

# Making Music with Teens

## A Supplemental Manual

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If you're looking for even more options to make music with teens, you've come to the right place. This guide will take you through the language, different hardware options, and a range of programs (both downloadable and online) that you can use to further harness teens' creative power.

### Talking the talk

**Track.** A track is a single layer of sound in a recording, which can be edited or manipulated independently. Traditionally, tracks have been used to record the input from a single microphone or other input (e.g., guitar, bass, vocals, drums, turntables, etc.). However, with the advent of new technologies, multiple sound sources or samples can be cut and pasted into a single track, depending on the needs of the project. Tracks are usually represented horizontally across the screen, recalling recording onto tape. Computer programs that can handle more than one track are called multitrack recording software.

**Sample.** A sample is a small audio file, recorded independently, that is then used inside a project. Samples can be played as "one shots" (meaning, they are just played once, in full, like one often does when they put speeches or movie clips inside their songs), looped (like often happens when, for example, small pieces of Motown or funk records are used in hip-hop), or played as part of a sampler instrument. A sampler lets people play audio files at will, upon a keyboard, button press, or other activity. Samplers are also used extensively in hip-hop as well as electronic music. A terrific resource for samples is Soundsnap ([www.soundsnap.com](http://www.soundsnap.com)), a free library of high-quality loops and other audiorecorded by its community of users.

**Digital Audio Workstation (DAW).** A digital audio workstation is a system designed to record, edit, and play back tracks on their computer. Today's DAW consists largely of a computer running audio recording & editing software, as well as an audio interface. The audio interface uses analog to digital converters (ADCs) to convert sound into a digital signal for the computer. It also uses digital to analog converters (DACs) to convert its digital sound back into something that can be connected to a stereo or speakers. In this guide, we'll mostly be using DAW to mention the software component.

**Sequencer.** A sequencer is a device or a piece of software that contains information about songs or musical patterns. To put it in librarian-like terms, sequencers contain the metadata for an electronically-based music performance. That information is then fed to either another piece of software, another aspect of the same software, or another device to

generate sound. Many DAWs have sequencers built into their program. There is a form of sequencer called a "step sequencer," in which messages to play sounds are arranged on a grid (usually of sixteenth notes) and looped indefinitely. The music changes as the messages are taken on and off the grid.

**Musical Instrument Digital Interface (MIDI).** MIDI is the most widespread way by which digital instruments, computers, and other devices interact with each other. It does so by sending event messages. These event messages can be anything from note messages (saying what pitch and at what volume the note should be played), control messages (to set parameters for a device such as overall volume, how long the note sustains after being played, or its vibrato), and other messages that are less commonly used. MIDI does not produce sound, but the information for other devices or software to make sound. Most sequencers utilize MIDI, although similar protocols (like Open Sound Control) have recently emerged.

**Plug-ins.** Plug-ins are third party effects or instruments that can be used within a DAW. Plug-ins come in a variety of formats. The most commonly found as free are Virtual Studio Technology (VST), which are cross-platform compatible (though usually Windows-only), and Audio Unit (AU), which is Apple-only. KVR Audio ([www.kvraudio.com](http://www.kvraudio.com)) is a rich interface for searching for plug-ins of all kinds. You may want to pay special attention to equalization plug-ins, which allow you to shape the volume of certain sound frequencies can be added to tracks to bring out particular characteristics of an instrument or voice. Check out the "Recommended Equalization Frequencies" ([www.recordingwebsite.com/rwtip/archive/rw15r.html](http://www.recordingwebsite.com/rwtip/archive/rw15r.html)) for a list of suggested settings for a variety of voices and instruments.

**Remix.** A remixes comprises a changed version of a song's original recording. Tracks and effects are added, subtracted, and edited to perform something that can either be a subtle change or a nearly original song.

