

Although you have reached the end of this book, you have certainly not reached the end of your journey into the world of music technology. There are many more things to learn about music technology, The purpose of this book was not to teach you everything there is to know about recording, DAWs, sequencing, or creating CD's.. Instead, this book helped you gather knowledge which will serve as a good foundation to the more complex ideas in book 2. However, it is really important to remember what you learned in this book, as you will need all of this knowledge as you begin working through the next book. Before you start book two, you might want to spend some time rereading this book, and looking over your quizzes.

You now have a broad base of knowledge in the field of music technology. Now that you have this good working knowledge of this exciting field, it is time to branch out and learn about certain aspects of music technology in greater depth. There is still much to learn about MIDI, sequencing, digital audio, and synthesizers. You are now at a point where you have to choose which branch of music technology interests you the most and what you want to learn about next.

Of course, remember that even if you exhaust all of the books in this series, there is always more to learn about the field of music technology. Since this field is so new, there are almost constantly new developments and advances which bring about a never-ending stream of exciting things to learn about.

If you are interested in finding out more about all of the different music technology lessons which are currently offered, you may request a free course catalog which contains a complete listing of all courses, and the textbooks associated with them.

Activity lights - Small lights on a MIDI interface which light briefly when a MIDI message comes into or out of a given port.

Add - An editing type for velocity and duration of MIDI tracks which allows you to increase the velocity or duration of selected notes by a set amount.

Analysis file - A file created by a DAW which contains a picture of a waveform of the recorded audio.

Arm - A control on multitrack recorders (and DAWs) which allows you to designate which track or tracks you wish to record on.

Audio card - A special circuit board which sits inside the computer. It allows you to connect the audio interface. Some audio cards do not require a separate audio interface because they have jacks on them.

Audio drive - A hard drive which is designed specifically for media production. Audio drives are typically very fast, and very high capacity.

Audio file - A file created by a DAW which holds the actual recorded sounds.

Audio interface - A device which has several inputs and outputs which serve as the DAW's inputs and outputs. On some DAWs, the audio interface is integrated into the audio card.

Audio monitor window - A window in most DAW programs which allows you to see the volume level of the signal coming in to the inputs on the DAW's audio interface.

Automation - A feature of most DAWs which allows you to record your moves on the DAW's mixer and plug-ins in real time, and play back those moves at a later time.

Automation controls - Controls found in the mixer window in a DAW which allow you to enable or disable automation per track, and also allow you to record automation data.

Aux track - A DAW track which can't be used to record any sound. Rather, aux tracks are used to route signals within the DAW.

Bouncing - A multitrack recording technique in which the contents of several tracks are combined so that some tracks can be erased and used again to record other sounds.

Bus - A data pathway in a mixer or DAW which allows you to route audio signals from one place to another. Among other things busses are used when submixing tracks and when creating aux sends on a DAW's mixer.

Bypass - A button found on most plug-ins which allows you to temporarily disable them so that you can listen to the audio without processing.

Cans - A slang term for headphones.

Capstan - A thin metal post which spins at a highly consistent rate. The capstan is responsible for pulling tape through the tape path on a tape recorder.

Capstan roller - Another name for pinch roller.

CD burner - A special CD drive which is able to save data onto a CD. By inserting a CD-R, it is possible to save music onto a CD for playback in an ordinary CD player.

CD-R - A blank CD onto which music or data can be recorded for later playback or retrieval. A typical CD-R holds 650 MB of data

Central processing unit - (CPU) the case or enclosure which houses a computer's hard drive, audio card, CD drive, etc. CPU also refers to the actual main processing chip on the computer's motherboard. CPUs serve as a central connecting point for a DAW.

Channel - A setting which keeps MIDI messages for different multitimbral parts separated. There are 16 MIDI channels.

Compositing - The process of splicing together the best parts of several takes to obtain a single take which is as close to perfect as possible.

Compress - A command used in editing velocity messages which simulates the operation of an audio compressor.

Contact list - A listing of all of the people involved in a particular project.

Continuous controller messages - MIDI messages generated by real time controls such as modulation wheels, damper pedals, volume, and pan controllers.

Control room - The room the engineers, producers, and assistants sit in during a tracking or mixing session. This room contains most of the equipment.

Control surface - A device which simulates a hardware mixer and allows greater ease of use when tracking and mixing on a DAW.

Conversation log - A written listing of every phone call and/or discussion about a project. The date, time, and content of each conversation are recorded.

Copy - An editing command which allows you to make a duplicate of the selected data which is temporarily stored in an area of the computer's memory called the clipboard.

