least expensive MIDI synth on the market. I knew that the instrument would not send velocity messages from its keyboard. But, could it respond to velocity information sent from an external drum machine or sequencer? Over the phone, a sales person confirmed that this instrument would not generate velocity messages, yet it could receive different velocity values from a sequencer.

When the unit arrived, I recorded some data onto my sequencer, adjusted the velocities to create a crescendo, and sent the data back to the synth. No changes in volume! After several tries, I decided it was time to read the manual. To my surprise, I found the answer in something called the MIDI implementation chart. The sales agent was correct! The Casio did receive all velocities from 1-127, but then interpreted all incoming velocity data as a value of 64. In other words, when the synth saw a command for a velocity value of 25, it responded with a value of 64. When it saw a command for a value of 117, it still played velocity 64.

The sales person didn't lie to me. But he did hold back information that was important to my needs. I decided then, it was time to learn how to read these charts!

MIDI implementation charts are most often found in the back of the owner's manual of a MIDI device. Before buying any piece of MIDI equipment, ask to see the implementation chart. If you know how to read them, these charts offer a wealth of information about the MIDI device in question. Information that you find (or don't find) in the chart can tell you if the device will do what you want. The implementation chart can even tell you if the unit is capable of doing what the fancy brochure says it can do.

Example Number 1 shows a sample MIDI implementation chart for a simulated drum unit called the DAQ 750. Keep in mind that manufacturers have guidelines concerning how these charts should look and what they should include, but they don't have to follow them. These charts are often translated into English from another language. For these reasons, just about any type of spelling or different symbols may be used in an implementation chart.

At the top of the chart is a header. The header gives the name of the manufacturer, the model of the device, the version number (perhaps this unit has an updated set of MIDI commands), and the date. Under the header are four columns called Function, Transmitted, Received, and Remarks. The function column describes a particular type and class of MIDI messages. The transmitted and received columns will tell you whether or not this device will transmit or receive a particular command. The remarks column may contain additional information. Now, let's take a look at each function.

Basic Channel—The "default" row will tell you which channel the instrument will send over or respond to, upon power-up. Instruments that can program their default channel might have "1-16" in this position with the word "memorized" in the remarks column. The row called "changed" will show you which MIDI channels can be assigned as the basic channel by the user. So, by reading the chart, we can tell that this drum unit can send or receive on any of the sixteen MIDI channels. But it will always default back to MIDI channel one whenever the power is turned off.

Mode—The information in the "default" row indicates the MIDI mode when the unit is first turned on. Mode numbers are usually defined at the bottom of the chart. The "messages" row shows which of the four MIDI mode messages can be sent or received by the device. In this example, the device can't send any MIDI mode messages, but it can receive them. The "X" is the most common indication of "No", and "O" is most common for "Yes", but be careful, as some companies reverse the meaning of these symbols. This code should be defined at the bottom of the chart. The "altered" row will show you if any of the mode messages are altered inside the machine. The received column is the one to watch, as the transmitted column does not apply. If an instrument can't respond to a particular mode, you might find something like "Mono On=Poly On" at this position.

Note Number—Here you will find the range of MIDI note numbers that an instrument can send and receive. In the example, you can see that the notes correspond to the range of a piano keyboard. The "true voice" row is only valid in the received column, and is only required if the true voice range is less than the received note numbers. If this is the case, notes that fall outside the true range will be transposed up or down in order for them to sound.

Velocity—This is an indication of an instrument's ability to send and receive note on and note off velocities. In the example, note off velocities are not sent or received. The "v=0" tells you that this instrument will send a note on with a velocity of 0, as a note off command (running status).

After Touch—These rows will tell you if the instrument sends or receives polyphonic key pressure or channel pressure.

Pitch Bender—This is the indication for pitch wheel change. Sometimes the remarks column will show you the range or the resolution of this control.

Control Change—This section of the chart lists the different control change messages that the unit can send or receive. Most often, they are defined by their control change number and its definition. In the example, you can see that

DAQ 750 PROGRAMMABLE HYDRO DRUM VERSION 2.0

Function		Transmitted	Received	Remarks
Basic	Default	1	1	
Channel	Changed	1-16	1-16	
	Default	3	1, 2, 3, 4	Memorized
Mode	Messages	X	0	
	Altered	XXXXXXXX	X	
Note		21-108	0-127	
Number	True Voice	XXXXXXXX	21-108	
Velocity	Note On	0 v = 1-127	0 v = 1-127	
	Note Off	X v = 0	X	
Touch	Key's	X	X	
	Ch's	0	0	
Pitch Bender		0	0	7 Bit
Control Change	1	0	0	Mod Wheel
	2	0	0	Breath Control
	4	0	0	Foot Controller
	64	0	0	Sustain F. Sw.
	66	0	0	Sostenuto
	Right Wheel	0	0	Assign to 1-31
Program		0 0-127	0 0-127	64-127 = Cartridge
Change	True #	XXXXXXXX	1-128	
System. Exclusive		0 *1	0 *1	
System	Song Pos	0	0	
	Song Sel	0	0	
Common	Tune	X	X	
System	Clock	0	0	
Real-Time	Messages	0	0	
	Local On/Off	X	0	
Aux	All Notes Off	X	0	
Mess.	Active Sense	0	0	
	Reset	X	X	

Notes *1 = Transmit / Receive only if device number is not off.

Mode 1: Omni On, Poly
Mode 2: Omni On, Mono
Mode 3: Omni Off, Poly
Mode 4 Omni Off, Mono

0 = Yes
X = No

the "right wheel" can be assigned to send or receive any control change number from 1-31.

Program Change—This column will be the most useful in determining which program change messages will call up which sounds. As you can see in the example, this instrument sends and receives all messages from 0-127. The numbers from 0 through 63 will call up the internal voices, while numbers 64 through 127 will call up the voices in the cartridge. The chart also explains that the unit numbers its programs from 1-128. So, calling up program 100 on the unit will send a MIDI message of program 99.

System Exclusive—Here is where you can find out if the device can send or receive system exclusive messages. The remarks column or the notes at the bottom of the chart will usually give you more information about this class of messages. Notice that, in the example, the unit can send and receive these messages only if the device number is not off. The owner's manual should give you more specific information about these messages.

System Common—Because this is a drum unit with an on-board sequencer, it sends and responds to song position pointers or song select. Because it is a unit that can never go out of tune, it won't send or receive the tune request messages.

System Real Time—If you see "O" in these rows, you know that the unit will send and receive MIDI clock messages and the real time messages of start, stop, and continue. If the unit doesn't contain an on-board sequencer, there is no reason for it to send or read these messages.

Aux Messages—These are extra messages that don't really fall into the other categories. They include local on/off, all notes off, active sensing, and system reset messages. (PN)