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The Promise of MIDI Technology

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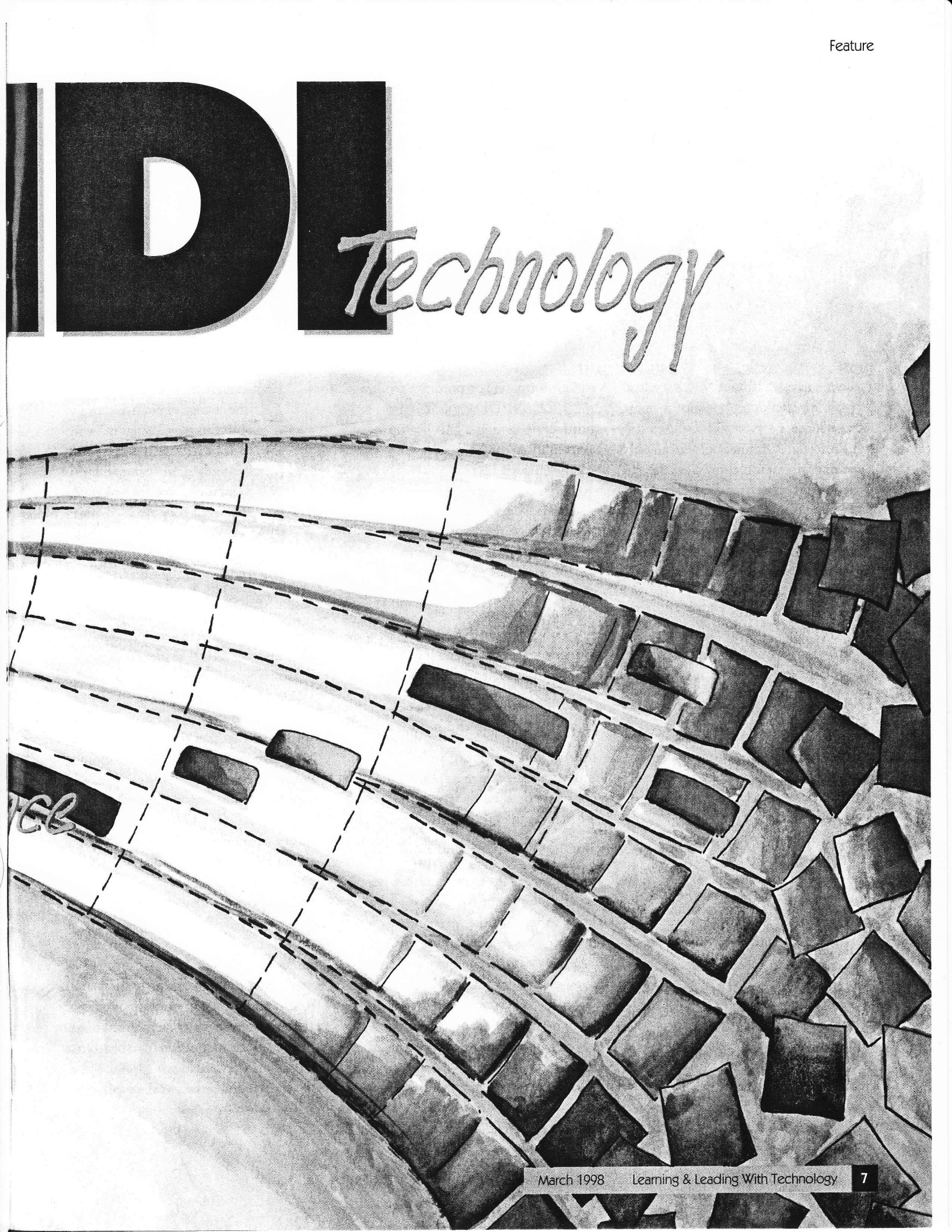
The Promise Of MI

By Jason Ohler

A Reflection on Musical Intellige

For many students, the traditional approach to learning music—especially the need to learn musical notation and musical theory—has been both intimidating and stifling to natural creativity. This no longer needs to be the case: MIDI technology allows anyone to make music first and learn theory second. In this article, Jason Ohler describes a new understanding of intelligence and creativity and then details how MIDI technology can make an entire world available to students who might otherwise be shut out.

ID Technology



Sometimes it takes a well-respected researcher and author to convince nonbelievers of an obvious truth. Such is the case with music and its importance in intellectual development. Fortunately, in his identification of multiple intelligences in his books Frames of Mind (1993a) and Multiple Intelligences (1993b), Howard Gardner has begun to convince the educational world of music's positive effects on the human brain and student success.* Ironically, this general recognition is taking place just as many art and music programs in K–12 education are losing their funding. We can only hope that we can somehow close the gap between our understanding of student development and the need to fund art education.