**Mash-up.** A mash-up is a hybrid song, consisting of slicing, splicing, and overlaying the beats, instrumentation, vocals, or choruses of two or more songs on top of each other. Songs are often chosen for humorous contrast, such as Joy Division's "Love Will Tear Us Apart" and Missy Elliott's "Get Your Freak On" into "Love Will Freak Us." (<http://youtube.com/watch?v=OVGZRmK7E1Q>).

## Building a Mini Studio

### Microphones

Microphone options are pretty wide-ranging. If a library is looking for a free option, a cheap desktop microphone probably came with your computer. Ask around if you got one, and you can connect it to the microphone input of your soundcard. Similar desktop microphones can be had for \$15 from your local Radio Shack.

If your library uses the most recent generation of Macs (iMacs and laptops specifically), you will have microphones built into your computers.

If you are looking for something a little more functional, there are two recommended USB microphones available. USB microphones require no audio interface because the microphone itself is already converting the sound into a digital format.

The Blue Snowball (MSRP \$139.00, street \$99.97) is an excellent microphone, though it doesn't pick up sounds with a low frequency as strongly as it could. However, it offers the ability to switch between three specific settings: one for vocals and wind instruments, one for amplified guitar, and one for dispersed sources, like vocal groups.

Another, the Samson C01U microphone (MSRP \$234.99, street \$90) is a great vocal mic that is more even in the sound frequencies it captures. For libraries who would want to use a mixer for multiple microphones or a microphone with other sound input sources (such as turntables), there are a few cheap, adequate condenser microphone options.

The Marshall Electronics MXL V57M (MSRP \$249.95, street \$59.95) and Behringer B-1 (MSRP \$129.99, street \$99.99) are two microphones that will do the job without overextending your budget. If your mixer or audio interface does not offer "phantom power" (which condenser microphones require to function), you will want to use a dynamic microphone, which is not as ideal for "studio" recording but is more adaptable. Shure's SM57 (MSRP \$170.00, street \$99.00) is ideal for instruments, while the SM58 (MSRP \$188.00, street \$99.00) works well for vocals.

### Audio Interface

If you're looking to be more expansive with your projects, you'll need something beyond a direct connection from a single microphone to your computer. You'll need an audio interface. Audio interfaces come in several shapes and sizes. For people who want a simple, cheap solution, the Behringer U-Control UCA202 (MSRP \$34.99, street \$29.99) has a stereo input that can connect to a mixer.

The mixer will "mix" signals from a variety of sources and then feed that mix into the computer through your audio interface. Check out the Behringer Eurorack series of mixers (MSRP \$39.99+) for something cheap and satisfactory, if not high-quality. Libraries who are just looking for a slightly more expanded solution, to record single vocals and/or instruments, can check out Lexicon Alpha USB Audio Interface (MSRP

\$182.00, street \$99.99). The Mackie Onyx Satellite (MSRP \$499.00, street \$199.99) expands on that premise by allowing for recording two tracks of instruments or effects apiece. It also uses Firewire instead of USB, for faster and more reliable recording.

For libraries with larger budgets who are looking for a full, integrated solution, Alesis offers a series of mixers called the MultiMix (MSRP \$199.99+, street \$149.99+). These mixers come in two flavors: Firewire and USB and can have either 8, 12, or 16 inputs. The USB mixers are only capable of sending the final mix to the computer, while the Firewire can record each input independently.

### MIDI Controller

MIDI controllers will help you make the most of your DAW. They'll help you play your virtual instruments, record into your sequencers, and manipulate your effects. To that end, the Novation ReMOTE 25 LE (MSRP \$299.99, street \$99.99) is a terrific solution. It offers 25 keys, a bunch of hands-on knobs to twist, and a special touchpad that controls two effects with the swipe of a finger. For teens who might want to do some beats, the M-Audio Axiom 25 (MSRP \$239.95, street \$179.00) provides eight pressure-sensitive (aka "finger-drummable") pads in addition to its knobs and keys. It's worth mentioning that libraries committed to music programming and budgeting may wish to investigate the M-Audio Ozonic (MSRP \$599.95, street \$499.99), which is a MIDI controller and audio interface all in one. It's also worth noting that many old keyboards (which can be bought at thrift stores or used music stores) are MIDI-compatible. These keyboards can be used in a limited function to at the least play virtual instruments, if not manipulate effects. Using them requires a MIDI interface, which can come relatively cheaply compared to a controller. The M-Audio USB Uno 1X1 MIDI Interface (MSRP \$49.95, street \$39.99) will let you connect to any keyboard with a MIDI output.

