OPUS ONE

BY GARY STAGER

Critics of computers in education often argue the investment in technology detracts from the arts. This does not need to be the case. Increasingly powerful and easy-to-use music hardware and software can rejuvenate any school music program

Did you ever wonder how Stevie Wonder can play just one keyboard and yet produce an orchestra of sounds? The easy answer is because of the Musical Instrument Digital Interface. The MIDI is essentially a networking protocol that allows musical instruments, synthesizers, recorders and computers to communicate. In the case of Stevie Wonder, the one keyboard he plays triggers a variety of synthesizers and generates a remarkable collection of sounds.

Now, why should K-12 schools care about any of this? Because the same tools that allow Stevie Wonder to impress his audience also can make music composition, expression and performance a part of the educational process. These tools provide the scaffolding required to allow even young children to realize the most sophisticated of musical ideas. For less than $500 any classroom can be equipped with a composition/performance/recording studio consisting of a musical keyboard and powerful music software. This technology offers an opportunity to reinvigorate arts education and help schools come alive with the sound of music.

Unlike many high-tech standards, MIDI has withstood the test of time. Since 1983 synthesizers, controllers and computers have spoken the
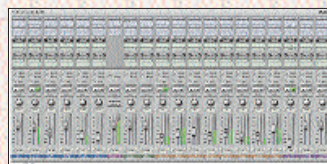
Kid Composers

Kids love music, but until now you needed the prodigious talent of Mozart to compose music. A variety of software packages now provide children tools with which they can express their original musical ideas. There are several distinct categories of music software, but many packages contain features from other categories. For example, sequencing software may include features found in digital recording software allowing you to add reverb or other effects to your music.

SEQUENCING SOFTWARE

Sequencers are hardware devices that store and playback music. Sequencing software allows the player of a MIDI controller (typically a keyboard) to not only remember the notes played, but also to edit those notes. Most sequencing software even lets you enter notes one at a time, regardless of tempo, and overcome a lack of piano technique by fixing your flubs later. Unlike playing the piano, you do not need to play more than one note at a time. You can layer parts like tracks in a video. Most sequencing software uses some sort of non-musical graphical representation of the music for the purposes of editing. (All of the software mentioned is available for Mac or PC except where noted)

Mark of the Unicorn's *(www.motu.com)* **Performer and GVOX's** *(www.gvox.com)* **Master Tracks Pro** are excellent examples of "super-sized" sequencing software.

NOTATION SOFTWARE

Notation software provides the musician with a way to create written scores and sheet music. The notes, rests and accidentals are entered with a mouse or keyboard. The software offers many advantages over writing by hand, including the ability to instantly turn scores into transposed parts, excellent print output and the ability to cut and paste.
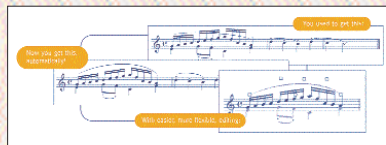
Finale Notepad, *(www.finalenotepad. com),* by Coda Music, is an easy-to-use notation package that allows you to choose different instruments, create up to eight staves, enter lyrics, and publish music created on your computer on the Web. Did I mention that it is also free for both the Mac and PC?

Fifth grade students at the Village School in Los Angeles use Finale Notepad to compose their own musical pieces by developing a melody and harmony for three or more instruments (See illustration). By limiting themselves to the pentatonic scale, pesky dissonances are easily avoided. The music is composed on the computer where it may be heard, modified and printed. After just two months kids are adding second and third themes to their compositions. Each completed opus will be about two minutes long. The school's technology director, Tara Higgins, will then open the Notepad files in one of Coda's more powerful packages, like PrintMusic! or Finale

language of MIDI.

MIDI is a bi-directional pipeline allowing connected devices to share data. That data is a series of numbers describing a musical note—its pitch, volume, length (sustain) and instrument. Anytime you turn an event or data into a code remembered by a computing device you are digitizing that information. Striking the key on a MIDI keyboard turns that middle-C into a set of bits capable of being manipulated. It is the potential for the manipulation of musical gestures that makes this technology so powerful in an educational setting.