In the meantime, we are left with an educational system that was created many decades ago largely to address just two types of intelligences identified by Gardner: the verbal–linguistic and the logical–mathematical. It is a system that has long treated music as a desirable but unnecessary add-on to the standard curriculum. The task of today's educator might well be identified, then, as reversing the atrophy of musical intelligence that exists within each of us. Fortunately, this is precisely what *musical instrument digital interface* (MIDI) technology can do. Because MIDI technology is relatively cheap and can plug into almost any personal computer, music is rapidly moving to within anyone's reach.

Demystifying MIDI

MIDI is a set of technical standards that guides the development of the technology that is used to help create computer-based music. Thanks to these MIDI standards, computer-based music can be shared among different hardware and software platforms with relative ease. I may have my own preferences in the hardware and software I use, but a classroom MIDI workstation can consist of almost any basic MIDI keyboard, interface, and sequencing software program running on either the PC or the Mac platform.

("Getting in Touch with the Musician Within: Conducting a MIDI Workshop for All Ages" on page 11 includes information on how to conduct MIDI training. For more information on putting together a MIDI workstation, see "Creating a MIDI Workstation for Your Classroom" on page 13.)

Music Lost and Regained

There is nothing "natural" about the way we have represented music for centuries as black dots and markings on a lined staff. This method developed of necessity when paper and ink were scarce and difficult to work with. Understanding and using standard notation requires such a significant commitment in time and education that most people give up experimenting with music early in their lives. If they did not have formal music lessons or an informal discovery process, such as playing a guitar or piano on their own or with the help of friends, then the world of music creation would be largely closed to them.

MIDI technology is particularly good for awakening the creative spirit in people by allowing them to focus on musical ideas rather than the mechanics of playing an instrument or learning musical notation. MIDI technology has brought an ease to creating music that is similar to the ease that word processing brought to writing. MIDI technology allows almost anyone, regardless of training or manual dexterity, to compose, edit, and use the writing process to experiment with music in genuine and gratifying ways.

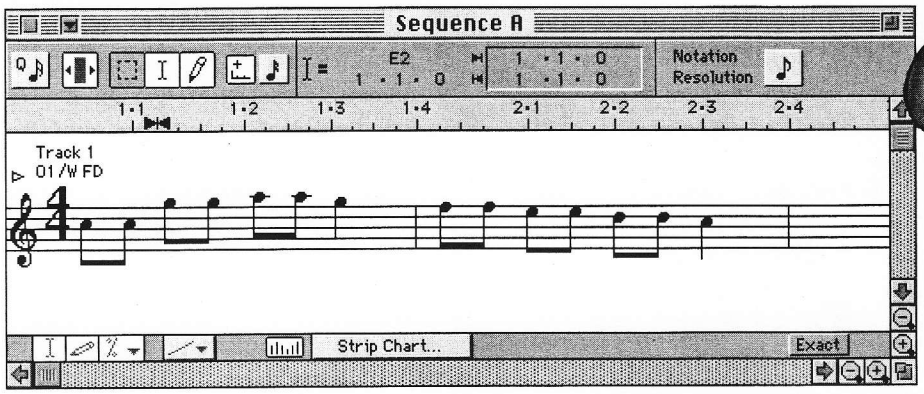
What makes music so accessible with MIDI technology is that it uses *sequencing,* a much more intuitive approach to representing notes. Instead of composing with conventional notation, students create sequences by drawing lines of sound using a music keyboard or mouse on a grid where height corresponds to pitch and length corresponds to duration. A long, high-pitched note, for example, appears as a long bar that sits high on the grid. Students can select this bar and then shorten or lengthen it, move it anywhere on the grid, hear the change of pitch as they go, and thus play "What if?" with their own musical ideas. Using sequences, informal experimentation, not formal training, is all they need to begin exploring the world of musical ideas. Sequences can then be translated into standard notation if desired. Figure 1 shows the same musical piece in standard notation (top) and as a MIDI sequence.

Composition is not restricted to the MIDI software. Someone can simply use a keyboard and play without recording or editing what they do. I find that making a keyboard available in a classroom is an invitation to students of all ages, and they frequently experiment with their own musical ideas. One of their first applications often is building stories around the sounds they have created.

The Important Question

I have used MIDI technology for several years to help adults and children get in touch with "the musician within." I begin my workshop by asking participants, "How many of you consider yourself unmusical?" Without fail, many of them raise their hands. When I work with adults, many more hands go up. These are the people I am most determined to

**Gardner began with seven intelligences and then added an eighth—naturalistic intelligence—in 1996.*



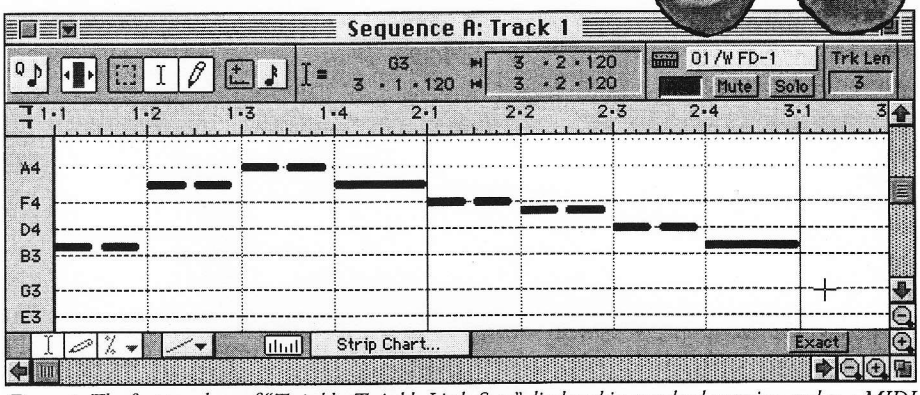


Figure 1. The first two bars of "Twinkle, Twinkle Little Star" displayed in standard notation and as a MIDI sequence creatd using StudioVivion Pro by Opcode.

