A Plain and Simple Introduction to MIDI

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MIDI is the buzz word of music of the '80s and maybe you're not quite sure just what all this MIDI stuff is about. MIDI is a language, nothing much more and nothing much less. Very few advances in music have had such a profound impact. A couple do come to mind, however: the invention of notation, the invention of the piano, and the invention of recorded sound. If it sounds like I think that MIDI is important, well, then you've guessed right. MIDI stands for Musical Instrument Digital Interface, and it has changed the way musicians can relate to music.

A few short years ago, a group of interested people got together and decided that it would be great for musical instruments to be able to communicate with each other and with computers. In order to accomplish this communication, they had to access the instrument's microprocessor. These small internal computers were already being used on most keyboard synthesizers to determine what sound was going to be made when a particular key was pressed. Because computers understand only two numbers, 0 and 1 (off and on), it was decided that these numbers would make up the "letters" of the MIDI language.

You may already know that each of these single digit numbers of 0 or 1 is called a bit, and that a combination of bits to form a "word" is called a byte. It was decided that a MIDI byte would consist of eight bits. If you take all of the combinations of a string of eight 0's and 1's – from 0000 0000 to 1111 1111 – then you would have 256 different possible words. While this is a large number, it is not large enough to be a very expressive language. A solution for this problem was devised which would increase the number of possible words by a vast amount.

The first bit of each byte would be either a "status" or a "data" byte. A status byte would begin with the number 1 while a data byte would begin with the number 0. Each MIDI command or message is made up of a status byte and either one or two additional data bytes. Let's take a look at how this might be done.

The first message would be a status byte that would say something like "the next message you receive is going to tell you which note is going to be turned on." The following byte might say "note A♭," and the last data byte might be "volume 64." This is a full MIDI message which says to play A♭ at a medium dynamic.

Because the first bit has been taken by telling the microprocessor information about status or data, there are now only 128 different MIDI words (seven bits), *but* these words now refer to 128 different things.

There are 128 different levels of dynamics, 128 different notes, 128 different levels or degrees of 128 different parameters! If you punch up these numbers on a calculator, you'll find that there are now 16,384 different commands that can be sent and received through MIDI.

Another wonderful thing about MIDI is channel assignments. There are sixteen MIDI channels that can be used to send and receive all of these commands. These are not "hard-wired" channels like a sixteen track tape recorder, but more akin to a walkie-talkie that has sixteen channels. It is possible to set your MIDI instrument to listen to only one of the channels (in which case, only commands sent to that channel are heard by your instrument), or it can be set to listen to all sixteen channels at once (in this case, all commands are going to be received).

Because computers are very good and very fast when they are dealing with numbers, MIDI commands can be sent through the cable at an extremely fast rate. MIDI moves at 31,250 bits per second. Every MIDI byte also contains two extra bits; one at the front to tell the computer that a byte is now going to be sent, and a stop bit at the end to say that the byte is complete. Since these extra bits must be included, there are now ten bits to a complete MIDI byte. More math will tell you that 3,125 complete MIDI commands can be sent every second. That's a lot of information!

Well, there you have it, a brief explanation of MIDI – just a way to communicate that has completely changed the music industry in less than five years. If you are interested in learning more about MIDI, order a copy of *MIDI 1.0 Detailed Specification Document* from the International MIDI Association, 11857 Hartsook St., North Hollywood, CA 91607.

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