### Downloadable Software

Thankfully, after the hundreds of dollars possibly spent on equipment, DAW and other music creation software can be had for quite cheap, if not free. If you purchased an audio or MIDI interface, you probably got a free limited edition version of expensive commercial software, such as Steinberg's Cubase LE or Ableton Live Lite. Here, we'll explore different free and cheap options for downloadable software that might not already be part of any equipment packages.

**Garageband** ([www.apple.com/ilife/garageband](http://www.apple.com/ilife/garageband)). Garageband is Apple's easy-to-use DAW for everyone. Songs are built one-track at a time, by recording audio as well as sequences for Garageband's supplied virtual instruments. One can also use AU plug-ins on the tracks as well, both as virtual instruments and effects. Garageband's especially easy on beginners due to its "loop browser," which stores ready-made sequences and samples to plug into your song. It may

be lacking in many respects, but its ease of use and fun factor make it a go-to program for teens. Garageband comes pre-installed for free on most newer Macs but otherwise costs \$79 as part of iLife '06.

**Ardour** ([www.ardour.org](http://www.ardour.org)). Ardour is Linux's premiere open-source DAW, capable of many of the same powerful operations as DAWs that cost hundreds of dollars. It can record, edit, and mix multiple tracks of audio. It edits non-destructively, meaning Ardour only edits information about how it will play back the samples. It doesn't affect the actual sample files themselves. It also has powerful mixing capabilities, and all aspects of each track are fully automated. That means that the values of every effect, for example, can be set at every moment along the timeline of the song. Ardour has been incorporating support for MIDI sequencing over the summer of 2008. Ardour is free for Linux and Mac users, and is recommended for teens looking for more powerful options.

**Audacity** (<http://audacity.sourceforge.net>). Audacity is a well-known multi-track audio editor and recorder. Audacity allows one to record, input, and edit any number of tracks. Many effects can be applied to audio samples, such as an echo or "wahwah" effect, and people can add VST effects to their tracks through an expansion program called VST Enabler. Audacity is not a full DAW, as it does not have sequencing capabilities and virtual instruments nor does it let you view your project in musical time (beats & measures) instead of mechanical time. However, it does give you the opportunity to create a "click track," which is an audio metronome that people can play to. Audacity is free and open source for Linux, Mac, and Windows users. It's a worthwhile solution for teens only looking for simple audio recording.

**KRISTAL Audio Engine** ([www.kreatives.org/kristal/](http://www.kreatives.org/kristal/)). KRISTAL Audio Engine is a rather powerful multi-track recorder, sequencer, and mixer for Windows. It's main interface is the mixer, and the multi-track recorder and sequencer can be added as necessary. KRISTAL offers a series of built-in effects and allows for other plug-ins as well, such as VSTs. Though not currently in development, KRISTAL Audio Engine is free for non-commercial use and will serve moderately well as a fairly powerful, customizable DAW.