reach. Little do they know that they have just volunteered to be part of a musical composition team.

In as few as 20 minutes (although I prefer twice that much time if I can get it), I am able to lead participants through a process in which they create, edit, engineer, and record a song by "laying down tracks." At the end of the workshop, I again ask them if they consider themselves unmusical—and few, if any, hands go up. "I had no idea that I could do this." This is what I hear most often from participants at the end of the workshop: "I discovered my inherent musical intelligence." This is one of those truly gratifying experiences that educators have, knowing we have just helped transform the world in a small but vital way. (For details, see "Getting in Touch with the Musician Within.")

The MIDI Trade-Off

As with any technology, MIDI involves trade-offs that you should be aware of in the beginning. Here are five that I consider to be particularly important: (1) experimentation versus formal training, (2) real versus synthetic sounds, (3) performing versus composing, (4) composing versus engineering, and (5) universal notation versus universal technology.

Experimentation Versus Formal Training. Even though MIDI offers many opportunities, particularly in the field of composition, it is no substitute for learning to play an instrument. Beginners usually experiment with MIDI technology using a keyboard, but more advanced musicians also may use other MIDI instruments such as guitars, woodwinds, and voice. At some point, beginners usually decide whether to take additional steps in their music education; among these steps might be studying music theory or perhaps developing the physical dexterity and hand–brain coordination needed to learn a conventional instrument. However, as many have told me, experimenting with MIDI technology is the one experience that compelled them to consider music more seriously than they otherwise would have. In other words, just playing around with MIDI can fan the desire for more formal and traditional training. In this way, MIDI is a wonderfully "scaled" technology. It not only allows beginners to enter the world of music, but also satisfies the interests of people of varying musical dexterities.

Using Real Versus Synthetic Sounds. If a student intends to use MIDI to write electronically for conventional instruments, then he or she will often be surprised when sounds produced for a high-tech instrument are translated to wood and brass. This is something that can be addressed with experience. The best advice here is to expect the unexpected and plan to experiment a great deal. But also consider that many contemporary composers have no desire to mimic conventional instruments. They celebrate the electronic domain precisely because it is so different, so unlike anything they have ever experienced. By offering new sounds, MIDI offers new opportunities.

Performing Versus Composing. As amazing as it is, composing with MIDI does not provide a student the incredible experience of performing in a real-time ensemble. It is within the context of a group that they develop the ability to listen, react, and play along with others. Playing with others, in fact, is a skill that translates far beyond the immediate ensemble or even the field of music.

Keep in mind the following points, however: (1) Composing with conventional notation is also a solo venture, (2) many performance artists perform alone and in an ensemble with MIDI technology, and (3) MIDI technology invites several students to converge on a single project, involving them in many different roles, from composer to producer. So even though MIDI is usually thought of as a composition tool, it is not necessarily a solitary technology.

Composing Versus Engineering. MIDI technology will be a shock to musicians who are accustomed to having someone else play the role of sound technician, because they will find that they must assume some of the roles and duties more traditionally handled by an engineer. Thus, even though MIDI technology allows users to do things they could not otherwise do, it will sometimes force them to focus on technology at the expense of music, and they may spend what seems like an inordinate amount of time setting software parameters and twisting dials rather than playing and composing. This can be a great experience in a classroom setting in which many students have many different interests in the musical composition process, but it also can be frustrating, especially to people who are used to conventional instruments. Nothing is more disappointing than a system error in the middle of a creative surge, yet nothing is more exhilarating than capturing musical ideas in a flexible and editable format that allows a composer to develop a musical idea to its fullest. There is always a trade-off.

Universal Notation Versus Universal Technology. Because it *is* a universal language, conventional notation has its advantages. Just like professionals in other disciplines, musicians can communicate with one another with relative ease, regardless of their nationalities, because they use a language based on numbers rather than text. But keep two points in mind. First, those who play music "by ear" can also engage in the universal conversation of music. In other words, understanding conventional notation is helpful, but not required. Second, MIDI is an international computer-music standard that is facilitating musical collaboration among both seasoned and beginner musicians. Projects such as World Band, in which kids from around the world collaborate on the same MIDI-based composition, emphasize this point dramatically. (For more information on World Band, go to http://conect.bbn.com/WorldBand/CoNECTMusic.html.) So, as you can see, standard notation may be the universal language of formally trained musicians, but MIDI may well become the universal language for the rest of us.

