

Desktop Music Handbook



Glossary of MIDI and Digital Audio Terms

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ACTIVE SENSING - a method by which a MIDI device detects disconnection. A message is sent to the receiver around three times per second, and if no message is received during this period, the unit assumes the MIDI connection has been broken. It then begins a routine to reestablish normal operation.

ADDITIVE SYNTHESIS - a synthesis method that builds complex waveforms by combining sine waves whose frequencies and amplitudes are independently variable.

ADSR - Attack, Decay, Sustain and Release are the four stages of an envelope that describe the shape of a sound over time. Attack represents the time the sound takes to rise from an initial value of zero to its maximum level. Decay is the time for the initial falling off to the sustain level. Sustain is the time during which it remains at this level. Release is the time it takes to move from the sustain to its final level. Release typically begins when a note is let up. In most sound generators, the time and the value reached are programmable.

AFTER TOUCH - a measurement of the force applied by a performer to the key on a controller after it has been depressed. Either polyphonic, which measures the pressure on each individual key, or monophonic, reflecting the total pressure on all keys.

AIFF - the standard file format for storing audio information on an Apple Macintosh computer.

ALGORITHM - a set of instructions supplied to a computer for the purpose of solving a problem.

ALL NOTES OFF - a three byte MIDI channel message that instructs the receiving device to terminate all notes currently sounding.

ALIASING (FOLD-OVER) - "false frequencies" that are created when sampling frequencies greater than one-half the sampling rate.

AMPLIFIER - a device that increases the amplitude, power or current of a signal. The resulting signal is a reproduction of the input signal as well as this increase.

AMPLITUDE - the strength or magnitude of any changing quantity when compared to its 'at rest' or 'zero' value.

ANALOG - information which is continuously variable in nature.

ANALOG SYNTHESIS - a method of sound synthesis that relies on predefined waveforms to create sounds that vary over time. The amplitude, frequency and harmonic content of these waveforms can be manipulated to produce a vast number of different results.

ARPEGGIATE - to play the notes of a chord in succession rather than simultaneously.

ATTACK - the initial stage of an envelope. Refers to the time from the beginning of the sound to its highest or maximum level.

BANK - a storage location in a sampler or synthesizer that typically holds a large number of individual program (sounds).

BINARY NUMBERS - a numbering system based on 2 in which 0 and 1 are the only available digits.

BITS (BYTES) - a binary digit. Mode of information used by a computer to store numbers. One bit equals a 'one' or a 'zero'. Usually 8 bits equals one byte, however, MIDI uses a 10 bit-byte that includes a start bit, the 8-bit data message, and a stop bit.

BUFFER - an area of RAM used to temporarily store data.

CENTRAL PROCESSING UNIT (CPU) - a silicon chip that performs calculations and acts as the brain of a computer.

CHANNELS - one of 16 different data paths that are available to carry messages in MIDI.

CHANNEL MESSAGE - a type of MIDI message that carries specific channel information.

CHORUSING - a doubling effect commonly found on a synthesizer or sampler that makes a single sound appear to sound like an entire ensemble. The initial signal is split and appears at a slightly altered pitch from the original, or at a slightly later point in time. This time and pitch level are often controllable by a low frequency oscillator (LFO).

CONTINUOUS CONTROLLER - a type of MIDI message that is generated by the movement of a continuous control.

CONTROLLERS - various sliders, levers, knobs, or wheels typically found on a MIDI controller. Used to send continuous (as opposed to discrete) data to control some aspect of a sound.

DECIBEL - a decibel (or dB) is 1/10th of a bel, which is a relative measure of two sounds.

DC (DIRECT CURRENT) - an electrical current that flows in one direction.

DECAY - one of the four basic stages of an envelope. Refers to the time the sound takes to settle into its sustain level.

DEFAULT - the "normal" or "startup" state of a hardware device or software application.

DELAY - a common effect in a sampler or synthesizer that mimics the time difference between the arrival of a direct sound and the first reflection to reach the listener's ears.

DIGITAL AUDIO - the numeric representation of sound. Typically used as the means for storing sound information in a computer or sampler.

DIGITAL SYNTHESIS - the use of numbers to create sounds. Method most often used in today's synthesizers for generating sounds, as compared to analog method employed previously.

DIN PLUG - a five-pin connector used by MIDI equipment.

DISTORTION - a process, often found desirable by guitar players, that alters a sound's waveform.

DRUM MACHINE - an electronic device, usually controllable via MIDI commands, that contains samples of acoustic drum sounds. Used to create percussion parts and patterns.

DSP - digital signal processing. Processes used to alter sound in its digital form.

