

PRACTICAL USES OF MIDI IN THE CLASSROOM AND CONGREGATION

Main Points of this Presentation

- What is MIDI?
- What do you need to get started with MIDI?
- What can you use MIDI for?
- Hands-on time
- Resources



What is MIDI?

When the manufacturers of musical instruments first put microprocessors into their products, a problem came up – these microprocessors usually couldn't communicate with others. So, in the early 1980's, several different companies got together and designed MIDI. Musical Instrument Digital Interface (MIDI) was a language designed to help musical devices "talk" to one another. General MIDI (GM) is a standard list of 128 instruments so files will play back as the composer intended.

Although MIDI allows you to listen to music, remember that MIDI is not a sound. MIDI signals are only instructions that tell an instrument what to play. Think of MIDI like a player-piano roll.

For instance, I can sit down at a MIDI keyboard and play a song. Each time I hit a note, a set of MIDI instructions is recorded. These instructions keep track of things like:

- when the note started
- what the duration of the note was
- what pitch was played, the loudness of the note
- what sound (piano, trumpet, drum, etc.) was used

When I have an entire MIDI file recorded, I can replay it on any device that understands MIDI. And because MIDI is a set of instructions instead of a sound, I can easily make changes in tempo, instruments, and so on – all without any distortion. If I tried changing the tempo of a recorded sound, it would change the sound of the notes (if you've ever played an album or tape at the wrong speed, you know what I mean).

Another great thing about MIDI is that you don't even know how to play an instrument to record music. You can record instructions by using a mouse, a keyboard, a piano, other instruments, or nothing at all!

In addition, you can layer the instructions. In other words, you can have a set of instructions for a piano song, and you can then add other instrument layers on top of it. By doing this, you can play a duet yourself... or even play all the instruments of an orchestra!

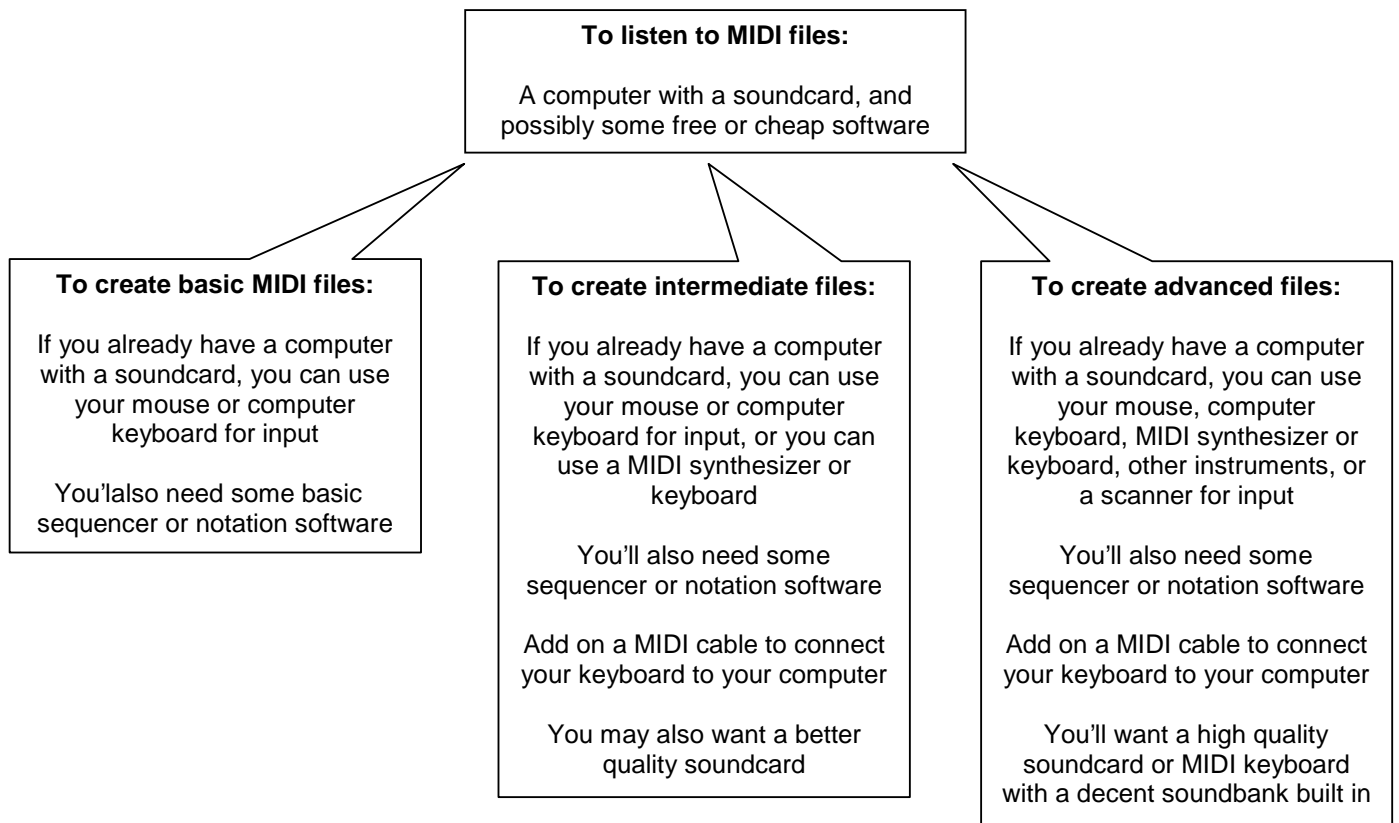
Some people ask, "But doesn't it sound fake?" Remember, you're not saving sounds. The sound is dependent on the MIDI instrument you are using for playback. If you have a good instrument, it'll sound good. The organ at the Cathedral of Notre Dame in Paris was converted to MIDI a few years ago. Tourists now hear beautiful pipe organ music each day from 9 to 5, but the entire performance was prerecorded in MIDI, so there's no one at the console.