The Fourth "R"

MIDI might be described as an "assistive" technology for the artistically challenged. It represents one more way in which technology can make the world of art more accessible to people who consider themselves outside its domain. The realm of music is no longer restricted to those who are traditionally trained. It is open to anyone who can hear musical ideas and who is willing to take the time to learn MIDI technology to capture those ideas. In other words, all you have to be able to do is *think* music or hear it in your inner ear, not necessarily understand it in the conventional sense. It reveals the musician within—just as the word processor reveals the writer in all of us and graphics software uncovers the artist. This is truly revolutionary and represents technology at its finest.

With term papers yielding to multimedia presentations and Web pages, and with relatively inexpensive, easy-to-use, multimedia-authoring technology now available in many U.S. schools, students are being asked to combine words, pictures, sound, music, and movies into unified presentations. Because of the emergence of multimedia technology, especially the World Wide Web, we are being forced to broaden one cornerstone of our academic culture. The so-called three R's are becoming the four R's—Reading, "wRiting," "aRithmetic," and "aRt."

Music's use to set tone and reinforce content is obvious. Most students may not be asked to create music, but they may well be asked to use and manage it. Imagine a video or a movie without music—or imagine it with the *wrong* music. Knowing how to match music and message, particularly in conjunction with other kinds of information, will become critical to expression in many, if not most, fields. If students are to become *intelligent* in the fullest sense of the word, then they will need to flex the musical muscle that Gardner reminds us has always been there, even when we have ignored it. ■

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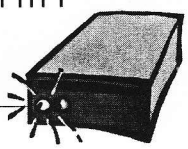
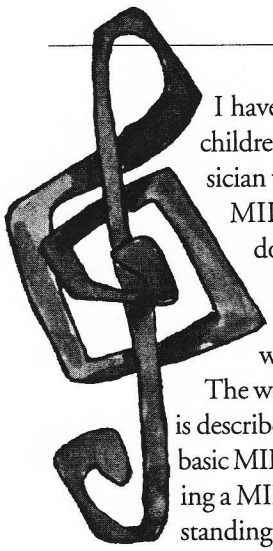
Getting in Touch with the **MUSICIAN** Within

Conducting a MIDI Workshop for All Ages





I have worked for several years with adults and children using MIDI technology to find the "musician within." At the beginning and end of each MIDI seminar, I ask my students, "Who doesn't consider themselves musical?" At the beginning of the workshop, many of them raise their hands. But at the end of the workshop, almost no one does.

The workshop that facilitates this transformation is described here. It can be easily replicated by using basic MIDI equipment like that described in "Creating a MIDI Workstation" and basic musical understanding.

Setting Up the Room

Room setup is critical. During the workshop, I call on many people to help create a song, usually those who have identified themselves as "nonmusical." To facilitate this process, I arrange the equipment in a semicircle that opens into the audience—that is, the participants. This makes it easy for them to interact with the equipment and to let others watch the process. The computer must be connected to an overhead display so everyone can see and follow the composition process.

Building a Song

Our workshop builds on our common understanding of the parts of a typical song. With just a little help from me, students easily identify a song's components as drums, bass, and melody. To keep the process simple, I leave out such background elements as chords; a more extended project might include this and other, more demanding aspects of electronic music such as sampling. One by one, volunteers are asked to come forward and play an instrument. In this way we collectively build a cooperative song by "laying down tracks," as the music industry describes it. Each track is one line of musical data that is separated from the rest so that it can be individually controlled in terms of volume, instrument sound, and so on.

Creating Drum Tracks

Drum tracks are the first ones we create. These provide the foundation for our song. Normally, to help establish rhythm, I use a metronome; these are now electronic devices and are part of most MIDI software programs. I tap participants on the shoulder in time with the metronome to help them internalize the beat. Drums are broken down into bass drum, snare drum, and whatever else sounds good from the drum sounds on the keyboard. A song usually requires three drum parts, so I ask at least three students to help us build a solid rhythmic foundation. Before we build the drum tracks, though, I ask a volunteer to press all the keys on the keyboard to show the students what sounds are available, and then we all choose a few sounds that audience members like.

Quantizing

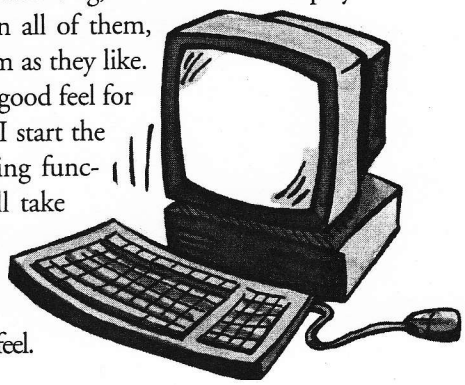
Quantization is a function of MIDI software that essentially corrects for input that is not on beat, allowing us to move sounds to the nearest beat. This is our next task. This nearly magical tool gives hope to people who feel they have no sense of rhythm. Although quantization is extremely helpful, it can become a crutch and keep people from learning how to recognize an established beat and synchronize their input with it. Too much quantization also can make a song sound sterile and overly predictable—that is, as if it were computer-created. For this reason, I recommend using it cautiously and selectively.