Most people are familiar with the popular electronic keyboards that allow the player to change instrument sounds or play-along with accompaniment. Some of these keyboards are MIDI controllers as well. That means that it can be played like a piano and be used to control infinite sounds, multiple instruments or even record a performance digitally. These devices are connected to each other via MIDI cables and to computers via a MIDI interface.

The cost of a MIDI interface starts at about $50 and goes up depending on how many devices you wish to control. Older MIDI interfaces required a serial port, but most new ones use USB. MIDI hardware and software is available for Macs and

Allegro and export MIDI files. Those MIDI files can easily be converted to .WAV files via QuickTIme Player Pro (quicktime.apple.com) and burned to a "Greatest Hits of Fifth Grade CD." This explosion of musical expression impresses kids and parents alike.

HYBRID SEQUENCING/NOTATION SOFTWARE
The best bet for schools may be software packages combining the features of sequencing and notation software. Budding composers may play their composition, edit, print and perform their compositions in one package. Many of these packages allow note entry via computer keyboard, mouse or musical controller.

PrintMusic! *(www.codamusic.com)* is an entry-level sequencing/notation package costing only $69. It allows for 24 staves of music and includes MIDI-Scan technology allowing you to turn sheet music into editable music via a scanner.
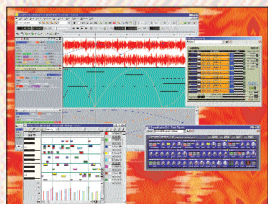
Mark of the Unicorn's Freestyle *(www.motu.com),* **Music Time Deluxe** *(www.gvox.com),* **Finale Allegro** *(www.codamusic.com)* **and CakeWalk HomeStudio** (PC only) *(www.cakewalk.com)* are powerful, moderately priced sequencing/notation packages for serious music students and their teachers.

Coda Music's Finale 2002 *(www.codamusic.com)* enjoys a 50 percent academic price, and it is the most popular notation/sequencing suite on the market. More advanced arrangers, composers and school band leaders will find the $300 a wise investment. Encore (www.gvox.com) is Finale's worthy competitor.

Mosaic (Mac only) *(www.motu.com)* considers itself state-of-the-art desktop publishing for music. While it includes sequencing features, its strength is in paper output.

Cubasis VST *(www.steinberg.net)* combines sequencing, notation and digital recording studio functionality in one package for Mac or PC.

Most sequencing and notation programs have a proprietary file format. They usually include the ability to export or import a standard MIDI file. This is the way you will move your music between applications.

COMPOSING WITHOUT NOTES
Hip-hop music is often built upon digital samples of other music woven together to create a new aural fabric. **Mixman** *(www.mixman.com)* and **Acid** *(www.sonicfoundry.com/products/)* are programs that allow you to combine samples of pre-recorded songs, known as loops, with MIDI files to compose new royalty-free music. Tracks are visually layered to create compositional sophistication to a funky beat. Both products have large libraries of loops/samples available for use in new compositions. The user/DJ community trades free loops online.

Superduper Music Looper *(www.sonicfoundry.com/products)* lets kids, ages 6-10, compose music with just a mouse, on-

Windows. Like many visual artists, Macs are popular among musicians.

If you are looking to purchase an electronic keyboard, be sure it has a GM logo on it indicating that the device is General MIDI compliant. General MIDI is a refinement of the MIDI standard ensuring that your piccolo always sounds like a piccolo and not a tuba, regardless of the device generating the final sound. You should also remember to invest in headphones for each musician.

Other MIDI devices include drum machines, electronic wind-instruments (imagine playing a trumpet and hearing a violin), synthesizer modules and digital recording decks. Not every synthesizer, the computer producing digital sounds, needs to have a keyboard, drum pad or wind controller attached. Many synthesizers are housed in small boxes often mounted in racks off-stage and out of view.