What do you need to get started with MIDI?

This is a tough one to answer. Probably the easiest way to answer the question is to look at what you already have, and where you want to go.

For instance, back in the early 1990's I bought a computer that had a basic soundcard built in. For some applications this was fine, but I needed it to sound good enough so I could use it as a classroom piano, or even as a church organ, if necessary. The cheap video-game sound wouldn't cut it for those situations. I shopped around quite a bit and was told, "Well, that's just the way they all sound." I'm glad I didn't listen to them. Finally, I found a great soundcard that came with good software, and I've been using it ever since.

Let me give you a list of a few basic recommendations:



Soundcards

All modern soundcards should support MIDI tones. Try playing a MIDI file on your computer. If you can't hear anything, you may have to check your volume (MIDI usually has its own volume control – double-click the speaker icon next to the clock), your connections, or see if your card is installed correctly.

There are two main kinds of cards: *FM synthesis* and *wavetable*. An FM synthesis card is the kind that produces the fake, cheap-sounding noise. A wavetable card stores digital samples of sound from various instruments, which can then be combined, edited, and enhanced. Wavetable synthesis reproduces the sound of musical instruments better than FM synthesis. There are big differences from one wavetable card to another, so try to listen to MIDI files before you buy.

Some soundcards are internal and some are external. People who dislike clutter usually like the convenience of having the card internal, but some of the best soundcards I've heard are external ones.

Bit and sample rates are useful. With bit rates, you'll normally see 16-bit vs. 20/24-bit. When sound is recorded digitally it is stored as 1's and 0's. Each of these digits is one byte. There are 8 bits in one byte. Therefore, when you use more bits to define a sound the better it will sound. Sample rates are usually 44.1/48kHz vs. 96kHz. In this case the numbers, 44.1, 48, and 96 indicate how many times in one cycle of a sound wave it is being sampled by the computer. A sound recorded at 96kHz has been sampled twice as many times than a 48kHz recording so the result is a more defined digital representation of the sound.

I'll give a few recommendations, but try to get a listen before you buy. A computer store may be helpful if you're on a tight budget, but for something of higher quality you should really go to a music store that deals with MIDI. Again, make sure you listen to MIDI files -- not WAV's, not CD's, not MP3's – only MIDI.

Budget:	Around \$50	Soundblaster Live 5.1, Turtle Beach Santa Cruz
Intermediate:	\$100-\$200	Soundblaster Audigy, Audigy2, or Extigy
Advanced:	\$200 and up	Roland (Edirol) sound modules (there are many to choose from)

You could also try the Roland (Edirol) SoundCanvas. This software makes cheap soundcards sound better, and it gives them more capabilities.

Keyboards

It's a good idea to have a music keyboard to allow songs to be recorded in a free-flowing, rhythmic manner. The keyboard doesn't actually need to make any sound, but it does need to have a MIDI port so you can connect it to your computer. Intermediate-range keyboards usually include more features, such as touch-sensitive keys, weighted keys, 88 full size keys, a variety of instruments, and so on. Advanced keyboards usually look, feel, and sound identical to a real piano – but there are added features: ability to record several tracks straight to disk (no computer needed), lifelike instruments, and more.