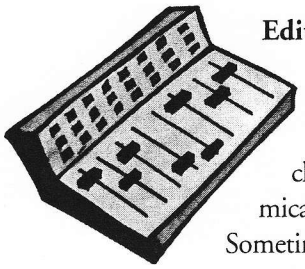
Creating a Bass Track

The bass part of our song is next. In a short workshop, I create the bass track to save time and to make sure it's coherent; otherwise, the song usually falls apart. For simplicity, the bass part uses an adaptation of the C-major blues scale; that is, we use the white keys with a few variations—C, E flat, F, G flat, G, A, B flat, and C. This is a widely recognized popular "funk" music scale. If the workshop is longer and we have enough time, I may have students create this track themselves.

Creating a Melody Track

Melody follows next. I again facilitate as the group explores the keyboard in a search for two or three good melody sounds. Once we have decided on these sounds, I put small colored stickers on the keys that participants are allowed to play within our C blues scale. I use two or three colors and then, as a warm-up exercise before we start recording, ask volunteers to play one color, then another, then all of them, and finally alternate them as they like. When I feel they have a good feel for the song and the notes, I start the MIDI software's recording function. Students often will take more than one pass and may add more than one melody line to the song. This creates a "funk fugue" feel.





Editing Our Song

Next, we will edit our music by picking out a few notes and manipulating them—that is, deleting them, changing their pitch, moving them rhythmically, or making them longer or shorter. Sometimes we will add new ones. At this point, note processing most closely resembles word processing, and most of the participants can see the resemblance. Most people can relate to this metaphor, and it can help convince even the self-described nonmusical that they, too, can create music.

Postproduction

Depending on the software you use, you may have at least some postproduction capabilities. The two most important capabilities are fading and panning.

Fading simply means adjusting the volume (e.g., "fade in and fade out"). This allows a composer to set each track at a different volume and thereby adjust each instrument's volume in relation to others. Studio Vision and other programs will allow composers to record such adjustments as their songs play so that changes in instrument volume are heard during playback.

Panning allows a composer to determine where each track of the song is heard in the stereo mix: in the stereo's right channel, left channel, or somewhere in-between. The easiest way to teach students how to use panning is to ask them to visualize a band onstage playing the song the students have just composed. If they imagine the bass guitar player on the left, then we pan the bass track all the way to the left. Drums are typically placed in the middle (that is, no pan), and the melody is put on the right side of the stereo. But be sure to let your students experiment with both panning and ading. Note that panning in professional situations is often more complex and more difficult.

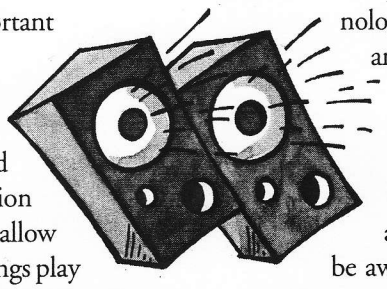
Recording

Connecting the amplifier to a standard cassette tape deck to record is simple at this point. Again, I involve as many students as possible, this time as engineers. If you are fortunate, you might have a dual-port cassette deck that allows you to make multiple copies so that many students can leave the workshop with a copy of their song. You can find the necessary cords to connect your amplifier and the cassette player at many department stores.

Naming that Tune and the Band

Last, but not least, we collectively give the song a name and then choose a name for our "band." Once we have decided, I ask a student to create the cassette label and box. By the end of the workshop, at least 10 people have contributed to a song's creation.

Even without a cassette recording, students leave the workshop with the file they have created. This constitutes a real breakthrough in music education. With most art forms, students leave a class with something on which they have worked: a drawing, a poem, a piece of sculpture. But music is different: Most musical creations are ephemeral and difficult to capture. MIDI technology gives students a way to capture their work and save it for later editing.



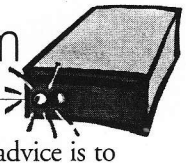
Final Thoughts

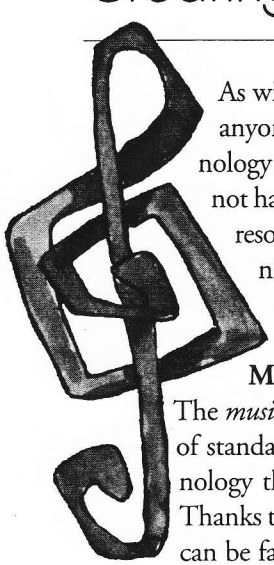
Thanks to Howard Gardner, we no longer see music as an innate talent possessed by just a fortunate few, but as an intelligence that can be awakened in every one of us. Whether we develop our musical skills is largely a matter of circumstance and opportunity rather than intrinsic calling. The educator's job is to provide the time, place, and opportunity to stimulate natural musical intelligence; this job can no longer be left just to music specialists.