Most computer operating systems possess the ability to play MIDI files. QuickTime uses General MIDI as its standard and will play most MIDI files. The great thing about MIDI files is that they are so compact you can easily add complex music to a multi-media project or Web page without using too much disk space or bandwidth. For example, a commercially produced MIDI arrangement of Stevie Wonder's "My Cherie Amour" requires only 48K of disk space.

Royalty-free and commercial MIDI files are easily found on the Web. Depending on the license granted by the copyright owner, you may use these files in your own projects.

The microcomputer is MIDI's best friend. It may be used to compose and playback music; edit and master recorded music and store musical ideas for future manipulation. The processing power and storage capabilities of the personal computer are

essential for the production of digital music. The music synthesizing abilities of most personal computers are primitive when compared with dedicated musical synthesizers. It is for that reason that you should connect a hardware synthesizer to the computer and play the music through the device when performance is the goal. **D**

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screen paintbrush, an erase tool and their imaginations. A huge library of professionally recorded loops lets kids experiment with instrument sounds and compose their own music.
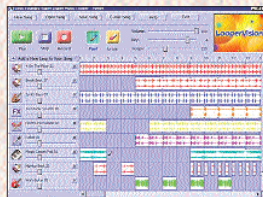
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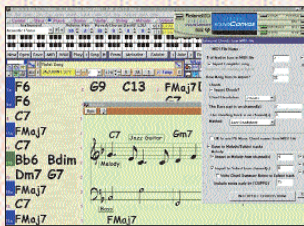
Band-in-a-Box is a perennial favorite among performers of popular music. Its publisher *(www.pgmusic.com)* calls Band-in-a-Box "intelligent music accompaniment." Type a chord progression into the software, choose a style of music from a huge selection and Band-in-a-Box will produce a professional-quality accompaniment of piano, bass, guitar, drums and string section. It will even generate improvised solos and import/export MIDI files. This software could come in quite handy for school musicals. PGMusic sells libraries of songs and sounds for Band-in-a-Box. Despite its novel (funky) interface, Band-in-a-Box is loved by its users.

MAGIC SOFTWARE

There are a few pieces of music software that take your breath away. **SmartMusic Studio** *(www.codamusic.com)* and **SmartScore** *(www.musitek.com)* are clear examples of software alchemy. I have not personally reviewed **Autoscore Pro,** *(www.wildcat.com)* but it holds a great deal of promise.

Autoscore Pro (PC only) from Wildcat Canyon Software (www.wildcat.com) promises musicians the ability to sing or play a non-MIDI instrument and have the software automatically convert that music to editable written music. It will even cope with your occasional intonation problems by restricting input to a particular key.
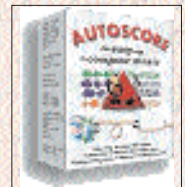
SmartMusic Studio for Vocalists, SmartMusic Studio for Woodwinds and Brass and **SmartMusic Studio for Vocalists, Woodwinds and Brass** are designed to make music practice more efficient and pleasant. The player uses a microphone to input her performance into the computer and then the computer accompanies the musician. It not only accompanies, it follows you with spontaneous tempo changes! SmartMusic Studio brings emotion to the too often-isolated mechanics of practicing an instrument.

Music teachers will be impressed by the 20,000 exercises and 5,000 musical pieces in its library available for an annual subscription of between $20 and $90 per year. The online library even features audition pieces organized by state. *(www.smartmusic.com)*

Musicians interested in rearranging a piece of sheet music with the drudgery of hand-copying will love SmartScore. The moderately priced software scans sheet music and turns it into fully editable notes on the screen. It may then be performed by the computer or attached MIDI synthesizer, rearranged, exported as a new MIDI file or printed. Three versions exist for full scores, lyrics with piano and either piano or solo instrument.