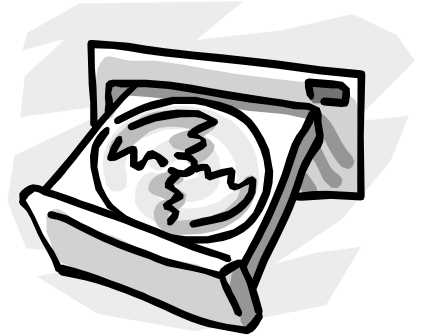
Budget:	Under \$200	Roland ED PC-300 USB, PC-160A, PC-70, Adventus Piano Suite Deluxe
Intermediate:	\$200-\$1000	Roland A-37, and assorted Yamaha, Korg, Casio, Suzuki
Advanced:	\$1000 and up	Roland, Yamaha, Korg, etc.

If you have a high-quality MIDI keyboard already, or if your church organ has MIDI, you can have your computer take over the controls. Instead of the sound coming out of your computer speakers, it will come out of the instrument.

Software

The software to listen to MIDI is probably already built in to your computer, but the software to create MIDI files normally needs to be installed separately.

The two main types you'll run into are called *sequencing* or *notation*. Sequencers are mainly concerned with how the music *sounds*. For example, a sequencer can record parts and then "quantize" them – it lines the music parts up to the metronome. Some advanced sequencers can also "humanize" the parts, making the music sound more realistic. Most sequencers also allow for an audio recording using a microphone. Sequencers usually will not print out the music, or are restricted to simple melodies and rhythms when they do print.



Notation programs, on the other hand, are very strong in printing out scores or parts. They usually do not allow for changing the way the music sounds. Traditionally, a sequencer would be used to record the music before exporting it to a notation program for printing.

Luckily, the distinction between these two programs are starting to blur, and a number of programs now merge the two into one. Here's a good article to read: <http://kellysmusic.mb.ca/pdf/104.pdf>

Budget:	free	Notepad by Coda Music - www.codamusic.com
Intermediate:	\$50-\$200	Allegro by Coda, MidiSoft Studio/Worship Studio – www.midisoft.com
Advanced:	\$200 and up	Finale by Coda, Sibelius – www.sibelius.com

Other software packages are more for music lessons and tutorials. Programs like MusicAce 1 and 2 are very popular.

HymnSoft is another popular program, because it has *Christian Worship* all ready to go in MIDI format. Songs were entered by hand (so they sound "human"), but they can also be manipulated like any other MIDI file.



What can you use MIDI for?

Let's look at a few of the many possibilities:

- Create original songs, and play or print them out
- Copy and paste staff sections into a word processor for music quizzes
- Play hymns or other songs, and set your own tempo, volume, etc.
- Transpose music that you want in a different key, and then print it out
- Some software allows you to print song posters – sheet music large enough for a group to see
- Pick out and play individual voices in a song (soprano, alto, tenor, bass) for drill work
- Band or piano students can “take the band home” and play along with a group
- Introduce students to the sounds of different instruments from around the world
- Have a brass player enter MIDI files using a microphone, and change the instrument to whatever you want
- Add sound to webpages, PowerPoint presentations, etc.
- Enhance piano lessons by adding accompaniment
- Accompany the choir without playing the piano or organ
- Use your scanner to input music, even if you can't play a note
- Put a challenging descant or pedal part into MIDI and play along on the other parts
- Use instruments like trumpets and drums to accompany your choir
- Use your imagination!

Jason Callaghan and Philip Davies came up with this list for MIDI in the classroom and working with multiple intelligences:

Bloom's Levels of Thinking	Classroom Examples
Knowledge	<ul style="list-style-type: none"> ♫ Play the sound of.. ♫ Find songs about.. ♫ Recall the tune of.. ♫ What is this instrument?
Comprehension	<ul style="list-style-type: none"> ♫ Identify this song.. ♫ Where have you heard this sound? ♫ Tap the beat to this song... ♫ What is the message of this song? ♫ What emotion does this melody evoke?
Application	<ul style="list-style-type: none"> ♫ Make sound effects for your story ♫ Make a backing track for your... ♫ Play a melody on the keyboard ♫ Program a song using the piano roll ♫ Select MIDI tracks to use when...
Analysis	<ul style="list-style-type: none"> ♫ What instruments have been used.. ♫ Fit the patterns in... ♫ What is different/similar with these two files...
Synthesis	<ul style="list-style-type: none"> ♫ Play along with this song... ♫ Sing to a melody ♫ Write lyrics for this melody.. ♫ Combine a variety of melodies into one song ♫ Compose an original song using a sample of popular music ♫ Change the genre of a piece of music, eg: classical>pop
Evaluation	<ul style="list-style-type: none"> ♫ Improve this song.. ♫ Why would this instrument have been used?

Hands-on time

- Keyboard demo
- Music Ace, Sibellius, MidiSoft Studio, Notepad demos
- Finale demo: Input – scanner, microphone, keyboard, mouse Output – to speakers, to keyboard
- CD's and pamphlets
- Other