MIDI technology allows a teacher to use music anywhere in the curriculum: as part of a storytelling unit, in a multimedia project, in conjunction with studying the science of sound, or simply as part of an exploration station. If you, as a teacher, are intimidated by music or by a lack of musical training, then simply set up a MIDI workstation, tell your students that it's there, and step out of the way. Students will converge on a MIDI workstation with amazing enthusiasm.

"I had no idea that I could do this." This is what I hear most often after a workshop. In a short period of time, MIDI technology can open a door to musical intelligence that has been closed in most of us. Thanks to this technology, we all have a chance to experience music firsthand and decide what part we want it to play in our lives. This is one of the best possible legacies we can leave our children.

Creating a **MIDI** Workstation for Your Classroom





As with most technology these days, the best way anyone can become acquainted with MIDI technology is to have a patient friend explain it. If you do not have that opportunity or are simply looking for resources, then the following overview of the technical side of MIDI will show what you need to set up a MIDI workstation in your classroom.

MIDI Demystified

The *musical instrument digital interface* represents a set of standards that guide the development of the technology that is used to create computer-based music. Thanks to the MIDI standard, computer-based music can be fairly easily shared on different hardware platforms and with different software programs. Although I have my own preferences in hardware and software, a classroom MIDI workstation can consist of almost any basic MIDI keyboard, interface, and sequencing software program running on either the PC or Mac platform. If you want to play your music for a group or record it, then you will also need amplification and recording equipment.

MIDI Keyboards

Many people start with just a keyboard sans computer. You strap on your headphones, fire up your keyboard and presto—you discover a world of nifty sounds, no computer experience necessary. But this method does have its limitations, which I will cover in a later section.

Keyboards abound. You can buy them at garage sales, at department stores, at music stores; from friends who bought them with the best of intentions but who have not touched them in years; and from many other sources. The keyboard should work just fine as long as it has MIDI input and output jacks for connection to your computer and output jacks for connection with an amplifier.

The bottom-line question to ask about a keyboard is, Do you like how it sounds? You will have to live with whatever sounds your keyboard has. You can always buy more sound modules and even download sounds from the Internet, but if you are just starting out or are on a limited budget, you should assume that "what you hear is what you get." Spend time comparing keyboards before you buy one. Listen to the drum sounds, horns, strings, special effects, and everything else they have to offer and then choose the keyboard that sounds best to you.

MIDI Interface

A MIDI interface connects a computer to a music keyboard in much the same way that a modem links a computer to a telephone line. It translates the signals created by the keyboard into information that a computer can understand. My advice is to start with the $50 beginner's interface. It can be found in most mail order catalogs and will allow you to connect one or two instruments to your computer, which is all that most MIDI workstations need. If you add more instruments later, then you can buy an interface with more capabilities. Make sure whatever interface you purchase has lights that indicate the movement of "MIDI In" and "MIDI Out" information. These lights are essential for troubleshooting.

MIDI Software

Once your keyboard is connected to your computer via your MIDI interface, the next order of business is to get software. MIDI software allows you to do many wonderful things, but its primary purpose is to allow you to create sequences, or songs, that you can store and edit. You use MIDI software to edit notes and songs in much the same way that you use word-processing software to edit words and stories, using the familiar functions of copying, pasting, deleting, moving, and so on.

Many keyboards will come with built-in sequencers. But you are usually forced to stare at a small, badly lit screen and work with a set of sequencing commands that are about as intuitive as an early version of DOS. If you are the least bit serious about creating MIDI music, then you will outgrow your built-in sequencer and want to plug your keyboard into a computer that runs MIDI software.

I am always afraid that I will inspire a holy war when I make a software recommendation; people become incredibly attached to the software they use. But, as always, two rules to buying software should guide what you do: (1) What you are trying to do should determine what you buy, and (2) you get what you pay for. Hundreds of MIDI music programs are on the market.

I tend to be conservative and use industry standards. I use Studio Vision Pro by Opcode on a Mac because it has been widely adopted, I like how it handles MIDI music and sampled sounds, and it has a vast number of features. Although it can seem complex, students seem to adapt to it quickly. On the Mac you can even create music with just a computer and QuickTime system software, although this is rather limited. For PCs, Cakewalk is quite popular. Free MIDI-sequencing software is even available on the Internet if you want to look for it.

MIDI files are quite similar to word-processed text files. You can create them in one program but use them in others. So, feel free to experiment without worrying about converting your product to another program later. Keep in mind, however, that when you use a MIDI file on another workstation, you need to reassign the instruments in your song to those available on the new workstation. In general, the song will sound somewhat different.

Hearing What You Play

Every MIDI music workstation consists of two systems: (1) the *digital* (the MIDI system, which allows you to connect your instruments to your computer), and (2) the *analog* (the amplification and recording system, which allows you to hear and record what you play). So far, I have only discussed digital matters. We will now consider the analog components of a system.