CPU - An abbreviation for central processing unit.

Cut - An editing command which allows you to remove the selected data which is temporarily stored in an area of the computer's memory called the clipboard.

DAW - A digital audio workstation which allows you to record, edit, and save audio.

Default patch - A column in the tracks overview window in Digital Performer which allows you to select patches on the synthesizers in the room.

Demo - A rough recording used to give musicians an idea of the piece to be recorded.

DirectX - A format of plug-ins used by many Windows machines.

Distort - A change in the shape of recorded sound waves which occurs when signals become too loud in an electronic circuit.

Drum loop - A short recording of percussive sounds which repeat over and over again. Drum loops are typically played by samplers.

Duplication facility - A factory which can make many copies of a CD for the purpose of mass distribution.

Duration - The length of a MIDI event.

Edit decision list - A compilation of all of the edits which have been made to a particular project.

Editing - The process of removing, moving, and replacing parts of a performance to yield the best possible performance.

EDL - An abbreviation for Edit Decision List.

Erase head - The left-most head on a tape recorder which is capable of erasing parts of the tape as they pass by so that new audio signals can be recorded.

Event edit - A method of editing a MIDI track in which events are displayed as a list in a window.

Fast-forward button - Causes the tape guides to pull tape away from the tape heads and move tape quickly from the supply reel to the take-up reel.

Format - The type of software a given plug-in will work with. Some examples include TDM, VST, MAS, Premiere, DirectX, and RTAS. A plug-in will not work with a DAW unless that DAW supports the format of that plug-in.

Graphic editing - A style of editing in which the DAW's operator works with pictures of notes and audio waveforms on the DAW's monitor.

Hard drive - A hard drive is a part of a DAW, usually kept inside the computer's CPU. The hard drive stores audio information.

Headphone mix - A mix designed to allow a performer to hear themselves clearly while tracking.

Headphone mixer - A mixer which allows a performer some control over the headphone mix.

Hide - Using the show/hide commands in a DAW's mixer window, it is possible to view only those channels which are currently being worked on.

Humanize - A command which randomly moves MIDI events forward or backward in time. The opposite of quantization.

IN - A MIDI jack which only accepts incoming MIDI data. An IN jack can only be connected to an OUT or a THRU.

Keyboard - The typewriter-style keyboard used to input data into a DAW.

Keyboard equivalents - Combinations of keys which can be pressed in lieu of certain mouse actions.

Keyboard shortcuts - Another name for keyboard equivalents.

Latency - A small delay which is introduced when audio signals go through the audio interface, through the CPU, and back out the audio interface.

Layering - A multitrack technique in which the same part is performed over and over again on separate tracks, and then all tracks are played simultaneously.

Leading edge - The left most edge of a sound bite.

Level meter - A small bar graph to the right of each channel in the mixer window which displays an instantaneous measurement of the track's volume.

Limit - A method of editing velocity data which allows you to specify a highest and lowest allowable data value.

Local - A setting on a synthesizer which determines whether the keyboard can directly play sounds in the synthesizer.

Markers - Points in a sequence which can easily be located. Markers are often placed at the beginnings of sections of music.

MAS - MOTU Audio System. This is a format of plug-in used by Mark of the Unicorn's sequencing and recording software, including Performer, Digital Performer, and Audio Desk.

Master channel - A channel in a DAW's mixer window which allows you to control all tracks assigned to a particular output on the audio interface.

Master inserts - inserts which affect all channels on the mixer.

Mastering - The stage in production when signals are made to seem as loud as possible and the order of pieces for the album is determined.

Mastering engineer - An engineer who specializes in mastering other people's music.

MIDI - Musical instrument digital interface. A common communications protocol which allows MIDI devices to communicate performance data.

MIDI cable - A cable used to connect the MIDI jacks on different instruments together.

MIDI interface - A device which allows you to connect MIDI devices to a computer. Most computers do not have MIDI jacks on them.

MIDI Jacks - Connectors which allow performance data to move between MIDI instruments.

Mixdown - The final step in the mixing stage. During mixdown, all of the tracks on the multitrack recorder are mixed together in a pleasing way to a 2-track format.

Mixer Window - The window in the DAW which displays the DAW's mixer. In this window, you can make level and panning changes, control automation, and insert plug-ins.

Monitor - The computer screen which provides information to a DAW's user.

Mother keyboard - A keyboard which can make no sound of its own but merely generates MIDI messages.

Multiband compressor - A compressor which allows you to compress high, mid, and low components of a mix differently.