DYNAMICS - the relative loudness or softness of a piece of music.

ECHO - the repetition of a sound delayed in time by at least 50 milliseconds after the original. An effect often found in synthesizers and samplers.

ENVELOPE - changes in a sound over time, including alterations in a sound's amplitude, frequency and timbre.

ENVELOPE GENERATOR - a device or process in a synthesizer or other sound generator that creates a time varying signal used to control some aspect of the sound.

ERROR CORRECTION - a procedure found in digital audio systems that detects and corrects inaccurate or missing bits in the data stream.

EQUALIZATION (EQ) - boosting or cutting various frequencies in the spectrum of a sound.

FADE IN/OUT - a feature of most audio editing software that allows the user to apply a gradual amplitude increase or decrease over some segment of the sound.

FADER - also known as a slider or attenuator, this control allows the user to perform a gradual change to the amplitude of a signal. Commonly found as a feature of MIDI software programs.

FILTER - a circuit which permits certain frequencies to pass easily while inhibiting or preventing others. Typical filters include low pass, high pass, band pass, and band reject.

FLANGE - an effect applied to a sound wherein a delayed version of the sound is mixed with the original.

FM SYNTHESIS - a synthesis method that involves the interaction of a signal (carrier) by another (modulator).

FREQUENCY - the rate per second at which an oscillating body vibrates. Usually measured in Hertz (Hz), humans can hear sounds whose frequencies are in the range 20 Hz to 20kHz.

FUNDAMENTAL FREQUENCY - the predominant frequency in a complex waveform. Typically provides the sound with its strongest pitch reference.

GRAPHIC EQUALIZER - a device type that applies a series of bandpass filters to a sound, each of which works on a certain range of the spectrum. The frequencies that fall within the range, typically one-third octave, can be boosted or cut.

HARMONIC - a sine wave component of a complex sound whose frequency is a whole number multiple of the fundamental frequency.

HARMONIC SERIES - also known as the "overtone" series, this is the series of frequencies in a sound that are whole number multiples of the fundamental.

HERTZ - a measurement used to represent the number of times per second a waveform repeats its pattern of motion (cycle).

KEYBOARD SPLIT- a setup of a keyboard where different notes trigger different sounds. Also known as zoning.

LCD - Liquid Crystal Display. A small screen found on electronic instruments that displays data.

LFO - a low frequency oscillator that is used to alter a sound's frequency or amplitude.

LIBRARIAN - a category of MIDI software that is used to organize and store a MIDI device's patch (program) data.

LOCAL ON/OFF - a three byte channel message that determines the status of the Local On function of a MIDI device. LOCAL ON allows the instrument to produce sounds from incoming MIDI data and its own keyboard. LOCAL OFF states that only external MIDI data is responded to.

LOOP - to repeat a sequencer pattern or portion of an audio sample repeatedly. The point to which the program returns, whether the beginning or some other point, is usually definable by the user.

METRONOME - a device or software function that produces a discrete pulse. Used to synchronize music with a specific tempo.

MIDI - the Musical Instrument Digital Interface. An international standard for communication between a musical instrument and a computer.

MIDI CLOCK - a system real time message that enables the synchronization of different MIDI devices. The standard rate is 24 divisions per beat.

MIDI INTERFACE - a device that adds a MIDI In, Out and sometimes Thru port to a desktop computer.

MIDI MERGE - used to combine MIDI data from various sources into a single source.

MIDI MESSAGE - the different packets of data that form a MIDI transmission.

MIDI PATCHER - a device that allows the routing of one or more MIDI signals to various MIDI devices. Typically reconfigurable to allow for different routings of the data.

MIDI PORTS - the three connectors that pass MIDI data into (MIDI IN), out of (MIDI OUT) and through (MIDI THRU) a MIDI device.

MIDI TIME CODE (MTC) - a timing system used as a universal reference for all the devices in a MIDI network. Represents the information contained in a SMPTE signal using MIDI messages.

MIXER - a recording device that allows several different audio sources to be combined. Provides independent control over each signal's loudness and stereo position.

MODULATION WHEEL - one of several common continuous controls on a MIDI device. Often used to add a vibrato effect to a sound.

MONOPHONIC - the ability to play only one note at once. A characteristic of some older synthesizers.

MULTITIMBRAL - having the ability to produce many different musical timbres (sounds) at once.

MULTITRACK - in traditional recording technology, the ability to layer multiple different audio signals at once. In MIDI software, the ability to layer numerous MIDI data streams.