Most keyboards come with headphone jacks. This is a must for a quiet classroom, but for demonstrating and sharing projects you will want the entire class to hear what is being played. For this you will need an amplifier with speakers. A household boombox with input jacks will work, but it usually produces only mediocre sounds, and low notes can wreak havoc on cheap speakers. A "living room" stereo will typically work much better, but again watch out for low notes. I advise people who are about to invest in a MIDI workstation to buy a good amplifier and speakers: After all, the point of music is to create good sound. Any reputable music store should be able to recommend an amplifier and set of speakers. A good rule of thumb is that an amplifier and speaker system that offers 50 watts per channel will meet classroom needs. I like the Alesis RA-100; it is impressive and low-cost. Keep in mind that most professional amplifiers do not have tone controls (bass and treble). The mixer controls the tone in most professional workstations. So, if you don't plan to use a mixer, then look for an amplifier that has tone controls.

Before buying speakers, ask your colleagues and friends if they have speakers they would be willing to donate for your workstation. You'd be amazed how many people have unused stereo equipment that they are willing to give to a worthy cause. But test them first; play a few high notes and low notes through the speakers, listening for distortion.

If you do need to buy speakers, again I find that Alesis has several high-quality, low-cost options. And don't forget to ask for connecting cords. Many stereo components require that you purchase them separately.

Recording

When you write poetry, paint, sculpt, or create a story, you have something to show for your efforts. Not so with music—unless you record it. Recording music is similar to publishing other types of projects in that it allows students to leave with a product in hand that they can play for parents, friends, and themselves. Just like kids who know their writing will be published, kids who record their music projects put a lot more time and effort into their work.

Typically, any boombox with record input jacks will work, but quality is again limited. If you are following my previous recommendation and buying a separate amplifier for playback, then at least buy a medium-quality cassette-recording deck; many are available through reputable stereo stores for between $200 and $400. I recommend a dual-port recorder—that is, one that has two built-in cassette decks. This will allow you to make multiple copies so that more students can leave with a product. Keep in mind that you will be generating editable MIDI files; the students can work with them at their own or any other workstation. Also keep in mind that students can publish their work on the Web in two ways: (1) They can make MIDI files available for downloading and adapting to other workstations, and (2) they can create a sampled version of their song (this is the more popular option). See the section on sampling.

Mixing

A typical living-room stereo is a mixer of sorts: It allows you to bring together several components such as an amplifier, a cassette deck, and a CD player into a single system that uses one amplifier. But it does not allow you to play more than one component at a time—that is, it does not allow you to "mix" the sounds of the various components. This is what a real mixer does. It also allows you to adjust the volume of each instrument in the mix, thus making one instrument louder or softer than another, and adjust other qualities such as tone and effects.

You will need a mixer only if you have more than one instrument. If you have one keyboard connected to one amplifier, then you do not need a mixer. But I recommend using a mixer for two reasons: (1) It will allow you to control tone and add effects such as echo, fade, and reverb; and (2) it will give you the flexibility to add more instruments as needed. If you need a mixer, my favorite for the classroom teacher on a tight budget is the Mackie 1202. It is a remarkable deal at $250.

The All-In-One Solution

Keyboards come with many of the components described above; they are built-in or "on-board." For sequencing, I strongly urge you to hook your keyboard to a computer and use one of the many affordable, user-friendly MIDI sequencing packages on the market.

Some keyboards also come with built-in amplifiers and speakers. If you are on a budget and are not involved with groups bigger than an average classroom, this may be the route to explore. However, keep in mind that the same rule applies here that applies to any all-in-one technology: When one component breaks, all of them are inoperable. Also bear in mind that it is frequently problematic to use the built-in amplifier and speaker for other instruments if you add them to your workstation.

Sampling

Sampling is a technique that allows you to capture a sound of your own, such as singing, talking, or making sounds with an instrument or object. Whenever you capture something through a microphone, you are sampling. A short audio clip to put on the Web is easily done by plugging a Walkman into the microphone port of your computer and playing a cassette recording of your song. You can capture your sample with any of the free audio-capture software packages that are available on the Web.