Multitimbral - The ability of some synthesizers to play more than one sound at once.

Multitrack recorder - Any recorder which can record sounds to different tracks at different times.

Nondestructive - A style of editing permitted by DAWs. Each edit made to the recorded audio can easily be undone at any time.

Nonlinear - A property of DAWs. Non linear refers to the fact that DAWs do not record to a medium which moves forward in a line. They can access any point in a recording almost instantly. This eliminates winding time associated with tape-based recorders.

Note off message - A MIDI message which indicates that a key has been lifted.

Note on message - A MIDI message which indicates that a key has been pressed.

Omni - A MIDI mode in which a synthesizer responds to all incoming signals, regardless of their channel.

OUT - A MIDI jack which puts out data created in the device the OUT jack is attached to. Out jacks can only be connected to MIDI IN jacks.

Overdubbing - A multitrack technique in which sound sounds are recorded at one time, and other sounds are added at a later time.

Parts per quarter - A measure of a sequencer's timing resolution. The larger the number, the more sensitive the sequencer is to exactly where a MIDI event occurred in time.

Paste - An editing command which allows you to place the contents of the clipboard into a selected space.

Pinch roller - A small rubber wheel which presses audio tape up against the capstan so that the capstan can pull the tape through the tape path on a tape recorder.

Ping-pong - Another name for bouncing.

Play button - A button found in the transport controls which shuttles tape forward at a normal speed and reads magnetically encoded sounds off of the tape as it passes the playback head.

Playback head - Part of a tape machine responsible for reading magnetically encoded sounds off of tape.

Plug-ins - Pieces of software which add functionality to a DAW. Plug-ins often take the place of effects and processor, but can also replace instruments like synthesizers and samplers.

Ports - A pair of MIDI INs and OUTs.

PPQ - An abbreviation for parts per quarter.

Preproduction - The stage in production in which a recording project is planned out.

Production schedule - A document which clearly states the deadlines for each phase of the production process.

Program change - A MIDI message which instructs a synthesizer or effects device to call up a particular preset.

Project studio - A small recording studio which is set up typically for use by one person for his or her personal projects.

Psycho acoustic processors - Effects or processors which trick your ears into believing that a sound's source is coming from beyond your speakers or headphones.

Punching in and out - A multitrack editing technique in which errors are corrected by recording over a small portion of a previous take on one track.

Quantize - An editing command for MIDI tracks which brings notes closer to being perfectly in time.

Real-time entry - A method of recording MIDI data which simulates the use of a tape recorder. MIDI events are recorder in real time as they are performed.

Record - A transport control which activates the erase and record heads for any armed tracks.

Record head - A head on a tape machine which is responsible for putting new signals onto the passing tape.

Reel - A round wheel which hold tape while it is not being played or recorded onto.

Region - A part of a sound bite which has been split off from the entire bit.

Region edit - Any kind of edit which is performed on an entire region of MIDI events as opposed to an event edit, which affects only one note. Quantize, change velocity, and change duration are all examples of region edits.

Release velocity message - A MIDI message which describes how quickly a key is released.

Reproduce head - Another name for playback head.

Reverse - An editing command which causes sound bites to play from the trailing edge to the leading edge.

Rewind button - Causes tape guides to pull tape away from the heads, and tape is quickly shuttled from the take-up reel to the supply reel.

RTAS - A format of plug-ins used by native (i.e. non-hardware dependent) Pro Tools systems.

Safe - The state of a tack when the arm control has not been activated.

Sampler - A specialized synthesizer which can play drum loops.

Scale - A method of editing velocity and durations of MIDI tracks which allows you to increase or decrease all values by a certain percentage.

Sequencing - The arts of layering different MIDI tracks to create a finished piece of music. Also, part of the Mastering stage when the order in which pieces will appear on an album is decided.

Set - A method of editing velocity and duration values which allows you to specify one value for all selected notes.

Show - A command which allows you to see a channel in a DAW's mixer window. (See hide)

Shuttle control - A mouse-like device which allows users to fast forward and rewind, and often provides buttons which can be set to keyboard equivalents.

Smooth - A method of editing velocity data in which values smoothly change from one set value to another.

Sound bite - The representation of a take of audio on screen. Sound bites are often divided into many regions.

Step-time entry - A method of entering MIDI data in which rhythms are entered separately from notes. Step-time is helpful in creating highly mechanical parts, or in executing parts which would normally be too difficult to play.

Stereo image - Our perception of sound coming from between two speakers.