**Reaper** ([www.cockos.com/reaper](http://www.cockos.com/reaper)). Reaper is a powerful and recommended MIDI sequencer and multi-track recorder for Windows (a full Mac OS X version is currently in development). Reaper was largely developed with the input of novice musicians and, as such, has a relatively low learning curve despite its many features. Reaper has support for many popular file formats; incorporating those files is as easy as dragging and dropping them. Reaper has a lot of options for editing that audio. In addition to its built-in effects, Reaper offers support for VST plug-ins and allows for each parameter to be automated over the course of the project. It also offers powerful recording and MIDI options. One of Reaper's greatest features is its size and compatibility. Reaper is small and portable enough to run directly from a flash drive,

requiring no additional installations; it's also compatible with Windows versions back through Windows 98. Reaper is "uncrippled unexpiring shareware," meaning that it can be used without any restrictions during an evaluation period. After the period is over, a non-commercial license is only \$40

**Soundflower, JACK.** Soundflower and JACK are various options for sending audio between computer applications. While primarily for music-related functions, Soundflower is a free Mac application that allows for all types of audio routing. JACK is a free, open source application that also allows for flexible routing between programs. While primarily for Linux and Mac, Windows options are available. These programs could be used, for example, to record songs made using programs that don't offer recording capabilities. They could also be used to send playing a computer game through effects.

**PureData (Pd)** (<http://crca.ucsd.edu/~msp/software.html>). Pd is not for the faint of heart, but it's the way to go for teens who are very computer savvy and want to take things a step further by creating their own audio programs. Pd is an example of what's called a "modular programming environment," in which people use various building blocks to construct the program from the ground up. Each of these programs is called a "patch," and many patches can in turn be strung together to create complex environments. The programs could be anything from a simple audio effect to using a MIDI keyboard to set off a wild chain of randomly generated sounds. Pd comes included with many examples to study as well as a dedicated community of people willing to lend help, tutorials, and further examples at [www.puredata.info](http://www.puredata.info). While Pd is not pretty or easy, I do know teens who have used it for music-making and art installations. Pd is open source, available for all operating systems and comes free of charge.

**Max/MSP Runtime Environment** (<http://cycling74.com/downloads/maxmsp>). Max/MSP, like Pd, is a "modular programming environment." However, it's commercial software that is far beyond the reach of almost any teen budget. Nonetheless, Max/MSP has created a free "runtime environment," which is like a sandbox in which teens can play with the really cool toys that others have created (such as the really neat ones at [www.studiotoolz.net/category/maxmsp-runtime/](http://www.studiotoolz.net/category/maxmsp-runtime/)). Max/MSP Runtime is available for Mac and Windows.

Your set-up is generally going to be some form of mix and match amongst the various options. Here are some examples to get you thinking about what you can do with your options. This doesn't include the cost of any necessary cables or adapters.

## Online Audio Software

**eJAMMING** ([www.ejamming.com](http://www.ejamming.com)). eJAMMING AUDiiO is a tool that let's people collaborate in real-time music making from anywhere, using downloadable software and a broadband internet connection. With any combination of

	Microphone	Interface	DAW	Cost
<b>No budget</b>	Included desktop microphone (\$0.00)	Audio: computer's sound card (\$0.00) MIDI: none	Splice Music (\$0.00) Audacity (\$0.00)	\$0.00
<b>Small/Med budget</b>	Blue Snowball USB Microphone (\$99.97)	Audio: none needed MIDI: Novation Remote 25 LE (\$99.99)	Garageband (\$0.00)	\$198.96
<b>Large budget</b>	Behringer B-1 (\$99.99)	Audio: Lexicon Alpha (\$99.99) MIDI: M-Audio Axiom 25 (\$179.99)	Cubase LE (\$0.00 w/Lexicon Alpha)	\$379.97

audio and MIDI sources (to drive virtual instruments), players can stream all of their output to each other in a collaborative jam session. The software calculates the latency (i.e., the delay between sending audio over a network and hearing it reflected back) and works to help make sure everyone is more or less together. It has fun social networking aspects. Users make a profile and enter the "lobby," where they can join jams-in-progress or create their own and invite others.

**Kompoz** ([www.kompoz.com](http://www.kompoz.com)). Kompoz is a "social workspace" for musicians. People can upload tracks they recorded onto their computer for others to critique and add to. Between the discussion and the addition of new tracks, great new songs will be formed.