NOTE ON COMMANDS - a channel voice message that indicates a note is to begin sounding. Contains two additional data bytes: Note number and Note velocity.

NYQUIST FREQUENCY - the highest frequency that any given digital audio system can capture. Defined as one half the sampling rate of that system.

OCTAVE - a frequency ratio of 2:1. A musical distance (interval) of 12 semitones.

OSCILLATOR - an electronic device capable of generating a recurring waveform, or a digital process used by a synthesizer to generate the same..

OVERDUB - the ability to record one sound on top of another.

PATCH CORD - an audio cable used to connect the output of a device to an amplifier or mixer.

PAN - to move a signal from the left to the right of a stereo field, or vice versa.

PARAMETERS - characteristic elements of a sound that are usually programmable in a synthesizer or other MIDI device.

PARTIAL - a sine wave component of a complex sound.

PATCH EDITOR - a category of MIDI software used to control the sound characteristics of a synthesizer from a computer.

PATCHES - also variously known as programs, timbres, or voices. The name used for the sounds that can be generated by a MIDI device.

PERIOD - the time required for one cycle in a periodic waveform. Period is the inverse of frequency.

PHASE - the relative position of a wave to some reference point.

PITCH - a continuous frequency over time.

PITCH BEND - a MIDI controller that can vary the pitch of a sound.

POLYPHONIC - the ability to play many different notes at once.

POTENTIOMETER (POT) - a variable resistor used to alter voltage.

PRESETS - typically, the sounds permanently stored by the manufacturer in a sound generating device.

PROGRAMS (SEE PATCHES)

PROGRAM CHANGE MESSAGE - a two byte MIDI message used to request that a synthesizer change the currently loaded program.

PUNCH IN/OUT - the ability to start and stop a recording at some point other than the beginning.

QUANTIZATION - rounding or truncating a value to the nearest reference value. In a sequencer, used to adjust recorded material so it will be performed precisely on a selected division of the beat. In digital audio, the range of numbers used for specifying amplitude levels of a recorded signal. (16 bit quantization = 65,536 values; 8-bit = 256, etc.)

RAM - random access memory. The temporary storage area of a computer or sampler.

REAL TIME - a recording or realization of a sound processing procedure as it occurs. (see Step Time).

RECEPTION MODE - one of four basic configurations used by a synthesizer that determines how it will respond to incoming data.

ROM - read only memory. Permanent memory in a computer or MIDI device.

SAMPLER - an electronic device that can record, alter and playback digital audio data under the control of a MIDI data stream.

SAMPLING - digitizing a waveform by measuring its amplitude fluctuations at some precisely timed intervals. The accuracy of the measurements is a function of the bit resolution.

SAMPLING RATE - the rate at which samples of a waveform are made. Must be twice the highest frequency one wishes to capture. Commercial compact discs use a rate of 44,100 samples per second.

SEQUENCER - MIDI software or less commonly, a hardware device that can record, edit and playback a sequence of MIDI data.

SINE WAVE - the most basic waveform, consisting of a single partial. Forms the basis of all complex, periodic sounds.

SMPTE TIME CODE - a timing standard adopted by the Society of Motion Picture and Television Engineers for controlling different audio and video devices. Allows a sequencer and an external device such as a tape recorder to stay synchronized.

STEP TIME - entering notes one by one, as opposed to real time recording in a sequencer.

SONG POSITION POINTER (SPP) - a system-common message that specifies where in a sequencer a device should begin to play.

STANDARD MIDI FILE - a standardized form of data used for exchanging MIDI files between programs.

STATUS BYTE - the first byte of a MIDI message that specifies what type of message it is.

SUSTAIN PEDAL - a pedal on a MIDI controller (or acoustic piano) that keeps all notes sounding even a key is released.

SYSTEM COMMON MESSAGES - MIDI messages used for various functions including tuning an instrument and song selection.

SYSTEM EXCLUSIVE MESSAGE - MIDI message used to communicate with a device made by a specific manufacturer.

SYSTEM REAL TIME MESSAGES - commands used to synchronize one MIDI device with another.

TEMPO - the rate of speed at which a musical composition proceeds. Usually uses a quarter note as the timing reference.

TIMBRE - the property of a sound that distinguishes it from all other. Tone color.

TREMOLO -a rapid alternation of two tones. Usually a third apart. On a synthesizer, this effect can usually be controlled by the modulation wheel or modulation amount.

VELOCITY - a measure of the speed with which a key on a controller is pressed. Used to determine volume characteristics of note.

WAVEFORM - the graphical display of a sound pressure wave over time.

WAVETABLE - a storage location that contains data used to generate waveforms digitally.