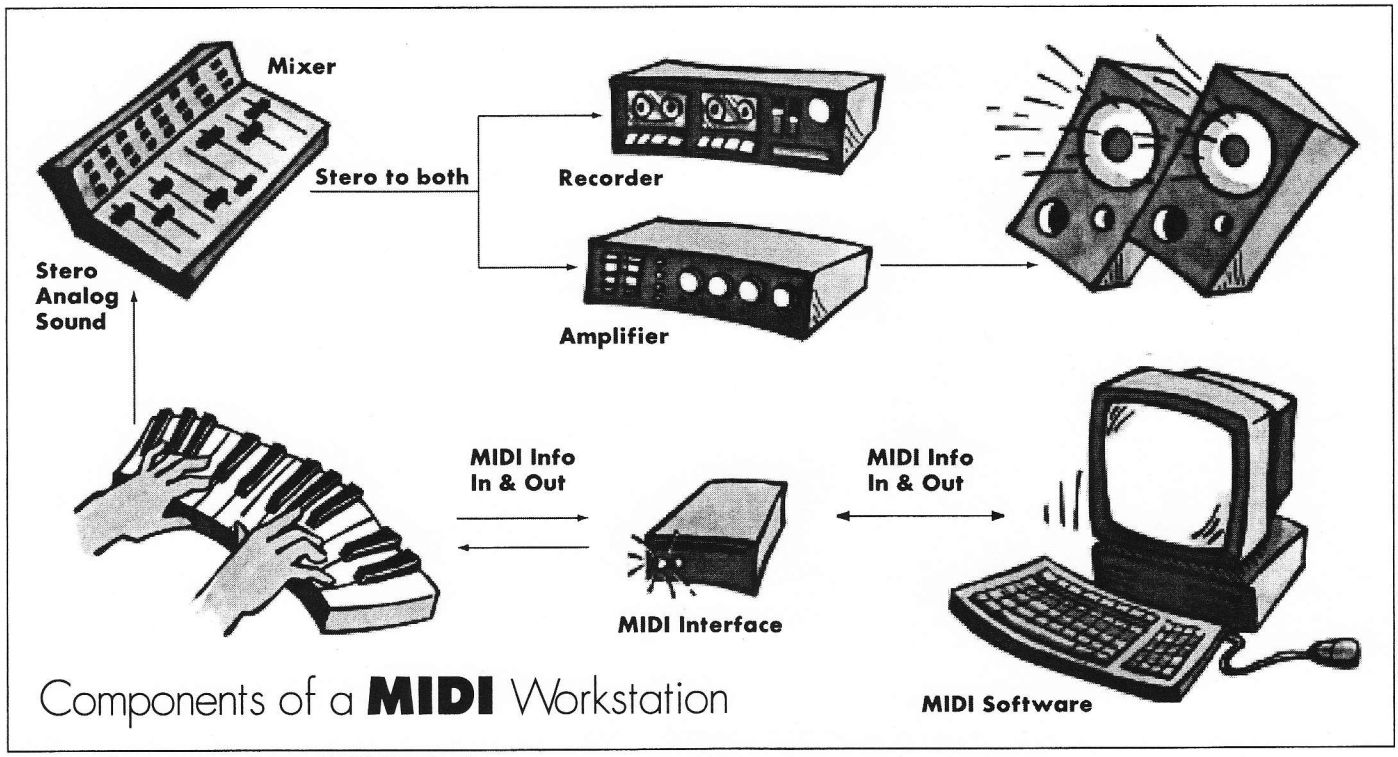


Figure 1. The components of a typical MIDI workstation.

Generally, however, serious sampling requires a fast computer, creates large files that require a significant amount of storage space, and uses a fair amount of memory. MIDI software, on the other hand, will run on just about any computer, generates small files, and uses relatively little memory. This is why I recommend you begin with MIDI and see whether sampling is something your students will need. So I leave more in-depth information on sampling for another time.

A Few Rules

Figure 1 provides a general overview of a MIDI workstation. Here are a few rules I have developed over the years for putting one together.

Rule 1: Clarify Your Goals. There's really nothing new here: Get clear about what you want. Most of us have learned MIDI technology the hard way. Unfortunately, this can also be the expensive way. The clearer you are on your goals, the easier it will be for people to advise you and the more likely you will make a purchase that you will not regret later.

Rule 2: Visit, Talk, Ask. Be an information sponge. Visit teachers who have already set up MIDI workstations. Talk to musicians who use MIDI technology for a living. Talk to vendors and store managers. In short, get as much information you can. But before you do, make sure you have considered Rule 1. The clearer you are, the clearer they will be.

Rule 3: Forgive Yourself. No matter what you buy, one day you will inevitably say, "Darn, I really wish I had also gotten..." Don't do this to yourself. You will have so much to learn about MIDI technology that you cannot possibly make a perfect decision every time. And remember, MIDI technology, like most other technologies, is evolving rapidly. What looks like only dream equipment when you make your first purchase will be tomorrow's standard equipment that "everyone's just gotta have." This will always be the case, so there is no sense worrying about it.

Rule 4: Enjoy. I have never met a MIDI workstation I didn't like. All of them have strengths and limitations, but they all do one thing: make it possible for everyone, from rank novices to advanced musicians, to create, capture, and edit music. So, once you have made your purchase, sit back and enjoy it!

Resources

Alesis equipment is sold in music and consumer-electronics stores. For more information, call 800/5-ALESIS or 310/841-2272, e-mail alecorp@alesis1.usa.com, or go to http://www.alesis.com.

Cakewalk can be found at computer, consumer-electronics, and music equipment stores. Contact Cakewalk at 5 Cambridge Center, Cambridge, MA 02142; 617/441-7870 or 888/CAKEWALK; education@cakewalk.com; http://cakewalk.com.

Contact Mackie Designs at 16220 Wood-Red Road NE, Woodinville, WA 98072; 800/258-6883; fax 425/487-4337; sales@mackie.com; http://mackie.com.

Opcode software is available at computer and music equipment stores. Find out more about Opcode products by calling 650/856-3533 or accessing http://www.opcode.com.