**Indaba** ([www.indaba.com](http://www.indaba.com)). Indaba is another online music collaboration tool, in which users start a session, invite people to add content to their session (or wait for them to "audition" electronically), and then edit, remix, and communicate with their session members through an online Flash application. The results can then be saved to your hard drive or posted online for all to see.

**Singshot** ([www.singshot.com](http://www.singshot.com)). Singshot is like the "American Idol" of Web 2.0. Users have their own personal "recording studio," which is a Flash-based audio recording application in which users record their renditions of thousands of licensed, legal songs. Members then listen to, rate, and chat about other users' songs for a full, fun, and rich experience. There are more than enough recent songs (and classics with retro teen appeal (to keep their interest).

**Jamglue** ([www.jamglue.com](http://www.jamglue.com)). Jamglue is a social community built around an online "remixing" application. Users upload music and other sounds. They then take those, along with the combined uploaded content of the entire community, and create remixes and mash-ups of their favorite tracks. Each saved mix has its own individual page, on which people can declare themselves as "fans" and make comments. Each user in turn has their own page, with listings of their uploaded songs, sounds, and remixes. Of course, all of these links are ripe for remixing.

**Splice Music** ([www.splicemusic.com](http://www.splicemusic.com)). Splice is another online remixing and mash-up community, which has some features that makes it nearly an online DAW. Splice is for users to upload and edit samples and songs, which can be viewed and remixed in the "Splice Studio." The Splice Studio is an online audio sequencer in which users can arrange those

samples and songs. Splice (which was the first website of its kind) is distinct in that it allows users to apply affects and utilize virtual instruments.

## Video Game-based Music Software

Looking for more creative uses for your Wii? There are lots of free applications available that will help you use your Wiimote for all sorts of exciting musical purposes, so long as your computer is capable of receiving a Bluetooth signal (which can be done easily). The Wiimote Drum Kit for Windows ([www.thisisnotalabel.com/My-Wiimote-Drum-Kit.php](http://www.thisisnotalabel.com/My-Wiimote-Drum-Kit.php)) takes the gyroscope data and corresponds different Wiimote activity to a different drum sound. For those who have Macs, The Amazing Rolo's Wii Loop Machine ([www.theamazingrolo.net/wii.html](http://www.theamazingrolo.net/wii.html)) lets people play and manipulate musical loops for live performance. Mac users can use their Wiimotes as a MIDI controller for any application using the WiiToMidi (<http://mike.verdone.ca/wiitomidi>) software. Windows users can do the same with a combination of the programs GlovePie ([http://carl.kenner.googlepages.com/glovespie\\_download](http://carl.kenner.googlepages.com/glovespie_download)) and MidiYoke ([www.midiox.com/myoke.htm#Download](http://www.midiox.com/myoke.htm#Download)). And since that takes a few extra steps, you can find a tutorial here: <http://crustea.vjfrance.com/article-130714.html>.

PSP hackers can use PSP Rhythm ([www.psprhythm.com/](http://www.psprhythm.com/)), a home-brewed digital synthesizer and sequencer that allows for teens to compose whole songs in the classic electro video gaming sound. They can also use PSP2MIDI (<http://e-mu.org/index.php?tag=psp>), available for both Mac and Windows to turn their PSP into a wireless MIDI controller for their projects.

Teens with a Nintendo DS also have a lot of exciting options to turn their game machines into music devices. Nitrotracker (<http://nitrotracker.tobw.net>) turns the DS into a handheld music sequencer that uses the stylus to arrange the timing and pitches of the samples. DSMIDI WiFi (<http://dsmidiwifi.tobw.net>) turns the DS into a MIDI-capable machine, allowing you to use your DS to play virtual instruments or affect your plug-in effects. It's worth mentioning that a commercial game called Jam Sessions is scheduled to be released in September 2007 for Nintendo DS, allowing DS users to strum their DS with a guitar pick as though strumming actual strings.