Stop button - If you need a definition for this one, you need more help than I can provide. :-)

Studio - The room performers occupy while performing. Studio walls are often treated to absorb or reflect sound waves in a particular way.

Submixing - A technique in which the outputs of several channels are mixed into one aux track before emerging at an output on the audio interface.

Subtract - A method of changing the duration of notes in MIDI tracks that allows you to shorten events by a set number of beats and/or ticks.

Supply reel - The part of a reel-to-reel tape machine that holds tape which has not yet moved through the tape path. The supply reel is the reel on the left side of the tape machine.

Take - A recording of one time through a song.

Take-up reel - The part of a reel-to-reel tape machine that holds tape which has already moved through the tape path. The take-up reel is the reel on the right side of the tape machine.

Talkback mic - A microphone in the control room which allows the engineers and producer to communicate with the artists in the studio.

Tape path - the route tape follows as it passes through a tape recorder.

Telephone log - Another name for a conversation log.

THRU - A MIDI jack which puts out a copy of the MIDI data received at the MIDI IN jack.

Tick - The smallest unit of measure in a sequencer. There are typically 480 ticks per quarter note.

Tone module - A synthesizer which doesn't have keys. Tone modules usually cost less than keyboards and take up much less space.

Track ball - A pointing device which some people use as an alternative to a mouse. Trackballs typically offer more buttons and greater speed.

TDM - A format of plug-in used by high-end Pro Tools software.

Tolerance - The amount of error intentionally permitted when quantizing a track to keep the track from losing its human quality.

Tracks - A section of tape onto which one instrumental part is recorded.

Tracking - The stage of production in which sounds are recorded from live musicians.

Trailing edge - The right-most edge of a sound bite.

Transport controls - The buttons which control the tape's movement through the machine, or allow you to control what the DAW is doing. The play, record, stop, rewind, and fast-forward buttons are all transport controls.

Transposition - A form of editing MIDI in which entire parts are shifted to a higher or lower range.

Trimmer tool - An audio editing tool on a DAW which allows you to change which part of a sound bite becomes the trailing or leading edge.

Velocity message - A MIDI message which describes how hard a key is played.

VST - A format of plug-in used by many different DAWs. VST is probably the most common plug-in format.

About the Author

Sam Ecoff is a graduate of the University of Wisconsin in Eau Claire where he studied music theory and composition. Sam also studied Recording Arts at Full Sail Center for the Recording Arts. Sam saw his first synthesizer at age 8 (a Moog IIIp!) and was completely entranced. The spell hasn't been broken yet. (Sam offers a simple explanation for his love of synthesizers: "Simpleminded folk like me are just naturally attracted to the blinking lights, buttons and knobs. The more knobs, buttons, and blinking lights it has, the better.... especially the blinking lights. I really like those....")

When Sam's days are not being consumed writing new books, he composes music for radio and television commercials using his synthesizers. Although he has a great love of vintage instruments, his studio is stocked with many of the latest synthesizers and samplers, both hardware and virtual.

Sam's great passion in life is teaching young people about all kinds of music, particularly about synthesizers and music technology. In addition to teaching applied piano, music theory, and composition, Sam also teaches a wide range of music technology courses at a private conservatory in southeastern Wisconsin where he has taught since 1997. Sam has been teaching music lessons privately since 1987.

On the rare occasions he is away from his studio, Sam enjoys Eastern philosophy, Tae Kwon Do, ballroom dancing, and long walks out of doors with

his wife Kara and his dog Emillie.

He tells us that the best part of writing books like this one is getting to share his enthusiasm and excitement about music technology with many young people, while the worst part is definitely the page layout. "You don't know how many sentences

I had to rewrite just to make everything fit neatly on the page!" He laughingly exclaims. "Nothing too terribly important ever gets left out, though," he assures us.

When asked for a quote, he provided two: "96 simultaneous channels of synthesizers is really *not* enough," and "No, I don't think it is an unreasonable goal to attempt to collect one of every synthesizer ever made. What do you think I am going to do in retirement? I am going to open a museum and let the kids in to play them!"

Sam would like to thank all of the students who gladly served as test subjects

for this book and Mr. Vinny Millevolte who kindly shared his insights, ideas, and knowledge and reviewed this and other books to insure the highest level of technical accuracy throughout.

While *Basic Music Technology II* is Sam's third book, he has many others in the works. Look for his book on synthesis techniques coming soon! You can learn more about Sam Ecoff and take a virtual tour of Secret Society Productions on line at <http://www.execpc.com/~secoff>.

